

BIODIVERSITY ENHANCEMENT and MANAGEMENT PLAN

SEPTEMBER 2022

Ormskirk Road
Knowsley
Liverpool
L34 9EY

**U R B A N
G R E E N**

QUALITY MANAGEMENT

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1 Introduction

1.1 Background to the Scheme

Caddick Developments are proposing to develop land at Ormskirk Road in Knowsley (hereafter referred to as 'the site'). The proposals include the development of three industrial units, with associated hard and soft landscaping.

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

The author of the report is Senior Ecologist Mark Blacker ACIEEM, MSc. Mark 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 SJ 43756 96752 and comprises a total area of approximately 6ha (see Figure 1).

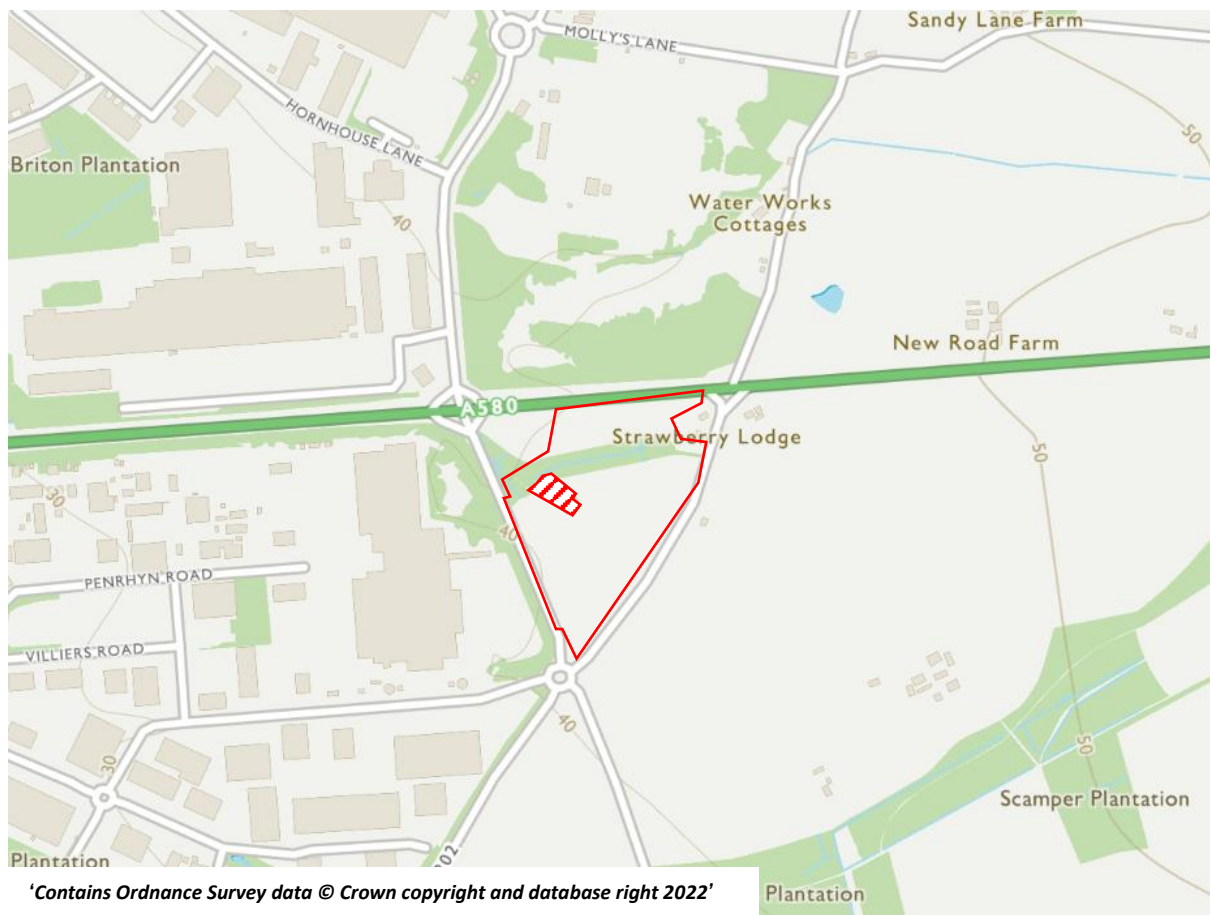


Figure 1 – Site Extent

The site is located upon the edge of an industrial estate approximately 450m north of Knowsley, and 10km to the north-east of Liverpool. The industrial estate is located within the urban rural fringe, with agricultural fields to the east and south, and industrial units to the west. Shared land use lies to the north, comprising both industrial and agricultural land. The A580 major road directly borders the site to

the north beyond which lies a small area of woodland, whilst Ormskirk Road and the B5202 road directly borders the site to the south and west

1.3 Purpose of this Management Plan

The purpose of this management plan is to provide a schedule for the long-term 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. Habitats should be maintained under a formal management regime for a minimum of 30 years, with a full UKHab habitat assessment, and full habitat condition assessment, being undertaken every 5 years post-completion to assess the extent and condition of habitats against expectations.

1.4 Aims of this Management Plan

This management plan covers the habitat creation and enhancement on site, as detailed within the Biodiversity Net Gain (BNG) Assessment (Urban Green, 2022). This report assessed the development as scoring a net gain in area biodiversity units of 30.97%, and a gain in hedgerow biodiversity units of +199.89%. The ditch habitat on site is to be retained and unsuitable for enhancement, therefore there was no change in the value of this habitat. All assessments were conducted using 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 for a minimum of 30 years, based on requirements within the Environment Act (2021). 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 4. 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, Knowsley 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

Regular monitoring of the development against measurable targets (as detailed within Section 4.) will be undertaken across all habitats detailed within this management plan across the 30 year period. 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 annually by an experienced ecologist. Results should be reported back and feed into a five-year management plan review, 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, 2022a). 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 Development Proposals

The proposed development covers approximately 6ha, comprising largely poor-quality neutral grassland, bramble scrub, and broadleaved woodland, with hedgerows present around the borders. The existing site grassland will be lost, whilst the broadleaved woodland and scrub present on site will be partially lost and partially retained and enhanced. A large proportion of hedgerows present around the site borders will be retained within the development. All habitats present on site are currently of poor quality and the loss of these habitats 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 the following habitats will be enhanced and created on site:

- Partial retention and enhancement of broadleaved woodland
- Partial retention and enhancement of poor-quality scrub habitats.
- Protection of on-site trees
- Creation of areas of intensely managed modified grassland.
- Creation of areas of other neutral grassland including a wet meadow.
- Native trees will be planted across the site.
- Native species rich hedgerow planting.
- Creation of areas of native scrub.
- Ornamental groundcover planting within the site.

4 Ecological Strategy

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

4.1 Habitat Retention

4.1.1 Ditches

The full lengths of the ditches and their associated units are to be retained on site. There are no proposed enhancements to the ditches and the current condition score is poor, however, ditches should still be managed to prevent a decline in condition and in the interest of creating a beneficial aquatic habitat. Management objectives in relation to condition criteria are detailed in Table 1 and an annual schedule of works can be found in Section 4.3.

Table 1 – Ditch Management Targets

Condition Assessment Criteria / objective	Management Activities	Benefit to environment	Target time for Positive Assessment
1. The ditch is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution.	- Remove large litter and debris from the ditch regularly - Seed the banks to encourage vegetation growth and prevent runoff into the ditch	Ensures water is clean and light levels within the ditch are maintained to benefit aquatic and marginal vegetation	From year 1
2. A range of emergent, submerged and floating leaved plants are present. As a guide >10 species of plants in a 20m ditch length.	- Artificially introduce aquatic plants to the ditch - Ensure light levels are maintained within the ditch by following the management activities for condition criteria 1 and 3 within this table	The presence of aquatic plants increases structural diversity within the ditch habitat and provides an extra resource for foraging, refuge and reproduction	From year 3
3. There is less than 10% cover of filamentous algae and/or duckweed	Manually skim dense algal/duckweed growth from the water surface	Ensures light can penetrate the water surface and reach the bed so aquatic plants can flourish	From year 1
4. A fringe of marginal vegetation is present along more than 75% of the ditch	- Introduce vegetation to the banks of the ditch by seeding or planting plugs - Where possible, limit human disturbance by footfall	Provides a transitional habitat between the ditch and surrounding habitats and prevents excess runoff of silt and sediment into water	From year 3
5. Physical damage not present	- Avoid using heavy equipment/machinery close to the ditch - Limit footfall around the ditch	Allows undisturbed water flow and growth of vegetation	From year 1
6. Sufficient water levels are maintained	Consistently remove litter and debris from ditch	Secures a constant habitat year-round for aquatic/amphibious species	

	Remove excess growth of woody species which may threaten to reduce water levels within the ditch		
7. Less than 10% of the ditch is heavily shaded	Cut back excess growth at the appropriate time of year (Section 4.3)	Ensures adequate light levels reach the ditch	From year 2
8. Non-native plants are absent	Consistent monitoring and removal of invasive species when identified	Prevents invasive species from dominating the habitat and outcompeting native species. Ensures the character of the habitat is maintained	From year 1

4.2 Habitat Enhancement

4.2.1 Native Scrub

Areas of native scrub are to be enhanced across the site. Enhancement will include the planting of native scrub species including flowering and fruiting species as detailed in Table 2 to provide the highest value to wildlife including foraging and sheltering opportunities. This habitat will also be subject to regular pruning and thinning to maintain a variety of habitat structure.

Table 2 – Species included within planting scheme

Benefit to Environment	Species that Fulfil Benefit
Proposed Native Shrub Planting	
Native Species	Guelder rose (<i>Viburnum opulus</i>), elder (<i>Sambucus nigra</i>), hazel (<i>Corylus avellana</i>), holly (<i>Ilex aquifolium</i>), hawthorn (<i>Crataegus monogyna</i>), silver birch (<i>Betula pendula</i>), blackthorn (<i>Prunus spinosa</i>).
Foraging for pollinators	Guelder rose, elder, hawthorn, blackthorn, silver birch
Invertebrate food plant	Elder, hazel, holly
Foraging for mammals, birds etc.	Guelder rose, elder, hazel, holly
Nesting opportunities for ground nesting birds	Guelder rose, hazel, elder, holly
Year round sheltering and foraging opportunities	Guelder rose
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 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 then at least three of the following criteria are expected to be achieved by 5 years.

Table 3 – 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 sapling growth - Periodic cutting to create a graded margin at scrub edge - 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	Ensures successful natural regeneration of scrub species while maintaining a diverse age range	By year 5
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 10

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

4.2.2 Other Broadleaved Woodland

Other broadleaved woodland is to be retained within the eastern section of the site. Enhancement of this habitat will be carried out through 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 4. The targeted condition for the broadleaved woodland on site is Moderate with an expected time to reach target condition of 10 years.

Table 4 – Species included within the planting scheme

Benefit to Environment	Species that Fulfil Benefit
Proposed Native Specimen Trees	
Native Species	Field maple (<i>Acer Campestre</i>), alder (<i>Alnus glutinosa</i>), silver birch (<i>Betula pendula</i>), common hawthorn (<i>Crataegus monogyna</i>), wild cherry (<i>Prunus avium</i>), sessile oak (<i>Quercus petraea</i>)
Forging for pollinators	Field maple, alder, silver birch, common hawthorn, wild cherry
Invertebrate food plant	Field maple, silver birch, sessile oak
Foraging for mammals, birds etc.	Field maple, silver birch, common hawthorn, wild cherry, sessile oak
Nesting opportunities for birds	Field maple, silver birch, common hawthorn, 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 (<i>Viburnum opulus</i>), elder (<i>Sambucus nigra</i>), dog wood (<i>Cornus sanguinea</i>), hazel (<i>Corylus avellana</i>), wild privet (<i>Ligustrum vulgare</i>), holly (<i>Ilex aquifolium</i>)
Forging for pollinators	Guelder rose, elder, holly
Invertebrate food plant	Elder, hazel, holly
Foraging for mammals, birds etc	Guelder rose, elder, hazel, holly
Nesting opportunities for birds	Hawthorn, hazel, holly
Opportunities for ground nesting birds	Hazel
Fungi host plant	Hazel
Year round sheltering and foraging opportunities	Guelder rose, holly

Detailed management techniques to promote structural variation and allow light to reach the developing ground flora and scrub layer are detailed within Table 5 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 5 – 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, overshadowing 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 of fauna and fungi.	By year 10
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*), Shalloon (*Gaultheria shallon*), Snowberry (*Symphoricarpos albus*), Variegated yellow archangel (*Lamium galeobdolon* subsp. *Argentatum*), Rhododendron (*Rhododendron ponticum*).

4.3 Habitat Creation

4.3.1 Modified Grassland

Areas of modified grassland on site are to be created adjacent to car parks and pedestrian walkways (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 4 years. Detailed management techniques 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 then 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 6 – 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	N/A	N/A	N/A
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 - Periodic monitoring of grassland to assess presence of damage - If damage is identified apply protections including fencing or signage as necessary	Ensures amenity use and prevent degradation of habitat	From year 1
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	Periodic monitoring and control/removal	Ensure native assemblage of species throughout grassland. Prevents competition from aggressive non-native species.	By year 4

undesirable species less than 5% of total area.	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		
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**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*).

4.3.2 Other Neutral Grassland – Wildflower Meadow

Areas of other neutral grassland (described as Wildflower Meadow) 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 these areas of other neutral grassland on site is good with an expected time to reach target condition of 10 years. Detailed management techniques to create diverse and well-structured areas of grassland are detailed in Table 7 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 good then at least five of the following criteria are expected to be achieved by 10 years.

Table 7 – 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 specific grassland habitat. Wildflowers, sedges and indicator species are Clearly visible throughout the sward.	• 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 10
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 • Periodic monitoring and control/removal undesirable species as necessary	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 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 jacobaea*), 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*).

4.3.3 Other Neutral Grassland – Wet Meadow

Additional areas of other neutral grassland will be created as wet meadows to form the SuDS attenuation basin. This area will be regularly inundated with water and will be seeded with a wet wildflower meadow seed mix containing species which are suited to this environment, such as meadowsweet (*Filipendula ulmaria*) and common sorrel (*Rumex acetosa*). Management practices must reflect the wet nature of this habitat and its role as a SuDS feature.

The targeted condition for these areas of other neutral grassland on site is good with an expected time to reach target condition of 10 years. Detailed management techniques to create diverse and well-structured areas of grassland are detailed in 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 good then at least five of the following criteria are expected to be achieved by 10 years.

Table 8 – 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 specific grassland habitat.	• To be provided through a diverse species mix	Ensures diversity is maintained throughout the grassland and its function as a SuDS feature is maintained	By year 10

Wildflowers, sedges and indicator species are clearly visible throughout the sward.	- Monitoring to ensure balance of species across habitat areas - Removal of vigorous species which will dominate habitats, such as bulrush (<i>Typha latifolia</i>) and greater pond sedge (<i>Carex riparia</i>) - Removal of shrub and tree species which would impact function of the habitat		
2. Sward height is varied	- Mow vegetation within SuDS basin to 100mm and allow growth of 150mm max. Mow as frequently as required - Stagger mowing to cut different areas of grassland at different times to create a varied vertical structure	Provides a range of microclimates and opportunities for a range of fauna while preventing scrub encroachment. Mowing prevents vegetation from growing too tall and restricting water movement.	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

Additional management practices relating to SuDS maintenance are detailed in Table 9

Table 9 – SuDS basin management targets

Management objective	Frequency	Benefit
Remove litter and large debris from the basin	Monthly	Keeps grassland and standing water free from pollution and encourages free movement of water
Remove silt accumulation and dispose of off-site	Annually	Maintains depth of the basin and allows sufficient light to reach vegetation
Inspection, maintenance and clearance of any inlets and outlets	Monthly	Ensures free movement of water into SuDS basin and prevents accumulation of water at other parts of the site
Control of woody growth within 5m of pond edge by pruning/removal	Annually	Prevents encroachment into meadow habitat and maintains high light levels for consistent growth
Promoting drainage by harrowing or scarification	As required	Encourages drainage of water through soil and off-site

4.3.4 Native Scrub

Areas of native scrub are to be created across the site. Creation will include planting of native ground cover and scrub species including flowering and fruiting species as detailed in Table 10 to provide the highest value to wildlife including foraging and sheltering opportunities.

Table 10 – Species included within planting scheme

Benefit to Environment	Species that Fulfil Benefit
Proposed Native Shrub Planting	
Native Species	Guelder rose (<i>Viburnum opulus</i>), wayfaring tree (<i>Viburnum lantana</i>), dog wood (<i>Cornus sanguinea</i>), alder (<i>Rhamnus frangula</i>), buckthorn (<i>Rhamnus catharticus</i>), wild privet (<i>Ligustrum vulgare</i>), common gorse (<i>Ulex europeus</i>), elder (<i>Sambucus nigra</i>), hazel (<i>Corylus avellana</i>), holly (<i>Ilex aquifolium</i>), yew (<i>Taxus baccata</i>)
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, holly, 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 11 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 then at least three of the following criteria are expected to be achieved by 5 years.

Table 11 – 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 sapling growth - Periodic cutting to create a graded margin at scrub edge - 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	Ensures successful natural regeneration of scrub species while maintaining a diverse age range	By year 5
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 10

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

4.3.5 Native Species Rich Hedgerow

Native species rich hedgerows are to be created around the periphery and within the site. The targeted condition for the created hedgerows is good with an expected time to reach target condition of 12 years.

Table 12 – Species included within the planting scheme

Benefit to Environment	Species that Fulfil Benefit
Native Hedge Mix	
Native Species	Common hawthorn (<i>Crataegus monogyna</i>), hazel (<i>Corylus avellana</i>), wild privet (<i>Ligustrum vulgare</i>), holly (<i>Ilex aquifolium</i>), guelder rose (<i>Viburnum opulus</i>)
Forging for pollinators	Hazel, common hawthorn, holly, guelder rose
Invertebrate food plant	Hazel, common hawthorn
Foraging for mammals, birds ect.	Hazel, common hawthorn, holly, guelder rose
Nesting opportunities for ground nesting birds	Hazel, common hawthorn, guelder rose
Year round sheltering and foraging opportunities	Common hawthorn, guelder rose
Fungi host plant	Hazel

Detailed management techniques to create diverse and well-structured areas of hedgerow 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 at least six of the following criteria are expected to be achieved by year 5.

Table 13 – 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	As above	Ensure function of hedgerow is maintained.	By year 5

and base of canopy <0.5 m for >90% of length			
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 prevent gaps and repair damage	Ensures hedgerow is protected from adjacent operations	From year 1

4.3.6 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/fruitle 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.

4.4 Detailed Work Programme

Management should be undertaken on a 5-year cycle with a full habitat assessment after each cycle to assess the condition of each habitat. Following each assessment, if necessary, the work programme can be amended to ensure habitats are achieving the best possible condition score and are performing full ecological function. As habitats need to be maintained for 30 years, this means that management will be carried out in 6 cycles.

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	■	■	■	■	■	■	■	■	■	■	■	■
	Control and removal of non-native species	As required following monitoring	■	■	■	■	■	■	■	■	■	■	■	■
	Monitoring throughout growing and dormant period to ensure successful establishment and control browsing and other damage	Every three months	■	■	■	■	■	■	■	■	■	■	■	■
	Any required pruning to damaged or diseased plants	As required annually	■	■	■	■	■	■	■	■	■	■	■	■
Mixed Scrub	Initial and replacement planting	Year 1 then as required annually	■	■	■	■	■	■	■	■	■	■	■	■
	Control and removal of non-native species	As required annually	■	■	■	■	■	■	■	■	■	■	■	■
	Monitoring throughout growing and dormant period to ensure successful establishment and control browsing and other damage	As required annually	■	■	■	■	■	■	■	■	■	■	■	■
	Any required pruning to damaged or diseased plants	As required following monitoring	■	■	■	■	■	■	■	■	■	■	■	■
	Mowing of grass / herb margin at scrub edge.	Every other year	■	■	■	■	■	■	■	■	■	■	■	■
	Selective clearing of scrub edge to ground. Clear 1/3-1/5 of each scrub parcel edge on rotation.	Once every three years	■	■	■	■	■	■	■	■	■	■	■	■
	Initial and replacement planting	Year 1 then as required annually	■	■	■	■	■	■	■	■	■	■	■	■

Habitat	Action	Frequency Notes	Indicative timing of operation											
			J	F	M	A	M	J	J	A	S	O	N	D
Other neutral grassland (Species rich wildflower meadow)	Control and removal of non-native species	As required following monitoring												
	Mowing of grass and removal of arisings.	Annually												
Other neutral grassland – wet meadow	Remove litter and debris from basin	Monthly												
	Remove silt accumulation from basin	Annually												
	Inlet and outlet inspection and clearance	Monthly												
	Cut back excess growth around pond edge	Annually												
	Scarification of ground to improve drainage	Annually as required												
	Re-seeding of bare ground	As required												
	Removal of vigorous species and invasives	Consistent monitoring and removal as required												
Native species rich hedgerows	Initial and replacement planting	Year 1 then as required annually												
	Control and removal of non-native species	As required annually following monitoring												
	Rotational pruning of hedges 1/3 total area	Annually from year 2												
Ditches	Removal of dense algal/duckweed cover	As required												
	Removal of litter and debris	Monthly												
	Cutting back of excess marginal growth shading ditch	Annually												
	Removal of invasive species	Consistent monitoring and removal as necessary												

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