A57 Link Roads

TR010034

9.40 Outline Landscape and Ecological Management and Monitoring Plan

Rule 8(k)

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1. Introduction

1.1 Scope of the document

1.1.1 This Outline Landscape and Ecological Management and Monitoring Plan (LEMP) describes the proposed management and monitoring of the landscape and ecological mitigation and compensation features of the A57 Link Roads scheme (the Scheme).

1.1.2 The purpose of this plan is to set out the general principles and quality standards required for the management of the softworks and of the long-term landscape maintenance operations.

1.1.3 The Scheme is a Nationally Significant Infrastructure Project (NSIP) and this Outline LEMP has been developed in support of National Highways' application for a Development Consent Order (DCO) to authorise construction, operation and maintenance of the Scheme. An Environmental Impact Assessment (EIA) has been carried out for the Scheme and is reported in the Environmental Statement (ES). The ES and other DCO documents prepared to support the application are available through the Planning Inspectorate project document library: **TR010034-000603-A57 Link Road Examination Library Published.pdf (planninginspectorate.gov.uk)**.

1.1.4 This Outline LEMP is based on the commitments set out in the ES for the Scheme, and specifically those in the Environmental Management Plan (First iteration) (APP-183) and the Register of Environmental Actions and Commitments (REAC) (REP1-037) and Figure 2.4 Environmental Masterplan of the ES (APP-074).

1.1.5 It has been prepared as an Outline document to support the DCO application, which was submitted to the Planning Inspectorate in June 2021. The preparation of a LEMP will be secured by requirement 5 of the DCO during the Detailed Design stage and submitted to the Secretary of State (SoS) for their approval in writing, following consultation with the relevant planning authorities it is intended that the LEMP will be a live document that is reviewed and updated to include detailed design information or Scheme changes during the Scheme development and implementation on site.

1.1.6 This Plan aims to ensure that the vision for the A57 Link Roads landscape scheme, can be achieved through a long-term co-ordinated approach to landscape management by the:

- Implementation of ecological mitigation proposals, including habitat creation and management.
- Implementation of landscape proposals including establishment and maintenance.
- Annual monitoring of the plan full review.

1.1.7 An Environmental Management Plan (EMP) (Second iteration) will be produced by the appointed Principal Contractor to mitigate the impacts during the construction phase of the Scheme, at which stage the REAC will be combined so they become a single document. This will broadly follow the EMP (First iteration)

(APP-183) and will reflect the mitigation measures set out in the REAC (APP-184) requirements.

1.1.8 The Outline LEMP is a preliminary document based on the design to date. All details are subject to further work and stakeholder engagement. A final version of the LEMP will be created by the Principal Contractor for implementation during the establishment period and after the establishment period. The LEMP will be substantially in accordance with this Outline LEMP, including the habitat management objectives, targets and prescriptions set out in it.

1.1.9 It is assumed for the purposes of the Outline LEMP that the management and maintenance of the Scheme, including all landscape elements, features and ecological habitats included in this Outline LEMP, will remain the responsibility of the respective landowner following hand over of the project after the establishment period. Details of landowner responsibility will be included within Section 8 Outline Management Plan of the LEMP following the detailed design stage.

1.1.10 This Outline LEMP does not include routine vegetation management activities required for safety, such as maintaining visibility splays; or routine maintenance tasks such as rubbish removal, repair to fences, or reinstatement of habitat following incidents or incursions to the verge.

1.1.11 The protected species licences and the EMP (Second iteration) will be taken into consideration during the development of the LEMP.

1.2 Structure of the document

1.2.1 The Outline LEMP covers the initial period following construction up to 25 years, and has been prepared in accordance with the requirements of Design Manual for Roads and Bridges (DMRB) LD117 Landscape Design[1], LD118 Biodiversity design[2], and LA120 Environmental management plans [3].

1.2.2 This document includes:

- An overview of how the LEMP will be implemented, including roles and responsibilities of individual parties is provided.
- A brief summary of the environmental context of the Scheme and the potential effects on landscape and visual receptors or biodiversity resources to support the development of this Outline LEMP.
- The approach to mitigation and compensation design including specific design constraints and assumptions.
- The objectives for creation and management of new landscape and ecology features, targets for function/condition, and outline prescriptions for management activities.
- An outline management plan which includes timescale periods for management requirements.
- Outline specifications for management activities and monitoring.

[redacted]

1.2.3 The LEMP should be read along with the Environmental Masterplan (ES Figure 2.4, APP-074). Landscape management plan drawings will be completed following the detailed design stage.

1.3 Description of the Scheme

1.3.1 The Scheme is for the creation of two new link roads at the western end of the A57/A628 route, to provide a dual carriageway bypass around Mottram-in-Longdendale. The two new link roads being delivered by this Scheme are as follows:

- Mottram Moor Link Road – a new dual carriageway from the M67 Junction 4 roundabout to a new junction on the A57(T) at Mottram Moor.
- A57 Link Road – a new single carriageway link from the A57(T) at Mottram Moor to a new junction on the A57 in Woolley Bridge.

1.3.2 The Scheme is shown on Figure 2.2 of the ES (APP-074) and permanent and temporary land take is shown on the Scheme Land Plans (APP-007)

1.3.3 The Scheme includes the following components:

- A new offline bypass of 1.12 miles (1.8km) of dual carriageway road connecting the M67 Junction 4 to A57(T) Mottram Moor Junction.
- A new offline bypass of 0.81 miles (1.3km) of single carriageway road connecting the A57(T) Mottram Moor to the A57 Woolley Bridge.
- Two new junctions, Mottram Moor Junction and Woolley Bridge Junction and improvement works to the existing M67 Junction 4.
- Five new structures (Old Mill Farm Underpass, Roe Cross Road Overbridge, Mottram Underpass, Carrhouse Lane Underpass and River Etherow Bridge).
- One main temporary construction compound area, located on agricultural land to the east of the M67 Junction 4.
- Detrunking, including safety measures from the M67 Junction 4 to Mottram Back Moor Junction, to be agreed with TMBC.
- Safety measures and improvements to the A57 from Mottram Moor Junction to Gun Inn Junction and from Gun Inn Junction to Woolley Bridge Junction, to be agreed with TMBC.
- One main compound area located close to the M67/A57(T)/A560 Junction, with three other locations along the route for storage.

1.3.4 Associated works for temporary access, temporary lay-down, work areas and ancillary works will also be required.

2. Implementation of the Landscape and Ecological Management and Monitoring Plan (LEMP)

2.1 Roles and responsibilities

2.1.1 The roles and responsibilities in relation to the Outline LEMP are summarised below.

Table 2.1 – Roles and responsibilities

Role	Responsibilities
National Highways	National Highways has committed to make resources available for the works described within this Outline LEMP. These durations are dependent on habitat type and/or management activities. National Highways (or the relevant highway authority) will continue to be responsible for carrying out routine maintenance of any highways assets such as road verges and drainage systems as part of their routine asset management programme.
Principal Contractor	The appointed Principal Contractor will be responsible for carrying out the detailed design and construction works detailed in the DCO; they will have the overall control of delivering the Scheme. The Principal Contractor will be responsible for the implementation of the landscape masterplan proposals in accordance with the Environmental Masterplan (ES Figure 2.4, APP-074) and any temporary or permanent land take areas and compensation areas. They will be responsible for constructing any new structures or features (such SuDS features or ponds). The Principal Contractor will be responsible for monitoring the establishment of new planting and seeding in line with the detailed landscape scheme specification up until handover to the monitoring party. They will also be responsible for replacing planting defects during the contracted establishment period, and any other management prescriptions provided within the detailed LEMP, and that are scheduled to be undertaken during the establishment period. The Principal Contractor will appoint an appropriately experienced and qualified landscaping contractor. The contractor is to be competent at identifying plant species, including those proposed as part of seeded and planted mixes, as well as any undesirable species, and experienced in the various habitat creation and enhancement works required on this Scheme. Specialist work (such as pond and backwater creation) may be carried out by specialist sub-contractors appointed by the Principal Contractor where particular specific skills, equipment and/or experience are required.
Landowner	It has been assumed for the purpose of this Outline LEMP, the landowner will have responsibility for ongoing management and maintenance of the soft works following completion of the construction works.
Monitoring party	Monitoring the progress towards the targets is critical to meeting the objectives. National Highways (or the relevant highway authority) will appoint a monitoring party to monitor the outcomes of the works carried out at set intervals during the agreed management/monitoring period following handover. The

Role	Responsibilities
	monitoring shall be undertaken by suitably qualified and experienced ecologists and landscape architects. The monitoring will record details of management works carried out, targets met, and/or remedial actions required. Records of monitoring will be retained for reference. Monitoring will be continued for the duration that management activities are undertaken. Monitoring will be carried out to determine: • Whether measures have been implemented as agreed. • The relative success/effectiveness of the measures. • How to remedy the situation if any of the measures fail. • If further consultation / approvals are required in the instance that the proposed measures are not proving effective.

2.2 Habitat management and monitoring duration

2.2.1 The duration of management and monitoring for each landscape/ecology element created or enhanced is 25 years from completion of the authorised development.

2.2.2 The LEMP will be reviewed periodically to determine whether the management activities are meeting the objectives.

3. Site Description

3.1 Location

3.1.1 The Scheme (see Insert 1, below) is located primarily within Mottram-in-Longdendale, on the eastern edge of the Manchester conurbation, adjacent to and within the settlements of Hattersley, Mottram-in-Longdendale, Hollingworth and Woolley Bridge. The road connects the M67 in the west, to the A57 Brookfield Road in the east and crosses through the surrounding, predominately pasture, agricultural land within the Harrop Edge and Mottram Moor valley sides and within the Etherow river valley.

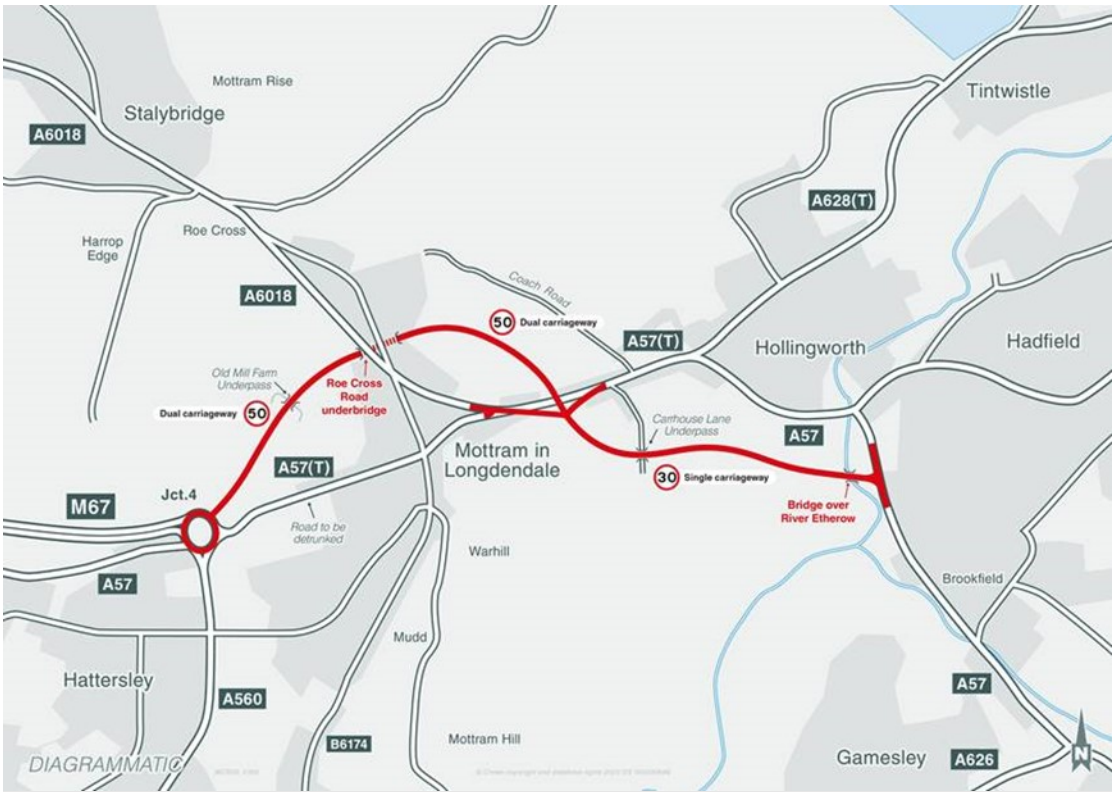

Figure 3.1 – Indicative Scheme Alignment

3.1.2 The Scheme lies mainly within the administrative boundaries of Tameside Metropolitan Borough Council (TMBC), which extends to the proposed River Etherow Bridge. To the east of this, the Scheme crosses over the boundary with High Peak Borough Council (HPBC) and Derbyshire County Council (DCC).

3.2 Existing landscape

3.2.1 The existing landscape setting for the Scheme predominately comprises low-lying undulating valley topography, with a network of streams, dense tree cover interspersed between pastoral farmland, small to medium sized fields enclosed by hedgerows and drystone walls, and dispersed settlement. Towards the eastern section of the Scheme the landscape progresses into a flat alluvial meandering river corridor, with grazing meadows, and dense waterside and scattered hedgerow trees. Key characteristics of the Scheme landscape envelope are predominately:

- A low-lying undulating valley topography, rising towards adjacent higher ground

- Network of streams and localised damp hollows with millponds and leats
- Pastoral farmland enclosed by hedgerows and drystone walls
- Small to medium sized fields
- Trees are dense along watercourses and scattered along hedgerows and around settlement
- Dispersed settlement with isolated farmsteads and small clusters of dwellings
- Stone built terraced housing associated with historic mills
- Narrow winding lanes, sunken on slopes

3.2.2 For the eastern area of the Scheme, from Carrhouse Farm to the River Etherow crossing, the key landscape envelope characteristics are:

- A flat alluvial river corridor
- Meandering river channel with shingle beds and marginal vegetation
- Seasonally waterlogged alluvial soils
- Grazing meadows, often with patches of wet grassland
- Dense waterside and scattered hedgerow trees

3.3 Existing habitats

3.3.1 The majority of the Scheme predominantly includes grazed improved grassland interspersed with hedgerow and drainage ditches. Patches of semi-improved grassland are also present, although fewer in number.

3.3.2 Five parcels of lowland mixed deciduous woodland (with a combined total area of approximately 0.78 ha) fall within the Scheme with the two largest areas located just east of Old Hall Lane and just west of Carr House Lane.

3.3.3 Within the Scheme, extents of lowland dry acid grassland were present in pastural land west of the A6018 Roe Cross Road and north of the A57 Mottram Moor. The grassland comprises species indicative of acid grassland, including common bent, tormentil, heath bedstraw, hard-fern, bilberry, mat-grass and sheep's sorrel, with betony also present. Two areas of wet woodland measuring approximately 0.1 ha combined were present within poorly drained hollows within pastural land west of the A6018 Roe Cross Road within the Scheme. This woodland type was dense in structure and was dominated by grey willow.

3.4 Proposed landscape and ecological design

3.4.1 Overall, the proposed landscape design provides a number of important functions across the Scheme. Firstly, as mitigation - to screen the highway from visual receptors, either residential properties, footpaths or places of business. Secondly, to help to integrate this linear infrastructure into a complex and attractive local landscape through sympathetic design of landform, planting patterns and materials. The design will also provide compensatory replacement planting greater than total of habitat lost, as result of the Scheme, which will contribute to achieving a target of 10% biodiversity net gain within the Scheme boundary. Features have also been included within the landscape to provide mitigation and compensation measures, such as bat and bird nesting boxes,

artificial otter holts, and bat crossing points to aid connectivity in strategic locations.

3.4.2 Landscape and ecological design-led objectives will be achieved through new earthworks with cuttings and false cuttings and new slopes and embankments, plus a range of planting typologies including significant areas of native deciduous woodland, wet woodland, scattered trees, scrub and shrub planting, extensive new hedgerows and a variety of grasslands to provide a rich habitat mosaic.

3.4.3 Overall, around seven hectares of new woodland planting will be provided, 0.5 hectares of scrub and over 7km of new hedgerows plus 1 hectare of acid grassland and 1.4 hectares of wet grasslands.

3.4.4 The landscape and environmental proposals have been developed to minimise the impact of loss of habitat, biodiversity, provide screening of the road and loss of a sense of rural tranquillity whilst delivering the core route creation objectives. Proposed environmental features, such as habitat creation and improved biodiversity, help to minimise the adverse environmental effects of the proposed scheme.

3.4.5 The proposed design will:

- Compensate through replacement planting, hedgerows and woodland areas that require removal to accommodate the road, planting provide visual screening to the road and reflect the character of the surrounding landscape. There will be a net increase in hedgerows and linear tree and woodland cover.
- Minimise the impact of biodiversity loss, maximise biodiversity gain and create a sustainable environment for long term species diversity through habitat creation.
- Protect existing trees by the implementation of tree protection measures in accordance with Appendix 7.3 - Arboricultural Impact Assessment of the ES (APP-168), which is compliant with BS 5837:2012 '*Trees in Relation to Design, Demolition and Construction – Recommendations*'.

4. Mitigation/compensation Design Approach

4.1 Design principles

4.1.1 The Scheme includes a range of measures designed to mitigate for potential effects on biodiversity, landscape character and visual amenity. The Scheme design has been an iterative process which has been developed through optioneering to identify the most suitable location and development of the design to minimise landscape and visual impacts, which includes the retention of existing vegetation and features, where possible, within the Draft Order Limits.

4.1.2 The mitigation strategy proposed encompasses mitigation requirements and potential enhancements for the ecology and landscape assets. These are illustrated on the Environmental Masterplan (Figure 2.4, APP-074).

4.1.3 The potential proposed mitigation focuses on the following principles:

- Retaining and protecting existing mature trees and hedges wherever possible, maintaining important visual screening and biodiversity habitat.
- Replacing any habitat losses as a minimum to ensure no net loss of biodiversity.
- Retaining natural character and planting local native species.
- Proposed tree planting to provide screening to sensitive receptors.
- Proposed earth contouring environmental bund and integrated planting.

4.2 Mitigation during construction

4.2.1 Mitigation has incorporated embedded landscape, biodiversity, and visual mitigation measures, which are considered integral to the design of the Scheme provided in Chapter 2: The Scheme of the ES (APP-060). These measures are designed to reduce disruption, visual intrusion and to assist in landscape integration, they are summarised as:

- Construction programme kept to the minimum practicable time to reduce the duration of any landscape and visual impact
- Construction plant and materials storage areas appropriately sited to minimise their landscape and visual impact
- Construction managed such that the loss of any existing vegetation not affected by the permanent works is minimised
- Profile shapes and habitat created naturalistically to reflect the existing surroundings, the footprint of the scheme has been minimised to avoid unnecessary tree removal and ensures future obligations for maintenance during the operation phase are reduced
    - Embedded mitigation measures have been incorporated into the Scheme design to avoid and prevent effects including environmental working practices to ensure adequate pollution control measures are implemented and use of precautionary methods of working (PMW) during construction to minimise risks to individual animals and/or protected species where licences would not be required

- Essential mitigation has been provided for protected species through increased breeding opportunities (including a dedicated bat structure and a range of bat/bird nesting boxes) and several crossing points to aid connectivity across the Scheme, and
- Mitigation measures under licence (for bats and badgers) will be required due the legal protection afforded to these species.

4.3 Planting and seeding specification

4.3.1 The detailed specifications for ground preparation, planting and seeding will be provided at the Detailed Design stage. This Outline LEMP provides preliminary species mixes in Section 6.

4.4 Monitoring strategy

4.4.1 A suitable programme of monitoring of new features will be implemented to identify and remedy any failings with the management of the landscape elements as well as determine success.

4.4.2 Monitoring, to ensure the success of the proposed mitigation measures provided, including long-term management plans for the notable habitats and species monitoring programmes.

4.4.3 An outline monitoring specification is set out in Section 9.

4.5 Key design constraints

4.5.1 The landscape and ecological mitigation (and compensation) is provided in response to the potential impacts on landscape and visual receptors and biodiversity resources, the landscape character of the area and the historical land-use . These are identified and reported in the ES within Chapter 7: Landscape and Visual Effects and Chapter 8: Biodiversity.

4.5.2 The preliminary design takes into account the requirements of legally protected species that will be subject to licences from Natural England to undertake the works. This includes a European Protected Species Mitigation (EPSM) licence for bats and a protected species licence for badgers. These will be applied for upon successful approval of the DCO.

4.5.3 Constraints considered as part of the landscape and ecological mitigation (and compensation) design:

- The predicted state of the following construction activities, including any damage due to disturbance to the habitat and soils from earthworks and utilities diversions,
- restrictions to maintenance and operational activities within the highway boundary arising from safety requirements and intends minimal intervention while meeting the objectives of the landscape and biodiversity mitigation; and
- as far as reasonably possible the interests of the adjacent landowners and any effects the mitigation design might have on external stakeholders.

4.6 Design assumptions

4.6.1 The following design assumptions have been made where the mitigation design is subject to further assessments or activities at detailed design or construction stage:

- Species-rich grassland seeding will be on soils stripped of topsoil. Surplus topsoil will be utilised elsewhere on site, where possible, taking into account the prevention of spread of invasive plant species. No topsoil will be used on verges as per NH Major Projects Instructions MPI-85-102020.
- Amenity grassland areas will be on areas prepared with topsoil gained from the site and not imported, taking into account prevention of spread of invasive plant species.
- Attenuation ponds are not considered for management in this Outline LEMP and will be maintained under a DMRB Series 3000 maintenance specification which will be completed following detailed design. The exception is the surrounds of each attenuation pond, which will include grassland habitat.
- This Outline LEMP does not include detailed routine vegetation management activities required for safety, such as maintaining visibility splays; or detailed routine maintenance tasks such as rubbish removal, repair to fences, or reinstatement of habitat following incidents or incursions to the verge.
- All non-native invasive plant species will either be eradicated prior to any works commencing, or fully avoided during the duration of the works in line with the Invasive Non-Native Species Management Plan, which will be prepared and included in Annex B of the EMP (Second iteration).

5. Landscape & Ecological Management Objectives

5.1 General landscape management objectives

- Apply good horticulture and ecological practice to all operations;
- Promote healthy growth and establishment of all plants, trees and grasses;
- Ensure consistent control of invasive weeds;
- Promote optimum display and flowering periods and stem colour;
- Ensure development of optimum plant form, shape and planting density;
- Provide protection against pests and diseases;
- Promote wildlife value and species diversity where appropriate; and
- Ensure long term commitment to replacement of defective plant material.

5.2 General ecological management objectives

- Achieve a target of 10% biodiversity net gain;
- Retain and protect important habitats where possible;
- Provide compensation habitats for those lost using native species of local provenance;
- Maintain connecting habitat for commuting and foraging species; and
- Enhance retained habitats.

5.3 Landscape elements, environmental function & objectives

5.3.1 The location of landscape elements is shown Environmental Masterplan (ES Figure 2.4, APP-074) and the functions and objectives described in Table 5.1. Ecological constraints and mitigation / compensation objectives are outlined in Section 5.4.

Table 5.1 – Landscape elements, environmental function & objectives

Landscape Element	Environmental Function	Objectives
LE1.1 Amenity grassland	• Visual amenity • Landscape integration	• Create a dense amenity grassland sward along the highway maintenance strip, along embankments and in some amenity areas. • The seed choice is a specially selected blend of fast establishing, low maintenance species and varieties that will aid in the stabilisation of embankments, prevent soil erosion and tolerate road salt grit conditions. • Visual integration of highway infrastructure and landscape
LE1.2 Grassland with bulbs	• Visual amenity • Landscape integration	• Provides seasonal change and interest

Landscape Element	Environmental Function	Objectives
	• Nature conservation and biodiversity	• Provides colour, form, texture, scale and variety. • Maintains a variety of wildflower species sympathetic to adjoining species rich habitats.
LE1.3 Species rich grassland - neutral grassland	• Visual amenity • Landscape integration • Nature conservation and biodiversity	• A diverse sward which allows natural colonisation by a wide variety of wildflowers and grasses and which is ecologically and visually diverse. • Provides colour, form, texture, scale and variety. • Maintains a variety of wildflower species sympathetic to adjoining species rich habitats.
LE1.3i Species rich grassland - neutral grassland	• Visual amenity • Landscape integration • Nature conservation and biodiversity	• A diverse sward which allows natural colonisation by a wide variety of wildflowers and grasses and which is ecologically and visually diverse. • Provides colour, form, texture, scale and variety. • Maintains a variety of wildflower species sympathetic to adjoining species rich habitats.
LE1.6 Open grassland	• Visual amenity • Landscape integration • Nature conservation and biodiversity	• Provide a species-rich grassland habitat of native grasses and wildflowers, with a mosaic of structure, and occasional scattered native scrub species. • Create transitional habitat grading from tussocky grassland to more dense scrub habitats where adjacent to dense scrub or woodland. • Improve biodiversity, through providing a diversity of species and structure, which will enhance feeding and shelter opportunities for invertebrates and in turn for other species such as birds, bats and small mammals. • Control of invasive plant species.
LE2.1 Native woodland mix	• Screening/ Integration • Nature conservation and biodiversity • Visual Amenity • Visual Screening	• Protect retained trees from damage during the construction period and to monitor their condition during the duration of the management plan. • Width and density of planting to achieve layered structure, providing year-round screening including evergreen plants in mix • Maintain effective screening of Scheme. • Tie the Scheme into landscape reflecting local rural wooded landscape character and planting style

Landscape Element	Environmental Function	Objectives
		• Integrate retained mature and veteran trees and dead wood habitat • Manage in sympathy with management of adjacent and nearby woodlands. • Mix of native species to reflect local landscape character.
LE2.2 Woodland edge mix	• Screening/ Integration • Nature conservation and biodiversity • Visual Amenity	• Width and density of planting to achieve layered structure, providing year-round screening including evergreen plants in mix. • Maintain effective screening of Scheme. • Manage in sympathy with management of adjacent and nearby woodlands. • Mix of native species to reflect local landscape character.
LE2.3 Wet woodland mix	• Screening/ Integration • Nature conservation and biodiversity • Visual Amenity • Visual Screening	• Protect retained trees from damage during the construction period and to monitor their condition during the duration of the management plan. • Width and density of planting to achieve layered structure, providing year-round screening including evergreen plants in mix. • Maintain effective screening of Scheme. • Tie the Scheme into landscape reflecting local rural wooded landscape character and planting style • Integrate retained mature and veteran trees and dead wood habitat • Manage in sympathy with management of adjacent and nearby woodlands. • Mix of native species to reflect local landscape character.
LE2.4 Linear belts of shrubs and trees	• Screening/ Integration • Nature conservation and biodiversity • Visual Amenity • Visual Screening	• Width and density of planting to achieve layered structure, providing year-round screening including evergreen plants in mix. • Manage in sympathy with management of adjacent and nearby woodlands. • Mix of native species to reflect local landscape character. • Maintain effective screening of Scheme. • Visual screening of the road from neighbouring properties and other views
LE2.5 Shrubs and intermittent trees	• Screening/ Integration • Landscape Integration • Nature conservation and biodiversity • Visual Amenity	• Width and density of planting to achieve layered structure, providing year-round screening including evergreen plants in mix. • Maintain effective screening of Scheme.

Landscape Element	Environmental Function	Objectives
		• Manage in sympathy with management of adjacent and nearby woodlands. • Mix of native species to reflect local landscape character.
LE2.7 Scattered trees	• Landscape Integration • Nature conservation and biodiversity • Visual Amenity	• Protect retained trees from damage during the construction period and to monitor their condition during the duration of the management plan. • Mix of native species to reflect local landscape character.
LE2.8 Scrub mix	• Landscape integration. • Nature conservation and biodiversity	• Provide a range of successional scrub habitats, from occasional scattered scrub in a mosaic with grassland grading to more dense scrub habitats where there is a transition to woodland. • Scrub areas are proposed along the drainage swales to create some diversity of habitat and interest along the linear park and leisure route/ bridleway while not interfering with function of the drainage design. • Encourage growth of desirable scrub species employing techniques for establishing new planting where appropriate. • Apply control measures to contain growth. • Enrich scrub to allow conversion into structured planting prevent succession where desirable to retain scrub as habitat. • Encourage native species, using fruiting and flowering plants.
LE3.1 Ornamental shrubs	• Landscape integration • Nature Conservation and Biodiversity • Visual Amenity.	• Plant species provide rich seasonal variety of colours • Visually attractive • Defines public and semi-public areas
LE4.1 Ornamental species hedgerow	• Landscape integration • Visual Amenity •	• Plant species provide rich seasonal variety of colours • Visually attractive • Defines public and semi-public areas
LE4.2 Native species hedgerow (trimmed)	• Landscape integration • Nature Conservation and Biodiversity • Visual Amenity.	• Using local, indigenous species use same form of hedgerow management to provide links to adjacent landscapes. • To provide links between habitats to protect adjacent fragile habitats. • Plant species provide rich seasonal variety of colours.

Landscape Element	Environmental Function	Objectives
LE4.3 Native species hedgerow (un-trimmed)	• Landscape integration • Nature Conservation and Biodiversity • Visual Amenity • Visual Screening	• Dense, tall hedges with evergreen content to screen views to and from the carriageway. • Maintain effective screening of Scheme. • Using local, indigenous species use same form of hedgerow management to provide links to adjacent landscapes. • To provide links between habitats to protect adjacent fragile habitats. • Plant species provide rich seasonal variety of colours.
LE4.4 Native hedgerow & trees	• Visual Screening. • Landscape integration • Nature Conservation and Biodiversity • Visual Amenity.	• Dense, tall hedges with evergreen content to screen views to and from the carriageway. • Maintain effective screening of Scheme • Trees allowed to grow to full height provide intermittent screens. • Using local, indigenous species use same form of hedgerow management to provide links to adjacent landscapes. • To provide links between habitats to protect adjacent fragile habitats. • Plant species provide rich seasonal variety of colours and added structure with trees.
LE5.1 Individual trees	• Landscape Integration, trees will be planted in lines and as informal natural groups • Visual Amenity, the new tree planting will be of good stature including extra heavy standards and smaller transplant trees. • Nature Conservation and Biodiversity, the areas surrounding the trees will comprise a mix of amenity grass, wildflower, wetland or shrub plots.	• Individual trees are located along the scheme route for biodiversity and visual amenity value, roundabouts and along linear routes. • Individual trees proposed are a mix or native and ornamental and are predominately of a heavy standard size to create instant structure along the scheme. • Tree species and form to provide continuity and identity in urban settings, separating the road from adjacent land uses and softening the built environment. • Seasonal interest. • Native trees, especially fruiting trees, support wildlife. • Trees act as song posts for birds, bat roosts and perches for some predatory species.
LE6.1 Water bodies	• Visual Amenity. • Nature Conservation and Biodiversity. • Landscape integration.	• Maintain a balance of open water to associated vegetation to provide habitat and nature conservation interests • Maintenance regimes should be devised to have the minimum effect on flora and fauna, and to provide the

Landscape Element	Environmental Function	Objectives
		necessary protection to any protected species that may be present. • Low maintenance species, capable of being maintained by one cut per year or less. • Improve biodiversity, by providing a range of plant species not currently present within ponds, and provide additional habitat for specialist invertebrates and new foraging opportunities for birds and bats
LE6.2 Banks & ditches	• Field drainage • Nature Conservation and Biodiversity. • Landscape integration.	• Maintenance regimes should be devised to have the minimum effect on flora and fauna, and to provide the necessary protection to any protected species that may be present. • Low maintenance species, capable of being maintained by one cut per year or less.
LE6.3 Reed beds	• Nature Conservation and Biodiversity. • Landscape integration.	• Maintenance regimes should be devised to have the minimum effect on flora and fauna, and to provide the necessary protection to any protected species that may be present. • Low maintenance species, capable of being maintained by one cut per year or less. • Provides colour, form, texture, scale and variety. • Maintains a variety of species sympathetic to adjoining species rich habitats.
LE6.4 Marsh & wet grassland mix	• Visual Amenity. • Nature Conservation and Biodiversity. • Landscape integration.	• Maintenance regimes should be devised to have the minimum effect on flora and fauna, and to provide the necessary protection to any protected species that may be present. • Low maintenance species, capable of being maintained by one cut per year or less. • A diverse sward which allows natural colonisation by a wide variety of wildflowers and grasses and which is ecologically and visually diverse. • Provides colour, form, texture, scale and variety. • Maintains a variety of wildflower species sympathetic to adjoining species rich habitats.
E2.1i Ponds	• Sustainable urban Drainage	• Include grass, herb and woody species appropriate to the location or as exist

Landscape Element	Environmental Function	Objectives
	• System (SuDS) component, to maintain water quality. • Visual Amenity. • Nature Conservation and Biodiversity. • Hard or soft discrete measures intended to protect receiving watercourses and groundwaters from unacceptable impacts from pollutants contained in surface water runoff and from the effects of spillages	already on site with a species composition and diversity. • Low maintenance species, capable of being maintained by one cut per year or less. • Maintain a balance of open water to associated vegetation to provide habitat and nature conservation interests to maintain capacity of feature to hold and transport water and to protect the road from flooding. • Maintenance regimes for vegetative systems should be devised to have the minimum effect on flora and fauna, subject to preserving the full efficiency of the system, and to provide the necessary protection to any protected species that may be present
E2.1ii Swales and ditches	• Sustainable urban Drainage System (SuDS) component, to maintain water quality. • Visual Amenity. • Nature Conservation and Biodiversity. • Hard or soft discrete measures intended to protect receiving watercourses and groundwaters from unacceptable impacts from pollutants contained in surface water runoff and from the effects of spillages	• Include grass, herb and woody species appropriate to the location or as exist already on site with a species composition and diversity. • Low maintenance species, capable of being maintained by one cut per year or less. • Maintenance regimes for vegetative systems should be devised to have the minimum effect on flora and fauna, subject to preserving the full efficiency of the system, and to provide the necessary protection to any protected species that may be present.

5.4 Ecological Constraints and Mitigation/Compensation Objectives

5.4.1 The ecological constraints and mitigation/compensation objectives are outlined within Table 5.2 below.

Table 5.2 – Ecological Constraints and Mitigation/Compensation Objectives

Ecological Constraint	Ecological Objectives	Mitigation/Compensation
Bats	• To compensate for the loss of roosting opportunities for bats. • To compensate for permanent loss of foraging habitat.	• Over five hectares of native broadleaved woodland will be created across the Scheme. Woodland provision will address the reduction in roosting opportunities in the Scheme as trees will develop potential roost features (PRFs) over time.

Ecological Constraint	Ecological Objectives	Mitigation/Compensation
	• To mitigate for loss and fragmentation of foraging habitats and commuting routes used by bats	• At least 37 bat boxes will be maintained on retained mature trees within the Scheme. • Approximately 2,688 m of native, species rich, hedgerows and 11.8 hectares grassland will be maintained to compensate for permanent losses of habitat. • Tall vegetation (3-4 m) planting will be provided at strategic locations to encourage bats to fly higher over the carriageway and reduce the risk of vehicle collisions. • Where hedgerows and existing tree cover will be severed by the road, dense wooded thickets and scrub up to 6 metres in height (bat 'hop-overs') will be maintained which extend down the embankment to encourage bats to fly up and over the road on existing commuting routes. • Dedicated bat roost structure will be erected to provide roost spaces for bats.
Badger	• To compensate for loss of available foraging habitat for badgers. • To discourage badgers from crossing the new road and avoid/reduce road collisions by providing ledges within box culverts and targeted planting to provide suitable habitat within a social group's territory.	• An artificial badger sett would be provided prior to the closure of the identified main sett within the Site. A further artificial sett would be created in the event that a new badger clan were to colonise the Site prior, or during, construction. • Over five hectares of native broadleaved woodland will be created across the Scheme. • Hedgerow planting across the Scheme will increase the extent and availability of foraging habitat and reduce the likelihood of regular road crossings by badgers. • Linear fencing will be utilised to prevent road mortalities and guide badgers to safe crossing points. • Excavations are to be filled or covered overnight to prevent animals (such as badger) becoming entrapped. Where excavations cannot be filled or covered overnight, a plank of wood (or similar) should be placed into the excavation at an angle that allows means of escape.
Breeding birds	• To compensate for loss of arable and open grassland habitat used by ground-nesting and other breeding bids.	• Where possible, tree felling, and vegetation clearance will be minimised and undertaken outside the core bird nesting season (1 March to 31 August). • Loss of suitable bird nesting and foraging habitats would be mitigated via net increases in habitats. • Bird nest boxes would provide suitable nesting habitats until the new planting has established.
Otter	• To discourage otters from crossing the new road and avoid/reduce	• Otter proof fencing will be maintained to ensure gaps that an otter could fit beneath are absent.

Ecological Constraint	Ecological Objectives	Mitigation/Compensation
	road collisions by providing otter proof fencing/mesh 100 m either side of the bridge over the Linden.	• Otter proof fencing will be inspected every 6 months to ensure weak points have not developed.

6. Landscape elements – management approach prescriptions and general maintenance

6.1 LE1.1 Amenity grassland

Management approach

6.1.1 Create a dense amenity grassland sward along the highway maintenance strip, along embankments and in some amenity areas.

6.1.2 Provide a grass sward in composition, texture and density to blend with surrounding/adjoining amenity grass.

6.1.3 Implement a suitable cutting/mowing regime to maintain a favourable sward height and species composition

6.1.4 Operate cutting regimes in sympathy with surrounding areas.

Outline prescription

- Cutting regime to maintain grass to a uniform height, cover and colour with neat edging and no scrub invasion
- Annual noxious / self-sown weed assessment and assessment of the general condition of the area to identification any appropriate remedial works.
- As required. Cultivate existing soil profile into a fine tilth and re-seed with the seed mix to match the existing
- Mow to a height of 40-60mm. Rake off and remove arisings from site.

Indicative seeding mix

Table 6.1 – LE1.1 Amenity grassland seeding mix

Botanical Name	Common Name
Agrostis castellana	Highland Browntop Bentgrass
Festuca rubra rubra	Borluna Slender Creeping Red Fescues
Lolium perenne	Cabrio Perennial Ryegrass

6.2 LE1.2 Grassland with bulbs

Management approach

6.2.1 Create a dense amenity grassland sward with seasonal bulb planting along the highway maintenance strip, along embankments and in some amenity areas.

6.2.2 Provide a grass sward with seasonal bulb planting in composition.

6.2.3 Implement a suitable cutting/mowing regime to maintain a favourable sward height and species composition along with ensuring season colour interest.

6.2.4 Operate cutting regimes in sympathy with surrounding areas and the timing of bulb flowering.

Prescriptions

6.2.5 The following management prescriptions are proposed for grassland with bulbs creation.

- Cutting regime to maintain grass to a uniform height, cover and colour with neat edging and no scrub invasion
- Annual noxious / self-sown weed assessment and assessment of the general condition of the area to identification any appropriate remedial works.
- As required. Cultivate existing soil profile into a fine tilth and re-seed with the seed mix to match the existing
- Following bulb flowering planting mow to a height of 40-60mm. Rake off and remove arisings from site. Care should be taken to avoid cutting flowering plants.

Indicative seeding mix

Table 6.2 – LE1.2 Grassland with bulbs mix

Botanical Name	Common Name
Grasses	
Agrostis castellana	Highland Browntop Bentgrass
Festuca rubra	Corail Strong Creeping Red Fescue
Festuca rubra communata	Highnote Chewings Fescue
Lolium perenne	Calico Perennial Ryegrass
Lolium perenne	Zurich Perennial Ryegrass
Poa pratensis	Tetris Smooth Stalked Meadow Grass
Trifolium repens	Aberace (Small) White Clover
Bulbs	
Hyacinthoides non-scripta	Bluebell
Narcissus pseudonarcissus	Daffodil

6.3 LE1.3 & LE1.3i - Species Rich Grassland

Management Approach

6.3.1 Species rich grassland will be created from a combination of seeding and reinstatement of existing grassland where this remains following construction.

6.3.2 Following establishment, species rich grassland shall be mown annually or every three years. Mowing shall aim to create a variety of structure and sward height by variations in the mowing frequency and location each year. Management shall aim to create the following grassland structural types:

- Meadow (mown annually)
- Margin (one third mown every year on rotation)

6.3.3 The margin will be left where grassland is adjacent to other habitats and will be mown less frequently than the main grassland area. Margins will remain undisturbed other than when mown to allow a refuge for invertebrates and other animals.

6.3.4 Invasive plants shall be treated where present.

Prescriptions

6.3.5 The following management prescriptions are proposed for species rich grassland creation.

- Species rich grassland shall be created through a combination of reinstatement and seeding using a mixture of suitable native species.
- Meadow areas shall be mown once annually.
- One third of margin areas shall be mown every year on rotation.
- All mowing operations shall be undertaken in between late August and early October during dry weather.
- Where possible, cuttings shall be left lying for 3-4 days to allow seeds to ripen and drop. Cuttings shall be removed from the plot for composting off- site.
- Invasive, non-native species will be controlled to prevent further spread and removed/eradicated as much as possible.

Indicative seeding mixes

Table 6.3 – LE1.3 Species Rich Grassland - Neutral Grassland

Botanical Name	Common Name
Grasses (80% of mix)	
Agrostis capillaris	Common bent
Cynosurus cristatus	Crested dogstail
Festuca rubra	Red fescue
Phleum bertolonii	Smaller cat's-tail
Poa pratensis	Smooth-stalked meadow-grass
Wildflower (20% of mix)	
Achillea millefolium	Yarrow
Agrimonia eupatoria	Agrimony
Anthyllis vulneraria	Kidney vetch
Betonica officinalis (Stachys officinalis)	Betony
Centaurea nigra	Common knapweed
Centaurea scabiosa	Greater knapweed
Daucus carota	Wild carrot
Galium pratense	Meadow crane's-bill
Knautia arvensis	Field scabious

Botanical Name	Common Name
Leucanthemum vulgare	Oxeye Daisy
Lotus corniculatus	Birdsfoot Trefoil
Medicago lupulina	Black Medick
Origanum vulgare	Wild Marjoram
Pastinaca sativa	Wild Parsnip
Poterium sanguisorba (Sanguisorba minor)	Salad Burnet
Primula veris	Cowslip
Prunella vulgaris	Selfheal
Ranunculus acris	Meadow Buttercup
Rumex acetosa	Common Sorrel
Silaum silaus	Pepper Saxifrage
Silene vulgaris	Bladder Campion
Torilis japonica	Upright Hedge-parsley
Vicia cracca	Tufted Vetch

Table 6.4 – LE1.3 Species Rich Grassland – Acid Grassland

Botanical Name	Common Name
Grasses (80% of mix)	
Alopecurus pratensis	Meadow Foxtail (w)
Cynosurus cristatus	Crested Dogstail
Dactylis glomerata	Cocksfoot
Deschampsia cespitosa	Tufted Hair-grass (w)
Festuca rubra	Strong-creeping Red-fescue
Holcus lanatus	Yorkshire Fog
Schedonorus arundinaceus - (Festuca arundinacea)	Tall Fescue (w)
Schedonorus pratensis (Festuca pratensis)	Meadow Fescue
Wildflower (20% of mix)	
Achillea millefolium	Yarrow
Agrimonia eupatoria	Agrimony
Arctium minus	Lesser Burdock
Centaurea nigra	Common Knapweed
Centaurea scabiosa	Greater Knapweed
Chaerophyllum temulum	Rough Chervil
Daucus carota	Wild Carrot
Dipsacus fullonum	Wild Teasel
Filipendula ulmaria	Meadowsweet

Botanical Name	Common Name
Galium album - (Galium mollugo)	Hedge Bedstraw
Geranium pratense	Meadow Crane's-bill
Knautia arvensis	Field Scabious
Leucanthemum vulgare	Oxeye Daisy - (Moon Daisy)
Pastinaca sativa	Wild Parsnip
Pimpinella major	Greater Burnet-saxifrage
Prunella vulgaris	Selfheal
Silene dioica	Red Campion
Torilis japonica	Upright Hedge-parsley
Vicia cracca	Tufted Vetch

6.4 LE1.6 Open grassland

Management Approach

Open grassland will be created from a combination of seeding and reinstatement/management of existing grassland where this remains following construction.

Following establishment, open grassland shall be mown every 5 years on rotation. Mowing shall aim to create a variety of structure and sward height by variations in the mowing frequency and location each year. Management shall aim to create the following grassland structural types:

- Scattered scrub will be cleared from mown areas with each mowing operation.
- Invasive plants shall be treated where present, with the aim of eradicating non-native goldenrod from grassland areas as much as possible.

Outline Prescription

6.4.1 The following management prescriptions are proposed for open grassland creation and management.

- Open grassland shall be created through a combination of reinstatement and seeding using a mixture of suitable native species.
- Open grassland shall be mown on a long-rotation, cut every 5 years, with one fifth of the area of grassland cut each year.
- Mowing shall be undertaken in October or November during dry weather to avoid times when amphibians and reptiles are active.
- Cutting of open grassland shall be undertaken using a cut and collect mowing machine where possible. If mechanical collection of cuttings is not possible then cuttings shall be raked off and removed from the plot for composting off-site.
- Where possible, cuttings shall be left lying for 3-4 days to allow seeds to ripen and drop.

Indicative seeding mixes

Table 6.5 – LE1.6 Open Grassland Mix

Botanical Name	Common Name
Lolium perenne	Aberchoice (Late) Dip Per Ryegrass
Lolium perenne	Aberclyde (Int) Tet Per Ryegrass
Lolium perenne	Aberdart (Int) Dip Per Ryegrass
Lolium x boucheanum	Aberecho Hybrid Tet Ryegrass
Phleum pratense	Comer (Early) Timothy
Trifolium repens	Aberace (Small) W Clover

6.5 LE2.1 Native woodland mix, LE2.2 Woodland edge mix, and LE2.3 Wet woodland mix

Management Approach

6.5.1 New woodland will be managed to maintain a dense low canopy that will provide effective visual screening to sensitive receptors. A shrub layer within the woodland will be encouraged through retention/protection of selected shrub species.

6.5.2 Woodland shall be created through a mixture of new planting and natural generation. To provide new woodland, trees will be planted in random formation, and ground flora species introduced to supplement natural colonisation. Woodland plots will have scalloped edges where possible.

6.5.3 All new woodland will undergo initial thinning as required, then selected areas will be coppiced on rotation, with a section cut every winter.

6.5.4 Thinning or coppicing operations will aim to maintain visual screening or continuity of habitat corridors as much as possible while balancing the objective to provide light to ground flora and bushy re-growth;

6.5.5 Selected woodland within highways verge and associated land shall have minimal intervention. Minimal-intervention plots shall only require removal of non-native invasive plants as required.

6.5.6 Dead wood within woodland will be left in situ and not disturbed as much as possible to provide habitat for invertebrates.

6.5.7 New woodland will be protected by means of appropriate fencing until established. Areas required for dense visual screening will be permanently protected from grazing ~~from deer browsing to~~mammals to maintain a low canopy and shrub layer.

Prescriptions

6.5.8 The following management prescriptions are proposed for woodland creation.

- New woodland will be created using a mixture of suitable native species.

- Branches on developing trees up to 2.5 m above ground will be pruned in the third year following planting to prevent against the formation of co- dominant leading stems. Pruning shall be carried out in winter using hand tools.
- All new woodland will be thinned out by removal of 15% of trees in the first 5-8 years. Thinning shall be carried out in winter by hand using chainsaws. Weak, damaged or irregular growth trees shall be selected for removal.
- Existing mature or veteran trees shall be retained.
- Following thinning, woodland on the highways verge or associated land will have minimal intervention except removal of non-native invasive plants as required. Fallen and standing dead wood within woodland shall be left in situ.
- All new woodland shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Where coppicing is used, trees shall be cut on first occasion 200 mm height, and thereafter any regrowth shall be cut back to the same point.

Indicative planting mixes

Table 6.6 – LE2.1 Native Woodland Mix

Botanical Name	Common Name
Trees	
Acer campestre	Field Maple
Betula pubescens	Downy Birch
Malus sylvestris	Crab Apple
Prunus padus	Bird Cherry
Quercus petraea	Sessile Oak
Sorbus aucuparia	Mountain Ash
Tilia cordata	Small Leafed Lime
Ulmus glabra	Wych Elm
Shrubs	
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Ilex aquifolium	Holly
Ligustrum vulgare	Privet
Prunus spinosa	Blackthorn
Rosa canina	Dog Rose
Salix caprea	Goat Willow
Viburnum opulus	Guelder Rose

Table 6.7 – LE2.2 Woodland edge mix

Botanical Name	Common Name
Acer campestre	Field Maple
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Cornus sanguinea	Dogwood
Ilex aquifolium	Holly
Prunus spinosa	Blackthorn
Rubus fructicosus	Bramble
Salix caprea	Goat willow
Viburnum opulus	Guelder rose

Table 6.8 – LE2.3 Wet woodland Mix

Botanical Name	Common Name
Trees	
Alnus glutinosa	Common alder
Betula pendula	Silver birch
Betula pubescens	Downy birch
Salix fraglilis	Crack willow
Shrubs	
Cornus sanguinea	Dogwood
Prunus spinosa	Blackthorn
Rosa canina	Dog rose
Salix aurita	Eared willow
Salix caprea	Goat willow
Salix cinerea	Grey willow
Sambucus nigra	Elder
Viburnum opulus	Guelder rose

6.6 LE2.4 Linear belts of shrubs and trees

Management Approach

6.6.1 An annual assessment of the failed stock to ensure the number of planted trees and shrubs meets the requirements of the agreed planting scheme.

6.6.2 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, details of which will be specified in the updated LEMP following detailed design.

6.6.3 Linear belts of shrubs and trees will be managed to maintain structural form along boundaries and as visual screening to sensitive receptors.

6.6.4 Linear belts of shrubs and trees shall be created through a mixture of new planting and natural generation.

6.6.5 All new planting will undergo initial thinning as required, then selected areas will be coppiced on rotation.

6.6.6 Thinning or coppicing operations will aim to maintain visual screening or continuity of habitat corridors as much as possible while balancing the objective to provide bushy re-growth.

6.6.7 Selected belts of shrubs and trees within highways verge and associated land shall have minimal intervention. Minimal-intervention plots shall only require removal of non- native invasive plants as required.

6.6.8 Dead wood within woodland will be left *in situ* and not disturbed as much as possible to provide habitat for invertebrates.

6.6.9 Linear belts of shrubs and trees will be protected by means of appropriate fencing until established. Areas required for dense visual screening will be permanently protected from deer browsing to maintain a low canopy and shrub layer.

Prescriptions

6.6.10 The following management prescriptions are proposed for woodland creation.

- Linear belts of shrubs and trees will be created using a mixture of suitable native species.
- Branches on developing trees up to 2.5 m above ground will be pruned in the third year following planting to prevent against the formation of co- dominant leading stems. Pruning shall be carried out in winter using hand tools.
- Linear belts of shrubs and trees will be thinned out by removal of 15% of trees in the first 5-8 years. Thinning shall be carried out in winter by hand using chainsaws. Weak, damaged or irregular growth trees shall be selected for removal.
- Existing mature or veteran trees shall be retained.
- Following thinning, woodland on the highways verge or associated land will have minimal intervention except removal of non-native invasive plants as required. Fallen and standing dead wood within woodland shall be left in situ.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Where coppicing is used, trees shall be cut on first occasion 200 mm height, and thereafter any regrowth shall be cut back to the same point.

Indicative planting mix

Table 6.9 – LE2.4 Linear belts of shrubs and trees mix

Botanical Name	Common Name
Trees	
Alnus glutinosa	Alder
Malus sylvestris	Crab apple
Prunus padus	Bird cherry
Quercus petraea	Sessile oak
Sorbus aucuparia	Mountain ash
Shrubs	
Corylus avellana	Hazel
Prunus spinosa	Blackthorn
Ilex aquifolium	Holly
Sambucus nigra	Elder

6.7 LE2.5 Shrubs and intermittent trees

Management Approach

6.7.1 Shrubs and intermittent trees will be of predominately native species. Tree planting will be of good stature, including extra heavy standards and smaller transplant trees.

6.7.2 An annual assessment of the failed stock to ensure the number of planted trees and shrubs meets the requirements of the agreed planting scheme.

6.7.3 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

Prescriptions

6.7.4 The following management prescriptions are proposed for woodland creation.

- Linear belts of shrubs and trees will be created using a mixture of suitable native species.
- Branches on developing trees up to 2.5 m above ground will be pruned in the third year following planting to prevent against the formation of co- dominant leading stems. Pruning shall be carried out in winter using hand tools.
- Linear belts of shrubs and trees will be thinned out by removal of 15% of trees in the first 5-8 years. Thinning shall be carried out in winter by hand using chainsaws. Weak, damaged or irregular growth trees shall be selected for removal.
- Existing mature or veteran trees shall be retained.

- Following thinning, vegetation on the highways verge or associated land will have minimal intervention except removal of non-native invasive plants as required. Fallen and standing dead wood within woodland shall be left in situ.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Where coppicing is used, trees shall be cut on first occasion 200 mm height, and thereafter any regrowth shall be cut back to the same point.

Indicative planting mix

Table 6.10 – LE2.5 Shrubs with intermittent trees mix

Botanical Name	Common Name
Trees	
Betula pendula	Silver birch
Malus sylvestris	Crab apple
Prunus padus	Bird cherry
Sorbus aucuparia	Mountain ash
Shrubs	
Corylus avellana	Hazel
Prunus spinosa	Blackthorn
Ilex aquifolium	Holly
Ligustrum vulgare	Wild privet
Sambucus nigra	Elder
Viburnum opulus	Guelder rose

6.8 LE2.7 Scattered Trees

Management Approach

6.8.1 New tree planting will be of good stature, including extra heavy standards and smaller transplant trees. They will be planted in lines and as informal natural groups as shown on the Environmental Masterplan (ES Figure 2.4, APP-074).

6.8.2 The areas surrounding the trees will comprise a mix of amenity grass, wildflower, wetland or shrub plots.

6.8.3 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within LEMP following detailed design.

6.8.4 An annual assessment of the failed stock to ensure the number of planted trees meets the requirements of the agreed planting scheme.

Prescriptions

6.8.5 The following management prescriptions are proposed for scattered trees:

- Formative pruning including the removal of dead or dying wood back to an appropriate live side branch.
- Branches on developing trees up to 2.5 m above ground will be pruned in the third year following planting to prevent against the formation of co- dominant leading stems. Pruning shall be carried out in winter using hand tools.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Where coppicing is used, trees shall be cut on first occasion 200 mm height, and thereafter any regrowth shall be cut back to the same point.
- Weeds to be removed in appropriate manner within area surrounding newly planted tree

Indicative planting mix

Table 6.11 – LE2.7 Scattered trees mix

Botanical Name	Common Name
Alnus glutinosa	Alder
Betula pendula	Birch
Betula pubescens	Downy birch
Fagus sylvatica	Beech
Malus sylvestris	Crab apple
Populus tremula	Aspen
Prunus avium	Wild cherry
Prunus padus	Bird cherry
Quercus petraea	Sessile oak
Quercus robur	English oak
Sorbus aucuparia	Rowan
Tilia cordata	Small leaved lime
Ulmus glabra	Wych elm

6.9 LE2.8 Scrub mix

Management Approach

6.9.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

6.9.2 An annual assessment of the failed stock to ensure the number of shrubs (scrub species) meets the requirements of the agreed planting scheme and adequate space is available in the plots, for establishment and development of the scrub species.

Prescriptions

6.9.3 The following management prescriptions are proposed for areas of scrub mix:

- Prune to promote healthy growth and natural shape. Remove dead, dying diseased wood and suckers.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Weed in an appropriate manner within area surrounding newly planted shrubs

Indicative planting mix

Table 6.12 – LE2.8 Scrub mix

Botanical Name	Common Name
Acer campestre	Field maple
Cornus sanguinea	Dogwood
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Ilex aquifolium	Holly
Ligustrum vulgarae	Wild privet
Prunus spinosa	Blackthorn
Rosa canina	Dog rose
Viburnum opulus	Guelder rose

6.10 LE3.1 Ornamental Shrubs

Management Approach

6.10.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment.

6.10.2 An annual assessment of the failed stock to ensure the number of shrubs meets the requirements of the agreed planting scheme and adequate space is available in the plots, for establishment and development of the ornamental shrub species.

Prescriptions

6.10.3 The following management prescriptions are proposed for areas of ornamental shrubs:

- Prune to promote healthy growth and natural shape. Remove dead, dying diseased wood and suckers.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Weed in an appropriate manner within area surrounding newly planted shrubs, Mulch levels to be sustained at around 75mm where required.

Indicative planting mix

Table 6.13 – LE3.1 Ornamental amenity shrub mix

Botanical Name	Common Name
Amelanchier canadnesis	Amelanchier
Berberis thunbergii 'Atropurpurea Nana'	Barberry
Choisya ternata	Mexican orange blossom
Cornus alba 'Sibirica'	Dogwood

Botanical Name	Common Name
Cornus alba 'Spaethii'	Dogwood
Escallonia rubra 'Crimson Spire'	Escallonia
Hebe pinguifolia 'Sutherlandii'	Hebe
Hedera colchica 'Gold Flame'	Ivy
Hydrangea arborescens 'Annabelle'	Hydrangea
Lavandula angustifolia 'Hidcote'	Lavender
Lonicera nitida 'Maygreen'	Shrub honeysuckle
Lonicera nitida 'Elegant'	Shrub honeysuckle
Mahonia x media 'Winter Sun'	Mahonia
Pachysandra terminalis 'Green Carpet'	Japanese spurge
Prunus laurocerasus 'Otto Luyken'	Cherry laurel
Prunus x cistena	Purple leaf sand cherry
Salix alba 'Vitellina'	Golden willow
Santolina virens	Lavander cotton
Skimmia japonica	Skimmia
Spirea japonica 'Firelight'	Japanese japonica
Symphoricarpos x chenaultii 'Hancock'	Snowberry
Viburnum carlcephalum	Fragrant snowball
Viburnum davidii	Davidii viburnum
Vinca minor	Lesser periwinkle

6.11 LE4.1 Ornamental Species Hedgerow

6.11.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

6.11.2 An annual assessment of the failed stock to ensure the number of hedgerow species meets the requirements of the agreed planting scheme and adequate space is available in the plots, for establishment and development of the scrub species.

Prescriptions

6.11.3 The following management prescriptions are proposed for areas of ornamental species hedgerow:

- New hedgerows will undergo establishment period maintenance
- Prune to promote healthy growth and natural shape. Remove dead, dying diseased wood and suckers.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Weed in an appropriate manner within area surrounding newly planted shrubs, mulch levels to be sustained at around 75mm where required.

Indicative planting mix

Table 6.14 – LE4.1 Ornamental hedgerow mix

Botanical Name	Common Name
Fagus sylvatica 'Atropurpurea'	Purple beech

6.12 LE4.2 Native Species Hedgerow (Trimmed)

Management Approach

6.12.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

6.12.2 An annual assessment of the failed stock to ensure the number of hedgerow species meets the requirements of the agreed planting scheme and adequate space is available in the plots, for establishment and development of the scrub species.

6.12.3 New hedgerow shall be created to fill gaps in existing hedgerows through a mixture of new planting and natural generation. Where appropriate, double staggered rows of planting will be used.

6.12.4 Following establishment, hedgerow trees will undergo initial thinning as required, then trimmed on rotation, with a section cut every winter, in order to promote bushy regrowth.

Prescriptions

6.12.5 The following management prescriptions are proposed for areas of trimmed native species hedgerow:

- New hedgerows will undergo establishment period maintenance
- Prune to promote healthy growth and natural shape. Remove dead, dying diseased wood and suckers.

- Cut top in year 3 to 1.2m. Then maintain hedgerow at same height as mature adjacent hedgerow from year 5. Sides are to be cut from year 5 to form a compact hedgerow.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Weed in an appropriate manner within area surrounding newly planted shrubs, mulch levels to be sustained at around 75mm where required.

Indicative planting mix

Table 6.15 – LE4.2 Native Species Hedgerow (Trimmed)

Botanical Name	Common Name
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Ilex aquifolium	Holly
Ligustrum vulgare	Privet
Rosa canina	Dog rose
Prunus spinosa	Blackthorn
Sambucus nigra	Elder

6.13 LE4.3 Native Species Hedgerow (Untrimmed)

Management Approach

6.13.1 New hedgerow shall be created to fill gaps in existing hedgerows through a mixture of new planting and natural generation. Where appropriate, double staggered rows of planting will be used.

6.13.2 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

6.13.3 An annual assessment of the failed stock to ensure the number of hedgerow species meets the requirements of the agreed planting scheme and adequate space is available in the plots, for establishment and development of the scrub species.

Prescriptions

6.13.4 The following management prescriptions are proposed for areas of un-trimmed native species hedgerow:

- New hedgerows will undergo establishment period maintenance
- Prune to promote healthy growth and natural shape. Remove dead, dying diseased wood and suckers.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Weed in an appropriate manner within area surrounding newly planted shrubs, mulch levels to be sustained at around 75mm where required.

Indicative planting mix

Table 6.16 – LE4.3 Native Species Hedgerow (Untrimmed)

Botanical Name	Common Name
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Ilex aquifolium	Holly
Rosa canina	Dog Rose
Prunus spinosa	Blackthorn
Sambucus nigra	Elder

6.14 LE4.4 Native Hedgerow with Trees

Management Approach

6.14.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

6.14.2 An annual assessment of the failed stock to ensure the number of hedgerow species meets the requirements of the agreed planting scheme and adequate space is available in the plots, for establishment and development of the scrub species.

6.14.3 New hedgerow shall be created to fill gaps in existing hedgerows through a mixture of new planting and natural generation. Where appropriate, double staggered rows of planting will be used.

6.14.4 Following establishment, hedgerow trees will undergo initial thinning as required, then trimmed on rotation, with a section cut every winter, in order to promote bushy regrowth.

6.14.5 In relation to hedgerow management, existing mature trees, or trees with features suitable for roosting bats, or with deadwood suitable for invertebrates, shall be retained and not removed, pollarded or coppiced.

Prescriptions

6.14.6 The following management prescriptions are proposed for areas of native hedgerow with trees:

- New hedgerows will undergo establishment period maintenance
- Prune to promote healthy growth and natural shape. Remove dead, dying diseased wood and suckers.
- Cut hedge top in year 3 to 1.2m. Then maintain hedgerow at same height as mature adjacent hedgerow from year 5. Sides are to be cut from year 5 to form a compact hedgerow.
- Formative tree pruning including the removal of dead or dying wood back to an appropriate live side branch

- Branches on developing trees up to 2.5 m above ground will be pruned in the third year following planting to prevent against the formation of co- dominant leading stems. Pruning shall be carried out in winter using hand tools
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Weed in an appropriate manner within area surrounding newly planted shrubs, mulch levels to be sustained at around 75mm where required.

Indicative planting mix

Table 6.17 – LE4.4 Native hedgerow with trees mix

Botanical Name	Common Name
Trees	
Carpinus betulus	Hornbeam
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Ilex aquifolium	Holly
Rosa canina	Dog rose
Prunus spinosa	Blackthorn
Sambucus nigra	Elder
Shrubs	
Acer campestre	Field maple
Quercus robur	English oak
Prunus avium	Wild cherry
Sorbus aucuparia	Rowan

6.15 LE5.1 Individual trees

Management Approach

6.15.1 New tree planting will be of good stature, including extra heavy standards and smaller transplant trees. They will be planted in lines and as informal natural groups as shown on the Environmental Masterplan (ES Figure 2.4, APP-074).

6.15.2 The areas surrounding the trees will comprise a mix of amenity grass, wildflower, wetland or shrub plots.

6.15.3 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

6.15.4 An annual assessment of the failed stock to ensure the number of planted trees meets the requirements of the agreed planting scheme.

Prescriptions

6.15.5 The following management prescriptions are proposed for individual trees:

- Formative pruning including the removal of dead or dying wood back to an appropriate live side branch.
- Branches on developing trees up to 2.5 m above ground will be pruned in the third year following planting to prevent against the formation of co- dominant leading stems. Pruning shall be carried out in winter using hand tools.
- All new planting shall be protected by appropriate exclusion fencing. Plastic-free or biodegradable tree guards will be used as required.
- Where coppicing is used, trees shall be cut on first occasion 200 mm height, and thereafter any regrowth shall be cut back to the same point.
- Weeds to be removed in appropriate manner within area surrounding newly planted tree

Indicative planting

Table 6.18 – LE5.1 Individual trees

Botanical Name	Common Name
Acer campestre 'Streetwise'	Field maple ‘Streetwise’
Acer hippocastanum	Horse chestnut
Acer platanoides 'Crimson Sentry'	Norway maple 'Crimson Sentry'
Alnus glutinosa	Alder
Amelanchier lamarckii	June berry
Betula pendula	Birch
Betula pubescens	Downy birch
Betula utilis jacquemontii Multi Stem	Multi stem birch
Carpinus betulus	Hornbeam
Crataegus prunifolia	Broad-leaved Cockspur Thorn
Fagus sylvatica	Beech
Larix decidua	Larch
Liquidamber styraciflua	Sweet gum
Malus sylvestris	Crab apple
Pinus sylvestris	Scot’s pine
Prunus avium 'Plena'	Wild cherry
Prunus accolade	Ornamental cherry
Prunus sargentii	Sargent's cherry
Pyrus calleryana 'Chanticleer'	Pear 'Chanticleer'
Quercus palustris	Pin oak
Quercus robur	Oak

Botanical Name	Common Name
Sorbus aria	Whitebeam
Sorbus aucuparia	Rowan

6.16 LE6.1 Waterbodies and associated plants

Management Approach

6.16.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment, to be specified within the LEMP following detailed design.

6.16.2 An annual assessment of the failed stock to ensure the number of plants meets the requirements of the agreed planting scheme

6.16.3 Minimal management shall be undertaken other than periodic clearance of invasive weeds or inundations of reeds or removal of silt build up.

6.16.4 Clearance of vegetation shall take into account the presence of amphibians (such as common toad) and carried out sensitively for this species. No dredging of ponds shall be undertaken during the breeding season unless an assessment of the impacts has been carried out with appropriate mitigation put in place.

Prescriptions

6.16.5 The following management prescriptions are proposed for waterbodies and associated plants:

- Pond margins shall by planted using a mixture of suitable native species.
- Inundations of reeds shall be cleared every 5-10 years in winter (or more frequently as required).
- As required, any undesirable weed species, either in the water or around the perimeter, should be controlled and reduced where possible. Weeds to be removed in appropriate manner.
- As required, cut back and remove scrub/shrub vegetation to prevent it from encroaching into the water. Coppice willow species as required.
- Dredging should be avoided due to the disruptive nature of the works and impact on biodiversity. However, on occasion small-scale silt removal may be required as identified through annual monitoring.

Indicative planting mix

Table 6.19 – LE6.1 Waterbodies and associated plants mix

Botanical Name	Common Name
Marginal Species	
Alisma plantago-aquatica	Water plantain
Caltha palustris	Marsh marigold
Carex pendula	Pendulous sedge

Botanical Name	Common Name
Iris pseduacorus	Yellow flag iris
Juncus effusus	Soft rush
Lythrum salicaria	Purple-loosestrife
Juncus inflexus	Hard rush
Mentha aquatica	Water mint
Menyanthes trifoliata	Bogbean
Phalaris arundinacea	Canary grass
Potentilla palustris	Marsh cinquefoil
Veronica beccabunga	Brooklime
Aquatic Species	
Callitriche palustris	Water starwort
Nymphaea alba	European white waterlily
Potamogeton spp.	Pondweed

6.17 LE6.2 Banks & ditches

Management Approach

6.17.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment.

6.17.2 An annual assessment of the failed stock to ensure the number of plants meets the requirements of the agreed planting scheme

6.17.3 Minimal management shall be undertaken other than periodic clearance of invasive weeds or inundations of reeds or removal of silt build up.

6.17.4 Clearance of vegetation shall take into account the presence of great crested newts and carried out sensitively for this species.

Prescriptions

6.17.5 The following management prescriptions are proposed for banks & ditches and associated plants:

- Banks & ditches shall by planted using a mixture of suitable native species.
- Inundations of reeds shall be cleared every 5-10 years in winter (or more frequently as required).
- As required, any undesirable weed species, either in the water or around the perimeter, should be controlled and reduced where possible. Weeds to be removed in appropriate manner.
- As required Cut back and remove scrub/shrub vegetation to prevent it from encroaching into the water. Coppice willow species as required.

- Dredging should be avoided due to the disruptive nature of the works and impact on biodiversity. However, on occasion small-scale silt removal may be required as identified through annual monitoring.
- As required, any major debris or blockages swales and ditches should be removed. Checks for blockages are especially important after heavy rainfall.
- Banks & ditches are to be dug out as and when necessary to ensure conveyance and retention capacity

Indicative planting mix

Table 6.20 – LE6.2 Banks and ditches mix

Botanical Name	Common Name
Agrostis capillaris	Common bent
Alopecurus pratensis	Meadow foxtail (w)
Anthoxanthum odoratum	Sweet vernal-grass (w)
Briza media	Quaking grass (w)
Cynosurus cristatus	Crested dogstail
Deschampsia cespitosa	Tufted hair-grass (w)
Festuca rubra	Red fescue
Hordeum secalinum	Meadow barley (w)

6.18 LE6.3 Reed Beds

Management Approach

6.18.1 A suitable management regime will be implemented to ensure the planting becomes 100% established and is maintained in a suitable condition to promote successful establishment.

6.18.2 An annual assessment of the failed stock to ensure the number of plants meets the requirements of the agreed planting scheme

6.18.3 Minimal management shall be undertaken other than periodic clearance of invasive weeds or inundations of reeds or removal of silt build up.

6.18.4 Clearance of vegetation shall take into account the presence of great crested newts and carried out sensitively for this species.

Prescriptions

6.18.5 The following management prescriptions are proposed for reed beds:

- As required, any undesirable weed species, either in the water or around the perimeter, should be controlled and reduced where possible. Weeds to be removed in appropriate manner.
- As required, any major debris or blockages swales and ditches should be removed. Checks for blockages are especially important after heavy rainfall.

- Reed beds are to be dug out as and when necessary to ensure conveyance and retention capacity

Table 6.21 – LE6.3 Reed beds mix

Botanical Name	Common Name
Phragmites australis	Common reed

6.19 LE6.4 Marsh & wet grassland mix

Management Approach

6.19.1 Marsh & wet grassland will be created from a combination of seeding and reinstatement of existing grassland where this remains flowing construction.

6.19.2 Following establishment, species the grassland shall be mown annually or every three years. Mowing shall aim to create a variety of structure and sward height by variations in the mowing frequency and location each year.

6.19.3 Invasive plants shall be treated where present.

Prescriptions

6.19.4 The following management prescriptions are proposed for marsh and wet grassland:

- Created through a combination of reinstatement and seeding using a mixture of suitable native species.
- Meadow areas shall be mown once annually.
- All mowing operations shall be undertaken in between late August and early October during dry weather.
- Where possible, cuttings shall be left lying for 3-4 days to allow seeds to ripen and drop. Cuttings shall be removed from the plot for composting off- site.
- Invasive, non-native species will be controlled to prevent further spread and removed/eradicated as much as possible.

Indicative seeding mix

Table 6.22 – LE6.4 Marsh and wet grassland mix

Botanical Name	Common Name
Grasses (80% of mix)	
Agrostis capillaris	Common bent
Alopecurus pratensis	Meadow foxtail
Anthoxanthum odoratum	Sweet vernal-grass
Briza media	Quaking grass
Cynosurus cristatus	Crested dogstail
Deschampsia cespitosa	Tufted hair-grass
Festuca rubra	Slender-creeping red-fescue

Botanical Name	Common Name
Hordeum secalinum	Meadow barley
Schedonorus pratensis	Meadow fescue
Wildflower (20% of mix)	
Achillea ptarmica	Sneezewort
Angelica sylvestris	Wild angelica
Caltha palustris	Marsh marigold
Eupatorium cannabinum	Hemp agrimony
Filipendula ulmaria	Meadowsweet
Geum rivale	Water avens
Hypericum tetrapterum	Square-stalked St. John's-wort
Iris pseudacorus	Yellow iris
Lotus pedunculatus	Greater birds trefoil
Lycopus europaeus	Gypsywort
Lythrum salicaria	Purple loosestrife
Mentha aquatica	Water mint
Pulicaria dysenerrica	Common fleabane
Rannunculus acris	Meadow buttercup
Scrophularia auriculata	Water figwort
Silene flos-cuculi	Ragged robin
Succisa pratensis	Devil's-bit scabious
Vicia cracca	Tufted vetch

7. General Maintenance and Programme

7.1 Maintenance Specification

7.1.1 A full DMRB Series 3000 specification will be produced following the detailed design, this section is an indicative maintenance specification and is applicable to all management works including programme, notices, reporting, plant establishment and replacement, control of noxious weeds and health and safety requirements. As a minimum it is intended that the landscape works will be carried out in accordance with the following standards;

- BS3882:2007 Specification for the Topsoil;
- BS3936-1:1992 Nursery Stock Part 1: Specification for trees and shrubs;
- BS 3936-2:1990. Nursery Stock Part 2: Specification for roses;
- BS 3936-3:1990 Nursery Stock Part 3: Specification for fruit plants;
- BS3936-4 2007: Nursery Stock Part 4: Nursery stock. Specification for forest trees, poplars and willows;
- BS 3936-9:1998 Nursery Stock Part 9: Specification for bulbs, corms and tubers;
- BS 3936-10:1990. Nursery Stock Part 10: Specification for ground cover plants;
- BS3998:2010 Tree works – Recommendations;
- BS4428:1989 Code of Practice for General Landscaping Operations;
- BS5837:2012 Trees in relation to design, demolition and construction. Recommendations;
- BS 7370-3:1991 Grounds maintenance - Part 3: Recommendations for maintenance of amenity and functional turf (other than sports turf);
- BS 7370-4:1993 Grounds maintenance - Part 4: Recommendations for maintenance of soft landscape (other than amenity turf);
- BS 7370-5:1998 Grounds maintenance - Part 5: Recommendations for the maintenance of water areas;
- BS 8545:2014 Trees: from nursery to independence in the landscape. Recommendations; and
- CIRIA SuDS Manual 2015 – Part E – Chapter 32.

Plant Establishment

7.1.2 The first 5 years will be the establishment phase for all newly planted vegetation, with annual replacements being planted to ensure the plant numbers and objectives are achieved. After 5 years the works on the planted stock will move away from replacement to management.

Badger and Otter Fencing Inspection

7.1.3 For the duration of the Scheme construction Badger and otter fencing shall be inspected every six months from installation, by a suitably qualified ecologist to

check for any gaps and weak points that an otter could fit through.

Replacement of Stock

7.1.4 The appointed Principal Contractor is to replace all dead, dying or defective stock during the contracted defects liability period.

7.1.5 Replacement planting shall be undertaken on an annual basis for the duration of the 5-year establishment period. A defective plant includes those that are failing to thrive with poor extension growth. All plants shall be replaced in the planting season following on from annual monitoring.

7.1.6 Following the establishment period, gaps left within planting beds from dead stock may, if appropriate, be filled by the growth of surrounding plants rather than with replacement planting.

Ground and Pit Preparation for Replacement Planting

7.1.7 All ground and pit preparation for replacement planting is to be undertaken in accordance with best practice and recognised industry standards. All diseased plants are to be disposed of to a licensed facility off-site.

Planting Sundries, Including Stake & Ties for Replacement Planting

7.1.8 Following replacement planting, any stakes, ties, tubes or guards shall be re-fixed/replaced and any mulch or mulch mats reinstated to the original specification. Watering in maybe specified on completion of the replacement planting as determined by the landowner.

Pesticide Application

7.1.9 All pesticides, methods of application, materials and tank mixes, methods of working, transportation, storage and records shall be strictly in accordance with current legislation, codes of practice and in line with Local Authority Policy where applicable. Landowner consent should be sought before the application of pesticides. The Contractor shall make available to the landowner evidence of competency in the use of pesticides.

7.1.10 The Food and Environment Protection Act 1985 and Control of Pesticides Regulations 1986, as amended sets out the rules on using pesticides to control weeds growing in water or on land. Permission shall be sought from the Environment Agency (EA) prior to the application of herbicides near water using the EA AqHerb01: Agreement to use herbicides in or near water [4].

Control of Noxious and Injurious Weeds

7.1.11 The control of noxious and injurious weeds is required throughout the duration of this management plan, in all areas of the site, in line with current legislation including The Weeds Act 1959, The Wildlife & Countryside Act 1981 as amended, The Environmental Protection Act 1990 and the Ragwort Control Act 2003. The control method is to be appropriate to the location, type of weed and season.

[4] https://www.gov.uk/government/publications/application-to-use-herbicides-in-or-near-water

7.1.12 The list of noxious and injurious weeds and includes the following:

- Broadleaved Dock *(Rumex obtusifolius)*
- Common Ragwort *(Senecio jacobaea)*
- Curled Leaved Dock *(Rumex crispus)*
- Spear Thistle *(Circium vulgare)*
- Creeping Thistle *(Circium arvensis)*

7.1.13 Where the treatment of noxious weeds conflicts with other environmental constraints, such as the presence of protected species, the Contractor is to notify the landowner to ensure any mitigation measures are identified and implemented to comply with all relevant legislation.

7.1.14 Where broadleaved weeds have established in newly seeded areas these are to be treated using an appropriate selective non-residual translocated herbicide via spot application. The herbicide shall be applied during a period of active growth in accordance with the manufacturer's guidelines. Spot applications of translocated herbicide may be specified for any of the injurious and noxious weeds dependent on site conditions and location.

7.1.15 Weed control by hand weeding shall be carried out as necessary, to control injurious and noxious weeds for the duration of the management period in marginal planting areas, individual shelters, guards and spirals and ornamental planting beds where spot applications may cause damage.

7.1.16 Hand weeding is to include the removal of the entire weed, including roots, by digging, forking, hoeing or pulling. Weeds shall be removed prior to flowering.

7.1.17 Weed control via cutting can be carried out as instructed by the supervising Landscape Architect or Project Manager. This will only relate to grassed areas or strimming in plots.

7.1.18 All arisings from weed control operations are to be removed from site and disposed to a licensed tip.

7.1.19 Further advice on the treatment and removal of invasive non-native plants can be found at:

- https://www.gov.uk/guidance/prevent-the-spread-of-harmful-invasive-and-non-native-plants
- https://www.gov.uk/guidance/prevent-japanese-knotweed-from-spreading
- https://www.gov.uk/government/publications/treatment-and-disposal-of-invasive-non-native-plants-rps-178/treatment-and-disposal-of-invasive-non-native-plants-rps-178

Works to Trees and Shrubs Generally

7.1.20 Bird nesting season is defined as the beginning of March to the end of August. All breeding birds and their nests are protected by the Wildlife & Countryside Act 1981. Therefore, all necessary vegetation clearance of shrubs, scrub and trees and ponds shall be carried out outside of the bird nesting season when there is less risk of damaging nests. If any vegetation clearance needs to be carried out between March and August, the areas must be checked by a suitably qualified ecologist.

7.1.21 All arisings from site operations are to be disposed of in an appropriate matter, to licensed tip offsite or where approved chipped and spread evenly within planting plots. Any infected (diseased or pest) cuttings or woody material is to be removed off site and disposed of either by burning or in line with any recommendations specified by the Forestry Commission in their Forest Research[5] section on their website (www.forestry.gov.uk).

7.1.22 Confirmation of the disease or pest will need to be sought from a suitably qualified and experienced Arboriculturist or similar.

Tree Works

7.1.23 Tree works may be necessary to maintain trees in a safe condition, promote growth, regulate size and shape or to improve the quality of flowers, fruit or timber.

7.1.24 During construction, retained trees will be protected in line with guidelines provided in BS 5837 Trees in relation to Construction[6].

7.1.25 Where possible, tree felling will be minimised and undertaken outside the core bird nesting season (1 March to 31 August) to avoid damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection of vegetation to be cleared for breeding birds and their occupied nests by a suitably qualified ecologist no more than 24 hours prior to any works being undertaken. If any nesting birds are identified during the survey, they will be left in situ for their entire nesting period and alternative approaches to the work proposed. This may include leaving an exclusion zone around the nests to avoid disturbance.

7.1.26 A felling licence from the Forestry Commission is required if more than 5 cubic metres of timber are felled in one calendar quarter and/ or the trees are greater than 8cm in diameter measured at 1.3 metres from the ground.

7.1.27 Permission of the landowner or occupier shall be required to remove dead dying diseased trees, additionally prior to works on trees the local authority shall be consulted to check for any relevant tree protection (TPO's or conservation areas).

7.1.28 Tree works generally:

- Thin, trim and shape each specimen appropriately to species, location, season, and stage of growth, leaving a well-balanced natural appearance.
- Prune/coppice/crown lift to promote healthy growth and natural shape.
- Remove dead, dying, diseased wood and suckers. Keep wounds as small as possible and cut cleanly back to sound wood.
- Make cuts above and sloping away from an outward facing healthy bud, angled so that water will not collect on cut area.
- When removing branches do not damage or tear the stem or bark.
- For larger branches prune neither flush nor leaving a stub but using the branch bark ridge or branch collar as a pruning guide.

[5] https://www.forestresearch.gov.uk/
[6] British Standards Institute (2012) BS 5837:2012 Trees in relation to design, demolition, construction.

- Use clean sharp secateurs, hand saws or other approved tools. Trim off ragged edges of bark or wood with a sharp knife.
- Prune young trees up to 4 m in height by removing dead branches and reducing selected side branches by one third to preserve a well-balanced head and ensure the development of a single strong leader. Remove duplicated branches and potentially weak or tight forks. In each case cut back to live wood.
- Remove arisings from site, to suitably licensed recycling facility or tip unless otherwise instructed.
- Permission should be sought to chip on site and chippings spread evenly within the planting area.
- Do not prune whips or feathered trees.
- Do not prune/coppice/crown lift during the late winter/ early spring sap flow period.
- Give notice if disease or infection is detected.
- Do not use growth retardants, fungicide or pruning sealant unless instructed.
- Ensure works are undertaken by a suitably qualified and experienced contractor.

Pruning

7.1.29 Pruning works may be necessary to; maintain shrubs in a safe condition, promote growth, regulate size and shape or to improve the quality of flowers or fruit. Pruning works generally should be in accordance with good horticultural and arboricultural practice.

7.1.30 Where possible, tree felling will be minimised and undertaken outside the core bird nesting season (1 March to 31 August) to avoid damage or destruction of occupied nests or harm to breeding birds.

7.1.31 Timing of pruning generally:

- Winter flowering shrubs: Spring.
- Shrubs flowering between March and July: Immediately after the flowering period.
- Shrubs flowering between July and October: Back to old wood in winter.
- Rose bushes: Early spring to encourage basal growths and a balanced, compact habit.

7.1.32 Pruning shrubs generally:

- Thin, trim and shape each specimen appropriately to species, location, season, and stage of growth, leaving a well-balanced natural appearance.
- Prune/ to promote healthy growth and natural shape.
- Remove dead, dying, diseased wood and suckers. Keep wounds as small as possible and cut cleanly back to sound wood.
- Make cuts above and sloping away from an outward facing healthy bud, angled so that water will not collect on cut area.

- Use clean sharp secateurs, hand saws or other approved tools. Trim off ragged edges of bark or wood with a sharp knife.
- Remove arisings from site, to suitably licensed recycling facility or tip unless otherwise instructed.
- Permission should be sought to chip on site and chippings spread evenly within the planting area.
- Do not prune lift during the late winter/ early spring sap flow period.
- Give notice if disease or infection is detected.
- Do not use growth retardants, fungicide or pruning sealant unless instructed.
- Ensure works are undertaken by a suitably qualified and experienced contractor.

Watering

7.1.33 This will be as required and determined by monitoring especially during summer months, to ensure healthy establishment and growth.

Grass cutting operations

7.1.34 Prior to any cutting operations, all stones and detritus that may hinder mowing including litter, is to be removed.

7.1.35 Any seating or other movable obstructions such as bins are to be removed to facilitate cutting and replaced on completion of the cutting. If the obstructions are fixed then the obstructions are to be cut around, strimmer's are recommended, to prevent contact from either ride on or pedestrian mowers.

7.1.36 All grass cutting equipment is to comply with manufacturers recommendations regarding fitting and operation of attachments. The machinery to have appropriately sharpened blades set according to the manufacturer's guidelines. Arisings from the cutting that lands on any adjacent hard surfaces are to be removed from site, except where otherwise noted for Landscape elements.

7.1.37 During periods of wet weather, the ground conditions are to be assessed prior to commencing any cutting operations. If the ground conditions are too wet, i.e. machinery sinking into the soil profile and creating ruts, the grass cutting operations are to cease and recommence only when the ground conditions and weather conditions are suitable. Any rutting or other surface damage is to be rectified at the expense of the contractor undertaking the works.

Control of Rabbits

7.1.38 Rabbits are considered pests under the Pests Act 1954, and all occupiers of land have a responsibility to take action to prevent them from causing damage. Rabbit control is best achieved by liaising with adjoining landowners to plan control and management action.

7.1.39 Where existing land boundaries are proposed to be severed during the implementation of the scheme, it is proposed to refix fencing to form a continuous rabbit proof boundary to protect adjacent farmland and property.

7.1.40 Where rabbit actively has been identified, through monitoring on site, within the scheme pest control and boundary fencing may be required to protect sensitive structures and areas.

7.2 Programme

General Programme Considerations

7.2.1 For soft landscape elements, all replacement planting will be carried out in the recognised planting seasons, for grass sowing this is April to October, and for shrubs between late October and late March. Trees will be replaced during the tree planting season from November until the end of March.

7.2.2 An indicative programme, to be updated following detailed design, has been included at the end of this Section outlining the timings for general operations, refer to Table 7.1 – Indicative programme for maintenance works.

Maintenance Monitoring

7.2.3 To protect the quality of landscape works, the long-term maintenance contractor must provide a high standard of maintenance as the long-term success of the scheme is dependent on its maintenance regime.

7.2.4 The Outline LEMP is intended to provide a basic performance specification to enable the maintenance contractor to submit for agreement, a detailed programme of work which shall include scheduled dates for planting refurbishment and review.

7.2.5 The effectiveness of the management operations is to be closely and continually monitored, on site and reviewed annually against the Specification and LEMP with any resulting changes incorporated into the subsequent years' programme.

Work Programme

7.2.6 Maintenance operations shall follow the timescales and operations specified in Table 7.1 – Indicative programme for maintenance works of this Outline LEMP for each different Landscape Elements.

7.2.7 The landowner must be made aware of the intention to commence the operations listed below should the works differ from the monthly programme advised:

- Arboricultural works, including tree felling or tree surgery and hedge cutting;
- Application of pesticides;
- Grass cutting, including strimming;
- Scrub clearance;
- De-silting water bodies

7.2.8 Should works be suspended then the Contractor is to provide a revised programme for delivering the management prescriptions to ensure continued compliance with overall objectives. The reasons for suspension might include, for example, identification of protected species, fuel spillage or inclement weather.

Inspection Reports

7.2.9 Inspection reports are to be completed by the appointed contractor and agreed by the landowner

Annual Inspection

7.2.10 Site inspections shall be as on annual basis for years 1 to 5, specific inspections for landscape elements shall be detailed within the LEMP following detailed design.

7.2.11 The replacement planting inspections shall be undertaken by the landowner. The details will be captured in a Landscape Inspection Report, during the defect liability period, and the numbers of replacements agreed by all parties prior to any replacement planting occurring.

Indicative programme

7.2.12 is an indicative annual schedule of maintenance visits. This provides a reasonable frequency of the more common operations, and a good indication of the required level of intensity of management required but is not intended to be fully comprehensive or restrictive.

7.2.13 Following detailed design the updated LEMP shall provide a full programme of maintenance work including details of proposed frequency of visits and operations as detailed in the specification, i.e., pruning. Along with details of:

- Infrequent operations such as re-spacing of plants, pruning, topping up of mulch, replacement of plants / restocking of beds etc,
- Planting review and refurbishment; and
- Monitoring and review.

Table 7.1 – Indicative programme for maintenance works

Task	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Weed control		•	•	•	•	•	•	•	•	•	•		By appropriate means
Watering			•	•	•	•	•	•	•	•			Monitor during dry periods
Top up mulch				•					•				As required
Firm up plants	•	•	•	•	•	•	•	•	•	•	•	•	As required
Fix tree ties & support guys				•					•				
Pest & disease control	•	•	•	•	•	•	•	•	•	•	•	•	As required
Pruning to shrubs		•	•	•					•	•			
Replacement Planting	•	•	•										
Works to trees	•	•	•	•	•	•	•	•	•	•	•	•	Note avoid nesting birds
Mow amenity areas			•	•	•	•	•	•	•	•			Remove arisings off site. Monthly mowing (Apr-Oct)

Task	J	F	M	A	M	J	J	A	S	O	N	D	Notes
Mow wildflower/ species rich areas				•	•				•	•			Remove arisings off site.
Weed control	•	•	•	•	•	•	•	•	•	•	•	•	As appropriate
Vegetation clearance to ditches, waterbodies and watercourse banks	•	•	•	•	•	•	•	•	•	•	•	•	As required, periodic clearance of invasive weeds or inundations of reeds
Removal of silt build up to ditches, reed beds and watercourses	•	•	•	•	•	•	•	•	•	•	•	•	Minimal management as required

8. Outline Management Plan

8.1.1 The outline management plan summarises the requirements for each landscape element, by specifying targets, management prescriptions, programme, timescales and overall responsibility. The management approach is detailed in Section 6 Landscape elements – management approach prescriptions and general maintenance. The table below is an example of the information to be included in the updated LEMP.

Table 8.1 – Example outline management plan table

Landscape Element	Target Attribute	Responsibility	Management Prescription	Detail	Timings	Years after Planting	Annual Frequency
LE1.3 Species Rich Grassland	• Number of species • Target species/habitat • Landscape integration	Contractor/ Landowner	Annual Site monitoring.	Annual noxious / self-sown weed assessment and assessment of the general condition of the area to identification any appropriate remedial works.	Sept	All	Once
		Contractor/ Landowner	Noxious & injurious weed control.	As required. Weed in an appropriate manner all noxious or injurious weeds within the Wildflower Meadow.	Continuous	All	Once
		Contractor/ Landowner	Supplementary seeding.	As required. Cultivate existing soil profile into a fine tilth and re-seed with the seed mix to match the existing.	March-May	1 - 5	Once, As required
		Contractor/ Landowner	Removal of litter.	As required during each maintenance visit.	Continuous	All	Twice, as required.
		Contractor	Establishment cut.	Mow to a height of 40-60mm. Rake off and remove arisings from Site.	Sept	1	Once

Landscape Element	Target Attribute	Responsibility	Management Prescription	Detail	Timings	Years after Planting	Annual Frequency
		Contractor/ Landowner	Grass cutting regime.	After flowering 'hay cut' meadow, mow to a height of 40-60mm. Leave the 'hay' to dry and shed seed for 1-7 days then remove arisings from Site.	1 cut: (Aug - October)	2 and thereafter	Once
		Contractor	Watering	As required in order to achieve successful establishment. Additional watering will be instructed during periods of abnormally dry weather.	April-Sept	1-3	As required.

9. Outline Monitoring specifications

9.1 Habitat monitoring approach

9.1.1 Monitoring will be undertaken during the construction and operational phases to assess the progress towards the targets of the management features outlined in Table 8.1. Monitoring shall provide information to determine whether certain targets have been met or missed, and whether maintenance operations or remedial actions are required. Table 8.1 provides a list of attributes against each management feature that will be measured against the targets during monitoring.

9.1.2 During construction, monitoring requirements will include that detailed in the EMP (Second iteration).

9.1.3 Monitoring for establishment of newly created habitats will follow the establishment maintenance specifications produced during Detailed Design and will take the form of quarterly inspection in the first two years, followed by annual inspections in the following three years after seeding/planting.

9.1.4 Monitoring of habitats following establishment will take the form of annual monitoring.

9.1.5 Table 9.1 below gives a draft monitoring schedule for all landscape and ecology features during the establishment period and ongoing operation phase of the Scheme.

Table 9.1 – Outline monitoring schedule

Monitoring Method	Timescale	Responsibility
Establishment inspections following completion of mitigation works	Quarterly first 2 years Annually next 3 years	Appointed Principal Contractor
Walkover survey	Annually	Appointed Principal Contractor (establishment period) Operation & Maintenance Contractor (following handover)

9.1.6 The appointed Principal Contractor and Operation and Maintenance Contractor will appoint suitably qualified persons (i.e. an appropriately qualified landscape management consultant) to undertake monitoring and report on progress towards the targets.

9.1.7 If necessary, the findings of monitoring may result in corrective actions being required or the prescriptions for a management feature or the targets themselves may need to be modified.

9.2 Species monitoring approach

9.2.1 Species monitoring requirements shall take into account the conditions of protected species licences (for bats and badger). The monitoring approach will be agreed with Natural England upon submission of the relevant licence application and prior to construction commencing.

9.2.2 An outline of the monitoring specifications for protected and priority species is provided within Table 9.2.

Table 9.2 – Monitoring specifications

Species/habitat	Monitoring
Bats	Construction and operation of the Scheme will change the habitat availability in terms of foraging opportunities for bats. To monitor the success of habitat reinstatement and creation on foraging bats, a monitoring strategy will be developed including, pre-construction, during construction and post construction surveys. This monitoring strategy will be agreed with Natural England as part of the European Protected Species licence application. Monitoring will include any measures required under the Natural England European Protected Species (EPS) licence for construction of the Scheme. This will detail the frequency and type of monitoring required and measures of success.
Badger	Monitoring will be required as part of the licence conditions for badgers upon completion of the artificial sett during the construction stage. The artificial badger sett will be monitored in accordance with a Method Statement, which will be agreed with Natural England prior to construction commencing.
Otter	Monitoring will be required (to survey for the presence of otter setts or resting places) of the water courses (including the River Etherow) in order to keep the baseline relating to otter updated. These monitoring surveys will commence prior to construction and will be undertaken everything three months during the construction period.
Other species	Should pre-construction survey work, or survey work carried out during the construction period determine that monitoring is required for other species (e.g. water vole), these requirements will be set out in the LEMP developed by the Principal Contractor.

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