Ecological Report

Construction and Environmental Management Plan – Biodiversity and Ecological Enhancements Scheme

Land East of Holt Road
Horsford
Norfolk
NR10 3ED

December 2016

230311-ED-03a
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**Project** | Land East of Holt Road
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**Report Type** | Construction and Environmental Management Plan – Biodiversity and Ecological Enhancement Scheme
**Report Date** | 15/12/2016
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**Updates** | Revision – updated hoarding plan 16/12/2016
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1 INTRODUCTION

Background

1.1 This report has been instructed by Barratt David Wilson Homes.

1.2 A full planning application is being submitted for a development on land currently occupied as farmland, east of Holt Road, Horsford, Norwich. The proposed development involves the erection of 259 dwellings, together with associated public open space, landscaping, highways and drainage infrastructure works.

1.3 Tim Moya Associates undertook an Extended Phase 1 Habitat and Bat Scoping Assessment of the site in April 2016 and as a result of the findings of the survey further bat emergence/re-entry surveys were undertaken in May 2016. No bats were recorded emerging or re-entering the surveyed building. A further badger survey was recommended along with precautionary measures associated with nesting birds and reptiles.

Purpose of the report

1.4 The purpose of this report is to ensure that adverse environmental effects of the development activities are mitigated.

1.5 This report follows Barratt David Wilson Homes consultation with the Natural Environment Team at Norfolk County Council who have recommended that;

“Given that there are a number of recommended mitigation measures, and several are time specific, we would suggest that the simplest approach maybe to condition a Construction Ecological Management Plan (CEMP). This should be in line with the BS42020:2013 Biodiversity - Code of practice for planning and development, and agreed in writing by BDC before works (including clearance works) take place. This should clearly state what works will be undertaken when and by whom, and include details of enhancements that the applicant is committed to.”

1.6 The CEMP provides a framework within which measures will be implemented to comply with wildlife legislation throughout the project.

1.7 The CEMP outlines the contractors approach to environmental management throughout the construction phases with the primary aim of reducing any adverse impacts from construction on local sensitive receptors.
1.8 This document shall address issues in relation to biodiversity only. Other issues to address within the CEMP may comprise air quality, noise and vibration, contamination and waste. The aforementioned are specialist entities not within our remit.

1.9 This CEMP is a dynamic document which should be reviewed if activities or conditions on site change that may influence management measures.

1.10 This report aims to satisfy the requirements of the National Planning Policy Framework (DCLG, 2012), the British Standard, Biodiversity Code of Practice for Planning and Development and local planning policies.

1.11 This report will also include ecological enhancement measures proposed for the site to maximise the ecological value of the site and minimise the impact of the development on biodiversity. Enhancement measures will comprise the following:

- An area of locally native heathland planting will be created within northern section of the site creating habitat for the locally recorded silver studded butterfly and other invertebrate species associated with this habitat type.
- Bird, invertebrate and bat boxes will be installed within suitable habitats throughout the site.
- Additional planting will provide foraging and nesting opportunities for invertebrates and breeding birds. This will also enhance the site for commuting and foraging bats.
- Existing hedgerows will be enhanced and new hedgerows will be created.
- Hibernacula and log piles will be installed within suitable habitats throughout the site.
- Areas of open space will be created throughout the site helping reduce recreational pressures on the nearby Horsford Woods County Wildlife Site.

1.12 Long term management and monitoring of enhancement measures will be implemented on site.

Information supplied

1.13 This report has been prepared with reference to the following supplied plans, showing extent of the site boundary and the proposed development:

- Site Layout_16.2105/010_November 2016_Boyer
Site location

1.14 The site is situated within a rural environment dominated by arable farmland and coniferous woodland interspersed with small villages and B roads.

1.15 Green Lane delineates the site's northern boundary with arable land to the east, residential development to the south and residential housing to the west.

1.16 The central grid reference for the site is TG189172. The surveyed site covers approximately 11.3 hectares.
2 METHODOLOGY AND GUIDANCE

2.1 This report has been prepared in accordance with the BS 42020 Biodiversity - Code of practice for planning and development and will cover the below points;

- Risk assessment of potentially damaging construction-type activities;
- Identification of “biodiversity protection zones”;
- Practical measures (both physical measures and sensitive working practices) to avoid or reduce impacts during construction;
- The location and timing of sensitive works to avoid harm to biodiversity features;
- The times during construction when specialist ecologists need to be present on site to oversee works;
- Responsible persons and lines of communication;
- The role and responsibilities on site of an Ecological Clerk of Works (ECoW); and
- Use of protective fences, exclusion barriers and warning signs.
3 REVIEW OF ECOLOGICAL CONSTRAINTS AND OPPORTUNITIES

3.1 Tim Moya Associates undertook an Extended Phase 1 Habitat of the site in April 2016 and as a result of the findings of the survey further bat emergence/re-entry surveys were undertaken in May 2016. Table 1 below provides a summary of survey findings and identification of the ecologically sensitive receptors identified within and in association with the site and associated mitigation opportunities.
### Table 1 – Summary of Ecological Constraints

<table>
<thead>
<tr>
<th>Ecological Constraints</th>
<th>Description/comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retained Habitats</strong></td>
<td></td>
</tr>
<tr>
<td>Hedgerows / Dense scrub</td>
<td>The Phase 1 Assessment identified four species-poor intact hedgerows along the site’s northern and eastern field boundaries. Hedgerows are UK Biodiversity Action Plan habitats listed as Habitats of Principal Importance under the Natural Environment and Rural Communities Act 2006 and listed as Norfolk Biodiversity Action Plan Habitats (BAP). Pockets of dense scrub were recorded throughout the site, mainly along field boundaries and surrounding the buildings within the north-western part of the site. Tree and hedgerow losses will be kept to a few individuals with the majority being retained and protected throughout construction.</td>
</tr>
<tr>
<td>Scattered Trees</td>
<td>The site contains a high number of trees of various species and sizes. Trees were mainly located along field boundaries. The majority of peripheral trees will be retained on site and several new trees will be planted.</td>
</tr>
<tr>
<td>Horsford Wood County Wildlife Site</td>
<td>Horsford Woods County Wildlife Site (CWS) lies approximately 0.015 km north of the site’s northern boundary. Short-term, temporary, reversible indirect impacts may arise from the development to the Horsford Woods CWS. Short term reversible indirect impacts to the site may arise from noise, light and dust pollution throughout construction. There will be no night time working or lighting at night that falls on to the adjacent CWS.</td>
</tr>
<tr>
<td>All other on-site habitats including the cultivated land habitat, buildings and hard standing, amenity grassland and improved grassland will be lost to proposals.</td>
<td></td>
</tr>
<tr>
<td><strong>Species</strong></td>
<td></td>
</tr>
<tr>
<td>Bats - foraging and commuting</td>
<td>During the bat emergence/re-entry surveys on site both common pipistrelle (<em>Pipistrellus pipistrellus</em>) and soprano pipistrelle (<em>Pipistrellus pygmaeus</em>) were recorded occasionally commuting and foraging, largely commuting across the site from west to north and foraging along the tree –line parallel to the site’s northern boundary.</td>
</tr>
<tr>
<td>Badgers</td>
<td>Two mammal entrances, potentially a badger sett currently not in use, were recorded on the southern boundary of the western arable field. Badger setts are protected if they are in current use.</td>
</tr>
</tbody>
</table>
Table 1 – Summary of Ecological Constraints

<table>
<thead>
<tr>
<th>Ecological Constraints</th>
<th>Description/comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nesting Birds</td>
<td>The site includes trees, scrub and hedgerows, all of which are suitable for birds during the nesting season (March to August inclusive). The arable fields on site have potential for ground nesting birds such as skylark.</td>
</tr>
<tr>
<td>Reptiles</td>
<td>The habitats found towards the edges of the site – scrub and hedgerow – provide suitable habitat for reptiles, such as slow-worm, which have been recorded in the local area. The amenity grassland within the north-western section of the site offers good foraging and basking opportunities. Rubble piles within the amenity grassland offer good refuge and hibernation habitat.</td>
</tr>
<tr>
<td>Hedgehogs</td>
<td>The site provides suitable cover and foraging opportunities for hedgehog which may be present. The most suitable habitat for this species are the boundary features including dense scrub and hedgerows the majority of which will be retained.</td>
</tr>
<tr>
<td>Mammals, reptiles and amphibians</td>
<td>Excavations may be created throughout the construction phase that may kill or injure mammals, amphibians and reptiles.</td>
</tr>
</tbody>
</table>
4 RISK ASSESSMENT OF POTENTIALLY DAMAGING CONSTRUCTION-TYPE ACTIVITIES

4.1 The below risk assessment covers all proposed construction-type activities likely to impact upon important biodiversity on site. The risk assessment has been prepared in relation to the findings of the Extended Phase 1 Habitat Assessment and Bat Emergence/Re-entry survey for the site and identifies areas of potential conflict where proposed development activities could impact on biodiversity features.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Clearance Activities</strong></td>
<td></td>
</tr>
<tr>
<td>Removal or pruning/cutting of trees, shrubs and ground vegetation</td>
<td>Killing / injury or disturbance to nesting birds that may be using scrub, tree, hedgerow and arable field habitats on site. Killing / injury or disturbance to reptile species that may be using scrub and hedgerow habitats for refuge and foraging.</td>
</tr>
<tr>
<td>Removal of soil, rubble and other materials</td>
<td>Killing / injury of reptiles that may be occupying the grassland habitats at the time of site clearance. Killing / injury of reptiles that may be occupying rubble piles located within the amenity grassland habitat within the north-western section of the site. Accidental physical damage to retained trees / hedgerows.</td>
</tr>
<tr>
<td>Demolition of buildings and structures</td>
<td>Killing / injury or disturbance to nesting birds that may be using arable field and scrub and tree habitats on site.</td>
</tr>
<tr>
<td><strong>Site set-up</strong></td>
<td></td>
</tr>
<tr>
<td>Location of site offices, site huts, temporary latrines (including their drainage)</td>
<td>Killing / injury of reptiles that may be occupying the grassland habitats at the time of site clearance. Killing / injury or disturbance to nesting birds that may be using arable field and scrub and tree habitats on site.</td>
</tr>
<tr>
<td>Temporary storage areas and stockpiles for soils, materials, spoils and waste;</td>
<td>Killing / injury of reptiles that may be occupying the grassland habitats at the time of site clearance.</td>
</tr>
<tr>
<td>Site lighting</td>
<td>Disturbance to commuting and foraging bats that may be using peripheral hedgerow, tree and scrub habitats as a foraging and commuting resource. Disturbance to Horsford Woods County Wildlife Site and its associated habitats and species.</td>
</tr>
<tr>
<td>Areas for plant maintenance and for storage of oils, fuels and chemicals</td>
<td>Death of badgers, birds, small mammals and reptiles that may be occupying the site due to ingestion of spilt materials. Potential damage to trees and hedgerows through spillages of chemicals.</td>
</tr>
<tr>
<td>Activity</td>
<td>Potential Impacts</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
</tr>
<tr>
<td><strong>Site Clearance Activities</strong></td>
<td></td>
</tr>
<tr>
<td>Establishment of haul roads (e.g. construction of rubble or concrete temporary roads);</td>
<td>Killing/injury of small mammals, reptiles and badgers that may be crossing roads during the construction phase.</td>
</tr>
<tr>
<td>Site fencing</td>
<td>Disruption/severance of badger runs and paths.</td>
</tr>
<tr>
<td><strong>Groundworks</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Ground investigations, foundations, excavations and piling, temporary earthworks, tunnelling (including the necessary space to operate cranes and large machinery) | Killing / injury of reptiles that may be occupying the grassland at the time.  
Accidental physical damage to retained trees / hedgerows  
Killing / injury and/or disturbance to badgers that may be occupying setts on or near the site.  
Killing / injury or disturbance to nesting birds that may be using arable field habitats on site  
Killing / injury of mammals (including badgers), reptiles that may fall into excavations |
<p>| Installation of underground services (e.g. pipes, electricity, gas, telecommunications cables, foul and surface water drains) | Killing / injury and/or disturbance to badgers that may be occupying setts on site. |
| <strong>Assembly areas for components of construction</strong> | |
| Assembly areas for dry trades (e.g. steel works and reinforcements) | Killing / injury of reptiles that may be occupying the grassland at the time. |</p>
<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Clearance Activities</strong></td>
<td></td>
</tr>
<tr>
<td>Assembly areas for wet trades (e.g. concrete pours and batching).</td>
<td>Killing / injury of reptiles that may be occupying the grassland at the time.</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td></td>
</tr>
<tr>
<td>Night time working</td>
<td>Killing / injury and/or disturbance to badgers that may be foraging on site.</td>
</tr>
<tr>
<td></td>
<td>Disturbance to bats using the site or habitats close to the site as a foraging and commuting resource.</td>
</tr>
<tr>
<td>Dust and noise</td>
<td>Habitat degradation to retained trees and hedgerows on site via dust deposition.</td>
</tr>
<tr>
<td></td>
<td>Noise disturbance to roosting bats adjacent to the site.</td>
</tr>
<tr>
<td></td>
<td>Noise disturbance to nesting birds on and adjacent to the site.</td>
</tr>
<tr>
<td>Increase in traffic movements</td>
<td>Noise disturbance and dust deposition to nearby Horsford Woods County Wildlife Site (CWS).</td>
</tr>
<tr>
<td>(deliveries, materials, etc.)</td>
<td>Killing / injury of reptiles that may be occupying the grassland at the time.</td>
</tr>
<tr>
<td><strong>Environmental Incidents</strong></td>
<td></td>
</tr>
<tr>
<td>Fuel leaks and spills</td>
<td>Habitat degradation to retained trees and hedgerows on site via pollution incidents.</td>
</tr>
<tr>
<td>Fires and burning of wastes</td>
<td>Accidental lighting of trees, scrub and hedgerows.</td>
</tr>
</tbody>
</table>
5 IDENTIFICATION AND PROTECTION OF BIODIVERSITY PROTECTION ZONES

5.1 The following habitats have been assessed as having ecological value on site and within the wider landscape and will be retained and protected throughout the construction phase. These are shown in Figure 1 below;

- Hedgerows, scrub and scattered trees bordering the site and field boundaries (as well as any species using these features including nesting birds, reptiles, hedgehogs and potentially badgers).
- Horsford Woods County Wildlife Site and its associated habitats and species.

5.2 Construction-type activities will be subject to timing and access restrictions to ensure that the aforementioned biodiversity features are protected throughout the development.
6  PRACTICAL MEASURES (BOTH PHYSICAL MEASURES AND SENSITIVE WORKING PRACTICES) TO AVOID OR REDUCE IMPACTS DURING CONSTRUCTION

6.1 The below practical measures will be implemented to minimise the risks identified within section 4 of this report. These measures will ensure that biodiversity features are protected during construction or development implementation.

**Retained trees, hedgerows and scrub/shrubs**

6.2 Protection of the retained trees will be undertaken in accordance with British Standard 5837: Trees in relation to design, demolition and construction. Calculated Root Protection Areas (RPA) will be protected through the erection of tree protection barriers to the specification within the arboricultural report for the site (TMA 2016). This will be implemented prior to the commencement of any construction or site clearance operations. Retained hedgerows will also be protected by the specified protection barriers. The approximate locations of proposed tree and hedgerow protection is shown on Figure 1 within this report and on the tree protection plans for the site (drawing numbers 230311-P-22-01-06).

6.3 Only tree works specified within the arboricultural assessment (TMA 2016) document may be carried out. Any uncertainty regarding trees to be pruned will be immediately confirmed with the arboricultural consultant and local authority tree officer.

6.4 All key / critical activities that will affect trees during construction will be regularly inspected and monitored by the approved arboricultural consultant with at least one visit per month during the construction phase. Reports will be issued to the client and local authority. Supervision visits will occur as follows;

- Inspection of tree works, tree protection prior to demolition and construction works;
- Monthly visits to inspect tree protection measures; and
- During works that may affect retained trees.

6.5 Protective fencing will be constructed of robust barriers fit for the purpose of excluding demolition and construction traffic. The main contractor will inform the local authority
officer and the arboricultural consultant that tree protection is in place before demolition or site clearance works commence.

6.6 Once installed, the areas protected by fencing will be regarded as a construction exclusion zones where no construction or site activity will take place. Fencing should not be removed or altered without prior consultation with the ECoW. Barriers would be maintained to ensure that they remain ‘fit for purpose’ for the duration of construction activities on site.

6.7 All weather notices would be attached to the protective fencing to indicate that construction activates are not permitted within the fenced area. Details of appropriate signage can be seen on the Tree Protection Specification Plan drawing number 230311-P-25 (TMA, 2016).

6.8 All site staff and contractors will be made aware of the tree protection fencing on site and the requirement to ensure its protection. A copy of the Tree Protection Plan will be displayed in the site office and canteen as a point of reference for all site operatives.

6.9 No site offices, permanent and temporary access, material storage, contractor parking, working space or scaffolding will be provided within the RPAs of retained trees.

6.10 The construction areas within the site will have clearly-defined set-down areas, haul routes, pedestrian walkways and plant parking and manoeuvring areas, thereby mitigating the potential for accidental physical damage to retained trees. The contractor will report any damage to trees or shrubs, whether caused by construction activities or from any other cause, to the ECoW immediately.

6.11 Oil, bitumen, cement or other materials that are potentially injurious to trees and hedgerows should not be stored within 10m of a tree bole or hedgerow. No fires will be lit where flames are anticipated to extend to within 5m of tree foliage, branches or trunk or hedgerow, taking into consideration wind direction and size of fire. Notice boards, telephone cables or other services should not be attached to any part of a retained tree.

6.12 Areas requiring no-dig methods of construction are illustrated within the tree protection specification plan Drawing number 230311-P-25 (TMA,2016). No-dig will involve either excavating existing hard surfacing down to sub base and building up, or laying materials to create new hard surfacing onto existing ground levels. No
scraping or reducing of existing soft ground levels in the areas indicated on this plan will be undertaken, and all construction in these areas will avoid the use of machinery.

6.13 The fence shall remain in place until the development is completed and all site machinery and materials taken off site.

**Horsford Woods County Wildlife Site**

6.14 Horsford Woods County Wildlife Site (CWS) lies approximately 0.015 km north of the site’s northern boundary.

6.15 Short-term, temporary, reversible indirect impacts may arise from the development to the CWS. Indirect disturbance to the site may arise from noise, light and dust pollution throughout construction.

6.16 The site’s northern boundary will be delineated with hoarding during construction. This will act as a buffer against indirect impacts to the CWS from light, noise and dust. The location of protective hoarding is shown within section 5 of this report. Installation and maintenance is detailed within section 6 of this report.

**Impacts to Badgers**

6.17 The habitats on the edges of the site offer suitable areas for foraging and shelter for badgers. Two mammal entrances, potentially a badger sett currently not in use (i.e. no signs of current activity, e.g. latrines, badger footprints, were recorded), were recorded on the southern boundary of the western arable field. No further evidence of badgers was recorded within the site.

6.18 According to published guidelines (CCW, 2011), the following activities should be avoided:

- Any excavation or machinery within 10 m of the sett (including using hand tools);
- Light or heavy machinery (particularly for excavation) within 20 m of the sett; and
- Using heavy machinery within 30 m of the sett.

6.19 A detailed badger survey will be undertaken a month prior to commencement of works. This survey will confirm whether the mammal entrances are in current use by badgers or not, and/or if further signs of current badger activity are present on site.
6.20 Should the survey find the setts still to be inactive and no further current evidence of badgers is identified on or within close proximity to the site, the works may proceed without constraint.

6.21 If the survey reveals that the sett has become active and/or further badger entrances are present, in order to avoid the need for further surveys and potential delays to the works, there will be no building works or excavations should take place within 30 m of the setts. Protective fencing will be used during construction to prevent accidental disturbance or damage to badger setts e.g. by storage of materials, vehicle movements etc.

6.22 In addition to the aforementioned precautions any open trenches or similar must be covered at night or installed with a wildlife ladder to prevent badger entrapment. Any soil piles must be covered over or compacted down to minimise the risk of badgers digging in to create setts.

6.23 Should the setts be in current use by badgers and disturbing works are necessary and unavoidable within 30 m of the setts, a Natural England licence may be required for temporary disturbance or closure of the sett(s). A licence is only likely to permit activities between July and November (inclusive) to avoid the badger breeding season.

**Impacts to Nesting Birds**

6.24 The site includes trees, scrub and hedgerows, all of which are suitable for nesting birds during the nesting season (March to August inclusive). The arable fields on site have potential for ground nesting birds such as skylark. Several bird species were recorded during the Preliminary Ecological Survey along with several returned from the desk study. No ground nesting birds were identified during the Preliminary Ecological Appraisal.

6.25 It is recommended that vegetation removal, building demolition and disturbance to the arable fields on site is only undertaken outside the nesting season to avoid destruction of active nests. Vegetation removal, building demolition and disturbance to the arable fields may only be undertaken during the nesting season if a careful check by a suitably experienced ecologist/ ECoW can confirm that no active nests are present. If bird nests are present within vegetation, buildings to be removed or the arable land to be disturbed, they must be left *in situ* and not disturbed until all the young have fledged and cease to return to the nest.
6.26 The nesting season for nesting birds (March to August) coincides with the majority of the active season for reptiles (March to September, weather dependent). When removing habitats where both may be present i.e. dense scrub and hedgerow bases, careful timing is required to avoid impacting active bird nests whilst also protecting reptiles from killing or injury. Ideally, dense vegetation should be removed in September, when birds have largely finished nesting, but reptiles are still active and are therefore at lower risk of harm. Ground clearance should be undertaken under the supervision of a suitably experienced ecologist to minimise the risk of harm to reptiles. Alternatively, vegetation should be removed down to 15 cm height during the winter (October to February) to remove bird nesting habitat, and then cleared completely to ground level or below during the summer (March to September), when reptiles are active. This phased timing minimises the risk to both reptiles and nesting birds.

Impacts to Reptiles

6.27 The habitats found towards the edges of the site – scrub and hedgerow – provide suitable habitat for reptiles, such as slow-worm, which have been recorded in the local area. The amenity grassland within the north-western section of the site offers good foraging and basking opportunities. Rubble piles within the amenity grassland offer good refuge and hibernation habitat.

6.28 Removal of dense scrub and hedgerows will be undertaken as specified above. Removal of long amenity grassland (> 15cm in height) will be supervised by the ECoW and will be strimmed carefully using hand tools in two passes (first to a height of no less than 30cm, the second to ground level) from the centre of the suitable habitat out to its edges, to flush any reptile species into adjacent habitats of the site or peripheral habitats that will be retained and protected during construction activities. Following this the grassland will be regularly mown prior to the start of construction activities to ensure the site remains unsuitable for reptile species.

6.29 Rubble piles to be carefully dismantled by hand under supervision of the ECoW.

6.30 These approaches can only be undertaken between March and November (when temperatures are not below 10°C) when reptiles are active. It is not appropriate for use between November and March, when reptiles are in hibernation.

Disturbance to foraging and commuting bats by lighting

6.31 The line of trees parallel to the site’s northern boundary and adjacent Horsford Woods CWS provide a valuable foraging and commuting corridor for bats in the landscape.
Trees, hedgerows and scrub located around the peripheries of the site may also provide valuable commuting and foraging corridors.

6.32 In order to avoid a detrimental impact on bats using the site, the following measures will be implemented within the lighting scheme during and post construction;

- There will be no increased light spillage on to the hedgerows, scattered trees and scrub that delineate field boundaries on site, where bats are most likely to forage and commute (protection zones as stipulated within section 10 of this report);
- Lighting will be restricted to the interior of the site and should be kept to a low level;
- Minimise light spill, through use of lighting hoods, and setting the height and angle appropriately;
- Application of low-intensity (sodium lamps or similar) lighting, where possible;
- Reduce the light intensity to the minimum required for safety and security;
- Set lighting curfews, e.g. lights off at night;
- Strategic planting to shield sensitive areas; and
- Where security lamps are used these should use a trigger to illuminate them (e.g. infra-red detector), and switch off after a short period, rather than remaining on all night.

Impacts from dust pollution

6.33 To prevent dust deposition onto protected habitats on site dust will be controlled by regular damping down of the road on dry days. The site manager will be responsible to ensure the methods of best practice are implemented to ensure that minimal dust is apparent on site throughout construction.

Impacts from noise and vibration

6.34 Noise and vibration during the construction process have potential to cause disturbance to wildlife using protected peripheral habitats on site and within the adjacent Horsford Woods CWS. This may be derived from plant or construction related traffic both on site and on the local road network. Noise and Vibration levels associated with construction related activities will comply with BS5228: 2009. Noise levels be monitored weekly and also during any identified noisier activities.
6.35 Further mitigation measures which may be implemented to control noise levels during construction will be provided within the Construction Method Statement for the site. This document will be provided to all contractors and will be made available in the site office and canteen as a point of reference for all site operatives.

**Risk avoidance from pollution incidents**

6.36 To control this risk of pollution incidents, the following measures will be taken:

- Fuel will be stored in a lockable, bunded tank.
- Spill kits will be available on site at high risk locations.
- A Pollution Risk Assessment will be produced by the Site Manager (and updated as necessary).
- A Pollution Incident and Emergency Response Plan will be prepared by the Site Manager.

6.37 Further mitigation measures to prevent pollution incidents will be provided within the Construction Method Statement for the site. This document will be provided to all contractors and will be made available in the site office and canteen as a point of reference for all site operatives.

**Contingency measures for unexpected events**

6.38 The provision of training and awareness on existing biodiversity features on site and the potential for protected species and invasive species previously not identified on site will be provided through “Tool box talks” presented by the ECoW. This will include appropriate measures to undertake if a protected species or invasive species is discovered during construction works.
7 THE TIMING OF SENSITIVE WORKS

7.1 Table 2 below provides the timing of specific mitigation measures in association with works to avoid or reduce impacts.
Table 2 – Timing of Mitigation Measures

<table>
<thead>
<tr>
<th>Habitat or features</th>
<th>Activity</th>
<th>Timing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badgers</td>
<td>Pre-works survey to be undertaken by an appropriately-experience ecologist of the site area and accessible off-site areas within 30 m.</td>
<td>March 2017/all year round, within a month of works commencing - Subject to planning permission being granted.</td>
<td>This survey will confirm whether the mammal entrances are in current use by badgers and/or if further signs of current badger activity are present on site. Should the setts be in current use by badgers and disturbing works are necessary and unavoidable within 30 m of the setts, a Natural England licence may be required. A licence is only likely to permit activities between July and November (inclusive) to avoid the badger breeding season. In the event that any potential evidence of badgers within the site boundary is noted during the construction works an ecologist will be contacted to undertake a site survey.</td>
</tr>
<tr>
<td>Breeding Birds</td>
<td>Pre-works inspection of any suitable nesting vegetation to be cleared</td>
<td>September 2017 - Subject to planning permission being granted.</td>
<td>Removal in September, when birds have largely finished nesting, but reptiles are still active. Alternatively, remove vegetation down to 15 cm.</td>
</tr>
<tr>
<td><strong>Reptiles</strong></td>
<td><strong>Trees, hedgerows, northern perimeter of site (protection of Horsford Woods CWS).</strong></td>
<td><strong>General measures</strong></td>
<td><strong>General Measures</strong></td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Removal of suitable reptile habitat – Hedgerow bases, dense scrub, rubble piles, amenity grassland within the north-western section of the site (if more than 15 cm in height).</td>
<td>Installation of protective fencing</td>
<td>Ecological ‘Toolbox Talk’</td>
<td>Ongoing construction works</td>
</tr>
<tr>
<td>March 2017 before the start of construction activities - Subject to planning permission being granted. See breeding bird timing stipulations for clearance of habitats suitable for reptiles and breeding birds.</td>
<td>March 2017/all year round but prior to the start of construction activities - Subject to planning permission being granted.</td>
<td>March 2017 - Subject to planning permission being granted.</td>
<td>All year round as appropriate</td>
</tr>
<tr>
<td>Undertake habitat clearance in an ecologically sensitive manner under the direct supervision of the ECoW. Can only be undertaken between March and November (when temperatures are not below 10°C) when reptiles are active and not in hibernation.</td>
<td>Tree and hedgerow protective fencing to be erected as per specifications shown within the arboricultural report (TMA, 2016).</td>
<td>To be provided by the ECoW before the commencement of construction activities.</td>
<td>All fuel, oil and chemical storage will be sited on an</td>
</tr>
</tbody>
</table>
impervious base within a bund and secured. Leaking or empty oil/fuel drums will be removed from the site immediately and disposed of via a licensed waste disposal contractor. Refuelling of mobile plant will be carried out in a designated area, preferably on an impermeable surface and away from any drains or watercourses. A spill kit will be available at all times during the refuelling procedure. Vehicles will be attended at all times during refuelling. Daily checks of hoses and valves will be carried out for signs of wear. Valves will be turned off and securely locked when not in use. Diesel pumps and similar equipment (if required) will be placed on drip trays to collect minor spillages. These would be checked regularly and any accumulated oil removed for disposal at registered disposal area.
8 RESPONSIBLE PERSONS AND LINES OF COMMUNICATION

8.1 It is necessary to ensure that the project team and know who to liaise with, who the client is and which person is undertaking each required task along with details of personnel and lines of communication necessary for its full implementation, including those responsible for providing the following in relation to biodiversity conservation;

   a) Advice and monitoring in relation to regulations, legal consents, planning conditions, environmental procedures and contractual arrangements;

   b) Correct installation and maintenance of physical protection measures;

   c) Training and toolbox talks for staff;

   d) Contingency measures in the event of an accident or occurrence of other potentially damaging incidents; and

   e) Periodic reporting on the success of a) to d) as required, for example, by planning conditions.

8.2 The Principal Contractor (detail below) will maintain a record of all environmental monitoring during the construction process, which should be made available for inspection by any relevant statutory bodies as required. Monthly reports will be submitted by the Principal Contractor with input from the ECoW as required to provide evidence that the monitoring has been undertaken.

8.3 The CEMP will be reviewed jointly by the Principal Contractor and ECoW every three months during the life of the project to ensure that it remains suitable to ensure the environmental commitments are being met. Any significant changes to the CEMP will be submitted to the Local Authority for review prior to the relevant construction activity commencing.

<table>
<thead>
<tr>
<th>Principal Contractor</th>
<th>Ecological Clerk of Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Barratt David Wilson Homes</td>
<td>Emma Reid</td>
</tr>
<tr>
<td></td>
<td>Senior Ecologist with over 6 years’ experience of providing toolbox talks and supervision on a variety of construction sites. Emma has vast experience of undertaking protected</td>
</tr>
</tbody>
</table>
species surveys and holds personal survey licences for barn owl, dormouse, great crested newt and bats.
Or competent person with equal or similar experience.

<table>
<thead>
<tr>
<th>Company</th>
<th>Barratt David Wilson Homes</th>
<th>Tim Moya Associates</th>
</tr>
</thead>
</table>

8.4 All works at all stages are to be overseen by the Principal Contractor whose duties will include:

- Arrange site-wide species monitoring as required during the development;
- Oversee the agreed programme of environmental monitoring;
- Contribute to communication on environmental matters with stakeholders and statutory bodies;
- Arrange appropriate inspections and audits to ensure compliance with the CEMP;
- Monitor implementation of any corrective action required;
- Monitor the developer’s management of environmental complaints;
- Provide a detailed plan for managing the requirements of the CEMP prior to work commencing;
- Ensure that practical arrangements are in place to comply with the CEMP;
- Keep records to demonstrate implementation of the CEMP;
- Ensure full co-operation with the site environmental inspection and audit programme;
- Keep records to demonstrate implementation of the CEMP;
- Monitor the environmental performance of sub-contractors and provide direction as necessary;
- Co-ordinate the periodic review of the CEMP;
- Weekly checks of the protective tree fencing to ensure its integrity and correct positioning, with repairs made as necessary and weekly monitoring of...
boundary areas to check for the presence of any signs of possible badger digging;

- Ensure that all appropriate ecological reports etc. are kept in the site office available for reference at any time. Contact details for an appropriate ecological consultant shall also be kept in the same location;

- Ensure that all appropriate site protection measures are implemented in order to ensure no inadvertent effect upon ecological features; and

- Ensure an appropriate ECoW is present on-site as required to ensure the measures as recommended within this CEMP (and any other relevant ecological documents) are followed.

8.5 Duties of the ECoW are provided within the following section.
9 ROLE AND RESPONSIBILITIES ON SITE OF AN ECOLOGICAL CLERK OF WORKS (ECOW)

9.1 The British Standards BS42020 Biodiversity Code of Practice defines an Ecological Clerk of Works as;

“Person who has the ecological qualifications, training, skills and relevant experience to undertake appropriate monitoring and to provide specialist advice to “development” site personnel on necessary working practices required to i) safeguard ecological features on site and ii) aid compliance with any consents and relevant wildlife legislation related to the works.”

9.2 Emma Reid of Tim Moya Associates or alternative competent personnel who fulfils the aforementioned criteria will act as the ECoW for the scheme. The specific role and responsibilities of the ECoW will comprise the following:

- Provide tool-box talks for all non-ecological personnel with appropriate training and information. This information will include the ‘Toolbox Talk Flyers’, copies of which will also be displayed prominently on site. A training record shall also be signed by all on-site staff to confirm that appropriate training has been received;

- Provide input into monthly reports to be submitted by the Principal Contractor as required to provide evidence that the monitoring has been undertaken;

- To review the CEMP jointly with the Principal Contractor every six months during the life of the project to ensure that it remains suitable to ensure the environmental commitments are being met. Any significant changes to the CEMP will be submitted to the Local Authority for review prior to the relevant construction activity commencing;

- To act as the developer’s main point of contact in relation to environmental issues and liaison officer with relevant statutory bodies as necessary;

- Carry out on-site monitoring and site investigations / supervision relating to ecological constraints and post-construction/implementation success of mitigation methods/ enhancement measures and aftercare of sensitive habitats and features;
• To be available and ‘on-call’ to advise the site manager regarding any of the above or additional ecological issues as necessary; and

• Ensure that an appropriately qualified ecologist undertakes the required on-site surveys etc. in the event that the ECoW cannot attend site.
10 USE OF PROTECTIVE FENCES, EXCLUSION BARRIERS AND WARNING SIGNS

Hedgerows and trees

10.1 Protection of the retained trees, dense scrub and hedgerows will be undertaken in accordance with BS5837 ensuring that they are protected through the erection of tree protection barriers to the specification provided within the arboricultural report (TMA, 2016).

10.2 The approximate locations of proposed tree and hedgerow protection are shown on the Tree Protection Plan (Drawing No.230311-P-22-01).

Horsford Woods County Wildlife Site

10.3 The site’s northern boundary will be delineated with hoarding. This will act as a buffer against indirect impacts to the CWS from light, noise and dust pollution.

10.4 The approximate locations of hoarding are shown on Figure 1 within this report.

Protection of badger setts if discovered

10.5 Protective fencing will be used during construction to prevent accidental disturbance or damage to badger setts e.g. by storage of materials, vehicle movements etc if active setts are identified during the update badger survey.

Installation and maintenance of fencing

10.6 Protective fencing/hoarding will be erected before any materials or machinery are brought onto the whole or part of a site and before any demolition, development or removal of soil or vegetation commences. Once erected, fencing will not be removed or altered without prior consultation with the Ecological Clark of Works (ECoW).

10.7 The purpose of protective fencing, wildlife exclusion barriers and warning signs, and the potential consequences of removing or damaging them, should be explained to all site personnel by the ECoW through appropriate toolbox talks.

10.8 Fencing/hoarding will be maintained by all site workers to ensure that they remain ‘fit for purpose’ for the duration of construction activities on site. Appropriate signage will be securely fixed on fencing/hoarding in appropriate numbers and locations to inform people of the importance of the features it protects and to indicate that construction activates are not permitted within or beyond the protected area. Signs will be written in plain language and will be large enough to be visible and clearly legible from the
cab of any construction machinery that might be operating in close proximity. Lost or damaged signs should be replaced at the earliest possible opportunity.
11 SUMMARY OF RELEVANT LEGISLATION FOR PROTECTED SPECIES RECORDED ON OR WITH POTENTIAL TO BE ON SITE

Bats

11.1 All species of bat and their breeding sites or resting places (roosts) are protected under Regulation 41 of The Conservation of Habitats and Species Regulations 2010 and Section 9 of the Wildlife and Countryside Act 1981. It is an offence for anyone intentionally to kill, injure or handle a bat, to possess a bat (whether live or dead), disturb a roosting bat, or sell or offer a bat for sale without a licence. It is also an offence to damage, destroy or obstruct access to any place used by bats for shelter, whether they are present or not.

Badgers

11.2 Badgers are protected under UK law by the Protection of Badgers Act 1992, which protects the animals from harm and injury and from disturbance, including whilst using a sett. Habitats on site of potential interest to badgers included the hedgerows, grassland and arable planting as sources of foraging/commuting.

Nesting birds

11.3 All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to kill, injure or take wild birds; take, damage or destroy the nest of wild birds while it is in use or being built; or take or destroy the eggs of wild birds.

11.4 Certain bird species are listed on Schedule 1 of The Wildlife and Countryside Act 1981 (as amended). Under this legislation they are afforded the same protection as all wild birds and are also protected against disturbance whilst building a nest, or on or near a nest containing eggs and or unfledged young.

Reptiles

11.5 All species of native reptiles are protected against killing or injury under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).
12 BIODIVERSITY ENHANCEMENT MEASURES

12.1 In accordance with the NPPF, Policy 1 of the Joint Core Strategy for Broadland, Norwich and South Norfolk and Policies EN1 and EN2 of the Development Management DPD, suggested opportunities for biodiversity enhancement are set out below. It should be noted that current landscaping plans may be subject to minor amendments any changes made will be identified and enhancement measures will be appropriately amended. The exact locations of enhancement measures will be provided within the Landscaping Strategy for the site once it has been finalised.

Bats

12.2 Tree planting throughout the site will enhance the site for commuting and foraging bats and provide connectivity to suitable habitats within the local and wider environment (See Landscape Strategy Plan, Drawing number 1477A203, Liz Lake Associates October 2016 for further details on planting schemes). The most notable areas in which landscaping will be enhanced are as follows:

- Lime (Tilia) trees will be planted around the village green;
- Heathland planting pockets appropriate to the North Norfolk landscape along the site’s northern boundary;
- Shrub and herbaceous planting throughout the site;
- Retention of the majority of existing trees along the peripheries of the site;
- Locally native tree enhancement planting on Green Lane;
- New tree belts will be created throughout the site; and
- Approximately 10 new native hedgerows will be planted along the peripheries of the site.

12.3 The inclusion of 5 bat boxes installed on existing mature peripheral trees will provide new roost sites for bats within the local area. A variety of bat boxes will be used including 2 x Schwegler 1FF bat box, 1 x Schwegler 2F bat box, 1 x Schwegler 1FD bat box and 1 x 3FF Schwegler bat box. Bat boxes will be located in sheltered spots and at placed at a height of at least 3 metres from the ground. Boxes will be arranged so that a number of different aspects are covered.
Breeding Birds

12.4 Enhancements for breeding birds will include:

- Five bird boxes with 25mm holes will be installed upon existing mature trees throughout the site. Bird boxes will be installed facing north and east, thus avoiding strong sunlight and wet winds.

- Two house sparrow terraces (*Passer domesticus*), two house martin nest boxes (*Delichon urbicum*) and two starling (*Sturnus vulgaris*) boxes will be integrated permanently into the fabric of buildings. It is recommended that the 1SP Schwegler Sparrow Terrace, 9A Schwegler House Martin Nest Boxes and Starling Box - Custom Brick Facing are used. These boxes will be of particular value as these species are currently facing steep declines in the UK.

Tree Planting

12.5 Additional trees shall be planted throughout the site including planting around the proposed village green, extensive street planting along proposed roads and vegetative boundary planting along Green Lane (See Landscape Masterplan, Drawing number 1477 A2 02C, Liz Lake Associates). Tree planting will include locally native woody species or species with a known attraction or benefit to local ecology, with species bearing nectar, berries, fruit and nuts providing food for birds, small mammals and invertebrates. Native tree species will include; field maple (*Acer campestre*), English oak (*Quercus robur*), Scots pine (*Pinus sylvestris*) and silver birch (*Betula pendula*). Tree planting will provide a good foraging resources for birds, invertebrates and small mammals and connectivity to habitats within the local and wider environment.

Public Open Space

12.6 Large areas of public open space will be provided throughout the development (See Landscape Strategy, Liz Lake Associates, 2016). These spaces will be multifunctional providing space for recreational games, dog walking, exercise, sport and ecological enhancement through green link tree planting. These areas will provide foraging resources for birds, invertebrates and small mammals and help to reduce recreational pressures to the nearby Horsford Woods CWS.
Native Heathland Planting

12.7 An area of locally native heathland planting will be created within the northern section of the site. The aim of this area will be to attract the studded blue butterfly (*Plebejus argus*), a Section 41 species of principal importance under the NERC Act in England, previously recorded within the nearby Horsford Woods CWS (8 records were returned from the data search requested from Norfolk Biodiversity Information Centre). This species is rare and is associated with heathland, sand dunes and chalk/limestone grassland habitats.

12.8 This habitat will incorporate a mosaic of heathland plant species of different stages and a continual presence of early successional vegetation, which will encourage populations of the symbiotic ants which the butterfly is often associated with. The habitat will also support patches of bare ground suitable for egg laying. Plant species will include heather (*Calluna vulgaris*), bell Heather (*Erica cinerea*) and Western gorse (*Ulex gallii*) which are often associated with the butterfly.

12.9 This habitat area along with additional tree planting on the northern boundary of the site will act as a buffer zone separating housing within the development site from the adjacent Horsford Woods CWS.

Shrub/herbaceous Planting

12.10 The planting scheme throughout the site will incorporate flowering shrubs and evergreen shrubs and herbaceous species providing food for birds, small mammals and invertebrates. Species including David viburnum (*Viburnum davidii*), English lavender (*Lavandula angustifolia*), Darwin’s barberry (*Berberis darwinii*), red-barked dogwood (*Cornus alba*), hebe species (*Hebe sp.*), skimmia (*Skimmia japonica*), elephant ear (*Bergenia sp.*) and Chinese anemone (*Anemone hupehensis*) will be used.

Hedgerows

12.11 Approximately 10 new native hedgerows will be planted along the peripheries of the site. Hedgerows will be formed of native whips of local provenance. Hedgerow species will include; common hawthorn (*Crataegus monogyna*), field maple, silver birch, common hornbeam (*Carpinus betulus*), common hawthorn (*Crataegus monogyna*), wild cherry (*Prunus avium*), elder (*Sambucus nigra*) and rowan (*Sorbus aucuparia*). These will provide winter seeding for bird species, bird nesting
opportunities as well as a foraging and refuge resource for small mammals, reptiles and invertebrates. Hedgerows will also provide connectivity for wildlife throughout the site and to habitats within the local and wider area.

Log piles

12.12 Logs derived from the felling of trees on site will be used to create three log piles within the heathland planting habitat adjacent to existing retained trees. The log/brash/dead wood piles will provide a hibernation, feeding and shelter resource for amphibians, small mammals and invertebrates. The log piles will be 1 m³ located in shaded locations.

Hibernacula

12.13 Two hibernacula will be installed; one within the heathland planting and one within the amenity grassland habitat along the site’s southern boundary. These will provide refuge, basking and hibernation habitat for invertebrates, small mammals and reptiles. See Appendix 1 for hibernacula design. Each hibernacula should be at least 4 m long, 2 m wide and 1 m tall. Hibernacula will be located in sunny, well-drained and sheltered positions that are neither too dry nor prone to winter flooding or freezing. The hibernacula will be located below ground level by excavating a pit and infilling with a mixture of topsoil, rubble, brash and logs/wood. Wood chippings or loose topsoil can be used to pack the largest cavities.

Invertebrate boxes

12.14 Two invertebrate boxes will be provided throughout the site; within the shrub/herbaceous planting habitat and within the heathland planting habitat, to attract invertebrates, particularly bees, which are in decline across the. Boxes should be located in the driest, sunny and sheltered position possible, ideally south facing. Ideally boxes should also be located as close as possible to large areas of pollen and nectar forage; and sited away from bird feeders and bird nest boxes. The "Bug mansion" model is recommended, supplied by NHBS (https://www.nhbs.com/title/162125/bugmansion). These boxes can be attached to a post, fence or pole.
Long Term Monitoring and Management

12.15 To assess the effectiveness of mitigation and enhancement measures the below long term management will be undertaken on site.

- Established hedgerows will be cut outside of the nesting bird season twice annually in February and October – December. More information on cutting regimes can be found within the Landscape Strategy for the site.
- All wildlife boxes, log piles and hibernacula will be checked annually by a suitably qualified ecologist for five years starting one year after completion of the development to ensure that they are still present and undamaged. Any damage or loss will be rectified by repair or replacement.
- The heathland habitat on site will be managed twice annually to maintain its suitability for the silver studded butterfly and hymenoptera species (bees, wasps, ants, and sawflies) often associated with this habitat. A disturbance regime will be implemented to prevent vegetation succession and dense scrub to develop which could prevent access for invertebrate assemblages. This will comprise scrub removal/maintenance and the careful removal of topsoil within bare ground areas to maintain its open structure.
- The removal of scrub and topsoil will be carried out between November and February which is outside of the main invertebrate activity and nesting bird period.
- The results of on-going monitoring will be reported by the ecologist/ECoW. Where results show that conservation aims and objectives are not met the report will set out how contingencies and/or remedial action will be implemented.
REFERENCES

- Broadland District Council (2015). Development Management DPD.
- Tim Moya Associates (2016). Extended Phase 1 Habitat Assessment and Bat Scoping Survey.
Appendix 1

Hibernacula Design
inert, clean fill: hardcore, brick rubble, logs, sleepers etc plus loose topsoil

100cm min

200cm min

cap: topsoil, ideally with turf covering

margins to have fill exposed, allowing access

surrounds: rough vegetation
• Habitat Surveys (Extended Phase 1/Walkover/Botanical)
• Protected Species Surveys
• Ecological Mitigation & Licencing
• BREEAM & CFSH
• Ecological Management Plans
• Hedgerow Surveys
• Landscape Analysis
• Arboricultural & Ecological Reports for Planning
• Feasibility Tree Surveys
• British Standard 5837 Tree Surveys
• Tree Constraints Reports & Drawings
• Appeal Statements & Proofs
• Expert Witness
• Evidence at Hearings & Public Inquiries
• Method Statements to Satisfy Planning Conditions
• Design Solutions
• Landscape Plans
• Tender Documents & Drawings
• Supervision & Inspection of Works
• Contract & Project Management
• Health & Safety Surveys
• GPS Surveys
• Computerised Tree Population Surveys
• CAD Plans & Consultancy
• Subsidence Risk Assessments
• Mortgage & Insurance Reports
• TPO Review
• Local Government Officer Contracts

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