

HOGWOOD FARM, FINCHAMPSTEAD

DETAILED ECOLOGICAL PERMEABILITY SCHEME – PARCEL 6

Prepared for Vistry Thames Valley

by

Hankinson Duckett Associates

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hankinson duckett associates

t 01491 838175 **f** 01491 838997 **e** consult@hda-enviro.co.uk **w** www.hda-enviro.co.uk
The Stables, Howbery Park, Benson Lane, Wallingford, Oxfordshire, OX10 8BA

Hankinson Duckett Associates Limited Registered in England & Wales 3462810 Registered Office: The Stables, Howbery Park, Benson Lane, Wallingford, OX10 8BA

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1 INTRODUCTION

1.1 Site location and summary description

1.1.1 This report describes a Detailed Ecological Permeability Scheme in relation to Parcel 6 of the development of approximately 110ha of land at Hogwood Farm, Finchampstead. The Parcel 6 development area comprises approximately 5.2ha of land, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SU767642. The study was commissioned by Vistry Thames Valley in January 2025.

1.1.2 The Parcel 6 site is located to the south of Arborfield Green, Berkshire. In general terms, at the time of the Phase 1 habitat survey in 2023 it comprised part of a former agricultural field dominated by modified grassland with a large area of bare ground in the centre associated with a construction track and material storage. The Parcel 6 site is bounded by areas of woodland, including ancient and aged woodland, in addition to native hedgerows with dry ditches. The Parcel 6 site is bordered to the south and east by the existing Suitable Alternative Natural Greenspace (SANG) (delivered as part of the wider Hogwood Farm development); to the north by residential dwellings associated with a previous development phase; and to the west by a future development parcel which currently comprises tall ruderal vegetation and hardstanding. The location and boundary of the Parcel 6 site is shown in *Appendix A*.

1.1.3 The Parcel 6 site is part of a larger area covering a total of 110ha, hereinafter referred to as the 'wider site'. The wider site includes residential properties and a construction site associated with previous phases in the north-west and a SANG in the south which comprises a mix of wetland, species-rich grassland, scrub and woodland habitats. In general terms, the western area of the wider site is comprised of three fields of disturbed ground dominated by short ruderal vegetation with scattered areas of tall ruderal vegetation and large spoil heaps bordered by mature trees and woodland with scrub field margins. The central and eastern areas of the wider site are comprised of areas of hardstanding and construction/disturbed ground bordered by mature treelines and woodland. The south-eastern areas of the wider site comprise two fields of semi-improved grassland fields intersected by a ditch with associated scrub and scattered trees. A species-rich hedgerow with trees adjacent to Park Lane is present along the southern boundary. Woodland shaws and copses are located in the northern, western and central areas of the wider site, including mixed, broadleaved and broadleaved plantation woodland types, some of which are included on Natural England's Inventory of Ancient Woodland. Wetland habitats within the wider site include drainage ditches and small streams associated with the field boundaries and several ponds in poor condition are located across the wider site. The wider site is bordered to the north by a construction site, the Bohunt School and the Hogwood Industrial Estate; to the east by Park Lane beyond which lie residential dwellings and park homes; to the south by Park Lane and farmland; and to the

west by A327 Reading Road and Sheerlands Road beyond which lie farmland and woodland. The wider area is dominated by agricultural land interspersed with woodland and residential properties.

- 1.1.4 Further information on the extent and composition of habitats, including hedgerows, across the Parcel 6 site and the wider site is provided in *Appendix A*.

1.2 Development proposals and context

- 1.2.1 Planning permission (O/2014/2179 and 140764) was granted in January 2017 for a hybrid application. This comprises:

- Outline permission for demolition of all existing buildings on site; up to 1,500 new dwellings; employment floor space; a Neighbourhood Centre; a primary school; sports pitches and associated pavilion building; highways infrastructure; associated landscaping, public realm, open/green space and sustainable urban drainage systems; and
- Full permission for a 29.7ha Suitable Alternative Natural Greenspace (SANG) in the south of the site.

The hybrid planning permission was subsequently amended by a Section 73 application (181194) which was approved in November 2018. Subsequently, in April 2023 a Non-Material Amendment (NMA) application was submitted to WBC to vary the parameter plans approved as part of the Section 73 application (ref:181194)

- 1.2.2 Condition 28 of the planning permission states that:

“Prior to submission of any Reserved Matters application other than pertaining to the Nine Mile Ride Extension South an outline scheme to maintain or enhance the ecological permeability of the site (especially with regard to reptiles, amphibians and hedgehogs) shall be submitted to and approved in writing by the local planning authority. The mitigation and contingency measures contained within the plan shall be implemented in accordance with the approved plan unless otherwise approved in writing by the local planning authority. All Reserved Matters applications for any sub phase of the development shall include a detailed ecological permeability scheme that demonstrates how the relevant sub phases have been designed to incorporate the provisions of the outline ecological permeability scheme and the detailed mitigation strategies shall be implemented in accordance with the approved details unless otherwise approved in writing by the local planning authority.”

- 1.2.3 In accordance with the requirements of Condition 28, this document provides a Detailed Ecological Permeability Scheme for Parcel 6. This has been produced to ensure measures to maintain the ecological permeability for wildlife are implemented within the Parcel 6 development scheme. The measures identified are in keeping with the 'Outline Site-wide Ecological Permeability Scheme' prepared for the wider site and the Parcel 6 site in its entirety (HDA, 2018a).

2 BASELINE CONDITIONS

Designated areas

- 2.1 No statutory or non-statutory designated areas are located within or immediately adjacent to the Parcel 6 site. Part of the woodland located approximately 11m beyond the Parcel 6 south-eastern site boundary, is however listed on Natural England's Inventory of Ancient Woodland. Ancient woodland is defined as any wooded area that has been continuously wooded since at least 1600AD. Although ancient woodland is not subject to legal protection in its own right, ancient woodland habitats are regarded as irreplaceable under the 2024 National Planning Policy Framework (NPPF) and Natural England and the Forestry Commission have provided Standing Advice for ancient woodland (a material consideration in the planning process). Lowland Mixed Broadleaved Woodland is also identified as a Habitat of Principal Importance under Section 40 of the 2006 NERC Act and is therefore a material consideration in the planning process.

Habitats and existing habitat corridors

- 2.2 In general terms, the Parcel 6 site currently comprises a former agricultural field now dominated by modified grassland and bare ground. Habitat corridors associated with the Parcel 6 site are limited to a species-rich hedgerow with trees along the northern site boundary and bands of broadleaved woodland located beyond the southern, eastern and western site boundaries.
- 2.3 In general, the habitat corridors are well-connected around the site and to the wider site. Further information on the extent and composition of these features is provided in the Parcel 6 Habitat Survey and Target Notes included as *Appendix A*.

Existing lighting

- 2.4 A lighting strategy for the Parcel 6 site and wider site was prepared to assess the likely effects of the proposed development on external artificial lighting levels and includes information on the baseline lighting conditions within the site (MMA Lighting Consultancy, 2018).
- 2.5 The lighting strategy identifies that the environment surrounding the Parcel 6 site has 'low district brightness' and is categorised as an E2 Environmental Zone in accordance with the ILP Guidance (See *Table 1* below).

Table 1: Environmental Zone table

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc.

E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres

Hard landscaping

2.6 No hard landscaping is currently located within the site.

3 ECOLOGICAL CONTEXT

3.1 The proposals for the development of the Parcel 6 site have been informed by several detailed studies including an Environmental Statement (Royal Haskoning, 2014), updated field surveys in relation to protected and notable habitats and species and the lighting strategy. This work has been used to inform a scheme for the avoidance and mitigation of potential effects of development on features of nature conservation interest.

3.2 With regard to the ecological permeability of the proposed development, the following receptors have been identified as being potentially sensitive and form the focus of this report:

- **Foraging and commuting bats:** Although bat foraging and commuting activity has generally been found to be low, it will be necessary to maintain foraging opportunities and commuting corridors across the Parcel 6 development site. This is considered in this report in addition to the Detailed Bat Mitigation Strategy (HDA, 2025a) produced for the Parcel 6 site in relation to Condition 24.
- **Roosting bats:** All trees within and bordering the Parcel 6 site identified as having moderate or higher potential to support roosting bats during the Phase 1 bat scoping survey, are to be retained and not expected to be affected by the development proposals. The Detailed Bat Mitigation Strategy produced for the Parcel 6 site includes the specific provision of retained, replacement and additional bat roosting features within the development phase (HDA, 2025a). These are in keeping with the measures set out in this report.
- **Badgers:** During the most recent Badger survey carried out in 2024, a total of one main Badger sett, seven outlying setts and one replacement sett¹ have been recorded within the wider site. The closest active setts include Sett DD located approximately 1.5m to the east of the Parcel 6 site and comprising an outlying sett supporting one partially-used entrance and Sett Q located approximately 5m to the west of the Parcel 6 site and comprising an outlying sett supporting one

¹ Following approval of a Natural England licence application to temporarily close four setts in the north-east of the site due to the proximity of the NMRE works (a main sett, the annex sett and two of the outlying setts), Stantec carried out temporary sett closures in 2020. As part of these works two replacement setts were constructed, one within the Green Corridor associated with Phase 2 in the north-west of the wider site and one within the SANG (Stantec, 2020) (the SANG was not included in the scope of the 2023 survey).

partially-used entrance. In addition to the measures detailed in this document, a Badger Protection Plan (HDA, 2018b) has been produced for the site which was subsequently updated by the 2024 Badger Survey Report and Badger Protection Plan (HDA, 2024a) (required under Condition 29 of the planning consent).

- **Reptiles:** Low populations of Grass Snake and Slow-worm and a very low population of Common Lizard have been recorded across the wider site (HDA, 2021a). However, no reptiles were recorded within the Parcel 6 site during the 2023 reptile survey. In addition to the measures detailed in this document, a Detailed Reptile Mitigation Strategy has been produced for the Parcel 6 site as required under Condition 26 of the planning consent (HDA, 2025b).
- **Amphibians:** No evidence of Great Crested Newts has been recorded at the site or its surrounds, however it is likely that other species of amphibian such as Common Frog and Common Toad are present.
- **Hedgehogs:** Hedgehogs are a generalist species, found in a wide range of rural and urban habitats in the UK and as such are likely to be present within the Parcel 6 site and wider site. In addition, they are a Species of Principal Importance identified under Section 41 of the 2006 NERC Act and are in decline in the UK (Wilson & Wembridge, 2018).

4 ECOLOGICAL PERMEABILITY OBJECTIVES

4.1 With regard to the baseline conditions and potentially sensitive ecological receptors described above, the following objectives for this ecological permeability scheme for the Parcel 6 site have been identified:

- Provide and maintain a series of habitat corridors around the site;
- Ensure the functionality of proposed habitat corridors, through sensitive lighting design; and
- Include features within areas of hard and soft landscaping to facilitate the movement of wildlife within/across the proposed development.

5 HABITAT CORRIDORS

5.1 Habitat corridors associated with the Parcel 6 site currently comprise woodland margins along the southern, eastern and western site boundaries and a native species-rich hedgerow along the northern site boundary. Habitat corridors are generally well-connected around the site (see *Appendix A*).

5.2 The majority of these features will be retained within the Parcel 6 development scheme with additional planting where appropriate as demonstrated in the Detailed Landscape Proposals for Public Open Space (Pegasus Group, 2026a) and the Detailed Landscape and Ecological Management Plan for Parcel 6 (HDA, 2025c). Key habitat corridors to be

secured within the Parcel 6 development scheme will focus on the existing features and are shown on the plan provided in *Appendix B*. Key corridors will comprise:

- The aged and ancient woodland belts located beyond the southern, eastern and western site boundaries will be retained and the margins will be enhanced with wildflower meadow, wet grassland, scrub and native hedgerow planting.
- The hedgerow along the northern site boundary will be retained and enhanced through the planting of wildflower meadow and native hedgerows.

5.3 In addition to the key habitat corridors associated with the site boundaries, 'stepping stone' habitats will be provided across the Parcel 6 development area shown on the Detailed Soft On-Plot Landscape Proposals (Sheets 1 to 5) (Pegasus Group, 2026b-f). These include:

- Small pockets of open space within the development area complimented by standard tree planting and ornamental hedgerow planting along roads and property boundaries.
- The gardens of the proposed development are also likely to maintain connectivity across the site for some mobile species including birds and invertebrates. This is likely to be encouraged through use of the proposed ornamental planting mix which includes fruiting and nectar/pollen rich species benefitting groups such as birds and invertebrates.

5.4 The above habitat corridors will maintain and improve connections to other corridors within the wider site and wider area, including the areas of ancient woodland to the east and west of the site and hedgerows within the wider site, which connect to areas of proposed public open space and the SANG.

5.5 Lighting proposals in the vicinity of habitat corridors will be subject to the sensitive design measures described in *Section 6* and where it is unavoidable that habitat corridors are crossed by access roads, measures to minimise effects on the movement of wildlife are identified in *Section 7* below.

6 LIGHTING

6.1 This section describes the strategy that the external lighting design of the Parcel 6 development will employ unless otherwise agreed with Local Planning Authority, in order to achieve the objectives set out in *Section 4* above.

6.2 Where appropriate, these measures are shown on the *Illustrative Lighting Parameters Plan* provided in *Appendix C*. Further information on the types and specifications of the luminaires described and their proposed distribution across the site are shown in the Site-wide Lighting Strategy (MMA, 2018) provided in *Appendix D*.

6.3 **Lighting Exclusion Zones**

6.3.1 The Illustrative Lighting Parameters Plan provided in *Appendix C* identifies 'Lighting Exclusion Zones'. Within the Lighting Exclusion Zones, unless otherwise agreed with the local planning authority:

- No new external lighting will be installed;
- All existing external lighting will be removed; and
- Light will be of no more than 0.75 lux at ground level from new luminaires.

6.3.2 The lighting exclusion zones include the following areas:

- The SANG;
- Hogwood Shaw LWS;
- Areas of ancient woodland and aged woodland, beyond the SANG boundary; and
- Substantial areas of additional open space within the site proposed for habitat enhancement works.

6.4 **Lighting Restriction Zones**

6.4.1 The Illustrative Lighting Parameters Plan provided in *Appendix C* identifies 'Lighting Restriction Zones'. Unless otherwise agreed with the local planning authority, lighting Restriction Zones identify areas where:

- Lighting will be avoided and lighting will be at the lowest level required for public safety, in order to limit levels of horizontal or vertical light spill into sensitive areas associated with the Lighting Exclusion Zones;
- Lighting Restriction Zones adjacent to retained native hedgerows will be at least 5m; and
- Lighting Restriction Zones adjacent to woodland will be at least 15m.

6.4.2 The Lighting Restriction Zones primarily relate to identified features within the Lighting Exclusion Zones and public open space designed to be used for recreational activities in addition to habitat enhancement works. It is proposed that lighting in the Lighting Restriction Zones will comprise low-level bollard luminaires along footpaths/cycleway/bus routes. These will be approximately 1.2m in height, and will use LED bulbs with full cut-off optics to contain light on the footpath/cycleway with negligible horizontal or vertical luminance on the opposite side of the roadway².

6.4.3 In the event that lighting is required outside of the above parameters in relation to the Parcel 6 development scheme, any such deviation will first be agreed with the local

² It should be noted that on some roadways additional lighting will be required for public safety.

planning authority, and measures to minimise effects of lighting will be incorporated into the lighting design in accordance with the measures set out below.

6.5 **Lighting design**

6.5.1 In addition to the lighting restriction measures identified above, where new/replacement lighting outside of the Lighting Exclusion Zones is proposed within the Parcel 6 site, the Site-wide Lighting Strategy (MMA, 2018) provided in *Appendix D* identifies measures to achieve a minimum level of lighting required for public amenity and safety whilst restricting horizontal or vertical light spill into non-target areas. Measures include:

- LED lighting with a correlated 'warm' colour temperature of 3000 Kelvin, which will be lowered to 2700 Kelvin (where practical) within the Lighting Restriction Zones.
- LED light sources contain no UV wavelengths and the warmer colour temperatures reduce the light emitted beyond the 550 nanometer wavelengths. These requirements are consistent with the current research on the impact of artificial lighting on bats as published by the Bat Conservation Trust and Institution of Lighting Professionals (BCT & ILP, 2023).
- The lighting columns will be limited to 6m for the subsidiary roads such as those running through the Parcel 6 development site.
- Rear spill guards will be attached to luminaires to focus light onto target areas and away from habitat corridors.
- LED luminaires are suitable for dimming. A Remote Monitoring System will be considered for lighting in sensitive locations to allow luminaires to be dimmed to an appropriate level and then dimmed back further after a late night curfew (23:00) (or switched off entirely).
- Pedestrian-only footpaths/cycleways will be unlit with the exception of bollard lighting at nodal points, fitted with LED luminaires and rear spill guards/louvres/cowls, as appropriate.

6.6 **Ecological receptors**

Bats

6.6.1 The retained trees which include suitable features for roosting bats are located within areas proposed as Lighting Exclusion Zones. The seven proposed tree-mounted bat boxes will also be installed in this zone (see *Section 7.3.3* below) and the 18 bat boxes proposed on new buildings will be located within areas subject to the sensitive lighting measures described in *Section 6.5.1* above.

6.6.2 Key area of existing foraging habitats and corridors for the movement of bats will be maintained by the Lighting Exclusion Zone identified in *Appendix C* and incorporated into the design of the Parcel 6 development scheme. Sensitive lighting proposals within the

Parcel 6 development area would also be expected to maintain opportunities for foraging and commuting bats in this area, and maintain connectivity between roost sites and foraging habitat in the wider site and its surrounds.

Other species

- 6.6.3 The above measures would be expected to maintain opportunities around the Parcel 6 development site for a variety of other nocturnal species, including Badgers, together with limiting effects of lighting on diurnal species associated with the retained network of semi-natural habitats provided by the site.

7 HARD AND SOFT LANDSCAPING

- 7.1 This section describes features to be included in the hard and soft landscaping proposals for the Parcel 6 site in order to allow small animals, such as reptiles, amphibians and Hedgehogs, to safely cross the site and use all areas of the site of benefit to them. In addition, measures to be provided to increase opportunities for roosting bats and nesting birds are detailed.

7.2 Road crossing points

- 7.2.1 Facilitating the movement of wildlife across roads will involve measures to prevent animals becoming trapped in the carriageway and/or being run-over by vehicles. A number of measures will be included within the road system to: (i) reduce the likelihood of small animals entering the carriageway (avoidance measures); and (ii) if in the event that small animals do enter the road system, that they can safely exit the carriageway (protection measures).

Avoidance measures

- 7.2.2 No additional woodland or hedgerow loss is proposed to facilitate the proposed development of Parcel 6³.

³ As part of the consented works for the wider site the following works have been undertaken:

- Phase 2 development area - located to the immediate north of the hedgerow, the hedgerow was crossed by access infrastructure at two points, comprising a road and a footpath (HDA, 2021b).
- SANG development area - located to the immediate east and south of the site, the woodland belt was crossed by access infrastructure at two points, comprising two footpaths (RPS, 2019).
- Service Corridor (and subsequent Parcel 4 and 5 development area) – located to the immediate west of the site, the woodland belt was crossed by access infrastructure, comprising a footpath (HDA, 2021c; HDA, 2024b).

No additional woodland or hedgerow loss is proposed for Parcel 6.

Protection measures

7.2.3 The design of the road system includes the provision of kerbs for the secondary roads to discourage drivers from parking/driving on footpaths and adjacent landscaping⁴. However, sections of the tertiary and private road network will comprise shared surface roads with the carriageway demarcated with edging/soldier course blockwork, which will allow small animals to cross these minor roads with no barriers to movement. The road network bordering the woodland belts, located within the wider site, associated with the southern, eastern and western site boundaries comprises 'private drive' and 'shared surface' roads which it is understood the carriageways will be demarcated with edging/soldier course blockwork. Protection measures are therefore not proposed along the road network associated with the southern, eastern and western site boundaries. Where the provision of kerbs is required in the vicinity of habitat corridors, the following measures will be included to allow small animals to safely exit the carriageway.

7.2.4 *Dropped kerbs:*

In addition to dropped kerbs to assist pedestrians to cross roads safely, dropped kerbs will be specifically provided to allow small animals to easily exit the carriageways in areas where animals are most likely to be trapped within the carriageway. The proposed locations of the dropped kerbs specifically provided to allow small animals to easily exit the carriageway within the Parcel 6 development scheme are shown in *Appendix B*.

7.2.5 *Wildlife kerbs and off-set gulley pots:*

Small animals, in particular amphibians, naturally follow the line of the kerb when trying to exit the carriage way until a feature such as a dropped kerb is encountered. Subsequently if a gulley pot is installed immediately adjacent to the kerb, when they reach a gully pot the animal may fall through into the gulley and be unable to escape. Wildlife kerbs (e.g. www.aco.co.uk/products/wildlife-kerb or similar) have a bypass recess in the front face allowing amphibians to safely bypass the gully pot.



(Image sourced from www.aco.co.uk)

⁴ As part of the Phase 2 development a small tunnel (e.g. www.aco.co.uk/products/climate-tunnel or similar) was installed at the location which the road bisects the hedgerow on the northern site boundary to allow small animals to safely cross road (HDA, 2021d).

An alternative to wildlife kerbs is locating gully pots further into the road, rather than immediately adjacent to the kerb.

The 'secondary street' and 'tertiary street' adjacent to the northern site boundary hedgerow is most likely to present a risk to small animals using the habitat corridors described in *Section 5*. These two areas are shown in *Appendix B*. In addition to the dropped kerb described above, wildlife kerbs, offset gully pots and gully pot ladders within gully pots (see below) will be provided in these locations to avoid entrapment in the site drainage system.

7.2.6 *Gully pot ladders:*

Amphibian gully pot ladders (e.g. www.thebhs.org/shop/the-bhs-amphibian-gully-pot-ladder or similar) will be installed within gully pots at the key locations shown in *Appendix B*. These provide amphibians and small mammals with a means of escape if they become trapped within a gully pot.

7.3 Garden and residential property permeability

7.3.1 To ensure private dwellings and their gardens are of benefit to a range of wildlife, in addition to the planting proposals described in *Section 5.5* above and shown on the Detailed Soft On-Plot Landscape Proposals (Sheets 1 to 5) (Pegasus Group, 2026b-f), a number of measures will be included in the Parcel 6 development scheme to provide permeability and opportunities for roosting and nesting.

7.3.2 *Hedgehog highways:*

Hedgehogs travel around 1 mile every night through a range of habitats, including gardens. Fences and walls inhibit the movement of Hedgehogs within their territory, reducing the amount of land available to them (www.hedgehogstreet.org). In order to separate the gardens of private properties, the provision of hedgerows, fences and walls is proposed. Where possible hedgerows will be provided as these provide habitat for a range of species and do not inhibit the movement of Hedgehogs and other terrestrial animals. Where fences and walls are proposed, holes in these potential barriers will be provided to allow the movements of Hedgehogs between the gardens (e.g. jacksonsfencing.co.uk/product/sc_667610/hedgehog-gravel-board-for-use-with-slotted-posts-1.83m-x-150-x-28mm-incl.1-x-end-packer-1-x-length-packer-jakcured or similar). These holes can be as small as 13x13cm, which are sufficient for Hedgehogs to pass through but too small for the majority of pets. These holes will be provided at a rate of at least one per garden fence/wall to ensure multiple routes through the residential gardens are accessible to Hedgehogs. The locations of the proposed Hedgehog highway holes in Parcel 6 are indicated in *Appendix B*. In order to ensure these holes are not blocked by householders

and to raise awareness of the issue, holes will be marked with signs to inform householders on the reason for their presence:



(Images sourced from www.hedgehogstreet.org)

7.3.3 *Bird and box boxes:*

The inclusion of bat and bird roosting opportunities on new dwellings and retained mature trees will enhance roosting/nesting opportunities for bats and birds within the Parcel 6 site and improve the permeability of the site for these species groups. Vistry Thames Valley have signed up to the ‘Homes for Nature’ initiative for all their new developments. As part of this initiative, Vistry Thames Valley will incorporate a bird-nesting brick or box on every new home built. Further to this, bat roosting features will be incorporated into the development. The location of these features is shown in *Appendix B*.

Bird boxes:

A total of 110 bird nesting features will be included within the Parcel 6 site located within a range of habitats, using different types of boxes suitable for a range of bird species. These will comprise:

A total of 104 bird boxes will be attached/ incorporated to the walls of the new buildings. These will comprise a mix of:	
Manthorpe Swift nesting brick: Designed for Swifts, which inhabit cracks and crevices. Swift boxes have been selected as they are considered to support nesting features for a wide range of bird species.	Woodstone Swift nesting box: Designed for Swifts, which inhabit cracks and crevices. Swift boxes have been selected as they are considered to support nesting features for a wide range of bird species.
	
A total of 6 bird boxes will be attached to existing retained trees:	

3x Vivara Pro Seville WoodStone Nest Box with 32mm Oval Hole: Favoured by Blue Tits, Tree Sparrows, Great Tits, Crested Tits, Nuthatches, Coal Tits and Pied Flycatchers. 	3x Vivara Pro Barcelona WoodStone Open Nest Box: Favoured by Wrens, Robins, Spotted Flycatchers, Pied Wagtails, Grey Wagtails, Song Thrushes and Blackbirds as well as offering protection from woodpeckers, squirrels and cats. 
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(Images sourced from nhbs.com, www.manthorpebp.co.uk).

Bat boxes:

A total of 25 bat roosting features will be included within the Parcel 6 site located within a range of habitats, using different types of boxes suitable for a range of bat species. These will comprise:

A total of 18 bat roosting features will be included on new buildings. Bat roosting features have been selected that require no maintenance or cleaning. These will comprise a mix of:	
Ibstock bat box type B: Designed specifically for Pipistrelle bats with several roosting zones being present within the box. Maintenance free with entrance at the base. 	Wildcare soffit bat box: Designed with two roost chambers with different properties, providing hanging areas which differ spatially and climatically: 
Ibstock bat box type C: Designed specifically for Pipistrelle bats with several roosting zones being present within the box. Maintenance free with entrance at the base. 	Beaumaris Woodstone Bat Box: Designed with a single narrow cavity, which makes it suitable for crevice roosting bats such as the Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Brandt's bat and Whiskered Bat. The interior of the box has a rough surface for bats to cling to. 
A total of 7 bat roosting features will be included on retained mature trees:	

7 x Greenwoods Ecohabitats Medium Hollow Bat Boxes: Designed for larger groups of bats who prefer a wider cavity, such as Brown Long-eared bat, Noctule and *Myotis* sp.



(Images sourced from ibstockbrick.co.uk, wildcare.co.uk, vivarapro.co.uk, nhbs.com and greenwoodsecohabitats.co.uk).

7.3.4 'Living with Wildlife' leaflet:

New residents will be provided with a 'Living with Wildlife' leaflet which will raise awareness about sensitive habitats and species within the site and its surrounds, and how they can be enjoyed and protected. This will include information on the following:

- Responsible disposal of green waste;
- Responsible use of the site and wider area for recreation including the SANG;
- Keeping cats indoors at dawn/dusk and ensuring cats wear collars with bells to avoid them killing reptiles and other groups, such as small mammals;
- Presence of the hedgehog highways;
- Presence of bird and bat boxes;
- Plants of benefit to wildlife (e.g. RHS Perfect for Pollinators);
- Benefits of the provision of garden ponds (including the use of ramps to allow animals to escape);
- Benefits of feeding birds; and
- The presence within the Parcel 6 site and wider site of areas of the woodland, scrub, rough and meadow grassland and wetland habitats and their benefits for wildlife.

8 CONCLUSION

8.1 Through implementation of these safeguarding measures and the prescriptions detailed above, it is considered that the ecological permeability objectives for the Parcel 6 site will be achieved and secured in the long-term, thereby maintaining opportunities for wildlife to move around and within the site, the wider site and the surrounding countryside throughout the operational phase of the proposed development.

9 REFERENCES

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	Personnel	Position
Author	Clare Bird MCIEEM	Associate Ecologist
Approved for issue	Sarah Thornton-Mills MCIEEM	Principal Ecologist

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APPENDIX A

Existing Habitat Connectivity



KEY

- Parcel 6 boundary
- Lowland mixed deciduous woodland - (w1f)
- Other woodland - mixed - mainly broadleaved (w1h5)
- Ancient Woodland - based on Natural England's Inventory of Ancient Woodland
- Aged Woodland
- Scattered trees (indicative)
- Native hedgerow - (h2a)
- Native hedgerow with trees - (h2a - 11)
- Non-native and ornamental hedgerow - (h3b)
- Mixed scrub - (h3h)
- Scattered scrub
- Ruderal - (81)
- Developed land - sealed surface - (u1b)
- Modified grassland - (g4)
- Standing open water - (r1)
- Wet ditch / Dry ditch - (50)
- Bare ground - (510)
- Buildings
- Fence
- Target notes

CLIENT:
Vistry Thames Valley

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcel 6 - Phase 1 Habitat Survey Plan

SCALE AT A3:
NTS

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Target Notes – Arborfield

1. Site yard comprised a hardstanding area with mobile cabins.
2. Relatively sparse ruderal vegetation dominated by Common Nettle *Urtica dioica*, Spear Thistle *Cirsium vulgare*, Common Ragwort *Senecio jacobaea*, Bristly Oxtongue *Helminthotheca echioides* and Common Dandelion *Taraxacum officinale*. Small areas of scattered bare ground/ recently disturbed ground are present. Field margins vary between 1 – 5m and are more densely vegetation with the above species with the inclusion of Annual Meadow Grass *Poa annua*, Red Fescue *Festuca rubra*, Cleavers *Galium aparine*, Broad-leaved Dock *Rumex obtusifolius*, Cut Leaved Cranes Bill *Geranium dissectum*, Field Forget-me-not *Geranium dissectum* and Scarlett Pimpernel *Anagallis arvensis*.
3. Mixed woodland along the western boundary with species including Ash *Fraxinus excelsior*, Larch *Larix decidua*, Scots Pine *Pinus sylvestris*, Beech *Fagus sylvatica*, Pedunculate Oak *Quercus robur* and Black Poplar *Populus nigra*. Some of the trees are mature and have suitable bat roosting features. The understorey is comprised of Elder *Sambucus nigra*, Hawthorn *Crataegus monogyna*, Holly *Ilex aquifolium*, Willow *Salix Sp.* and Hazel *Corylus avellana*. The ground layer is dominated by Bramble *Rubus fruticosus* and Common Nettle with Bracken *Pteridium aquilinum*, Ground Ivy *Glechoma hederacea*, Cleavers, Wood Avens *Geum urbanum*, Herb Robert *Geranium robertianum*, White Bryony *Bryonia dioica* and Black Bindweed *Fallopia convolvulus*. Part of the southern area of this woodland is listed on Natural England's Ancient Woodland Inventory; this area is especially dominated by Larch and other introduced coniferous species.
4. Native defunct hedgerow with trees comprising a hedgerow of Field Maple *Acer campestre*, Hazel, Blackthorn *Prunus spinosa* and Ash, with Ash and Oak mature trees and a dry ditch below.
5. Newly created culvert with a small area of standing water.
6. Treeline of mature Ash and Pedunculate Oak trees with relic species rich hedgerow of Hazel, Holly, Field Maple, Hawthorn and Blackthorn. Some of the mature trees have the potential to support roosting bats. The ground layer vegetation is sparse and mostly comprised of Bramble with occasional Cowslip *Primula veris* and Creeping Thistle *Cirsium arvense*.
7. Lowland mixed deciduous woodland comprised of Pedunculate Oak and coppiced Ash with Wild Cherry *Prunus avium*, Field Maple, Hazel, Hawthorn and Blackthorn. Mature trees are present, some of which have features of bat roosting potential. The ground layer includes Bramble, Cow Parsley *Anthriscus sylvestris*, Ground Ivy, Germander Speedwell *Anthriscus sylvestris*, Common Sorrel *Rumex acetosa* and Lords-and-ladies *Arum maculatum*. A dry ditch is present along the western boundary of the parcel and a ditch that was wet at the time of the survey along the eastern boundary.
8. A field of ruderal vegetation of varying height from 10cm to 50cm in height dominated by Spear Thistle, Common Nettle and Perennial Ryegrass and White Clover *Trifolium repens* with the occasional Creeping Buttercup *Ranunculus repens*, Common

Hogweed *Heracleum sphondylium*, Ragwort and Broad Leaved Dock and Cleavers. Small areas within the parcel are sparsely vegetated with areas of bare ground with occasional ruderal species mentioned above but include Scarlett Pimpernel and Bird Foot Trefoil *Lotus corniculatus*.

9. A small depression of bare ground that had standing water at the time of the survey with occasional Yellow Flag Iris present.
10. Plantation lowland mixed deciduous woodland comprised of White Poplar, Pedunculate Oak, Ash and Field Maple. Mature trees are present, some of which have features of bat roosting potential. Understorey comprised of Holly, Dog Rose *Rosa canina*, Common Nettle, Cow Parsley, Cleavers, Curled Dock *Rumex crispus*, Bramble and Ground Ivy. A dry ditch is present along the boundary along the southern boundary of the wooded strip.
11. Species poor modified grassland of varying sward length between 5cm – 40cm comprised of Perennial Ryegrass, Cocksfoot *Dactylis glomerata*, White Clover, Oxeye Daisy *Leucanthemum vulgare*, Creeping Buttercup with occasional Broad Leaved Dock, Dandelion and Scarlett Pimpernel. Field margins are approximately 4-6m wide and are comprised of Common Nettle, Spear Thistle, Common Vetch *Vicia sativa* and Cow Parsley.
12. Area of bare ground used for storage of construction materials.
13. Lowland mixed deciduous woodland comprised of Pedunculate Oak standards and coppiced Ash with Wild Cherry *Prunus avium*, White Poplar, Field Maple, Hazel, Willow, English Elm *Ulmus procera*, Holly, Hawthorn and Blackthorn. Mature trees are present, some of which have features of bat roosting potential. The ground layer includes Bramble, Wood Avens *Geum urbanum*, Herb Robert, Common Ivy, Wood Spurge *Euphorbia amygdaloides*, Violet *Viola* sp., Greater Stitchwort *Stellaria holostea*, Common Nettle, Remote Sedge *Carex remota*, False Brome *Brachypodium sylvaticum* and Butcher's Broom *Ruscus aculeatus* present. Standing and fallen dead wood is present throughout the woodland area. The woodland becomes increasingly wet to the west where Willow becomes dominant and dry ditches border most of the woodland edges, a further dry ditch running centrally through the southern area of woodland is also present. The eastern area of this woodland is listed on Natural England's Ancient Woodland Inventory; here the dominant tree species is White Poplar in the south and Pedunculate Oak in the north. This area is demarcated in its western boundary by a small woodbank.
14. Mixed Scrub comprised of Bramble, Blackthorn, Dog Rose and Pendulate Oak samplings over a dry ditch.
15. Artificial Badger sett located at the northern end of TN13.
16. A wooden bat barn set between treelines of Pendulate Oak, Ash and Hazel.
17. Mixed scrub comprised of Bramble, Elder and Holly with large amounts of deadwood above a steep-sided wet ditch. Towards the eastern end of the scrub parcel, Elder becomes the dominant species with the inclusion of ruderals in the ground layer including Common Nettle, Spear Thistle, Cleaver and Broad Leaved Dock.

18. Ruderal vegetation comprised of Perennial Rye Grass, Spear Thistle, Common poppy *Papaver rhoeas*, Cocks Foot, Rosebay Willowherb *Chamerion angustifolium*, Annual Sow Thistle *Sonchus oleraceus*, Common Nettle, and Curled Dock.
19. Listed building with multiple features with bat roost potential including lifted roof tiles and cracks in the brickwork. Situated on an area of concrete hardstanding. Surrounded by scaffolding at the time of the survey.
20. Species-rich native hedgerow comprised of Hawthorn, Hazel, Blackthorn, English Elm and Ash.
21. Ruderal vegetation similar to TN 20 with the inclusion of Oxeye Daisy at high densities and occasional Red Campion *Silene dioica*.
22. A SUDS pond within a parcel of ruderal vegetation described in TN21. Sloping earth banks with occasional Pendulous Sedge *Carex pendula*.
23. A shaded pond approximately 30cm in depth. Tussocks of Pendulous Sedge and patches of encroaching Bramble, Willow, Pedunculate Oak and Alder, border the edge of the pond. The pond area is enclosed by a chicken-wire fence.
24. Modified grassland with a short sward length of approximately 20cm in length comprised of Perennial Rye Grass, Cocks Foot, Red Fescue, Meadow Buttercup, Broadleaved Dock and Dandelion.
25. Lowland mixed deciduous woodland. Dominant species within the woodland include Ash, Pedunculate Oak and Alder with a Hawthorn and Field Maple understorey. The ground layer includes Bramble, Wood Aven, Herb Robert, Ground Ivy, and Hairy Brome *Bromopsis ramosa*. There are fallen wood and dead-wood piles throughout the woodland area and multiple trees with possible bat roosting potential. The woodland, in part, is listed on Natural England's Ancient Woodland Inventory.
26. Large parcel of bare ground with large spoil heaps. During the time of the survey, excavators were topping soil within the parcel. Field margins were sparsely vegetated with ruderal species including Bramble, Curly Dock, Spear Thistle, Ragwort and Common Nettle.
27. Lowland mixed deciduous woodland. A thin strip of broadleaved woodland plantation behind this comprised of Ash, Lombardy Poplar, Field Maple, White Willow, Grey Willow, Dogwood, Hazel, Hawthorn, Blackthorn and Bramble with Common Ivy and Cleavers dominating the ground layer. Some of the trees have features of possible bat roosting potential. A ditch that had small pools of standing water is present along the southern side of the wooded strip.
28. Site compound on hardstanding area.
29. Short ruderal vegetation within the northern end of the parcel similar in species composition to TN18 with the inclusion of Ribwort Plantain *Plantago lanceolata*, Timothy *Phleum pratense*, Musk Mallow *Malva moschata* and Bristly Oxtongue. Bare ground is present across the southern area of the parcel with small field margins

approximately 1m in width comprised of similar short ruderal species as the northern area.

30. A dense, intact, species-rich native hedgerow with trees comprising Pedunculate Oak, Beech, Ash, Goat Willow *Salix caprea*, Black Poplar *Populus nigra*, Field Maple, Dogwood, Hazel, Holly, Bramble and Common Broom *Sarothamnus scoparius*. The hedgerow is approximately 15 years old and tree guards are present on some individual plantings with some mature trees present along the roadside, especially within the southern section of the hedgerow.
31. Modified grassland with species including Yorkshire Fog, Perennial Rye-grass, False Oat-grass *Arrhenatherum elatius*, Cock's Foot, Red Fescue, Common Bent, Creeping Buttercup, White Clover, Doves-foot Cranesbill *Geranium molle*, Common Vetch, Common Mouse-ear *Cerastium fontanum*, Scentless Mayweed *Tripleurospermum inodorum*, Creeping Thistle, Spear Thistle, Common Sorrel, Ragwort, Greater Willowherb *Epilobium hirsutum*, Cleavers, Broad-leaved Dock, Common Knapweed *Centaurea nigra*, Meadow Vetchling *Lathyrus pratensis*, Forget-me-not sp., Fleabane *Pulicaria dysenterica* and Self-Heal *Prunella vulgaris*. Along the treeline to the south, Hemp Nettle *Galeopsis tetrahit*, Lady's Thumb *Persicaria maculosa*, Scentless Mayweed, Prickly Sow-Thistle and Clustered Dock with wet flushes of Sedge and Soft Rush. There are two soil bunds/soil storage piles with tall ruderals dominated by Spear Thistle, Common Nettle, Broadleaved Dock and Smooth Hawksbeard *Crepis capillaris* with large patches of scrub within the grassland with species including Bramble, Elder, Silver Birch and Dog-rose with Common Nettle. There are also piles of deadwood near and within the scrub.
32. Non-native and ornamental species-poor hedgerow comprising Cherry Laurel *Prunus laurocerasus*, Leylandii Cypress *Cupressus x leylandii* and Elder, broken by Bramble scrub on the north-eastern edge of the grassland field (TN 31). To the south of the hedgerow, continuing along the field boundary is a wooden post and electric wire fence which is overgrown with tall grasses and ruderal vegetation.
33. An outgrown, defunct native species-rich hedgerow with trees adjacent to Park Lane, with a dry ditch below. Species within the hedgerow include Pedunculate Oak, Black Poplar, Gorse (*Ulex europaeus*), Holly, Grey Willow, Blackthorn, Bracken and Bramble. A treeline of Pedunculate Oak is present approximately 5m into the field from the hedgerow.
34. A ditch that was dry at the time of survey with scattered Bramble scrub and trees including Willow and Pedunculate Oak, some of which have possible bat roosting potential. Behind the ditch is a fence and a dirt track, used as an access route into the site. A scrub line is present along the eastern side of the track and is 1-2m wide comprised of Grey Willow, Dog Rose, Oak and Bramble scrub. Track supports ephemeral vegetation including Scentless Mayweed, Cocks Foot, Smooth Hawksbeard, Common Yarrow, Hawthorn saplings, Common Bent and Spear Thistle.
35. Modified grassland field with a similar species composition to Target Note 31, with more Bent dominant in the north and False Oatgrass and Fescue sp. dominated to the south. Occasional species include Greater Plantain, Ribwort Plantain, Greater Birds-foot Trefoil, Common Hogweed, Cleavers, Meadow Vetchling, Mouse-ear, Common Vetch, Common Fleabane, Creeping Buttercup, Red Fescue and Soft Rush.

Bramble scrub is present along many of the field boundaries, with Common Nettle also present. A wet flush is present within the west of the field and contains Common Horsetail, Common Nettle, Sow Thistle, Soft Rush and occasional Hemp Nettle.

36. Scattered semi-mature trees and scattered areas of dense scrub along fence line. Species present include Oak, Ash, Blackthorn, Dog Rose, Bramble and Common Nettle.
37. A line of scrub and trees with a dry ditch bordering Park Lane.

APPENDIX B

Biodiversity Mitigation and Enhancement Plan



KEY

Parcel 6 boundary

Hibernacula (indicative)

Log and brush pile (indicative)

Dropped kerb (Ecological use)*

Wildlife corridor features (comprising wildlife kerbs, offset gully pots and/or gully pot ladders with gully pots to be provided to avoid entrapment in the site drainage system).

Proposed Hedgehog access point (indicative)

New opportunity for nesting birds provided on new buildings and retained trees (indicative)

New opportunity for roosting bats provided on new buildings and retained trees (indicative)

* All kerbing types remain subject to detailed design and approval with WBC.

CLIENT:
Vistry Thames Valley

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcel 6 - Biodiversity Mitigation and Enhancement Plan

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t 01491 838175 e consult@hda-enviro.co.uk w www.hda-enviro.co.uk

Landscape Architecture
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APPENDIX C

Illustrative Lighting Parameters Plan



LIGHTING CONSULTANCY
Exterior Lighting Design Specialists

Hogwood Farm, Finchampstead

Lighting Strategy

MMA Project Number: 14409

Date: 12/03/2018

Produced by: Aimie Loveday

Revision: R0

Issued by: -

MMA Lighting Consultancy Ltd

Summer Field House

99 Old Bath Road, Charvil, Reading, Berkshire, RG10 9QN

Tel: +44 (0) 0118 321 5636

Fax: +44 (0) 0118 321 5636

www.mma-consultancy.co.uk

info@mma-consultancy.co.uk

CONTENTS
HOGWOOD FARM, FINCHAMPSTEAD
LIGHTING STRATEGY

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1.0

INTRODUCTION

- 1.1 This lighting strategy document has been prepared on behalf of Legal & General for the proposed development located off Hogwood Farm, Finchampstead, Berkshire. The land is proposed for the construction of up to 1,500 dwellings; across the development the new community will be provided with primary and secondary schools, community facilities, good quality open space.
- 1.2 The report has been prepared to assess, in terms of artificial lighting, the likely effects of the proposed development. The lighting assessment includes information on the baseline lighting conditions within the area and considers possible mitigation measures to reduce potential light spill into neighbouring properties, upward light (which can create sky glow) and visual source intensity (glare). Lighting class proposals will be included as part of this assessment.
- 1.3 This new development will require external adoptable lighting for all areas of the development. The safety of the pedestrians and vehicles within this new development should be considered as a priority, and as such a good quality sustainable external lighting solution will be required to ensure the safety and security of users, however careful consideration of all ecological restraints and local residents should be considered. The below location plan shows the site location and site boundary.
- 1.4 The lighting design of this site should be carried out by a competent person governed by the Institution of Lighting Professionals.
- 1.5 The report has been prepared by MMA Lighting Consultancy Ltd to the best of our knowledge using information provided by Bloor Homes.

2.0

SITE DESCRIPTION

Existing site

- 2.1 Finchampstead is a village and civil parish in the Wokingham Borough of Berkshire. The application site is comprised of Hogwood Farm and forms the southern part of the Arborfield Garrison Strategic Development Location (SDL). The application site is some 109.93 ha in size and comprises predominantly large open fields, parcels of mature woodland, Hogwood Farm Industrial Estate and two houses. The below location plan shows the site location and site boundary.



Proposed Development

- 2.2 The proposed development will comprise of approximately 1,500 dwellings, across the SDL. The new development will be provided with new primary and secondary schools, community facilities, good quality open spaces. Development layout shown below.
- 2.3 An Ecology report produced by Hankinson Duckett Associates has highlighted that this is a sensitive area in terms of ecology and there are various species of bats within the surrounding area of the development site. Any new lighting scheme should be accompanied by an environmental impact assessment covering the development site and surrounding area. Development layout shown below.
- 2.4 Development layout shown below.



3.0

POLICY & GUIDANCE

Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

- 3.1 Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (the 'EPA', 1990), states: "artificial light emitted from premises so as to be prejudicial to health or nuisance."

National Planning Policy Framework

- 3.2 The National Planning Policy Framework (NPPF), published in March 2012, sets out the governments planning policies for England and how they are expected to be applied and provides a framework for local plans. Under the broad heading of "Achieving Sustainable Development", Chapter 11 "Conserving and enhancing the natural environment" deals with obtrusive light in clause 125 which states: "By encouraging good design, planning policies and decisions should limit the impact from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

Relevant British Standards

- 3.3 The most applicable British Standards for lighting that relates to the proposed development are:
- BS5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas

Institution of Lighting Professionals, BATS Conservation Trust Lighting Guidance (January 2008)

- 3.4 The Bat Conservation Trust and the ILP produced a paper in 2009, "Bats and Lighting in the UK", discussing the appropriate lighting levels, types of lamps, colour temperatures etc. which are suitable for lighting areas adjacent to bat houses.

Guidance Notes for the Reduction of Obtrusive Light; 2011 Institution of Lighting Professionals (ILP)

- 3.5 Guidance notes produced by the Institution of Lighting Professionals are among the most commonly referenced guidance notes for good practice within the lighting design industry.
- 3.6 Obtrusive light (or sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and as such is detrimental to other users. The assessment has been carried out in accordance with the published guidance documents from the ILP.
- 3.7 Light intrusion refers to the spilling of light beyond the boundary of the area to be lit. This includes the intrusion of light into bedroom windows.
- 3.8 Sky glow refers to the brightening of the sky above towns cause by direct or reflected upward light.
- 3.9 Glare refers to the uncomfortable brightness of a light source when viewed against a dark background. **Figure 1** illustrates the different types of obtrusive light.

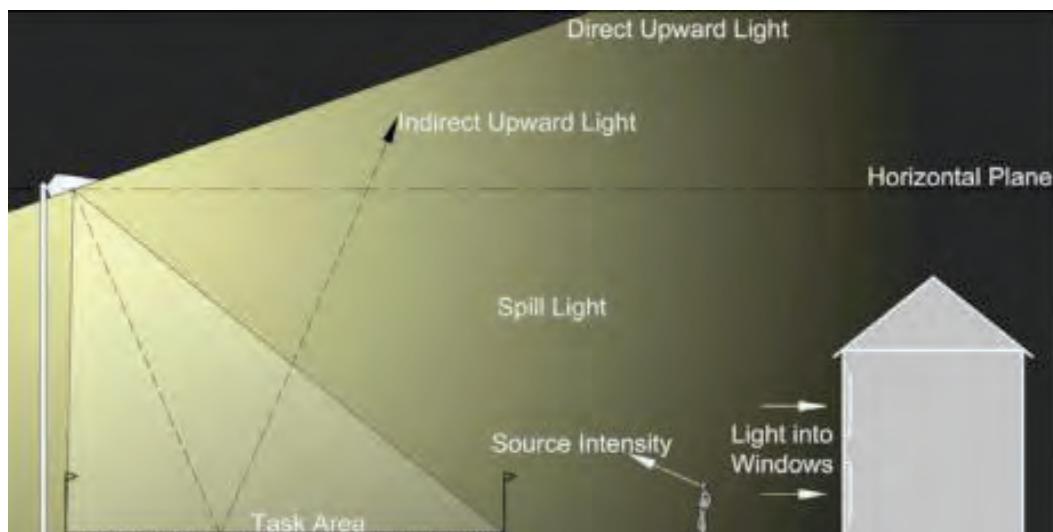


Figure 1: Light Obtrusion characteristics

4.0 ASSESSMENT METHODOLOGY

- 4.1 A desk-top study has been undertaken to identify relevant legislation, planning policy and good practice guidance in relation to lighting. The methodology takes guidance from the Institution of Lighting Professionals PLG 04 document "Guidance on Undertaking Environmental Lighting Impact Assessments". This sets out good practice which was followed during the assessment.
- 4.2 The scope of the assessment shall cover the effects of artificial lighting as a result of the proposed development. The assessment will consider the following:
- Assess the existing baseline lighting conditions on the immediate surroundings.
 - To limit light pollution and sky glow
 - To limit obtrusive light, spill light and glare to neighbouring land and properties.
 - To limit potential light spill to vegetation and wildlife.

5.0

BASELINE CONDITIONS

- 5.1 The assessment site for the proposed development currently comprises predominantly of large open fields, parcels of mature woodland, Hogwood Farm Industrial Estate and two houses. The Arborfield Garrison situated approximately 4 km south west of Wokingham town centre and about 5 km south east of M4 Junction 11 and the edge of Reading, will provide new housing in the south of Wokingham Borough.
- 5.2 The north east access into the site joins onto an existing adoptable road, at the junction of Hogwood Lane/Park Road. The road is maintained by Wokingham Borough Council and is currently lit near the proposed access with high pressure sodium lanterns mounted on 5m street lighting columns. **Upgrades to the existing lighting may be required but this would be subject to a design brief from WBC.**



Hogwood Lane/Park Road

- 5.3 The eastern access into the site joins onto an existing adoptable road, at the junction of Park Road/Nine Mile Ride. The road is maintained by Wokingham Borough Council and is currently lit near the proposed access with high pressure sodium lanterns mounted on 5m hockey stick street lighting columns. **Upgrades to the existing lighting may be required but this would be subject to a design brief from WBC.**



Park Road/Nine Mile Ride

- 5.4 The north west of the proposed site links to the Arborfield Local Centre, at the junction of Sheerlands Road/Nine Mile Ride Extension. The road is maintained by Wokingham Borough Council and is currently lit at the link road with high pressure sodium lanterns mounted on 10m street lighting columns. **Upgrades to the existing lighting may be required but this would be subject to a design brief from WBC.**



Sheerlands Road/Nine Mile Ride Extension

- 5.5 The western access into the site joins onto an existing adoptable road, Sheerlands Road. The road is maintained by Wokingham Borough Council and is currently unlit near the proposed access. **New lighting may be required but this would be subject to a design brief from WBC.**



Sheerlands Road

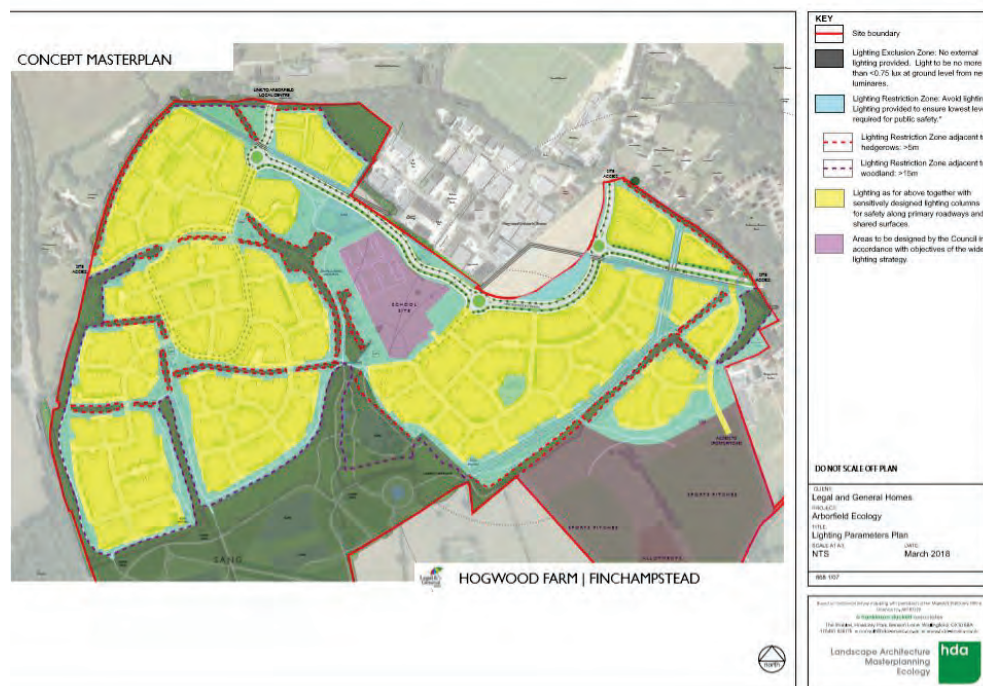
- 5.6 The application site is in a village and civil parish in the Wokingham Borough of Berkshire. There are a number of existing residential and commercial properties and a number of open fields and trees near the proposed development. The new lighting installation shall consider all aspects of the surrounding area and environment and shall comply with BS 589:2013 & BS EN 12464: 2014.

- 5.7 The environment surrounding the application site is low district brightness, categorised as an E2 Environmental Zone in accordance with the ILP Guidance Notes. There are some isolated areas where exterior lighting is visible from the application site; however these light sources are not significant enough to affect the Environmental Zone.

6.0

ECOLOGY

- 6.1 Several areas within the proposed development have been identified by the ecological consultants as being sensitive for wildlife. The report suggests that some areas where there are mature trees could provide the opportunity for roosting bats.
- 6.2 Within the development it is proposed that LED lighting with a correlated colour temperature of 4000 kelvin is used. LED light sources contain no UV wavelengths and the warmer colour temperatures reduce the light emitted beyond the 550 nanometer wavelengths. These requirements are consistent with current research on the impact of artificial lighting on bats, as published by the Bat Conservation Trust.
- 6.3 Light spill has the potential to affect both flora (plants etc) and fauna (from insects through to reptiles, wild animals and domestic animals). Light spill can disrupt feeding patterns and force ecological receptors to leave their habitat. The lighting strategy will seek to mitigate light spill where there are potential ecological receptors that could be adversely affected. This will be sought through guidance provided by the ILP for the reduction of obtrusive light.
- 6.4 A Lighting Parameters plan has been produced by Hankinson Duckett Associates, which relates to dark corridors across the development site. Dark corridors can be created to encourage and or guide bats away from lit areas or around lit obstacles such as roads. Below shows the Lighting Parameters layout:



- 6.5 Section **8.0 Proposed Lighting Levels** illustrates the typical levels that should be achieved to fulfil the requirements of the Lighting Parameters plan.

7.0

DESIGN PROPOSALS

- 7.1 The scheme shall be designed in accordance with BS5489-1:2013 & BS EN 13201-2:2003 and designed to ensure that external lighting is focussed in the appropriate areas and that upward light is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties. Selected luminaires are to have minimal upward light spill and a colour rendering index (Ra) greater than or equal to 60Ra. Colour rendering index relates to the accuracy of colours perceived, relative to daylight
- 7.2 The proposed Roundabouts within the development would be a Conflict area “C class” in accordance with BS5489-1:2013, GN01: 2011 Table 1 - Environmental Zone & the ILP ‘Guidance Notes for the Reduction of Obtrusive Light’ GN01. The initial lighting class would be C5 the required illuminance levels would be a minimum Eave of 7.50 lux to 10.00 lux (Average) and a maintained Uniformity (Emin/Eave) of 40%. Guidance from the ILP PLG02 The Application of Conflict Areas on the Highway has also been taken into consideration.
- 7.3 The Primary spine road through the development would be a residential “P class” in accordance with BS5489-1:2013, GN01: 2011 Table 1 - Environmental Zone & the ILP ‘Guidance Notes for the Reduction of Obtrusive Light’ GN01. The initial lighting class would be P4 with an S/P ratio of 1.61, the required illuminance levels would be a minimum Eave of 3.75 lux to 5.62 lux (Average) and a maintained Emin of 0.74 lux (minimum). The specified lighting class for this development is at a low level which further reduces the impact of the new lighting systems on the surrounding area.
- 7.3 The subsidiary roads through the development would be a residential “P class” in accordance with BS5489-1:2013, GN01: 2011 Table 1 - Environmental Zone & the ILP ‘Guidance Notes for the Reduction of Obtrusive Light’ GN01. The initial lighting class would be P5 with an S/P ratio of 1.62, the required illuminance levels would be a minimum Eave of 1.99 lux to 2.99 lux (Average) and a maintained Emin of 0.40 lux (minimum). The specified lighting class for this development is at a low level which further reduces the impact of the new lighting systems on the surrounding area.
- 7.4 **Figure 2** illustrates GN01:2011 Table 1 – Environmental Zones

GN01:2011 Table 1 - Environmental Zones			
Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres

Figure 2: Environmental Zone Table

- 7.5 Based on an Environmental Zone classification of E2, the likely effects of the proposals are as follows:
- A slight increase in sky glow, this may result in the alteration of wildlife patterns in the area.

- A possible increase in the light 'glare' which may have an effect on the visual comfort of local residents.

7.6 The specified lantern currently approved for use within Wokingham Borough Council is the Philips Gen 3 Mini Iridium (ref: BGP381 1xGRN30_740WSO) & Philips Luma 1B R4 DS-NW 1 & Philips Luma 1B R3 DS-NW 1. **Figure 3:** Philips Lanterns.



Figure 3 Philips Luma Iridium LED

Philips Gen 3 Mini

- 7.7 The Mini Iridium and Luma offers a Ra value of ≥ 70 , the correlated colour temperature arrays from 3000 to 4000 Kelvin and has an IP rating of IP66.
- 7.8 The luminaire has a range of optics, for this development, as per Wokingham Borough Council specification the optic for the roundabouts is the Luma 1B R3 DS-NW 1 12000 lumens, for the spine road the optic is Luma Mini 1B R4 DS-NW 1 8800 lumens and the optic for the subsidiary roads are the Mini Iridium BGP381 1xGRN30_740WSO 2000 lumens. Correlated colour temperature is 4000 kelvin neutral white LED. The reason for using different optics is due to the varied road widths; the spine road is wider than the subsidiary roads, therefore the difference in optics & wattages to achieve the required lighting class. All optics have an acceptable glare rating of G3 or above, thus minimising the spread of light above horizontal. All luminaires are to have a dimmable electronic control gear.
- 7.9 Where possible street lighting has been located at boundary points of properties in order to further reduce the risk of disturbance from light spill. If a resident complains about light spill from a specific luminaire, rear light shields can be retrospectively installed. 10m columns are proposed for the roundabouts, 8m columns are proposed for the spine road and 6m columns for the subsidiary roads.
- 7.10 The Philips lantern has good light control and cut off angles to reduce light spillage. Where possible luminaires are orientated towards the site, away from the land outside the site to make them less intrusive.
- 7.11 Remote Monitoring Systems should be considered for the development site so that any installed lighting in sensitive areas can be significantly reduced during the hours of darkness or lights switched off entirely. This type of solution, if considered acceptable for this area, could further assist with minimising the potential impact of any proposed lighting on the local wildlife in the surrounding area to the development site.

8.0 PROPOSED LIGHTING LEVELS

- 8.1 The Hogwood Farm, Finchampstead development has been assessed under BS5489:2013 to require a lighting level of C5 for the roundabout, P4 for the spine road and P5 for the subsidiary roads for an LED light source. This lighting classes shall cover the main residential roadway areas throughout the development. The environmental zone for the area has been assessed as being E2 and this helps derive the below lighting class taken from table A.5 from within BS 5489: 2013. Please note this is an assessment and Wokingham Borough Council prefers to issue designs briefs with the lighting classifications they require. Details of our assessment are below:

Table A.5 Lighting classes for subsidiary roads with a typical speed of main user $v \leq 30$ mph

Traffic flow	Lighting class			
	Ambient luminance: very low (E1)	Ambient luminance: low (E2)	Ambient luminance: moderate (E3)	Ambient luminance: high (E4)
Busy ^{A)}	S3 or P3	S3 or P3	S2 or P2	S2 or P2
Normal ^{B)}	S4 or P4	S4 or P4	S3 or P3	S3 or P3
Quiet ^{C)}	S5 or P5	S5 or P5	S4 or P4	S4 or P4

NOTE 1 Table A.5 assumes no parked vehicles – see risk assessment in A.3.3.2.

NOTE 2 If facial recognition is important then an E5 lighting class from BS EN 13201-2:2003, Table 5, or an E_{sc} lighting class from CIE 115:2010 [N1], Table 7, can be selected as an additional criterion. Good colour rendering contributes to better facial recognition. (The E5 lighting class in BS EN 13201-2:2003 is expected to be replaced by SC upon publication of the revised edition.)

NOTE 3 To ensure adequate uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 It is recommended that the actual overall uniformity of illuminance U_a be as high as reasonably practicable.

NOTE 5 Grey highlighting indicates situations that would not usually occur in the UK.

NOTE 6 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP GN01 [N5].

^{A)} Busy traffic flow refers to areas where the traffic usage is high and can be associated with local amenities such as clubs, shopping facilities, public houses, etc.

^{B)} Normal traffic flow refers to areas where the traffic usage is of a level equivalent to a housing estate access road.

^{C)} Quiet traffic flow refers to areas where the traffic usage is of a level equivalent to a residential road and mainly

A.3.2 Conflict areas

The CE or C lighting classes are intended for motorists on conflict areas within traffic routes as defined in 7.5.

Table A.4 gives lighting classes for conflict areas on traffic routes, using the CE lighting classes in BS EN 13201-2:2003, Table 2, and the C classes in CIE 115:2010 [N1], Table 5, related to the lighting class on the roads approaching the conflict area.

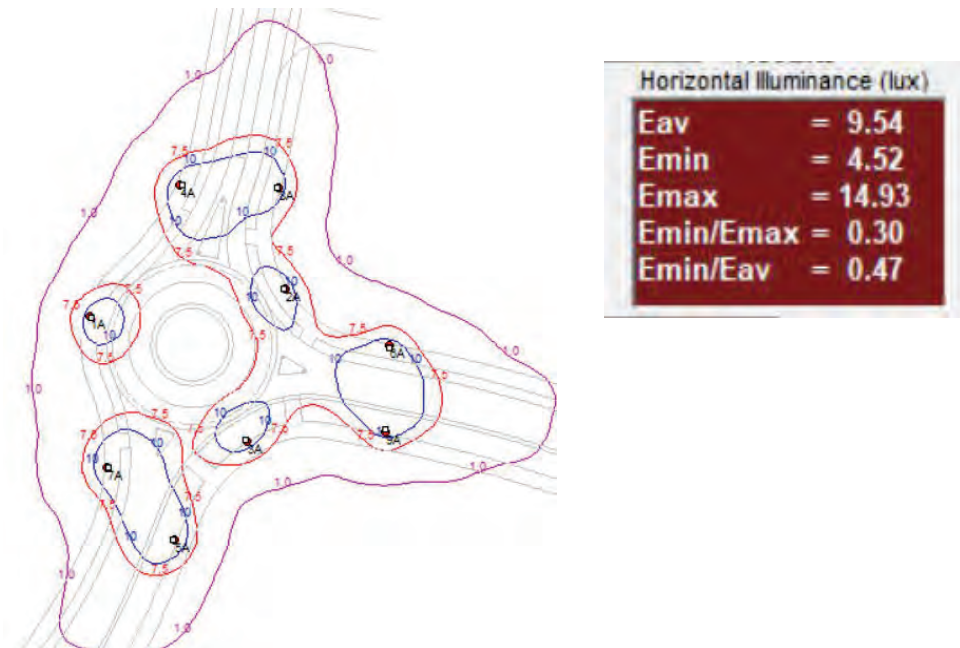
Where traffic routes having different lighting classes meet, the higher lighting class normally determines the class at the conflict area.

NOTE Further guidance on the selection of lighting class for conflict areas will be given in ILP PLG02 [36], currently in preparation.

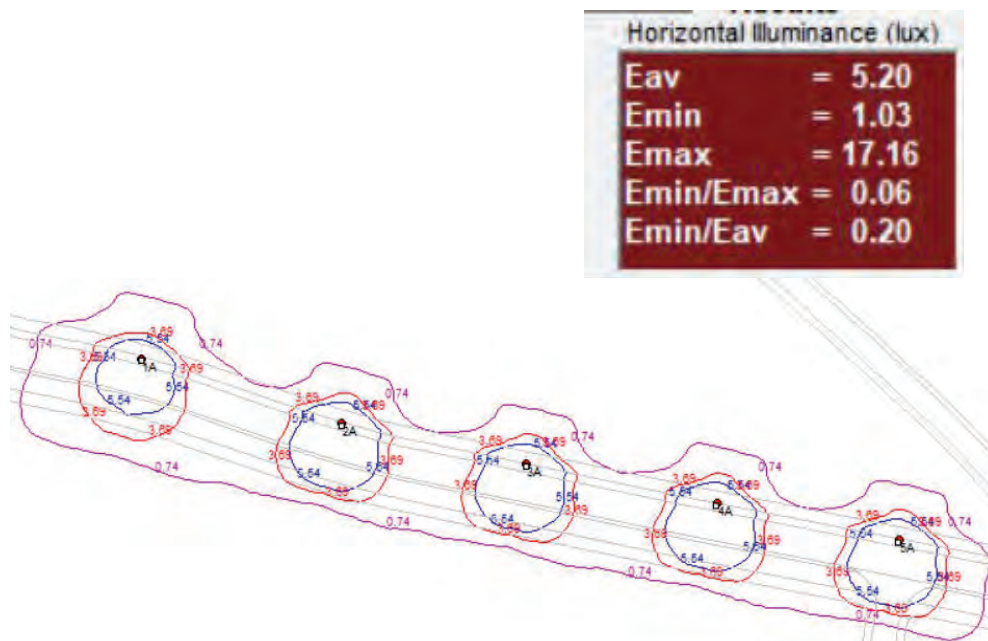
Table A.4 Lighting classes for conflict areas

Traffic route lighting class	Conflict area lighting class
ME1 or M1	CE0 or C0
ME2 or M2	CE1 or C1
ME3 or M3	CE2 or C2
ME4 or M4	CE3 or C3
ME5 or M5	CE4 or C4
ME6 or M6	CE5 or C5

- 8.2 Below indicates the typical levels achieved using the Philips Luma 1B R3 DS-NW 1 12000 lumens LED lantern for the roundabout – lighting class C5



- 8.3 Below indicates the typical levels achieved using the Philips Luma Mini 1B R4 DS-NW 1 8800 lumens LED lantern for the spine road – lighting class P4 applied S/P ratio 1.61.



- 8.4 Below indicates the typical levels achieved using the Philips Gen 3 Mini Iridium 2000 lumens LED lantern for the subsidiary roads – lighting class P5 applied S/P ratio 1.62 (this lantern is dimmed to 60% to achieve P5 lighting class)



- 8.4 Lighting provided within residential areas shall be carefully considered, lighting design solutions with an overall uniformity of between 0.20 and 0.40 can be provided if deemed necessary by the developer.

Table 12.1: Obtrusive Light Limitations for Exterior Lighting Installations

Guidelines and threshold values for the environmental zones published by the ILP provides a guideline on technical limits

Environmental Zones	Sky Glow UWLR (Max%)	Light into Windows Ev (Lux) Before Curfew	Light into Windows Ev (Lux) After Curfew	Source Intensity I (Kcd) Before Curfew	Source Intensity I (Kcd) After Curfew	Building Luminance L (Cd/m2) Average Before Curfew
E1 - Intrinsically Dark Landscapes	0	2	1	2.5	0	0
E2 - Low District Brightness Areas	2.5	5	1	7.5	0.5	5
E3- Medium District Brightness Areas	5	10	2	10	1	10
E4 - High District Brightness Areas	15	25	5	25	2.5	25

Notes to table:

UWLR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky; Ev is Vertical illuminance in Lux; I is Light Intensity in Candelas; L is Luminance in Candelas per square metre.

9.0

IMPACTS

During Construction

- 9.1 During construction phase, it is likely that the site will be affected through the use of temporary site lighting either for health and safety purposes, site security, or both. It is assumed that the main impacts will be spill light and luminous intensity.
- 9.2 Lighting for health and safety will be needed where work is required to take place during the hours of diminishing ambient lighting levels which is likely to occur if the construction works are carried out in the winter months or if night-time working is required. Security lighting is often required to deter crime in both compounds and in areas where plans and materials are stored overnight.

Post Construction

- 9.3 The site is classified as Environmental Zone E2, with the proposed lighting for the site being assessed in accordance with the limiting criteria for that zone, **figure 3** illustrates GN01:2011 Table 2 – Obtrusive light limitations for exterior installations

GN01:2011 Table 2 – Obtrusive Light Limitations for Exterior Lighting Installations – General Observers						
Environmental Zone	Sky Glow ULR [Max %](1)	Light Intrusion (into Windows) Ev [lux]		Luminaire Intensity [candelas]		Building Luminance Pre-curfew (4)
		Pre - curfew	Post - curfew	Pre – curfew	Post – curfew	
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	15

Figure 3 GN01:2011 Table 2 – Obtrusive light limitations for exterior installations

- 9.4 The effect of artificial light associated with the site is predicted to have a minor adverse effect. Modern road lighting luminaires, when mounted with 0° tilts, do not typically produce significant upward light, therefore the effects of upward light/ULR (upward light ratio) are predicted to be negligible.

10.0

MITIGATION MEASURES

During Construction

10.1 Mitigation of the effects of the lighting installation during construction phase will include the following:

- Specifying working hours, use of lighting, location of temporary floodlights in the construction compound and agreeing these with the local council. Lighting to be switched off when not required specifically for construction activities or required health and safety or security.
- Adhere to best practice measures as recommended by the Institution of Lighting Professionals (ILP), Health & Safety Executive (HSE) and CIE (International Commission on Illumination) guidance. Lighting solutions will be selected to reduce light pollution.
- Specifically, designed luminaires will be selected to minimise upward spread of light. The optics in the lanterns will control the distribution of light to avoid overspill, sky glow and glare.
- Glare will be kept to a minimum by ensuring the main beam angle of all lights directed towards any potential observer is not more than 70°. Higher mounting heights allow lower main beam angles, which can assist in reducing glare.
- Restrict lighting to the task area using horizontal cut-off optics and zero tilts.
- Operate curfew and minimise the duration of any lighting (switch off or part-night dimming).

Post Construction

10.2 The detailed lighting design will be designed to use current best practice and technology and will be agreed with Wokingham Borough Council. The impacts of external lighting will be minimised by the installation of lighting to the minimum specification required to provide a safe night time environment for residents, therefore lighting will be designed to comply with the minimum illuminance levels given within the appropriate guidance.

10.3 Care should be taken to minimise glare from all luminaires installed, by ensuring the correct luminaires are selected and installed correctly, in line with the recommendations within the ILP Guidance Notes for the Reduction of Obtrusive Light.

11.0 CUMULATIVE EFFECT AND RESIDUAL EFFECTS

Cumulative

- 11.1 The appearance of sky glow was considered as part of the assessment of the external lighting conditions. During the lighting assessment, it was noted that the site is partially surrounded by an existing brightly lit environment and is adjacent to an established urban location.
- 11.2 The increase with sky glow associated with the proposed development is considered to be negligible.

Residual during construction

- 11.3 It is considered that following the implementation of the mitigation measures outlined in Section 9.0, overall there will be minor adverse residual effect of lighting during the construction phase. The development area is assumed to currently fall into Environmental Zone E2 in accordance with a suburban location with medium district brightness.

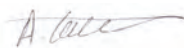
Residual post construction

- 11.4 It is considered that there will be overall minor negative effects from the lighting of the proposed scheme on residential receptors and road users. The use of well located, modern light fittings, will minimise glare, light spill and reduce sky glow contributions to the existing sky glow above Wokingham. Back shields will be installed to luminaires where possible to mitigate the impacts in terms of ecology.

12.0 CONCLUSION AND SUMMARY

- 12.1 In conclusion, subject to implementation of the above proposals, a compliant lighting scheme can be designed and installed and an acceptably low impact on the residential properties and wildlife can be achieved.
- 12.2 During the construction phase, the lighting impacts are likely to be associated with the requirements for temporary lighting to illuminate the contractor's compound and work areas. Installed lighting will involve the use of well located, modern light fittings which are directionally controlled and will be in accordance with current best practice standards and WBC requirements. Overall the effect on sensitive receptors during the construction phase will be short term and temporary in nature and considered to be of minor negative significance.
- 12.3 During the operational phase, the likely impacts include the introduction of artificial light sources as part of the proposed development, which will result in changes to the current baseline conditions. The proposed lighting scheme will comply with all relevant British Standards and the Institution of Lighting Professionals lighting guidelines and will serve to ensure that the safety and security of all areas of the development can be effectively maintained.
- 12.4 The effects on sensitive receptors will be mitigated through the implementation of a stringent lighting design, which will include the use of low light pollution fittings which retain light spill within the development area, minimising the loss of light to the night sky and glare discomfort to on-site or neighbouring receptors.
- 12.5 In our considered opinion, if the measures detailed above are undertaken then we anticipate the proposed development will not have a negative impact on the immediate environment with respect to light pollution. The likely cumulative effect of artificial lighting may be a slight increase in sky glow. However, as the street lighting installed surrounding the development does not utilise dark sky technology, the visual glow of the existing estate would be greater than the proposed development site.
- 12.6 This report has been prepared to the best of our knowledge, any lighting designs proposed shall require technical approval by Wokingham Borough Council and all designs shall be proposed by a competent lighting consultant in accordance with BS 5489: 2013, BS EN 12464: 2014 and Wokingham Borough Council standard street lighting specification.

Prepared By: -



(Signed)

Aimie Loveday

(Print Name)

12th March 2018

(Date)

Reviewed By: -



(Signed)

Simon Winch

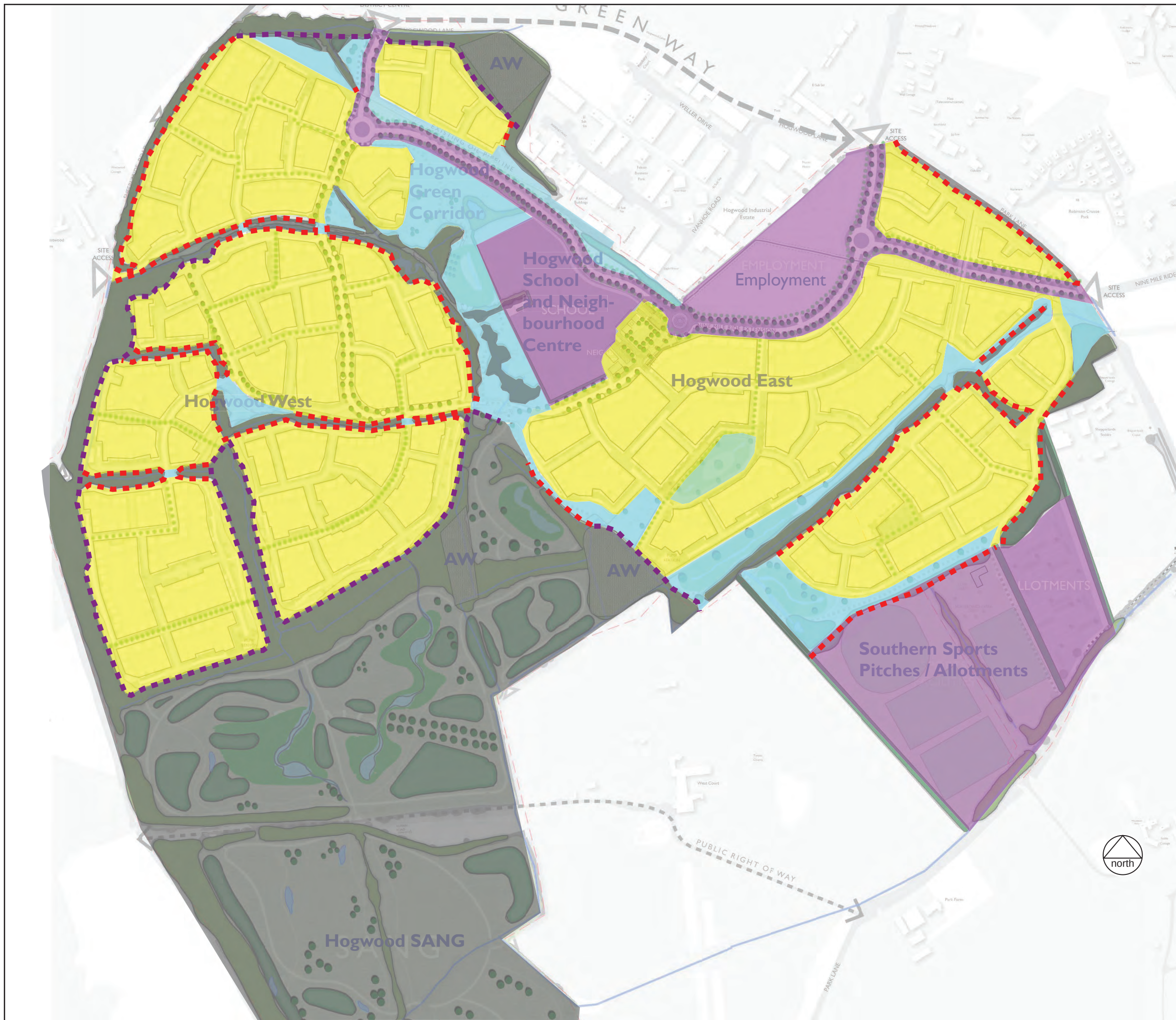
(Print Name)

21st March 2018

(Date)

APPENDIX D

Site-wide Lighting Strategy (MMA, 2018)



- KEY**
- Lighting Exclusion Zone: No external lighting provided. Light to be no more than <0.75 lux at ground level from new luminaires.
 - Lighting Restriction Zone: Avoid lighting. Lighting provided to ensure lowest level required for public safety.*
 - Lighting Restriction Zone adjacent to hedgerows, recent plantation woodland and treelines: $>5m$
 - Lighting Restriction Zone adjacent to woodland: $>15m$
 - Lighting as for above together with sensitively designed lighting columns for safety along primary roadways and shared surfaces.
 - Areas to be designed by the Council/ others in accordance with objectives of the wider lighting strategy.

DO NOT SCALE OFF PLAN

CLIENT:
Legal and General Homes

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Illustrative Lighting Parameters Plan

SCALE AT A3:
NTS

DATE:
September 2018

868.1/07REVC

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The Stables, Howbery Park, Benson Lane, Wallingford, OX10 8BA
t 01491 838175 e consult@hda-enviro.co.uk w www.hda-enviro.co.uk

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