BIODIVERSITY ENHANCEMENT MANAGEMENT PLAN

December 2022

Farington Cricket Ground,

Woodcock Estate,

Farington

URBAN GREEN

QUALITY MANAGEMENT

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CONTENTS

1 Introduction 1

1.1 Background to the Scheme 1

1.2 Site Context 1

1.3 Purpose of this Management Plan 2

1.4 Aims of this Management Plan 2

2 Management Considerations 3

2.1 Management Responsibilities 3

2.2 Controlling Authority 3

2.3 Health and Safety 3

2.4 Monitoring and Review 3

2.5 General Measures 4

3 Ecological Baseline 5

4 Development Proposals 8

5 Ecological Strategy 9

5.1 Habitat Creation 9

5.2 Five Year Work Programme 0

5.3 Species Specific Enhancements 2

6 References 5

1 Introduction

1.1 Background to the Scheme

Lancashire County Council are proposing to develop land at Woodcock Estate in Farington (hereafter referred to as 'the site'). The proposals include a cricket Facility comprising 2No. cricket ovals and associated pavilion building and spectator seating, covered cricket nets, access, parking, landscaping and associated works (including temporary event overlay facilities on ticketed match days), realignment of Public Right of Way Ref 9-12-FP 1, 7-4-FP 6 and Public Right of Way Ref 9-12-FP 2, 7-4-FP 5.

Urban Green have been appointed to provide a 30-year Biodiversity Enhancement Management Plan (BEMP) for the site.

The author of the report is Senior Biodiversity Consultant Maisie McKenzie ACIEEM, MSc. Maisie has experience providing ecological consulting services including Biodiversity Net Gain assessments for a range of development schemes across the UK, including residential, commercial, and large infrastructure schemes.

1.2 Site Context

The site is located at National Grid Reference SD 54768 34749 and comprises a total area of approximately 13.7ha (see Figure 1).

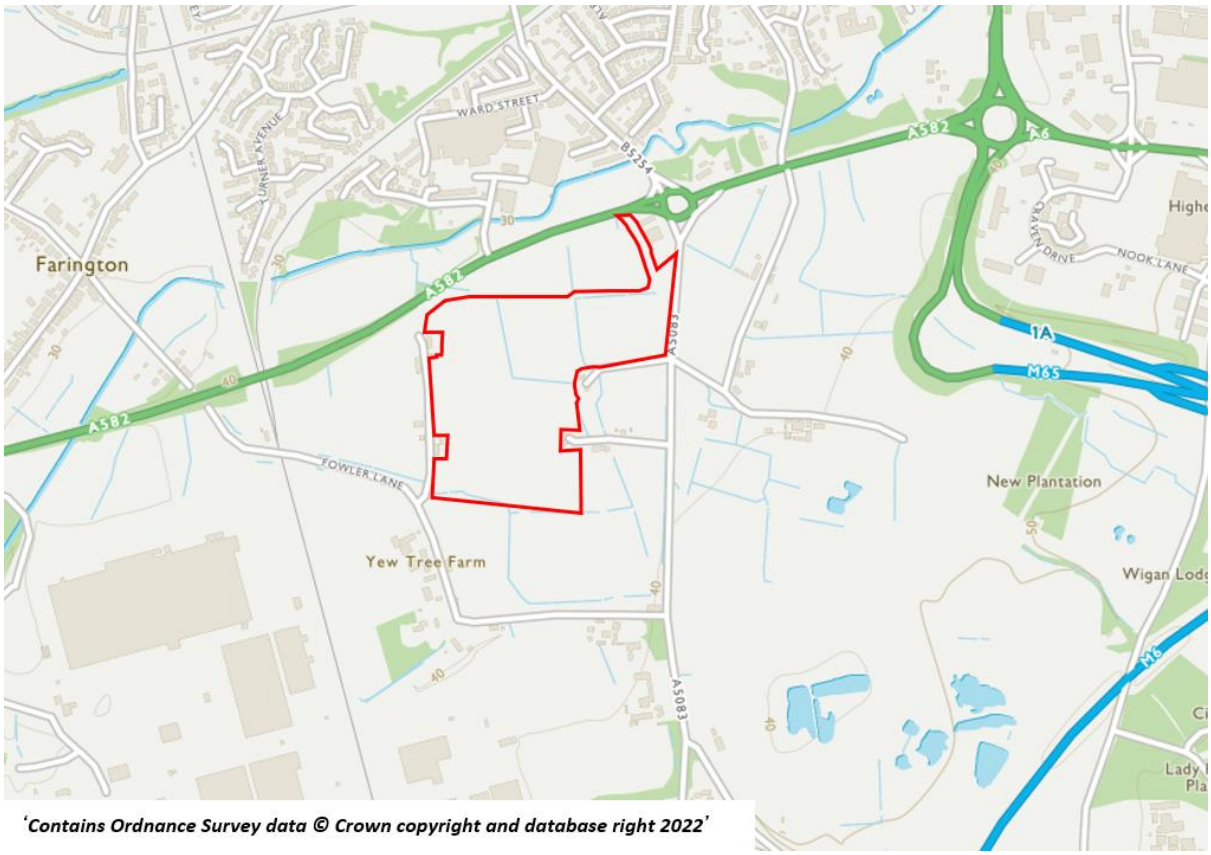

Figure 1 – Site Extent

The site is located in suburban area of Farington, approximately 5km southwest of Preston town centre. Residential estates are located to the south and west with commercial buildings to the east. A series of

broadleaved woodland areas are located to the south and east connecting the wider agricultural landscape to the southeast.

The site consists of seven arable fields bounded by native hedgerows with mature trees. An area of plantation woodland is present to the south of the site and a stream runs adjacent to the southern boundary within the site.

1.3 Purpose of this Management Plan

The purpose of this management plan is to is to provide a schedule for the 30-year management of habitats on site, ensuring that existing and proposed habitats are suitably maintained and to ensure good establishment and continued improvement of habitat condition. This allows those responsible for the management and maintenance of the site to understand the existing habitats, the proposed development and ongoing management requirements of the site. The management plan does not cover the management and maintenance of private residential areas.

1.4 Aims of this Management Plan

This management plan covers the habitat creation and enhancement on site for a period of 30 years, as detailed within the Biodiversity Net Gain (BNG) Assessment (Urban Green, 2022a). This report assessed the development as scoring a gain of 65.40% in area biodiversity units, 33.59% linear biodiversity units and 22.38% in river biodiversity units, utilising the Biodiversity Metric 3.0.

Appropriate management practices are essential to ensuring that the proposed habitats reach the condition outlined within the Biodiversity Net Gain assessment and that the development achieves the predicted gain in value to the environment. The aim of this management plan is to provide a habitat management plan that:

- Maintains and enhances site biodiversity, through the sustainable management of on-site habitats;
- Promotes the successful establishment and growth of newly created habitats;
- Ensures the health and safety of all site user's post development is protected;
- Outlines a process for the regular monitoring and review of management practices and site habitats; and
- Provide measurable and achievable targets appropriate to each habitat to ensure condition targets are met as set out in Section 5 in accordance with Biodiversity Metric 3.0 habitat condition sheets.

2 Management Considerations

2.1 Management Responsibilities

The implementation of this management plan will be the responsibility of the landowner. Any transference of responsibility of this plan should be undertaken with the appropriate appointment of a competent organisation capable of delivering the management detailed within the document.

The organisation implementing this plan will be a management company with the necessary certificates of competence to implement landscape management operation on site. The managing organisation will ensure that all site management complies with good practice standards and all relevant health and safety procedures. The managing organisation will also ensure that measures outlined to avoid pollution incidents, comply with protected species and habitats legislation, and ensure overall environmental protection are enforced.

A maintenance specification is provided in Section 5. This sets out the detailed maintenance requirements for the habitats onsite, which must be followed at all times. Any deviations from the management plan must be highlighted to the site owners or management company.

2.2 Controlling Authority

The controlling authority, Lancashire County Council should be consulted on any matters relating to the approved landscape proposals for the scheme.

2.3 Health and Safety

The site will be managed to comply with all relevant health and safety legislation, approved codes of practice (ACOP) and Health and Safety Executive (HSE) guidance.

As the managing organisation will be the main company involved in on site works, the managing organisation will fulfil the landowner's role and the work manager's role. This places an obligation on the managing company to ensure that any contractor understands and fulfils their health and safety role and any work undertaken on the site will follow the guidelines of the HSE.

2.4 Monitoring and Review

Management will be carried out for 30 years, divided into 5-year cycles. Regular monitoring of the development against measurable targets (as detailed within Section 5.) will be undertaken across all habitats detailed within this management plan. The outcome of this monitoring will form part of a Monitoring and Audit Report to be submitted to the site owner annually to inform the forthcoming year's work. The report will include management operations undertaken, any unexpected changes or declines in habitat condition and any actions required that fall outside those detailed within the BEMP or LEMP.

A more in-depth habitat assessment of the created habitats on site should also be undertaken between April and September every 5 years by an experienced ecologist. Results should be reported back and feed into a review of the five-year management plan, to enable assessment of the management prescriptions against the defined objectives for each habitat. Where objectives are not being adequately met, appropriate action will be put in place, with any refinements incorporated into the updated management plan and annual work programme. This review will enable maintenance operations to evolve in accordance with habitat requirements as they establish, and mature and targeted conditions are met.

2.5 General Measures

Habitat creation on site will follow details set out in the Soft Landscape designs (Urban Green, 2022b). The following general measures shall be met to ensure successful habitat creation and succession on site.

- All planting is to follow guidance set out in the relevant British Standard or Horticultural Trades Association documents and carried out by a competent person.
- Planting is to remain undamaged, with healthy and vigorous growth, and is to be planted upright and well balanced. Trees and shrubs are to be of good shape and without elongated shoots, grown in a suitable environment and hardened off before being delivered to the site.
- All planting is to be true to name and free from pests, diseases, discoloration, weeds, fungus and physiological disorders upon planting.
- If plants/trees are unobtainable alternatives are to be agreed with the Ecologist/Landscape Architect in writing prior to ordering.
- After planting ensure that the full depth of topsoil is wetted. Apply water evenly and without damaging or displacing plants or soil. Continue to water as necessary to ensure the successful establishment and continued thriving of planting.
- Notices will be provided at strategic locations, such as beside footpath entrances and POS areas to encourage self-removal of general litter and dog waste. A general litter pick should be undertaken as appropriate to avoid harm to wildlife or encouragement of pests.
- All tree/shrub/hedgerow works shall be completed outside of nesting bird season (i.e. between October and February inclusive). If works are required within the nesting bird season, a check must be undertaken of all affected trees by a suitable qualified ecologist.
- All tree works shall be carried out by a skilled, qualified and approved Arboricultural Contractor in accordance with BS3998: 2010 'Tree Work – Recommendations'.

3 Ecological Baseline

The ecological baseline for the site was assessed within the Ecological Assessment (EA) (BDP, 2022) informed by an extended phase one habitat survey. A summary of notable/protected species and habitats identified on site is provided below though full descriptions are available within the EA.

Table 1 – Protected/Notable Fauna Species

Species / Species Group	Field Evidence	Considered within Assessment	Rationale for Consideration
Fauna			
Badger (*Meles meles*)	None	Yes	No records of badger were returned within the data search. No evidence of badger was recorded during the field survey however they may utilise the site for foraging.
Aquatic Mammals	None	No	A survey for the presence/absence of water vole and otter and their field signs was carried along the entire ditch located along the southern boundary of the site and 10m beyond the site boundary. The ditch lacked the basic aquatic plant habitat and water depth suitable for water voles and otters and no field signs of either species were identified during the survey.
Bats (all species)	None	Yes	The hedgerows, scattered trees and ditches within the Site provide foraging habitat for bat species found in the local area, in particular the common pipistrelle species. Multiple trees were assessed as having bat roosting potential however no emergences or re-entries were recorded during nocturnal bat surveys. Four bat species were identified during the transect surveys.
Birds (nesting)	None	Yes	The hedgerows and trees onsite offer suitable nesting and foraging resources for notable bird species.
Reptiles	None	No	The Site comprises predominately grazed improved grassland which provides unsuitable habitat for common reptiles such as grass snakes and slow worms which have been recorded within the wider landscape. The hedgerows through the site and dry pond provide limited cover and foraging habitat for these species.
Great crested newt (*Triturus cristatus*)	None	No	The dry pond does not provide suitable breeding habitat for GCN and the surrounding habitats within the Site which comprises predominantly of improved grassland is unfavourable for this species.

Common Amphibians	None	Yes	The onsite grassland may provide suitable overwintering and foraging habitat for common amphibians.
Invertebrates	None	Yes	No habitats of high floristic diversity known to support notable invertebrates are present on site. Common invertebrates are anticipated to be present.
Flora			
Notable Plant Species	No	No	Due to the past use of the site and high levels of nutrient enrichment only common and widespread grass and forb species were identified within grassland on site.

Table 2 – Pre development Habitats Identified

Uk Hab Classification	Dominant Species / Description	Development Actions and Mitigation
Modified grassland	Modified grassland was present across the site. This was heavily and species diversity included common and widespread grass and herb species.	Grassland on site is to be lost to facilitate development. This habitat has low species diversity and ecological value due to past use and management. Areas of higher value habitat including species rich grassland are to be created on site to compensate for the loss of these habitats.
Native Hedgerows	Native species poor hedgerows and hedgerows with trees were present across the site. Species diversity was dominated by hawthorn (*Crataegus monogyna*) with limited ground flora diversity.	Hedgerows on site are to be lost to facilitate development. This habitat has low species diversity. The loss of this habitat will be compensated for by the enhancement of retained hedgerows on site and the creation of new species rich hedgerows across the site.
Ditch	A series of ditches are present across the site. These were largely unvegetated and water quality was poor.	Ditches on site are to be lost to facilitate development. The loss of this habitat will be compensated for with the inclusion of linear swales within the landscape designs. These will partially hold water year round and will be planted with native aquatic and semi aquatic species.
Marshy Grassland	A dry pond and area of marshy grassland was present to the east of the site.	This habitat has low species diversity and ecological value due to past use and management. Areas of higher value habitat including species rich grassland are to be created on site to compensate for the loss of these habitats.
Broadleaved Woodland	An area of plantation broadleaved woodland was present to the south of the site.	This area is to be partially within the development proposals. Further areas of woodland including tree and ground

		cover planting are to be created within the development.

4 Development Proposals

The proposed development covers approximately 13.7ha, comprising largely modified grassland with hedgerows. The existing site grassland and hedgerows will be partially lost and partially retained and enhanced. The modified grassland is currently of poor quality the loss of this habitat is not considered to be of importance to nature conservation at greater than the site level.

In order to minimise the impact of the proposed development and achieve a gain for biodiversity the following habitats will be created:

- Retention and protection of on-site trees
- Creation of areas of broadleaved woodland – 0.8ha
- Creation of areas of other neutral grassland – 1.8ha
- Native trees will be planted across the site
- Native species rich hedgerow planting - 1.17km
- Creation of linear aquatic swales – 0.42km

5 Ecological Strategy

This section summarises the management strategy for each ecological habitats and enhancement proposed to be introduced within the final design of the scheme. The current soft landscape plans (Urban Green, 2022b) detail the created and enhanced habitats on site.

5.1 Habitat Creation

5.1.1 Modified Grassland

Areas of modified grassland on site are to be created across POS and amenity areas (described as Amenity Grassland) through seeding grassland areas with native flowering species with known benefit to pollinators. Species mix will comprise the RE1 Traditional Hay Meadow Mix which contains a ratio of 80% grasses to 20% wildflower.

The targeted condition for the areas of modified grassland on site is moderate with an expected time to reach target condition of 14 years. Detailed management techniques are detailed within Table 3 along with the corresponding condition criteria. Each objective includes a target time for positive assessment provided to enable identification of failing management and trigger early intervention. In order to reach the expected targeted condition of moderate the at least three of the following criteria are expected to be achieved by 4 years. Due to the amenity use of the grassland Condition Criteria 3 – Sward height is varied – is not targeted.

Table 3 – Modified Grassland Management Targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment
1. 6-8 species per m2	• To be provided through a diverse species mix • Monitoring to ensure balance of species across habitat areas • Where wildflower cover is low in successive years use of conservation harrowing to create bare areas necessary to promote wildflower germination • Sowing of seed (especially yellow rattle) on bare ground to reduce grass dominance	Ensures diversity is maintained throughout the grassland providing a balance of various plant types	By year 4
2. Sward height is varied	Na	Na	Na
3. Cover of scrub less than 20%	• Management as above for criterion 1. • Hand removal of scrub species as necessary to prevent encroachment	Prevents scrub encroachment and preserves grassland habitat	By year 4
4. Physical damage evident in less than 5% of total grassland area	• Periodic monitoring and control/removal undesirable species as necessary	Ensures amenity use and prevent degradation of habitat	From year 1

	• Periodic monitoring of grassland to assess presence of damage • If damage is identified apply protections including fencing or signage as necessary		
5. Cover of bare ground between 1-5%	• Management as above for criterion 1.	Ensures diversity is maintained throughout the grassland providing a balance of various plant types	By year 4
6. Cover of bracken <5% of grassland area	• Management as above for criterion 2.	Prevents bracken encroachment and preserves grassland habitat	From year 1
Absence of invasive non-native species. Combined cover of damage and undesirable species less than 5% of total area.	• Periodic monitoring and control/removal undesirable species as necessary • Periodic monitoring of grassland to assess presence of damage • If damage is identified apply protections including fencing or signage as necessary	Ensure native assemblage of species throughout grassland. Prevents competition from aggressive non-native species.	By year 4

**Creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), curled dock (*Rumex crispus*), broad-leaved dock (*Rumex obtusifolius*), common ragwort (*Senecio jacobea*), common nettle (*Urtica dioica*), creeping buttercup (*Ranunculus repens*), white clover (*Trifolium repens*), cow parsley (*Anthriscus sylvestris*), marsh thistle (*Cirsium palustre*) and marsh ragwort (*Senecio aquaticus*).

5.1.2 Other Neutral Grassland

Areas of other neutral grassland (described as Species Rich Grassland and Pollen & Nectar Wildflower Mix) will be created on site. Creation will include the seeding grassland areas with native flowering species with known benefit to pollinators. Species mix will comprise the EN1F Species Pollen and Nectar Wildflowers and RE1 Traditional Hay Meadow which contain a ratio of 60% wildflower to 40% grasses and 80% grasses to 20% wildflower respectively.

The targeted condition for the areas of other neutral grassland on site is moderate with an expected time to reach target condition of 5 years. Detailed management techniques to create diverse and well-structured areas of grassland are detailed in Table 4 along with the corresponding condition criteria. Each objective includes a target time for positive assessment provided to enable identification of failing management and trigger early intervention. In order to reach the expected targeted condition of moderate the at least three of the following criteria are expected to be achieved by 5 years.

Table 4 – Other Neutral Grassland management targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment
1. Vegetation closely matches the Characteristics of the	• To be provided through a diverse species mix	Ensures diversity is maintained throughout the grassland providing a balance of various plant types	By year 5

specific grassland habitat. Wildflowers, sedges and indicator species are Cleary visible throughout the sward.	• Monitoring to ensure balance of species across habitat areas • Where wildflower cover is low in successive years use of conservation harrowing to create bare areas necessary to promote wildflower germination • Sowing of seed (especially yellow rattle) on bare ground to reduce grass dominance		
2. Sward height is varied	Rotational and reduced mowing regimes to achieve varied height	Provides a range of microclimates and opportunities for a range of fauna while preventing scrub encroachment and	By year 5
3. Cover of bare ground between 1-5%	• Management as above for criterion 1. • Where bare ground is below threshold use of conservation harrowing • Where use of harrow not considered appropriate undertake scarification by hand of smaller areas	Provides opportunities for wildflower regeneration and creates microclimates for use by invertebrates	By year 5
4. Cover of bracken <20% and scrub including bramble <5%.	• Periodic mowing and hand removal of woody species to prevent scrub and bracken encroachment	Prevents scrub / bracken encroachment and preserves grassland habitat	From year 1
5. Absence of non-native invasive species. Undesirable species and physical damage accounts for <5% of total area	• Periodic monitoring and control/removal undesirable species as necessary • Periodic monitoring of grassland to assess presence of damage • If damage is identified apply protections including fencing or signage as necessary	Ensure native assemblage of species throughout grassland. Prevents competition from aggressive non-native species.	By year 5

**Creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), curled dock (*Rumex crispus*), broad-leaved dock (*Rumex obtusifolius*), common ragwort (*Senecio jacobea*), common nettle (*Urtica dioica*), creeping buttercup (*Ranunculus repens*), white clover (*Trifolium repens*), cow parsley (*Anthriscus sylvestris*), marsh thistle (*Cirsium palustre*) and marsh ragwort (*Senecio aquaticus*).

5.1.3 Native Scrub

Areas of native scrub are to be created across the site. Creation will include planting of native ground cover and scrub species i9ncluding flowering and fruiting species as detailed in Table 5 to provide the highest value to wildlife including foraging and sheltering opportunities.

Table 5 – Species included within planting scheme

Benefit to Environment	Species that Fulfil Benefit
Proposed Native Shrub Planting	
Native Species	Guelder rose (*Viburnum opulus*), wayfaring tree (*Viburnum lantana*), dog wood (*Cornus sanguinea*), alder (*Rhamnus frangula*), buckthorn (*Rhamnus catharticus*), wild privet (*Ligustrum vulgare*), common gorse (*Ulex europeus*), elder (*Sambucus nigra*), hazel (*Corylus avellana*), holly (*ilex aquifolium*), yew (*Taxus baccata*)
Forging for pollinators	Guelder rose, wayfaring tree, alder, buckthorn, wild privet, common gorse, elder, hazel, holly
Invertebrate food plant	Elder, hazel, yew
Foraging for mammals, birds etc.	Guelder rose, buckthorn, wild privet, elder, hazel, holly
Nesting opportunities for ground nesting birds	Guelder rose, hazel, buckthorn, wild privet, elder, holy, yew
Year round sheltering and foraging opportunities	Guelder rose, common gorse, yew
Fungi host plant	Hazel

Detailed management techniques to create diverse and well-structured areas of scrub containing multiple different microclimates and habitats are detailed within Table 6 along with the corresponding condition criteria. Each objective includes a target time for positive assessment provided to enable identification of failing management and trigger early intervention. In order to reach the expected targeted condition of moderate the at least three of the following criteria are expected to be achieved by 5 years.

Table 6 – Mixed Scrub Management Targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment
1. At least three woody species with no one species comprising more than 75% cover	• To be provided through a diverse species mix planted in groups of groups of 10 individual plants of different species • Replacement of failed plant species like for like	Ensures diversity is maintained throughout the scrub providing a range of microclimates and opportunities for fauna	From year 1
2. A good age range – a mixture of seedling, saplings, young shrubs and mature shrubs	• Periodic clearance down to ground level in rotated areas at scrub edge to promote seedling and sampling growth • Periodic cutting to create a graded margin at scrub edge	Ensures successful natural regeneration of scrub species while maintaining a diverse age range	By year 5

	• Light trimming and thinning of rotated areas to promote regeneration • Periodic assessment of the need for any replacement or enhancement planting, to broaden the age range		
3. Absence of invasive species and undesirable* species make up <5% ground cover	• Periodic monitoring and control/removal of non-native species as necessary	Ensure native assemblage of species throughout scrub. Prevents competition from aggressive non-native species.	By year 5
4. Well-developed edge with ungrazed tall herbs	• Periodic cutting to create a graded margin at scrub edge • Mowing of grassland/herb ground flora to maintain adjacent habitats free of scrub growth • Removal of woody species from within the scrub edge	Prevents scrub encroachment onto adjacent habitats and provides a gradient edge valuable to wildlife	By year 5
5. Many clearings and glades within the scrub	• Managed as above for criterion 2 and 4	Ensures diversity is maintained throughout the scrub providing a range of microclimates and opportunities for fauna	By year 5

*Creeping thistle (*Cirsium arvense*), common nettle (*Urtica diocia*), cherry laurel (*Prunus laurocerasus*), snow berry (*Symphoricarposl* spp). *Buddleia* (Buddleja *spp.*), cotoneaster (*Cotoneaster* spp.), Spanish bluebell (*Hyacinthoides hispanic*) or hybrids.

5.1.4 Other Broadleaved Woodland

Other broadleaved woodland is to be created in the southern aspect of the site. Creation will include the planting of native tree species and understory native shrub and ground cover planting providing foraging opportunities for wildlife. Species included within the planting scheme are detailed in Table 7 The targeted condition for the broadleaved woodland on site is Moderate with an expected time to reach target condition of 10 years.

Table 7 – Species included within the planting scheme

Benefit to Environment	Species that Fulfil Benefit
Proposed Native Specimen Trees	
Native Species	Field maple (*Acer Campestre*), alder (*Alnus glutinosa*), silver birch (B*etula pendula*), common hawthorn (*Crataegus monogyna*), aspen (*Populus tremula*), wild cherry (*Prunus avium*), sessile oak (*Quercus petraea*)
Forging for pollinators	Field maple, alder, silver birch, common hawthorn, aspen wild cherry
Invertebrate food plant	Field maple, silver birch, aspen, sessile oak
Foraging for mammals, birds ect.	Field maple. silver birch, common hawthorn, aspen, wild cherry, sessile oak

Nesting opportunities for birds	Field maple. silver birch, common hawthorn, aspen, wild cherry, sessile oak
Fungi host plant	Silver birch
Year round sheltering and foraging opportunities	Common hawthorn
Understory Species – Native understory Planting	
Native Species	Guelder rose (*Viburnum opulus*), elder (*Sambucus nigra*), dog wood (*Cornus sanguinea*), hazel (*Corylus avellana*), wild privet (*Ligustrum vulgare*), holly (*Ilex aquifolium*)
Forging for pollinators	Guelder rose, elder, dogwood, wild privet, elder, holly
Invertebrate food plant	Dog wood, wild privet, elder, hazel, holly
Foraging for mammals, birds ect	Guelder rose, dogwood, wild privet, elder, hazel, holly
Nesting opportunities for birds	Wild privet, hazel, holly
Opportunities for ground nesting birds	Hazel
Fungi host plant	Hazel
Year round sheltering and foraging opportunities	Guelder rose, wild privet, holly

Detailed management techniques to promote structural variation and allow light to reach the developing ground flora and scrub layer are detailed within Table 8 along with the corresponding condition criteria. Each objective includes a target time for positive assessment provided to enable identification of failing management and trigger early intervention. In order to reach the expected targeted condition of poor it is expected that the following objectives will be met within 10 years.

Table 8 – Broadleaved Woodland Management Targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment
1. Age distribution of trees – Three age class present	• Thinning of poor quality and dense saplings • Early protection/promotion of canopy tree species through weed and understorey scrub management • Replacement of tree species like for like in the event of tree failure	Ensures healthy growth of canopy tree species without stunting, overshading or competition from weed, ground cover or shrub species.	By year 10
2. Browsing damage - No significant browsing damage present	• Monitoring and installation of deer fencing / rabbit guards or other protection as deemed necessary	Ensures successful tree growth, natural development and ongoing regeneration of structurally diverse woodland.	From year 1

3, Invasive plant species - No invasive species present in the woodland	• Periodic monitoring and control/removal of non-native species as necessary	Ensure native assemblage of species through all storeys of woodland. Prevents competition from aggressive non-native species.	From year 1
4. Number of native tree species – Three to four native tree and shrub species	• To be provided through varied planting scheme from initial habitat planting • Replacement of failed plant species like for like	Ensure high diversity of plants to create maximum foraging, pollination and sheltering opportunities for a wider range of fauna.	From year 1
5. Cover of native tree and shrub species - >80% of canopy trees and understory shrubs are native	• To be provided through varied planting scheme from initial habitat planting • Periodic monitoring and control/removal of non-native species as necessary	Ensure native assemblage of species through all storeys of woodland. Prevents competition from aggressive non-native species.	From year one
6. Open space within woodland – 10– 20% or less of woodland has areas of temporary open space	• Replacement of failed plant species like for like • Periodic assessment of the need for any replacement or enhancement planting, to increase vegetation and canopy cover	Ensures successful tree growth, natural development and ongoing regeneration of structurally diverse woodland.	By year 10
7. Woodland regeneration – One to two class present in woodland	• Regular cutting to create dense stands with graded margin (at woodland/glade edge) • Infrequent management of selective stands including thinning of stands and light trimming to aid succession of canopy species.	Increase woodland biodiversity by encouraging microhabitats to develop providing differing microclimates, food opportunities, camouflage and sheltering opportunities for a range of fauna.	By year 10
8. Tree health – 11-25% mortality and/or crown dieback or low risk pest or disease present	• Periodic monitoring and control of browsing pressure as indicated above • Periodic monitoring of woodland to assess presence of disease/crown die back	Ensures successful natural regeneration of canopy tree species while maintaining a diverse age range within the woodland	By year 5
9. Vegetation and ground flora – No recognisable NVC community	N/A	N/A	N/A
10. Woodland vertical structure - Two storeys present	• To be provided through varied planting scheme from initial habitat planting • Infrequent management of selective stands including thinning of stands and light trimming to aid succession of canopy species.	Ensures successful natural regeneration of canopy tree species while maintaining a diverse age range within the woodland	From year 1

11. Veteran trees – No veteran trees present in woodland	N/A	N/A	N/A
12. Amount of deadwood – Less than 25% of survey plots has standing deadwood, large stems or stumps	• Retention of non-diseased pruned material following management in brash piles and hibernacula. • Retention of non-diseased standing deadwood including branches and whole trees (where safe to do so)	Deadwood provides further microhabitats within the woodland with benefit for a wide range or fauna and fungi.	By year 5
13. Woodland disturbance – less than 20% of the woodland has evidence of nutrient enrichment or damage	• No nutrient enriched substrate, topsoil or fertilizers are to be used at any time including planting periods	Damaged caused by anthropogenic activities including nutrient introduction from adjacent agricultural activities can delay or prevent the natural establishment of woodland.	By year 10

*American skunk cabbage (*Lysichiton americanus*), Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Reynoutria japonica*), Cherry Laurel (*Prunus laurocerasus*), Shallon (*Gaultheria shallon*), Snowberry (*Symphoricarpos albus*), Variegated yellow archangel (*Lamiastrum galeobdolon* subsp. *Argentatum*), Rhododendron (*Rhododendron ponticum*).

5.1.5 Native Species Rich Hedgerow

Native species rich hedgerows are to be created around the periphery of the site. The targeted condition for the created hedgerows is moderate with an expected time to reach target condition of 5 years.

Table 9 – Species included within the planting scheme

Benefit to Environment	Species that Fulfil Benefit
Native Hedge Mix	
Native Species	Common hawthorn (*Crataegus monogyna*), common beech (*Fagus sylvatica*), common hornbeam (*Carpinus betulus*), hazel (*Corylus avellana*), common dog wood (*Cornus sanguinea*), holly (*Ilex aquifolium*), guelder rose (*Viburnum opulus*)
Forging for pollinators	Hazel, common hawthorn, common hornbeam, holly, guelder rose
Invertebrate food plant	Hazel, common hawthorn, common beech
Foraging for mammals, birds ect.	Hazel, common hawthorn, common beech, common hornbeam, holly, guelder rose
Nesting opportunities for ground nesting birds	Hazel, common hawthorn, guelder rose
Year round sheltering and foraging opportunities	Common hawthorn, blackthorn, guelder rose
Fungi host plant	Hazel

Detailed management techniques to create diverse and well-structured areas of hedgerow are detailed within Table 10 along with the corresponding condition criteria. Each objective includes a target time for positive assessment provided to enable identification of failing management and trigger early intervention. In order to reach the expected targeted condition of Moderate at least six of the following criteria are expected to be achieved by year 5.

Table 10 – Hedgerow Management Targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment
A1. Height >1.5 m average along	• Early protection of hedgerow species • Light trimming and thinning of rotated areas to promote regeneration • Periodic assessment of the need for any replacement or enhancement planting, to prevent gaps	Ensure function of hedgerow is maintained	By year 5
A2. Width >1.5 m average along length	• As above	Ensure function of hedgerow is maintained	By year 5
B1. Gap - Hedge Base. Gap between ground and base of canopy <0.5 m for >90% of length	• As above	Ensure function of hedgerow is maintained.	By year 5
B2. Gap – hedge canopy continuity. Gaps make up <10% of total length. No canopy gaps >5m	• As above	Ensure function of hedgerow is maintained.	By year 5
C1. Undisturbed ground and perennial vegetation - 1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length	• No mowing to be undertaken within 1m of the hedgerow	Ensures hedgerow is protected from adjacent operations	By year 5
C2. Undesirable perennial vegetation - Undesirable species <20% cover of the area of undisturbed ground	• Periodic monitoring and control/removal of non-native species as necessary	Ensures native assemblage of species and prevents competition from aggressive non-native species	From year 1
D1. Invasive Non-native species >90% of the hedgerow and undisturbed ground is free of invasive non-native species	• As above	Ensures native assemblage of species and prevents competition from aggressive non-native species	From Year 1
D2. Current damage >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	• Periodic monitoring and assessment of the need for any replacement or enhancement planting, to	Ensures hedgerow is protected from adjacent operations	From year 1

	prevent gaps and repair damage		

5.1.6 Pond (Non-Priority)

A non-priority pond is to be created in the northwest corner of the site which will be connected to the drainage system for the pitches and connect to a stream via an overflow pipe. The pond is expected to hold water year-round. The periphery is to be planted with marginal/aquatic species as detailed in Table 11. The targeted condition for the areas of the pond is Moderate with an expected time to reach target condition of 3 years.

Table 11 – Species included in planting scheme

Benefit to Environment	Species that Fulfil Benefit
Native planting	
Native Species	Lesser pond sedge (*Carex actuformis*), yellow iris (*Iris pseudacorus*), branched bur reed (*Sparganium erectum*), cluster club rush (*Scirpoides holoschoenus*), common reed (*Juncus articulates*), purple loosestrife (*Lythrum salicaria*), common reed grass (*Phragmites australis*), common bullrush (*Typha latifolia*)
Forging for pollinators	Purple loosestrife, yellow iris, common bullrush cluster club rush,
Water Filtration	Lesser pond sedge, branched bur reed, common reed, purple loosestrife, yellow iris, common reed grass, common bullrush

Detailed management techniques to create a diverse aquatic habitat with multiple different microclimates are detailed within Table 12 along with the corresponding condition criteria. Each objective includes a target time for positive assessment provided to enable identification of failing management and trigger early intervention. In order to reach the expected targeted condition of moderate the at least six of the following criteria are expected to be achieved by 3 years. Conditions 3, 4 and 7 are not assessed as these have been determined at design stage.

Table 12 – Pond Management Targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment
1. The pond is of good water quality, with clear water (low turbidity)	• Ensure marginal habitats are suitably maintained to reduce run-off of sediment into the pond • Avoid intensive management activities or excessive human disturbance around the pond edge • Remove large litter regularly	Ensures aquatic vegetation receives adequate light levels Marginal semi-natural habitat provides a transitional habitat between the pond and other site areas. Valuable area for refuge for amphibious species.	From year 1
2. There is semi-natural habitat for at least 10 m from the pond edge.	• Maintain marginal habitats and re-seed any areas of bare ground within the		From year 1

	other neutral grassland habitat • Encourage colonisation of bare ground by managing disturbance by anthropogenic activity around the pond edge i.e. designated walkways/paths, restricted areas		
3. Less than 10% of the pond is covered with duckweed or filamentous algae.	Remove duckweed and filamentous algae by hand using a pond net or a rake	Ensures aquatic vegetation receives adequate light levels	From year 1
4. The pond is not artificially connected to other waterbodies, either via streams, ditches or artificial pipework.	• N/A	N/A	N/A
5. Pond water levels should be able to fluctuate naturally throughout the year. No obvious dams, pumps or pipework.	• N/A	N/A	N/A
6. There is an absence of non-native plant and animal species.	• Regular monitoring (monthly) of habitat for invasive species • Identify and remove invasive, non-native species as soon as possible • Where possible, remove invasive species by hand. If more intensive removal is required, this should be carried out by an experienced contractor	Ensure native assemblage of species. Prevents competition from aggressive non-native species.	From year 1
7. The pond is not artificially stocked with fish. If the pond naturally contains fish, it is a native fish assemblage at low densities.	• N/A	N/A	N/A
8. In non-woodland ponds, plants, be they emergent, submerged or floating (excluding duckweeds), should cover at least 50% of the pond area that is less than 3 m deep.	• Ensure duckweed is removed to prevent dominant cover • Monitor health of aquatic plants throughout the year and remove dead plant material when necessary • Supplementary introduction of aquatic	Aquatic plants provide foraging and resting opportunities for aquatic and amphibious species	From year 1

	vegetation, incorporating species reflective of the existing community		
9. The surface of non-woodland ponds is no more than 50% shaded by woody bankside species.	• Selective removal of shrub/tree regeneration to thin areas of growth • Prune excess (>50% cover) growth around the periphery of the pond	Allows maximum light levels to reach the pond surface to encourage growth of aquatic vegetation	From year 2

5.1.7 Ditches

A series of ditches/ linear swales are to be created parallel to the roads of site. The basin of the ditches will be seeded with mixes describe in Section 5.1.2 and will periodically flood. The periphery is to be planted with reed and aquatic species as detailed in Table 12. The targeted condition for the ditches is Moderate with an expected time to reach target condition of 5 years.

Table 12 – Species included in planting scheme

Benefit to Environment	Species that Fulfil Benefit
Native reed planting	
Native Species	Lesser pond sedge (*Carex actuformis*), yellow iris (*Iris pseudacorus*), branched bur reed (*Sparganium erectum*), cluster club rush (*Scirpoides holoschoenus*), common reed (*Juncus articulates*), purple loosestrife (*Lythrum salicaria*), common reed grass (*Phragmites australis*), common bullrush (*Typha latifolia*)
Forging for pollinators	Purple loosestrife, yellow iris, common bullrush cluster club rush,
Water Filtration	Lesser pond sedge, branched bur reed, common reed, purple loosestrife, yellow iris, common reed grass, common bullrush
Native aquatic planting	
Native species	Water forget-me-not (*Myosotis scorpioides*), water mint (*Mentha aquatica*), greater spearwort (*Ranunculus lingua*), spike water milfoil (Myriophyllum spicatum), water knotweed (*Polygonum amphibium*), common water crowfoot (*ranunculus aquatilis*)
Foraging for pollinators	Water forget-me-not, water mint, greater spearwort, spike water milfoil, water knotweed, common water crowfoot

Detailed management techniques to create diverse seasonally aquatic habitat with multiple different microclimates are detailed within Table 13 along with the corresponding condition criteria. Each objective includes a target time for positive assessment provided to enable identification of failing management and trigger early intervention. In order to reach the expected targeted condition of moderate the at least six of the following criteria are expected to be achieved by 5 years.

Table 13 – Ditch Management Targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment

1. Good water Quality with low turbidity	• To be provided through a diverse species mix including filtering plants • Monitoring to ensure water does not become polluted	Ensures good water quality therefore providing more suitable habitat for flora and fauna	From year 1
2. Diverse range of emergent submerged and floating plant species.	• Provided through diverse species mix • Periodic assessment of the need for any replacement or enhancement planting, to broaden diversity and prevent domination from a single species	Ensure diversity among vegetation providing a wider range of opportunities for flora	By year 5
3. Less than 10% cover of filamentous algae and/or duckweed	• Periodic monitoring and control/removal of undesirable species as necessary		By year 5
4. A fringe or marginal vegetation is present along more than 75% of the ditch	• Diverse species mix of marginal vegetation. • Reduced management of marginal vegetation including rotational cutting of vegetation within 1m of ditch not cutting more than 10% of the ditch length per year	Ensure diversity among vegetation providing a wider range of oppertunities for flora and protects ditch from adjacent activities	By year 5
5. Physical damage is present along less than 5% of the ditch	• Management as for Criteria 4. • Periodic monitoring and replacement planting in areas where damage has occurred		B year 5
6. Sufficient water levels are maintained	• Achieved through ditch design	Ensures habitat is present for aquatic and semi aquatic species	From year 1
7. Less than 10% of the ditch is shaded	• Periodic management and control of adjacent scrub habitats to ensure no shading of the ditch occurs	Ensure diversity among vegetation providing a wider range of oppertunities for flora	From year 1
8. There is an absence of non-native plant and animal species	• Provided through diverse species mix • Periodic monitoring and control/removal of non-native species as necessary		From year 1

5.1.8 Urban and Amenity Habitats

The following habitats will be created as part of the scheme:

- Street Trees (Native, horticultural and non-native species)
- Introduced Shrub

Though these habitats have fixed targeted conditions they nevertheless perform an important function by providing connectivity through the built environment. The following management principles should be adhered to within the regular maintenance regime:

- Inputs of herbicide should be reduced to the minimum necessary (ideally only on persistent perennial weeds) and the use of mulch should be prioritised, including regular topping-up to replace that rotted down.
- Use of herbicide should not be considered a replacement for proper mulching which also helps to retain soil moisture.
- Street Trees
    - Pruning of the canopy of street trees should be more restrained and limited to the minimum necessary/appropriate for the location.
    - Avoid cutting all specimens across the plot in a single period, particularly where this is likely to removes all flower/fruit interest for wildlife.
- Introduced Shrub
    - While regular cutting of introduced shrub will help to maintain shape and vigour cutting to promote flowering/fruiting and height variation should be encouraged to promote diversity.
    - Avoid cutting all specimens across the plot in a single period, particularly where this is likely to removes all flower/fruit interest for wildlife.

5.2 Five Year Work Programme

Work should be undertaken on six rotations of five-year work periods (to cover the 30-year management period), adhering to the recommendations made in Section 5 and the work table below.

Table 10 – Five year work programme

Habitat	Action	Frequency Notes	Indicative timing of operation											
			J	F	M	A	M	J	J	A	S	O	N	D
Broadleaved Woodland	Initial and replacement planting	Year 1 then as required to year 5												
	Control and removal of non-native species	As required year 1 to 5												
	Monitoring throughout growing and dormant period to ensure successful establishment and control browsing and other damage	Every three months years 1 to 5												
	Any required pruning to damaged or diseased plants	As required year 1 to 5												
Mixed Scrub	Initial and replacement planting	Year 1 then as required to year 5												
	Control and removal of non-native species	As required year 1 to 5												
	Monitoring throughout growing and dormant period to ensure successful establishment and control browsing and other damage	Year 1 to 5												
	Any required pruning to damaged or diseased plants	As required year 1 to 5												
	Mowing of grass / herb margin at scrub edge.	Year 2 and 4												
	Selective clearing of scrub edge to ground. Clear 1/3-1/5 of each scrub parcel edge on rotation.	Year 3												

Habitat	Action	Frequency Notes	Indicative timing of operation											
			J	F	M	A	M	J	J	A	S	O	N	D
Other neutral grassland	Initial and replacement planting	Year 1 then as required to year 5												
	Control and removal of non-native species	As required year 1 to 5												
	Mowing of grass.	Year 1												
	Rotational mowing of grass 1/3 of total area	Annually from year 2												
Native species rich hedgerows	Initial enhancement planting	Year 1 then as required to year 5												
	Control and removal of non-native species	As required year 1 to 5												
	Rotational pruning of hedges 1/3 total area	Annually from year 2												
Pond and Ditches	Initial and replacement planting	Year 1 then as required to year 5												
	Control and removal of non-native species	As required year 1 to 5												
	Monitoring throughout growing and dormant period to ensure successful establishment and control browsing and other damage	Year 1 to 5												

5.3 Species Specific Enhancements

5.3.1 Bird Box Installation

The PEA recommends the inclusion of bird boxes on retained and planted trees on site. These be installed at least 4m high on the north and east elevations of the tree and target general passerine species known to be in the local area. A total of ten bird boxes (five of each option laid out below) should be erected on site. A location plan for bird box placement will be provided upon request.

Bird box specifications are detailed in Table 3.

Table 2 – Bird Nest Boxes/Brick

Bird Box Type	Image	Associated Species
Vivara Pro Seville 32mm WoodStone Nest Box Approx. Height 310mm x width 200mm x depth 200mm To be position at least 2m high on the north and east elevations		Blue tits, tree sparrows, house sparrows, great tits, crested tits, nuthatches, coal tits and pied flycatchers
Vivara Pro Barcelona WoodStone Open Nest Box Approx. Depth 175mm x Height 240mm x Width 190mm To be position at least 2m high on the north and east elevations		Wrens, robins, spotted flycatchers, pied and grey wagtails, song thrushes and blackbirds

Positioning of Bird Boxes

Bird boxes are most effective when positioned on a north-east to north-west facing aspect to prevent overheating during the summer nesting season. Care is to be taken to make sure boxes are not angled in such a manner to allow rain to enter them. They should be places at least 2m from the ground.

Maintenance of Bird Boxes

Bird boxes require periodic checking and cleaning, once every two years. **Note bird boxes must only be opened and cleaned outside the bird nesting season (which is between March to September inclusive).**

- Unhatched eggs may be removed legally between October and January and must then be disposed of.
- Disused nests must be removed, and the box must be cleaned using boiling to remove parasites. Boxes should be left to dry before replacing the lid. Insecticides and flea powders must not be used.
- If any boxes are identified as damaged or missing, they are to be replaced with a box of similar specification.

Timing of Installation of Bird Boxes

Bird boxes are to be installed during the construction phase of the development.

5.3.2 Bat Box Installation

The PEA of the site recommends that bat boxes be installed on retained or planted trees on site. A minimum of 10 bat boxes should be erected on site. A location plan for bat box placement will be provided upon request.

Table 4 – Bat Box

Bat Box Type	Image
Crevice Bat Box Width 280mm Length 650mm Height 400mm	

Positioning of Bat Boxes

Bat boxes should be located so that they receive the maximum amount of sunlight, ideally on the southerly aspects of trees. Bat boxes should be positioned a minimum of 4 metres (but preferably 5 to 7 metres) above ground.

Maintenance of Bat Boxes

Bat boxes are considered self-cleaning and require minimal maintenance once installed. The boxes are made of hard-wearing material that is generally long-lasting. Bat boxes are to be checked periodically (e.g. every two years) to assess their use and the condition of the boxes.

If any boxes are identified as damaged or missing, they are to be replaced with a box of similar specification.

Note only those holding the appropriate Natural England Class 2 bat licence may open and inspect these boxes. It is an offence for anyone without this licence to open a bat box. If a bat box becomes occupied by a bird the nest must be left *in situ* until after the bird nesting season (March to September inclusive).

Timing of Installation of Bat Boxes

Bat boxes are to be installed during the construction phase of the development, prior to the occupation of the dwelling.

6 References

Bat Conservation Trust / Institution of Lighting Professionals (2018). Guidance Note 08/18: Bats and artificial lighting in the UK. Bats and the Built Environment series.

English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough

Gunnell, K., Grant, G., and Williams, C. (2012). Landscape and urban design for bats and biodiversity. Bat Conservation Trust.

The Institution of Lighting Engineers (2005). Guidance Notes for the Reduction of Obtrusive Light.

Middleton Bell Ecology (2021). Ecological Impact Assessment MBE/ECO/2020/20/03

Shawyer C (2012). Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment. Wildlife Conservation Partnership.

Roost Maternity Box (2020). Natural History Book Service https://www.nhbs.com/improved-roost-maternity-bat-box

Schwegler (2020). Natural History Book Service https://www.nhbs.com/manufacturer/schwegler?q=&dFR[publisher.name][0]=Schwegler&fR[doc_s][0]=false&fR[hide][0]=false&fR[live][0]=true

Urban Green (2022a). Biodiversity Net Gain Design Stage Assessment. Ref: UG_1053_ECO_BNG_08.

Urban Green (2022b). Soft Landscape Plan. Ref: UG_1016_LAN_GA_DRW_01.