OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

DCO Submission

Environmental Statement

Chapter 6: Ecology including Arboriculture
Appendix 6.11: Habitat Management & Monitoring Plan (HMMP)

Document 6.6K (tracked)
Rev BA

On behalf of
Oxfordshire Railfreight Limited

Prepared by FPCR Ltd.
October~~May~~ 2026

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Revision	B~~A~~

APPENDIX ES6.11

Framework Habitat Management and Monitoring Plan

Site Name:	Oxfordshire Strategic Rail Freight Interchange
Date:	~~15/10/2026~~25/10/2026
Version:	Final (Change Application)



Illustrative Masterplan

Author:

FPCR | environment & design

Client:

OxSRFI OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE

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Appendix 1: Furlong Bard, Ardley Oxfordshire. Baseline Soil assessment. Tim O'Hare Associates, 7th August 2026.

~~Appendix 1: Soil Investigation of Land at Dewars Farm, Ardley. Land Research Associates Ltd. 7th January 2026.~~

Appendix 2: Soil Investigation, Land west of Ardley. Land Research Associates Ltd. 24th March 2026.

Appendix 3~~1~~: Soil Investigation of Land at Dewars Farm, Ardley. Land Research Associates Ltd. 7th January 2026.

Appendix 4~~3~~: Veteran Tree Strategy, Oxfordshire Strategic Rail Freight Interchange, FPCR, 2026.

Appendix 5: HMMP – SSSI Compensation Land Only

Version Control

The version control is used for updates to the content. Record the initial version and further version control details in this table each time the management plan is altered throughout the management and monitoring period.

Version	Issue Status	Prepared by / Date	Approved by / Date
	Draft	OGJ / 20.08.25	
V 1.0	Final	HH 10.02.26	JDH / 10.02.26
V2.0	Final	JDH / HH 27.03.26	RG / 31.03.26
V3.0	Final	JDH / 21.08.26	
V4.0	Final (Change Application)	RG / 15.10.26	RG / 24.10.26
V5.0	Final (Change Application)	RG / 25.10.26	RG / 25.10.26

Document Details

Authorship Details

This HMMP uses the best available data at the time of writing, including ecological information, site conditions, and guidance. While recommendations are based on current best practices, success and long-term establishment cannot be guaranteed. Ecological enhancements depend on varied factors including climatic conditions, site management, ecological interactions, and external environmental pressures; outcomes may be affected by uncontrollable factors. Effectiveness and suitability may change over time, requiring ongoing monitoring and updates. FPCR Ltd. accepts no liability for any loss or damage resulting from reliance on this plan, where it has not been reviewed in consideration of changing circumstances, updated data or guidance.

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1. Project Background

Site Overview PB-B01	
Project type	On-site
Development Name and Address	Oxfordshire Strategic Rail Freight Interchange Ardley, Bicester
Author Organisation	FPCR Environment and Design
Landowner	Oxfordshire Railfreight Ltd.
Land Manager	Oxfordshire Railfreight Ltd.
Responsible person/organisation for creating or enhancing the habitat	Oxfordshire Railfreight Ltd.
Period covered by this management plan	TBC
Planning authority	Cherwell District ~~Oxfordshire County~~ Council
Planning reference (if applicable)	TBC
Central OS grid reference	SP533263
Metric revision/title	Rev F
Are any Irreplaceable Habitats present onsite	Yes: ☒ No: ☐

Summary of Management Plan

Habitats to be Retained, Created and Enhanced PB-B02

This HMMP has been informed by baseline habitat surveys and BNG mapping completed by FPCR Environment and Design to support the ~~planning~~ DCO application for the creation of a strategic rail freight interchange.

This HMMP provides a framework that outlines the establishment, management, monitoring and review of the green infrastructure component of the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) development. Habitats to be retained, created and enhanced include new woodlands, wetlands, species-rich grasslands and scrub habitats, as well as new individual trees and hedgerows.

Prior to commencement of works within each construction phase a Phase specific P-HMMP will be issued and agreed with the LPA. P-HMMPs will detail any phase-specific measures and considerations and will accord with the principles set out within this document.

Timescales for Actions PB-B03

The detailed timescales for the proposed actions are yet to be confirmed. It is anticipated that in general terms construction works will commence with earliest phases in the fields to the north (in the areas closest to the railway, and where the main site vehicular access will be delivered), and progress southwards. Structural landscaping will be established along the western bund adjacent the former Upper Heyford airfield during the early landscaping phase/s and will ~~encompass~~ include heavy standard trees and hedge plants suitable to deliver short-term or ~~an~~ immediate screening benefits.

It is currently expected that work at the Landfill (Work No. 34 (for works areas see Components of Development Plan, revision~~,~~ p23 as updated for deadline 29~~7~~)) will begin in Year 1, with arisings deposited (reprofiled) across a wider area of the Landfill site, resulting in temporary habitat loss (other neutral grassland). ~~Works~~ Habitat enhancement will also commence within the north-west Ecological Mitigation Areas (Work Nos. 29 and 37), where existing arable land will ~~be managed to reduce soil nutrient levels and converted into skylark plots for approximately 2 years~~replaced by lowland meadow, calcareous grassland and a and area of cover crop suitable to provide year-round cover and foraging opportunities for farmland bird species ~~to mitigate the temporary loss of other neutral grassland habitats~~. The lowland meadow and calcareous grassland areas ~~arable fields~~ will not be subject to any artificial inputs. Soil analysis undertaken across these field compartments has confirmed there is no requirement to first undertake measures to reduce ~~, and~~ soil nutrient levels ~~will be reduced through cropping in advance of lowland calcareous grassland and lowland meadow creation~~to appropriate levels (see Section 2: Soils and Substrates (EI-T02)).

Monitoring Requirements PB-B04

This HMMP provides a monitoring schedule which includes annual habitat monitoring during the first five years following habitat creation/establishment measures and then monitoring every 5 years from year 5 onwards.

Separate to habitat monitoring, the open lowland meadow and calcareous grassland areas to the north-west (Work Nos. 29, and 37) will be monitored in Years 2, 3, 5, 10, 15, 20, 25, and 30 to

determine whether management prescriptions are maintaining the previously recorded farmland bird assemblages. Where appropriate, survey data will inform updates to the relevant phase-specific P-HMMP and SSSI-HMMP to reflect any habitat management strategy amendments deemed necessary to benefit the farmland bird assemblage, whilst also continuing to deliver the relevant target habitat conditions and long-term viability.

Required Consents and Licences PB-B05

Any consents and licences required for habitat management will be addressed through the planning process. The following work areas are expected to require 3rd party inputs-

- National Highways land
- Network Rail land
- Landfill and Watercourse works (Environment Agency) –
- SSSI habitats (Natural England)

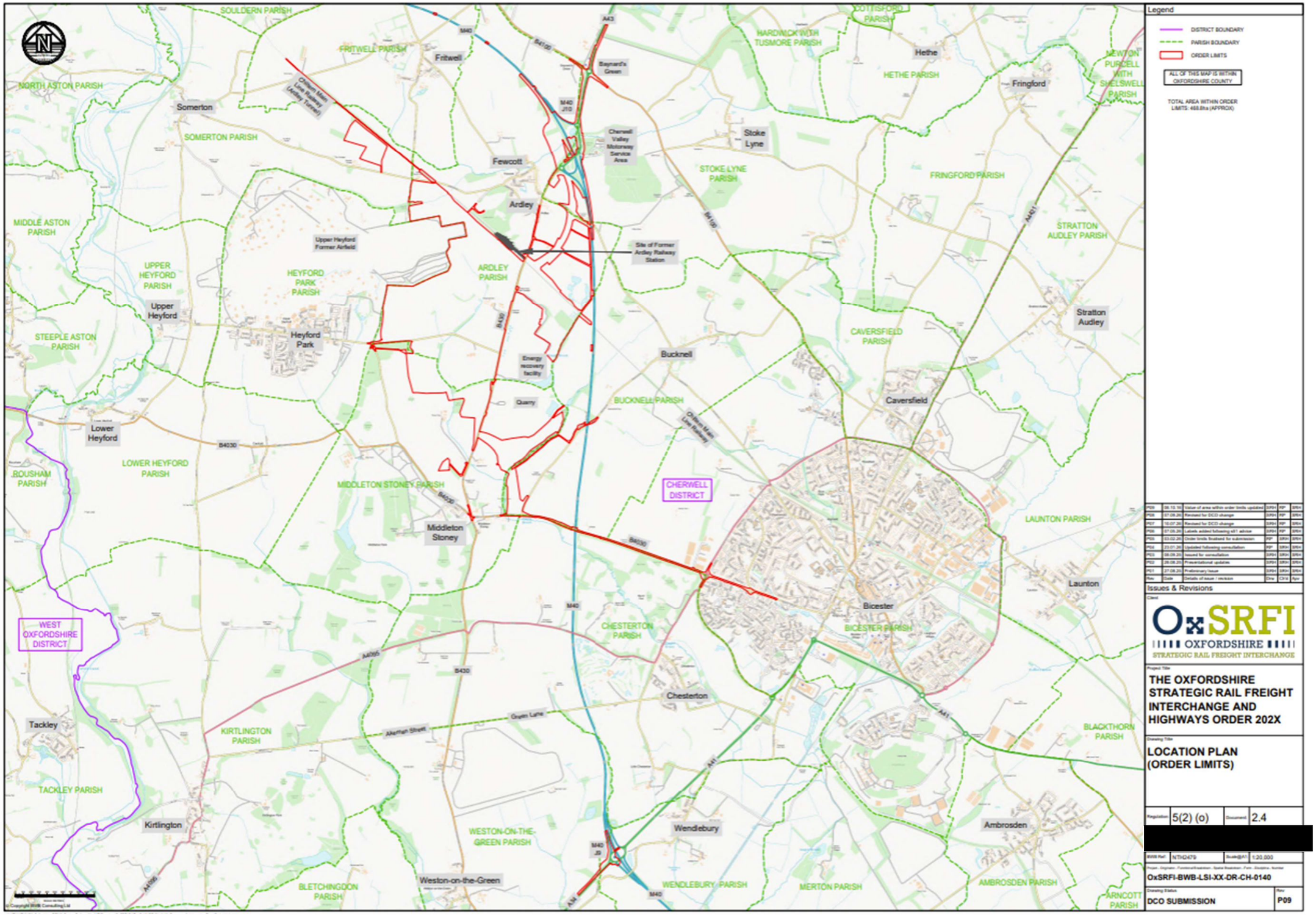
Funding PB-B06

Future management of the main development area and ecological mitigation areas will be secured by Oxfordshire Railfreight Limited.

Legal Agreement PB-B07

~~TBC~~Secured through the discharge of DCO Requirement 12

Site Boundary Plan PB-F01



Site Context Plan PB-F02

Contents | Project Background | Planned Management Activities | Monitoring Schedule

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N

0 1,500 3,000 m

- Draft Order Limits
- Ancient Woodland
- Local Nature Reserves
- Sites of Special Scientifc Interest
- Conservation Areas
- Parks and Gardens
- Scheduled Monuments
- Flood Zone 3
- Cherwell Local Plan Allocations & Potential Development Sites

Listed Buildings

- Grade I
- Grade II
- Grade II*

(Sources: Environment Agency; Historic England; Natural England; Adopted Cherwell Local Plan 2011-2031)

date	drawn/chkd
13/02/26	JDS/TRJ

client
Oxfordshire Railfreight Ltd.

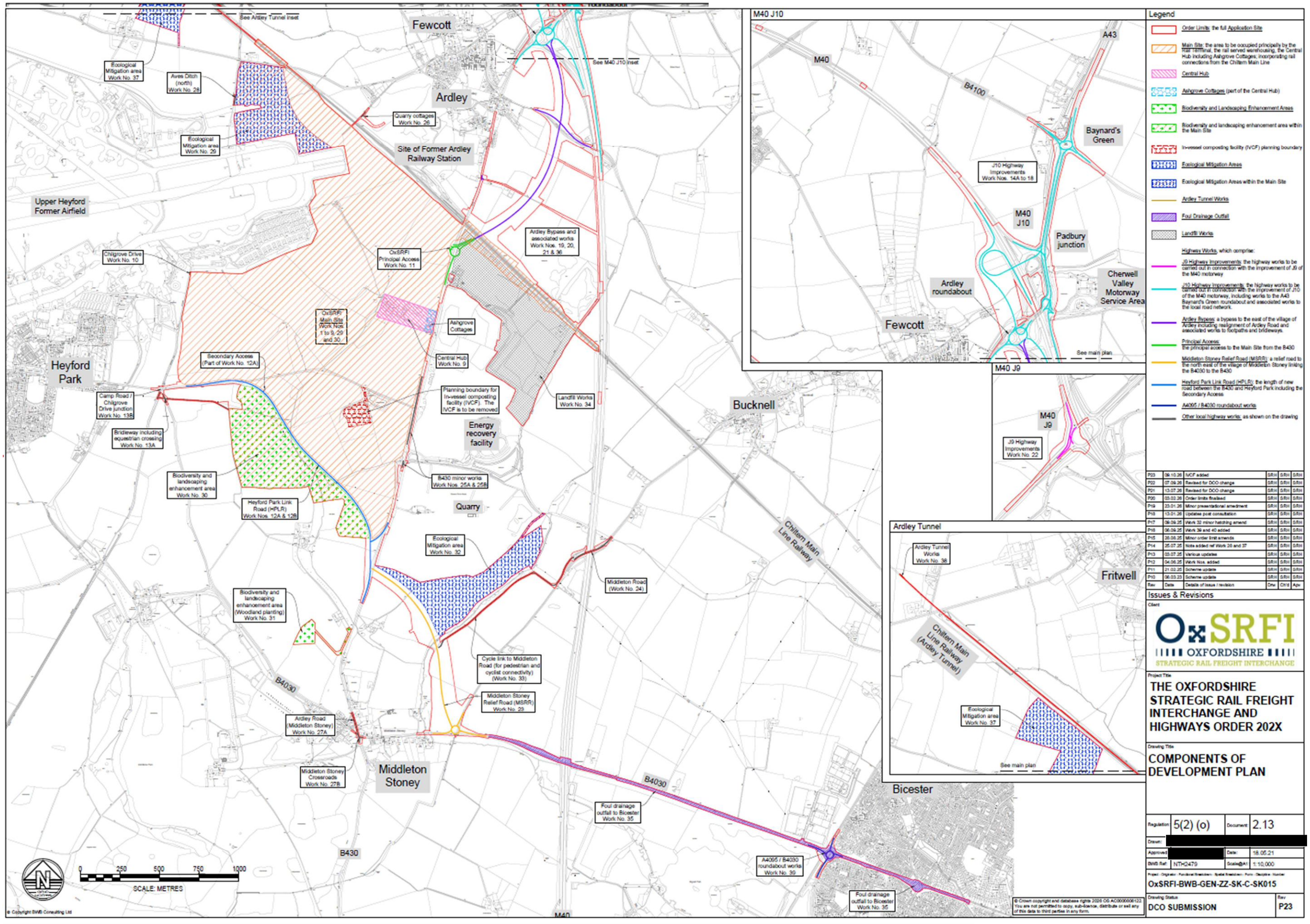
project
Oxfordshire SRFI,
Oxfordshire

title	scale
ENVIRONMENTAL DESIGNATIONS AND FEATURES	Approx 1:50,000 @ A3

FPCR | environment & design



Schedule


See Ardley Tunnel inset
See M40 J10 inset
Fewcott
Ardley
Ecological Mitigation area Work No. 37
Aves Ditch (north) Work No. 28
Quarry cottages Work No. 26
Ecological Mitigation area Work No. 29
Site of Former Ardley Railway Station
Upper Heyford Former Airfield
Ardley Bypass and associated works Work Nos. 19, 20, 21 & 36
Chilgrove Drive Work No. 10
OxSRFI Principal Access Work No. 11
OxSRFI Main Site Work Nos. 1 to 9, 29 and 30
Ashgrove Cottages
Heyford Park
Secondary Access (Part of Work No. 12A)
Central Hub Work No. 9
Camp Road / Chilgrove Drive junction Work No. 13B
Planning boundary for In-vessel composting facility (IVCF). The IVCF is to be removed
Landfill Works Work No. 34
Bucknell
Energy recovery facility
Bridleway including equestrian crossing Work No. 13A
Biodiversity and landscaping enhancement area Work No. 30
B430 minor works Work Nos. 25A & 25B
Heyford Park Link Road (HPLR) Work Nos. 12A & 12B
Quarry
Ecological Mitigation area Work No. 32
Chiltern Main Line Railway
Middleton Road (Work No. 24)
Biodiversity and landscaping enhancement area (Woodland planting) Work No. 31
Cycle link to Middleton Road (for pedestrian and cyclist connectivity) (Work No. 33)
B4030
Middleton Stoney Relief Road (MSRR) Work No. 23
Ardley Road (Middleton Stoney) Work No. 27A
Middleton Stoney Crossroads Work No. 27B
Middleton Stoney
B4030
Foul drainage outfall to Bicester Work No. 35
B430
A4095 / B4030 roundabout works Work No. 39
Foul drainage outfall to Bicester Work No. 35
M40
Bicester
0 250 500 750 1000
SCALE: METRES
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M40 J10
M40
A43
B4100
Baynard's Green
J10 Highway Improvements Work Nos. 14A to 18
M40 J10
Padbury junction
Ardley roundabout
Cherwell Valley Motorway Service Area
Fewcott
See main plan
M40 J9
M40 J9
J9 Highway Improvements Work No. 22
Ardley Tunnel
Ardley Tunnel Works Work No. 36
Fritwell
Chiltern Main Line Railway (Ardley Tunnel)
Ecological Mitigation area Work No. 37
See main plan
Legend
Order Limits: the full Application Site
Main Site: the area to be occupied principally by the rail terminal, the rail served warehousing, the Central Hub including Ashgrove Cottages, incorporating rail connections from the Chiltern Main Line
Central Hub
Ashgrove Cottages (part of the Central Hub)
Biodiversity and Landscaping Enhancement Areas
Biodiversity and landscaping enhancement area within the Main Site
In-vessel composting facility (IVCF) planning boundary
Ecological Mitigation Areas
Ecological Mitigation Areas within the Main Site
Ardley Tunnel Works
Foul Drainage Outfall
Landfill Works
Highway Works, which comprise:
J9 Highway Improvements: the highway works to be carried out in connection with the improvement of J9 of the M40 motorway
J10 Highway Improvements: the highway works to be carried out in connection with the improvement of J10 of the M40 motorway, including works to the A43 Baynard's Green roundabout and associated works to the local road network.
Ardley Bypass: a bypass to the east of the village of Ardley including realignment of Ardley Road and associated works to footpaths and bridleways.
Principal Access: the principal access to the Main Site from the B430
Middleton Stoney Relief Road (MSRR): a relief road to the north east of the village of Middleton Stoney linking the B4030 to the B430
Heyford Park Link Road (HPLR): the length of new road between the B430 and Heyford Park including the Secondary Access
A4095 / B4030 roundabout works
Other local highway works, as shown on the drawing
P23 26.10.26 IVCF added SRH SRH SRH
P22 07.09.26 Revised for DCO change SRH SRH SRH
P21 13.07.26 Revised for DCO change SRH SRH SRH
P20 03.02.26 Order limits finalised SRH SRH SRH
P19 23.01.26 Minor presentational amendment SRH SRH SRH
P18 13.01.26 Updates post consultation SRH SRH SRH
P17 09.09.25 Work 32 minor hatching amend SRH SRH SRH
P16 08.09.25 Work 39 and 40 added SRH SRH SRH
P15 28.08.25 Minor order limit amends SRH SRH SRH
P14 25.07.25 Note added ref Work 26 and 37 SRH SRH SRH
P13 03.07.25 Various updates SRH SRH SRH
P12 04.06.25 Work Nos. added SRH SRH SRH
P11 21.02.25 Scheme update SRH SRH SRH
P10 06.03.23 Scheme update SRH SRH SRH
Rev Date Details of issue / revision Drw Chkd Apv
Issues & Revisions
Client
OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE
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Drawing Title
COMPONENTS OF DEVELOPMENT PLAN
Regulation 5(2) (o) Document 2.13
Drawn: [redacted]
Approved [redacted] Date: 18.05.21
BWB Ref. NTH2479 Scale@A1 1:10,000
Project Originator Functional Breakdown Spatial Breakdown Form Discipline Number
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Drawing Status DCO SUBMISSION Rev P23
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Phasing strategy

Will the proposed work measures be delivered in phases? PB-B08 **Yes: ☒ No: ☐**

The habitat management and monitoring prescriptions detailed in this plan are structured to be delivered in accordance with a future, project-specific phasing strategy. The timing of 'Year 1' for the implementation of these prescriptions will be relative to the commencement of each phase of the development. The Phasing Strategy for the development will deliver the following:

- Sequential Delivery: Habitat creation and management works will be implemented in a phased manner, ensuring that the commencement of each phase of the development is concurrent with the establishment of its associated ecological mitigation and compensation measures.
- Adaptive Timeline: The 'Year 1' start date for management activities provided within the management prescriptions in this document will correspond to the commencement of a particular phase of development or the completion of a specific construction milestone within that phase, as defined by the approved Phasing Strategy.
- Long-term Commitment: The commitment to a minimum of 30 years of management and monitoring will apply to each habitat area from the point of its creation and establishment (minimum of 80 years for ~~,~~SSSI mitigation areas ~~– see also the separate SSSI HMMP~~).
- Monitoring Integration: The monitoring schedule will be tied to the phasing plan, with surveys requirements adjusted to reflect the agreed-upon timeline for each project phase.

This approach will ensure that the ecological mitigation and enhancement measures are delivered in a timely and effective manner, directly correlating with the specific impacts of each phase of the project as it is implemented.

Roles and Responsibilities

Provide details of the responsible persons and organisation(s) for delivering this management plan.

Ecologist or Other Professional Responsible for HMMP PB-B09				
Organisation		FPCR Environment and Design Ltd.		
Responsibility	Start Date:	2025	End Date:	2026
As one of the leading consultancies in advancing and delivering BNG, FPCR has worked with a broad range of landowners, Local Authorities, and government bodies to establish banks of biodiversity units. The experienced team at FPCR has a proven record and competency in delivering Habitat Banking schemes and habitat management.				
Statement of Competency				

The preparation of this HMMP was initially led by [redacted], an ecologist with more than 11 years' experience in the ecology and conservation sector. [redacted] has over 7 years of experience with BNG in the UK. The HMMP was updated by [redacted] an ecologist and principal BNG Specialist with over 9.5 years' experience in the ecology and environmental sector.

This HMMP has been quality-assured by [redacted] an Associate Ecologist with 9 years' experience utilising BNG within ecological consultancy in the UK. All work was overseen by [redacted]

Landowner or Land Manager PB-B10				
Name or Initials		Oxfordshire Railfreight Limited		
Organisation		Oxfordshire Railfreight Limited		
Responsibility	Start Date:	Commencement of works	End Date:	80 years following completion of the established works (SSSI Mitigation Areas), 30 years for other areas*.
The Ddeveloper will be responsible implementation of this HMMP during the construction period. The Ddeveloper has a track record of completing similar development projects and an established track record of ensuring that projects are completed to time scales and that operations are fully complaint with relevant regulations and national guidance and standards. *excludes areas reverting to landowner/third party management such as highways verges and the capped Ardley Landfill.				
Statement of Competency				
The Developer will be able to demonstrate management and monitoring competency and/or relevant site knowledge and skills through relevant training, qualifications or experience, or a combination of these.				

Management Organisation(s) Responsible for Implementing the HMMP PB-B11	
Name or Initials	A suitable qualified company will be contracted.
Organisation	A suitable qualified company will be contracted.

Responsibility	Start Date:	Commencement of works	End Date:	TBC
The Management Organisation will have responsibility for the post construction management and monitoring implementation of this HMMP.				
Statement of Competency				
The Developer will commission a suitable Management Company to implement the post construction elements of the HMMP that is able demonstrate the knowledge, skills and experience to undertake habitat management in a manner that will achieve the stated BNG outcomes. Evidence will comprise relevant training, experience, qualifications, or combination of these.				
LPA or Responsible Body for Reviewing HMMP PB-B12				
Name or Initials		TBC		
Organisation		~~Oxfordshire County~~ Cherwell District Council (or relevant local planning authority)		
Responsibility	Start Date:	Commencement of works	End Date:	TBC
~~TBC~~ Cherwell District Council (or relevant local planning authority)~~Oxfordshire County Council~~ will be the responsible body in the review and auditing of subsequent phase specific P-HMMPs.				

Land Use Summary

Overview of Baseline Site Use PB-B13

The application site, as defined by the 'Order Limits', is located to the south of Ardley. The 'Main Site' is located between the B430 and the former RAF Upper Heyford airfield, which lies to the west, and immediately south of the Chiltern Railway line. The Main site is dominated by arable and neutral grassland used for grazing, with hedgerows, trees, and scrub at the field margins. The Ashgrove farmstead lies in the north-east of the Main Site, which comprises several farm buildings and residences, and the Seven Trent Green Power 'In Vessel Compositing' facility lies within the southern east. Agricultural fields extend from the southern boundary and form much of the surrounding landscape. To the east of the Main site and the B430 is the Ardley Landfill Site and Viridor Ardley Energy Recovery Facility ('Viridor ERF'), and to the south of the waste facilities is an active minerals quarry. Other habitats present within the Main Site include small plantation broadleaved woodlands, small waterbodies, watercourses and areas of hardstanding and unsealed surfaces, buildings, scrub, introduced shrub, lowland calcareous grassland, lowland meadows, modified grassland, mixed and coniferous woodland, ephemeral vegetation, tall forbs and bare ground.

The Highways Works part of the application site includes land on the eastern and western sides of the M40 Junction 10, and the western side of M40 Junction 9 largely comprises arable land (as well as existing highway land) with planted tree groups and scrub associated with screening functions of highways infrastructure. Other habitats include neutral grassland, road verges, and ponds. The proposed 'Ardley Bypass' is located to the north-east of the Main Site and crosses arable fields bound by native hedgerows, as well as the Chiltern Railway line. To the south-east of the Main Site the proposed 'Middleton Stoney Relief Road' includes arable fields and native hedgerows, a section of the Gagle Brook and neutral and modified grassland road verges and woodland associated with the B4030.

Overview of Proposed Site Use PB-B14

Full details of the Proposed Development are provided separately in ES Chapter 2: Proposed Development of the Environmental Statement Chapter, which supported the Application. The Proposed Development comprises a Strategic Rail Freight Interchange with associated infrastructure and distribution warehousing units. In brief, the Proposed Development consists of the following:

- An intermodal freight terminal and associated infrastructure.
- Construction of warehousing and ancillary buildings.
- New road infrastructure and improvement work to the existing road network, and related traffic management measures.
- Relocation of the Severn Trent Green Power In-Vessel Composting Facility.
- Strategic landscaping and tree planting to provide screening and improve habitat connectivity.
- New foot and cycle links and associated sustainable drainage.
- Earthworks and demolition of some existing structures within the Main Site.
- Renovation and change of use of retained residential and agricultural buildings.

The Ecological Mitigation areas and Biodiversity Landscaping enhancement areas that support Biodiversity Net Gain are divided into four main regions, alongside specific consideration given to watercourses.

- **North-west Ecological Mitigation Area (NW) (Work Nos. 29 & 37)**
  - The mitigation area comprises the creation of Lowland Calcareous Grassland, Lowland Meadow and Cropland. These habitats will provide replacement and enhancement of foraging, nesting and shelter resources for qualifying bird species affected by the development, as well as compensation habitat for the SSSI. Establishment will include appropriate soil preparation, locally appropriate seed mixes, and long-term management through controlled mowing regimes.
- **South-east Ecological Mitigation Area (SE) (Work No. 32)**
  - The mitigation area comprises the creation of neutral grassland and mixed scrub mosaic, alongside riparian woodland and individual tree planting, which will enhance the Gagle Brook corridor by increasing habitat diversity and connectivity, providing improved foraging and shelter opportunities for bird species.
- **Biodiversity and Landscaping Enhancement Area (BL) (Work No. 30)**
  - This area comprises dedicated landscape features and green infrastructure, including attenuation ponds, wet basins, four newly created Great Crested Newt ponds and associated newt-friendly terrestrial habitats. A bund along the western boundary will be planted with woodland to provide screening and ecological connectivity. Additional areas of new woodland will be created across the site, alongside tree planting and the establishment of new hedgerows to enhance habitat diversity and biodiversity value.
- **Main Site (MS)**
  - Green infrastructure will be delivered through the creation of amenity grassland, species-rich grassland, street tree planting and attenuation basins. These features will enhance landscape quality, support wildlife and contribute to sustainable drainage and biodiversity enhancement across the site.
- **Watercourses**
  - Sections of watercourses within the site will be enhanced through the removal of riparian encroachment, helping to restore natural riparian corridors.
  - The proposals retain or realign sections of channels of watercourses within green infrastructure corridors wherever possible.

Management / Land Excluded from the HMMP

Areas of land within the Order Limits that are under the control of 3rd parties, such as road verges and railway sidings, are excluded from this HMMP as they are not subject to management control by the Applicant. It is assumed that these retained habitats will continue to be managed as they are currently and will therefore remain in their existing (generally poor/moderate) condition for the

purposes of this plan, to avoid over-commitment to habitat quality improvements that cannot be secured.

Works at the Landfill site (Work No. 34) involves the temporary removal of an area of existing other neutral grassland and subsequent creation of replacement neutral grassland across the same area following the distribution of landfill arisings from within the area of the new railway cutting. The landfill owners will resume management of the new grassland once established, in accordance with the existing management regime. Prescriptions for this area are therefore not included within this HMMP.

Site Baseline, Environmental Information and Associated Impacts Checklist PB-T01

Baseline and Environmental Information	Prompts for when these may be relevant. This is not an exhaustive list. Use your professional judgement to determine which are required for your HMMP	Check box if included	Document Reference or Reason if not included
Statutory / Non-statutory Designated Sites	Will your proposals lead to direct or indirect effects on designated sites?	☒	Proposals will result in impacts to the Ardley Cutting & Quarry SSSI. Details of desktop study records, including locations of designated sites and an assessment of potential impacts from the project on these, is provided in the Environmental Statement Chapter 6 prepared to accompany the application.
Protected and Notable Species	Does the presence or proximity of specific species on or near your site present any constraints or opportunities to project design or management?	☒	Further details of desktop study records, including locations of protected/notable species records and an assessment of potential impacts from the project on these, are provided in the Environmental Statement Chapter 6 prepared to accompany the application.
Invasive Non-Native Species (INNS)	Are any INNS present onsite that could affect the proposals?	☒	Details regarding the presence of INNS are provided in Chapter 6 of the Environmental Statement, prepared to accompany the application. Where applicable, the management of invasive non-native species (INNS) is included within the management prescription outlined in this HMMP, and in the CEMP.
Biological Records Plan - Sites and Species	Does the presence of designated sites or specific species on or near the site present any constraints or opportunities to proposals?	☒	Details of biological records are presented in the ES Appendix ES6.1: Ecological Appraisal and Environmental Statement Chapter 6 prepared to accompany the application.
Baseline Habitats Survey	Is this current and important HMMP information located in a separate document? If so, provide details on where it is located.	☒	Details of botanical surveys and baseline habitats are provided in the Environmental Statement Chapter 6 and ES Appendices ES6.1: Ecological Appraisal; ES6.2: SSSI Botanical Survey Report and ES6:9 BNG Report. prepared to accompany the application.
Public Access	Has public access, or proposals to allow public access, influenced your management prescriptions? If so, how?	☒	The Site has a degree of public access as described in the accompanying Environmental Statement (Chapter 2). Public access has been considered throughout the project design stage to ensure habitat targets are appropriate.
Climate	Are local climate conditions and, or, climate change likely to impact the target habitat retention, creation or enhancement?	☒	Target habitat types are consistent with baseline habitats, appropriate for the location, and therefore not considered especially sensitive to climate impacts. Adaptive management techniques are considered for climate change adaptation.
Geology and Topography	Any geological or topographical constraints or opportunities?	☐	The Site's topography will be regraded as part of the proposals to create flat platforms. Consequently, topography will not have a significant effect on proposed habitat interventions or ongoing management.
Agricultural Land Status	Does the site support any land favourable for agricultural management? Could this affect the proposals?	☒	The loss of agricultural land has been considered as part of the Environmental Statement (ES Chapter 14) prepared to support the application.
Soils and Substrates	Do soils and substrates present any constraints or opportunities?	☒	Soil nutrient levels, soil type, and pH have been considered in creating lowland calcareous and lowland meadow grasslands, as these factors strongly influence feasibility and success. Additionally, the loss of soil conditions on site has been considered in the Environmental Statement prepared to support the application.
Contaminated Land	If there is any contaminated land, will this present any constraints?	☒	The Contaminated Land has been considered as part of the Environmental Statement prepared to support the application.
Hydrology and Drainage	Will the site hydrology present any constraints or opportunities?	☒	The flood risk, hydrology and drainage for the Site have been considered as part of the Environmental Statement (Chapter 9) prepared to support the application.
Flood Risk Zones	Is the site within a flood risk zone? Will that present any site management risks?	☒	
Landscape Character and Designations	Does the landscape character of the site present any constraints or opportunities?	☒	A landscape impact assessment of the Site has been included in the Environmental Statement (Chapter 7) prepared to support the application.
Historic Land Use	Does the historic land use present any constraints or opportunities?	☒	The historic environment has been considered as part of the Environmental Statement (Chapter 10: Heritage and Archaeology) prepared to support the application.

Historic Environment and Earth Heritage	Are there any historic environment designations? What are the implications for your plan?	☒	

2. Baseline and Environmental Information

Land Tenure and Public Access

Relevant Land Tenure Information (EI-B01)

The areas included within this HMMP are owned or will be under the control of Oxfordshire Railfreight Ltd, who will be responsible for procuring suitably qualified contractors and management personnel and for ensuring the successful implementation of this habitat management plan.

Potential Impact to Scheme (EI-B02)

All management prescriptions detailed in this management plan will be the responsibility of the landowner and their land manager (s). Therefore, there will be no constraints on completing the management prescriptions regarding land tenure.

Public Access Information (EI-B03)

Existing public access: A public bridleway currently runs through the Main Site area. A Public Footpath is present along the north and southern boundaries of the SE Ecological Mitigation Area.

Proposed public access: The OxSRFI development will provide new and enhanced pedestrians and cycle links and facilities that would provide links to, and enhance connectivity between, Heyford Park, Ardley, Bicester, and Middleton Stoney. See the Footway/Cycleway/Rights of Way Strategy Overview below.

In summary, the OxSRFI development will provide multiple footway/cycleway improvements including new footways and cycleways through the site and connecting to neighbouring development, a Toucan crossing on the B430 and reallocated of road space at the Middleton Road bridge over the M40 to provide a traffic free route for walkers, cyclists and horse riders

Existing public PRoWs through the OxSRFI Main Site are to be diverted. Replacement access will include a footway/bridleway within a landscaped corridor around the perimeter of the Main Site, new bridleways routed between Heyford Park and Ardley and over the Chiltern Main Line railway, and a new link under the proposed Middleton Stoney Relief Road to the wider bridleway network. Further details are provided in the Framework Travel Plan (Appendix 3.2 to ES Chapter 3: Transport).

Potential Impact to Scheme (EI-B04)

It is unlikely that the existing public rights of way (PRoW) will significantly impact the project. If disturbances and larger areas of soil erosion are properly managed, small areas of bare ground created by human disturbance can help increase biodiversity. The PRoW currently has light usage, which will be monitored to ensure no negative impacts on habitat targets throughout the project's lifecycle.

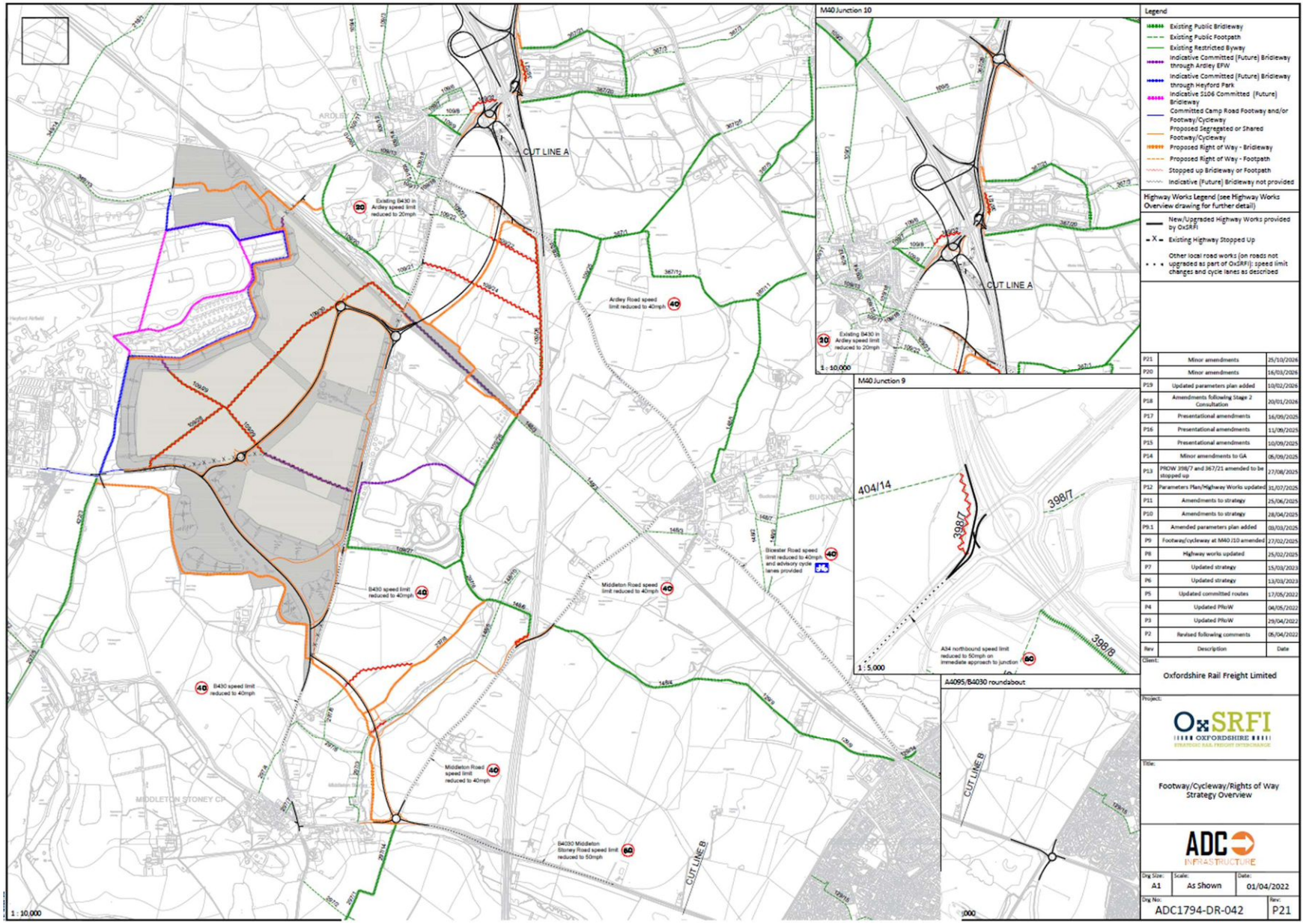
The new footpath links may cause some disturbances, primarily due to increased access and disturbances from dog walkers, and issues such as litter should be addressed. Access through the habitat mitigation or compensation field areas can be controlled

using strategically mown pathways in the grassland, while areas should be left to grow longer to discourage access. A longer, tussocky grass buffer strip should be created along the pathway to discourage people from entering and recreationally using that space. Additional measures based on monitoring may need to be considered as and when required.

Signage should be erected at accessible locations to explain the scheme to recreational users of the Site and to request that dog walkers keep their dogs under control.

While the presence of Public Rights of Way (PRoW) may cause some disturbances, they also offer access to nature for the local community and visitors. This access supports conservation efforts, encourages pro-environmental behaviours, and enhances well-being.

Public Access Plan (EI-F01)



Climate

Current Climate Information (EI-T01)	
Nearest weather station details	Oxford
Days of rain per year	117.67 days
Average annual rainfall mm	681.55 mm
Average temperature °C	7.12°C min / 15.02°C max
Highest temperature – Month and temperature °C	July - 23.06°C
Lowest temperature – Month and temperature °C	February - 2.32°C
Average annual hours of sunshine	1615.48 hours
Sunniest month and average hours of sunshine	July - 211.99 hours
Average number of days with air frost	33.73
Frostiest month and number of days	December – 8.60 days

Potential impact of current climate on project (EI-B05)

Like much of England, Ardley and its surrounding areas experience a temperate maritime climate, characterised by mild winters, warm summers, and moderate rainfall throughout the year. Sunshine hours are typical for southern central England, with occasional frosts but little severe cold or frequent snow. This climate supports a diverse range of lowland English habitats, and current conditions do not hinder habitat creation, including species-rich grassland, woodland, and scrub.

As such, species mixes selected for planting and/or seeding should be appropriate for this climate, including frost-resistant perennials tolerant of seasonal variations in soil moisture. This will be easily achievable for the habitats proposed.

The climate supports ponds; summer drying is common without groundwater input. Creating a network of ponds with varied depths can benefit amphibians and invertebrates during seasonal drying.

Potential Impact of Climate Change on Proposals (EI-B06)

Impacts of Climate Change

As a result of climate change, all areas of the UK are projected to get warmer, resulting in drier, warmer summers and milder, wetter winters, which are already being observed. Southern England is projected to have the largest change in summer mean temperatures.

As full impacts are unknown at the time of writing, the plan will be implemented using an adaptive management approach. This approach allows the scope to introduce new management responses to achieve the same objectives. For instance, this may involve changing the timing of a hay cut to reflect earlier plant growth and flowering.

Drier conditions will favour stress-tolerant and ruderal species. Higher spring soil moisture levels, combined with higher spring temperatures, may also favour more competitive species, impacting less tolerant species and reducing botanical diversity, therefore consideration has been given to;

- Creating a more resilient system by combining various habitat types and natural elements, mimicking natural ecosystems.
- Seeding the grassland with a variety of species adapted to varying degrees of soil moisture will allow the site to remain resilient to climate change by encouraging a more diverse seed bank within the soils. This will provide flexibility in the sward, allowing species to establish based on the soil moisture regime that dominates the site.
- Selecting more drought-tolerant species in woodland planting, assessing the ecological role of a near-native, naturalised species, and considering accepting as a component of semi-natural woodland, e.g., sycamore
- Tree planting with a variety of species tolerant of different soil moisture regimes.

Adaptive Management

The climate change sensitivity rating for (priority) habitats related to the proposals within this HMMP, along with some adaptive management measures from the Climate Change Adaptation Manual (Natural England and the RSPB, 2nd edition 2020), are provided below to help inform habitat management strategies and adaptive management requirements that may be needed as the effects of climate change occur.

Grasslands

Lowland calcareous grassland

Lowland calcareous grassland has been shown to be relatively robust to the direct threats posed by climate change and to have **low climate change sensitivity,** at least in the short term. Drought and wildfire may affect the habitat. Climate change adaptation should focus on reducing other sources of harm to increase resilience. Adaptive management may include, but is not limited to;

- Flexibility in site management, such as varying the timing of hay cuts, to respond to increased variation in seasonal growing conditions (but being mindful of the risk to ground nesting birds).

- Increasing topographical, soil and hydrological heterogeneity; and
- Accepting changes to community composition where it is driven by climate change.

Lowland meadow

Lowland meadows, particularly wetter types, are influenced by water availability, and seasonal variation in the water table are likely to be sensitive to changes in rainfall; wet lowland meadows are thought to have **medium sensitivity to climate change** impacts, whilst typically dry lowland meadows are predicted to have **low sensitivity to climate change** impacts. Adaptive management may include, but is not limited to;

- Flexibility in site management, such as varying the timing of hay cuts, to respond to increased variation in seasonal growing conditions (but being mindful of the risk to ground nesting birds).
- Increasing the grassland's structural heterogeneity by varying the management type and timing.
- Monitoring and ensuring the control of invasive species, including previously unknown species as they occur.
- Maintain or restore water level management, including actions to increase water holding capacity, such as restoring ditch networks or reviewing water management structures.

Other neutral grassland

Climate change sensitivity is likely to be similar to that of lowland calcareous and lowland meadows, and adaptive management is also likely to follow similar principles, such as flexibility in site management, including the timing of cuts, and increasing structural heterogeneity to help provide resilience against the pressures of drought.

Woodland

Lowland Mixed Deciduous Woodland / Other Broadleaved Woodland

The greatest threat to woodlands from climate change is likely to be an increase in the frequency and severity of summer droughts. Stressed trees become more vulnerable to insect pests and diseases, and most insect pests currently affecting UK woodlands are likely to benefit from climate change, with increased activity and decreased winter mortality. There is also likely to be a shift in the distribution of the main tree species across much of England and the UK. Overall, lowland mixed deciduous woodland is thought to have **low climate change sensitivity.** Adaptive management may include, but is not limited to;

- Increasing the woodlands' age structure and structural heterogeneity and increasing the proportion of decaying wood and its diversity to build resilience in the woodland habitat.
- Accept and encourage a greater mix of native trees and shrubs through active management.
- Monitoring and ensuring the control of invasive species, including previously unknown species as they occur.
- Reducing other pressures such as human, pollutants and deer pressures.
- Threats posed by climate change, such as introducing new pests and diseases, must be carefully assessed, and any

changes to management objectives should be discussed with the responsible authority first.

- Reflect management changes and potential changes in native
  - tree composition in management objectives.

Standing Open Water / Ponds

Climate change is predicted to bring about a range of changes to environmental conditions in ponds, including shifts in temperature and hydrological regimes. Increased temperatures and longer growing seasons may intensify eutrophication, leading to more frequent and longer-lasting algal blooms when nutrient loads are sufficient to support them. Wetter winters and an increase in storm event frequency could increase runoff of silt and nutrients into water bodies, increasing the potential for eutrophication and physical impacts from sediment covering substrates and/or macrophytes. As such, ponds are thought to have high sensitivity to climate change impacts. Adaptive management may include, but is not limited to;

- Establishing ecological networks and ensuring hydrological connectivity is maintained between naturally connected sites is important to allow species to migrate between sites in response to climate change.
- Ensure semi-natural vegetation such as woodland and grassland along critical run-off pathways. Encourage and maintain marginal habitat and emergent species.
- Restrict nutrient applications and manage pollutant loads near wastewater bodies.

Green Infrastructure / Urban

The provision of high-quality, well-designed green infrastructure within urban development areas will play a key role in climate change adaptation and biodiversity enhancement. Green infrastructure will contribute to sustainable flood management by incorporating sustainable drainage systems (SuDs), including sustainable drainage features. It will also help to mitigate the urban heat island effect through extensive tree planting and increased vegetation cover. In addition, the proposed green infrastructure will support biodiversity by creating new areas of valuable habitat and strengthening ecological connectivity, contributing to a coherent network of ecologically rich sites.

Hedgerows

Hedgerows are inherently linear, which makes them more susceptible to edge effects. Droughts and storms are therefore more likely to negatively impact hedgerow trees than larger woodland blocks. Hedgerows are also vulnerable to changes in the use and management of adjacent land. They are considered to have low sensitivity to climate change impacts. Adaptive management may include, but is not limited to;

- Maintain a diverse range of hedgerow structures, ranging from hedgerows that grade from tall scrub, with plentiful side shoots and foliage in the summer, to well-developed shrubs and tall sward grassland with herbs.
- Provide links to the existing hedgerow network and patches of semi-natural habitat to promote the movement of species through the landscape.

- When planting or restocking, aim to diversify the range of species and select species and provenances adapted to a wider range of climatic conditions.

Other habitats

All other habitats will be managed through an adaptive management approach, allowing management prescriptions to be reviewed and adjusted over time in response to climate change impacts, monitoring results, and habitat condition, to ensure long-term resilience and biodiversity value.

Natural England and RSPB, 2019. Climate Change Adaptation Manual - Evidence to support nature conservation in a changing climate, 2nd Edition (2020). Natural England, York, UK

Soils and Substrates (EI-T02)

Soil Analysis for Northwest Ecological Mitigation Area (grassland field) (Work No. 37)

Parcel Refs	Soil Texture	pH	Extractable Magnesium	Phosphorous (P) ADAS Index	Extractable Potassium (K) (ADAS Soil Nutrient Index)
1.1	Sandy Clay Loam	7.8	38	2	Low (1)
1.2	Sandy Clay Loam	8.0	51	2	Moderate (2)
1.3	Sandy Clay Loam	8.1	34	2	Low (1)
2.1	Sandy Clay Loam	7.1	54	2	Moderate (2)
2.2	Sandy Clay Loam	7.9	35	2	Low (1)
2.3	Sandy Clay Loam	7.4	42	2	Low (1)

Soil Analysis for North-west Ecological Mitigation Area (Work No. 29)

Parcel Refs	Soil Texture	pH	Magnesium (Mg) Index	Phosphorous (P) Index	Potassium (K) Index
A	Clay Loam, calcareous	8.1	1	0	2-
B	Clay Loam, calcareous	7.9	2	0	2-
C	Clay Loam	7.6	2	0	1
D	Clay Loam, calcareous	8.1	2	0	2-
E	Clay Loam, calcareous	8.1	1	0	2-

Soil Analysis for South-east Ecological Mitigation Area (Work No. 32)

Parcel Refs	Soil Texture	pH	Magnesium (Mg) Index	Phosphorous (P) Index	Potassium (K) Index
A	Clay Loam	7.9	2	1	4
B	Clay Loam	7.9	2	2	3
C	Clay Loam	8.0	2	2	3
D	Clay Loam	8.1	2	1	2+
E	Clay Loam	8.1	2	2	4

~~**Soil Analysis for North-west Ecological Mitigation Area (Work No. 29)**~~

~~Parcel Refs~~	~~Soil Texture~~	~~pH~~	~~Magnesium (Mg) Index~~	~~Phosphorous (P) Index~~	~~Potassium (K) Index~~
~~A~~	~~Clay Loam, calcareous~~	~~8.1~~	~~1~~	~~0~~	~~2-~~
~~B~~	~~Clay Loam, calcareous~~	~~7.9~~	~~2~~	~~0~~	~~2-~~
~~C~~	~~Clay Loam~~	~~7.6~~	~~2~~	~~0~~	~~1~~
~~D~~	~~Clay Loam, calcareous~~	~~8.1~~	~~2~~	~~0~~	~~2-~~
~~E~~	~~Clay Loam, calcareous~~	~~8.1~~	~~1~~	~~0~~	~~2-~~

Summary of Soils Information (EI-B13)

Soil analysis was undertaken of the northwesternmost two field compartments within the **North-east Ecological Mitigation Area** (adjacent the rail track) by Tim O'Hare Associates in July 2026 (Fields 1 and 2, see Appendix 1) to inform appropriate habitat creation and management requirements. Field 1 (smaller, western field, Plot adjacent to 2/4) is proposed for the provision of cover crops, and Field 2 for lowland meadow creation (Plot 2/4, Work Number 37), both with subsequent management beneficial to the local farmland bird assemblage.

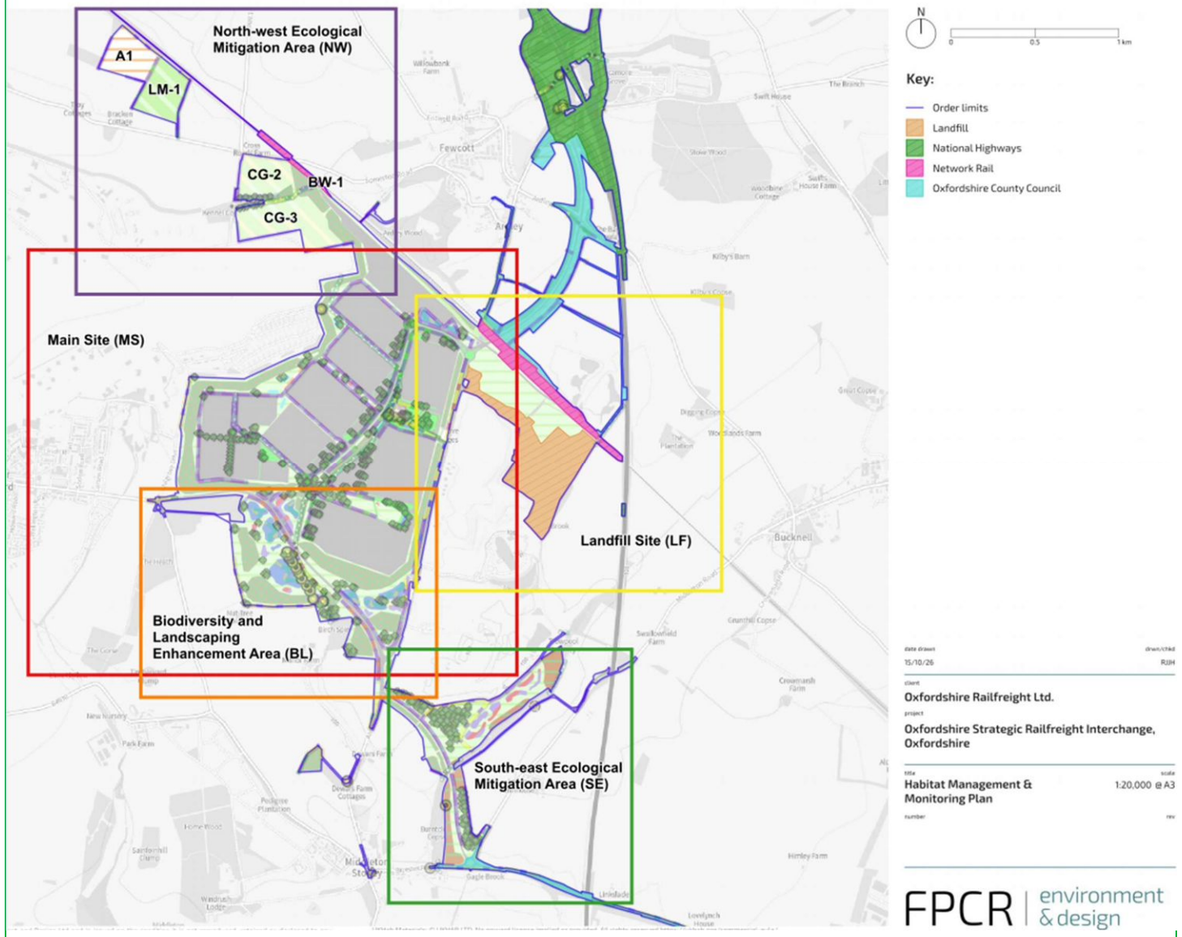
Of these, Field 2 (LM-1) had very slightly calcareous to moderately calcareous sandy clay loams topsoil (mean pH 7.4) with occasional limestone fragments and typically contained moderate to high levels of total nitrogen, moderate levels of organic matter and extractable potassium, low to moderate levels of extractable magnesium and very low to low levels of extractable phosphorus. The underlying subsoil was described as 'medium' in soil texture (clay loam) with a low stone content. The low phosphorus levels are suitable to encourage species diversity and prevent aggressive species, such as nettles and rye grass, from dominating the sward. The soils are therefore considered acceptable for lowland meadow creation if a suitable seed mix tolerant of moderately draining, medium soils is selected, and with effective management to prevent undesirable species from colonising the grassland sward.

Soil testing and analysis was~~s~~ere additionally undertaken in the **South-east Ecological Mitigation Area** (SE) (Work No. 32) and parcels CG-2 and CG-3 within the **N~~n~~orth-west Ecological Mitigation Area~~s~~** (Work No. 29) by Land Research Associates (LRA) in December 2025 and February 2026 respectively ~~to inform appropriate habitat creation and management requirements~~ (see Appendices 2~~1~~ and 3~~2~~). Results show that these ~~land has~~areas have a calcareous nature (pH above 7.5) and moderately high topsoil organic matter (loss-on-ignition). Phosphate availability is relatively low in arable soils, making ~~it~~ these suitable for creating grassland. *Map 1* (*LRA*) *shows the sampling locations*, *Map 2* (*LRA*) *shows soil types*.

The North-west Ecological Mitigation Area (Plot 2/14, Work No. 29) contains predominantly calcareous clay loam topsoil, either directly over hard fractured limestone, with the limestone on the northwest of this area interbedded with mudstone and with evidence of seasonal waterlogging. The central section lies within a small valley centred along a tributary to Padbury Brook and is characterised by decalcified clay loam topsoil and upper subsoil, over a strongly calcareous weakly structured clay lower layer.

The South-east Ecological Mitigation Area contains two soil types. The shallower soils are suitable for developing lowland calcareous grassland; however, medium-term management may be needed to reduce topsoil phosphate levels. This will help decrease competition from productive grasses and weed species. In contrast, the deeper soils in the western part of the area are not strongly calcareous and lack limestone or very calcareous layers. This makes them more appropriate for moist neutral grassland. Additionally, while the clay soils may retain some moisture, this is unlikely to result in a dominance of rushes or sedges. ~~*Map 2 (LRA) shows soil types.*~~ Habitats proposed for this area comprise other neutral grassland, native scrub, lowland mixed deciduous woodland, and scattered native trees.

~~The North-west Ecological Mitigation Area (Work No. 29) contains predominantly calcareous clay loam topsoil, either directly over hard fractured limestone, with the limestone on the northwest of this area interbedded with mudstone and with evidence of seasonal waterlogging. The central section lies within a small valley centred along a tributary to Padbury Brook and is characterised by~~



~~decalcified clay loam topsoil and upper subsoil, over a strongly calcareous weakly structured clay lower layer.~~

According to Soilscapes (LandIS, 2026), the soil across the Site is freely draining, lime-rich, and loamy. These soils are generally permeable and found in landscapes with limestone or chalky parent materials.

Potential Impact on Project (EI-B14)

~~Land in the South-east Ecological Mitigation Area has good potential for creating species-rich meadows; however, it is recommended that phosphate levels be lowered through an extractive grass~~

~~silage harvest. As per current best-practice guidance, the optimal level of P to create a species-rich sward is thought to be an Index of 0-1 or less than 16 mg/L. Soil P levels currently have an index of 2 or greater than 16mg/l. Therefore, there is the potential that more competitive species will outcompete wildflowers. Soil nutrient levels can be reduced before grassland establishment through cropping without adding fertiliser. However, the timeline for reducing nutrient levels is difficult to predict, as it is highly site-specific. Other, more drastic techniques include topsoil stripping and soil inversion, which may be required where reduction through cropping is unsuccessful.~~

Land within the North-west Ecological Mmitigation Area already has very low phosphate levels. This land is considered well suited to the establishment of species-rich grassland.

Land in the South-east Ecological Mitigation Area has good potential for creating the proposed non-priority other neutral grassland without the need for further reduction of soil nutrient levels, albeit a reduction will be achieved as a consequence of the grassland management regime throughout the management period.

Focus should also be on improving soil health, including the soil microbial community, in particular mycorrhizal fungi, which fertilisers are known to deplete. It has been suggested that the recovery of plant species diversity in improved grassland may be linked to the development of mycorrhizal fungi in the soil. Employing methods such as cutting and collecting once the grassland has been established will help to further reduce nutrient levels over time.

~~Soil Nutrient Reduction~~

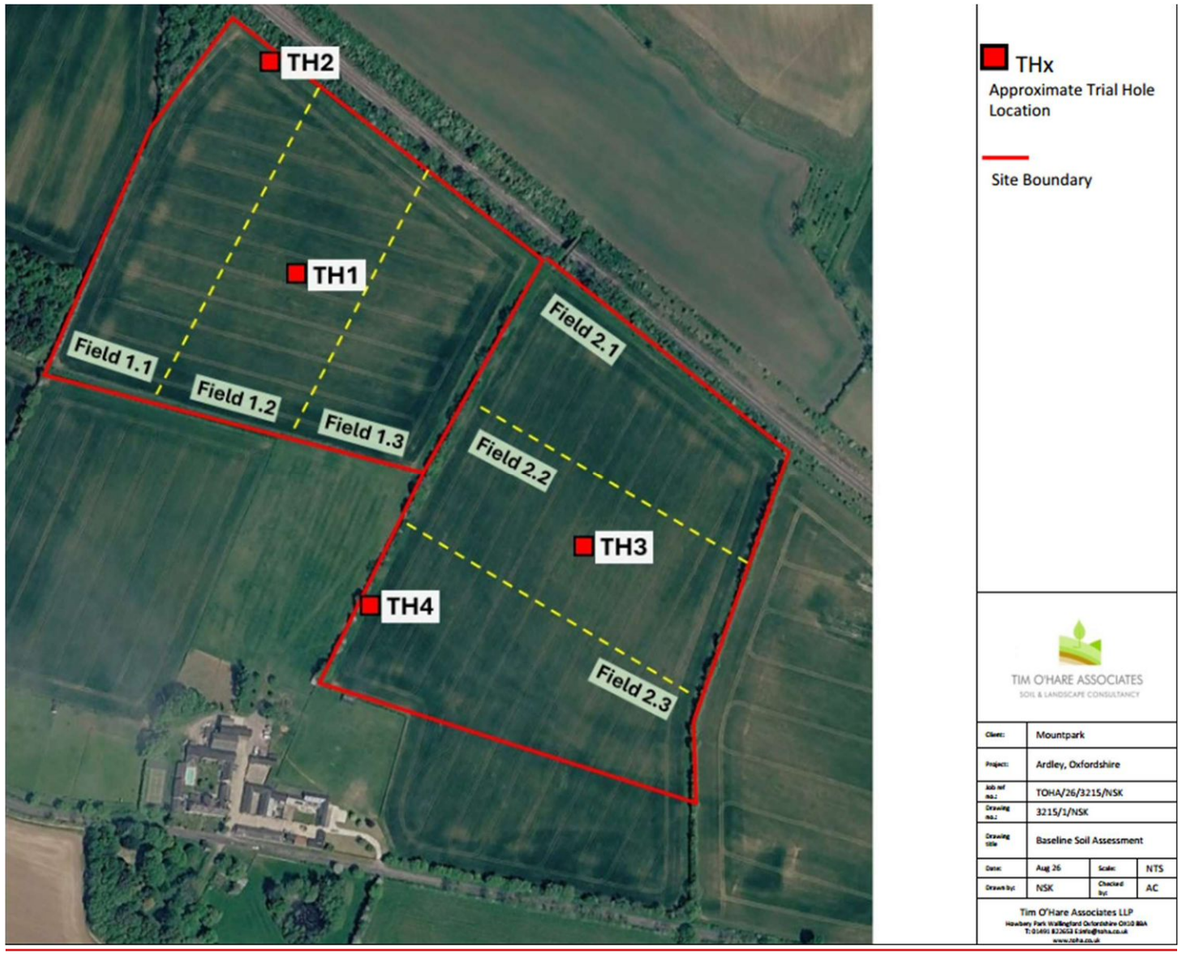
~~Existing Grassland~~

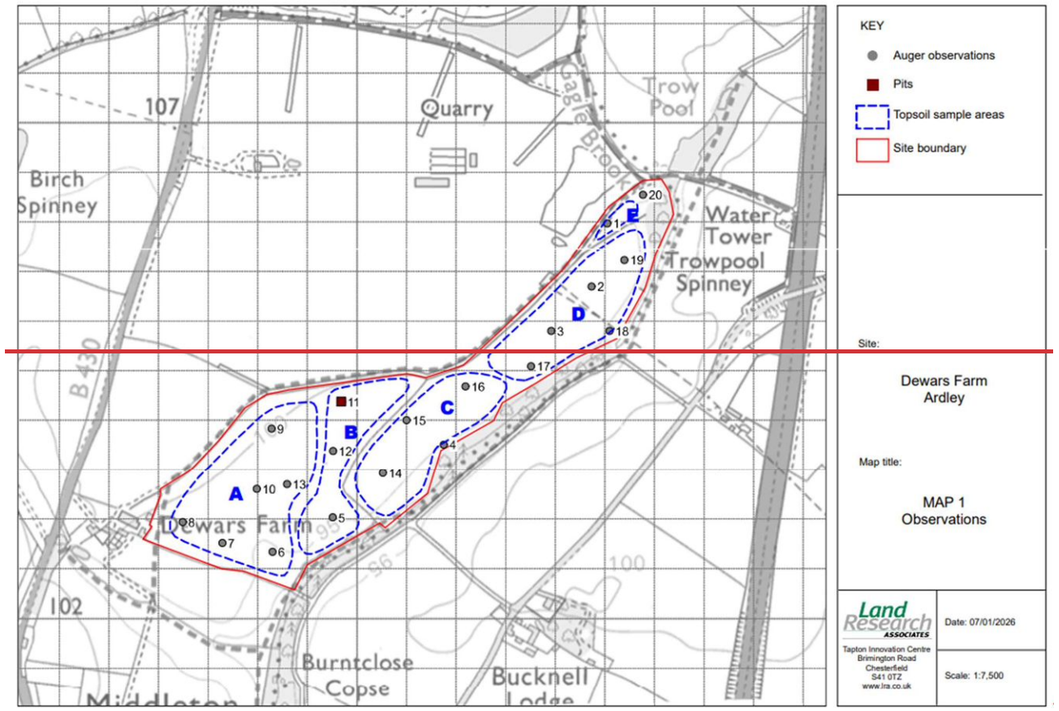
~~SE Mitigation Area:~~ ~~The most efficient means would be to fertilise the existing temporary grass and clover leys with commercial rates of nitrogen fertiliser for at least one year, but no additional phosphate or potash (or manure or slurry). After the first-year grass or hay harvest, without any additional fertiliser, the soil should further reduce phosphate and potash availability. This would facilitate commercial yields (e.g., two to three silage cuts) and is likely to reduce phosphate availability to Index 1 or 0 within 2 to 3 years (recommended levels for habitat grassland). At this point, the land can be effectively sown with a suitable species-rich seed mix.~~

~~Arable Land~~

~~NW Mitigation Area: Arable land will undergo a 2-year nutrient reduction through cropping, using plants to reduce soil nutrient levels. This should include planting crops such as spring barley or rye with no fertilisers or slurry (nitrogen to get the crop away but not pushing yield too hard) and harvesting and removing all biomass.~~

Soils and Substrate Plan (EI-F04)





KEY

- Auger observations
- Pits
- Topsoil sample areas
- Site boundary

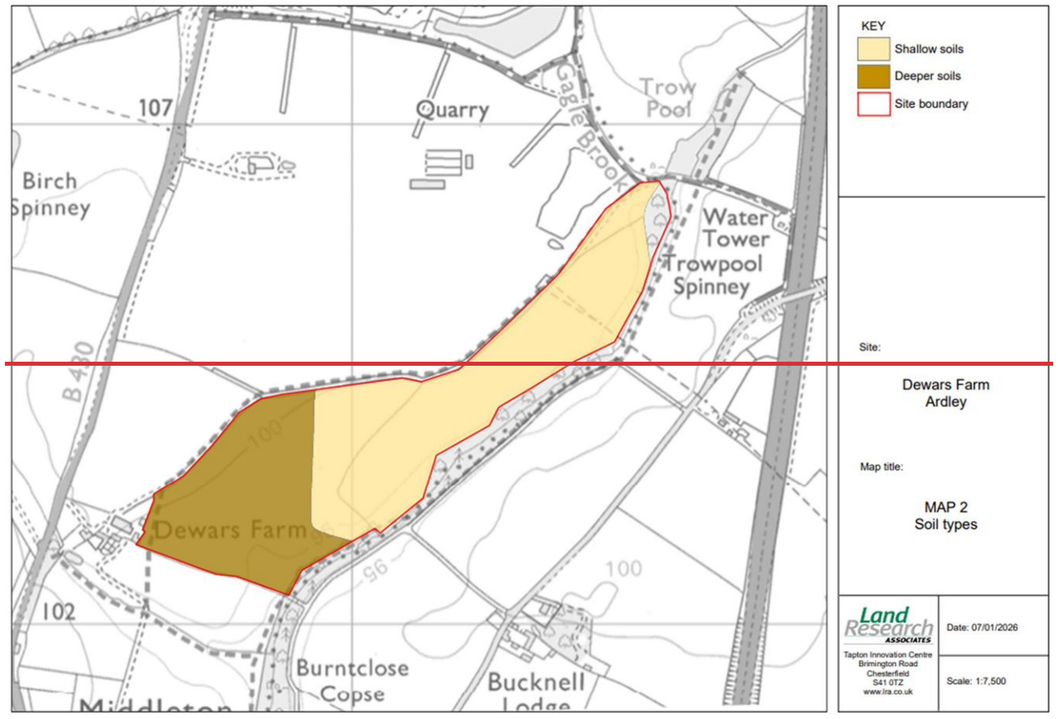
Site: Dewars Farm Ardley

Map title: MAP 1 Observations

Land Research ASSOCIATES
Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 07/01/2026

Scale: 1:7,500



KEY

- Shallow soils
- Deeper soils
- Site boundary

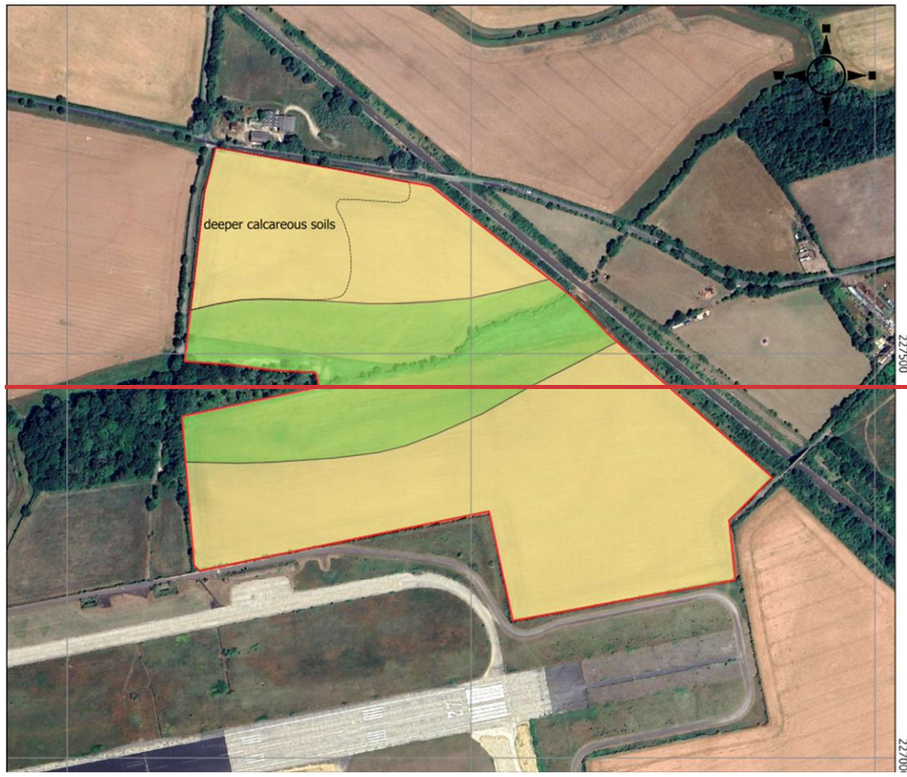
Site: Dewars Farm Ardley

Map title: MAP 2 Soil types

Land Research ASSOCIATES
Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 07/01/2026

Scale: 1:7,500



Key

- Deep clay soils
- Soils over limestone
- Site boundary

Location: Land west of Ardley

Map: Map 2 Soil types

Date: 15/03/2026

Scale: 1 : 5,000 at A4

Land Research ASSOCIATES
Tapton Park Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk



Key

Deep clay soils

Soils over limestone

Site boundary

Location:

Land west of Ardley

Map:

Map 2
Soil types

Date: 15/03/2026

Scale: 1 : 5,000 at A4

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Chesterfield
S41 0TZ
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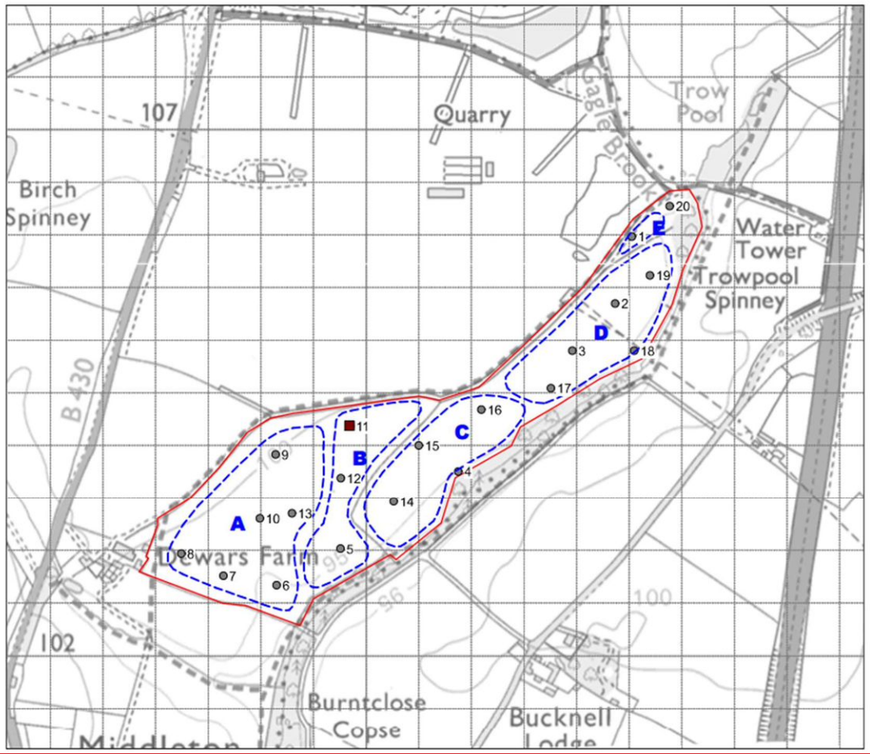

KEY

Auger observations

Pits

Topsoil sample areas

Site boundary

Site:

Dewars Farm
Ardley

Map title:

MAP 1
Observations

Land Research ASSOCIATES
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Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 07/01/2026

Scale: 1:7,500



Key

Pits

Observations

Topsoil sample areas

Site boundary

Location:

Land west of Ardley

Map:

Map 1
Observations and sampling

Date: 20/03/2026

Scale: 1 : 5,000 at A4

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S41 0TZ
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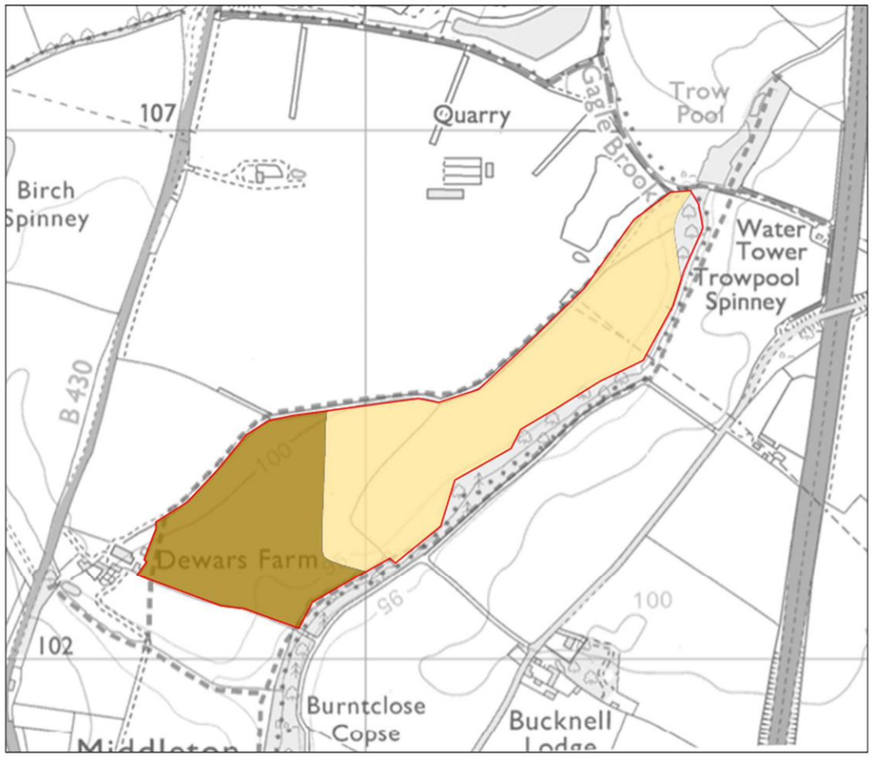


KEY

Shallow soils

Deeper soils

Site boundary

Site:

Dewars Farm
Ardley

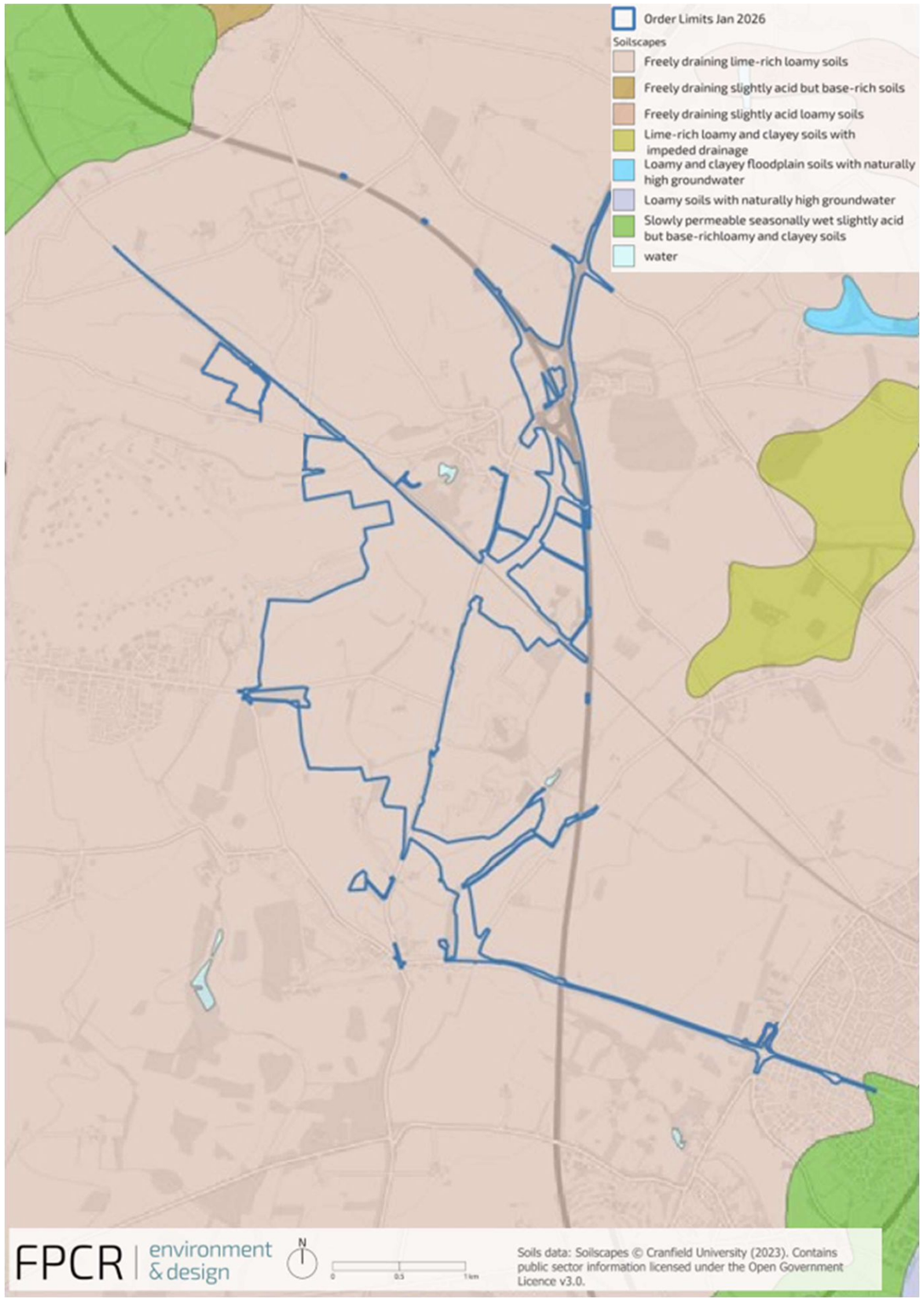
Map title:

MAP 2
Soil types

Land Research ASSOCIATES
Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 07/01/2026

Scale: 1:7,500


Order Limits Jan 2026
Soilscapes
Freely draining lime-rich loamy soils
Freely draining slightly acid but base-rich soils
Freely draining slightly acid loamy soils
Lime-rich loamy and clayey soils with impeded drainage
Loamy and clayey floodplain soils with naturally high groundwater
Loamy soils with naturally high groundwater
Slowly permeable seasonally wet slightly acid but base-richloamy and clayey soils
water
FPCR | environment & design
N
0
0.5
1 km
Soils data: Soilscapes © Cranfield University (2023). Contains public sector information licensed under the Open Government Licence v3.0.

3. Planned Management Activities (SSSI Mitigation – 80 years)

Management Plan Aims and Objectives PM-B01

The key aim of this HMMP is to provide habitat creation, enhancement and management prescriptions that can help to deliver a minimum of 10% biodiversity net gain for the Project, as demonstrated through the Statutory Biodiversity Metric. Within this overall delivery, specific objectives have been agreed to compensate for impacts within Ardley Cutting and Quarry SSSI.

Grasslands

- The proposals will seek to compensate for losses of lowland meadow and lowland calcareous grasslands through the creation of substantial areas of these habitats, which will increase their extent when compared with the baseline.

This plan seeks to ensure the Project is delivered in a manner that minimises ecological impacts and secures a lasting positive contribution to local and national biodiversity, aligning with the principles of biodiversity net gain. The HMMP is designed to directly support and contribute to key local and county-level strategies for nature recovery in Oxfordshire.

The specific objectives of this plan are to:

- Secure the long-term protection of important ecological features associated with the SSSI, including retained areas of lowland meadow and lowland calcareous grassland.
- Mitigate unavoidable habitat losses within the proposed sidings, by creating extensive areas of new compensatory habitats that will seek to far exceed the current baseline areas of each habitat type. This forms a core component of the project's net gain delivery and provides a substantial contribution to local biodiversity targets for these priority habitats.

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~~The specific objectives of this plan are to:~~

- ~~Secure the long-term protection of important ecological features associated with the SSSI, including retained areas of lowland meadow and lowland calcareous grassland.~~
- ~~Mitigate unavoidable habitat losses within the proposed sidings, by creating extensive areas of new compensatory habitats that will seek to far exceed the current baseline areas of each habitat type. This forms a core component of the project's net gain delivery and provides a substantial contribution to local biodiversity targets for these priority habitats.~~

Design Principles Informed by Baseline Information PM-B02

Habitat and Condition Targets PM-T01

Target Habitat Type	Parcel / Feature Refs	Targeted Condition	Years to Targeted Condition	Condition Assessment Targets	Comments
Lowland meadows	NW-LM-1	Good	15	The proposal will seek to achieve the condition criteria A, B, D and F at a minimum.	This habitat will be created where suitable soil conditions have been identified to support a diverse meadow grassland habitat.
Lowland calcareous grassland	NW-CG-2 NW-CG-3 MS-CG (various parcels)	Good	20	The proposal will seek to achieve the condition criteria A, C and D at a minimum.	Where suitable soils exist, grassland will be sown with a native species-rich grassland seed mix or green hay, which will establish an appropriate calcareous grassland sward.
Lowland calcareous grassland	MS-CG (various parcels)	Poor	5	The proposal will seek to achieve the condition criteria A, C and D.	Retained calcareous grassland within the northern railway cutting.

Habitat Retention

Measures to be Implemented to Protect and Maintain Retained Habitats PM-03

Retained habitats will be protected in accordance with the Construction and Environmental Protection measures. The management of all retained habitats within the Project Boundary will be delivered in strict accordance with the prescriptions detailed in this Habitat Management and Monitoring Plan (HMMP). The overall objective is to ensure the long-term viability and ecological integrity of these habitats, contributing to the Project's biodiversity net gain commitment and a resilient ecological network.

The specific management prescriptions for each retained habitat type are as follows:

- **Lowland Meadows and Lowland Calcareous Grasslands**: The management of these species-rich grasslands will be based on a traditional hay-cut regime. This will involve a single annual or biannual hay-cut mowing, with the cuttings removed from the site to prevent nutrient enrichment and encourage a diverse flora. The timing of the cut will be sensitive to the flowering and seeding times of key plant species and the presence of nesting birds. This will also be included within the retained areas of tall forb vegetation.

Where these retained habitats are to be included within the habitat management prescriptions provided below, parcel references have been provided.

Habitat Retention Plan PM-F01

Tick box if any additional plans are provided in the Appendices ☒ . Reference: Please refer to Figure 4 of the BNG Report (ES Appendix 6.9) for habitat retention plans at functional scale.

Creation, Enhancement and Management Targets and Prescriptions

Lowland Meadow

Creation, Enhancement and Management Summary (GH-T01)

Target Habitat				Lowland Meadow	
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHab Classification Description*** *A neutral grassland that meets at least two of these three criteria:* *1. >15 species per m^2 (including grasses and excluding bryophyte);* *2. >30% cover of broadleaved herbs and sedges (excluding white clover Trifolium repens, creeping buttercup Ranunculus repens and injurious weeds);* 3. *<10% cover of rye-grasses and white clover Trifolium repens.* *AND EITHER ≥ 4 of the indicator species (listed in UKHab Category Definitions) at least 'present' on DAFOR scale.* *OR ≥3 of these indicators at least 'occasional' on DAFOR scale (but not limited to field corners or edges).*	Yes	NW-LM-1	The grassland is to be created using a proprietary species-rich native Lowland Meadow mix with an appropriate species composition to meet this description. This mix will contain at least 15 species, including lowland meadow indicator species. Soil nutrient investigations ~~will be undertaken to assess whether~~have confirmed soil nutrient levels ~~in~~ are appropriate to facilitate the establishment of lowland meadows without the need for intervention to reduce these further. ~~Where soil nutrient levels are too high, topsoil and subsoil will be mixed, or (a topsoil strip will be undertaken prior depending on soil investigations) sowing to promote appropriate soil conditions and allow meadow grassland to be sown directly into less fertile subsoils.~~	Following successful establishment, management will include annual hay-cut mowing with all arisings removed.
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type. **Note – this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	Yes	NW-LM-1	To achieve this criterion, the grassland will target all three UKHab Description criteria for lowland meadows and establish at least 4 indicator species, to be achieved by seeding using a suitable seed mix. ~~As discussed above, measures will be taken to ensure soil nutrient levels are appropriate for lowland meadow establishment.~~	Following successful creation/enhancement, ongoing management of lowland meadow will include hay-cut mowing. This will include ~~alternating~~ an annual grass cut in ~~late July/Early August and~~ late August/e~~E~~arly September. The approach aims to maintain a diverse sward characteristic of good-quality meadow grasslands.
B	Sward height is varied (at least 20% of the sward is less than 7cm and at least 20 per cent is more than 7cm) creating microclimates which provide opportunities	Yes	NW-LM-1	Suitable seed mix will introduce a range of grass and herbaceous species, promoting the establishment of a diverse sward.	A diverse sward will help maintain a varied sward height along with varied cutting to mimic natural disturbances. Regular mowing will help maintain a varied sward.

	for insects, birds and small mammals to live and breed.				
C	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	No	NW-LM-1	N/A	While not specifically targeted, rabbit grazing/burrowing activity or other such faunal disturbance my create areas of bar ground. Public access will be limited to prevent excessive human disturbance.
D	Cover of bracken *Pteridium aquilinum* less than 20% and cover of scrub (including bramble) less than 5%.	Yes	NW-LM-1	The field does not currently include bracken or excessive scrub, and the introduction of green hay and/or seed will not introduce these species.	Regular mowing will prevent scrub and bracken from establishing. Regular monitoring will track where scrub or bracken encroachment has occurred and trigger remedial action where necessary.
E	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging activities) accounts for less than 5% of total area. If any invasive non-native species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed.	No	NW-LM-1	While not specifically targeted, the seed mix will not include significant seed stock of any species listed by the Statutory Metric Condition Assessment criteria as 'species indicative of sub-optimal condition.'	While not specifically targeted, regular monitoring will track the presence of invasive non-native species across all habitats and trigger remedial action to remove or reduce them. If pernicious weeds begin to dominate and affect the definition of grasslands as a 'good example' of Lowland Meadow, appropriate remedial measures will be undertaken to reduce the number of species indicative of sub-optimal conditions.
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type. **Note – this criterion is essential for achieving Good condition for non-acid grassland types only.**	Yes	NW-LM-1	The grassland will target a minimum of 10 species per m^2.	Timings of the annual hay-cut will be alternated to allow a diverse range of wildflowers to set seed. A ~~late July/E~~late~~arly~~ August/September hay-cut will be undertaken ~~one year, while the next a September cut will be completed~~. Species diversity will be continuously monitored and, where below 10 species per m^2, remedial measures will be introduced. These could include supplementary seed or adjusted the timings of hay-cuts. Further details on potential remedial measures are provided later in this document.

Additional Management Prescriptions (GH-B01a)

Using Local Green Hay

Green hay is preferable for lowland meadow creation due to its high proportion of viable seed, local provenance and associated propagules (beyond the seed), but logistical, temporal, and site constraints mean its use is not always practicable. Where possible use locally sourced green hay from a donor site (within 10 miles of the site) that contains a mix of wildflower species characteristic of neutral soils, as well as yellow rattle, *Rhinanthus minor*. The donor site should be within an hour's drive from the site, so green hay can be transported to and spread on the land in one day. Donor site must have similar characteristics, including soil type, soil pH and hydrology, to the new grassland. 1 hectare (ha) is sufficient to spread over 3 ha.

Using Commercial Seed Mix

Where sufficient donor sites are available, commercial seed mixes can be beneficial as they are readily available and do not have the same seasonal and logistical constraints as green hay. Species content and proportions can also be specified, allowing for better targeting of habitat type and species compositions. Seed mixes are also more practical for large sires, and when seed quality and germination rates are tested, they reduce the uncertainty during establishment.

Ground Nesting Birds

To minimise risks to ground nesting birds, the annual hay cut will be undertaken sensitively in accordance with advice provided to FPCR by the RSPB grassland restoration specialists. This will include delaying to at least August where possible and by beginning the cut by mowing the field margins first, where ground-nesting birds are unlikely to nest, as they favour field interiors with better sight lines. Mowing will then cut the centre of the field before working outwards to the already cut margins. This will allow any birds and chicks present in the field ample opportunity to escape to cover. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided, and mowing will not be undertaken within the area until after chicks have fledged.

Leave uncut margins and strips of vegetation alongside hedgerows and field edges on a rotational basis to support invertebrates and mammals. Rotate these uncut margins each year.

Grassland (Lowland Meadow)

Creation, Enhancement and Management Detailed Methods (GH-T02)

Action	Relevant Parcels	Timing	Prescriptions
Beetle BankSoil Nutrient Reduction Creation	NW-LM-1 and adjacent compartment to NW	Prior to creationYear 0	In the interim, the fields will be managed as skylark plots for 2 years as mitigation for short-term grassland loss, facilitating a reduction in soil nutrient levels through no-input arable management with no fertiliser or agrochemical inputs. The fields are likely to be sown with autumn-sown crops (like winter barley or wheat) and/or a wild bird seed mix. Cereal stubbles should receive no pre-harvest glyphosate and no post- harvest herbicides throughout the winter. Two bBeetle banks should also be includedwill be created within the centre of the field margins of each compartment in accordance with the protocol specified by Sustainable Farming Incentive AHW3: Beetle banks[1] by creating a raised earth ridge (around 3 metres (m) wide to 5 m wide and at least 0.4m high and sowing a mixture of fine-leaved grasses, such as red fescue, timothy and cocksfoot. (Fields 30-50 hectares ideally bed 3 to 4 ridges), Beetle banks - Game and Wildlife Conservation Trust
Soil Sampling	NW-LM-1	Year 0	Soils should be nutrient-poor to support a diverse range of lowland meadow habitats. Specifically, soil phosphate levels should be low (index < 2, ideally < 1). Other nutrients, including nitrogen and potassium, can be quickly leached from soils, so their levels are less of a constraint. Soil nutrient levels should be sampled before ground preparation.
Ground Preparation – Topsoil Strip (If necessary)	NW-LM-1	Year 0 – Spring/Autumn	If soil phosphate levels are ≥2, after 2 years of cropping, a topsoil strip can be undertaken. This should be completed using a low ground pressure excavator or bulldozer to carefully scrap and remove the top 5-10cm of topsoil. The goal is to remove the fertile, nutrient-rich layer without disturbing the underlying, less fertile soil. Where necessary, topsoil stripping should be undertaken during the dry summer months to minimise compaction.
Topsoil Harvest	SSSI NW-LM-1	Year 0 – Early Spring/Autumn	Prior to the ground works within the rail track cutting, mow the existing lowland meadow areas within the SSSI working areas and remove all arisings several weeks prior to the topsoil strip. Immediately prior to the soil strip, scarify the soils at compartment NW-LM-1. The top-soils will be stripped to a depth of 10-20cm immediately prior to translocation to NW-LM-NW-LM-11.
Ground Preparation – Soil Mixing	NW-LM-1	Year 0 – Spring/Autumn	Top-soils from existing lowland meadow habitat within the SSSI working area will be spread across the receptor field, for example . Soils can be spread using a muck spreader. Mix the soils using a rotavator set to a depth of 10-20cm. Lightly cultivate the rotavated soils ready for the application of green hay / appropriate seed mix.
Apply green hay	NW-LM-1	Year 0 – Autumn	After soil has been allowed to settle, lightly re-cultivate the seed bed prior to seed applying green hay. Apply green hay from a suitable local donor site if available. A green hay crop should be cut and collected as wildflowers and grasses start to shed their seed (typically late July to early August). The green hay crop should be cut and collected using a drum or disc mower. A mower conditioner should not be used. A forage harvester can be used to collect the hay, or the hay can be baled. The hay must be transferred and spread the same day that it is collected. If a baler is used, it should be transferred to the receptor site for spreading within an hour of being baled. The green hay should ideally be cut and transported on a cool and cloudy day.

[1] see https://www.gov.uk/find-funding-for-land-or-farms/ahw3-beetle-banks [Accessed 18.08.25].

			If the green hay has been collected using a forage harvester, it should be blown directly into a muck spreader, and this can be used to spread the hay on the receptor site. If bales have been collected, the green hay can be spread using a muck spreader, by hand, with a chopper or with a hay turner[2].
Seeding (if required)	NW-LM-1	Year 0 – Spring/Autumn	Seed Species-Rich Neutral Grassland seed mix onto low-fertility, weed-free ground in either early autumn (preferred) or spring, following shallow cultivation to create a firm, fine seedbed with plenty of bare soil. Broadcast the seed evenly at around 4 g/m² (40 kg/ha), ideally in two passes for good coverage, and do not bury the seed—most species require light to germinate. After sowing, roll firmly to ensure good seed–soil contact. Do not apply fertiliser or organic manures and avoid sowing into lush or nutrient-rich soils, as this will favour grasses over wildflowers and reduce establishment success.
Establishment management	NW-LM-1	Year 1	Maintain short grass during the first year and dispose of all clippings to encourage perennial plants to establish and avoid a flush of pernicious weed species. Mow or trim the grass monthly during the growing season to manage weed and grass growth while promoting the spread of perennial species. Avoid applying any fertiliser at any stage. Newly created beetle banks will be cut several times during the first growing season to aid establishment.
Long-term Management	NW-LM-1	Year 2+	Annual grass cuts ~~alternating between a late July/early~~in late August ~~cut one year and a late august~~/early September ~~cut the next~~. This will allow a range of wildflowers to set seed. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from site. Mow the regrowth through to late autumn/winter to circa 50mm and again in spring if needed. Alternatively low density aftermath grazing is also possible after the hay cut and will encourage a varied sward height. Cut or hand-pull pernicious and/or invasive weeds before they seed in late summer. As a last resort option, use glyphosate spray to spot-treat affected areas only. Beetle banks will be cut between August and November as necessary to remove woody vegetation and/or undesirable species such as thistles.
Protected species and Wildlife considerations	NW-LM-1	Project duration	To minimise risks to ground-nesting birds, mowing will begin by cutting field margins first (c.20m). Mowing will then cut the field's centre line before working outwards in a circular fashion towards the already cut margins. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided and mowing will not be undertaken within the area until after chicks have fledged. Leave at least one margin in each field (minimum 12 metres in width) to be cut at the end of the season (September/Early ~~oct~~Oct). This can be a shelter for any ground-nesting species to escape during mowing. This can also help maintain species that flower later, alternating the margin each year.
Supplementary Seeding (if required)	NW-LM-1	Year 5+	Spread supplementary native green hay can be introduced as necessary in response to poor establishment uptake by broadcasting seeds. Alternatively, consider plug-planting if only certain desired species have failed to establish, but the sward is otherwise in good condition.

[2] https://meadows.plantlife.org.uk/making-meadows/sowing-seed/green-hay-how-to-cut-collect-and-spread/#:~:text=Spreading%20Green%20Hay&text=Generally%2C%20green%20hay%20will%20land,to%20trample%20in%20the%20seeds.

Lowland Meadow Species Lists (GH-T03)

Species below are based on the Meadow Mania Species-Rich Neutral Grassland seed mix

Common Name	Scientific Name	Abundance / %	Comments
Wildflowers (~20-25 species)			
Common Knapweed	*Centaurea nigra*		
Oxeye Daisy	*Leucanthemum vulgare*		
Yellow Rattle	*Rhinanthus minor*		*Key species for reducing grass vigour*
Bird's-foot Trefoil	*Lotus corniculatus*		
Red Clover	*Trifolium pratense*		
Selfheal	*Prunella vulgaris*		
Ribwort Plantain	*Plantago lanceolata*		
Meadow Buttercup	*Ranunculus acris*		
Lady's Bedstraw	*Galium verum*		
Yarrow	*Achillea millefolium*		
Meadowsweet	*Filipendula ulmaria*		*Optional for damper sites*
Field Scabious	*Knautia arvensis*		
Small Scabious	*Scabiosa columbaria*		
Red Campion	*Silene dioica*		
Kidney Vetch	*Anthyllis vulneraria*		*Optional addition*
Tufted Vetch	*Vicia cracca*		
Meadow Vetchling	*Lathyrus pratensis*		
Salad Burnet	*Sanguisorba minor*		
Devil's-bit Scabious	*Succisa pratensis*		*High biodiversity value*
Germander Speedwell	*Veronica chamaedrys*		
Grasses (~6–8 fine-leaved native species)			
Crested Dog's-tail	*Cynosurus cristatus*		
Red Fescue	*Festuca rubra*		
Common Bent	*Agrostis capillaris*		
Sweet Vernal Grass	*Anthoxanthum odoratum*		
Quaking Grass	*Briza media*		*If available*
Downy Oat Grass	*Helictotrichon pubescens*		
Sheep's Fescue	*Festuca ovina*		*Optional*

Other Supporting Information

Supporting Information (GH-B02)

Note: The exact species mix and composition have yet to be confirmed and will depend on the availability of a suitable donor site. The species list above is indicative of those considered appropriate for inclusion, based on the Meadow Mania Species-Rich Neutral Grassland seed mix and on those typically found in a lowland meadow (NVC classification MG5 / UKHab g3a). Seed mixes should be suitable for neutral soil. Other comparable seed mixes include:

- Emorsgate EM5 Meadow Mixture for Loamy soils
- Emorsgate EM3 Special General-Purpose Meadow Mixture

What Does Success Look Like? (GH-F01)





Creation, Enhancement and Management Targets and Prescriptions

Lowland Calcareous Grassland

Creation, Enhancement and Management Summary (GH-T01)

Target Habitat				Lowland Calcareous Grassland	
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHab Classification Description*** *A grassland that meets at least two of these three criteria:* • *>15 species per m^2 (including grasses and excluding bryophyte);* • *>30% cover of broadleaved herbs and sedges (excluding white clover Trifolium repens, creeping buttercup Ranunculus repens and injurious weeds);* • *<10% cover of rye-grasses and white clover Trifolium repens.* *AND ≥2 of the indicator species (listed in UKHab Category Definitions) at least 'frequent' on DAFOR scale.* *AND ≥3 of the indicators are classed as 'occasional' on DAFOR scale.*	Yes	NW-CG-2 NW-CG-3	The fields are known to support suitable alkaline soils with a pH level of 7.6-8.1. If possible, grassland seed will be created using green hay from a suitable donor site supporting Lowland Calcareous Grassland with an appropriate sward to meet this habitat criteria. Soil nutrient investigations indicate suitable nutrient levels are achievable to facilitate the establishment of calcareous grassland. To promote the successful establishment of this habitat type, topsoil from the SSSI rail works will be retained and mixed with the ~~topsoil or sub~~soil present in the proposed compartment to introduce some of the seedbed from this existing lowland meadow and to further promote appropriate soil conditions.	Following successful establishment, management will include annual hay-cut mowing with all arisings removed.
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type. **Note – this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	Yes	NW-CG-2 NW-CG-3	To achieve this criterion, grassland will target all of the UKHab Description criteria for lowland calcareous grassland. This will be achieved by a combined approach of topsoil translocation from within the SSSI working areas and the sowing green hay from a suitable local donor site currently considered to be a good example of this habitat type, if available. A proprietary seed mix will be used to supplement the green hay/translocated material as necessary, such as Emorsgate EM6 – Chalk and Limestone seed mix. As discussed above, ~~measures will be taken to ensure~~ soil nutrient levels have been confirmed to be~~are~~ appropriate for lowland meadow creation~~s~~.	Following successful creation/enhancement, ongoing management will include hay-cut mowing. This will include alternating an annual grass cut in ~~late July/Early August and~~ late August/~~Early~~ early September. The approach aims to maintain a diverse sward characteristic of good quality meadow grasslands.
B	Sward height is varied (at least 20% of the sward is less than 7cm and at least 20 per cent is more than 7cm) creating	Yes	NW-CG-2 NW-CG-3	The combination of green hay, translocated material and appropriate proprietary seed mix will introduce a range of grass and herbaceous species, promoting the establishment of a diverse sward.	A diverse sward will help maintain a varied sward height along with varied cutting to mimic natural disturbances.

	microclimates which provide opportunities for insects, birds and small mammals to live and breed.				Management through regular mowing will help maintain a varied sward.
C	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	No	NW-CG-2 NW-CG-3	N/A	While not specifically targeted, rabbit grazing/burrowing activity or other such faunal disturbance my create areas of bar ground. Public access will be limited prevent excessive human disturbance.
D	Cover of bracken *Pteridium aquilinum* less than 20% and cover of scrub (including bramble) less than 5%.	Yes	NW-CG-2 NW-CG-3	The fields do not currently include bracken or excessive scrub and so the introduction of green hay and/or seed mix will not introduce these species.	Regular mowing will prevent scrub and bracken from establishing. Regular monitoring will track where scrub or bracken encroachment has occurred and trigger remedial action where necessary.
E	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging activities) accounts for less than 5% of total area. If any invasive non-native species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed.	No	NW-CG-2 NW-CG-3	While not specifically targeted, the green hay will not include significant seed stock of any species listed by the Statutory Metric Condition Assessment criteria as 'species indicative of sub-optimal condition.'	While not specifically targeted, regular monitoring will track the presence of invasive non-native species across all habitats and trigger remedial action to remove or reduce their presence, respectively. If pernicious weeds begin to dominate and affect the definition of grasslands as a 'good example' of Lowland Calcareous Grassland, appropriate remedial measures will be undertaken to reduce over of species indicative of sub-optimal condition.
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type. **Note – this criterion is essential for achieving Good condition for non-acid grassland types only.**	Yes	NW-CG-2 NW-CG-3	The grassland will target a minimum of 10 species per m^2 through the introduction of green hay from green hay, translocated material and appropriate proprietary seed mix. The Emorsgate EM6 – Chalk and Limestone seed mix for example includes 21 forbs and 8 grass species.	Timings of the annual hay-cut will be alternated to allow a diverse range of wildflowers to set seed. A late ~~late July/Early~~ August/early September hay-cut will be undertaken ~~one year, while the next a September cut will be completed~~. Species diversity will be continuously monitored and, where below 10 species per m^2, remedial measures will be introduced. These could include supplementary seed or adjusted the timings of hay-cuts. Further details on potential remedial measures are provided later in this document.

Additional Management Prescriptions (GH-B01)

Using Local Green Hay

Green hay is preferable for lowland meadow creation due to its high proportion of viable seed, local provenance and associated propagules (beyond the seed), but logistical, temporal, and site constraints mean its use is not always practicable. Use locally sourced green hay from a donor site (within 10 miles of the site) that contains a mix of wildflower species characteristic of neutral soils, as well as yellow rattle, *Rhinanthus minor*. The donor site should be within an hour's drive from the site, so green hay can be transported to and spread on the land in one day.

Using Commercial Seed Mix

Where sufficient donor sites are available, commercial seed mixes can be beneficial as they are readily available and do not have the same seasonal and logistical constraints as green hay. Species content and proportions can also be specified, allowing for better targeting of habitat type and species compositions. Seed mixes are also more practical for large sires, and when seed quality and germination rates are tested, they reduce the uncertainty during establishment.

Ground Nesting Birds

To minimise risks to ground nesting birds, the annual hay cut will be undertaken sensitively in accordance with advice provided to FPCR by the RSPB grassland restoration specialists. This will include delaying to at least August where possible and by beginning the cut by mowing the field margins first, where ground-nesting birds are unlikely to nest, as they favour field interiors with better sight lines. Mowing will then cut the centre of the field before working outwards to the already cut margins. This will allow any birds and chicks present in the field ample opportunity to escape to cover. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided, and mowing will not be undertaken within the area until after chicks have fledged. Leave uncut margins and strips of vegetation alongside hedgerows and field edges on a rotational basis to support invertebrates and mammals. Rotate these uncut margins each year.

Translocation of Priority Species Basil thyme *Clinopodium acinos* and Meadow clary *Salvia pratensis*

No direct impacts to neighbouring meadow clary and basil thyme populations are anticipated, however updating habitat surveys will be undertaken prior to the removal of ground flora and associated soils within the Ardley Cutting and Quarry SSSI and adjacent grasslands (basil thyme), and within and adjacent to the Ardley Road Verge Nature Reserve (meadow clary). Should either species be present within or closely adjacent to a proposed working area an appropriate translocation exercise will be undertaken in advance of such works as outlined below.

Any meadow clary or basil thyme identified present within the development footprint will be translocated prior to the commencement of works to established or created calcareous grassland habitat within the site.

Meadow clary is a Schedule 8 species therefore a licence from Natural England will be required to enable ~~its~~ seed collection and/or the translocation of plants.

- Soil analysis will be undertaken from around the current population/s and soil analysis has been undertaken in potential receptor areas on-site to ensure appropriate soil conditions are created at the receptor site;
- The receptor site/s will likely be located within the extensive species-rich grassland/lowland meadow areas proposed to the north-west corner of the Main Site and within the close vicinity of the Ardley Cutting and Quarry SSSI to ensure that the receiving grassland habitat is of sufficient size to enable the translocated population/s to expand;
- Translocation is best to be undertaken late winter/early spring (mid-February to mid-March) as any slight root damage will heal relatively quickly as the spring growth surge starts. Works will avoid working in frosty conditions;

Meadow clary

- Dig out around individual meadow clary plants using a hand spade digging around the rosette and a spade depth deep to ensure that the rosette comes out with a large bulb of soil attached underneath. This step will be delayed following very dry conditions to avoid soil loss from around the bulb. Soil bulbs will be wrapped in damp sacking or similar and place the lifted plant in a bucket/trug or similar, and transported to the receptor area;
- A hole of the size to match the root ball will be dug and attached soil on the plant loosened with the base with a fork;
- Re-plant in the hole ensuring that the rosette is at ground level the same as before, and water;

Basil thyme

- As this is generally an annual species care will be taken to translocate associated turf/soils in addition to individual plants to ensure the seed bank is included. Plants and associated turf/soil will be placed in a bucket/trug or similar, and transported to the receptor area;
- A hole of the size to match the root ball/turf/soil sample will be dug and any soil attached to plants loosened with the base with a fork;
- Re-plant in the hole ensuring that plants are at ground level the same as before, and water;

Aftercare

- The translocation timing should mean that there should not be any problem with soil moisture and subsequent watering should be unnecessary. However, if exceptionally dry conditions do occur during spring, plants will be checked every other week for drought stress and watered very thoroughly as required, but with the avoidance of watering where possible as this will encourage the roots to go down to find moisture.
- Monitoring: Annually for 3 years to monitor establishment of translocated plants and to see if there has been any natural population growth as a result of seed shed by the translocated plants.

It is furthermore proposed that if a licence is required to be obtained to enable the translocation of meadow clary plants, that the licence should also permit new meadow clary plants to be grown from mature seed collected from the existing population within the Ardley Road Verve Nature Reserve to provide a back-up to maintain the genetic stock should translocation fail. These would be planted out from the spring after the second year of growing on into on-site calcareous grassland receptor areas to increase the local population.

- Seed will be collected from the existing stock during summer/early autumn (timing of seed set will be variable depending on the conditions), ensuring that collection is taken before seed fall happens;
- Divide collected seeds into two halves. To reduce risk and increase chances of success, seed to be grown in two different locations by two different people/groups;
- Collect sufficient topsoil from the location of the existing population, sufficient to fill two seed trays (one for each half of the seed);
- Sterilise the collected soil;
- Sow the seeds straightaway in the autumn to mimic when they would naturally fall and come into contact with the soil);
- Sow on the surface of the sterilised soil and lightly cover with sterilised soil. Important to not bury too deep (should only be covered with a few mm of soil otherwise germination will be reduced significantly);
- When large enough, seedlings will be pricked out into small pots filled with loam and grow on, re-potting as needed. Continue to grow on during the second year following germination;
- Plant out in in receptor area to increase the population, the spring after the second year of growing on. If there is surplus stock, plants will be offered to the local Wildlife Trust who may be interested in planting up a second population if it is known and recorded that this is stock grown from the known population.

Lowland Calcareous Grassland

Creation, Enhancement and Management Detailed Methods (GH-T02)

Action	Relevant Parcels	Timing	Prescriptions
~~Soil Nutrient Reduction~~	~~NW-CG-2~~ ~~NW-CG-3~~	~~Prior to creation~~	~~In the interim, the fields will be managed as skylark plots for 2 years as mitigation for short-term grassland loss, facilitating a reduction in soil nutrient levels through no-input arable management with no fertiliser or agrochemical inputs.~~ ~~The fields are likely to be sown with autumn-sown crops (like winter barley or wheat) and/or a wild bird seed mix. Cereal stubbles should receive no pre-harvest glyphosate and no post- harvest herbicides throughout the winter.~~ ~~Beetle banks should also be included in the centre of the fields by creating a raised earth ridge (around 3 metres (m) wide to 5 m wide and at least 0.4m high and sowing a mixture of fine-leaved grasses, such as red fescue, timothy and cocksfoot. (Fields 30-50 hectares ideally bed 3 to 4 ridges), Beetle banks - Game and Wildlife Conservation Trust~~
~~Ground Preparation – Topsoil Strip (If necessary)~~	~~NW-CG-2~~ ~~NW-CG-3~~	~~Year 0 – Spring/Autumn~~	~~Soils should be nutrient-poor to support a diverse example of lowland calcareous grassland habitat. In particular, soil phosphate levels should be low (index < 2). Other nutrients, including nitrogen and potassium, can quickly be leached from soils, and so their levels are less of a constraint. Soil nutrient level sampling should be undertaken prior to ground preparation.~~ ~~If soil phosphate levels are an index of ≥2, after 2 years of cropping, a topsoil strip can be undertaken. This should be completed using a low ground pressure excavator or bulldozer to carefully scrap and remove the top 5-10cm of topsoil. The goal is to remove the fertile, nutrient-rich layer without disturbing the underlying, less fertile soil. Where necessary, topsoil stripping should be undertaken during the dry summer months to minimise compaction.~~
Topsoil Harvest	SSSI NW-CG-2 NW-CG-3	Year 0 – Early Spring/Autumn	Prior to the ground works within the rail track cutting, mow the existing calcareous grassland compartments within the SSSI working areas and remove all arisings several weeks prior to the topsoil strip. Immediately prior to the soil strip, scarify the soils at compartments NW-CG-2 and NW-CG-3. The top-soils will be stripped to a depth of 10-20cm immediately prior to translocation.
Ground Preparation – Seedbed Preparation	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	~~**If Topsoil Strip is Necessary (P index in topsoil are >2)**~~ ~~Immediately following topsoil strip, lightly cultivate the subsoil ground to create a fine, firm seedbed. Remove large stones or bricks during cultivation. Following cultivation, the ground should be allowed to settle for several days or weeks.~~ ~~**If Topsoil Strip is Not Required (P index in topsoil are <2)**~~ Mow vegetation and then remove all arisings. Scarify the topsoil to a depth of 30-40cm to break up compaction and to create a good interface for the soil.
Ground Preparation – Soil Mixing	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	Topsoils from the existing calcareous grassland compartments within the SSSI working areas will be spread evenly within NW-CG-2 and/or NW-CG-3, for example~~. Soils can be spread~~ using a muck spreader. Mix the soils using a rotavator set to a depth of 10-20cm. Lightly cultivate the rotavated soils ready for the application of green hay.
Apply green hay	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	After soil has been allowed to settle, lightly re-cultivate the seed bed prior to seed applying green hay. Apply green hay from a suitable local donor site if available. A green hay crop should be cut and collected as wildflowers and grasses at the donor site start to shed their seed (typically ~~late July~~ to early August). The green hay crop should be cut and collected using a drum or disc mower. A mower conditioner should not be used. A forage harvester can be used to collect the hay, or the hay can be baled. The hay must be transferred and spread

			the same day that it is collected. If a baler is used, it should be transferred to the receptor site for spreading within an hour of being baled. The green hay should ideally be cut and transported on a cool and cloudy day. If the green hay has been collected with a forage harvester, it should be blown directly into a muck spreader, which can then spread the hay onto the receptor site. If bales have been collected, the green hay can be spread using a muck spreader, by hand, with a chopper or with a hay turner[3].
Meadow clary & Basil thyme translocation (if required)	NW-CG-2 NW-CG-3	Year 0	Where required, a programme of meadow clary *Salvia pratensis* and basil thyme *Clinopodium acinos* translocation (as above) will be implemented to safeguard these species, involving the relocation of any plants recorded within impacted areas of the Ardley Cutting and Quarry SSSI to a suitable location within the receptor site with appropriate soil conditions. Full details of the translocation methodology will be provided within a dedicated method statement above.
Seeding (if required)	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	Seed Species-Rich Calcareous Grassland seed mix onto low-fertility, weed-free ground in either early autumn (preferred) or spring, following shallow cultivation to create a firm, fine seedbed with plenty of bare soil. Broadcast the seed evenly at around 4 g/m² (40 kg/ha), ideally in two passes for good coverage, and do not bury the seed—most species require light to germinate. After sowing, roll firmly to ensure good seed–soil contact. Do not apply fertiliser or organic manures, and avoid sowing into lush or nutrient-rich soils, as this will favour grasses over wildflowers and reduce establishment success.
Establishment management	NW-CG-2 NW-CG-3	Year 1	Maintain short grass during the first year and dispose of all clippings to encourage perennial plants to establish and avoid a flush of pernicious weed species. Mow or trim the grass monthly during the growing season to manage weed and grass growth while promoting the spread of perennial species. Avoid applying any fertiliser at any stage.
Long-term Management	NW-CG-2 NW-CG-3	Year 2+	Annual grass cuts ~~alternating between a late July/early August cut one year, and a~~in late August/early September ~~cut the next. This will~~to allow a range of wildflowers to set seed. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from site. Mow the regrowth through to late autumn/winter to circa 50mm and again in spring if needed. Cut or hand-pull pernicious and/or invasive weeds before they seed in late summer. As a last resort option, use glyphosate spray to spot-treat affected areas only.
Protected species and Wildlife considerations	NW-CG-2 NW-CG-3	Project duration	To minimise risks to ground-nesting birds, mowing will begin by cutting field margins first (c.20m). Mowing will then cut the field's centre line before working outwards in a circular fashion towards the already cut margins. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided and mowing will not be undertaken within the area until after chicks have fledged. Do not cut or graze grassland between early April and the end of May to enable successful Skylark nests. Leave at least one margin in each field (minimum 12 metres in width) to be cut at the end of the season (September/early October). This can serve as a shelter for ground-nesting species to escape during mowing. This can also help maintain species that flower later, alternating the margin each year.
Supplementary Seeding (if required)	NW-CG-2 NW-CG-3	Year 5+	Spread supplementary native green hay can be introduced as necessary in response to poor establishment uptake by broadcasting seeds. Alternatively, consider plug-planting if only certain desired species have failed to establish, but the sward is otherwise in good condition.

[3] https://meadows.plantlife.org.uk/making-meadows/sowing-seed/green-hay-how-to-cut-collect-and-spread/#:~:text=Spreading%20Green%20Hay&text=Generally%2C%20green%20hay%20will%20land,to%20trample%20in%20the%20seeds.

Lowland Calcareous Grassland Species Lists (GH-T03)

The species provided below are based on the Emorsgate EM6 – Chalk and Limestone seed mix; exact seed mixes are still to be confirmed.

Common Name	Scientific Name	Abundance / %	Comments
Wildflowers – 20%			
Yarrow	*Achillea millefolium*	0.80%	
Kidney Vetch	*Anthyllis vulneraria*	0.40%	
Common Knapweed	*Centaurea nigra*	2.00%	
Greater Knapweed	*Centaurea scabiosa*	1.00%	
Wild Carrot	*Daucus carota*	1.00%	
Dropwort	*Filipendula vulgaris*	0.10%	
Hedge Bedstraw	*Galium album*	1.00%	
Lady's Bedstraw	*Galium verum*	1.0%	
Horseshoe Vetch	*Hippocrepis comosa*	0.10%	
Field Scabious	*Knautia arvensis*	0.60%	
Oxeye Daisy	*Leucanthemum vulgare*	1.20%	
Musk Mallow	*Malva moschata*	1.40%	
Black Medick	*Medicago lupulina*	0.40%	
Wild Marjoram	*Origanum vulgare*	0.20%	
Ribwort Plantain	*Plantago lanceolata*	1.20%	
Salad burnet	*Poterium sanguisorba (Sanguisorba minor)*	2.00%	
Cowslip	*Primula veris*	1.10%	
Selfheal	*Prunella vulgaris*	2.00%	
Meadow Buttercup	*Ranunculus acris*	1.10%	
Yellow Rattle	*Rhinanthus minor*	0.40%	
Bladder Campion	*Silene vulgaris*	1.00%	
Grasses – 80%			
Common Bent	*Agrostis capillaris*	6.40%	
Sweet Vernal-grass	*Anthoxanthum odoratum*	0.80%	
Quaking Grass	*Briza media*	1.20%	
Upright Brome	*Bromopsis erecta*	8.00%	
Crested Dogstail	*Cynosurus cristatus*	38.00%	
Sheep's Fescue	*Festuca ovina*	8.00%	
Red Fescue	*Festuca rubra*	9.60%	
Smaller Cat's-tail	*Phleum bertolonii*	8.00%	

Other Supporting Information

Supporting Information (GH-B02)

Note: The exact species mix and composition have yet to be confirmed and will depend on the availability of a suitable donor site for green hay. The species list above is indicative of those considered appropriate for inclusion in the Emorsgate EM6 Meadow Mixture for Chalk and Limestone Soils seed mix and those typically found in calcareous grassland. Seed mixes should be suitable for Chalky/Limestone soils.

What Does Success Look Like? (GH-F01)



Source: https://www.wildoxfordshire.org.uk/guidance/types-of-grasslands-in-oxfordshire



Source: Emorsgate Seeds https://wildseed.co.uk/product/mixtures/complete-mixtures/meadow-mixtures-for-specific-soils/meadow-mixture-for-chalk-and-limestone-soils/

4. Planned Management Activities (Wider Site – 30 years)

Management Plan Aims and Objectives PM-B01

The key aim of this HMMP is to provide habitat creation, enhancement and management prescriptions that can help to deliver a minimum of 10% biodiversity net gain for the Project, as demonstrated through the Statutory Biodiversity Metric. This will be achieved by retaining valuable habitats where possible and providing substantial compensation for any necessary losses. To achieve this, the following habitats are proposed.

Grasslands

- Provide species-rich grassland (other neutral grassland) habitat within informal areas of green infrastructure, along with areas of amenity (modified) grassland.

Scrub

- Mixed scrub habitats will be created to contribute to structural and botanical diversity across the Site. These will be designed alongside grasslands and woodlands to promote varied edge habitat and mosaic ecological networks

Woodland/Trees

- New lowland mixed deciduous woodlands will be created by encouraging natural succession, combined with low-density target species planting
- New plantation woodlands will be created using a diverse range of native species and will be managed to promote good structural diversity.
- Green Infrastructure around development areas will include standard tree planting to promote structural diversity.

Wetlands

- New wetland features will include ponds that will be designed specifically for wildlife and to encourage great crested newts to colonise.
- SuDS will be designed with varied bed profiles to encourage biodiversity into drainage features.
- Some SuDS onsite will be designed to develop into reedbeds, with a degree of standing water to promote a variety of species to establish.

Hedgerows

- New hedgerows will be created to promote connectivity across the Site
- Existing hedgerows will be managed sensitively for biodiversity.

Principles Informed by Design Stage

Design Principles Informed by Baseline Information PM-B02

This plan seeks to ensure the Project is delivered in a manner that minimises ecological impacts and secures a lasting positive contribution to local and national biodiversity, aligning with the principles of biodiversity net gain. The HMMP is designed to directly support and contribute to key local and county-level strategies for nature recovery in Oxfordshire.

As a general principle, early delivery of planting/landscaping will be undertaken where feasible/practical. Early-stage green infrastructure delivery will include establishment of structural landscaping along the western bund adjacent the approved residential development at Heyford Park that will include broadleaved woodland with heavy standard trees and hedge planting along the bund ridge suitable to aid delivery of early screening (visual) mitigation benefits.

The specific objectives of this plan are to:

- Create and enhance a robust, resilient, and well-connected ecological network across the Site and its surrounding landscape, promoting ecological connectivity and creating corridors of movement for faunal species, including bats, birds, and other mobile species. This directly supports the county's ambition to create 'bigger, better, more joined up' spaces for nature.
- Secure the long-term protection of important ecological features, including retained areas of lowland meadow, lowland calcareous grassland, and lowland mixed deciduous woodland. Where these important habitats are part of a Conservation Target Area (CTA) identified in the Oxfordshire Biodiversity Action Plan, the plan's prescriptions have been designed to contribute to the delivery of these landscape-scale conservation objectives.
- Mitigate unavoidable habitat losses, particularly those within the proposed sidings, by creating extensive areas of new compensatory habitats that will seek to far exceed the current baseline areas of each habitat type. This forms a core component of the project's net gain delivery and provides a substantial contribution to local biodiversity targets for these priority habitats.
- Maximise the biodiversity benefit of new features, such as the proposed drainage network, through sensitive design and targeted management to create valuable wetland and aquatic habitats. This aligns with local strategies that use blue-green infrastructure as a tool for nature recovery and flood resilience and contributes to improving water quality in local catchments.
- Contribute to local and national biodiversity targets through the strategic creation of new habitats, including new wildlife ponds suitable for Great Crested Newt (GCN), species-rich grassland for invertebrates and reptiles, and habitat linkages to benefit priority species. The creation of such habitats directly supports the conservation of species of importance identified in Oxfordshire, such as GCN, and contributes to the objectives of organisations like the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT).
- Provide habitats that are consistent with the Cotswolds National Character Area. The use of locally sourced species in the planting mix will further promote the ecological integration into the local landscape character, particularly within the new areas of lowland calcareous grasslands proposed.

- The Oxfordshire Local Nature Recovery Strategy, and prior to that the Ardley and Heyford CTA (Conservation Target Area) has guided the design of this HMMP, particularly the extensive creation of new lowland calcareous grassland using translocated soils and green hay. New lowland meadows will also provide excellent habitats for ground-nesting birds while proposed woodlands will increase total woodland cover. New ponds will be designed to support GCN and new hedgerow creation is also in line with the CTA.

Habitat and Condition Targets PM-T01

Target Habitat Type	Parcel / Feature Refs	Targeted Condition	Years to Targeted Condition	Condition Assessment Targets	Comments
Cereal crops	NW-A-1	NA	1	N/A – no condition criteria for arable land	The arable field will be managed to provide bird mitigation established annually in accordance with the provisions of Sustainable Farming Incentive (SFI) CAB12: Supplementary winter bird food and SFI CAHL2: Winter bird food on arable and horticultural land. Management will~~,~~ include~~ing~~ the retention of winter stubble and the provision of beetle banks to support farmland bird foraging and invertebrate prey availability.
Modified grassland	MS-MG (various parcels)	Poor	1	No specific targets beyond achieving the desired habitat type (i.e. being dominated by grass and herb species).	Management parcel MS-MG comprise numerous small, discontinuous areas of amenity grassland distributed across the Main Site. All areas will be managed under the same grassland management prescription as detailed in this plan. This comprises road verges and areas within the Main Site. Consequently, they will not specifically target any condition assessment targets. The chief purpose of management will be to maintain the desired habitat type.
Other neutral grassland	MS-ONG (various parcels)	Poor	2	No specific targets beyond achieving the desired habitat type (i.e. comprising a range of grass and herb species).	The Management parcel MS-MG comprises numerous connected and disconnected areas of other neutral grassland distributed across the Main Site. All areas will be managed under the same grassland management prescription as detailed in this plan. This comprises areas of species-rich grassland creation near buildings which may have high levels of access. Consequently, they will not specifically target any condition assessment targets. The chief purpose of management will be to maintain the desired habitat type of other neutral grassland.
Other neutral grassland	BL-ONG (various parcels) SE-ONG-1	Moderate	5	The proposal will seek to achieve the condition criteria A, B and D at a minimum.	The Management parcel MS-MG comprises continuous areas of other neutral grassland distributed across the Biodiversity and Landscaping enhancement area and within the South-east mitigation area. All patches will be managed under the same grassland management prescription as detailed in this plan. This comprises areas of species-rich grassland within the proposed green infrastructure areas within which the focus of management will be to achieve biodiverse native grasslands.
Traditional orchard	MS-TO-1	Poor	20	Primary aim is achieving the desired habitat type (i.e. comprising a range of fruit-bearing trees over neutral grassland). The proposal will seek to achieve condition criteria C, F, G and H in accordance with wider grassland management.	A selection of fruit-bearing trees to be planted on other neutral grassland.

Mixed Scrub	BL-SC (various parcels)	Moderate	5	The proposals will seek to meet the condition criteria A, B, and C at a minimum.	The Management parcel BL-SC comprises numerous small, discontinuous areas of scrub distributed across the Biodiversity and Landscaping enhancement area. All areas will be managed under the same scrub management prescription as detailed in this plan. This comprises mixed scrub blocks proposed within green infrastructure areas, to be managed to form mosaics alongside proposed grasslands.
Mixed Scrub	SE-SC (various parcels)	Good	10	The proposals will seek to meet all the condition criteria A, though E.	The Management parcel SE-SC comprises a mosaic of numerous, discontinuous areas of scrub distributed across the South-east Ecological mitigation area. All areas will be managed under the same scrub management prescription as detailed in this plan. This comprises mixed scrub blocks proposed within the South-east mitigation area, to be managed to form mosaics alongside proposed grasslands and woodland.
Sustainable Urban Drainage System	BL-SD (various basins)	Moderate	3	Proposals will seek to achieve the condition criteria A, B, C and E1.	The Management parcel BL-SD comprises several attention basins distributed across the Biodiversity and Landscaping enhancement area. All areas will be managed under the same SuDS management prescription as detailed in this plan. Drainage features will primarily serve a drainage function however have been designed to include linear ditch features which will hold areas of permanent water. These areas will be sown with an appropriate wet grassland seed mix to promote the establishment on native species throughout.
Sustainable Urban Drainage System	MS-SD (various basins)	Poor	1	Proposals will seek to achieve the condition criteria A, B, and C.	The Management parcel MS-SD comprises several attention basins distributed across the Main Site and associated with highways drainage. All areas will be managed under the same SuDS management prescription as detailed in this plan. Drainage features will primarily serve a drainage function and so will only be seasonally wet. These areas will be sown with an appropriate wet grassland seed mix to promote the establishment on native species throughout.
Other woodland; broadleaved	NW-BW-1 SE-BW (various parcels) MS-BW (various parcels) BL-BW (various parcels)	Moderate	15	Proposals will seek to target the following scores for each condition criterion: A – 2, C – 3, D – 3, E – 3, F – 3, G – 2, H – 3, J – 2, L – 2. Criteria B, I, K and M will not be specifically targeted.	The Management parcels SE-BW, MS-BW and BL-BW comprise woodland patches distributed across the Site. All areas will be managed under the same other woodland; broadleaved management prescription as detailed in this plan. Woodland will be planted across the Site using a range of native tree species to promote the establishment of botanically and structurally diverse woodlands in the long-term. Management will seek to promote natural regeneration and good tree health across each woodland compartment. Broadleaved woodland will be established along the western bund adjacent the neighbouring residential development at Heyford Park during the early landscaping phase/s and will include heavy standard trees suitable to deliver immediate screening benefits.

Other woodland; broadleaved	SE-BW (various parcels) MS-BW (various parcels) BL-BW (various parcels)	Poor	5	Proposals will seek to target the following scores for each condition criterion: A – 2, C – 2, D – 2, E – 2, F – 2, G – 2, H – 2, J – 2, L – 2. Criteria B, I, K and M will not be specifically targeted.	Smaller parcels of woodland, where the scale is likely to limit achievable condition.
Lowland Mixed Deciduous Woodland	SE-LW (various parcels)	Poor	10	Proposals will seek to target the following scores for each condition criterion: A – 2, B – 3, C – 3, D – 3, E – 3, F – 3, G – 2, H – 3, J – 2, L – 2. Criteria I, K and M will not be specifically targeted.	The Management parcels SE-LW comprise woodland patches distributed across the South-east Ecological Mitigation area. All areas will be managed under the same lowland mixed deciduous woodland management prescription as detailed in this plan. These woodlands will be managed to allow a degree of natural colonisation, particularly where they are sited adjacent to existing woodland compartments. Planting reflective of local species compositions will be undertaken at commencement, but at a low density to encourage opportunities for natural colonisation across the remainder of the parcel.
Ponds (priority habitat)	MS-P1, P2, P3, P4	Moderate	3	Proposals will seek to achieve condition criteria B, D, E, F, G, H and I at a minimum.	This comprises ponds specifically designed for wildlife, and ponds close to existing ponds that support GCN, to allow this species to colonise new ponds. Ponds will be designed to hold water year-round.
Individual trees	All newly planted	Poor	10	Proposals will seek to meet the condition criteria B, D, and , however a pre-cautionary restrictive condition target has been set.	492 new native and ornamental ‘small’ trees are proposed across the Site. Tree planting will be located within green space, with long-term management on maintain healthy trees or replacing failed specimens.
Species-rich Native Hedgerow with trees	All newly planted	Moderate	10	Proposals will seek to achieve condition criteria A1, A2, B1, B2, C1, D1, D2 and E2.	Hedgerow planting will include a range of native shrub and tree species, with long-term management focused on maintaining healthy trees and a bushy, outgrown hedge. Frontages of main development and access roads. Hedgerow planting will additionally be established along the ridge of the western bund adjacent the neighbouring Heyford Park development early in the landscaping phase to deliver immediate screening benefits.
Species-rich Native Hedgerow with trees with an associated bank or ditch	All newly planted	Moderate	10	Proposals will seek to achieve condition criteria A1, A2, B1, B2, C1, D1, D2 and E2.	Hedgerow planting will include a range of native shrub and tree species along a shallow ditch feature, with long-term management focused on maintaining healthy trees and a bushy, outgrown hedge. Targeted along the road verge adjacent to the ecological zone south of the main development area
Species-rich Native hedgerow	All newly planted	Moderate	5	Proposals will seek to achieve condition criteria A1, B1, B2, C1, D1, D2	Default hedgerow provision across the scheme which will include a range of native species.

Watercourse	New channels	Fairly poor	2	Proposals will aim to create semi-natural profiles, with a range of bank face and bank top vegetative cover.	Re-routed channels in development area linking into to upstream outflows.
Watercourse	KC-A	Fairly poor to Moderate	2	Bank face and Bank top diversity	Managed to match the condition of the adjoining section of the watercourse by promoting bank face and bank top species and structural diversity and reducing encroachment.
Watercourse	ToGB-F	Poor to Fairly poor	2	Bank face and Bank top diversity	Managed to match the condition of the adjoining section of the watercourse by promoting bank face and bank top species and structural diversity and reducing encroachment.
Riparian Enhancement	J10-A J-10-B KC-A KC-B/C ToGB-E ToGB-F ToGB-G ToGB-H ToGB-I	No Encroachment / No Encroachment	1	N/A	Habitat proposals above will remove intensive management within the riparian zone of the watercourses, therefore improving encroachment and riparian habitat.

Habitat Retention

Measures to be Implemented to Protect and Maintain Retained Habitats PM-03

Retained habitats will be protected in accordance with the Construction and Environmental Protection measures. The management of all retained habitats within the Project Boundary will be delivered in strict accordance with the prescriptions detailed in this Habitat Management and Monitoring Plan (HMMP). The overall objective is to ensure the long-term viability and ecological integrity of these habitats, contributing to the Project's biodiversity net gain commitment and a resilient ecological network.

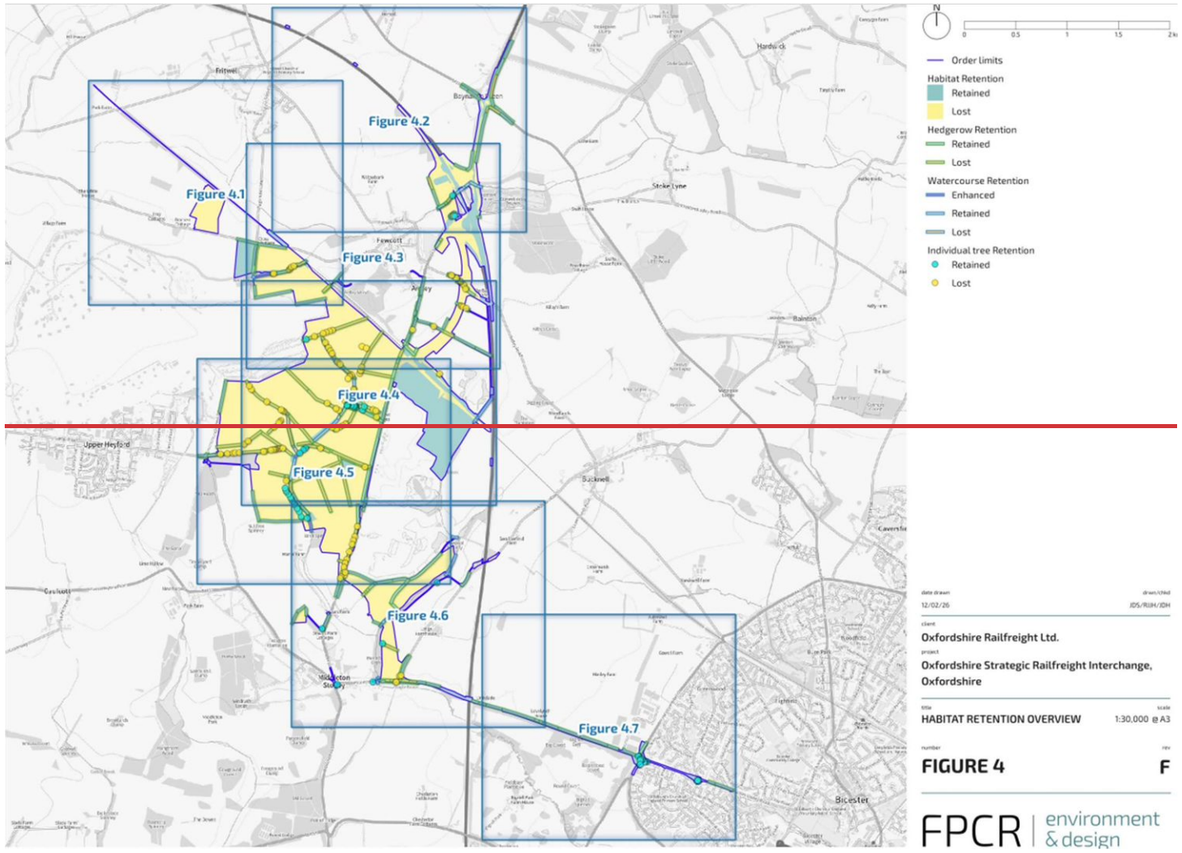
The specific management prescriptions for each retained habitat type are as follows:

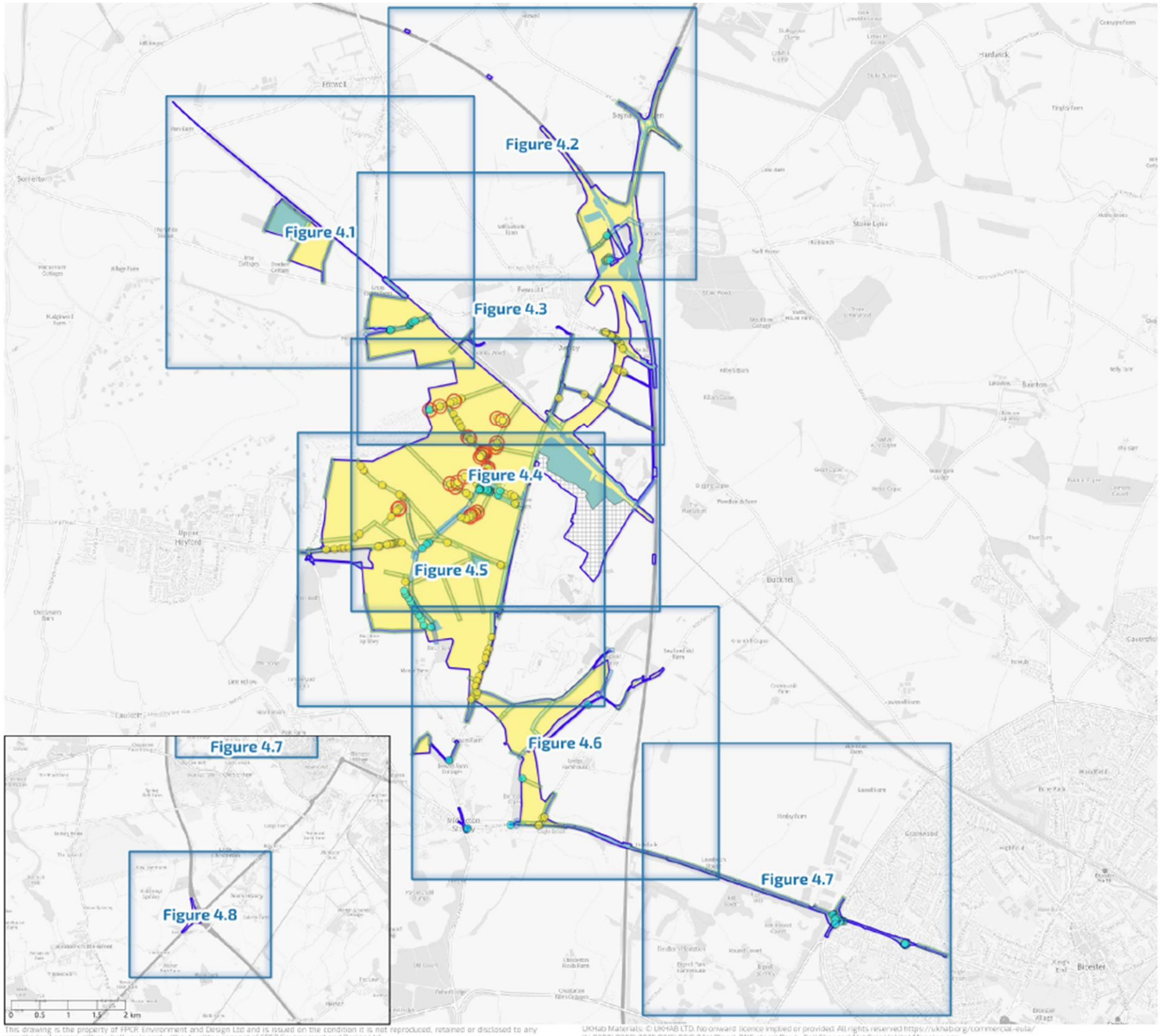
- **Modified Grasslands**: These areas will undergo regular mowing, as defined in the plan, to maintain a desired sward structure. This management is essential for their functional role within the scheme, such as amenity use, or to reduce the risk of fire.
- **Other Neutral Grasslands, Lowland Meadows, and Lowland Calcareous Grasslands**: The management of these species-rich grasslands will be based on a traditional hay-cut regime. This will involve a single annual or biannual hay-cut mowing, with the cuttings removed from the site to prevent nutrient enrichment and encourage a diverse flora. The timing of the cut will be sensitive to the flowering and seeding times of key plant species and the presence of nesting birds. This will also be included within the retained areas of tall forb vegetation.
- **Ponds:** All retained ponds will be managed to maintain their ecological value. This will involve a programme of periodic monitoring to assess water quality, vegetation structure, and the presence of key species. Remedial works, such as selective desilting or vegetation clearance, will be undertaken as required to prevent succession and maintain open water habitats for amphibians, aquatic invertebrates, and other wildlife.
- **Woodlands:** Retained woodland habitats will be managed to enhance their structural diversity and long-term health. A programme of selective thinning will be implemented as required to improve light penetration to the woodland floor, thereby promoting the regeneration of ground flora and the establishment of a diverse age structure.
- **Hedgerows**: The health and functionality of retained hedgerows will be ensured through rotational mowing. Specifically, only one side of the hedgerow will be mown every two years to provide a continuous food source and shelter for foraging species, such as birds and invertebrates. The height and width of the hedgerow will be maintained to provide a robust habitat corridor.
- **Veteran Trees**: Management objectives ~~have~~ cover a wide range of specific needs ~~(see Appendix 3)~~. These include the safeguarding of a tree's structural integrity and the safety of people and property, whilst ensuring the retention of decaying wood and decay cavities that play host to fungi, invertebrates as well as potential roost sites for some bird species. Further thought has been given to the environment surrounding the trees, an example being recommendations for introducing essential nectar and pollen sources, such as the planting or retention of hawthorn (thorny bushes) and brambles. Where it is not feasible to retain veteran trees (including dead and dying individuals) within the development area these will be translocated to a Veteran Tree Reserve within the Application Site and adjacent to off-site ancient woodland (see Appendix 4: Veteran Tree Strategy)

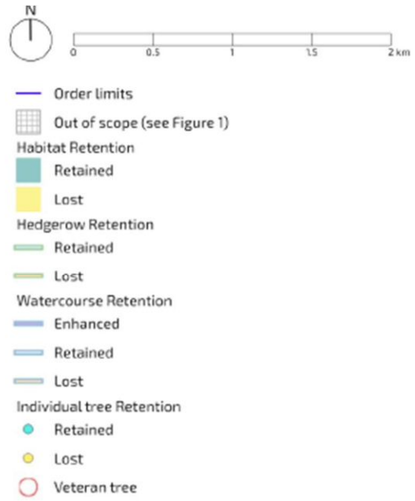
Where these retained habitats are to be included within the habitat management prescriptions provided below, parcel references have been provided.

Habitat Retention Plan PM-F01

Tick box if any additional plans are provided in the Appendices ☒ . Reference: Please refer to Figure 4 of the BNG Report (ES Appendix 6.9) for habitat retention plans at functional scale.







date drawn 13/10/25 drawn/chkd RJH

client
Oxfordshire Railfreight Ltd.

project
Oxfordshire Strategic Railfreight Interchange, Oxfordshire

title
HABITAT RETENTION OVERVIEW

scale
1:30,000 @ A3

number
FIGURE 4

rev
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Grassland (Modified Grassland)

Creation, Enhancement and Management Summary (GL-T01)

Target Habitat:			Modified Grassland		
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHAB Classification Description*** *Species-poor vegetation (<9 species per m^2) dominated by a few fast-growing grasses on fertile neutral soils. It is frequently characterised by an abundance of Rye-grasses Lolium spp. And white clover Trifolium repens. Most broad-leaved species present will be associated with high fertility.*	Yes	MS-MG (All)	All areas of modified grassland will be created using an appropriate seed mix or turf. For grasslands targeting poor condition, this will comprise hard-wearing species that are tolerant of regular mowing management. These areas can be created using turf or seed as preferred. For grasslands targeting moderate condition, a flowering lawn seed mix will be used which will comprise a range of native grass and herb species. Turf will not be used.	All grasslands are to be managed through regular mowing. For grasslands targeting poor condition, the primary focus of management will be for amenity purposes and so mowing frequency will typically be twice per month, with the frequency of cuts likely increasing in spring/summer and decreasing over winter. Moderate condition grasslands will be cut no more than once per month to encourage variation across the Site.
A	There are 6-8 vascular plant species per m^2 present, including at least 2 forbs. **Note - this criterion is essential for achieving Moderate or Good condition.** Where the vascular plant species present are characteristic of medium, high or very high distinctiveness grassland, or there are 9 or more of these characteristic species per m^2, please review the full UKHab description to assess whether the grassland should be classified as a higher distinctiveness grassland. Where a grassland is classed as medium, high or very high distinctiveness, please use the relevant condition sheet.	No	MS-MG (All)	These grassland compartments will be sown with a native species-rich flowering lawn seed mix. The species will comprise a range of grasses and herbs that are all tolerant of regular mowing.	Management will be through regular mowing at a frequency of no more than once per month. Where grasslands border semi-natural habitats (such as hedgerows, woodland and scrub) the borders should be mown no more than twice per year, including a spring cut and a late summer/early autumn cut. This will help to promote structural variation, provide a continuity of habitat for faunal species (particularly invertebrates) and allow a great range of herb species to propagate.
B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for vertebrates and invertebrates to live and breed.	No	MS-MG (All)	N/A	N/A
C	Any scrub present accounts for less than 20% of the total grassland area. (Some	No	MS-MG (All)	Species mixes used to create grassland will comprise only grass/herb species.	Regular mowing will prevent scrub from establishing. Regular monitoring will track where scrub encroachment or regrowth has occurred and trigger remedial action where necessary.

	scattered scrub such as bramble *Rubus fruticosus* agg. may be present). Note - patches of scrub with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.				
D	Physical damage is evident in less than 5% of total grassland area Examples of physical damage include excessive poaching, damage from machinery use or storage, erosion caused by high levels of access, or any other damaging management activities.	No	MS-MG (All)	N/A	This is not specifically targeted as all areas of grassland may be subject to disturbance through pedestrian access. Regardless, the establishment and condition of grassland will be monitored and where excessive damage is observed, remedial measures will be introduced to restore grasslands.
E	Cover of bare ground between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens.)	No	MS-MG (All)	N/A	As above, this is not specifically targeted as disturbance can cause localised areas of bare ground or amenity lawns will likely support insufficient areas of bare ground to achieve this condition criterion. Where excessive damaged is observed during monitoring, remedial measures will be introduced.
F	Cover of bracken *Pteridium aquilinum* less than 20%.	Yes	MS-MG (All)	Seed mixes or turf used to create grasslands will not include bracken.	Regular mowing will prevent bracken from establishing. Regular monitoring will track if bracken encroachment has occurred and trigger remedial action where necessary.
G	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA).	Yes	MS-MG (All)	Seed mixes or turf used to create grasslands will comprise native species only.	Regular monitoring will track the presence of invasive non-native species or those indicative of sub-optimal conditions and trigger remedial action to remove or reduce their presence, respectively.

Grassland (Modified Grassland)

Creation, Enhancement and Management Detailed Methods (GL-T02)

Action	Relevant Parcels	Timing	Prescriptions
Ground preparation	MS-MG (All)	Year 0 – Spring/Autumn	Topsoil for all areas of modified grassland should aim to be at least 150mm deep, ensuring a free-draining formation level before spreading it. Lightly cultivate the ground to create a fine, firm and weed-free seedbed. Remove large stones or bricks during cultivation. Following cultivation, the ground should be allowed to settle for several days or weeks.
Sow Seeds / Lay turf	MS-MG (All)	Year 0 – Spring/Autumn	After ground preparation has settled, likely re-cultivate the surface, then rake and roll to create a firm, even surface with a medium-fine tilth. **Seed Sowing:** Broadcast sow at the supplier's recommended rate. Sowing must be undertaken in still wind conditions when the soil is saturated but not flooded. A suitable seed mix for poor-condition grasslands is Emorsgate Seeds' EG21 Fine Lawn Grass Mixture (or a similar approved alternative). After sowing, immediately roll the seedbed with a flat roller. **Turf (optional):** If Turf is the chosen method for creating poor-condition grasslands, lay the turf following the supplier's instructions in rows, staggering the joints and ensuring a tight fit with no gaps. Thoroughly water the turf immediately following laying.
Establishment management	MS-MG (All)	Year 1	Keep the grass short in the first year and remove all cuttings. Mow or top the grass once-twice a month during the growing season to control weed/grass growth and encourage perennial species propagation. Apply no fertiliser to areas of moderate condition grassland. Avoid fertiliser application in poor-condition grasslands unless necessary to maintain the desired lawn.
Long-term management	MS-MG (All)	Year 2-9	After successful establishment, begin the long-term mowing regime on all grasslands. For Poor condition grasslands, mowing can be undertaken at a frequency to maintain the desired sward. This will likely be twice monthly; however weekly cuts may be undertaken during the spring/summer and monthly cuts over winter. Avoid fertiliser application in grasslands unless considered necessary to maintain the desired lawn. If pernicious or invasive weeds begin to dominate, cut before they seed in late summer. If needed as a last resort, use glyphosate spray to spot-treat affected areas only.
Supplementary Seeding (if required)	MS-MG (All)	Year 5+	Spread supplementary seed as necessary in response to poor establishment uptake by broadcasting seeds. Sowing must be undertaken in still wind conditions when the soil is saturated but not flooded.

Grassland (Modified Grassland) Species Lists (GL-T03)

Species list is based on recommended seed mixes Emorsgate EG21 (Fine Lawn Grass mix for Poor condition grassland)

Common Name	Scientific Name	Abundance / %	Comments
EG21 - Fine Lawn Grass			
Red Fescue	*Festuca rubra*	50%	Poor condition grassland
Chewing's Fescue	*Festuca rubra spp. commutata*	40%	
Common Bent	*Agrostis capillaris*	10%	

Emorsgate EL1 (Flowering Lawn Mixture for Moderate condition grassland)

EL1 - Flowering Lawn Mixture - Wildflowers 20%			
Kidney Vetch	*Anthyllis vulneraria*	1.00%	Moderate condition grassland
Betony	*Betonica officinalis*	1.00%	
Common Knapweed	*Centaurea nigra*	1.60%	
Hedge Bedstraw	*Galium album*	1.00%	
Lady's Bedstraw	*Galium verum*	1.60%	
Oxeye Daisy	*Leucanthemum vulgare*	1.40%	
Bird's-foot Trefoil	*Lotus corniculatus*	0.20%	
Black Medick	*Medicago lupulina*	0.60%	
Ribwort Plantain	*Plantago lanceolata*	2.40%	
Cowslip	*Primula veris*	1.00%	
Selfheal	*Prunella vulgaris*	1.20%	
Meadow Buttercup	*Ranunculus acris*	1.60%	
Bladder Campion	*Silene vulgaris*	1.00%	
Dandelion	*Taraxacum officinale*	0.40%	
White Clover	*Trifolium repens (ag)*	4.00%	

EL1 - Flowering Lawn Mixture - Grasses 80%			
Common Bent	*Agrostis capillaris*	8%	Moderate condition grassland
Crested Dogstail	*Cynosurus cristatus*	28%	
Red Fescue	*Festuca rubra*	24%	
Smaller Cat's-tail	*Phleum bertolonii*	4%	
Smooth-stalked Meadow-grass	*Poa pratensis*	16%	

Other Supporting Information

Supporting Information (GL-B02)

EG21 Mixture

- Sow at a rate of 250kg/ha (100kg/acre)
- This mixture is composed of fine-leaved varieties of bent and fescue grasses, which are required for a low-maintenance grass sward.

EL1 Mixture

- Sow at a rate of 40kg/ha (16kg/acre)
- Mixture EL1 contains slow-growing grasses with a selection of wildflowers that respond well to regular short mowing.

What Does Success Look Like? (GL-F01)





Moderate condition modified grasslands (source: https://wildseed.co.uk/product/mixtures/complete-mixtures/special-habitat-mixtures/flowering-lawn-mixture/)

Creation, Enhancement and Management Targets and Prescriptions

Other Neutral Grassland

Creation, Enhancement and Management Summary (GH-T01)

Target Habitat				Other Neutral Grassland	
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHab Classification Description*** *A neutral grassland that does not meet the definition of either Lowland Meadow or Upland Hay Meadows AND that meets at least three of these four criteria:* 1. *>20% cover of broadleaved herbs and sedges;* 2. *>8 species per m^2 (including forbs, grasses, sedges and rushes, and excluding bryophyte);* 3. *≥1 grass species that is not generally sown for intensive agricultural production (ie. Rye-grasses Lolium spp., Cock's-foot Dactylis glomerata, Meadow fescue Festuca pratensis) is at least abundant;* 4. *Cover of Rye-grasses Lolium spp. and White clover Trifolium repens, where present, is <30%.*	Yes	MS-ONG (All) BL-ONG (All) SE-ONG-1	All other neutral grasslands will be created using a native species-rich grassland seed mix, such as Emorsgate Seed's EM3 Special General-Purpose Meadow Mixture (or a similar approved mix). This contains a diverse range of native grass and herb species suitable for the Site.	Following successful establishment, management will include annual hay-cut mowing to maintain the desired habitat type.
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type. **Note – this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	Yes No	BL-ONG (All) & SE-ONG-1 MS-ONG (All)	To achieve this criterion, compartments will target all four UKHab Description criteria for other neutral grasslands. This will chiefly be achieved through the selection of an appropriate, diverse native grassland seed mix (such as Emorsgate Seed's EM3 Special General-Purpose Meadow Mixture (or similar approved)). Areas targeting poor condition (MS-ONG) are generally characterised by small or narrow patches of grasslands and therefore achieving criterion 1 of the UKHab description criteria of ONG may be challenging, and therefore this criterion will not be targeted in these compartments.	Following successful creation/enhancement, the ongoing management of all areas of other neutral grassland (including areas targeting only poor condition) will include mowing. This will include an annual grass cut in ~~late July~~ August after seed setting for mowing. The approach aims to maintain a diverse sward characteristic of good quality neutral grasslands.

B	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Yes No	BL-ONG (All) & SE-ONG-1 MS-ONG (All)	The selected seed mix will introduce a range of grass and herbaceous species, promoting the establishment of a diverse sward.	A diverse sward will help maintain a varied sward height along with varied cutting to mimic natural disturbances. Management through regular mowing will help maintain a varied sward. Public access to the Site will help maintain small areas of disturbance, promoting a more varied sward with species more tolerant of disturbance established in areas frequented by recreational users of the Site.
C	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	No	N/A	Disturbance through public access or by rabbits and other faunal species may create localised areas of bare ground, but this criterion will not be specifically targeted.	
D	Cover of bracken *Pteridium aquilinum* less than 20% and cover of scrub (including bramble) less than 5%.	Yes No	BL-ONG (All) & SE-ONG-1 MS-ONG (All)	Seed mixes used to create new grasslands will include grass and herb species only and will not include any bracken.	Regular mowing will prevent scrub and bracken from establishing. Regular monitoring will track where scrub or bracken encroachment has occurred and trigger remedial action where necessary.
E	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging activities) accounts for less than 5% of total area. If any invasive non-native species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed.	No	N/A	While not specifically targeted, the chosen species mix will not include any species listed by the Statutory Metric Condition Assessment criteria as 'species indicative of sub-optimal condition.'	While not specifically targeted, Regular monitoring will track the presence of invasive non-native species across all habitats and trigger remedial action to remove or reduce their presence, respectively. If pernicious weeds begin to dominate and affect the definition of grasslands as a 'good example' of ONG, appropriate remedial measures will be undertaken to reduce over of species indicative of sub-optimal condition.
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type. **Note – this criterion is essential for achieving Good condition for non-acid grassland types only.**	No	N/A	N/A – Not targeted as likely to pose a challenge given the grasslands' location and intended use.	

Other Neutral Grassland

Creation, Enhancement and Management Detailed Methods (GH-T02)

Action	Relevant Parcels	Timing	Prescriptions
Ground Preparation	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 0 – Spring/Autumn	Soils for areas of other neutral grassland should not be nutrient-rich. Soil phosphate levels should be moderate to low (index of 2 or less). Other nutrients, including nitrogen and potassium, are thought be more readily leached from soils, and so their levels are less of a constraint. Soil nutrient sampling should be undertaken prior to ground preparation if not already undertaken (for example within the BL area south and west of the proposed Heyford Park Link Road). Where soil nutrient levels are considered high, a topsoil strip can be undertaken. This should be completed using a low ground pressure excavator or bulldozer to carefully scrape and remove the top 5-10cm of topsoil. The goal is to remove the fertile, nutrient-rich layer without disturbing the underlying, less fertile soil. Where necessary, topsoil stripping should be undertaken during the dry summer months to minimise compaction. Across all areas proposed for grassland creation, lightly cultivate the ground to create a fine, firm, weed-free seedbed (after topsoil stripping where relevant). Remove large stones or bricks during cultivation. Following cultivation, the ground should be allowed to settle for several days or weeks.
Sow Meadow Seed Mix (	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 0 – Spring/Autumn	After the soil has settled, lightly re-cultivate the seedbed before sowing. Broadcast the seed mix using the Emorsgate Special General-Purpose Meadow Mixture (EM3) or similar approved, at a rate of 40 kg per hectare. Sow the seeds when the soil is saturated but not flooded, ideally in calm wind conditions. After sowing, roll the seed to ensure it is properly bedded in. There is likely to be a flush of annual weeds during the first growing season. While these weeds may appear unsightly, they offer shelter for sown seedlings and benefit invertebrates. Therefore, avoid cutting the annual weeds until mid to late summer. Afterwards, cut them, remove them, and compost them.
Aftercare Management	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 1	Take a spring cut and then allow the sward to establish over summer. Take a late summer (~~late July/~~August) hay crop at the first opportunity that weather conditions allow and after wildflowers have been allowed to set seed (particularly annual species). If necessary to mow before July in the first year, do so above the height of the germinated yellow rattle plants to enable this annual species to bloom and produce seeds. All arising must be removed. Do not apply fertiliser.
Sow Meadow Seed Mix	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 1 or 2 – Spring/Autumn	Broadcast the seed mix using the Emorsgate Special General-Purpose Meadow Mixture (EM3) or similar at a rate of 40 kg per hectare. Sow the seeds when the soil is saturated but not flooded, ideally in calm wind conditions. After sowing, roll the seed to ensure it is properly bedded in.
Aftercare Management	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 2 or 3 – Spring/Autumn	~~Maintain short grass during the first year and dispose of all clippings.~~ Mow or trim the grass monthly during the late growing season to manage weed and grass growth while promoting the spread of perennial species. ~~If you need to mow before July in the first year, do so above the height of the germinated yellow rattle plants to enable this annual species to bloom and produce seeds.~~ Avoid applying any fertiliser.
Short-term Management	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 2 – 9	After successfully implementing the establishment management stage, take a grass cut at the first opportunity that weather conditions allow from ~~late Ju~~Augustly onwards, after wildflower seeds have been set. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from site. Mow the regrowth through to late autumn/winter to circa 50mm and again in spring if needed. Apply no fertiliser.

Long-term Management	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 10+	In years 10+, annual grass cutting from ~~late-July~~August onwards, after wildflower seeds have set, continues at the first opportunity that weather conditions allow. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from site. Mow the regrowth through to late autumn/winter to a height of circa 50mm, and again in spring if needed. Cut or hand-pull pernicious and/or invasive weeds before they seed in late summer. As a last resort option, use glyphosate spray to spot-treat affected areas only.
Supplementary Seeding (if required)	BL-ONG (All) SE-ONG-1 MS-ONG (All)	Year 5+	Spread supplementary native wildflower seeds as needed to improve establishment and uptake by broadcasting seeds or introducing plug plants. Sowing must be undertaken in still wind conditions when the soil is saturated but not flooded.

Other Neutral Grassland Species Lists (GH-T03)

Emorsgate EM3 – Recommended grassland species mix or similar

Common Name	Scientific Name	Abundance / %	Comments
Wildflowers – 20%			
Yarrow	*Achillea millefolium*	0.40%	
Agrimony	*Agrimonia eupatoria*	0.20%	
Betony	*Betonica officinalis*	1.20%	
Common Knapweed	*Centaurea nigra*	2.00%	
Wild Carrot	*Daucus carota*	1.00%	
Viper's-bugloss	*Echium vulgare*	0.60%	
Meadowsweet	*Filipendula ulmaria*	0.20%	
Hedge Bedstraw	*Galium album*	0.80%	
Lady's Bedstraw	*Galium verum*	0.40%	
Meadow Crane's-bill	*Geranium pratense*	0.40%	
Oxeye Daisy	*Leucanthemum vulgare*	1.00%	
Musk Mallow	*Malva moschata*	1.00%	
Black Medick	*Medicago lupulina*	0.40%	
Sainfoin	*Onobrychis viciifolia*	0.20%	
Wild Parsnip	*Pastinaca sativa*	0.20%	
Ribwort Plantain	*Plantago lanceolata*	1.40%	
Salad Burnet	*Poterium sanguisorba ssp. sanguisorba*	0.60%	
Cowslip	*Primula veris*	1.00%	
Selfheal	*Prunella vulgaris*	1.60%	
Meadow Buttercup	*Ranunculus acris*	1.60%	
Bulbous Buttercup	*Ranunculus bulbosus*	0.60%	
Yellow Rattle	*Rhinanthus minor*	0.40%	
Common Sorrel	*Rumex acetosa*	0.40%	
Small Scabious	*Scabiosa columbaria*	0.20%	
Red Campion	*Silene dioica*	0.80%	
Bladder Campion	*Silene vulgaris*	1.00%	
Dandelion	*Taraxacum officinale*	0.20%	
Tufted Vetch	*Vicia cracca*	0.20%	
Wildflowers – 80%			
Common Bent	*Agrostis capillaris*	8%	
Crested Dogstail	*Cynosurus cristatus*	28%	
Red Fescue	*Festuca rubra*	24%	
Smaller Cat's-tail	*Phleum bertolonii*	4%	
Smooth-stalked Meadow-grass	*Poa pratensis*	16%	

Other Supporting Information

Supporting Information (GH-B02)

Sowing rate 40kg/ha (16kg/acre). Sowing rates can be reduced to 20kg/ha (8kg/acre) for large areas with low soil nutrients (Phosphate index < 2).

Emorsgate EM3 is a mixture that contains a very wide range of species. It can be used to create a diverse sward where conditions differ across a site. It is also beneficial in situations where specific soil and site conditions have not been previously determined before sowing.

What Does Success Look Like? (GH-F01)





Lowland Meadow

Creation, Enhancement and Management Summary (GH-T01)

Target Habitat				Lowland Meadow	
Condition Assessment Criteria		Targeted	Relevant Parcels	Creation Approach	Management Approach
*	***UKHab Classification Description*** *A neutral grassland that meets at least two of these three criteria:* *4. >15 species per m^2 (including grasses and excluding bryophyte);* *5. >30% cover of broadleaved herbs and sedges (excluding white clover Trifolium repens, creeping buttercup Ranunculus repens and injurious weeds);* 6. *<10% cover of rye-grasses and white clover Trifolium repens.* *AND EITHER ≥ 4 of the indicator species (listed in UKHab Category Definitions) at least 'present' on DAFOR scale.* *OR ≥3 of these indicators at least 'occasional' on DAFOR scale (but not limited to field corners or edges).*	Yes	NW-LM-1	The grassland is to be created using a proprietary species-rich native Lowland Meadow mix with an appropriate species composition to meet this description. This mix will contain at least 15 species, including lowland meadow indicator species. Soil nutrient investigations have confirmed soil nutrient levels are appropriate to facilitate the establishment of lowland meadows without the need for intervention to reduce these further.	Following successful establishment, management will include annual hay-cut mowing with all arisings removed.
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type. **Note – this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	Yes	NW-LM-1	To achieve this criterion, the grassland will target all three UKHab Description criteria for lowland meadows and establish at least 4 indicator species, to be achieved by seeding using a suitable seed mix.	Following successful creation/enhancement, ongoing management of lowland meadow will include hay-cut mowing. This will include an annual grass cut in late August/early September. The approach aims to maintain a diverse sward characteristic of good-quality meadow grasslands.
B	Sward height is varied (at least 20% of the sward is less than 7cm and at least 20 per cent is more than 7cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Yes	NW-LM-1	Suitable seed mix will introduce a range of grass and herbaceous species, promoting the establishment of a diverse sward.	A diverse sward will help maintain a varied sward height along with varied cutting to mimic natural disturbances. Regular mowing will help maintain a varied sward.

C	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	No	NW-LM-1	N/A	While not specifically targeted, rabbit grazing/burrowing activity or other such faunal disturbance my create areas of bar ground. Public access will be limited to prevent excessive human disturbance.
D	Cover of bracken *Pteridium aquilinum* less than 20% and cover of scrub (including bramble) less than 5%.	Yes	NW-LM-1	The field does not currently include bracken or excessive scrub, and the introduction of green hay and/or seed will not introduce these species.	Regular mowing will prevent scrub and bracken from establishing. Regular monitoring will track where scrub or bracken encroachment has occurred and trigger remedial action where necessary.
E	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging activities) accounts for less than 5% of total area. If any invasive non-native species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed.	No	NW-LM-1	While not specifically targeted, the seed mix will not include significant seed stock of any species listed by the Statutory Metric Condition Assessment criteria as 'species indicative of sub-optimal condition.'	While not specifically targeted, regular monitoring will track the presence of invasive non-native species across all habitats and trigger remedial action to remove or reduce them. If pernicious weeds begin to dominate and affect the definition of grasslands as a 'good example' of Lowland Meadow, appropriate remedial measures will be undertaken to reduce the number of species indicative of sub-optimal conditions.
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type. **Note – this criterion is essential for achieving Good condition for non-acid grassland types only.**	Yes	NW-LM-1	The grassland will target a minimum of 10 species per m^2.	Timings of the annual hay-cut will be alternated to allow a diverse range of wildflowers to set seed. A late August/early September hay-cut will be undertaken. Species diversity will be continuously monitored and, where below 10 species per m^2, remedial measures will be introduced. These could include supplementary seed or adjusted the timings of hay-cuts. Further details on potential remedial measures are provided later in this document.

Additional Management Prescriptions (GH-B01a)

Using Local Green Hay

Green hay is preferable for lowland meadow creation due to its high proportion of viable seed, local provenance and associated propagules (beyond the seed), but logistical, temporal, and site constraints mean its use is not always practicable. Where possible use locally sourced green hay from a donor site (within 10 miles of the site) that contains a mix of wildflower species characteristic of neutral soils, as well as yellow rattle, *Rhinanthus minor*. The donor site should be within an hour's drive from the site, so green hay can be transported to and spread on the land in one day. Donor site must have similar characteristics, including soil type, soil pH and hydrology, to the new grassland. 1 hectare (ha) is sufficient to spread over 3 ha.

Using Commercial Seed Mix

Where sufficient donor sites are available, commercial seed mixes can be beneficial as they are readily available and do not have the same seasonal and logistical constraints as green hay. Species content and proportions can also be specified, allowing for better targeting of habitat type and species compositions. Seed mixes are also more practical for large sires, and when seed quality and germination rates are tested, they reduce the uncertainty during establishment.

Ground Nesting Birds

To minimise risks to ground nesting birds, the annual hay cut will be undertaken sensitively in accordance with advice provided to FPCR by the RSPB grassland restoration specialists. This will include delaying to at least August where possible and by beginning the cut by mowing the field margins first, where ground-nesting birds are unlikely to nest, as they favour field interiors with better sight lines. Mowing will then

cut the centre of the field before working outwards to the already cut margins. This will allow any birds and chicks present in the field ample opportunity to escape to cover. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided, and mowing will not be undertaken within the area until after chicks have fledged.

Leave uncut margins and strips of vegetation alongside hedgerows and field edges on a rotational basis to support invertebrates and mammals. Rotate these uncut margins each year.

Grassland (Lowland Meadow)

Creation, Enhancement and Management Detailed Methods (GH-T02)

Action	Relevant Parcels	Timing	Prescriptions
Beetle Bank Creation	NW-LM-1 and adjacent compartment to NW	Year 0	Two beetle banks will be created within the field margins of each compartment in accordance with the protocol specified by Sustainable Farming Incentive AHW3: Beetle banks[4] by creating a raised earth ridge (around 3 metres (m) wide to 5 m wide and at least 0.4m high and sowing a mixture of fine-leaved grasses, such as red fescue, timothy and cocksfoot.
Topsoil Harvest	SSSI NW-LM-1	Year 0 – Early Spring/Autumn	Prior to the ground works within the rail track cutting, mow the existing lowland meadow areas within the SSSI working areas and remove all arisings several weeks prior to the topsoil strip. Immediately prior to the soil strip, scarify the soils at compartment NW-LM-1. The topsoils will be stripped to a depth of 10-20cm immediately prior to translocation to NW-LM-1.
Ground Preparation – Soil Mixing	NW-LM-1	Year 0 – Spring/Autumn	Topsoils from existing lowland meadow habitat within the SSSI working area will be spread across the receptor field, for example using a muck spreader. Mix the soils using a rotavator set to a depth of 10-20cm. Lightly cultivate the rotavated soils ready for the application of green hay / appropriate seed mix.
Apply green hay	NW-LM-1	Year 0 – Autumn	After soil has been allowed to settle, lightly re-cultivate the seed bed prior to seed applying green hay. Apply green hay from a suitable local donor site if available. A green hay crop should be cut and collected as wildflowers and grasses start to shed their seed (typically early August). The green hay crop should be cut and collected using a drum or disc mower. A mower conditioner should not be used. A forage harvester can be used to collect the hay, or the hay can be baled. The hay must be transferred and spread the same day that it is collected. If a baler is used, it should be transferred to the receptor site for spreading within an hour of being baled. The green hay should ideally be cut and transported on a cool and cloudy day. If the green hay has been collected using a forage harvester, it should be blown directly into a muck spreader, and this can be used to spread the hay on the receptor site. If bales have been collected, the green hay can be spread using a muck spreader, by hand, with a chopper or with a hay turner[5].
Seeding (if required)	NW-LM-1	Year 0 – Spring/Autumn	Seed Species-Rich Neutral Grassland seed mix onto low-fertility, weed-free ground in either early autumn (preferred) or spring, following shallow cultivation to create a firm, fine seedbed with plenty of bare soil. Broadcast the seed evenly at around 4 g/m² (40 kg/ha), ideally in two passes for good coverage, and do not bury the seed—most species require light to germinate. After sowing, roll firmly to ensure good seed–soil contact. Do not apply fertiliser or organic manures and avoid sowing into lush or nutrient-rich soils, as this will favour grasses over wildflowers and reduce establishment success.
Establishment management	NW-LM-1	Year 1	Maintain short grass during the first year and dispose of all clippings to encourage perennial plants to establish and avoid a flush of pernicious weed species. Mow or trim the grass monthly during the growing season to manage weed and grass growth while promoting the spread of perennial species.

[4] see https://www.gov.uk/find-funding-for-land-or-farms/ahw3-beetle-banks [Accessed 18.08.25].
[5] https://meadows.plantlife.org.uk/making-meadows/sowing-seed/green-hay-how-to-cut-collect-and-spread/#:~:text=Spreading%20Green%20Hay&text=Generally%2C%20green%20hay%20will%20land,to%20trample%20in%20the%20seeds.

			Avoid applying any fertiliser at any stage. Newly created beetle banks will be cut several times during the first growing season to aid establishment.
Long-term Management	NW-LM-1	Year 2+	Annual grass cuts in late August/early September to allow a range of wildflowers to set seed. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from site. Mow the regrowth through to late autumn/winter to circa 50mm and again in spring if needed. Alternatively low density aftermath grazing is also possible after the hay cut and will encourage a varied sward height. Cut or hand-pull pernicious and/or invasive weeds before they seed in late summer. As a last resort option, use glyphosate spray to spot-treat affected areas only. Beetle banks will be cut between August and November as necessary to remove woody vegetation and/or undesirable species such as thistles.
Protected species and Wildlife considerations	NW-LM-1	Project duration	To minimise risks to ground-nesting birds, mowing will begin by cutting field margins first (c.20m). Mowing will then cut the field's centre line before working outwards in a circular fashion towards the already cut margins. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided and mowing will not be undertaken within the area until after chicks have fledged. Leave at least one margin in each field (minimum 12 metres in width) to be cut at the end of the season (September/Early Oct). This can be a shelter for any ground-nesting species to escape during mowing. This can also help maintain species that flower later, alternating the margin each year.
Supplementary Seeding (if required)	NW-LM-1	Year 5+	Spread supplementary native green hay can be introduced as necessary in response to poor establishment uptake by broadcasting seeds. Alternatively, consider plug-planting if only certain desired species have failed to establish, but the sward is otherwise in good condition.

Lowland Meadow Species Lists (GH-T03)

Species below are based on the Meadow Mania Species-Rich Neutral Grassland seed mix

Common Name	Scientific Name	Abundance / %	Comments
Wildflowers (~20-25 species)			
Common Knapweed	*Centaurea nigra*		
Oxeye Daisy	*Leucanthemum vulgare*		
Yellow Rattle	*Rhinanthus minor*		*Key species for reducing grass vigour*
Bird's-foot Trefoil	*Lotus corniculatus*		
Red Clover	*Trifolium pratense*		
Selfheal	*Prunella vulgaris*		
Ribwort Plantain	*Plantago lanceolata*		
Meadow Buttercup	*Ranunculus acris*		
Lady's Bedstraw	*Galium verum*		
Yarrow	*Achillea millefolium*		
Meadowsweet	*Filipendula ulmaria*		*Optional for damper sites*
Field Scabious	*Knautia arvensis*		
Small Scabious	*Scabiosa columbaria*		
Red Campion	*Silene dioica*		
Kidney Vetch	*Anthyllis vulneraria*		*Optional addition*
Tufted Vetch	*Vicia cracca*		
Meadow Vetchling	*Lathyrus pratensis*		
Salad Burnet	*Sanguisorba minor*		
Devil's-bit Scabious	*Succisa pratensis*		*High biodiversity value*
Germander Speedwell	*Veronica chamaedrys*		
Grasses (~6–8 fine-leaved native species)			
Crested Dog's-tail	*Cynosurus cristatus*		
Red Fescue	*Festuca rubra*		
Common Bent	*Agrostis capillaris*		
Sweet Vernal Grass	*Anthoxanthum odoratum*		
Quaking Grass	*Briza media*		*If available*
Downy Oat Grass	*Helictotrichon pubescens*		
Sheep's Fescue	*Festuca ovina*		*Optional*

Other Supporting Information

Supporting Information (GH-B02)

Note: The exact species mix and composition have yet to be confirmed and will depend on the availability of a suitable donor site. The species list above is indicative of those considered appropriate for inclusion, based on the Meadow Mania Species-Rich Neutral Grassland seed mix and on those typically found in a lowland meadow (NVC classification MG5 / UKHab g3a). Seed mixes should be suitable for neutral soil. Other comparable seed mixes include:

- Emorsgate EM5 Meadow Mixture for Loamy soils
- Emorsgate EM3 Special General-Purpose Meadow Mixture

What Does Success Look Like? (GH-F01)





Pond

Creation, Enhancement and Management Summary (PO-T01)

Target Habitat:			Pond (Priority Habitat)		
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHab Category Description*** *Permanent and seasonal standing water bodies that are <2ha in extent AND meet one of more of the UK Priority Habitat Criteria.*	Yes	P1, P2, P3, P4	The ponds will be created close to existing ponds, which support great crested newts, and therefore qualify as priority habitat ponds for supporting a species protected under the Wildlife and Countryside Act (1981) Schedule 5 (see Figure 13 within Appendix ES6.9: Biodiversity Net Gain Assessment). The ponds will be designed to provide suitable habitats for GCN, encouraging this species to colonise.	Management will aim to promote the continued suitability of new ponds for GCN and the continued connectivity between new ponds and off-site ponds located within Heyford Park.
A	The pond is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution. Turbidity is acceptable if the pond is grazed by livestock.	No	P1, P2, P3, P4	While not specifically targeted, the ponds will be allowed to fill naturally, and they will be created within semi-natural habitats where no fertiliser use will be permitted. This will reduce the risk of eutrophication or pollution caused by artificial filling or run-off.	Fertiliser application will be prohibited within medium-distinctiveness habitats across the Site, preventing run-off from entering newly created ponds and reducing the risk of eutrophication.
B	There is semi-natural habitat (moderate distinctiveness or above) completely surrounding the pond, for at least 10 m from the pond edge for its entire perimeter.	Yes	P1, P2, P3, P4	The ponds have been designed to sit within semi-natural habitats, which are proposed as other neutral grassland or scrub, managed to promote their biodiversity value in accordance with prescriptions presented in this document.	The management of surrounding grassland habitats as described within this document will maintain the presence of this 10m semi-natural habitat buffer around the proposed pools.
C	Less than 10% of the water surface is covered with duckweed *Lemna* spp. or filamentous algae.	No	P1, P2, P3, P4	While not specifically targeted, the ponds will be allowed to fill naturally and they will be created within to semi-natural habitats where no fertiliser use will be permitted. This will reduce the risk of eutrophication that can lead to algal/duckweed blooms.	Fertiliser application will be prohibited within medium distinctiveness habitats across the Site, reducing the risk of pond eutrophication from run-off.
D	The pond is not artificially connected to other waterbodies, such as agricultural ditches or artificial pipework.	Yes	P1, P2, P3, P4	No artificial drainage features will be dug as part of the proposals and the ponds will be dug as separate features within artificial connections.	N/A
E	Pond water levels can fluctuate naturally throughout the year. No obvious artificial dams, pumps or pipework.	Yes	P1, P2, P3, P4	The ponds are designed to be allowed to drain or fill naturally. The ponds will not be lined unless necessary to hold water and no dams, pumps or pipework will feature in their design.	N/A
F	There is an absence of listed non-native plant and animal species.	Yes	P1, P2, P3, P4	When carrying out work during pond creation – biosecurity measures must be employed to prevent non-native plant or animal species being introduced to the Site.	Regular monitoring will track the presence of invasive non-native species and will trigger remedial action where necessary to remove their presence.

G	The pond is not artificially stocked with fish. If the pond naturally contains fish, it is a native fish assemblage at low densities.	Yes	P1, P2, P3, P4	Fish will not be introduced during pond creation.	Ponds will be monitored for any fish introductions and remedial measures taken where non-native fish assemblies are introduced or where native fish assemblages are seen at high densities, exhibiting signs of detrimental effects on the ponds.
H	In non-woodland ponds: emergent, submerged or floating plants (excluding duckweed)[3] cover at least 50% of the pond area which is less than 3 m deep. (only applicable to non-woodland ponds)	Yes	P1, P2, P3, P4	Ponds will be created with varied depth and shallow draw down zones, underwater bars and shoals to create a variety of micro-climates for flora and fauna. Ponds will be allowed to naturally colonise with marginal/emergent/aquatic plants.	Ponds will require minimal management once established. Monitoring will track the successful establishment of marginal, emergent and aquatic plants with remedial measures taken where any failures are observed (i.e. cutting and removal of arisings where reeds outcompete or replanting/reseeding)
I	The pond surface of non-woodland ponds is no more than 50% shaded by adjacent trees and scrub. (only applicable to non-woodland ponds)	Yes	P1, P2, P3, P4	Tree and scrub planting will not be undertaken along the banks of any of the newly created ponds.	Ponds will be monitored and where excessive shading is observed, remedial measures will include the thinning of tree/shrubs around the ponds.

Pond

Creation, Enhancement and Management Detailed Methods (PO-T02)

Action	Relevant Parcels	Timing	Prescriptions
Pond creation	P1, P2, P3, P4	Year 0	Ponds will be dug in late summer/early autumn during a dry period to minimise soil disturbance and compaction. The design will include a varied bed profile with both shallow and deep areas to prevent freezing, and a drawdown zone—a broad, gently sloping margin—to allow for a dynamic fringe of vegetation. Underwater features, such as bars and shoals, will be created to provide diverse micro-climates and a range of substrates. Boulders, logs, and other coarse woody debris will be placed in and around the pond margins to provide shelter for amphibians and invertebrates. The pond will not be lined (unless necessary) and will be allowed to naturally fill with rainwater. Ponds will be allowed to naturally colonise with marginal, emergent and aquatic plants, which will typically quickly colonise new wetland features.
Supplementary pond planting	P1, P2, P3, P4	Year 3+	Although letting the pond colonise naturally is the preferred management option, if marginal, emergent and aquatic plants are not successfully colonising naturally, a range of plug plants tolerant of inundated soil conditions will be introduced into the ponds. Ideally, translocating native pond plants from nearby ponds where appropriate should be considered, but careful checks should be undertaken to avoid accidentally transferring seeds or fragments of non-native invasive or undesirable plants. Pot grown plants or plugs will be planted out in April or May when frosts have passed. Plants will be sourced from a reputable supplier or can be grown in advance from seeds or cuttings. Aquatic plants favoured by newts including GCN and supporting egg laying, such as Water Forget-Me-Not *Myosotis scorpioides*, Water Mint *Mentha aquatica*, Brookline *Veronica beccabunga,* and Starwort *Callitriche stagnalis*, will be selected*. See species below for the full list of suitable species.* Aquatic plants can be introduced directly into the pond following the supplier's instructions. Fertiliser or topsoil will not be used during planting. **Careful planning and checks should be conducted before planting to avoid disturbing GCN.**
Ongoing Monitoring	P1, P2, P3, P4, P50	Year 5+	Following establishment, ponds will require minimal management. Monitoring will track the establishment of vegetation and will trigger remedial measures where appropriate.

Pond Species Lists (PO-T03)

Common Name	Scientific Name	Plants per m^2	Comments
Brooklime	*Veronica beccabunga*	1.0	Marginal herbs 0-20cm depth
Fool's-water-cress	*Apium nodiflorum*	0.5	
Water Mint	*Mentha aquatica*	0.25 (1 plant per 4m^2)	
Lesser Water-parsnip	*Berula erecta*	0.5	
Water Forget-me-not	*Myosotis scorpioides*	1.0	
Water-plantain	*Alisma plantago-aquatica*	0.5	
Common Water-starwort	*Callitriche stagnalis*	0.5	Submergent
Frogbit	*Hydrocharis morsus-ranae*	1	Floating-leaved plant
Branched Bur-reed	*Sparganium erectum*	0.1- 0.2	Tall emergent – chose either as can dominate quickly 20- 60cm depth
Reed Sweet-grass	*Glyceria maxima)*	0.05 -0.1	
Purple Loosestrife	*Lythrum salicaria*	0.25	Tall emergent 20- 60cm depth

Other Supporting Information

Supporting Information (PO-B02)

Ensure plants are UK-grown native wetland varieties and include a mixture of marginals, floating, and submergent species.

Care will be taken to avoid the introduction of invasive non-native species during pond planting, with all aquatic and marginal plants sourced from reputable suppliers, verified as native species, and planted in accordance with best practice biosecurity measures.

5–7 plants per m² total. Water Mint, Reed sweet-grass, Bur-reed, Purple loosestrife can all outcompete others so planting densities of these should be reduced.

What Does Success Look Like? (PO-F01)



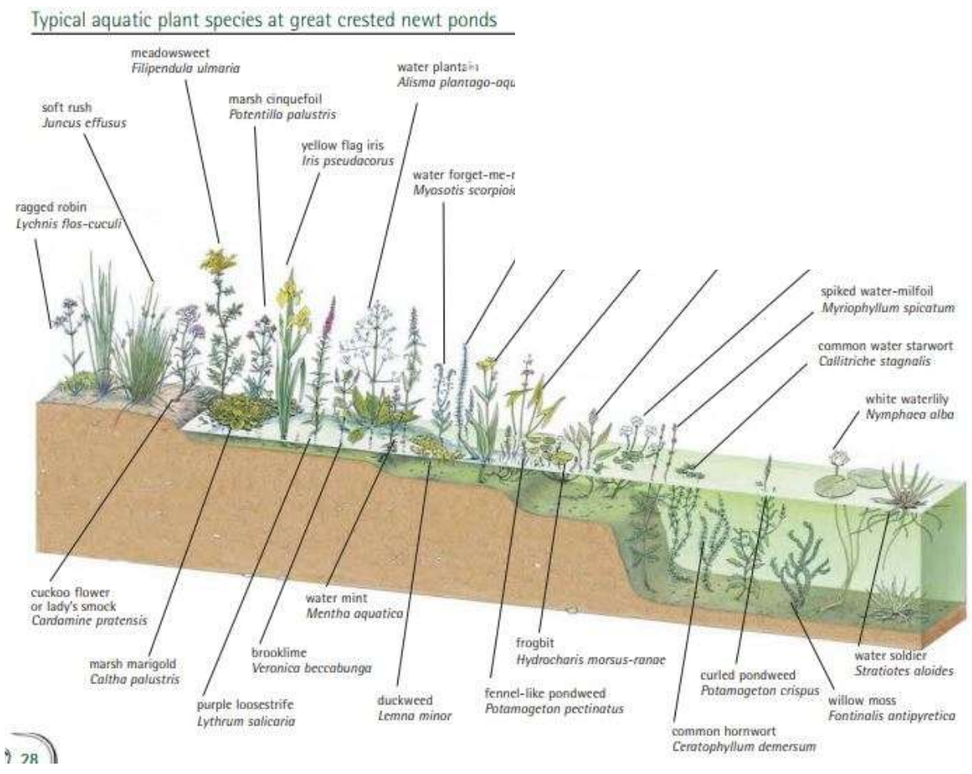


Diagram from GCN Conservation Handbook. Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001), Great Crested Newt Conservation Handbook, Froglife, Halesworth

Scrub

Creation, Enhancement and Management Summary (SC-T01)

Target Habitat:			Mixed Scrub		
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation approach**	**Management Approach**
*	***UKHab Category Description*** *Dense scrub comprising a mixture of species without a single species dominant or stands with a dominant species.*	Yes	BL-SC (All) SE-SC (All)	Planting will include at least five native woody species in each new scrub block, with no species comprising more than 50% of the planted specimens. This will allow a diverse area of mixed scrub to be established. All species planted will be native species.	Scrub will be managed through a combination of rotational coppicing undertaken every five years, with no more than a quarter of the total scrub area of the site cleared at any one time and pruning depending on the species. Hawthorn and blackthorn will be managed through regular pruning following establishment to prevent them becoming too tall and dominating the canopies of scrub blocks. These species will also be selectively thinned where it is considered appropriate. The remaining species will be brought under a 21-year rotational cycle whereby blocks of scrub will be coppiced every 7 years, aiming for approximately 1/3rd of the total scrub resource across the Site every 7 years, whereby each scrub block will be coppiced every 21 years. Where appropriated, scrub will be coppiced through selective thinning of blocks to ensure that the coppicing does not lead to one species dominating more than 75% of the canopy of the remaining scrub block. These two different management approaches will help to create a structurally diverse habitat.
A	The parcel represents a good example of its habitat type – the appearance and composition of the vegetation closely matches its UKHab description (where in its natural range). - At least 80% of scrub is native, - There are at least three native woody species, - No single species comprising more than 75% of the cover (except hazel *Corylus avellana,* common juniper *Juniperus communis,* sea buckthorn *Hippophae rhamnoides* or box *Buxus sempervirens,* which can be up to 100% cover).	Yes	BL-SC (All) SE-SC (All)		
B	Seedlings, saplings, young ~~shrubs~~ scrub and mature (or ancient or veteran) ~~shrubs~~ scrub plants are all present.	Yes	BL-SC (All) SE-SC (All)	N/A	Rotational coppicing and/or ~~the~~ pruning of scrub will ensure that diverse age ranges are present across the site. Individual scrub blocks will be rotationally cut/coppiced to ensure that in addition to the Site wide resource of scrub supporting a diverse age range, this will also be the case within each scrub block present across the Site through the combination of coppicing and pruning management of different species.
C	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA) and species indicative of suboptimal condition make up less than 5% of ground cover.	Yes	BL-SC (All) SE-SC (All)	No fertiliser will be used during planting of the scrub to prevent eutrophication of the soil. All scrub planting will utilise native species only.	Regular monitoring will track the presence of invasive non-native species or those indicative of sub-optimal condition and will trigger remedial action where necessary to remove or reduce their presence respectively.

D	The scrub has a well-developed edge with scattered scrub and tall grassland and or forbs present between the scrub and adjacent habitat.	No	BL-SC (not targeted) SE-SC (All)	The south-east scrub blocks will be created in a mosaic with substantial edge habitat.	Rotational coppicing of scrub blocks will help to create scalloped edges and bays along the boundaries between scrub and grasslands to maximise the ecotone habitats present.
E	There are clearings, glades or rides present within the scrub, providing sheltered edges.	No	BL-SC (not targeted) SE-SC (All)	The mosaic nature of the planting will allow provide rides between blocks of scrub and woodlands.	These grassland areas will be managed in accordance with an annual hay cut.

Scrub

Creation, Enhancement and Management Detailed Methods (SC-T02)

Action	Relevant parcels	Timing	Prescriptions
Ground Preparation	BL-SC (All) SE-SC (All)	Year 0 – Autumn/Winter	Remove the existing dense grass cover to reduce competition. Apply herbicide to control weed growth/docks before planting (only if required). An appropriately qualified contractor will select an appropriate herbicide. Any chemicals will be used in accordance with the product label. Alternatively, control by hand, although this can be difficult.
Scrub Planting	BL-SC (All) SE-SC (All)	Year 0 – Autumn to Early Spring	• Plant native scrub species in the new scrub blocks with a naturalistic pattern. • Plant approximately 1,000 whips per hectare in groups of 3-4 species with similar growth rates. • Use tree guards to protect young plants • Space plants at varying distances of 1-3 metres apart to create structural diversity • Plant hawthorn and blackthorn in small clumps throughout the scrub blocks, avoiding edges. • Intermittently plant honeysuckle and clematis between scrub plants within the planting rows. • Design the scrub planting to include significant edge habitats and structural diversity, including clearings and glades. • Excavate shallow square planting pits larger than the whip's root ball, using existing soils for backfilling. • Avoid using compost or fertiliser during planting • Plant each tree slightly above ground level to ensure the base meets the soil level, aiming for 25mm above it. • Apply a layer of organic mulch to retain moisture, suppress weeds and improve soil fertility.
Establishment	BL-SC (All) SE-SC (All)	After planting (In Year 1 to Year 5)	In the first few years, to enhance growth, provide supplemental watering during dry periods and remove competing weeds around young plants. Keep a circle of at least 1m^2 around each tree free from weeds, particularly grasses, as this will compete with young shrubs for water and nutrients. Apply 5-10cm of organic mulch around the tree base (but not touching the stem). Mulching will also help retain soil moisture. Weeds can also be hand-pulled or hoed around young trees every few months, or alternatively, mow or strim around the trees to suppress weeds. However, this must be done carefully to avoid damage to the trees. Avoid the use of herbicides. Herbicide spot treatment should only be considered a last-resort option to deal with pernicious weeds. Weed control should be carried out once or twice a year (approximately years 1-5).
Long-term management	BL-SC (All) SE-SC (All)	Year 5+	Starting in year 7, a program of selective thinning will be implemented. Every 7 years, 1/3rd of the total scrub resource will be coppiced and pruned in rotation. This will be done in specific areas within the scrub blocks to promote the growth of ground flora. Hawthorn and blackthorn will be pruned as needed, as these species do not respond well to coppicing. The remaining species will be managed through coppicing. During coppicing and pruning, retain at least 25% of brash and deadwood in situ. Avoid cutting large contiguous areas at once to maintain habitat connectivity. • Allow certain areas to mature while periodically clearing others will promote a range of scrub age classes. • Create a mosaic of dense and open spaces • Scrub will be kept to a maximum height of 5 metres. • Cut marginal rough grass and tall herbs on rotational to increase age ranges within the scrub and provide structural diversity. • Scrub should not be allowed to grow and spread onto adjacent grassland habitat

Aftercare – removal of tree guards & tie	BL-SC (All) SE-SC (All)	Years 5-10	Remove tree guards and ties (unless required to support replacement specimens).
Replacement planting	BL-SC (All) SE-SC (All)	Year 5+	Where failed specimens occur, supplementary planting will be undertaken as necessary between November and March.
Protected species and wildlife considerations	All	Project lifetime	**Nesting Birds:** All scrub management works will be timed to avoid the bird nesting season, thereby preventing disturbance to nesting birds. **Dormouse**: Scrub management will be undertaken outside sensitive periods for hazel dormice and, where necessary, will be informed by a check by a suitably qualified ecologist to avoid disturbance.

Scrub Species Lists (SC-T03)

Suggested native scrub species mix

Common Name	Scientific Name	Abundance / %	Comments
Main scrub species			
Hawthorn	*Crataegus monogyna*	30%	Main scrub species
Blackthorn	*Prunus spinosa*	20%	Main scrub species
Buckthorn	*Rhamnus cathartica*	10%	Main scrub species
Dog rose	*Rosa canina*	10%	Main scrub species
Guelder rose	*Viburnum opulus*	10%	Main scrub species
Wild Privet	*Ligustrum vulgare*	10%	Main scrub species
Elder	*Sambucus nigra*	10%	Main scrub species
Edge species and climbers			
Dog wood	*Cornus sanguinea*	20%	Edge scrub species
Hazel	*Corylus avellana*	20%	Edge scrub species
Wayfaring tree	*Viburnum lantana*	20%	Edge scrub species
Spindle	*Euonymus europaeus*	20%	Edge scrub species
Dog rose	*Rosa canina*	20%	Climber
Honeysuckle	*Lonicera periclymenum*	-	Climber
Clematis	*Clematis vitalba*	-	Climber

Other Supporting Information

Supporting Information (SC-B02)

Local whips/cuttings should be sourced where possible. Plants should be pest—and disease-free and grown in the UK. Where possible, source plants from Plant Health-certified nurseries.

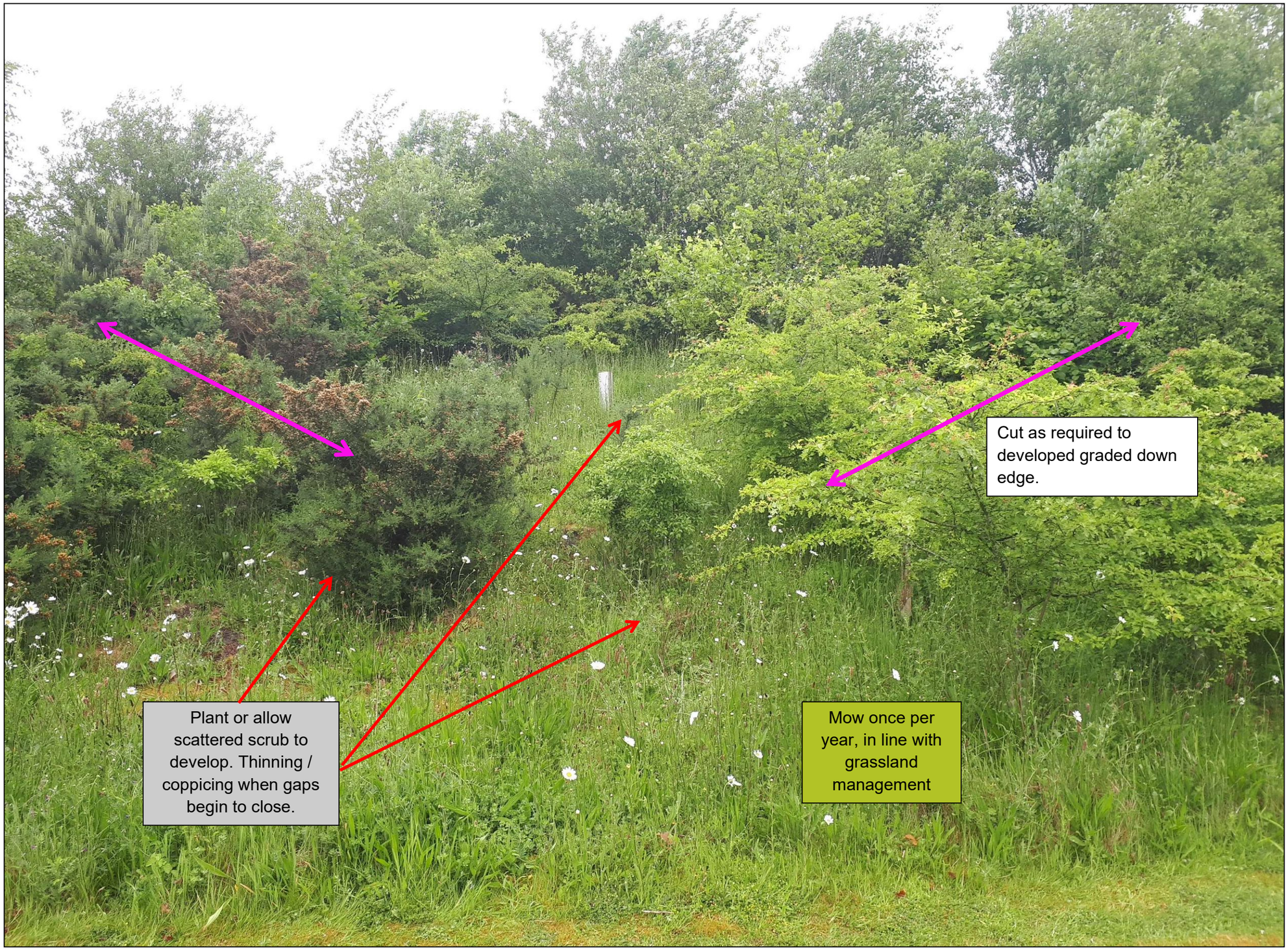
Planting a mix of **native scrub species** will help create a dynamic and biodiverse habitat. The species listed above are well-suited to local conditions and offer a range of benefits for wildlife, including shelter and food sources. When planting, aim for a variety of species to create layers of vegetation that will support a wider range of species and ecological functions.

What Does Success Look Like? (SC-F01)





Example Scalloped edge scrub habitat.



Urban – Sustainable Urban Drainage System (SuDS)

Creation, Enhancement and Management Summary (UR-T01)

Target Habitat:			Sustainable Urban Drainage System (SuDS)		
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
A	Vegetation structure is varied, providing opportunities for vertebrates and invertebrates to live, eat and breed. A single structural habitat component or vegetation type does not account for more than 80% of the total habitat area.	Yes	BL-SD (All) MS-SD All)	The SuDS will be designed to support a degree of variation in the bed profile, with wide, shallow drawn-down zones. This will create micro-variations in soil conditions, encouraging a range of plant species to establish.	Long-term management will comprise a combination of annual mowing of the bankside and a rotational cutting regime for areas of emergent and marginal vegetation. This will help to maintain vegetation diversity across the SuDS features.
B	The habitat parcel contains different plant species that are beneficial for wildlife, for example flowering species providing nectar sources for a range of invertebrates at different times of year.	Yes	BL-SD (All) MS-SD (All)	The banksides of SuDS will be sown with a native species-rich seed mix suitable for wet grasslands (such as Emorsgate Seeds' EP1 Pond Edge Mixture). This will encourage a variety of plant species to establish with a range of flowering times.	Long-term management, comprising mowing and rotational cutting, will help maintain a variety of plant species. Monitoring will track diversity, and when SuDS begin to be dominated by a limited number of species, supplementary seed sowing can be undertaken.
C	Invasive non-native plant species (listed on Schedule 9 of WCA) and others which are to the detriment of native wildlife (using professional judgement) cover less than 5% of total vegetated area. **Note - to achieve Good condition, this criterion must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).**	Yes	BL-SD (All) MS-SD (All)	The chosen seed mix will contain only native species suitable for wetland habitats. When carrying out work during SuDS creation, biosecurity measures must be implemented to prevent the introduction of non-native plant or animal species to the Site.	Regular monitoring will track the presence of invasive non-native species and trigger remedial action where necessary to remove them.
E1	Plant species are mostly native. If non-native species are present, they should not be detrimental to the habitat or native wildlife. (only applicable to Bioswale and SUDS habitat types)	Yes	BL-SD (All)	The chosen seed mix will contain only native species suitable for wetland habitats.	Regular monitoring will check for the presence of non-native species and, should they begin to dominate vegetation in SuDS, remedial removal measures can be introduced.
E2	The vegetation is comprised of plant species suited to wetland or riparian situations. (only applicable to Bioswale and SUDS habitat types)	No	N/A	This is not specifically targeted as SuDS will only be seasonally wet, which may limit the dominance of wetland/riparian plants.	

Urban – Sustainable Urban Drainage System (SuDS)

Creation, Enhancement and Management Detailed Methods (UR-T02)

Action	Relevant Parcels	Timing	Prescriptions
SuDS Creation	BL-SD (All) MS-SD (All)	Year 0 – Late Summer/early Autumn	Excavation will be undertaken during a dry period to minimise soil compaction. The design will feature a varied bed profile with a range of depths from shallow margins to deeper central areas in accordance with the drainage scheme requirements. The aim is to prevent the entire waterbody from freezing or drying out. SuDS will include a wide, shallow drawdown zone with a gently sloping margin (1:5 or shallower). This area will be left largely unvegetated initially to allow wetland plants to naturally colonise. SuDS will be allowed to fill naturally.
Sow Pond Edge Seed Mix	BL-SD (All) MS-SD (All)	Year 0 – Autumn after Pond Creation	The banksides will be sown with a seed mix to encourage the establishment of wet grassland banks. Broadcast the seed mix on banksides using the Emorsgate Seeds' EP1 Pond Edge Mix or similar approved at a rate of 40 kg per hectare. Sow the seeds when the soil is saturated but not flooded, ideally in calm wind conditions. After sowing, roll the seed to ensure it is properly bedded in. There is likely to be a flush of annual weeds. While these weeds can look unsightly, they provide shelter for sown seedlings and are beneficial to invertebrates. Therefore, do not cut the annual weeds until mid-to late summer. Then, cut, remove and compost.
Ongoing Management (SuDS)	BL-SD (All) MS-SD (All)	Year 1 +	Wet grassland, which only occasionally or seasonally floods, can be managed as meadow or grassland. Following establishment, the central part of the SuDS will be subject to a rotational cutting regime. This will involve cutting no more than one-third of the total vegetation area in any given year. All cuttings will be removed from the pond area to prevent nutrient enrichment. Monitoring will track vegetation establishment and trigger remedial measures where appropriate.
Aftercare Management (Banksides)	BL-SD (All) MS-SD (All)	Year 1	Maintain short grass on the bankside during the first year and dispose of all clippings. Mow or trim the grass monthly during the growing season to manage weed and grass growth while promoting the spread of perennial species. If ~~you need~~necessary to mow before July in the first year, do so above the height of the germinated yellow rattle plants to enable this annual species to bloom and produce seeds. Avoid applying any fertiliser. Leave the central wet/damp part of the SuDS to allow marginal/wetland plants to continue to establish.
Short-term Management (Banksides)	BL-SD (All) MS-SD (All)	Year 2 – 9	After successfully implementing the establishment management stage of grassland banksides, take a grass cut at the first opportunity that weather conditions allow from ~~late July~~August onwards, after wildflower seeds have been set. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from the site. Variation in structure can be achieved by cutting back and removing short sections of vegetation every 2-3 years in rotation Mow the regrowth through to late autumn/winter to a height of circa 50mm, and again in spring if needed.
Long-term Management (Banksides)	BL-SD (All) MS-SD (All)	Year 10+	In years 10+, annual grass cuts from the bankside only from ~~late July~~August onwards, after wildflower seeds have set. Continue annual grass cutting at the first opportunity that weather conditions allow. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from the site. Mow the regrowth through to late autumn/winter to circa 50mm and again in spring if needed. Variation in structure can be achieved by cutting back and removing short sections of vegetation every 2-3 years in rotation Cut or hand-pull pernicious and/or invasive weeds before they seed in late summer. Glyphosate use should be avoided near to waterbodies. Machines and heavy equipment should be used with care on wet sites to avoid damage to soil and vegetation.
Supplementary Seeding (if required)	BL-SD (All) MS-SD (All)	Year 5+	Spread supplementary native wildflower seeds as necessary in response to poor establishment uptake on banksides by broadcasting seeds. Sowing must be undertaken in still wind conditions when the soil is saturated but not flooded.

SuDS Species Lists (UR-T03)

Species list is based on Emorsgate EP1 Pond Edge Mixture

Common Name	Scientific Name	Abundance / %	Comments
Wildflowers – 20%			
Wild Angelica	*Angelica sylvestris*	1.00%	
Betony	*Betonica officinalis*	0.40%	
Common Knapweed	*Centaurea nigra*	2.40%	
Wild Teasel	*Dipsacus fullonum*	0.60%	
Hemp Agrimony	*Eupatorium cannabinum*	0.20%	
Meadowsweet	*Filipendula ulmaria*	2.00%	
Hedge Bedstraw	*Galium album*	1.00%	
Water Avens	*Geum rivale*	0.60%	
Yellow Iris	*Iris pseudacorus*	4.00%	
Meadow Vetchling	*Lathyrus pratensis*	0.40%	
Greater Bird's-foot Trefoil	*Lotus pedunculatus*	0.10%	
Purple Loosestrife	*Lythrum salicaria*	1.00%	
Gypsywort	*Lycopus europaeus*	0.10%	
Corky-fruited Water-dropwort	*Oenanthe pimpinelloides*	0.60%	
Selfheal	*Prunella vulgaris*	2.00%	
Meadow Buttercup	*Ranunculus acris*	1.00%	
Red Campion	*Silene dioica*	0.80%	
Ragged Robin	*Silene flos-cuculi*	0.80%	
Tufted Vetch	*Vicia cracca*	1.00%	
Grasses – 80%			
Common Bent	*Agrostis capillaris*	8.00%	
Star Sedge (w)	*Carex echinata*	4.80%	
Crested Dogstail	*Cynosurus cristatus*	32.00%	
Red Fescue	*Festuca rubra*	17.60%	
Meadow Barley (w)	*Hordeum secalinum*	1.60%	
Smaller Cat's-tail (w)	*Phleum bertolonii*	9.60%	
Smooth-stalked Meadow-grass	*Poa pratensis*	6.40%	

Other Supporting Information

Supporting Information (UR-B02)

The habitat value of pond-edge sowings is enhanced when there is a variety of vegetation structures, from dense tussock stands to bare and recently colonised mud. Management of these wetland areas should therefore aim to create variation with minimum disturbance to animal populations.

What Does Success Look Like? (UR-F01)





Individual Trees

Creation, Enhancement and Management Summary (UT-T01)

Target Habitat:			Urban & Rural Trees		
Condition Assessment Criteria		**Targeted**	**Relevant Features**	**Creation Approach**	**Management Approach**
A	The tree is a native species (or more than 70% within the block are native species).	No	All	This criterion is not specifically targeted for all proposed trees as a range of non-native species will be planted in associated with the formal green infrastructure areas. In areas of informal GI, the planting on native tree species will be encouraged.	N/A
B	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	Yes	All	Trees will be planted as individual trees where they will not compete with neighbouring trees or scrub, allowing them to grow a full and continuous canopy.	N/A
C	The tree is mature (or more than 50% within the block are mature).	No	All	N/A - This criterion will not be targeted due to the limited time frame available within his management plan (30 years), which will not be sufficient to allow a tree to grow to full maturity	N/A
D	There is little or no evidence of an adverse impact on tree health by human activities (such as vandalism, herbicide or detrimental agricultural activity). And there is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.	Yes	All	Trees will be mulched to prevent weed growth. Other than removing diseased or failed species, there will be no pruning or management.	No herbicides shall be used in the planting and establishment process. There will be no pruning or management other than the removal of diseased or failed species. Therefore, this should not hinder species from meeting this criterion.
E	Natural ecological niches for vertebrates and invertebrates are present, such as presence of deadwood, cavities, ivy or loose bark.	Yes	All	This criterion will not be targeted as it is unlikely that young, planted trees will be guaranteed to achieve this within the 30-year management period.	Even though the criterion is not targeted, trees may be managed through veteranisation where appropriate to encourage natural ecological niches.
F	More than 20% of the tree canopy area is oversailing vegetation beneath.	No	All	Trees are to be planted on areas of grassland.	Grassland will be maintained beneath tree canopies.

Individual Trees

Creation, Enhancement and Management Detailed Methods (UT-T02)

Action	Relevant Features	Timing	Prescriptions
Introduce tree planting	All	Year 1	Trees should be sought from a reputable supplier. Trees will be planted with sufficient space to grow to full maturity. Site selection must be mindful of overhead services to ensure mature tree canopies would not affect these. Selection should also be mindful of underground services, followed by>5m offset from any underground services. A range of trees ages are to be planted in accordance with the Indicative Planting Schedule (ES Chapter 7 Appendix 7.6), including whips, feathered whips and standards. Any evidence of existing soil compaction will be remediated before planting to ensure the soil can support tree establishment and growth. The planting pit dug will be a shallow square, larger than the tree's root ball. The base of the planting pit will be broken up to encourage aeration to the depth of a garden fork before tree planting. Backfilling of soil will utilise existing excavated soils only with no compost or fertiliser application. Existing subsoils and top-soils should be kept separate during excavation, with the subsoil backfilled first before topping with topsoil. Lightly firm down the backfill, avoiding compaction. Planting should aim to create scattered trees with a minimum of a 15-20m gap between trees, to reduce competition. Trees are to be mulched using wood chippings or bark to establish a 1m diameter around the tree stem. Planting will be undertaken from 1 November to 31 March as required when the ground is not frozen or waterlogged. This will accord with BS 8545:2014. • Species should be mixed and planted randomly. Species provided in the table below will create a diverse mix. • Plant with hand tools, such as spades – do not plough or cultivate. • No fertiliser or compost should be used. Trees should not be planted lower than the surrounding ground level, with the aim of planting to ensure that the base meets the soil level, which will be slightly above ground level, with an aim of 25mm above. Spiral guards are to be installed around whips to prevent them from being browsed. Standard trees should be tied and staked, with protective fencing installed where considered necessary to prevent excessive browsing.
Weed Control	All	Years 1-5	A weed-free mulched 1m diameter circle will be placed around the tree stem to a minimum depth of 75mm (but not touching the stem). When trees have reached independence, the sward can be allowed to grow up to the trunk, although tall weeds, bramble, and ivy will be removed from around the trees. Care will be taken when using strimmer or mower to avoid damaging trees. Weeds and grass within 100mm of the trunks will be removed by hand.
Aftercare	All	Year 1	Trees will be watered regularly during their first year after planting, when the soil becomes dry.
Aftercare	All	Years 1-5	Examine all tree stakes and ties and replace or adjust as appropriate. If the tree has yet to be established, replace or adjust ties, spacers, and tree tubes as appropriate. If the tree has established well, then remove all stakes, ties, spacers, tubes, etc., and disturb the good surfaces—filling any holes with suitable topsoil.
Failure replacement	All	Years 1-10	Replace failed specimens on a like-for-like basis, to be replaced in the next planting season. Top up mulch to a depth of 75mm where necessary.
Aftercare	All	Years 1-5	Where periods of extreme drought occur, trees that have not yet established (not healthy, not in full leaf, suppressed growth) need to be watered where their drought tolerance is deemed insufficient.
Removal of tree guards & ties	All	Years 5-10	Remove tree guards, stakes and ties (unless required to support replacement trees).

Individual Trees Species Lists (UT-T03)

Common Name	Scientific Name	Abundance / %	Comments
Maple	*Acer campestre 'Streetwise'*		Restricted to within built development zones and associated roads
Maple	*Acer platanoides varieties*		
Maple	*Acer rubrum*		
Alder	*Alnus glutinosa*		
Silver/ Downy Birch	*Betula pendula/ pubescens*		
Beech	*Fagus sylvatica*		
Hornbeam	*Carpinus betulus*		
Sweet chestnut	*Castanea sativa*		Restricted to within built development zones and associated roads
Elm (Nanguen- Lutece disease resistant cultivar)	*'Plantyn' × (U. minor × U. minor)) × ('Bea Schwarz' × 'Bea Schwarz'*		
Sessile oak	*Quercus petraea*		
English Oak	*Quercus robur*		
Wild service tree	*Sorbus torminalis*		
Small leaved lime	*Tilia cordata*		
Elm (Ademuz disease resistant cultivar)	*Ulmus x hollandica*		

The species mixes and associated details will be confirmed and agreed as part of the detailed design stage and confirmed by Soft Landscape/ Planting Plans. Variations in the planting mixes are likely to be introduced based upon the detailed design proposals.

Other Supporting Information

Supporting Information (UT-B02)

What Does Success Look Like? (UT-F01)



Veteran Trees (T150, T152, T170)

Creation, Enhancement and Management Summary (UT-T01)

Target Habitat:			Urban & Rural Trees		
Condition Assessment Criteria		**Targeted**	**Relevant Features**	**Creation Approach**	**Management Approach**
A	The tree is a native species (or more than 70% within the block are native species).	Yes	All	Retained ~~NPPF V~~veteran trees are native.	N/A
B	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	n/a	All	Trees retained in existing situation	N/A
C	The tree is mature (or more than 50% within the block are mature).	Yes	All	Retained NPPF Veterans are mature	N/A
D	There is little or no evidence of an adverse impact on tree health by human activities (such as vandalism, herbicide or detrimental agricultural activity). And there is no current regular pruning regime, so the trees retain >75% of expected canopy for their age range and height.	Yes	All	~~Manage as per veteran tree strategy (appendix 3).~~ Soil improvement works should aim to reduce compaction of previously cultivated soil to a radius of 5m. A layer of composted bark mulch to a depth of 10-20cm should then be applied to the area around the tree on all sides to act as a weed suppressant and retain valuable moisture to the roots. The mulch layer should not be laid in direct contact with the base of the stem. As this layer decomposes, the mulch will be replenished within a radius of 5m around the trees. A low post-and-wire fence, timber bollards, or other suitable barrier will be installed to prevent unauthorised human access or interference. New planting should aim to provide cover to the south face of veterans to help with resilience to spells of dry, hot weather. Manage on site relocated veteran tree material as per the Veteran Tree Strategy (Appendix 4).	~~Manage as per veteran tree strategy (appendix 3).~~ Replenish mulch within a radius of 5m around the trees. Surrounding vegetation should be carefully managed to avoid excessive shading whilst still providing protection from extreme desiccation. Canopies of surrounding trees should not be allowed to overlap with the veteran. Competitive vegetation such as grass will be managed regularly as to significantly reduce competition for nutrients. This management is considered necessary and the aim of which should serve to improve the conditions for the veteran tree in terms of nutrient uptake and so improve the vitality of a veteran tree as well as provide adequate soil volumes within the perceived rooting area. Where height or weight reduction is needed wounds arising from these works need to be kept to the minimum diameter necessary to achieve the objective. It is important to phase the reduction of the crown in order to mimic the natural aging process of the tree. Heavy or unsympathetic pruning may result in the rapid decline or death of the tree due to extensive reduction of vital stored energy reserves. Manage on site relocated veteran tree material as per the Veteran Tree Strategy (Appendix 4).
E	Natural ecological niches for vertebrates and invertebrates are present, such as presence of deadwood, cavities, ivy or loose bark.	Yes	All	Retained NPPF Veterans (retained in situ and as translocated material within the Veteran tree reserve) provide appropriate features.	Manage relocated veteran tree material on site as per the Veteran Tree Strategy (Appendix 4).~~N/A~~

F	More than 20% of the tree canopy area is oversailing vegetation beneath.	Yes	All	Grassland will be seeded beneath tree canopies where required.	Grassland will be maintained beneath tree canopies.

Veteran Trees (T150, T152, T170)

Creation, Enhancement and Management Detailed Methods (UT-T02)

Action	Relevant Features	Timing	Prescriptions
Monolith Creation	Removed trees	Year 1	Create monoliths as per ~~veteran~~ the Veteran T~~t~~ree S~~s~~trategy (A~~a~~ppendix ~~34~~). Large-diameter sections of felled trees will be repurposed into standing and lying monoliths, preserving decay features like heart rot and bark sloughing~~.~~.
Soil Improvement	All	Year 1	Soil improvement works should aim to reduce compaction of previously cultivated soil to a radius of 5m. A layer of composted bark mulch to a depth of 10-20cm should then be applied to the area around the tree on all sides to act as a weed suppressant and retain valuable moisture to the roots. The mulch layer should not be laid in direct contact with the base of the stem as the above harmful effects may cause bark death and leave the tree susceptible to colonisation by pathogenic organisms. As this layer decomposes, the mulch will be replenished within a radius of 5m around the trees.
Aftercare	All	Years 2-30	The mulch will be replenished within a radius of 5m around the trees.
Adjacent vegetation	All	Year 1	New planting should aim to provide cover to the south face of veterans to help with resilience to spells of dry, hot weather. Replace failed specimens within this planting on a like-for-like basis~~,~~ in the next planting season.
Adjacent vegetation	All	Years 1-30	Surrounding vegetation should be carefully managed to avoid excessive shading whilst still providing protection from extreme desiccation. Canopies of surrounding trees should not be allowed to overlap with the veteran. Competitive vegetation such as grass will be managed regularly as to significantly reduce competition for nutrients.
Aftercare	All	Years 1-30	Where height or weight reduction is needed wounds arising from these works need to be kept to the minimum diameter necessary to achieve the objective. It is important to phase the reduction of the crown in order to mimic the natural aging process of the tree. All of the above operations will be supervised by the appointed consulting Arboriculturist who will direct and guide the various works.

Other Woodland; Broadleaved

Creation, Enhancement and Management Summary (WO-T01)

Target Habitat:			Other woodland; broadleaved			
Condition Assessment Criteria			**Target Score**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
A	Age distribution of trees	Three age classes present	2	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	As this management plan will be in effect for 30 years, it will not be possible to target older and mature trees within the woodland.	Selective thinning of established woodlands will encourage natural regeneration. This will allow the woodlands to include young (0-20 yr old) and intermediate (20-60/150 yr old) age-class trees.
		Two age classes present				
		One age class present				
B	Wild, domestic and feral herbivore damage	No significant browsing damage evident in woodland	1	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	This will not be specifically targeted. If deer browsing begins to affect natural regeneration, remedial measures such as brash piling, the installation of fencing or deer population control can be introduced.	
		Evidence of significant browsing pressure is present in 40% or less of whole woodland				
		Evidence of significant browsing pressure is present in 40% or more of whole woodland				
C	Invasive plant species	No invasive species present in woodland	3	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Planting will comprise only native tree and shrub species.	All habitats across the Site will be monitored for the introduction of invasive non-native species and remedial measures will be introduced to remove and dispose of them appropriately if they establish.
		Rhododendron *Rhododendrion ponticum* or cherry laurel *Prunus laurocerasus* not present, other invasive species <10% cover				
		Rhododendron or laurel present, or other invasive species) 10% cover				
D	Number of native trees species	Five or more native tree or shrub species found across woodland parcel	3	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Tree planting will include at least 7 native tree or shrub species in each planting block.	Within the first 10 years, monitor and replace failed specimens like-for-like. After this, woodlands will begin to mature and become dense and additional planting is not advised. When selective thinning is undertaken, trees selected for thinning will be required to meet this requirement, ensuring that each block maintains a minimum of five native tree/shrub species. Supplementary planting will be undertaken as required.
		Three to four native tree or shrub species found across woodland parcel				
		Two or less native tree or shrub species present across woodland parcel				
E	Cover of native tree	>80% of canopy trees and >80% of understorey shrubs are native	3	NW-BW-01		

	and shrub species	50 – 80% of canopy trees and 50-80% of understorey shrubs are native <50% of canopy trees and <50% understorey shrubs are native		SE-BW (All) MS-BW (All) BL-BW (All)	Tree planting will comprise only native tree/shrub species.	If non-native species establish, selective thinning can be used to target their removal.
F	Open space within woodland	10-20% of woodland has areas of temporary open space. Unless woodland <10ha in which case 0-20% temporary open space is permitted. 21-40% of woodland has areas of temporary open space <10% or >40% of woodland has areas of temporary open space. But if woodland <10ha has <10% temporary open space, please see Good category.	3	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	All woodland planting blocks will be less than 10ha and planting will not include areas of temporary open space at the outset.	Woodlands will be managed through selective thinning and, where appropriate, coppicing, creating temporary open space.
G	Woodland regeneration	All three classes present in woodland; trees 4-7cm Diameter at Breast Height (DBH), saplings and seedlings or advanced coppice regrowth One or two classes only present in woodland No classes or coppice regrowth present in woodland	2	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	N/A	Selective felling and coppicing will encourage the natural regeneration within the gaps. Tree guards could protect any existing natural regeneration from browsing if necessary.
H	Tree health	Tree mortality less than 10%, no pests or diseases and no crown dieback 11% to 25% mortality and/or crown dieback or low risk pest or disease present Greater than 25% tree mortality and or any high risk pest or disease present	3	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	N/A	Establishment management includes the provision to replace any dead or dying trees. Monitor for signs of disease. Report any signs of ash dieback. Selective felling and ringbarking will target any dead or diseased trees.
I	Vegetation and ground flora	Recognisable NVC plant community at ground layer present, strongly characterised by ancient woodland flora specialists. Recognisable NVC plant community at ground layer present No recognisable NVC plant community at ground layer present.	1	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	N/A—This is not specifically targeted. Long-term management through selective thinning and coppicing will help vary light levels in the ground layer and encourage the development of shade-tolerant woodland herbs.	

J	Woodland vertical structure	Three or more storeys across all survey plots or a complex woodland. Two storeys across all survey plots One of less storey across all survey plots	2	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Planting will include a range of native tree species and shrub understorey species with different growth rates that will encourage the establishment of a minimum of two storeys over the 30-year management period.	Management through selective felling and coppicing will maintain and encourage natural regeneration and diversify the woodland structure.
K	Veteran trees	Two of more veteran per hectare One veteran tree per hectare No veteran trees present in woodland	1	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	N/A – this is not targeted within the 30-year management period.	
L	Amount of deadwood	50% of all survey plots within the woodland parcel have deadwood, such as standing deadwood, large dead branches and or stems and stumps, or an abundance of small cavities. Between 25% and 50% of all survey plots within the woodland parcel have deadwood, such as standing deadwood, large dead branches and or steams, stubs and stumps, or an abundance of small cavities. Less than 25% of all survey plots within the woodland parcel have deadwood, such as standing deadwood, large dead branches and or steams, stubs and stumps, or an abundance of small cavities.	2	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Deadwood generated from the clearance of existing woodland areas will be installed amongst woodland planting to introduce large deadwood pieces from the outset of woodland creation. These will be scattered through the planting as individual pieces and into log piles to create a variation of habitat features for different faunal species to utilise.	A proportion of deadwood through dying trees or selective thinning will be retained within the woodland areas. Excess deadwood can be used to create log piles elsewhere within the Site.
M	Woodland disturbance	No nutrient enrichment or damaged ground evident Less than 1 hectare in total of nutrient enrichment across woodland area and or less than 20% of woodland area has damaged ground More than 1 hectare of nutrient enrichment and or more than 20% of woodland area has damaged ground	1	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	This is not specifically targeted, however, no fertilisers will be used within the management of medium, high and very high distinctiveness habitats across the site at any time.	

Other Woodland; Broadleaved

Creation, Enhancement and Management Detailed Methods (WO-T02)

Action	Relevant Parcels	Timing	Prescriptions
Ground preparation	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Year 0 – Autumn/Winter	Prepare the ground by clearing all existing vegetation in late autumn/early winter and then lightly cultivate the soil to a depth of 30cm to alleviate compaction and create a suitable planting bed.
Tree Whip Planting	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Year 0 – Autumn/Winter	Plant a diverse mix of native broadleaved tree species. The mix will be composed of native species appropriate for the local area, including fast-growing pioneer species (e.g., birch, rowan, hazel) and slower-growing canopy species (e.g., pedunculate oak, ash, field maple). The mix will be planted at a range of densities (e.g., 1,100-2,500 stems per hectare) to encourage structural diversity Plant whips in a naturalised pattern, avoiding straight lines and uniform spacing. Clusters and groups of trees will be planted to replicate a more natural woodland structure, with smaller gaps left to promote light-loving ground flora. The species mix within each individual woodland planting area will include at least seven native species per planting area, comprising a minimum of four canopy and understorey three species. The mix will include trees with different growth rates. Fast-growing species like birch and hazel will be interspersed with slower-growing, long-lived species such as oak and beech. The mix of canopy and understorey shrubs will help to establish a multi-layered structure from the outset. Dig planting pits that are slightly wider and deeper than the whip's root system. The bottom of the pit should be firmed and the roots should be spread out before backfilling with the original soil, ensuring the root collar (the point where the stem meets the roots) is level with the surrounding ground or slightly above. Ensure the root collar is not below the surrounding ground level. The soil around the base should be firmed gently but firmly to prevent air pockets. All newly planted trees will be protected with individual spiral guards and stakes to prevent damage from grazing mammals (e.g., deer, rabbits). Newly planting whips should be mulched using woodchips or shredded bark for a minimum of 50cm-1m diameter around each whip (but not touching the stem) to help inhibit weed growth during establishment and retain moisture. The mulch layer should be approximately 75-100mm deep. Prior to mulching, ensure the area is weed free.
Aftercare Management	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Years 1-5	During the first five years, keep a circle of at least 1m^2 around each tree free from weeds, particularly grasses, as this will compete with young trees for water and nutrients. Weeds can also be hand-pulled or hoed around young trees every few months, or alternatively, mow or strim around the trees to suppress weeds. However, this must be done carefully to avoid damage to the trees. Avoid the use of herbicides. Herbicide spot treatment should only be considered a last-resort option. Weed control should be carried out once or twice a year until the canopy has closed (approximately 3-5 years). Trees will be watered during the first few years of growth where soil becomes dry to promote healthy establishment, with the frequency of watering increased for woodland planting on bunds as required. Examine all tree stakes and ties, replace or adjust as appropriate. If the tree has yet to establish, replace or adjust ties, spacers and tree tubes as appropriate. If the tree has established well, then remove all stakes, ties, spacers, tubes etc. and make good surfaces disturbed – filling any holes with suitable topsoil.
Failure Replacement	NW-BW-01	Years 1-5	Replace failed specimens on a like-for-like basis, to be replaced in the next planting season. Top up mulch to a depth of 75mm where necessary.

	SE-BW (All) MS-BW (All) BL-BW (All)		
Removal of tree guards	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Year 10	Remove tree guards and ties (unless required to support replacement trees).
Long-term Management	NW-BW-01 SE-BW (All) MS-BW (All) BL-BW (All)	Year 10+	A selective thinning programme will commence from Year 10 onwards, removing approximately 10-20% of the poorest quality, immature trees every 5-10 years. This will increase light availability to the woodland floor, promoting ground flora and a healthy understorey. Tree thinning must be mindful of species diversity in each block and avoiding removing specimens which would lead to a reduction in species diversity below five native species in each block of woodland. Coppicing will be done as and when needed at the discretion of the ecologist/land manager, but no more than 10% of understorey shrubs. Focus on margins and patches internally within the wood from 10 to 30m in diameter. Species that respond well to coppicing will include hazel and willow species. Stools subject to coppice management will be cut just above ground level with clean, slightly sloping cuts to encourage water to drain off the cut surfaces. Coppicing should be undertaken in the period November-February. Brash arisings from coppicing will surround cut stools to protect them from deer browsing (1-2m wide rings), with any surplus chipped and spread thinly through the woodland. A diverse understorey of native shrubs will be encouraged to establish. Where the canopy is too dense, small-scale glades or clearings will be created to increase light levels and provide opportunities for new shrubs to grow and promote natural tree and shrub regeneration. Deadwood, including standing dead trees, stumps, and fallen logs, will be retained in situ wherever it does not pose a health and safety risk. This provides an important habitat resource for fungi and invertebrates.

Other Woodland; Broadleaved Species Lists (WO-T03)

Common Name	Scientific Name	Abundance / %	Comments
Field Maple	*Acer campestre*	9	Understorey – shade tolerant
Alder	*Alnus glutinosa*	8	Canopy tree
Silver/ Downy Birch	*Betula pendula/ pubescens*	13	Canopy tree – fast growing
Hornbeam	*Carpinus betulus*	8	Canopy tree
Hazel	*Corylus avellana*	8	Understorey – shade-tolerant
Hawthorn	*Crateagus monoyna*	10	Understorey – shade tolerant
Beech	*Fagus sylvatica*	2	Canopy tree
Holly	*Ilex aquifolium (male)*	3	Understorey – shade tolerant
Aspen	*Populus tremula*	8	Canopy tree – fast growing
Wild Cherry	*Prunus avium*	2	Canopy tree
Blackthorn	*Prunus spinosa*	5	Understorey
Rowan	*Sorbus aucuparia*	5	Canopy tree
English Oak	*Quercus robur*	10	Canopy tree
Small leaved lime	*Tilia cordata*	9	Canopy tree

Other Supporting Information

Supporting Information (WO-B02)

Local whips / cuttings should be sourced where possible – plants should be pest and disease free and grown in the UK. Where possible source plants from Plant Health certified nurseries.

As an exception to the above, woodland tree planting established adjacent the former Heyford Park airfield during the initial landscaping stage will encompass heavy standard trees to provide early stage screening for the neighbouring residential development and biodiversity benefits.

The species mixes and associated details will be confirmed and agreed as part of the detailed design stage and confirmed by Soft Landscape/ Planting Plans. Variations in the planting mixes are likely to be introduced based upon the detailed design proposals.

What Does Success Look Like? (WO-F01)



Lowland Mixed Deciduous Woodland

Creation, Enhancement and Management Summary (WO-T01)

Target Habitat:			Lowland Mixed Deciduous Woodland			
Condition Assessment Criteria			**Target Score**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
A	Age distribution of trees	Three age classes present	2	SE-LW (All)	As this management plan will be in effect for a period of 30 years, it will not be possible to target old trees being present within the woodland. Low density planting will help encourage the establishment of intermediate ae class trees (20-60/150 years) from the outset, while natural colonisation of native trees will promote the presence of younger trees.	Selective thinning of establishing woodlands will encourage natural regeneration. This will allow the woodlands to include young (0-20 yr old) and intermediate age class trees.
		Two age classes present				
		One age class present				
B	Wild, domestic and feral herbivore damage	No significant browsing damage evident in woodland	3	SE-LW (All)	To promote the establishment of a semi-natural woodland, low density tree planting will be undertaken and the remaining area will be allowed to naturally succeed to woodland. To facilitate this, deer fencing will be installed around the area proposed for this habitat type to prevent deer browsing of naturally colonising trees.	Deer fencing will be maintained throughout the life of this management plan.
		Evidence of significant browsing pressure is present in 40% or less of whole woodland				
		Evidence of significant browsing pressure is present in 40% or more of whole woodland				
C	Invasive plant species	No invasive species present in woodland	3	SE-LW (All)	Planting will comprise only native tree and shrub species.	All habitats across the Site will be monitored for the introduction of invasive non-native species and remedial measures will be introduced to remove and dispose of them appropriately if they establish.
		Rhododendron *Rhododendrion ponticum* or cherry laurel *Prunus laurocerasus* not present, other invasive species <10% cover				
		Rhododendron or laurel present, or other invasive species) 10% cover				
D	Number of native trees species	Five or more native tree or shrub species found across woodland parcel	3	SE-LW (All)	Tree planting will include a minimum of seven native tree or shrub species within the area.	When selective thinning is undertaken as the woodland establishes, trees selected for thinning will consider this requirement to ensure that the area maintains a minimum of five native tree/shrub species. Supplementary planting will be undertaken as required.
		Three to four native tree or shrub species found across woodland parcel				
		Two or less native tree or shrub species present across woodland parcel				
E	Cover of native tree	>80% of canopy trees and >80% of understorey shrubs are native	3	SE-LW (All)	Tree planting will comprise only native tree/shrub species.	If non-native species establish, selective thinning can target their removal.

	and shrub species	50 – 80% of canopy trees and 50-80% of understorey shrubs are native				
		<50% of canopy trees and <50% understorey shrubs are native				
F	Open space within woodland	10-20% of woodland has areas of temporary open space. Unless woodland <10ha in which case 0-20% temporary open space is permitted.	3	SE-LW (All)	The planting block will be less than 10ha and its entirety will be allowed to succeed to woodland.	Woodlands will be managed through selective thinning and, where appropriate, coppicing, creating temporary open space.
		21-40% of woodland has areas of temporary open space				
		<10% or >40% of woodland has areas of temporary open space. But if woodland <10ha has <10% temporary open space, please see Good category.				
G	Woodland regeneration	All three classes present in woodland; trees 4-7cm Diameter at Breast Height (DBH), saplings and seedlings or advanced coppice regrowth	2	SE-LW (All)	The installation of deer fencing will protect the area to allowed natural regeneration to colonise from the outset.	Long-term management will include selective felling and, where appropriate, coppicing to encourage the natural regeneration within the gaps. Tree guards could protect any existing natural regeneration from browsing if necessary.
		One or two classes only present in woodland				
		No classes or coppice regrowth present in woodland				
H	Tree health	Tree mortality less than 10%, no pests or diseases and no crown dieback	3	SE-LW (All)	N/A	Long-term management will include monitoring for signs of disease. Report any signs of ash dieback. Selective felling and ringbarking will target any dead or diseased trees.
		11% to 25% mortality and/or crown dieback or low risk pest or disease present				
		Greater than 25% tree mortality and or any high risk pest or disease present				
I	Vegetation and ground flora	Recognisable NVC plant community at ground layer present, strongly characterised by ancient woodland flora specialists.	1	SE-LW (All)	N/A—This is not specifically targeted. Long-term management through selective thinning and coppicing will help to vary light levels in the ground layer and encourage the development of shade-tolerant, woodland herbs within the woodlands.	
		Recognisable NVC plant community at ground layer present				
		No recognisable NVC plant community at ground layer present.				

J	Woodland vertical structure	Three or more storeys across all survey plots or a complex woodland.	2	SE-LW (All)	Planting will include a range of native tree species and shrub understorey species with different growth rates. The combination of planting alongside natural colonisation will help to introduce staggered age ranges. These measures will encourage the establish of a minimum of two storeys over the 30-year management period.	Management through selective felling and coppicing will maintain and encourage natural regeneration and diversify the woodland structure.
		Two storeys across all survey plots				
		One of less storey across all survey plots				
K	Veteran trees	Two of more veteran per hectare	1	SE-LW (All)	N/A – this is not targeted within the 30-year management period.	
		One veteran tree per hectare				
		No veteran trees present in woodland				
L	Amount of deadwood	50% of all survey plots within the woodland parcel have deadwood, such as standing deadwood, large dead branches and or stems and stumps, or an abundance of small cavities.	2	SE-LW (All)	Deadwood generated from the clearance of existing woodland areas will be installed within new areas of woodland planting to introduce large deadwood pieces from the outset of woodland creation. These will be scattered through the area as individual pieces and into log piles to create a variation of habitat features for different faunal species to utilise.	A proportion of deadwood through dying trees or selective thinning will be retained within the woodland areas. Excess deadwood can be used to create log piles elsewhere within the Site.
		Between 25% and 50% of all survey plots within the woodland parcel have deadwood, such as standing deadwood, large dead branches and or steams, stubs and stumps, or an abundance of small cavities.				
		Less than 25% of all survey plots within the woodland parcel have deadwood, such as standing deadwood, large dead branches and or steams, stubs and stumps, or an abundance of small cavities.				
M	Woodland disturbance	No nutrient enrichment or damaged ground evident	1	SE-LW (All)	This is not specifically targeted; however no fertilisers will be used within the management of medium, high and very high distinctiveness habitats across the site at any time.	
		Less than 1 hectare in total of nutrient enrichment across woodland area and or less than 20% of woodland area has damaged ground				
		More than 1 hectare of nutrient enrichment and or more than 20% of woodland area has damaged ground				

Lowland Mixed Deciduous Woodland

Creation, Enhancement and Management Detailed Methods (WO-T02)

Action	Relevant Parcels	Timing	Prescriptions
Deer fence installation	SE-LW (All)	Year 0 – Autumn/Winter	A secure deer fence (e.g., mesh or stock fencing at a minimum height of 1.5m) will be erected around the perimeter of the designated woodland creation area. This is a critical step to protect newly planted trees from browsing and to allow natural regeneration to occur unhindered by herbivory.
Ground preparation	SE-LW (All)	Year 0 – Autumn/Winter	Prepare the ground by clearing all existing vegetation in late autumn/early winter and then lightly cultivate the soil to a depth of 30cm to alleviate compaction and create a suitable planting bed.
Tree Whip Planting	SE-LW (All)	Year 0 – Autumn/Winter	A low-density planting of native broadleaved tree species will be carried out. This targeted planting will focus on key, long-lived canopy species that may be slow to regenerate naturally but will include some understorey shrubs (80/20 split between canopy trees and understorey shrubs). The mix will be composed of at least seven native species appropriate for the local area, including fast-growing pioneer species (e.g., birch, rowan, hazel) and slower-growing canopy species (e.g., pedunculate oak, ash, field maple). The planting density will be approximately 400-600 stems per hectare to ensure ample space and light for natural regeneration. Most of the woodland area will be left to colonise naturally from the existing seed bank and wind-blown seeds from surrounding habitats. The presence of the deer fence will allow this natural succession to progress, creating a more naturalised and diverse understorey and ground flora layer than a full plantation. Plant whips in a scattered, naturalised pattern, avoiding straight lines and uniform spacing. Clusters and groups of trees can be planted to replicate a more natural woodland structure; however, it is important to maintain large gaps through the area for natural tree colonisation. The mix of canopy and understorey shrubs will help to establish a multi-layered structure from the outset. Dig planting pits that are slightly wider and deeper than the whip's root system. The bottom of the pit should be firmed and the roots should be spread out before backfilling with the original soil, ensuring the root collar (the point where the stem meets the roots) is level with the surrounding ground or slightly above. Ensure the root collar is not below the surrounding ground level. The soil around the base should be firmed gently but firmly to prevent air pockets. All newly planted trees will be protected with individual spiral guards and stakes to prevent damage from grazing mammals (e.g., deer, rabbits). Newly planting whips should be mulched using woodchips or shredded bark for a minimum of 50cm-1m diameter around each whip (but not touching the stem) to help inhibit weed growth during establishment and retain moisture. The mulch layer should be approximately 75-100mm deep. Prior to mulching, ensure the area is weed free. Tree spacing must be mindful of preventing extensive mulching that could impact natural colonisation.
Aftercare Management	SE-LW (All)	Years 1-5	During the first five years, keeping planted and naturally regenerating trees free from weeds is important to facilitate healthy establishment, as weeds can compete with young trees for water and nutrients. Weeds can also be hand-pulled or hoed around young trees every few months, or alternatively, mow or strim around the trees to suppress weeds. However, this must be done carefully to avoid damage to the trees. Avoid the use of herbicides. Herbicide spot treatment should only be considered a last-resort option. Weed control should be carried out once or twice a year within until the planted trees have established (3-5 years). Trees will be watered during the first few years of growth where soil becomes dry to promote healthy establishment. Examine all tree stakes and ties, replace or adjust as appropriate. If the tree has yet to establish, replace or adjust ties, spacers and tree tubes as appropriate. If the tree has established well, then remove all stakes, ties, spacers, tubes etc. and make good surfaces disturbed – filling any holes with suitable topsoil

Failure Replacement	SE-LW (All)	Years 1-5	Replace failed specimens of planted tree on a like-for-like basis, to be replaced in the next planting season. Top up mulch to a depth of 75mm where necessary.
Removal of tree guards	SE-LW (All)	Year 10	Remove tree guards and ties (unless required to support replacement trees).
Long-term Management	SE-LW (All)	Year 10+	A selective thinning programme will commence from Year 10 onwards, removing approximately 10-20% of the poorest quality, immature trees every 5-10 years. This will increase light availability to the woodland floor, promoting ground flora and a healthy understorey. Tree thinning must be mindful of species diversity in each block and avoid removing specimens that would reduce species diversity to fewer than 5 native species in each block of woodland. Coppicing will be done as and when needed at the discretion of the ecologist/land manager, but no more than 10% of understorey shrubs. Focus on margins and patches internally within the wood from 10 to 30m in diameter. Species that respond well to coppicing include hazel and willow. Stools subject to coppice management will be cut just above ground level with clean, slightly sloping cuts to encourage water to drain off the cut surfaces. Coppicing should be undertaken in the period November-February. Brash arising from coppicing will surround cut stools to protect them from deer browsing (1-2m wide rings), with any surplus chipped and spread thinly through the woodland. A diverse understorey of native shrubs will be encouraged to establish. Where canopy is too dense, small-scale glades or clearings will be created to increase light levels, provide opportunities for new shrubs to grow, and promote natural tree and shrub regeneration. Deadwood, including standing dead trees, stumps, and fallen logs, will be retained in situ wherever it does not pose a health and safety risk. This provides an important habitat resource for fungi and invertebrates.

Lowland Mixed Deciduous Woodland Species Lists (WO-T03)

Common Name	Scientific Name	Abundance / %	Comments
Field maple	*Acer campestre*	10%	Understorey - shade-tolerant
Silver birch	*Betula pendula*	8%	Canopy tree - fast growing
Downy birch	*Betula pubescens*	5%	Damper areas - Canopy tree
Hornbeam	*Carpinus betulus*	5%	Canopy tree
Hazel	*Corylus avellana*	5%	Understorey - shade-tolerant
Hawthorn	*Crataegus monogyna*	15%	Understorey - shade-tolerant
Beech	*Fagus sylvatica*	5%	Canopy tree
Holly	*Ilex aquifolium*	5%	Understorey - shade-tolerant
Crab apple	*Malnus sylvestris*	4%	Canopy tree
Aspen	*Populus tremula*	3%	Canopy tree
Wild Cherry	*Prunus avium*	3%	Canopy tree
Sessile Oak	*Quercus petrea*	5%	Canopy tree
Pedunculate oak	*Quercus robur*	10%	Canopy tree
Dog Rose	*Rosa canina*	5%	Understory - edge planting
Rowan	*Sorbus aucuparia*	4%	Canopy tree
Guelder Rose	*Virburnum opulus*	5%	Understory - edge planting

Other Supporting Information

Supporting Information (WO-B02)

Local whips / cuttings should be sourced where possible – plants should be pest and disease free and grown in the UK. Where possible source plants from Plant Health certified nurseries.

What Does Success Look Like? (WO-F01)



Traditional Orchard

Creation, Enhancement and Management Summary (OR-T01)

Target Habitat:			Traditional Orchard		
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
A	Presence of ancient and or veteran trees. **Note – this criterion is essential for achieving Good condition.**	No	MS-TO-1	This criterion will not be targeted due to the limited time frame available in this management plan (30 years), which will not be sufficient for a tree to reach veteran status.	General arboricultural management will ensure that the tree's health is maintained as it grows. Where these is opportunities to provide retention and create natural ecological features in the tree growth form the specimens will be supported
B	Presence of deadwood in or on trees, or on the ground: at least 20% of mature trees have deadwood associated with them. Some examples of deadwood are: standing, attached and fallen trees or limbs; dead stems; branches and branch stubs greater than 10 cm diameter; and internal cavities. The types and distribution of deadwood provide a range of habitats suitable to support a wide assemblage of saproxylic invertebrates. **Note – this criterion is essential for achieving Good condition.**	No	MS-TO-1	This criterion will not be targeted due to the limited time frame available within this management plan (30 years), which will not be sufficient to grow a mature tree with deadwood.	While the trees are not expected to produce an abundance of deadwood to target this criterion, management will ensure that deadwood is maintained throughout this habitat where it naturally forms. Where deadwood shows signs of disease, it will be removed from the site to protect the trees' future growth and health.
C	Less than 5% of fruit trees are smothered by scrub. Small patches of dense scrub and or scattered scrub growing between trees can be beneficial to biodiversity, however these occupy less than 10% of ground cover.	Yes	MS-TO-1	Scrub planting will not be included within the orchard planting regime.	Management of grassland amongst fruit trees on an annual basis through a grass cut that will control the abundance of scrub in between the fruit trees. Where monitoring demonstrates significant scrub establishment, appropriate remedial measures will be implemented.
D	There is evidence of formative and or restorative pruning to maintain longevity of trees.	Yes	MS-TO-1	Trees will be monitored for any signs of damage, and restorative pruning will be undertaken where required.	
E	At least 95% of the trees are free from damage caused by humans or animals, for example browsing, bark stripping or rubbing on non-adjusted ties.	Yes	MS-TO-1	Trees will be protected during the first 10+ years of growth to protect from wild grazing animals.	Trees will be monitored during grazing periods to ensure the trees do not show excessive signs of damage from browsing, bark stripping or rubbing.
F	Grassland is not overgrazed, poaching is not evident around the trees, with no more	Yes	MS-TO-1	The orchard will be managed through an annual grass cut.	

	than 10% of trees poached under the canopy.				
G	Species richness of the grassland is equivalent to a medium, high, or very high distinctiveness grassland.	Yes	MS-TO-1	A native species-rich grassland seed-mix will be sown to encourage the establishment of a sward analogous to other neutral grassland.	The grassland will be managed following other areas of species-rich grassland across the site to include annual grass cut.
H	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA) and species indicative of suboptimal condition make up less than 10% of ground cover.	Yes	MS-TO-1	Regular monitoring will track the presence of invasive non-native species or those indicative of sub-optimal condition and trigger remedial action where necessary to remove or reduce their presence.	

Additional Management Prescriptions (OR-B01)
N/A

Traditional Orchard

Creation, Enhancement and Management Detailed Methods (OR-T02)

Action	Relevant Parcels	Timing	Prescriptions
Grassland creation	MS-TO-1	Year 0	See Other neutral grassland
Tree planting	MS-TO-1	Year 0	Fruit trees will be planted in the winter following grass seed sowing. Trees should be sought from a reputable local supplier and contain a variety of trees from the Rosaceae family, primarily apple *Malus* sp. Trees will be planted where there is sufficient space to grow to full maturity with 8-10 m between rows and 7-9 m between trees within the rows. Bare-rooted fruit trees should be planted from November to March. The planting pit dug will be a shallow square, no more than 50cm deep and dug immediately before planting to prevent it from filling with water. The base of the planting pit will be broken up to encourage aeration to the depth of a garden fork before tree planting. Backfilling of soil will utilise existing excavated soils only with no compost or fertiliser application. Existing subsoils and topsoils should be kept separate during excavation, with the subsoil backfilled first before topping with topsoil. Lightly firm the backfill, avoiding compaction. The tree should be placed in the hole, so the root collar is level with the top of the hole. After planting, water the trees if necessary. Fence the orchard area to protect the trees from livestock and deer.
Aftercare	MS-TO-1	Years 2-5	Trees will be watered regularly during their first year after planting, when the soil becomes dry. Plantings will be inspected quarterly through the first two growing seasons following planting, with any failures replaced in the next planting season. Weeds can be controlled around the bases of trees and shrubs using non-residual herbicides during establishment. Herbicides will be avoided thereafter unless strictly necessary. The aim is to keep a 1-1.5m weed-free diameter around the tree for the first 2 years after planting.
Grassland management	MS-TO-1	Year 5+	During establishment, the orchard will be fenced and mown 1-2 times a year when weather conditions allow on a flexible basis from July onwards. If site and sward conditions allow, a late season cut should be taken one year in four from late August to September. In all cases, arisings should be removed. Following the establishment of the fruit trees, fencing can be removed and the grassland subject to the same long-term management as the other neutral grassland.
Pruning	MS-TO-1	Year 3+	Formative pruning should be undertaken from the first winter using hand tools to ensure the tree's growth and shape. Maintenance pruning will be required in subsequent years to ensure continued fruit production. Specialist arboricultural advice should be sought on the specifics of orchard pruning.
Maintenance	MS-TO-1	Year 7+	Scrub control should be ongoing from year 7 to ensure the scrub cover is <10%, using hand-tools including brush cutters and chainsaws. However, Small scrub areas will be encouraged as this can boost diversity and this measure will only seek to prevent it from becoming dominant.

Orchard Species Lists (OR-TO3)

Common Name	Scientific Name	Abundance / %	Comments
Apple	*Malus domestica*	25%	Plant at least 8-10m between rows and 7-9m in the row at planting density of 100-150 trees/ha.
Plum	*Prunus domestica*	25%	Plant at 6-8m spacing and planting density of 185-260 trees/ha.
Pear	*Pyrus communis*	20%	Plant 10-20m apart and planting density of 100-150 trees/ha.
Wild Cherry	*Prunus avium*	15%	Plant at 10-12m spacing and planting density of 100-150 trees/ha.
Walnut	*Juglans regia*	5%	Plant at 10-12m spacing and planting density of 100-150 trees/ha.
Hazelnut (Cobnut)	*Corylus avellana*	5%	Plant at least 5m spacing or about 400 trees per ha.
Rowan	*Sorbus aucuparia*	5%	Plant at least 5m spacing or about 400 trees per ha.

What Does Success Look Like? (OR-F01)



Other Supporting Information

Supporting Information (OR-B02)

Hedgerow

Creation, Enhancement and Management Summary (HD-T01)

Target Hedgerow Type:			Species-rich native hedgerow Species-rich Native Hedgerow with Trees Species-rich native hedgerow with trees - associated with bank or ditch		
Condition Assessment Criteria		**Targeted?**	**Relevant Features**	**Creation Approach**	**Management Approach**
*	***UKHab Category Description*** *Native Hedgerows with ≥5 UK-native or archaeophyte species in a 30m section.*	Yes No	All newly created	Hedgerows will be planted using native whips with a minimum of 6-7 native species in each hedgerow. Species planting will be mixed to ensure that in each 30m section, a minimum of 6-7 species are planted. In addition, standard native tree species will be planted along the hedgerow, spaced no more than 30m apart. Two sections of hedgerow adjacent the Heyford Park Link Road in the south of the Main Site totalling 1.1km will also include a shallow ditch feature. The soil from the creation of the ditches will be used to create a bank on which the hedge sections will be planted.	During establishment, new species-rich native hedgerows will be monitored and failed specimens will be replaced on a like-for-like based.
A1	Height >1.5m average along length.	Yes	All newly created	Rotational trimming of hedgerows in an 'A' profile to promote healthy hedgerow base. Starting in year 5 after planting (or until plants have established to minimum 1.5m height). Mowing will only be undertaken on one side of each hedgerow in any one year. Hedgerows will be allowed to increase in height incrementally and not cut to the same height each year. Hedges will target a minimum height of 2m. New hedgerows will be allowed to establish to a minimum height of 1.5m before long-term management commences. Rotational trimming will avoid standard trees to ensure that these can grow to maturity.	
A2	Width >1.5m average along length.	Yes	All newly created	As above, with hedgerows also targeting a minimum width of 2m.	
B3	Gap – hedge base Gap between ground and base of canopy <0.5m for >90% of length.	Yes	All newly created	Planting with double rows will help encourage the establishment of a dense hedge. Newly planted whips will be protected by stakes and rabbit guards. These will be removed once the hedgerow establishes (c. year 5) to allow a bushy base to form.	Regular pruning to through A-profile trimming allowing the hedge to incrementally increase in height and width, encouraging a bushy base to establish.
B2	Gap – hedgerow canopy continuity Gaps make up <10% of total length; and no canopy gaps >5m.	Yes	All newly created	During first five years following initial planting, dead and diseased plants will be replaced on a like-for-like basis in the following planting season. Should monitoring identify that gaps have formed in hedgerows, infill planting can be undertaken.	
C1	Undisturbed ground and perennial vegetation	Yes	All newly created	Hedgerows within areas of green infrastructure will be located adjacent to semi-natural other neutral grassland	The undisturbed margins will be managed in accordance with prescriptions for the corresponding adjacent habitat type for other neutral grassland. This will help to maintain the presence of these

	>1m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: • measured from outer edge of hedgerow, and • is present on one side of the hedge (at least)			habitats that will act as an undisturbed margin, exceeding 1m in width along the base of the hedge.	margins and the heterogeneity of habitats between hedgerows and adjacent grassland in the long-term.
C2	Nutrient-enriched perennial vegetation Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.	No	N/A	While this is not specifically targeted, the cessation of agricultural management across the Site will help to reduction nutrient enrichment Site-wide.	
D1	Invasive and neophyte species >90% of the hedgerow and undisturbed ground is free of invasive non-native plant species (including those listed on Schedule 9 of WCA) and recently introduced species.	Yes	All newly created	Planting will include native species only.	All habitats across the Site will be monitored for the introduction of invasive non-native species and remedial measures will be introduced to remove and dispose of them appropriately if they establish.
D2	Current damage >90% of the hedgerow or undisturbed ground is free of damage caused by human activities.	Yes	All newly created	Hedgerows will be monitored for any signs of damage caused by human activities, such as inappropriate management or vandalism. In the event that any signs of damaged are observed, remedial measures will be introduced.	
E1	Tree class (applicable to hedgerows with trees only) There is more than one age-class (or morphology) of tree present (for example: young, mature, veteran and or ancient), and there is on average at least one mature, ancient or veteran tree present per 20 – 50m of hedgerow.	No	N/A	N/A – not specifically targeted as standard trees will all be planted at the same time.	
E2	E2. Tree health (applicable to hedgerows with trees only) At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Yes	All newly created with trees	Long-term management will include monitoring for signs of disease or damage. Remedial measures (such as replacement planting) will be undertaken as required.	

Creation, Enhancement and Management Methods (HD-T02)

Action	Relevant Features	Timing	Prescriptions
Ditch/Bank Creation	All newly created with ditch	Year 0 – Late Autumn	A shallow ditch will be dug along the proposed length of two sections of hedgerow south of the proposed Heyford Park Link Road. The ditches will be approximately 25-35cm deep, with a bed approximately 0.5wide and shallow, but varied sloped banks. The ditches will be designed to hold water only seasonally and should not be a permanently wet feature. Spoil generated from the digging of the ditches will be used to create a low bank on which species-rich native hedgerows will be planted. The spoil should be placed in a loose pile and graded to support shallow slopes and a minimum 0.5m wide top that whips can be planted into. After the banks are graded, these should be lightly firmed ready for hedgerow whips planted and left to settle for several week prior to planting.
Hedgerow planting	All newly created	Year 0 – Late Autumn to Early Spring	**Shrub Planting** Hedgerows will be planted using a mix of native whip species as per the species list below sourced from a reputable supplier. Hedgerows will comprise at least seven species per 30m. Existing hedgerows to be retained will also include additional planting to fill in gaps. These will follow the same prescriptions (detailed here), with planting numbers and densities amended to reflect the size of gaps to be infilled. Hedgerows to be enhanced will not be planted with standard trees. Hedgerow plants will be planted in staggered rows, with six bare root whips per linear metre, in double staggered rows. Planting will include single species clumps of 2-4 specimens, with the clumps of species mixed along the length of the hedge to encourage the establishment of a diverse, native species-rich hedgerow with a minimum of seven species within an average 30m stretch of the hedge. Dig planting pits that are slightly wider and deeper than the whip's root system. The bottom of the pit should be firmed and the roots should be spread out before backfilling with the original soil, ensuring the root collar (the point where the stem meets the roots) is level with the surrounding ground or slightly above. Ensure the root collar is not below the surrounding ground level. The soil around the base should be firmed gently but firmly to prevent air pockets. All newly planted shrubs will be protected with individual spiral guards and stakes to prevent damage from grazing mammals (e.g., deer, rabbits). Newly planting whips should be mulched using woodchips or shredded bark for a minimum of 50cm-1m diameter around each whip (but not touching the stem) to help inhibit weed growth during establishment and retain moisture. The mulch layer should be approximately 75-100mm deep. Prior to mulching, ensure the area is weed free. Tree spacing must be mindful of preventing extensive mulching that could impact natural colonisation. **Tree Planting** Standard trees will be planted throughout the hedge in a scattered pattern, with a maximum distance of 40m between each tree. Trees should be spaced out by a minimum of 15m from each other to allow them to grow to maturity free from competition. Avoid standard spacing to help create a more naturalistic planting pattern. Trees should be sought from a reputable supplier. Trees will be planted with sufficient space to grow to full maturity. Site selection must be mindful of overhead services to ensure mature tree canopies would not affect these. Selection should also be mindful of underground services, followed by>5m offset from any underground services. Any evidence of existing soil compaction will be remediated before planting to ensure the soil can support tree establishment and growth. The planting pit dug will be a shallow square, larger than the tree's root ball. The base of the planting pit will be broken up to encourage aeration to the depth of a garden fork before tree planting. Backfilling of soil will utilise existing excavated soils only with no compost or fertiliser application. Existing subsoils and top-soils should be kept separate during excavation, with the subsoil backfilled first before topping with topsoil. Lightly firm down the backfill, avoiding compaction. Trees are to be mulched using wood chippings or bark to establish a 1m diameter around the tree stem. Planting will be undertaken from 1 November to 31 March as required when the ground is not frozen or waterlogged. This will accord with BS 8545:2014. • Species should be mixed and planted randomly. Species provided in the table below will create a diverse mix.

			• Plant with hand tools, such as spades – do not plough or cultivate. • No fertiliser or compost should be used. Trees should not be planted lower than the surrounding ground level, with the aim of planting to ensure that the base meets the soil level, which will be slightly above ground level, with an aim of 25mm above. Standard trees should be tied and staked, with protective fencing installed where considered necessary to prevent excessive browsing.
Rotational Pruning	All newly created	Year 1 – Late Autumn to Early Spring	Commence rotational management of existing hedgerows to improve their structure. Hedgerows will be pruned no more than once annually to an A-shaped cross-section, with only a single side of each hedgerow cut each year. Pruning must be undertaken outside of the breeding bird season (November to March) and should ideally wait until December to February to allow the provision of berries into the winter. The hedgerow should be allowed to increase in height incrementally and not cut to the same height each year. Hedges should be allowed to reach a minimum width of 1.5m and a minimum height of 1.5m to provide maximum benefit to wildlife.
Aftercare Management	All newly created	Years 1-5	During the first five years, keep a circle of at least 1m^2 around each tree/shrub free from weeds, particularly grasses, as this will compete with young trees for water and nutrients. Weeds can also be hand-pulled or hoed around young trees every few months, or alternatively, mow or strim around the trees to suppress weeds. However, this must be done carefully to avoid damage to the trees. Avoid the use of herbicides. Herbicide spot treatment should only be considered a last-resort option. Planted hedgerow shrubs should be pruned between November and March, within the first couple of years of growth to encourage dense bushy growth. Weed control should be carried out once or twice a year until the hedgerow shrubs have established (approximately 3-5 years). Trees will be watered during the first few years of growth where soil becomes dry to promote healthy establishment~~.~~, with the frequency of watering increased for hedgerow planting along bund sections as required. Examine all tree stakes and ties, replace or adjust as appropriate. If the tree has yet to establish, replace or adjust ties, spacers and tree tubes as appropriate. If the tree has established well, then remove all stakes, ties, spacers, tubes etc. and make good surfaces disturbed – filling any holes with suitable topsoil.
Failure Replacement	All newly created	Years 1-5	Replace failed specimens of planted tree on a like-for-like basis, to be replaced in the next planting season. Top up mulch to a depth of 75mm where necessary.
Removal of tree guards	All newly created	Year 5	Remove tree guards and ties (unless required to support replacement trees).
Long-term Management	All newly created	Year 5+	Commenced 'Rotational Pruning' of newly planted hedgerows in accordance with the above prescription. Continue Rotational Pruning of all hedgerows throughout the life of this management plan. Aim to achieve outgrown, bushy hedgerows that provided dense vegetation corridors for fauna. Ideally, hedgerows will be 3-4m high and wide.

Hedgerow Species Lists (HD-T03)

Common Name	Scientific Name	Abundance / %	Comments
Hawthorn	*Crataegus monogyna*		
Blackthorn	*Prunus spinosa*		
Hazel	*Corylus avellana*		
Field Maple	*Acer campestre*		
Wayfaring tree	*Viburnum lantana*		
Guelder Rose	*Viburnum opulus*		
Wild privet	*Ligustrum vulgare*		
Spindle	*Euonymus europaeus*		
Dogwood	*Cornus sanguinea*		
Elder	*Sambucus nigra*		
Crab Apple	*Malus sylvestris*		
Oak	*Quercus robur*		Standard tree
Silver birch	*Betula pendula*		Standard tree
Honeysuckle	*Lonicera periclymenum*		Climber
Clematis	*Clematis vitalba*		Climber

Hedgerow plants should be sourced as **bare-root whips** from reputable UK nurseries that specialise in native stock. Whips are young trees or shrubs, typically **40–60 cm or 60–90 cm tall**, supplied without soil around the roots during the dormant season.

Hawthorn is typically the main component of a hedgerow, with a range of other species to reflect the local hedgerow composition.

Planting is usually carried out in a **double-staggered row, with** approximately **6–7 plants per metre.**

Other Supporting Information

Supporting Information (HD-B02)

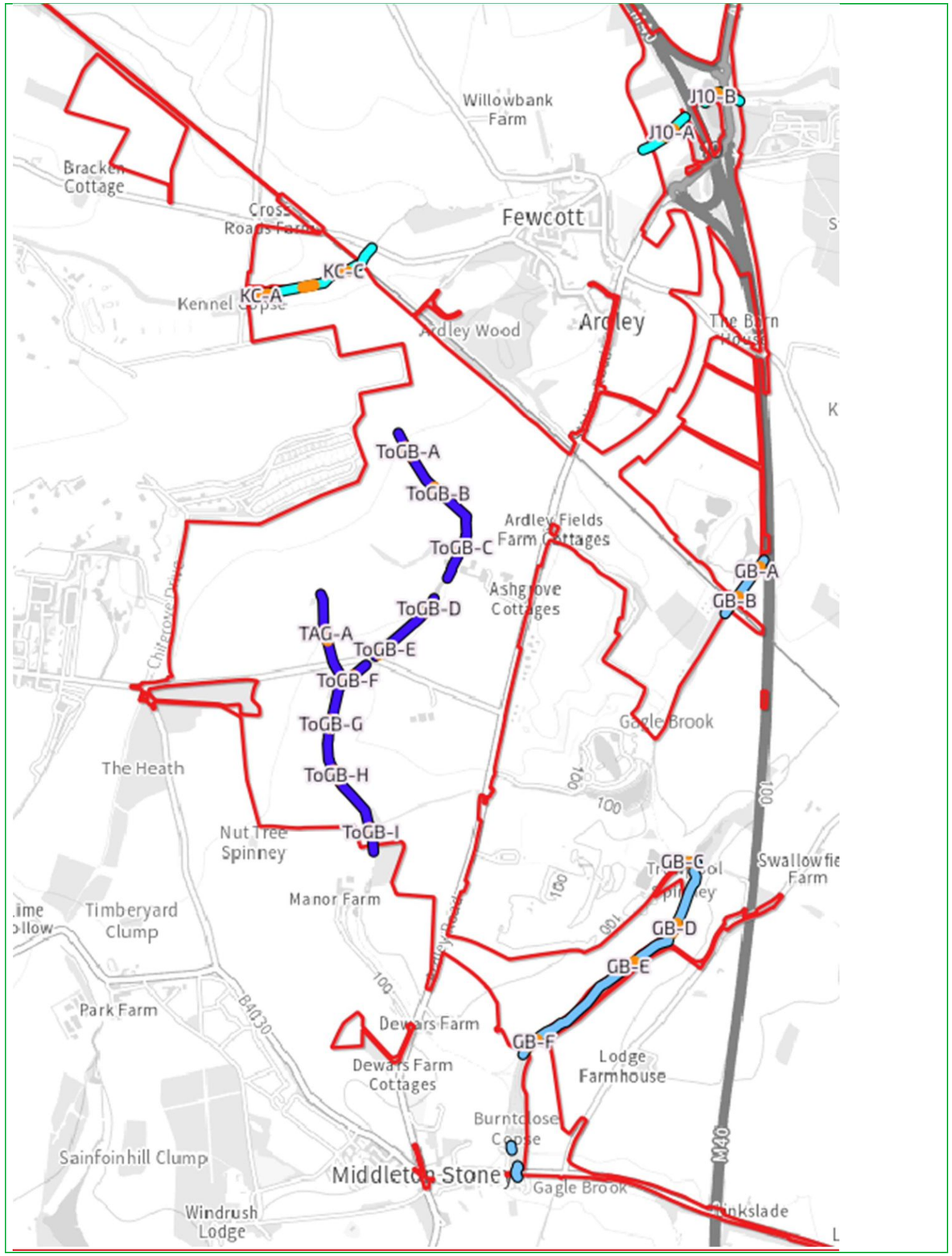
What Does Success Look Like? (HD-F01)

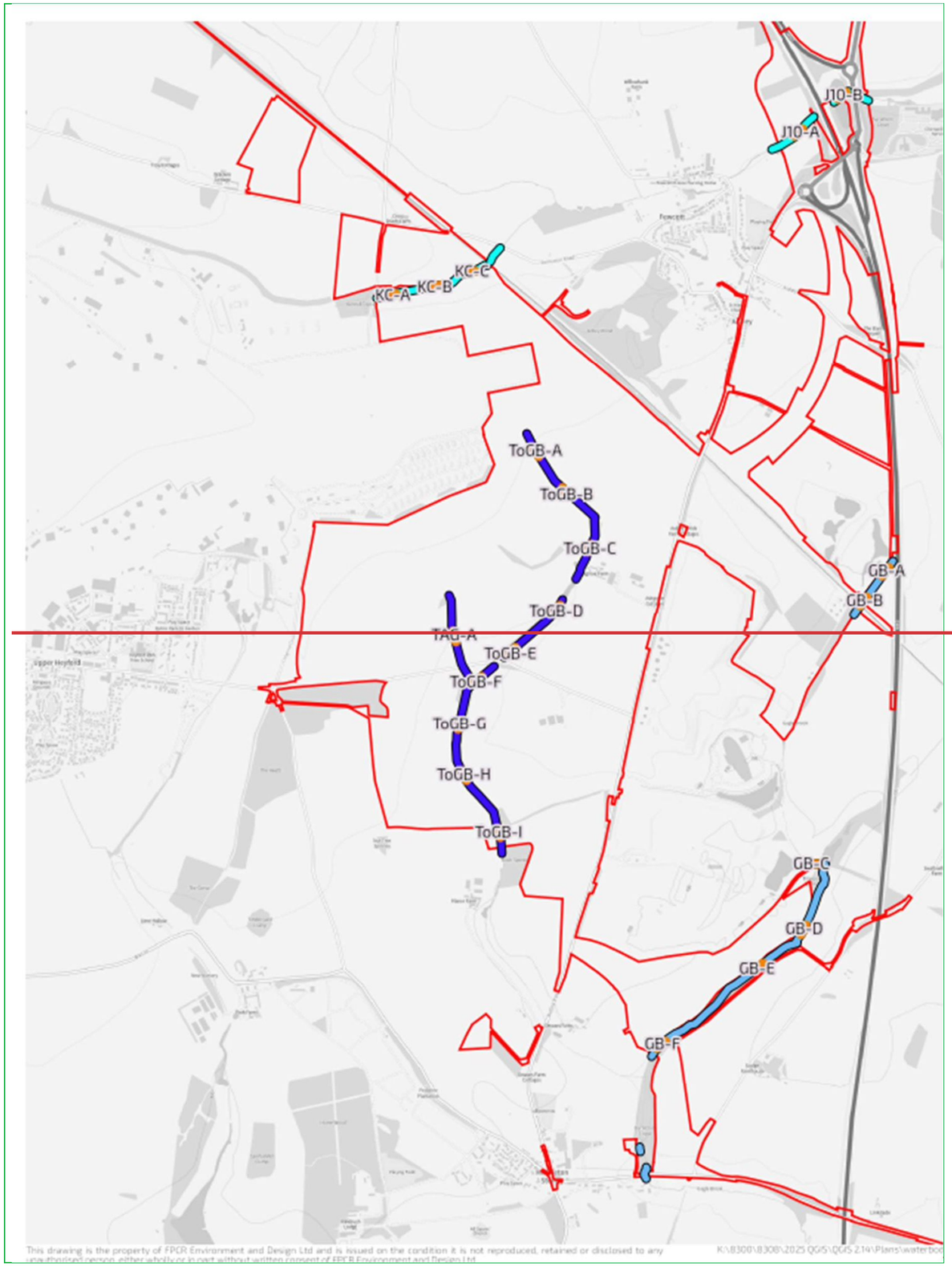


Watercourses

Creation, Enhancement and Management Summary

Summary of Watercourse Enhancement Proposals (WC-B01)	
A 0.17 km section of KC-A and a 0.14 km section of ToGB-F (both classified as other rivers and streams) will be subject to targeted enhancement measures to improve condition and achieve alignment with the adjoining watercourse reaches. New sections of watercourse (other rivers and streams) will be created through the realignment of channels, with their siting located within green infrastructure corridors where practicable. Additionally, enhancement of the watercourse/s will be achieved through the removal of riparian encroachment as adjacent land is taken out of intensive agricultural use and semi-natural habitat is created in its place. This will be achieved through land-use change rather than direct impacts on the watercourse (s), as it is proposed to be utilised as semi-natural grassland managed for wildlife rather than intensive agriculture. The watercourse/s will be managed through a long-term, low-intervention approach designed to support biodiversity objectives and ecological resilience. Riparian buffers will be protected from agricultural activity through permanent exclusion of grazing and cultivation. Sections of watercourse to be enhanced via reduction of riparian encroachment; • J10-A & J-10-B • KC-A & KC-B/C • ToGB-E, ToGB-F, ToGB-G, ToGB-H, ToGB-I See the CEMP and the Habitat Creation and Management – Risk Register and Remedial Measures section below regarding precautionary working methods to avoid the spread of signal crayfish *Pacifasticus leniusculus* during works to watercourses and adjacent habitats.	
Will the length of the watercourse be altered as part of the enhancement? (WC-B02)	Yes
Approximately 1.52 km of watercourse classified as other rivers and streams will be created through the realignment of channels, resulting in an alteration to the overall length of the watercourse.	
Will enhancements target improvements to watercourse encroachment? (WC-B03)	No
No watercourse encroachment at baseline or post-intervention.	
Will enhancements target improvements to riparian encroachment? (WC-B04)	Yes
By ceasing intensive pasture grazing and arable cropping within 10 metres of the watercourse and up to the watercourse margins, natural riparian buffers will be restored, allowing native vegetation to establish and regenerate. This will reduce nutrient runoff, sedimentation, and bank erosion associated with intensive agriculture, improving water quality and channel stability. The re-established riparian corridor will provide improved habitat connectivity, shade, and food resources for aquatic and terrestrial species, leading to measurable gains in biodiversity value and the long-term resilience of the watercourse. A buffer is to be implemented at the top of the riverbank/10m from the riverbank, this will include rough grassland and tall vegetation. Management will focus on natural regeneration, supplemented by targeted native planting where required. Invasive and non-native species will be monitored and controlled to prevent encroachment, while selective vegetation management will be undertaken only where necessary to maintain channel function and habitat diversity. Regular ecological monitoring will be used to assess habitat condition, inform adaptive management, and demonstrate BNG delivery over time, ensuring the watercourse continues to improve in biodiversity value and ecological function.	
Will enhancements target improving distinctiveness of the watercourse (WC-B05)	No
Will enhancements target improving condition of the watercourse (WC-B06)	Yes
A 0.17 km section of KC-A and 0.14 km of ToGB-F will be enhanced through management efforts to align with the adjacent watercourse section. Management will include the establishment and ongoing management of riparian buffer zones, periodic clearance of accumulated debris where it poses a barrier to flow or habitat function, and selective management of bankside vegetation. This will include the removal of encroaching scrub, pollarding of trees where excessive shading is present, and the control of non-native invasive species. In-channel enhancements will include the introduction and retention of natural features such as woody debris to increase habitat diversity. Ongoing monitoring and adaptive management will be undertaken to inform and refine management measures over time.	


Willowbank Farm
J10-B
J10-A
Bracken Cottage
Cross Roads Farm
Fewcott
KC-C
KC-A
Kennel Copse
Ardley Wood
Ardley
The Barn
ToGB-A
ToGB-B
ToGB-C
Ardley Fields Farm Cottages
GB-A
GB-B
Ashgrove Cottages
ToGB-D
TAG-A
ToGB-E
ToGB-F
ToGB-G
Gagle Brook
The Heath
ToGB-H
Nut Tree Spinney
ToGB-I
GB-C
Swallowfield Farm
Manor Farm
Timberyard Clump
GB-D
GB-E
Park Farm
B4030
Dewars Farm
GB-F
Dewars Farm Cottages
Lodge Farmhouse
Burntclose Copse
M40
Sainfoinhill Clump
Middleton Stoney
Gagle Brook
Windrush Lodge
Clinkslade
100



Watercourse Condition Enhancements (WC-T01)			
Watercourse ID:	**KC-A**		
Watercourse Baseline Condition:	Fairly Poor		
Is the Watercourse Baseline Overdeep?	Yes: X☐ No:☐		
Watercourse Proposed Condition:	Moderate		
Will the Proposed Watercourse be Overdeep?	Yes: ☐ No:X☐		
Condition Assessment Criteria		**RCA Index Values**	
RCA Index ID*	**RCA Index Name**	**Baseline Score**	**Proposed Score**
Bank Top			
B1 (+)	Bank top vegetation structure	1	3
B2 (+)	Bank top tree feature richness	0	0
B3 (+)	Bank top water-related features	0	0
B4 (-)	Bank top NNIPS cover	0	0
B5 (-)	Bank top managed ground cover	-3	0
Bank face			
C1 (+)	Bank face riparian vegetation structure	1	1
C2 (+)	Bank face tree feature richness	0	0
C3 (+)	Bank face natural bank profile extent	3	3
C4 (+)	Bank face natural bank profile richness	1	2
C5 (+)	Bank face natural bank material	1	1
C6 (-)	Bank face bare sediment extent	1	1
C7 (-)	Bank face artificial bank profile extent	0	0
C8 (-)	Bank face reinforcement extent	0	0
C9 (-)	Bank face reinforcement material	0	0
C10 (-)	Bank face NNIPS cover	0	0
Channel Margin			
D1 (+)	Channel margin aquatic vegetation	1	1
D2 (+)	Channel margin aquatic morphotype	0	1
D3 (+)	Channel margin physical feature extent	0	0
D4 (+)	Channel margin physical feature	0	0
D5 (-)	Channel Margin artificial features	0	0
Channel Bed			
E1 (+)	Channel aquatic Morphotype richness	1	1
E2 (+)	Channel bed tree features richness	1	1
E3 (+)	Channel bed hydraulic features richness	2	2
E4 (+)	Channel bed nature features richness	0	0
E5 (+)	Channel bed natural features richness	0	0
E6 (-)	Channel bed material richness	3	3
E7 (-)	Channel bed siltation	0	0
E8 (-)	Channel bed reinforcement extent	0	0
E9 (-)	Channel bed reinforcement severity	0	0
E10 (-)	Channel bed artificial features severity	0	0
E11 (-)	Channel bed NNIPS extent	0	0
E12 (-)	Channel bed filamentous algae extent	0	0

*where (+) are positive scoring indices and (-) are negative scoring

Watercourse Condition Enhancements (WC-T01)			
Watercourse ID:	**ToGB-F**		
Watercourse Baseline Condition:	Poor		
Is the Watercourse Baseline Overdeep?	Yes: X☐ No:☐		
Watercourse Proposed Condition:	Fairly Poor		
Will the Proposed Watercourse be Overdeep?	Yes: ☐ No:X☐		
Condition Assessment Criteria		**RCA Index Values**	
RCA Index ID*	**RCA Index Name**	**Baseline Score**	**Proposed Score**
Bank Top			
B1 (+)	Bank top vegetation structure	1	2
B2 (+)	Bank top tree feature richness	0	0
B3 (+)	Bank top water-related features	0	0
B4 (-)	Bank top NNIPS cover	0	0
B5 (-)	Bank top managed ground cover	-3	-1
Bank face			
C1 (+)	Bank face riparian vegetation structure	1	1
C2 (+)	Bank face tree feature richness	0	0
C3 (+)	Bank face natural bank profile extent	3	3
C4 (+)	Bank face natural bank profile richness	1	1
C5 (+)	Bank face natural bank material	1	1
C6 (-)	Bank face bare sediment extent	1	1
C7 (-)	Bank face artificial bank profile extent	0	0
C8 (-)	Bank face reinforcement extent	0	0
C9 (-)	Bank face reinforcement material	0	0
C10 (-)	Bank face NNIPS cover	0	0
Channel Margin			
D1 (+)	Channel margin aquatic vegetation	0	1
D2 (+)	Channel margin aquatic morphotype	0	0
D3 (+)	Channel margin physical feature extent	0	0
D4 (+)	Channel margin physical feature	0	0
D5 (-)	Channel Margin artificial features	-1	0
Channel Bed			
E1 (+)	Channel aquatic Morphotype richness	1	2
E2 (+)	Channel bed tree features richness	0	0
E3 (+)	Channel bed hydraulic features richness	0	0
E4 (+)	Channel bed nature features richness	0	0
E5 (+)	Channel bed natural features richness	0	0
E6 (-)	Channel bed material richness	1	1
E7 (-)	Channel bed siltation	-3	-3
E8 (-)	Channel bed reinforcement extent	0	0
E9 (-)	Channel bed reinforcement severity	0	0
E10 (-)	Channel bed artificial features severity	-4	-2
E11 (-)	Channel bed NNIPS extent	0	0
E12 (-)	Channel bed filamentous algae extent	0	0

*where (+) are positive scoring indices and (-) are negative scoring

Watercourses

Enhancement and Management Summary (WC-T02)

Watercourse ID:			
Enhancement Method/RCA Indices Targeted	**Creation Approach**	**Enhancement Approach**	**Management Approach**
B1 & B2	-	Creation of a varied vegetation structure within the riparian zone, including other neutral grassland, scrub and tree planting	Following successful establishment, management will include annual cutting of grassland to maintain desired habitat type and removal of encroaching scrub and self-set trees.
B5	-	Reduction of bank top encroachment by removing land within arable rotation and creating natural habitats	Following successful establishment of new habitats, no new encroachment will occur within the 10m riparian zone.
C4	-	Creation of a varied bank face shape as part of reprofiling works to increase richness and remove over-deepening factor	Following successful channel modifications, no groundworks will occur in channel.
D2 & E1	-	Introducing varied aquatic botanical species to the channel i.e. through use of plug plants or pre-plated coir matts	Following successful establishment, management will include annual check of vegetation with targeted removal of species which dominate the channel.
E4 & E5		Introduction of substrate to the channel to create new natural features in the channel such as boulders and gravel	Following successful establishment, management will include annual check to ensure new substrate has not been washed downstream
D5	-	Removal of artificial features on the bank face	Following successful establishment, management will include annual cutting of grassland to maintain desired habitat type and removal of encroaching scrub or self-set trees.
E10		Removal of artificial features within the channel and replaced by natural substrate such as gravel or cobbles	Following successful removal of artificial features and placement of new substrate, annual review of channel will be required to ensure new substrate has not been washed downstream

Enhancement and Management Detailed Methods (WC-T03)

Watercourse ID:		
Action	**Timing**	**Prescriptions**
C4 0	Year 0	Reprofiling works to create a more varied bank profile

E4 & E5	Year 0	A small number of boulders and gravel will be introduced to the channel
B1, B2 & B5 Establish grassland and scrub habitats within the riparian zone	-	See Creation, Enhancement and Management Detailed Methods on pages 35-40 for other neutral grassland, pages 60-65 for scrub creation, pages 70-73 for tree planting and pages 74-85 for woodland planting.
D2 &E1 Supplementary marginal and in-channel planting	Years 2-5	If marginal, emergent and aquatic plants are not successfully colonising naturally, a range of plug plants tolerant of inundated soil conditions will be introduced into the watercourse channel. Ideally, translocating native aquatic plants from nearby waterbodies where appropriate should be considered, but careful checks should be undertaken to avoid accidentally transferring seeds or fragments of non-native invasive or undesirable plants. Pot grown plants or plugs will be planted out in April or May when frosts have passed. Plants will be sourced from a reputable supplier or can be grown in advance from seeds or cuttings. Aquatic plants can be introduced directly into the channel following the supplier's instructions. Fertiliser or topsoil will not be used during planting.
D5	Years 2-5	Following removal of artificial features from the bank face allow the bare ground to become colonised by surrounding vegetation.
D2 & E1 Ongoing Monitoring	Year 5+	Following establishment, watercourses will require minimal management. Monitoring will track the establishment of vegetation and will trigger remedial measures where appropriate.
E4 & E5	Year 5+	If substrate has been washed downstream it will be replaced, Faggots and natural ways to ensure the substrate is not lost can be considered if substrate is frequently washed away.

Habitat Creation and Management – Risk Register and Remedial Measures PM-T02

Habitat Type	Risk Factor	Trigger for Action	Remedial Measure
All Habitats	Invasive Non-Native Species (INNS) Introduction or Establishment	The presence and establishment of any INNS onsite (other than signal crayfish – see below)	Initiate a program of targeted removal. Engage with an appropriately experienced specialist to provide an eradication strategy.
Riverine corridors and adjacent habitats	Spread of invasive non-native signal crayfish beyond the current distribution. Accidental spread of INNS is an offence under the Wildlife and Countryside Act 1981	Works within or adjacent to watercourses	Works to proceed in strict accordance with the relevant prescriptions detailed within the CEMP to ensure good biosecurity practices observed throughout.
Modified grassland	Failed areas of seeding	Greater than 5% bare ground during years 2-5	In areas of failed establishment, apply additional seeds or, where possible, local green hay from a suitable source during the next appropriate season.
Modified grassland	Poor species establishment	Less than 6 species per average m^2	Initiate a second round of seeding following the relevant prescriptions above.
Modified grassland	Scrub or bracken encroachment	Scrub and or bracken cover greater or 20%.	Initiate a programme of scrub and/or bracken removal as required. This can either be through mechanical removal or spot spraying with herbicide.
Other Neutral Grassland, Lowland Meadow, Lowland Calcareous Grassland	Poor species diversity establishment	Where species establishment is not in line with target habitat type when surveyed against UKHab Category Description	Initiate a second round of seeding following the prescriptions provided for the grassland field compartment(s) which are falling short of this target.
Other Neutral Grassland, Lowland Meadow, Lowland Calcareous Grassland	Failed areas of seeding	Greater than 5% bare ground during years 2-5	In areas of failed establishment, apply additional seeds or, where possible, local green hay from a suitable source during the next appropriate season.
Other Neutral Grassland, Lowland Meadow, Lowland Calcareous Grassland	Poor sward height diversity	Where <20% of the sward is <7cm and <20% of the sward is >7cm.	This will likely be a result of poor species mix establishment. Consider second round of seeding. Monitoring surveys must not be undertaken within 1 month before or after hay-cut as this will skew data.
Other Neutral Grassland, Lowland Meadow, Lowland Calcareous Grassland	Vigorous grass growth limiting species diversity.	Sward 'collapsing' due to lushness before cutting or palatable/productive grasses are identified as dominating the sward (over 50%):	Remove early spring grass regrowth by either taking an additional cut in March/April (if ground conditions allow). If further monitoring shows continued vigorous grass growth, introduce yellow rattle seed: 1) After the grass cut chain, harrow the grassland three times in immediate succession, each time in a different direction. 2) Broadcast yellow rattle seed at a rate of 2.5kg/ha, then roll immediately with a flat roller. 3) If there is sufficient grass growth following sowing, remove arisings by taking another cut before the end of the year.

Other Neutral Grassland, Lowland Meadow, Lowland Calcareous Grassland, Traditional Orchard	Scrub or bracken encroachment	Scrub and or bracken cover greater than 5% or 20%, respectively.	Initiate a programme of scrub and/or bracken removal as required. This can either be through mechanical removal or spot spraying with herbicide.
Other Neutral Grassland, Lowland Meadow, Lowland Calcareous Grassland	Establishment of species indicative of sub-optimal condition	Where species indicative of sub-optimal comprise >5% of sward	Initiate a programme of spot-spraying species indicative of sub-optimal conditions using glyphosate herbicide.
Ponds (Priority Habitat)	Poor water retention	Where >50% of the pond area dries annually	Consult a suitably experienced hydrologist for advice on remedial measures to promote water retention. This will likely include reprofiling the feature. Also consult a suitably experienced ecologist to ensure works can be completed without breaching wildlife legislation.
Ponds (Priority Habitat)	Fish colonisation	Where the pond has been stocked of is native fish assemblages recorded at high density	Initiate a removal program. This can be done using electro fishing techniques, with non-native fish removed and/or a proportion of native fish where high densities are observed.
Ponds (Priority Habitat)	Shading	Where more than 50% of the pond surface becomes shading	Initiate a selective thinning program of trees and shrubs on the pond banks/margins to reduce shading.
Ponds (Priority Habitat)	Poor natural colonisation	Where <50% of the pond area which is less than 3 m deep does not support emergent, submerged or floating plants.	Initiate a planting program to introduce a range of native plants to the pond. A suitably experienced ecologist should be consulted to provide an appropriate planting mix.
Mixed Scrub	Insufficient variation of age classes	One or more age classes are missing across the habitat type.	Selective thinning of scrub to allow natural regeneration to occur. Where natural regeneration is unsuccessful, additional planting of native species should be introduced.
Mixed Scrub	Overdominance of one species within the canopy	Where one species of scrub within a scrub block represents more than 75% of canopy cover.	Selective thinning of dominant species to allow other species to establish within the canopy.
Mixed Scrub	Encroachment of scrub into adjacent grasslands	The edges of scrub begin to creep into grasslands to the extent that they begin to reduce the overall extent of grasslands onsite. This may be a particular problem with blackthorn suckering.	Initiate a program of dense scrub removal where this habitat has begun to creep into grassland habitats. This should not be undertaken where only scattered scrub is present at the edges of the boundaries between these habitats; it should only be undertaken where more dense scrub is established.
Mixed Scrub	Establishment of species indicative of sub-optimal condition	Where species indicative of sub-optimal comprise >5% of sward	Initiate a programme of spot-spraying species indicative of sub-optimal conditions using glyphosate herbicide.
Mixed Scrub, Woodland, Individual trees, Traditional Orchard	Newly planted whips failing to establish from drought etc	10% of newly planted trees found to be dead during years 1-10.	Undertake a second round of planting, replacing failed specimens on a like-for-like basis.

SuDS	Poor vegetation structure	The SuDS support only a single ecotone	Undertake a second round of planting. This should encourage a second ecotone to establish and so may include scrub/tree planting or marginal vegetation planting. Consult a suitably experienced ecologist to provide an appropriate planting mix.
SuDS	Poor species diversity	Where the SuDS becomes dominated by a single, or small number, of species	Undertake a second round of planting to include a variety of species that flower at different times of the year. Consult a suitably experienced ecologist to provide an appropriate planting mix.
SuDS	Poor establishment of riparian species	The SuDS becomes dominated by grassland that is not indicative of damp soils.	Adapt water level controls to encourage the SuDS to hold water for longer. If water control measures are not present, consult a suitably experienced hydrologist for advice on remedial measures to promote water retention. Also consult a suitably experienced ecologist to ensure works can be completed without breaching wildlife legislation.
Lowland Mixed Deciduous Woodland, Other woodland; broadleaved, Individual trees, Veteran trees, hedgerows, Traditional Orchard	Plant heath / disease i.e. ash dieback, *Phytophthora*	Either: • Ash Dieback due to *Hymenoscyphus fraxineus* fungus noted within the woodland; • More than 10% mortality rate of trees; Any of the following high-risk disease or pests are present: Identify a tree pest or disease: overview - GOV.UK (www.gov.uk)	Phytophthora - Fell as first intervention Ash dieback – review species selection at restocking. Thinning and weeding to maintain airflow Where more than 10% mortality of trees observed (excluding those ring-barked to create deadwood), undertake selective thinning to remove dying specimens. Retain deadwood in situ (unless there are concerns around disease spread). Where significant mortality is observed (>20% of trees) seek ecological advice to initiate additional planting if required.
Lowland Mixed Deciduous Woodland, Other woodland; broadleaved, Individual trees, Veteran trees, hedgerows	Significant Deer browsing	One of the three regeneration classes is missing from the woodland or coppice re-growth is being significantly impacted.	Deer population control at the individual woodland level could be undertaken, but it is often not practicable and requires a widespread population-level management approach. Recommendation: As an alternative, protect areas of the thinned woodland by piling arisings over the cut stump to project new shoots which will work their way through the brash. Where brash is not deemed to be effective, tree tubes can be used to protect self-seeded regeneration from browsing impact. Where regeneration is not successful due to overcrowding, selective thinning can be undertaken as required to allow more light to penetrate the woodland floor. Where regeneration is not successful due to overcrowding by pernicious species such as common nettle, targeted removal of weeds can be undertaken.
Lowland Mixed Deciduous Woodland, Other woodland;	Grey squirrel tree damage	Extensive bark stripping, often in long, irregular shapes, commonly occurs on young	Protect trees from squirrel damage

broadleaved, Individual trees, Veteran trees, Hedgerows, Traditional Orchard		trees. If the bark is stripped around the trunk, it can halt the nutrient flow, potentially damaging or killing the tree. If grey squirrel damage is considered significant	Install tree guards or metal bands around trunks. Use deterrents like taste repellents (capsaicin-based sprays) Consider habitat modification (removing nesting sites). Control numbers where other measures are not successful
Lowland Mixed Deciduous Woodland, Other woodland; broadleaved, Individual trees, hedgerows, Traditional Orchard	Field /Bank vole damage of young tree planting	<u>Field Vole</u> Bark is stripped on roots or lower stem up to height of surrounding vegetation. Very small trees can be felled and girdled - when a piece of bark is removed around the entire trunk of a tree. Bark removed in short, irregular strips 5 to 10mm wide, with incisor marks 1mm wide in pairs in the bark around the edge of the wound. <u>Bank Vole</u> Bark removed in short, irregular strips 5 to 10mm wide, with incisor marks 1mm wide in pairs. Bank voles climb so that damage can occur up to 4m. *It is less common than damage by field voles.*	Damage to trees is likely to occur when vole numbers are high and food is scarce (winter and spring), but damage can occur at any time of the year. Protect whips with small plastic guards, without ventilation holes and at least 200mm tall. Create weed-free areas around the trees as voles are reluctant to cross bare ground, trees surrounded by bare soil tend to suffer less damage than those growing in weeds.
Lowland Mixed Deciduous Woodland, Other woodland; broadleaved Individual trees, hedgerows, Traditional Orchard	Insufficient deadwood presence	<25% of the have large deadwood.	Introduce larger pieces of deadwood either through additional selective thinning (if appropriate) or through the creation of log piles.
Hedgerows	Significant gaps form	Gaps between hedgerow base and ground level form or canopy gaps comprise >10% of total hedgerow length	Introduce second round of infill planting

5. Monitoring Schedule

Monitoring Strategy

Provide details of the monitoring strategy to encourage successful implementation of the management plan (MS-B01)

The Site will be monitored at various degrees, from initial establishment to long-term management. Initially, during years 1 to 5, an ecologist will conduct annual site monitoring to assess progress in habitat creation and enhancement. The main observations during this period will focus on determining whether habitats have been successfully established and improved, and whether replacement planting or reseeding may be necessary.

Beginning in Year 5, all habitats will be monitored every five years. The primary objective of this monitoring is to assess whether the long-term management practices are advancing the habitats towards their intended conditions and habitat types. Once achieved, the habitats will be monitored to ensure they are maintained for 30 years. During this period, adaptive management strategies will be employed to modify management approaches as conditions evolve and issues arise, ensuring that conditions are met and maintained.

Update reports will be sent to Oxfordshire County Council (OCC) during Years 1 to 4 to confirm the progress of the initial habitat establishment. From Year 5, a formal monitoring review will be conducted every five years upon completion of the establishment phase. A full UKHab and Condition Assessment Survey will then be conducted across the Site in Years 5, 10, 15, 20, 25, and 30, with monitoring reports issued to OCC accordingly. The client is responsible for appointing a suitably qualified ecologist to conduct the survey and ensure that monitoring reports are completed and issued to OCC for review at the agreed-upon intervals in the monitoring schedule below.

Monitoring Methods and Intervals MS-T01

Habitat Type	Monitoring Methods	Monitoring Interval and Timing
Modified Grassland	During the grassland's establishment phase (year 1), monitoring will focus on determining whether the grassland has been created as per the management plan and a sufficient number of species within the seed mixes have begun to establish. As well as the above, the following should be monitored: • Species diversity • Estimate the percentage of bare ground, bramble and bracken cover. • Presence of non-native invasive species	Annually from starting in Year 1 after creation and then every five years starting from year 5. Grassland monitoring will be undertaken between May and August.
Other Neutral Grassland, Lowland Meadow, Lowland Calcareous Grassland	During the grassland's establishment phase (years 1 to 5), monitoring will focus on determining the DAFOR abundances of plants present throughout the sward and whether a sufficient number of species within the seed mixes used have been established. It will also be important to monitor the percentage coverage of palatable grasses. Quadrat sampling will be undertaken to identify the habitat type that is established and then a number of species per m^2 and collect a botanical species list across grassland to check against the target species list. As well as the above, the following should be monitored: • Grassland swards must be assessed against corresponding UKHab Category Description to determine if the desired sward type is establishing • Estimate the percentage of bare ground, bramble and bracken cover. • Presence of non-native invasive species • Presence of positive or negative indicator species	Annually from years 1-5, then every 5 years. Grassland monitoring will be undertaken between May to August. Surveys should not be undertaken within 1 month following a hay cut.

	• Sward height diversity	
Ponds (Priority Habitat)	The pond's water levels will be reviewed throughout years 2 and 3. During the remainder of the management period, ponds will be monitored for: • The presence and percentage covers of filamentous algae and/or duckweed on water surfaces • The level of shading at the banks of pools caused by tree and/or scrub • Water levels • Presence of non-native invasive species • Presence of fish • Marginal vegetation diversity	Annually in years 1-5 and then every 5 years Pond monitoring will be undertaken between May to August.
Mixed Scrub	During years 1-5 of the management plan period, individual specimen scrub plants will be monitored for their health. The abundance of species indicative of sub-optimal conditions and the presence of non-native invasive species will also be reviewed. Throughout the remainder of the management period, the scrub will be monitored for: • The number of native scrub canopy species in each block • The percentage cover of various age ranges of scrub throughout scrub blocks • Percentage cover of species indicative of sub-optimal condition • Presence of non-native invasive species • The character of edge habitats The presence of clearings, glades and rides	Annually from years 1-5, then every 5 years. Scrub monitoring will be undertaken between May to September.
SuDS	The pond's water levels will be reviewed throughout years 2 and 3. During the remainder of the management period, ponds will be monitored for: • Habitat heterogeneity/diversity • Water levels • Presence of non-native invasive species • Marginal vegetation diversity	Annually in years 1-5 and then every 5 years Pond monitoring will be undertaken between May to August.
Lowland Mixed Deciduous Woodland, Other Woodland; Broadleaved	The woodland communities will be mapped broadly following the UKHab classification system and assessed for their condition using methodology as detailed within Statutory Biodiversity Metric Technical Annexes. Each woodland will be walked, and a comprehensive species list should be made of the woody components (split into upper canopy, understorey, and regeneration), together with a comprehensive species list of the ground flora. Each element should have an associated DAFOR measure of abundance. Within the patch of woodland, five 50x50m quadrats will be collected. based on the England Woodland Biodiversity Group (EWBG) Woodland Condition Survey Method[6]. This method collects information on the following within each quadrat:	Annually from years 1-5, then every 5 years. Woodland monitoring will be undertaken between April and June.

[6] https://woodlandwildlifetoolkit.sylva.org.uk/assess

	• Native tree/shrub richness; • Percentage cover of native trees/shrubs; • Open space; • Woodland regeneration; • Ground flora; • Vertical structure; & • Amount of deadwood. Using the information collected, the woodland condition assessment table will be completed with notes on individual criteria and management recommendations to improve scores	
Traditional Orchard	The grassland will be monitored via quadrat sampling to identify the habitat type establishing and the number of species per m2. Collect a botanical species list across grassland to check against the target species list, including an associated DAFOR measure of abundance of each species. The habitat will also be monitored for: • Percentage cover of scrub; • The percentage of trees damaged by humans or animals; • Success of formative pruning regimes; • Percentage cover of poached land under trees; • Presence of any invasive non-native species Percentage cover of species indicative of suboptimal condition.	Years 1 and 5 to review establishment and then every 5 years from year 10 until year 30. Orchard monitoring will be undertaken between May-September.
Individual and Veteran trees	Individual and Veteran tree health will be monitored throughout the life of the management plan period.	Year 1 ~~after creation~~ and then every 5 years starting from year 5. Tree monitoring will be undertaken between May and September.
Hedgerow	During years 1 – 5 of the management plan period monitoring of new planting will be taken and monitored for: • Size of and % of gaps within the canopy • The height and width of the hedgerow • Presence of invasive non-native species • The character of the edge habitats • Species diversity within hedgerow and undisturbed margin	Year 1 after creation, and then every 5 years starting from year 5. Hedgerow monitoring will be undertaken between May and September.
Watercourse (s)	MoRPh5 at designated sub-reaches to repeat surveys and provide accurate condition changes.	Year 1, then every 5 years, include remedial measures as outlined in prescriptions where necessary. Surveys to be conducted ideally between April and June
Watercourse (s) – Riparian Encroachment	Monitoring for riparian encroachment will focus on identifying and preventing the re-establishment of agricultural activity or inappropriate vegetation management within the riparian buffer. Regular site inspections will be undertaken to check for evidence of grazing, cultivation, vehicle access, or trampling within the buffer zone, as well as the spread of invasive or non-native plant species.	Every 5 years, include remedial measures as outlined in prescriptions where necessary.

	Fixed-point photography and walkover surveys will be used to record changes in vegetation structure and buffer width over time, ensuring the riparian corridor remains intact and functional. Any signs of encroachment will be logged and addressed promptly through remedial actions such as repairing fencing, adjusting management practices, or targeted vegetation control to maintain the integrity of the riparian habitat.	

Monitoring for Fauna

Habitat Type	Monitoring Methods	Monitoring Interval and Timing
Lowland Meadow and Calcareous Grassland	Monitoring of the established green infrastructure, concentrating on the main mitigation areas to establish whether previously recorded bird assemblages continue to breed and over-winter successfully on Site or if they have been displaced as a result of the development. Monitoring will broadly follow the standard BTO Breeding Bird Survey (BBS) guidelines but with flexibility to specifically focus on ground-nesting species such as skylark and corn bunting and other notable farmland bird species. Monitoring is proposed in Years 2, 3, 5, 10, 15, 20, 25, and 30, with territories mapped using standard BTO symbology. A minimum of three survey visits is required per monitoring year (April - July), with the final survey to be undertaken in July to coincide with the late timing of the corn bunting nesting season. A minimum of two winter monitoring survey visits will be undertaken each monitoring year, timed to cover the early (November/December) and late (January/February) winter period. The methodology will encompass flock counts and record evidence of foraging behaviour. Monitoring reports will be submitted to the Local Planning Authority for each monitoring year and the survey results will feed into the phase-specific P-HMMP documents, which will be live documents and amended to reflect updated habitat management strategies as required throughout the 30-year management period. If the target bird species are not recorded or occur in low numbers (<70%) relative to the pre-development baseline or the generalist bird assemblage diversity drops below the initial baseline this will trigger review of the status and condition of habitats and adaptive management as appropriate. Management interventions will target relevant associated habitats and may comprise additional mowing/grazing to break up sward density, the resowing of field compartment interiors or field margins to increase the availability of invertebrates and/or seeds, alteration of hedgerow cutting rotations to boost winter berry yields, or the removal of encroaching scrub providing predator perches. If fencing alongside public footpaths is not maintained this can contribute to disturbance effects and will be reported to the appointed Management Company for immediate repair/replacement.	Years 2, 3, 5, 10, 15, 20, 25, and 30. Breeding bird monitoring will be undertaken between April and July. Wintering bird surveys will be undertaken between November and February.

Monitoring Reports

Monitoring Report Schedule MS-T02

Organisation Responsible for Submitting the Monitoring Reports	Organisation Receiving and Responsible for Reviewing Reports
Oxfordshire County Council	TBC

Project Year	Month Report to be Submitted	Month Management Plan to be reviewed	Comments
Y1	October TBC	December TBC	Report on habitat and creation measures.
Y2	October TBC	December TBC	Report on habitat and creation measures.
Y3	October TBC	December TBC	Report an update on habitat establishment progress.
Y4	October TBC	December TBC	Report an update on habitat establishment progress.
Y5	October TBC	December TBC	Report an update on habitat establishment. Depending on the progress of habitats – review management techniques and the need for yearly surveys.
Y10	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y15	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y20	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y25	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y30	October TBC	December TBC	Monitor progress – adapt management techniques where required

Adaptive Management

Summary of Adaptive Management Approaches (MS-B02)
Adaptive management is a systematic approach to natural resource management that involves monitoring and evaluating the effectiveness of management actions and adjusting as necessary to improve outcomes over time. It is an iterative process in which management actions are followed by targeted monitoring. Regular robust monitoring, and reporting to the responsible authority, should identify issues early. Then the landowner will make conscious decisions to implement effective actions in consultation with the ecologist responsible for completing monitoring where required. By continuously monitoring of the project, essential changes in management will be identified and implemented to continue progressing towards targets. Any changes will be updated in the monitoring reporting and any future updates to this management plan. Any major changes which will impact outcomes, such as the success of the project or the habitat type and condition being targeted will be discussed with the appropriate authority and agreed on. **To ensure its effectiveness, this management plan will undergo regular updates and reviews every five years. The monitoring reports will provide feedback on the implementation of the plan, and any necessary changes will be made accordingly. Additionally, the plan will identify and address any previously unknown risks that may arise.** **It is important to note that any significant changes to management prescriptions that could alter the expected outcomes will be discussed and agreed upon with the relevant authority before implementation.**

FURLONG BARN, ARDLEY
OXFORDSHIRE

BASELINE SOIL ASSESSMENT

Prepared on behalf of:

MOUNTPARK

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Appendix 1 – Site Plan Showing Sampling Areas / Trial Hole Locations

Appendix 2 – Laboratory Analysis Results

1.0 INTRODUCTION

Tim O'Hare Associates (TOHA) LLP was commissioned by Mountpark to undertake a Baseline Soil Assessment at the Furlong Barn site in Ardley, Oxfordshire.

The authority to carry out the work was confirmed by [redacted] via email, dated 09/07/2026.

1.1 Purpose

It is understood that 2 No. arable fields (hereby referenced Field 1 and Field 2; see Site Plan in **Appendix 1**) are being considered as mitigation areas for priority grassland. It is proposed to establish winter stubble / crops in Field 1 and lowland meadow in Field 2.

No information is available on the current basic chemistry and fertility status of the topsoil across this site for the proposed Biodiversity Net Gain (BNG) habitat typologies. As such, a soil assessment was requested to ascertain the baseline soil information within the 2 No. fields, to confirm their suitability for the proposed other neutral grassland / lowland meadow creation.

This report issues the findings of the soil assessment, including site observations, soil descriptions, results and interpretation of all analyses, discussion on topsoil quality and suitability for the proposed habitat types.

2.0 SITE INVESTIGATION

2.1 Site Visit

The site visit was conducted on 16th July 2026 during a period of warm, dry weather.

2.2 Site Overview

The site was located to the east of Ardley and was access from Ardley Road.

The survey area comprised of 2 No. arable fields (referenced *Field 1* and *Field 2*), bordered by mature trees, shrubs and wire fencing. Both fields were relatively level, with some slight undulating microtopography. They were vegetated with wheat crop residue.



Plate 1: View across Field 1 to the west.



Plate 2: View across the southern margin of Field 1 to the east.



Plate 3: View across Field 2 to the south.



Plate 4: View across the eastern margin of Field 2 to the north.

2.3 Soil Sampling and Assessment

For the purpose of topsoil sampling, the centers of Field 1 and Field 2 were each divided into 3 No. 'Sampling Areas'. The extent of each Sampling Area has been indicated on the Site Plan in **Appendix 1**.

Each Sampling Area was sampled in accordance with Natural England Technical Information Note 035 – *Soil sampling for habitat recreation and restoration (TIN 035)*, based on the requirements for arable land. As such, sub-samples of the topsoil were taken along a 'W' pattern to a depth of 200mm within each Sampling Area using a hand-driven soil auger / spade. Where consistent in soil type, these subsamples were combined to form a single composite topsoil sample for laboratory analysis for each Sampling Area.

Along each field margin, topsoil subsamples were taken along a straight line to a depth of 200mm and composited into a single sample for laboratory testing.

In addition, 4 No. trial holes were constructed using a spade and hand-held soil auger at representative locations across the site to a maximum depth of 600mm (ground conditions permitting) for the purpose of soil profile description. At these locations, the topsoil and subsoil were examined with reference to the Soil Survey Field Handbook. Important physical soil characteristics were recorded, including soil texture, soil structure, compaction, moisture status, drainage characteristics, stone content and the presence of deleterious materials. The locations of these trial holes are also indicated on the Site Plan.

2.4 Soil Conditions

Two topsoil types were encountered across the site; *Field 1 Topsoil* within Field 1 and *Field 2 Topsoil* within Field 2; the primary difference between them being their calcareousness. Both topsoils were recorded over a consistent *Subsoil*. These soil types can be described as below:

Field 1 Topsoil Within Field 1 0 – 290/300mm Average Depth: 300mm	Dark yellowish brown (Munsell Colour 10YR 3/4 to 4/6), dry, friable SANDY CLAY LOAM with a moderately developed, fine to coarse granular and subangular blocky structure. Slightly to moderately stony, including occasional subangular stones up to 50mm in size. The topsoil within Field 1 was moderately calcareous to very calcareous. Occasional limestone fragments (up to 80mm in size) were recorded within the topsoil. No observable deleterious materials were recorded. Gradual boundary to *Subsoil*:
Field 2 Topsoil Within Field 2 0 – 310/360mm Average Depth: 340mm	As described in *Field 1 Topsoil*. The topsoil within Field 2 was very slightly calcareous (rarely moderately calcareous), including occasional limestone fragments up to 50mm in size. Gradual boundary to *Subsoil*:
Subsoil 290/360 – 400/450mm*	Brown (Munsell Colour 10YR 5/3), dry, friable, very calcareous CLAY LOAM. Slightly stony, comprising of stones and limestone fragments up to 30mm. No foreign matter was observed.

** No further progress at TH1 below 450mm and TH2, TH3 and TH4 below 400mm due to the dry soil conditions and the presence of stones.*



Plate 5: Typical trial pit showing *Field 1 Topsoil* over *Subsoil* – TH1.



Plate 6: Typical *Field 1 Topsoil* arisings.



Plate 7: Typical *Subsoil* arisings.



Plate 8: Typical trial pit showing *Field 2 Topsoil* over *Subsoil* – TH3.



Plate 9: Typical *Field 2 Topsoil* arisings.



Plate 10: Example of large stones and limestone fragments with the topsoils.

3.0 LABORATORY ANALYSIS

3.1 Analytical Schedule

A total of 14 No. composite topsoil samples were submitted to the laboratory for physical and chemical analysis to primarily confirm their soil reaction and fertility status. The samples were analysed in accordance with all or part of the following schedule:

- particle size analysis (clay, silt, sand);
- pH value;
- electrical conductivity values;
- organic matter;
- total nitrogen;
- extractable phosphorus;
- extractable potassium;
- extractable magnesium;
- organic matter content;
- C:N ratio.

The results are presented on the Certificates of Analyses in **Appendix 2** and an interpretation of the results is given below.

3.2 Results of Analysis

Particle Size Analysis

The *Field 1 Topsoil* and *Field 2 Topsoil* samples fell into the *sandy clay loam* texture class and would be described as 'medium' in texture. Such soils usually have good water and nutrient retention capacities, but are prone to structural degradation and compaction during handling, especially when plastic in consistency.

pH and Electrical Conductivity

The *Field 1 Topsoil* samples were alkaline to strongly alkaline in reaction (pH 7.7 to 8.1).

The *Field 2 Topsoil* samples from within the sampling areas covering the centre of the field were slightly alkaline to alkaline in reaction (pH 7.1 to 7.9) while they were acid to alkaline along its field margins (pH 6.9 to 7.8).

The mean pH values of *Field 1 Topsoil* and *Field 2 Topsoil* were pH 7.8 and pH 7.4 respectively.

The electrical conductivity (salinity) values (water and $CaSO_4$ extracts) of *Field 1 Topsoil* and *Field 2 Topsoil* samples were low, which indicates that soluble salts were not present at levels that would be harmful to plants.

Organic Matter and Fertility Status

The table below summarises the organic matter contents and fertility status for the topsoil samples.

		Organic Matter	***Total Nitrogen***	***Extractable Phosphorus***	***Extractable Potassium***	***Extractable Magnesium***
Field 1 Topsoil						
Sampling Areas	Field 1.1	*NT*	*NT*	*o (2)*	*✓(2)*	*x (1)*
	Field 1.2	*✓*	*✓*	*o (2)*	*✓(2)*	*✓(2)*
	Field 1.3	*NT*	*NT*	*o (2)*	*✓(2)*	*x (1)*
Field Margins	North	*✓*	*✓*	*x (1)*	*✓(2)*	*x (1)*
	South	*✓*	*✓*	*o (2)*	*✓(2)*	*✓(2)*
	East	*NT*	*NT*	*o (2)*	*✓(2)*	*x (1)*
	West	*NT*	*NT*	*x (1)*	*✓(2)*	*✓(2)*
Field 2 Topsoil						
Sampling Areas	Field 2.1	*NT*	*NT*	*o (2)*	*✓(2)*	*✓(2)*
	Field 2.2	*✓*	*✓*	*o (2)*	*✓(2)*	*x (1)*
	Field 2.3	*NT*	*NT*	*o (2)*	*✓(2)*	*x (1)*
Field Margins	North	*NT*	*NT*	*xx (0)*	*x (1)*	*✓(2)*
	South	*NT*	*NT*	*xx (0)*	*✓(2)*	*✓(2)*
	East	*✓*	*✓✓*	*x (1)*	*✓(2)*	*✓(2)*
	West	*✓*	*✓*	*x (1)*	*✓(2)*	*✓(2)*

✓✓ = high ✓ = moderate o = slightly low x = low xx = very low NT = Not Tested

(ADAS Soil Nutrient Index)

4.0 DISCUSSION

The purpose of this Baseline Soil Assessment was to assess the basic chemistry, fertility status and physical characteristics of the existing topsoil across the Furlong Barn site in Ardley, Oxfordshire (*Field 1* to *Field 2*; field centres and margins) to determine its suitability for the proposed lowland meadow and other neutral grassland BNG habitat creation.

4.1 Summary of Findings

Based on the on-site assessment and subsequent laboratory analysis, two topsoil types (*Field 1 Topsoil* and *Field 2 Topsoil)* were encountered across the site, varying in their soil reaction and calcareousness.

Both topsoils could be described as non-saline *sandy clay loams* ('medium' soil texture) with moderately developed structures and low to moderate stone contents.

Field 1 Topsoil was alkaline to strongly alkaline in reaction and moderately calcareous to very calcareous, with occasional limestone fragments up to 80mm in size. It contained moderate levels of organic matter, total nitrogen and extractable potassium, low to slightly low levels of extractable phosphorus and very low to low levels of extractable magnesium.

Field 2 Topsoil was acid to alkaline in reaction and very slightly calcareous to moderately calcareous with occasional limestone fragments up to 50mm in size. It typically contained moderate to high levels of total nitrogen, moderate levels of organic matter and extractable potassium, low to moderate levels of extractable magnesium and very low to low levels of extractable phosphorus.

Both topsoils were underlain by *Subsoil* which would be considered 'medium' in soil texture (*clay loam*) with a low stone content.

4.2 Soil Requirements

Lowland Meadow

Lowland meadows occur on shallow slopes or level ground with relatively deep soils that are close to neutral in pH, being neither strongly acidic nor lime-rich.

Generally, meadow mixes should be established on soils that are not too fertile and do not have a problem with perennial weeds. Low phosphorus levels are particularly important to encourage species diversity and prevent aggressive species, such as nettles and rye grass, from dominating the sward. Appropriate management practices (e.g. periodic mowing, grazing and collection of cuttings to prevent seed head development) may be necessary to maximise diversity in the sward.

Other Neutral Grassland

The soil requirements for other neutral grassland are soils which provide the following key properties:

- Low plant available phosphorus;
- At least moderate reserves of organic matter and total (organic) nitrogen;
- Neutral pH values (typically slightly acid to slightly alkaline).
- Undrained, with heavy soil textures and moisture retentive

Plant available phosphorus is regarded as the key nutrient when considering the fertility status of soil in relation to species-rich grasslands. Whereby, a low phosphorus level is preferred to maximise floral diversity and prevent domination of the sward by grasses and aggressive weeds such broad-leaved dock (*Rumex obtusifolius*) and stinging nettle (*Urtica dioica*).

4.3 Comparison of Topsoil within Field 1 and Field 2

The table below summarises the key characteristics of the topsoils within the Sampling Areas and field margins of Field 1 and Field 2, with regards to the proposed habitat creation.

	Field 1 Center	**Field 1 Margins**	**Field 2 Center**	**Field 2 Margins**
Soil Texture	*Sandy clay loam* ('medium' soil texture)			
Soil Reaction (pH value)	Alkaline to strongly alkaline (pH 7.7 to 8.1)		Slightly alkaline to alkaline (pH 7.1 to 7.9)	Acid to alkaline (pH 6.9 to 7.8)
Carbonate Content (by acid test)	Moderately calcareous to very calcareous		Very slightly calcareous to moderately calcareous	
Extractable Phosphorus (ADAS Index)	Slightly low (2)	Low to slightly low (1 to 2)	Slightly low (2)	Very low to low (1 to 2)
Organic Matter & Total Nitrogen	Moderate			

The test results should be forwarded to the project ecologist for confirmation of their final suitability of Field 1 and Field 2 (field centre and field margins), in relation to the proposed lowland meadows / other neutral grassland establishment.

4.4 Soil Suitability for Lowland Meadows / Other Neutral Grassland

The following considerations are given to the proposed lowland meadows and other neutral grassland creation across the site.

Physical Properties

Soil Texture & Physical Condition

The topsoil within both fields fell into the *sandy clay loam* soil texture class, and the subsoil fell into the *clay loam* texture class (based on hand texturing). Such soils usually have good water and nutrient retention capacities, but they are also prone to structural degradation and compaction during handling, and especially when plastic in consistency.

The soils possessed adequate structures, with no signs of restricted drainage recorded during the site visit. This, along with the soil texture and underlying limestone bedrock, indicates that the soils are likely to be moderately well drained, with little to no seasonal waterlogging.

Lowland meadow is considered to prefer moisture-retentive soils, while other neutral grasslands typically prefer slow to moderately draining soils. The site soils would therefore not be considered ideal, but may be considered acceptable for these habitat types if a suitable seed mix tolerant of moderately draining, medium soils is selected.

Chemical Considerations

Soil Reaction

The pH range (pH 6.9 to 7.9, mean pH 7.4) and generally low carbonate content (by acid test) of the *Field 2 Topsoil* would be considered acceptable for the creation of lowland meadow or other neutral grassland.

Field 1 Topsoil's alkaline to strongly alkaline pH range (pH 7.7 to 8.1, mean 7.9) and moderate to high carbonate content (by acid test) would not be ideally suited for lowland meadow and other neutral grassland establishment. An alternative grassland type tolerant of alkaline, calcareous soil conditions may be required if this field is to be re-used for grassland habitat creation.

Fertility Status and Seed Bank

The low phosphorus levels of the topsoil within both fields (main field and margins) are suitable for 'species-rich' grassland / meadow establishment. Furthermore, the overall balance of fertility with generally satisfactory levels of organic matter (linked to biological activity) and total nitrogen is currently ideal for seed germination and establishment. However, the topsoils will contain an existing weed seed bank and therefore, effective grassland management will be necessary to prevent undesirable species from colonising and outcompeting the new lowland meadow / other neutral grassland sward.

The levels of magnesium and potassium are considered to be of less influence with respect to 'species-rich' grassland establishment.

4.5 Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. vegetation clearance, cultivation or seeding). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

We would like to thank Mountpark for entrusting our practice with this commission. We trust this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of any further assistance.

[redacted]

[redacted]

For & on behalf of Tim O'Hare Associates LLP

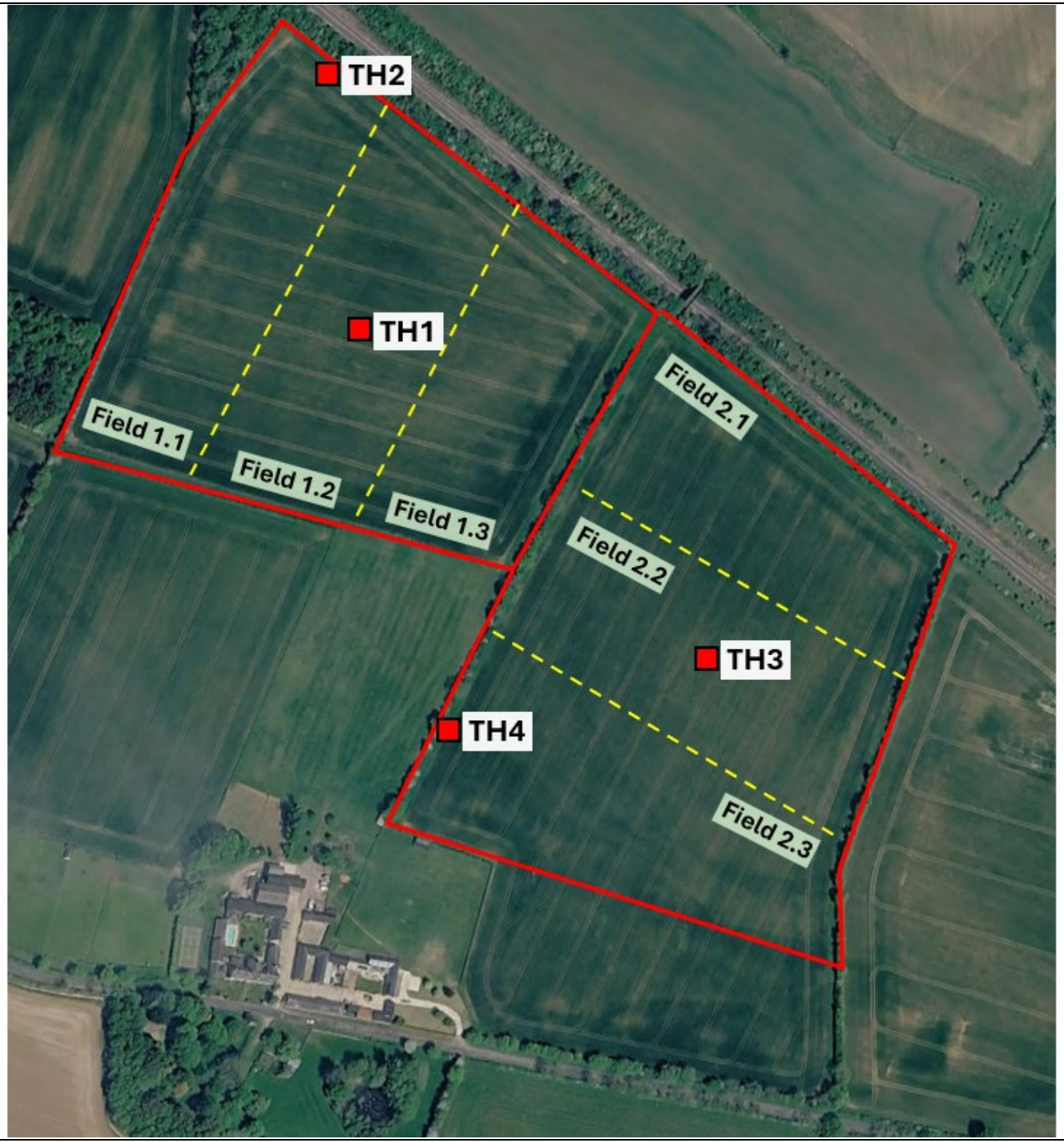
Report Qualifications

TOHA's interpretation of the soil conditions is based on observations made during the site investigation and the results of laboratory tests. This report presents TOHA's site observations and test results and the interpretation of those observations and results. On any site there may be variations in soil conditions between these exploratory positions. TOHA can therefore not accept any responsibility for soil conditions that have not been exposed by this investigation.

This assessment considers the re-use of the site soils for lowland meadow and other neutral grassland creation at Furlong Barn. Ardley. It should not therefore be relied on for alternative end-uses or for other schemes. This report has been prepared solely for the benefit of our client Mountpark. No warranty is provided to any third party and no responsibility or liability will be accepted for any loss or damage in the event that this report is relied upon by a third party or is used in circumstances for which it was not originally intended.

Appendix 1

Site Plan Showing Trial Hole Locations



THx
Approximate Trial Hole Location

Site Boundary

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	Mountpark		
Project:	Ardley, Oxfordshire		
Job ref no.:	TOHA/26/3215/NSK		
Drawing no.:	3215/1/NSK		
Drawing title	Baseline Soil Assessment		
Date:	Aug 26	Scale:	NTS
Drawn by:	NSK	Checked by:	AC

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Appendix 2

Laboratory Analysis Results

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**Mountpark**
Project:	**Furlong Barn, Ardley, Oxfordshire**
Job:	**Baseline Soil Assessment - Field 1 Topsoil Analysis**
Date:	**August 2026**
Job Ref No:	**TOHA/26/3215/NSK**

				Field Center			Field Margins			
Sampling Area				**Field 1.1**	**Field 1.2**	**Field 1.3**	**North**	**South**	**East**	**West**
Soil Type				**Field 1 Topsoil**	**Field 1 Topsoil**	**Field 1 Topsoil**	**Field 1 Topsoil**	**Field 1 Topsoil**	**Field 1 Topsoil**	**Field 1 Topsoil**
		Accreditation								
Clay (<0.002mm)	%	UKAS		NT	25	NT	NT	NT	NT	NT
Silt (0.002-0.05mm)	%	UKAS		NT	23	NT	NT	NT	NT	NT
Sand (0.05-2.0mm)	%	UKAS		NT	52	NT	NT	NT	NT	NT
Texture Class (UK Classification)	--	UKAS		NT	SCL	NT	NT	NT	NT	NT
Stones (2-20mm)	% DW	GLP		NT	7	NT	NT	NT	NT	NT
Stones (20-50mm)	% DW	GLP		NT	9	NT	NT	NT	NT	NT
Stones (>50mm)	% DW	GLP		NT	0	NT	NT	NT	NT	NT
pH Value (1:2.5 water extract)	units	UKAS		7.8	8.0	8.1	8.0	7.7	8.0	7.9
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS		NT	262	NT	181	429	NT	NT
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS		NT	2129	NT	NT	NT	NT	NT
Exchangeable Sodium Percentage	%	UKAS		NT	0.2	NT	0.2	0.2	NT	NT
Organic Matter (LOI)	%	UKAS		NT	6.4	NT	6.3	7.1	NT	NT
Total Nitrogen (Dumas)	%	UKAS		NT	0.26	NT	0.26	0.36	NT	NT
C : N Ratio	ratio	UKAS		NT	14	NT	14	11	NT	NT
Extractable Phosphorus	mg/l	UKAS		18	20	19	11	20	16	15
Extractable Potassium	mg/l	UKAS		166	208	147	154	309	176	160
Extractable Magnesium	mg/l	UKAS		38	51	34	42	68	47	51

SCL = SANDY CLAY LOAM
NT = NOT TESTED

Results of analysis should be read in conjunction with the report they were issued with

[redacted]

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	**Mountpark**
Project:	**Furlong Barn, Ardley, Oxfordshire**
Job:	**Baseline Soil Assessment - Field 2 Topsoil Analysis**
Date:	**August 2026**
Job Ref No:	**TOHA/26/3215/NSK**

			Field Center			**Field Margins**				
Sampling Area			**Field 2.1**	**Field 2.2**	**Field 2.3**	**North**	**South**	**East**	**West**
Soil Type			**Field 2 Topsoil**	**Field 2 Topsoil**	**Field 2 Topsoil**	**Field 2 Topsoil**	**Field 2 Topsoil**	**Field 2 Topsoil**	**Field 2 Topsoil**
		Accreditation							
Clay (<0.002mm)	%	UKAS	NT	23	NT	NT	NT	NT	NT
Silt (0.002-0.05mm)	%	UKAS	NT	22	NT	NT	NT	NT	NT
Sand (0.05-2.0mm)	%	UKAS	NT	55	NT	NT	NT	NT	NT
Texture Class (UK Classification)	--	UKAS	NT	SCL	NT	NT	NT	NT	NT
Stones (2-20mm)	% DW	GLP	NT	4	NT	NT	NT	NT	NT
Stones (20-50mm)	% DW	GLP	NT	10	NT	NT	NT	NT	NT
Stones (>50mm)	% DW	GLP	NT	5	NT	NT	NT	NT	NT
			NT						
pH Value (1:2.5 water extract)	units	UKAS	7.1	7.9	7.4	6.9	7.1	7.3	7.8
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	NT	333	NT	NT	NT	365	208
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	NT	2213	NT	NT	NT	NT	NT
Exchangeable Sodium Percentage	%	UKAS	NT	0.2	NT	NT	NT	0.7	0.2
Organic Matter (LOI)	%	UKAS	NT	6.6	NT	NT	NT	8.3	6.8
Total Nitrogen (Dumas)	%	UKAS	NT	0.34	NT	NT	NT	0.43	0.35
C : N Ratio	ratio	UKAS	NT	11	NT	NT	NT	11	11
Extractable Phosphorus	mg/l	UKAS	16	17	16	6	8	10	13
Extractable Potassium	mg/l	UKAS	132	136	117	118	169	294	234
Extractable Magnesium	mg/l	UKAS	54	35	42	73	64	115	64

SCL = SANDY CLAY LOAM
NT = NOT TESTED

Results of analysis should be read in conjunction with the report they were issued with

[redacted]

SOIL INVESTIGATION

LAND WEST OF ARDLEY

Report 2730/2

24th March 2026

Land Research ASSOCIATES
www.lra.co.uk

SOIL INVESTIGATION

LAND WEST OF ARDLEY

[redacted]

Report 2730/2

Land Research Associates Ltd
Tapton Park Innovation Centre
Brimington Road
Chesterfield
S41 0TZ

24th March 2026

1.0 Introduction

1.1 This report details an investigation of soil conditions of approximately 26 ha of land west of Ardley, Oxfordshire. The report is based on a survey of the land in February 2026 and assesses the suitability of the land for habitat creation.

SITE ENVIRONMENT

1.2 The survey area (Site) forms a gentle valley, with a stream/ditch dividing the Site east to west. The Site comprises two arable fields and a small area of wet grassland on the valley floor. The Site is bordered to the north by Somerton Road, to the south by Heyford Airfield, to the east by a railway line, and to the west by adjoining agricultural land and woodland.

PUBLISHED INFORMATION

1.3 British Geological Survey 1:50,000 scale information records the underlying geology of the most of the land as White Limestone Formation. The lower ground of the valley floor is recorded as Rutland Mudstone, partially covered by river alluvium.

1.4 The National Soil Map (published at 1:250,000 scale) records the land as Aberford Association: mainly calcareous shallow well drained loamy soils over Jurassic limestone, with some deeper soils in outcrops of clay reported in the Oxfordshire area[1].



Photo 1: Aerial image with darker colours showing areas of deeper soils

[1] Jarvis., *et al*., (1984). Soils and their Use in South East England, Soil Survey of England and Wales Bulletin No. 15, Harpenden.

2.0 Soil types

2.1 A detailed soil resource survey was carried out in February 2026. The soils were investigated at regular intervals, with an average density of approximately 1 observation per hectare. The location of observation points is shown by Map 1 in an appendix to the report, and full survey logs are also appended.

2.2 Five representative topsoil (0-15 cm) samples were collected from the field. Samples were submitted to an UKAS accredited laboratory for nutrient analysis. The location of samples is shown by Map 1.

CALCAREOUS SOILS OVER LIMESTONE BEDROCK

2.3 These soils are dominant on higher ground in the south-west and north-east (see Map 2). They comprise calcareous clay loam topsoil, either directly over hard fractured limestone bedrock or with a thin very stony/brashy subsoil. The topsoils are slightly to moderately stony, containing hard limestone fragments. The shallowest soils correspond to areas with the highest stone content. These soils are freely drained (Soil Wetness Class I).

2.4 In the north-west the limestone is interbedded with mudstone. The soils in this area are also strongly calcareous but deeper and with evidence of seasonal waterlogging, caused by water perching over the mudstone layers.



Photo 2: Shallow soil (observation 16)



Photo 3: Deep calcareous groundwater-affected soil (observation 6)

DEEP CLAY SOILS

2.5 The soils in the central valley are stoneless clays formed in mudstone or clayey alluvium derived from mudstone. They mainly comprise decalcified clay loam topsoil and upper subsoil, over a strongly calcareous weakly structured clay lower layer. These soil show evidence of seasonal waterlogging and the lowest ground adjoining the ditch is rush-infested.



Photo 4: Slowly permeable clay soil (Observation point 3)

Photo 5: Clay soil with grey slowly permeable lower subsoil (Observation point 9)

3.0 Soil analysis

3.1 The land has neutral to calcareous soils with moderately low topsoil organic matter (loss on ignition). Phosphate availability is unusually low for land in arable use, which may be partly due to the effects of calcium carbonate in 'fixing' phosphorous in unavailable forms.

Table 3.1: Summary of laboratory analysis.

Sample ID*	pH	Loss on ignition %	P	K	Mg
			MAFF indices		
A	8.1	5.3	0	2-	1
B	7.9	5.3	0	2-	2
C	7.6	7.1	0	1	2
D	8.1	5.3	0	2-	2
E	8.1	5.2	0	2-	1

See Map 1 for sample areas

3.2 Full laboratory testing certificates are in an appendix to the report.

4.0 Habitat creation potential

SPECIES-RICH GRASSLAND

4.1. The land has two soil types:

- The shallow soils over limestone are well suited to the creation of calcareous grassland. Topsoil phosphate availability was low at the time of survey and if the and is not subject to future fertiliser additions, the establishment of species-rich grassland habitat would be relatively straightforward. The deeper calcareous soils in the north-west (see Map 2) are likely to experience some waterlogging during the growing season, which means they trend towards a neutral moist grassland community.
- The clay soil in the central valley are not strongly calcareous and do not have limestone or very calcareous layers within grass rooting depth. They are best suited to the creation of moist neutral or marshy grassland.

Grassland management systems

4.2. Provided fertility levels are not increased by fertiliser additions, the soils are well suited to the establishment of species-rich grassland. Reseeding with appropriate seed mixes followed by the introduction of a meadow management system (annual hay cutting with limited post-cut grazing) are likely to be effective.

APPENDIX

OBSERVATIONS & MAPS

LABORATORY TESTING

Ardley: Soil resources survey – Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil		
No	Depth (cm)	Texture	Stone %	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling
1	0-30	CL ca	15	30-40	vst CL ca	o	40+	LST	
2	0-27	CL vslca	10	27-47	slst CL vslca	o	47-100+	C ca	xxx
3	0-28	CL	0	28-50	CL	xxx	50-100+	C ca	xxx
4	0-26	CL ca	<5	26-40	slst SCL ca	xx	40-100+	C ca	xxx
5	0-24	CL ca	10	24-54	mst CL ca	o	54+	LST	
6	0-30	CL ca	10	30-42	CL ca	xx	42-76 76-100+	CL ca (wet) CL ca	xxx xxx
7	0-32	CL ca	10	32-40	brashy CL ca	o	40+	LST	
8	0-33	CL	<5	33-67	CL	xxx	67-100+	C ca	xxx
9	0-27	CL	5	27-46	brashy CL ca	o	46+	LST	
10	0-25	CL slca	5	25-39	vslst CL slca	o	39+	LST	
11	0-30	CL	0	30-55	CL	o	55-66 66-100+	CL CL ca	xx xxx
12	0-28	CL ca	20	28-46	vst CL ca	o	46+	Saturated (drain?)	
13	0-30	CL slca	10	30-45	brashy CL ca	o	45+	LST	
14	0-27	CL ca	10	27-36	brashy CL ca	o	36+	LST	
15	0-26	CL ca	5-10	26-40	slst CL ca	o	40+	LST	
16	0-24	CL ca	5-10	24-45	mst CL ca	o	45+	LST	
17	0-28	CL	0	28-50	C	xxx	50-70+	C ca	xxx
18	0-25	CL ca	10	25-44	C ca	xxx	44-75	CL ca	xxx

Key to table

Mottle intensity:

o unmottled
x few to common rusty root mottles (topsoils)
or a few ochreous mottles (subsoils)
xx common to many ochreous mottles and/or dull structure faces
xxx common to many greyish or pale mottles (gleyed horizon)
xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

Texture:

C - clay
ZC - silty clay
SC - sandy clay
CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SCL - sandy clay loam
SZL - sandy silt loam (F-fine, M-medium, C-coarse)
SL - sandy loam (F-fine, M-medium, C-coarse
LS - loamy sand (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
P - peat (H-humified, SF-semi-fibrous, F-fibrous)
LP - loamy peat; PL - peaty loam

Texture suffixes & prefixes:

ca – calcareous: x-extremely, v-very, sl-slightly vsl – very slightly
(ca) – marginally calcareous
fmn – ferri-manganiferous concentrations
r – reddish;
vslst, slst, mst, vst, xst – (very slightly, slightly, moderately, very, extremely stony) stony;

SST – sandstone MST – mudstone; LST- limestone
dist - disturbed soil layer;

a depth underlined (e.g. <u>50</u>) indicates the top of a slowly permeable layer
(a wavy underline indicates the top of a layer borderline to slowly permeable)



Key

- Pits
- Observations
- Topsoil sample areas
- Site boundary

Location:

Land west of Ardley

Map:

Map 1
Observations and sampling

Date: 20/03/2026

Scale: 1 : 5,000 at A4

Land Research Associates
Tapton Park Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk



Key

- Deep clay soils
- Soils over limestone
- Site boundary

Location:

Land west of Ardley

Map:

Map 2
Soil types

Date: 15/03/2026

Scale: 1 : 5,000 at A4

Land Research Associates
Tapton Park Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

ANALYSIS REPORT

[redacted]

Please quote the above code for all enquiries

Client : ARDLEY II

Sample Matrix : Agricultural Soil

Laboratory Reference

Card Number 65125/26

Date Received 03-Mar-26

Date Reported 12-Mar-26

SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
352338/26	1	**ARDLEY II A** *No cropping details given*	**8.1**	**0**	**2-**	**1**	**9.2**	**131**	**47**
352339/26	2	**ARDLEY II B** *No cropping details given*	**7.9**	**0**	**2-**	**2**	**8.0**	**130**	**51**
352340/26	3	**ARDLEY II C** *No cropping details given*	**7.6**	**0**	**1**	**2**	**7.2**	**112**	**61**
352341/26	4	**ARDLEY II D** *No cropping details given*	**8.1**	**0**	**2-**	**2**	**6.8**	**139**	**51**
352342/26	5	**ARDLEY II E** *No cropping details given*	**8.1**	**0**	**2-**	**1**	**8.4**	**158**	**46**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released [redacted] On behalf of NRM Date 12/03/26

ANALYSIS REPORT

DATE **12th March 2026**

SAMPLES FROM **ARDLEY II**

Report Reference: 65125/26

[redacted]
LAND RESEARCH ASSOCIATES
TAPTON PARK INNOVATION CENTRE
BRIMINGTON ROAD
CHESTERFIELD S41 0TZ
[redacted]

Lab Ref.	Field Details		Soil Organic Matter [LOI%] Result
	No.	Field Name or Reference	
352338	1	ARDLEY II A	5.3
352339	2	ARDLEY II B	5.3
352340	3	ARDLEY II C	7.1
352341	4	ARDLEY II D	5.3
352342	5	ARDLEY II E	5.2

Your Organic Matter Results Interpretation

Land use	Rainfall	Soil type	Very Low	Low	Target	High
Arable	Low <650mm	Light	<=1.0	1.1-2.1	2.2-3.2	>=3.3
		Medium	<=1.7	1.8-3.3	3.4-5.0	>=5.1
		Heavy	<=2.2	2.3-4.4	4.5-6.5	>=6.6
	Moderate 650-800mm	Light	<=1.0	1.1-3.0	3.1-4.5	>=4.6
		Medium	<=1.9	2.0-4.0	4.1-6.0	>=6.1
		Heavy	<= 2.7	2.8-5.2	5.3-7.6	>=7.7
	High 800-1100mm	Light	<=1.3	1.4-3.7	3.8-6.1	>=6.2
		Medium	<=2.5	2.6-5.0	5.1-7.5	>=7.6
		Heavy	<=3.6	3.7-6.2	6.3-8.8	>=8.9
Grassland (Lowland)	All	Light	<=2.1	2.2-4.9	5.0-7.9	8.0-14.9
		Medium	<=3.4	3.5-6.4	6.5-9.3	9.3-19.9
		Heavy	<=4.6	4.7-7.6	7.7-10.5	10.6-19.9

SOIL INVESTIGATION

OF LAND AT DEWARS FARM

ARDLEY

Report 2730/1

7th January 2026

Land Research ASSOCIATES
www.lra.co.uk

SOIL INVESTIGATION

OF LAND AT DEWARS FARM, ARDLEY

[redacted]

Report 2730/1

Land Research Associates Ltd
Tapton Park Innovation Centre
Brimington Road
Chesterfield
S41 0TZ

7th January 2026

1.0 Introduction

1.1 This report details an investigation of soil conditions of approximately 25 ha of land at Dewars Farm, Ardley, Oxfordshire. The report is based on a survey of the land in December 2025 and assesses the suitability of the land for habitat creation.

SITE ENVIRONMENT

1.2 The survey area (Site) comprises two arable fields and a small area of grassland in the north-east. The Site is bordered to the north by Ardley/Dewars Farm Quarry, to the south and east by a strip of woodland along Gagle Brook, and to the west by adjoining agricultural land.

PUBLISHED INFORMATION

1.3 British Geological Survey 1:50,000 scale information records the underlying geology as White Limestone Formation.

1.4 The National Soil Map (published at 1:250,000 scale) records the land as Aberford Association: mainly calcareous shallow well drained loamy soils over Jurassic limestone, with some deeper soils in outcrops of clay reported in the Oxfordshire area[1].

[1] Jarvis., *et al*., (1984). Soils and their Use in South East England, Soil Survey of England and Wales Bulletin No. 15, Harpenden.

2.0 Soil types

2.1 A detailed soil resource survey was carried out in December 2025. The soils were investigated at regular intervals, with an average density of approximately 1 observation per hectare. The location of observation points is shown by Map 1 in an appendix to the report, and full survey logs are also appended.

2.2 Five representative topsoil (0-15 cm) samples were collected from the field. Samples were submitted to an UKAS accredited laboratory for nutrient analysis. The location of samples is shown by Map 1.

SHALLOW SOILS OVER LIMESTONE BEDROCK

2.3 These soils are dominant in central and eastern areas (see Map 2). They comprise calcareous clay loam topsoil, either directly over hard fractured limestone bedrock or with a thin very stony/brashy subsoil. The topsoils are slightly to moderately stony, containing hard limestone fragments. The shallowest soils correspond to areas with the highest stone content. These soils are freely drained (Soil Wetness Class 1).



Photo 1: Shallow soil (Observation point 11)



Photo 2: Stony soil surface (Observation point 14)



Photo 3: Aerial image showing areas of shallow soil (lighter colour)

DEEPER FINE LOAMS OVER CLAY

2.4 The soils of the west of the Site are mainly formed in clay layers associated with the limestone. They have clay loam topsoil, often with lower stone concentrations than the shallow soils described above, and mainly only weakly calcareous[2]. The subsoils are clay-textured and generally non-calcareous or slightly calcareous in their upper layer, and strongly calcareous below 50 cm. They are mostly freely-drained (Soil Wetness Class I) but where the soils are deepest the lower layer is greyish and mottled indicating drainage restriction. However, these soils will rarely experience shallow waterlogging during the growing season (Soil Wetness Class II) and this is not likely to affect habitat.



Photo 4: Permeable clay soil (Observation point 8)



Photo 5: Clay soil with grey slowly permeable lower subsoil (Observation point 9)

INTERMEDIATE SOILS

2.5 On the boundary between soil types and in patches elsewhere the soils comprise slightly stony calcareous clay loam topsoil, over permeable calcareous clay or clay loam subsoil, grading to fractured limestone bedrock at approximately 40-50 cm. These soils are freely drained (Soil Wetness Class I).



Photo 6: Clay soil over limestone (Observation 15)

[2] Determined during the field survey by testing with dilute hydrochloric acid.

3.0 Soil analysis

3.1 The land has calcareous soils (above pH 7.5) with moderately high topsoil organic matter (loss on ignition). Phosphate availability is relatively low for arable soils, which may be partly due to the effects of calcium carbonate in 'fixing' phosphorous in unavailable forms. Historical aerial imagery indicates the land has mainly been under arable rotation in recent years.

Table 3.1: Summary of laboratory analysis.

Sample ID*	pH	Loss on ignition %	P	K	Mg
			MAFF indices		
A	7.9	7.6	1	4	2
B	7.9	8.1	2	3	2
C	8.0	7.6	2	3	2
D	8.1	6.0	1	2+	2
E	8.1	6.6	2	4	2

See Map 1 for sample areas

3.2 Full laboratory testing certificates are in an appendix to the report.

4.0 Habitat creation potential

SPECIES-RICH GRASSLAND

4.1. The land has two soil types:

- The shallow soils are well suited to the creation of lowland calcareous grassland, although management to lower topsoil phosphate availability is likely to be necessary in the medium term (see paragraph 4.2) to reduce competition from productive grasses and weed species.
- The deeper soils in the west are not strongly calcareous and do not have limestone or very calcareous layers within grass rooting depth. They are more suited to the creation of moist neutral grassland; while some wetness is likely on the clay soils this is unlikely to be sufficient to result in any rush or sedge infestation.

Grassland management systems

4.2. Prior to establishment of species rich meadow grassland, it is recommended that phosphate levels be lowered by extractive grass silage harvest. The most efficient means would be to fertilise the existing grass with commercial rates of nitrogen fertiliser[3] for at least one year, but no additional phosphate or potash (or manure or slurry). After the first year grass or hay harvest without any additional fertiliser should further reduce phosphate and potash availability. This would facilitate commercial yields (e.g. two to three silage cuts) and is likely to reduce phosphate availability to Index 1 or 0 within two to three years (recommended levels for habitat grassland). At this point the land could be effectively sown with a suitable species-rich seed mix.

[3] Defra RB209 fertiliser recommendations: 130/250 nitrogen; for a 2 cut/3 cut system respectively – split application in spring and after cuts 1 (and 2).

APPENDIX

OBSERVATIONS & MAPS

LABORATORY TESTING

Dewars Farm: Soil resources survey – Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil		
No	Depth (cm)	Texture	Stone %	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling
1	0-21	CL ca	<5	21-37	slst CL ca	o	37+	LST	
2	0-26	CL ca	15-20	26+	LST				
3	0-25	sCL ca	10-15	25-35	CL ca (brashy)	o	35+	LST	
4	0-27	CL vslca	5-10	27+	LST				
5	0-29	CL ca	15-20	29-46	C ca	xxx	46+	Stopped on stones	
6	0-28	CL	<5	28-90+	vslst C	o			
7	0-25	CL ca	15-20	25+	LST				
8	0-30	CL	<5	30-73	C	xx	73-88 88+	mst C ca LST	xx
9	0-28	CL	<5	28-56	C	x	56-87 87+	mst C ca LST	xxx
10	0-26	CL	5-10	26-58	C	x	58+	LST	
11	0-24	CL ca	10-15	24-32	xst CL ca	o	32+	Stopped on stones	
12	0-25	CL ca	20-25	25+	LST				
13	0-26	CL slca	<5	26-42	C ca	o	42+	LST	
14	0-25	CL ca	20-25	25-35	xst CL ca	o	35+	Stopped on stones	
15	0-25	CL slca	<5	25-38	slst C slca	o	38-52 52+	vst C ca Stopped on stones	o
16	0-24	CL ca	10-15	24+	LST				
17	0-24	CL ca	20-25	24+	LST				
18	0-22	CL ca	<5	22-46	slst CL ca	o	46+	LST	
19	0-20	CL ca	15-20	20-30	CL vca (brashy)	o	30+	LST	
20	0-23	CL slca	<5	23-35	mst CL ca	o	35+	LST	

Key to table

Mottle intensity:

o unmottled
x few to common rusty root mottles (topsoils)
or a few ochreous mottles (subsoils)
xx common to many ochreous mottles and/or dull structure faces
xxx common to many greyish or pale mottles (gleyed horizon)
xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

Texture:

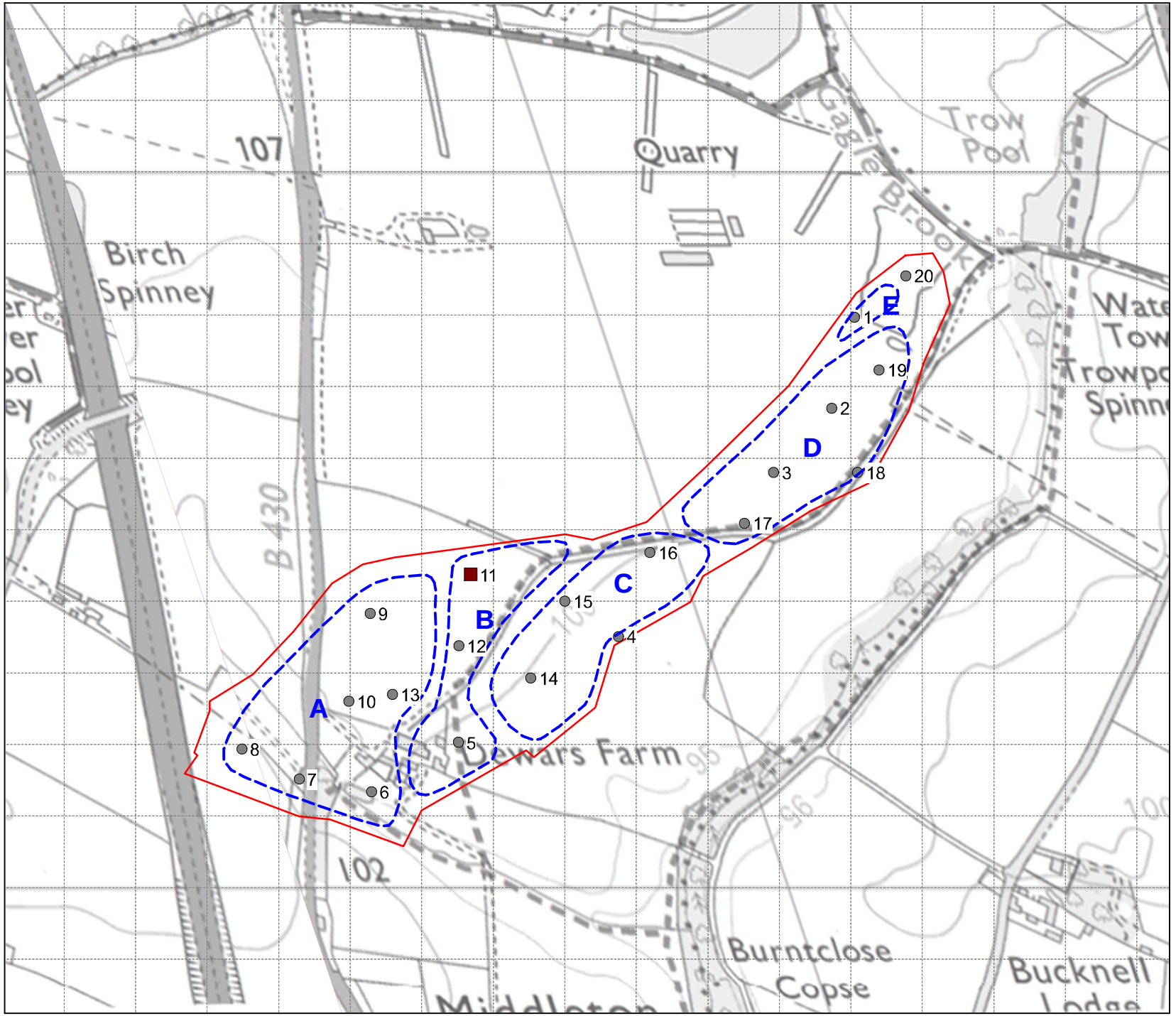
C - clay
ZC - silty clay
SC - sandy clay
CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SCL - sandy clay loam
SZL - sandy silt loam (F-fine, M-medium, C-coarse)
SL - sandy loam (F-fine, M-medium, C-coarse
LS - loamy sand (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
P - peat (H-humified, SF-semi-fibrous, F-fibrous)
LP - loamy peat; PL - peaty loam

Texture suffixes & prefixes:

ca – calcareous: x-extremely, v-very, sl-slightly vsl – very slightly
(ca) – marginally calcareous
fmn – ferri-manganiferous concentrations
r – reddish;
vslst, slst, mst, vst, xst – (very slightly, slightly, moderately, very, extremely stony) stony;

SST – sandstone MST – mudstone; LST- limestone
dist - disturbed soil layer;

a depth underlined (e.g. <u>50</u>) indicates the top of a slowly permeable layer
(a wavy underline indicates the top of a layer borderline to slowly permeable)



KEY

- Auger observations
- Pits
- Topsoil sample areas
- Site boundary

Site:

Dewars Farm
Ardley

Map title:

MAP 1
Observations

Land Research Associates
Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 07/01/2026

Scale: 1:7,500



KEY

- Shallow soils
- Deeper soils
- Site boundary

Site:

Dewars Farm
Ardley

Map title:

MAP 2
Soil types

Land Research Associates
Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 07/01/2026

Scale: 1:7,500

ANALYSIS REPORT

Contact : [redacted]

Client : ARDLEY-MIDDLETON STONEY

Please quote the above code for all enquiries

Sample Matrix : Agricultural Soil

Laboratory Reference

Card Number 15423/25

Date Received 10-Dec-25

Date Reported 24-Dec-25

SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
67058/25	1	**A** *No cropping details given*	**7.9**	**1**	**4**	**2**	**12.4**	**424**	**84**
67059/25	2	**B** *No cropping details given*	**7.9**	**2**	**3**	**2**	**21.0**	**385**	**82**
67060/25	3	**C** *No cropping details given*	**8.0**	**2**	**3**	**2**	**24.4**	**293**	**70**
67061/25	4	**D** *No cropping details given*	**8.1**	**1**	**2+**	**2**	**14.6**	**202**	**58**
67062/25	5	**E** *No cropping details given*	**8.1**	**2**	**4**	**2**	**17.8**	**430**	**68**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released b [redacted] . On behalf of NRM Date 24/12/25

ANALYSIS REPORT

DATE **24th December 2025**

SAMPLES FROM **ARDLEY-MIDDLETON STONEY**

Report Reference: 15423/25

[redacted]
LAND RESEARCH ASSOCIATES
TAPTON PARK INNOVATION CENTRE
BRIMINGTON ROAD
CHESTERFIELD S41 0TZ
[redacted]

Lab Ref.	Field Details		Soil Organic Matter [LOI%] Result
	No.	Field Name or Reference	
67058	1	A	7.6
67059	2	B	8.1
67060	3	C	7.6
67061	4	D	6.0
67062	5	E	6.6

Your Organic Matter Results Interpretation

Land use	Rainfall	Soil type	Very Low	Low	Target	High
Arable	Low <650mm	Light	<=1.0	1.1-2.1	2.2-3.2	>=3.3
		Medium	<=1.7	1.8-3.3	3.4-5.0	>=5.1
		Heavy	<=2.2	2.3-4.4	4.5-6.5	>=6.6
	Moderate 650-800mm	Light	<=1.0	1.1-3.0	3.1-4.5	>=4.6
		Medium	<=1.9	2.0-4.0	4.1-6.0	>=6.1
		Heavy	<= 2.7	2.8-5.2	5.3-7.6	>=7.7
	High 800-1100mm	Light	<=1.3	1.4-3.7	3.8-6.1	>=6.2
		Medium	<=2.5	2.6-5.0	5.1-7.5	>=7.6
		Heavy	<=3.6	3.7-6.2	6.3-8.8	>=8.9
Grassland (Lowland)	All	Light	<=2.1	2.2-4.9	5.0-7.9	8.0-14.9
		Medium	<=3.4	3.5-6.4	6.5-9.3	9.3-19.9
		Heavy	<=4.6	4.7-7.6	7.7-10.5	10.6-19.9

FPCR | environment & design






HMMP Appendix 4: Veteran Tree Strategy

Client

Oxfordshire Railfreight Limited

Project

Oxfordshire Strategic Rail Freight Interchange (OxSRFI)

Date

October 2026

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Rev	Issue Status	Prepared/Date	Approved/Date
-		JDH / 14.08.26	RG / 25.08.26
A	Final	JDH / RG 22.10.26	RG / 22.10.226

1.0 INTRODUCTION

1.1 The following report has been prepared by FPCR Environment and Design Ltd. on behalf of the Oxfordshire Railfreight Ltd. to support an application for a Development Consent Order for the proposed Oxfordshire Strategic Rail Freight Interchange (central OS grid reference SP533263) herein referred to as 'the Site'.

1.2 This report provides a proposed mitigation/compensation strategy to minimise impacts on veteran trees as defined under the National Planning Policy Framework (NPPF, 2026) and/or are considered to be irreplaceable habitats under the Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024. These include mature trees showing signs of structural decay, hollowing, and deadwood features.

1.3 This report should be read in conjunction with the Arboricultural Assessment (ES Appendix 6.8, 2026), the Construction Environmental Management Plan (ES Appendix 2.3, 2026) and the Habitat Management and Monitoring Plan (ES Appendix 6.11, 2026).

Development Proposals

1.4 The Proposed Development comprises a Strategic Rail Freight Interchange with associated infrastructure and industrial units (referenced to herein as the 'Main Site') and associated Highway Works (referred to collectively herein as the Highway Works').

1.5 In brief, the Proposed Development consists of the following:

- An intermodal freight terminal and associated infrastructure;
- Construction of warehousing and ancillary buildings;
- New road infrastructure and improvement works to the existing road network, and related traffic management measures;
- Strategic landscaping and tree planting to provide screening and improve habitat connectivity;
- New foot and cycle links and associated sustainable drainage;
- Earthworks and demolition of some existing structures within the Main Site, and
- Renovation and change of use of retained residential and agricultural buildings.

1.6 Full details of the Proposed Development are provided separately in the Environment Strategy (ES) Chapter 2: Proposed Development.

Site Context

1.7 The Application Site, as defined by the 'Order Limits', is located south and south-east of Ardley. The 'Main Site' is located between the B430 and the disused RAF Upper Heyford airfield which lies to the west and lies immediately south of the Chiltern Railway line, and the Dorchester Living Heyford Park development to the south of the former airfield.

1.8 The Main Site is dominated by arable and neutral grassland used for grazing, with hedgerows trees, scrub and neutral grassland at the field margins. The Ashgrove Farm farmstead lies in the north-east of the Main Site and comprises several farm buildings and residences and a Biffa 'In Vessel Composting' facility lies within the southern east. Agricultural fields extend from the

southern boundary and form much of the surrounding landscape. To the east of the Main Site and the B430 is the Viridor Ardley Energy Recovery Facility ('Viridor ERF'), Valencia Waste Management facility and Ardley former landfill site, and to the south of the waste facilities is an active minerals quarry. Other habitats present within the Site include small plantation woodlands; predominantly broadleaved, although inclusive also of some mixed and coniferous areas, six waterbodies, watercourses and areas of hardstanding and unsealed surfaces, buildings, scrub, introduced shrub, lowland calcareous grassland, lowland meadows, modified grassland, ephemeral vegetation, tall forbs and bare ground.

1.9 The Highways Works components of the Application Site include land on the eastern and western sides of the M40 Junction 10 and the western side of M40 Junction 9 and largely comprises arable land with planted tree groups and scrub associated with screening functions of highways infrastructure. Other habitats include neutral grassland road verges and ponds. The route of the proposed 'Ardley Bypass' is located to the north-east of the Main Site and crosses arable fields bound by native hedgerows, as well as the Chiltern Railway line. To the south-east of the Main Site the proposed route of the 'Middleton Stoney Relief Road' crosses arable fields and native hedgerows, a section of the Gagle Brook, neutral and modified grassland road verges and also woodland associated with the B4030.

National Networks National Policy Statement (NNNPS)

1.10 The NNNPS[1] states at 5.63 that:

'The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and ancient and veteran trees unless there are wholly exceptional reasons (for example, where the public benefit would clearly outweigh the loss or deterioration of habitat) and a suitable compensation strategy exists'.

1.11 The exceptional reasons in relation to this point is that as a nationally significant infrastructure projects the public benefit would clearly outweigh the small-scale loss of the relevant habitats.

1.12 This document sets out a suitable compensation strategy, such that the residual impacts of the Proposed Development on veteran trees are minimised.

Biodiversity Net Gain

1.13 In accordance with the Defra Biodiversity Net Gain (BNG) guidance[2], veteran trees are excluded from standard numerical biodiversity unit calculations and compensation must be provided outside of this framework.

1.14 Consideration has been given to the mitigation hierarchy to prioritise avoidance, and minimise impacts prior to considering compensation.

1.15 Proposals have sought to appropriately mitigate impacts and support targets set out within the Local Nature Recovery Strategy (LNRS).

[1] Ministry of Housing, Communities & Local Government (2026) National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/media/6a8334c03bd75b81e2329ac4/National_Planning_Policy_Framework.pdf.
[2] Department for Environment, Food & Rural Affairs (2025) The Statutory Biodiversity Metric User Guide.

2.0 TREE ASSESSMENT METHODOLOGY

2.1 Various published methodologies are currently available for the identification of Ancient and Veteran trees which, due to the complexity and subjectivity of the process of defining and assessing these trees, often have conflicting definitions.

National Networks National Policy Statement (NNNPS)

2.2 In regards to the definition of Veteran Trees, the NNNPS includes the below explanatory footnote at 5.62 which states:

'A tree which, may not be very old, but they have significant decay features, such as branch death and hollowing. habitat. All ancient trees are veteran trees, but not all veteran trees are ancient.'

2.3 The detail provided is considered descriptive, rather than prescriptive, and so industry standard definitions from other sources have also been relied on as detailed below.

British Standard BS:5837

2.4 This Arboricultural Assessment produced in accordance with British Standard 5837:2012 (ES Appendix 6.8, 2026) has assessed veteran tree based upon the definition within BS:5837.

"Tree that, by recognized criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned".'

NOTE These characteristics might typically include a large girth, signs of crown retrenchment / reorganisation and hollowing of the stem.

2.5 Stem girth is the most reliable guide when determining the age of trees and in normal growing conditions, ancient and veteran trees are those which have a large girth by comparison with other trees of the same species. To inform the assessment of chronological age reference has been made to the chart provided within Lonsdale (2013).

2.6 BS:5837 does not provide a definition for ancient trees and therefore the assessment and the criterion being used for identifying ancient trees is based upon government guidance on, Ancient woodland, ancient trees and veteran trees: advice for making planning decisions[3] which states.

"All ancient trees are veteran trees, but not all veteran trees are ancient. The age at which a tree becomes ancient, or veteran will vary by species because each species ages at a different rate."

National Planning Policy Framework (NPPF, 2026)

2.7 Ancient and veteran trees are also material considerations within the planning process and their importance is specifically recognised within the NPPF 2026[4], which includes its own definition of ancient and veteran trees. The Arboricultural Assessment (ES Appendix 6.8, 2026) has also considered any potential candidates against the below definition:

[3] Ancient woodland, ancient trees and veteran trees: advice for making planning decisions - GOV.UK (www.gov.uk)

[4] Ministry of Housing, Communities & Local Government (2026) National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/media/6a8334c03bd75b81e2329ac4/National_Planning_Policy_Framework.pdf.

'A tree which, because of its age, size, and condition, is of exceptional biodiversity, cultural or heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage'.

2.8 To be considered a veteran tree in accordance with the definition within NPPF, veteran trees must be 'trees which, because of their age, size, and condition are of exceptional biodiversity, cultural or heritage value'. Therefore, to be considered a veteran tree, the tree must be of sufficient age and size with a stem girth which is considered large for its species.

2.9 Stem girth alone however does not constitute a veteran tree, and veteran trees should display characteristics of ancient trees which include.

- Major stem cavities with decay and/or hollowing,
- Signs of crown reorganisation
- Large quantity of dead wood in crown, 150mm+ diameter;
- Major storm damage, e.g. breakout wounds, broken stubs 30cm;
- Habitat spaces: decay holes and/ or crevices/ branch splits sheltered from direct rainfall;
- Aerial rooting;
- Sap run / slime flux;
- Water pool;
- Bark loss (exceeding 400cm2 inc. due to lightning strike;
- Fungi (especially notable or protected species, and
- Other epiphytic plants, including ferns & significant presence of lichens or mosses

2.10 It is considered that the greater the number and extent of these features present within a given tree, the greater its ecological habitat value.

The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024

2.11 Veteran trees are defined for biodiversity net gain (BNG) purposes in The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024. This definition states:

"Veteran trees are mature trees that share physical and other characteristics in common with ancient trees, due to their life or environment, but are neither developmentally nor chronologically ancient. All ancient trees are veteran trees, but not all veteran trees are ancient. Veteran and ancient trees which have died are still recognised as such because they retain significant biodiversity value for many decades.

Veteran trees exhibit one or more of the following—

(i) significant decay features such as deadwood, hollowing or signs of advanced decay in the trunk or major limbs

(ii) a large girth, depending on and relative to species, site and management history

(iii) a high value for nature, especially in hosting rare or specialist fungi, lichens and deadwood invertebrate".

2.12 This definition sets a lower threshold to qualify as veteran relative to the other definitions detailed above.

Other considerations

2.13 When assessing veteran trees, reference has also been made to number of publications which include.

- Owen & Alderman (2008) and Reed, H. (2000). Veteran Trees: A Guide to Good Management. English Nature
- Lonsdale, D (ed.) (2013) Ancient and other Veteran Trees: Further Guidance on Management, The Tree Council & Ancient Tree Forum for guidance on the recognition of both ancient and veteran trees.
- RAVEN 2 (Recognition of Ancient, Veteran & Notable trees) Julian Forbes-Laird (2023)[6]
- Recognising and Categorising Ancient and Other Veteran Trees (2024)[7]

[6] Recognition of Ancient, Veteran & Notable Trees – RAVEN 2 (2023) – Julian Forbes-Laird Consultancy.
[7] Recognising and Categorising Ancient and Other Veteran Trees (2024) – Woodland Trust..

3.0 SITE ASSESSMENT RESULTS

3.1 A veteran tree survey and assessment was undertaken by FPCR Environment and Design on 30th June 2026. The survey was conducted by an experienced arboriculturist. Trees were reviewed under using two approaches.

3.2 All trees on Site were firstly assessed using NPPF definition for veteran trees. Four such trees were identified, of which three can be retained and appropriately buffered within the scheme designs.

3.3 The lower threshold set by The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024, was only considered in relation to trees which would be removed as a result of proposals. As such the list identifies impacted trees but should not be viewed as an exhaustive list of BNG veterans on-Site. As well as the four trees identified as veterans under the NPPF 2026 definition, a further twenty-seven trees were identified as BNG veterans.

3.4 These trees are detailed in Table 1 below, with locations illustrated in Figure 1.

Table 1: Veteran Tree Assessment

Tree Number	Species	Summary Notes	Designation	Retention
T13	Ash *Fraxinus excelsior*	Poor condition Ash die back likely *Inonotus hispidus*	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T16	Ash *Fraxinus excelsior*	Ash die back likely *Inonotus hispidus* Woodpecker holes	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T17	English Oak *Quercus robur*	Cavities and deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T22	English Oak *Quercus robur*	Cavities	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T23	English Oak *Quercus robur*	Cavities	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T25	Ash *Fraxinus excelsior*	Poor condition Ash die back likely	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T26	Hawthorn *Crataegus monogyna*	Former hedgerow tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T27	Field Maple *Acer campestre*	Former hedgerow tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T28	Hawthorn *Crataegus monogyna*	Former hedgerow tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed

Tree Number	Species	Summary Notes	Designation	Retention
T29	Ash *Fraxinus excelsior*	Poor condition Ash die back likely	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T33	English Oak *Quercus robur*	Cavities and deadwood *Inonotus dryadeus*	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T34	English Oak *Quercus robur*	Poor condition Cavities and deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T35	English Oak *Quercus robur*	Cavities and deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T36	Ash *Fraxinus excelsior*	Cavities and deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T47	Ash *Fraxinus excelsior*	Standing dead tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T48	Ash *Fraxinus excelsior*	Standing dead tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T50	Ash *Fraxinus excelsior*	Standing dead tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T51	Ash *Fraxinus excelsior*	Standing dead tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T79	Ash *Fraxinus excelsior*	Poor condition Deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T80	English Oak *Quercus robur*	Cavities and deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T81	English Oak *Quercus robur*	Cavities	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T82	English Oak *Quercus robur*	Standing dead tree	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T91	Ash *Fraxinus excelsior*	Cavities	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T92	Ash *Fraxinus excelsior*	Cavities	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T93	Ash *Fraxinus excelsior*	Cavities Barn owl pellets	NPPF 2024Veteran Tree / The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T99	Ash *Fraxinus excelsior*	Poor condition Deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T100	Ash *Fraxinus excelsior*	Standing dead tree Cavities and deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed
T102	Beech *Fagus sylvatica*	Cavities and deadwood	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Removed

Tree Number	Species	Summary Notes	Designation	Retention
T150	Beech *Fagus sylvatica*	Cavities *Ganoderma applanatum*	NPPF 2024Veteran Tree / The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Retained
T152	Beech *Fagus sylvatica*	Cavities Woodpecker holes	NPPF 2024Veteran Tree / The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Retained
T170	Ash *Fraxinus excelsior*	Hollow stem	NPPF 2024Veteran Tree / The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024	Retained

3.5 Under the proposals 28 trees which qualify as Irreplaceable Habitats under Regulations 2024, will be lost. This includes one tree which qualifies as a veteran under the NPPF 2026 definition.

3.6 Bespoke compensation for the loss of these irreplaceable habitats is required and detailed below.

3.7 The three retained NPPF veterans will be subject to sensitive management to promote their long-term value.

4.0 PROPOSED MITIGATION

4.1 Mitigation for the loss of trees, including the veterans identified above, will take a holistic approach to the wider woodland resource. In brief this aims to:

- Avoid tree loss where feasible through site design;
- Minimise impacts of tree loss on associated faunal assemblages by re-using the dead wood arisings within site designs;
- Enhance retained trees through improved management and buffering, and
- Create new habitats and improve connectivity through woodland, scrub and orchard planting.

4.2 Site designs have retained three of the four NPPF 2026 defined veteran trees.

Habitat Loss

4.3 Where the loss of veteran trees is unavoidable, a bespoke compensation strategy will be implemented to conserve ecological function and support habitat continuity.

4.4 Felling works will have due consideration for relevant wildlife protection legislation including potential usage by nesting birds and roosting bats. Felling works should be undertaken outside of the nesting bird season (March – August, inclusive), or checked by an ecologist prior to clearance. The removal of trees with bat roosting potential will be undertaken in accordance with the relevant phase Construction Environmental Management Plan. Depending on the timing of works, update survey work may be required to confirm current status. Where sectional felling methods are stipulated, works will be undertaken by experienced arborists under the supervision of an appropriately licensed bat worker and avoiding cutting through potential roost features.

4.5 Larger arisings (>10cm diameter) generated from the removal of trees, will be used to supplement the dead wood resource available for habitat creation.

4.6 After initial felling operations, arisings will be stockpiled within the mitigation area (indicative location shown on **Figure 2**). Veteran material will be kept separate from general arisings. The stockpile areas will be demarcated with Heras fencing to prevent incidental works access and also reduce the likelihood of the material from being opportunistically sequestered by firewood foragers.

Deadwood Monolith Creation

4.7 Large-diameter sections of felled trees will be repurposed into standing and lying monoliths, preserving decay features such as heart rot and bark sloughing.

4.8 Monoliths will be installed in clusters within designated areas of the on-site green infrastructure. An indicative location for monolith creation is shown on **Figure 2**, additional areas will be considered based on availability of suitable material. Monolith locations will be sited to allow faunal connectivity to existing and newly planted woodland, including nearby ancient woodland.

4.9 Further scattered individual dead wood features will be created throughout areas of new woodland creation.

4.10 Monoliths will be positioned in a range of light and moisture conditions to replicate the environmental heterogeneity found in natural settings.

4.11 They will ideally be in proximity to retained over-mature trees to facilitate natural species dispersal.

4.12 Additional modifications to dead wood via the creation of a range of cuts and drill holes will enhance opportunities for the development of decay features and opportunities for faunal species.

4.13 Images (1-4) below show this method being implemented on active development sites.



Image 1: Example monolith cluster



Image 2: Example modifications to deadwood



Image 3: Example monolith installation



Image 4: Example monolith establishment

Working methods

4.14 A suitable and experience physical works contractor be appointed to deliver the requirements of this mitigation strategy. The process requires access to large and specialist machinery, and skilled operators to deliver the work in an effective and safe manner. It was the responsibility of the contractor to provide any RAMS required to secure the delivery of this work.

<u>Step 1: Selection and Preparation of Monolith Material</u>

- Trees identified for monolith translocation will be assessed by an ecologist and arboriculturist to identify key ecological features (e.g. heart rot, cavities, large dead limbs).

- Using a tree shear attached to an excavator, side branches will be selectively removed to create manageable monolith stems.
- Where necessary, a chainsaw operator and climbing arborist will assist with branch removal to retain ecologically important features such as cavities or fungal bodies.



Image 5: Tree prior to felling



Image 6: Tree sectionally felled

Step 2: Felling of the Main Stem

- The main stem will be felled using a controlled mechanical grappling technique, using a 360° excavator fitted with a timber grab.
- The base of the stem will be gently lowered to the ground to minimise the risk of shattering or compromising existing decay features.

Step 3: Excavation of Monolith Pits

- An auger hole will be created at each monolith installation point to a depth of approximately one-quarter to one-third the total stem height to ensure adequate support.
- The diameter of the hole should allow room for backfilling material to secure the monolith upright.
- Hole depth and width will be adjusted to suit timber size and soil conditions.



Image 7: Auger pit creation



Image 8: Example tree pit

Step 4: Installation of Monoliths

- The excavator and grab will lower the monoliths gently into the prepared pits, with stems oriented to replicate their original position (e.g. south-facing exposure, canopy cover).
- A smaller machine will then backfill around the base using site-won or imported subsoil.
- A vibrating plate or hand-held soil compactor will be used to consolidate the material and ensure the monolith is firmly supported and upright.



Image 9: Installing monolith



Image 10: Completed monoliths

Step 5: Repeat for All Usable Timber Sections

- The above process will be repeated for all usable sections of felled trees, including trunks and substantial limbs.
- Timber should be installed with variation in height, angle, and exposure to create a varied deadwood resource.

Step 6: Translocation of Tree Stumps

- The original stumps of felled veteran trees will be excavated using a large excavator.
- These will be relocated and installed adjacent to the monoliths, partially buried in natural orientation to provide continuity of below-ground fungal and microbial associations.



Image 11: Tree stump relocation

Image 12: Vertical log piles



Step 7: Construction of Vertical Log Piles

- A shallow trench (c. 0.5 m deep) will be excavated.
- Smaller branchwood will be stacked vertically in rows and clusters within the trench to form vertical log piles.
- The trench will be backfilled with loose soil, leaving the upper sections of timber exposed.
- Piles should be placed in semi-shaded areas, ideally near hedgerows or mature retained trees.



Image 13: Vertical log piles



Image 14: Soil translocation

Step 8: Associated soil translocation

- The topsoil immediately surrounding the original veteran tree (typically top 10–30 cm) will be carefully stripped and collected.
- At each monolith installation site, the existing topsoil will be removed and stockpiled separately to receive the translocated material.
- The collected soil will then be spread around the base of the monoliths and relocated stumps to transfer microbial, fungal, and invertebrate communities associated with the original tree.
- Care will be taken to minimise compaction and retain soil structure during excavation, transport, and placement.

Step 9: Protection and Interpretation

- A low post-and-wire fence, timber bollards, or other suitable barrier will be installed to prevent unauthorised human access or interference.
- Interpretive signage will be installed at selected points to explain the ecological value of the features and the reasoning behind their installation, including their importance for saprophytic fungi, invertebrates, and biodiversity net gain.

Habitat Creation

4.15 Site designs have buffered retained veteran trees with new semi-natural habitats and the cessations of adjoining agricultural activities.

4.16 New woodland planting (c.60.1ha), scrub planting (c.4.8ha) and orchard planting (c.0.3ha) will significantly increase the overall tree resources on the Site.

4.17 Planting designs will

- Provide habitat connectivity across the Site;
- Buffer Burntclose Copse Ancient Woodland, and
- Enhance existing woodland corridor along Gagle Brook.

4.18 These areas will be managed in line with prescriptions set out within the HMMP.

Veteran Tree Management

4.19 The three retained NPPF veteran trees will be registered on the Woodland Trust's ancient tree inventory (https://ati.woodlandtrust.org.uk/), which provides a publicly accessible record of ancient, veteran and notable trees.

4.20 Interpretation boards will be incorporated in proximity to veteran trees to inform the public of their value along with the importance of managing veteran trees. Veteran trees provide ideal educational opportunities for people to learn about their local environment and traditions. A series of information boards could form part of a veteran tree walk/nature walk.

4.21 Retained NPPF 2026 veteran trees within the Site (**Figure 1**) will be managed sensitively in order to bolster their longevity. The key component of their survival depends on long-term management of both the tree and its surrounding environment. The survival of a veteran tree is often threatened by the increasing change in our use of the landscape as well as by climate change and the introduction of new pests and pathogens.

4.22 Management objectives have considered a wide range of specific needs; examples include the safeguarding of a tree's structural integrity and the safety of people and property, whilst ensuring the retention of decaying wood and decay cavities that play host to fungi, invertebrates as well as potential roost sites for some bird species. Further thought has been given to the environment surrounding the trees, an example being recommendations for introducing essential nectar and pollen sources, such as the planting or retention of hawthorn (thorny bushes) and brambles.

General Principles

4.23 Significant weighting will be put on the retention of ecological features when considering management options. The two main objectives for any interventions are:

- One-off operations with a view to making them safe, or preventing imminent collapse (remedial work), and
- Semi-regular operations with a view to establishing regular pollarding/coppicing routine.

4.24 Soil improvement works should aim to reduce compaction of previously cultivated soil to a radius of 5m. A layer of composted bark mulch to a depth of 10-20cm should then be applied to the area around the tree on all sides to act as a weed suppressant and retain valuable moisture to the roots. The mulch layer must not be laid in direct contact with the base of the stem as this may cause bark death and leave the tree susceptible to colonisation by pathogenic organisms. As part of the habitat management regime the mulch layer within a radius of 5m around the trees will be replenished as it decomposes.

4.25 Surrounding vegetation should be carefully managed to avoid excessive shading, whilst still providing protection from extreme desiccation. Canopies of surrounding trees should not be allowed to overlap with the veteran. New planting should aim to provide cover to the south face of veterans to help with resilience to spells of dry, hot weather.

4.26 Competitive vegetation such as grass will be managed regularly as to significantly reduce competition for nutrients. This management is considered necessary and the aim of which should serve to improve the conditions for the veteran tree in terms of nutrient uptake and so improve the vitality of a veteran tree as well as provide adequate soil volumes within the perceived rooting area.

4.27 In the event that grazing is to be used on grassland surrounding veteran trees, suitable stock proof fencing must be installed to protect the trees from incidental damage.

4.28 Where height or weight reduction is needed, any wounds arising from these works must be kept to the minimum diameter necessary to achieve the objective. It is important to phase the reduction of the crown over multiple years in order to mimic the natural aging process of the tree. Heavy or unsympathetic pruning may result in the rapid decline or death of the tree due to extensive reduction of vital stored energy reserves.

4.29 All of the above operations will be supervised by the appointed consulting Arboriculturist who will direct and guide the various works.

4.30 A low post-and-wire fence, timber bollards, or other suitable barrier will be installed to prevent unauthorised human access or interference.

4.31 Interpretive signage will be installed at selected points to explain the ecological value of the features, including their importance for saprophytic fungi, invertebrates, and biodiversity net gain.

Monitoring and review

4.32 The monitoring of NPPP 2026 veteran trees is of fundamental importance and necessary to determine specific management objectives.

4.33 The site will be visited every two years by a suitably qualified Arboriculturist.

4.34 Veteran tree risk will be quantified by using the VALID Tree Risk-Benefit Management Strategy, or other equivalent methodology in line with the current industry standards.

4.35 This VALID system comprises of three tiered levels of assessment as detailed below:

- Basic Assessment – This is the starting point where trees with obvious risk features are identified. Where the risk is not Acceptable or Tolerable a Detailed Assessment is conducted.
- Details Assessment – This assessment is carried on those trees highlighted by the Basic Assessment and consists of a more detailed assessment of the obvious risk features and tree condition. This assessment may also be carried out because we've been asked to take a closer look at a particular tree.
- Advanced Assessment - If we need more information about the likelihood of failure, an Advanced Assessment can be carried out. This might be an aerial inspection or decay detection because we suspect extensive decay with significant strength-loss and want to find out whether the tree has a high enough 'safety factor'.

4.36 The Likelihood of Occupancy, Consequences, and Likelihood of Failure are used to assess risk levels to inform management (**Table 2**).

Table 2: Management Priority Ratings

VALID Risk Level	Definitions
Not Acceptable	Risks will be reduced to an Acceptable level
Not Tolerable	Risks will be reduced to an Acceptable level, but with a lower priority than red Not Acceptable risks
Tolerable	Risks will not be reduced but may require an increased frequency of assessment than green Acceptable risks
Acceptable	Risks will not be reduced

4.37 A Not Acceptable risk level is reserved for trees in danger of structural disintegration or accelerated physiological decline within the foreseeable future and to which without intervention may be lost.

4.38 Following the inspection, a monitoring report will be produced detailing any remedial actions or interventions determined to be necessary to promote veteran tree longevity.

Securing Management

4.39 Future management of the main development area and ecological mitigation areas will be secured by Oxfordshire Railfreight Limited. Transport infrastructure are understood to be managed by the appropriate bodies including Network Rail, Highways England and Oxfordshire County Council.

4.40 A Habitat Management and Monitoring Plan (HMMP) is provided that provide details on how creation, retained and enhanced habitats across the Site that are significantly contributing to

the Site's BNG will be managed for a minimum of 80 years (for SSSI mitigation areas) and for 30 years (remainder of the on-site green infrastructure).

4.41 This Veteran Tree Strategy will be included as an appendix to the HMMP, with specific provisions detailed within relevant sections.

4.42 This Veteran Tree Strategy will be included as an Appendix to the Construction Environmental Management Plan CEMP, with specific provisions detailed within relevant sections.

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N

0 125 250 375 500 m

Key

Site Boundary

Veteran Tree

- BNG Veteran - Lost
- NPPF Veteran - Lost
- NPPF Veteran - Retained

drawn date: 20/08/26

drwn/chkd: JDH

client: **Oxfordshire Railfreight Limited**

project: **Proposed Oxfordshire Strategic Rail Freight Interchange**

title: **Veteran Tree Plan**

scale: 1:10,000 @ A3

number: **FIGURE 1**

rev: -

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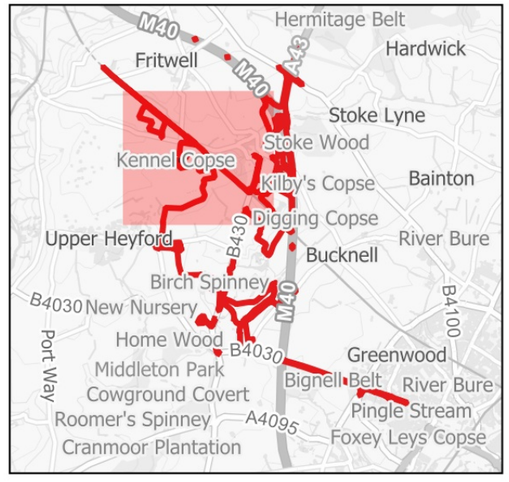
N

0 125 250 375 500 m

Key

Site Boundary

Indicative Mitigation Area



drawn date: 22/10/26

drwn/chkd: JDH

client: **Oxfordshire Railfreight Limited**

project: **Proposed Oxfordshire Strategic Rail Freight Interchange**

title: **Indicative Mitigation Location**

scale: 1:10,000 @ A3

number: **FIGURE 2**

rev: -

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APPENDIX ES6.11

Appendix 5

Framework Habitat Management and Monitoring Plan - SSSI Compensation Land



Site Name:	Oxfordshire Strategic Rail Freight Interchange
Date:	25/10/2026
Version:	Final (Change Application)

Author:

Client:

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Soil Investigation, Land west of Ardley. Land Research Associates Ltd. 24th March 2026.

Version Control

The version control is used for updates to the content. Record the initial version and further version control details in this table each time the management plan is altered throughout the management and monitoring period.

Version	Issue Status	Prepared by / Date	Approved by / Date
-	Final	RG / 24.10.26	RG / 24.10.26
V1.0	Final	RG / 25.10.26	RG / 25.10.26

Document Details

Authorship Details

This HMMP uses the best available data at the time of writing, including ecological information, site conditions, and guidance. While recommendations are based on current best practices, success and long-term establishment cannot be guaranteed. Ecological enhancements depend on varied factors including climatic conditions, site management, ecological interactions, and external environmental pressures; outcomes may be affected by uncontrollable factors. Effectiveness and suitability may change over time, requiring ongoing monitoring and updates. FPCR Ltd. accepts no liability for any loss or damage resulting from reliance on this plan, where it has not been reviewed in consideration of changing circumstances, updated data or guidance.

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1. Project Background

Site Overview PB-B01	
Project type	On-site
Development Name and Address	Oxfordshire Strategic Rail Freight Interchange Ardley, Bicester
Author Organisation	FPCR Environment and Design
Landowner	Oxfordshire Railfreight Ltd.
Land Manager	Oxfordshire Railfreight Ltd.
Responsible person/organisation for creating or enhancing the habitat	Oxfordshire Railfreight Ltd.
Period covered by this management plan	TBC
Planning authority	Cherwell District Council
Planning reference (if applicable)	TBC
Central OS grid reference	SP 530 275
Metric revision/title	The_Statutory_Metric_On-site_SSSI+Mitigation
Are any Irreplaceable Habitats present onsite	Yes: ☐ No: ☒

Summary of Management Plan

Habitats to be Retained, Created and Enhanced PB-B02

This HMMP has been informed by baseline habitat surveys and BNG mapping completed by FPCR Environment and Design to support the DCO application for the creation of a strategic rail freight interchange.

This HMMP provides a framework that outlines the establishment, management, monitoring and review of the green infrastructure component of the proposed Oxfordshire Strategic Rail Freight Interchange (OxSRFI) development provided specifically to mitigate development effects on the Ardley Quarry and Cutting SSSI. Habitats to be created and managed in the long-term comprise species-rich calcareous grassland and lowland meadow.

Timescales for Actions PB-B03

The detailed timescales for the proposed actions are yet to be confirmed. It is anticipated that in habitat enhancement will commence within the SSSI Compensation Area (Work No. 29), where existing arable land will replaced by lowland meadow and calcareous grassland. These areas will not be subject to any artificial inputs. Soil analysis undertaken across these field compartments has confirmed there is no requirement to first undertake measures to reduce soil nutrient levels to appropriate levels (see Section 2: Soils and Substrates (EI-T02)).

Monitoring Requirements PB-B04

This HMMP provides a monitoring schedule which includes habitat monitoring during the first five years following habitat creation/establishment measures and then monitoring every 5 years from year 5 onwards.

Where appropriate, survey data will inform updates to the SSSI-HMMP to reflect any habitat management strategy amendments deemed necessary to deliver the relevant target habitat conditions and long-term viability.

Required Consents and Licences PB-B05

Any consents and licences required for habitat management will be addressed through the planning process.

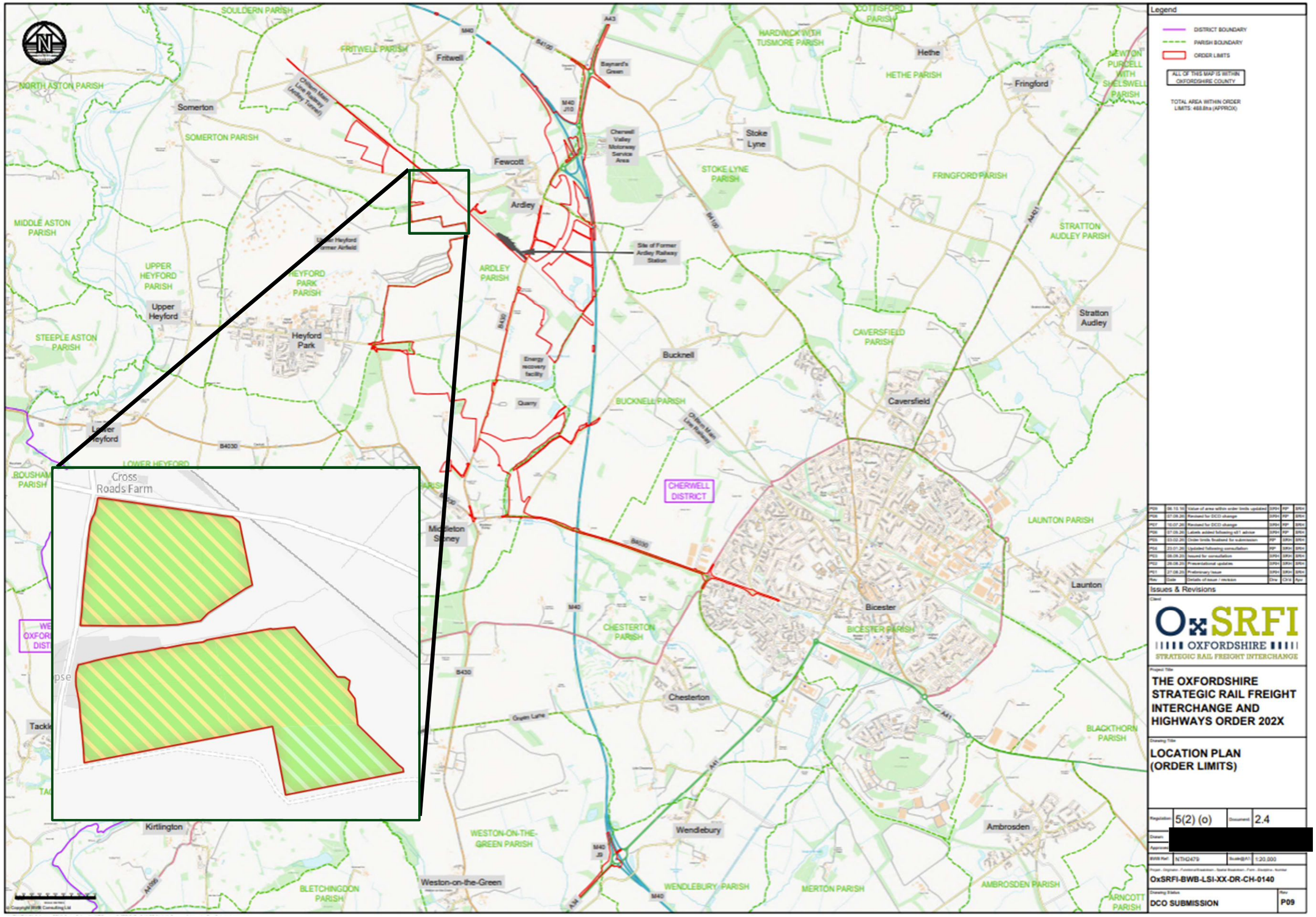
Funding PB-B06

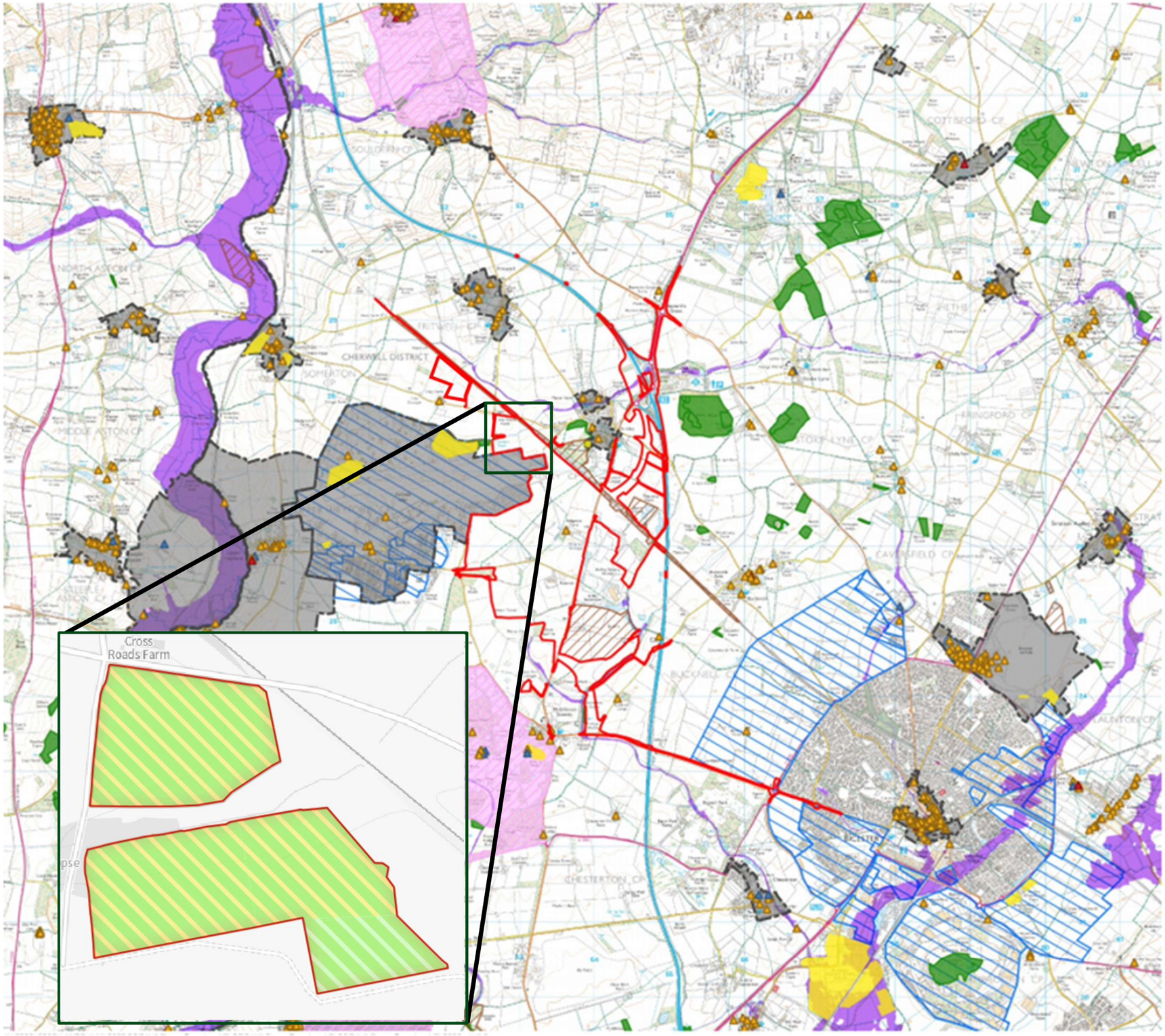
Future management of the main development area and ecological compensation areas will be secured by Oxfordshire Railfreight Limited.

Legal Agreement PB-B07

Secured through the discharge of DCO Requirement 12

Site Boundary Plan PB-F01





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N

0 1,500 3,000 m

- Draft Order Limits
- Ancient Woodland
- Local Nature Reserves
- Sites of Special Scientifc Interest
- Conservation Areas
- Parks and Gardens
- Scheduled Monuments
- Flood Zone 3
- Cherwell Local Plan Allocations & Potential Development Sites

Listed Buildings

- Grade I
- Grade II
- Grade II*

(Sources: Environment Agency; Historic England; Natural England; Adopted Cherwell Local Plan 2011-2031)

date	drawn/chkd
13/02/26	JDS/TRJ

client
Oxfordshire Railfreight Ltd.

project
Oxfordshire SRFI,
Oxfordshire

title
ENVIRONMENTAL DESIGNATIONS AND FEATURES

scale
Approx 1:50,000 @ A3

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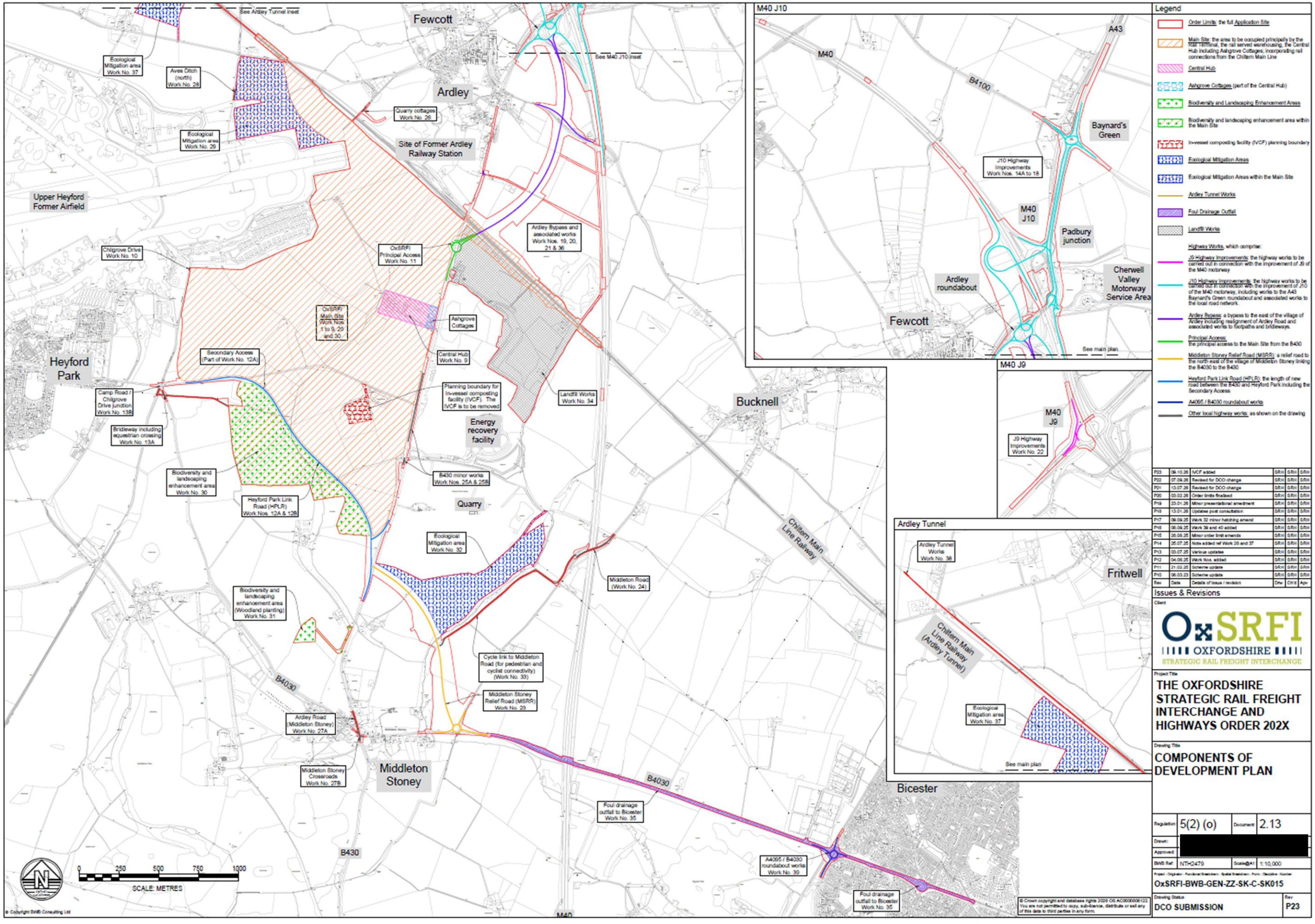
See Ardley Tunnel inset
See M40 J10 inset
Fewcott
Ardley
Site of Former Ardley Railway Station
Upper Heyford Former Airfield
Heyford Park
Bucknell
Energy recovery facility
Quarry
Middleton Stoney
Bicester
Ecological Mitigation area Work No. 37
Aves Ditch (north) Work No. 28
Ecological Mitigation area Work No. 29
Quarry cottages Work No. 26
Ardley Bypass and associated works Work Nos. 19, 20, 21 & 36
Chilgrove Drive Work No. 10
OxSRFI Principal Access Work No. 11
OxSRFI Main Site Work Nos. 1 to 9, 29 and 30
Ashgrove Cottages
Secondary Access (Part of Work No. 12A)
Central Hub Work No. 9
Planning boundary for In-vessel composting facility (IVCF). The IVCF is to be removed
Landfill Works Work No. 34
Camp Road / Chilgrove Drive junction Work No. 13B
Bridleway including equestrian crossing Work No. 13A
Biodiversity and landscaping enhancement area Work No. 30
Heyford Park Link Road (HPLR) Work Nos. 12A & 12B
B430 minor works Work Nos. 25A & 25B
Ecological Mitigation area Work No. 32
Biodiversity and landscaping enhancement area (Woodland planting) Work No. 31
Middleton Road (Work No. 24)
Chiltern Main Line Railway
Cycle link to Middleton Road (for pedestrian and cyclist connectivity) (Work No. 33)
Middleton Stoney Relief Road (MSRR) Work No. 23
Ardley Road (Middleton Stoney) Work No. 27A
Middleton Stoney Crossroads Work No. 27B
Foul drainage outfall to Bicester Work No. 35
A4095 / B4030 roundabout works Work No. 39
B4030
B430
M40
0 250 500 750 1000
SCALE: METRES
M40 J10
M40
A43
B4100
Baynard's Green
J10 Highway Improvements Work Nos. 14A to 18
M40 J10
Padbury junction
Ardley roundabout
Cherwell Valley Motorway Service Area
Fewcott
See main plan
M40 J9
M40 J9
J9 Highway Improvements Work No. 22
Ardley Tunnel
Ardley Tunnel Works Work No. 38
Fritwell
Chiltern Main Line Railway (Ardley Tunnel)
Ecological Mitigation area Work No. 37
See main plan
Legend
Order Limits: the full Application Site
Main Site: the area to be occupied principally by the rail terminal, the rail served warehousing, the Central Hub including Ashgrove Cottages, incorporating rail connections from the Chiltern Main Line
Central Hub
Ashgrove Cottages (part of the Central Hub)
Biodiversity and Landscaping Enhancement Areas
Biodiversity and landscaping enhancement area within the Main Site
In-vessel composting facility (IVCF) planning boundary
Ecological Mitigation Areas
Ecological Mitigation Areas within the Main Site
Ardley Tunnel Works
Foul Drainage Outfall
Landfill Works
Highway Works, which comprise:
J9 Highway Improvements: the highway works to be carried out in connection with the improvement of J9 of the M40 motorway
J10 Highway Improvements: the highway works to be carried out in connection with the improvement of J10 of the M40 motorway, including works to the A43, Baynard's Green roundabout and associated works to the local road network.
Ardley Bypass: a bypass to the east of the village of Ardley including realignment of Ardley Road and associated works to footpaths and bridleways.
Principal Access: the principal access to the Main Site from the B430
Middleton Stoney Relief Road (MSRR): a relief road to the north east of the village of Middleton Stoney linking the B4030 to the B430
Heyford Park Link Road (HPLR): the length of new road between the B430 and Heyford Park including the Secondary Access
A4095 / B4030 roundabout works
Other local highway works, as shown on the drawing
P23 26.10.26 IVCF added SRH SRH SRH
P22 07.09.26 Revised for DCO change SRH SRH SRH
P21 13.07.26 Revised for DCO change SRH SRH SRH
P20 03.02.26 Order limits finalised SRH SRH SRH
P19 23.01.26 Minor presentational amendment SRH SRH SRH
P18 13.01.26 Updates post consultation SRH SRH SRH
P17 09.09.25 Work 32 minor hatching amend SRH SRH SRH
P16 08.09.25 Work 39 and 40 added SRH SRH SRH
P15 28.08.25 Minor order limit amends SRH SRH SRH
P14 25.07.25 Note added ref Work 26 and 37 SRH SRH SRH
P13 03.07.25 Various updates SRH SRH SRH
P12 04.06.25 Work Nos. added SRH SRH SRH
P11 21.02.25 Scheme update SRH SRH SRH
P10 06.03.23 Scheme update SRH SRH SRH
Rev Date Details of issue / revision Drw Chkd Apv
Issues & Revisions
Client
OxSRFI
OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE
Project Title
THE OXFORDSHIRE STRATEGIC RAIL FREIGHT INTERCHANGE AND HIGHWAYS ORDER 202X
Drawing Title
COMPONENTS OF DEVELOPMENT PLAN
Regulation 5(2) (o) Document 2.13
Drawn: [redacted]
Approved:
BWB Ref. NTH2479 Scale@A1 1:10,000
OxSRFI-BWB-GEN-ZZ-SK-C-SK015
Drawing Status DCO SUBMISSION Rev P23
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Phasing strategy

Will the proposed work measures be delivered in phases? PB-B08	**Yes: ☐ No: ☒**

The habitat management and monitoring prescriptions detailed in this plan are structured to be delivered in accordance with a future, project-specific phasing strategy and are anticipated to form part of the initial landscaping phase.

Long-term Commitment: The commitment to a minimum of 80 years of management and monitoring will apply to the SSSI compensation areas.

This approach will ensure that the ecological measures are delivered in a timely and effective manner, directly correlating with the specific impacts of each phase of the project as it is implemented.

Roles and Responsibilities

Provide details of the responsible persons and organisation(s) for delivering this management plan.

Ecologist or Other Professional Responsible for HMMP PB-B09				
Organisation		FPCR Environment and Design Ltd.		
Responsibility	Start Date:	2025	End Date:	2026

As one of the leading consultancies in advancing and delivering BNG, FPCR has worked with a broad range of landowners, Local Authorities, and government bodies to establish banks of biodiversity units. The experienced team at FPCR has a proven record and competency in delivering Habitat Banking schemes and habitat management.

Statement of Competency

The preparation of this HMMP was initially led by [redacted], an ecologist with more than 11 years' experience in the ecology and conservation sector. [redacted] has over 7 years of experience with BNG in the UK. The HMMP was updated by [redacted], an ecologist and principal BNG Specialist with over 9.5 years' experience in the ecology and environmental sector.

This HMMP has been quality-assured by [redacted], an Associate Ecologist with 9 years' experience utilising BNG within ecological consultancy in the UK. All work was overseen by [redacted].

Landowner or Land Manager PB-B10				
Name or Initials		Oxfordshire Railfreight Limited		
Organisation		Oxfordshire Railfreight Limited		
Responsibility	Start Date:	Commencement of works	End Date:	80 years following completion of habitat creatoin.

The Developer will be responsible implementation of this HMMP during the construction period. The Developer has a track record of completing similar development projects and an established track record of ensuring that projects are completed to time scales and that operations are fully complaint with relevant regulations and national guidance and standards.

*excludes areas reverting to landowner/third party management such as highways verges and the capped Ardley Landfill.

Statement of Competency

The Developer will be able to demonstrate management and monitoring competency and/or relevant site knowledge and skills through relevant training, qualifications or experience, or a combination of these.

Management Organisation(s) Responsible for Implementing the HMMP PB-B11				
Name or Initials		A suitable qualified company will be contracted.		
Organisation		A suitable qualified company will be contracted.		
Responsibility	Start Date:	Commencement of works	End Date:	TBC

The Management Organisation will have responsibility for the post construction management and monitoring implementation of this HMMP.

Statement of Competency

The Developer will commission a suitable Management Company to implement the post construction elements of the HMMP that is able demonstrate the knowledge, skills and experience to undertake habitat management in a manner that will achieve the stated BNG outcomes. Evidence will comprise relevant training, experience, qualifications, or combination of these.

LPA or Responsible Body for Reviewing HMMP PB-B12				
Name or Initials		TBC		
Organisation		Cherwell District Council (or relevant local planning authority)		
Responsibility	Start Date:	Commencement of works	End Date:	TBC
Cherwell District Council (or relevant local planning authority) will be the responsible body in the review and auditing of subsequent revisions of this HMMP.				

Land Use Summary

Overview of Baseline Site Use PB-B13

The SSSI Compensation Area, as defined by the 'Order Limits', is located to the south of Ardley and the Chiltern Railway line, and northeast of the former RAF Upper Heyford airfield. It is comprises two areas of open arable land located to either side of a tributary of Padbury Brook. Hedgerows border the field parcels to the north, west and south.

Overview of Proposed Site Use PB-B14

Full details of the Proposed Development are provided separately in ES Chapter 2: Proposed Development of the Environmental Statement Chapter, which supported the Application. The Proposed Development comprises a Strategic Rail Freight Interchange with associated infrastructure and distribution warehousing units.

The proposals for the SSSI Compensation Area solely comprise the creation and long-term management of species-diverse native calcareous grassland and lowland meadow habitats.

Grassland establishment will include appropriate soil preparation, locally appropriate seed mixes, and long-term management through controlled mowing regimes.

Site Baseline, Environmental Information and Associated Impacts Checklist PB-T01

Baseline and Environmental Information	Prompts for when these may be relevant. This is not an exhaustive list. Use your professional judgement to determine which are required for your HMMP	Check box if included	Document Reference or Reason if not included
Statutory / Non-statutory Designated Sites	Will your proposals lead to direct or indirect effects on designated sites?	☒	The wider proposals will result in impacts to the Ardley Cutting & Quarry SSSI. Details of desktop study records, including locations of designated sites and an assessment of potential impacts from the project on these, is provided in the Environmental Statement Chapter 6 prepared to accompany the application.
Protected and Notable Species	Does the presence or proximity of specific species on or near your site present any constraints or opportunities to project design or management?	☒	Further details of desktop study records, including locations of protected/notable species records and an assessment of potential impacts from the project on these, are provided in the Environmental Statement Chapter 6 prepared to accompany the application.
Invasive Non-Native Species (INNS)	Are any INNS present onsite that could affect the proposals?	☒	Details regarding the presence of INNS are provided in Chapter 6 of the Environmental Statement, prepared to accompany the application. Where applicable, the management of invasive non-native species (INNS) is included within the management prescription outlined in this HMMP, and in the CEMP.
Biological Records Plan - Sites and Species	Does the presence of designated sites or specific species on or near the site present any constraints or opportunities to proposals?	☒	Details of biological records are presented in the ES Appendix ES6.1: Ecological Appraisal and Environmental Statement Chapter 6 prepared to accompany the application.
Baseline Habitats Survey	Is this current and important HMMP information located in a separate document? If so, provide details on where it is located.	☒	Details of botanical surveys and baseline habitats are provided in the Environmental Statement Chapter 6 and ES Appendices ES6.1: Ecological Appraisal; ES6.2: SSSI Botanical Survey Report and ES6:9 BNG Report. prepared to accompany the application.
Public Access	Has public access, or proposals to allow public access, influenced your management prescriptions? If so, how?	☒	The Site has a degree of public access as described in the accompanying Environmental Statement (Chapter 2). Public access has been considered throughout the project design stage to ensure habitat targets are appropriate.
Climate	Are local climate conditions and, or climate change likely to impact the target habitat retention, creation or enhancement?	☒	Target habitat types are consistent with baseline habitats, appropriate for the location, and therefore not considered especially sensitive to climate impacts. Adaptive management techniques are considered for climate change adaptation.
Geology and Topography	Any geological or topographical constraints or opportunities?	☐	The topography of the SSSI Compensation Area will not be altered and will not have a significant effect on proposed habitat interventions or ongoing management.
Agricultural Land Status	Does the site support any land favourable for agricultural management? Could this affect the proposals?	☒	The loss of agricultural land has been considered as part of the Environmental Statement (ES Chapter 14) prepared to support the application.
Soils and Substrates	Do soils and substrates present any constraints or opportunities?	☒	Soil nutrient levels, soil type, and pH have been considered in creating lowland calcareous and lowland meadow grasslands, as these factors strongly influence feasibility and success. Additionally, the loss of soil conditions on site has been considered in the Environmental Statement prepared to support the application.
Contaminated Land	If there is any contaminated land, will this present any constraints?	☒	The Contaminated Land has been considered as part of the Environmental Statement prepared to support the application.
Hydrology and Drainage	Will the site hydrology present any constraints or opportunities?	☒	The flood risk, hydrology and drainage for the Site have been considered as part of the Environmental Statement (Chapter 9) prepared to support the application.
Flood Risk Zones	Is the site within a flood risk zone? Will that present any site management risks?	☒	
Landscape Character and Designations	Does the landscape character of the site present any constraints or opportunities?	☒	A landscape impact assessment of the Site has been included in the Environmental Statement (Chapter 7) prepared to support the application.
Historic Land Use	Does the historic land use present any constraints or opportunities?	☒	The historic environment has been considered as part of the Environmental Statement (Chapter 10: Heritage and Archaeology) prepared to support the application.
Historic Environment and Earth Heritage	Are there any historic environment designations? What are the implications for your plan?	☒	

2. Baseline and Environmental Information

Land Tenure and Public Access

Relevant Land Tenure Information (EI-B01)

The areas included within this HMMP are owned or will be under the control of Oxfordshire Railfreight Ltd, who will be responsible for procuring suitably qualified contractors and management personnel and for ensuring the successful implementation of this habitat management plan.

Potential Impact to Scheme (EI-B02)

All management prescriptions detailed in this management plan will be the responsibility of the landowner and their land manager (s). Therefore, there will be no constraints on completing the management prescriptions regarding land tenure.

Public Access Information (EI-B03)

Existing public access: There is currently no public access to the SSSI Compensation Area.

Proposed public access: The OxSRFI development will provide a new footway/bridleway that would provide links to, and enhance connectivity between Heyford Park and Ardley including a footbridge over the Chiltern Main Line railway. See the Footway/Cycleway/Rights of Way Strategy Overview below.

Further details are provided in the Framework Travel Plan (Appendix 3.2 to ES Chapter 3: Transport).

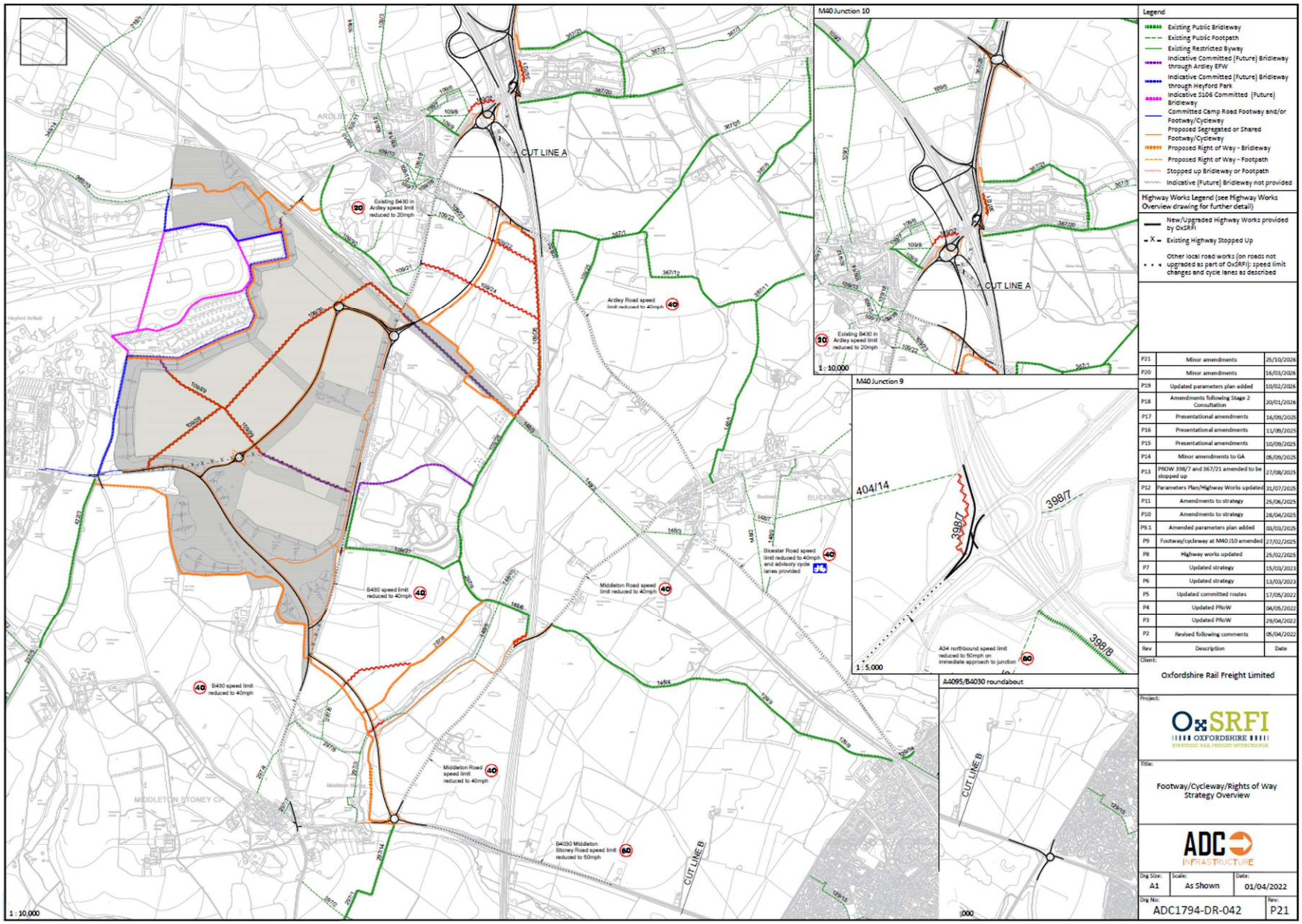
Potential Impact to Scheme (EI-B04)

The new footpath links may cause some disturbances, primarily due to increased access and disturbances from dog walkers, and issues such as litter should be addressed. Access through the habitat compensation area will be controlled using fencing where appropriate, or otherwise via strategically mown pathways in the grassland, with areas of grassland left to grow longer to discourage access. A longer, tussocky grass buffer strip should be created along the pathway to discourage people from entering and recreationally using that space. Additional measures based on monitoring may need to be considered as and when required.

Signage should be erected at accessible locations to explain the scheme to recreational users of the Site and to request that dog walkers keep their dogs under control.

While the presence of Public Rights of Way (PRoW) may cause some disturbances, they also offer access to nature for the local community and visitors. This access supports conservation efforts, encourages pro-environmental behaviours, and enhances well-being.

Public Access Plan (EI-F01)



Climate

Current Climate Information (EI-T01)	
Nearest weather station details	Oxford
Days of rain per year	117.67 days
Average annual rainfall mm	681.55 mm
Average temperature °C	7.12°C min / 15.02°C max
Highest temperature – Month and temperature °C	July - 23.06°C
Lowest temperature – Month and temperature °C	February - 2.32°C
Average annual hours of sunshine	1615.48 hours
Sunniest month and average hours of sunshine	July - 211.99 hours
Average number of days with air frost	33.73
Frostiest month and number of days	December – 8.60 days

Potential impact of current climate on project (EI-B05)

Like much of England, Ardley and its surrounding areas experience a temperate maritime climate, characterised by mild winters, warm summers, and moderate rainfall throughout the year. Sunshine hours are typical for southern central England, with occasional frosts but little severe cold or frequent snow. This climate supports a diverse range of lowland English habitats, and current conditions do not hinder habitat creation, including species-rich grassland, woodland, and scrub.

As such, species mixes selected for planting and/or seeding should be appropriate for this climate. This will be easily achievable for the habitats proposed.

Potential Impact of Climate Change on Proposals (EI-B06)

Impacts of Climate Change

As a result of climate change, all areas of the UK are projected to get warmer, resulting in drier, warmer summers and milder, wetter winters, which are already being observed. Southern England is projected to have the largest change in summer mean temperatures.

As full impacts are unknown at the time of writing, the plan will be implemented using an adaptive management approach. This approach allows the scope to introduce new management responses to achieve the same objectives. For instance, this may involve changing the timing of a hay cut to reflect earlier plant growth and flowering.

Drier conditions will favour stress-tolerant and ruderal species. Higher spring soil moisture levels, combined with higher spring temperatures, may also favour more competitive species, impacting less tolerant species and reducing botanical diversity, therefore consideration has been given to:

- Creating a more resilient system by combining various habitat types and natural elements, mimicking natural ecosystems.
- Seeding the grassland with a variety of species adapted to varying degrees of soil moisture will allow the site to remain resilient to climate change by encouraging a more diverse seed bank within the soils. This will provide flexibility in the sward, allowing species to establish based on the soil moisture regime that dominates the site.

Adaptive Management

The climate change sensitivity rating for (priority) habitats related to the proposals within this HMMP, along with some adaptive management measures from the Climate Change Adaptation Manual (Natural England and the RSPB, 2nd edition 2020), are provided below to help inform habitat management strategies and adaptive management requirements that may be needed as the effects of climate change occur.

Grasslands

Lowland calcareous grassland

Lowland calcareous grassland has been shown to be relatively robust to the direct threats posed by climate change and to have **low climate change sensitivity,** at least in the short term. Drought and wildfire may affect the habitat. Climate change adaptation should focus on reducing other sources of harm to increase resilience. Adaptive management may include, but is not limited to:

- Flexibility in site management, such as varying the timing of hay cuts, to respond to increased variation in seasonal growing conditions (but being mindful of the risk to ground nesting birds).
- Increasing topographical, soil and hydrological heterogeneity; and
- Accepting changes to community composition where it is driven by climate change.

Lowland meadow

Lowland meadows, particularly wetter types, are influenced by water availability, and seasonal variation in the water table are likely to be sensitive to changes in rainfall; wet lowland meadows are thought to have **medium sensitivity to climate change** impacts, whilst typically dry lowland meadows are predicted to have **low sensitivity to climate change** impacts. Adaptive management may include, but is not limited to:

- Flexibility in site management, such as varying the timing of hay cuts, to respond to increased variation in seasonal growing conditions (but being mindful of the risk to ground nesting birds).
- Increasing the grassland's structural heterogeneity by varying the management type and timing.
- Monitoring and ensuring the control of invasive species, including previously unknown species as they occur.
- Maintain or restore water level management, including actions to increase water holding capacity, such as restoring ditch networks or reviewing water management structures.

Soils and Substrates (EI-T02)

Soil Analysis for SSSI Comnpensation Area (Work No. 29)

Parcel Refs	Soil Texture	pH	Magnesium (Mg) Index	Phosphorous (P) Index	Potassium (K) Index
A	Clay Loam, calcareous	8.1	1	0	2-
B	Clay Loam, calcareous	7.9	2	0	2-
C	Clay Loam	7.6	2	0	1
D	Clay Loam, calcareous	8.1	2	0	2-
E	Clay Loam, calcareous	8.1	1	0	2-

Summary of Soils Information (EI-B13)

Soil analysis was undertaken of the two field compartments within the SSSI Compensation Area by Land Research Associates (LRA) in February 2026 (see Appendix 1). Results show that these areas have a calcareous nature (pH above 7.5) and moderately high topsoil organic matter (loss-on-ignition). Phosphate availability is relatively low in arable soils, making these suitable for creating grassland. *Map 1* (*LRA*) *shows the sampling locations, Map 2* (*LRA*) *shows soil types.*

The soils predominantly comprise calcareous clay loam topsoil, either directly over hard fractured limestone, with the limestone on the northwest of this area interbedded with mudstone and with evidence of seasonal waterlogging. The central section along the Padbury Brook tributary lies within a small valley centred characterised by decalcified clay loam topsoil and upper subsoil, over a strongly calcareous weakly structured clay lower layer.

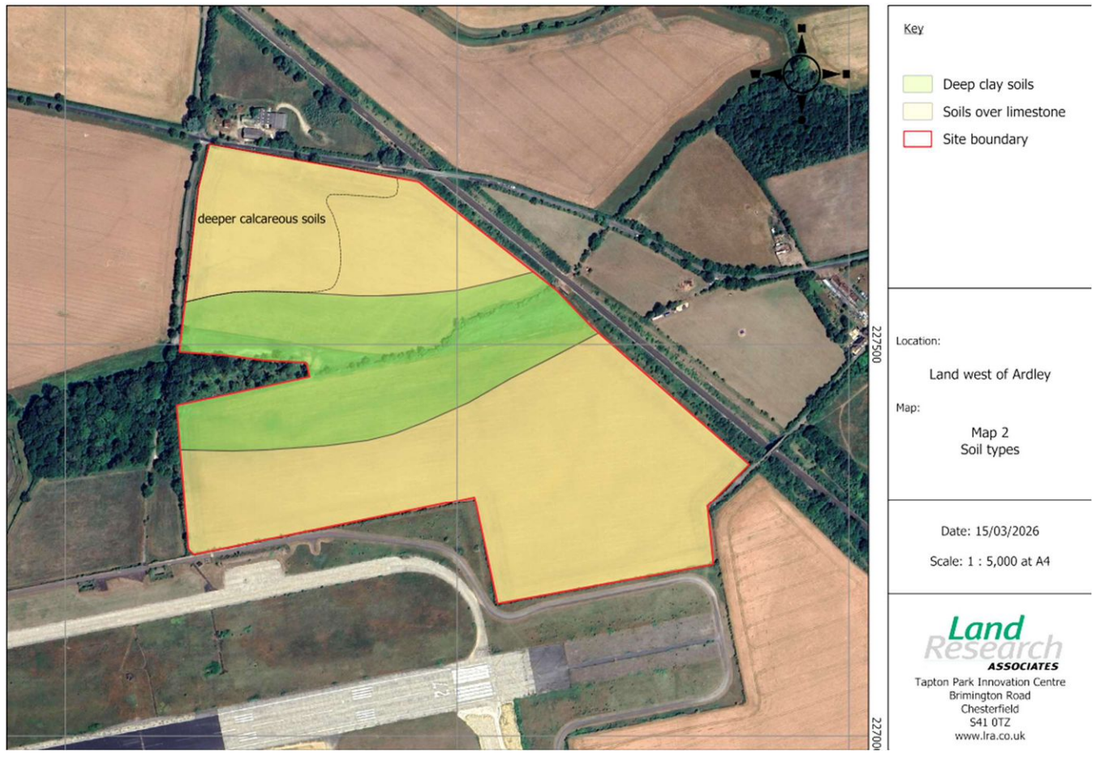
According to Soilscapes (LandIS, 2026), the soil across the Site is freely draining, lime-rich, and loamy. These soils are generally permeable and found in landscapes with limestone or chalky parent materials.

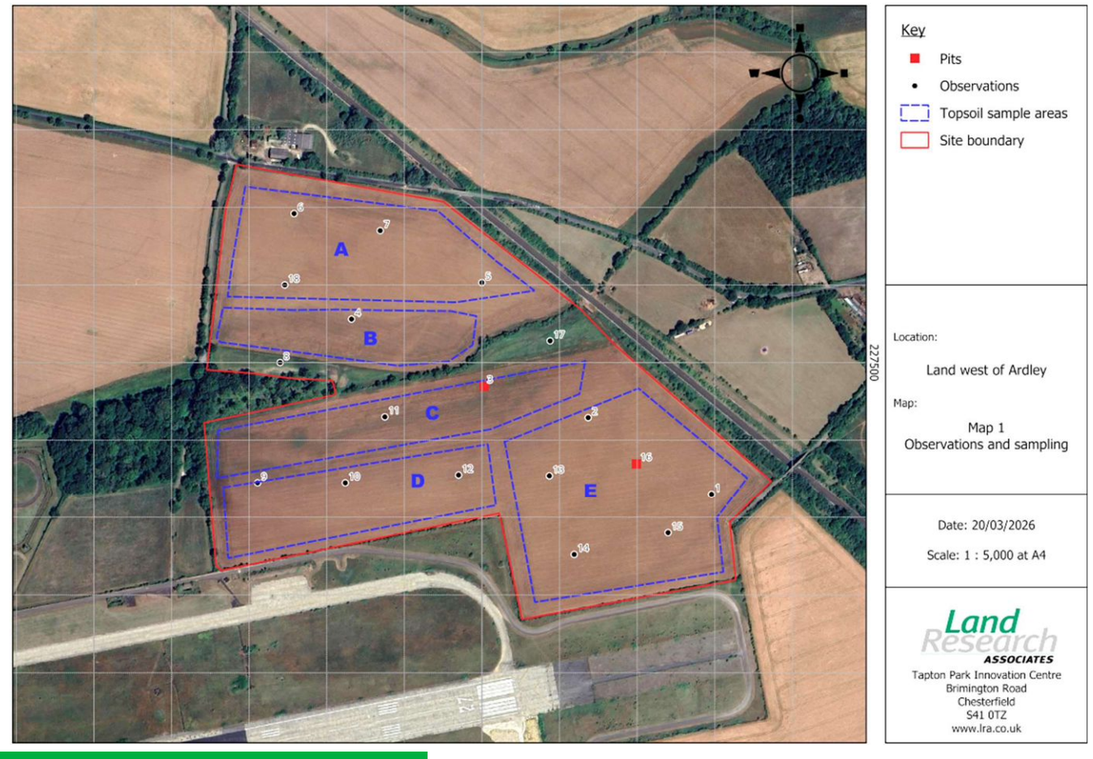
Potential Impact on Project (EI-B14)

This land already has very low phosphate levels and is considered well suited to the establishment of species-rich grassland.

Focus should also be on improving soil health, including the soil microbial community, in particular mycorrhizal fungi, which fertilisers are known to deplete. It has been suggested that the recovery of plant species diversity in improved grassland may be linked to the development of mycorrhizal fungi in the soil. Employing methods such as cutting and collecting once the grassland has been established will help to further reduce nutrient levels over time.

Soils and Substrate Plan (EI-F04)





3. Planned Management Activities

Management Plan Aims and Objectives PM-B01

The key aim of this HMMP is to provide habitat creation, enhancement and management prescriptions that can help to deliver a minimum of 10% biodiversity net gain for the Project, as demonstrated through the Statutory Biodiversity Metric. Within this overall delivery, specific objectives have been agreed to compensate for impacts within Ardley Cutting and Quarry SSSI.

Grasslands

- The proposals will seek to compensate for losses of lowland meadow and lowland calcareous grasslands through the creation of substantial areas of these habitats, which will increase their extent when compared with the baseline.

This plan seeks to ensure the Project is delivered in a manner that minimises ecological impacts and secures a lasting positive contribution to local and national biodiversity, aligning with the principles of biodiversity net gain. The HMMP is designed to directly support and contribute to key local and county-level strategies for nature recovery in Oxfordshire.

The specific objectives of this plan are to:

- Secure the long-term protection of important ecological features associated with the SSSI, including retained areas of lowland meadow and lowland calcareous grassland.
- Mitigate unavoidable habitat losses within the proposed sidings, by creating extensive areas of new compensatory habitats that will seek to far exceed the current baseline areas of each habitat type. This forms a core component of the project's net gain delivery and provides a substantial contribution to local biodiversity targets for these priority habitats.

Design Principles Informed by Baseline Information PM-B02

Habitat and Condition Targets PM-T01

Target Habitat Type	Parcel / Feature Refs	Targeted Condition	Years to Targeted Condition	Condition Assessment Targets	Comments
Lowland meadows	NW-LM-1	Good	15	The proposal will seek to achieve the condition criteria A, B, D and F at a minimum.	This habitat will be created where suitable soil conditions have been identified to support a diverse meadow grassland habitat.
Lowland calcareous grassland	NW-CG-2 NW-CG-3 MS-CG (various parcels)	Good	20	The proposal will seek to achieve the condition criteria A, C and D at a minimum.	Where suitable soils exist, grassland will be sown with a native species-rich grassland seed mix or green hay, which will establish an appropriate calcareous grassland sward.
Lowland calcareous grassland	MS-CG (various parcels)	Poor	5	The proposal will seek to achieve the condition criteria A, C and D.	Retained calcareous grassland within the northern railway cutting.

Habitat Retention

Measures to be Implemented to Protect and Maintain Retained Habitats PM-03

Retained habitats will be protected in accordance with the Construction and Environmental Protection measures. The management of all retained habitats within the Project Boundary will be delivered in strict accordance with the prescriptions detailed in this Habitat Management and Monitoring Plan (HMMP). The overall objective is to ensure the long-term viability and ecological integrity of these habitats, contributing to the Project's biodiversity net gain commitment and a resilient ecological network.

The specific management prescriptions for each retained habitat type are as follows:

- **Lowland Meadows and Lowland Calcareous Grasslands**: The management of these species-rich grasslands will be based on a traditional hay-cut regime. This will involve a single annual or biannual hay-cut mowing, with the cuttings removed from the site to prevent nutrient enrichment and encourage a diverse flora. The timing of the cut will be sensitive to the flowering and seeding times of key plant species and the presence of nesting birds. This will also be included within the retained areas of tall forb vegetation.

Where these retained habitats are to be included within the habitat management prescriptions provided below, parcel references have been provided.

Habitat Retention Plan PM-F01

Tick box if any additional plans are provided in the Appendices ☒ . Reference: Please refer to Figure 4 of the BNG Report (ES Appendix 6.9) for habitat retention plans at functional scale.

Creation, Enhancement and Management Targets and Prescriptions

Lowland Meadow

Creation, Enhancement and Management Summary (GH-T01)

Target Habitat				Lowland Meadow	
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHab Classification Description*** *A neutral grassland that meets at least two of these three criteria:* *1. >15 species per m^2 (including grasses and excluding bryophyte);* *2. >30% cover of broadleaved herbs and sedges (excluding white clover Trifolium repens, creeping buttercup Ranunculus repens and injurious weeds);* 3. *<10% cover of rye-grasses and white clover Trifolium repens.* *AND EITHER ≥ 4 of the indicator species (listed in UKHab Category Definitions) at least 'present' on DAFOR scale.* *OR ≥3 of these indicators at least 'occasional' on DAFOR scale (but not limited to field corners or edges).*	Yes	NW-LM-1	The grassland is to be created using a proprietary species-rich native Lowland Meadow mix with an appropriate species composition to meet this description. This mix will contain at least 15 species, including lowland meadow indicator species. Soil nutrient investigations have confirmed soil nutrient levels are appropriate to facilitate the establishment of lowland meadows without the need for intervention to reduce these further.	Following successful establishment, management will include annual hay-cut mowing with all arisings removed.
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type. **Note – this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	Yes	NW-LM-1	To achieve this criterion, the grassland will target all three UKHab Description criteria for lowland meadows and establish at least 4 indicator species, to be achieved by seeding using a suitable seed mix.	Following successful creation/enhancement, ongoing management of lowland meadow will include hay-cut mowing. This will include an annual grass cut in late August/early September. The approach aims to maintain a diverse sward characteristic of good-quality meadow grasslands.
B	Sward height is varied (at least 20% of the sward is less than 7cm and at least 20 per cent is more than 7cm) creating microclimates which provide opportunities	Yes	NW-LM-1	Suitable seed mix will introduce a range of grass and herbaceous species, promoting the establishment of a diverse sward.	A diverse sward will help maintain a varied sward height along with varied cutting to mimic natural disturbances. Regular mowing will help maintain a varied sward.

	for insects, birds and small mammals to live and breed.				
C	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	No	NW-LM-1	N/A	While not specifically targeted, rabbit grazing/burrowing activity or other such faunal disturbance my create areas of bar ground. Public access will be limited to prevent excessive human disturbance.
D	Cover of bracken *Pteridium aquilinum* less than 20% and cover of scrub (including bramble) less than 5%.	Yes	NW-LM-1	The field does not currently include bracken or excessive scrub, and the introduction of green hay and/or seed will not introduce these species.	Regular mowing will prevent scrub and bracken from establishing. Regular monitoring will track where scrub or bracken encroachment has occurred and trigger remedial action where necessary.
E	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging activities) accounts for less than 5% of total area. If any invasive non-native species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed.	No	NW-LM-1	While not specifically targeted, the seed mix will not include significant seed stock of any species listed by the Statutory Metric Condition Assessment criteria as 'species indicative of sub-optimal condition.'	While not specifically targeted, regular monitoring will track the presence of invasive non-native species across all habitats and trigger remedial action to remove or reduce them. If pernicious weeds begin to dominate and affect the definition of grasslands as a 'good example' of Lowland Meadow, appropriate remedial measures will be undertaken to reduce the number of species indicative of sub-optimal conditions.
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type. **Note – this criterion is essential for achieving Good condition for non-acid grassland types only.**	Yes	NW-LM-1	The grassland will target a minimum of 10 species per m^2.	Timings of the annual hay-cut will be alternated to allow a diverse range of wildflowers to set seed. A late August/September hay-cut will be undertaken. Species diversity will be continuously monitored and, where below 10 species per m^2, remedial measures will be introduced. These could include supplementary seed or adjusted the timings of hay-cuts. Further details on potential remedial measures are provided later in this document.

Additional Management Prescriptions (GH-B01a)

Using Local Green Hay

Green hay is preferable for lowland meadow creation due to its high proportion of viable seed, local provenance and associated propagules (beyond the seed), but logistical, temporal, and site constraints mean its use is not always practicable. Where possible use locally sourced green hay from a donor site (within 10 miles of the site) that contains a mix of wildflower species characteristic of neutral soils, as well as yellow rattle, *Rhinanthus minor*. The donor site should be within an hour's drive from the site, so green hay can be transported to and spread on the land in one day. Donor site must have similar characteristics, including soil type, soil pH and hydrology, to the new grassland. 1 hectare (ha) is sufficient to spread over 3 ha.

Using Commercial Seed Mix

Where sufficient donor sites are available, commercial seed mixes can be beneficial as they are readily available and do not have the same seasonal and logistical constraints as green hay. Species content and proportions can also be specified, allowing for better targeting of habitat type and species compositions. Seed mixes are also more practical for large sires, and when seed quality and germination rates are tested, they reduce the uncertainty during establishment.

Ground Nesting Birds

To minimise risks to ground nesting birds, the annual hay cut will be undertaken sensitively in accordance with advice provided to FPCR by the RSPB grassland restoration specialists. This will include delaying to at least August where possible and by beginning the cut by mowing the field margins first, where ground-nesting birds are unlikely to nest, as they favour field interiors with better sight lines. Mowing will then cut the centre of the field before working outwards to the already cut margins. This will allow any birds and chicks present in the field ample opportunity to escape to cover. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided, and mowing will not be undertaken within the area until after chicks have fledged.

Leave uncut margins and strips of vegetation alongside hedgerows and field edges on a rotational basis to support invertebrates and mammals. Rotate these uncut margins each year.

Grassland (Lowland Meadow)

Creation, Enhancement and Management Detailed Methods (GH-T02)

Action	Relevant Parcels	Timing	Prescriptions
Beetle Bank Creation	NW-LM-1 and adjacent compartment to NW	Year 0	Two beetle banks will be created within the field margins of each compartment in accordance with the protocol specified by Sustainable Farming Incentive AHW3: Beetle banks[1] by creating a raised earth ridge (around 3 metres (m) wide to 5 m wide and at least 0.4m high and sowing a mixture of fine-leaved grasses, such as red fescue, timothy and cocksfoot.
Topsoil Harvest	SSSI NW-LM-1	Year 0 – Early Spring/Autumn	Prior to the ground works within the rail track cutting, mow the existing lowland meadow areas within the SSSI working areas and remove all arisings several weeks prior to the topsoil strip. Immediately prior to the soil strip, scarify the soils at compartment NW-LM-1. The topsoils will be stripped to a depth of 10-20cm immediately prior to translocation to NW-LM-1.
Ground Preparation – Soil Mixing	NW-LM-1	Year 0 – Spring/Autumn	Topsoils from existing lowland meadow habitat within the SSSI working area will be spread across the receptor field, for example using a muck spreader. Mix the soils using a rotavator set to a depth of 10-20cm. Lightly cultivate the rotavated soils ready for the application of green hay / appropriate seed mix.
Apply green hay	NW-LM-1	Year 0 – Autumn	After soil has been allowed to settle, lightly re-cultivate the seed bed prior to seed applying green hay. Apply green hay from a suitable local donor site if available. A green hay crop should be cut and collected as wildflowers and grasses start to shed their seed (typically early August). The green hay crop should be cut and collected using a drum or disc mower. A mower conditioner should not be used. A forage harvester can be used to collect the hay, or the hay can be baled. The hay must be transferred and spread the same day that it is collected. If a baler is used, it should be transferred to the receptor site for spreading within an hour of being baled. The green hay should ideally be cut and transported on a cool and cloudy day. If the green hay has been collected using a forage harvester, it should be blown directly into a muck spreader, and this can be used to spread the hay on the receptor site. If bales have been collected, the green hay can be spread using a muck spreader, by hand, with a chopper or with a hay turner[2].
Seeding (if required)	NW-LM-1	Year 0 – Spring/Autumn	Seed Species-Rich Neutral Grassland seed mix onto low-fertility, weed-free ground in either early autumn (preferred) or spring, following shallow cultivation to create a firm, fine seedbed with plenty of bare soil. Broadcast the seed evenly at around 4 g/m² (40 kg/ha), ideally in two passes for good coverage, and do not bury the seed—most species require light to germinate. After sowing, roll firmly to ensure good seed–soil contact. Do not apply fertiliser or organic manures and avoid sowing into lush or nutrient-rich soils, as this will favour grasses over wildflowers and reduce establishment success.

[1] see https://www.gov.uk/find-funding-for-land-or-farms/ahw3-beetle-banks [Accessed 18.08.25].
[2] https://meadows.plantlife.org.uk/making-meadows/sowing-seed/green-hay-how-to-cut-collect-and-spread/#:~:text=Spreading%20Green%20Hay&text=Generally%2C%20green%20hay%20will%20land,to%20trample%20in%20the%20seeds.

Establishment management	NW-LM-1	Year 1	Maintain short grass during the first year and dispose of all clippings to encourage perennial plants to establish and avoid a flush of pernicious weed species. Mow or trim the grass monthly during the growing season to manage weed and grass growth while promoting the spread of perennial species. Avoid applying any fertiliser at any stage. Newly created beetle banks will be cut several times during the first growing season to aid establishment.
Long-term Management	NW-LM-1	Year 2+	Annual grass cuts in late August/early September. This will allow a range of wildflowers to set seed. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from site. Mow the regrowth through to late autumn/winter to circa 50mm and again in spring if needed. Alternatively low density aftermath grazing is also possible after the hay cut and will encourage a varied sward height. Cut or hand-pull pernicious and/or invasive weeds before they seed in late summer. As a last resort option, use glyphosate spray to spot-treat affected areas only. Beetle banks will be cut between August and November as necessary to remove woody vegetation and/or undesirable species such as thistles.
Protected species and Wildlife considerations	NW-LM-1	Project duration	To minimise risks to ground-nesting birds, mowing will begin by cutting field margins first (c.20m). Mowing will then cut the field's centre line before working outwards in a circular fashion towards the already cut margins. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided and mowing will not be undertaken within the area until after chicks have fledged. Leave at least one margin in each field (minimum 12 metres in width) to be cut at the end of the season (September/Early Oct). This can be a shelter for any ground-nesting species to escape during mowing. This can also help maintain species that flower later, alternating the margin each year.
Supplementary Seeding (if required)	NW-LM-1	Year 5+	Spread supplementary native green hay can be introduced as necessary in response to poor establishment uptake by broadcasting seeds. Alternatively, consider plug-planting if only certain desired species have failed to establish, but the sward is otherwise in good condition.

Lowland Meadow Species Lists (GH-T03)

Species below are based on the Meadow Mania Species-Rich Neutral Grassland seed mix

Common Name	Scientific Name	Abundance / %	Comments
Wildflowers (~20-25 species)			
Common Knapweed	*Centaurea nigra*		
Oxeye Daisy	*Leucanthemum vulgare*		
Yellow Rattle	*Rhinanthus minor*		*Key species for reducing grass vigour*
Bird's-foot Trefoil	*Lotus corniculatus*		
Red Clover	*Trifolium pratense*		
Selfheal	*Prunella vulgaris*		
Ribwort Plantain	*Plantago lanceolata*		
Meadow Buttercup	*Ranunculus acris*		
Lady's Bedstraw	*Galium verum*		
Yarrow	*Achillea millefolium*		
Meadowsweet	*Filipendula ulmaria*		*Optional for damper sites*
Field Scabious	*Knautia arvensis*		
Small Scabious	*Scabiosa columbaria*		
Red Campion	*Silene dioica*		
Kidney Vetch	*Anthyllis vulneraria*		*Optional addition*
Tufted Vetch	*Vicia cracca*		
Meadow Vetchling	*Lathyrus pratensis*		
Salad Burnet	*Sanguisorba minor*		
Devil's-bit Scabious	*Succisa pratensis*		*High biodiversity value*
Germander Speedwell	*Veronica chamaedrys*		
Grasses (~6–8 fine-leaved native species)			
Crested Dog's-tail	*Cynosurus cristatus*		
Red Fescue	*Festuca rubra*		
Common Bent	*Agrostis capillaris*		
Sweet Vernal Grass	*Anthoxanthum odoratum*		
Quaking Grass	*Briza media*		*If available*
Downy Oat Grass	*Helictotrichon pubescens*		
Sheep's Fescue	*Festuca ovina*		*Optional*

Other Supporting Information

Supporting Information (GH-B02)

Note: The exact species mix and composition have yet to be confirmed and will depend on the availability of a suitable donor site. The species list above is indicative of those considered appropriate for inclusion, based on the Meadow Mania Species-Rich Neutral Grassland seed mix and on those typically found in a lowland meadow (NVC classification MG5 / UKHab g3a). Seed mixes should be suitable for neutral soil. Other comparable seed mixes include:

- Emorsgate EM5 Meadow Mixture for Loamy soils
- Emorsgate EM3 Special General-Purpose Meadow Mixture

What Does Success Look Like? (GH-F01)





Creation, Enhancement and Management Targets and Prescriptions

Lowland Calcareous Grassland

Creation, Enhancement and Management Summary (GH-T01)

Target Habitat				Lowland Calcareous Grassland	
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHab Classification Description*** *A grassland that meets at least two of these three criteria:* • *>15 species per m^2 (including grasses and excluding bryophyte);* • *>30% cover of broadleaved herbs and sedges (excluding white clover Trifolium repens, creeping buttercup Ranunculus repens and injurious weeds);* • *<10% cover of rye-grasses and white clover Trifolium repens.* *AND ≥2 of the indicator species (listed in UKHab Category Definitions) at least 'frequent' on DAFOR scale.* *AND ≥3 of the indicators are classed as 'occasional' on DAFOR scale.*	Yes	NW-CG-2 NW-CG-3	The fields are known to support suitable alkaline soils with a pH level of 7.6-8.1. If possible, grassland seed will be created using green hay from a suitable donor site supporting Lowland Calcareous Grassland with an appropriate sward to meet this habitat criteria. Soil nutrient investigations indicate suitable nutrient levels are achievable to facilitate the establishment of calcareous grassland. To promote the successful establishment of this habitat type, topsoil from the SSSI rail works will be retained and mixed with the soil present in the proposed compartment to introduce some of the seedbed from this existing lowland meadow and to further promote appropriate soil conditions.	Following successful establishment, management will include annual hay-cut mowing with all arisings removed.
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type. **Note – this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	Yes	NW-CG-2 NW-CG-3	To achieve this criterion, grassland will target all of the UKHab Description criteria for lowland calcareous grassland. This will be achieved by a combined approach of topsoil translocation from within the SSSI working areas and the sowing green hay from a suitable local donor site currently considered to be a good example of this habitat type, if available. A proprietary seed mix will be used to supplement the green hay/translocated material as necessary, such as Emorsgate EM6 – Chalk and Limestone seed mix. As discussed above, soil nutrient levels have been confirmed to be appropriate for lowland meadow creation.	Following successful creation/enhancement, ongoing management will include hay-cut mowing. This will include alternating an annual grass cut in late August/early September. The approach aims to maintain a diverse sward characteristic of good quality meadow grasslands.
B	Sward height is varied (at least 20% of the sward is less than 7cm and at least 20 per cent is more than 7cm) creating microclimates which provide opportunities	Yes	NW-CG-2 NW-CG-3	The combination of green hay, translocated material and appropriate proprietary seed mix will introduce a range of grass and herbaceous species, promoting the establishment of a diverse sward.	A diverse sward will help maintain a varied sward height along with varied cutting to mimic natural disturbances.

	for insects, birds and small mammals to live and breed.				Management through regular mowing will help maintain a varied sward.
C	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	No	NW-CG-2 NW-CG-3	N/A	While not specifically targeted, rabbit grazing/burrowing activity or other such faunal disturbance my create areas of bar ground. Public access will be limited prevent excessive human disturbance.
D	Cover of bracken *Pteridium aquilinum* less than 20% and cover of scrub (including bramble) less than 5%.	Yes	NW-CG-2 NW-CG-3	The fields do not currently include bracken or excessive scrub and so the introduction of green hay and/or seed mix will not introduce these species.	Regular mowing will prevent scrub and bracken from establishing. Regular monitoring will track where scrub or bracken encroachment has occurred and trigger remedial action where necessary.
E	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging activities) accounts for less than 5% of total area. If any invasive non-native species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed.	No	NW-CG-2 NW-CG-3	While not specifically targeted, the green hay will not include significant seed stock of any species listed by the Statutory Metric Condition Assessment criteria as 'species indicative of sub-optimal condition.'	While not specifically targeted, regular monitoring will track the presence of invasive non-native species across all habitats and trigger remedial action to remove or reduce their presence, respectively. If pernicious weeds begin to dominate and affect the definition of grasslands as a 'good example' of Lowland Calcareous Grassland, appropriate remedial measures will be undertaken to reduce over of species indicative of sub-optimal condition.
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type. **Note – this criterion is essential for achieving Good condition for non-acid grassland types only.**	Yes	NW-CG-2 NW-CG-3	The grassland will target a minimum of 10 species per m^2 through the introduction of green hay from green hay, translocated material and appropriate proprietary seed mix. The Emorsgate EM6 – Chalk and Limestone seed mix for example includes 21 forbs and 8 grass species.	Timings of the annual hay-cut will be alternated to allow a diverse range of wildflowers to set seed. A late August/early September hay-cut will be undertaken. Species diversity will be continuously monitored and, where below 10 species per m^2, remedial measures will be introduced. These could include supplementary seed or adjusted the timings of hay-cuts. Further details on potential remedial measures are provided later in this document.

Additional Management Prescriptions (GH-B01)

Using Local Green Hay

Green hay is preferable for lowland meadow creation due to its high proportion of viable seed, local provenance and associated propagules (beyond the seed), but logistical, temporal, and site constraints mean its use is not always practicable. Use locally sourced green hay from a donor site (within 10 miles of the site) that contains a mix of wildflower species characteristic of neutral soils, as well as yellow rattle, *Rhinanthus minor*. The donor site should be within an hour's drive from the site, so green hay can be transported to and spread on the land in one day.

Using Commercial Seed Mix

Where sufficient donor sites are available, commercial seed mixes can be beneficial as they are readily available and do not have the same seasonal and logistical constraints as green hay. Species content and proportions can also be specified, allowing for better targeting of habitat type and species compositions. Seed mixes are also more practical for large sires, and when seed quality and germination rates are tested, they reduce the uncertainty during establishment.

Ground Nesting Birds

To minimise risks to ground nesting birds, the annual hay cut will be undertaken sensitively in accordance with advice provided to FPCR by the RSPB grassland restoration specialists. This will include delaying to at least August where possible and by beginning the cut by mowing the field margins first, where ground-nesting birds are unlikely to nest, as they favour field interiors with better sight lines. Mowing will then

cut the centre of the field before working outwards to the already cut margins. This will allow any birds and chicks present in the field ample opportunity to escape to cover. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided, and mowing will not be undertaken within the area until after chicks have fledged. Leave uncut margins and strips of vegetation alongside hedgerows and field edges on a rotational basis to support invertebrates and mammals. Rotate these uncut margins each year.

Translocation of Priority Species Basil thyme *Clinopodium acinos* and Meadow clary *Salvia pratensis*

No direct impacts to neighbouring meadow clary and basil thyme populations are anticipated, however updating habitat surveys will be undertaken prior to the removal of ground flora and associated soils within the Ardley Cutting and Quarry SSSI and adjacent grasslands (basil thyme), and within and adjacent to the Ardley Road Verge Nature Reserve (meadow clary). Should either species be present within or closely adjacent to a proposed working area an appropriate translocation exercise will be undertaken in advance of such works as outlined below.

Any meadow clary or basil thyme identified present within the development footprint will be translocated prior to the commencement of works to established or created calcareous grassland habitat within the site.

Meadow clary is a Schedule 8 species therefore a licence from Natural England will be required to enable seed collection and/or the translocation of plants.

- Soil analysis will be undertaken from around the current population/s and soil analysis has been undertaken in potential receptor areas on-site to ensure appropriate soil conditions are created at the receptor site;
- The receptor site/s will likely be located within the extensive species-rich grassland/lowland meadow areas proposed to the north-west corner of the Main Site and within the close vicinity of the Ardley Cutting and Quarry SSSI to ensure that the receiving grassland habitat is of sufficient size to enable the translocated population/s to expand;
- Translocation is best to be undertaken late winter/early spring (mid-February to mid-March) as any slight root damage will heal relatively quickly as the spring growth surge starts. Works will avoid working in frosty conditions;

Meadow clary

- Dig out around individual meadow clary plants using a hand spade digging around the rosette and a spade depth deep to ensure that the rosette comes out with a large bulb of soil attached underneath. This step will be delayed following very dry conditions to avoid soil loss from around the bulb. Soil bulbs will be wrapped in damp sacking or similar and place the lifted plant in a bucket/trug or similar, and transported to the receptor area;
- A hole of the size to match the root ball will be dug and attached soil on the plant loosened with the base with a fork;
- Re-plant in the hole ensuring that the rosette is at ground level the same as before, and water;

Basil thyme

- As this is generally an annual species care will be taken to translocate associated turf/soils in addition to individual plants to ensure the seed bank is included. Plants and associated turf/soil will be placed in a bucket/trug or similar, and transported to the receptor area;
- A hole of the size to match the root ball/turf/soil sample will be dug and any soil attached to plants loosened with the base with a fork;
- Re-plant in the hole ensuring that plants are at ground level the same as before, and water;

Aftercare

- The translocation timing should mean that there should not be any problem with soil moisture and subsequent watering should be unnecessary. However, if exceptionally dry conditions do occur during spring, plants will be checked every other week for drought stress and watered very thoroughly as required, but with the avoidance of watering where possible as this will encourage the roots to go down to find moisture.
- Monitoring: Annually for 3 years to monitor establishment of translocated plants and to see if there has been any natural population growth as a result of seed shed by the translocated plants.

It is furthermore proposed that if a licence is required to be obtained to enable the translocation of meadow clary plants, that the licence should also permit new meadow clary plants to be grown from mature seed collected from the existing population within the Ardley Road Verve Nature Reserve to provide a back-up to maintain the genetic stock should translocation fail. These would be planted out from the spring after the second year of growing on into on-site calcareous grassland receptor areas to increase the local population.

- Seed will be collected from the existing stock during summer/early autumn (timing of seed set will be variable depending on the conditions), ensuring that collection is taken before seed fall happens;
- Divide collected seeds into two halves. To reduce risk and increase chances of success, seed to be grown in two different locations by two different people/groups;
- Collect sufficient topsoil from the location of the existing population, sufficient to fill two seed trays (one for each half of the seed);

- Sterilise the collected soil;
- Sow the seeds straightaway in the autumn to mimic when they would naturally fall and come into contact with the soil);
- Sow on the surface of the sterilised soil and lightly cover with sterilised soil. Important to not bury too deep (should only be covered with a few mm of soil otherwise germination will be reduced significantly);
- When large enough, seedlings will be pricked out into small pots filled with loam and grow on, re-potting as needed. Continue to grow on during the second year following germination;
- Plant out in in receptor area to increase the population, the spring after the second year of growing on. If there is surplus stock, plants will be offered to the local Wildlife Trust who may be interested in planting up a second population if it is known and recorded that this is stock grown from the known population.

Lowland Calcareous Grassland

Creation, Enhancement and Management Detailed Methods (GH-T02)

Action	Relevant Parcels	Timing	Prescriptions
Topsoil Harvest	SSSI NW-CG-2 NW-CG-3	Year 0 – Early Spring/Autumn	Prior to the ground works within the rail track cutting, mow the existing calcareous grassland compartments within the SSSI working areas and remove all arisings several weeks prior to the topsoil strip. Immediately prior to the soil strip, scarify the soils at compartments NW-CG-2 and NW-CG-3. The topsoils will be stripped to a depth of 10-20cm immediately prior to translocation.
Ground Preparation – Seedbed Preparation	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	Mow vegetation and then remove all arisings. Scarify the topsoil to a depth of 30-40cm to break up compaction and to create a good interface for the soil.
Ground Preparation – Soil Mixing	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	Topsoils from the existing calcareous grassland compartments within the SSSI working areas will be spread evenly within NW-CG-2 and/or NW-CG-3, for example using a muck spreader. Mix the soils using a rotavator set to a depth of 10-20cm. Lightly cultivate the rotavated soils ready for the application of green hay.
Apply green hay	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	After soil has been allowed to settle, lightly re-cultivate the seed bed prior to seed applying green hay. Apply green hay from a suitable local donor site if available. A green hay crop should be cut and collected as wildflowers and grasses at the donor site start to shed their seed (typically to early August). The green hay crop should be cut and collected using a drum or disc mower. A mower conditioner should not be used. A forage harvester can be used to collect the hay, or the hay can be baled. The hay must be transferred and spread the same day that it is collected. If a baler is used, it should be transferred to the receptor site for spreading within an hour of being baled. The green hay should ideally be cut and transported on a cool and cloudy day. If the green hay has been collected with a forage harvester, it should be blown directly into a muck spreader, which can then spread the hay onto the receptor site. If bales have been collected, the green hay can be spread using a muck spreader, by hand, with a chopper or with a hay turner[3].
Meadow clary & Basil thyme translocation (if required)	NW-CG-2 NW-CG-3	Year 0	Where required, a programme of meadow clary *Salvia pratensis* and basil thyme *Clinopodium acinos* translocation (as above) will be implemented to safeguard these species, involving the relocation of any plants recorded within impacted areas of the Ardley Cutting and Quarry SSSI to a suitable location within the receptor site with appropriate soil conditions. Full details of the translocation methodology will be provided within a dedicated method statement above.
Seeding (if required)	NW-CG-2 NW-CG-3	Year 0 – Spring/Autumn	Seed Species-Rich Calcareous Grassland seed mix onto low-fertility, weed-free ground in either early autumn (preferred) or spring, following shallow cultivation to create a firm, fine seedbed with plenty of bare soil. Broadcast the seed evenly at around 4 g/m² (40 kg/ha), ideally in two passes for good coverage, and do not bury the seed—most species require light to germinate. After sowing, roll firmly to ensure good seed–soil contact. Do not apply fertiliser or organic manures, and avoid sowing into lush or nutrient-rich soils, as this will favour grasses over wildflowers and reduce establishment success.

[3] https://meadows.plantlife.org.uk/making-meadows/sowing-seed/green-hay-how-to-cut-collect-and-spread/#:~:text=Spreading%20Green%20Hay&text=Generally%2C%20green%20hay%20will%20land,to%20trample%20in%20the%20seeds.

Establishment management	NW-CG-2 NW-CG-3	Year 1	Maintain short grass during the first year and dispose of all clippings to encourage perennial plants to establish and avoid a flush of pernicious weed species. Mow or trim the grass monthly during the growing season to manage weed and grass growth while promoting the spread of perennial species. Avoid applying any fertiliser at any stage.
Long-term Management	NW-CG-2 NW-CG-3	Year 2+	Annual grass cuts in late August/early September to allow a range of wildflowers to set seed. Leave the 'hay' to dry and shed seed for 1-7 days, then remove from site. Mow the regrowth through to late autumn/winter to circa 50mm and again in spring if needed. Cut or hand-pull pernicious and/or invasive weeds before they seed in late summer. As a last resort option, use glyphosate spray to spot-treat affected areas only.
Protected species and Wildlife considerations	NW-CG-2 NW-CG-3	Project duration	To minimise risks to ground-nesting birds, mowing will begin by cutting field margins first (c.20m). Mowing will then cut the field's centre line before working outwards in a circular fashion towards the already cut margins. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided and mowing will not be undertaken within the area until after chicks have fledged. Do not cut or graze grassland between early April and the end of May to enable successful Skylark nests. Leave at least one margin in each field (minimum 12 metres in width) to be cut at the end of the season (September/early October). This can serve as a shelter for ground-nesting species to escape during mowing. This can also help maintain species that flower later, alternating the margin each year.
Supplementary Seeding (if required)	NW-CG-2 NW-CG-3	Year 5+	Spread supplementary native green hay can be introduced as necessary in response to poor establishment uptake by broadcasting seeds. Alternatively, consider plug-planting if only certain desired species have failed to establish, but the sward is otherwise in good condition.

Lowland Calcareous Grassland Species Lists (GH-T03)

The species provided below are based on the Emorsgate EM6 – Chalk and Limestone seed mix; exact seed mixes are still to be confirmed.

Common Name	Scientific Name	Abundance / %	Comments
Wildflowers – 20%			
Yarrow	*Achillea millefolium*	0.80%	
Kidney Vetch	*Anthyllis vulneraria*	0.40%	
Common Knapweed	*Centaurea nigra*	2.00%	
Greater Knapweed	*Centaurea scabiosa*	1.00%	
Wild Carrot	*Daucus carota*	1.00%	
Dropwort	*Filipendula vulgaris*	0.10%	
Hedge Bedstraw	*Galium album*	1.00%	
Lady's Bedstraw	*Galium verum*	1.0%	
Horseshoe Vetch	*Hippocrepis comosa*	0.10%	
Field Scabious	*Knautia arvensis*	0.60%	
Oxeye Daisy	*Leucanthemum vulgare*	1.20%	
Musk Mallow	*Malva moschata*	1.40%	
Black Medick	*Medicago lupulina*	0.40%	
Wild Marjoram	*Origanum vulgare*	0.20%	
Ribwort Plantain	*Plantago lanceolata*	1.20%	
Salad burnet	*Poterium sanguisorba (Sanguisorba minor)*	2.00%	
Cowslip	*Primula veris*	1.10%	
Selfheal	*Prunella vulgaris*	2.00%	
Meadow Buttercup	*Ranunculus acris*	1.10%	
Yellow Rattle	*Rhinanthus minor*	0.40%	
Bladder Campion	*Silene vulgaris*	1.00%	
Grasses – 80%			
Common Bent	*Agrostis capillaris*	6.40%	
Sweet Vernal-grass	*Anthoxanthum odoratum*	0.80%	
Quaking Grass	*Briza media*	1.20%	
Upright Brome	*Bromopsis erecta*	8.00%	
Crested Dogstail	*Cynosurus cristatus*	38.00%	
Sheep's Fescue	*Festuca ovina*	8.00%	
Red Fescue	*Festuca rubra*	9.60%	
Smaller Cat's-tail	*Phleum bertolonii*	8.00%	

Other Supporting Information

Supporting Information (GH-B02)

Note: The exact species mix and composition have yet to be confirmed and will depend on the availability of a suitable donor site for green hay. The species list above is indicative of those considered appropriate for inclusion in the Emorsgate EM6 Meadow Mixture for Chalk and Limestone Soils seed mix and those typically found in calcareous grassland. Seed mixes should be suitable for Chalky/Limestone soils.

What Does Success Look Like? (GH-F01)



Source: https://www.wildoxfordshire.org.uk/guidance/types-of-grasslands-in-oxfordshire



Source: Emorsgate Seeds https://wildseed.co.uk/product/mixtures/complete-mixtures/meadow-mixtures-for-specific-soils/meadow-mixture-for-chalk-and-limestone-soils/

Lowland Meadow

Creation, Enhancement and Management Summary (GH-T01)

Target Habitat				Lowland Meadow	
Condition Assessment Criteria		**Targeted**	**Relevant Parcels**	**Creation Approach**	**Management Approach**
*	***UKHab Classification Description*** *A neutral grassland that meets at least two of these three criteria:* *4. >15 species per m^2 (including grasses and excluding bryophyte);* *5. >30% cover of broadleaved herbs and sedges (excluding white clover Trifolium repens, creeping buttercup Ranunculus repens and injurious weeds);* 6. *<10% cover of rye-grasses and white clover Trifolium repens.* *AND EITHER ≥ 4 of the indicator species (listed in UKHab Category Definitions) at least 'present' on DAFOR scale.* *OR ≥3 of these indicators at least 'occasional' on DAFOR scale (but not limited to field corners or edges).*	Yes	NW-LM-1	The grassland is to be created using a proprietary species-rich native Lowland Meadow mix with an appropriate species composition to meet this description. This mix will contain at least 15 species, including lowland meadow indicator species. Soil nutrient investigations have confirmed soil nutrient levels are appropriate to facilitate the establishment of lowland meadows without the need for intervention to reduce these further.	Following successful establishment, management will include annual hay-cut mowing with all arisings removed.
A	The parcel represents a good example of its habitat type, with a consistently high proportion of characteristic indicator species present relevant to the specific habitat type. **Note – this criterion is essential for achieving Moderate or Good condition for non-acid grassland types only.**	Yes	NW-LM-1	To achieve this criterion, the grassland will target all three UKHab Description criteria for lowland meadows and establish at least 4 indicator species, to be achieved by seeding using a suitable seed mix.	Following successful creation/enhancement, ongoing management of lowland meadow will include hay-cut mowing. This will include an annual grass cut in late August/early September. The approach aims to maintain a diverse sward characteristic of good-quality meadow grasslands.
B	Sward height is varied (at least 20% of the sward is less than 7cm and at least 20 per cent is more than 7cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Yes	NW-LM-1	Suitable seed mix will introduce a range of grass and herbaceous species, promoting the establishment of a diverse sward.	A diverse sward will help maintain a varied sward height along with varied cutting to mimic natural disturbances. Regular mowing will help maintain a varied sward.

C	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	No	NW-LM-1	N/A	While not specifically targeted, rabbit grazing/burrowing activity or other such faunal disturbance my create areas of bar ground. Public access will be limited to prevent excessive human disturbance.
D	Cover of bracken *Pteridium aquilinum* less than 20% and cover of scrub (including bramble) less than 5%.	Yes	NW-LM-1	The field does not currently include bracken or excessive scrub, and the introduction of green hay and/or seed will not introduce these species.	Regular mowing will prevent scrub and bracken from establishing. Regular monitoring will track where scrub or bracken encroachment has occurred and trigger remedial action where necessary.
E	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging activities) accounts for less than 5% of total area. If any invasive non-native species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed.	No	NW-LM-1	While not specifically targeted, the seed mix will not include significant seed stock of any species listed by the Statutory Metric Condition Assessment criteria as 'species indicative of sub-optimal condition.'	While not specifically targeted, regular monitoring will track the presence of invasive non-native species across all habitats and trigger remedial action to remove or reduce them. If pernicious weeds begin to dominate and affect the definition of grasslands as a 'good example' of Lowland Meadow, appropriate remedial measures will be undertaken to reduce the number of species indicative of sub-optimal conditions.
F	There are 10 or more vascular plant species per m^2 present, including forbs that are characteristic of the habitat type. **Note – this criterion is essential for achieving Good condition for non-acid grassland types only.**	Yes	NW-LM-1	The grassland will target a minimum of 10 species per m^2.	Timings of the annual hay-cut will be alternated to allow a diverse range of wildflowers to set seed. A late August/early September hay-cut will be undertaken. Species diversity will be continuously monitored and, where below 10 species per m^2, remedial measures will be introduced. These could include supplementary seed or adjusted the timings of hay-cuts. Further details on potential remedial measures are provided later in this document.

Additional Management Prescriptions (GH-B01a)

Using Local Green Hay

Green hay is preferable for lowland meadow creation due to its high proportion of viable seed, local provenance and associated propagules (beyond the seed), but logistical, temporal, and site constraints mean its use is not always practicable. Where possible use locally sourced green hay from a donor site (within 10 miles of the site) that contains a mix of wildflower species characteristic of neutral soils, as well as yellow rattle, *Rhinanthus minor*. The donor site should be within an hour's drive from the site, so green hay can be transported to and spread on the land in one day. Donor site must have similar characteristics, including soil type, soil pH and hydrology, to the new grassland. 1 hectare (ha) is sufficient to spread over 3 ha.

Using Commercial Seed Mix

Where sufficient donor sites are available, commercial seed mixes can be beneficial as they are readily available and do not have the same seasonal and logistical constraints as green hay. Species content and proportions can also be specified, allowing for better targeting of habitat type and species compositions. Seed mixes are also more practical for large sires, and when seed quality and germination rates are tested, they reduce the uncertainty during establishment.

Ground Nesting Birds

To minimise risks to ground nesting birds, the annual hay cut will be undertaken sensitively in accordance with advice provided to FPCR by the RSPB grassland restoration specialists. This will include delaying to at least August where possible and by beginning the cut by mowing the field margins first, where ground-nesting birds are unlikely to nest, as they favour field interiors with better sight lines. Mowing will then

cut the centre of the field before working outwards to the already cut margins. This will allow any birds and chicks present in the field ample opportunity to escape to cover. Where the mower operator observes any active nests (or signs of), the area around the nest (10-30m buffer) will be avoided, and mowing will not be undertaken within the area until after chicks have fledged.

Leave uncut margins and strips of vegetation alongside hedgerows and field edges on a rotational basis to support invertebrates and mammals. Rotate these uncut margins each year.

Habitat Creation and Management – Risk Register and Remedial Measures PM-T02

Habitat Type	Risk Factor	Trigger for Action	Remedial Measure
All Habitats	Invasive Non-Native Species (INNS) Introduction or Establishment	The presence and establishment of any INNS onsite (other than signal crayfish – see below)	Initiate a program of targeted removal. Engage with an appropriately experienced specialist to provide an eradication strategy.
Lowland Meadow, Lowland Calcareous Grassland	Poor species diversity establishment	Where species establishment is not in line with target habitat type when surveyed against UKHab Category Description	Initiate a second round of seeding following the prescriptions provided for the grassland field compartment(s) which are falling short of this target.
Lowland Meadow, Lowland Calcareous Grassland	Failed areas of seeding	Greater than 5% bare ground during years 2-5	In areas of failed establishment, apply additional seeds or, where possible, local green hay from a suitable source during the next appropriate season.
Lowland Meadow, Lowland Calcareous Grassland	Poor sward height diversity	Where <20% of the sward is <7cm and <20% of the sward is >7cm.	This will likely be a result of poor species mix establishment. Consider second round of seeding. Monitoring surveys must not be undertaken within 1 month before or after hay-cut as this will skew data.
Lowland Meadow, Lowland Calcareous Grassland	Vigorous grass growth limiting species diversity.	Sward 'collapsing' due to lushness before cutting or palatable/productive grasses are identified as dominating the sward (over 50%):	Remove early spring grass regrowth by either taking an additional cut in March/April (if ground conditions allow). If further monitoring shows continued vigorous grass growth, introduce yellow rattle seed: 1) After the grass cut chain, harrow the grassland three times in immediate succession, each time in a different direction. 2) Broadcast yellow rattle seed at a rate of 2.5kg/ha, then roll immediately with a flat roller. 3) If there is sufficient grass growth following sowing, remove arisings by taking another cut before the end of the year.
Lowland Meadow, Lowland Calcareous Grassland	Scrub or bracken encroachment	Scrub and or bracken cover greater than 5% or 20%, respectively.	Initiate a programme of scrub and/or bracken removal as required. This can either be through mechanical removal or spot spraying with herbicide.
Lowland Meadow, Lowland Calcareous Grassland	Establishment of species indicative of sub-optimal condition	Where species indicative of sub-optimal comprise >5% of sward	Initiate a programme of spot-spraying species indicative of sub-optimal conditions using glyphosate herbicide.

4. Monitoring Schedule

Monitoring Strategy

Provide details of the monitoring strategy to encourage successful implementation of the management plan (MS-B01)
The Site will be monitored at various degrees, from initial establishment to long-term management. Initially, during years 1 to 5, an ecologist will conduct annual site monitoring to assess progress in habitat creation and enhancement. The main observations during this period will focus on determining whether habitats have been successfully established and improved, and whether replacement planting or reseeding may be necessary. Beginning in Year 5, all habitats will be monitored every five years. The primary objective of this monitoring is to assess whether the long-term management practices are advancing the habitats towards their intended conditions and habitat types. Once achieved, the habitats will be monitored to ensure they are maintained for 80 years. During this period, adaptive management strategies will be employed to modify management approaches as conditions evolve and issues arise, ensuring that conditions are met and maintained. Update reports will be sent to Oxfordshire County Council (OCC) during Years 1 to 4 to confirm the progress of the initial habitat establishment. From Year 5, a formal monitoring review will be conducted every five years upon completion of the establishment phase. A full UKHab and Condition Assessment Survey will then be conducted across the Site in Years 5, 10, 15, 20, 25, and thereafter every five years to Year 80, with monitoring reports issued to OCC accordingly. The client is responsible for appointing a suitably qualified ecologist to conduct the survey and ensure that monitoring reports are completed and issued to OCC for review at the agreed-upon intervals in the monitoring schedule below.

Monitoring Methods and Intervals MS-T01

Habitat Type	Monitoring Methods	Monitoring Interval and Timing
Lowland Meadow, Lowland Calcareous Grassland	During the grassland's establishment phase (years 1 to 5), monitoring will focus on determining the DAFOR abundances of plants present throughout the sward and whether a sufficient number of species within the seed mixes used have been established. It will also be important to monitor the percentage coverage of palatable grasses. Quadrat sampling will be undertaken to identify the habitat type that is established and then a number of species per m^2 and collect a botanical species list across grassland to check against the target species list. As well as the above, the following should be monitored: • Grassland swards must be assessed against corresponding UKHab Category Description to determine if the desired sward type is establishing • Estimate the percentage of bare ground, bramble and bracken cover. • Presence of non-native invasive species • Presence of positive or negative indicator species • Sward height diversity	Annually from years 1-5, then every 5 years. Grassland monitoring will be undertaken between May to August. Surveys should not be undertaken within 1 month following a hay cut.

Monitoring Reports

Monitoring Report Schedule MS-T02

Organisation Responsible for Submitting the Monitoring Reports	Organisation Receiving and Responsible for Reviewing Reports
Oxfordshire County Council	TBC

Project Year	Month Report to be Submitted	Month Management Plan to be reviewed	Comments
Y1	October TBC	December TBC	Report on habitat and creation measures.
Y2	October TBC	December TBC	Report on habitat and creation measures.
Y3	October TBC	December TBC	Report an update on habitat establishment progress.
Y4	October TBC	December TBC	Report an update on habitat establishment progress.
Y5	October TBC	December TBC	Report an update on habitat establishment. Depending on the progress of habitats – review management techniques and the need for yearly surveys.
Y10	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y15	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y20	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y25	October TBC	December TBC	Monitor progress – adapt management techniques where required
Y30 etc. to Year 80	October TBC	December TBC	Monitor progress – adapt management techniques where required

Adaptive Management

Summary of Adaptive Management Approaches (MS-B02)
Adaptive management is a systematic approach to natural resource management that involves monitoring and evaluating the effectiveness of management actions and adjusting as necessary to improve outcomes over time. It is an iterative process in which management actions are followed by targeted monitoring. Regular robust monitoring, and reporting to the responsible authority, should identify issues early. Then the landowner will make conscious decisions to implement effective actions in consultation with the ecologist responsible for completing monitoring where required. By continuously monitoring of the project, essential changes in management will be identified and implemented to continue progressing towards targets. Any changes will be updated in the monitoring reporting and any future updates to this management plan. Any major changes which will impact outcomes, such as the success of the project or the habitat type and condition being targeted will be discussed with the appropriate authority and agreed on. **To ensure its effectiveness, this management plan will undergo regular updates and reviews every five years. The monitoring reports will provide feedback on the implementation of the plan, and any necessary changes will be made accordingly. Additionally, the plan will identify and address any previously unknown risks that may arise.** **It is important to note that any significant changes to management prescriptions that could alter the expected outcomes will be discussed and agreed upon with the relevant authority before implementation.**

SOIL INVESTIGATION

LAND WEST OF ARDLEY

Report 2730/2

24th March 2026

Land Research ASSOCIATES
www.lra.co.uk

SOIL INVESTIGATION

LAND WEST OF ARDLEY

[redacted]

Report 2730/2

Land Research Associates Ltd
Tapton Park Innovation Centre
Brimington Road
Chesterfield
S41 0TZ

24th March 2026

1.0 Introduction

1.1 This report details an investigation of soil conditions of approximately 26 ha of land west of Ardley, Oxfordshire. The report is based on a survey of the land in February 2026 and assesses the suitability of the land for habitat creation.

SITE ENVIRONMENT

1.2 The survey area (Site) forms a gentle valley, with a stream/ditch dividing the Site east to west. The Site comprises two arable fields and a small area of wet grassland on the valley floor. The Site is bordered to the north by Somerton Road, to the south by Heyford Airfield, to the east by a railway line, and to the west by adjoining agricultural land and woodland.

PUBLISHED INFORMATION

1.3 British Geological Survey 1:50,000 scale information records the underlying geology of the most of the land as White Limestone Formation. The lower ground of the valley floor is recorded as Rutland Mudstone, partially covered by river alluvium.

1.4 The National Soil Map (published at 1:250,000 scale) records the land as Aberford Association: mainly calcareous shallow well drained loamy soils over Jurassic limestone, with some deeper soils in outcrops of clay reported in the Oxfordshire area[1].



Photo 1: Aerial image with darker colours showing areas of deeper soils

[1] Jarvis., *et al*., (1984). Soils and their Use in South East England, Soil Survey of England and Wales Bulletin No. 15, Harpenden.

2.0 Soil types

2.1 A detailed soil resource survey was carried out in February 2026. The soils were investigated at regular intervals, with an average density of approximately 1 observation per hectare. The location of observation points is shown by Map 1 in an appendix to the report, and full survey logs are also appended.

2.2 Five representative topsoil (0-15 cm) samples were collected from the field. Samples were submitted to an UKAS accredited laboratory for nutrient analysis. The location of samples is shown by Map 1.

CALCAREOUS SOILS OVER LIMESTONE BEDROCK

2.3 These soils are dominant on higher ground in the south-west and north-east (see Map 2). They comprise calcareous clay loam topsoil, either directly over hard fractured limestone bedrock or with a thin very stony/brashy subsoil. The topsoils are slightly to moderately stony, containing hard limestone fragments. The shallowest soils correspond to areas with the highest stone content. These soils are freely drained (Soil Wetness Class I).

2.4 In the north-west the limestone is interbedded with mudstone. The soils in this area are also strongly calcareous but deeper and with evidence of seasonal waterlogging, caused by water perching over the mudstone layers.



Photo 2: Shallow soil (observation 16)



Photo 3: Deep calcareous groundwater-affected soil (observation 6)

DEEP CLAY SOILS

2.5 The soils in the central valley are stoneless clays formed in mudstone or clayey alluvium derived from mudstone. They mainly comprise decalcified clay loam topsoil and upper subsoil, over a strongly calcareous weakly structured clay lower layer. These soil show evidence of seasonal waterlogging and the lowest ground adjoining the ditch is rush-infested.



Photo 4: Slowly permeable clay soil (Observation point 3)

Photo 5: Clay soil with grey slowly permeable lower subsoil (Observation point 9)

3.0 Soil analysis

3.1 The land has neutral to calcareous soils with moderately low topsoil organic matter (loss on ignition). Phosphate availability is unusually low for land in arable use, which may be partly due to the effects of calcium carbonate in 'fixing' phosphorous in unavailable forms.

Table 3.1: Summary of laboratory analysis.

Sample ID*	pH	Loss on ignition %	P	K	Mg
			MAFF indices		
A	8.1	5.3	0	2-	1
B	7.9	5.3	0	2-	2
C	7.6	7.1	0	1	2
D	8.1	5.3	0	2-	2
E	8.1	5.2	0	2-	1

See Map 1 for sample areas

3.2 Full laboratory testing certificates are in an appendix to the report.

4.0 Habitat creation potential

SPECIES-RICH GRASSLAND

4.1. The land has two soil types:

- The shallow soils over limestone are well suited to the creation of calcareous grassland. Topsoil phosphate availability was low at the time of survey and if the and is not subject to future fertiliser additions, the establishment of species-rich grassland habitat would be relatively straightforward. The deeper calcareous soils in the north-west (see Map 2) are likely to experience some waterlogging during the growing season, which means they trend towards a neutral moist grassland community.
- The clay soil in the central valley are not strongly calcareous and do not have limestone or very calcareous layers within grass rooting depth. They are best suited to the creation of moist neutral or marshy grassland.

Grassland management systems

4.2. Provided fertility levels are not increased by fertiliser additions, the soils are well suited to the establishment of species-rich grassland. Reseeding with appropriate seed mixes followed by the introduction of a meadow management system (annual hay cutting with limited post-cut grazing) are likely to be effective.

APPENDIX

OBSERVATIONS & MAPS

LABORATORY TESTING

Ardley: Soil resources survey – Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil		
No	Depth (cm)	Texture	Stone %	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling
1	0-30	CL ca	15	30-40	vst CL ca	o	40+	LST	
2	0-27	CL vslca	10	27-47	slst CL vslca	o	47-100+	C ca	xxx
3	0-28	CL	0	28-50	CL	xxx	50-100+	C ca	xxx
4	0-26	CL ca	<5	26-40	slst SCL ca	xx	40-100+	C ca	xxx
5	0-24	CL ca	10	24-54	mst CL ca	o	54+	LST	
6	0-30	CL ca	10	30-42	CL ca	xx	42-76 76-100+	CL ca (wet) CL ca	xxx xxx
7	0-32	CL ca	10	32-40	brashy CL ca	o	40+	LST	
8	0-33	CL	<5	33-67	CL	xxx	67-100+	C ca	xxx
9	0-27	CL	5	27-46	brashy CL ca	o	46+	LST	
10	0-25	CL slca	5	25-39	vslst CL slca	o	39+	LST	
11	0-30	CL	0	30-55	CL	o	55-66 66-100+	CL CL ca	xx xxx
12	0-28	CL ca	20	28-46	vst CL ca	o	46+	Saturated (drain?)	
13	0-30	CL slca	10	30-45	brashy CL ca	o	45+	LST	
14	0-27	CL ca	10	27-36	brashy CL ca	o	36+	LST	
15	0-26	CL ca	5-10	26-40	slst CL ca	o	40+	LST	
16	0-24	CL ca	5-10	24-45	mst CL ca	o	45+	LST	
17	0-28	CL	0	28-50	C	xxx	50-70+	C ca	xxx
18	0-25	CL ca	10	25-44	C ca	xxx	44-75	CL ca	xxx

Key to table

Mottle intensity:

o unmottled
x few to common rusty root mottles (topsoils)
or a few ochreous mottles (subsoils)
xx common to many ochreous mottles and/or dull structure faces
xxx common to many greyish or pale mottles (gleyed horizon)
xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

Texture:

C - clay
ZC - silty clay
SC - sandy clay
CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SCL - sandy clay loam
SZL - sandy silt loam (F-fine, M-medium, C-coarse)
SL - sandy loam (F-fine, M-medium, C-coarse
LS - loamy sand (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
P - peat (H-humified, SF-semi-fibrous, F-fibrous)
LP - loamy peat; PL - peaty loam

Texture suffixes & prefixes:

ca – calcareous: x-extremely, v-very, sl-slightly vsl – very slightly
(ca) – marginally calcareous
fmn – ferri-manganiferous concentrations
r – reddish;
vslst, slst, mst, vst, xst – (very slightly, slightly, moderately, very, extremely stony) stony;

SST – sandstone MST – mudstone; LST- limestone
dist - disturbed soil layer;

a depth underlined (e.g. <u>50</u>) indicates the top of a slowly permeable layer
(a wavy underline indicates the top of a layer borderline to slowly permeable)



Key

- Pits
- Observations
- Topsoil sample areas
- Site boundary

Location:

Land west of Ardley

Map:

Map 1
Observations and sampling

Date: 20/03/2026

Scale: 1 : 5,000 at A4

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Key

- Deep clay soils
- Soils over limestone
- Site boundary

Location:

Land west of Ardley

Map:

Map 2
Soil types

Date: 15/03/2026

Scale: 1 : 5,000 at A4

Land Research Associates
Tapton Park Innovation Centre
Brimington Road
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ANALYSIS REPORT

Contact : [redacted]

Please quote the above code for all enquiries

Client : ARDLEY II

Sample Matrix : Agricultural Soil

Laboratory Reference

Card Number 65125/26

Date Received 03-Mar-26

Date Reported 12-Mar-26

SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
352338/26	1	**ARDLEY II A** *No cropping details given*	**8.1**	**0**	**2-**	**1**	**9.2**	**131**	**47**
352339/26	2	**ARDLEY II B** *No cropping details given*	**7.9**	**0**	**2-**	**2**	**8.0**	**130**	**51**
352340/26	3	**ARDLEY II C** *No cropping details given*	**7.6**	**0**	**1**	**2**	**7.2**	**112**	**61**
352341/26	4	**ARDLEY II D** *No cropping details given*	**8.1**	**0**	**2-**	**2**	**6.8**	**139**	**51**
352342/26	5	**ARDLEY II E** *No cropping details given*	**8.1**	**0**	**2-**	**1**	**8.4**	**158**	**46**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released by .....[redacted]..... On behalf of NRM Date 12/03/26

PAAG

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ANALYSIS REPORT

DATE **12th March 2026**

SAMPLES FROM **ARDLEY II**

Report Reference: 65125/26

[redacted]
LAND RESEARCH ASSOCIATES
TAPTON PARK INNOVATION CENTRE
BRIMINGTON ROAD
CHESTERFIELD S41 0TZ
[redacted]

Lab Ref.	Field Details		Soil Organic Matter [LOI%] Result
	No.	Field Name or Reference	
352338	1	ARDLEY II A	5.3
352339	2	ARDLEY II B	5.3
352340	3	ARDLEY II C	7.1
352341	4	ARDLEY II D	5.3
352342	5	ARDLEY II E	5.2

Your Organic Matter Results Interpretation

Land use	Rainfall	Soil type	Very Low	Low	Target	High
Arable	Low <650mm	Light	<=1.0	1.1-2.1	2.2-3.2	>=3.3
		Medium	<=1.7	1.8-3.3	3.4-5.0	>=5.1
		Heavy	<=2.2	2.3-4.4	4.5-6.5	>=6.6
	Moderate 650-800mm	Light	<=1.0	1.1-3.0	3.1-4.5	>=4.6
		Medium	<=1.9	2.0-4.0	4.1-6.0	>=6.1
		Heavy	<= 2.7	2.8-5.2	5.3-7.6	>=7.7
	High 800-1100mm	Light	<=1.3	1.4-3.7	3.8-6.1	>=6.2
		Medium	<=2.5	2.6-5.0	5.1-7.5	>=7.6
		Heavy	<=3.6	3.7-6.2	6.3-8.8	>=8.9
Grassland (Lowland)	All	Light	<=2.1	2.2-4.9	5.0-7.9	8.0-14.9
		Medium	<=3.4	3.5-6.4	6.5-9.3	9.3-19.9
		Heavy	<=4.6	4.7-7.6	7.7-10.5	10.6-19.9

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