Harworth

Gateway 36, Rockingham Phase 2A.1 Site

Landscape and Ecological Management Plan

Rev.D - November 2021

Produced by

URBAN WILDERNESS

CONTENTS

SECTION	TITLE	PAGE
1	Introduction	3
2	Background	4
3	Vision & Site Wide Aims	4
4	Landscape Typologies	5
5	Prescriptions	11
6	Enhancements (for Notable Species)	21
7	Monitoring and Managing the Site for Biodiversity in the Long-term	22

1.INTRODUCTION

1.1 The following Landscape and Ecological Management Plan (LEMP) has been prepared by Urban Wilderness Ltd in collaboration with FPCR, Mosodi and TEP on behalf of the Harworth Group. The document has been produced to support a Reserved Matters application for Phase 2 of the development at Gateway 36, Rockingham, Barnsley. The LEMP provides details which promote the successful establishment and maintenance of the landscape proposals within the phase boundary and should be read in conjunction with the Planting Proposals shown on drawing 334-UW-P-007, the Arboricultural Impact Assessment (TEP, 2020) and both the Habitat Creation, Biodiversity Mitigation and Enhancement Scheme (FPCR, 2021) and Biodiversity Impact Assessment (FPCR, 2021). The drawn planting proposals detail the positioning and extent of the soft landscape features within the site-wide areas of the Reserved Matters application boundary including woodland, scrub, mature trees, hedgerows, meadow, reed bed and the retained landscape areas. Also submitted as part the Reserved Matters application and of relevance to this document are the following drawings:

- 334-UW-P-004 Landscape Masterplan – Rendered Landscape Masterplan;
- 334-UW-P-008 Landscape Features Plan – Information including hard landscape material finishes, boundaries and edges, furniture and bins; and
- 334-ES-001 Landscape Mitigation Plan (Dec 2020) – Plan showing proposals to mitigate visual impacts identified.

1.2 The site wide landscape proposals have been developed by Urban Wilderness in collaboration with FPCR (Ecologists) and TEP (Arboricultural Consultants). On-plot landscape design proposals have been undertaken by others (Vector DC – Landscape Architects). A separate Management and Maintenance Plan has been produced by Vector for the on-plot landscape treatments.

1.3 The management of the site-wide landscape features will be completed in accordance with the agreed prescriptions within this document and will be undertaken by a specific management company with the aim of achieving long-term ecological and placemaking benefits on site. The LEMP has been produced to cover a 30-year period demonstrating the Biodiversity Net Gain over this period. Within this document, a working programme of an initial 15-year period is detailed. Following this period, the works should be reviewed at the end of the fifteenth year following an assessment of the site.

1.4 A further 15-year working programme should be created based on the results of that assessment if it is considered that any element within this document needs updating to best achieve and maintain the desired habitat condition.

1.5 This LEMP will be revised / and or supplemented alongside the subsequent landscape phases of the development to come forward (later phases within Phase 2 & Phase 3).

1.6 The following points set out the site-specific landscape aspirations that are considered within this management plan:

- The retention, enhancement and management of existing woodland, hedgerow, and neutral grassland habitats;
- The establishment of native woodland planting to both assist in screening the development and provide enhanced linkages for wildlife;
- The establishment of well-managed scrub areas to support a range of wildlife and managed to create a rich mosaic with varied age, species and structure;
- The creation of a sustainable surface water attenuation basin for the catchment of water run-off from proposed roofscapes and areas of hard standing. The basin will be planted with a species mix selected to reflect the surrounding landscape character, with suitable tolerance to fluctuating conditions;
- A range of mature trees will be planted across the site to provide focal features and assist in screening the development as well as providing greater structural diversity at year-0;
- The enhancement of existing Public Rights of Way and footpaths; and
- The creation of additional pedestrian/cycle routes to increase connectivity across the site.

2.BACKGROUND

2.1 The Reserved Matters application site covers an area of approximately 13.8ha, and previously comprised of established woodland planting and compartmentalised open pasture. Much of the site has now been stripped following the commencement of the proposed earthworks. There are areas of retained landscape outwith these approved works which include a small section of woodland and hedgerow around the site boundary in the north eastern corner, extending between the Dearne Valley Parkway and the Public Right of Way.

2.2 Together, these form the southern boundary of the wider site. In addition, a much larger area of retained landscape is present to the south west where both woodland and grassland habitats have been retained. Enhancements for these areas are detailed later in this document.

3.VISION & SITE WIDE AIMS

3.1 The overarching aim of the report is to ensure that the high-quality environment embodied within landscape drawings is implemented and maintained. This document is a key part in ensuring the successful establishment and enduring success of the landscape proposals.

3.2 The management of the landscape typologies described in Section 4 below will be completed in accordance with the prescriptions agreed within this document (Section 5, Management Prescriptions) and will be undertaken by a suitably qualified landscape management company.

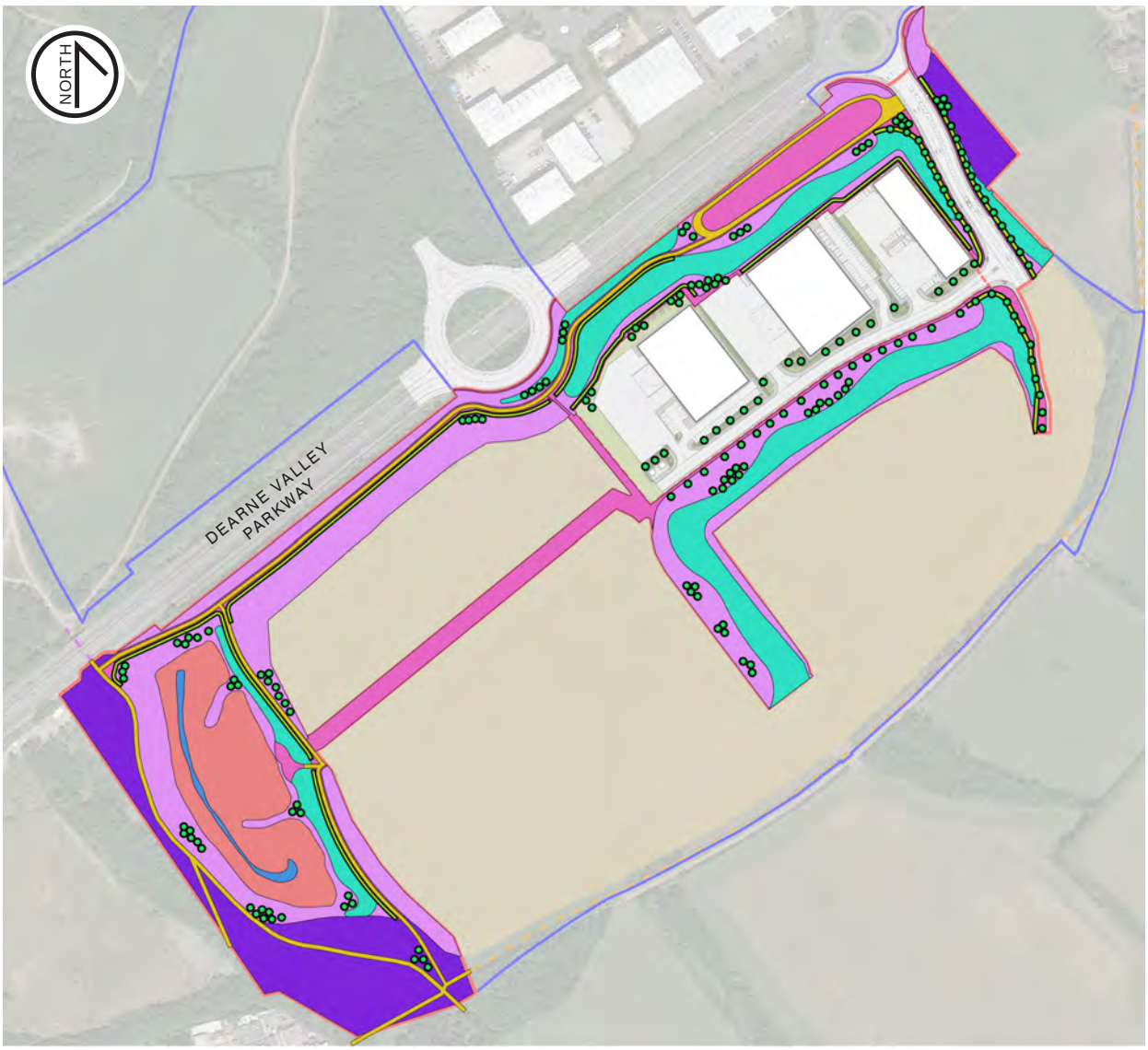
3.3 There are four long-term landscape and ecological management aims for the site:

- **Aim 1:** Maintain and enhance the existing landscape and ecological features within the development;
- **Aim 2:** Create new habitats to increase site-wide diversity, compensate for the loss of previous habitats; and provide connectivity to the wider landscape;
- **Aim 3:** To monitor and manage retained and created landscape features and habitats throughout the management period to ensure increasing ecological diversity is maintained in the long-term; and
- **Aim 4:** Provide landscape structure through appropriate hard and soft landscape interventions. These will provide (i) a strong sense of place, (ii) visual containment for the individual commercial sites and (iii) visual screening over the medium to long term to mitigate visual impacts identified in the Landscape and Visual Impact Assessment and associated Landscape Mitigation Strategy (both Urban Wilderness, 2020).

4.LANDSCAPE CHARACTER AREAS

4.1 The landscape proposals include large areas of new native woodland, scrub and meadow. These will be supplemented with mature tree planting and lengths of native formal and informal hedging. There are also areas of retained landscape within the Reserved Matters Application boundary which will be managed to improve their ecological condition, by enhancing structural and species diversity. These Landscape Typologies are shown on the plan below with related detailed drawings 334-UW-P-007 & 018-022.

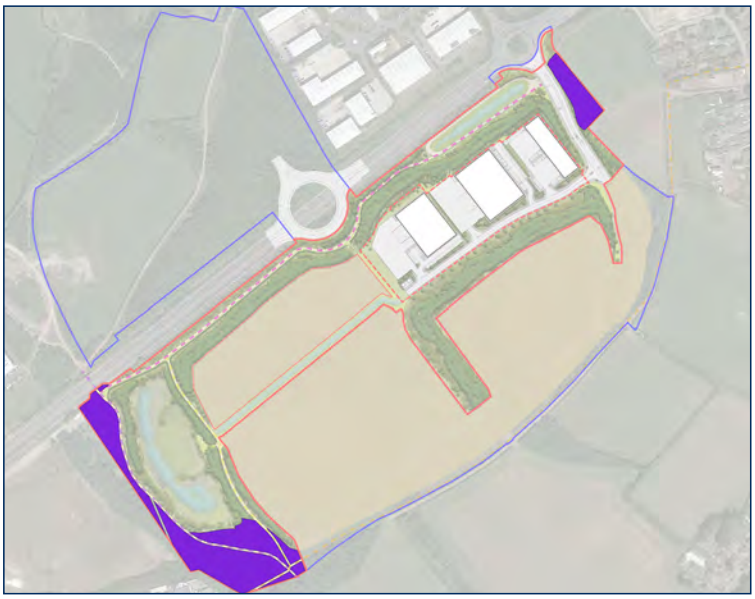
4.2 This section of the document outlines the hard and soft landscape features that are intended to occur across the site. Design and management objectives then describe how these landscape features will be managed and maintained to achieve the desired landscape quality/character and ecological value.



Landscape Typologies

- Retained Landscapes
- Woodland
- Scrub
- Mature Trees
- Hedgerow
- Wetland / Meadow
- Wetland / Reed Bed
- Mown Strips
- Pathways

RETAINED LANDSCAPES

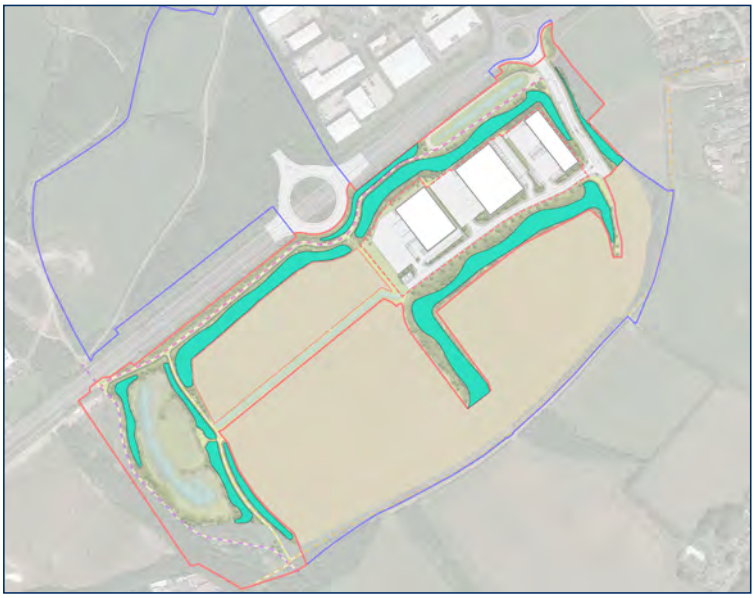


Areas of woodland and grassland have been retained outside of the approved earthworks. These retained landscapes already provide valuable habitat something which should be maintained by:

- Maintaining and enhancing existing hedgerows; and
- Protecting valuable ecological receptors, specifically wetland ditch and pond habitats on the western boundary, including adjoining grassland and woodland areas;
- Restoring retained grassland area promoting a functional grassland community.

Woodland belts within these areas will assist in screening the proposals at year-0, interrupting existing views toward the site from a number of viewpoints and create a valuable source of immediate landscape structure.

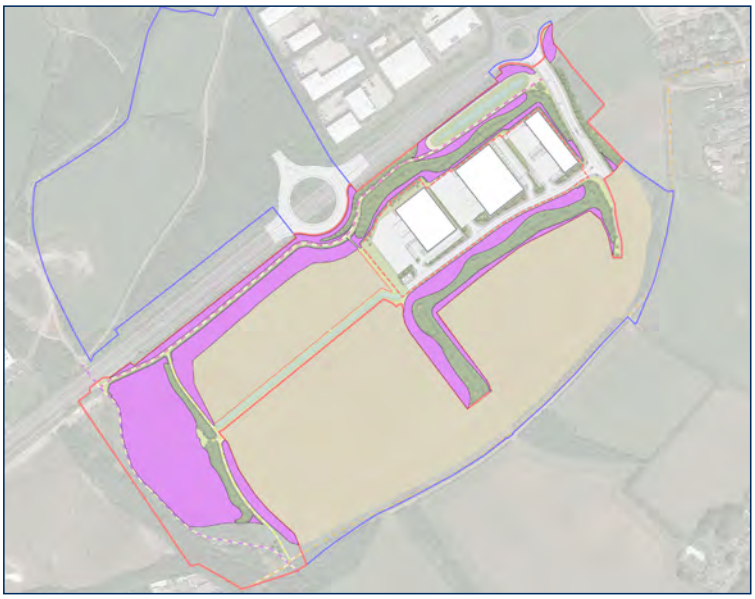
NATIVE WOODLAND



Planted as whips and transplants within a 1m matrix the proposed native woodland mix includes tree species Acer campestre (Field Maple), Alnus glutinosa (Common Alder) and Betula pubescens (Downy Birch). The objectives of the woodland planting are detailed below:

- Located towards the top of the newly created slopes on site to reduce the visual massing of proposed built development and create an attractive landscape setting;
- Screen the development through the creation of a dense body of woodland;
- Include scalloped edges and glades to increase woodland edge habitat. Open space to be targeted to between 10 and 20% of each distinct area;
- Plant more than 3 different native tree and shrub species in an average 10m radius; and
- Planting to be set out in lazy-S rows to avoid standard linear rows.

SCRUB



Well-managed scrub and its margins will support a range of wildlife. Diverse scrub is the most valuable to wildlife and includes scrub of varied age, species and structure. It is important to maintain all growth stages, from bare ground through young and old growth to decaying wood.

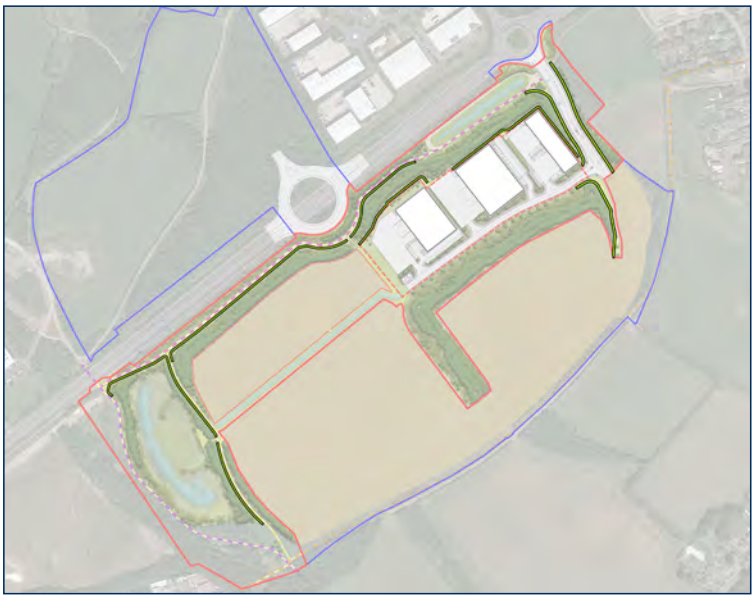
- Establish a naturalistic woodland edge habitat;
- Establish a diverse mosaic of native scrub which forms the transition between woodland and the ground layer vegetation; and
- Provide structural diversity through the inclusion of glades and rides, and a varied age structure.

MATURE TREES

The use of mature tree stock will provide instant impact in key areas of the soft landscape proposals. Mature trees will help provide valuable habitat and connectivity for a range of bat and bird species from an early stage, prior to other habitats establishing.

- Used along the proposed road access to create an instant sense of establishment with avenue style planting layout;
- Groupings of mature trees will also be planted to define linear views and direction of movement along proposed footpaths; and
- Mature trees will be strategically located and managed to promote ecological connectivity.

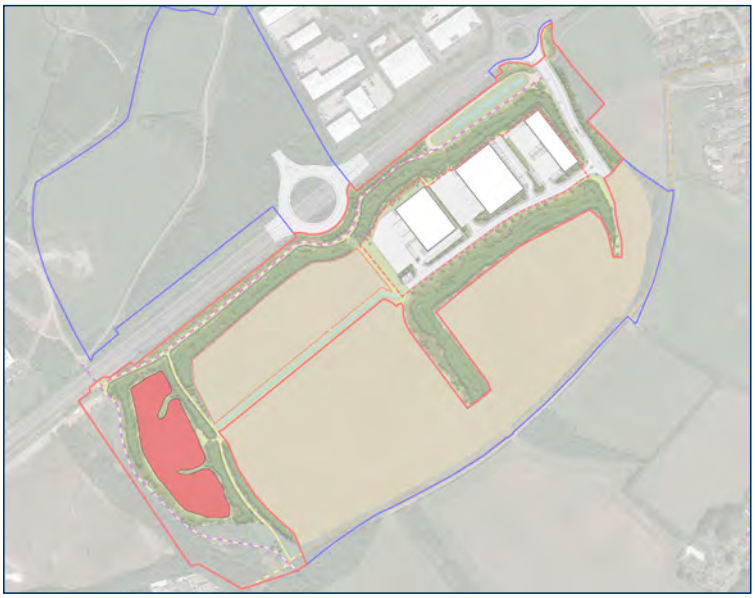
HEDGEROW



New hedgerow both formal and informal will provide key structural features and are proposed to assist in defining space, enclosing landscape typologies and the creation of wildlife corridors. The use of native species is prioritised on site. Hedgerow planting should include pollinator friendly species, increase habitat connectivity and improve long term site-wide biodiversity; and

- New native hedgerow planting will be provided in conjunction with associated ditches, providing valuable seasonally wet habitats for local amphibian species.
- Within the formal hedgerow Escallonia 'Apple Blossom' has been chosen for its evergreen colour and its summer flower which attracts pollinator species.

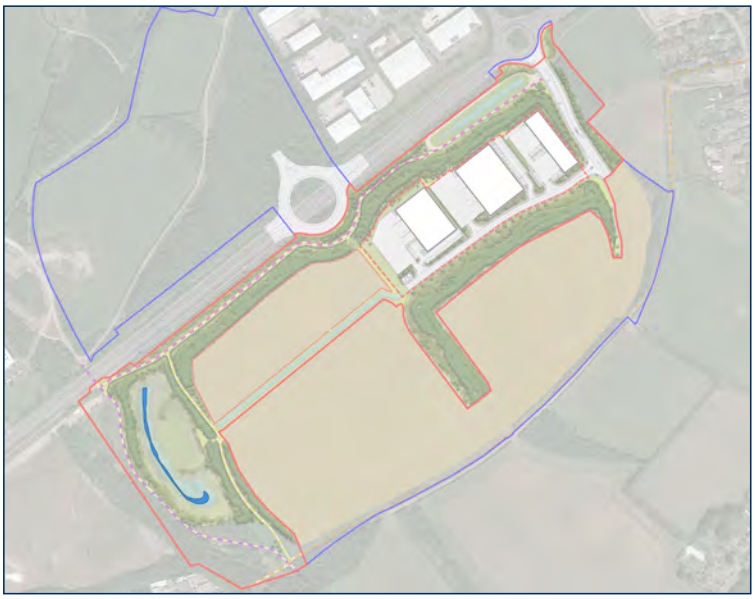
WETLAND / MEADOW



The attenuation basin area will experience changes in water level due to its role in the sustainable drainage systems on site. This will result in the basin filling during peak events and being dry during periods of drought. The meadow mixture needs to be varied to ensure that as some species decline others thrive. Wildflower and grassland mixes should be guaranteed sourced from within the UK.

- Create a very diverse sward where conditions vary across the area; and
- Marginal areas to provide further species diversity.

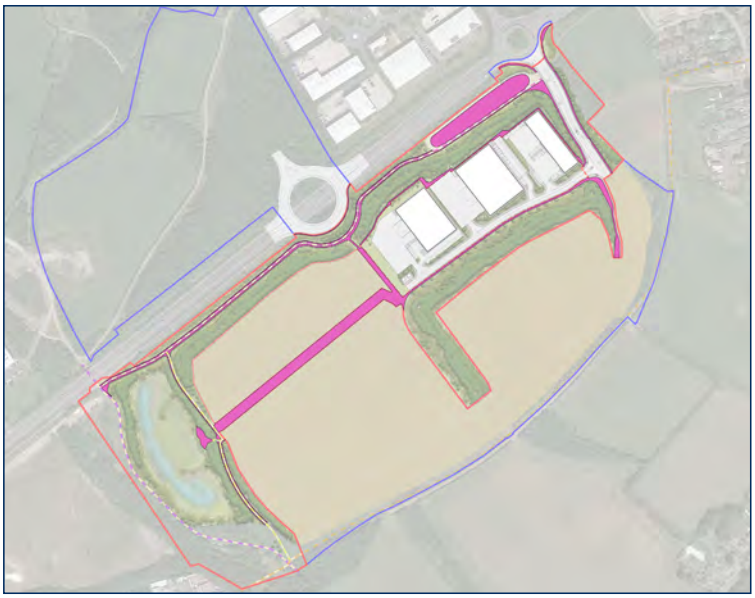
WETLAND / REEDBED



Within the attenuation basin there is an area of permanent water which will be planted with reed bed and areas of open water.

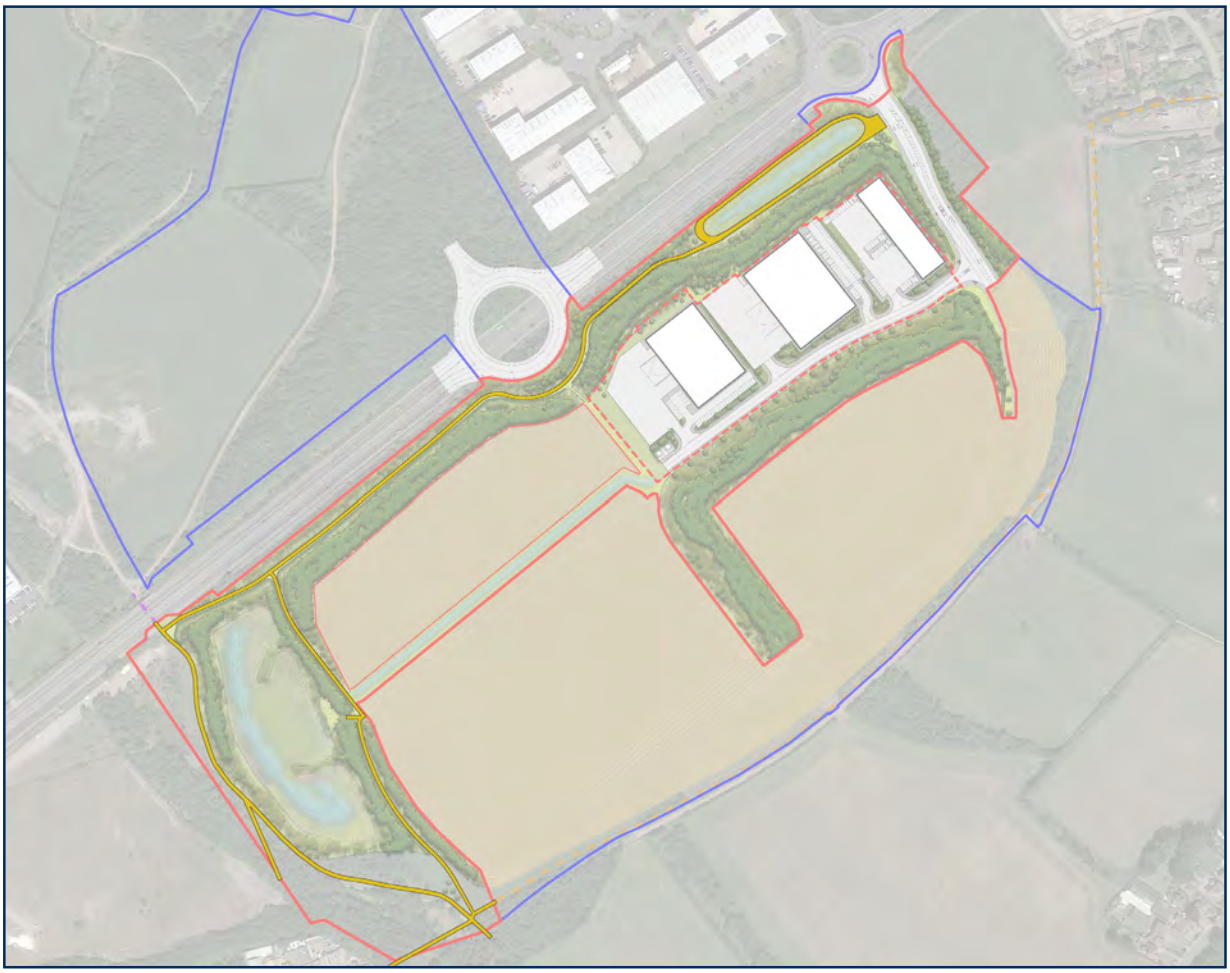
- Establish areas of reedbed across shallow areas (<1m depth) of the basin; and
- Ensure deeper areas remain free of reeds to provide open water habitat.

MOWN STRIPS



Mown strips flank pedestrian routes to increase openness and prevent overspill form he neighbouring scrub and woodland areas in between maintenance visits.

- Maintain a mown grass strip along perimeter edges of paths and roadways to create a 'tidy' appearance; and
- Mown strips throughout and against scrub areas, and away from main site access and built form can be left to grow longer to increase biodiversity.



Pathways

Cross site pedestrian/cyclist commuting is to be facilitated by several pathways which connect the existing local footpath network to key locations within the site. These routes will be surfaced with FlexiPave and locally sourced self-binding gravel/ aggregate. The objectives set out for the pathways are as follows:

- Establish a safe navigable path network with high visual permeability using with mown strips to increase the width of routes; and
- The setting out of Landscape typologies are designed to create a varied user experience, passing through the gradation of the varied habitat types, providing a balance of openness, transition, and enclosure.

Furniture

Waste Bins, Benches and Signage (see Landscape Features Plan – 334-UW-P-008)

- Site wide furniture should provide adequate navigation, relaxation and hygiene whilst being sympathetic to the site's rural context.
- Clearly define pathways through the use of clear signage.
- Simple timber palette of furniture across the site

5.MANAGEMENT PRESCRIPTIONS

5.1 The management prescriptions that follow set out practically the operations and regimes required to achieve the site wide aims and the objectives set out above.

5.2 The following sections should be read in conjunction with the Planting Proposals (334-UW-P-007).

General Maintenance Prescriptions

5.3 The appointed contractor will visit the site a minimum of once a month throughout the year, and additionally as necessary, to undertake the operations required to fulfill the prescriptions listed below and the management objectives of the site.

5.4 Management and maintenance operations will be carried out by competent landscape contractors, to the highest possible standards and in accordance with industry best practice, all relevant codes of practice and British Standards. All tools and machinery employed will be fit for purpose, suitable for site conditions and only used in accordance with the manufacturer's recommendations. All operations are to fully comply with relevant Health & Safety regulations.

Cleanliness

5.5 At the end of each visit, the contractor shall remove from site all litter/rubbish, arisings, trimmings, and superfluous materials, leaving the works in a clean and tidy condition. Particular attention shall be paid to ensuring all areas of hard surfacing, drains and gullies are left in a clean condition, free from any soil, mud, leaves, cuttings, and plant pruning. In the event of reported and substantial litter accumulation (e.g., fly tipping) the contractor shall remove material from site within two days.

Weed and Pest Control

5.6 All areas shall be kept free from weeds, pests and diseases. Planting is to be inspected on a monthly basis and any remedial action taken immediately. Weeding & the removal of self set seedlings (within the meadow areas) may be carried out by hand, with chemical, or through a combination of both methods in a manner consistent with the requirements of this management plan. Chemical treatments are to be applied in accordance with manufacturer's instructions and relevant safety regulations. Application of chemicals must be restricted to affected areas and spray drift or spillage must be prevented. Weeds and other debris will be removed from site at the end of each visit.

Mulch

5.7 Mulch is to be applied to the base of mature tree planting and should be inspected on a monthly basis and restored to the original depth (50mm) where levels have diminished. Medium grade bark mulch should be maintained to original levels (50mm) in perpetuity.

Watering

5.8 Planting (particularly Mature Trees) should be monitored for signs of drought stress every two weeks during dry periods for the first five years of planting. Specimen trees showing signs of drought stress are to be watered to field capacity until signs of drought stress are no longer visible.

5.9 Replacement Planting: An audit of all planting should be made in August/September of each year in the first five years. Where plants fail, they should be replaced in accordance with the original specification. Planting should be replaced in suitable weather conditions during the next winter planting season.

Fertiliser

5.10 Any approved and appropriate fertiliser to be applied to the planted areas listed below in Years 1, 2 and 3 in early spring to ensure rapid establishment.

- Native Woodland
- Formal and informal hedgerow
- Specimen tree planting

5.11 The meadow and wetland areas should be avoided.

Replacement Planting/Hard Landscape Defects

5.12 An audit of all planting should be made in August/September of each year in the first five years. Where plants fail, they should be replaced in accordance with the original specification on the drawings. Planting should be replaced in suitable weather conditions during the next winter planting season and maintained in accordance with this report.

5.13 Damaged furniture and surfaces to be made good within one month, with areas made safe in the meantime.

LANDSCAPE FEATURES TO BE RETAINED, PROTECTED AND ENHANCED

Aim 1: Maintain and enhance the existing landscape and ecological features within the development;

5.14 Existing landscape features have been retained where possible within the development and will be protected through the construction and operational phases.

Existing Trees/Woodland

5.15 The ongoing management of the retained woodland areas may result in the requirement to fell dead, damaged or diseased limbs. Arisings, where possible should be used to provide opportunities for invertebrates and bryophytes by forming micro-habitats from piles of dead wood or recumbent dead logs. Where possible, and where health and safety constraints permit, standing dead wood will be left in-situ to provide additional dead wood habitats to maximise saproxylic invertebrate biodiversity. Any fallen deadwood above 10cm girth should be left in situ where reasonably safe to do so.

5.16 Root Protection Areas (RPA's) established by a qualified arboriculturist will be incorporated with the use of Heras fencing or similar to ensure no accidental encroachment during the construction period. Refer to Arboricultural Impact Assessment (ref: 7890.001 Version 2, February 2020) for details.

5.17 Management prescriptions (throughout the initial 15-year period) include:

- Checks on safety and condition of trees annually, or as required (e.g., after high winds) to ensure continued health of trees and safety of site;
- Prune any diseased or rotten wood (including the removal of main stems and limbs) back to sound wood;
- Any ash trees within the site will be monitored for ash dieback, and where this occurs will be reported to the forestry commission, specimens would need to be cut down and burnt onsite, to avoid spreading;
- Any tree management and/or removal will require the assessment for bat roosting potential by a licenced bat ecologist;
- Where publicly accessible remove from tree all stems and limbs which are unsafe or are in danger of falling or breaking during gales. Use removed material (if suitable) to create wood piles and hibernaculum;
- Any necessary tree surgery should (ideally) be undertaken within the dormant season (November-February)
- Undertake works as recommended by Arboriculturist to ensure continued health and safety of trees.

Existing Hedgerows

5.18 The proposed design looks to retain existing hedgerow where possible. The hedgerows to be retained, will be protected from damage and from soil compaction during the construction period via the use of fenced RPA's of at least 4m width, which is in accordance with guidance in British Standard 5837 (2012) – Trees in Relation to Construction.

5.19 The retained hedgerows will be subjected to three-year rotational management to encourage the establishment of tall, bushy hedgerows. Management processes throughout the 15-year period are as follows:

- Top out hedgerow to a height of between 3m and 4m (where possible) to increase habitat suitability;
- Maintain a width of at least 3m;
- Prune any diseased or rotten wood (including the removal of main stems and limbs) back to sound wood;
- Remove all stems and limbs which are unsafe or are in danger of falling or breaking during gales;
- Prune annually between October to March, ideally in January and February to ensure that fruiting bodies can be used by birds;
- Cutting will be on a three-year rotational basis ideally with only one side cut;
- Trees located within the hedgerows will be allowed to mature into standard trees to provide nesting and foraging opportunities for local wildlife and a varied habitat structure; and
- A minimum of 1m adjacent the hedgerows will be managed as 'undisturbed' ground where possible within the site boundary

5.20 Gaps within any retained hedgerows will be filled where possible via supplementary planting using a mix of native species to increase the diversity of hedgerows and to provide increased foraging opportunities for local wildlife.

5.21 The recommended period for planting of woody species is between October and March however, it is recommended that hedgerow species are planted in October and November before the onset of colder weather to avoid periods of inundation or prolonged ground frost. During the first five years of establishment selective 'spot' spraying or strimming of weeds is required to reduce competition.

5.22 New infill planting will be inspected 12 months after planting. Any failed planting will be identified and replaced, with inspections taking place annually for the first 5 years from initial planting. Up to 5% failure rate will be allowed, but if more than 5% failure of supplementary planting occurs, replacement planting of the same species will be provided with an aim of attaining an 85% success rate after 5 years.

5.23 Native tree species will be included within the hedgerow mix and allowed to mature into standard trees to increase canopy cover and diversity.

Grassland

5.24 Retained areas of neutral grassland will be enhanced through the promotion of a healthy grassland community.

5.25 Initial works will remove scrub/tree encroachment using hand tools.

5.26 Areas of bare/damaged ground to be re-seeded with a wildflower mix. Newly sown areas are to be kept short in the first year following sowing (reduce to c.50-70mm every two months) to allow slow growing species to establish.

5.27 All arisings from cutting/clearance works will be removed.

5.28 After year 1, suspend cutting from mid-spring until after flowering in late summer and once established cutting to be reduced to a maximum of 2 or 3 cuts per year.

5.29 Established areas are to be mown/strimmed after flowering in late July or August to around 50-70mm, removing arisings after they have dried (around 48 hours) to reduce soil nutrients.

5.30 A further cut to take down re-growth can be carried out in late autumn/winter and again in spring if needed (to around 50-70mm).

5.31 Where monitoring shows cover of wildflowers remains below 30% by year 8:

i. Year 8, immediately areas after August cut, selectively scarifying pockets of these grassland areas with a power harrow

ii. Broadcast bespoke wildflower seed mix, the composition of which based on target species.

iii. Manage these areas as per initial seeding or bare ground.

PROPOSED LANDSCAPE FEATURES

Aim 2: Create new habitats to increase site-wide diversity, compensate for the loss of previous habitats; and provide connectivity to the wider landscape.

5.32 The following are general management operations that apply to all soft landscape features within the site:

- All clippings and grass cuttings are to be either composted on site at a designated location or removed to a composting area off site; and
- All specimen trees are to be watered as required during the summer months of years 1-5, particularly during periods of drought.

Woodland

5.33 The first few years after planting are critical and successful management and maintenance during this period will result in an established woodland that requires minimal ongoing work. The main management aims within the establishment period for the woodland areas are:

- Controlling weeds
- Protecting against wildlife damage
- Replacing losses

Controlling Weeds

5.34 Until they are tall enough to shade out other vegetation competing with other plants for light, water and nutrients is the main challenge for newly planted trees. It is vital that the woodland areas are weeded to achieve successful establishment. Weed-free prepared ground gives trees a good start, but measures need to be in place to keep weeds at bay.

Spot Spraying

5.35 Use of a knapsack sprayer to treat a circle, roughly 1m diameter, around each tree. Extra care needs to be taken when applying systemic herbicides to avoid contact with the tree. One application should be applied in the spring and, depending on the vigour of the weeds, another in mid-late summer.

5.36 Plastic shelters provide some protection but if weeds establish inside the tube, they can quickly smother the tree. A selective liquid or granule herbicide should be applied inside the tube.

5.37 The list of herbicides approved for use in forestry is constantly changing so always seek up-to-date professional advice. Herbicide use must follow label instructions, comply with the Control of Substances Hazardous to Health (COSHH) Regulations 2002 and only by done by people with Certificates of Competence for spraying.

Protecting Against Damage by Grazing Animals

5.38 To protect against animal browsing, the site is to adopt two separate approaches. One, used predominantly in large areas of matrix tree planting, will employ rabbit-proof fencing to protect and two, will use individual spiral guards principally around the SUDS basin and recreational amenity area.

SUDS Attenuation Pond Tree Protection:

5.39 Each plant will require a biodegradable spiral fixed to a wooden steak as per drawing 334-UW-P-013. The housing has the added benefit of creating a greenhouse effect that encourages rapid growth. The use of a biodegradable spiral removes the requirement for the removal and off-site disposal of plastic tubes. Spirals also expand as the trees grow removing the risk presented with a fixed diameter tube.

5.40 Check spirals regularly for damage by weather or vandalism. If the spiral comes loose, or the stake is broken, the plant can lean, resulting in a tree with poor stem form. Ensure all spirals are correctly positioned to prevent plant failure.

Fencing for all other areas:

5.41 Fencing the woodland areas is a very effective method of protecting young woodlands from wildlife damage, as long as they are well maintained. The fence line should be inspected regularly for damage. Gates can be particularly vulnerable and require a self- closing mechanism to maintain the closed perimeter. It is especially worth checking potential weak points following bad weather.

5.42 If there is evidence of wildlife (specifically, rabbit and deer) inside the fenced area, damaged lengths of fencing and/or gates will need to be removed and the fence repaired. Check twice yearly.

5.43 Fencing needs to be maintained for the first five years or until the planting stock has established sufficiently to allow bark around tree stems to harden. Once risk of damage to plants has been mitigated, fencing can be removed and recycled off-site. This will also facilitate future tree thinning and removal by creating unimpeded access in and around the tree planting areas.

Replacing Losses

5.44 Losses of 5-10% are normal for new woodland planting but they must be replaced. Planting contractors should walk along each row and plant a new tree next to every dead one.

Species Selection

5.45 Species selection will be in accordance with the Planting Proposals shown on drawing 334-UW-P-007.

5.46 All planting will be undertaken in accordance with British Standard 8545.

Planting Site Preparation

5.47 Prior to planting, an inspection of each planting site would be undertaken and the ground would be prepared. Grass and persistent ruderal herbs such as bramble would be strimmed or mown. For specimen trees, planting pits would be prepared in accordance with BS 8545 and vegetation would be sprayed with a glyphosate based herbicide within a 1m radius of the planting pit. For hedgerow, planting trenches would be turned over. Organic matter or other ameliorants may be incorporated as required.

Woodland Planting

5.48 Woodland planting is proposed to create new and connected habitats and landscape screening. The establishment of tree height, understorey and structural diversity will be prioritised.

5.49 Woodland planting will include 75% high canopy species and 25% small tree and understorey species.

5.50 Planting to discourage pedestrian access in areas of sensitivity and adjacent to footpaths will include spiky species such as hawthorn, blackthorn, buckthorn and holly.

5.51 All planting will be implemented between November and March while plants are dormant.

5.52 The distribution of species within planting areas will be diffuse with no block planting. Clusters of individuals will be planted to ensure establishment of all species present. Canopy species will be planted in clusters of up to 3 individuals; understorey species will be planted in clusters of up to 5 individuals.

5.53 New woodland planting will be inspected three times per year. Any failures within the first 5 years will be replaced. Damage to planting tubes, ties and stakes will be rectified as required.

5.54 Strimming to reduce weed competition, checking of guards, watering, and formative pruning will be undertaken as required.

5.55 Woodland thinning would be undertaken once in the first 10 years, removing some 25% of trees whilst maintaining species diversity. Thereafter, thinning will be undertaken as required at intervals of between 5 and 10 years removing decreasing proportions of trees to promote a balanced age and species structure.

5.56 Planting tubes, ties and stakes will be removed as required.

Accelerated Woodland Development

5.57 In order to accelerate the establishment of structural diversity in woodland, additional planting will be undertaken following the second thinning. This will include additional understorey species to augment the density of understorey and to add a secondary layer to it.

5.58 Understorey planting will comprise whips or pot grown plants in single-species clusters of 10 to 20 individuals at a rate of 5 clusters per hectare.

5.59 No two clusters in a planting compartment will comprise the same species.

5.60 The locations for understorey clusters and the specification of temporary protection and establishment measures such as stakes, tubes, mulch or weed suppressant matting will be determined by and in consideration of the prevailing conditions.

5.61 New understorey planting will be inspected three times per year. Any failures within the first 5 years will be replaced. It will thereafter be managed as part of its parent woodland.

Species Dominance

5.62 Areas in which one species begins to dominates the canopy will be thinned to reduce the dominance of the most abundant species.

5.63 Non-native and non-naturalised species will be targeted for removal from the woodland.

5.64 No more than 30% of trees in any area will be removed during any one thinning operation.

5.65 Surveys of all woodland to monitor the results of thinning operations and identify additional areas requiring thinning works will be undertaken biennially.

Understorey Improvement

5.66 Areas with poor understorey will be restocked either by coppicing, layering or planting. Restocking will be undertaken after all thinning and clearance operations have been completed to avoid damage to new plants.

5.67 Where suitable trees are available, they will be coppiced to convert them to an understorey form that is bushier and increases low level foliage. This practice will be used on maiden trees up to a diameter of 250mm or those with natural or previously coppiced multi-stemmed form. Most broadleaved species coppice well including hazel, wych elm, ash, sweet chestnut, beech and oak. Poplar and cherry do not coppice well. Most coniferous species do not coppice.

5.68 Trees will be coppiced with clean, outward-sloping cuts, as close to ground level as practicable unless dictated by stool form.

5.69 Where the understorey is sparse but individuals are present, layering will be used to accelerate the colonisation of vacant areas or augment the understorey. Suitable side branches will be selected and layered. Once established, propagated specimens may be transplanted within the immediate area or left in-situ to develop.

5.70 Where there are no suitable specimens or conditions for coppicing or layering, areas of poor understorey will be improved by new planting. The species selected will seek to build existing native populations to sustainable levels in the first instance and also to increase diversity.

Aerodynamic Resilience

5.71 New woodland edges will be created by the removal of trees during the Construction Phase. The remaining trees will be subject to increased exposure and therefore increased risk of failure by windthrow or breakage.

5.72 In order to improve aerodynamic resilience and also aesthetically soften new woodland margins, management of the edges will be undertaken. Typically, management activities will occur within the first 10m of the woodland as measured from the newly exposed edge. New woodland planting will not be managed in this way.

5.73 Woodland edge works for aerodynamic resilience also tend to increase light penetration, which can increase biodiversity.

5.74 Works to improve aerodynamic resilience will include thinning, scalloping and height reduction. In some areas, new planting will also contribute to woodland edge improvements but this effect cannot be relied upon in the short term.

5.75 Thinning reduces the density of the exposed edge and increases wind penetration, particularly where wind is perpendicular to the woodland edge. By allowing wind to penetrate the woodland edge, loading is distributed between greater numbers of trees. Thinning also creates a gradient of wind speed at the woodland edge and increases aerodynamic complexity.

5.76 Scalloping is the removal of the outermost trees from intermittent sections along the woodland edge within a 'D' shape (in plan). This turns straight or uniform perimeters into a 'scalloped' shape with increased surface area. This increases the aerodynamic roughness to wind travelling along the woodland edge and creates areas of low pressure and eddies that can reduce peak loading on edge trees. Scallops should principally be used on east-west rides or edges and should be wider than the height of the surrounding trees.

5.77 Height reduction is the most important aspect of aerodynamic resilience. The profile of new woodland edges tends to be abrupt and square because it comprises trees with woodland form that developed in response to conditions within the woodland. These are typically more slender and upright than open grown or edge trees and with fewer low branches.

5.78 An ideal woodland edge is graduated from small scrub to high canopy within a continuum. To replicate this effect, the tallest or most vulnerable trees within the woodland edge corridor would be removed so that shorter trees and understorey become the exposed canopy. Where the form and distribution of trees is not conducive to this practice, height reduction by pruning will be done instead.

5.79 The final scope of works in each area will comprise a combination of thinning, scalloping and height reduction. Since all options include the targeted removal or reduction of trees, it is often possible to achieve all three outcomes by careful selection of trees. The final scope of works at each woodland edge will be determined on site and trees for pruning or removal will be marked up by the Forest Manager. The total number of trees that would be removed within the woodland edge would not typically exceed 10%.

Scrub

5.80 Scrub management for wildlife should create and maintain a range of features; a diversity of shrub species, age and structure is essential. Scrub areas require periodic maintenance to retain its character and value to wildlife and if left unmanaged, scrub will develop into woodland.

5.81 Similarly, to the woodland areas the main aims of the maintenance regime during establishment are weeding out competitors and protection from wildlife browsing.

Spot Spraying

5.82 During the first-year spot spraying should be undertaken around each plant to suppress weed competition (to a one-metre radius). Avoid spraying any self-set wildflowers as they are important for nectar-feeding. Instead, consider using a herbicide that only controls grasses.

5.83 The list of approved herbicides is constantly changing so always seek up-to-date professional advice. Herbicide use must follow label instructions, comply with the Control of Substances Hazardous to Health (COSHH) Regulations 2002 and only by done by people with Certificates of Competence for spraying.

Protection Against Damage by Grazing Animals

5.84 Shrubs are vulnerable to browsing by livestock, deer and rabbits during establishment. Use of tree shelters a biodegradable spirals fixed to a wooden stake will protect plants from wildlife. They have the added benefit of creating a greenhouse effect that encourages rapid growth.

5.85 Check shelters regularly, shelters can be damaged by weather or vandalism. If the shelter comes loose, or the stake is broken, the whole thing can lean, resulting in a tree with poor stem form.

5.86 Fencing the scrub areas is a very effective method of protecting young woodlands from wildlife damage, as long as they are well maintained. Check the fence line for damage as often as you can.

5.87 If there is evidence of wildlife (specifically, rabbit and deer) inside the fenced area, they need to be removed and the fence repaired.

5.88 Cutting most species of scrub encourages re-growth and is useful for maintenance and restoration. Cut areas of scrub in a rotation, aiming to retain all ages. Detailed descriptions of management operations for Year 6-15 are set out below:

- Trimming following establishment period including maintenance of a sinuous edge with a graded margin down to field layer;
- Following establishment (year 5) introduce glades/clearings/rides and apply woodland seed mix to these opened up areas;
- Selective thinning of some stands and creation of open areas within/between stands to allow light to reach ground flora and promote regeneration of young shrubs;
- Selective clearing of scrub edge (roughly 1/3 to 1/5 every 2-3 years) down to ground to reduce dominance of species such as blackthorn and hawthorn and promote regeneration of young shrubs/herb edge. Cut between September and February, to avoid the bird breeding season; and
- Annual mowing of herb/grass margin at scrub edge to maintain herb margin free of scrub growth and encourage flowering herbs.

Specimen Trees

5.89 Specimen trees will be planted within the development for amenity and to provide habitats associated with mature open grown trees. Species selection will be in accordance with the Planting Proposals shown on drawing 334-UW-P-007.

5.90 Specimen trees will generally be planted as standards. A range of sizes will be used, depending on their location and context. For some species, feathered specimens may be appropriate.

5.91 Specimen trees will be bareroot or rootballed. They will fixed in position using underground guying with a woodchip mulch applied to a depth of 50m.

5.92 Trees will be inspected at least three times per year and any failures replaced during the next planting season. Woodchip mulch will be topped up and herbicide spray used as required to prevent weed growth through the mulch. Trees will be watered as necessary during the first 2 years to ensure full establishment. Stakes, tubes and ties will be removed as appropriate.

5.93 Specimen trees will be formatively pruned to develop a clear stem or stems to at least 2.5m.

5.94 The recommended period for planting of woody species is between November and March, but also avoiding periods of inundation or prolonged ground frost.

5.95 Specimen tree planting situated alongside footpaths will be maintained with clear stems to maximise visual permeability. Prune annually in late November (after the leaves have started to drop) to maintain long, clear views through tree planting along pedestrian corridors.

5.96 Detailed descriptions of management operations for Year 1-5 are set out below:

- Specimen trees should be watered as required to ensure that they establish and thrive. During the first 5 years following planting, trees will be watered during periods of extreme drought (2 or more weeks without substantial rainfall). Water in the morning or in the evening to restrict water evaporation;
- Top up mulch levels annually to original levels (50mm);
- Prune back any diseased or rotten wood back to sound wood. A suitably skilled and qualified Arboriculturist shall carry out such pruning. All cut material will be used on the site for hibernaculum;
- Keep trees upright and examine tree stakes and ties for their effectiveness and requirement. If the tree has yet to establish, replace or adjust ties, spacers and tree tubes as appropriate. If the tree has established well, then remove all stakes, ties, spacers, tubes etc. and make good surfaces disturbed, filling any holes with suitable topsoil; and

- Any tree that dies or is necessarily felled as a result of storm damage, vandalism, mechanical damage, fungal decay or other such cause, shall be replaced like for like. Such replacement shall be with a tree of either the same species or similar species as those existing. This is to allow some flexibility and to avoid problems encountered with 'Same Tree Disease.

5.97 Detailed descriptions of management operations for Year 6-15 are set out below:

- After establishment continue to water only if deemed to be required;
- Checks on safety and condition of trees annually, or as required (e.g., after high winds) to ensure continued health of trees and safety of site;
- Safe removal of dangerous or potentially dangerous trees; and
- All checks and reports on trees to be carried out by a qualified Arboriculturist. Undertake works as recommended to ensure continued health and safety of trees.

Special Measures (LONG TERM – post 15 years)

5.98 Targeted areas either side of the new access road should be reinforced with native species planting to create bat "hop-overs". Standard trees adjacent to the road allowed to grow to be above the level of vehicle movement. The lower branches of such trees should be regularly pruned back to the trunk in order to ensure that the most suitable flight line is above the maximum traffic height.

5.99 In the 30th year a small number of targeted trees with a trunk of at least 20cm will be selected for ringbarking. As well as thinning the canopy these will provide valuable standing dead wood. Trees should be spread out throughout the woodland block as to maximise over distribution.

Hedgerows

5.100 New hedgerows will be planted during the planting season (October to March inclusive) and will comprise of native species, planted at a density of five plants per linear metre, with plants arranged in an off-set double staggered row in species groups of five to eleven within the native hedgerow (formal hedgerow - hornbeam and escallonia should be mixed).

5.101 The following are management operations that apply to the proposed native hedgerows (Years 1-5).

5.102 Undertake to ensure the creation and maintenance of healthy, attractive and dense boundary, with seasonal and ecological interest.

- Individual spiral guards and canes will be required to prevent damage to saplings by browsing wildlife;
- Apply herbicide to base of hedge using knapsack sprayer. Extra care needs to be taken when applying systemic herbicides to avoid contact with the plant. One application made in spring and, depending on the vigour of the weeds, another in mid-late summer;
- Trim hedge to a height not greater than 2m during the establishment period to encourage dense growth.
- Prune between October to March, ideally in January and February to ensure that fruiting bodies can be used by local fauna;
- Remove any dead, damaged, or diseased growth;
- Trim hedge in February (outside of bird nesting season and allowing for fruit to remain over winter) to a height not greater than 2m. During the establishment period trim to encourage dense growth; and
- A minimum of 1m adjacent the hedgerows will be managed as 'undisturbed' ground where possible within the site boundary

5.103 Detailed descriptions of management operations for Year 6-15 are set out below:

- Apply herbicide spray to areas only where required to keep base of planting free of weeds;
- Prune in spring and autumn as necessary to remove any dead, damaged or diseased growth;
- Trim hedge in February (outside of bird nesting season and allowing for fruit to remain over winter) to a height of 2m; and
- Maintain a width of at least 3m.

Special Measures

5.104 Hedge planting within 1-3m foul sewage offset to be cut back to 3m from centre line of footpath (approx. alignment of foul sewer) every 7 years.

5.105 New native hedgerow planting on site is to be made in association with new ditches/banks. (This should be a minimum 0.5m ditch depth, with arisings used to form mound to elevate planting). There should be a stand off from the ditch to the hedge base of at least 1.5m-2m. Ditches should have inclined banks avoiding vertical steps.

5.106 Ditches to be cleaned out on rotation, to prevent being filled with plant or woody debris while ensuring there is continuity of habitat.

5.107 Vegetation adjacent to ditches to be trimmed/cut to prevent the ditches becoming overshadowed.

Wetland/Meadow

5.108 Seed is best sown in the autumn or spring but can be sown at other times of the year if there is sufficient warmth and moisture. Seed will need to be sown without risk of inundation of the basin which will wash the seed away. The seed must be surface sown and can be applied by machine or broadcast by hand. Do not incorporate or cover the seed, but firm in with a roll, or by treading, to give good soil/seed contact.

First Year Management

5.109 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 or mowing.

5.110 Mow newly sown meadows regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wildflowers.

5.111 Dig out any residual perennial weeds such as docks.

Management once Established

5.112 In the second and subsequent years sowings can be managed in a number of ways which, in association with soil fertility, which will determine the character of the grassland. The best results are usually obtained by traditional meadow management based around a main summer hay cut in combination with autumn and possibly spring mowing or grazing.

5.113 Meadow grassland is not cut from spring through to late July/August to give the sown species an opportunity to flower. After flowering in July or August cut back with a petrol strimmer or tractor mower to c. 50mm. Leave the arisings to dry and shed seed for 1-7 days then remove from site.

5.114 Mow the re-growth through to late autumn/winter to c. 50mm and again in spring if needed.

Wetland/Reedbed

5.115 Reedbed management is often aimed at increasing structure and diversity and preventing the invasion of scrub and eventual natural succession to carr/wet woodland. Once established a reedbed needs management each year to maintain a mosaic of vegetation at different stages of growth.

5.116 Management and maintenance during the establishment period for reedbeds varies depending on the method used to plant the reedbed. The techniques all have advantages and disadvantages. Each site needs to be assessed and the techniques chosen on a site-by-site basis, with water level and degree of control (as well as the time of year) often determining the technique used.

5.117 The techniques include:

- Sowing seed
- Planting seedlings
- Planting cuttings
- Spreading rhizomes
- Turf transplants

5.118 Detailed descriptions of management operations for Year 1-5 are set out below:

- Reed bed vegetation will require minimal management during establishment. Excessive growth of unwanted plants can be removed by hand to allow establishment of sown/planted species;
- Reed-beds should be monitored annually for their establishment;
- Base levels may need to be re-dug if the reed beds are permanently dry and re-seeding may be required if establishment does not occur within two years (10% of bed only); and
- Following successful establishment (expected approximately 2 year) growth should be checked annually.

5.119 Detailed descriptions of management operations for Year 6-15 are set out below:

- Significant areas of open water should be maintained. Winter cutting and removing different areas of reeds on a 4–7-year rotation to prevent the build-up of the nutrients and dead plant material.
- Removing reeds to prevent decomposition, litter build-up and nutrient enrichment and to keep some reed young and healthy.

- Scrub control – coppicing or root removal of scrub; and
- If clearing reeds, be aware that storing cut reeds on site can cause localised nutrient enrichment and decreased plant diversity/water quality. Where possible, reeds should be burned/ composted off-site or, if suitable, cut and used for thatching.

Mown Strips

5.120 The following are management operations that apply to the amenity grassland areas. Undertake as required to achieve a good sward of even colour and a maximum height of 70mm.

5.121 Detailed descriptions of management operations for Year 1 post seeding are set out below:

- Once seedling grasses are established, (typically in good growing conditions about three to four weeks after sowing), lightly roll or tread to firm and level the soil around the grass roots ready for the first cut. (Do not roll if the ground is wet and saturated with water);
- When the grass has picked up (typically after a few days), the lawn will be ready for its first cut. Cut with the mower set on a high setting (+50mm), aiming to trim the sown grass back by about one-third of its height;
- Thereafter, mow the new lawn regularly as needed, progressively reducing the mowing height over its first spring/summer to the desired height; and
- A new sown lawn will take a full year or more to reach full strength, complete ground cover and knit together as a turf. It can be walked on during this establishment phase but avoid heavy use that might cause excessive wear and tear.

5.122 Detailed descriptions of management operations for Year 2 onwards are set out below:

- Remove litter and debris at every visit before each cut;
- Cut back to 50mm and remove arisings. Maintain to between 50-70mm;
- Where bulbs are located in grass, only cut the affected grass once the bulbs have flowered, and the foliage and flowers have withered and turned brown;
- Repair eroded areas as required. Rotovate to 150mm, 100mm topsoil and reseed between May-September;
- Lightly scarify in March annually as required;
- Grass areas may be treated to control invasive or unsightly weed growth in spring and late summer;
- Water as required during dry spells to ensure establishment; and
- Fertilise in spring (up until Year3).

Proposed Hard Landscape Features

5.123 General litter picking to be undertaken at each site visit, to ensure the site is maintained with a tidy appearance.

Fencing and Gates

5.124 Ensure all fencing and gates are secure, undamaged and in a good state of repair. Should any part of a fence or gate be deemed below standard obtain guidance and/ or repair or replace as required. Carry out a twice annual inspection in spring and autumn. Record inspections/any actions arising from inspections.

Pathways and Hard Surfacing:

5.125 General: ensure all pathways and hard surfaces are free from weeds, trip hazards, debris, litter, chewing gum, snow and ice or other obstructions throughout the year. Carry out inspections at each site visit and as required by the weather/likely conditions on site.

5.126 Make good damaged surfaces to maintain safe and accessible routes that are fit for use throughout the year as required.

5.127 Pathways which are bound by a 1m mown grass strip should be mown regularly to maintain a sward height of 40-60mm. All cuttings to be removed.

Structures

5.128 General: maintain all structures, i.e. Footbridge and signage etc. in good condition. Should any part of a structure be deemed below standard, prohibit use, obtain guidance and/ or repair or replace as required.

5.129 Footbridge to be checked at each site visit for structural safety and usability. Repair or replace as required to minimise slip/trip hazards. Make good any damage that has occurred due to weathering or vandalism.

5.130 Ensure bird and bat boxes are structurally sound. Make good any damage that has occurred due to weathering or vandalism. Maintain visual appearance, any graffiti to be removed.

Furniture

5.131 General: maintain all furniture, i.e. benches, waste bins, signage, lighting columns etc. in good condition. Should any part of a structure be deemed below standard prohibit use, obtain guidance and/or repair or replace as required.

5.132 Signage will be provided at appropriate locations throughout the site to guide navigation. Ensure writing on signs is legible. Repair annually and/or as required.

5.133 Ensure signage is visible from key access routes. Any vegetation which is obstructing signage should be cut back to maintain visibility along key sight lines annually and/or as required.

5.134 Waste bins will be provided at appropriate locations throughout the site and waste will be collected at each site visit and removed to avoid harm to wildlife or encouragement of pests.

5.135 Repaint weathered furniture annually and/or as required.

5.136 Spray and weed around footings of furniture and lighting columns. Carry out two visits in spring and late summer and/or as required.

6.ENHANCEMENTS FOR NOTABLE SPECIES

Bats

6.1 Enhancement measures will aim to increase potential roosting opportunities, this will comprise of bat boxes in trees, bat bricks/tubes within buildings and possible roof voids; which will be dependent on the species identified.

6.2 Bat boxes will be checked bi-annually to ensure that they are functional and structurally sound, but also to assess their occupancy rate. These will need to be undertaken by a licenced bat ecologist between May to August. Where they are damaged, they will be replaced on a like for like basis, or if they are not be used a different type or position maybe required.

6.3 The creation of and hedgerow pollinator corridors will maintain bat foraging opportunities within the site, and the successful management will ensure that resources are available in the future.

Birds

6.4 The provision of meadow species, linear woodland features and new native hedgerows will provide breeding and foraging habitat for a range of bird species.

6.5 A mixture of small hole (26mm and 32mm) boxes will be placed throughout the site on suitable trees and buildings. These boxes generally have a high uptake rate.

6.6 Larger terraced style or multiple single holed 32mm nest boxes should be placed on buildings to attract house sparrows, and 42mm single holed nest boxes can be placed on building or trees to provide opportunity for starlings.

6.7 Small open fronted nest boxes again should be placed throughout the site especially on trees which support a climber such as ivy Hedera helix which provides a degree of concealment. These boxes typically attract robin, blackbird and spotted flycatcher. A provision of specialist nesting boxes will be provided dependent on species surveys, but could include stock dove, kestrel, swallow and swifts.

Herpetofauna (Reptiles and Amphibians)

6.8 To ensure that these species are protected and that their Favourable Conservation status is maintained a number of hibernacula features will be created in association with new attenuation features.

6.9 These should be located between the Native Woodland and Scrub planting and the Grassland. North facing micro-climates should be avoided.

6.10 The central core of the hibernaculum can contain a range of materials, including root balls, cut timber, brash, inert hardcore, bricks, rocks, root balls. All hibernacula created should meet a minimum size of at least 3 m long, by 1.5 m wide by 0.75 m high, and ideally much larger.

6.11 Top soil / turf should be removed from the footprint of the hibernaculum so that it can used to cover the completed construction. A pit should be dug to a depth of approximately 50cm and back filled with, larger rubble and root balls initially to provide structure, followed by the remaining materials. The top of the structure should them be profiled and the stripped turf replaced.

6.12 There should be access points around the edges. These are best created by ensuring that timber or rubble protrudes from the edge, creating crevices that allow wildlife to get deep inside.

6.13 The logs will be left in contact with the ground in dappled shade and built into a compact pile to maintain humidity. Stakes should be driven into the ground either side of the log pile to prevent the pile from collapsing.

6.14 Where topography allows, new native hedgerows will include an associated ditch. This is expected to provide seasonally wet habitats of benefit for commuting amphibians. These ditches will be a minimum of 0.5m deep with sloping banks. Management will prevent ditches from becoming filled with debris or overshadowed by scrub encroachment.

Hedgehogs

6.15 Wildlife friendly boundaries will be installed wherever possible throughout the development, this is to allow the free movement of hedgehog and other small mammals. This can be achieved by removing a section of timber or cutting a hole in the bottom of fences. Holes should be approximately 13cm2 and provide linkages to the wider areas. Each hole will have an attached sign, designating the holes purpose. The location of these holes will be identified at the Reserve Matters stage.

6.16 Holes will be instated immediately following the erection of the fence boundaries. Homeowners will be issued with information about management of the site for wildlife including information about hedgehog highways.

7.MONITOR AND MANAGE THE SITE FOR BIODIVERSITY IN THE LONG TERM

Aim 3: To monitor and manage retained and created landscape features and habitats throughout the management period to ensure increasing ecological diversity is maintained in the long term.

7.1 In order to ensure that the landscape features created within the site reach and maintain their maximum recreational, educational and aesthetic value, all landscape features are recommended to be monitored annually by a qualified landscape architect.

7.2 In order to ensure that habitat created within the site reaches and maintains it's maximum value to nature conservation. Habitat should be monitored every year by a qualified ecologist.

7.3 Results of this monitoring should be used to inform changes to the management plan and five year work programme. The prescriptions provided here should be altered if required to reflect any change in needs of the local community or habitats and species of interest. Changes to the procedures that have been set out in this report must ensure the site wide aims set out in this report are achieved.

7.4 The management plan should run for a period of five years, with the work programme fully reviewed at the end of the five year period by a suitably qualified and experienced ecologist, arboriculturist and landscape architect, working collaboratively.

Gateway 36, Rockingham
Phase 2 Site

Landscape and Ecological Management Plan

URBAN WILDERNESS

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