

Hydro Aluminium Recycling Facility, Wrexham Industrial Estate, Wrexham

BEMP

(Biodiversity Enhancement & Management Plan)

Prepared For: PACE Pace Architecture Limited on behalf of Hydro Aluminium Deeside Ltd

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1.0 Introduction

1.1 This Biodiversity Enhancement & Management Plan (BEMP) has been prepared to guide the post-construction ecological enhancement, management and long-term stewardship of habitats at the Hydro Aluminium Recycling Facility, Wrexham Industrial Estate. The BEMP builds directly upon the baseline ecological conditions identified in the Preliminary Ecological Appraisal (PEA) (TEP Ref 9871.002) and the protection and mitigation measures set out in the Construction Environmental Management Plan (CEMP) (TEP Ref 11549.005), ensuring continuity between the construction phase and the operational lifecycle of the site.

1.2 The PEA confirms the presence of adjacent ancient semi-natural woodland, plantation woodland, dense/continuous scrub, modified grassland, ephemeral/short-perennial habitats and nearby waterbodies supporting a wider ecological network, including suitability for dingy and grizzled skipper, foraging bats, amphibians, hedgehog and other Section 7 species. The CEMP provides the framework for protecting these receptors during construction, including Pollution Prevention, Biodiversity Protection Zones, and species-specific PWMS.

1.3 This BEMP focuses on enhancing and managing habitats beyond project completion, ensuring that the site contributes positively to local ecological networks within Wrexham Industrial Estate and that opportunities for biodiversity are secured.

Purpose and Scope

1.4 The purpose of this document is to:

- Deliver a coherent package of habitat creation, enhancement and long-term management targeted to the ecological receptors identified in the PEA.
- Ensure that ecological mitigation delivered under the CEMP evolves into functioning, high-value habitat mosaics post-construction, avoiding regression into uniform or degraded vegetation structure.
- Provide clear, spatially mapped prescriptions for enhancement features, including bat and bird boxes, hedgehog refuges, and specialist invertebrate habitats.
- Provide a monitoring and adaptive-management framework enabling continuous improvement and responsive management actions.

Ecological Baseline Context

1.5 The ecological baseline is characterised by a mix of semi-natural and modified habitats, key elements of which include:

- Ancient semi-natural woodland directly north of the site (Habitat of Principal Importance), requiring protection from encroachment, hydrological impacts and excessive lighting.
- Plantation woodland and scrub mosaics, offering connectivity to the wider woodland network and providing foraging, sheltering and dispersal habitat for bats, hedgehog, invertebrates and nesting birds.
- Modified neutral grassland and amenity grassland, providing baseline for enhancement into species-rich swards.
- Bare ground and ephemeral/short-perennial habitats, of particular importance for dingy and grizzled skipper, both recorded locally with high suitability on bunds and earth banks.
- A hydrological pathway linking site drains to Redwither Brook and ultimately the River Dee SAC/SSSI, a key pollution-sensitive receptor.

1.6 These features establish the ecological rationale for the BEMP's habitat enhancement and species-targeted interventions.

Structure of this BEMP

1.7 This BEMP is structured around the following core components:

- **Habitat Creation & Enhancement** – including woodland buffer restoration, scrub/woodland diversification, species-rich grassland creation, bare-ground management and butterfly banks.
- **Target Species Features** – provision and management of bat / bird boxes, hedgehog houses and invertebrate houses.
- **Siting Plans & Quantities** – including mapped locations and counts of enhancement features.
- **Management Prescriptions** – long-term actions for grassland, woodland/scrub mosaics, bare ground and butterfly banks.

1.8 These measures ensure that the completed development not only mitigates construction impacts but secures a net ecological benefit aligned with local planning guidance, Section 6 duty (Environment Wales Act), and the ecological enhancement expectations set out in the PEA.

2.0 Habitat Creation & Enhancement

2.1 This section sets out the proposed habitat creation and enhancement measures that will deliver long-term ecological uplift at the Hydro Aluminium Recycling Facility. Measures respond directly to the site's ecological baseline, including proximity to ancient semi-natural woodland, hydrological connectivity to the River Dee catchment, and the presence of early-successional habitats suitable for priority invertebrates.

Ancient Woodland Buffer and Woodland Enhancement

2.2 A 15 m ecological buffer will be maintained along the northern boundary where the site adjoins ancient semi-natural woodland. Although hardstanding currently buffers the woodland edge, the buffer will be restored and enhanced to improve ecological function and reduce impacts such as dust, light spill and nutrient runoff.

Replacement of Hardstanding with Native Scrub

2.3 Where feasible, existing hardstanding within the buffer will be replaced with native scrub and understorey planting, creating a more natural woodland edge and strengthening the transition between the built environment and retained woodland.

Woodland Diversification

2.4 The plantation woodland on the stepped bund will be enhanced through:

- Selective thinning to increase light penetration;
- Removal of suppressed or failing trees; and
- Understorey enrichment to diversify the ground flora and encourage natural regeneration.

2.5 These measures will improve structural diversity, increase resilience and enhance habitat suitability for bats, birds and small mammals.

Native Scrub and Tree Replacement

2.6 Any scrub or plantation trees unavoidably lost to the development will be replaced using appropriate native species already represented within or adjacent to the site (e.g., hawthorn, blackthorn, willow, birch). Planting will be designed to reinforce ecological connectivity and provide foraging and sheltering opportunities for a wide range of species.

Species-Rich Grassland Creation

2.7 Amenity grassland areas in the south of the site will be enhanced to form species-rich, low-nutrient grassland. Works include:

- Soil nutrient reduction where required;
- Sowing or plug planting of diverse wildflower and fine-grass mixes; and
- Management under a cut and remove scheme to maintain low fertility.

2.8 This habitat will increase floral resources for pollinators and provide improved foraging and cover for birds, hedgehogs and invertebrates

Bare Ground & Early Successional Habitat

2.9 Areas of bare ground and ephemeral/short-perennial vegetation on bunds and earth banks are valuable for invertebrates, including dingy and grizzled skipper. To conserve and expand this resource, the BEMP includes:

- Retention of existing early successional patches;
- Creation of new bare-ground zones using low-nutrient substrates; and
- Ongoing disturbance-based management to prevent scrub encroachment.

2.10 These habitats also benefit common lizard, grass snake and a range of other thermophilic species.

Butterfly Banks & Open Mosaic Habitat

2.11 To support dingy and grizzled skipper and other early successional specialists, south-facing butterfly banks and open mosaic habitat will be created. Features include:

- Low nutrient, free draining mounds or banks;
- A mosaic of bare ground, sparse vegetation and nectar-rich forbs;
- Inclusion of larval food plants such as bird's-foot-trefoil; and
- Management through light disturbance or periodic cutting to replicate grazing pressures.

2.12 This will provide high-quality breeding and foraging habitat, contributing to the wider metapopulation within Wrexham Industrial Estate.

Integration with Site Management

2.13 All habitat creation measures will be integrated with the site's long term operational management. Enhancement areas will be clearly mapped and supported by ongoing monitoring to ensure they develop in line with BEMP objectives. Management prescriptions for each habitat type are provided in later sections.

3.0 Target Species Features

3.1 This section outlines the ecological enhancement features proposed for the Hydro Aluminium Recycling Facility, designed to support priority species identified within and adjacent to the site. The features complement the habitat creation and enhancement measures described in Section 2 and are intended to increase nesting, roosting, sheltering and foraging opportunities for a range of wildlife.

Bats

3.2 The site and surrounding woodland/scrub mosaic provide suitable foraging and commuting corridors for several bat species. Although no roosting features were identified on site, opportunities for artificial roost enhancement will contribute to long term species support.

3.3 Proposed bat features include a combination of wall mounted bat boxes, tree mounted roost boxes and bat bricks integrated into built structures. These should be installed at varying orientations and heights to provide differing thermal conditions. Features must be positioned away from artificial lighting and with clear, unobstructed flight paths.

Table 1: Bat Enhancement

Product name	How to use	Photo
■ Beaumaris Woodstone® Bat Box - NHBS Product Code: 231797 ■ Integrated Bat Brick "Ibstock Enclosed Bat Box 'C'" - NHBS Product Code: 208936 (for building façades)	■ Install the box 3 to 5 m above ground, on a building or mature tree, facing south-east to south-west to maintain suitable thermal conditions. ■ Ensure the flight path is clear of vegetation. ■ Avoid placing near artificial lighting. ■ Inspect externally only; do not open or disturb the box.	 

Birds

3.4 Woodland edges, scrub, hedgerows and grassland areas provide a variety of foraging and nesting habitats for common and priority bird species. To enhance nesting opportunities and support species diversity, a range of bird boxes will be installed across the site.

3.5 Proposed features include hole fronted boxes for small passerines, open fronted boxes for species such as robin or wagtail, multi chamber sparrow terraces to encourage colony nesters, and integrated swift bricks where suitable. Boxes should be mounted at appropriate heights, away from disturbance, and oriented to avoid direct sun and prevailing weather. Seasonal maintenance should be undertaken outside the breeding season.

Table 2: Bird Enhancement

Product name	How to use	Photo
■ 32 mm Hole Nest Box "NHBS Wooden Bird Nest Box" (generalist garden birds) - NHBS Product Code: 254493 ■ Sparrow Terrace - NHBS Product Code: 179139 ■ Manthorpe Dual Swift Brick - NHBS Product Code: 265624 (integrated into building façades)	■ Mount boxes 2 to 4 m high on trees or buildings, avoiding prevailing winds and direct midday sun. ■ For hole nest boxes, face north-east to east for stable temperatures. ■ Sparrow terraces should be grouped together to mimic colony nesting. ■ Swift bricks must be installed flush into masonry during construction, with a clear drop and no obstructions below. ■ Clean non-Swift boxes annually in winter (outside the breeding season).	  

Hedgehog

3.6 Hedgehog remains a widespread but declining species, requiring safe nesting, shelter and hibernation spaces within development landscapes. The site's woodland edge and scrub provide dispersal routes, making hedgehog features a suitable enhancement.

3.7 Proposed features include hedgehog houses (with tunnel entrances) placed within shaded, undisturbed areas close to vegetation cover. These should be covered with

leaves or brash to provide insulation and camouflage. Access gaps ("hedgehog highways") should be maintained in perimeter vegetation to ensure free movement throughout the enhancement areas.

Table 3: Hedgehog Enhancement

Product name	How to use	Photo
■ Schwegler Hedgehog Dome - NHBS Product code: 178028	■ Place in a quiet, shaded area near scrub or woodland edge. ■ Cover with leaves or branches to provide insulation and reduce visibility to predators. ■ Ensure the tunnel entrance faces away from prevailing winds. ■ Avoid disturbance between October–March, when hibernation may occur.	

Amphibians & Reptiles

3.8 Although surveys recorded no amphibians or reptiles within the site footprint, suitable terrestrial habitat exists in the wider landscape, and the creation of early-successional and structurally diverse habitats will support species such as common lizard, grass snake, common toad and other small fauna.

3.9 Enhancement features include log and brash piles, reptile refugia sheets, and constructed hibernacula located in partially shaded areas close to scrub, rough grassland or wetland edges. These features provide refuge, basking and hibernation zones and should be positioned to maximise solar gain while still offering adjacent cover.

Table 4: Amphibian / Reptile Enhancement

Product name	How to use	Photo
■ Log & Brash Pile Habitat ■	■ Create brash/log piles in part-sun, part-shade close to scrub or woodland to provide shelter and overwintering habitat. ■ Construct amphibian hibernacula using logs, stones and soil in damp but not waterlogged areas. ■ Do not disturb habitat piles during winter when animals may be dormant.	

Invertebrates

3.10 The site contains habitat of value for dingy skipper, grizzled skipper and other early-successional invertebrates. Enhancements will focus on features that provide larval food plants, nectar sources and warm, open microhabitats.

3.11 Proposed invertebrate features include butterfly banks formed from low-nutrient, free-draining substrates; pollinator planting through plug plants and species-rich grassland; and structural nesting features such as bee hotels mounted in sunny, sheltered locations. These features should be maintained through light disturbance and rotational cutting to prevent scrub encroachment and preserve open ground conditions.

Table 5: Invertebrate Enhancement

Product name	How to use	Photo
■ Invertebrate Nesting Box ("Bee Hotel") ■ Pollinator Plug-Plant - Creeping Cinquefoil Planting	■ Sow Creeping Cinquefoil across and around banks. ■ "Bee hotels" should be mounted 1–2 m high, facing east or south-east, with a rain-shield where possible. ■ Avoid placing bee hotels near dense vegetation or artificial light sources.	

4.0 Siting Plans & Quantities

4.1 This section sets out the spatial arrangement and total number of biodiversity enhancement features to be installed across the Site. Drawing G11549.002 shows the locations of all enhancements.

Zones for Reference

4.2 A – Ancient Woodland Buffer (on-northern boundary)

4.3 B – Western Stepped Bund (plantation woodland)

4.4 C – Southern Amenity / Species-Rich Grassland

4.5 D – Bare Ground & Early-Successional Habitat (bund edges)

4.6 E – New Building Eaves

4.7 These zones reflect the Site's ecological areas and habitat opportunities.

Enhancement Feature Quantities

Bat Boxes – 20 total

4.8 A – Ancient Woodland Buffer: ≈12 boxes

- Positioned along the internal edge of the buffer, taking advantage of the dark, sheltered corridor.

4.9 B – Western Stepped Bund: ≈8 boxes

- Mounted on suitable trees within plantation woodland or on posts if tree structure is insufficient.

4.10 Installation notes:

- Orient SE–SW for thermal variation.
- Maintain clear, unobstructed flight lines.
- Avoid all lit areas, in line with sensitive-lighting principles.

Swift Bricks – 6 total (subject to building design)

4.11 E – New Building Façade(s)

- Grouped in sets, installed flush with the façade, with a clear drop beneath the entrance and minimal disturbance.

Bird Boxes – 12 total

Sparrow Terraces (3-chamber) – 6 total

4.12 E – New Building Façade(s) (if structure supports installation)

- Installed in small clusters to mimic natural colony formation.

Titrated Hole Front Boxes (Blue Tit / Great Tit) – 6 total

4.13 B – Western Stepped Bund and A – Ancient Woodland Buffer

- Dispersed along scrub and woodland edge, with a couple positioned on shaded building elevations where appropriate.

Hedgehog Houses – 2 total

4.14 A – Ancient Woodland Buffer and B – Western Bund / Scrub Interface

- Placed in shaded, undisturbed areas with good vegetation cover.
- Hedgehog highways: Ensure ≤13 cm gaps at fence lines or hedgerow bases to enable movement between habitats.

Reptile & Amphibian Features

4.15 Log / Brash Piles – 4 total

4.16 A – Ancient Woodland Buffer: 2 piles

- Placed in south facing sites but always near cover (scrub/woodland edge) to provide refuge, basking, and overwintering habitat.

5.0 Management Prescriptions

5.1 This section sets out the long-term management operations required to ensure that the habitats created and enhanced under this BEMP develop into high value, structurally diverse ecological features supporting the target species identified in the PEA and CEMP. Prescriptions apply across the operational lifespan of the Hydro Aluminium Recycling Facility and are designed to maintain net ecological gain and prevent regression of habitats through succession or nutrient enrichment.

5.2 Management prescriptions correspond to the habitat types defined in Section 2.0 (Habitat Creation & Enhancement) and the target species features in Section 3.0, ensuring continuity between creation, establishment and long-term maintenance.

Scrub Mosaic Management

5.3 Scrub mosaics occur within woodland edges, buffer zones and bund margins where structural diversity is a key ecological requirement for birds, hedgehog, invertebrates, amphibians and reptiles. To prevent the habitat developing into closed woodland and to retain a varied structure:

5.4 Objectives:

- Maintain a heterogeneous scrub structure (young, mid-aged, mature).
- Prevent complete succession to closed canopy woodland.
- Retain flowering/fruiting scrub for invertebrates and birds.
- Maintain connectivity with woodland and grassland habitat networks.

5.5 Prescriptions:

- Rotational Cutting:
  - Cut 20–30% of the scrub mosaic every 3–5 years on a rotational basis.
  - Rotation should maintain a patchwork of different ages and densities.
  - Avoid cutting March–August (bird breeding season). If unavoidable, an ecologist will complete a nest check within 24 hours prior.
- Control of Encroachment:
  - Lightly thin advancing scrub where it threatens bare-ground or early-successional habitat patches.
  - Retain thorny scrub (hawthorn/blackthorn) along edges to provide protective cover for hedgehog and small mammals.
- Brash Use:

- Arisings from cutting to be used to replenish brash piles or deadwood habitat (see Section 3 Target Species Features).

Species-Rich and Amenity Grassland Management

5.6 Species-rich grassland (including pollinator-friendly swards) is sensitive to nutrient build-up and requires consistent low-fertility management.

5.7 Objectives:

- Maintain low-nutrient grassland supporting diverse forb and fine-grass species.
- Retain high floral value for pollinators (including dingy/grizzled skipper nectar sources).
- Prevent scrub encroachment and sward homogenisation.

5.8 Prescriptions:

- Annual Cut and Remove:
  - Cut grassland once annually in late summer (August–September), after seed set.
  - Sward height after cutting: 100–150 mm.
  - All arisings to be removed to minimise nutrient enrichment.
- Scarification & Disturbance:
  - Light scarification of 5–10% of the grassland area every 2–3 years to maintain low nutrient levels, create fine-scale bare patches and promote regeneration of early-successional forbs.
- Scrub Control:
  - Remove encroaching woody vegetation annually (outside bird breeding season).
  - Thistles/docks/nettles controlled by hand pulling where feasible.
- No Fertiliser or Mulch:
  - Consistent with PEA / LEMP requirements for conservation grassland.
  - Herbicide use restricted to targeted applications for invasive or noxious weeds only.

Bare Ground & Early-Successional Habitat Management

5.9 Bare ground and short ephemeral/perennial vegetation are essential for dingy skipper, grizzled skipper, thermophilic invertebrates and reptiles. These habitats naturally move towards scrub dominance if unmanaged.

5.10 Objectives:

- Maintain open, sun-exposed, sparsely vegetated ground.
- Support larval foodplants (e.g., bird's-foot-trefoil) and warm microclimates.
- Prevent successional closure by grassland or scrub.

5.11 Prescriptions:

- Periodic Disturbance:
  - Carry out mechanical rotavating or hand-scraping of 10–20% of each bare-ground zone annually.
  - Interventions should occur September–October to avoid the peak invertebrate larval period.
- Scrub Removal:
  - Remove emergent scrub seedlings annually.
  - Cut back advancing scrub from surrounding mosaic habitat.
- Sward Suppression:
  - Remove dense grass where it begins to dominate using hand tools or small-scale scraping.
- Substrate Management:
  - Maintain some areas of free-draining, low-nutrient substrates such as crushed aggregate or sandy soil.
  - Re-apply loose aggregate periodically where compaction reduces suitability.
- Butterfly Bank Integration:
  - Ensure 5–10% of the surface always remains bare (in line with Section 3 Table 5 and LEMP KPI 10).
  - Maintain south-facing aspects free of overshadowing vegetation.

Integration and Adaptive Management

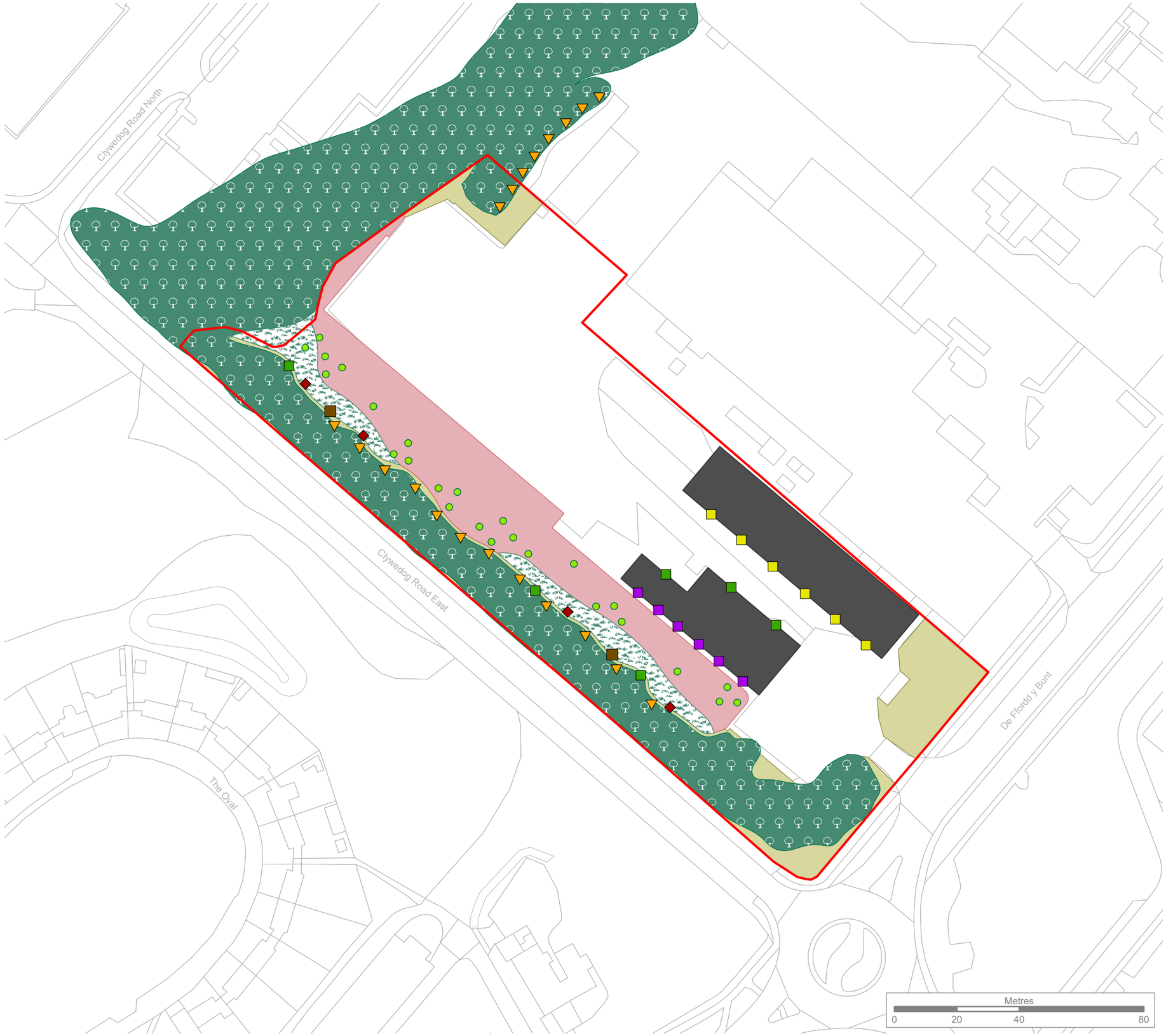
5.12 Habitat management areas will be reviewed during annual ecological walkovers, with reference to dingy/grizzled skipper habitat condition, scrub succession rates, and grassland species richness.

5.13 Prescriptions may be adapted following monitoring feedback, consistent with the adaptive-management framework.

THE ENVIRONMENT PARTNERSHIP

Drawings

Drawing 1: G11549.002 Ecological Enhancements



KEY

Site boundary

Bat Boxes

- Bat box

Bird Boxes

- Swift bricks
- Sparrow terraces (3 chamber)
- Titrated hole front boxes (blue tit/ great tit)

Other Enhancements

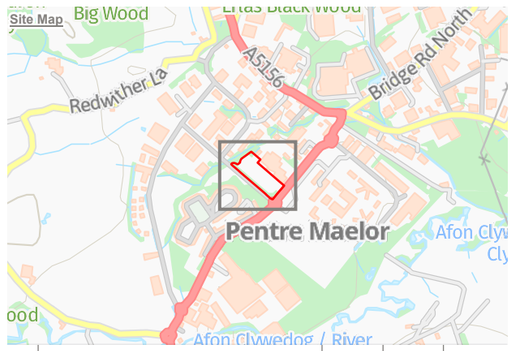
- Hedgehog house
- Log/ brash piles

Existing Habitat

- Tree
- Amenity grassland
- Ancient woodland buffer
- Species-rich grassland
- Woodland edge planting
- Building

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Rev	Description	Drawn	Approved	Date

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Project
Hydro Aluminium

Title
Ecological Enhancements Plan

Drawing Number
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