

Brooks

Ecological

Grounded advice

Biodiversity Enhancement Management Plan

Interchange 26 — Former sewage works North Bierley

ER-4003-02 .3
June 2020



Report Reference:	Biodiversity Enhancement Management Plan Interchange 26 — Former sewage works North Bierley
Report Reference:	ER-4003-02.3
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Date	25-6-2020

The information which we have prepared and provided is true and has been prepared and provided in accordance with the CIEEM's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions. This report does not constitute legal advice.

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Introduction

This Biodiversity Enhancement Management Plan (BEMP) is produced to show how biodiversity has been designed into their proposed development at the site known as Interchange 26—a former sewage works at North Bierley, Oakenshaw, West Yorkshire (SE 180 274).

The BEMP is produced in accordance with Chapter 11 of British Standard 42020. Reports which set out how wildlife interests will be enhanced, restored and maintained go under a variety of names, generated by the planning case officer or their internal consultant. This BEMP is the equivalent of a 'Biodiversity Management Plans' (BMPs), a term referenced in BS42020 Clause D.4.5.

In producing this plan, the following information sources are referred to:

- **Preliminary Ecological Appraisal.** Brooks Ecological R-1623-01 September 2013
- **Riparian Mammal & Crayfish Survey.** Former Bierley Treatment Works Oakenshaw. Brooks Ecological R-1623-04 May 2014
- **Reptile Survey** Former Bierley Treatment Works Oakenshaw. Brooks Ecological R-1623-03 May 2014
- **Bat Survey.** Former Bierley Treatment Works, Oakenshaw R-1623-05 August 2015
- **Environmental Statement.** Land at North Bierley Waste Water Treatment Works, Oakenshaw. July 2016
- **Environmental Statement Addendum (ESA) – Volume 1** Keyland Redevelopment of Former North Bierley WWTW November 2017

The BEMP is submitted in support of discharging Condition 6 of permission ref: 2016/60/92298/E and addresses the requirements reproduced below:

6. Detailed plans and particulars of the Reserved Matters shall include a Biodiversity Enhancement and Management Plan (BEMP). The content of the BEMP shall include the following:

- Description and evaluation of the features to be managed.*
- Ecological trends and constraints on site that might influence management.*
- Aims and objectives of management.*
- Appropriate management options for achieving aims and objectives.*
- Prescriptions for management actions.*
- Details of initial aftercare and long-term maintenance;*
- Details of the body or organisation responsible for implementation of the plan.*
- Details for on-going monitoring and remedial measures;*

The approved plan and particulars shall be implemented in accordance with the approved details and timescales pre, during and post construction.



Figure 1
Masterplan layout

Scope of Plan

This BEMP relates to development of the former sewage works and adjacent agricultural fields into an employment zone comprising business units with associated landscaping and infrastructure (see Figure 1). The BEMP addresses biodiversity enhancement across the entire site with particular management prescriptions for areas of retained natural habitat and new features to support biodiversity created through development.

Delivering the Plan

The developer is responsible for the creation and establishment works for a five-year period.

The developer will appoint either a Specialist Ecological Management Company (SEMC) or a company working under the direction of an Ecological Clerk of Works (ECoW) to oversee the delivery of this plan prior to any work commencing on site.

The ECoW would be a qualified Ecologist and member of the Chartered Institute of Ecology and Environmental Management, or be otherwise approved by the LPA.

After year five, this plan will be the responsibility of a Site Management Company. This plan and the use of an ECoW or SEMC will be included in the terms of reference of the Site Management Company and incorporated in their long-term Management Plan.

Legal and Funding Mechanisms

The developer will award a contract appointing either a Specialist Ecological Management Company or a suitable company working under the direction of an Ecological Clerk of Works (ECoW) to implement this plan to year 5, prior to commencement of any works. In-perpetuity management will be secured from the Site Management Company's management fund.

Funds needed to manage the site in perpetuity will be set by the Developer before the Site Management Company is instructed so that management prescriptions are itemised and budgeted for.

Description and evaluation of features



Figure 2 Typical views of the former sewage works and surrounding habitats

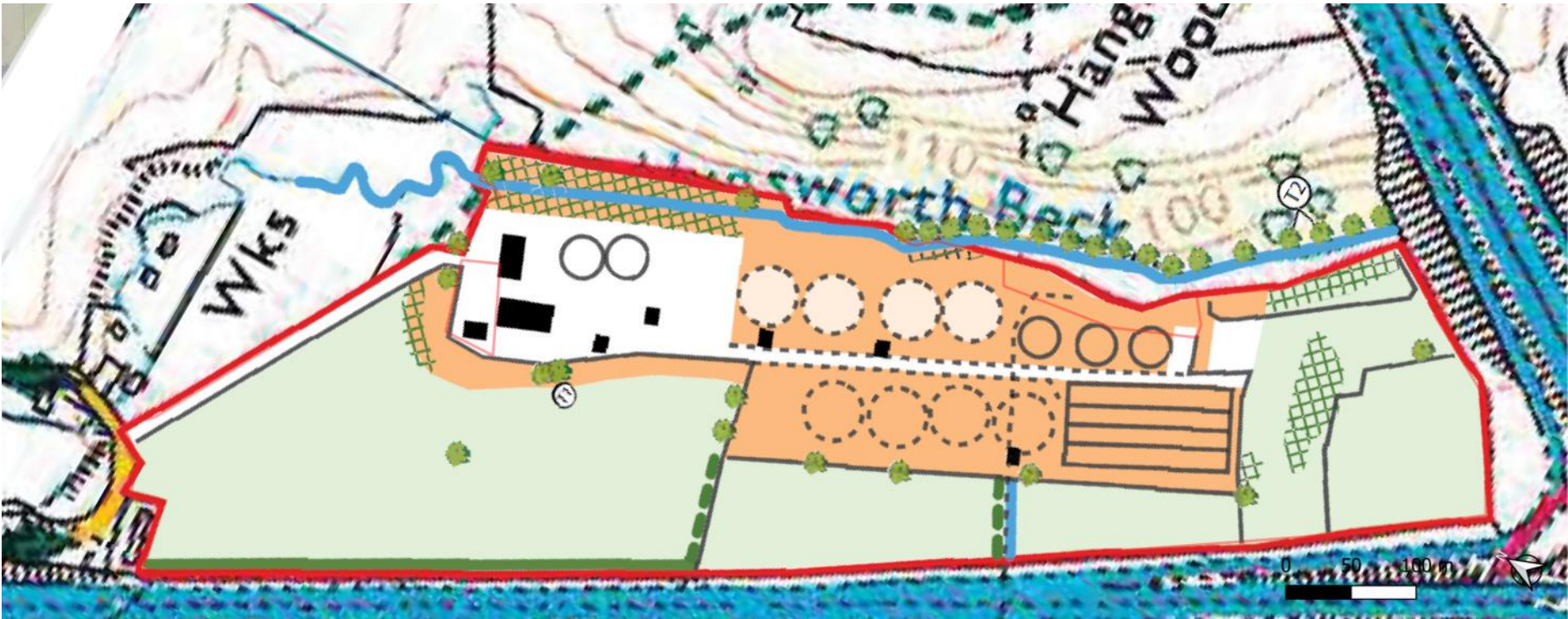
The Preliminary Ecological Appraisal report identified the main habitat areas and features that are present within the site red line boundary. These are reproduced below and described in detail in the PEA report.

The existing site is characterised as a large parcel of land which includes a strip of pasture and former water treatment works on the outskirts of Cleckheaton adjacent to the junction of the M62 and the M606. Significant features of likely wildlife value in the wider areas include Hanging Wood, along the eastern boundary of the site.

Summary findings from all ecological surveys of protected species and designations for the site are given on page 5. Much of the site comprises areas of low distinctiveness habitat which have value to site based wildlife, and present opportunities for enhancement in key locations through development.



- Improved grassland
- Rough grassland
- Hard-standing
- Trees / shrubs
- Intact hedgerow
- Scattered hedgerow
- Tall herb scrub
- Buildings
- Watercourse



Ecological Trends and Constraints

Protected sites

The site adjoins Hanging Wood, a Kirklees SWS. The development will need to provide appropriate vegetation and habitat enhancement to its eastern boundaries provide buffer to this locally important site.

Protected Species

No protected species have been identified on the site. Summary findings from dedicated surveys state:

Bat survey

Bat activity has been found to be low on site during the summer, confirming the assessment that the habitats on site are of relatively low importance for local bat populations. More valuable habitat is found to the east – this should be buffered within the masterplan to ensure minimal impacts on local bats.

Riparian mammal and crayfish survey

Dedicated survey has demonstrated the likely absence of water vole, otter and white clawed crayfish from the watercourse passing through the application site. Proposed development would therefore present minimal risk of impacting upon these species.

Reptiles

No reptiles have been found on site and impacts on reptiles are not predicted by the site's development.

Nesting birds

To prevent the proposed works impacting on nesting birds, site clearance will need to be undertaken outside of the breeding bird season which is 1st March – 31st August inclusive. Any clearance that is required during the breeding bird season should be preceded by a nesting bird survey to ensure that the Wildlife and Countryside Act (1981) is not contravened.

Invasive species

Three invasive species have been found on the site. Himalayan balsam is present in the stream corridor and has spread into the former sewage works. Japanese knotweed is present in stands along the stream. A small patch of Cotoneaster is present towards the Site centre. Where growing in areas planned for excavation these plants pose a risk and must be controlled in accordance with an agreed plan or method statement. Where present in retained areas these plants degrade the quality and biodiversity of the habitats and their control should form part of habitat enhancement.

Access

Access to the majority of the site unrestricted and the proposed development does not present clear obstacles to the establishment and management of habitats and features specified in this document. Occasional access for management of land to the east of the stream may require agreement with neighbouring land owners.

Hydrology

Hydrological issues are not anticipated though measures are specified in the CEMP be in place to buffer runoff from the construction towards the stream corridor.



Aims and Objectives of Management

The plan aims to protect and enhance the biodiversity of natural habitats that are present, and create new habitat features that improve the ecological value to local wildlife.

Specific aims of management are to:

- Establish target sown and planted habitats
- Maintain an open and diverse range of grassland, wildflower, scrub and woodland vegetation
- Enhance the ecological function and habitat quality of the Hunsworth Beck corridor
- Eradicate where possible non-native invasive plants
- Encourage use of the site by target groups such as pollinating insects, birds and riparian mammals.

Specific objectives of management to achieve the aims are:

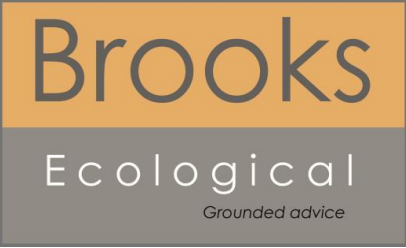
1. Native hedgerow management
2. Planted tree shelter belts
3. Establish new wildflower grassland
4. Wildflower grassland—establishment and management
5. Establish attenuation basins as new wetland meadow habitat
6. Scrub and riparian enhancement
7. Features for bats and birds
8. Features of hedgehogs and otters.

Deadwood for fungi and invertebrates

Wood piles make homes for invertebrates, amphibians and small mammals. They also slow the release of carbon into the atmosphere.



Opportunities and Themes



Homes for declining birds & bats.

A wide range of designs faunal boxes are now available which can either be integrated into built structures or positioned in optimal habitat locations



Wildflower grassland

Tall uncut areas make great refuges for small mammal which attract birds of prey and other predators. Voles are attracted to the dense 'thatch' of dead grass that accumulates and invertebrates that live out their lifecycle in undisturbed environment thrive here. Long grass is particularly important for late summer moths which rise out of the grass at dusk and attract bats to forage.



Management options

Options for particular areas of the site are outlined below with reference to the plan.

A

Agricultural grassland will be restored in the post construction phase to establish a rich wildflower grassland and areas of trees planting to provide screening and wildlife resources.

B and C

Constructed attenuation basins will buffer surface water discharge from Unit 1 and 2. As grassed features with locally wet depressions these have potential to provide habitat and forage to invertebrates, amphibians and wet marginal plants species. Basins will be managed under ownership of adjacent units.

D

This grazed pasture strip may benefit from removal of grazing pressure to allow a rougher grassland / scrub plant community to develop over time. Hedge boundaries to the M606 may be gapped up and thickened.

E

Reserved land to the south of Phase 2 is under a planning reservation for potential construction of a slip road between the M62 and M606.

This area to be retained until such time as the long term land uses are resolved.







G

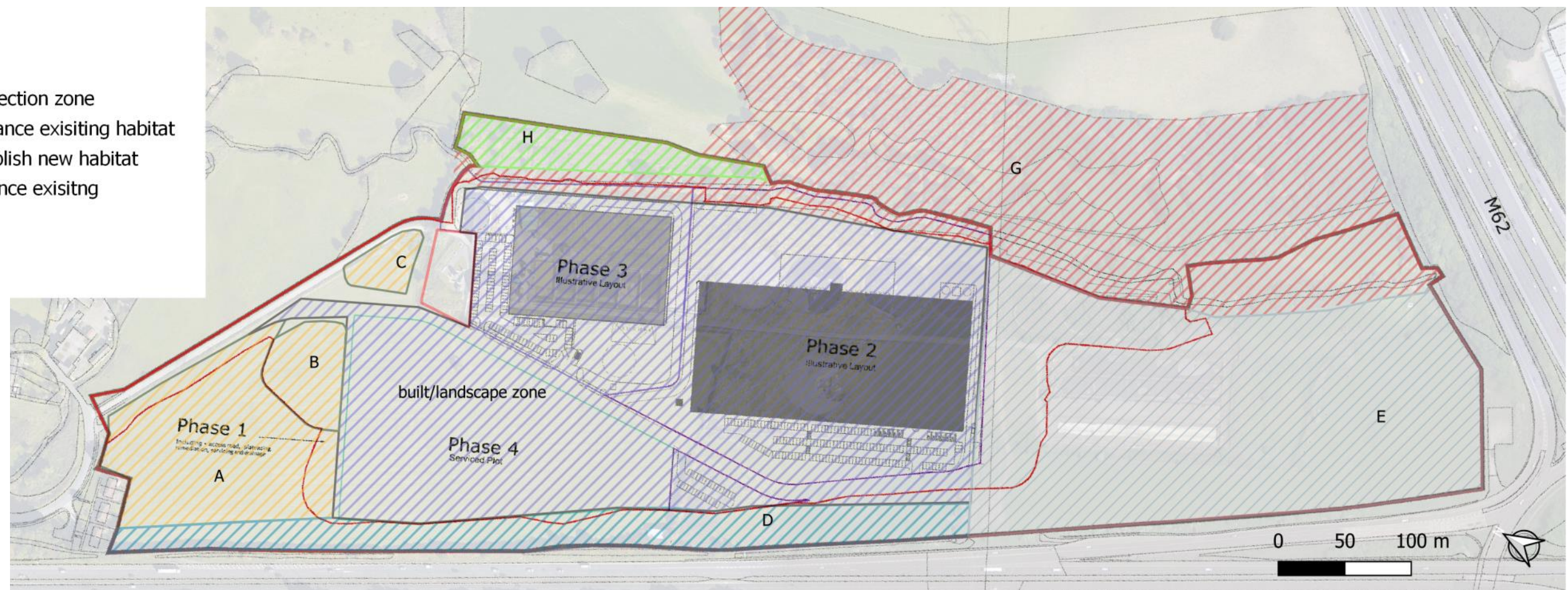
The Biodiversity Protection Zone comprising the Hunsworth Beck corridor and Hanging Wood SWS has a close association with the site and will be protected throughout the development. Sensitive enhancement works within the development boundary include control of invasive weeds and establishment of beneficial features such as an otter holt.

H

Tall herb scrub outside of the development footprint provides opportunity to enhance this area as a more rich and diverse scrub habitat that compliments the adjacent woodland and stream.

Management

-  Biodiversity protection zone
-  Protect and Enhance existing habitat
-  Create and establish new habitat
-  Retain and enhance existing
-  Built footprint
-  Reserved land



Native Hedgerow Management

Rationale

Retained boundary hedges and new hedges within the will be managed to maximise their value to fauna - both as source of food and shelter and as

Objectives

- 1. All hedgerows remain continuous and unbroken through gap planting where required
- 2. Berries, or berry bearing spurs remain on trees until the end of winter
- 3. A margin no less than 1m of uncut grass around at least one side of the hedge.

Specification

Planting as Landscape Plan or example schedule below.

Aftercare and Management

Year 1 –3 standard hedgerow establishment as per landscape plan.

Year 4 onwards - Cut no more than 90% of hedge in February, spread chippings under the hedge. Leave remaining sections to grow for 1 further year. Vary the location of sections which are left for two years each year.

Monitoring

Year 3 and 5 Ecologist to record according to objective 1- 3.

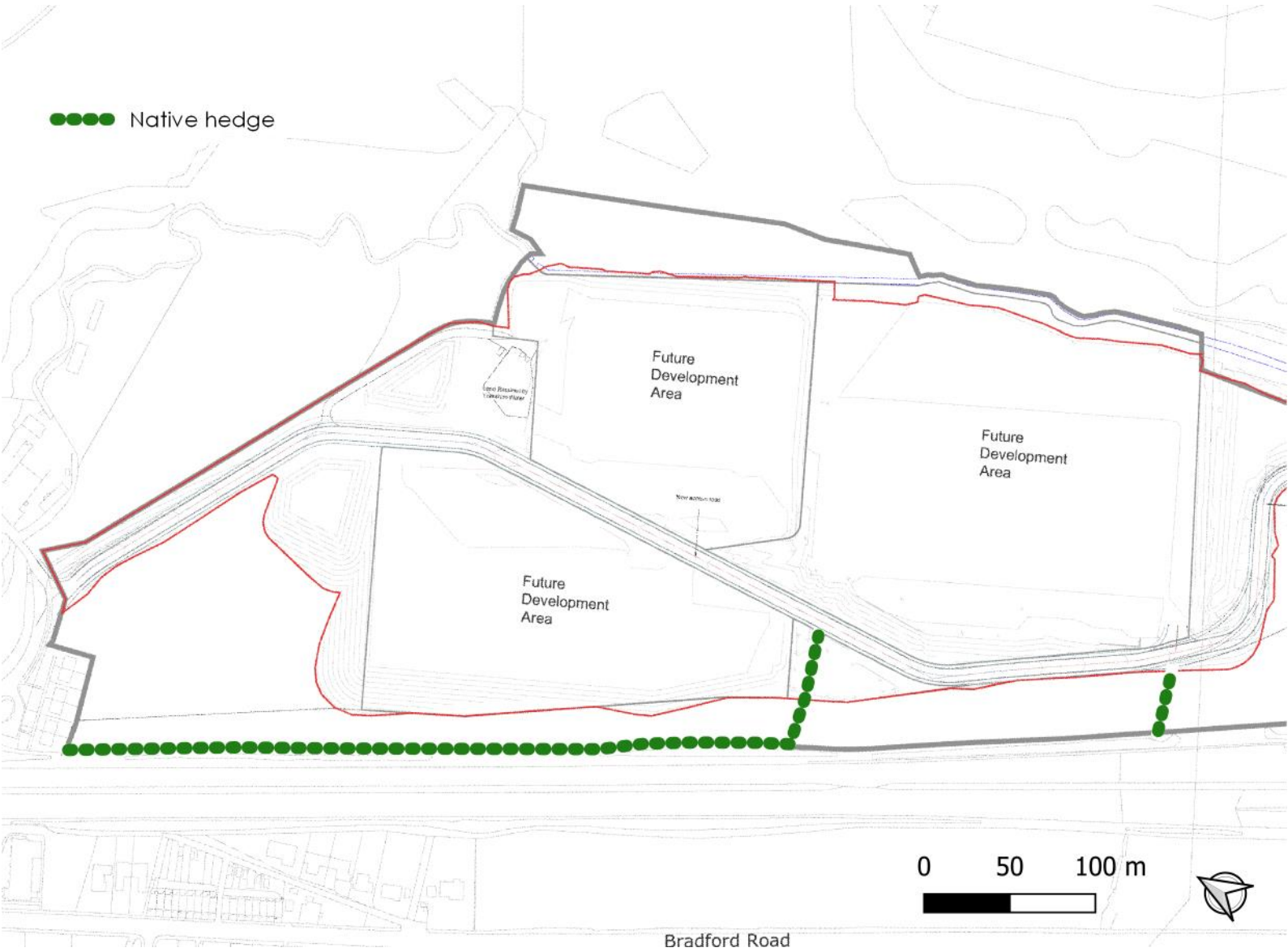
Output

ECoW report.

Remedial actions

ECoW to liaise with contractor to amended cutting regime, localised gapping up or replacement planting.

Percent mix	Shrub species	Common name	Size in cms
5	Acer campestre	Field maple	60-90
55	Crataegus monogyna	Hawthorn	45-60
5	Corylus avellana	Hazel	60-90
5	Ilex aquifolium	* Holly	45-60
2.5	Lonicera periclymenum	Honeysuckle	60-90
25	Prunus spinosa	Blackthorn	45-60
2.5	Rosa canina	Dogrose	45-60



Planted tree shelter belts

Objectives

- 1. Ensure that trees establish well after planting
- 2. Patches become well structured, diverse and free from invasive weeds.

Specification

As Schedule 1. Block planting into weed free ground with woodchip mulch behind rabbit proof fencing or in open stands with tree shelters.
Woodland flower seed mix Emorsgate EW1 or equivalent.

Management

Standard landscape establishment and maintenance as Landscape Management Document.
An annual cut mid summer may be worthwhile for a more managed appearance and to keep weeds of semi-shade such as nettles and brambles in check.

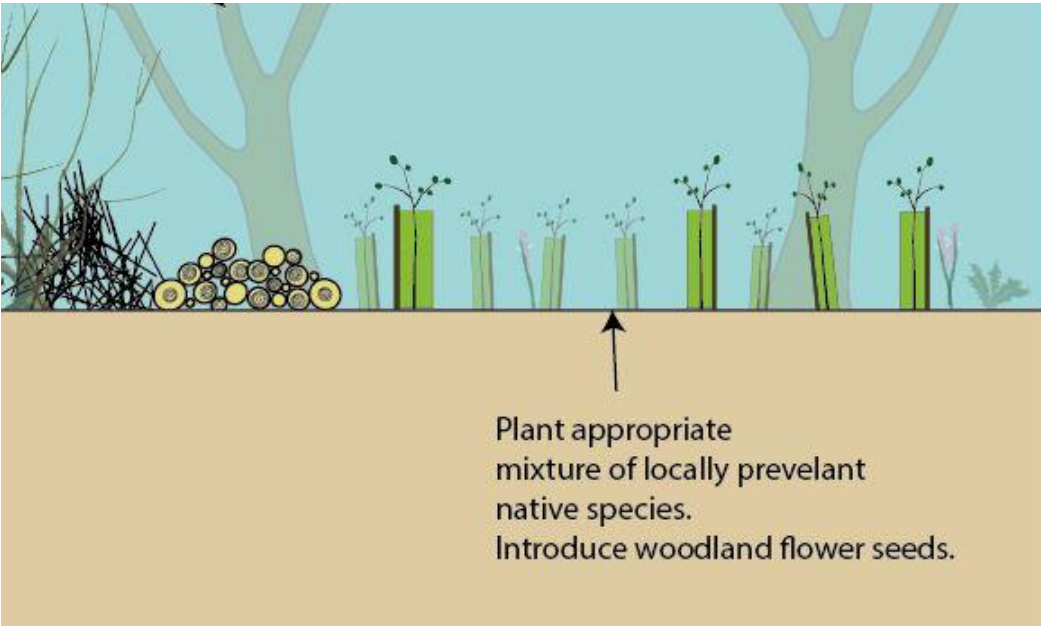
Monitoring

Landscape Architect standard monitoring visits for landscape planting.

Remedial actions
as Landscape Management specification.

Schedule 1 Tree shelter belts

Woody plants		
<i>Prunus spinosa</i>	Blackthorn	10%
<i>Corylus avellana</i>	Hazel	20%
<i>Acer campestre</i>	Field maple	20%
<i>Crataegus monogyna</i>	Hawthorn	10%
<i>Alnus glutinosa</i>	Alder	5%
<i>Rosa canina</i>	Dog rose	5%
<i>Quercus petraea</i>	Oak	10%
<i>Fraxinus excelsior</i>	Ash	10%
<i>Betula pendula</i>	Silver birch	6%
Climbing plants		
<i>Lonicera periclymenum</i>	Honeysuckle	2%
<i>Brionia dioica</i>	White bryony	1%
<i>Tamnus communis</i>	Black bryony	1%



Plant appropriate mixture of locally prevalent native species.
Introduce woodland flower seeds.



Establish New Wildflower Grasslands

Rationale

The grassland area shown in the figure below are a combination of existing retained grassland and areas that have been created, either on old arable land or in areas disturbed through construction. In both cases the rationale is to maximise the number of flowering plants to benefit invertebrates and in turn, larger fauna that will prey upon these. This will be achieved through a combination of wildflower seeding and wildflower management.

Objectives

1. Ensure that all seeding in the locations shown not already supporting grassland contains wildflower seeds (grass only mixes not used)
2. Ensure that flowering plants attain, and remain at, no less than 30% of the sward
3. Ensure that plants can flower (are not cut too often).

Specification

Preparation

In all areas that are damaged through construction: no more than 5cm of topsoil will be spread over the subsoil profile. This will be loose tipped and spread with back actor to avoid compaction, and harrowed to a fine tilth ready for seeding.

Seeding

Seed according to supplier's instructions. If soils have been spread before September, any weed growth that has established in the meantime will be sprayed off with glyphosate and a seedbed be re-prepared.

Seed will either be broadcast by hand or by approved lightweight machinery at c. 40Kg /Ha. Following seeding the area will be lightly rolled to incorporate the seed with the growing substrate.

Year 1 Management

Year 1

Five cuts, collect arisings and remove from site.

Use a weed wipe three times in year 1 to kill off weeds - Spear thistle, creeping thistle, broad-leaved dock, clustered dock, wood dock, curled dock, nettle, ragwort and others according to ECoW recommendations. Operative must be proven competent in identifying these in their early stages to prevent killing off sown wildflowers.

Monitoring

Year 2 Ecologist survey to record relative cover values according to objective 1- 3

Output

ECoW report.

Remedial actions

Localised weed control or over sowing with wildflower seed under the instructions of the ECoW.



Seed Mix: Emorsgate EL1 Flowering Lawn or equivalent by ECoW



Wildflower Grassland - Management – Annual cut and no cut areas

Rationale

Grassland cut once or twice a year can make great habitats for invertebrates and amphibians and in summer make attractive flower filled habitats. Managing for wildlife also means there is less need to use chemical fertilisers or pest treatments so make healthy sustainable environments. Uncut strips of grassland to be available to act as faunal refuges and habitat for small mammals and invertebrates that depend on coarse vegetation with a thatch layer.

Objectives

1. Flowing plants (forbs) make up no less than 40% of the sward
2. Flowers in bloom from April through to September
3. Competitive weeds no more than 10% cover
4. 10% of the grasslands on site remain uncut in any one year
5. Thatch present in uncut areas
6. Evidence of voles found in grasslands by year 5.

Specification

N/A

Management

Year 2 onwards:

September –annual cut in areas shown in the cutting plan and remove arisings as a hay crop, followed by hard raking.

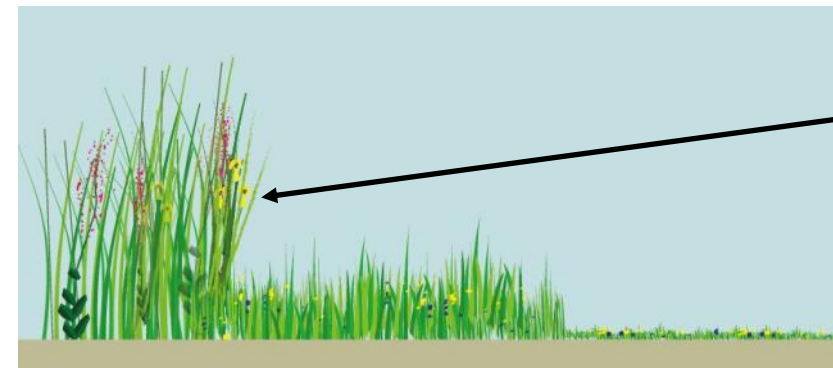
In uncut areas, litter pick regularly, remove woody vegetation (if establishing) on a three year cycle.

Monitoring

Year 4 Ecologist survey to record relative cover values according to objective 1– 6

Output

ECoW report



Tall uncut areas make great refuges for small mammal which attract birds of prey and other predators. Voles are attracted to the dense 'thatch' of dead grass that accumulates and invertebrates that live out their lifecycle in undisturbed environment thrive here.

Note: This cutting plan is indicative and can be varied under agreement with the ECoW



Evidence of voles is a sign of successful long term establishment



Attenuation basins

Rationale

Constructed drainage attenuation basins can provide a range of microhabitat conditions with a range of conditions that provide beneficial habitat resources for invertebrates, amphibians and birds.

Objectives

1. Establishment of a wet meadow type habitat will seasonally wet pools and hollows
2. Pooling water present for at least 10 months of the year.
3. Open water makes up 50% of area at year 3.
4. Vegetation never attains more than 75% cover from year 4 onwards.

Specification

Surface soils to consist of low nutrient material

Base of basins to be roughened and over-deepened in places to allow pooling.

No planting into basin bottom

Seeding with EP1 pond margin seed mix basin banks and margins

Management

Year 1 –2 weed management.

Year 3 onwards periodic pond clearance to prevent infilling.

Monitoring

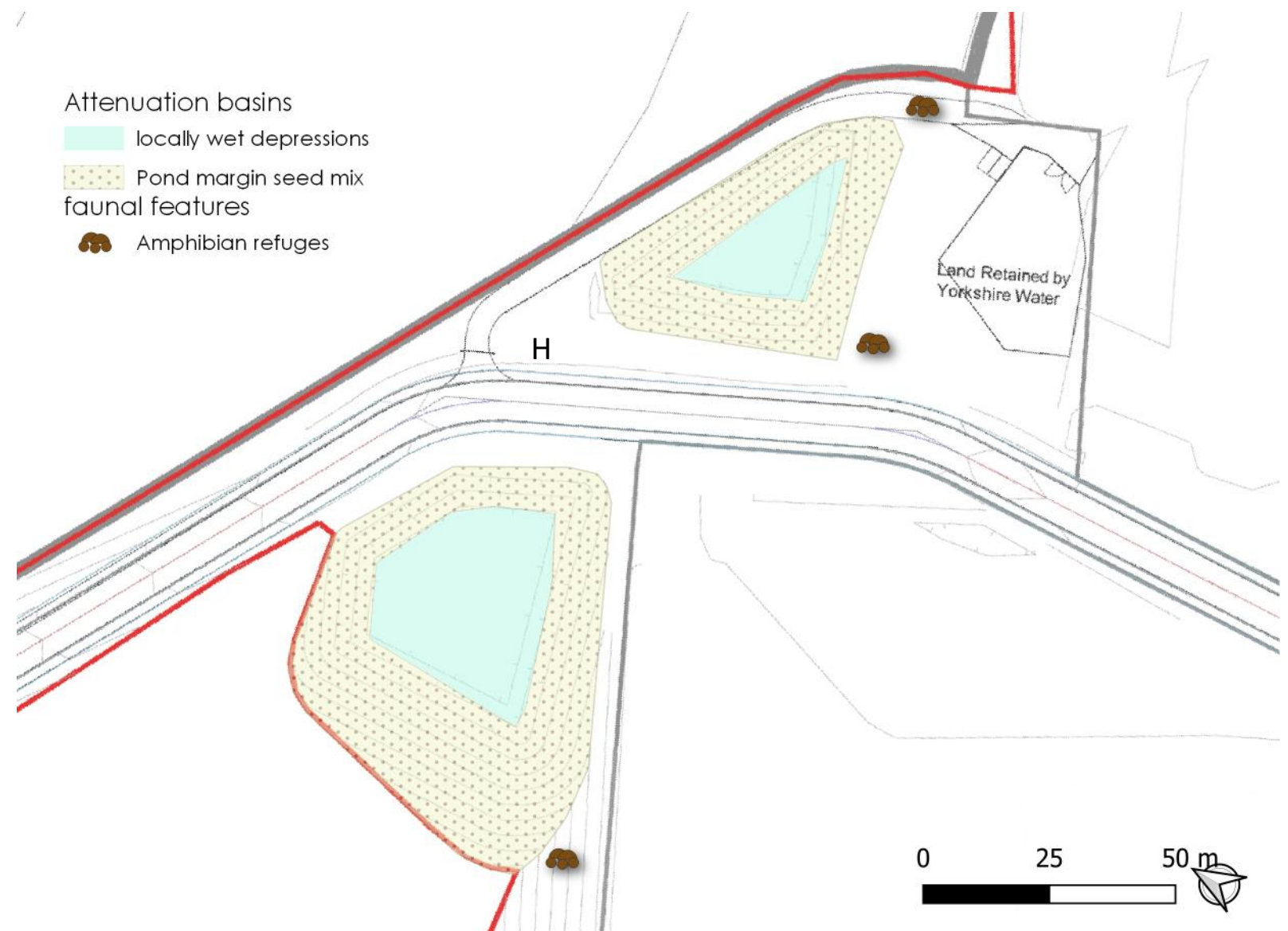
Year 3 and 5 Ecologist to record according to objective 1–3.

Output

ECoW report.

Remedial actions

Localised weed control and over sowing with marginal seed mix under the instructions of the ECoW.



Scrub and riparian enhancement

Rationale

Strips of land bordering Hunsworth Beck are dominated by patches of nettle and tall ruderal plants indicating high nutrient soils and potential to increase the structural diversity and species composition. Area H (p.7) may be enhanced with Phase 1 or the development with area G brought in to management with Phase 2 as development plans for this area are determined.

Objectives

1. Reduce cover of dominant ruderal species and control invasive non-native weeds (INNS)
2. Establish diverse open structure of flowering herbs and woody shrub species
3. Increase volume of dead wood.

Specification

Seeding with EP1 in cleared stream margins

Seeding with EW1 flowering woodland mix in cleared patches

Management

Treatment of INNS in the riparian zone should be included in a site wide management for control of INNS throughout the site.

Year 1—5

October— April Strimming / brushcutting to clear patches of dominant weeds (nettles, thistles, willowherb) in an annual rotation will diversify flora and allow seeded species to establish.

Seeding in to cleared patches and margins .

Planting 30% area of cleared patches with bare rooted native shrubs as specified in native hedge schedule.

Monitoring

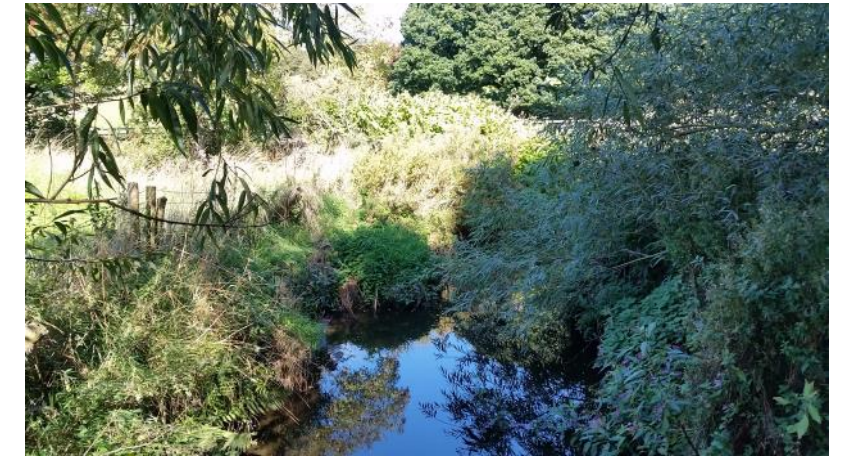
Year 2 and 4 Ecologist survey to record according to objective 1- 3.

Output

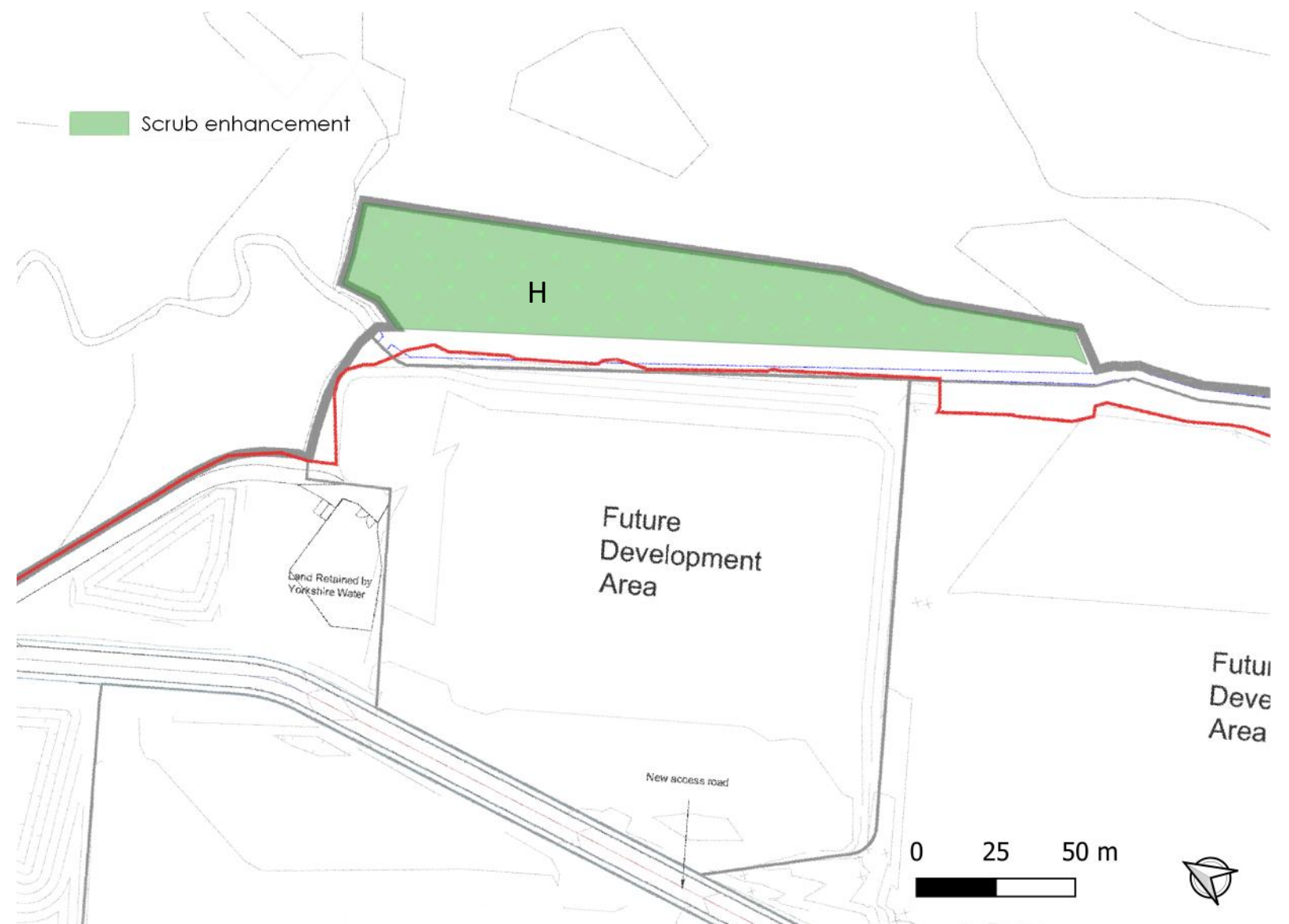
ECoW report.

Remedial actions

Localised weed control or over sowing with wildflower seed under the instructions of the ECoW.



Stream margins are dominated by tall herb and invasive plant species.



Features for birds and bats

Tree mounted bat box

Specification—as below or equivalent agreed by ECoW

10 x Kent Bat Box (mounted in pairs in trees) <https://www.nhbs.com/nhbs-kent-bat-box>

1 x Sparrow terrace box. <https://www.nhbs.com/1sp-schwegler-sparrow-terrace>

3 x swift box (WoodStone Swift Nest Box)

1 x raptor box (<https://www.wildcare.co.uk/10201-eco-barn-owl-nest-box-nbc.html>)

Location Notes

See illustrations with location notes (right).

When erected?

Prior to site operation.

Verification

Ecological Clerk of Works Certificate.

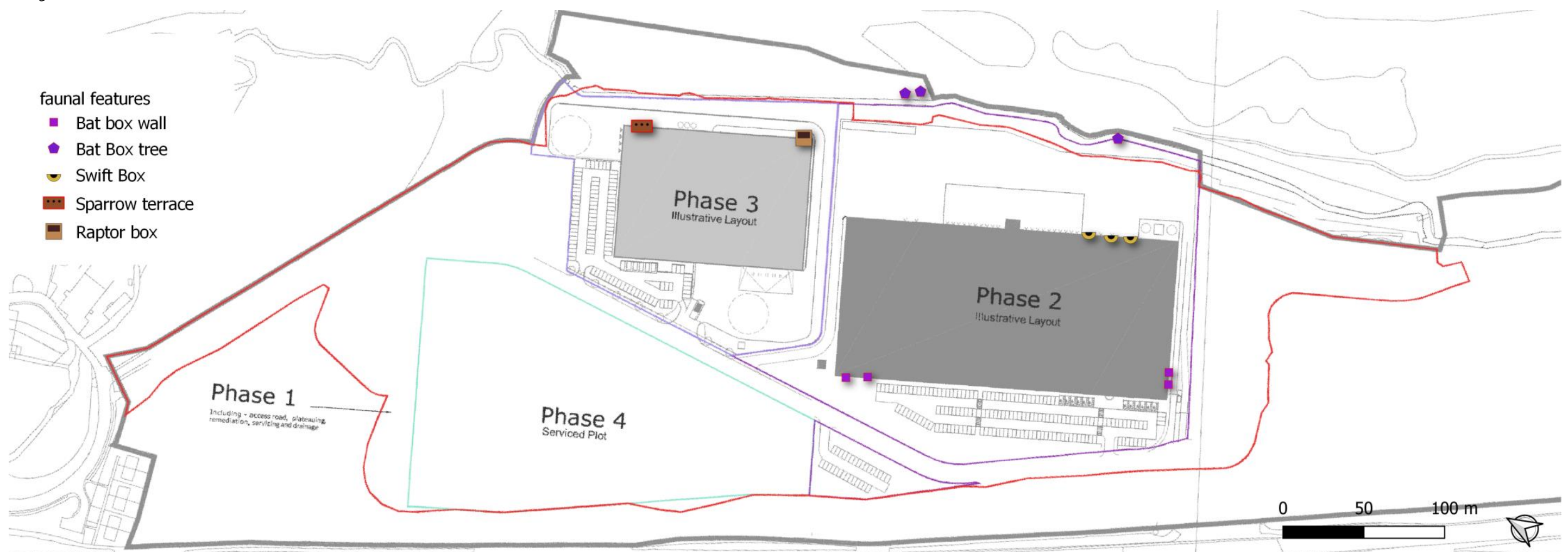


Bat boxes located in trees and buildings according to the ECoW instructions at minimum of 4m with clear flight-lines and providing a range of orientation.

House sparrow boxes will be positioned as high up on buildings as possible, ideally below the verges of gables. South-facing elevations will be avoided, with boxes fixed to north, northeast or north-west facing aspects.

Swift boxes should be installed at least five metres above the ground, ensuring that there is unobstructed access for birds entering and leaving. If possible, boxes should be sited under the shelter of eaves or overhanging roofs .

Barn Owl /raptor box is suitable for use outdoors by mounting on a wall or tree. Provides a safe and comfortable roost space.



Features for hedgehog amphibian and otter

Specification

A single Filcris recycled plastic otter holt will be erected within the Riparian Zone. (<http://www.filcris.co.uk/products/product-details/otterholt> or approved equivalent)

Location Notes

Otter holt located in close proximity to Hunsworth Beck in the position approximated in the plan below.

Number

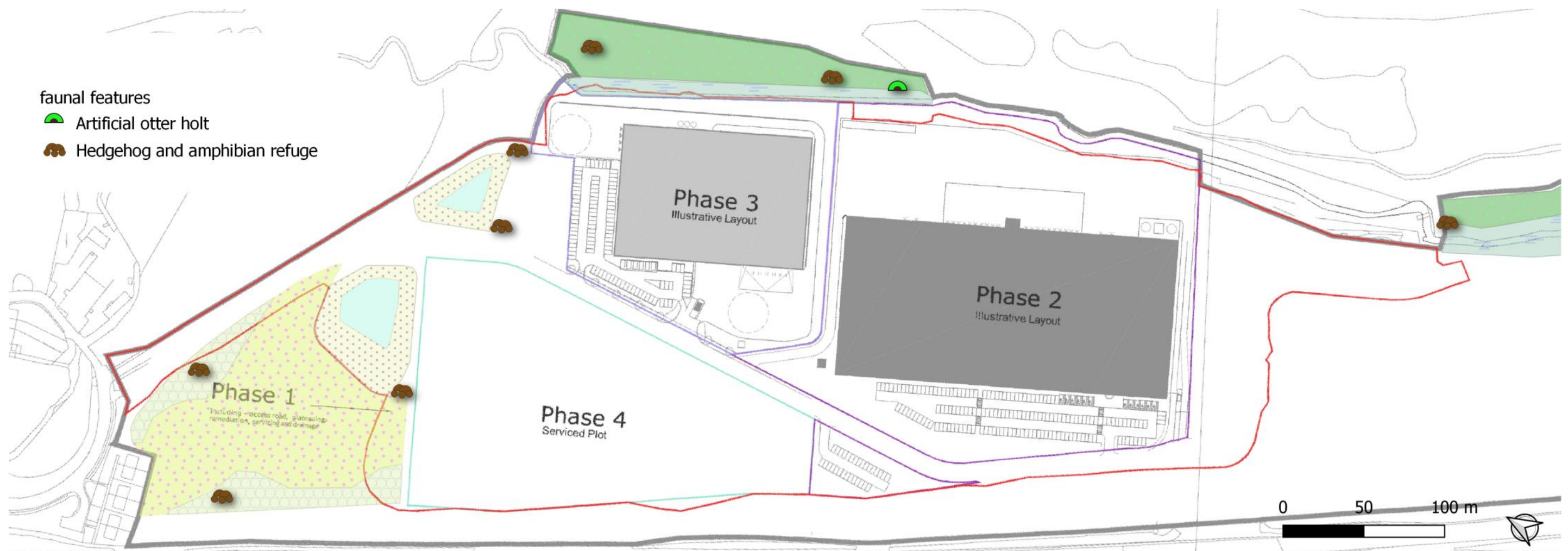
1 otter holt, 9 refuges.

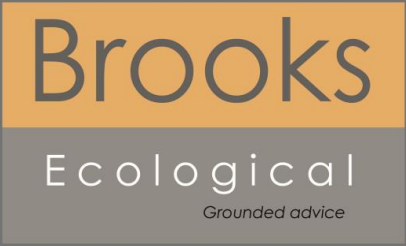
When erected?

Otter holt and refuges put in place during year 1.



Illustrative examples of artificial otter holt (left) and hedgehog / amphibian refuges (below) constructed from dead wood reclaimed during site clearance.





Work Schedule

The work schedule overleaf covers the 5-year establishment period (Developer’s responsibility) and the in-perpetuity period [6+] (Site Management Company’s responsibility).

‘Year 1’ is triggered as soon as any works commence on site. The following actions will be carried out by the site’s landscape maintenance company under the direction of the ECoW where required.

Task	ECoW to direct	ECoW to carry out	Prior to any work	Year 1	Year 2	Year 3	Year 4	Year 5	6+
Ground forming and soil cultivation				yes					
Prepare grassland areas for seeding				March-September	March-September				
Seed wildflower grassland				September-October	September-October				
Woody planting Tree belts and hedge gapping	yes			November-February	November-February				
Establish wildflower grassland	yes			April-September	April-September				
Manage wildflower grassland	yes			April-Sept	April-Sept	April-Sept	April-Sept	April-Sept	April-Sept
Monitor grassland		yes			June				
Riparian scrub planting	yes			Oct-April	Oct-April				
Monitor riparian scrub		yes			June			June	
Create hedgehog, amphibian refuges and otter holt	yes			Any time					
Establish attenuation basins scrapes and seeding	yes			April-September	April-September				
Monitor attenuation basins		Yes				March-May		March—May	
Erect bird and bat boxes	yes			Any time	Any time				
Planting defects maintenance (as Landscape Management Docu- ment)					yes	yes	yes	yes	