



ASPIRE DEFENCE

TIDWORTH

BP0631: Habitat Management and Monitoring Plan

Landscape and Urban Design



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BP0631: Habitat Management and Monitoring Plan

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1 INTRODUCTION

Overview

- 1.1 This Habitat Management and Monitoring Plan (HMMP) has been produced on behalf of the Client, Aspire Defence, to inform the management and maintenance of landscape and ecological proposals for the BP0631 Proposals, hereafter referred to as ‘the Proposed Development’.
- 1.2 When ‘Significant enhancements’ to areas of habitat are proposed which contribute significantly to a Proposed Development BNG, relative to the baseline biodiversity baseline value prior to development, these require a Habitat Management and Monitoring Plan (HMMP) and commitment to maintain them for at least 30 years. The Proposed Development’s landscaped habitats qualify as ‘Significant enhancements’ as although they cover small areas and are generally low or medium distinctiveness, they create a large number of post-development biodiversity units relative to the baseline biodiversity unit value.

Purpose of the Document

- 1.3 The HMMP intends to inform the ongoing management of the soft proposals so that the landscape, ecological objectives, and mitigation measures embodied in the design are delivered, monitored and reviewed. Its implementation will promote long-term maintenance and site-wide integration of the barrack’s green infrastructure, such that it remains an effective resource to the benefit of those who live and work on the barracks and the surrounding community, as well as its landscape setting and biodiversity value.
- 1.4 The following sections set out the proposed management objectives and responsibilities, as well as how the deliverables relate to the target timescales for delivery.
- 1.5 The document presents each structural landscape component within its own section. It presents an overview and description of the feature, followed by a set of Management Targets. It then presents a set of inspection or monitoring requirements, and target prescriptions to ensure that these targets are met. Each section provides a schedule for these operations for the first 5 years, plus ongoing management that would continue in perpetuity.
- 1.6 This document deals with the maintenance of the following areas:

General Items

- Weed control / total weed control;
- Pest and disease control;
- Control of litter;
- Watering;
- Pruning;
- Removal of stakes and ties from individual trees;
- Arisings; and,
- Cleaning through planting beds.

Soft Landscape Items

- Maintenance of specimen trees;
- Maintenance of ornamental planting;
- Maintenance of wildflower grassland areas; and,
- Maintenance of flowering lawns and amenity grasslands.

2 LANDSCAPE AND ECOLOGY MAINTENANCE AND MANAGEMENT

Overview

- 2.1 This document aims to ensure that the Site's landscape and ecological elements will be maintained and developed to provide a welcoming and safe environment for all users, whilst maximising the ecological value, in line with the ecological management principals and objectives set out below.
- 2.2 Maintenance and management operations detailed in this document will be required for the first 5 years during the establishment phase. Beyond this, the habitat management operations need to extend to ensure that the habitats thrive to meet the requirements of emerging Biodiversity Net Gain (BNG) requirements to provide ongoing management for 30 years, as defined in the BNG assessment (**PAC-L1-BP0631-XX-CA-ES-000002**). This is to ensure that landscape and ecological features are established successfully and continue to support the biodiversity objectives they have been designed to achieve.
- 2.3 The HMMP has been developed in conjunction with the following drawings and documents, which should be read alongside this document:
- Landscape Proposals Plan:
Drawing Refs: PAC-L1-BP0631-XX-DR-ES-002101
 - Soft Details
Drawing Refs: PAC-L1-BP0631-XX-DR-ES-002300, 002301, 002302 & 002303
 - Soft Landscape Specification
Document Ref: PAC-L1-BP0631-XX-SP-ES-000001
 - Planting Schedule
Drawing Refs: PAC-L1-BP0631-XX-SC-ES-000001

Ecological Management Principles and Objectives

- 2.4 Creating optimal planting conditions and adhering to high implementation standards are crucial to giving landscape schemes the best possible start. However, the long-term success of the landscape depends on the quality and frequency of the maintenance and management it receives afterwards. The following key objectives are based on best practice guidelines and are applicable for the establishment period and beyond.
- To manage all landscape areas effectively to ensure that the principles and long-term objectives of the Site's masterplan are achieved;
 - To facilitate an efficient and sustainable landscape management and maintenance regime throughout the lifetime of the development;
 - To maintain all newly planted trees, plants and grasslands. To keep it in a healthy and safe condition by regular inspection and management by landscape specialists in order to facilitate healthy establishment;
 - To create and manage habitats of the type and condition described in the BNG Assessment to ensure that the net gain in biodiversity units are achieved;

- To ensure that habitats types and conditions described in the Biodiversity Impact Assessment are maintained for 30 years;
- To take appropriate measures to ensure that trees identified for retention are protected throughout the construction period; and,
- To be flexible and adaptable to the changing needs of the landscape through its establishment and long-term management.

2.5 To achieve the key management objectives listed above, Section 3 below details specific targets together with specific maintenance operations and schedules for works that have been devised for each landscape and ecological typology within the Site.

Management Responsibilities – Establishment Period - Years 1 to 5

- 2.6 The maintenance operations/establishment period outlined in this report will run for a minimum of five years commencing on the date of certification of Practical Completion. It is the responsibility of the Aspire Defence to ensure that the landscape proposals for the Proposed Development are completed in accordance with this HMMP which includes having the works completed by a capable Landscape Contractor.
- 2.7 Following the period after certification of Practical Completion, maintenance will be undertaken by the Landscape Contractor responsible for the implementation of these works for 12 months.
- 2.8 The maintenance period will run concurrently with the Rectification Period. During this time the Landscape Contractor responsible for implementing the works will be liable for any failures or defects in accordance with the landscape plans, details, and specifications.
- 2.9 After 12 months, a certification of Final Completion will be issued. At this point, it is ultimately the responsibility of Aspire Defence to ensure the Site is maintained in accordance with the recommendations of this document for at least 30 years.
- 2.10 The management operations prescribed by this document shall be reviewed at the end of the five-year establishment period (or handover to the relevant client). This review will be used to inform the management of the Site for at least the next 30 years and will take into consideration the long-term objectives set out below.

Management Responsibilities – Long term Maintenance - Year 5 onwards

- 2.11 Aspire Defence will be responsible for ensuring that the appointed maintenance team is capable of delivering the monitoring and management requirements details within this HMMP. Once a capable maintenance team is appointed it will become their responsibility to monitor and manage the habitats from year five to at least 30 years as set out in this report.
- 2.12 The management plan will be reviewed regularly by Aspire Defence and the maintenance team to ensure that the key objectives and design intent for the habitats on Site are understood by all parties involved in their management. This Maintenance and Management Plan forms the basis of a long-term management strategy for the Site, which should be updated as needed to address site-specific issues that may arise from day-to-day management. Through continuous monitoring, review, and updates, it is intended for the management plan to evolve into a reference manual for the long-term maintenance and management of all landscape and ecological features across the Site.

British Standards and Best Practice Guidance

- 2.13 The following is a list of advice publications, British Standards or 'best practice' guidance notes deemed applicable to the undertaking of landscape works to which reference is required. This list is for guidance only, which the Site Operator may wish to update as required.

British Standards (Published by British Standards Institution)

- BS 3882: 2015 Specification for Topsoil
- BS 3936 Part1:1992 Nursery Stock (all parts)
- BS 3998:2010 Tree Work
- BS 4428:1989 Code of Practice for General Landscape Operations
- BS 4043:1989 Transplanting root-balled trees
- BS 5837:2012 Trees in Relation to Design, Demolition and Construction
- BS 7370 Grounds Maintenance (all parts)
- BS 8545: 2014 Trees: From Nursery to Independence in the Landscape

Arboricultural Association

- D. Lonsdale 1983: A Definition of the Best Pruning Position; Arboricultural Research Note 48/83.
- D. Lonsdale 1993: Choosing the Time of Year to Prune Trees; Arboricultural Research Note 117/93.

3 MANAGEMENT REQUIREMENTS

Overview

- 3.1 Targets including specific maintenance operations and schedule for works have been devised for each landscape typology and associated UK habitat type within the Site to achieve the key management objectives listed within Section 2. The following topologies and associated habitat types were identified:
- Specimen Trees – Individual urban trees;
 - Ornamental Planting – Urban ground level planters;
 - Wildflower Grassland – Other neutral grassland; and,
 - Eco Species Rich Lawn (Amenity Grassland) – Modified grassland.
- 3.2 The following sections provide a description of the habitats alongside their creation and management actions, maintenance operations/schedule, management specifications and monitoring/enhancement programme.

Specimen Trees – Individual urban trees

Description

- 3.3 Specimen trees should be regular in form, exhibiting a dense and bushy canopy. All trees, except for multi-stems, should have a minimum clear stem of 1.75-2m. Clear stems should be maintained at this minimum. Greater clearance may be required in situations where the lower canopy gets naturally clipped by large vehicles on roadways. In such instances the opposite side of the canopy should also be raised to match, ensuring a natural form. No low branches should be allowed to overhang any roadways, or footways or interfere with visibility splays. For further information on Specimen Tree Planting locations refer to the Landscape Proposals Plan (Drawing Ref: **PAC-L1-BP0631-XX-DR-ES-002101** for location).

Habitat creation

- 3.4 Ground Preparation Specimen Trees – Individual urban trees:
- In preparation for tree planting concerning habitat creation, the scheme should follow British Standard BS 4428: 1989 Code of Practice for General Landscape Operations (excluding hard surfaces). All trees and plants supplied shall comply with the requirements of all parts of British Standard BS 3936 Specification for Nursery Stock, BS 8545:2014 Trees: from nursery to independence in the landscape. Recommendations & The National Plant Specification. All new tree planting shall be positioned following the requirements of Table A.1 of British Standard BS 5837: 2012 Trees in Relation to Design, Demolition and Construction – Recommendations.
- 3.5 The proposed trees will be created and managed as individual urban native trees which will grow to a mature size and reach poor condition as per the criteria in the statutory BNG metric condition assessment sheets. The trees will need to be managed so that the following criteria are met:
- 1) They are a native species and reach a mature age class and size for that species;
 - 2) More than 20% of the tree canopy extends over vegetation beneath it; and,

- 3) There is a continuous canopy with gaps in canopy being less than 5m wide or <10% of the canopy where multiple trees are planted close enough to one another to allow canopy overlap.

It is assumed that the trees will require pruning due to their location and setting within the landscape proposals and that natural ecological niches are unlikely to arise given the management. These characteristics make it unlikely that criteria related to these criteria would be passed. Management Targets

- **Target 1.1:** Trees to have been established and are largely independent by year five.
 - Target monitoring: Trees are to be monitored once every three months. Site inspections to check for healthy growth and form; adequate watering and drainage; review soil fertility; and inspect for pests and diseases.
 - Target remediation: Remedies to action on any issues identified should be undertaken as soon as possible before tree failure.
- **Target 1.2:** Tree pit drainage to function correctly to ensure the tree pit does not become waterlogged.
 - Target monitoring: Inspect tree pits at least once a month (or tie into other maintenance visits). Tree pits should be checked more frequently during periods of heavy rainfall.
 - Target remediation: If waterlogging is found remediation action should be taken immediately, once discussed and agreed with the contract administrator. Excess water in tree pits with soakaway drainage should be pumped out of pits via the inspection pipe. In positively drained tree pits, piping systems should be checked and cleared of blockages. For other trees check for signs of soil compaction, if found de-compaction methods should be employed such as air injection.
- **Target 1.3:** Tree canopy to extend over vegetation for at least 20% of canopy size and continuous with gaps less than 5m wide or <10% of the canopy size.
 - Target monitoring: Inspect tree canopy in early summer to ensure that canopy has vigorous growth and meets target for vegetation cover and continuity.
Target remediation: If tree canopy is at risk of not meeting the criteria a long-term pruning strategy should be put in place to ensure that new growth fills any gaps and covers vegetation below it. If the tree health will not allow for recovery, then a new native tree standard should be planted to replace lost biodiversity value.

Maintenance Operations (Years 1 to 5)

- 3.6 The following maintenance operations below have been created to accomplish the management targets set out above.
- 3.7 The base of each tree should be kept weed free. Trees within planting should have all weeds around the trunk removed by hand or application of herbicide. Trees in grass should have a circular area of bark mulch, which should be topped up regularly to keep a 75mm layer.

- 3.8 Water should be applied to the base of the tree, evenly distributed over the entirety of the root ball to encourage even root development. Watering should aim to soak the root zone but avoid waterlogging. During drought conditions, periodic watering of conifers over the winter months is required to ensure successful establishment. Watering frequency is to be monitored and modified to ensure moisture levels within the rootzone are suitable to support the healthy growth of the tree, particularly in response to periods of drought and extended periods of rainfall. Minimum watering intervals:
- First growing season: Once or twice per week;
 - Second growing season: Once a week;
 - Third growing season: Once a fortnight; and,
 - Fourth and fifth growing season: Typically, only required during extended dry spells/ periods of drought.
- 3.9 Inspect and ensure tree pit drainage is working. Tree pits should never be waterlogged at any time of year. Ensure positive systems are not blocked. Where soakaway drainage is provided to the base of pits, the level of water should be checked via the inspection pipe at each maintenance visit. Any pits found to have excess water will require pumping out via the inspection pipe.
- 3.10 Inspect tree canopy in early summer to ensure that canopy has vigorous growth and meets target for vegetation cover and continuity as per target 1.3. If tree canopy is at risk of not meeting the criteria a long-term pruning strategy should be put in place to ensure that new growth fills any gaps and covers vegetation below it. If the tree health will not allow for recovery, then a new native tree standard should be planted to replace lost biodiversity value.
- 3.11 Remove any vandalised, unhealthy, or dead specimens as soon as possible and replacement with trees of the same size as those adjacent, during the next available planting season.
- 3.12 Inspection, adjustment and maintenance of stakes and ties as required. Stakes and ties are to be removed when instructed and when the individual tree has established successfully.
- 3.13 Remove any items that have been attached to trees, such as posters or bike locks/chains.
- 3.14 Re-firm trees after frost heave, strong winds, or other disturbances.
- 3.15 Inspect trees for dead, dying or diseased wood. Prune back to living wood, good growing points or main branches, do not leave any snags, and cut back to branch collars avoiding any flush cutting. Avoid making any large spring cuts which could cause excessive bleeding.
- 3.16 Formatively prune if necessary to achieve natural shape, healthy growth, remove crossing or rubbing branches, correct any potential weak attachments or narrow V crotches and to favour a strong single leader. All pruning should complement the tree's natural form and architecture according to their species.
- 3.17 Remove suckers /epicormic growth.
- 3.18 Crown lift if needed to maintain clearance of circulation routes and visibility splays.
- 3.19 Inspect trees for signs of pest and disease, and in cases of serious attack employ appropriate control measures.

- 3.20 Any deadwood should be used to create small log piles to provide habitat in areas inaccessible or out of view of the public.
- 3.21 Any tree management operations will be carried out outside of the main bird nesting season, from March to September. If any essential works need to occur within this period, a qualified Ecologist will carry out a check to ensure no nesting birds are present. If an active nest is found no works will take place. Weekly checks by a qualified Ecologist can be carried out until it is confirmed nests are no longer active. Only then should any works commence.
- 3.22 Where there are suitable opportunities, the installation of two bird and two bat boxes to specimen trees should be considered to enhance the biodiversity of the site.

Management operations/specification (Years 5 onwards)

- 3.23 Following the establishment stage, the management of the standard trees will be informed by regular inspections to determine what remedial operations, if any, are required. The trees are expected to reach their target condition after 10 years so inspections within years 6-10 should ensure the criteria of target 1.1 are being met or are on target to be achieved. From year 10 to at least year 30 it will be necessary to ensure that the condition of the trees is consistent the aims of target 1.1. The scope of these inspections for the health of the trees and their condition is presented below. Remedial operations may include:
- Inspect tree canopy for gaps and cover of ground vegetation in early summer. If tree canopy is at risk of not meeting the criteria a long-term pruning strategy should be put in place to ensure that new growth fills any gaps and covers vegetation below it;
 - Removal of dead/damaged limbs or branches that may cause a safety hazard to people or vehicles;
 - If a mature tree develops features such as decay (rot holes), loose bark, dense ivy cover, etc. leave the decaying tree in place for ecological benefit;.
 - Removal and replacement of unsafe trees;
 - Watering during periods of drought;
 - Removal of competitive weeds and grasses from around the tree;
 - Removal of guards or stakes when they begin to cause abrasion; and,
 - Remedial action to repair or replace damaged hardware.

Monitoring and enhancement programme

- 3.24 Table 3.1 below details when the maintenance operations for Years 1 to 5 should be undertaken and their frequency. Note that this schedule is to be repeated annually for the first five years.
- 3.25 Table 3.2 below details when the maintenance operations for Years 5 onwards should be undertaken and their frequency. Note that this schedule is to be repeated annually.
- 3.26 It is not anticipated that the trees will provide features suitable for roosting bats within the first 5 years. If bat roost features arise within a 30-year management plan, these should be retained where possible. Under the current proposals, no impacts on root zones of specimen trees are anticipated from the surrounding habitats. Should the surrounding habitat change, impacts to specimen tree root zones should be avoided.

Table 3.1 : Maintenance and Monitoring Schedule for Specimen Trees – Years 1 to 5

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weed the base of each tree	Four times annually				Y		Y		Y		Y		
Top up bark mulch to a 75mm layer	Once annually			Y									
Watering	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Check tree pit drainage	Once monthly or as required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Replace unhealthy and damaged stock	As required	Y	Y									Y	Y
Inspection of all trees, guards, stakes, ties and for objects attached.	Twice annually	Y						Y					
Reform trees	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pruning	As required	Y	Y										Y
Inspect trees for pests and disease	Twice annually	Y						Y					
Yearly Inspection	Once annually		Y										

Table 3.2 : Maintenance and Monitoring Schedule for Specimen Trees – Year 5 onwards

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weed the base of each tree	Four times annually				Y		Y		Y		Y		
Top up bark mulch to a 75mm layer	Once annually			Y									
Watering	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Replace unhealthy and damaged stock	As required	Y	Y									Y	Y
Removal of all trees, guards, stakes, ties and for objects attached (once they start causing abrasion)	As required	Y						Y					
Refirm trees	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pruning	As required	Y	Y										Y
Inspect trees for pests and disease	Twice annually	Y						Y					
Yearly Inspection	Once annually		Y										

Ornamental Planting – Urban introduced shrubs

Description

- 3.27 Ornamental planting areas within the Proposed Scheme are areas of planting where there is a predominance of ornamental perennials and grass species, many of which have been selected to provide seed heads or formative structures over the winter period. Areas of ornamental planting are located around the perimeter of the building and by access paths. For further information on ornamental planting locations refer to the Landscape Proposals Plan (Drawing Ref: **PAC-L1-BP0631-XX-DR-ES-002101** for location).

Habitat creation

- 3.28 Ground Preparation for Ornamental Planting – Urban introduced shrubs:
- After spreading topsoil, the soil profile shall be ripped at 200mm centres to a minimum depth of 300mm to decompact the soils and key in the topsoil and subsoil layers.
 - Any large, compacted lumps of soil shall be broken down by further appropriate cultivation (in accordance with BS 4428) to produce a fine tilth suitable for planting (<30mm), turving or seeding (<10mm).
 - The topsoil may be anaerobic after storage in a temporary stockpile - cultivations shall ensure that the topsoil is fully aerated.
 - Only when the topsoil has lost any sour odour and grey coloration (symptoms of anaerobism) will it be satisfactory for planting or seeding.
 - Any undesirable material brought to the surface during this exercise shall be removed by picking or raking. For example, stones, fill materials and coarse vegetation larger than 50mm in any dimension.
- 3.29 The proposed ornamental planting will be created and managed as areas of introduced shrubs which complement the urban access paths and buildings. This habitat type does not undergo condition assessment and as such there are no BNG criteria for its management.

Management Targets

- **Target 2.1:** By year three, ornamental grasses and evergreen perennials should have spread to provide dense cover. herbaceous plants should be well established and providing regular flowering each year.
- Target monitoring: Planting beds are to be monitored once every three months. Ensure herbaceous flowering species are not being crowded out by grass or fern species. Site inspections to check for healthy growth and form; adequate watering and drainage; review soil fertility; and inspect for pests and diseases.
- Target remediation: Remedies to action any issues identified should be undertaken as soon as possible before specimens /areas of plants fail or herbaceous species disappear through competition. Remediation could include the application of fertiliser, de-compacting soil, improving soil drainage, adjusting pruning regimes, proving control for pests and disease, adding

additional stock to increase density, reviewing competition from neighbouring plants and considering replacement of species or cultivars.

Maintenance Operations (Years 1 to 5)

- 3.30 The following maintenance operations below have been created to accomplish the management targets set out above.
- 3.31 Ornamental planting areas are to be mulched between plants whilst establishing ensuring a 75mm depth coverage. This should be checked and topped up regularly.
- 3.32 Watering of plants should be undertaken as necessary to ensure moisture levels are maintained appropriately for optimum growth. During drought conditions, periodic watering of evergreen perennials and grasses over the winter months is required to ensure successful establishment. Watering frequency is to be monitored and modified to ensure moisture levels suitable to support the healthy plant growth, particularly in response to periods of drought and extended periods of rainfall.
- 3.33 Application of a slow-release fertiliser only in situations where plants are showing signs of nutrient deficiency.
- 3.34 As herbaceous plants start to die from early autumn onwards, they should be left to stand until the plant collapses under its weight or starts to interfere with other planting or footpaths. Between September and January, maintenance operatives should aim to remove some of the dead stems of those species starting to look poor at each monthly maintenance visit.
- 3.35 Remove all dead growth and trim herbaceous perennial and ornamental grass plants, avoiding damage to any new shoots that have emerged by the end of February at the latest to allow spring bulbs to flower.
- 3.36 Refirm loose plants or straighten as required.
- 3.37 Control and removal of weeds by hand weeding and /or application of a spot-on herbicide.
- 3.38 Remove any vandalised, unhealthy, or dead specimens as soon as possible and replacement with trees of the same size as those adjacent, during the next available planting season.
- 3.39 Planting beds are to be inspected once every three months as above, to check for healthy growth and form; adequate watering and drainage; review soil fertility; and inspect for pests and diseases.
- 3.40 Remove litter from all planting beds to maintain the site in a tidy condition.
- 3.41 Reduction of dense shrub will be carried out outside of the main bird nesting season, from March to September. If any essential works need to occur within this period, a qualified Ecologist will carry out a check to ensure no nesting birds are present.
- 3.42 Removal or disturbance of deep leaf litter will take place outside of the hedgehog hibernation season, from October to April. If any essential works need to occur within this period, a qualified Ecologist will carry out a check to ensure no hibernating hedgehog are present.

Management operations/specification (Years 5 onwards)

- 3.43 Once the ornamental planting areas are sufficiently well-established the management will include the following annual operations:
- Weed control and removal;

- Removal of any litter from planting beds;
- Watering of areas to ensure moisture levels are appropriate;
- Pruning of shrubs; and,
- Pruning operations and trimming of herbaceous species.

Monitoring and enhancement programme

- 3.44 Table 3.3 below details when the maintenance operations for Years 1 to 5 should be undertaken and their frequency. Note that this schedule is to be repeated annually for the first five years.
- 3.45 Table 3.4 below details when the maintenance operations for Years 5 onwards should be undertaken and their frequency. Note that this schedule is to be repeated annually.

Table 3.3 : Maintenance and Monitoring Schedule for Ornamental Planting – Urban introduced shrub – Years 1 to 5

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weed control and removal	Four times annually				Y		Y		Y		Y		
Apply slow-release fertiliser (if required)	One visit annually			Y									
Top up mulch to 75mm depth	Once annually			Y									
Watering	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tidy dead stems of plants that collapse under their weight or starts to interfere with other planting or footpaths	Undertake during other maintenance visits between Sep and Jan	Y								Y	Y	Y	Y
Prune, trim and clear all dead plant material from planting beds.	One visit annually		Y										
Refirm loose plants or straighten.	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Replace unhealthy and damaged stock	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Remove litter from planting beds	Four times annually	Y			Y			Y			Y		
Review planting	One visit, annually.				Y								

Yearly Inspection	Once annually					Y							
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Table 3.4: Maintenance and Monitoring Schedule for Ornamental Planting – Urban introduced shrub – Years 5 onwards

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weed control and removal (long term frequency to be reviewed and reduced as required)	Four times annually				Y		Y		Y		Y		
Removal of litter from planting beds (long term frequency to be reviewed and reduced as required)	Four times annually	Y			Y			Y			Y		
Watering of areas to ensure moisture levels are appropriate (long term watering to be undertaken during drought only)	As required				Y	Y	Y	Y	Y	Y			
Pruning of shrubs	As required	Y	Y							Y	Y	Y	Y
Pruning operations and trimming of herbaceous species (e.g. seed heads) & ornamental grass species (non evergreen)	As required		Y	Y									

Check for nesting birds prior to any management works	As required			Y	Y	Y	Y	Y	Y	Y			
Yearly Inspection	Once annually					Y							

Wildflower Grasslands – Other neutral grassland

Description

- 3.46 A Wildflower grassland meadow is an area of grassland where a mixture of perennial plants and grasses.
- 3.47 Species will be structurally diverse comprising a variety of grasses and flowering perennials, providing a biodiverse habitat with nectar and pollen resources, nesting materials, food sources, refuge, etc. through the growing season and beyond.
- 3.47.1 Wildflower grassland provides a flowering display from spring throughout summer and into autumn.
- 3.48 Within the Proposed Scheme a 1:1 mixture of Boston Seed – Low Growing Wildflower Meadow Seed Mix (BS12P) and Emorsgate General Purpose Meadow Grass Mix (EG1) will be utilised in the wildflower grasslands. The wildflower grassland mix will be most frequently used in open areas away from the main building to help with the enhancement of biodiversity surrounding the new building. For further information of Wildflower Grassland locations refer to the Landscape Proposals Plan (**Drawing Ref: PAC-L1-BP0631-XX-DR-ES-002101 for location**).

Habitat creation

- 3.49 Ground Preparation for Wildflower Grasslands – Other neutral grassland:
- After spreading topsoil, the soil profile shall be ripped at 200mm centres to a minimum depth of 150mm to decompact the soils and key in the topsoil and subsoil layers.
 - Any large, compacted lumps of soil shall be broken down by further appropriate cultivation (in accordance with BS 4428) to produce a fine tilth suitable for planting (<30mm), turfing or seeding (<10mm).
 - The topsoil may be anaerobic after storage in a temporary stockpile - cultivations shall ensure that the topsoil is fully aerated.
 - Only when the topsoil has lost any sour odour and grey coloration (symptoms of anaerobism) will it be satisfactory for planting or seeding.
 - Any undesirable material brought to the surface during this exercise shall be removed by picking or raking. For example, stones, fill materials and coarse vegetation larger than 50mm in any dimension.
- 3.50 The wildflower grasslands will be created and managed as other neutral grassland and will reach moderate condition as per the criteria in the statutory BNG metric condition assessment sheets. The grassland will need to be managed so that the following criteria are met:
- 1) The sward will need to meet the following characteristics:
 - Between 9 and 15 species of plant per m²;
 - More than 20% cover of wildflowers or sedges;
 - More than 2 species of non-agricultural grasses being abundant (e.g. common bent, sheep fescue, red fescue, timothy, smooth meadow grass or rough meadow grass); and
 - Less than 30% cover of Lolium species grass or white clover.

- 2) Have limited bare ground that makes up 1-5% of the ground cover;
- 3) Have limited bracken (less than 20%) or scrub (less than 5%) within the sward; and,
- 4) Have less than 5% ground impacted by physical damage or sub-optimal weed species (including non-native invasive plant species).

The wildflower grasslands will undergo a cut in either early Spring or late Autumn and due to their small size, it is assumed that this cut will be uniform across the habitat. The small size of the habitats, their management and the species selected for sowing therefore make it unlikely that a varied sward height will develop, and that this criterion would not be passed.

Management Targets

- **Target 3.1:** A good ground covering for all wildflower grassland should be evident, without excessively large bare patches. Grassland will show a mixture of perennial plants and grasses, being free of undesirable weeds, bracken and invasive non-native plant species.
 - Target monitoring: Monitoring to check on seed germination and post-sward establishment should be undertaken every two weeks in the first growing season. Areas where wildflower has failed to establish should be recorded and note if waterlogging, dry condition and/or soil compaction could be an issue. Review the amount of grass and perennial flowering plants in general, ensuring that grass growth is not dominating.
 - Target remediation: Remediation will be required in areas that have failed or established poorly. Excessive and aggressive grass growth should be controlled in the first growing season. Remediation could include reseeding with additional drainage, soil decompaction, and a change to the watering schedule and/or cutting schedule.
 - Target monitoring: An annual monitoring survey should be completed in the autumn to check that the habitats are meeting the required sward composition and condition criteria.
 - Target remediation: Remediation will be required in areas that are not meeting the sward composition or are failing the condition criteria. Remediation could include seeding with grass semi-parasitic plants such as yellow rattle, scarification and overseeding with the seed mix used at habitat creation, selective weed, bracken and scrub removal, treatment of invasive plant species, and/or a change in the cutting schedule.

Maintenance Operations (Years 1 to 5)

- 3.51 The following maintenance operations below have been created to accomplish the management targets set out above.
- 3.52 Complete an annual monitoring survey in the autumn to confirm that the habitats are meeting the required sward composition and condition criteria.
- 3.53 Wildflower Grasslands can be cut once the flowers have died back in the autumn, but it is best left till February/March allowing the area to be a heaven for wildlife through the winter months.
- 3.54 Cut the area down to a max height of 100mm, operating a 'hay cut' and leave arisings in place for one to seven days allowing the seed to fall before removing all arisings.

- 3.55 Trim edges to, tree mulch circles and areas of hardstanding. Mechanical cutting operations are not to take place within 300mm diameter of trees and/or shrubs not protected by a shelter or guard, where only cutting with hand tools can take place.
- 3.56 Remove all arisings from the site and compost them.
- 3.57 Hay cut will be undertaken when ground and weather conditions are suitable.
- 3.58 Repair damaged or failed areas by re-seeding and top dressing.
- 3.59 Watering to ensure moisture levels are maintained, especially during drying seasons, to achieve optimum growth.
- 3.60 Undesirable weed species will be removed or managed by spot treatment with herbicides.
- 3.61 Remove areas of encroaching scrub.
- 3.62 Removal of litter to maintain the site in a tidy condition.
- 3.63 Aerate soil by spiking or hollow tines once a year to a depth of 75mm. Spike when needed to relieve compaction and areas of ponding.
- 3.64 Where works are required within the bird breeding season (March to September), a qualified Ecologist will carry out a check to ensure no ground nesting birds are present or would be disturbed by the works.
- 3.65 Impacts to reptiles and amphibians are not expected as the wildflower grassland will be cut to 100mm. Should the grassland be required to be cut to ground, a qualified ecologist will conduct a pre-works check. In addition, this cut will only occur during conditions when reptiles are active and able to move away from machinery (air temperatures above 9 °C). The cut will extend from the centre outwards to encourage the movement of reptiles into adjacent suitable habitats and avoid trapping reptiles in the path of machinery.

Management operations/specification (Years 5 onwards)

- 3.66 The long-term management of meadows would include actions consistent with those taken for Years 1 to 5 with the addition of soil aeration and fallen leaf removal. It is anticipated that the wildflower grasslands would achieve their target condition by Year 5 and that annual monitoring and maintenance would contribute to maintaining their biodiversity value. There would only be a requirement for a major adjustment in the management regime if the areas suffer broad-scale failures caused by issues such as invasive flora, contamination, climate change, or other abiotic influences. As such, notwithstanding such events, the operations presented in 3.6 should continue annually from Year 6 onwards.

Maintenance and enhancement programme

- 3.67 Table 3.5 below details when the maintenance operations for Years 1 to 5 should be undertaken and their frequency. Note that this schedule is to be repeated annually for the first five years.
- 3.68 Table 3.6 below details when the maintenance operations for Years 6 to 30 should be undertaken and their frequency. Note that this schedule is to be repeated annually.

Table 3.5 - Maintenance and Monitoring Schedule for Wildflower Grasslands – Other neutral grassland – Years 1 to 5

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cutting of wildflower grassland areas	One cut per year.		(Y)	Y									
Trim edges to hard-standing and tree mulch circles	As required			Y	Y	Y	Y	Y	Y	Y	Y		
Replacement of wildflower grassland that has failed to establish/ damaged/ worn by seeding and top dressing.	As required				Y	Y				Y	Y	Y	
Weed removal by hand or spot-on herbicide.	As required			Y	Y	Y	Y	Y	Y	Y	Y		
Watering to ensure moisture levels are maintained	As required			Y	Y	Y	Y	Y	Y	Y	Y		
Removal of litter	Before each grass cut/during maintenance visits			Y	Y	Y	Y	Y	Y	Y	Y	Y	
Remove encroaching scrub	One visit annually											Y	
Yearly Inspection	Once annually									Y			

Table 3.6 - Management and Monitoring Schedule for Wildflower Grasslands – Other neutral grassland – Years 5 onwards

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cut meadow areas to a height of 70mm. Remove arisings after max. 7 days in situ	Annually in late July-late August			Y	(Y)								
Cut meadow areas to a height of 70mm. Remove arisings after max. 7 days in situ	Annually in late October									Y	(Y)		
Trim edges to hard-standing and tree stations	As required				Y	Y	Y	Y	Y	Y	Y		
Reseed bare patches with correct meadow seed mix	As required during suitable weather conditions			Y	Y	Y							
Target weed removal by hand or spot-on herbicide	As required before plants flower			Y	Y	Y	Y						
Water newly seeded areas to ensure moisture levels are maintained	As required			Y	Y	Y	Y	Y					
Remove all litter	Before each grass cut or during			Y	Y	Y	Y	Y	Y	Y	Y	Y	

	maintenance visits												
Remove fallen leaves with mechanical leaf-blower	As required									Y	Y	Y	
Aerate soil using spiker or hollow-core tines to a depth of 75mm. Spike when needed to relieve compaction and areas of ponding	Annually as required.								Y	Y	Y		
Only cut grassland during conditions when reptiles are active	As required			Y	Y	Y	Y	Y	Y	Y	Y		
Yearly Inspection	Once annually									Y			

Eco Species Rich Lawns (Amenity Grassland) – Modified grassland

Description

- 3.69** Eco Species Rich Lawns are to be maintained to establish a healthy and vigorous sward that is free of leaves and litter. The area outside the 1m wide mown verges can be left to allow the sward to grow taller and enable longer flowering periods to benefit wildlife. For further information on amenity grassland locations refer to the Landscape Proposals **Plan (Drawing Ref: PAC-L1-BP0631-XX-DR-ES-002101 for location)**.

Habitat creation

- 3.70** Ground Preparation for Eco Species Rich Lawns (Amenity Grassland) – Modified grassland:
- After spreading topsoil, the soil profile shall be ripped at 200mm centres to a minimum depth of 150mm to decompact the soils and key in the topsoil and subsoil layers.
 - Any large, compacted lumps of soil shall be broken down by further appropriate cultivation (in accordance with BS 4428) to produce a fine tilth suitable for planting (<30mm), turfing or seeding (<10mm).
 - The topsoil may be anaerobic after storage in a temporary stockpile - cultivations shall ensure that the topsoil is fully aerated.
 - Only when the topsoil has lost any sour odour and grey coloration (symptoms of anaerobism) will it be satisfactory for planting or seeding.
 - Any undesirable material brought to the surface during this exercise shall be removed by picking or raking. For example, stones, fill materials and coarse vegetation larger than 50mm in any dimension.
- 3.71** The eco species-rich lawns will be created and managed as modified grassland and will reach poor condition as per the criteria in the statutory BNG metric condition assessment sheets. The grassland will need to be managed so that the following criteria are met:
- 1) Have less than 5% scrub within the sward;
 - 2) Have less than 5% ground impacted by physical damage;
 - 3) Have less than 20% bracken within the sward; and,
 - 4) Have no non-native invasive plant species.

The lawns will undergo a cut in either early Spring or late Autumn and due to their small size, it is assumed that this cut will be uniform across the habitat. The small size of the habitats, their management and the species selected for sowing therefore make it unlikely that a varied sward height with 6-8 species per m² will develop, and subsequently these criteria would not be passed. It is expected that the habitat will be managed to have no bare ground and as such this criterion would be failed.

Management Targets

- **Target 4.1:** Species rich lawns should be fully established within twelve months after seeding which would incorporate the first growing season after sowing and the growing seasons of Year 1. No bare ground should be visible, and a dense healthy sward should be evident.
 - Target monitoring: Monitoring to check on seed germination and post-sward establishment should be undertaken every two weeks in the first growing season. Areas where grass has failed to establish should be recorded and note if waterlogging, dry condition and/or soil compaction could be an issue.
 - Target remediation: Remediation will be required in areas that have failed or established poorly. Remediation could include reseeding with additional drainage, soil decompaction, and/or a change to the watering schedule.
 - Target monitoring: An annual monitoring survey should be completed in the autumn to check that the habitats are meeting the required sward composition and condition criteria.
 - Target remediation: Remediation will be required in areas that are not meeting the sward composition or are failing the condition criteria. Remediation could include scarification and overseeding with the seed mix used at habitat creation, selective weed, bracken and scrub removal, treatment of invasive plant species, and/or a change in the cutting schedule.
- **Target 4.2:** By year five, the species rich lawns should be in a condition where the sward has been maintained to be dense and flowers successfully over the summer months. No bare patches will be evident. Edges to each grassland will be neat.
 - Target monitoring: All areas of lawn should be monitored and reviewed twice a year, once in spring and once in autumn. As above, areas of bare ground should be recorded and note if waterlogging, dry condition, wear and/or soil compaction could be an issue.
 - Target remediation: Areas that have failed will require remediation. Remediation will vary depending on the cause of failure but is not limited to soil de-compaction /aeration, scarification to remove dead thatch, providing additional drainage, regular reseeding, and change to seed or cutting specification.
 - Target monitoring: An annual monitoring survey should be completed in the autumn to check that the habitats are meeting the required sward composition and condition criteria.
 - Target remediation: Remediation will be required in areas that are not meeting the sward composition or are failing the condition criteria. Remediation could include scarification and overseeding with the seed mix used at habitat creation, selective weed, bracken and scrub removal, treatment of invasive plant species, and/or a change in the cutting schedule.

Maintenance Operations (Year 0 to 1)

- 3.72 The following maintenance operations below have been created to accomplish the management targets set out above.
- 3.73 Complete an annual monitoring survey in the autumn to confirm that the habitats are meeting the required sward composition and condition criteria.

- 3.74 Areas outside grassland verges are to be regularly mown once a month in the first growing season (March to October) to a max height of 50mm. In subsequent growing seasons, grasslands are to be mown twice a year, once in late July to late August and the second in October.
- 3.75 Trim edges to planting beds, tree mulch circles and areas of hardstanding. Mechanical cutting operations are not to take place within 300mm diameter of trees and/or shrubs not protected by a shelter or guard, where only cutting with hand tools can take place.
- 3.76 Grass cutting will be undertaken when ground and weather conditions are suitable.
- 3.77 Remove all arisings from the site or use them as part of ecological enhancements.
- 3.78 Repair damaged or failed areas by re-seeding and top dressing.
- 3.79 Watering to ensure moisture levels are maintained, especially during drying seasons, to achieve optimum growth.
- 3.80 Remove leaves regularly in autumn.
- 3.81 Control and removal of aggressive self-seeded weeds.
- 3.82 Removal of litter to maintain the site in a tidy condition.
- 3.83 Where works are required within the bird breeding season (March to September), a qualified Ecologist will carry out a check to ensure no nesting birds are present or would be disturbed by works.
- 3.84 Only cut grassland during conditions when reptiles are active and able to move away from machinery (air temperatures above 9 °C). The cut will extend from the centre outwards to encourage the movement of reptiles into adjacent suitable habitats and avoid trapping reptiles in the path of machinery.

Maintenance Operations (Year 2 onwards)

- 3.85 The following maintenance operations below have been created to accomplish the management targets set out above.
- 3.86 Complete an annual monitoring survey in the autumn to confirm that the habitats are meeting the required sward composition and condition criteria.
- 3.87 1m Wide grassland verges to be maintained adjacent to all paths and hard landscape areas, cut to a max height of 30mm, to be cut twice a month in the growing season.
- 3.88 Areas outside grassland verges are to be regularly mown once a month in the first growing season (March to October) to a max height of 50mm. In subsequent growing seasons, grasslands are to be mown twice a year, once in late July to late August and the second in October.
- 3.89 Trim edges to planting beds, tree mulch circles and areas of hardstanding. Mechanical cutting operations are not to take place within 300mm diameter of trees and/or shrubs not protected by a shelter or guard, where only cutting with hand tools can take place.
- 3.90 Reform edges once per year with an edging tool as required.

- 3.91 Grass cutting will be undertaken when ground and weather conditions are suitable.
- 3.92 Remove all arisings from the site or use them as part of ecological enhancements.
- 3.93 Repair damaged or failed areas by re-seeding and top dressing.
- 3.94 Watering to ensure moisture levels are maintained, especially during drying seasons, to achieve optimum growth.
- 3.95 Remove leaves regularly in autumn.
- 3.96 Control and removal of aggressive self-seeded weeds.
- 3.97 Removal of litter to maintain the site in a tidy condition.
- 3.98 Aerate soil by spiking or hollow tines once a year to a depth of 75mm. Spike when needed to relieve compaction and areas of ponding.
- 3.99 Scarifying is to be carried out in spring to remove excess thatch and moss.
- 3.100 Where works are required within the bird breeding season (March to September), a qualified Ecologist will carry out a check to ensure no nesting birds are present or would be disturbed by works.
- 3.101 Only cut grassland during conditions when reptiles are active and able to move away from machinery (air temperatures above 9 °C). The cut will extend from the centre outwards to encourage the movement of reptiles into adjacent suitable habitats and avoid trapping reptiles in the path of machinery.

Management operations/specification (Years 2 onwards)

- 3.102 The long-term management of the Eco Species Rich Lawns (Amenity Grassland) – Modified grassland would include actions consistent with those taken for Years 0 to 1 with the addition of soil aeration and fallen leaf removal. It is anticipated that the Eco Species Rich Lawns (Amenity Grassland) – Modified grassland would achieve their target condition by Year 2 and that annual monitoring and maintenance would contribute to maintaining their biodiversity value. There would only be a requirement for a major adjustment in the management regime if the areas suffer broad-scale failures caused by issues such as invasive flora, contamination, climate change, or other abiotic influences. As such, notwithstanding such events, the operations presented in Table 3.8 should continue annually from Year 2 onwards.

Maintenance and enhancement programme

- 3.103 Table 3.7 below details when the maintenance operations for Year 0 and 1 should be undertaken and their frequency. Note that this schedule is for the first year.
- 3.104 Table 3.8 below details when the maintenance operations for Years 2 onwards should be undertaken and their frequency. Note that this schedule is to be repeated annually.

Table 3.7 : Maintenance and Monitoring Schedule for Eco Species Rich Lawns (Amenity Grassland) – Modified grassland – Years 0 to 1

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Remove all litter prior to grass cutting	Before every grass cut			Y	Y	Y	Y	Y	Y	Y	Y	Y	
Cut wider grass areas to a height of circa. 50mm	As required to maintain a height of 50mm			Y		Y		Y		Y		Y	
Trim edges to hard-standing and tree stations	Every other cut			Y	Y	Y	Y	Y	Y	Y	Y		
Repair damaged areas by seeding and top dressing	Twice annually			Y						Y			
Control excessive weed growth with herbicide application once annually	As required			Y	Y	Y	Y	Y	Y	Y	Y		
Water newly seeded areas as required to ensure establishment	As required			Y	Y	Y	Y	Y	Y	Y	Y		
Remove leaves using leaf vacuum. Dispose offsite at licenced green waste facility	As required									Y	Y	Y	

Table 3.8 - Maintenance and Monitoring Schedule for Eco Species Rich Lawns (Amenity Grassland) Modified grassland – Years 2 onwards

Maintenance Operation	Frequency	When maintenance operation is required											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Remove all litter prior to grass cutting	Before every grass cut			Y	Y	Y	Y	Y	Y	Y	Y	Y	
Cut grass verges to a height of circa. 30mm, avoiding periods of prolonged rainfall	Every 2 months in the growing season. Undertake a final annual cut before winter.			Y	Y	Y	Y	Y	Y	Y	Y		
Cut wider grass areas to a height of circa. 50mm	As required to maintain a height of 50mm			Y		Y		Y		Y		Y	
Trim edges to hard-standing and tree stations	Every other cut			Y	Y	Y	Y	Y	Y	Y	Y		
Reform edges	Once annually			Y									
Aerate soil by hollow tines or spiking	As required to rectify waterlogged areas			Y									
Repair damaged areas by seeding and top dressing	Once annually									Y			
Control excessive weed growth with herbicide	As required			Y	Y	Y	Y	Y	Y	Y	Y		

application once annually													
Water newly seeded areas as required to ensure establishment	As required			Y	Y	Y	Y	Y	Y	Y	Y		
Remove leaves using leaf vacuum. Dispose offsite at licenced green waste facility	As required									Y	Y	Y	

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