

Bristol's Water Recycling Centre at Avonmouth: Proposed Extension

Landscape and Ecological Management Plan

16 April 2024



Wessex Water
YTL GROUP



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Landscape and Ecological Management Plan

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On behalf of:
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1. Introduction

Wessex Water has received planning permission (Ref: 23/01154/F) for the proposed extension to Bristol's Water Recycling Centre (WRC) at Avonmouth (referred to as the 'Proposed Development') located off Kings Weston Lane, Avonmouth (NGR: 353391, 179395).

The aim of this report is to discharge condition 11, 22 and 23 (below) by providing a Landscape and Ecological Management Plan (LEMP) for the delivery of biodiversity compensation and net gain onsite as well as targeted species mitigation and ecological enhancements as outlined in Bristol's Water Recycling Centre at Avonmouth: Proposed Extension, Ecological Impact Assessment (Wessex Water, 2023¹) and Biodiversity Net Gain Plan (AECOM, 2023²).

Conditions 11: Onsite Landscape and Ecological Management Plan

Prior to commencement of Phase 2 - 'Civil Structures', the applicant shall submit a 30-year Landscape and Ecological Management Plan (LEMP). This should address retained features of ecological interest, a planting schedule, together with mitigation and enhancements to be provided.

The LEMP should set out management compartments (to target-condition for on-site BNG habitats), objectives, and prescriptions for all new proposed soft landscaping/planting. It should also show how management of the site will be resourced and monitored. The habitat unit requirements on land within the Applicant's control (the on-site biodiversity units) set out in the Biodiversity Net Gain Assessment (AECOM, 2023) shall then be delivered in accordance with the Landscape and Ecological Management Plan.

Reason: Ecological enhancement is needed to meet the requirements of the revised National Planning Policy Framework (NPPF, 2021). The NPPF states in paragraph 174 (d) on page 50 that "Planning policies and decisions should contribute to and enhance the natural and local environment by... minimising impacts on and providing net gains for biodiversity...". And, the Environment Act (2021) requires habitats to be maintained for 30 years after development is completed (schedule 7A, Part 1, paragraph 9) to secure net gains for biodiversity.

Conditions 22 (Part A): Landscaping hard and soft

Prior to the commencement of Phase 5 ('Reinstatement, prior to occupation') of the development hereby approved, details of all hard and soft landscaping shall be submitted to and approved in writing by the Local Planning Authority.

The details shall include:

1) a scaled plan showing all existing vegetation and landscape features to be retained and

¹ Wessex Water, 2023. *Bristol's Water Recycling Centre at Avonmouth: Proposed Extension, Ecological Impact Assessment*

² AECOM, 2023. *Bristol's Water Recycling Centre at Avonmouth: Proposed Extension, Biodiversity Net Gain report*

trees and plants to be planted;

2) location, type and materials to be used for hard landscaping including specifications;

3) a schedule detailing sizes and numbers/densities of all proposed trees/plants;

4) Types and dimensions of all boundary treatments.

There shall be no excavation or raising or lowering of levels within the prescribed root protection area of retained trees unless agreed in writing by the Local Planning Authority.

Conditions 23 (Part A): Tree planting (Orchard)

Phase 5 ('Reinstatement, prior to occupation') of the development hereby approved, shall not commence until further details of the proposed orchard trees that fall within the application blue line, including a schedule detailing sizes and numbers/densities of all the proposed trees, has been submitted to and approved in writing by the Local planning authority.

Reason: Ecological enhancement is needed to meet the requirements of the revised National Planning Policy Framework (NPPF, 2021). The NPPF states in paragraph 174 (d) on page 50 that "Planning policies and decisions should contribute to and enhance the natural and local environment by... minimising impacts on and providing net gains for biodiversity...". And, the Environment Act (2021) requires habitats to be maintained for 30 years after development is completed (schedule 7A, Part 1, paragraph 9) to secure net gains for biodiversity.

Due to hybrid approach to deliver No Net Loss as a result of the development, some of the measures will be offset within the Proposed Development boundary and adjacent, within Wessex Water's land ownership. Some measures will however be delivered through Belmont Estate. These habitats will be detailed within a separate LEMP (Belmont Estate LEMP 2024³) and controlled through planning condition 8.

For the purpose of this report, this document will focus solely on the delivery of habitats within the Proposed Development boundary and within the existing WRC, outside of the Proposed Development boundary.

All works will be undertaken in accordance with *BS 4428:1989 code of practice for general landscape operations (excluding hard surfaces)*, Wessex Water's *General Landscape & Planting Reinstatement Specification (Appendix D – Particular Specification)* and supplier planting guidelines where applicable.

³ Belmont Estate, 2023. *Landscape Ecological Management Plan for Wessex Water Avonmouth Proposed Extension.*

1.1 Summary of management prescriptions

1.1.1 Summary of biodiversity and landscape planting for biodiversity net gain

The biodiversity and landscape planting plan for the proposed project to ensure a minimum No Net Loss is shown on drawing D14162/ENV/420/REV A in Appendix A.1 and is summarised below.

Habitat creation proposed within the Proposed Development boundary:

- 0.22ha of mixed scrub
- 0.48ha other neutral grassland
- 0.51ha modified grassland
- 0.38ha reedbed
- 108m ditch
- 158m line of trees
- 219m species-rich hedgerow with trees
- 0.15ha urban trees

Habitat enhancements proposed within the Proposed Development site:

- 0.69ha environmental corridor including modified grassland, reedbed and scrub.
- 12m ditch located to the south and east of the site.
- 130m of species poor hedgerow located to the south-east.

Habitat creation proposed within Wessex Water's landownership, outside of the Proposed Development:

- 0.12ha orchard planting [covered by planning condition 23]
- 0.15ha of species-rich grassland

Habitat enhancements proposed within Wessex Water's landownership, outside of the Proposed Development:

- 110m species poor hedgerow
- 0.5ha broadleaved woodland

The offsetting measures mentioned above are considered to benefit local protected species including barn owl *Tyto alba*, bats, breeding birds, European eel *Anguilla anguilla* and water vole *Arvicola amphibius*.

1.1.2 Summary of ecological enhancements

The following ecological enhancements will be undertaken in addition to the biodiversity planting outlined in Section 1.1.1 above:

- Replacement of three existing barn owl boxes that have degraded.
- 10 bird boxes will be erected adjacent to the Proposed Development to compensate for the loss nesting habitat.
- 5 bat boxes to be placed south facing on mature trees surrounding the Proposed Development.

2. Management objectives and prescriptions

2.1 Duration, funding and responsibilities

The duration of the management for prescriptions given in this LEMP is for a minimum of 30 years. Wessex Water are responsible for the funding and implementing of all measures including habitat creation, maintenance, management, monitoring and any necessary remediation. All works will be undertaken directly by Wessex Water or contractors working on behalf of the company. All planting will be undertaken on land owned and managed by Wessex Water. The following proposed management prescriptions should be treated as a live document and altered where seen appropriate in order to achieve or maintain the desired condition for each habitat type.

2.2 Objectives and prescriptions

The details below show the habitats proposed within the development boundary with individual species and composition making up each habitat type and the proposed target condition for each habitat type as per the BNG assessment report (AECOM, 2023²). The location of the species can be found on Drawing D14162/ENV/420/REV A in Appendix A.1. Table A.1 in Appendix B summarises the below information.

2.3 Onsite habitat creation

2.3.1 Mixed scrub

0.22ha of mixed scrub will be created in the field in the south-east of the Proposed Development (refer to Target Note (TN) 1 and TN2, drawing D14162- AECM- ZZ- SW- D- T- 7125). The mixed scrub will provide connective habitat to isolated areas of retained scrub as well as providing mosaic habitat and provide a necessary foraging, refuge and nesting resource for a plethora of local native wildlife including breeding birds and bats. The mixed scrub will comprise the following native, fruit bearing species mentioned in table 1 below.

Table 1: Mixed scrub species composition

| Mixed scrub species composition | | | | |
|---------------------------------|---------------------------|---------------|-------------|------------|
| Common name | Scientific name | Size | % | No. |
| Common hawthorn | <i>Crataegus monogyna</i> | 600mm–900mm | 30 | 60 |
| Crab apple | <i>Malus sylvestri</i> | 600mm–900mm | 5 | 10 |
| Dog rose | <i>Rosa canina</i> | 600mm-900mm | 20 | 40 |
| Field rose | <i>Rosa arvensis</i> | 600mm-900mm | 10 | 20 |
| Grey willow | <i>Salix cinerea</i> | 2000mm-2500mm | 5 | 10 |
| Guelder rose | <i>Viburnum opulus</i> | 2000mm-2500mm | 10 | 20 |
| Alder | <i>Alnus glutinosa</i> | 2000mm-2500mm | 10 | 20 |
| Blackthorn | <i>Prunus spinosa</i> | 600mm-900mm | 10 | 20 |
| Total | | | 100% | 200 |

2.3.1.1 BNG target condition

Target condition for mixed scrub is '**moderate**' in **five years**. The condition criteria are as follows and must pass 3 or 4 out of 5 in order to achieve a moderate target condition:

- Habitat is representative of UKHab descriptions. At least 3 woody species present with no one species comprising more than 75% of cover.
- There is a good age range – all of the following are present: seedlings, young shrubs and mature shrubs.
- Absence of invasive non-native species and species of sub-optimal condition make up less than 5% of ground cover.
- Scrub has a well-developed edge.
- There are clearings, glades and rides present.

2.3.1.2 Timing

Mixed scrub will be planted during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.3.1.3 Site preparation

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, is friable, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1000mm to 2000mm around each specimen.

2.3.1.4 Planting

Mixed scrub planted along the south-eastern boundary of the Proposed Development site will be planted within a 5m x 5m grid. The whips will be spaced 1 - 2 m apart from each stem. Each group will comprise a mixture of sizes and species as shown in Table 1. A 5m gap will be provided between each group planted along the south-eastern boundary to allow maintenance access to the hedgerow planted adjacent to the mixed scrub as well as providing a mosaic of habitat to occur (refer to TN1 drawing D14162/ENV/420/REV A in Appendix A)

The area of mixed scrub connecting the existing hedgerow to the existing island of scrub will be 5m x 5m and spaced 2m apart (refer to TN2 drawing D14162/ENV/420/REV A in Appendix A.1). Excavations for whip pits will be at least twice the diameter of the root spread and 1.5 times the depth of the roots of the stock to be planted. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a 75mm thick softwood pressure impregnated stake.

2.3.1.5 Habitat management

To meet the BNG target condition described in section 2.3.1.1, it will be necessary to:

Management - Year 1 – 5

The following management will be undertaken twice per year in February and October:

- Allow scrub to regenerate within the 5m x 5m area, allowing for healthy mixture of specimens, avoiding dominance of certain species such as hawthorn and blackthorn.
- Plant additional specimens if not much successful regeneration has occurred.
- Protect stock with biodegradable guards.
- Control spread of scrub by undertaking strimming two times per year in February and October (outside of nesting birds' season) between each group and between the scrub and the reedbed. This will maintain mosaic and prevent scrub from taking over the field.
- Watering to be carried out during times of extended dry weather within the area of the scrub, to the depth of the roots.
- Wind and frost loosened scrub to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised scrub to be removed and replaced.
- Keep scrub below 5m height.
- All shelters to be removed in year 5.

Management - Year 6 – 30

The following management will be undertaken once per year between September and end of February:

- Remove any invasive or non-native species that may have appeared.
- Restructure scrub groups by allowing some specimens to grow to maximum of 5m and reduce others to height of 2-3m to ground level (via flailing) between September and February.
- Wind and frost loosened scrub to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated.
- Manage a healthy mixture of specimens within each group, preventing one species from dominating such as hawthorn and blackthorn.

2.3.2 Other neutral grassland

0.48ha of other neutral grassland will be created within the boundary of the Proposed Development site (refer to TN3 drawing D14162/ENV/420/REV A in Appendix A.1). The habitat type will provide foraging resources for invertebrates, bats and small mammals, which will encourage barn owls to hunt within the grassland area. Further details of the species mix to be used is given in table 2 below.

Table 2: Summary of other neutral grassland composition (Emorsgate EM4 Meadow Mixture for clay soils)

| Common name | Scientific name | % |
|--------------------|--------------------------------|-----------|
| Wildflowers | | 20 |
| Yarrow | <i>Achillea millefolium</i> | 0.90 |
| Agrimony | <i>Agrimonia eupatroia</i> | 0.20 |
| Betony | <i>Betonica officinalis</i> | 0.20 |
| Common knapweed | <i>Centaurea nigra</i> | 3.00 |
| Meadowsweet | <i>Filipendula ulmaria</i> | 0.60 |
| Lady's bedstraw | <i>Galium verum</i> | 1.50 |
| Meadow cranes-bill | <i>Geranium pratense</i> | 0.20 |
| Meadow vetchling | <i>Lathyrus pratensis</i> | 1.00 |
| Oxeye daisy | <i>Leucanthemum vulgare</i> | 1.60 |
| Birds-foot trefoil | <i>Lotus corniculatus</i> | 0.30 |
| Musk mallow | <i>Malva moschata</i> | 0.40 |
| Ribwort plantain | <i>Plantago lanseolata</i> | 2.00 |
| Cowslip | <i>Primula veris</i> | 0.80 |
| Selfheal | <i>Prunella vulgaris</i> | 1.00 |
| Meadow buttercup | <i>Ranunculus acris</i> | 0.80 |
| Yellow rattle | <i>Rhinanthus minor</i> | 3.00 |
| Common sorrel | <i>Rumex acetosa</i> | 0.80 |
| Great burnet | <i>Sanguisorba officinalis</i> | 0.40 |
| Ragged robin | <i>Silene flos-cuculi</i> | 0.20 |
| Tufted vetch | <i>Vicia cracca</i> | 1.00 |
| Grasses | | 80 |
| Common bent | <i>Agrostis capillaris</i> | 8.00 |
| Quaking grass | <i>Briza media</i> | 4.00 |
| Sweet vernal grass | <i>Anthoxanthum odoratum</i> | 2.40 |
| Crested dog's-tail | <i>Cynosurus cristatus</i> | 40.00 |
| Red fescue | <i>Festuca rubra</i> | 20.00 |
| Meadow foxtail | <i>Alopecurus pratensis</i> | 2.80 |
| Meadow fescue | <i>Schedonorus pratensis</i> | 2.80 |

2.3.2.1 BNG target condition for other neutral grassland

Target condition is **'Moderate' in 5 years**. Passes 4 of 5 of the following criteria:

- The appearance and composition of the vegetation closely matches characteristics of the habitat type.
- Sward height is varied. At least 20% is more than 7cm and 20% is less.
- Cover of bare ground is between 1% and 5%.
- Cover of bracken is less than 20% and scrub cover less than 5%.
- Absence of invasive non-native species.

2.3.2.2 Timing

The seed will be sown during the first available planting season (autumn or spring) following completion of construction.

2.3.2.3 Site preparation

Prior to seeding the area will be cultivated to remove weeds if required. The surface vegetation will then be buried by ploughing or digging, then harrowed or raked to produce a medium tilth. The area will then be rolled to produce a firm surface. Glyphosate will also be used to remove dominant grassland species.

2.3.2.4 Sowing

The seed will be surface sown at approximately 1.5g/m², applied by machine or broadcast by hand. The seed will not be incorporated or covered, but firmed in with a roller or treading, to give good soil/seed contact. Total area to be reseeded is 4800m² therefore 7200g will be required.

2.3.2.5 Habitat management

Management - Year 1 – 5

As the sown meadow species are perennial and slow to establish, it is anticipated there will be a flush of annual weeds arising from the soil seed bank. Whilst not considered desirable, they will provide cover for the sown seedlings, provide invertebrate habitat and will die off by the end of the year. They will therefore be retained until mid to late summer.

The following management will be undertaken twice per year, once in mid-Feb to end of March and once in August to October:

- Any scrub present will be stripped and removed.
- Strip soil and aerate/subsoil to 20cm depth.
- 80% of the grassland will be cut to a short sword (c. 10cm) twice per year, once in mid-Feb to end of March and once in August. Arisings will be removed to prevent nutrient build up.
- Residual perennial weeds will be spot sprayed.
- Injurious weed control, spot treatment twice per year to maintain them below 5%. To be undertaken by hand-pulling or targeted strimming or treating with a suitable non-residual herbicide two times annually during the active growing season.

Management - Year 6 – 30

The following management will be undertaken twice per year, once in mid-Feb to end of March and once in August to October:

- 80% of the grassland will be cut to a short sword (c. 10cm) twice per year, once in mid-Feb to end of March and once in August. Arisings will be removed to prevent nutrient build up.
- Residual perennial weeds such as docks, will be dug out and removed.

- Injurious weed control, spot treatment twice per year to maintain them below 5%. To be undertaken by hand-pulling or targeted strimming or treating with a suitable non-residual herbicide two times annually during the active growing season.

2.3.3 Modified grassland

0.51ha of modified grassland will be created within the boundary of the Proposed Development site around the proposed infrastructure (TN4 drawing D14162/ENV/420/REV A in Appendix A.1). Further details of the species mix to be used is given in table 3 below.

Table 3: Summary of modified grassland species composition (Emorsgate EG22: Strong Lawn Meadow Mix)

| Common name | Scientific name | % |
|-----------------------------|----------------------------|------------|
| Grasses | | 100 |
| Common bent | <i>Agrostis capillaris</i> | 5 |
| Red fescue | <i>Festuca rubra</i> | 50 |
| Perennial ryegrass | <i>Lolium perenne</i> | 25 |
| Smooth-stalked meadow-grass | <i>Poa pratensis</i> | 20 |

2.3.3.1 BNG target condition for modified grassland

Target condition is '**Poor**' in one year. The condition criteria are as follows. Passes 2 of 4 of the following criteria:

- The appearance and composition of the vegetation closely matches characteristics of the habitat type.
- Sward height is varied. At least 20% is more than 7cm and 20% is less.
- Cover of bare ground is between 1% and 5%.
- Cover of bracken is less than 20% and scrub cover less than 5%.

2.3.3.2 Timing

The seed will be sown during the first available planting season (autumn or spring) following completion of construction.

2.3.3.3 Site preparation

Prior to seeding the area will be cultivated to remove weeds if required. The surface vegetation will then be buried by ploughing or digging, then harrowed or raked to produce a medium tilth. The area will then be rolled to produce a firm surface.

2.3.3.4 Sowing

The seed will be surface sown at approximately 25g/m², applied by machine or broadcast by hand. The seed will not be incorporated or covered, but firmed in with a roller or treading, to give good soil/seed contact. Total area is 5100m² therefore 127,500g will be required.

2.3.3.5 Habitat management

Management - Year 1 +

Grassland cut ten times per year to maintain short sward.

2.3.4 Reedbed

0.38ha of reeded will be created within the boundary of the Proposed Development site to the south-east (TN 5 drawing D14162/ENV/420/REV A in Appendix A.1). The main area of the reedbed will be planted with common reed. The margins of the reedbed will be planted with species noted in table 4 below.

Table 4: Summary of species to be planted along the margins of the reedbed

| Common name | Scientific name | % |
|----------------|------------------------------|----|
| Yellow iris | <i>Iris pseudacorus</i> | 20 |
| Water mint | <i>Mentha aquatica</i> | 20 |
| Bog bean | <i>Menyanthes trifoliata</i> | 20 |
| Flowering rush | <i>Butomus umbellatus</i> | 20 |
| Marsh marigold | <i>Caltha palustris</i> | 10 |
| Common sedge | <i>Carex nigra</i> | 10 |

2.3.4.1 BNG target condition for reedbed

Target condition is '**Good**' in **six years**. The condition criteria are as follows. Passes 5 of 6 criteria:

- The water table is at or near the surface throughout the year. No artificial drainage, unless specifically to maintain water levels.
- Appearance and composition of the vegetation closely matches characteristics of the specific wetland habitat type.
- Cover of scrub and scattered trees less than 10%.
- Cover of bare ground less than 5%.
- Absence of invasive non-native species and species of indicative sub-optimal condition make up less than 5% of ground cover.
- Reedbed has a diverse structure with between 60 and 80% reeds. Other areas will include open water.

2.3.4.2 Timing

The reedbed will be created following completion of construction. The reedbed will measure 90m x 42m and will vary in water depth from 0.5m to 1.5m depths. The shallower areas will support phragmites whereas the deeper areas will provide open water. Marginal plant species will be planted during the first available planting season (autumn or spring) following completion of the reedbed.

2.3.4.3 Site preparation

Prior to planting the marginal plants any weeds will be removed by spot spraying to ensure the plant and root is completely removed. Scrub will also be cut back using hand tools, where it is safe to do so.

2.3.4.4 Habitat management

Management - Year 1 – 5

The following management will be undertaken once every three years between September and February:

- Rotational management of marginal plants in September – October to remove most dominant species to retain intended species diversity.
- Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area.
- Increase amount of reeds to cover between 60 and 80% of the reedbed with subsequent annual rotational management.
- Remove cuttings from the site.
- Monitor of silt depth and removal if considered to be impacting function.
- Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area.

Management – Year 6 – 30

The following management will be undertaken once every three years between September and February:

- Monitor of silt depth and removal if considered to be impacting function.
- Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area.
- Manage reeds to cover between 60 and 80% of the reedbed with subsequent annual rotational management.

2.3.5 Ditch

A ditch has been created to the south-east of the site (TN6 drawing D14162/ENV/420/REV A in Appendix A.1)The ditch measures approximately 108m in length with a right-angle bend in the middle. The ditch is 1m deep with a 1.25m tall bund on the southern side of the ditch to provide a variety of ecological niches. The slope is 1:3 with a width of 6.5m from bank to bank. Common reed was transplanted from the main area of proposed works to the ditch in September 2023. Figure 2 below shows the ditch cross section design.

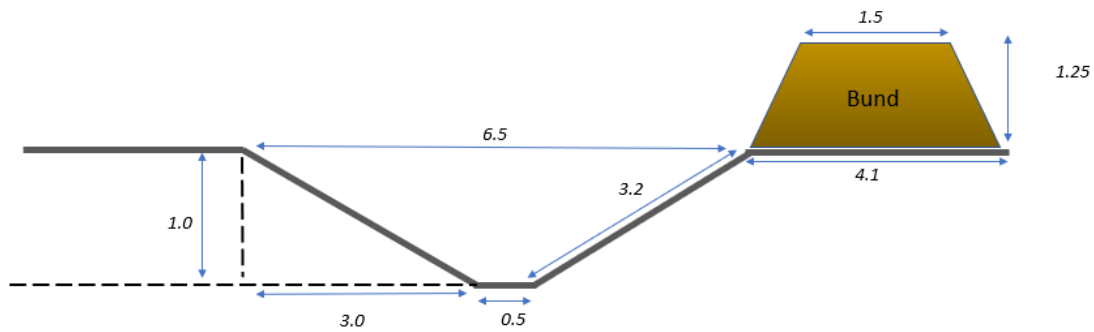


Figure 2: Diagram of the proposed ditch with cross-section design



Figure 3: Ditch created in September 2023

2.3.5.1 BNG target condition for ditch

Target condition is **'Poor' in 1 year**. Passes 5 or fewer:

- Ditch is of good quality water, no obvious signs of pollution.
- A range of emergent, submerged, and floating leaved plants are present.
- Less than 10% cover of filamentous algae and/or duckweed.
- Fringe of marginal vegetation present along more than 75% of ditch.
- Physical damage evident along less than 5% of ditch.
- Sufficient water levels are maintained (summer depth approx. 50cm).
- Less than 10% of ditch is heavily shaded.
- Absence of non-native plant and animal species.

2.3.5.2 Habitat management

Management - Year 1 – 5

The following management will be undertaken once every three years:

- Increase coverage of reeds to be between 60 and 80% with subsequent annual rotational management.
- Removal of arisings and disposed of responsibly.
- Reduce levels of scrub and scattered trees within the ditch to cover equal to or less than 10% of the area.

Management - Year 6 – 30

The following management will be undertaken once every three years:

- Check status of the ditch. Increase or decrease cutting regimes dependant on extent of scrub and common reed coverage.
- Undertake litter pick.

2.3.6 Line of trees

Two treelines will be planted along the south-eastern (108m, TN7 drawing D14162/ENV/420/REV A in Appendix A.1) and southern boundary (50m long, TN8, drawing D14162/ENV/420/REV A in Appendix A.1) of the site. The treelines will comprise a total of 44 native individual trees and will be planted approximately 4m apart in diagonal spacings and will vary in size. The treeline will comprise the following species mentioned in table 5 below.

Table 5: Proposed species of trees to be planted to the south-east of the site.

| Line of trees. The treelines will comprise a total of 44 native individual trees and will be planted approximately 4m apart in diagonal spacings and will vary in size. | | | | |
|---|-----------------------|--------------|-------------|-----------|
| Common name | Scientific name | Size | % | No. |
| Crack willow | <i>Salix fragilis</i> | 1750-2000mm | 100 | 44 |
| | | Total | 100% | 44 |

BNG target condition for line of trees

Target condition is '**Moderate**' in **20 years**. The condition criteria are as follows.

Passes 4 of 5 criteria:

- More than 70% of trees are native species.
- Tree canopy is predominantly continuous, extending up to 5m in width.
- Includes one or more mature or veteran tree.
- Undisturbed naturally vegetated strip of at least 6 m on both sides.

- At least 95% of trees are in a healthy condition.

2.3.6.1 Timing

The trees will be planted between during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.3.6.2 Site preparation

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1m around each specimen.

2.3.6.3 Planting

Excavations for tree pits will be at least twice the diameter of the root spread and 1.5 times the depth of the roots of the stock to be planted. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a 75mm thick softwood pressure impregnated stake. Bark mulch will be spread to a uniform depth of 100mm over a 0.5m radius around each specimen. Trees will be planted with a 4m spacing between stems.

2.3.6.4 Habitat management

Management - Year 1 - 5

The following management will be undertaken three times a year:

- Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm of the trees.
- Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots.
- Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5.
- Bark mulch to be topped-up as necessary to maintain specified depth.
- Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced.
- All shelters to be removed in year 5.

Management - Year 6 – 30

The following management will be undertaken once every three years:

- Replace any failed tree stock.

- Cut back encroaching scrub.
- Start rotational pollarding of the willow trees.

2.3.7 Species rich hedgerow with trees

179m (TN9, drawing D14162/ENV/420/REV A in Appendix A.1) and 40m (TN10, drawing D14162/ENV/420/REV A in Appendix A.1) of species rich hedgerow will be planted along the southern boundary of the Proposed Development site. The hedgerow will comprise the following native species noted in table 6 below.

Table 6: Proposed species rich hedgerow with trees

| Species rich hedgerow with trees. Trees will be planted every 20m. Specimens will be planted in a double row with a minimum of 300mm spacing between stems, 200mm between rows and a 600mm gap from the new site extension boundary fence | | | | |
|---|---------------------------|--------------|-------------|-----|
| Common name | Scientific name | Size | % | No. |
| Crab apple | <i>Malus sylvestris</i> | 800-1000mm | 9 | 15 |
| Blackthorn | <i>Prunus spinosa</i> | 600-800mm | 10 | 18 |
| Hawthorn | <i>Crataegus monogyna</i> | 600-800mm | 10 | 18 |
| Cherry | <i>Prunus avium</i> | 600-800mm | 10 | 18 |
| Spindle | <i>Euonymus europaeus</i> | 60-80cm | 10 | 18 |
| Holly | <i>Ilex aquifolium</i> | 125-150cm | 10 | 18 |
| Dogwood | <i>Cornus sanguinea</i> | 60-80cm | 10 | 18 |
| Grey willow | <i>Salix cinerea</i> | 125-150cm | 8 | 14 |
| English oak | <i>Quercus robur</i> | 125-150cm | 8 | 14 |
| Wild privet | <i>Ligustrum vulgare</i> | 60-80cm | 10 | 18 |
| Mature standard trees to be planted every 20m | | | | |
| Alder | <i>Alnus glutinosa</i> | 200-250cm | 2 | 4 |
| English oak | <i>Quercus robur</i> | 200-250cm | 2 | 4 |
| Crab apple | <i>Malus sylvestris</i> | 200-250cm | 1 | 2 |
| | | Total | 100% | 179 |

2.3.7.1 BNG target condition

Target condition is 'Moderate' in 10 years. The condition criteria are as follows. Passes 6 of 10 criteria:

- >1.5m average height along length.
- >1.5m average width along length.
- Gap between ground and base is >0.5m for 90% length.
- Gaps make up <10% of total length and no gap is >5m.
- >1m width of undisturbed ground with perennial herbaceous vegetation for >90% length:
 - Measured from outer edge of hedgerow
 - And is present on one side of the hedgerow (at least)
- Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.

- >90% hedgerow is free of invasive non-native plant species (including those listed on Schedule 9 of WCA) and recently introduced species.
- >90% of the hedgerow or undisturbed ground is free of damage caused by human activities.
- There is more than one age-class (or morphology) of tree present (for example young, mature, veteran and ancient) and there is on average at least one mature, ancient or veteran tree present per 20-50m of hedgerow.
- At least 95% of hedgerow trees are in health condition (excluding veteran features valuable for wildlife). There is little or no evidence of adverse impact on tree health by damage from livestock or wild animals, pests or diseases or human activity.

2.3.7.2 Timing

The hedgerow will be planted between during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.3.7.3 Site preparation

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, is friable, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1000mm along the length of the hedgerow.

2.3.7.4 Planting

Planting of the hedgerow will either be through notch or trench planting. Notches will be vertical and deep enough for the roots to hang freely and the root collar placed exactly level with the ground surface. The notch will then be closed and the soil well-firmed around the roots. Trench planting will be to a minimum of 400mm deep and 700mm wide. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a cane and spiral guard. Bark mulch will be spread to a uniform depth of 100mm over a 0.5m radius along the length of the hedgerow.

Specimens will be planted in a double row with a minimum of 300mm spacing between stems, 200mm between rows and a 600mm gap from the new site extension boundary fence (see Figure 4 below).

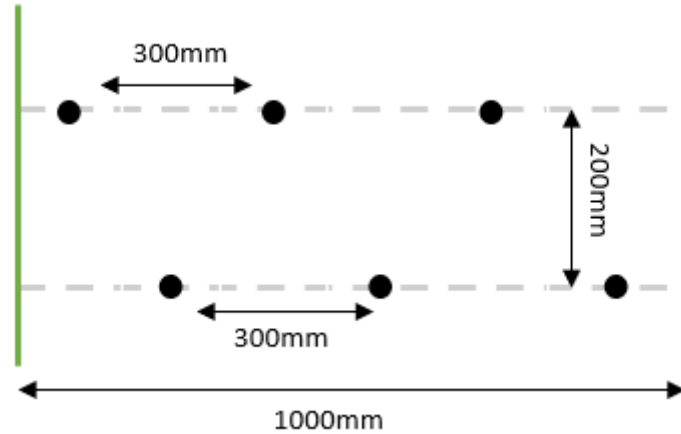


Figure 4: Hedgerow planting spacing

2.3.7.5 *Habitat management*

Management - Year 1 - 5

The following management will be undertaken three times a year:

- Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm from the base of the hedgerow.
- Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots.
- Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5.
- Bark mulch to be topped-up as necessary to maintain specified depth.
- Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced.

Management – year 6 – 30

The following management will be undertaken once every three years:

- Replace any failed tree stock or gap up where required.
- Cut back encroaching scrub.
- Keep hedgerow below 5m height. Allow designated trees to grow.

2.3.8 **Urban trees**

0.15ha urban trees (TN11, drawing D14162/ENV/420/REV A in Appendix A.1) will be planted within the understory canopy of an existing broadleaved woodland parcel located to the south of the Proposed Development boundary. The urban trees will provide improved canopy coverage and connectivity, additional nesting opportunities and food resources.

Urban trees will comprise the following native, fruit bearing species given in table 7 below.

Table 7: Urban trees

Urban trees Excavations for tree pits will be at least twice the diameter of the root spread and 1.5 times the depth of the roots of the stock to be planted. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a 75mm thick softwood pressure impregnated stake. Bark mulch will be spread to a uniform depth of 100mm over a 0.5m radius around each specimen. Trees will be planted with a 2500mm minimum spacing between stems.

| Common name | Scientific name | Size | No. |
|--------------|------------------------|-------------|----------|
| Alder | <i>Alnus glutinosa</i> | 600–900mm | 1 |
| Crack willow | <i>Salix fragilis</i> | 2000-2500mm | 1 |
| English oak | <i>Quercus robur</i> | 2000-2500mm | 2 |
| Total | | | 4 |

BNG target condition for urban trees

Target condition is '**Moderate**' in **27 years**. The condition criteria are as follows.

Must pass 4 of 6 criteria:

- Tree is a native species.
- Tree canopy is predominantly continuous with gaps in canopy cover making up 5m wide.
- Tree is mature or veteran.
- Little of no evidence of adverse impact on tree health by anthropogenic activities.
Currently no regular pruning regime, so the trees retain >75% of expected canopy for their rand and height.
- Micro-habitat for birds, mammals and insects are present.
- More than 20% of tree canopy is oversailing vegetation beneath.

2.3.8.1 Timing

The trees will be planted during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.3.8.2 Site preparation

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, is friable, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1000mm around each specimen.

2.3.8.3 Planting

Excavations for tree pits will be at least twice the diameter of the root spread and 1.5 times the depth of the roots of the stock to be planted. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a 75mm thick softwood pressure impregnated stake. Bark mulch will be spread to a uniform depth of 100mm over a 0.5m radius around each specimen. Trees will be planted with a 2500mm minimum spacing between stems.

2.3.8.4 Habitat management

Management - Year 1 - 5

The following annual maintenance will be undertaken three times a year:

- Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm of the trees.
- Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots.
- Tree shelters and stakes to be maintained and replaced as required.
- Bark mulch to be topped-up as necessary to maintain specified depth.
- Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced.
- Tree guards to be removed in year 5.

Management - Year 6 – 30

Undertake any management required once every three years:

- Monitor tree health and growth once a year and undertake any management as deemed necessary.

2.4 Onsite habitat enhancement

The following enhancements to existing, retained habitats are proposed within the Proposed Development site boundary:

2.4.1 Environmental corridor

0.69ha of environmental corridor (TN12, drawing D14162/ENV/420/REV A in Appendix A.1) will be enhanced following completion of the construction works. The environmental corridor comprises reedbed, predominantly common reed, mixed scrub and modified grassland. The corridor will be retained during construction, albeit a small section of removal for the proposed pipe bridge. The corridor will provide commuting and foraging opportunities for protected species such as bats, birds, barn owls.

2.4.1.1 BNG target condition for reedbed

Target condition is '**Good**' in **six years**. The condition criteria are as follows. Passes 5 of 6 criteria and essential criteria 7c.

- The water table is at or near the surface throughout the year. No artificial drainage, unless specifically to maintain water levels.
- Appearance and composition of the vegetation closely matches characteristics of the specific wetland habitat type.
- Cover of scrub and scattered trees less than 10%.
- Cover of bare ground less than 5%.
- Absence of invasive non-native species and species of indicative sub-optimal condition make up less than 5% of ground cover.
- Reedbed has a diverse structure with between 60 and 80% coverage of common reed. Other areas may include open water, species-rich fen and/or wet woodland.

2.4.1.2 Timing

The reedbed habitat will be enhanced following completion of construction and will take place outside of nesting bird season.

2.4.1.3 Habitat management

Management - Year 1 – 5

The following management will be undertaken once a year outside of the nesting bird season (between September and end of February):

- Annual rotational management of marginal plants in September – October to remove most dominant species to retain intended species diversity.
- Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area.
- Increase amount of reeds to cover between 60 and 80% of the ditch with subsequent annual rotational management.
- Removal of arisings and disposed of responsibly.

Management – Year 6 – 30

The following management will be undertaken once a year outside of the nesting bird season (between September and end of February):

- Monitor of silt depth and removal if considered to be impacting function.
- Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area.
- Maintain coverage of reeds within extent of baseline area.

2.4.1.4 BNG target condition for mixed scrub

Target condition for mixed scrub (TN13, drawing D14162/ENV/420/REV A in Appendix A.1) is '**Good**' in three years. The condition criteria are as follows and must pass 5 out of 5 in order to achieve a good target condition:

The condition criteria are as follows. Passes 5 of 5 criteria.

- Habitat is representative of UKHab descriptions. At least 3 woody species present with no one species comprising more than 75% of cover.
- There is a good age range – all of the following are present: seedlings, young shrubs and mature shrubs.
- Absence of invasive non-native species and species of sub-optimal condition make up less than 5% of ground cover.
- Scrub has a well-developed edge.
- There are clearings, glades and rides present.

2.4.1.5 Timing

Additional mixed scrub species will be planted alongside the existing during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.4.1.6 Site preparation

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, is friable, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1000mm to 2000mm around each specimen.

2.4.1.7 Habitat management

To meet the BNG target condition described in section 2.4.1.1, it will be necessary to:

Management - Year 1 – 5

Undertake the following management once per year between September and February:

- Maintain hawthorn within existing footprint, avoiding spreading along the environmental corridor.
- Create 1m clearings and rides in dense areas of scrub.

Management - Year 6 -30

Undertake the following management once every two years:

- Manage invasive non-native species.
- Restructure scrub planting to create a mosaic of mixed-aged scrub stands and open tussock grassland aiming to achieve a mosaic/matrix of 75% scrub.

- Manage on a rotational cut removing up to 30% of closed canopy scrub every 2 years – with the aim to develop a spectrum of successional scrub communities by maintaining patches of mixed scrub at different stages of growth from freshly cut to closed canopy.

2.4.2 Ditch

12m of a (currently) dry ditch (TN14, drawing D14162/ENV/420/REV A in Appendix A.1) located to the south of the Proposed Development is proposed to be enhanced. Refer to table 8 below for proposed marginal plants to be planted within the ditch.

Table 8: Proposed species to be planted within the ditch

| Common name | Scientific name | % |
|------------------|------------------------------|------|
| Yellow flag iris | <i>Iris pseudacorus</i> | 20 |
| Water mint | <i>Mentha aquatica</i> | 20 |
| Bogbean | <i>Menyanthes trifoliata</i> | 20 |
| Flowering rush | <i>Butomus umbellatus</i> | 20 |
| Marsh marigold | <i>Caltha palustris</i> | 10 |
| Common sedge | <i>Carex nigra</i> | 10 |
| | Total: | 100% |

2.4.2.1 BNG target condition

Target condition is '**Moderate**' in 1 year. Passes 6 of 8 criteria:

- Ditch is of good quality water, no obvious signs of pollution.
- A range of emergent, submerged and floating leaved plants are present.
- Less than 10% cover of filamentous algae and/or duckweed.
- Fringe of marginal vegetation present along more than 75% of ditch.
- Physical damage evident along less than 5% of ditch.
- Sufficient water levels are maintained (summer depth approx. 50cm).
- Less than 10% of ditch is heavily shaded.
- Absence of non-native plant and animal species.

2.4.2.2 Timing

Enhancements of the ditch will be undertaken following completion of the construction works.

2.4.2.3 Site preparation

The existing ditch will be extended from 12m to 20m and dredged down to ground water level (approximately 1.5m) in order to achieve permanent level of water within the ditch, supporting the marginal plant species proposed to be planted. Arisings will be used to create a bank at the side of the ditch to provide a variety of ecological niches for wildlife.

2.4.2.4 Habitat management

Management - Year 1 – 5

Undertake the following management once per year between September and end of February (outside of the nesting bird season):

- Remove any invasive/non-native species.
- Monitor of silt depth and removal if considered to be impacting function.
- Reduce levels of scrub and scattered trees within the ditch to cover equal to or less than 10% of the area.
- Increase coverage of reeds to be between 60 and 80% with subsequent annual rotational management.

Management – Year 6 – 30

Undertake the following management once every three years:

- Litter picking.
- Monitor of silt depth and removal if considered to be impacting function.
- Reduce levels of scrub and scattered trees within the ditch to cover equal to or less than 10% of the area; and
- Manage reed coverage to be between 60 and 80% of the ditch with subsequent annual rotational management.

2.4.3 Species poor hedgerow with trees

130m of species poor hedgerow (TN15, drawing D14162/ENV/420/REV A in Appendix A.1) will be enhanced to the south-east of the Proposed Development site. The hedgerow will be enhanced by in-fill planting with the following species noted in Table 9.

Table 9: Proposed species rich hedgerow with trees

| Common name | Scientific name | Size | Number |
|---------------|-------------------------|---------|--------|
| Crab apple | <i>Malus sylvestris</i> | 60-80cm | 5 |
| Cherry | <i>Prunus avium</i> | 60-80cm | 5 |
| Goat willow | <i>Salix caprea</i> | 60-80cm | 5 |
| English oak | <i>Quercus robur</i> | 60-80cm | 5 |
| Total: | | | 20 |

2.4.3.1 BNG target condition

Target condition is **'Moderate' in 10 years**. The condition criteria are as follows. No more than five failures:

- >1.5m average height along length.
- >1.5m average width along length.
- Gap between ground and base of canopy is <0.5m for >90% of length.
- Gaps make up <10% of total length and no canopy gaps >5m

- >1m width of undisturbed ground with perennial veg for >90% length.
- Plant species indicative of nutrient enrichment dominated 90% hedgerow and undisturbed ground is free of invasive non-native and neophyte species.
- >90% hedge or ground is free of damage by humans.
- Tree class: there is more than one age-class (or morphology) of tree present. And there is on average at least one mature tree present per 20m – 50m of hedgerow.
- Tree health: at least 95% of hedgerow trees are in healthy condition. Little or no evidence of livestock, wild animals or pest/diseases or human activity.

2.4.3.2 *Timing*

The hedgerow will be in-fill planted during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.4.3.3 *Site preparation*

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, is friable, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1m along the length of the hedgerow.

2.4.3.4 *Planting*

Planting of the hedgerow will either be through notch or trench planting. Notches will be vertical and deep enough for the roots to hang freely and the root collar placed exactly level with the ground surface. The notch will then be closed and the soil well-firmed around the roots. Trench planting will be to a minimum of 400mm deep and 700mm wide. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a 75mm thick softwood pressure impregnated stake. Bark mulch will be spread to a uniform depth of 100mm over a 0.5m radius along the length of the hedgerow.

Specimens will be planted in a double row with a minimum of 300mm spacing between stems, 200mm between rows and a 600mm gap from the new site extension boundary fence (see Figure 4 above).

2.4.3.5 *Habitat management*

Management - Year 1 - 5

Management will include the following three times a year:

- Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm from the base of the hedgerow.

- Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots.
- Pest control at suitable times of the year to combat insect or pest attack and disease.
- Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5.
- Bark mulch to be topped-up as necessary to maintain specified depth.
- Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced.

Management – year 6 – 30

Undertake the following management once every three years:

- Replace any failed tree stock.
- Cut back encroaching scrub.
- Keep hedgerow below 5m height. Allow trees to grow.

2.5 Offsite habitat creation

Habitat creation proposed within Wessex Water’s landownership, outside of the Proposed Development:

2.5.1 Orchard planting

0.12ha of orchard planting is proposed along the public right of way diversion within the existing WRC boundary to the south-east (TN16, drawing D14162/ENV/420/REV A in Appendix A.1). The trees will be planted 7m apart. This will provide compensatory foraging and nesting resources for birds. See table 10 below for proposed trees (subject to stock availability) to be planted and table 11 for proposed seeding of grassland.

Table 10: Proposed trees to be planted

| Common name | Size | % | Number |
|-------------------------------|-----------|------|--------|
| Crab apple | 175-200cm | 12.5 | 3 |
| Taunton cross | 175-200cm | 12.5 | 3 |
| Hunts Duke of Gloucestershire | 175-200cm | 12.5 | 3 |
| Severn bank | 175-200cm | 12.5 | 3 |
| Underleaf | 175-200cm | 12.5 | 3 |
| Wheeler’s russet | 175-200cm | 12.5 | 3 |
| Plymouth’s cross | 175-200cm | 12.5 | 3 |
| Neild’s drooper | 175-200cm | 12.5 | 4 |
| | Total: | 100% | 25 |

Table 11: Summary of other neutral grassland composition (Emorsgate EM4 Meadow Mixture for clay soils)

| Common name | Scientific name | % |
|--------------------|--------------------------------|-----------|
| Wildflowers | | 20 |
| Yarrow | <i>Achillea millefolium</i> | 0.90 |
| Agrimony | <i>Agrimonia eupatroia</i> | 0.20 |
| Betony | <i>Betonica officinalis</i> | 0.20 |
| Common knapweed | <i>Centaurea nigra</i> | 3.00 |
| Meadowsweet | <i>Filipendula ulmaria</i> | 0.60 |
| Lady's bedstraw | <i>Galium verum</i> | 1.50 |
| Meadow cranes-bill | <i>Geranium pratense</i> | 0.20 |
| Meadow vetchling | <i>Lathyrus pratensis</i> | 1.00 |
| Oxeye daisy | <i>Leucanthemum vulgare</i> | 1.60 |
| Birds-foot trefoil | <i>Lotus corniculatus</i> | 0.30 |
| Musk mallow | <i>Malva moschata</i> | 0.40 |
| Ribwort plantain | <i>Plantago lanseolata</i> | 2.00 |
| Cowslip | <i>Primula veris</i> | 0.80 |
| Selfheal | <i>Prunella vulgaris</i> | 1.00 |
| Meadow buttercup | <i>Ranunculus acris</i> | 0.80 |
| Yellow rattle | <i>Rhinanthus minor</i> | 3.00 |
| Common sorrel | <i>Rumex acetosa</i> | 0.80 |
| Great burnet | <i>Sanguisorba officinalis</i> | 0.40 |
| Ragged robin | <i>Silene flos-cuculi</i> | 0.20 |
| Tufted vetch | <i>Vicia cracca</i> | 1.00 |
| Grasses | | 80 |
| Common bent | <i>Agrostis capillaris</i> | 8.00 |
| Quaking grass | <i>Briza media</i> | 4.00 |
| Sweet vernal grass | <i>Anthoxanthum odoratum</i> | 2.40 |
| Crested dog's-tail | <i>Cynosurus cristatus</i> | 40.00 |
| Red fescue | <i>Festuca rubra</i> | 20.00 |
| Meadow foxtail | <i>Alopecurus pratensis</i> | 2.80 |
| Meadow fescue | <i>Schedonorus pratensis</i> | 2.80 |

2.5.1.1 BNG target condition

Target condition is '**Moderate**' in 20 years. The condition criteria are as follows. Passes 5 of 9:

- Presence of ancient and/or veteran trees.
- Less than 5% of trees are covered by scrub.
- Scrub occupies <10% ground cover.
- Evidence of formative and/or restorative pruning.
- Presence of standing and/or fallen dead wood.
- At least 95% of trees are free from damage from humans or animals.
- Sward height varies and areas of bare ground present.
- Species richness of grassland is equivalent to medium, high or very high distinctiveness grassland.
- Absence of invasive non-native species and species indicative of sub-optimal condition make up <10% of ground cover.

2.5.1.2 Timing

The hedgerow will be in-fill planted during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.5.1.3 Site preparation

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, is friable, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1000mm around each specimen.

2.5.1.4 Planting and sowing

Excavations for tree pits will be at least twice the diameter of the root spread and 1.5 times the depth of the roots of the stock to be planted. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a 75mm thick softwood pressure impregnated stake. Bark mulch will be spread to a uniform depth of 100mm over a 0.5m radius around each specimen. Trees will be planted with a 2500mm minimum spacing between stems. Grassland to be seeded at 15kg/ha therefore a total of 15kg will be required.

2.5.1.5 Habitat management

The following grassland management will be undertaken twice a year in Spring and August/September and trees will be managed three times a year.

Grassland:

Management - Year 1

- Manage and remove weeds by spot treatment or hand pulling and top initial growth/sward to maintain c.10cm height.

Management - Year 2+

- Mow and strim twice a year, once in spring and again in August/Sept. Avoid between March and early August (beneficial for birds and pollinators).

Trees:

Management - Year 1

- Mulch and water regularly replacing any failures.

Management - Year 2 - 3

- Monitor twice annually replacing failures and watering as required.

Management - Year 3 +

- Monitor every five years, lift crowns and prune where necessary leaving cut or dead wood in piles.

2.5.2 Other neutral grassland

0.15ha of other neutral grassland will be created within the boundary of the Proposed Development site (TN17, drawing D14162/ENV/420/REV A in Appendix A.1).

0.15ha of other neutral grassland will be created opposite the proposed orchard, within the existing WRC boundary to the south-east of the site. The grassland will provide compensatory foraging habitat for invertebrates, birds and bats.

Further details of the species mix to be used is given in table 12 below.

Table 12: Summary of other neutral grassland composition (Emorsgate EM4: Meadow Mixture for clay soils)

| Common name | Scientific name | % |
|--------------------|--------------------------------|-----------|
| Wildflowers | | 20 |
| Yarrow | <i>Achillea millefolium</i> | 0.90 |
| Agrimony | <i>Agrimonia eupatroia</i> | 0.20 |
| Betony | <i>Betonica officinalis</i> | 0.20 |
| Common knapweed | <i>Centaurea nigra</i> | 3.00 |
| Meadowsweet | <i>Filipendula ulmaria</i> | 0.60 |
| Lady's bedstraw | <i>Galium verum</i> | 1.50 |
| Meadow cranes-bill | <i>Geranium pratense</i> | 0.20 |
| Meadow vetchling | <i>Lathyrus pratensis</i> | 1.00 |
| Oxeye daisy | <i>Leucanthemum vulgare</i> | 1.60 |
| Birds-foot trefoil | <i>Lotus corniculatus</i> | 0.30 |
| Musk mallow | <i>Malva moschata</i> | 0.40 |
| Ribwort plantain | <i>Plantago lanceolata</i> | 2.00 |
| Cowslip | <i>Primula veris</i> | 0.80 |
| Selfheal | <i>Prunella vulgaris</i> | 1.00 |
| Meadow buttercup | <i>Ranunculus acris</i> | 0.80 |
| Yellow rattle | <i>Rhinanthus minor</i> | 3.00 |
| Common sorrel | <i>Rumex acetosa</i> | 0.80 |
| Great burnet | <i>Sanguisorba officinalis</i> | 0.40 |
| Ragged robin | <i>Silene flos-cuculi</i> | 0.20 |
| Tufted vetch | <i>Vicia cracca</i> | 1.00 |
| Grasses | | 80 |
| Common bent | <i>Agrostis capillaris</i> | 8.00 |
| Quaking grass | <i>Briza media</i> | 4.00 |
| Sweet vernal grass | <i>Anthoxanthum odoratum</i> | 2.40 |
| Crested dog's-tail | <i>Cynosurus cristatus</i> | 40.00 |
| Red fescue | <i>Festuca rubra</i> | 20.00 |
| Meadow foxtail | <i>Alopecurus pratensis</i> | 2.80 |
| Meadow fescue | <i>Schedonorus pratensis</i> | 2.80 |

2.5.2.1 BNG target condition for other neutral grassland

Target condition is 'Moderate' in 5 years. Passes 4 of 5 of the following criteria:

- The appearance and composition of the vegetation closely matches characteristics of the habitat type.
- Sward height is varied. At least 20% is more than 7cm and 20% is less.
- Cover of bare ground is between 1% and 5%.
- Cover of bracken is less than 20% and scrub cover less than 5%.
- Absence of invasive non-native species.

2.5.2.2 Timing

The seed will be sown during the first available planting season (autumn or spring) following completion of construction.

2.5.2.3 Site preparation

Prior to seeding the area will be cultivated to remove weeds if required. The surface vegetation will then be buried by ploughing or digging, then harrowed or raked to produce a medium tilth. The area will then be rolled to produce a firm surface.

2.5.2.4 Sowing

The seed will be surface sown at approximately 1.5g/m², applied by machine or broadcast by hand. The seed will not be incorporated or covered, but firmed in with a roller or treading, to give good soil/seed contact.

2.5.2.5 Habitat management

Management - Year 1 - 5

As the sown meadow species are perennial and slow to establish, it is anticipated there will be a flush of annual weeds arising from the soil seed bank. Whilst not considered desirable, they will provide cover for the sown seedlings, provide invertebrate habitat and will die off by the end of the year. They will therefore be retained until mid to late summer.

The following management will be undertaken twice per year, once in mid-Feb to end of March and once in August.

- The grassland will be cut to a short sward (c. 10cm) twice per year, once in mid-Feb to end of March and once in September/October. Arisings will be removed to prevent nutrient build up.
- Residual perennial weeds such as docks, will be dug out and removed.
- Injurious weed control, spot treatment twice per year to maintain them below 5%. To be undertaken by hand-pulling or targeted strimming or treating with a suitable non-residual herbicide twice annually during the active growing season.

Management - Year 6 – 30

The following management will be undertaken twice per year, once in mid-Feb to end of March and once in August:

- The grassland will be cut to a short sward (c.10cm) twice per year, once in mid-Feb to end of March and once in August. Arisings will be removed to prevent nutrient build up.
- Residual perennial weeds such as docks, will be dug out and removed.

2.6 Offsite habitat enhancement

2.6.1 Species-poor hedgerow with trees

110 m of species poor hedgerow will be enhanced to the south-east of the Proposed Development site (TN18, drawing D14162/ENV/420/REV A in Appendix A.1). The hedgerow will be enhanced by in-fill planting with the following species noted in Table 13.

Table 13: Proposed species to be integrated into existing hedgerow.

| Common name | Scientific name | Size | % | No. |
|-------------|-------------------------|-----------|----|-----|
| Crab apple | <i>Malus sylvestris</i> | 400-600mm | 7 | 13 |
| Cherry | <i>Prunus avium</i> | 400-600mm | 10 | 18 |
| Goat willow | <i>Salix caprea</i> | 400-600mm | 7 | 11 |
| English oak | <i>Quercus robur</i> | 400-600mm | 7 | 11 |

2.6.1.1 BNG target condition

Target condition is **'Moderate' in 10 years**. The condition criteria are as follows. No more than five failures:

- >1.5m average height along length.
- >1.5m average width along length.
- Gap between ground and base of canopy is <0.5m for >90% of length.
- Gaps make up <10% of total length and no canopy gaps >5m
- >1m width of undisturbed ground with perennial veg for >90% length.
- Plant species indicative of nutrient enrichment dominated 90% hedgerow and undisturbed ground is free of invasive non-native and neophyte species.
- >90% hedge or ground is free of damage by humans.
- Tree class: there is more than one age-class (or morphology) of tree present. And there is on average at least one mature tree present per 20m – 50m of hedgerow.
- Tree health: at least 95% of hedgerow trees are in healthy condition. Little or no evidence of livestock, wild animals or pest/diseases or human activity.

2.6.1.2 Timing

The hedgerow will be in-fill planted during the first planting season (1 November and 31 March) following completion of construction. Planting will be avoided when the soil is very wet or waterlogged, when the ground is frozen, when the air temperature is below 2°C or in very strong winds.

2.6.1.3 Site preparation

Prior to planting the subsoil and topsoil will be cultivated where necessary to ensure good physical structure, is friable, retentive of moisture and well drained. This will involve the following as required: digging over the site to a minimum of 500mm, the removal of undesirable materials such as larger stones over 100mm, turf, building materials etc., spreading of topsoil up to 300mm and the creation of weed-free area of at least 1000mm along the length of the hedgerow.

2.6.1.4 Planting

Planting of the hedgerow will either be through notch or trench planting. Notches will be vertical and deep enough for the roots to hang freely and the root collar placed exactly level with the ground surface. The notch will then be closed and the soil well-firmed around the roots. Trench planting will be to a minimum of 400mm deep and 700mm wide. Once backfilled, each specimen will be fitted with a 600mm biodegradable tree shelter and supported with a 75mm thick softwood pressure impregnated stake. Bark mulch will be spread to a uniform depth of 100mm over a 0.5m radius along the length of the hedgerow.

Specimens will be planted in a double row with a minimum of 300mm spacing between stems, 200mm between rows and a 600mm gap from the new site extension boundary fence (refer to Figure 4 in section 2.3.7.4).

2.6.1.5 Habitat management

Management - Year 1 - 5

The following management will be undertaken three times a year:

- Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm from the base of the hedgerow.
- Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots.
- Pest control at suitable times of the year to combat insect or pest attack and disease.
- Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5.
- Bark mulch to be topped-up as necessary to maintain specified depth.
- Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced.

Management – year 6 – 30

The following management will be undertaken every two years between September and end of February (outside of nesting bird season):

- Replace any failed tree stock.
- Cut back encroaching scrub.
- Keep hedgerow below 5m height. Allow trees to grow.

2.6.2 Broadleaved woodland

0.5ha of broadleaved woodland will be enhanced in line with the Scheduled Monument Management Plan⁴ (TN19, drawing D14162/ENV/420/REV A in Appendix A.1).

The scheduled monument management plan states the following should be undertaken:

Undertake selective tree work where there is dense growth over the rhine to improve light levels. This will encourage aquatic flora and bankside vegetation, enhancing the monument's setting and reducing the risk to the future stability of the monument and its underlying archaeology. The dense group of pole-stage elm to the east of the bank will be selectively thinned (coppiced), with dead and dying trees due to Dutch Elm Disease being felled first and then a percentage of the remaining trees removed as necessary. Elsewhere on the bank, vegetation that is significantly overhanging the rhine will be managed by selective branch removal and the complete removal of a small number of trees with a significant stem lean over the rhine that cannot be managed by branch removal only. 30% of deadwood will be kept onsite in piles.

If trees and ground vegetation are observed to be causing damage within the scheduled area, they will be managed by coppicing; root systems will not be removed to avoid harm to buried archaeological deposits within the bank and under the flanking ditches.

Carry out litter picking to improve the setting of the Scheduled Monument and enhance its value to the local community.

2.6.2.1 BNG target condition

Target condition is '**Good**' in **twenty years**. The enhancement are as follows.

Passes at least 3 of the below to achieve a good target condition:

- Three age classes present.
- All three classes present in woodland; trees 4-7 cm dbh, saplings and seedlings.
- Tree mortality less than 10%. No pests or diseases and no crown dieback.
- Two storeys of woodland vertical structure across all survey plots.
- 50% of all survey plots within woodland parcel have standing deadwood, large dead branches/stems and stumps.

2.6.2.2 Timing

⁴ AECOM, 2023. *Bristol's Water Recycling Centre at Avonmouth: Proposed Extension. Scheduled Monument Management Plan*

The woodland will be managed between the beginning of September and end of February, outside of the nesting bird season.

2.6.2.3 Habitat management

Management year 1 – 5

The following management will take place once every five years:

- Undertake selective tree work where there is dense growth over the rhine to improve light levels. The areas will be identified by an ecologist. This will encourage aquatic flora and bankside vegetation, enhancing the monument's setting and reducing the risk to the future stability of the monument and its underlying archaeology.
- The dense group of pole-stage elm to the east of the bank will be selectively thinned (coppiced), with dead and dying trees due to Dutch elm disease being felled first and then a percentage of the remaining trees removed as necessary. Elsewhere on the bank, vegetation that is significantly overhanging the rhine will be managed by selective branch removal and the complete removal of a small number of trees with a significant stem lean over the rhine that cannot be managed by branch removal only. 30% of dead wood will remain onsite.
- If trees and ground vegetation are observed to be causing damage within the scheduled area, they will be managed by coppicing; root systems will not be removed to avoid harm to buried archaeological deposits within the bank and under the flanking ditches.
- Carry out litter picking to improve the setting of the Scheduled Monument and enhance its value to the local community.

Management year 6 - 30

The following management will take place once every five years:

- Assess trees along the rhine once every five years and undertake selective tree work where there is dense growth over the rhine to improve light levels.
- If trees and ground vegetation are observed to be causing damage within the scheduled area, they will be managed by coppicing; root systems will not be removed to avoid harm to buried archaeological deposits within the bank and under the flanking ditches.
- Carry out litter picking to improve the setting of the Scheduled Monument and enhance its value to the local community.

2.7 Ecological enhancements and protection measures

2.7.1 Barn owl boxes

Three existing barn owl boxes located within Wessex Water's landownership, which are showing signs of degradation, will be replaced with new barn owl boxes (drawing D14162/ENV/421/REV A in Appendix A.1). The boxes will be replaced outside of the barn owl nesting season by licenced barn owl ecologist. Boxes will be cleaned out and inspected once every three years by a barn owl licenced ecologist or an accredited agent and replaced when needed.

2.7.2 Bat boxes

Five bat boxes to be placed south facing on mature trees surrounding the Proposed Development (refer to drawing D14162/ENV/420/REV A in Appendix A.1). The bat boxes will be positioned at least 5m up a mature tree, south facing and will comprise five Schwegler 2FN bat boxes or similar. The conditions of the boxes will be monitored by a bat licenced ecologist or accredited agent and replaced when needed.

2.7.3 Bird boxes

Ten bird boxes will be erected adjacent to the Proposed Development to compensate for the loss nesting habitat (refer to drawing D14162/ENV/420/REV A in Appendix A.1). The boxes will be positioned at least 5m up on mature trees and will comprise a mixture of Schwegler 2GR bird nest boxes and Schwegler 3SV bird nest boxes. The condition of the bird boxes will be monitored by an ecologist and replaced when needed.

2.7.4 Permanent fencing and signage

Post and rail fencing with gateways will be installed to demarcate the areas that are being managed for BNG and will be sign posted to make site staff aware and to get in touch with a Wessex Water ecologist (refer to drawing D14162/ENV/420/REV A in Appendix A.1). The fencing will be inspected every two years by an ecologist and replaced if damaged.

3. Monitoring and review of the LEMP

This LEMP sets out the long-term goals for the landscape proposals associated with the Proposed Development. As part of the inspection of habitats, records will be kept which report on the condition of each habitat against the management objectives set out in section 2 above. The successes and failings of the management plan will be reviewed internally in years 1, 3 and 5, then every five years subsequently, with the results reported to the LPA.

Revisions to the proposed prescriptions will be reviewed and amended if failures occur resulting in target conditions not being met. Effects as result of climate change will also be reviewed to ensure that the most productive maintenance methods are developed over time to respond to changes in conditions. The Management Plan is encouraged to evolve and develop as a live document.

Appendix A. Drawings

A.1 Landscape General Arrangements Plan

D14162/ENV/420/REV A

A.2 Barn owl box replacement plan

D14162/ENV/421/REV A

Appendix B. Table Summary

Table A.1: Summary table of section 2 detailing each habitat type to be created and enhanced both within the Proposed Development and outside of the Proposed Development, within Wessex Water’s land holding.

| Habitat type | Target note (D14162/E NV/420/RE V A) | Onsite/ offsite | Create/ enhance | Commencement of prescriptions | Management operations years 1-5 | Management frequency years 1-5 | Management operations years 6-30 onwards | Management frequency years 6-30 | Existing condition | Target condition | Condition criteria |
|--|---------------------------------------|-----------------|-----------------|-------------------------------|--|--|---|--|--------------------|------------------------|---|
| ONSITE HABITAT CREATION | | | | | | | | | | | |
| Mixed scrub (Common hawthorn, crab apple, dog rose, field rose, grey willow, guelder rose, alder and blackthorn.) | TN1 and TN2 | Onsite | Create | Post construction 2029/2030 | <ul style="list-style-type: none"> Allow scrub to regenerate within the 5m x 5m area, allowing for healthy mixture of specimens, avoiding dominance of certain species such as hawthorn and blackthorn. Plant additional specimens if not much successful regeneration has occurred. Protect stock with biodegradable guards. Control spread of scrub by undertaking strimming two times per year in February and October (outside of nesting birds’ season) between each group and between the scrub and the reedbed. This will maintain mosaic and prevent scrub from taking over the field. Watering to be carried out during times of extended dry weather within the area of the scrub, to the depth of the roots. Wind and frost loosened scrub to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised scrub to be removed and replaced. Keep scrub below 5m height. All shelters to be removed in year 5. | Twice per year in February and October | <ul style="list-style-type: none"> Remove any invasive or non-native species that may have appeared. Restructure scrub groups by allowing some specimens to grow to maximum of 5m and reduce others to height of 2-3m to ground level (via flailing) between September and February. Wind and frost loosened scrub to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Manage a healthy mixture of specimens within each group, preventing one species from dominating such as hawthorn and blackthorn. | Once per year between September and end of February. | N/A | Moderate in five years | <p>The condition criteria are as follows and must pass 3 or 4 out of 5 in order to achieve a moderate target condition:</p> <ul style="list-style-type: none"> Habitat is representative of UKHab descriptions. At least 3 woody species present with no one species comprising more than 75% of cover. There is a good age range – all of the following are present: seedlings, young shrubs and mature shrubs. Absence of invasive non-native species and species of sub-optimal condition make up less than 5% of ground cover. Scrub has a well-developed edge. There are clearings, glades and rides present. |
| Other neutral grassland (Emorsgate EM4 meadow mixture for clay soils) | TN3 | Onsite | Create | Post construction 2029/2030 | <ul style="list-style-type: none"> Any scrub present will be stripped and removed. Strip soil and aerate/subsoil to 20cm depth. 80% of the grassland will be cut to a short sward (c. 10cm) twice per year, once in mid-Feb to end of March and once in August. Arisings will be removed to prevent nutrient build up. Residual perennial weeds will be spot sprayed. Injurious weed control, spot treatment twice per year to maintain them below 5%. | Grassland cut twice per year, once in mid-Feb to end of March and once in August to October. | <ul style="list-style-type: none"> 80% of the grassland will be cut to a short sward (c. 10cm) twice per year, once in mid-Feb to end of March and once in August. Arisings will be removed to prevent nutrient build up. Residual perennial weeds such as | Grassland cut twice per year, once in mid-Feb to end of March and once in August to October. | N/A | Moderate in five years | <p>Passes 4 of 5 of the following criteria:</p> <ul style="list-style-type: none"> The appearance and composition of the vegetation closely matches characteristics of the habitat type. Sward height is varied. At least 20% is more than 7cm and 20% is less. Cover of bare ground is between 1% and 5%. Cover of bracken is less than 20% and scrub cover less than 5%. Absence of invasive non-native species. |

| | | | | | | | | | | | |
|---|-----|--------|--------|-----------------------------|---|--|---|--|-----|-------------------|--|
| | | | | | To be undertaken by hand-pulling or targeted strimming or treating with a suitable non-residual herbicide two times annually during the active growing season. | | docks, will be dug out and removed. <ul style="list-style-type: none"> Injurious weed control, spot treatment twice per year to maintain them below 5%. To be undertaken by hand-pulling or targeted strimming or treating with a suitable non-residual herbicide two times annually during the active growing season. | | | | |
| Modified grassland | TN4 | Onsite | Create | Post-construction 2029/2030 | Grassland cut ten times per year to maintain short sward. | Up to ten cuts | Grassland cut up to ten times per year to maintain short sward. | ten times per year throughout the year. | N/A | Poor in one year | The condition criteria are as follows. Passes 2 of 4 of the following criteria: <ul style="list-style-type: none"> The appearance and composition of the vegetation closely matches characteristics of the habitat type. Sward height is varied. At least 20% is more than 7cm and 20% is less. Cover of bare ground is between 1% and 5%. Cover of bracken is less than 20% and scrub cover less than 5%. |
| Reedbed (species to be planted on margin: yellow iris, water mint, bog bean, flowering rush, marsh marigold, common sedge) | TN5 | Onsite | Create | Post-construction 2029/2030 | <ul style="list-style-type: none"> Rotational management of marginal plants in September – October to remove most dominant species to retain intended species diversity. Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area. Increase amount of reeds to cover between 60 and 80% of the reedbed with subsequent annual rotational management. Remove cuttings from the site. Monitor of silt depth and removal if considered to be impacting function. Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area. | Once every three years between September and February. | <ul style="list-style-type: none"> Monitor of silt depth and removal if considered to be impacting function. Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area. Manage reeds to cover between 60 and 80% of the reedbed with subsequent annual rotational management. | Once every three years between September and February. | N/A | Good in six years | Passes 5 of 6 criteria: <ul style="list-style-type: none"> The water table is at or near the surface throughout the year. No artificial drainage, unless specifically to maintain water levels. Appearance and composition of the vegetation closely matches characteristics of the specific wetland habitat type. Cover of scrub and scattered trees less than 10%. Cover of bare ground less than 5%. Absence of invasive non-native species and species of indicative sub-optimal condition make up less than 5% of ground cover. Reedbed has a diverse structure with between 60 and 80% reeds. Other areas will include open water. |
| Ditch | TN6 | Onsite | Create | September 2023 | <ul style="list-style-type: none"> Increase coverage of reeds to be between 60 and 80% with subsequent annual rotational management. Removal of arisings and disposed of responsibly. Reduce levels of scrub and scattered trees within the ditch to cover equal to or less than 10% of the area. | Once every three years. | <ul style="list-style-type: none"> Check status of the ditch. Increase or decrease cutting regimes dependant on extent of scrub and common reed coverage. Undertake litter pick. | Once every three years. | N/A | Poor in 1 year | Passes 5 or fewer of the following criteria: <ul style="list-style-type: none"> Ditch is of good quality water, no obvious signs of pollution. A range of emergent, submerged, and floating leaved plants are present. Less than 10% cover of filamentous algae and/or duckweed. Fringe of marginal vegetation present along more than 75% of ditch. |

| | | | | | | | | | | | |
|---|--------------|--------|--------|-----------------------------|--|---------------------------------|--|--|-----|--------------------------|---|
| | | | | | | | | | | | <ul style="list-style-type: none"> Physical damage evident along less than 5% of ditch. Sufficient water levels are maintained (summer depth approx. 50cm). Less than 10% of ditch is heavily shaded. Absence of non-native plant and animal species. |
| Line of trees (crack willow) | TN7 and TN8 | Onsite | Create | Post-construction 2029/2030 | <ul style="list-style-type: none"> Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm of the trees. Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots. Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5. Bark mulch to be topped-up as necessary to maintain specified depth. Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced. All shelters to be removed in year 5. | Maintenance three times a year | <ul style="list-style-type: none"> Replace any failed tree stock. Cut back encroaching scrub. Start rotational pollarding of the willow trees. | Once every three years | N/A | Moderate in twenty years | <p>Passes 4 of 5 criteria:</p> <ul style="list-style-type: none"> More than 70% of trees are native species. Tree canopy is predominantly continuous, extending up to 5m in width. Includes one or more mature or veteran tree. Undisturbed naturally vegetated strip of at least 6 m on both sides. At least 95% of trees are in a healthy condition. |
| Species rich hedgerow with trees (crab apple, blackthorn, hawthorn, cherry, spindle, holly, dogwood, grey willow, English oak, wild privet, alder. Mature standard trees to be planted every 20m: alder, English oak, crab apple) | TN9 and TN10 | Onsite | Create | Post-construction 2029/2030 | <ul style="list-style-type: none"> Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm from the base of the hedgerow. Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots. Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5. Bark mulch to be topped-up as necessary to maintain specified depth. Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced. | Maintenance three times a year. | <ul style="list-style-type: none"> Replace any failed tree stock. Cut back encroaching scrub. Keep hedgerow below 5m height. Allow trees to grow. | Once every three years between September and February. | N/A | Moderate in ten years | <p>Passes 6 of 10 criteria: •</p> <ul style="list-style-type: none"> >1.5m average height along length. >1.5m average width along length. Gap between ground and base is >0.5m for 90% length. Gaps make up <10% of total length and no gap is >5m. >1m width of undisturbed ground with perennial herbaceous vegetation for >90% length: <ul style="list-style-type: none"> Measured from outer edge of hedgerow And is present on one side of the hedgerow (at least) Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground. >90% hedgerow is free of invasive non-native plant species (including those listed on Schedule 9 of WCA) and recently introduced species. >90% of the hedgerow or undisturbed ground is free of damage caused by human activities. There is more than one age-class (or morphology) of tree present (for example young, mature, |

| | | | | | | | | | | | |
|--------------------------------------|------|--------|-------------|-----------------------------|--|--|--|--|----------|--------------------------------|---|
| | | | | | | | | | | | <p>veteran and ancient) and there is on average at least one mature, ancient or veteran tree present per 20-50m of hedgerow.</p> <ul style="list-style-type: none"> At least 95% of hedgerow trees are in health condition (excluding veteran features valuable for wildlife). There is little or no evidence of adverse impact on tree health by damage from livestock or wild animals, pests or diseases or human activity. |
| Urban trees | TN11 | Onsite | Create | Post-construction 2029/2030 | <ul style="list-style-type: none"> Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm of the trees. Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots. Tree shelters and stakes to be maintained and replaced as required. Bark mulch to be topped-up as necessary to maintain specified depth. Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced. Tree guards to be removed in year 5. | Maintenance 3 times per year. | <ul style="list-style-type: none"> Monitor tree health and growth once a year and undertake any management as deemed necessary. | Once every 3 years between September and October. | N/A | Moderate in twenty-seven years | <p>Must pass 4 of 6 criteria:</p> <ul style="list-style-type: none"> Tree is a native species. Tree canopy is predominantly continuous with gaps in canopy cover making up 5m wide. Tree is mature or veteran. Little or no evidence of adverse impact on tree health by anthropogenic activities. Currently no regular pruning regime, so the trees retain >75% of expected canopy for their rand and height. Micro-habitat for birds, mammals and insects are present. More than 20% of tree canopy is oversailing vegetation beneath. |
| ONSITE HABITAT ENHANCEMENT | | | | | | | | | | | |
| Environmental corridor (reedbed) | TN12 | Onsite | Enhancement | Post-construction 2029/2030 | <ul style="list-style-type: none"> Annual rotational management of marginal plants in September – October to remove most dominant species to retain intended species diversity. Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area. Increase amount of reeds to cover between 60 and 80% of the ditch with subsequent annual rotational management. Removal of arisings and disposed of responsibly. | Once every three years between September and February. | <ul style="list-style-type: none"> Monitor of silt depth and removal if considered to be impacting function. Reduce levels of scrub and scattered trees within the reedbed to cover equal to or less than 10% of the area. Maintain coverage of reeds within extent of baseline area. | Once every three years between September and February. | Poor | Good in six years | <p>The condition criteria are as follows. Passes 5 of 6 criteria and essential criteria 7c.</p> <ul style="list-style-type: none"> The water table is at or near the surface throughout the year. No artificial drainage, unless specifically to maintain water levels. Appearance and composition of the vegetation closely matches characteristics of the specific wetland habitat type. Cover of scrub and scattered trees less than 10%. Cover of bare ground less than 5%. Absence of invasive non-native species and species of indicative sub-optimal condition make up less than 5% of ground cover. Reedbed has a diverse structure with between 60 and 80% reeds. Other areas may include open water, species-rich fen and/or wet woodland. |
| Environmental corridor (mixed scrub) | TN13 | Onsite | Enhancement | Post-construction 2029/2030 | <ul style="list-style-type: none"> Maintain hawthorn within existing footprint, avoiding spreading along the environmental corridor. Create 1m clearings and rides in dense areas of scrub. | Once per year between September | <ul style="list-style-type: none"> Manage invasive non-native species. Restructure scrub planting to create a mosaic of mixed- | Once every two years. | Moderate | Good in three years | <p>Passes 5 of 5 criteria.</p> <ul style="list-style-type: none"> Habitat is representative of UKHab descriptions. At least 3 woody species present with no one species comprising more than 75% of cover. |

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| | | | | | | and February. | aged scrub stands and open tussock grassland aiming to achieve a mosaic/matrix of 75% scrub. | | | | <ul style="list-style-type: none"> • There is a good age range – all of the following are present: seedlings, young shrubs and mature shrubs. • Absence of invasive non-native species and species of sub-optimal condition make up less than 5% of ground cover. • Scrub has a well-developed edge. • There are clearings, glades and rides present. |
| Ditch | TN14 | onsite | Enhancement | Post-construction 2029/2030 | <ul style="list-style-type: none"> • Remove any invasive/non-native species. • Monitor of silt depth and removal if considered to be impacting function. • Reduce levels of scrub and scattered trees within the ditch to cover equal to or less than 10% of the area. • Increase coverage of reeds to be between 60 and 80% with subsequent annual rotational management. • subsequent annual rotational management. | Once every three years. | • | Once every three years. | Poor | Moderate in one year | <p>Passes 6 of 8 criteria:</p> <ul style="list-style-type: none"> • Ditch is of good quality water, no obvious signs of pollution. • A range of emergent, submerged and floating leaved plants are present. • Less than 10% cover of filamentous algae and/or duckweed. • Fringe of marginal vegetation present along more than 75% of ditch. • Physical damage evident along less than 5% of ditch. • Sufficient water levels are maintained (summer depth approx. 50cm). • Less than 10% of ditch is heavily shaded. • Absence of non-native plant and animal species. |
| Species poor hedgerow with trees | TN15 | Onsite | Enhancement | Post-construction 2029/2030 | <ul style="list-style-type: none"> • Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm from the base of the hedgerow. • Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots. • Pest control at suitable times of the year to combat insect or pest attack and disease. • Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5. • Bark mulch to be topped-up as necessary to maintain specified depth. • Wind and frost loosened trees to be re-firmed. Any damaged or diseased | Three times a year. | <ul style="list-style-type: none"> • Litter picking. • Monitor of silt depth and removal if considered to be impacting function. • Reduce levels of scrub and scattered trees within the ditch to cover equal to or less than 10% of the area; and • Manage reed coverage to be between 60 and 80% of the ditch with subsequent | Once every three years | Poor | Moderate in ten years | <p>No more than five failures:</p> <ul style="list-style-type: none"> • >1.5m average height along length. • >1.5m average width along length. • Gap between ground and base of canopy is <0.5m for >90% of length. • Gaps make up <10% of total length and no canopy gaps>5m • >1m width of undisturbed ground with perennial veg for >90% length. • Plant species indicative of nutrient enrichment dominated 90% hedgerow and undisturbed ground is free of invasive non-native and neophyte species. • >90% hedge or ground is free of damage by humans. |

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| | | | | | branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced. | | annual rotational management. | | | | |
| OFFSITE HABITAT CREATION – on existing Wessex Water land | | | | | | | | | | | |
| Orchard planting | TN16 | Offsite | Creation | During construction 2024/2025 | <p>Grassland:</p> <p><i>Management - Year 1</i></p> <ul style="list-style-type: none"> Manage and remove weeds by spot treatment or hand pulling and top initial growth/sward to maintain c.10cm height. <p><i>Management - Year 2+</i></p> <ul style="list-style-type: none"> Mow and strim twice a year, once in spring and again in August/Sept. Avoid between March and early August (beneficial for birds and pollinators). <p>Trees:</p> <p><i>Management - Year 1</i></p> <ul style="list-style-type: none"> Mulch and water regularly replacing any failures. <p><i>Management - Year 2 - 3</i></p> <ul style="list-style-type: none"> Monitor three times annually replacing failures and watering as required. <p><i>Management - Year 3 +</i></p> <ul style="list-style-type: none"> Monitor every five years, lift crowns and prune where necessary leaving cut or dead wood in piles. | Cut grassland twice a year in spring and August/Sept ember. Manage trees three times a year. | <ul style="list-style-type: none"> Monitor every five years, lift crowns and prune where necessary leaving cut or dead wood in piles. | Cut grassland twice per year. Monitor trees every five years. | N/A | Moderate in twenty years | <p>Passes 5 of 8:</p> <ul style="list-style-type: none"> Presence of ancient and/or veteran trees. Less than 5% of trees are mothered by scrub. Scrub occupies <10% ground cover. Evidence of formative and/or restorative pruning. Presence of standing and/or fallen dead wood. At least 95% of trees are free from damage from humans or animals. Sward height varies and areas of bare ground present. Species richness of grassland is equivalent to medium, high or very high distinctiveness grassland. Absence of invasive non-native species and species indicative of sub-optimal condition make up <10% of ground cover. |
| Other neutral grassland | TN17 | Offsite | Creation | During construction 2024/2025 | <ul style="list-style-type: none"> The grassland will be cut to a short sword (c. 10cm) twice per year, once in mid-Feb to end of March and once in September/October. Arisings will be removed to prevent nutrient build up. Residual perennial weeds such as docks, will be dug out and removed. Injurious weed control, spot treatment twice per year to maintain them below 5%. To be undertaken by hand-pulling or targeted strimming, or treating with a suitable non-residual | Grassland cut twice per year, once in mid-Feb to end of March and once in August. | <ul style="list-style-type: none"> The grassland will be cut to a short sword (c. 10cm) twice per year, once in mid-Feb to end of March and once in August. Arisings will be removed to prevent nutrient build up. | Grassland cut twice per year, once in mid-Feb to end of March and once in August. | N/A | Moderate in five years | <p>Passes 4 of 5 of the following criteria:</p> <ul style="list-style-type: none"> The appearance and composition of the vegetation closely matches characteristics of the habitat type. Sward height is varied. At least 20% is more than 7cm and 20% is less. Cover of bare ground is between 1% and 5%. Cover of bracken is less than 20% and scrub cover less than 5%. Absence of invasive non-native species. |

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| | | | | | herbicide two times annually during the active growing season. | | <ul style="list-style-type: none"> Residual perennial weeds such as docks, will be dug out and removed. Injurious weed control, spot treatment twice per year to maintain them below 5%. To be undertaken by hand-pulling or targeted strimming or treating with a suitable non-residual herbicide two times annually during the active growing season. Possibly re-seed every five years depending on dominance of course grassland species. | | | | |
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OFFSITE HABITAT ENHANCEMENT

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| Species poor hedgerow with trees | TN18 | Offsite | Enhancement | Post-construction 2029/2030 | <ul style="list-style-type: none"> Weed control by strimming to be carried out at least three times per year between May and September within an area of at least 1000mm from the base of the hedgerow. Watering to be carried out during times of extended dry weather within the area of the trees, to the depth of the roots. Pest control at suitable times of the year to combat insect or pest attack and disease. Tree shelters and stakes to be maintained and replaced as required. Tree shelters to be removed in year 5. Bark mulch to be topped-up as necessary to maintain specified depth. Wind and frost loosened trees to be re-firmed. Any damaged or diseased branches/shoots to be pruned and wounds treated. Any dead or vandalised trees to be removed and replaced. | Maintenance three times a year | <ul style="list-style-type: none"> Replace any failed tree stock. Cut back encroaching scrub. Keep hedgerow below 5m height. Allow trees to grow. | Cut once every two years between September and end of February (outside of nesting bird season). Avoid trees along hedge line. | Poor | Moderate in ten years | <p>No more than five failures:</p> <ul style="list-style-type: none"> >1.5m average height along length. >1.5m average width along length. Gap between ground and base of canopy is <0.5m for >90% of length. Gaps make up <10% of total length and no canopy gaps>5m >1m width of undisturbed ground with perennial veg for >90% length. Plant species indicative of nutrient enrichment dominated 90% hedgerow and undisturbed ground is free of invasive non-native and neophyte species. >90% hedge or ground is free of damage by humans. Tree class: there is more than one age-class (or morphology) of tree present. And there is on average at least one mature tree present per 20m – 50m of hedgerow. Tree health: at least 95% of hedgerow trees are in healthy condition. Little or no evidence of |
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| | | | | | | | | | | | livestock, wild animals or pest/diseases or human activity. |
| Broadleaved woodland | TN19 | offsite | Enhancement | Post-construction 2029/2030 | <ul style="list-style-type: none"> Undertake selective tree work where there is dense growth over the rhine to improve light levels. The areas will be identified by an ecologist. This will encourage aquatic flora and bankside vegetation, enhancing the monument's setting and reducing the risk to the future stability of the monument and its underlying archaeology. The dense group of pole-stage elm to the east of the bank will be selectively thinned (coppiced), with dead and dying trees due to Dutch Elm Disease being removed first and then a percentage of the remaining trees removed as necessary. Elsewhere on the bank, vegetation that is significantly overhanging the rhine will be managed by selective branch removal and the complete removal of a small number of trees with a significant stem lean over the rhine that cannot be managed by branch removal only. If trees and ground vegetation are observed to be causing damage within the scheduled area, they will be managed by coppicing; root systems will not be removed to avoid harm to buried archaeological deposits within the bank and under the flanking ditches. Carry out litter picking to improve the setting of the Scheduled Monument and enhance its value to the local community. | Once every five years | <ul style="list-style-type: none"> Assess trees along the rhine once every five years and undertake selective tree work where there is dense growth over the rhine to improve light levels. If trees and ground vegetation are observed to be causing damage within the scheduled area, they will be managed by coppicing; root systems will not be removed to avoid harm to buried archaeological deposits within the bank and under the flanking ditches. Carry out litter picking to improve the setting of the Scheduled Monument and enhance its value to the local community. | Once every five years | Moderate | Good in twenty years | <p>Passes at least 3 of the below to achieve a good target condition:</p> <ul style="list-style-type: none"> Three age classes present All three classes present in woodland; trees 4-7 cm dbh, saplings and seedlings. Tree mortality less than 10%. No pests or diseases and no crown dieback. Two storeys across all survey plots. 50% of all survey plots within woodland parcel have standing deadwood, large dead branches/stems and stumps. |
| Ecological enhancement and protection | | | | | | | | | | | |
| Barn owl box | TN20 | Offsite | Enhancement | Pre-construction 2024 | <ul style="list-style-type: none"> Boxes cleaned out and inspected once every three years by licenced barn owl ecologist or accredited agent. | Once every three years. | <ul style="list-style-type: none"> Boxes cleaned out and inspected once every 3 years by licenced barn owl ecologist or accredited agent. | Once every three years | N/A | N/A | N/A |

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| Bat box | | Onsite | Creation | Post-construction 2029/2030 | <ul style="list-style-type: none"> Monitor condition and replace when necessary. | Once every five years. | <ul style="list-style-type: none"> Monitor condition and replace when necessary by an ecologist with | Once every five years | N/A | N/A | N/A |
| Bird box | | Onsite | Creation | Post-construction 2029/2030 | <ul style="list-style-type: none"> Monitor condition and replace boxes when necessary. | Once every five years. | <ul style="list-style-type: none"> Monitor condition and replace boxes when necessary by an ecologist. | Once every five years. | N/A | N/A | N/A |
| Permanent fencing and signage | | Onsite | Creation | Post-construction 2029/2030 | <ul style="list-style-type: none"> Fencing and signs inspected for any damage. | Once a year | <ul style="list-style-type: none"> Fencing inspected by an ecologist for any damage. Replace any failed fencing. | Once a year | N/A | N/A | N/A |