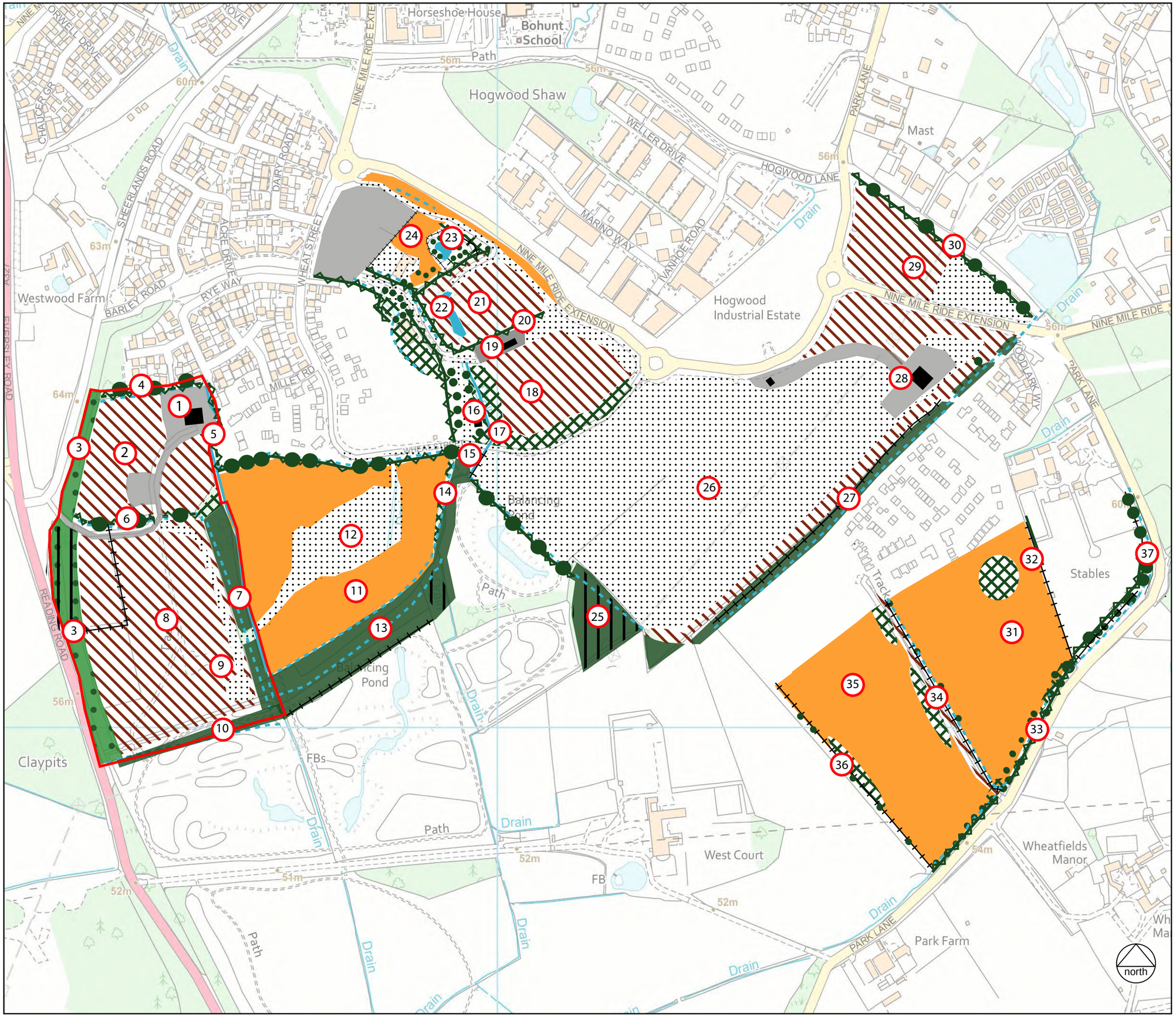

KEY

- Parcels 4 and 5 boundary
- Lowland mixed deciduous woodland - (w1f)
- Other woodland - mixed - mainly broadleaved (w1h5)
- Ancient Woodland
- Scattered trees
- Native hedgerow - (h2a)
- Native hedgerow with trees - (h2a - 11)
- Non-native and ornamental hedgerow - (h3b)
- Mixed scrub - (h3h)
- Ruderal - (81)
- Developed land - sealed surface - (u1b)
- Modified grassland - (g4)
- Standing open water - (r1)
- Wet ditch / Dry ditch - (50)
- Bare ground - (510)
- Buildings
- Fence
- 45 Target notes

CLIENT:
CALA Homes (Thames) Ltd

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcels 4 & 5 - Phase 1 Habitat Survey Plan

SCALE AT A3:
NTS

DATE:
June 2024

868.1/89

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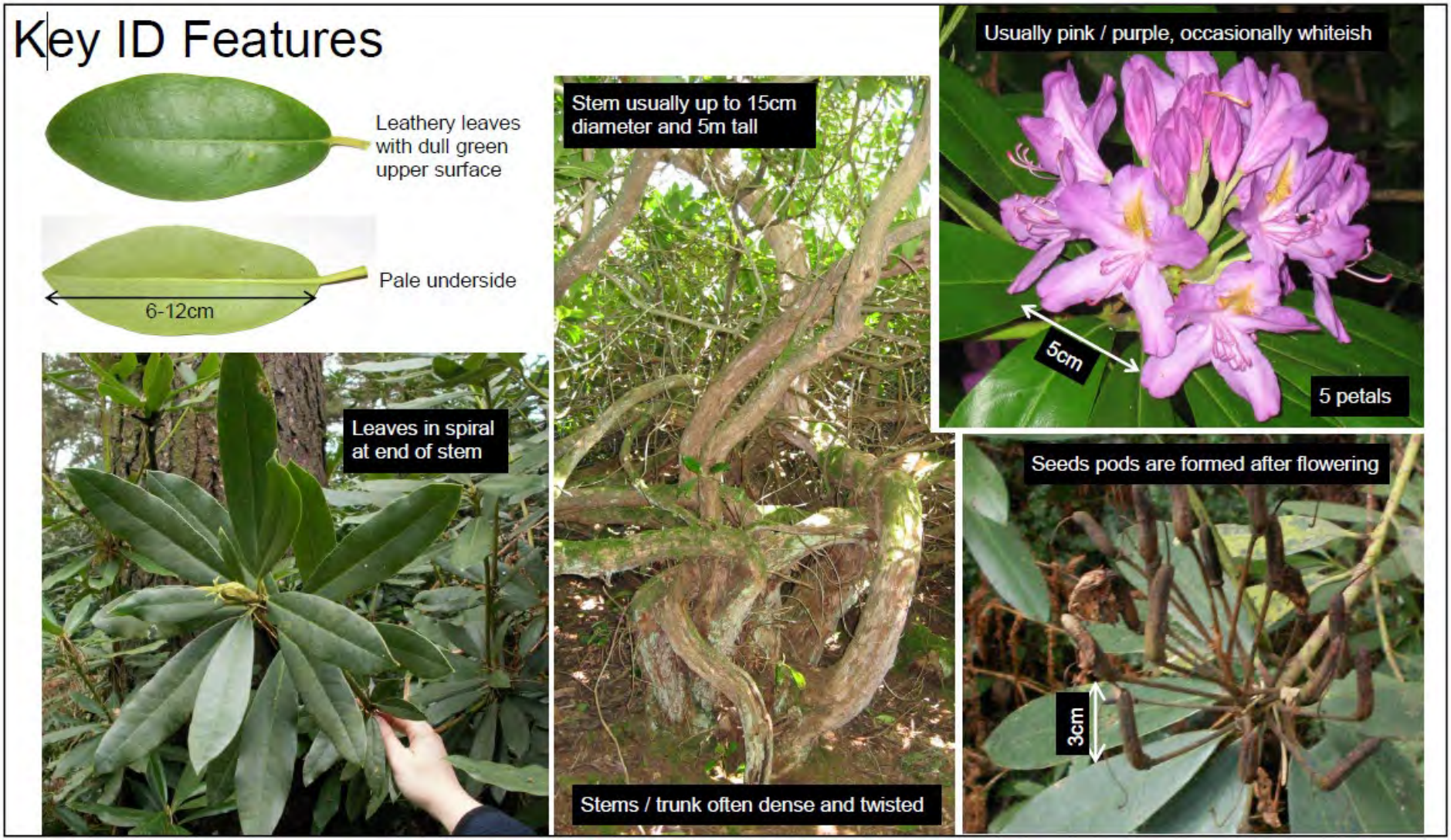
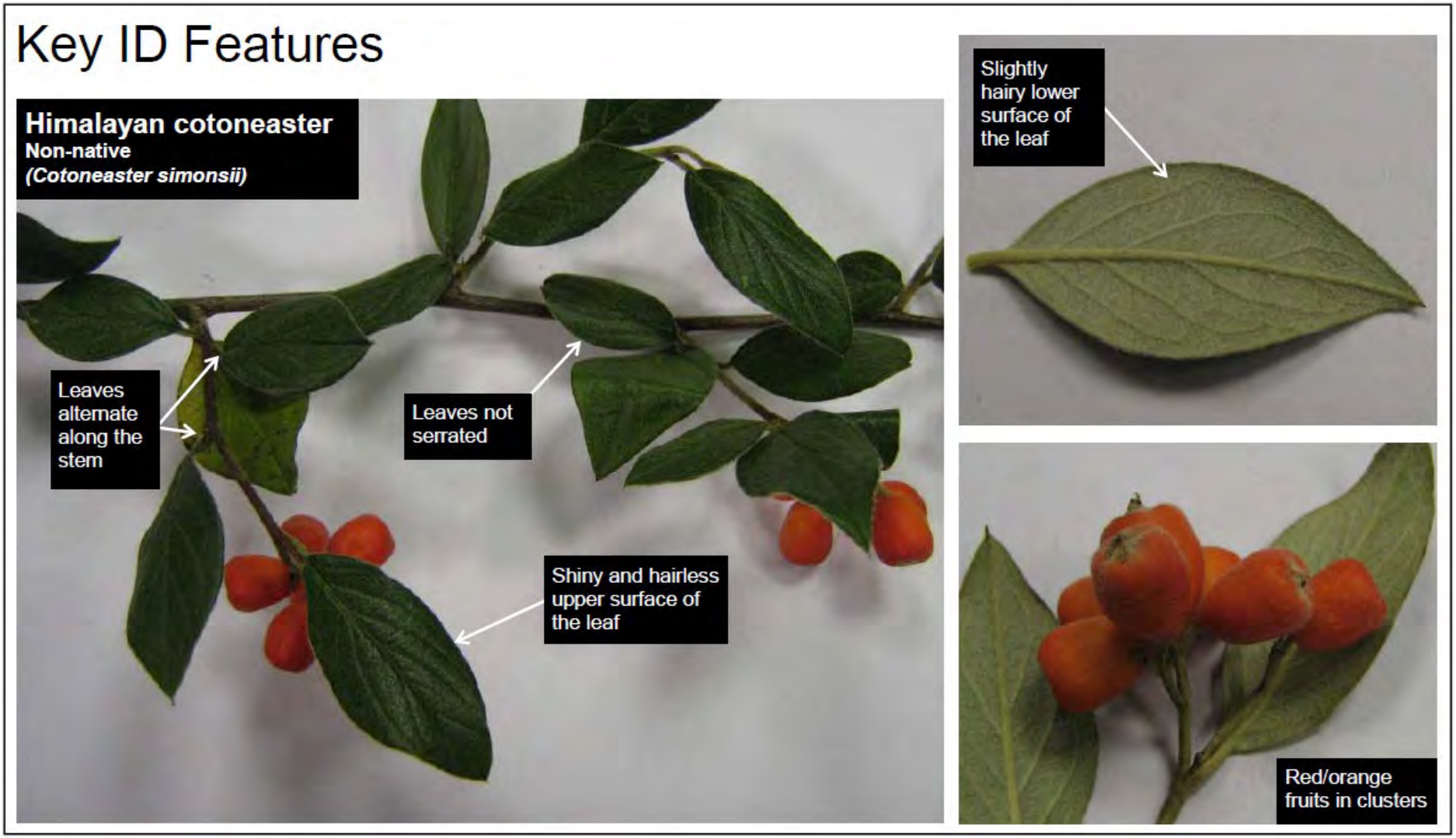
Appendix B

Key identification features of the invasive, non-native species recorded on the wider site or wider area

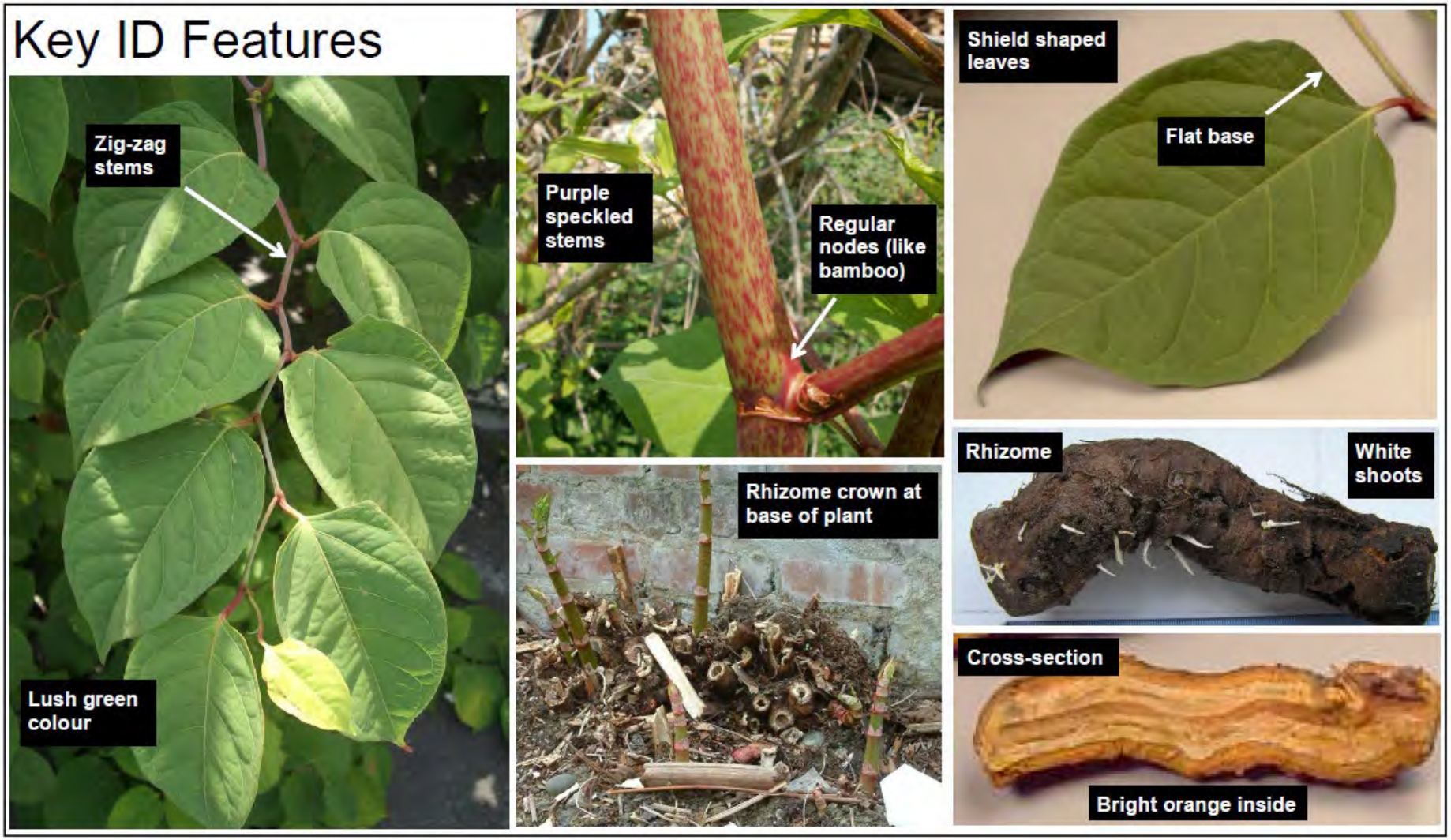
Rhododendron (www.nonnativespecies.org)

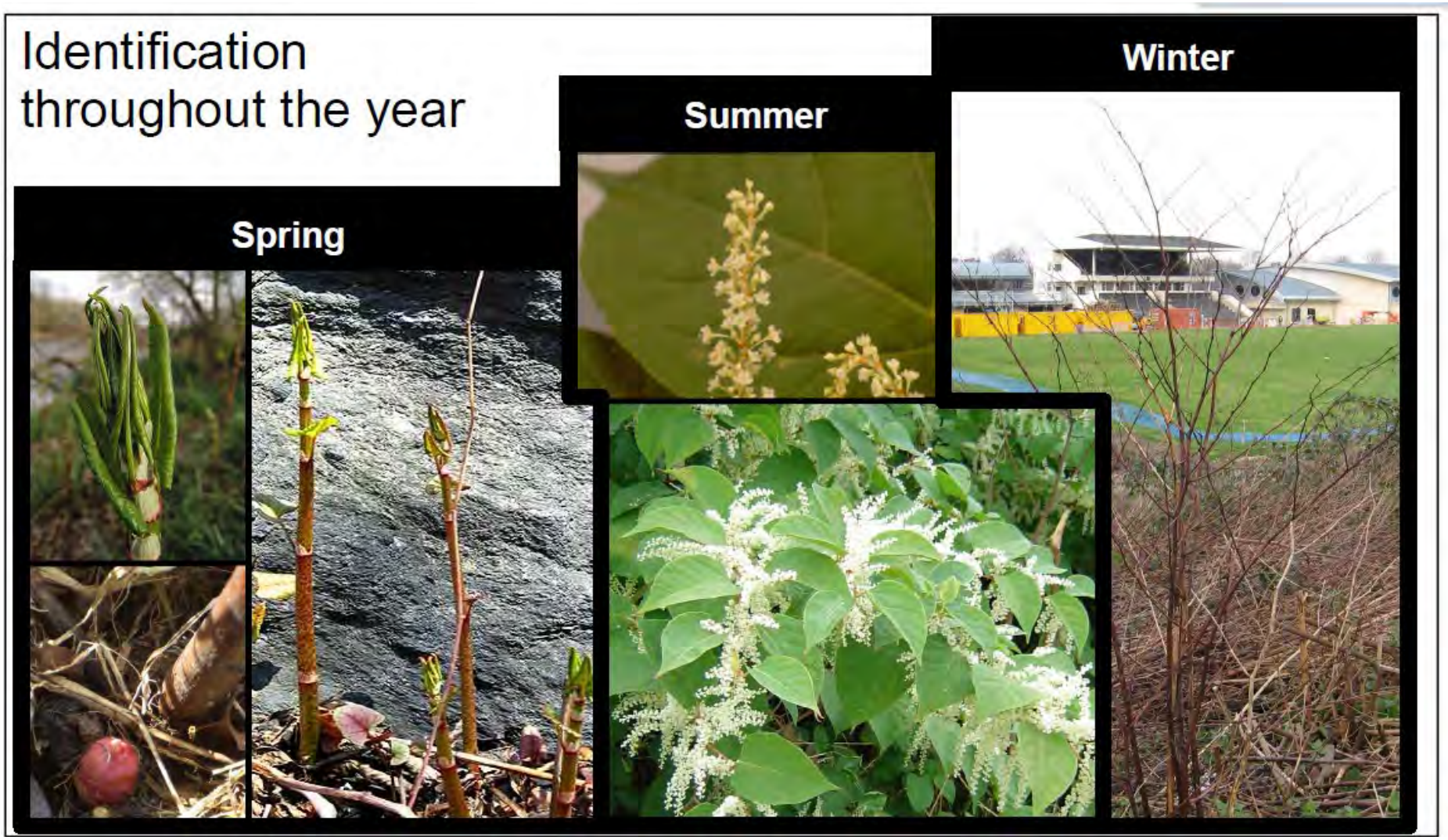


Cotoneaster (www.nonnativespecies.org)

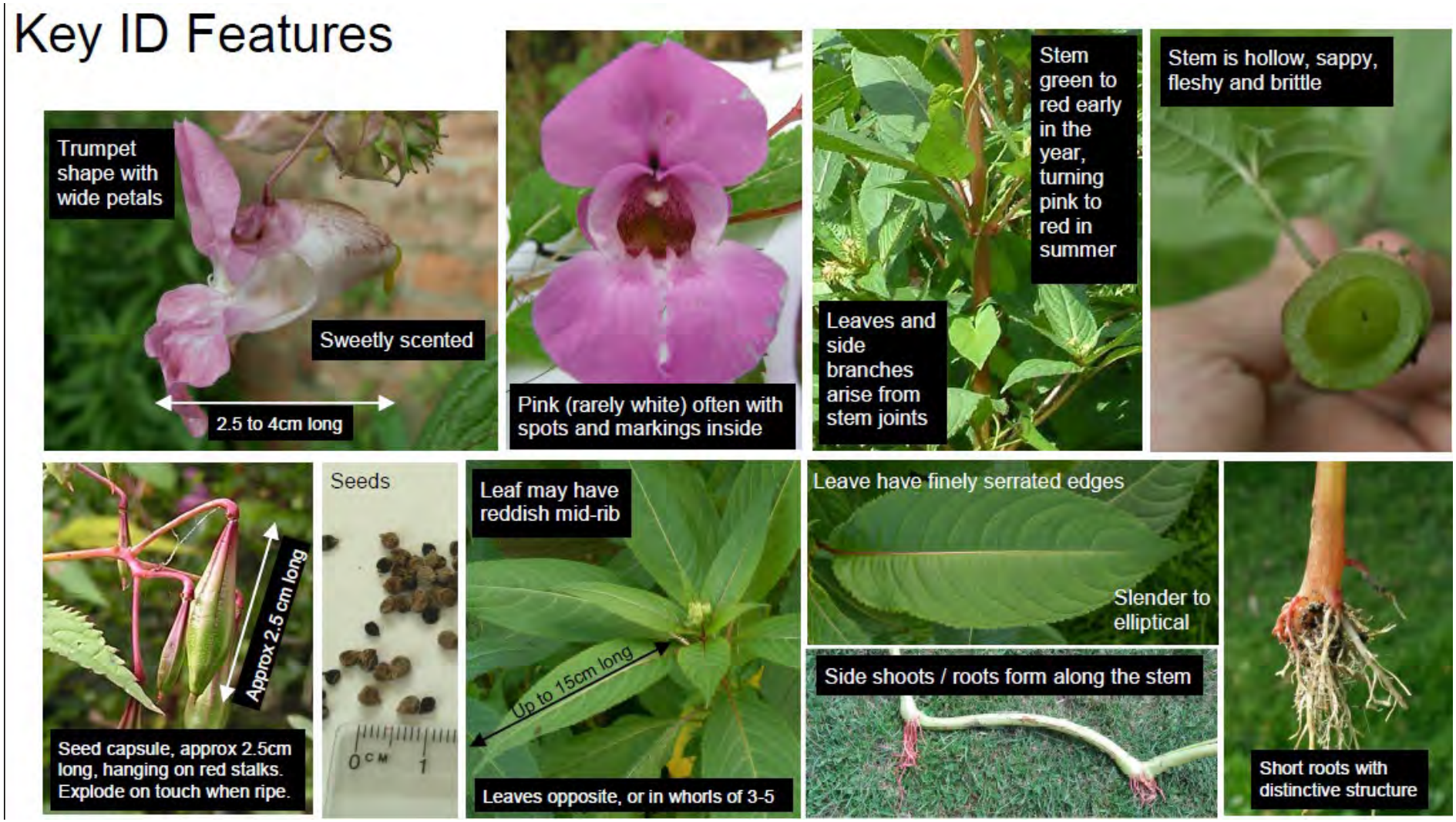


Japanese Knotweed (www.nonnativespecies.org)




Identification
throughout the year
Spring
Summer
Winter

Himalayan Balsam (www.nonnativespecies.org)



Variegated Yellow Archangel (www.nonnativespecies.org)

- Erect hairy perennial. The green variegated leaves have characteristic and distinctive silvery patches, they are hairy with toothed edges, growing in opposing pairs to a length of 4-7cm.
- Yellow flowers which are lipped and hooded, flowering from April to June.

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HOGWOOD FARM, FINCHAMPSTEAD

DETAILED ECOLOGICAL PERMEABILITY SCHEME – PARCELS 4 AND 5

Prepared for CALA Homes Thames Ltd

by

Hankinson Duckett Associates

HDA ref: 868.1

July 2024

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Contents **Page**

1 INTRODUCTION

1.1 Site location and summary description

1.1.1 This report describes a Detailed Ecological Permeability Scheme in relation to Parcels 4 and 5 of the development of approximately 110ha of land at Hogwood Farm, Finchampstead. The Parcels 4 and 5 development area comprises approximately 9ha of land, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SU 7653 6421. The study was commissioned by CALA Homes Thames Ltd in May 2024.

1.1.2 The Parcels 4 and 5 site is located to the north-west of the village of Finchampstead, Berkshire. In general terms, it comprises two fields supporting ruderal vegetation, bare ground, a small area of scrub and a hardstanding construction access track and compound area. The fields are bounded by areas of woodland, including ancient and aged woodland, in addition to native hedgerows with wet and dry ditches. The Parcels 4 and 5 site is bordered to the south by the existing Suitable Alternative Natural Greenspace (SANG) (delivered as part of the wider Hogwood Farm development); to the north by Parcels 2 and 3 of the development which are currently under construction; to the east by a future development parcel which currently comprises modified grassland and bare ground; and to the west by the A327 and Sheerlands Road, with ancient woodland and fields beyond. The location and boundary of the Parcels 4 and 5 site is shown in *Appendix A*.

1.1.3 The Parcels 4 and 5 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 associated with Parcel 1 and a construction site associated with Parcel 2 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 site are comprised of areas of hardstanding and construction/disturbed ground bordered by mature treelines and woodland. The south-eastern areas of the 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 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 site include drainage ditches and small streams associated with the field boundaries and several ponds in poor condition are located across the 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 Parcels 4 and 5 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.

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 Parcels 4 and 5. This has been produced to ensure measures to maintain the ecological permeability for wildlife are implemented within the Parcels 4 and 5 development scheme. The measures identified are in keeping with the 'Outline Site-wide Ecological Permeability Scheme' prepared for the wider site and the Parcels 4 and 5 site in its entirety (HDA, 2018b).

2 BASELINE CONDITIONS

Designated areas

2.1 No statutory or non-statutory designated areas are located within the Parcels 4 and 5 site. The area of woodland located within the western part of the site 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 2023 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

2.3 In general terms, the Parcels 4 and 5 site currently comprises two fields supporting ruderal vegetation, bare ground, a small area of scrub and a hardstanding construction access track and compound area bounded by woodland and native hedgerows.

2.4 Habitat corridors associated with the Parcels 4 and 5 site comprise:

- A strip of woodland, including an area of ancient semi-natural woodland, runs along the western boundary of the Parcels 4 and 5 site.
- A strip of broadleaved 'aged' woodland with wet and dry ditches is present along the southern part of the eastern boundary of the Parcels 4 and 5 site. The wet ditch continues to the north of the woodland along a native hedgerow running north along the eastern boundary and connected to a native hedgerow with trees that run east into the wider site.
- A defunct native hedgerow with mature trees is situated along the northern site boundary and connects with woodland along the western boundary.
- The site's southern boundary comprises a strip of plantation lowland mixed deciduous woodland with a dry ditch. This woodland connects to the woodlands along the western and eastern boundaries, and the SANG lies to the south of this woodland.
- A treeline with a relic species-rich hedgerow and dry ditch at its base is present at the centre of the site, between Parcel 4 and Parcel 5. The compound access track crosses at its centre; however, the hedgerow and ditch provide limited connectivity to the eastern and western woodland strips.

2.5 In general, the habitat corridors are well-connected across the site and to the wider site. Further information on the extent and composition of these features is provided in the Parcels 4 and 5 Habitat Survey and Target Notes included as *Appendix A.*

Existing lighting

2.6 A lighting strategy for the Parcels 4 and 5 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).

2.7 The lighting strategy identifies that the environment surrounding the Parcels 4 and 5 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

2.8 Hard landscaping within the site is limited to the construction access roadand compound with mobile cabins. These areas of hardstanding do not have kerbs or gulley pots and are subsequently unlikely to have a significant effect on the existing ecological permeability of the Parcel 4 and 5 site or wider site.

3 ECOLOGICAL CONTEXT

3.1 The proposals for the development of the Parcels 4 and 5 site have been informed by a number of 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 Parcels 4 and 5 development site. This is considered in this report in addition to the Detailed Bat Mitigation Strategy (HDA, 2024a) produced for the Parcels 4 and 5 site in relation to Condition 24.
- **Roosting bats:** One tree within/adjacent to the site supporting a low-status, non-breeding bat roost for Soprano Pipistrelle, will be retained within the scheme. The Detailed Bat Mitigation Strategy produced for the Parcels 4 and 5 site includes the specific provision of retained, replacement and additional bat roosting features within the development phase (HDA, 2024a). These are in keeping with the measures set out in this report.
- [redacted]
- **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, 2021). However, no reptiles were recorded within the Parcels 4 and 5 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 Parcels 4 and 5 site as required under Condition 26 of the planning consent (HDA, 2024b).
- **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 Phases 4 and 5 site and wider site. In addition, they are a Species of Principal Importance

[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).

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 Parcels 4 and 5 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 Parcels 4 and 5 site currently comprise woodland margins and woodland belts along the western, eastern and southern site boundaries, and native hedgerows/treelines along the northern, north-eastern boundaries and through centre of the site. Habitat corridors are generally well-connected across the site (see *Appendix A*).

5.2 The majority of these features will be retained within the Parcels 4 and 5 development scheme with additional planting where appropriate as demonstrated in the Landscape Proposals P4+5 Masterplan (CSA, 2024) and the Detailed Landscape and Ecological Management Plan for Parcels 4 and 5 (HDA, 2024c). Key habitat corridors to be secured within the Parcels 4 and 5 development scheme will focus on the existing features and are shown on the plan provided in *Appendix B*. Key corridors will comprise:

- Woodland associated with the western site boundary will be retained, with the exception of the removal of 2 trees (Holly and Beech) associated with the existing construction access point (RPS, 2024). The margin will be enhanced with wildflower meadow and shrub planting, which will improve habitat connectivity north to south through and adjacent to the site.
- The aged woodland and native hedgerow along the eastern boundary bordered by wet and dry ditches will be retained and enhanced, with the exception of a single Field Maple and a group of mixed broadleaves (approximately 13m in length) will be removed from the centre of the hedgerow of the north-eastern boundary (RPS, 2024). Enhancements include the provision of wildflower meadow, shrub, tree and native hedgerow planting.

- The plantation woodland along the southern boundary will be retained and the margin will be enhanced with wildflower meadow, scrub and native hedgerow planting.
- The native hedgerow along the northern boundary will be retained and enhanced through the planting of wildflower meadow and native hedgerows.
- The treeline and relic species-rich hedgerow in the centre of the site will be retained and enhanced, with the exception of three Leyland Cypress at the western end and approximately 9m of hedgerow at the eastern end (RSP, 2024). The retained sections will be enhanced through planting of wildflower meadow, scrub and trees improving the connectivity through the centre of the site.

5.3 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 west of the site and hedgerows within the wider site, which connect to areas of proposed public open space and the SANG.

5.4 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.

5.5 In addition to the key habitat corridors around the Parcels 4 and 5 site, 'stepping stone' habitats will be provided across the Parcels 4 and 5 development area and within its wider green infrastructure as shown on the Landscape Proposals P4+5 Masterplan (CSA, 2024). These include:

- 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.

6 LIGHTING

6.1 This section describes the strategy that the external lighting design of the Parcels 4 and 5 development will employunless 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 luminaries 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 roadway[2].

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

6.4.3 In the event that lighting is required outside of the above parameters in relation to the Parcels 4 and 5 development scheme, any such deviation will first be agreed with the local 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 Parcels 4 and 5 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 8m for the spine road and 6m for the subsidiary roads such as those running through the Parcels 4 and 5 development site; and
- 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 Montoring System will be considered for lighting in sensitive locations to allow luminaires to be dimmed to an appropriate level and them 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 bat roost and retained trees which include suitable features for roosting bats are located in areas proposed as either Lighting Exclusion Zones or Lighting Restriction Zones. The four proposed tree-mounted bat boxes will also be installed in these zones (see *Section 7.3.3* below) and the remaining 177 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 areas of existing foraging habitats and corridors for the movement of bats will be maintained by the Lighting Exclusion Zones and Lighting Restriction Zones identified in *Appendix C* and incorporated into the design of the Parcels 4 and 5 development scheme. Sensitive lighting proposals within the Parcels 4 and 5 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 Parcels 4 and 5 development site for a variety of other nocturnal species, [redacted] 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 Parcels 4 and 5 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).

<u>Avoidance measures</u>

7.2.2 *Number of crossing points:*

The number of points at which roads and cycleways cross the habitat corridors described in *Section 5* has been kept to the minimum level required to allow effective movement of people and vehicles around the site.

7.2.3 *Location of crossing points:*

Where possible, the positions of roads crossing the habitat corridors focus on locations where the habitat is of lowest ecological interest and that where possible existing pinch points and/or gaps in the existing habitats are already present. Examples of this include

use of the existing gaps in the woodland belt on the northern site boundary for access routes.

7.2.4 *Orientation of crossing points:*

Where possible crossing points across habitat corridors described in *Section 5* approach the habitat corridor perpendicularly. This is shown in the design for the access point from the Parcels 4 and 5 development area into development Parcel 2 to the north and where the spine road crossed the central treeline. This has limited the extent of existing habitat to be lost and the extent of road within the habitat corridor.

7.2.5 *Tunnels/ shelves:*

To reduce the likelihood of small animals entering the carriageway where the road crosses the strip of woodland on western boundary and central treeline, either:

- Two small tunnels (e.g. www.aco.co.uk/products/climate-tunnel or similar) will be installed flush with or below the road surface to allow small animals to safely cross the road. Tunnels will be slotted to equalise ambient temperatures between the tunnel and the open air, whilst maximising light and humidity. The locations of the tunnels are shown on the 'Parcel 4 and 5 Indicative Ecological and Pedestrian Permeability Plan' (JNP, 2024) provided in *Appendix E*; OR

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

- The culvert for the section of ditch crossed by the road would be of a suitable design to allow the passage of wildlife. This may include use of a shelf to allow dry passage of animals at times when the ditch is carrying water.

7.2.6 *Standard Tree Planting:*

Where bats are most likely to cross roads, for example where roads bisect hedgerows, treelines or ditches associated with habitat corridors described in *Section 5*, where existing mature trees are not already present new standard trees will be planted. These will serve the purpose of increasing the height of bat flight lines thereby reducing risk of collision with vehicles.

Protection measures

7.2.7 The design of the road system includes the provision of kerbs for the primary and secondary roads to discourage drivers from parking/driving on footpaths and adjacent

landscaping. 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 (*Appendix E*). 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.

7.2.8 *Dropped kerbs:*

In addition to dropped kerbs to assist pedestrians to cross roads safely, dropped kerbs will also be specifically provided to allow small animals to easily exit the carriageway in areas where animals are most likely to cross roads or be trapped within the carriageway, for example where roads bisect hedgerows, woodlands or ditches associated with habitat corridors described in *Section 5*. The proposed locations of dropped kerbs within the Parcels 4 and 5 development scheme, both designed for pedestrian/cycle use and for use by wildlife, are shown in *Appendix E*. These are focussed on locations where it is expected that wildlife is most likely to enter/exit the road system.

7.2.9 *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)

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

The primary and secondary road system bordering the perimeter of the Parcels 4 and 5 site is most likely to present a risk to small animals using the habitat corridors described in *Section 5*. These areas are shaded green on the 'Parcels 4 and 5 Indicative Ecological and Pedestrian Permeability Plan' (JNP, 2024) provided in *Appendix E*. In addition to the

dropped kerbs described above, wildlife kerbs, offset gully pots and gully pot ladders within gulley pots (see below) will be provided in these locations to avoid entrapment in the site drainage system.

7.2.10 *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 on the 'Parcels 4 and 5 Indicative Ecological and Pedestrian Permeability Plan'. 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 Parcels 4 and 5 Landscape Strategy (CSA, 2024), a number of measures will be included in the Parcels 4 and 5 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. jacksons-fencing.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 Parcels 4 and 5 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 mature trees will enhance roosting/nesting opportunities for bats and birds within the Parcels 4 and 5 site and improve the permeability of the site for these species. CALA Homes Thames Ltd have an 'Urban Wildlife Strategy' in place for all their new developments. As part of this strategy CALA Homes (Thames) will incorporate:

- An average of one swift nesting feature per house and apartment building; and
- Each house and apartment block to have at least one bat roosting feature.

This strategy will be implemented for Parcels 4 and 5. The location of these features is shown in *Appendix B*.

Bird boxes:

A total of 177 bird nesting features will be included within the Parcels 4 and 5 site located within a range of habitats, using different types of boxes suitable for a range of bird species. These will comprise:

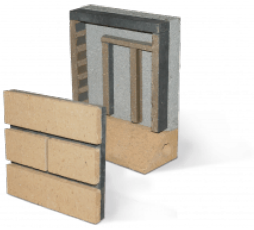
<table>
<tr><td colspan="2">A total of 177 bird boxes will be attached/ incorporated to the walls of the new buildings. These will comprise a mix of:</td></tr>
<tr><td>Manthorpe Swift nesting brick: Designed for Swifts, which inhabit cracks and crevices. Swift boxes have been selected as they are considered to support nesting features for a wide range of bird species.
  </td><td>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.
  </td></tr>
</table>

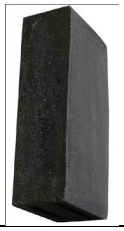
A total of 15 bird boxes will be attached to existing retained trees:	
8x Vivara Pro Seville WoodStone Nest Box with 32mm Oval Hole: Favoured by Blue Tits, Tree Sparrows, Great Tits, Crested Tits, Nuthatches, Coal Tits and Pied Flycatchers. 	**7x Vivara Pro Barcelona WoodStone Open Nest Box:** Favoured by Wrens, Robins, Spotted Flycatchers, Pied Wagtails, Grey Wagtails, Song Thrushes and Blackbirds as well as offering protection from woodpeckers, squirrels and cats. 

(Images sourced from nhbs.com, www.manthorpebp.co.uk).

Bat boxes:

A total of 181 bat roosting features will be included within the Parcels 4 and 5 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 177 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 4 bat roosting features will be included on mature trees:
4 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 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 Parcels 4 and 5 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 Parcels 4 and 5 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.

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HDA Document Control and Quality Assurance Record

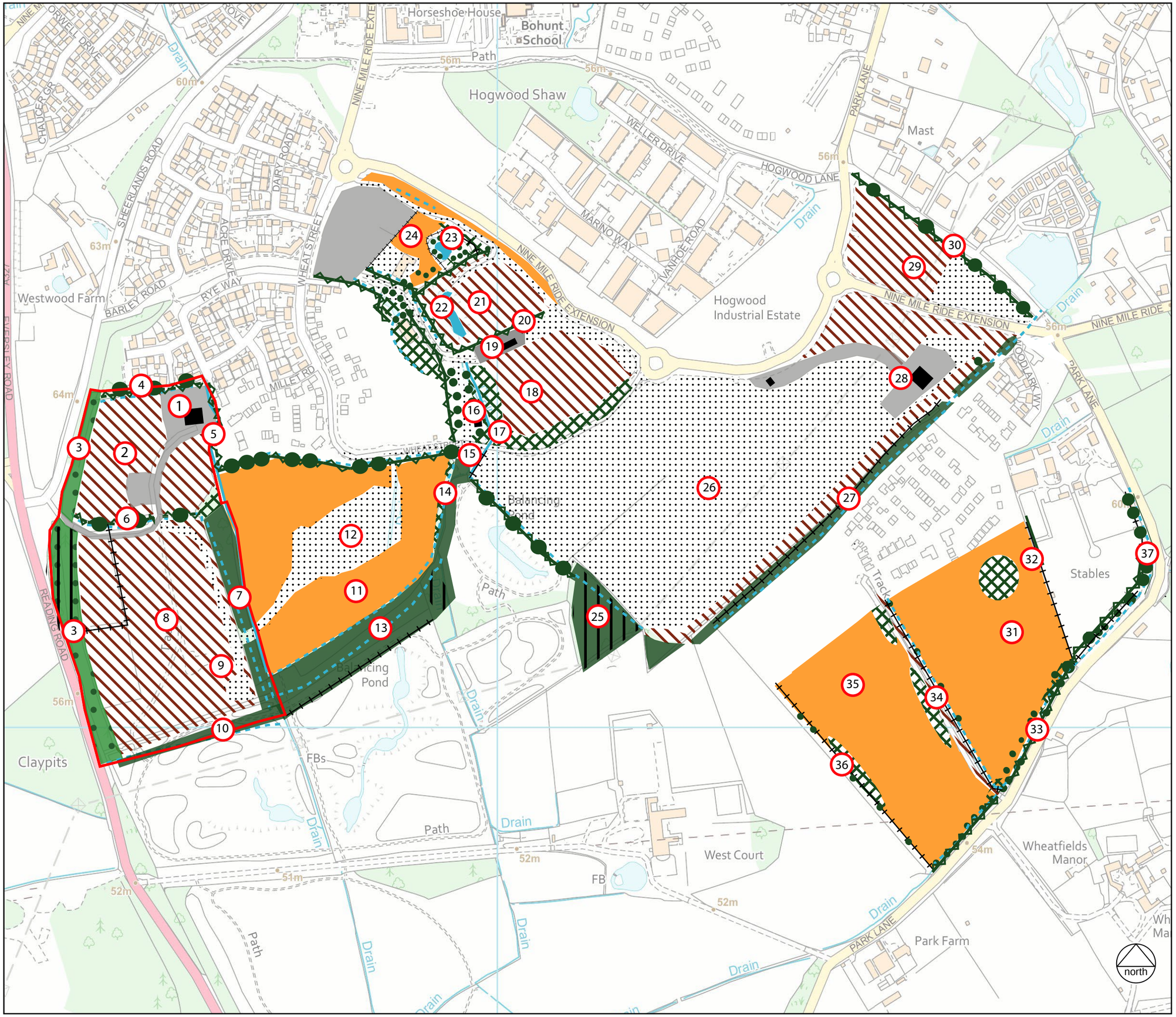
Project Title: Arborfield Eco
Project Reference: 868.1
Document Title: Detailed Ecological Permeability Scheme – Parcels 4 and 5
Commissioning Party: CALA Homes Thames Ltd

Issue	Description	Date of Issue	Signed
1	Detailed Ecological Permeability Scheme – Parcels 4 and 5	July 2024	[redacted]

	Personnel	Position
Author	Sarah Thornton-Mills MCIEEM	Principal Ecologist
Checked by	Anna Potter	Senior Ecologist
Approved for issue	Adrian Meurer MCIEEM	Director

APPENDIX A

Existing Habitat Connectivity



KEY

- Parcels 4 and 5 boundary
- Lowland mixed deciduous woodland - (w1f)
- Other woodland - mixed - mainly broadleaved (w1h5)
- Ancient Woodland
- Scattered trees
- Native hedgerow - (h2a)
- Native hedgerow with trees - (h2a - 11)
- Non-native and ornamental hedgerow - (h3b)
- Mixed scrub - (h3h)
- Ruderal - (81)
- Developed land - sealed surface - (u1b)
- Modified grassland - (g4)
- Standing open water - (r1)
- Wet ditch / Dry ditch - (50)
- Bare ground - (510)
- Buildings
- Fence
- 45 Target notes

CLIENT:
CALA Homes (Thames) Ltd

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcels 4 & 5 - Phase 1 Habitat Survey Plan

SCALE AT A3:
NTS

DATE:
June 2024

868.1/89

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Landscape Architecture
Masterplanning
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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 robertianium*, 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. [redacted]

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 Avens, 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

Proposed Habitat Connectivity, Hedgehog Highways and Features for Nesting birds/Roosting bats

KEY

Parcels 4 and 5 boundary

Proposed new bat boxes

Bat roosting opportunities on new buildings (indicative)

CLIENT:
CALA Homes (Thames) Ltd

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcels 4 & 5 - Proposed Bat Roosting Features

SCALE AT A3:
NTS

DATE:
July 2024

868.1/91

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

Landscape Architecture
Masterplanning
Ecology

hda

north

KEY

Parcels 4 and 5 boundary

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

CLIENT:
CALA Homes (Thames) Ltd

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcels 4 & 5 - Proposed Bird Nesting Features

SCALE AT A3:
NTS

DATE:
July 2024

868.1/92

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

Landscape Architecture
Masterplanning
Ecology

hda

KEY

Parcels 4 and 5 boundary

Proposed hedgehog access points (indicative)

CLIENT:
CALA Homes (Thames) Ltd

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcels 4 & 5 - Proposed Wildlife Corridors

SCALE AT A3:
NTS

DATE:
July 2024

868.1/93

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

Landscape Architecture
Masterplanning
Ecology

hda

KEY

- Parcels 4 and 5 boundary
- Proposed bat box location*
- Proposed bird box location*

* Position indicative

CLIENT:
CALA Homes Thames Ltd

PROJECT:
Hogwood Farm, Finchampstead

TITLE:
Parcels 4 & 5 Landscape Proposals and Bat and Bird Mitigation

SCALE AT A3:
NTS

DATE:
July 2024

868.1/94

The Stables, Howbery Park, Benson Lane, Wallingford, OX10 8BA
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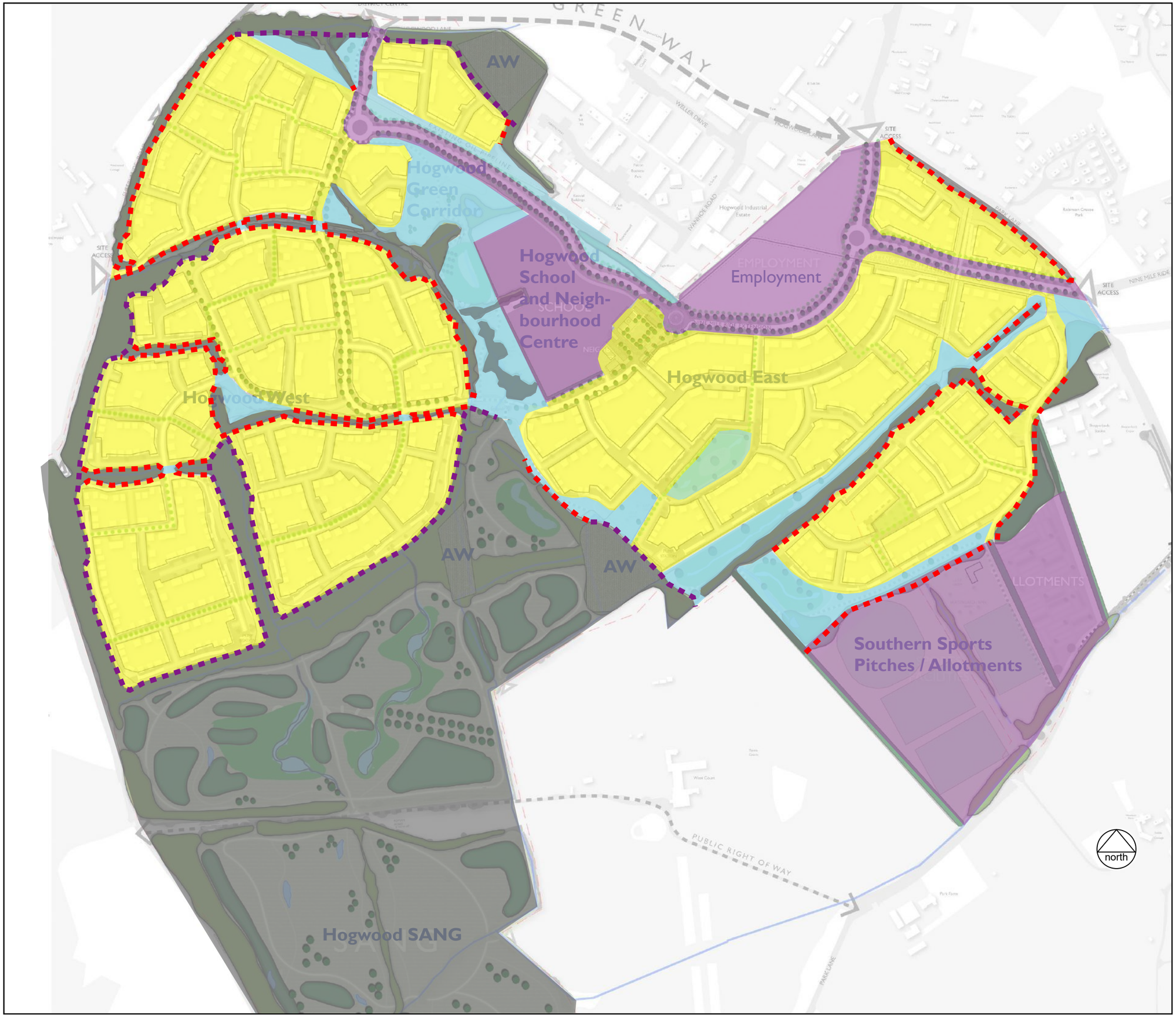
Landscape Architecture
Masterplanning
Ecology

hda

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 luminares.

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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APPENDIX C

Illustrative Lighting Parameters Plan

MMA LIGHTING CONSULTANCY
Exterior Lighting Design Specialists

Hogwood Farm, Finchampstead

Lighting Strategy

MMA Project Number: 14556

Date: 09/04/2018

Produced by: Aimie Loveday

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CONTENTS

HOGWOOD FARM, FINCHAMPSTEAD

LIGHTING STRATEGY

1.0 INTRODUCTION

1.1 This lighting strategy document has been prepared on behalf of Legal & General Homes 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 and ecology receptors, 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 ecological receptors and local residents should also 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 Legal and General 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 The ES Ecology Chapter accompanying the outline planning application and subsequent guidance provided 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. In addition to the measures set out in this report to avoid and minimise effects of lighting on ecology receptors, detailed lighting proposal, for each phase of the proposed development should be subject to review by a suitably qualified ecologist.

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, Bat 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.

Bat Conservation Trust 2014 Interim Guidance

3.5 The Bat Conservation Trust 2014 interim guidance provides recommendation to help minimise the impact of artificial lighting.

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

3.6 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.

3.7 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.

3.8 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.

3.9 Sky glow refers to the brightening of the sky above towns cause by direct or reflected upward light.

3.10 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.

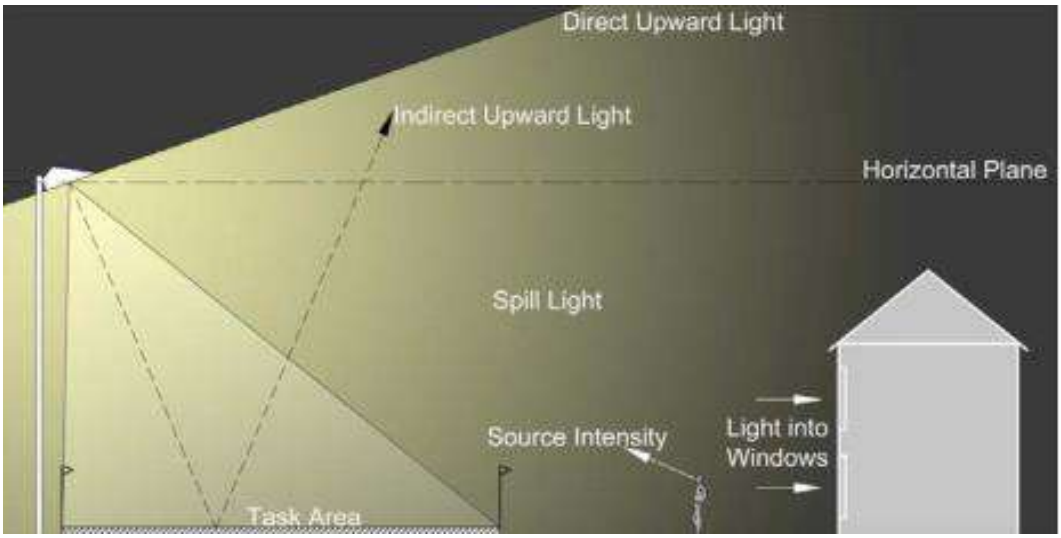


Figure 1: Light Obtrusion characteristics

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.**

Sheelands 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. These include areas of woodland, tree belts and hedgerows that provide habitat for nocturnal wildlife in addition to retained buildings and standard trees which provide opportunities 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 manometer 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 bats. Light spill can disrupt feeding patterns and force ecological receptors to leave their habitat. The lighting strategy will seek to avoid and 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 maintenance of dark corridors and other unlit areas of habitat across the development site. These will be implemented to maintain suitable habitat for nocturnal wildlife and its movement across the site.

6.5 Lighting Parameters layout is shown as an appendix.

6.6 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.

7.4 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 wildlife and surrounding area.

7.5 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 wildlife and surrounding area.

7.6 **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

7.7 Based on an Environmental Zone classification of E2, the likely effects of the proposals are as follows:

- A slight increase in sky glow, in the absence of avoidance or mitigation measures, such as any lighting exclusion zones or luminance design 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.

7.8 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 **Philips Gen 3 Mini Iridium LED**

7.9 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.

7.10 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.

7.11 Where possible street lighting will be 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.

7.12 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.

7.13 Similarly, street lighting will be positioned to avoid light spill into the dark corridors presumed on the Lighting Parameters plan (see Section 6) in order to avoid and minimise effects on sensible ecological habitats and habitat corridors. Luminaires in the vicinity of these habitats will be fitted with additional shield where required in order to achieve this.

7.14 Remote Monitoring Systems will also 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 ES 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 ES 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_o 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.

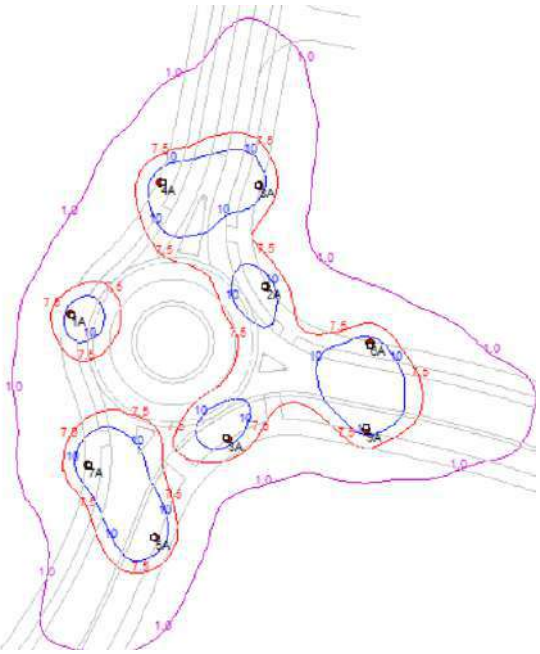
Where traffic routes having different lighting classes meet, the higher lighting class normally determines the class at the conflict area.

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



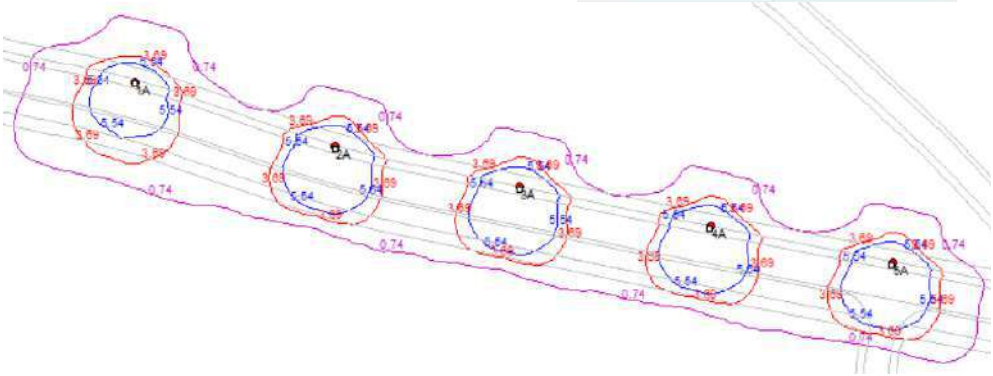
Horizontal Illuminance (lux)

Eav	= 9.54
Emin	= 4.52
Emax	= 14.93
Emin/Emax	= 0.30
Emin/Eav	= 0.47

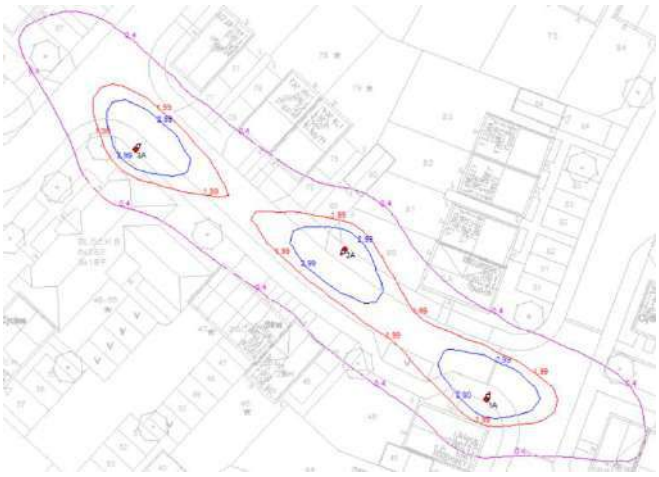
8.3 Below indicates the typical levels achieved using the Philips Luma Mini 1B R4 DS-NW 1 8800 lumens LED lantern for the spine road – lighting class P4 applied S/P ratio 1.61.

Horizontal Illuminance (lux)

Eav	= 5.20
Emin	= 1.03
Emax	= 17.16
Emin/Emax	= 0.06
Emin/Eav	= 0.20



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)



Horizontal Illuminance (lux)

Eav	= 2.47
Emin	= 0.68
Emax	= 6.01
Emin/Emax	= 0.11
Emin/Eav	= 0.28

8.5 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 luminance 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. These levels relate to residential areas. Sensitive habitats for wildlife will be unlit as identified in the Lighting Parameters plan.

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. These levels relate to residential areas. Sensitive habitats for wildlife will be unlit as identified in the Lighting Parameters plan.

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 I [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 on the environment. Important areas of habitat for wildlife will remain unlit by keeping within the Lighting Parameters plan and the design proposals detailed in Section 7. 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. The detailed lighting design will be in keeping with the Lighting Parameters identified in Section 6 in order to maintain the integrity of habitats for wildlife within and around the site.

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 CUMUATIVE 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 of the development site on sensitive habitats for wildlife. Subject to sensitive lighting design the effects on key areas of wildlife habitat identified on the Lighting Parameters plan is expected to be negligible. 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. Subject to sensitive lighting design, including positioning and design of luminaires and use of remote monitoring systems, the effects on key areas of wildlife habitat identified on the Lighting Parameters plan is expected to be negligible.

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, where an effect arises 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: -

[redacted] (Signed) Aimie Loveday (Print Name) 12th March 2018 (Date)

Reviewed By: -

[redacted] (Signed) Simon Winch (Print Name) 22nd March 2018 (Date)

APPENDIX E

Parcels 4 and 5 Indicative Ecological and Pedestrian Permeability Plan (JNP, 2024)