Harras Moor

HABITAT MANAGEMENT PLAN

784-A090070-410 Rev 2

Homes England

May 2022

Prepared on Behalf of Tetra Tech. Registered in England number: 01959704

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GLOSSARY

BoCC	Bird(s) of Conservation Concern
BNG	Biodiversity Net Gain
BSI	British Standard Institute
CBDC	Cumbria Biodiversity Data Centre
CIEEM	Chartered Institute of Ecology & Environmental Management
CWS	County Wildlife Site
DEFRA	Department for the Environment, Food and Rural Affairs
ECoW	Ecological Clerk of Works
Hedgerow Regulations	The Hedgerow Regulations 1997
HMP	Habitat Management Plan
HPI	Habitat(s) of Principal Importance
HRA	Habitats Regulations Assessment
ILP	Institute of Lighting Professionals
MCIEEM	Member of Chartered Institute of Ecology & Environmental Management
Natura 2000 site	A European site designated for its nature conservation value
NE	Natural England
PEA	Preliminary Ecological Appraisal
RLB	Red Line Boundary
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SPA	Special Protection Area
SPI	Species of Principal Importance
SSSI	Site(s) of Special Scientific Interest
TEP	The Environment Partnership
W&CA	Wildlife & Countryside Act 1981 (as amended)

1.0 INTRODUCTION

1.1 BACKGROUND

Tetra Tech was commissioned by Homes England in February 2022 to produce a Habitat Management Plan (HMP) in order to support an application for a residential development at the site known as Harras Moor, Whitehaven, Cumbria.

The residential development is shown as the Red Line Boundary (RLB) on Figure 1 and will be hereafter referred to as the 'site'.

The purpose of the HMP is to provide a practical guide for the site contractors and occupants to ensure appropriate long-term management and protection of ecologically valuable features and habitats within the RLB during construction and for 15 years from completion of construction and any associated landscaping, in line with the Biodiversity Net Gain (BNG) requirements.

This report has been prepared by Senior Ecologist Patryk Gruba MCIEEM and the conditions pertinent to it are provided in Appendix A.

1.2 SITE OVERVIEW

The site is located at Harras Moor in Whitehaven, Cumbria and is Centred at Ordnance Survey National Grid Reference NX986180 as shown in Figure 1. The site is bounded by dwellings on Laurel Bank to the north, by Harras Road and Red Lonning Industrial Estate to the east, by dwellings and Midgey Wood to the south and dwellings along the A595 to the west and south-west.

The site primarily comprised agricultural grazing pasture (species-poor semi-improved grassland and semi-improved grassland). Other habitats present on site included broad-leaved plantation woodland, scattered trees, scrub, marshy grassland, swamp, tall ruderal, bracken and various boundary features including hedgerows and fences.

1.3 DEVELOPMENT PROPOSALS

The proposed development comprises a residential development to provide up to 370 new homes. An outline planning application (Planning ref: 4/18/2287/0O1) was submitted on the 26th June 2018. Access to the development will be from Caldbeck Road and Harras Road. The development will consist of two Phases: Phase 1 and Phase 2, each with a north and south element.
A Draft Illustrative Masterplan, an Illustrative Layout, a Parameters Plan and Indicative Phasing Plan are provided in Appendix B.

1.4 PURPOSE OF THE HABITAT MANAGEMENT PLAN

The HMP is intended to cover the pre-construction, construction phase and first fifteen years post-construction and is structured as follows:

- Specification of measures that will be implemented during the pre-construction and construction phase to avoid and minimise impacts to ecological features and protected and notable species;
- Specification of measures that will result in the creation and enhancement of features of ecological value as part of the development of the site;
- Specification of measures to maintain any new and retained habitats and ecological features for the 15 years following completion of construction and associated landscaping, in line with the Biodiversity Net Gain requirements; and

- Provision of a monitoring schedule which outlines the commitment to oversee that these measures are implemented, reviewed and adjusted as appropriate.

This HMP considers the unique features of the site, the local area and is based on currently available information. If the development proposal is altered substantially, or significant new ecological information comes to light, then this plan should be revised accordingly by the named ecologist or accredited agent.

2.0 ROLES AND RESPONSIBILITIES

The HMP will be distributed to all relevant personnel involved in the construction works. A copy of this document will be kept on site during construction.

The following monitoring and review process will be carried out as an integral part of the overall management plan.

2.1 CONTRACTOR RESPONSIBILITIES

The contractor responsibilities should include the following;

- To adhere to the relevant provisions made within this document and to comply with the advice of the Ecological Clerk of Works (ECoW).
- To make sure that the protective barriers around retained habitats and habitats highlighted for enhancement / creation are maintained for the duration of the construction period to prevent damage to these areas.
- To contact the ECOW regarding any uncertainties or activities that may impact on ecological features within the site.
- Supervising and monitoring the implementation and habitat creation measures as set out in this document;

2.2 CLIENT RESPONSIBILITIES

The client developer responsibilities should include the following;

- To adhere to the relevant provisions made within this document and to comply with the advice of the ecologist.
- Oversee the management schedule actions for the 15 years post-construction and landscaping and ensure that specific tasks are implemented in as specified within this document.

3.0 BASELINE INFORMATION

Tetra Tech completed an Ecological Appraisal of the site, including an Extended Phase 1 habitat survey undertaken in July 2021 (Tetra Tech, 2021a). Site Condition Assessment was also conducted using UK Habitats methodology; the results of this assessment have been included in the Biodiversity Net Gain Assessment Report for the site (Tetra Tech, 2022). A summary of the baseline information is provided below.

3.1 PREVIOUS REPORTS

Previous ecological reports pertaining to the proposed development are listed below:

- Tetra Tech (2021a), Harras Moor: Ecological Appraisal, August 2021
- Tetra Tech (2021b), Harras Moor: Habitat Regulations Assessment, September 2021
- Tetra Tech (2022), Harras Moor: Biodiversity Net Gain Assessment Revision 2 – Version 1 Using illustrative layout 04 E (all housing)
- Tetra Tech (2022), Harras Moor: Biodiversity Net Gain Assessment Revision 2 – Version 2 Using illustrative layout 04 E (with playing fields)
- TEP (2019), Harras Moor, Whitehaven. Ecological Assessment. 5060.Eco.Harras.003
- TEP (2018a), Harras Moor, Whitehaven. Winter Bird Survey Report. 5060.Eco.HarrasMoorEcoandArb.005.004.
- TEP (2018b), Harras Moor, Whitehaven, Woodland and Hedgerow Survey Report. 5060.Eco.HarrasMoor.008.
- TEP (2018c), Harras Moor, Whitehaven, Breeding Bird Survey. 5810.66.001
- TEP (2018d), Harras Moor, Whitehaven, Bat Appendix Report. 5810.66.002
- TEP (2018e), Harras Moor, Whitehaven, Vegetation Survey Technical Report. 5810.66.003
- TEP (2018f), Harras Moor, Whitehaven, Arboricultural Impact Assessment (Outline Planning). 5060.Eco.Harras.006.
- WYG (2018), Proposed development at Harras Moor: Design and Access Statement, May 2018

3.2 DESK STUDY

The Solway Firth SPA is located 1.7 km west of the site and the River Ehen SAC is located 5.3 km south-east from site. St Bees SSSI is located 1.7 km south-west from the site. Midgey Wood County Wildlife Site (CWS) is adjacent west to the site with A595 road separating this CWS from the proposed development site. Castle Park Woods CWS is located 50 m away from the proposed development site.

According to DEFRA's MAGIC website, the following Habitats of Principal Importance (HPI) were identified as occurring on or adjacent to the site, using MAGIC:

- Onsite - Deciduous woodland (Priority Habitat Inventory and National Forest Inventory) present west of the site.
- Adjacent (south of the most western boundary) **-** Deciduous woodland (Priority Habitat Inventory and National Forest Inventory) and Midgey Wood CWS - Ancient woodland (Priority Habitat Inventory and National Forest Inventory).

3.3 FIELD SURVEY

A summary of the survey within the development boundary is shown in Table 1 and the Phase 1 habitat plan is shown in Figure 2. The UK Habitat Plan with pre-construction habitat areas is shown in Figure 3.

Table 1: Ecological Appraisal summary

Ecological Feature	Summary of Results
Habitats	The following habitats were identified during the Phase 1 survey within the site boundary: • Broad-leaved Plantation Woodland • Scrub • Scattered trees • Hedgerows • Semi-improved Neutral Grassland • Marshy Grassland • Poor Semi-improved Grassland • Bracken • Tall ruderal • Swamp • Dry ditches The Site Condition Assessment (UK Habitat Classification methodology) recorded the following habitats: • Grassland – Bracken • Grassland – Modified grassland • Grassland – Other neutral grassland • Heathland and shrub – Mixed scrub • Heathland and shrub – Bramble scrub • Woodland and forest – Other woodland; broadleaved • Sparsely vegetated land – Ruderal/Ephemeral • Native hedgerow • Urban – Developed land; sealed surface • Urban – Built linear features
Protected and notable species	The site has habitat suitability for badgers *Meles meles*, breeding birds, red squirrel *Sciurus vulgaris,* terrestrial invertebrates, hedgehog *Erinaceus europaeus* and brown hare *Lepus europaeus.* Bats were observed foraging and commuting onsite, using the woodland edges (TEP 2018d).
Invasive species	Invasive montbretia *Crocosmia x crocosmiiflora*, Himalayan balsam *Impatiens glandulifera* and variegated yellow archangel *Lamium galeobdolon* were recorded on site.

4.0 IDENTIFICATION OF ECOLOGICAL FEATURES & HABITATS

This section lists habitats and ecological features to be retained/created within the site.

Location of habitats and features discussed below are presented within the Figure 3 (pre-development habitats) and Figure 4 (post-development habitats).

4.1 RETAINED HABITATS AND ECOLOGICAL FEATURES

- Woodland (2.58 ha) – this habitat includes broadleaved woodland and will be subject to enhancement measures including Ash dieback management.
- Grassland (2.54 ha) – this habitat includes semi-improved neutral grassland and marshy grassland. Retained grassland habitats on site will be subject to enhancement measures.
- Hedgerow (125 m in total) – native hedgerows 1 & 3 to be retained (see Figure 4) and enhanced through gap fill planting and invasive species management.

4.2 CREATED HABITATS AND NEW ECOLOGICAL FEATURES

- New broadleaved woodland planting (0.89 ha)
- Newly planted native trees – approximately 329 trees (Approximate Root protection area 0.15 ha)
- Newly planted hedgerows (210 m)
- New scrub planting (0.56 ha)
- Newly planted grassland/turf around the site (2.08 ha)
- New vegetated gardens (5.64 ha)
- New ponds and SUDs features – 7 in total
- Habitat piles comprising a log, brash or rock pile; and
- Bat features and bird boxes on mature trees and/or the new building.
- There will also be the creation of hardstanding to facilitate access to the site.

5.0 MANAGEMENT PLAN OBJECTIVES

The key objectives of this HMP are:

- To protect features of ecological value which are to be retained within the site, namely trees / woodland features in accordance with *BS5837: 2012 Trees in relation to design, demolition and construction* (BSI, 2012);
- Outline the creation of habitats within the site including woodland, grassland, hedgerows, scrub, trees and ponds;
- Outline the enhancement and management of retained and new habitats within the site;
- Outline provision of habitat piles for small animals, such as amphibians and terrestrial invertebrates;
- Outline provision of a variety of nesting features to increase the opportunities for nesting birds on site;
- Outline provision of new bat roost features to increase the opportunities for bat roosting on site; and
- To comply with relevant wildlife legislation.

6.0 CONSTRUCTION MANAGEMENT PLAN

6.1 TOOLBOX TALK

All construction workers will be provided with a 'Toolbox Talk' conducted by the ECoW prior to commencing work within the site so that they are made aware of the ecological issues relating to the proposed development.

This talk will detail the important ecological features, identifying their locations and explain the purpose of the HMP. Initially this presentation will be delivered by the ecologist however it is anticipated that subsequent presentations will be incorporated into the general Health and Safety briefing which is given to all workers when they first visit the site.

6.2 PROTECTION OF RETAINED HABITATS

Relevant habitats to be protected from impacts caused by development include those which will be retained on site and habitats adjacent to the application site, including:

- Broadleaved native woodland including Midgey Gill CWS adjacent to the southern boundary of the site;
- Retained hedgerows; and
- Retained grassland habitats.

The following methods are recommended to provide protection to relevant habitats both on and off site.

6.3 GENERAL GUIDANCE

Habitats at risk from being inadvertently impacted during clearance or construction works comprise woodland and trees (including Midgey Gill CWS) and areas of grassland that are to be retained. Prior to any works on site commencing, the development footprint (and root protection areas) will be fenced off (orange flexinet, heras fencing or similar) in order to demarcate it from adjacent habitats. This will minimise the risk of site staff accessing habitats off site, or from vehicles or other equipment entering these areas. These areas should be under supervision of an ECoW who will inspect general protective fencing on a regular basis for damage and will be repaired as required.

A safe system for the correct storage of materials and chemicals on site will be implemented to make sure that materials are stored in a suitable manner to avoid potential impacts on retained vegetation. Liquids and chemicals will not be stored near vegetated areas and will be stored on an impermeable base. Spillage kits will also be made available on site.

Appropriate cleaning or maintenance of machinery and tools on site will be undertaken within a designated area(s) and at a sufficient distance from vegetated areas. Failure to do so may result in contaminated water entering the soil and changing soil pH and increasing contaminant levels. It is anticipated that an appropriate pollution prevention control plan will be implemented during the construction phase of the development.

Although the presence of construction waste on site is unavoidable, waste will be stored safely within a designated area(s) on site and removed at the earliest opportunity to avoid contamination of ground, degradation of soil quality and possible disturbance to wildlife.

6.4 ROOT PROTECTION AREAS

Trees which are being retained on and adjacent to the site need to be protected from damage during the construction phase by demarcating root protections areas. These areas will be fenced (e.g. using Heras fencing) to prevent heavy machinery compressing the root stock or causing inadvertent damage during clearance and construction. Root protection zones will be detailed within the Arboricultural Impact Assessment (AIA) (to be produced at the reserved matters stage). In the British Standard 5837, root protection area is generally calculated by multiplying the diameter of the tree at breast height in metres by 12, up to a maximum of 15 m from the trunk.

6.5 LIGHTING

It is recommended that the retained woodland habitats should be protected from light disturbance through implementation of a wildlife-friendly lighting scheme for both the construction and operational phases of the development. The design should include an unlit buffer between the retained woodlands and new housing infrastructure (5 to 10 m in width) to minimise light spill onto hedgerows, trees and suitable habitats on and adjacent to the site.

Examples of wildlife friendly lighting include the following:

- LED surface down lighters mounted within the under croft or soffit of new builds;
- Low level light bollards or surface / recessed bulkhead LED lights fitted along public walkways; and
- Columns with asymmetric optics and shields to reduce light spill.

Please note that lighting schemes should be developed in accordance with the Institute of Lighting Professionals (ILP) Guidance Note 08/8 *Bats and artificial lighting in the UK* (ILP, 2018). The detail of the lighting scheme or schemes for any phase of development will be considered at reserved matters planning application stage.

6.6 REMOVAL OF NON-NATIVE PLANT SPECIES

Montbretia, Himalayan balsam and variegated yellow archangel are listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended); these species have been identified on site and location are depicted within the Figure 3.

It is advised that an **Invasive Species Method Statement is produced by a specialist invasive species contractor and implemented to control and eradicate these species on site.** The stands of invasive species should be marked out and all contractors aware of its location. Species specific

approaches should be taken, and an aftercare period should also be detailed. The Invasive Species Method Statement should complement this HMP document.

6.7 IMPACTS TO PROTECTED SPECIES

6.7.1 Bats

The proposed habitat management on site will include woodland management and felling trees affected by **Ash dieback. Any trees proposed for removal should be subject to an up-to-date Preliminary Bat Roost Level Assessment survey prior to works.**

Any trees with moderate or high roosting suitability should be retained wherever possible. If these trees are proposed for removal, they should be subject to further presence / absence survey.

Trees with low roosting suitability may be felled using soft felling techniques. Felling should take place either in March / April or September / October to avoid the key active (e.g. maternity) and hibernation seasons. Soft felling techniques include the following:

- A pre-fell inspection of the roosting feature(s) by a class 1 bat licensed ECoW;
- Sectional cutting around the potential roosting feature; and
- Each section gently lowered to the ground and left for 24 hours with the feature facing upwards to allow any bats to disperse.

In the event that evidence of roosting bats is discovered prior to or during felling, work must cease immediately to avoid an offence being committed, and a bat licensed ecologist consulted to determine an appropriate course of action. No other trees with bat roost potential were identified within the felling area during site visits.

6.7.2 Nesting Birds

Removal of vegetation on site (including trees, scrub and grassland) should be avoided during the breeding bird season to prevent disturbing nesting birds (an offence under the W&CA). Therefore, this should be undertaken between October and February (inclusive). This recommendation is also applicable to the ash trees affected by ash dieback.

If the nesting bird period cannot be avoided, then this work must be done in the presence of an ECoW. If active bird nests are present, the ECoW will demarcate a suitable buffer zone around the nest (as determined by an ECoW based on species impacted) in which works must cease until the young have fledged and nest abandoned.

6.7.3 Red Squirrel

Any trees that are proposed for removal, should be checked for squirrel dreys prior to works. These checks should be conducted at least three months prior to works in order to allow for mitigation measures if red squirrels are discovered to be breeding on site.

6.7.4 Badger

It is recommended that a pre-works badger survey is undertaken on site at least three months prior to any enabling works commencing.

If a badger sett is found during works, an application for a licence to disturb or destroy the sett may be required to be completed and approved by NE, to avoid contravention of legislation.

6.7.5 Other Species

The site has potential for hedgehog and brown hare. A precautionary approach has been taken and both species are assumed to be present. Before clearance works commence, any areas covered by dense vegetation should be checked by ECoW for presence of these animal; it is also recommended that ECoW should deliver a Toolbox talk to site personnel regarding the best practice with regard to ecological issues in advance of working.

Boundary features should utilise hedgerow planting where possible. Any new fencing used within the proposed housing development should include gaps at ground level (13 cm x 13cm) or clearance beneath to allow hedgehog dispersal throughout the site. These conditions can be actioned through the use of hedgehog holes or hedgehog friendly gravel boards.

7.0 CREATION OF HABITATS ON SITE

7.1 WOODLAND, TREE AND SCRUB PLANTING

Where tree and shrub planting is proposed (see Figure 4 for post-development layout), native tree and scrubby plant species will be used wherever possible. This includes infilling areas which become vacant following non-native invasive species removal.

The new broadleaved woodland planting will account for approximately 0.71 ha; these will include new screen planting along the north-west of the site and new replanting within the existing woodland (predominantly within the areas subject to removal of ash trees diseased by ash dieback). The proposed planting may artificially encourage regeneration, as tree removal will open up areas for colonisation. Planting whips will diversify the age structure of trees present within the existing woodland.

Suggested species for the woodland replanting include

- Silver Birch *Betula Pendula*
- English Oak *Quercus robur*
- Sessile Oak *Quercus petraea*
- Small leaved lime *Tilia cordata*
- Wych elm *Ulmus glabra*
- Rowan *Sorbus aucuparia*
- Bird cherry *Prunus avium*
- Alder *Alnus glutinosa*
- Crab apple *Malus sylvestris*

The new trees will be planted throughout the development site predominantly around the open access areas and along the access roads; new tree planting will cover 0.15 ha and will account for 329 new trees (See Figure 4). It is suggested that these trees should be predominantly UK native and include species highlighted above.

New native hedgerow planting will comprise approximately 210 m and will include three hedgerow sections (see Figure 4). The suggested species should include:

- Hawthorn *Crataegus monogyna*
- Blackthorn *Prunus spinosa*
- Holly *Ilex aquifolium*
- Hazel *Corylus avellana*

- Elder *Sambucus nigra*
- Field rose *Rosa arvensis*
- Honeysuckle *Lonicera periclymenum*

New native scrub planting will account for 0.56 ha and will be carried predominantly in the west of the site. Planting native scrub will provide screening / buffer between Midgey Wood CWS and the proposed residential areas as well as the screening between the existing properties along the Loop Road / A595. It is recommended that the planting mix includes the following native species:

- Blackthorn
- Hawthorn
- Dog rose *Rosa canina*
- Hazel
- Elder
- Crab apple *Malus sylvestris*
- Dogwood *Cornus sanguinea.*

New trees, hedgerows and native scrub will provide food and shelter for wildlife as well as connectivity between the habitats on site and Midgey Gill woodland.

7.2 PONDS

Seven open water features acting as attenuation ponds will be created within the development boundary as part of the proposals with four being permanent ponds and three being Sustainable Drainage Areas (SuDs).

The ponds will benefit wildlife, such as amphibians and aquatic invertebrates including dragonflies, as well as being a visual amenity feature. The locations of the new ponds have been included in the Figure 4. A pre-commencement check of the area is required in the first instance to ensure no underground services would be impacted.

The new ponds will vary in size and with the smallest pond being 93m^2 and the largest 264m^2.

In order to provide optimum opportunities for biodiversity, the new ponds should have a variety of depths and bank steepness. This can be achieved by designing one side of the pond with a shallow and gradual bank, and the other side of the pond with a steeper bank. Ideally, the pond should be around 2 m at its deepest point.

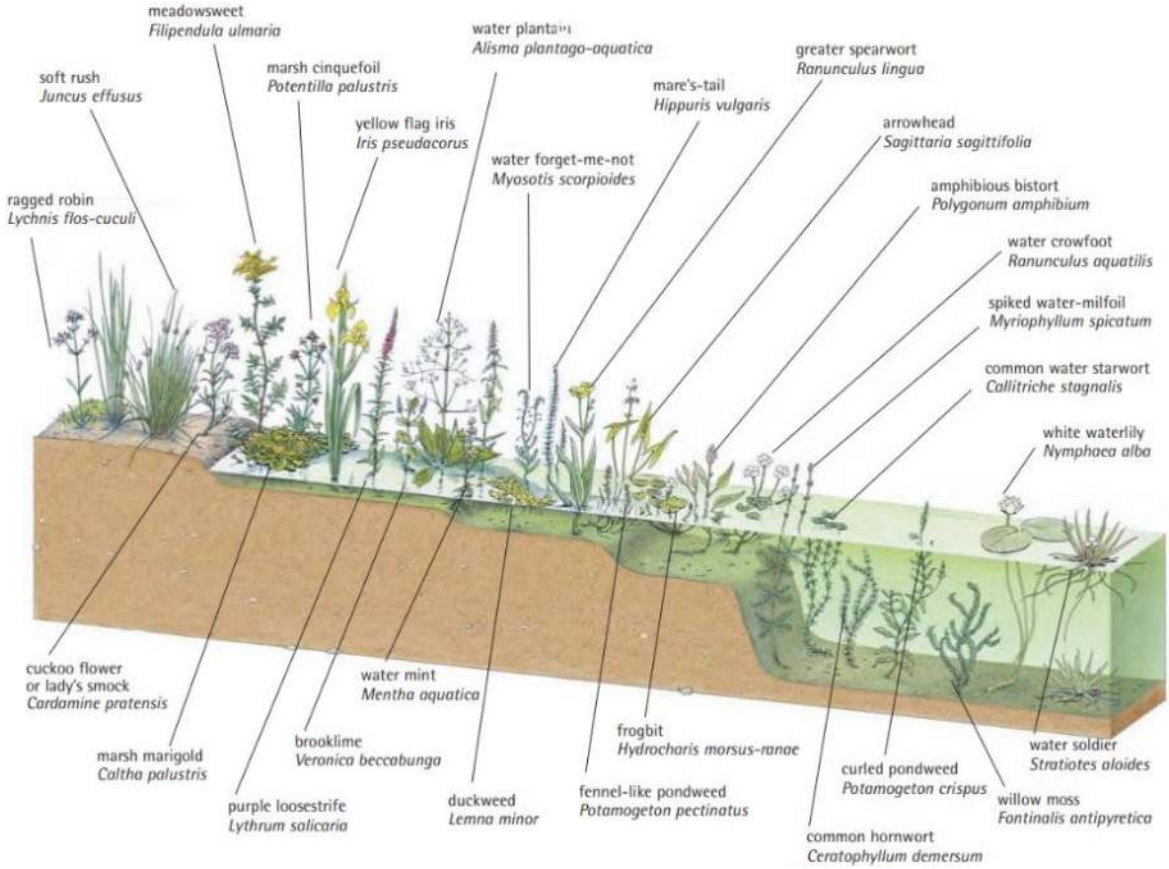
Depending on the type of soil, an artificial pond lining may be required. Spoil from pond excavation should be used to create pond banks, elsewhere on site or disposed of responsibly. If a liner is used, fill over the liner with stone free top-soil to help aquatic planting to establish. Advice from an experienced pond-builder / landscaping contractor should be sought.

If necessary, for safety reasons, fencing may be used to deter access to the pond. Fencing should have wide spacing between posts to allow wildlife to pass through (at least 13cm x 13cm) and to avoid being a visual obstruction, for example post and rail fencing.

Natural colonisation of aquatic and terrestrial plants in and around the pond is usually preferred, and will occur naturally over time; however, it is possible that natural colonisation may include non-native species from the site. Therefore, limited planting of a variety of native aquatic and terrestrial species is recommended to increase native species richness. All seeds and plug plants will be of local provenance or of UK origin when local sources are not available.

Diagram 1 shows an example of relevant native species which may be appropriate to introduce in and around the new pond.

Diagram 1 Typical aquatic plant species at great crested newt ponds (from Langton et al, 2001).



The following plants are considered invasive (are listed on Schedule 9 of the W&CA) and will therefore **not** be introduced to the new ponds and will be removed if identified on site:

- Canadian pondweed *Elodea canadensis*,
- water fern *Azolla filiculoides*,
- Nuttall's pondweed *Elodea nuttallii*,
- New Zealand pigmyweed *Crassula helmsii*,
- curly waterweed *Lagarosiphon major*,
- floating pennywort *Hydrocotyle ranunculoides* and
- parrot's-feather *Myriophyllum aquaticum*.

7.3 GRASSLAND AND WILDFLOWER AREAS

The remaining habitat within the proposed development will be mainly grassland. In order to maximise species diversity, specific management methods are required to reduce soil fertility and reduce the dominance of grass species. This would be most beneficial in the open space areas and around the ponds (Figure 4).

A native wildflower meadow seed mix or plug planting should be used in areas where wildflower meadows are desired, in order to increase species richness with a variety of meadow flowers. Prior to introducing wildflower seed or plugs, the sward will need to be cut and the arisings taken off site. At

least 50% bare ground needs to be present at the recipient site, to aid establishment, which can be created by scarification using a disc and/or chain harrow. It is recommended that seed is sown at a rate of 4-5g per square metre and should be rolled in to ensure contact with the bare ground.

The native meadow seed mixes should include species suitable for specific habitats; suggestions for species to be included in seed mixes are listed below

Open grassland / wildflower meadow areas:

- Sweet vernal grass *Anthoxanthum odoratum*,
- Crested dog's-tail *Cynosurus cristatus*,
- Common bent *Agrostis capillaris*,
- Meadow foxtail *Alopecurus pratensis*,
- Meadow fescue *Festuca pratensis*,
- Red fescue *Festuca rubra,*
- Cock's-foot *Dactylis glomerata*,
- Autumn hawkbit *Scorzoneroides autumnalis*,
- Betony *Betonica officinalis*,
- Common knapweed *Centaurea nigra*,
- Common sorrel *Rumex acetosa*,
- Meadow buttercup *Ranunculus acris*,
- Meadow cranesbill *Geranium pratense*,
- Meadow vetchling *Lathyrus pratensis*,
- Oxeye daisy *Leucanthemum vulgare*,
- Red clover *Trifolium pratense*,
- Ribwort plantain *Plantago lanceolata*,
- Tufted vetch *Vicia cracca* and
- Yellow rattle *Rhinanthus minor*.

SUDS / pond margins and existing wet grassland areas:

- Devil's-bit scabious *Succisa pratensis,*
- Great burnet *Sanguisorba officinalis,*
- Gypsywort *Lycopus europaeus,*
- Meadowsweet *Filipendula ulmaria,*
- Marsh woundwort *Stachys palustris,*
- Meadow vetchling,
- Ragged robin *Lychnis flos-cuculi,*
- Selfheal *Prunella vulgaris*,
- Sneezewort *Achillea ptarmica*,
- Water avens *Geum rivale*,
- Water forget-me-not *Myosotis scorpioides*,
- Water mint *Mentha aquatica* and
- Wild angelica *Angelica sylvestris*.

Seed mixes should be applied at 4-5 gms/m^2. in accordance with the suppliers' guidelines. The wildflower areas should be cut twice annually, in an early spring cut (March/April) and in late summer (September to October) and arisings removed (bailed or raked off). A late cut will ensure that the seed has dropped from the herbs and grasses present. The mowers/cutting method should be undertaken so that a sward height of 20 cm is retained as ground cover. This will prevent ground scalping, which can encourage the invasion of weeds, see Section 8.4 for further detail.

Alternatively, selected grassland areas can be prepared as described above and seeded with a yellow rattle crop to help control vigorous grass species (see Plantlife, 2020 for further information on introducing yellow rattle). The yellow rattle may require a couple of years to establish and reduce grass dominance allowing other broadleaved species to establish.

The species richness of the wildflower areas can be additionally enhanced through the native wildflower plug planting, which allows for easier establishment of target species.

Native widlfower seeds and plug plants should be ideally of local provenance and supplied by locally based suppliers such as Cumbria Wildflowers.

7.4 HABITAT PILES

A simple and effective enhancement for invertebrates (and the animals which feed on them) as well as providing shelter for amphibians and hedgehog, includes adding one or more habitat piles. These can comprise log, brash or rock piles and retained tree stumps.

New habitat piles can be added within sheltered, vegetated areas of the site. Ideally, at least one habitat pile will be included close to each new pond on site. To benefit amphibians and reptiles, looser habitat piles with small gaps are preferable, whereas tightly packed log piles or tree stumps are best for dead-wood invertebrates. A stone pile could also be added on the pond edge in an area which receives open sunlight, as habitat for sheltering small animals or as a basking spot for reptiles or butterflies.

An illustrative example of a habitat pile is shown in Appendix C. Some of the hibernacula should be turfed over and some should be log or brash piles only.

If it is considered that a habitat feature will be visually or educationally beneficial during the operational phase of the development, a feature such as an ‘insect tower’ or ‘bee hotel’ may also be added (though these only provide a limited beneficial habitat for invertebrates). These can be purchased ready-constructed for immediate installation and should be attached to a tree or fence in a sheltered location; ideally one that catches the sun in the morning and dappled shade during the day.

7.5 WILDLIFE BOXES

7.5.1 Bat Features

To increase the value of the site for bats, bat boxes, tubes or roof tiles should be installed on site in ratio one roosting feature for every ten new dwellings. These are a relatively low-cost enhancement for ecology. The following are all options which are appropriate for the site (detailed in

Table 2);

- **Integrated bat access tile set** within the roof of the new building and avoiding locations which are lit with artificial lighting.
- **Integrated bat tube** within the exterior wall, just below the soffit box of the new building. The location chosen should not be directly above a window or doorway and must avoid locations lit by artificial lighting. Note that a detachable / external bat box is not suitable in this location, as they are normally recommended to be installed at least 3 m above ground.
- **Bat box** installed on a mature tree. Tree-friendly nails/fixtures must be used. Note that two boxes may be added on the same tree if required (spaced apart and on differing elevations).

Table 2: Examples of suitable bat features to be installed

	**Integrated bat access tile set** The bat access tile set presents a bat-optimized entrance to the under-felt, or to the loft when the under-felt is opened. Each set comprises three roof tiles. The top 'tunnel' tile offers the bat a tunnel to an entrance hole in the undertiles. This allows the bat to crawl into the roost area. The two tiles beneath the 'tunnel' tile have small cutaway sections to facilitate access for the bat. Several bat access tile sets may be installed within the roof to allow a variety of access points.
	**Integrated bat tube: Habibat Bat Box 001 (or similar)** This feature should be located where it will receive the maximum amount of sunlight, i.e. south, south-west and south-east aspects, and be at least 2m above ground.
	**Bat box: 1FF Schwegler Bat Box (or similar)** This box is spacious enough for bats to use as a summer roost or nursery site and is open at the bottom, allowing droppings to fall out so it does not need cleaning. It can be affixed to trees, is ideally located between 4m to 6m above ground and facing southerly aspects.

7.5.2 Bird Box

The previous ecological surveys identified that the site was in use by a range of common garden birds. Therefore, a beneficial enhancement would involve installation of a sparrow terrace box for house sparrow *Passer domesticus* (SPI and red-listed BoCC), swift boxes or integrate bricks for swift *Apus Apus* (SPI and red-listed BoCC), and swallow cups for swallow *Hirundo rustica* and house martins *Delichon urbicum* (SPI and red-listed BoCC), – see Table 3. This should be installed at the top of the exterior wall of the new buildings (just below the soffit box), out of direct sunlight. As for bat boxes, this should not be located above windows or doorways.

To increase the value of the site for birds, it is recommended that bird nesting boxes are installed on site at the density of 1 nest box per dwelling RIBA (2016). Nest boxes are a low-cost enhancement for ecology. Additionally, nest boxes for common garden birds may also be installed on trees. Suggested nest box types are shown in Table 3.

Table 3: Examples of suitable bird boxes to be installed

	**1SP Schwegler Sparrow Terrace (or similar)** House sparrows are social birds and like to nest in company. This terrace provides ideal nesting opportunities for three families. The terrace can be fixed on to the surface of a suitable wall or incorporated into the wall.
	**Vivara Pro Woodstone build-in swift nest box** This box can be mounted onto a wall or it can be unobtrusively built into the fabric of the wall. The front of the nest box can be removed for cleaning. Site at least 5 metres high and with a clear flight path, avoiding south facing sites. As swifts are colonial. It is advised to install two swift bricks in every other house or three in every third dwelling, Action for Swifts (2019).
	**Swallow nest cup** Swallows are cave nesters, so it's best to site a swallow nest cup high inside an external building or in a substantial porch with permanent access to the outside to allow feeding visits. It is important that the nest is situated high enough for the birds to launch and fly away comfortably.
	**1B Schwegler Nest Box (or similar)** 32mm entrance hole (for species including great tit *Parus major*, blue tit *Cyanistes caeruleus* and nuthatch *Sitta europaea*). Install on a tree at least 3m above ground. Position is preferably not facing south-west, to avoid prevailing wind.

7.6 OTHER FEATURES

Regularly spaced gaps (hedgehog holes or hedgehog friendly gravel boards) should be made at ground level within the residential fencing to allow animals such as amphibians and hedgehog to pass through. These holes should be at least 13cm x 13cm which allows hedgehogs to pass through.

8.0 OPERATIONAL HABITAT MANAGEMENT

An outline of the management for each habitat on site is provided below, with a schedule provided in **Error! Reference source not found.**.

8.1 BROAD-LEAVED WOODLAND

Management Aim

The overall goal of the existing woodland management is to improve upon the habitat condition score, which is currently moderate, with the goal of achieving a good condition score (Tetra Tech, 2022). The management aims to improve tree health, facilitate woodland regeneration, reduce grazing pressure, minimise invasive species, create a varied structure within the woodland, and to promote native tree and shrub growth.

Management Tasks

In order to improve tree health, the removal of four Ash trees which have been identified with ash dieback will be removed to help mitigate the spread. Once the infected Ash have been removed, monitoring of the remaining Ash trees will take place to assess the condition of the trees with the intention to promote trees that are resistant to the disease. If a tree is subsequently found to have ash dieback further removal works would be required.

The proposed planting of native species, as listed in section 7.1 will encourage regeneration, especially in areas of ash tree and non-native removal. The removal of non-native tree species including sycamore *Acer pseudoplatanus* and Norway maple *Acer platanoides* will provide open space ready to be colonised. Similarly, planting of whips will diversify the age structure of trees present.

A reduction in grazing pressure will be required in order to protect the diversity of species and help improve the condition score, where feasible as this will benefit the structural and age diversity within the woodland. This is likely to occur as no domestic grazing will occur adjacent to the woodland. Fencing around woodland areas may need to be implemented in order to restrict access from the public and prevent livestock grazing (if applicable)

There are areas within the woodland which contain or is in close proximity to non-native invasive species as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), including Himalayan balsam *Impatiens glandulifera* and yellow archangel *Lamiastrum galeobdolon subsp. Argentatum (*see Figure 3 for location of the invasive non-native species). In order to achieve good condition, species listed on Schedule 9 should be carefully removed and disposed of at an approved tip to prevent further spread and loss of native species.

In order to improve upon the structure of the woodland, a coppicing regime may be implemented in which native retained trees such as rowan *Sorbus aucuparia*, hazel *Corylus avellana* and hawthorn *Crataegus monogyna*. The coppicing should be managed on an 8-10 year cycle in which the objective is to provide a variation in woodland structure in order to provide a heterogenous habitat.

Besides this, the woodland should be managed with wildlife in mind. After initial establishment, management should be minimal with fallen deadwood left in situ as a resource for invertebrates and fungi. Standing deadwood should also be retained (unless dangerous) as roosting resource for bats and birds.

8.2 SCATTERED TREES AND SHRUB

Management Aims

The management aims should improve tree health and to promote native tree and shrub growth in order to increase the biodiversity value of the site

Management Tasks

After planting, additional maintenance will be required to replace any failed trees. This is only required for the first two years, after which failures are less likely.

The tree stakes and ties will be inspected in spring and adjusted in autumn to prevent constriction of the stem. After two growing seasons the trees should have made sufficient root growth to anchor the tree and the supporting stake can be removed.

It is important to remove weeds from areas of new tree and scrub planting as they will reduce competition for light, water, nutrients and space. A weed / grass free ring around each new tree should be maintained at approximately 1 m for the first two to three years. This can be achieved through physical weeding, fitting a mulch mat or mulching with materials such as straw after planting. Chemical applications should be avoided where possible.

Trees are relatively maintenance free, but care should be taken so that they establish successfully. Trees and scrub will not be removed or severely thinned during the bird nesting season (March–September inclusive) to avoid possible breaching of legislation which protects breeding birds and their nests. From year five onwards trees will require little maintenance.

Light pruning of scrubby tree species will encourage denser growth, which is favourable for wildlife. Once established, pruning will be done every two to three years rather than every year. This is because most tree and shrub flowers (and therefore also berries and nuts) are produced on year-old twigs.

8.3 HEDGEROWS

Management Aim

To retain as much of the hedgerow as possible on site and enhance the existing hedgerow through in-filling gaps with native plants and invasive species management. New hedgerow planting to increase the biodiversity value of the site and improve habitat connectivity.

Management Tasks

Hedgerow planting will aim to infill the gaps within the existing hedgerow and create additional 210 m of hedgerow on site (See Figure 4).

The best time for planting new hedgerow is late autumn, after mid-November, although anytime between October and March is appropriate, provided the ground is not frozen.

The guidance / best practice for hedgerow planting are provided below:

- Create a 1 m wide, weed free strip either by ploughing, digging or in limited cases, treating with a systemic herbicide.
- Ensure the bare roots of the plants do not dry out before planting.
- Use 60-90 cm high stock.
- Plant in a double staggered row approximately 30 cm apart.

- Set out plants evenly using the plan below as a guide.
- The base of the hedge should be mulched with a 50-75 mm layer of composted bark to stop weed growth and retain moisture in the soil.
- Where necessary, protect plants from damage and grazing by using protective tubes or spiral guards.

Himalayan balsam within the existing hedgerow (hedgerow 3) should be carefully removed and disposed of by an appropriate specialist contractor at an approved tip to prevent further spread. It is recommended that mechanical removal / hand pulling is conducted as the affected area is fairly small and this method is considered the most effective for small stands of Himalayan balsam. Spraying is not recommended as this has the potential to adversely affect hedgerow habitats.

8.4 PONDS AND SUDS

Management Aims

The waterbodies / new ponds will provide suitable aquatic habitat for amphibians and aquatic invertebrates and increase the biodiversity value of the site. Some of the ponds will be sited within the areas that naturally flood and hold water (e.g. ponds within the wet semi-improved neutral grassland and marshy grassland along the western site boundary). The ponds will also collect water which has run off from natural grassland and scrub habitats.

Management Tasks

Emergent vegetation in the waterbodies should be removed periodically as part of a four-year rotation to open up an equivalent of 25% of the perimeter area as part of each cut. The removal of vegetation as part of this management regime will create clear channels out into the main open water areas, helping to maintain a diversity of marginal conditions within the waterbodies. The arisings will be left in a pile, close to the waterbodies, 1-2 days following their removal to allow invertebrates to move back into the water prior to their removal from site. Following this the arisings will be either removed or moved away from the ponds to avoid nutrient enrichment of the waterbodies.

It will also be necessary to monitor vegetation encroachment into the open water habitat annually both for potentially dominant native species such as common reed *Phragmites australis*, but also to identify the potential establishment of any invasive non-native species such as:

- Canadian Pondweed or Waterweed *Elodea canadensis;*
- Floating pennywort *Hydrocotyle ranunculoides*; and
- New Zealand Pigmyweed *Crassula helmsii.*

These non-native species can spread rapidly and choke small waterbodies. Should any such encroachment by invasive non-native species be identified, it will be necessary to remove these inundations as soon as feasibly possible.

A sediment removal from the retention buds and SuDs might need to be undertaken every few years if the new water features on site are subject to extensive siltation. The water features should be monitored for sediment on annual basis and sediment removal should be undertaken as required under the supervision of an ECoW.

8.5 GRASSLAND AND WILDFLOWER AREAS

Management Aims

The native wildflower grassland habitats (including semi-improved neutral grassland and marshy grassland) are of high ecological value and the management of these habitats on site aimed at retaining and enhancing existing native species content and improving biodiversity value of the site.

Management Tasks

Areas of amenity grassland can be mown as and when required, with the grounds keepers aware of which areas will be allowed to grow taller. Longer uncut areas of grassland should be left around the base of trees and shrubs within these areas, to avoid damaging the trees.

Mow newly sown (if seeded) meadow areas regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wildflowers. Most sown meadow wildflower and grass species are perennial; they will be slow to germinate and grow and will not usually flower in their first growing season. There will often be a flush of annual weeds from the soil in the first growing season which may grow up and obscure the meadow seedlings beneath. This annual weed growth is easily controlled by topping, mowing, or spot spraying.

After the first year (if seeded), mowing of these taller grassland / meadow areas will be done annually in late summer / early autumn, after flowering has finished. A late summer / early autumn mow (with the clippings removed) will help keep scrub and dominant grasses from proliferating. Providing that the continuity of mowing is maintained over the years, then wildflowers will be able to flower and set seed between cuts. If this mowing regime is varied however and the area cut at another time, then wildflowers will be lost.

8.6 WILDLIFE BOXES

8.6.1 Bat Features

It may take several years for a bat box to become occupied and it can be difficult to know whether roosting bats are present on any occasion. Bats typically use a variety of temporary roosts during the summer, spending a night or two in one location, before moving on to roost elsewhere, then returning. Bats are usually active from March to October inclusive, hibernating during the winter months.

Bat boxes will be checked externally, from the ground using binoculars, to visually check for damage. This will be done annually. A bat licensed person (an ecologist or the local bat group) should be contacted for advice if the box appears to be damaged and requires repair, replacement or re-siting.

All British bat species are fully protected through their inclusion in Schedule 5 of W&CA. Under the legislation, it is an offence to intentionally kill, injure or take a bat as well as intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a bat, or disturb an animal while it is occupying a structure or place which it uses for that purpose. Therefore, bat boxes cannot be disturbed by anyone without a licence after they have been installed.

8.6.2 Bird Box

Bird boxes will be checked and maintained annually outside of breeding bird season (i.e. between October and February), removing old nests and cleaning if required, with the aim of restoring the box to its original state. Should the box(es) be damaged or missing during these checks then it should be fixed or replaced like-for-like.

9.0 MANAGEMENT AND MAINTENANCE SCHEDULE

The proposed management prescriptions and monitoring requirements of this document have been described within the preceding sections and are summarised below. The below management and maintenance tasks and measures should be implemented for the 15 years post-construction and landscaping in line with the Biodiversity Net Gain requirements.

Table 4: Schedule for 15-year habitat management following the construction

Schedule for habitat management

		J	F	M	A	M	J	J	A	S	O	N	D
Initial Habitat Creation (Year 0)													
Tree and hedgerow planting		■	■	■							■	■	■
Installation of ponds		■	■	■							■	■	■
Grass sowing and wildflower plug planting				■	■	■				■	■		
Installation of habitat pile, bat feature and bird box at any time		■	■	■	■	■	■	■	■	■	■	■	■
		■	■	■	■	■	■	■	■	■	■	■	■
Woodland Enhancement (Year 0)													
Removal of ash trees diseased by ash dieback and non-native tree species		■	■	■							■	■	■
Native tree planting within the existing woodland		■	■	■							■	■	■
Removal of non-native invasive Himalayan balsam within the woodland					■	■							
Ongoing Management													
Woodland, trees and hedgerows		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Years 1-2	Planted trees checked and replaced if failed	■	■	■							■	■	■
Years 1-2	Check planted tree stakes and ties			■	■	■							
Years 1-2	Adjust tree ties if required									■	■	■	
Years 1-2	Prune trees if required	■	■									■	■
Years 1-2	Weeding around planted trees as required (urban trees only)	■	■	■	■	■	■	■	■	■	■	■	■
Annually	Monitoring and removal of non-native invasive Himalayan balsam within the woodland				■	■							
Year 3 onwards	Coppicing woodland areas on the 8-10 year rotation	■	■									■	■
Pond Management		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Annually	Remove pond vegetation (including invasive species) if required									■	■	■	
Annually	Top up water level in pond if required	■	■								■	■	■
Annually	Monitoring and sediment removal if required	■	■								■	■	■
Year 2 onwards	Grass around pond mown annually late in the autumn in order to allow wildflower establishment. Cuttings removed									■	■		
Grassland		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Year 1	Regularly mow sown meadow areas to 40-60mm	■	■	■	■	■	■	■	■	■	■	■	■
Year 1	Wildflower plug planting and seeding within the wildflower grassland areas and around the ponds	■	■	■	■					■	■	■	■
Year 2 onwards	Mow meadow/long grass areas annually. This to be undertaken in late summer autumn							■	■	■	■		
Wildlife Boxes		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Annually	Check bat features for damage	■	■	■	■	■	■	■	■	■	■	■	■
Annually	Check and clean bird boxes	■	■								■	■	■

10.0 USEFUL LOCAL CONTACTS

Table 5: Useful local contacts

Organisation	Contact
Tetra Tech	Tetra Tech Lakeland Business Park, Lamplugh Road, Cockermouth, Cumbria CA13 0QT Email: Ecology.Cumbria@tetratech.com Telephone: 01900 898600
Local Biodiversity Action Plan	Cumbria Biodiversity Partnership, c/o Cumbria Wildlife Trust Plumgarths Crook Road Kendal LA8 8LX Email: biodiversity@cumbriawildlifetrust.org.uk Telephone: 01539 816300
Local Wildlife Trust	Cumbria Wildlife Trust Plumgarths Crook Road Kendal LA8 8LX Email: biodiversity@cumbriawildlifetrust.org.uk Telephone: 01539 816300
Bat Conservation Trust and Cumberland Bat Group	If a grounded bat is found, call National Bat Helpline 0345 1300 228 or contact Cumberland Bat Group info@cumberlandbatgroup.org.uk
Cumbria Amphibian and Reptile Group	Email: cumbria.arg@gmail.com
RSPB	www.rspb.org.uk

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FIGURES

Figure 1 – Site Location Plan

Figure 2 – Phase 1 Habitat Plan

Figure 3 – Pre-Development Habitats (UK Habitats Classification)

Figure 4 – Post-development Habitats

Site Location Plan

Harras Moor

Homes England

Legend

Site boundary

Notes:

Drawn by: BB
Checked by: EW
Office: Southampton

Figure No. 1
Revision No. A

0 300 600 900 Meters
Scale 1:20,000 @A3

04 August 2021

NGR: 298633E 517973N

TETRA TECH

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Hedge End
Southampton
Hampshire, SO30 2AF

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Phase 1 Habitat Plan

Harras Moor

Homes England

Legend

- Site boundary
- Bracken, Continous
- Built-up areas, Buildings
- Hardstanding
- Marsh/marshy grassland
- Neutral grassland, Semi-improved
- Other, Tall ruderal
- Poor semi-improved grassland(optional)
- Scrub, Dense/continuous
- Swamp
- Woodland, Broad-leaved, Plantation
- Defunct hedge - native species-poor
- Dry ditch
- Fence
- Wall
- Scattered scrub - broad-leaved
- Scattered tree - broad-leaved

Notes:

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Checked by: EW
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Figure No. 2
Revision No. A

0 50 100 150 Meters
Scale 1:4,000 @A3

11 March 2022
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Pre-Development Habitats (UK Habitats Classification)

Harras Moor

Homes England

Legend

- Site boundary
- Grassland - Bracken
- Grassland - Modified grassland
- Grassland - Other neutral grassland
- Heathland and shrub - Mixed scrub
- Sparsely vegetated land - Ruderal/Ephemeral
- Urban - Developed land; sealed surface
- Woodland and forest - Other woodland; broadleaved
- Heathland and shrub - Bramble scrub
- Defunct hedge - native species-poor
- Dry ditch
- Fence
- Wall
- Invasive Plant Location
- Scattered scrub - broad-leaved
- Scattered tree - broad-leaved

Notes:

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Figure No. 3
Revision No. A

0 50 100 150 Meters
Scale 1:4,000 @A3

11 March 2022

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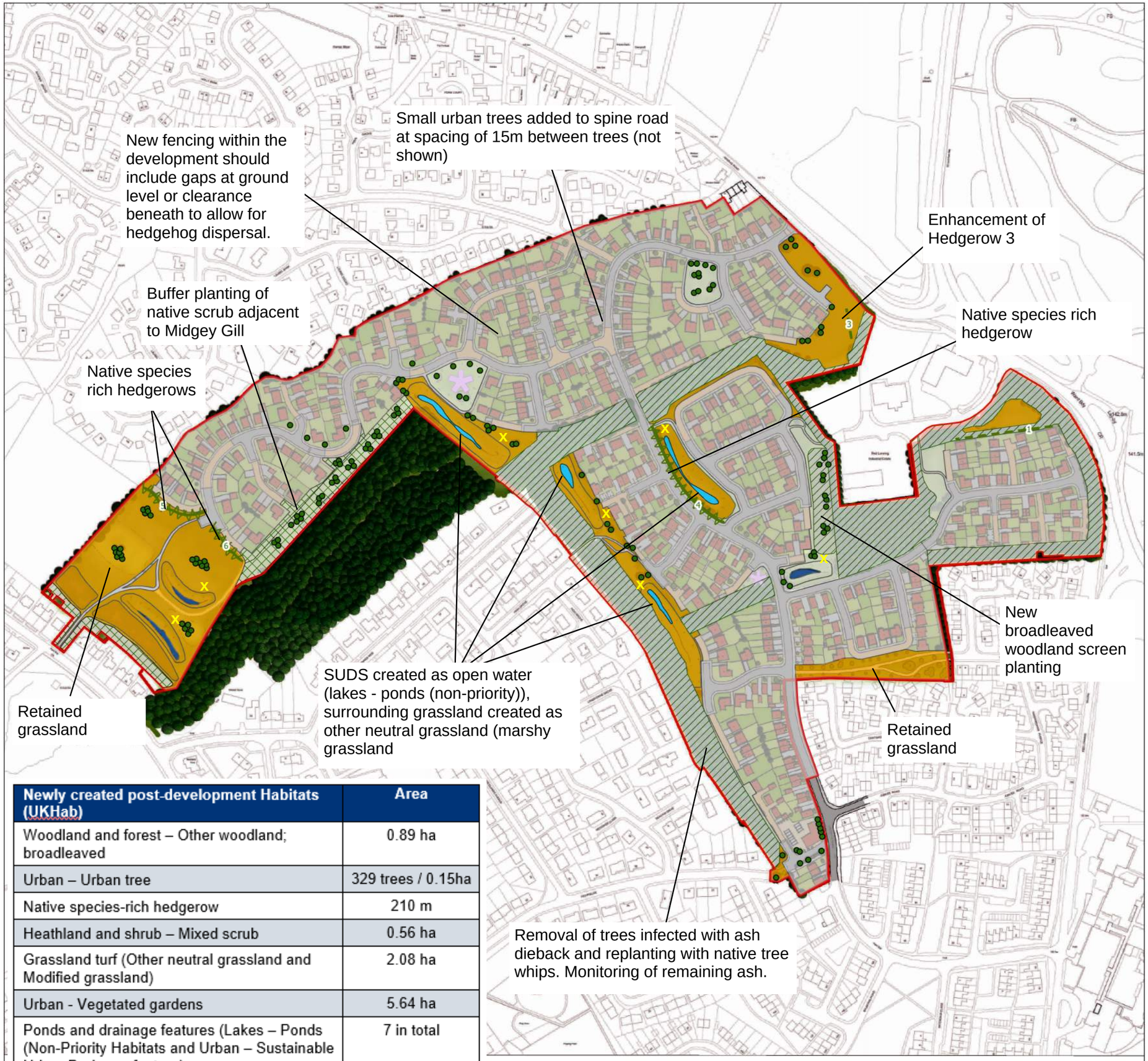

Newly created post-development Habitats (UKHab)	Area
Woodland and forest – Other woodland; broadleaved	0.89 ha
Urban – Urban tree	329 trees / 0.15ha
Native species-rich hedgerow	210 m
Heathland and shrub – Mixed scrub	0.56 ha
Grassland turf (Other neutral grassland and Modified grassland)	2.08 ha
Urban - Vegetated gardens	5.64 ha
Ponds and drainage features (Lakes – Ponds (Non-Priority Habitats and Urban – Sustainable Urban Drainage feature)	7 in total

Post-Development Habitats Additional Enhancements

Harras Moor

Homes England

Legend

- Site boundary
- Grassland - Modified grassland
- Grassland - Other neutral grassland
- Heathland and shrub - Mixed scrub
- Urban - Developed land; sealed surface
- Woodland and forest - Other woodland; broadleaved
- Urban – Sustainable urban drainage feature
- Lakes - Ponds (non-priority habitat)
- Intact hedge - native species-rich
- Defunct hedge - native species-poor
- Scattered Trees
- Logpile

Notes: Basemap = A090070-410 004E Harras Moor Illustrative Layout

Drawn by: SB
Checked by: EW
Office: Southampton

Figure No. 4
Revision No. A

0 50 100 150 Meters
Scale 1:3,500 @A3

02 March 2022
NGR: 298633E 517972N

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APPENDIX A – REPORT CONDITIONS

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The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accept no liability for issues with performance arising from such factors.

APPENDIX B – ILLUSTRATIVE SITE LAYOUT

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- Indicative dwellings
- Indicative primary streets
- Indicative shared surface / private drives
- Open space
- Indicative back gardens
- Retained trees / woodland
- Proposed trees
- Acoustic bund
- Attenuation areas
- Local Equipped Area of Play (LEAP)

North

Harras Moor, Whitehaven
Homes England

Illustrative layout

TTE Proj No	Drwn / date	Ch'ked / date	Appr'd / date	Scale @ A2	Suitability
A090070-410	EI /FEB '22	BR/ FEB '22	JL/ FEB '22	1:2500	-

Client Proj No	Origin	Vol/System	Level/Loc	Type/Code	Role	Drwg no	Revision
-	TTE	00	XX	DR	UD	04	E

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APPENDIX C – HABITAT CREATION GUIDANCE

HIBERNACULA

This activity sheet will tell you all about how to create your very own hibernacula. A hibernacula is somewhere for reptiles and amphibians to hunt for food, hide away and hibernate in the winter.

Materials:

- Rocks / bricks
- Stones
- Logs
- Soil
- Turf / wildflower seed
- Twigs / dead wood

Tools:

- Spades
- Gloves
- Safety boots
- Wood saw

Step 1: **Choose a spot in the garden**
Choose a place for your hibernacula in the garden that won't flood, is quiet and that is not in the sunlight all the time.

Step 2: **Dig a hole or make a pile**
If placing your hibernacula on dry soil then dig a small hole. If constructing your hibernacula on wetter soil, simply pile the materials on top of the soil.

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HIBERNACULA

Step 3: **Construct your hibernacula**
Your hibernacula needs small holes low down for wildlife to access, but too many larger holes will make your hibernacula draughty.

Step 4: **Add soil**
Cover your hibernacula with soil or compost.

Step 5: **Finishing touches**
Finish your hibernacula with wildflower seed or turf. This will attract insects to your new shelter and help it blend in with it's surroundings.

WILDLIFE GARDENING