Biodiversity Offsetting to compensate for nightingale habitat loss at Lodge Hill, Kent

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Environment Bank Ltd.
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Biodiversity Offsetting to compensate for nightingale habitat loss at Lodge Hill, Kent

1 Introduction and context

Introduction

This report is part of a suite of reports and information that is being submitted to a stakeholder workshop to consider the potential for biodiversity offsetting to compensate for habitat loss at Lodge Hill. This report builds on (and specifically in the calculations of how much offsetting might be required, supersedes) the first 'scoping' report compiled by The Environment Bank, which was submitted to and considered by a technical workshop of experts held on 25 September 2012. That report was based on best available knowledge at that time, and considered the compensatory proposals put forward at that time, but then needed to make a range of assumptions, or without assumptions provide a range of areas, on what offsetting might be necessary. Nevertheless, that scoping report concluded that offsetting was technically feasible at Lodge Hill and the technical workshop then considered that conclusion.

This report incorporates, where relevant, the main conclusions of that technical workshop, the output of an associated British Trust for Ornithology report commissioned to consider ornithological issues, and a site visit to Lodge Hill to assess habitat condition. In particular (further details are explained below and in the main appendix) this report:

- considers **all** of the semi-natural habitat at Lodge Hill on the basis that the site is likely to be abandoned by nightingales
- considers the BTO recommendation that 300-400 ha of offset habitat are required
- takes account of the fact that the site visit determined that habitats at Lodge Hill were broadly in good condition for nightingales.

Consequently, this report produces a refined set of recommendations for the amount of habitat that would be needed to compensate for the loss of Lodge Hill if biodiversity offsetting were to proceed using the Defra habitat-based protocol and metrics.

Context

The Lodge Hill planning application is a complex matter requiring a wide range of considerations to be made by the planning authority. Environmental concerns are one of these, and whilst this covers many different species and habitats, there has been a particular focus on one species in particular, the nightingale *Luscinia megarhyncos*.

It has been known for many years that the Lodge Hill site was used by nightingales, a species that has declined considerably in Britain over the past 60 years. The developer has accepted that habitats used by nightingales would be lost as a result of the development, and has proposed strategies to compensate for the loss of suitable nightingale habitats by creating off-site compensatory habitat - these proposals have been under consideration.

In 2012, a new national survey of nightingales suggested that the site holds many more birds than was previously thought (and also meant that the site is now being

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considered for notification by Natural England as a Site of Special Scientific Interest, although this issue is not considered further here). At the same time, 'biodiversity offsetting' was announced as a Government Policy in the Natural Environment White Paper, with an accompanying framework of national metrics to quantify how much habitat offsetting is necessary to ensure 'no net loss' of biodiversity.

2 Analysis of impact and offsetting needed

BTO estimation of offset required

The BTO report was welcomed by the technical workshop and is publicly available. In summary, the BTO estimated that the habitat lost to the development would cause the probable loss of 64-65 nightingale territories, and that given the uncertainties of effects of pressures associated with the development, that even more territories could be lost. The BTO report proposed, cautiously and with significant caveats on the uncertainties of habitat creation, that between **300-400 ha** of habitat creation – of the right sort, of the right quality, of the right size, with the right management, and in the right place - would need to be created off-site to provide adequate compensatory habitats for displaced birds. The BTO report (and the technical workshop) also went on to consider what sort of habitat criteria might be used to define what was 'right' for the nightingales.

The BTO recommendation is based on expert ornithological opinion of what habitat would be lost to nightingales and how much would need to be created to provide replacement habitat. Although it seeks to answer the same question, it is entirely different to the offsetting methodology using the Defra habitat-based metrics that the Environment Bank use in the rest of this report.

The technical workshop of 25 September (below) welcomed the BTO report and there was broad consensus that the area of habitat proposed (stressing all the caveats) seemed about right. A number of workshop attendees indicated their preference for expert opinion over the habitat-based offset calculations, although it was agreed to continue to run both in parallel. The results from the two methods are compared in section 3 below.

Technical workshop

The technical workshop was convened by Medway Council and comprised a range of national and local organisations with technical expertise in, or knowledge of, the site or nightingales or biodiversity offsetting. The workshop concluded, *inter alia* (see workshop report for further details), that:

- there are a range of habitat criteria that can usefully guide habitat creation/restoration schemes but also many uncertainties relating to habitat creation;
- offsetting could work in principle for nightingales in Kent – it is technically feasible but it is neither straightforward nor guaranteed;
- that, given the development schedule presented, some temporary reduction in habitat availability was unavoidable;
- the biodiversity offsetting strategy for nightingales should be inclusive of all semi-natural habitats present at the site.

In terms of the offset calculations that follow below and are detailed in Appendix 2, the final point on the 'loss' (to the nightingales) of all the semi-natural habitats at Lodge Hill is important. Based on ornithological expert opinion and evidence available, we will now assume that all of the habitat within the Lodge Hill site will be lost to nightingales

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as a consequence of the development. Consequently, in this report the metrics are applied to the entire Lodge Hill site with the exception of some 'technotopes' (areas of hard-standing and buildings) and compared to the original scoping report, many more habitats (and larger areas) are included in the analysis.

Applying Defra metrics to estimate compensatory requirements

Full metric analysis for offsetting requires site visits to assess habitat loss and condition, and takes several weeks. Furthermore, the metric is designed for habitats rather than species, therefore to assess the habitat condition for an estimate of compensatory habitat requirements has required the generation of nightingale-specific criteria and independent ornithological expertise. In the limited time available, nightingale-specific criteria were developed and a site visit was undertaken in which the criteria were applied to habitats present. The habitat phase 1 mapping was reviewed (as proposed at the technical workshop), so as to account for changes in habitats since the original survey was carried out in 2008 (the Thomson Ecology report with revised habitat phase 1 survey information is attached at Appendix 1).

The updated habitat classification and additional habitat condition information allows for the estimates for compensatory habitat requirement set out in the previous 'scoping' report to be refined and assumptions of condition to be withdrawn. The national Defra metrics are applied to the entirety of the Lodge Hill site as it is likely that all nightingale territories within the site will be lost through development, and indirect impacts to the adjacent Chattenden Woods SSSI are also assessed. The metric approach is applied:

- with the assumption of habitat loss of the entire site due to the development and subsequent disturbance and pressures, as agreed by the stakeholders;
- using the complete data set on the location and numbers of breeding nightingales to determine the condition of habitats – in this case we have used data from nightingale surveys from 2009, 2010 and 2012 to give complete coverage of all habitat used by the birds (these data are set out in Figure 1 and were kindly provided by Thomson Ecology);
- considering further that the development would indirectly impact the site to such an extent that even the habitat retained on the site would be lost to the nightingales – in effect, the total abandonment of the development site by the nightingales. Therefore, proposed habitat retention and onsite habitat creation is not factored into the metric calculations.

Application of the Defra metrics is sensitive to the type and condition of the habitat being lost, the type and condition of the habitat being created off-site in compensation, and the timeframe of the compensation delivery. Differences in habitat type and condition uplift provided by the conservation works, and the length of project and spatial context can make a big difference to the amount of offsetting required. In the absence of a detailed assessment of the offset site or sites, and management plans of habitat creation or restoration works off-site, it is not possible to limit all of these variables. In the interest of comprehension therefore, the following assumptions in the application of the metrics have been made:

- the target condition of any habitat being created off-site would only be 'moderate' – although in some cases habitat created and managed for the species could be 'good';
- the compensation strategy for any habitat being created or restored off-site is a minimum of 25 years in duration;

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- the off-site receptor areas will contribute to existing ecological networks by helping to establish larger, better managed and greater interconnectivity between green spaces.

Finally, the offsetting metrics allow for compensation either by creating habitat or by restoring existing habitat. Usually, the area of habitat required under habitat restoration schemes is smaller than under habitat creation schemes because the risks of delivery (and therefore the multipliers used to calculate areas needed) are reduced.

So, we have calculated the area of offset needed for both habitat restoration and habitat creation options as well as combinations of these. The full offsetting report, demonstrating the calculation of the metrics, is attached at Appendix 2. The results for all offsetting strategy scenarios are set out in Table 1 below.

Results of applying Defra metrics

The results of applying the Defra metrics are set out in the summary table below. A site visit was undertaken in October 2012 (EBL & BTO) to assess habitat condition for all habitat blocks at the site allowing for an enhanced metric application. The condition assessment determined that 66% of the habitat blocks were in 'good' condition, 25% in 'moderate' condition and 27% in 'poor' condition. In this scenario the nightingales completely abandon the site as it is predicted that the development will cause the loss of all nightingale territories present at the site, and the consequent habitat loss suffered by the birds is much greater than considered previously; in this case, one would need to restore 375 hectares of habitat, or create 658 hectares. The offset requirement is likely to be c. 450-500 hectares if a combination of creation and restoration options are used.

Table 1 – showing the areas of habitat creation or restoration that would be required for each habitat type (area data provided by Thomson Ecology)

Assumptions:

- all on-site mitigation (both retention and creation) does not contribute towards providing suitable nightingale habitat
- target condition of any future off-site habitat creation is limited to a maximum increase of two categories
- Minimum 20 years compensatory strategy

Habitat	Area (ha)	Credit Requirement	Restoration (ha)	Creation (ha)
Semi-natural broadleaved woodland	82.8	1326.3	160.96	338.35
Plantation broadleaved woodland	17.6	281.1	34.11	71.71
Scattered broadleaved trees	0.35	5.4	0.65	1.37
Scattered mixed woodland	0.08	1.4	0.17	0.37
Hedges	455m	455m	-	455m
Dense scrub	29.3	304.3	45.62	63.93
Dense scrub mosaic	6	72.5	10.86	15.22
Scattered scrub	0.5	6.1	0.91	1.28

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Improved grassland	35.7	81.6	14.29	11.43
Semi-improved grassland	38.9	157.4	22.05	33.08
Semi-improved grassland mosaic	12.2	111.7	15.64	23.46
Coarse grassland	18.5	74.1	10.38	15.58
Coarse grassland mosaic	24	271.3	37.99	56.99
Standing water	1	14.9	1.79	1.79
Tall ruderal vegetation	1.2	5.0	0.88	1.51
Tall ruderal mosaic	3.3	34.2	6.0	10.28
Ephemeral/short perennial vegetation	0.2	0.7	0.13	0.1
Ephemeral/short perennial mosaic	0.01	0.06	0.06	0.01
Amenity grassland	7.3	44.5	7.80	6.24
Amenity grassland mosaic	0.3	5.9	1.04	0.83
Introduced shrub	0.02	0.02	0.004	0.003
Bare ground	1	6.1	1.07	1.84
Bare ground mosaic	0.7	3.9	0.68	1.17
Arable	3.1	12.5	2.19	1.75
Hardstanding	37.6	0	n/a	n/a
Buildings	2.8	0	n/a	n/a
Total	324.4	2821.2*	375.25*	658.28*

*Not inclusive of hedge requirement

Potential for habitat management to deliver offsetting

Work to identify potential habitat creation sites within the area has been done by the 'Greening the Gateway' project. Using nightingale-specific criteria based on information provided by the BTO report, a GIS-based search to identify suitable areas for locating compensatory sites in Kent has been carried out. The GIS-based analysis mapped wet geology, ancient and deciduous woodland along with altitude contours below 40 m. In the limited time available, a total of 12 possible nightingale habitat creation areas were identified, of which 4 (Abbey Farm was excluded due to insufficient area) were assessed as potentially suitable (green colour code in legend - see map in Figure 2). The work located potentially suitable areas and analysed suitability based on:

- size – a minimum requirement of 50 ha for sites was suggested in the technical workshop and has been adopted here;
- proximity to existing nightingale habitat – this aspect may require revision as mapped BTO Nightingale Survey 2012 data is not yet available for Kent;
- potential for scrub conversion or restoration – determined by a preliminary site visit undertaken by EBL and BTO as scrub habitat maps are not available;

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- proximity to developed areas – a minimum distance of 500 m was considered to be conservative and appropriate;
- surrounding land use – eliminating sites adjacent to areas potentially earmarked for development;
- ownership details and willingness, where possible.

We recommend the site search now be extended to provide additional potential sites and establish site areas to determine whether an offsetting strategy in Kent would be deliverable. Additional potential sites would be helpful as landowner willingness, contribution to ecological networks and whether the sites would be appropriate (subject to soil tests and independent habitat creation/restoration expert assessment) for habitat creation and restoration are yet to be determined and these stages may further limit the options. The GGKM report is attached at Appendix 3 (interactive pdf map is attached as a separate file). This search is at a preliminary stage and an offsetting strategy could only be definitively recommended once compensatory sites have been identified and suitability confirmed.

3 Conclusion

We conclude that:

- habitat offsetting for nightingales is an appropriate compensatory mechanism to ensure no net loss of biodiversity and is technically feasible in Kent, although there are significant uncertainties in calculating how much is necessary, and in delivering a 'good' offsetting strategy (in particular, there is an issue of a unavoidable temporary loss of habitat which is not the subject of this report);
- in the time and with the information available, it is not possible to be precise on the area of offset land that would be needed, but there are now two estimates using two different methodologies
    - the consensus of expert opinion is that 300 – 400 ha is necessary, but with significant caveats on the assumption that this is 'good' habitat (i.e. without any risk management);
    - employing the Defra habitat metrics (which try to account for delivery risk) yields estimates of c.650 ha of habitat creation **or** c.375 ha of habitat restoration; the precise area would depend on the kind of compensatory habitats available, but a combination approach of restoration (75%) and creation (25%) be applied would suggest 450 – 500 ha;
- the precise potential for habitat creation or restoration is unknown at this stage, but other studies suggest there are enough suitable areas to adequately create or restore nightingale habitat;
- an offsetting strategy could not definitively be recommended to proceed until the potential for habitat creation and restoration in Kent was established and suitability of sites confirmed.

Thus, we conclude that restoring or creating c.500ha of nightingale habitat would compensate for the loss of Lodge Hill nightingale habitat and that initial research suggests this is technically feasible within Kent.

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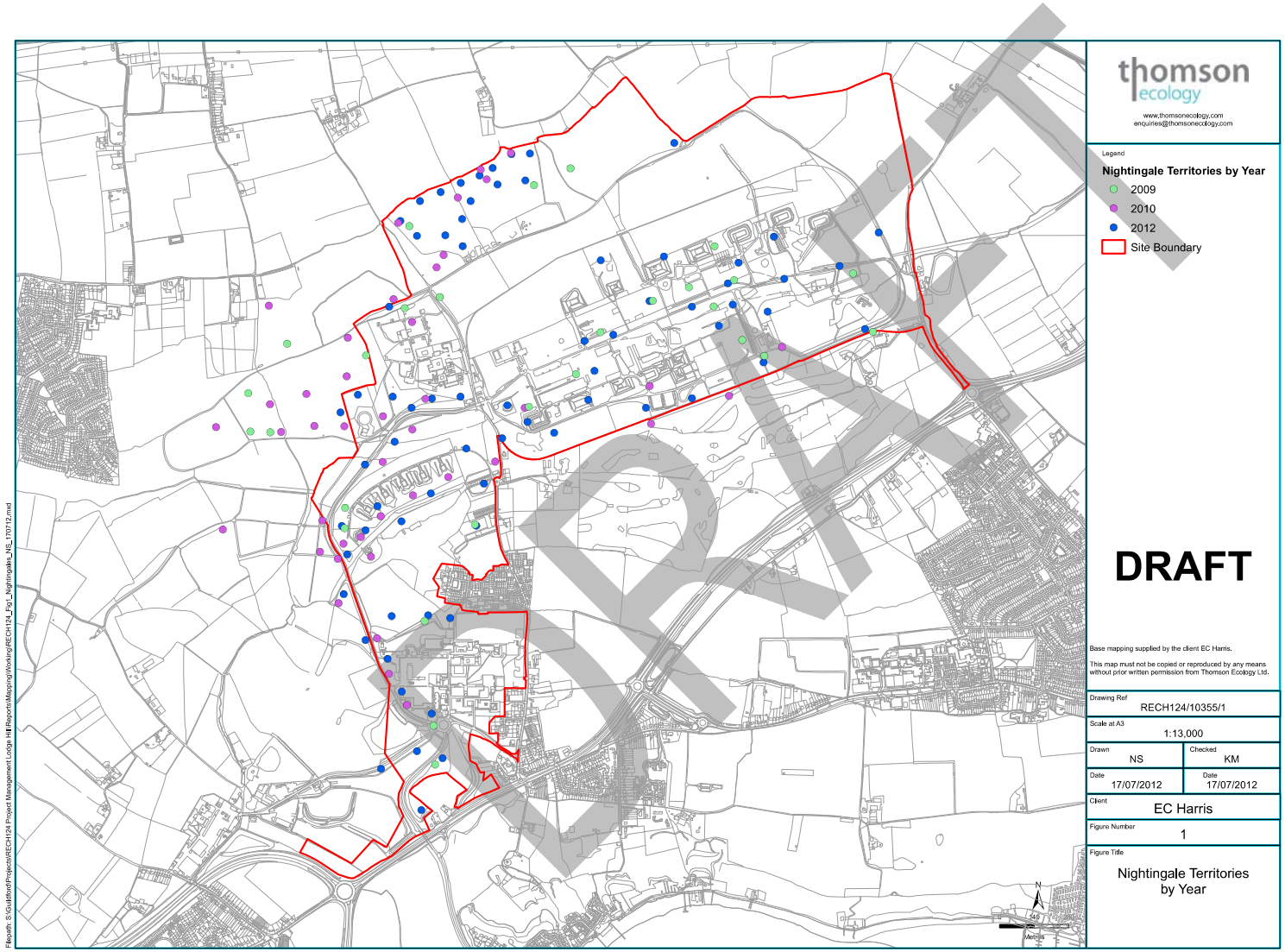
Figure 1 Nightingale territories at Lodge Hill for three years 2009-2012.



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Legend

Nightingale Territories by Year

- 2009
- 2010
- 2012
- Site Boundary

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Base mapping supplied by the client EC Harris.

This map must not be copied or reproduced by any means without prior written permission from Thomson Ecology Ltd.

Drawing Ref	RECH124/10355/1
Scale at A3	1:13,000
Drawn: NS	Checked: KM
Date: 17/07/2012	Date: 17/07/2012
Client	EC Harris
Figure Number	1
Figure Title	Nightingale Territories by Year

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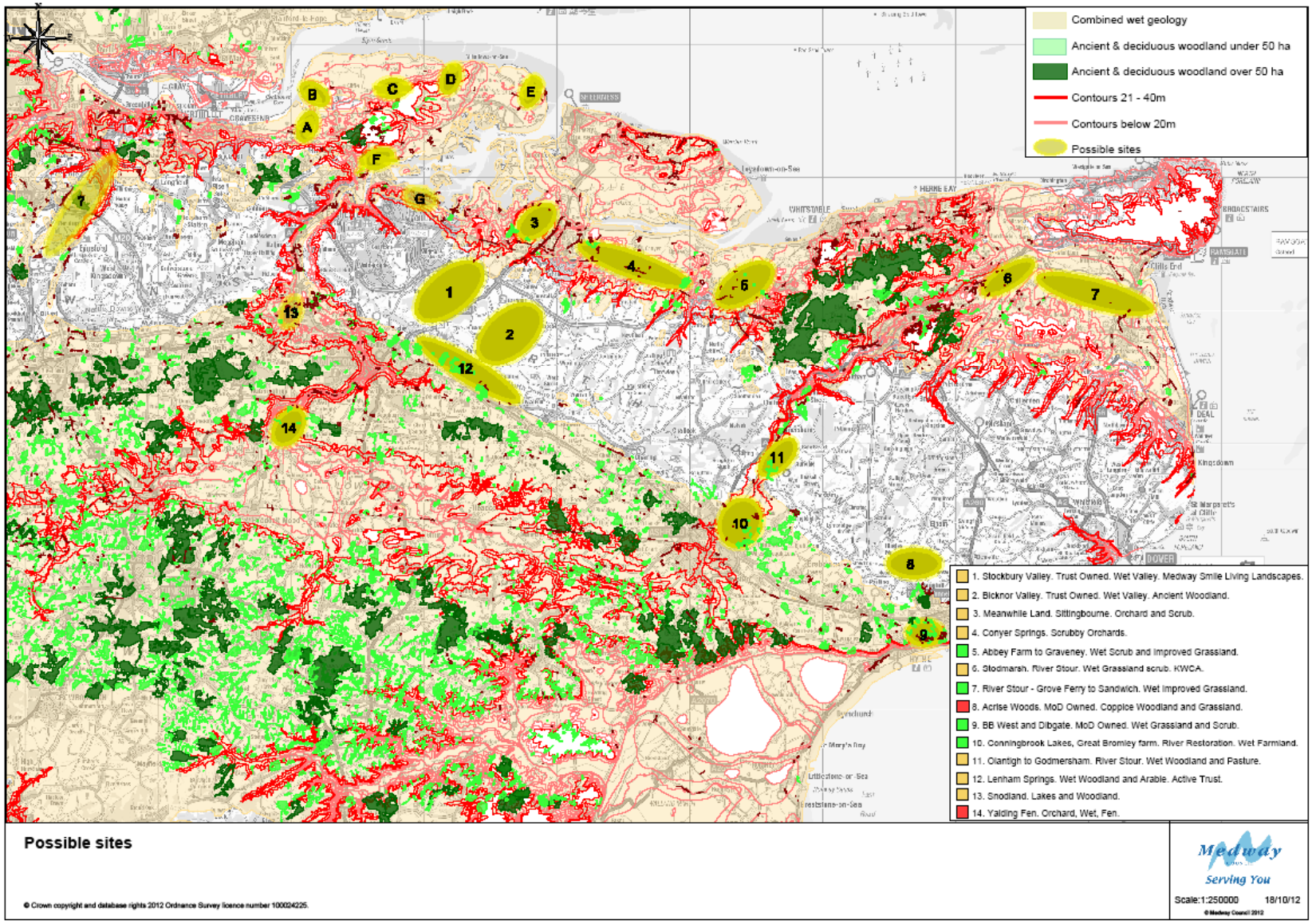
Figure 2. Location of possible opportunity sites in Kent: The map below shows the locations of the 11 Nightingale habitat creation opportunity sites. Map provided by GGKM.



Appendix 1

Thomson Ecology: Revised Phase 1 Habitat Survey 2012

(To follow)

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Appendix 2

Biodiversity Offsetting Analysis of Lodge Hill, Kent

1 Introduction

1.1 General Introduction

This report has been prepared for Medway Council by The Environment Bank Ltd (EBL). Biodiversity offsetting has been introduced as a policy in the government's Natural Environment White Paper. This report presents an analysis of the biodiversity offsetting requirement, through the purchase of Conservation Credits, for impacts on habitats in relation to nightingale habitat by the proposed development at Lodge Hill, Kent. This analysis is based on existing ecological knowledge including a site visit undertaken in October 2012 by EBL, the British Trust for Ornithology (BTO) and Thomson Ecology.

1.2 Location and Description of Site

The site, an area of 320ha (grid reference TQ761736), comprises the former Chattenden Barracks (now demolished) located north of the village of Chattenden, part of the Chattenden Training Area, Lodge Hill Camp and Lodge Hill Training Area.

The site supports broadleaved woodland, plantation broadleaved woodland, scattered trees, dense scrub, scattered scrub, poor semi-improved grassland, improved grassland, coarse grassland, standing water, amenity grassland, ephemeral short perennial vegetation, introduced shrub, species-poor hedgerows, buildings, bare ground and hard standing. Several UK BAP Priority habitats occur on the site including Wet Woodland, Lowland Mixed Deciduous Woodland, Hedgerows, Ponds, Lowland Meadow, and Purple Moor-grass and Rush Pasture. Mixed Deciduous Woodlands, Lowland Meadows, Standing Open Water and Wet Woodlands are also Kent BAP Priority habitats.

Approximately 35ha of Chattenden Woods SSSI, of national importance, occur within the site, together with areas of ancient woodland, including Round Top Wood, Deansgate Wood, Wybornes Wood and Lodge Hill Wood considered of County value.

Species of conservation importance including scarce plants, scarce/notable invertebrates, great crested newts, slow worms, grass snakes, adders, common lizards, nightingale, bullfinch, house sparrow, skylark, song thrush, dunnock, swallow and water voles were recorded.

1.3 Background and other work to date

Redevelopment of the site is expected to deliver 5000 homes, employment and retail facilities, schools, health centres, sports areas and open space. Areas of Chattenden Woods SSSI that occur within the site and all areas of ancient woodland, including Round Top Wood, Deansgate Wood, Wybornes Wood and Lodge Hill Wood will be retained in any future development proposals. The proposals described above are hereafter referred to as "the proposed development".

An EIA Scoping Report produced by Hyder Consulting in September 2008 for the Chattenden and Lodge Hill proposed development included considerations with regards to the potential and significance of effects of the proposed development on ecological resources and designated sites. A Desk Study and Extended Phase 1 Habitat Survey

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Report was produced by Thomson Ecology in October 2011. This report provided a preliminary ecological assessment of the site and was submitted as a technical appendix for the ecology chapter of the Environmental Statement for the development proposals. EBL, BTO and Thomson Ecology visited the site in October 2012 to assess the condition of the habitats present and update the Habitat Phase 1 Survey undertaken by Thomson Ecology in October 2008. These surveys together with the original Thomson Ecology report have provided the ecological basis for the metric calculations reported here.

A key issue, currently being considered by Natural England, is that the nightingale population of the current Chattenden Woods SSSI and adjacent Lodge Hill site comprises more than 1% of the British population and is therefore of special scientific interest and eligible for protection through SSSI designation. In October 2012 Natural England chose not to notify the site but it is understood that the BTO are currently analysing the 2012 National Nightingale Survey results to provide an accurate estimation of the national population and, therefore, the relative importance of the Lodge Hill site. The SSSI designation process is outwith the scope of this report.

Nightingales breed in a wide range of lowland habitats but tend to require deciduous woodland and a dense understory of scrub. Nightingales are found throughout the proposed development site and the Chattenden Woods SSSI. Nightingales currently form part of the woodland breeding bird assemblage feature of the SSSI, but are now breeding across the SSSI and the surrounding area. A comprehensive nightingale survey in, and around, the proposed strategic allocation site was conducted by the BTO as part of the National Nightingale Survey 2012. The survey identified the following number of nightingale territories:

Table 1.1. BTO National Nightingale Survey 2012 results for the site and environs.

Survey Area	BTO National Nightingale Survey 2012
Lodge Hill area, including the proposed Lodge Hill strategic allocation site, Chattenden Woods SSSI and areas bordering the SSSI	84
Chattenden Woods SSSI	27*
Areas bordering with the Chattenden Woods SSSI and the proposed Lodge Hill Strategic Allocation Site	6
Proposed Lodge Hill Strategic Allocation Site	**69***
Area of Chattenden Woods SSSI which falls within the proposed Lodge Hill Strategic Allocation Site	16
Within the Lodge Hill Strategic Allocation Site and outside of the area of the Chattenden Woods SSSI which falls within the Strategic Allocation Site	53*

*This number includes 2 territories which straddle the border of the Chattenden Woods SSI and the Lodge Hill Strategic Allocation Site.

The Nightingale's ecological requirements are provided in a range of habitat types within Britain. These include: various types of scrub, including those found on heathland and chalk downland; coniferous, mixed and broad-leaf woodland, including active coppice (especially with a low to medium density of standard trees) and woodland edges, glades and rides; carr; new and young plantations; thick hedgerows with and without trees.

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To compensate for impacts to and achieve no net loss of suitable habitat for breeding nightingales, biodiversity offsetting is being considered. EBL was previously commissioned by Medway Council to undertake an analysis of the impacts to woodland and scrub habitats in the proposed development area, with and to consider the potential for a biodiversity offsetting approach. This report was submitted in August 2012. Following the submission of the scoping analysis, and of a BTO report (BTO 2012) examining ornithological issues in more detail, a technical workshop regarding the suitability of a biodiversity offsetting strategy to compensate for loss of nightingale habitat was held in September 2012.

The technical workshop concluded, *inter alia* (see workshop report for further details), that:

- there are a range of habitat criteria that can usefully guide habitat creation/restoration schemes but also many uncertainties relating to habitat creation;
- offsetting could work in principle for nightingales in Kent – it is technically feasible but it is neither straightforward nor guaranteed;
- that, given the development schedule presented, some temporary reduction in habitat availability was unavoidable;
- the biodiversity offsetting strategy for nightingales should be inclusive of all semi-natural habitats present at the site.

In terms of the offset calculations of impact that follow, the final bullet on the 'loss' (to the nightingales) of all the semi-natural habitats at Lodge Hill is important. Based on ornithological expert opinion and evidence available, we will now assume that all of the habitat within the Lodge Hill site will be lost to nightingales as a consequence of the development. The loss of suitable nightingale habitat will result from the loss of habitats comprising territories and habitats forming part of wider home ranges, fragmentation and reduction in quality of habitats retained on site, a reduction in social attraction and on completion of the development the increase in disturbance and cat predation linked to developed areas (BTO 2012).

Consequently, in this report the metrics are applied to the entire Lodge Hill site with the exception of some 'technotopes' (areas of hard-standing and buildings) and compared to the original scoping report, many more habitats (and larger areas) are included in the analysis.

Prior ecological assessments undertaken, details of generated criteria and condition assessment survey, and impact assessments (in biodiversity units) and offset options are presented below.

1.4 Objectives of Report

This report provides a provisional biodiversity offsetting analysis to determine compensatory habitat requirements for the predicted loss or degradation of suitable nightingale habitats at the Lodge Hill site, including Rough Shaw and Lodge Hill Wood (areas of Chattenden Woods SSSI which lie within the site boundary) as a result of the proposed development. This includes a review of ecological information of habitat(s) to be lost or degraded, an assessment of the quality and condition of the habitats to be lost or degraded based on existing ecological knowledge and an estimation of the Conservation Credit requirement (and amount of offset land) to achieve 'no net loss' of biodiversity in relation to nightingale habitats.

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1.5 Limitations of Report

The conclusions of this report are based on information provided by the client at the time of the assessment. Some of this information has not been verified and, therefore, EBL cannot accept responsibility for any conclusions based on this information. EBL accepts no responsibility for the accuracy of any third party data used in the production of this report.

Natural ecological communities are susceptible to change, and, at times, as a result of internal and external environmental factors, this change can be rapid. Conservation Credit requirements are based on ecological assessments of habitats carried out at a prior date, and, as such, changes which may affect the conclusions of this report may occur if the recommendations for purchasing Conservation Credits are not taken up for a period of time.

A biodiversity offset is a commitment to compensate for significant adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the 'mitigation hierarchy'. The credit requirement estimated in this report does not take into consideration the development proposals for building-in beneficial biodiversity features as part of a good design as it has been considered that the loss of all suitable nightingale habitat at the site will result through the development and subsequent disturbance and pressures of the developed area.

2 Habitats

2.1 Surveys

This assessment makes use of an impact assessment of habitat losses, extended phase 1 habitat survey of the site and desk study conducted by Thomson Ecology (2008, revised 2012), plus a habitat condition survey conducted by EBL in conjunction with BTO in October 2012..

2.1.1 Environmental Impact Assessment Scoping Report

An EIA scoping report was undertaken by Hyder Consulting in September 2008 for the Chattenden and Lodge Hill proposed development. This report included an assessment of potential effects on ecological resources and designated sites.

2.1.2 Desk Study

A desk-based study was conducted by Thomson Ecology in November 2008 for records of protected species and designated sites within 2 km of the site. This included a review of existing statutory sites of nature conservation interest, such as Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and National Nature Reserves (NNRs), and non-statutory sites, such as County Wildlife Sites (CWSs).

2.1.3 Extended Phase 1 Habitat Survey

An extended Phase 1 habitat survey was undertaken by Thomson Ecology in November 2008 in accordance with the Joint Nature Conservation Committee (JNCC 1993) and Institute of Ecological Assessment (IEA 1995) guidelines. In summary, this comprised walking over the survey area and recording the habitat types and boundary features present. Dominant plant species observed within each habitat type were recorded on a DAFOR scale. This scale classifies species as 'dominant', 'abundant', 'frequent', 'occasional' or 'rare'. Full details of methods and results can be found in the Thomson Ecology report (Thomson Ecology 2011). The Phase 1 habitat survey was revised by Thomson Ecology in October 2012 to determine any changes in area or habitat

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classification. Full details of revisions to habitat re-classifications and areas can be found in the Thomson Ecology report (To be included).

2.1.4 Habitat Condition Assessment Survey

A habitat condition assessment was undertaken by EBL, together with BTO providing independent ornithological expertise in October 2012. In summary, this comprised walking over the survey area assessing habitats against condition criteria as recommended by Defra guidelines with additional nightingale-specific criteria to determine the a condition category for each individual habitat parcel. The assessment classifies habitats as either 'poor', 'moderate' or 'good' in accordance to criteria met. Full details of criteria are outlined in the methodology of this report (see section 3.2.2.)

2.2 Habitat Descriptions

A wide range of habitats were identified at the site. Further information and details can be found in the Thomson Ecology report (RECH101 Desk Study and Phase 1 Report 2011) Drawings (Ref: 116512 – attached as separate file) show the habitats present on site (revised map included on completion). A summary of the habitat areas present is shown in Table 2.1

Table 2.1. Summary of potential nightingale habitat existing on site*

Habitat	Area (ha) existing on site
Semi-natural broadleaved woodland	86
Plantation broadleaved woodland	18
Scattered broadleaved and mixed trees	0.4
Dense scrub	34.6
Scattered scrub	0.5
Improved grassland	36
Poor semi-improved grassland	50
Coarse grassland	42
Standing water	1
Tall ruderal vegetation	5
Ephemeral/short perennial vegetation	0.2
Amenity grassland	7
Introduced shrub	0.02
Bare ground	1.7
Arable	3.1
Hard standing	37.1
Buildings	2.8

* Areas based on 2008 Phase 1 survey (Thomson Ecology 2011). These areas will need to be revised following the results of the site visit of October 2012.

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3 Biodiversity Offsetting

3.1 Non-statutory Guidance

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity[3].

Biodiversity offsets, as set out by 'Principles of Biodiversity Offsetting' (Business and Biodiversity Offset Programme, BBOP), 'should be designed to comply with all relevant national and international law, and planned in accordance with the Convention on Biological Diversity and its ecosystem approach, as articulated in National Biodiversity Strategies and Action Plans'.

The UK Government, as signatory to the Rio Convention on Biological Diversity, is committed to conserving and enhancing biodiversity. This commitment is further enforced in the Countryside and Rights of Way Act 2000 (Section 74) and most recently in the Natural Environment White Paper (June 2011), much of which is delivered by Natural England through its Corporate Plan.

EBL is developing a model approach to biodiversity offsetting through the use of Conservation Credits. Specialist advice, as provided by EBL, is needed for implementing the Conservation Credits biodiversity offsetting scheme, assessing development credit requirements in association with, or on behalf of, developers or planning authorities, and sourcing appropriate receptor sites. EBL has used Defra's proposed metrics approach to provide as robust a methodology as possible, along with a support system for clients so they can fulfil guidelines and observe best practice for biodiversity offsetting through Conservation Credits.

Biodiversity offsetting through the Conservation Credits scheme provides the means of recreating or restoring habitats to offset land affected through development. Best practice in biodiversity offsetting aims to deliver biodiversity gains by encouraging a novel and improved approach to sustainable development to meet the needs of society.

3.2 Biodiversity Offsetting Assessment

3.2.1 Methodology

The methodology for the assessment (Defra 2012) of habitats uses a number of metrics to assess the quality of the habitats on site in relation to each habitat's ecological value and current condition, therefore providing a suitable assessment of the biodiversity value of the site. This allows the impact of the development on the scrub habitats to be quantified, so that what is needed in terms of compensation, as an offset requirement, can be evaluated.

Habitat type

Firstly, habitats are pre-assigned to one of three habitat type bands (Table 3.1 below). Habitats are assigned to these bands on the basis of their distinctiveness. Distinctiveness includes parameters such as species richness, diversity, rarity (at local, regional, national and international scales) and the degree to which a habitat supports species rarely found in other habitats and/or their Biodiversity Action Plan (BAP) designation.

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Biodiversity bands have been assigned to a range of habitats for Defra technical guidelines and these documents are referred to in the assignment process. A biodiversity distinctiveness category is assigned to each habitat parcel present at the site, excluding the operational areas. Any designated habitats or habitats of significant biodiversity value are defined as 'high'. Semi-natural non BAP habitats are deemed to be of 'moderate' biodiversity value, and intensively managed agricultural land and artificial habitats are deemed to be of 'low' biodiversity value. Operational areas and hard surfaces are assigned to the 'very low' categories of both biodiversity distinctiveness and condition and obtain no credit score.

Table 3.1: Habitat type bands

Habitat type Bands	Biodiversity distinctiveness	Type of habitat
High	High	BAP priority habitats as defined in Section 41 of the NERC act (2006)
Medium Low	Medium Low	Semi-natural habitats Artificial and agricultural habitats

Habitat condition

For each habitat type there are high value provisos, should these not be met then the criteria are applied. To assess the condition of the habitats, the Higher Level Stewardship Farm Environment Plan (FEP) handbook (Natural England, 2010) provides a clear and transparent methodology which assigns habitat condition into one of 3 categories; poor, moderate or good. Additional nightingale-specific criteria, based on ornithological evidence provided and considered by the BTO, were incorporated into the condition assessment protocol are detailed below.

The condition assessment category is derived from the number of criteria that the habitat meets. To balance the increase in stringency due to the addition of further criteria the parameters defined for the categories have been modified from the proposed Defra methodology. There are three condition assessment categories: A (Good – 0 or 1 failed criteria), B (Moderate – 2 or 3 failed criteria) and C (Poor - 3 or more failed criteria). Section 2 of the FEP handbook lists the features for habitat identification, feature details and condition assessments for a range of habitats.

The FEP handbook is not comprehensive and does not include condition assessment criteria for all habitats. In these cases, criteria for similar habitats would be used if appropriate or additional information, such as species of conservation importance (i.e. nightingale) recorded and deemed to be supported by the condition of the habitat is factored in.

As with the habitat distinctiveness, each habitat is assigned a condition category as shown in table 3.2 below.

Table 3.2: Condition categories

Habitat condition category	Description
Good	Excellent representation of 'typical' habitat type concerned. None or one 'typical' habitat condition criteria are not met.

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Moderate	Average to reasonable representation of 'typical' habitat type concerned. Two or three 'typical' habitat condition criteria not met.
Poor	Below average representation of 'typical' habitat type concerned. Several 'typical' habitat condition criteria not met.

3.2.2 Habitat Distinctiveness and Condition

Habitats on site were assigned one of three categories of distinctiveness. UK BAP priority habitats are considered to be of high distinctiveness. Other semi-natural habitats not included as BAP priority habitats were considered to be of medium distinctiveness (e.g. scrub and scrub mosaic habitats).

A site visit was undertaken to establish condition categories for habitats. The FEP condition (normal) and nightingale-specific (italics) criteria for habitats are outlined below.

Scrub

The areas of scrub and scrub mosaic are not included in any BAP priority habitat but are semi-natural and are therefore considered to be of 'medium' habitat distinctiveness.
Scrub was recorded as being high environmental value if it is described by least one of the following:

- Scrub that is recorded as one of the interest features in a Site of Special Scientific Interest (SSSI) designation.
- Scrub where any UK BAP priority species (e.g. dormouse), any animal species protected under the Wildlife and Countryside Act, or any Red Data Book species (e.g. Nightingale) have been recorded within the past 10 years.
- Common juniper or box scrub.
- On calcareous soils with three or more of wayfaring-tree, wild privet, dogwood, buckthorn, hawthorn and spindle.
- Native sea buckthorn scrub (on the east coast)
- Scrub on peat soils with two or more of alder, buckthorn, eared willow, goat willow, grey willow, bay willow, purple willow and osier.
- Montane scrub (above 600m altitude)

If the scrub was not described by any of the above then the criteria were applied. Table 3.3 gives the criteria for condition assessment.

Table 3.3. Criteria for assessment of scrub habitat

Habitat criteria
There are at least three woody species, with no one species comprising more than 75% of the cover.
There is a good age range – a mixture of seedlings, saplings, young shrubs and mature shrubs.
Pernicious weeds and invasive species make up less than 5% of the ground cover.
The scrub has a well-developed edge with ungrazed tall herbs.
There are many clearings and glades within the scrub.

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Scrub patches with dense and continuous canopy forming a shell over bare ground.
Damp or should be within 250m of a wetland feature (marshy area, pond, stream or ditch).

Broadleaved woodland

Areas of broadleaved semi-natural woodland are considered to fit the criteria for the UK/local BAP priority habitats and the distinctiveness for the woodland is defined as 'high'.

Broadleaved woodland (semi-natural or plantation broadleaved woodlands) was recorded as of high value if the woodland was at least one of the following:

- Ancient woodland (presumption of avoidance in current mitigation hierarchy).
- Supports any UK BAP priority species (e.g. dormouse), any animal species protected under the Wildlife and Countryside Act, or where any Red Data Book species (e.g. Nightingale) has been recorded within the past 10 years.
- Contains or is proximal to 'high value' scrub.

If the broadleaved woodland was not described by any of the above then the criteria were applied. Table 3.4 gives the criteria used for condition assessment of broadleaved woodland.

Table 3.4. Criteria for assessment of broadleaved woodland habitat

Habitat criteria
Native species are dominant. Non-native and invasive species account for less than 10% of the vegetation cover.
A diverse age and height structure.
Free from damage (in the last 5 years) from stock or wild mammals – there should be evidence of tree regeneration such as seedlings, saplings and young trees.
Standing and fallen dead trees of over 20 cm diameter are present.
The area is protected from damage by agricultural and other adjacent operations.
There are external and internal edges, gaps and patches of young regeneration.
Damp or should be within 250m of a wetland feature (marshy area, pond, stream or ditch).
Dense understorey vegetation present.

Hedges

A hedge was recorded as of high environmental value if it was described by least one of the following:

- Have a high biodiversity value within the hedge and the surrounding ground flora.
- Support Nightingales (occupancy based on records within the past 10 years).
- Support named target species of farmland birds, insects, mammals, lichen or fungi.

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- Are historically important boundaries.
- Include ancient trees.

If a hedge was not described by any of the above then the criteria were applied. Table 3.5 gives the criteria used for condition assessment.

Table 3.5. Criteria for assessment of hedges

Habitat criteria
The hedgerow must meet a minimum threshold of 2m in height.
The hedgerow must meet minimum threshold of 1.5m in width.
No more than 10% of the hedgerow length should be occupied by gaps and no one gap should be greater than 5m wide (excluding access points and gates).
The hedgerow contains species associated with nightingale use (at least one of blackthorn, hawthorn, elder, oak, hazel).

Grassland

All species-rich grasslands are recorded under a specific BAP habitat (high value).

Due to the time of year the survey was undertaken whether the habitat met the first proviso below could not be determined. Therefore, a grassland was recorded as of high environmental value if was described by the following second proviso:

- Will have a range of characteristics that make it particularly valuable for invertebrates in general, or it will be the known habitat of a nationally scarce (notable) invertebrate species.
    - Cover of grass, rush or sedge tussocks should be between 5% and 40% (Tussock is a single plant or clump of plants at least 15cm wide that is more than 3cm taller than surrounding vegetation).
    - Flowering heads of wildflowers, especially clovers, vetches and plants of the daisy family should be frequent between 1 April and 31 August.
    - Cover of scrub should be between 5% and 20%, of mixed composition and age structure and distributed in more than one block.

- Support any UK BAP priority species (e.g. hornet robberfly), protected species (e.g. mole cricket) or where any Red Data Book species (e.g. Nightingale**)** has been recorded within the past 10 years.

If a grassland was not described by the second proviso above then the criteria were applied. Table 3.6 gives the criteria used for condition assessment.

Table 3.6. Criteria for assessment of grassland habitat (criteria variations exist for specific grassland habitats)

Habitat criteria
Cover of undesirable species is less than 5%.
Cover of wildflowers and sedges throughout sward (excluding undesirable species) more than 30%.

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Cover of bare ground is less than 10%.
At least two indicator species are frequent, and three occasional.
Damp or should be within 250m of a wetland feature (marshy area, pond, stream or ditch).
If cover of scrub is less than 5% the grassland must be associated with or adjacent to scrub or woodland habitat.

Pond

A pond was recorded as of high environmental value, including sunny, shaded, permanent or temporary ponds, if it was described by at least one of the following:

- Support 'high value' species that are dependent on the pond – these include BAP species and species that have been recognised as being of national and local significance.
- Have good water quality and contain a range of features characteristic of that pond type.

If a pond was not described by at least one of the above then the criteria were applied. Table 3.7 gives the criteria used for condition assessment.

Table 3.7. Criteria for assessment of pond condition

Habitat criteria
Pond should be set within a semi-natural habitat.
Should be within 500m of another wetland feature (such as pond, river or fen).
There should be no obvious signs of pollution or inappropriate quality of water supply.
There should be an absence of damaging non-native plant or animal species.
The pond should not be stocked with fish or support damaging numbers of wildfowl.
It should experience only natural fluctuations in water levels.
Should be within 250m of scrub, woodland or other habitat recorded as used by nightingales.

Wet ditch

A wet ditch was recorded as of high environmental value if is described by at least one of the following:

- Contain more than ten submerged, floating or emergent native aquatic plant species per 20m stretch or contain species of high conservation interest (e.g. water voles).
- Found on flood plains and marshes. Agricultural drainage ditches may be included if they meet minimum depth requirement (below).
- Regularly contain standing or flowing water.

Table 3.8. Criteria for assessment of a wet ditch

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Habitat criteria
Water levels in the ditch must be no more than 45 cm below the mean field level and the water must have a minimum depth of 30 cm throughout the year.
Cover of macro-algae is less than 30% in the summer.
The following species together make up less than 75% of the vegetation cover: common duckweed, fennel pondweed and yellow water-lily.
The following species make up less than 10% of the vegetation cover: New Zealand pygmyweed, floating pennywort, water fern and parrot's feather.
Less than 20% of the ditch is in heavy shade (unless the ditch is adjacent to a hedge or within a woodland) and more than 25% has a gently sloping profile or berms and shelves.
Should be within 250m of scrub, woodland or other habitat recorded as used by nightingales.

Whether the wet ditch met the second criteria could not be determined at the time that the survey was undertaken. For the purposes of this analysis this criterion was excluded from the category assignation process.

3.3 Biodiversity Offset Calculations

The Conservation Credit analysis uses Defra's metrics (Defra 2012) to determine the credits required to offset the impacts of the proposed development on habitats present. This methodology has been the subject of extensive consultation as part of Defra's development of biodiversity offsets.

Development of an appropriate biodiversity offsetting strategy requires; taking into consideration measures to avoid, minimise and compensate for biodiversity loss; the identification of potential offset sites; and measures required to implement, monitor and manage the biodiversity offset in the long term.

The net credit requirement estimated in this report takes into account the predicted direct habitat losses due to the proposed development, but does not include on-site habitat creation proposals as suitable nightingale habitat was deemed to be lost as a result.

3.3.1 Conservation Credit Requirement Calculation

Following habitat distinctiveness and condition assessments (as outlined in section 3.2.1), the site credit requirement is established to allow biodiversity offset design.

The key components of the metric, which determine the number of credits that are required to be purchased, are;

a) area of habitat to be lost to, or degraded by the proposed development
b) the distinctiveness and condition of the habitat lost or degraded at the site of development, inclusive of any designation.

For each habitat parcel, the assigned band of habitat distinctiveness and condition category is scored, as shown in the offset scoring matrix (Table 3.9), which provides the "units" of biodiversity per hectare as a measure of habitat value.

Table 3.9. Offset scoring matrix for habitat condition and biodiversity distinctiveness

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		Biodiversity distinctiveness		
		Low	Medium	High
Condition	Poor	2	4	6
	Moderate	4	8	12
	Good	6	12	18

Distinctiveness and condition categories assigned consider species richness, habitat type and quality, capability of supporting biodiversity, with particular reference to protected species, site context and contribution to wider landscape.

Any site designations (e.g. BAP priority habitat) confer a biodiversity distinctiveness of 'high'; this is because species or habitats present have been deemed to be of value on either a local, regional or national level. The area of the habitat to be lost or degraded, multiplied by the matrix score (Table 3.9) gives the credits, or 'biodiversity units' required for the offset. With several habitat types present, the assessment is repeated for each one and the results summed to give the overall offset requirement according to habitat types or offset strategy.

3.3.2 Biodiversity Offset Calculations

With the credit requirement of a site established, the offset strategy is designed accordingly. To achieve 'no net loss' of biodiversity for a habitat type or habitats at a site the offset must deliver an overall ratio of 1:1 (or better) when offset gains are compared with predicted losses due to development. The necessary compensation for the type of offset can include either 'trading up' to a higher distinctiveness band (such as converting non UK BAP habitat into a UK BAP habitat) or creating / maintaining a habitat in the same band. Recommended offset strategies for habitat types are shown in Table 3.10.

Table 3.10. Habitat type bands and recommended offset strategies

Habitat band	Habitat type	Offset strategy
High	BAP priority habitats as defined in Section 41 of the NERC act (2006)	Within band type and ideally 'like for like'
Medium	Semi-natural	Within band type or trade up
Low	For example: Intensive agricultural	Trade up

Multipliers

A range of multipliers have been developed by Defra to buffer offset delivery, by factoring in a range of risks associated with habitat restoration or creation. These multipliers are applied to the offset area Conservation Credit calculations.

In delivering offsets there may be a mismatch in the timing of impact and offset; for example, there may be a considerable time difference between the occurrence of a negative impact on biodiversity and the time when the offset compensation reaches the

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required quality or level (target condition). A temporal multiplier is used to compensate for this time lag.

Table 3.11. Multipliers for different time periods

Years to target condition	Multiplier
5	1.2
10	1.4
15	1.7
20	2.0
25	2.4
30	2.8
32	3

Offsets will involve either restoration or expansion of habitats, and both are likely to have risks associated with them. Some habitats are more difficult than others to restore or expand, and there will therefore be different levels of risk for different habitats. However, for any particular habitat, restoration is likely to be lower risk than expansion (creation).

To compensate for the level of risk involved a multiplier is used depending on the level of technical difficulty of restoration or expansion, shown in Table 3.12.

Table 3.12. Multipliers for different categories of delivery risk

Difficulty of creation/restoration	Multiplier
Very High	10
High	3
Medium	1.5
Low	1

3.4 Biodiversity Offset Analysis

3.4.1 Credit Requirement

Here, we report the metric calculations to determine the credit requirement for the loss of suitable nightingale habitats present at Lodge Hill site as a result of the proposed development. A predicted loss or degradation of approximately 325ha of suitable nightingale habitat is estimated including Chattenden Woods SSSI areas (Rough Shaw and Lodge Hill Wood) within the boundary. With the exception of Rough Shaw and Lodge Hill Wood which are considered to be affected indirectly, all areas are considered to be lost as suitable nightingale habitats due to fragmentation, disturbance and pressure of development. The credit requirement has been estimated independently for all habitat parcels affected by direct and indirect impacts of the proposed development (see Table 3.13).

The credit requirements per habitat type are detailed below. Condition of each habitat parcel is not discussed here as there were several parcels within each habitat type. Details

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are included in the Appendix (Final habitat classifications yet to be confirmed - reference to relevant Appendix to be included).

Semi-natural broadleaved woodland

The areas of semi-natural broadleaved woodland are considered to be of 'high' biodiversity distinctiveness. The credit requirement of semi-natural broadleaved woodland habitats to be lost or degraded is estimated at 1326.3 credits. This includes indirect impacts to Lodge Hill Wood (Chattenden SSSI), an area of 16.7 ha.

Plantation broadleaved woodland

The areas of plantation broadleaved woodland are considered to be of 'high' biodiversity distinctiveness. The credit requirement of broadleaved plantation woodland habitats to be lost is estimated at 281.1.

Scattered broadleaved trees

The areas of scattered broadleaved trees are considered to be of 'high' biodiversity distinctiveness. The credit requirement is estimated at 5.4.

Scattered mixed woodland

The areas of scattered mixed woodland are considered to be of 'high' biodiversity distinctiveness. The credit requirement is estimated at 1.4.

Hedges

Hedges are treated separately as their biodiversity value is considerable. Hedges were deemed species-poor and in poor condition. The requirement for hedges is 455m of new hedge to be created to offset for the loss of hedges due to development.

Standing water

Ponds and wet ditches are considered to be of 'high' biodiversity distinctiveness. The credit requirement is estimated at 14.9.

Dense scrub

The areas of dense scrub are considered to be of 'medium' habitat distinctiveness unless located within a designated area. The credit requirement of dense scrub habitats is estimated at 304.3.

Dense scrub mosaic

The areas of dense scrub mosaic are considered to be of 'medium' habitat distinctiveness unless a secondary habitat with a higher distinctiveness band is present or is within a designated area. The credit requirement of dense scrub mosaic habitats is estimated at 72.5.

Scattered scrub

The areas of scattered scrub are considered to be of 'medium' habitat distinctiveness. The credit requirement of dense scrub mosaic habitats is estimated at 6.1.

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Coarse grassland

The areas of coarse grassland are considered to be of ‘low’ habitat distinctiveness unless located within a designated area. The credit requirement is estimated at 74.1.

Coarse grassland mosaic

The areas of coarse grassland mosaic are considered to be of ‘low’ habitat distinctiveness unless a secondary habitat of higher biodiversity distinctiveness value is present or it is located within a designated area. The credit requirement is estimated at 271.3.

Semi-improved grassland

The areas of semi-improved grassland are considered to be of ‘low’ habitat distinctiveness unless located within a designated area. The credit requirement is estimated at 157.4. This includes Rough Shaw (Chattenden SSSI)

Semi-improved grassland mosaic

The areas of semi-improved grassland mosaic are considered to be of ‘low’ habitat distinctiveness unless a secondary habitat of higher biodiversity distinctiveness value is present or it is located within a designated area. The credit requirement is estimated at 111.7.

Introduced shrub

The areas of semi-improved grassland are considered to be of ‘low’ habitat distinctiveness. The credit requirement is estimated at 157.4.

Amenity grassland

The areas of amenity grassland are considered to be of ‘low’ habitat distinctiveness. The credit requirement is estimated at 44.5.

Amenity grassland mosaic

The areas of amenity grassland mosaic are considered to be of ‘low’ habitat distinctiveness unless a secondary habitat of higher biodiversity distinctiveness value is present. The credit requirement is estimated at 5.9.

Arable

The areas of arable are considered to be of ‘low’ habitat distinctiveness. The credit requirement is estimated at 12.48.

Ephemeral/short perennial

The areas of ephemeral/short perennial are considered to be of ‘low’ habitat distinctiveness. The credit requirement is estimated at 0.7.

Ephemeral/short perennial mosaic

The areas of ephemeral/short perennial mosaic are considered to be of ‘low’ habitat distinctiveness unless a secondary habitat of higher biodiversity distinctiveness value is present. The credit requirement is estimated at 0.06.

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Improved grassland

The areas of improved grassland are considered to be of 'low' habitat distinctiveness. The credit requirement is estimated at 81.6.

Bare ground

The areas of bare ground are considered to be of 'low' habitat distinctiveness. The credit requirement is estimated at 6.1.

Bare ground mosaic

The areas of bare ground are considered to be of 'low' habitat distinctiveness unless a secondary habitat of higher biodiversity distinctiveness value is present. The credit requirement is estimated at 3.9.

Tall ruderal

The areas of tall ruderal are considered to be of 'low' habitat distinctiveness. The credit requirement is estimated at 5.0.

Tall ruderal mosaic

The areas of tall ruderal are considered to be of 'low' habitat distinctiveness unless a secondary habitat of higher biodiversity value is present. The credit requirement is estimated at 34.2.

Technotopes

Hardstanding and buildings are considered to be of 'very low' biodiversity distinctiveness and therefore are not assigned a value.

Table 3.13. Areas and credit scores per habitat type

Habitat	Area (ha) existing on site	Credit Requirement
Semi-natural broadleaved woodland	82.8	1326.3
Plantation broadleaved woodland	17.6	281.1
Scattered broadleaved trees	0.35	5.4
Scattered mixed woodland	0.08	1.4
Hedges	455m	455m
Dense scrub	29.3	304.3
Dense scrub mosaic	6	72.5
Scattered scrub	0.5	6.1
Improved grassland	35.7	81.6
Semi-improved grassland	38.9	157.4

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Semi-improved grassland mosaic	12.2	111.7
Coarse grassland	18.5	74.1
Coarse grassland mosaic	24	271.3
Standing water	1	14.9
Tall ruderal vegetation	1.2	5.0
Tall ruderal mosaic	3.3	34.2
Ephemeral/short perennial vegetation	0.2	0.7
Ephemeral/short perennial mosaic	0.01	0.06
Amenity grassland	7.3	44.5
Amenity grassland mosaic	0.3	5.9
Introduced shrub	0.02	0.02
Bare ground	1	6.1
Bare ground mosaic	0.7	3.9
Arable	3.1	12.5
Hardstanding	37.6	0
Buildings	2.8	0
Total	324.4	2821.2*

* Not inclusive of hedge requirement

The credit requirement for the site is the credit requirement for the proposed development area. Proposals for onsite habitat creation or retention have not been taken into account as areas would not be considered suitable for nightingales. At the time of writing this report there were no specific proposals for offsite mitigation therefore the credit requirement is estimated to be 2821.2 credits.

3.5 Offsetting Measures

The main ways to generate measurable biodiversity gains are by improving condition of a particular habitat (e.g. by bringing a degraded lowland meadow habitat into appropriate management) or by elevating the distinctiveness category (e.g. by converting a habitat of 'low' distinctiveness such as 'improved grassland' to a habitat of 'high' distinctiveness such as 'unimproved neutral grassland'). Offsets for the potential loss of particularly high value habitats on site, hedges, and other habitats are discussed. Recommended offset measures reported here have factored in recreation or restoration and temporal risks associated with the delivery of the biodiversity offset and are based on receptor area(s) that aim to deliver condition uplifts through appropriate management works. All offset measures provided in this report are estimates and provisional in their nature. Final offset measures are dependent on the identification and evaluation of the biodiversity offsetting potential of the appropriate receptor site(s). Summaries of credit requirements and offset options are shown in Table 3.14.

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As specific receptor sites have not yet been agreed, assumptions have been applied to the target condition of off-site habitats. The offset requirements are presented as a series of areas depending on restoration or expansion options. To increase the accuracy of the offset requirements potential receptor sites would need to be identified, ecological information on current habitats and condition established, management plans for enhancement works along with target habitats and condition along with determining the length of time for the offset strategy.

3.5.1 Offsets for loss of habitat types

Within type

Credit requirements of valued habitats such as UK BAP habitats would be employed in within type (like-for-like) offsets, that is, the creation or restoration of BAP priority habitats. In this case, scrub habitats are also considered for within type offsets as the offsetting strategy is designed for nightingales and scrub habitats are preferentially used by this bird.

Broadleaved woodland

Semi-natural broadleaved woodland

The loss of broadleaved woodland on the site due to the proposed development is estimated at 82.3ha. The credit requirement for the loss of semi-natural broadleaved woodland is 1326.3. To offset the loss of the semi-natural broadleaved woodland one of the following off-site measures are recommended;

- the creation of 338.4 ha of broadleaved woodland at a suitable receptor area or areas
- the restoration of 161.0 ha broadleaved woodland at a suitable receptor area or areas.

Plantation broadleaved woodland

The loss of plantation broadleaved woodland on the site due to the proposed development is estimated at 17.6ha. The credit requirement for the loss of plantation woodland is 281.1. To offset for the loss of the plantation broadleaved woodland at the site one of the following off-site measures are recommended;

- the creation of 71.7 ha of broadleaved woodland at a suitable receptor area or areas
- the restoration of 34.1 ha of broadleaved woodland at a suitable receptor area or areas.

While the creation or restoration of large woodland areas for conservation purposes should be a priority, the extension of smaller woods to a size of 10ha is considered to be highly beneficial to both species richness and population stability of regional woodland bird assemblages (Mason 2001). Extensions of smaller woods would only be recommended if a part of larger restoration or creation works as only receptor sites of 50ha or greater are to be considered in the offsetting strategy.

Scattered broadleaved trees

The loss of scattered broadleaved trees on the site due to the proposed development is estimated at 0.35 ha. The credit requirement for the loss of scattered broadleaved trees is 5.4. To offset for the loss of the scattered broadleaved trees at the site one of the following off-site measures are recommended;

- the creation of 1.4 ha of scattered broadleaved trees at a suitable receptor area or areas

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- the restoration of 0.7 ha of scattered broadleaved trees at a suitable receptor area or areas.

Scattered mixed woodland

The loss of scattered mixed woodland on the site due to the proposed development is estimated at 0.35 ha. The credit requirement for the loss of scattered mixed woodland is 1.4. To offset for the loss of the scattered mixed woodland at the site one of the following off-site measures are recommended;

- the creation of 0.4 ha of scattered mixed woodland at a suitable receptor area or areas
- the restoration of 0.2 ha of scattered broadleaved trees at a suitable receptor area or areas.

Hedges

Hedges are treated separately as their biodiversity value is considerable. The requirement for hedges is the creation of 455m of new hedge at the offset site or sites.

Standing water

The loss of standing water on the site due to the proposed development is estimated at 1 ha. The credit requirement for the loss of scattered mixed woodland is 14.9. To offset for the loss of standing water at the site one of the following off-site measures are recommended;

- the creation or restoration of 1.8 ha of standing water, which includes features such as ponds, at a suitable receptor area or areas

Dense scrub

The loss of dense scrub habitats on the site due to the proposed development is estimated at 29.3 ha. The credit requirement for the loss of dense scrub account is 304.3. To offset the loss of the dense scrub at the site one of the following off-site measures are recommended;

- the creation of 63.9 ha of dense scrub at a suitable receptor area or areas
- the restoration of 45.6 ha of dense scrub at a suitable receptor area or areas.

Dense scrub mosaic

The loss of dense scrub mosaic on the site due to the proposed development is estimated at 6 ha. The credit requirement for the loss of dense scrub mosaic is 72.5. To offset the loss of the dense scrub mosaic at the site one of the following off-site measures are recommended;

- the creation of 63.9 ha of dense scrub mosaic at a suitable receptor area or areas
- the restoration of 45.6 ha of dense scrub mosaic at a suitable receptor area or areas.

Within type or trade up

This offset type generally applies to semi-natural habitats considered to be of ‘medium’ habitat distinctiveness as there is the option to trade up an offset to a habitat of higher value

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(e.g. BAP habitat) although the relative importance of habitats to nightingales has been taken into consideration. The following recommendations are based on within type offsets.

Scattered scrub

The loss of scattered scrub on the site due to the proposed development is estimated at 0.5 ha. The credit requirement for the loss of scattered scrub is 6.1. To offset the loss of the scattered scrub at the site one of the following off-site measures are recommended;

- the creation of 0.9 ha of scattered scrub at a suitable receptor area or areas
- the restoration of 1.3 ha of scattered scrub at a suitable receptor area or areas

Coarse grassland

The loss of coarse grassland on the site due to the proposed development is estimated at 18.5 ha. The credit requirement for the loss of coarse grassland is 74.1. To offset the loss of the coarse grassland at the site one of the following off-site measures are recommended;

- the creation of 15.6 ha of neutral grassland at a suitable receptor area or areas
- the restoration of 10.4 ha of neutral grassland at a suitable receptor area or areas

Coarse grassland mosaic

The loss of coarse grassland mosaic on the site due to the proposed development is estimated at 24 ha. The credit requirement for the loss of coarse grassland mosaic is 271.3. To offset the loss of the coarse grassland mosaic at the site one of the following off-site measures are recommended;

- the creation of 57 ha of neutral grassland mosaic at a suitable receptor area or areas
- the restoration of 38 ha of neutral grassland mosaic at a suitable receptor area or areas

Semi-improved grassland

The loss of semi-improved grassland on the site due to the proposed development is estimated at 38.9 ha. The credit requirement for the loss of semi-improved grassland is 157.4. To offset the loss of the semi-improved grassland at the site one of the following off-site measures are recommended;

- the creation of 57 ha of neutral grassland at a suitable receptor area or areas
- the restoration of 38 ha of neutral grassland at a suitable receptor area or areas

Semi-improved grassland mosaic

The loss of semi-improved grassland mosaic on the site due to the proposed development is estimated at 38.9 ha. The credit requirement for the loss of semi-improved grassland mosaic is 111.7. To offset the loss of the semi-improved grassland mosaic at the site one of the following off-site measures are recommended;

- the creation of 23.5 ha of neutral grassland mosaic at a suitable receptor area or areas
- the restoration of 15.6 ha of neutral grassland mosaic at a suitable receptor area or areas

Bare ground and mosaic habitats

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The loss of bare ground and mosaic habitats on the site due to the proposed development is estimated at 1.7 ha. The credit requirement for the loss of bare ground and mosaic habitats is 10. To offset the loss of the bare ground and mosaic habitats, which are considered an important foraging area for nightingales, one of the following off-site measures are recommended;

- the creation of 2 ha of bare ground mosaic habitat at a suitable receptor area or areas
- the restoration of 1.8 ha of bare ground mosaic habitat at a suitable receptor area or areas

Trade up

This offset type applies to habitats considered to be of 'low' habitat distinctiveness and allows for the offset to be traded up for habitats of higher value, wither 'medium' or 'high' biodiversity distinctiveness.

Introduced shrub

The loss of introduced shrub on the site due to the proposed development is estimated at 0.01 ha. The credit requirement is 0.02. To offset the loss of introduced shrub at the site one of the following off-site measures are recommended;

- the creation of 0.004ha of a habitat of higher biodiversity value at a suitable receptor area or areas
- the restoration of 0.003 ha of a habitat of higher biodiversity value at a suitable receptor area or areas

Amenity grassland

The loss of amenity grassland on the site due to the proposed development is estimated at 7.3 ha. The credit requirement is 44.5. To offset the loss of amenity grassland at the site one of the following off-site measures are recommended;

- the creation of 6.24 ha of a habitat of higher biodiversity value at a suitable receptor area or areas
- the restoration of 7.8 ha of a habitat of higher biodiversity value at a suitable receptor area or areas

Amenity grassland mosaic

The loss of amenity grassland mosaic on the site due to the proposed development is estimated at 0.3 ha. The credit requirement is 5.9. To offset the loss of amenity grassland mosaic at the site one of the following off-site measures are recommended;

- the creation of 0.83 ha of a habitat of higher biodiversity value at a suitable receptor area or areas
- the restoration of 1 ha of a habitat of higher biodiversity value at a suitable receptor area or areas

Arable

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The loss of arable on the site due to the proposed development is estimated at 3.1 ha. The credit requirement is 12.5. To offset the loss of arable at the site one of the following off-site measures are recommended;

- the creation of 1.75 ha of a habitat of higher biodiversity value at a suitable receptor area or areas
- the restoration of 2.19 ha of a habitat of higher biodiversity value at a suitable receptor area or areas

Ephemeral/short perennial and mosaic

The loss of ephemeral/short perennial and mosaic habitats on the site due to the proposed development is estimated at 0.2 ha. The credit requirement is 0.8. To offset the loss of ephemeral/short perennial and mosaic habitats at the site one of the following off-site measures are recommended;

- the creation of 0.1 ha of a habitat of higher biodiversity value at a suitable receptor area or areas
- the restoration of 0.1 ha of a habitat of higher biodiversity value at a suitable receptor area or areas

Improved grassland

The loss of improved grassland on the site due to the proposed development is estimated at 35.7 ha. The credit requirement is 81.6. To offset the loss of improved grassland at the site one of the following off-site measures are recommended;

- the creation of 11.43 ha of a habitat of higher biodiversity value at a suitable receptor area or areas
- the restoration of 14.29 ha of a habitat of higher biodiversity value at a suitable receptor area or areas

Tall ruderal and mosaic habitats

The loss of tall ruderal and mosaic habitats on the site due to the proposed development is estimated at 4.5 ha. The credit requirement is 81.6. To offset the loss of tall ruderal habitats at the site one of the following off-site measures are recommended;

- the creation of 11.7 ha of a habitat of higher biodiversity value at a suitable receptor area or areas
- the restoration of 6.9 ha of a habitat of higher biodiversity value at a suitable receptor area or areas

Technotopes

Offset measures are not required for hardstanding and buildings.

Table 3.14. Areas, credit scores and offset areas required for restoration and creation options per habitat type

Habitat	Area (ha)	Credit Requirement	Restoration (ha)	Creation (ha)
Semi-natural broadleaved woodland	82.8	1326.3	160.96	338.35

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Plantation broadleaved woodland	17.6	281.1	34.11	71.71
Scattered broadleaved trees	0.35	5.4	0.65	1.37
Scattered mixed woodland	0.08	1.4	0.17	0.37
Hedges	455m	455m	-	455m
Dense scrub	29.3	304.3	45.62	63.93
Dense scrub mosaic	6	72.5	10.86	15.22
Scattered scrub	0.5	6.1	0.91	1.28
Improved grassland	35.7	81.6	14.29	11.43
Semi-improved grassland	38.9	157.4	22.05	33.08
Semi-improved grassland mosaic	12.2	111.7	15.64	23.46
Coarse grassland	18.5	74.1	10.38	15.58
Coarse grassland mosaic	24	271.3	37.99	56.99
Standing water	1	14.9	1.79	1.79
Tall ruderal vegetation	1.2	5.0	0.88	1.51
Tall ruderal mosaic	3.3	34.2	6.0	10.28
Ephemeral/short perennial vegetation	0.2	0.7	0.13	0.1
Ephemeral/short perennial mosaic	0.01	0.06	0.06	0.01
Amenity grassland	7.3	44.5	7.80	6.24
Amenity grassland mosaic	0.3	5.9	1.04	0.83
Introduced shrub	0.02	0.02	0.004	0.003
Bare ground	1	6.1	1.07	1.84
Bare ground mosaic	0.7	3.9	0.68	1.17
Arable	3.1	12.5	2.19	1.75
Hardstanding	37.6	0	n/a	n/a
Buildings	2.8	0	n/a	n/a
Total	324.4	2821.2*	375.25	658.28

* Not inclusive of hedge requirement

Nightingale habitat preferences would dictate the type of woodland and scrub habitats and long-term management to maximise the potential of the sites as suitable nightingale habitat. Nightingales are known to breed in a wide range of habitats but require dense understory or ground vegetation and show a preference for dense scrub habitats, for example, thickets of dense scrub such as blackthorn *Prunus spinosa* and bramble with margins of rough grass and deciduous woodland especially oak *Quercus* spp., or a mixture of oak and birch *Betula* spp., or hazel *Corylus avellana,* the latter forming a dense understory.

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It also must be noted that nightingales have not colonised many coppices where suitable habitat has been recreated, suggesting that it is not a strong colonist (Fuller & Peterken 1995) and although a biodiversity offsetting strategy will aim to achieve ‘no net loss’ of suitable nightingale habitats, the successful creation or restoration of these habitats will not guarantee that nightingales will colonise these areas.

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4 Conclusions

An offset requirement, in Conservation Credits, based on existing ecological knowledge, has been estimated for the loss of habitats present at the proposed development including the Chattenden SSSI areas located within the boundary. The predicted impacts to the SSSI areas of Rough Shaw and Lodge Hill Wood considered to be indirect as the proposed development would likely lead to the degradation of the habitats present. The proposed on-site habitat creation and retention plans have been not been taken into consideration in the estimates of credit requirements as it is likely that all nightingale territories at the Lodge Hill site will be lost as a result of the proposed development. As at the time of writing the report specific ecological information required to calculate the condition uplift available at receptor sites was not available and therefore assumptions were made for receptor site condition uplift potential. The offset measures recommended here are provisional and would require revision should receptor sites be identified and assessed, management plans be drawn up and relevant ecological information be submitted.

The credit requirement for the loss or degradation of habitats at the Lodge Hill site is evaluated at 2821 Conservation Credits. To ensure ecological equivalence through biodiversity offsetting for the loss or degradation of habitats suitable for nightingales offset measures (creation or restoration offset options) for proposed options to expend the credit requirement of the development and discharge the mitigation would require the following:

To offset the loss of suitable nightingale habitats at Lodge Hill would require the creation of 658 ha <u>or</u> the restoration of 375 ha of primarily woodland, scrub and grassland habitats.

The amount of offset area necessitated would depend on available offset sites and the appropriate enhancement works that could be undertaken. The offset measures could include a combination of restoration and creation options. **If a combination of restoration and creation was undertaken then it is likely that 450 – 500 ha would be needed in total.**

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5 References

1. ‘Factors Potentially Affecting the Viability and Success of Biodiversity Offsetting to Compensate for Nightingale Habitat Loss’, BTO 2012
2. ‘Handbook for Phase 1 habitat survey: A technique for environmental audit.’ Joint Nature Conservancy Committee, Peterborough, 1993.
3. ‘Guidelines for Baseline Ecological Assessment.’ Institute of Environmental Assessment, E & FN Spon, London, 1995.
4. ‘Desk Study and Extended Phase 1Habitat Survey’, Thomson Ecology Ltd, October 2011 (RECH101/001/001).
5. ‘Technical Paper: Proposed Metric for the Biodiversity Offsetting Pilot in England’, Department for Environment, Food and Rural Affairs, March 2012.
6. ‘Standard of Biodiversity Offsets’, The Business and Biodiversity Offset Programme (BBOP), January 2012.
7. Habitat Statement included in *Biodiversity: the UK Steering Group Report, Vol 2* (1995),
8. ‘Woodland area, species turnover and conservation of bird assemblages in Lowland Britain.’ C. F. Mason, Biodiversity & Conservation Vol:10 Number 4 (2001), 495-510.
9. ‘Managing habitats for conservation.’ Eds. Sutherland, W.J. and Hill, D., Chapter 12: ‘Woodland and scrub’, Fuller, R.J. and Peterken, G.F. 1995

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Appendix 3

GGKM: Study of Nightingale habitat creation opportunities across Kent

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Study of Nightingale habitat creation opportunities across Kent (supported by interactive pdf)

31st October 2012

Context: This document is to be read in conjunction with the GIS based interactive pdf which shows the location of the identified sites and the GIS layers that aid the development of the area of search for possible Nightingale habitat. This Kent-wide report forms an extension of the previous GGKM previous study (23rd July 2012) on Nightingale Habitat Opportunity on the Hoo Peninsula. The July 2012 report identified sites on the Hoo Peninsula and Gillingham riverside, and scored these against slightly different criteria to that used in this Kent-wide report.

The Ask: GGKM was asked to undertake the following work to help develop understanding of habitat creation opportunities across Kent. The work falls into three main tasks – GIS, interview and site visits.

Task 1: To create a GIS mapping tool to aid the identification and testing of opportunities for the creation of Nightingale Habitat. This mapping tool has been developed in accordance to the ecological criteria discussed at the Technical meeting held on 25th September 2012 and by the findings of the British Trust for Ornithology report by Chris Hewson and Robert Fuller.

Three main BTO criteria seek to identify areas capable of supporting lowland damp scrub:

- Wet soils / impeded drainage – used geology data
- Altitude - captured as areas below 21 metres or below 41 metres
- Habitat type – woodland (above and below 50 ha plus the most recent publicly available data for scrub – the 2003 County Habitat Survey (held by Kent Biological Record Centre)

Task 2: To meet with the countryside management partnerships (CMPs) across Kent to use the mapping tool to aid the identification of priority opportunities for the creation of breeding Nightingale habitat opportunities.

GGKM met with the following CMPs:

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- White Cliff Countryside / Romney Marsh
- Kentish Stour
- Mid Kent Downs
- Medway Valley
- Medway Swale Estuary Partnership

- Plus the Kent Wildfowling and Conservation Association

The High Weald CMP were contacted but decided not to participate. The High Weald AONB Unit were available to input to the work but at a GIS data level rather than site-specific knowledge. This option was not realised as it was felt by GGKM that it would add limited value.

GGKM also met with Matthew Morris – the Kent Downs AONB forestry officer. Matthew is interested in linking the possible outcomes of this work with the Forestry Commission's target to increase the area of woodland in management from 40 to 80%. Matthew is able to provide additional GIS showing areas of woodland not known to be receiving positive management.

The RSPB (Sam Dawes) and KWT (Greg Hitchcock) decided not to participate in the identification of possible habitat creation opportunities across Kent.

GGKM received a map of DIO sites (7) in Kent, which were proposed for consideration for possible Nightingale habitat creation. Of these seven sites only one (Dibgate Camp and St Martins Plain) was considered to meet the GIS criteria. The other six sites were excluded from this study as they were too high, or supported existing high value wildlife sites (acid grassland and shingle) or are too small or too close to urban areas. The Dibgate Camp and St Martins Plain site was visited on 25th October 2012 and is shown on the sites map.

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Task 3: The mapping of opportunities identified during cmp meetings.

- See attached GIS map.

Summary of opportunities and RAG scoring to inform site visit.

Site / RAG	Summary
1. Stockbury Valley	An area within the Kent Downs AONB, supporting a system of dry river valleys with seasonally wet valley bottoms. The wider area supports numerous ancient woodland sites and is part of

	the Medway Smile Living Landscape area. Site may be too high but local wet conditions could counter this influence. The valley is largely trust owned meaning that future tenure issues may be simplified and support long-term engagement. Borders Medway Council area. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 – low and declining. Low human population densities and therefore limited likelihood of disturbance. The Mid Kent Downs team were unable to identify a specific site or landowner. Following a conversation with EBL and BTO it was agreed not to survey this site.
2. Bicknor Valley	An area adjacent to site 1 within the Kent Downs AONB. It supports a system of dry river valleys with seasonally wet valley bottoms. The wider area supports numerous ancient woodland sites and is part of the Medway Smile Living Landscape area. Site may be too high but local wet conditions could counter that fact. The valley is largely trust owned meaning that future tenure issues may be simplified and support long-term engagement. Low population densities and therefore limited likelihood of disturbance. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 – low and declining. The Mid Kent Downs team were unable to identify a specific site or landowner. Following a conversation with EBL and BTO it was agreed not to survey this site.
3. Sittingbourne meanwhile land	Located within Sittingbourne's urban fringe, this area of land has seen an extensive area of scrub development on land possibly to be developed. I am not aware of a future GI plan for the area or of its strategic fit within Swale's Green Grid.

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	The general area does fit the Nightingale site selection criteria – wet geology and altitude. Close proximity to infrastructure and housing may mean unacceptable levels of disturbance and predation. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales not recorded breeding here in the 1999 survey. The Mid Kent Downs team were unable to identify a specific site or landowner. Not worth exploring and no site survey was undertaken.
4. Conyer Springs	Conyer springs: an area of low lying wet land centred on Conyer Creek – a landscape of orchards and arable fields with a few elm copses, isolated scrub and lakes. The area is in the Greater Thames Marshes Nature Improvement Area and could realise links to Thames Terrace Invertebrates (requiring some scrub, rank grassland and bare earth). Based on visual interpretation of 1999 population and change maps (A. Henderson): No Nightingales recorded in the 1999 survey. The Mid Kent Downs team were unable to identify a specific site or landowner. May be worth exploring further but due to its Amber status it was decided not to explore this area further at present.
5. Abbey Farm – Nagden +	Abbey Farm environs – east of Faversham. A complicated area of recently created arable with fragments of retained scrapes, ditches, ponds and rank grassland and scrub. The scrub habitat is now too disperse and immature to support a significant Nightingale population. Grasshopper warblers have bred here in the past – an indication of habitat quality. This area is owned by the Attwood Family who have participated in the delivery of significant compensation schemes on the Isle of Sheppey. Long-term options for residential development may compromise this area's suitability for Nightingale habitat creation. The site is wet, low and has developing scrub. Based on visual interpretation of 1999 population and change

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	maps (A. Henderson): Proposed by the Mid Kent Downs team. Worth exploring further. During a site visit we discussed the site's proximity to the Oare Marshes KWT reserve and to the Cleve Hill London Array land holding. It was felt that a positive landscape scale plan could be developed to cerate a mosaic of wetland / scrub habitats suitable for Nightingales and other key species.
6. Westbere to Stodmarsh	A complicated wetland area adjacent to the River Stour comprising NNR and SSSI and wildfowl reserves. The area meets altitude and soil / geological interests but as an opportunity site is severely compromised by existing conservation objectives to reduce scrub component in favour of wetland areas. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 increasing. Promoted by both the Kentish Stour Partnership and the Kent Wildfowling and Conservation Association. After a site visit it was agreed that due to size of the opportunity sites and to the existing appropriate conservation objectives this area is not worth developing.
7. River Stour from Grove Ferry to Sandwich	The area supports suitable geology, altitude and consists of largely semi improved grassland with limited scrub and poplar woods. The opportunity, as identified by Kentish Stour Partnership, is to explore landscape scale landscape restoration including scrub creation opportunities on riparian land of the River Stour. The area currently lacks diversity and riparian semi-natural habitats. Based on visual interpretation of 1999 population and change maps (A. Henderson): a sizeable and increasing Nightingale population recorded in 1999. The presence of KSCMP would aid project delivery and works could also link to Water Framework Directive proposals / CIG? The site was visited on 25th October when it was agreed that habitat creation opportunities would exist and that the environmental factors support these study's goals.

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8. Acrise Wood / MoD	Mature sweet chestnut coppice across about 5 significant blocks. It may be the areas between the woodland blocks that lend themselves to scrub creation. The woods are located on top of the Downs and therefore do not meet altitude / geological conditions. The woodland stands lacked diversity and structure. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 were low and declining. Owned by MoD / DIO. Woodland sites are not worth exploring further. It was agreed not to visit this site.
9. Dibgate Camp and St Martin's Plain	This site sits on a geological spring line and seems to support large areas of semi improved grassland and rough grazing. The site meets geological and altitude criteria, and supports areas of damp grassland, scrub woodland plantations. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 were low and static. Due to access limitations it was difficult to see much of the site but what was seen was interesting and definitely worth exploring further. It was commented that the site had the "feel" of Lodge Hill.
10. Conningbrook Lakes	Located to the south east of Ashford, adjacent to the River Stour and the proposed development at Conningbrook lakes. The location meets the GIS criteria well. It's low and wet and has some isolated scrub and adjacent wet woodlands. Adjacent land owned by the Hinxhill Estate. Land is high quality arable land that can lie wet and is liable to flooding. There is an opportunity to link Nightingale habitat creation schemes to emerging proposals at Conningbrook Lakes. Proposed by Kentish Stour Partnership and is worth further development. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 were low but increasing. The site was visited on 25th October and it was agreed that this

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	area could offer a viable Nightingale habitat creation opportunity.
11. Olantigh Estate	Located in the mid Stour Valley, a wet woodland carr habitat and riparian habitat. An interesting area but existing land management prescriptions do not support scrub creation as a long-term option. Meets criteria but not worth exploring further. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 low but increasing. Proposed by Kentish Stour Partnership. It was agreed not to visit this site.
12. Lenham springs	An area located on the spring line of the Kent Downs between Detling and Lenham. It supports numerous wet woods and springs and is the source of the River Len. The landscape forms part of the M20 and CTRL hinterland and has already seen some compensation schemes related to their development. Based on visual interpretation of 1999 population and change maps (A. Henderson): There appear not to have been Nightingales recorded in this area in the 1999 survey. Proposed by the Mid Kent Downs team. It was agreed not to explore this site further due to lack of obvious opportunities.
13. Snodland / Leybourne Lakes / Medway Valley	A suite of existing valuable scrub and wetland habitat that supports viable Nightingale populations. Opportunities may occur for the creation of additional scrub complementing existing population. The area meets the GIS criteria. It would be worth exploring opportunities with Valley of Vision and local authorities. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 were large and increasing. Proposed by Medway Valley CMP (and previously by the Valley of Visions scheme). It was agreed that as this area met the GIS criteria so well that there was no need to visit on 25th October 2012.

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14. Yalding Fen	An area of about 30ha supporting wet fen, carr woodland, meadows and scrub. The site is subject to a conservation management plan linked to existing local developments. The area meets GIS criteria but was considered not worth exploring due to existing biodiversity value. Based on visual interpretation of 1999 population and change maps (A. Henderson): Nightingales population in 1999 – not sure but probably low and declining. Proposed by Medway Valley CMP.

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