

Didcot Garden Town HIF 1

Biodiversity Net Gain Assessment

Oxfordshire County Council

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Quality information

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1. Introduction

AECOM Ltd was commissioned by Oxfordshire City Council (OCC) to undertake a Biodiversity Net Gain ('BNG') assessment to support a planning application for the development of the Didcot Garden Town HIF1 in Oxfordshire (hereafter referred to as the 'Proposed Development').

The BNG assessment has been undertaken to quantify the overall effect on biodiversity and to inform the requirement for habitat creation and enhancement using Biodiversity Metric 3.1¹ in accordance with the accompanying guidance² and best practice principles³. The report sets out the results of the BNG assessment. The methodology for the assessment is outlined in Section 2, the results in Section 3 and the conclusions are provided in Section 4.

This report supersedes the BNG Assessment submitted to OCC in September 2021 and responds to alterations to the layout of the Proposed Development following a Regulation 25 request from OCC under the Environmental Impact Assessment Regulations 2020⁴.

1.1 Site Description

The Site⁵ is located within the county of Oxfordshire and is approximately 155 ha in extent. The central Ordnance Survey (OS) grid reference for the Site is SU 521 923. The topography of the Site is broadly flat due to its location within the Thames valley, with the landscape rising gently across the north, and rising towards the North Wessex Downs in the east and south of the Site.

Within the Site there are localised manmade alterations to the landform, including areas of landfill, earthworks, bunds and embankments related to existing infrastructure and flood defences, and water bodies formed from disused gravel pits. This gives much of the Site between Didcot and Culham, a somewhat engineered and less natural character.

The principal watercourse running through the Site is the River Thames, which flows through the north of the Site and separates Culham and Clifton Hampden to the north of the river, from Sutton Courtenay, Appleford and Long Wittenham to the south of the river. Moor Ditch, a Water Framework Directive (WFD) water body and tributary of the River Thames, is crossed in the Didcot Science Bridge area.

The Site is characterised by several man-made water bodies formed by disused gravel pits or other industrial land uses, most notably the Hanson Restoration Area and water bodies at the Appleford Siding.

Trees and hedgerows within the Site and near to the Site boundary are generally found alongside roads, footpaths, settlement boundaries, railways and field boundaries, and as such the landscape has the perception of being well-vegetated, despite the broad areas of open agricultural and mining/ industrial land uses.

The landscape south of the River Thames through which the Site passes has a fragmented and somewhat industrialised character relating to land use including the former Didcot A Power Station, Milton Park industrial and commercial estate, Didcot Industrial Estate, working and former landfill sites, and gravel extraction areas and pits.

The landscape north of the River Thames has a more rural pattern of fields, hedgerows and treelines, but with the Culham Science Centre a notable area of development on the north side of the A415.

The Site passes several settlements which from south to north, these are:

- The town of Didcot, which the Site passes around its north-west boundary through the former Didcot A Power Station site;
- The Site passes close to the village of Appleford; and

¹ Natural England's Biodiversity Metric 3.1 <http://publications.naturalengland.org.uk/publication/6049804846366720>

² Natural England (2021). The Biodiversity Metric 3.1 – User Guide & Technical Supplement

³ Biodiversity Net Gain: Good Practice Principles for Development, A Practical Guide (2019)

⁴ The 2020 EIA Regulations - GOV.UK (www.gov.uk)

⁵ Please refer to Site Location Plan drawing GEN_PD_ACM_HGN_DGT_ZZ_ZZ_ZZDR T 0040 P02

- The village of Clifton Hampden, which the Site passes to the north, between the village and CSC.

Several roads, rail and public rights of way pass through The Site.

1.2 The Proposed Development

The Proposed Development consists of four separate but interdependent highway elements, namely: i) the A4130 Widening; ii) Didcot Science Bridge; iii) Didcot to Culham River Crossing; and iv) Clifton Hampden Bypass. A brief overview of each section of the Proposed Development is presented below. The full description can be found in Chapter 2 of the Environmental Statement. In addition to the highway elements as described below, the Proposed Development includes landscape and ecological mitigation and enhancement measures.

Brief descriptions of each element of the Proposed Development are provided below:

- **A4130 Widening:** The proposal includes providing a dual carriageway from a point 320 m east of Milton Interchange, eastwards for approximately 1.6 km to the proposed Didcot Science Bridge roundabout. A four-arm roundabout about 200 m to the east of the existing Milton Gate junction is proposed to provide access to a new business park and Local Plan housing allocation to the south of the existing A4130. Also, before the proposed Didcot Science Bridge roundabout, a new three-arm roundabout will provide a link to the section of the current A4130 that is to be retained as single carriageway. A new single carriageway is proposed to link these two roundabouts. This section of the Proposed Development will include culverting of Meadow Brook, Stert Brook and Cow Brook.
- **Didcot Science Bridge:** This section of the Proposed Development is in two parts. The proposed road bridge is approximately 700 m in length. It will connect the Valley Park residential development, which would be located to the south of the A4130 and existing Great Western mainline, to the former Didcot A Power Station redevelopment site to the north of the railway line and the A4130. The second part is a single carriageway, on the western side of Purchas Road/ A4130 roundabout, north-east of the Didcot A redevelopment, which will be approximately 300 m in length. Pedestrian and cycle facilities would be provided. This section of the Proposed Development will include works to the culvert at Moor Ditch, including the replacement of an existing culvert with a shorter improved culvert.
- **Didcot to Culham River Crossing:** The proposed River Thames crossing would run approximately parallel to the western side of the existing Didcot to Culham railway line. Only a small proportion of the new road would be built above the river. The new road would be approximately 5 km in length and include the construction of two new roundabouts; construction of a viaduct and two bridges; enlargement of an existing roundabout; and the creation of a new pedestrian/cycle route. The River Thames will be crossed by viaduct, with viaduct foundations within 10 m of the river bank.
- **Clifton Hampden Bypass:** This section proposes to provide a new single carriageway link between the B4015 Oxford Road and the A415 which also provides access/egress to Culham Science Centre. This link is section 1 of a 2 phased bypass of Clifton Hampden which will provide a north-south route between the A4130 on the northern perimeter of Didcot, via the Didcot to Culham River Crossing, to the B4015 north of Clifton Hampden. The new road would be approximately 1.8 km long. It includes construction of two new roundabouts at the A415 Culham Science Centre entrance, and the junction of the new road with the existing B4015 and the provision of pedestrian and cycle facility. This section of the Proposed Development will include culverting of dry and ephemeral drainage ditches only.

1.3 Planning Policy context

1.3.1 National Legislation

It is government policy that planning decisions should minimise impacts on and provide net gain for biodiversity (National Planning Policy Framework 2021)⁶. In addition, the Environment Act 2021⁷ includes provisions to make biodiversity net gain (BNG) a mandatory requirement within the planning system in England requiring all relevant developments⁸ to achieve a minimum 10% net gain in biodiversity units relative to the Proposed Developments

⁶ National Planning Policy Framework - Guidance - GOV.UK (www.gov.uk)

⁷ Environment Act 2021 (legislation.gov.uk)

⁸ In this instance those planning applications under the Town and Country Planning Act

baseline biodiversity value, it is anticipated the secondary legislation mandating the need for 10% net gain will be in place by November 2023.

1.3.2 Local Planning Policy

The site is located within the administrative boundaries of the Vale of White Horse DC, South Oxfordshire DC, and Oxfordshire DC. Relevant policies are presented within the accompanying Planning Statement.

The Oxfordshire Plan 2050 – Securing Natures benefits⁹ states that all Local Plans within Oxfordshire contain policies that seek *‘To avoid a net loss in biodiversity and, where possible, achieve net gain, policies that seek developer contributions where these gains cannot be provided as part of the development’*.

1.3.3 Minimum BNG Requirement

At a minimum, the Proposed Development will be seeking to achieve a 10% net gain in biodiversity to align with both the National Legislation and Local Planning Policy as set out above.

2. Methodology

2.1 Biodiversity Metric 3.1

The BNG assessment involves making a comparison between the biodiversity value of habitats present within the Site prior to development (i.e., the ‘baseline’) and the predicted biodiversity value of habitats following the completion of the development (i.e., ‘post-development’). The comparison is made in terms of ‘biodiversity units’, with a ‘biodiversity metric’ providing the mechanism to allow biodiversity values to be calculated and compared.

Biodiversity Metric 3.11 calculates the overall loss or gain of biodiversity of development projects by assessing the distinctiveness (i.e., type of habitat and its value), condition, extent, and strategic significance of habitats on site pre- and post-development, including both permanent and temporary land-take areas. To achieve biodiversity net gain, the biodiversity unit score must have a post-development score higher than the baseline score.

When calculating the post-development biodiversity units, the metric includes a series of standard ‘risk multipliers’ to account for the inherent risk of creating and restoring habitats, the time taken to establish habitats and the location of the mitigation in relation to the habitats lost on site. The risk multipliers have the effect of reducing the value of the proposed habitats, which means larger areas, habitats of higher distinctiveness, and/or condition are required to mitigate for losses and achieve net gain.

The metric assesses and generates separate outputs for area-based habitats⁹ (measured in habitat units) and linear based habitats, including hedgerows (measured in hedgerow units) and rivers (measured in river units). To claim a net gain in biodiversity, there must be an increase across all habitats, hedgerow and river units, the units cannot be summed to give an overall biodiversity unit value i.e., an increase in habitat and hedgerow units cannot be used to offset a loss in river units.

The information required to undertake the calculation is described below.

2.1.1 Baseline Data Collection and Condition Assessment

Extended Phase 1 habitat surveys were undertaken by AECOM between January and November 2020¹⁰. These surveys covered all accessible areas within approximately a 100 m buffer of the Proposed Development. Habitat data collected during these surveys (hereafter referred to as ‘the baseline’) have been utilised to determine the baseline habitat types used within the assessment. Phase 1 habitat types were converted to UKHab before being digitised in a Geographic Information System to enable the metric calculation. The Baseline Habitat Plan is provided in Appendix A and habitat conversions from Phase 1 to UKHab are provided in Appendix B.

⁹ Topic Paper 6 - Securing Nature's Benefits v2.0 (oxfordshireplan.org)

¹⁰ AECOM 2020. Didcot Garden Town HIF 1: Preliminary Ecological Appraisal

Following the habitat surveys in 2020 a BNG assessment was undertaken in September 2021¹¹ using Natural England's Biodiversity Metric 3.0. This report was initially submitted to inform the planning application. The calculations presented in that report are updated and superseded below.

Whilst surveys during 2020 ensured enough information was collected to inform the condition assessments for the 2021 assessment much of the survey data had already been collected before the official publication of Metric 3.0 and the release of the specific condition assessment methodologies to be used to inform the Metric 3.0 calculation.

Following consultee comments as part of the Regulation 25 request this updated BNG assessment uses Natural England's Biodiversity Metric 3.1. As such, where data was gathered prior to both the Metric 3.0 and 3.1 release, a precautionary approach to assigning habitat condition has been adopted. The approach considers:

- 1) The variation in condition assessment methodologies occurring between consecutive Metric releases, and
- 2) Contemporary and emerging interpretation of the published guidance, including information issued during consultations on biodiversity net gain policy¹² and metric functionality¹³. The condition values and precautionary updates to assigned condition following the release of Metric 3.1 are provided in Table 1. Original condition assessment data can be found in Appendix C of the 2021 Assessment.

Table 1. Baseline Condition Assessment Data

Habitat type	2020 Metric 3.0 Condition Assessment	Metric 3.1 Condition Assessment Updates	Justification of change
Cereal crops	N/A - Agricultural	Condition Assessment N/A	No change
Modified grassland	Poor	Poor	No change
Other neutral grassland	Fairly Poor - Moderate	Poor - Moderate	Revised following the issue of further guidance relating to the use of intermediate condition criteria
Mixed scrub	Moderate	Poor - Moderate	Revised following further assessment of Phase 1 survey data
Ponds (Non- Priority Habitat)	Poor - Moderate	Poor - Moderate	No Change
Ponds (Priority Habitat)	Poor - Moderate	Poor - Moderate	No Change
Ruderal/Ephemeral	Poor	Poor	No Change
Developed land; sealed surface	N/A - Other	N/A - Other	No Change
Actively worked sand pit quarry or open cast mine	Poor	Condition Assessment N/A	Change in metric condition category
Vacant/derelict land/ bareground	Poor	Poor	No Change
Reedbeds	Poor- Good	Poor-Good	No Change
Lowland mixed deciduous woodland	Poor-Moderate	Poor-Moderate	No Change
Other woodland; broadleaved	Fairly Poor	Poor- Moderate	Revised following the issue of further guidance relating to the use of intermediate condition criteria
Other woodland; mixed	Poor	Poor	No Change
Urban Tree	N/A	Moderate	No baseline data reported in 2021
Native hedgerow	Poor-Moderate	Poor – Moderate	No Change
Native hedgerow with trees	Moderate	Moderate-Good	Revised following further assessment of Phase 1 survey data

¹¹ AECOM (2021) Didcot Garden Town HIF1 BNG Assessment

¹² Consultation on Biodiversity Net Gain Regulations and Implementation - Defra - Citizen Space

¹³ Technical consultation on the biodiversity metric - Defra - Citizen Space

Native hedgerow with trees associated with bank or ditch	N/A	Poor	No baseline data reported in 2021
Native Species Rich Hedgerow with trees	Good	Good	No Change

2.1.2 River Habitats

Habitat categories, associated distinctiveness and condition scores are approached differently for rivers. In line with current guidance¹⁴, a desk study was undertaken to identify all river habitats present within the Site using the 'Discovering Priority Habitat in England' river data map¹⁵. Following this, where data was available, river habitats were assigned a habitat category and distinctiveness using a combination of Section 41 (NERC Act, 2006) Priority Habitat descriptions and River Naturalness Assessment class scores.

Where data was not available for river habitats present in the Site, River Naturalness Assessments and River Condition Surveys (Modular River Physical (MoRPh) Survey)¹⁶ were undertaken between August 2021 and November 2021 by accredited surveyors. Surveys aimed to determine the habitat distinctiveness and condition of all stretches of river on site and within the 10 m riparian zone buffer of the Site boundary. Individual watercourses within the Proposed Development red line boundary were identified and measured using opensource data on MAGIC¹⁷. While undertaking the field survey, the average width of the watercourse was determined and used to calculate the individual survey module lengths. Five contiguous modules were then surveyed to provide data for one sub-reach. If the length of one sub-reach was not equal to or greater than 20% of the total length of the watercourse within the red line boundary, further sub-reaches were surveyed until this condition was met. Where this condition could not be met, condition of the watercourse was determined by either applying surveyor judgement considering the sections of the watercourse that could be surveyed, or by employing the low-risk river condition assessment in areas where development would not take place within the 10 m riparian zone.

Post-survey, an additional desk-study was conducted to determine the river type of the watercourse. The reach length, planiform, confinement and sinuosity of the watercourse was determined by assessing MAGIC and Google Earth data to provide the river type. This river type was combined with the indicative condition score (as determined by the MoRPh field surveys) to provide the final river condition.

2.1.3 Post-Development Data

The Outline Landscape Plan¹⁸ has been used to determine the extent and type of habitats to be retained and created post-development. Habitats in the Outline Landscape Plan were converted to UK Habitat Classification categories before being digitised into GIS to produce the Post Development Plan (Appendix D). Target condition scores for the proposed habitats were selected in accordance with Biodiversity Metric 3.1 User Guide and Technical Supplement¹⁹ using professional judgement to ensure the condition scores selected were realistic. The data was utilised to predict the post development biodiversity units.

2.1.4 Strategic Significance

Metric 3.1 requires that the Strategic Significance of all baseline and post-development habitats be defined. Strategic Significance refers to strategic locations for the local biodiversity and nature improvements, identified within local planning policies described in Table 2. As part of this assessment, the following local planning policy documents were reviewed to determine the strategic significance of the habitats on The Site:

¹⁴ Natural England (2020). The Biodiversity Metric 3.1 – User Guide & Technical Supplement .

¹⁵ Discovering Priority Habitats in England. River data - <https://priorityhabitats.org/rivers-data/>

¹⁶ <https://modularriversurvey.org/>

¹⁷ <https://magic.defra.gov.uk/>

¹⁸ AECOM (2022). Didcot HIF1 - Landscape Plan.

¹⁹ Natural England (2021). The Biodiversity Metric 3.1 – User Guide & Technical Supplement

Table 2. Strategic Significance**Table 2. Strategic Significance Local Document****Key priorities**

Biodiversity and Planning in Oxfordshire	Priority habitats/ecological feature mentioned that are relevant to the Site: <ul style="list-style-type: none"> • Conservation Target Areas (CTA) – High strategic significance. • Arable field margins (Mentioned within UK BAP section). • All forms of hedgerow. • Landscape design: Landscaping should aim to retain and enhance existing biodiversity features and link up habitats. For example, native hedgerows and strips of species-rich grasslands provide routes along which species such as hedgehogs, butterflies and bats can move.
Oxfordshire Plan 2050 – Securing Nature's Benefits	Priority habitats/ecological feature mentioned that are relevant to the Site: <ul style="list-style-type: none"> • Further mention of Conservation Target Areas (CTA).
Oxfordshire Biodiversity Action Plan and Cherwell Biodiversity Action Plan	Priority habitats/ecological feature mentioned that are relevant to the Site: <ul style="list-style-type: none"> • Hedgerows – “<i>Hedgerows serve as wildlife corridors, lessening the isolation of species in small pockets of woodland</i>” • Wetland – Strategic significance of rivers, streams, ditches and canals
Natural Conservation Area (NCA) profiled 108 Upper Thames Clay Vales	SEO 1: Along the Thames and its tributaries, promote sustainable farming and best practice mineral working in order to conserve and restore seminatural habitats <ul style="list-style-type: none"> - <i>Conserving, restoring and creating [...] reedbeds, ponds [...] and other semi-natural habitats.</i> Landscape opportunities: <ul style="list-style-type: none"> - <i>'Maintain hedgerows, hedgerow trees and stone walls as strong landscape features which also contribute to the ecological network'</i> - <i>'Conserve small woodlands, particularly ancient woodlands and seminatural woodlands. Explore opportunities to restore woodland within the historic Royal Hunting Forests and consider new woodlands and tree screens as part of development.'</i> – Semi-natural woodlands

Based on data provided by the Thames Valley Environmental Records Centre (TVERC) the Proposed Developments red line boundary falls outside of the published CTA areas for CTA's 29 and 30. The rationale behind the Strategic Significance assigned to each baseline habitat is presented in Table 3.

Table 3. Strategic Significance Rationale

Habitat type	Within Conservation Target Area	Outside Conservation Target Area	Assessment Rationale
Cereal crops	Low	Low	Outside CTA: Low
Modified grassland	High	Low	Outside CTA: Low
Other neutral grassland	High	Low	Outside CTA: Low
Mixed scrub	High	Low	Outside CTA: Low
Ponds (Non- Priority Habitat)	High	Low	Outside CTA: Low
Ponds (Priority Habitat)	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Ruderal/Ephemeral	High	Low	Outside CTA: Low
Developed land; sealed surface	Low	Low	Outside CTA: Low
Actively worked sand pit quarry or open cast mine	High	Low	Outside CTA: Low
Vacant/derelict land/ bareground	Low	Low	Outside CTA: Low
Reedbeds	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Lowland mixed deciduous woodland	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages

Other woodland; broadleaved	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Other woodland; mixed	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Urban Tree	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Native hedgerow	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Native hedgerow with trees	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Native hedgerow with trees associated with bank or ditch	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages
Native Species Rich Hedgerow with trees	High	Medium	Outside CTA: Priority Habitat, Identified in ES as supporting wider species assemblages

2.1.5 Advanced and Delayed Habitat Enhancement and Creation

When habitat creation is delayed significantly beyond the point at which the baseline losses occur the 'delay in starting habitat creation' multipliers enable the Biodiversity Metric 3.1 to account for the resulting increase in the time remaining to reach the target condition. This function recognises that the risk of failure remains the same as when habitat creation begins concurrently with the loss, so the difficulty risk multiplier is applied.

In keeping with the timeline reported in the accompanying Environmental Statement a 'delay in starting habitat creation' of two years has been applied to all terrestrial on-site habitat enhancement and creation to reflect the projected construction phase of the Proposed Development. Delay multipliers have not been applied to onsite river enhancements/creation activities as these are anticipated to occur in line with the construction phase.

2.1.6 Assumptions

In undertaking the calculation, the following assumptions have been made:

- The assessment is based on the outline landscape design illustrated in the Outline Landscape plan¹⁸. Should planning permission be granted, the Proposed Development will need to be subject to further design prior to construction commencing. This will include preparation of a detailed landscape design and an update of the BNG Assessment;
- The habitat "grasscrete" that is displayed within the landscape plan has been captured within the metric as a mixture of the following habitats:
 - 50% Urban – Developed land; sealed surface
 - 50% Grassland – Modified grassland
- The Hansons Restoration Area has been included within the Metric calculations baseline and also retained within the metrics post development data. This approach ensures the calculation avoids double counting and the net gain delivered by the Proposed Development is additional and transparent;
- The proposed development also results in a projected loss of 1.12 ha of 'Lowland Mixed Deciduous Woodland'. To address this loss and ensure 'like for like' replacement occurs for this high distinctiveness habitat post development proposals have included the enhancement of 3.59 ha of retained 'Other woodland: broadleaved' to 'Lowland Mixed Deciduous Woodland' in 'Poor' condition. The proposed habitat enhancement is projected to take 12 years to achieve target condition and over this time it is intended to deliver the replication of the species composition and habitat structure of the woodland being lost. The target condition of 'poor' has been selected as this is considered to be a realistic condition that is achievable in the timeframes expected for net gain delivery.
- The selection of specific parcels of retained 'Other Woodland Broadleaved' for enhancement was based on the following criteria. Either individual woodland stands approximately ≥ 0.25 ha or groups of woodland areas < 0.25 ha (where they were seen to form larger contiguous stands) were selected for enhancement. This approach is considered in keeping with existing guidance and information supporting DEFRA's current Metric 3.1 consultation:

- The enhancement is occurring within the broad habitat type, in this instance 'Woodland and Forest';
 - Following a review of woodland creation literature, current criteria published in support of woodland grant schemes and the existing landscape ecology of the baseline habitats present a 0.25 ha 'minimum viable area' for woodland was considered appropriate; and
 - Enhancement prescriptions draw upon published UKHab descriptions of Lowland Mixed Deciduous Woodland and focus upon diversifying tree species composition, the restructuring of vertical woodland structure and enhanced ground flora creation.
- Additional green infrastructure is to be provided along the central reservation of the Thames crossing and the deck of the nearby bridge, whilst structurally unable to support significant amounts of vegetation it is proposed that sedum blankets will be installed within these areas to add additional greening to the Proposed Development. These sedum blankets have been included within the metric calculation as 'Urban – Other Green Roof';
 - Green 'acoustic barriers' are to be installed at strategic sections along the Proposed Development. These features are captured within the metric as 'Urban – Ground Based Green Wall';
 - The Proposed Development will only result those impacts to the watercourse as described in this report within the post development section below;
 - River habitat condition was determined for Moor Ditch, Meadow Brook and Stert Brook using MoRPh survey techniques. A ditch condition assessment was undertaken on a single un-named watercourse and assumptions and professional judgement were applied for all other un-named watercourses on site where field surveys were not undertaken; and
 - River condition assessment site visits were not considered necessary on the River Thames (as shown in Appendix A of the Aquatic Ecology Report) as information from the River Habitat Survey was utilised to assess condition and complete MoRPh survey proforma retrospectively to inform the Metric 3.1 calculation. The River Thames was assigned a habitat condition score retrospectively using a reasonable precautionary approach and professional judgement to prevent underestimating the value of the baseline habitat.

2.1.7 Constraints

- All habitat areas and lengths have been measured manually using ArcGIS based on the Phase 1 Habitat Plan and the Landscape Plan, as such habitat areas are approximations only;
- Areas of some habitats within the Site were smaller than 0.005 ha so these habitats have not been included within the metric because the areas were too small for the metric to consider. It is considered that their omission from the calculation has not significantly affected the overall results;
- The river condition assessment survey utilises the MoRPh5 survey methodology which assesses watercourse condition based on morphological features, not biological elements of river condition; these are assessed in other reports associated with the Proposed Development;
- At present, the calculation of river units has been based on the assumption that the Proposed Development will only result in those impacts to the watercourses as described in this report, within the post development section below. Therefore, if finalised designs in relation to the Proposed Development deviate from this assumption and impacts to the river and/or its riparian zone differ from those included in this report, then calculation of river units will need to be repeated as they would also deviate;
- If The Site boundary changes, there is potential that more MoRPh surveys could be required, and calculation of river units would also need to be repeated in this instance;
- If proposed enhancements are not adhered to, there is potential for a greater loss of river units; and
- The proposed outfalls on Moor Ditch and Meadow Brook are to be designed in line with the existing watercourse profiles, but as the designs are not finalised at the time of writing this report, a precautionary 'worst-case scenario' approach was undertaken and it is assumed that they will extend 2 m along watercourse banks.

3. Results

3.1 Biodiversity Metric 3.0 Calculation Tool Output

3.1.1 On-site Baseline Habitats

The Site covers a total area of 155.17 ha. The habitats identified on Site prior to development vary in ecological value, ranging from very low to high distinctiveness. The most dominant habitat groups on site include cereal crops which covers approximately 37 ha and modified grassland which covers approximately 22 ha. In addition, approximately 10 km of hedgerow habitats and 2 km of river habitats are present within the baseline.

Full descriptions of the habitats present within the proposed development can be found in the Environmental Statement²⁰ and accompanying Extended Phase 1 Habitat survey report¹⁰.

3.1.2 On-site Baseline Habitat Units

In total, the baseline biodiversity value of the habitats present within the Site was calculated as comprising; 578.32 area-based habitat units (Table 4), 33.44 hedgerow units (Table 5), and 20.97 river units (Table 6).

Table 4. On-site baseline area-based habitat data

Habitat Type (UKHab)	Area (ha)	Distinctiveness	Condition	Strategic Significance	Habitat Units
Cereal crops	31.24	Low	N/A	Low	62.48
Cereal crops	5.97	Low	N/A	Low	11.94
Modified grassland	21.86	Low	Poor	Low	43.72
Other neutral grassland	10.65	Medium	Poor	Low	42.60
Other neutral grassland	0	Medium	Moderate	Low	0.00
Other neutral grassland	5.06	Medium	Moderate	Low	40.48
Other neutral grassland	7.44	Medium	Moderate	Low	59.52
Mixed scrub	9.62	Medium	Poor	Low	38.48
Mixed scrub	0.25	Medium	Poor	Low	1.00
Mixed scrub	0.43	Medium	Moderate	Low	3.44
Mixed scrub	0.12	Medium	Moderate	Low	0.96
Mixed scrub	0.82	Medium	Poor	Low	3.28
Ponds (Non- Priority Habitat)	0.65	Medium	Poor	Low	2.60
Ponds (Non- Priority Habitat)	0.23	Medium	Moderate	Low	1.84
Ponds (Non- Priority Habitat)	1.31	Medium	Poor	Low	5.24
Ponds (Non- Priority Habitat)	0.02	Medium	Poor	Low	0.08
Ponds (Priority Habitat)	1.53	High	Moderate	Medium	20.20
Ponds (Priority Habitat)	3.85	High	Poor	Medium	25.41
Ruderal/Ephemeral	13.2	Low	Poor	Low	26.40
Ruderal/Ephemeral	0.29	Low	Poor	Low	0.58
Ruderal/Ephemeral	0.01	Low	Poor	Low	0.02
Developed land; sealed surface	12.98	V.Low	N/A	Low	0.00
Developed land; sealed surface	1.38	V.Low	N/A	Low	0.00

²⁰

Actively worked sand pit quarry or open cast mine	8.74	Low	N/A	Low	17.48
Vacant/derelict land/ bare ground	2.73	Low	Poor	Low	5.46
Reedbeds	1.83	High	Good	Medium	36.23
Reedbeds	1.06	High	Poor	Medium	7.00
Reedbeds	0.23	High	Poor	Medium	1.52
Lowland mixed deciduous woodland	1.13	High	Poor	Medium	7.46
Lowland mixed deciduous woodland	1.02	High	Moderate	Medium	13.46
Lowland mixed deciduous woodland	1.32	High	Moderate	Medium	17.42
Other woodland; broadleaved	0.26	Medium	Moderate	Medium	2.29
Other woodland; broadleaved	7.76	Medium	Poor	Medium	34.14
Other woodland; mixed	0.18	Medium	Poor	Medium	0.79
Urban Tree	5.09	Medium	Moderate	Medium strategic significance	44.79
Total	155.17				578.32

* Areas of Urban – Urban tree not included by the metric, to prevent double counting of areas.

Table 5. On-site baseline hedgerow habitat data

Hedgerow Habitat (UKHab)	Length (Km)	Distinctiveness	Condition	Strategic Significance	Hedgerow Units
Native Hedgerow	4.44	Low	Poor	Medium	9.77
Native Hedgerow	1.5	Low	Poor	Medium	3.30
Native Hedgerow	1.23	Low	Moderate	Medium	5.41
Native Hedgerow	0.6	Low	Moderate	Medium	2.64
Native Hedgerow	1.25	Low	Poor	Medium	2.75
Native Hedgerow with trees - Associated with bank or ditch	0.01	High	Poor	Medium	0.07
Native Hedgerow with trees	0.05	Medium	Good	Medium	0.66
Native Hedgerow with trees	0.3	Medium	Moderate	Medium	2.90
Native Species Rich Hedgerow with trees	0.3	V. High	Good	Medium	5.94
Total	9.71				33.44

Table 6. On-site baseline river habitat data

River habitat (UKHab)	Length (km)	Strategic Significance	Distinctiveness	Condition	Watercourse Encroachment	Riparian Encroachment	River Units
Culvert	0.074	Low	Low	Poor	NA	No Encroachment	0.15
Other Rivers and Streams	0.0.4	Low	High	Moderate	No Encroachment	Major	0.36
Culvert	0.003	Low	Low	Poor	NA	No Encroachment	0.01
Other Rivers and Streams	0.55	Low	High	Fairly Good	No Encroachment	No Encroachment	8.25
Culvert	0.0.19	Low	Low	Poor	NA	No Encroachment	0.04
Other Rivers and Streams	0.057	Low	High	Fairly Good	No Encroachment	No Encroachment	0.86

Other Rivers and Streams	0.736	High	High	Moderate	No Encroachment	No Encroachment	10.16
Ditches	0.288	Low	Medium	Poor	No Encroachment	No Encroachment	1.15
Total	1.77	-	-	-	-	-	20.97

3.1.3 On-site Post-Development Habitat Units

The Outline Landscape Plan²¹ includes the retention, enhancement, and creation of a range of habitats varying in ecological value ranging from very low to high distinctiveness.

Retained, enhanced, and created habitats are presented in Tables 7 - 14.

The management and maintenance of on-site habitats will be delivered through highways maintenance contracts, the management regime required for these habitats to reach their target condition in the specified timeframe is provided in Appendix E of this report.

Area-based habitats due to be retained within the Proposed Development are detailed in Table 7. In total 48.31 ha of land is due to be retained with a biodiversity unit value of 209.87 habitat units. It is not proposed to deliver unit uplift for these habitats because these habitats are either due to be transferred back to private land holders after construction, they form part of the Hanson's Restoration Area or have an existing baseline condition value that allows for no further realistic or achievable biodiversity uplift.

Table 7. On-site retained area-based habitat data

Habitat type (UKHab)	Distinctiveness	Condition	Strategic Significance	Area retained	Retained Habitat Units
Cereal Crops	Low	NA	Low	12.97	25.94
Cereal Crops	Low	NA	Low	1.57	3.14
Modified grassland	Low	Poor	Low	5.45	10.90
Other neutral grassland	Medium	Moderate	Low	0.26	2.08
Other neutral grassland	Medium	Moderate	Low	7.29	58.32
Mixed Scrub	Medium	Poor	Low	0.04	0.16
Mixed scrub	Medium	Poor	Low	0.12	0.48
Mixed scrub	Medium	Moderate	Low	0.37	2.96
Mixed scrub	Medium	Moderate	Low	0.11	0.88
Mixed scrub	Medium	Poor	Low	0.27	1.08
Ponds (Non-Priority Habitat)	Medium	Moderate	Low	0.21	1.68
Ponds (Priority Habitat)	High	Moderate	Medium	1.53	20.20
Ruderal/Ephemeral	Low	Poor	Low	2.24	4.48
Ruderal/Ephemeral	Low	Poor	Low	0.26	0.52
Ruderal/Ephemeral	Low	Poor	Low	0.01	0.02
Developed land; sealed surface	V.Low	NA	Low	4.66	0.00
Developed land; sealed surface	V.Low	NA	Low	0.3	0.00
Actively worked sand pit quarry or open cast mine	Low	NA	Low	5.74	11.48
Vacant/derelict land/ bare ground	Low	Poor	Low	2.44	4.88

²¹ AECOM (2022) Regulation 25 Response Document; Appendix V

Reedbeds	High	Good	Medium	1.83	36.23
Reedbeds	High	Poor	Medium	0.23	1.52
Other woodland; broadleaved	Medium	Moderate	Medium	0.26	2.29
Other woodland; broadleaved	Medium	Moderate	Medium	0.15	0.66
Urban trees	Medium	Moderate	Medium	2.27	19.98
Total	-	-	-	48.31*	209.87

* Areas of Urban – Urban tree not included by the metric, to prevent double counting of areas.

The hedgerow habitats due to be retained within the Proposed Development are detailed in Table 8. In total 4.04 km of hedgerow habitat is proposed to be retained in the Proposed Development with a unit value of 15.53 hedgerow units.

Table 8. On-site retained hedgerow habitat data

Habitat type (UKHab)	Distinctiveness	Condition	Strategic Significance	Area retained	Retained hedgerow units
Native Hedgerow	Low	Poor	Medium	1.81	3.98
Native Hedgerow	Low	Poor	Medium	0.53	1.17
Native Hedgerow	Low	Moderate	Medium	0.56	2.46
Native Hedgerow	Low	Moderate	Medium	0.31	1.36
Native Hedgerow	Low	Poor	Medium	0.39	0.86
Native Hedgerow with trees - Associated with bank or ditch	High	Poor	Medium	0.01	0.07
Native Hedgerow with trees	Medium	Good	Medium	0.02	0.26
Native Hedgerow with trees	Medium	Moderate	Medium	0.25	2.20
Native Species Rich Hedgerow with trees	High	Good	Medium	0.16	3.17
Total	-	-	-	4.04	15.53

The river habitats due to be retained within the Proposed Development are detailed in Table 9. In total 0.68 km of river habitat is proposed to be retained in the Proposed Development with a unit value of 6.19 river units.

Table 9. On-site retained river habitat data

River habitat (UKHab)	Distinctiveness	Condition	Strategic Significance	Length (km)	Retained River Units
Culvert	Low	Poor	Low	0.04	0.08
Other Rivers and Streams	High	Moderate	Low	0	0.00
Culvert	Low	Poor	Low	0.003	0.01
Other Rivers and Streams	High	Fairly Good	Low	0.291	4.37
Culvert	Low	Poor	Low	0.019	0.04
Other Rivers and Streams	High	Fairly Good	Low	0.033	0.50
Other Rivers and Streams	High	Moderate	High	0.004	0.06
Ditches	Medium	Poor	Low	0.288	1.15
Total	-	-	-	0.68	6.19

The area-based habitats due to be enhanced within the Proposed Development are detailed in Table 19. In total 27.84 ha of habitat is proposed to be enhanced with a unit value of 225.99 habitat units. The management regime required for these habitats to reach their target condition in the specified timeframe is provided in Appendix E of this report.

Table 10. On-Site enhanced area-based habitat data

Habitat type (UKHab)	Distinctiveness change	Condition Change	Time to target condition (yrs)	Area (ha)	Enhanced Habitat Units
Other neutral grassland	Medium - Medium	Poor - Moderate	12	4.9	32.38
Other neutral grassland	Medium - Medium	Moderate - Good	12	2	21.22
Mixed scrub	Medium - Medium	Poor - Good	12	4.21	38.80
Ponds (Non- Priority Habitat)	Medium - Medium	Poor - Good	10	1.18	9.15
Ponds (Priority Habitat)	High - High	Poor - Good	10	3.57	45.67
Ruderal/Ephemeral	Low - Low	Poor - Good	7	5.01	20.48
Reedbeds	High - High	Poor - Good	14	0.9	10.77
Lowland mixed deciduous woodland	High - High	Poor - Moderate	22	0.65	4.94
Lowland mixed deciduous woodland	High - High	Moderate - Good	22	0.72	10.22
Lowland mixed deciduous woodland	High - High	Moderate - Good	22	0.98	13.91
Lowland mixed deciduous woodland	Medium - High	Lower Distinctiveness Habitat - Poor	12	3.59	17.50
Other woodland; mixed	Medium - Medium	Poor - Moderate	12	0.13	0.95
Total	-	-	-	27.84	225.99

The river habitats due to be enhanced within the Proposed Development are detailed in Table 11. In total 0.94 km of River Habitat with a unit value of 14.71 River units. The management regime required for these habitats to reach their target condition in the specified timeframe is provided in Appendix E of this report.

Table 11. On-Site enhanced river habitat data

Habitat Type (UKHab)	Distinctiveness	Condition enhancement	Strategic Significance	Time to target condition (yrs)	Length (km)	Enhanced River Units
Culvert → Other Rivers and Streams	Low	Fairly Good	Low	10	0.034	0.28
Other Rivers and Streams	High	Fairly Good	Low	2	0.038	0.53
Other Rivers and Streams	High	Good	Low	2	0.15	2.53
Other Rivers and Streams	High	Fairly Good	Hlgh	2	0.713	11.37
Total	-	-	-	-	0.94	14.71

The area-based habitats to be created within the Proposed Development are detailed in Table 12. In total 80.00 ha of habitats are proposed for creation. The proposed habitat creation delivers a total of 258.12 habitat units. The

management regime required for these habitats to reach their target condition in the specified timeframe is provided in Appendix E of this report.

Table 12. On-site created area-based habitat data

Habitat type (UKHab)	Area	Distinctiveness	Condition	Strategic significance	Created Habitat units
Modified grassland	0.14	Low	Poor	Low	0.25
Developed land; sealed surface	0.14	V.Low	N/A	Low	0.00
Artificial unvegetated, unsealed surface	1.72	V.Low	N/A	Low	0.00
Artificial unvegetated, unsealed surface	0.45	V.Low	N/A	Low	0.00
Artificial unvegetated, unsealed surface	0.06	V.Low	N/A	Low	0.00
Modified grassland	9.31	Low	Poor	Low	16.73
Modified grassland	0.98	Low	Poor	Low	1.76
Modified grassland	0.89	Low	Poor	Low	1.60
Other neutral grassland	16	Medium	Moderate	Low	99.75
Other neutral grassland	2.17	Medium	Moderate	Low	13.53
Other neutral grassland	10.59	Medium	Moderate	Low	66.02
Other neutral grassland	1.27	Medium	Moderate	Low	7.90
Hawthorn scrub	0.08	Medium	Moderate	Low	0.50
Mixed scrub	0.03	Medium	Moderate	Low	0.19
Ponds (Non- Priority Habitat)	0.09	Medium	Good	Low	0.84
Ponds (Non- Priority Habitat)	0.36	Medium	Good	Low	3.37
Developed land; sealed surface	23.56	V.Low	N/A	Low	0.00
Developed land; sealed surface	0.08	V.Low	N/A	Low	0.00
Developed land; sealed surface	3.34	V.Low	N/A	Low	0.00
Developed land; sealed surface	0.71	V.Low	N/A	Low	0.00
Introduced shrub	0.49	Low	N/A	Low	0.88
Introduced shrub	0.25	Low	N/A	Low	0.45
Reedbeds	0.62	High	Good	Medium	4.99
Reedbeds	0.17	High	Good	Medium	1.37
Other woodland; broadleaved	6.32	Medium	Moderate	Medium	30.35
Urban Tree	2.16	Medium	Moderate	Medium,	6.76
Other Green Roof	0.18	Low	N/A	Low	0.32
Ground based green wall	0.24	Low	Moderate	Low	0.54
Total	80.00				258.12

The hedgerow habitats to be created within the Proposed Development are detailed in Table 13. In total 3.84 km of hedgerow habitats are proposed for creation delivering a total of 31.58 hedgerow units. The management regime

required for these habitats to reach their target condition in the specified timeframe is provided in Appendix E of this report.

Table 13. On-site created hedgerow data

Habitat type (UKHab)	Length km	Distinctiveness	Condition	Strategic Significance	Created Hedgerow units
Native Hedgerow	0.08	Low	Moderate	Medium	0.27
Native Species Rich hedgerow with trees	3.53	High	Moderate	Medium	30.39
Native Species Rich hedgerow with trees	0.07	High	Moderate	Medium	0.60
Line of Trees	0.16	Low	Moderate	Medium	0.32
Total	3.84	-	-	-	31.58

The river habitats to be created within the Proposed Development. In total 0.15 km of culvert and stream creation is proposed delivering a total of 0.33 river units. The management regime required for these habitats to reach their target condition in the specified timeframe is provided in Appendix E of this report.

Table 14. On-Site created post-development river data

River habitat (UKHab)	Length (km)	Distinctiveness	Condition	Strategic Significance	Created River Units
Other Rivers and Streams	0.002	High	Moderate	Low	0.00
Culvert	0.103	Low	Poor	High	0.20
Other Rivers and Streams	0.006	High	Good	Low	0.02
Culvert	0.024	Low	Poor	Low	0.05
Other Rivers and Streams	0.019	High	Moderate	Low	0.06
Total	0.15	-	-	-	0.33

3.1.4 Summary of on-site results

All baseline habitats and habitats retained, enhanced, or created are presented within the accompanying metric assessment for the proposed development (Appendix F).

Based on the current Post-Development Plan, the Proposed Development is predicted to result in a net on-site gain of 115.67 habitat units (20.00%), 13.68 hedgerow units (40.90%) and 0.26 river units (1.26%).

Table 15. Summary of results

Area/Linear Units	On-site baseline	On-site post-development	Total net unit change	Total net % change
Habitat units	578.32	693.98	115.67	20.00%
Hedgerow units	33.44	47.12	13.68	40.90%
River units	20.97	21.23	0.26	1.26%

3.1.5 Biodiversity Net Gain Trading Rules

The trading rules have been met for all habitat distinctiveness categories.

4. Conclusion

Based on the current proposals and outlined assumptions the Proposed Development would be predicted to result in an overall on-site net gain 20% of habitat units, 40.90% Hedgerow units and 1.26% of river units.

Table 16. Summary of results

Area/Linear Units	On-site baseline	On-site post-development	Total net unit change	Total net % change
Habitat units	578.32	693.98	115.67	20.00%
Hedgerow units	33.44	47.12	13.68	40.90%
River units	20.97	21.23	0.26	1.26%

Therefore, further habitat mitigation is required to achieve a minimum of a 10% net gain across all unit measures. To achieve a 10% biodiversity net gain in association with the Proposed Development, river habitat creation and/or enhancement would need to achieve a minimum of 23.01 river units or a further 1.78 river units on top of current proposals. Potential mitigation measures in regard to river habitats could include:

- Riparian planting and buffer strips along the de-vegetated stretch of Meadow Brook and in the section to be de-culverted within Moor Ditch;
- De-silting of Meadow Brook;
- Enhancement of sections of Meadow Brook in line with the recommendations of the Water Framework Directive Assessment report to ensure 'no deterioration';
- Riparian planting along the banks of the River Thames alongside the Hanson Restoration Area, and adjacent to the temporary works area on the north bank to the west of the Proposed Development; and
- Eradication of riparian invasive non-native species (INNS) along watercourses within the Proposed Development boundary.

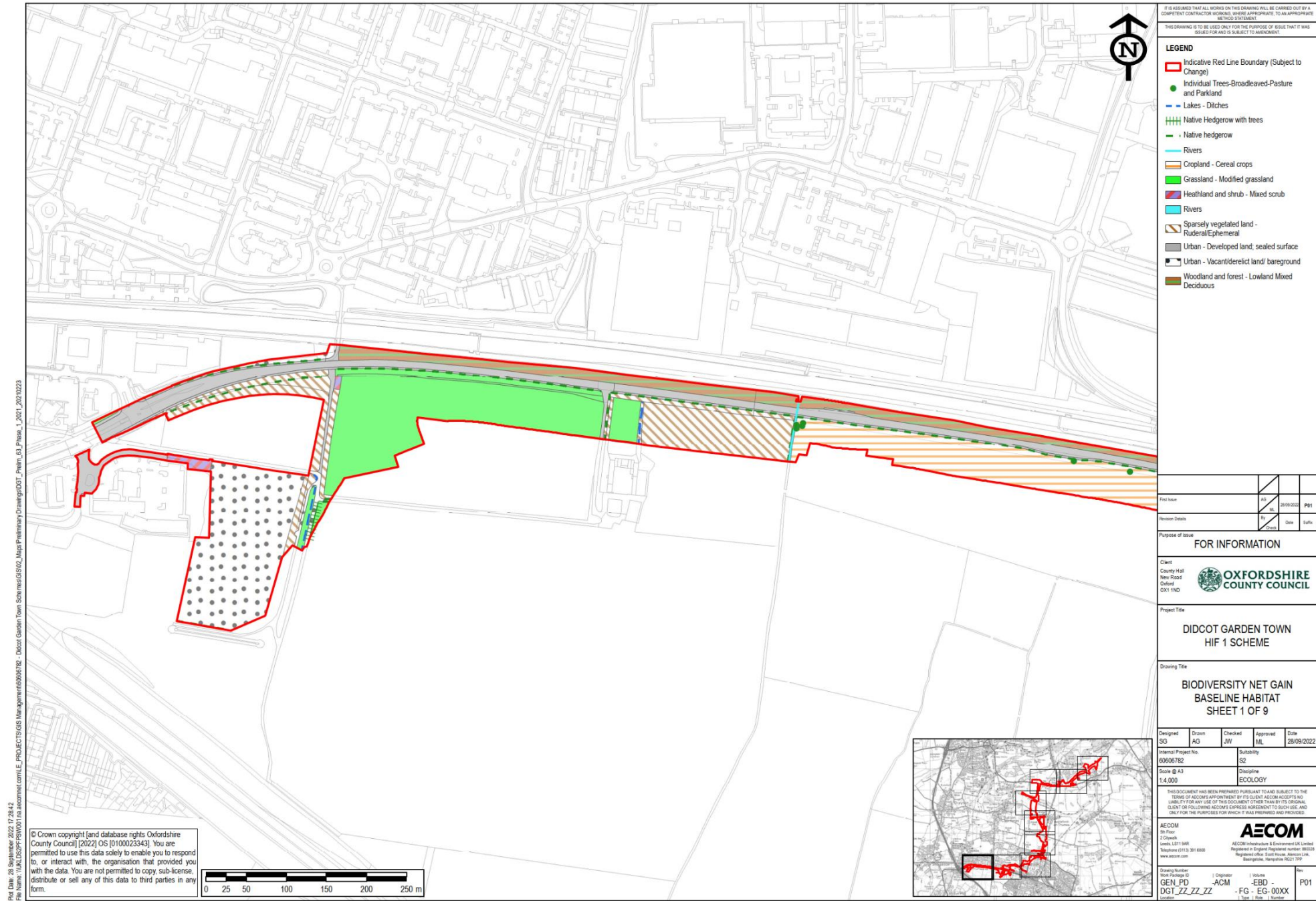
In accordance with best practice, the delivery of biodiversity units should always be initially considered on-site. However, where opportunity for additional habitat creation and enhancement on-site is limited, land outside of the site boundary may need to be considered for the proposed development to achieve net gains. Due to the limited opportunity to provide additional on-site river mitigation, opportunities to undertake off-site mitigation may be considered a potential option to achieve 10% biodiversity net gain. This would need to be agreed with local landowners and stakeholders and assured through an appropriate legal agreement.

The outputs of the metric are dependent on all created and retained and enhanced habitats meeting the target conditions, subject to the criteria outlined within Natural England's Biodiversity Metric 3.1 Technical Note²². Management methodology to meet the target condition for each habitat would therefore need to be outlined within an overarching Landscape Masterplan/ Ecological Management Plan for the Proposed Development.

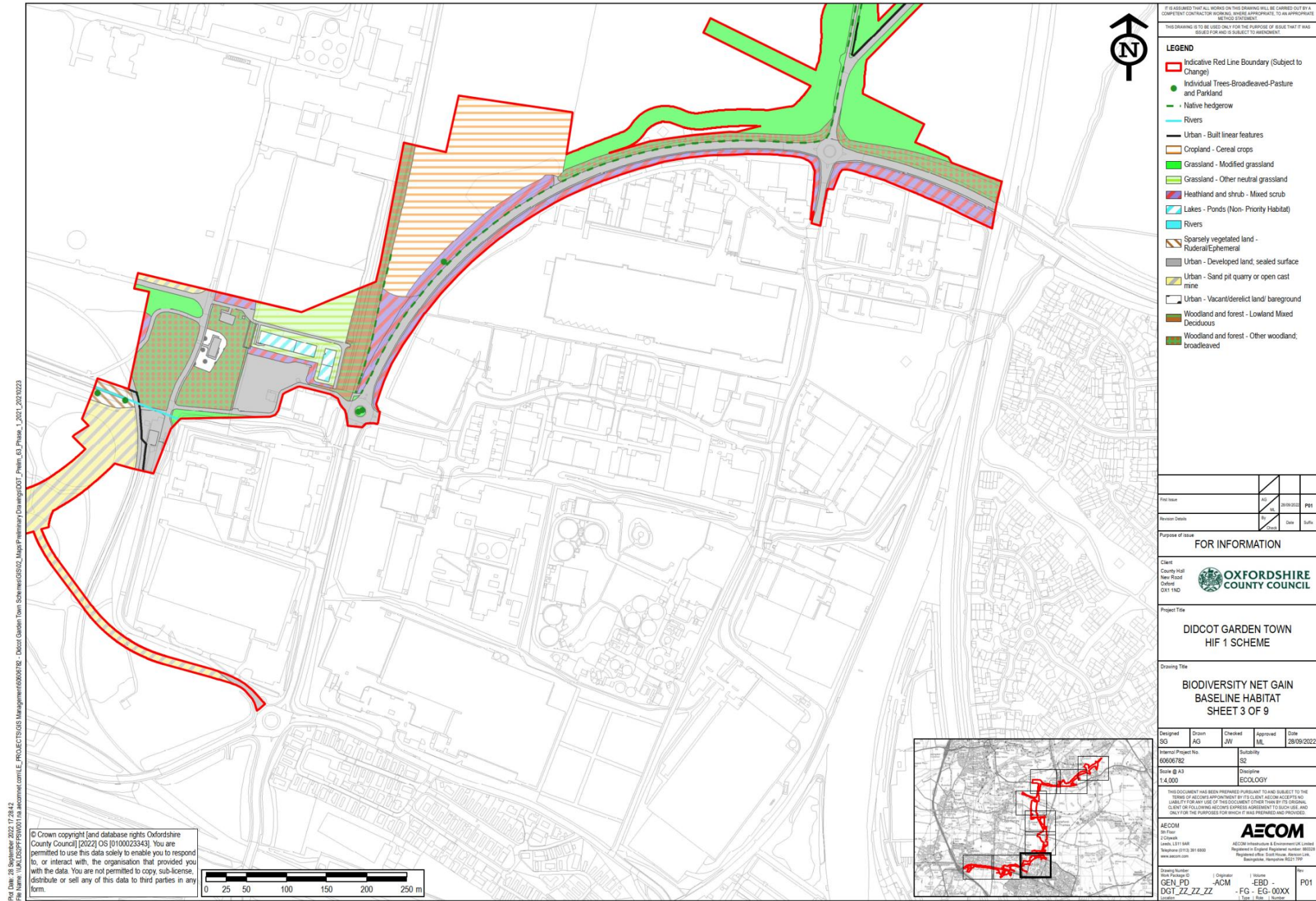
²² Natural England (2021). The Biodiversity Metric 3.0 – User Guide & Technical Supplement

Appendix A Baseline Habitat Plan

See below from page 22 – 29 for Baseline Habitat Plan:







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LEGEND

- Indicative Red Line Boundary (Subject to Change)
- Individual Trees-Broadleaved-Pasture and Parkland
- Native hedgerow
- Rivers
- Urban - Built linear features
- Cropland - Cereal crops
- Grassland - Modified grassland
- Grassland - Other neutral grassland
- Heathland and shrub - Mixed scrub
- Lakes - Ponds (Non- Priority Habitat)
- Rivers
- Sparsely vegetated land - Ruderal/Ephemeral
- Urban - Developed land, sealed surface
- Urban - Sand pit quarry or open cast mine
- Urban - Vacant/derelict land/ bareground
- Woodland and forest - Lowland Mixed Deciduous
- Woodland and forest - Other woodland; broadleaved

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1	Issue	AG	28/09/2022	P01

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**DIDCOT GARDEN TOWN
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Drawing Title
**BIODIVERSITY NET GAIN
BASELINE HABITAT
SHEET 3 OF 9**

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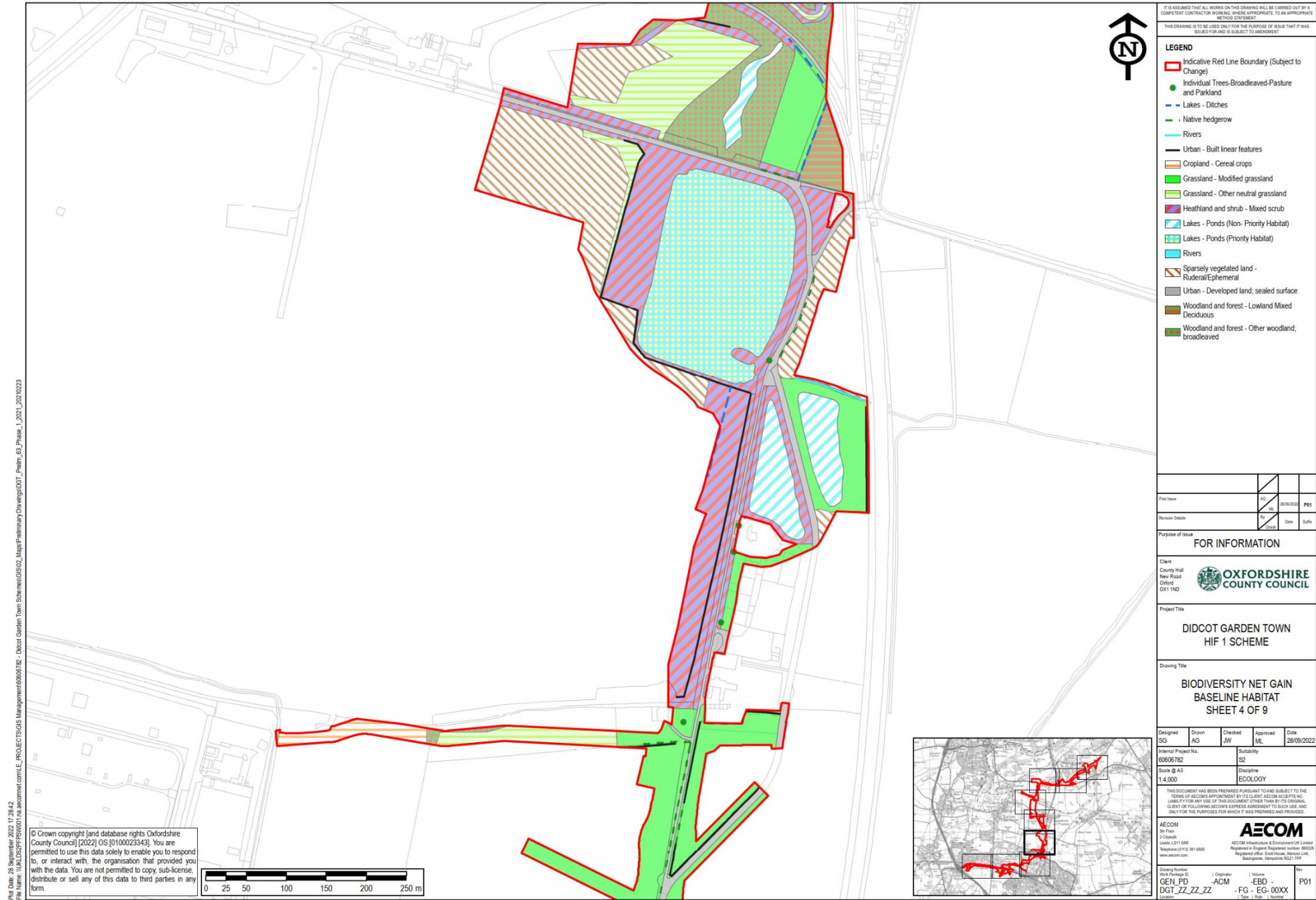
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 - Individual Trees-Broadleaved-Pasture and Parkland
 - Lakes - Ditches
 - Native hedgerow
 - Rivers
 - Urban - Built linear features
 - Cropland - Cereal crops
 - Grassland - Modified grassland
 - Grassland - Other neutral grassland
 - Heathland and shrub - Mixed scrub
 - Lakes - Ponds (Non- Priority Habitat)
 - Lakes - Ponds (Priority Habitat)
 - Rivers
 - Sparsely vegetated land - Ruderal/Ephemeral
 - Urban - Developed land; sealed surface
 - Woodland and forest - Lowland Mixed Deciduous
 - Woodland and forest - Other woodland; broadleaved

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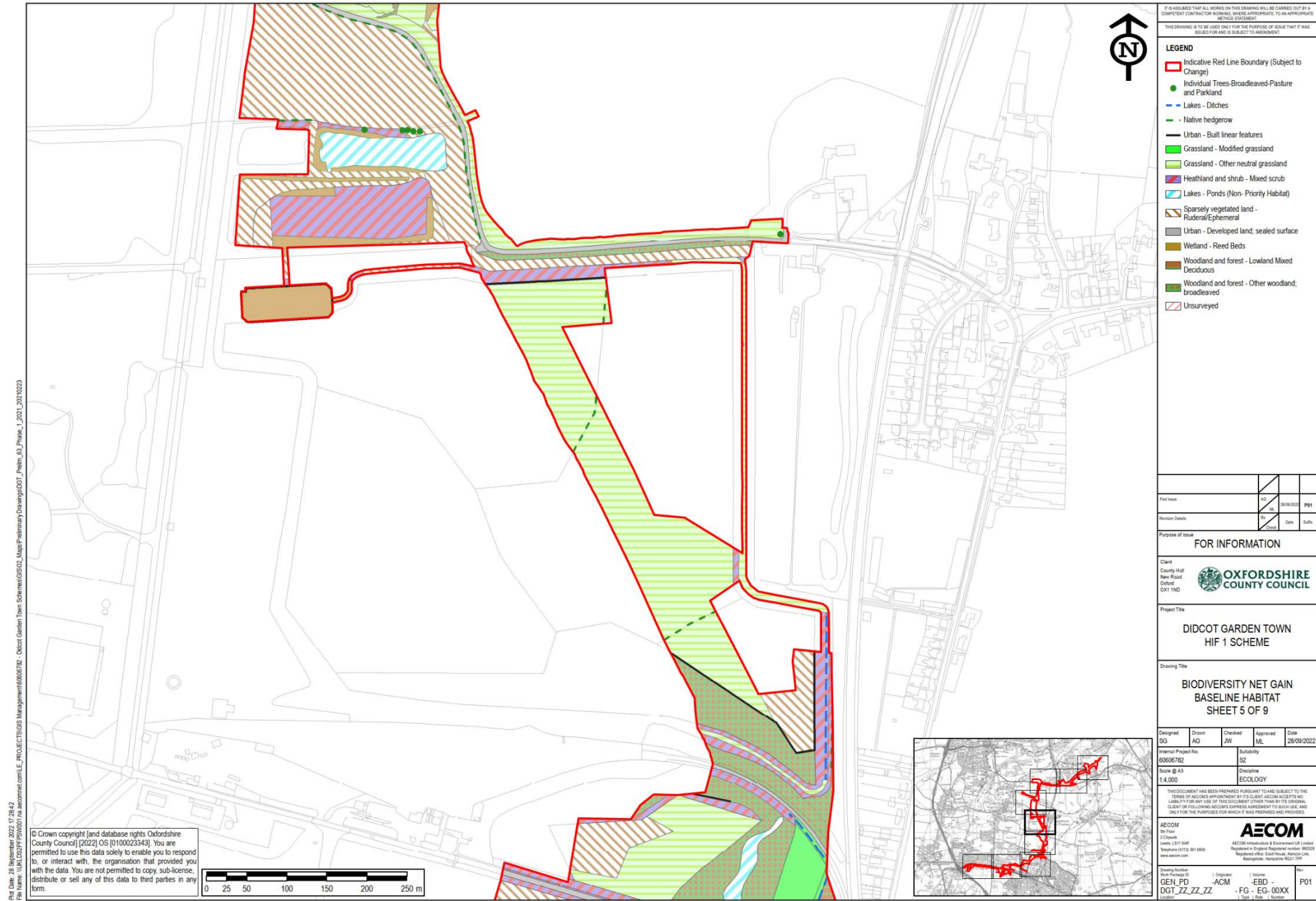
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- Individual Trees-Broadleaved-Pasture and Parkland
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- Grassland - Other neutral grassland
- Heathland and shrub - Mixed scrub
- Lakes - Ponds (Non - Priority Habitat)
- Sparsely vegetated land - Ruderal/Ephemeral
- Urban - Developed land, sealed surface
- Wetland - Reed Beds
- Woodland and forest - Lowland Mixed Deciduous
- Woodland and forest - Other woodland; broadleaved
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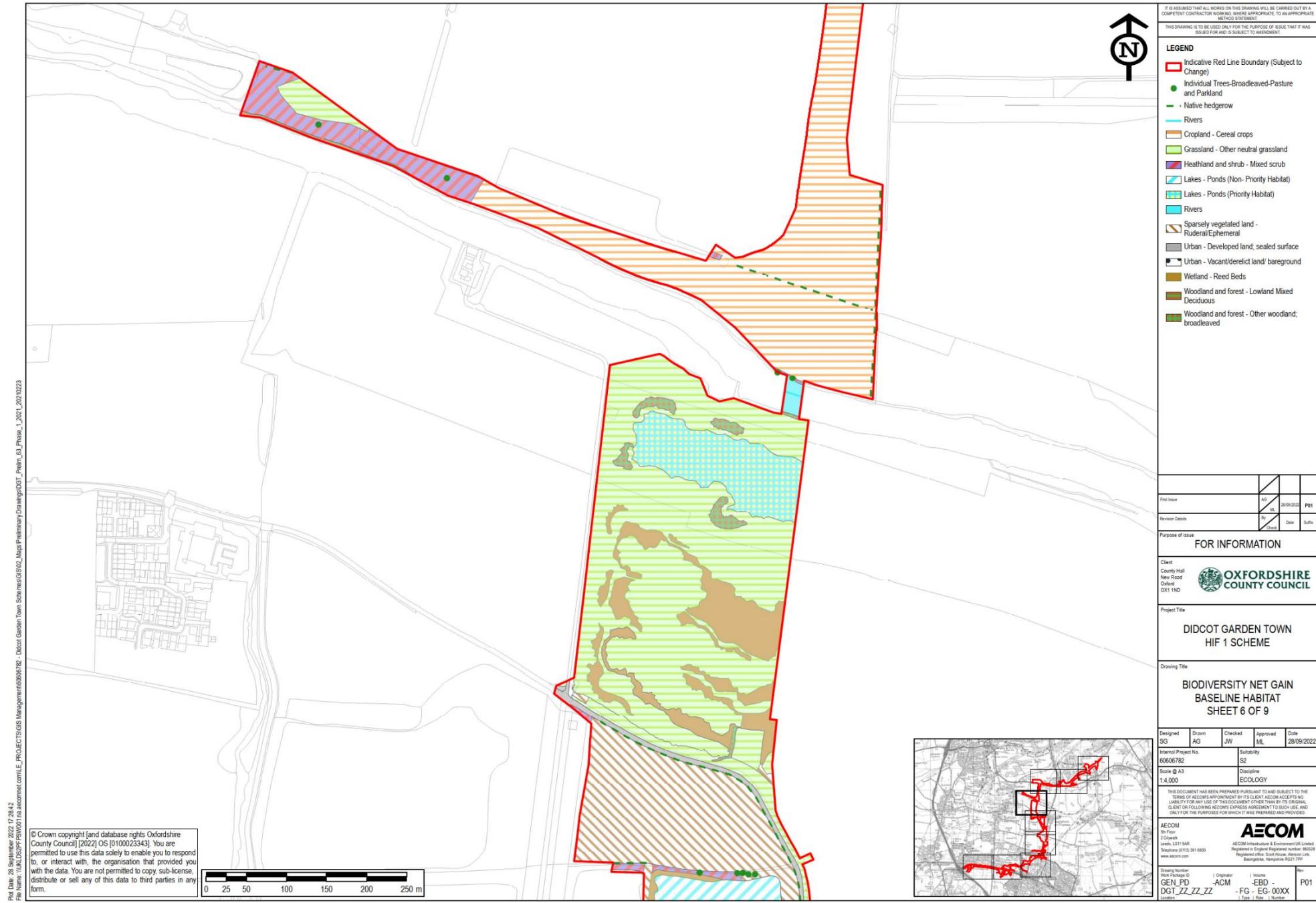
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- Individual Trees-Broadleaved-Pasture and Parkland
- Native hedgerow
- Rivers
- Cropland - Cereal crops
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- Lakes - Ponds (Priority Habitat)
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- Woodland and forest - Other woodland; broadleaved

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FOR INFORMATION

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County Hall
New Road
Oxford
OX1 1ND

OXFORDSHIRE COUNTY COUNCIL

Project Title
**DIDCOT GARDEN TOWN
HIF 1 SCHEME**

Drawing Title
**BIODIVERSITY NET GAIN
BASELINE HABITAT
SHEET 6 OF 9**

Designed	Drawn	Checked	Approved	Date
SG	AG	JW	ML	28/09/2022

Internal Project No.
60606782

Subsidiary
S2

Scale @ A3
1:4,000

Discipline
ECOLOGY

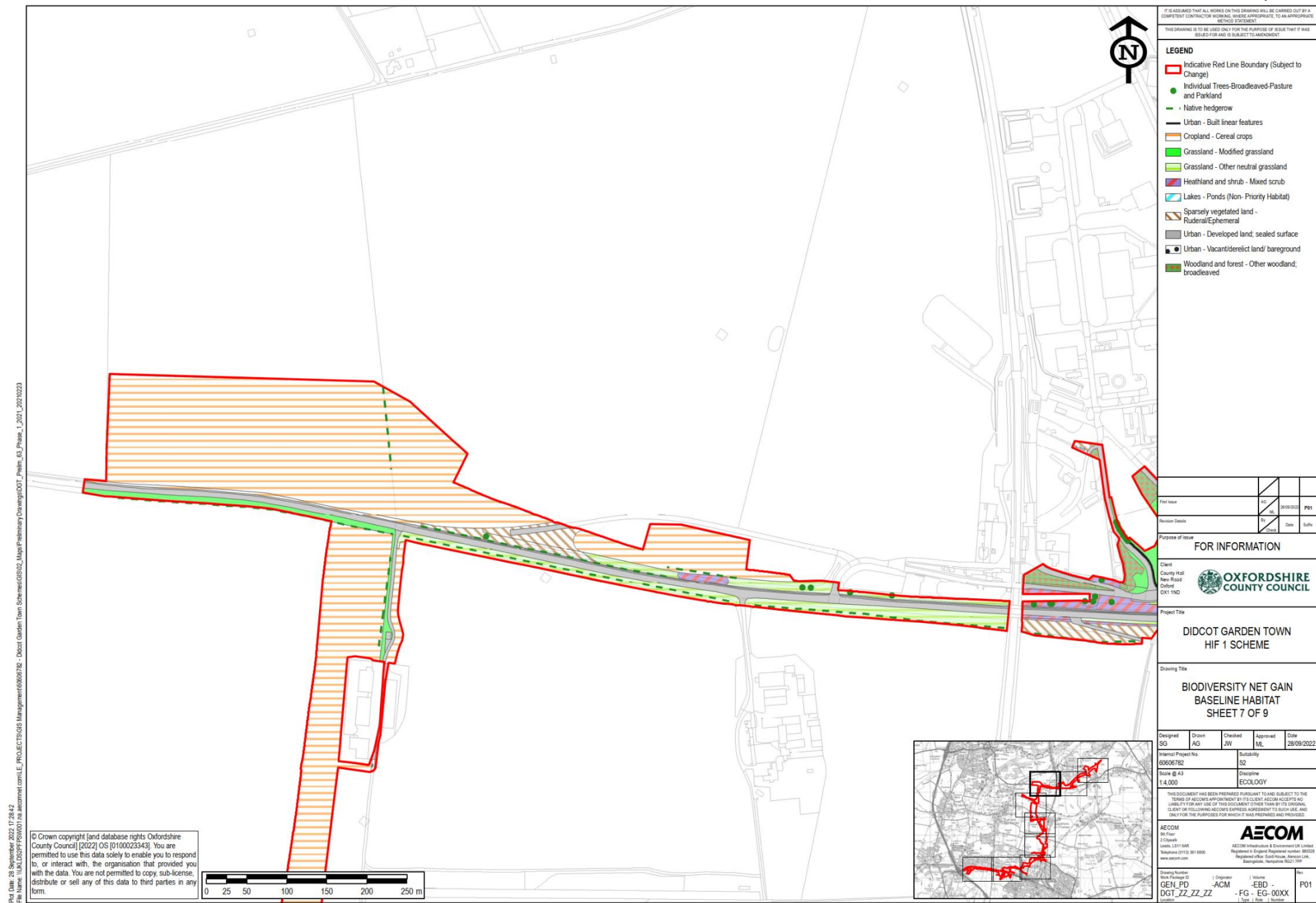
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Rev	Issue	By	Date	Issue
1	Issue	AG	28/09/2022	P01

File Name: \\UK\GIS\PROJECTS\GIS Management\60606782 - Didcot Garden Town Scheme\GIS\Map\Preliminary Drawings\DOT_Prelim_03_Phase_1_2021_20210223



- LEGEND**
- Indicative Red Line Boundary (Subject to Change)
 - Individual Trees-Broadleaved-Pasture and Parkland
 - Native hedgerow
 - Urban - Built linear features
 - Cropland - Cereal crops
 - Grassland - Modified grassland
 - Grassland - Other neutral grassland
 - Heathland and shrub - Mixed scrub
 - Lakes - Ponds (Non - Priority Habitat)
 - Sparsely vegetated land - Ruderal/Ephemeral
 - Urban - Developed land, sealed surface
 - Urban - Vacant/delict land/ bareground
 - Woodland and forest - Other woodland; broadleaved

First Issue	NO	28/09/2022	P01
Revision Details	Rev	Date	Issue

FOR INFORMATION

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Project Title

**DIDCOT GARDEN TOWN
HIF 1 SCHEME**

Drawing Title

**BIODIVERSITY NET GAIN
BASELINE HABITAT
SHEET 7 OF 9**

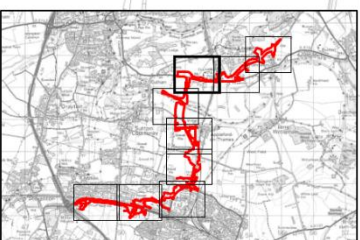
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Internal Project No. 60606782	Suitability S2			
Scale @ A3 1:4,000	Discipline ECOLOGICAL			

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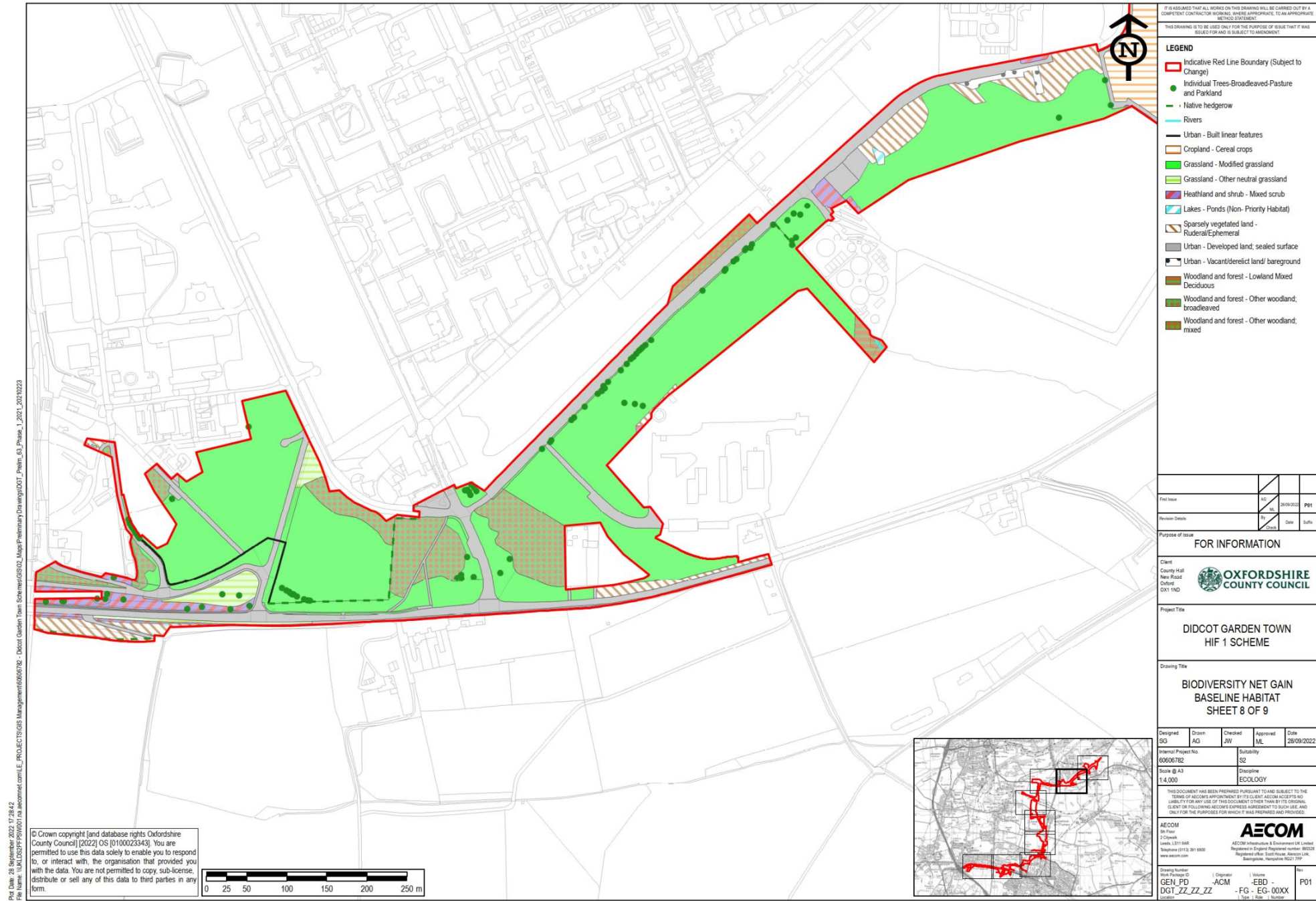
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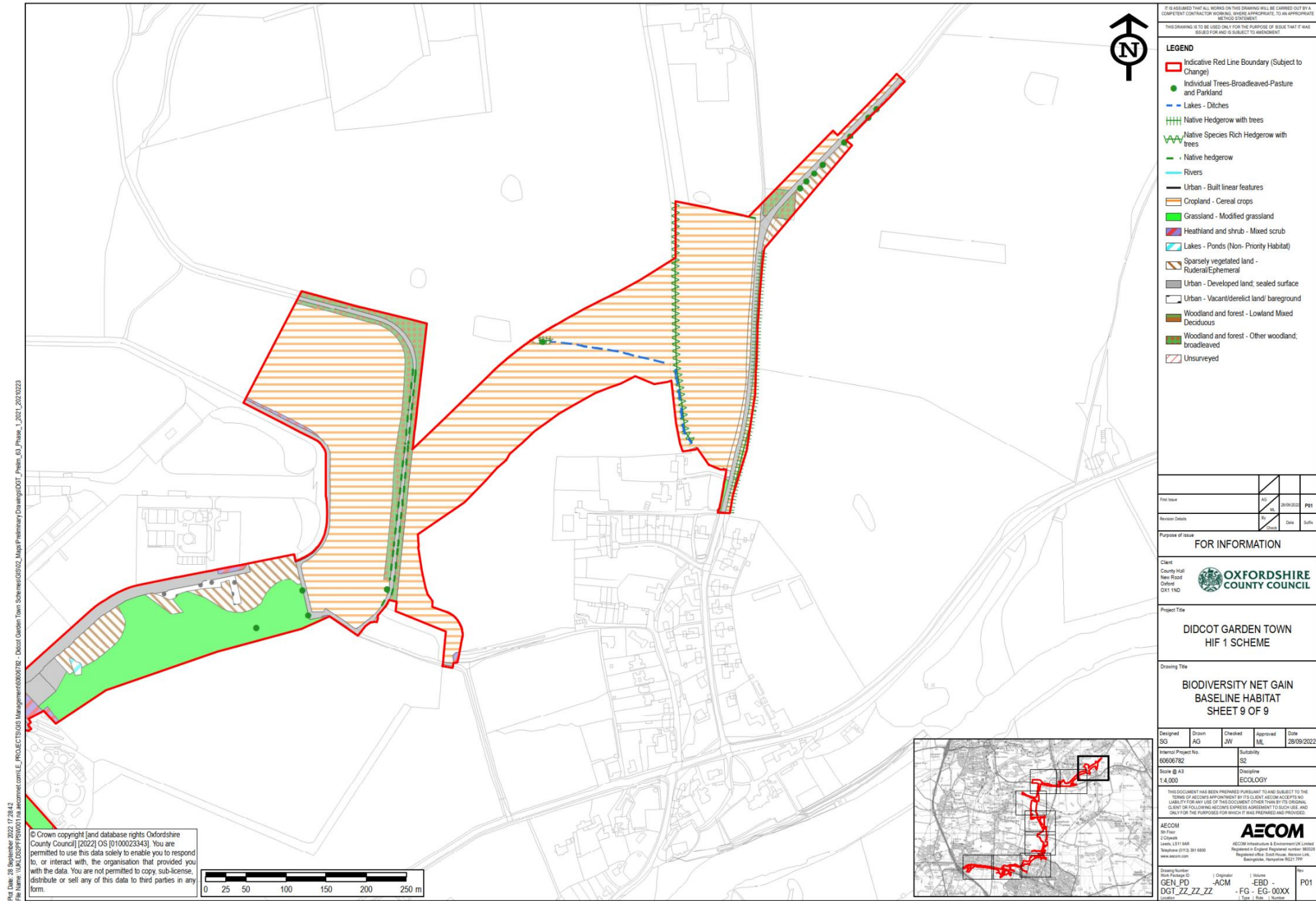
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Drawing Number: GEN_PD DGT_ZZ_ZZ_ZZ	Originator: -ACM	Volume: -EBD	Revision: -FG - EG-00XX	Sheet: P01
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Plot Date: 28 September 2022 17:26:42
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Appendix B Habitat Classification Conversion Tables

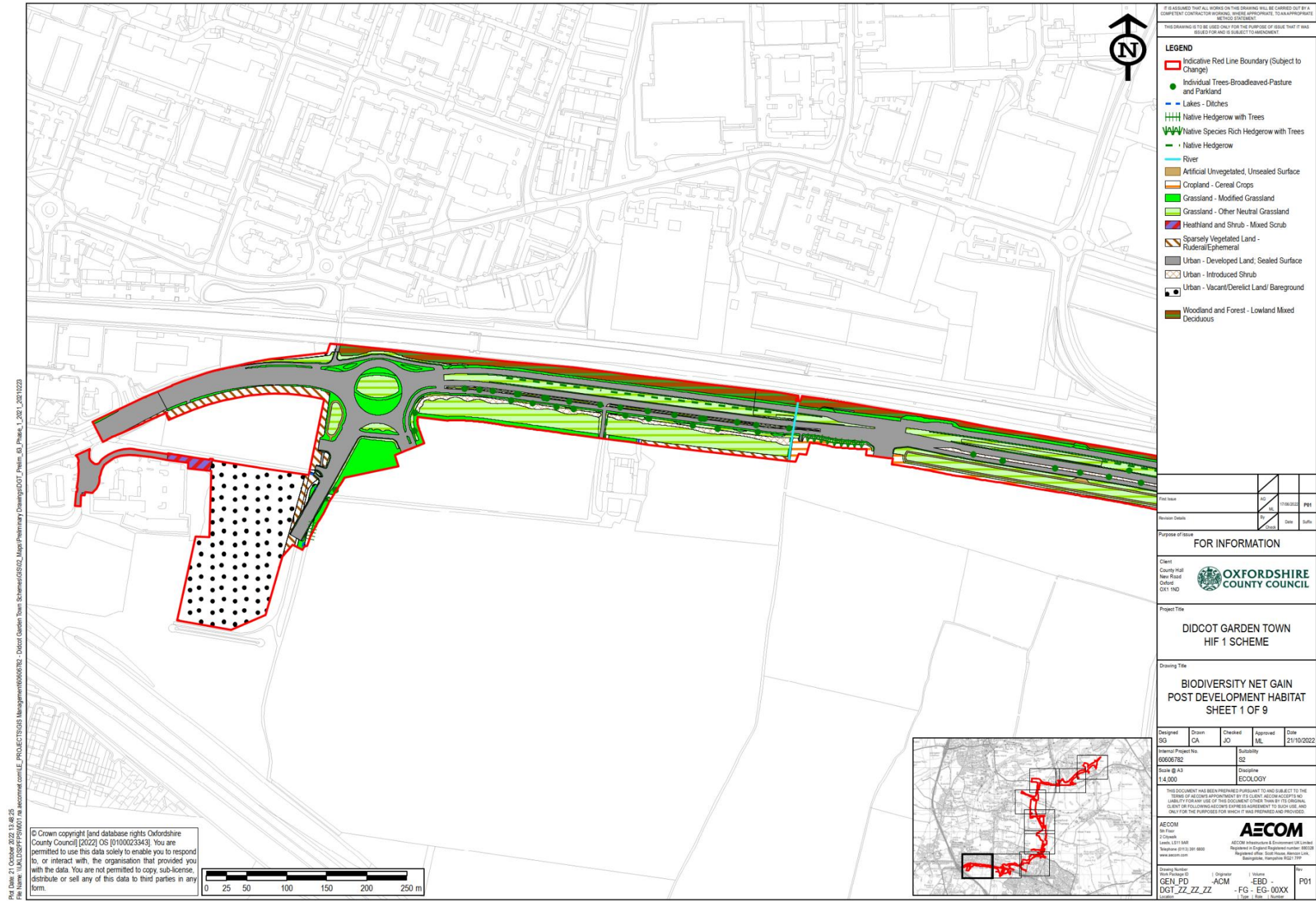
Phase 1 Habitat Classification	UK Habitat Classification
Hardstanding	Urban - Developed land; sealed surface
Buildings	Urban - Developed land; sealed surface
Bareground	Urban – Vacant/ derelict/bareground
Cultivated/disturbed land - amenity	Grassland - Modified grassland
Cultivated/disturbed land - arable	Cropland - Cereal crops
Improved grassland	Grassland - Modified grassland
Grassland -semi improved	Grassland – Other neutral grassland
Other tall herb and fern - ruderal	Sparsely vegetated land - Ruderal/ephemeral
Broadleaved woodland - semi natural	Woodland and forest - Lowland mixed deciduous woodland
Mixed woodland - plantation	Woodland and forest - Other woodland; mixed
Scrub - scattered	Heathland and shrub - Mixed scrub
Broadleaved parkland/scattered trees	Line of trees
Hedge with trees - native species-rich	Native Species Rich Hedgerow with trees
Hedge with trees – species poor	Native Hedgerow with trees
Intact hedge – species poor	Native Hedgerow
Dry ditch	Ditches
Broadleaved parkland/scattered tree	Urban Tree
Marsh/Marshy Background	Other improved grassland
Standing Water	Lakes – Ponds (Non- Priority Habitat)
Standing Water	Lakes - Ponds (Priority Habitat)
Swamp	Wetland - Reedbeds
Running Water	Rivers

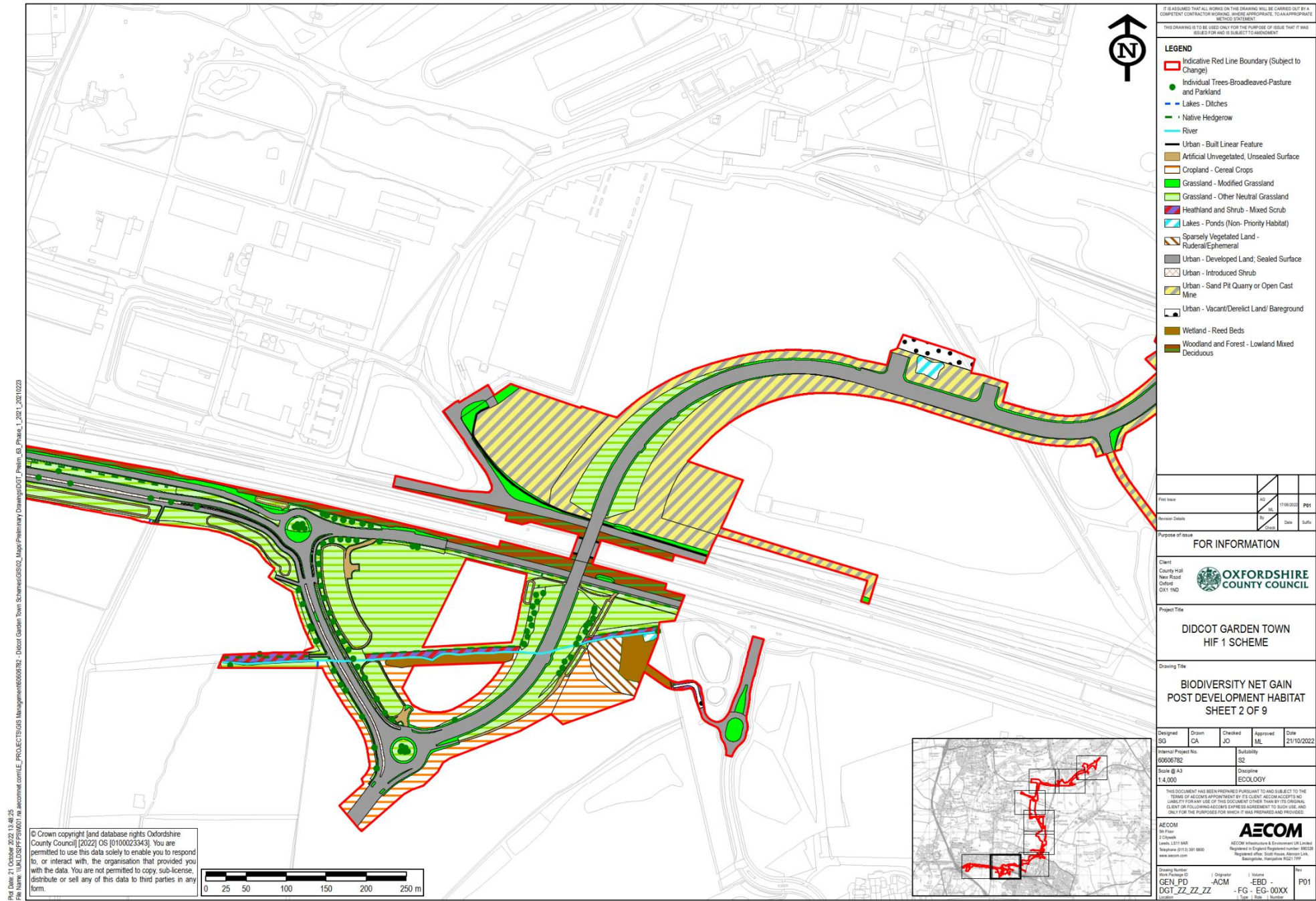
Appendix C Condition Assessment Rationale

Please refer to Table 1 in this report and Appendix D in the 2021 BNG Assessment

Appendix D Post Development Habitat Plan

See below from Page 34 – 42 for Post-Development Habitat Plan:





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LEGEND

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- Urban - Introduced Shrub
- Urban - Sand Pit Quarry or Open Cast Mine
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- Wetland - Reed Beds
- Woodland and Forest - Lowland Mixed Deciduous

For Issue	By	Date	By	Date	By
First Issue	AS	17/06/2022	PD		
Revision Details	By	Date	By	Date	By
	AS				

FOR INFORMATION

Client: County Hall, New Road, Oxford, OX1 1ND

OXFORDSHIRE COUNTY COUNCIL

Project Title: **DIDCOT GARDEN TOWN HIF 1 SCHEME**

Drawing Title: **BIODIVERSITY NET GAIN POST DEVELOPMENT HABITAT SHEET 2 OF 9**

Designed	Drawn	Checked	Approved	Date
SG	CA	JO	ML	21/10/2022

Internal Project No: 6006782
Scale: 1:1000
Discipline: ECOLOGY

Subsidiary: SG
Discipline: ECOLOGY

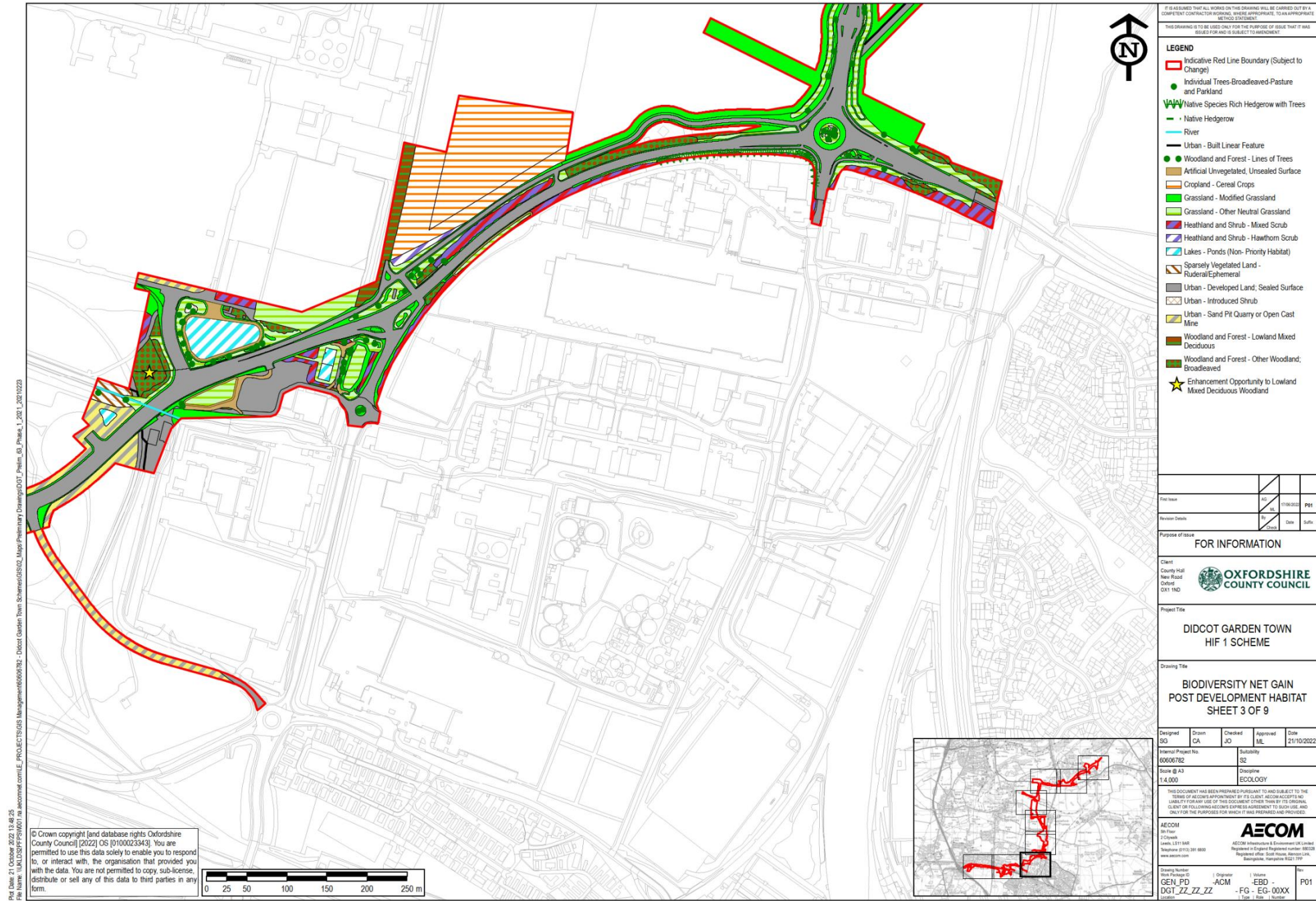
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DGT_ZZ_ZZ_ZZ	-FG	-EG-00XX			

Revision: 1
Date: 21/10/2022
By: PD



- LEGEND**
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 - Woodland and Forest - Other Woodland; Broadleaved
 - Enhancement Opportunity to Lowland Mixed Deciduous Woodland

First Issue	NO	15/03/2022	PP1
Revision Details	NO		
Purpose of Issue	NO		

FOR INFORMATION

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New Road
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OXFORDSHIRE COUNTY COUNCIL

Project Title
**DIDCOT GARDEN TOWN
HIF 1 SCHEME**

Drawing Title
**BIODIVERSITY NET GAIN
POST DEVELOPMENT HABITAT
SHEET 3 OF 9**

Designed SG	Drawn CA	Checked JO	Approved ML	Date 21/10/2022
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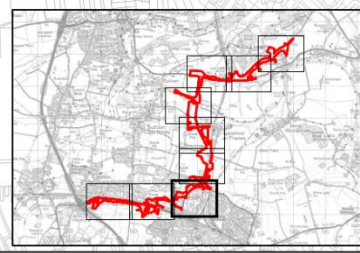
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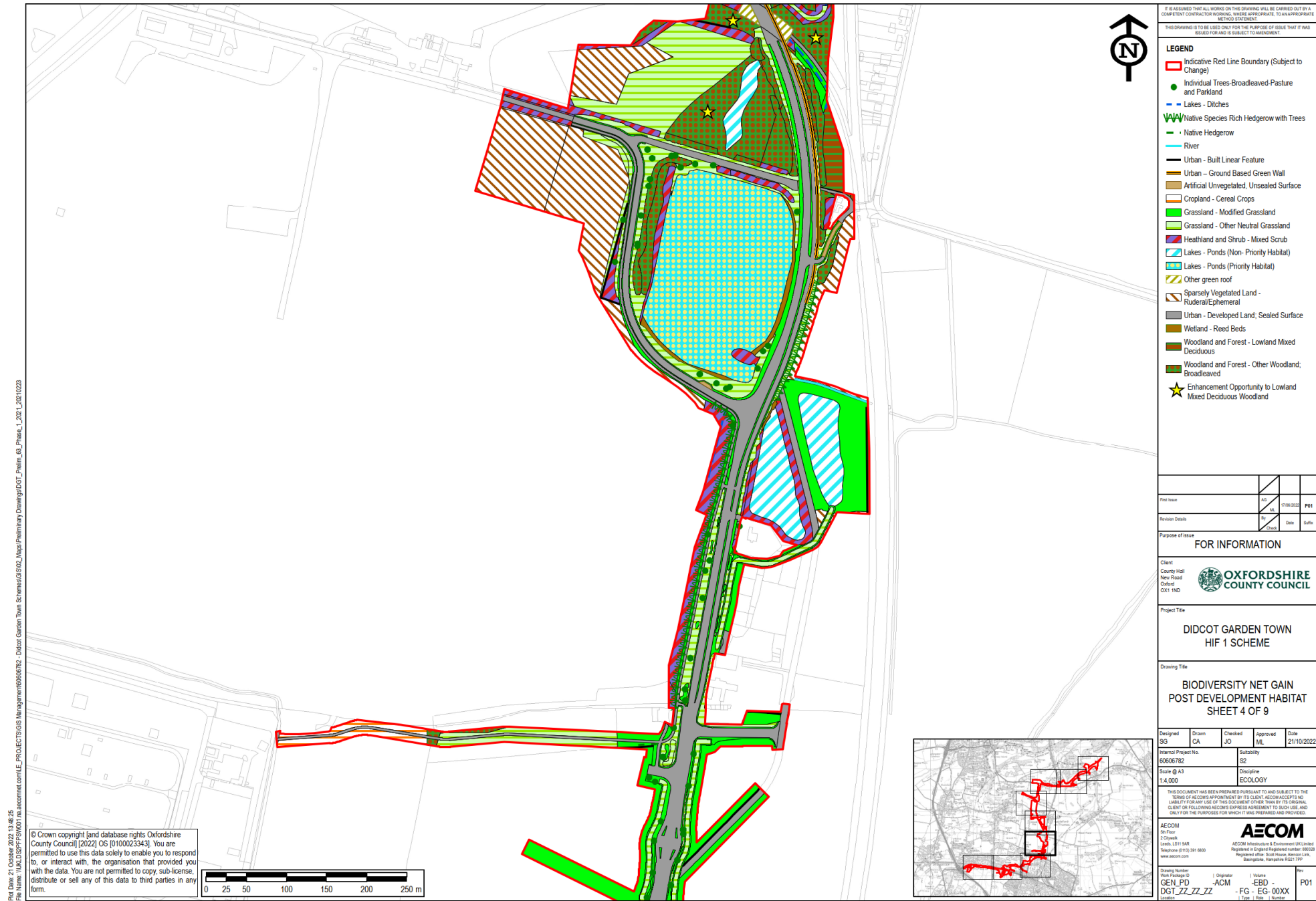
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Drawing Number GEN_PD DGT_ZZ_ZZ_ZZ	Originator -ACM	Volume -EBD	Revision -FG - EG-00XX	Sheet P01
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File Date: 21 October 2022 13:49:25
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First Issue	AL	21/06/2022	P01
Revision Details	Rev	Date	Issue
	1		

Purpose of issue
FOR INFORMATION

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OXFORDSHIRE COUNTY COUNCIL

Project Title
**DIDCOT GARDEN TOWN
HIF 1 SCHEME**

Drawing Title
**BIODIVERSITY NET GAIN
POST DEVELOPMENT HABITAT
SHEET 4 OF 9**

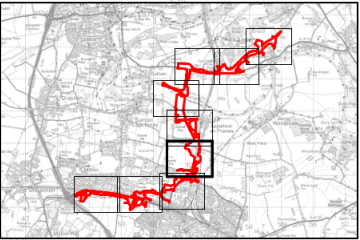
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Internal Project No. 60606782	Suitability S2			
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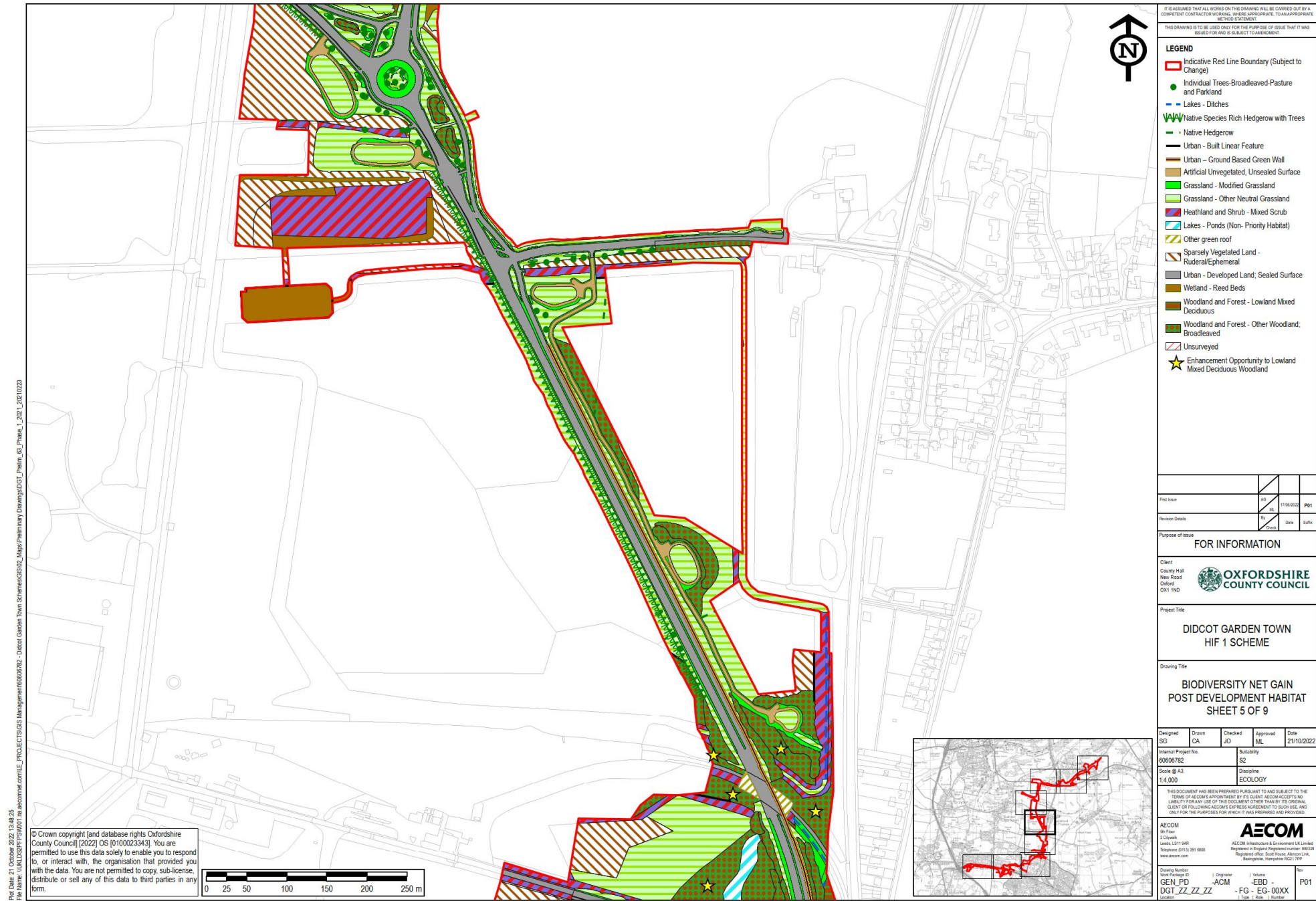
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Location	Type	Scale	Scale	



Plot Date: 21 October 2022 13:48:25
File Name: I:\UK\2022\PROJECTS\GIS Management\60606782 - Didcot Garden Town Scheme\GIS\2_Maps\Preliminary Drawings\DOT_Prelim_GD_Phase_1_2021_20210222



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- Unsurveyed
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First Issue	By	Date	Issue
	AK	17/08/2022	PP1

Revision Details	By	Date	Issue
	AK		

FOR INFORMATION

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County Hall
New Road
Oxford
OX1 1ND

OXFORDSHIRE COUNTY COUNCIL

Project Title
**DIDCOT GARDEN TOWN
HIF 1 SCHEME**

Drawing Title
**BIODIVERSITY NET GAIN
POST DEVELOPMENT HABITAT
SHEET 5 OF 9**

Designed SG	Drawn CA	Checked JO	Approved ML	Date
				21/10/2022

Internal Project No.	Subsidiary
6006762	S2

Scale @ A3	Discipline
1:4,000	ECOLOGY

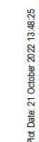
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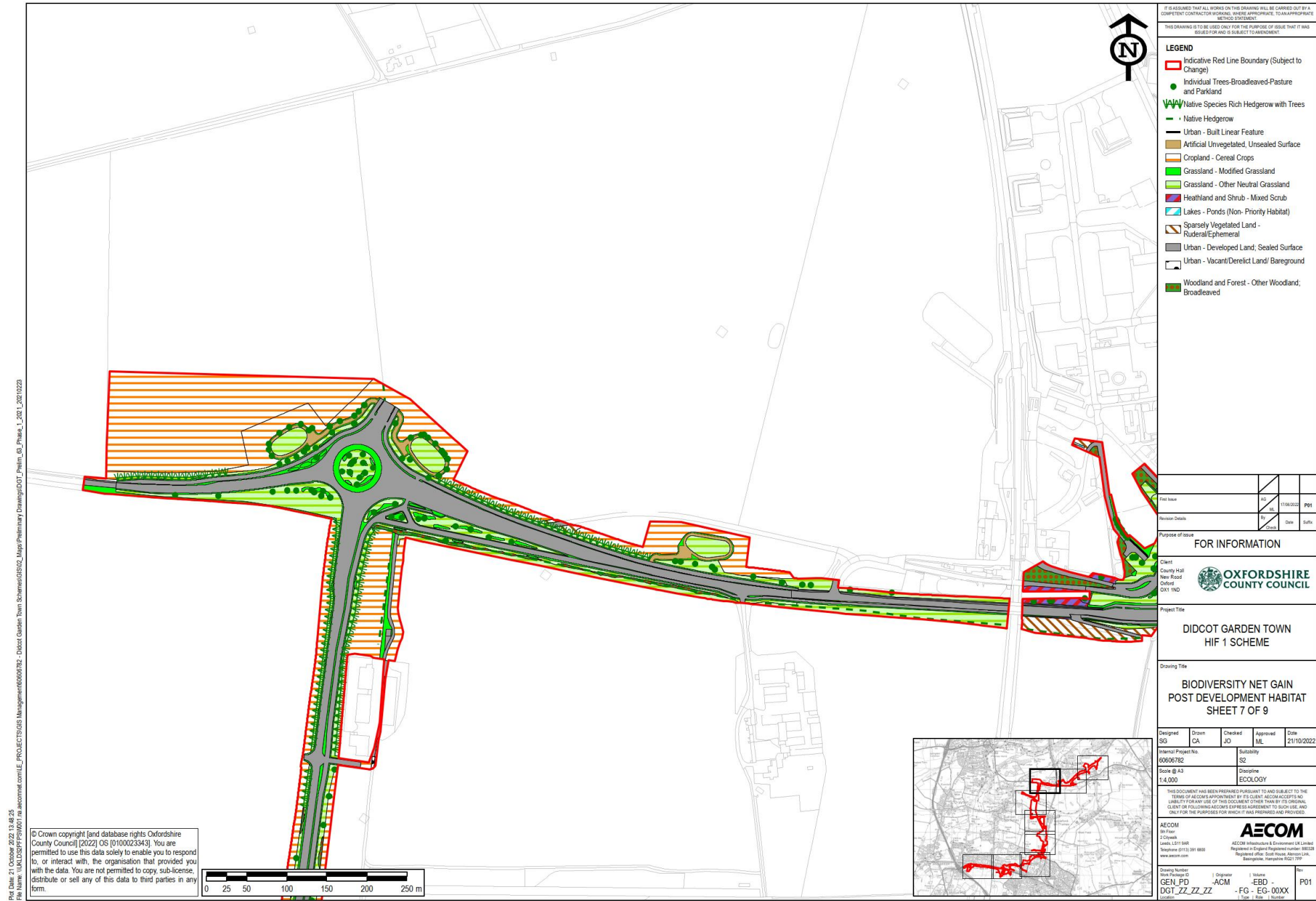
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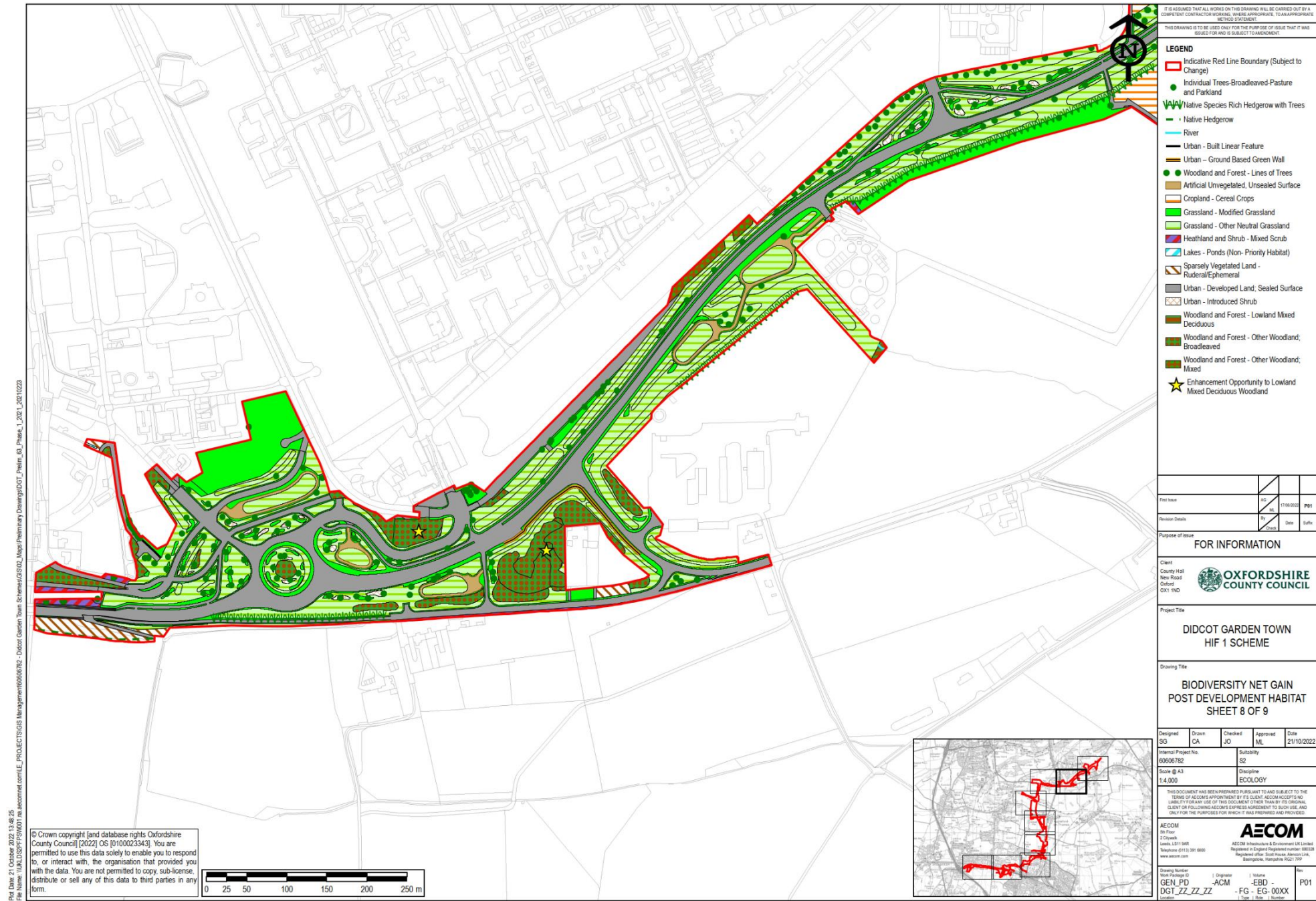
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First Issue	Rev	Date	By	For
1	1	17/08/2022	PPH	

Revision Details

Rev	Date	By	For
1			

Purpose of Issue

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OXFORDSHIRE COUNTY COUNCIL

Project Title
**DIDCOT GARDEN TOWN
HIF 1 SCHEME**

Drawing Title
**BIODIVERSITY NET GAIN
POST DEVELOPMENT HABITAT
SHEET 8 OF 9**

Designed	Drawn	Checked	Approved	Date
SG	CA	JO	ML	21/10/2022

Internal Project No.
60006782

Scale @ A3
1:4,000

Suitability
S2

Challenge
ECOLOGICAL

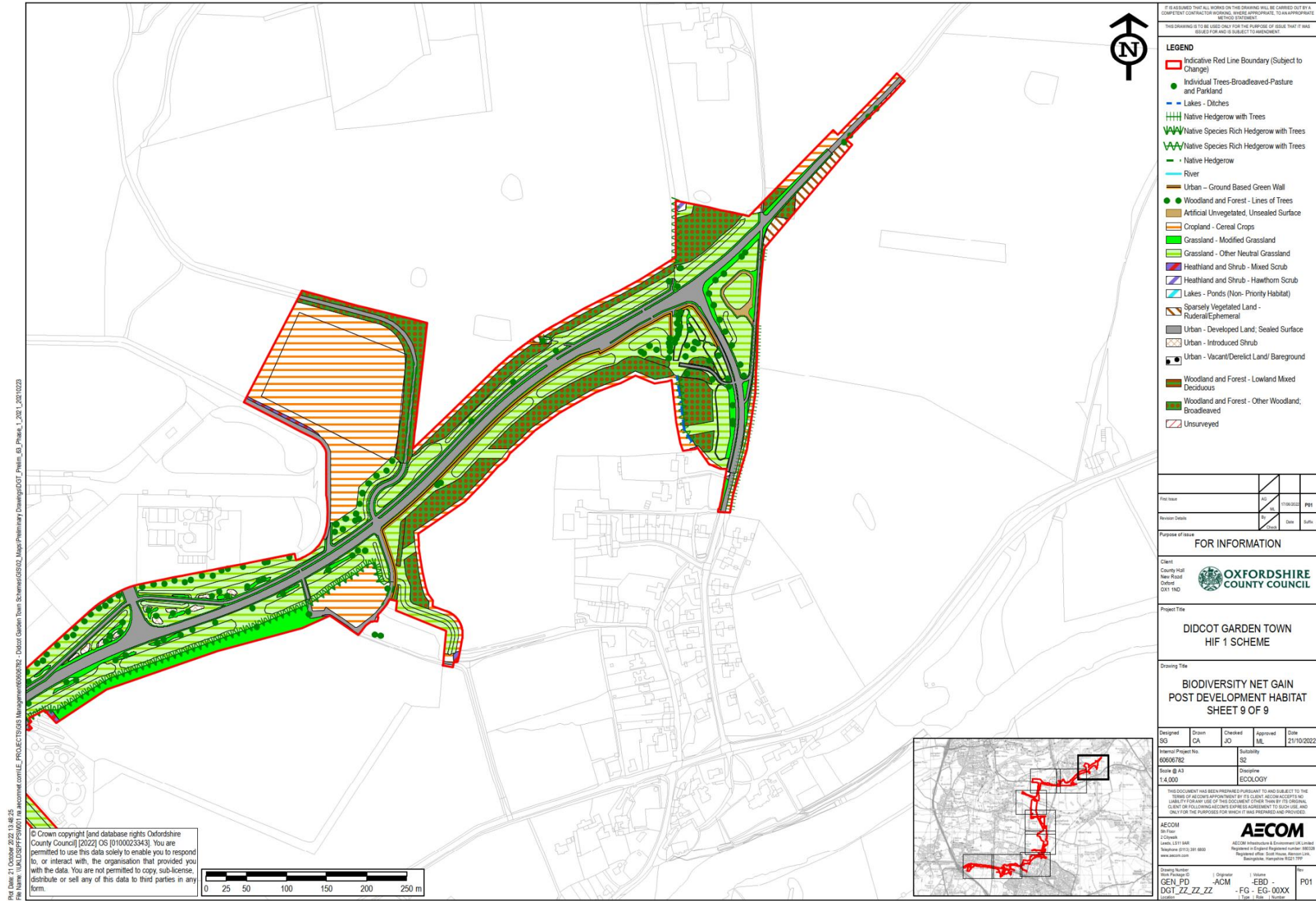
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Drawing Number	Rev	Author	Checker	Approver	Date
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First Issue	AL	21/08/2022	P01
Revision Details	Rev	Date	Issue
	01	21/08/2022	1

FOR INFORMATION

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OXFORDSHIRE COUNTY COUNCIL

**DIDCOT GARDEN TOWN
HIF 1 SCHEME**

**BIODIVERSITY NET GAIN
POST DEVELOPMENT HABITAT
SHEET 9 OF 9**

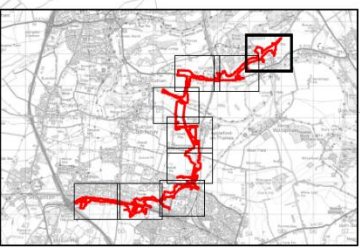
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Internal Project No. 60606782	Subsidiary S2	Scale @ A3 1:4,000		
		Discipline ECOLOGY		

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Drawing Number GEN_PD DGT_ZZ_ZZ_ZZ	Originator -ACM	Volume -EBD	Revision -FG - EG-00XX	Sheet P01
1 of 1				



Appendix E Habitat Management Required to Achieve Target Condition

Habitat type	Target condition and condition criteria	Associated habitat management requirements
Modified Grassland	<p>Target condition is 'Poor' in three years. The condition criteria are as follows:</p> <ol style="list-style-type: none"> 1. The area is clearly and easily recognisable as a good example of this type of habitat and there is little difference between what is described in the relevant habitat classifications and what is visible on site. Pass 2. The appearance and composition of the vegetation on site should very closely match the characteristics for the specific Priority Habitat [i.e as described by either the Phase 1 Habitat Classification or the UK Habitat Classification], with species typical of the habitat representing a significant majority of the vegetation. Fail 3. Wildflowers, sedges and indicator species for the specific Priority grassland habitat are very clearly and easily visible throughout the sward and occur at high densities in high frequency. See relevant Habitat Classification for details of indicator species for specific habitat. Fail 4. Undesirable species and physical damage is below 5% cover. Pass 5. Cover of bare ground greater than 10% (including localised areas, for example, rabbit warrens). Fail 6. Cover of bracken less than 20% and cover of scrub and bramble less than 5%. Pass 	<p>To meet target condition, it will be necessary to:</p> <p>Carry out planting according to the specification in the Landscape Plan;</p> <p>Carry out planting to appropriate standards;</p> <p>Monitor planting to ensure correct establishment, and take remedial action if growth fails.</p> <p>Planting suggestions:</p> <p>Sow amenity grassland seed mixes.</p> <p>Mow under OLEMP prescriptions</p>
Grassland – Other Neutral Grassland	<p>Target condition is 'Moderate' to 'Good' in 7 - 10 years. The condition criteria are as follows: .</p> <ol style="list-style-type: none"> 1. The area is clearly and easily recognisable as a good example of this type of habitat and there is little difference between what is described in the relevant habitat classifications and what is visible on site. Pass 2. The appearance and composition of the vegetation on site should very closely match the characteristics for the specific Priority Habitat [i.e as described by either the Phase 1 Habitat Classification or the UK Habitat Classification], with 	<p>To meet target condition, it will be necessary to:</p> <p>Carry out planting according to the specification in the Landscape Plan;</p> <p>Carry out planting to appropriate standards;</p> <p>Monitor planting to ensure correct establishment, and take remedial action if growth fails.</p> <p>Planting suggestions:</p> <p><u>Yr 1:</u></p> <p>June – Spray off or remove competitive/ruderal growth</p> <p>July – power/disc harrow</p> <p>August - Spray off or remove competitive/ruderal growth</p>

species typical of the habitat representing a significant majority of the vegetation. Pass

3. Wildflowers, sedges and indicator species for the specific Priority grassland habitat are very clearly and easily visible throughout the sward and occur at high densities in high frequency. See relevant Habitat Classification for details of indicator species for specific habitat. Pass

4. Undesirable species and physical damage is below 5% cover. Pass

5. Cover of bare ground greater than 10% (including localised areas, for example, rabbit warrens). Fail

6. Cover of bracken less than 20% and cover of scrub and bramble less than 5%. Pass

It is expected that the grassland will pass the majority of the criteria, however, a precautionary moderate condition has been assigned.

September to October – Seed with seed mix (Emorsgate EM5 or similar with additional yellow rattle @ 0.1g/m²)

Year 2:

April to June/July – control annual weeds by pulling or pot treatment

July to September – Mow to 5-10cm

Year 3 onwards

Cut and collect arisings late July early August

Heathland and Shrub – Mixed scrub

Target condition is 'Moderate' to 'Good' in 7 to 10 years. The condition criteria are as follows: Passes 3 of 5 criteria.

1. There are at least three woody species, with no one species comprising more than 75% of the cover (except common juniper, sea buckthorn or box, which can be 100% cover). Pass

2. There is a good age range – a mixture of seedlings, saplings, young shrubs and mature shrubs. Pass

3. Pernicious weeds and invasive species make up less than 5% of the ground cover. Pass

4. The scrub has a well-developed edge with un-grazed tall herbs. Fail

5. There are many clearings and glades within the scrub. Fail

To meet target condition, it will be necessary to:

Year 1

Use low fertility topsoil for any landscaping

September to October sow with tussock seed mix (Emorsgate EG26, EM10, EM10F or similar)

Plant ¼ area with hawthorn, blackthorn, gorse and bramble

Protect with biodegradable guards where appropriate

Year 3

Plant ¼ area with hawthorn, blackthorn, gorse and bramble

Protect with biodegradable guards where appropriate

Year 5

Plant ¼ area with hawthorn, blackthorn, gorse and bramble

Protect with biodegradable guards where appropriate

Manage invasive non-native species

Years 6-10

Restructure scrub planting to create a mosaic of mixed age scrub stands and open tussock grassland aiming to achieve a mosaic/matrix of 75% scrub.

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

Woodland and Forest - Other woodland; broadleaved/mixed	<p>Target condition is 'Moderate' to 'Good' in 20 years. The condition criteria are as follows:</p> <ol style="list-style-type: none"> 1. This should be an area of trees with complete canopy cover. Pass 2. Native species are dominant. Non-native and invasive species account for less than 10% of the vegetation cover. Pass 3. A diverse age and height structure of the trees. Fail 4. Free from damage [Bark stripping; Browse line; Damage shoot tips] (in the last five years) from stock or wild mammals with less than 20% of vegetation being browsed. Pass 5. There should be evidence of successful (i.e. not browsed off before it gets well established) tree regeneration such as seedlings, saplings and young trees. Fail 6. Standing and fallen dead wood of over 20 cm diameter are present including fallen large dead branches/stems and stumps. Fail 7. Wetland habitat if they exist within the wood has little sign of drainage or channel straightening. N/A 8. The area is protected from damage by agricultural and other adjacent operations. Pass 9. There should be no evidence of inappropriate management (e.g. deep ruts, animal poaching or compaction). Pass 10. Invasive non-native plants are below 5% (see list below). Pass 11. No signs of significant nutrient enrichment present Pass 12. More than 3 different native trees and 3 shrub species in an average 10 m radius. Pass <p>The main criteria that the woodland is predicted to fail are features that develop over time – moderate to good condition is realistic and achievable.</p>	<p>To meet target condition, it will be necessary to:</p> <ul style="list-style-type: none"> • Carry out planting according to the specification in the Landscape Plan; • Carry out planting to appropriate standards; • Monitor planting to ensure correct establishment, and take remedial action if growth fails. • Seclude the area with fencing to prevent herbivore damage. This will also decrease woodland disturbance. <p>Planting suggestions:</p> <ul style="list-style-type: none"> • Planting of saplings to give woodland regeneration. Fill in areas of open space. • Plant in groups of 3s, 5s and 7s of same species, at 2m spacings. • All plants to be fitted with biodegradable guards; • Planting pits to have minimum topsoil depths of 300mm and minimum subsoil depths of 700mm, with base of broken-up to 150mm; • Woodland Mix - Weed control measures to continue until the canopy of shrubs is closed. Weeds to be cleared by hand or by application of translocated herbicide, with inspections made regularly through the growing season. Prune back any badly damaged shrubs to sound growth. Cut back plants adjacent to paths and access ways where necessary, retaining a balanced shape. Clear litter and debris from planted areas and cut leggy growth hard back to promote bushy growth; • Watering - In periods of dry weather apply sufficient water to maintain healthy growth; and, • Refirming - Ensure that all trees and shrubs are firmly bedded in the ground after strong winds, frost heave or other disturbances.
Lakes – Ponds (Priority/non-Priority Habitat)	<p>Target condition is 'Good' in eight years. The condition criteria are as follows:</p> <ol style="list-style-type: none"> 1. Are of good water quality, with clear water (substrate can be seen) and no obvious sign of pollution in the water body. Pass 2. The water body should have semi natural riparian land for at least 10 m from the pond edge. Pass 3. Non-woodland ponds should be dominated by plants, be they submerged or floating (note dominance of duckweed is a sign of eutrophication). Pass 4. Non-woodland ponds [i.e. that have always been open] should not be shaded more than 50%. Pass 	<p>To meet target condition, it will be necessary to:</p> <ul style="list-style-type: none"> • Create semi-natural habitat (i.e. moderate distinctiveness or above) for at least 10m from the pond edge • Less than 10% of the pond is covered with duckweed or filamentous algae. • No connection to other waterbodies, either via streams, ditches or artificial pipework. • Absence of non-native plant and animal species • No artificial presence of fish – natural occurring number to be low density

	<p>5. Many ponds will be fishless, those which naturally contain fish should not be stocked and should contain a native fish assemblage. Pass</p> <p>6. Ponds should not be artificially connected to other water bodies, e.g. ditches. Pass</p> <p>7. Pond water levels should be able to fluctuate naturally throughout the year. Pass</p> <p>8. Non-native species should be absent. Pass</p> <p>9. Less than 10% of the pond should be covered with duckweed or filamentous algae. Pass</p>	
Wetland - Reedbeds	<p>Target Condition is 'Good' in 12 years condition criteria are as follows.</p> <p>1. There is no artificial drainage, which would include ditches that are now revegetated and streams that have been depend and widened. Fail – minor drainage could still be in place</p> <p>2. The water level and its management should result in surface water throughout the year. Pass</p> <p>3. Cover of undesirable species (common nettle, docks, creeping/spear thistles, common ragwort and Indian (Himalayan) balsam) should be less than 10%. Pass</p> <p>4. Cover of scrub should be less than 10%. Pass</p> <p>5. Cover of bare ground should be less than 10%. Pass</p> <p>6,7 & 8. N/A</p> <p>9. Reedbed vegetation should include at least 60% common reeds. Pass</p>	<p>To meet target condition, it will be necessary to:</p> <ul style="list-style-type: none"> • Carry out earthworks to create ground and water conditions suitable for reedbed • Establish reedbed vegetation – coir rolls • Manage water levels and water supply • Manage distribution and flow of water through the site • Maintain any culverts, sluices, or bunds • Manage scrub and opportunistic species to assist reedbed establishment • Dispose of cut material appropriately • Manage open water features
Lowland Mixed Deciduous Woodland	<p>Target condition is 'Poor' in ten years. Total score using Woodland Type condition sheet is <26 (13 to 25)</p>	<p>Create ground flora</p> <p><u>Year 1:</u></p> <p>Apply deep mulch to ground flora and over sow area with seed mix (Emorsgate EG9 and EW1 or similar). Targeting the following</p> <p><u>Woodland edge species sown as seed at 3kg/ha</u></p> <ul style="list-style-type: none"> • <i>Allaria petiolate</i> • <i>Arum maculatum</i> • <i>Bromus recemosus</i> • <i>Brachypodium sylvaticum</i> • <i>Digitalis purpurea</i> • <i>Galliu, mollugo</i> • <i>Geum urbanum</i> • <i>Hypericum hirsutum</i>

- *Milium effusum*
- *Silene dioica*
- *Stachys sylvatica*
- *Stellaria holostea*
- *Torilis japonica*

Shade tolerant species sown at 10kg/ha

- *Allium ursinum*
- *Conopodium majus*
- *Gallium odoratum*
- *Hyacinth non-scriptus*
- *Primula vulgaris*
- *Viola odorata*

Shade tolerant species pot/plugs 3-9/m2

- *Anemone nemorosa*
- *Ajuga reptans*
- *Circaea lutetiana*
- *Lamium galeobdolon*
- *Mercurialis perennis*
- *Oxalis acetosella*
- *Teucrium scorodonia*
- *Viola riviniana*

Assess and restructure existing stands

Selectively fell and/or crown lift approximately 1/3 of existing woodland stands. Stacking dead wood in piles and retaining on site.

Create three age classes of tree and shrub:

Year 1: Plant 25% of open area with minimum 5 native tree species* and 2 native shrub species. Protect with biodegradable guards where appropriate

Year 3: Plant 25% of open area with minimum 5 native tree species* and 2 native shrub species.

Protect with biodegradable guards where appropriate

Year 5: Plant 25% of area with minimum 5 native tree species* and 2 native shrub species.

Protect with biodegradable guards where appropriate

		<p>Years 2-7 Monitor and replace trees that have failed to establish</p> <p>Spot treat/remove invasive non natives</p> <p>Year 8 and beyond, Reassess stand structure and selectively fell and crown lift where appropriate.</p> <p>Monitor and condition assess in years 2, 5, 10, 15, 20, 25 and 30</p> <p>*When planting tree species plant 20% 4-7cm dbh, 20% feathers, 60% whips.</p>
Native Species Rich Hedgerow With Trees	<p>Target condition is 'Moderate' in 10 years. The condition criteria are as follows.</p> <p>No more than two failures in total and no more than one in any functional group.</p> <p>A1: >1.5m average height along length. Pass</p> <p>A2: >1.5m average width along length. Pass</p> <p>B1: Gap between ground and base of canopy <0.5m for >90% length. Pass</p> <p>B2: Gaps make up <10% of total length and no canopy caps >5m. Pass</p> <p>C1: >1m width of undisturbed ground with perennial herbs for >90% length, on at least one side of hedge. Pass</p> <p>C2: Plant sp. indicative of nutrient enrichment dominate <20% cover. Pass</p> <p>D1: >90% of hedge & undisturbed ground free of INNS and neophytes. Pass</p> <p>D2: >90% hedge or undisturbed ground free of damage caused by human activities. Fail</p> <p>E1: At least 1 mature tree per 30m. Pass</p> <p>E2: Min 95% of hedge trees in healthy condition. Little/no evidence of adverse impact on tree health by animals/pests/disease/human activity. Fail</p>	<p>To meet target condition, it will be necessary to:</p> <p>Carry out planting according to the specification in the Landscape Plan;</p> <p>Carry out planting to appropriate standards;</p> <p>Monitor planting to ensure correct establishment, and take remedial action if growth fails.</p>
Native Species Rich Hedgerow	<p>Target condition is 'Good' in ten years. The condition criteria are as follows. No more than two failures in total and no more than one in any functional group.</p> <p>A1: >1.5m average height along length Pass</p> <p>A2: >1.5m average width along length Pass</p> <p>B1: Gap between ground and base of canopy <0.5m for >90% length Pass</p> <p>B2: Gaps make up <10% of total length and no canopy caps >5m Pass</p> <p>C1: >1m width of undisturbed ground with perennial herbs for >90% length, on at least one side of hedge Fail</p> <p>C2: Plant sp. indicative of nutrient enrichment dominate <20% cover Pass</p> <p>D1: >90% of hedge & undisturbed ground free of INNS and neophytes Pass</p>	<p>To meet target condition, it will be necessary to:</p> <p>Carry out planting according to the specification in the Landscape Plan;</p> <p>Carry out planting to appropriate standards;</p> <p>Monitor planting to ensure correct establishment, and take remedial action if growth fails.</p>

D2. >90% hedge or undisturbed ground free of damage caused by human activities Fail

Appendix F Biodiversity Metric 3.1 Calculation

Full metric calculator to be included as an attachment.

On-site baseline	<i>Habitat units</i>	578.32
	<i>Hedgerow units</i>	33.44
	<i>River units</i>	20.97
On-site post-intervention (Including habitat retention, creation & enhancement)	<i>Habitat units</i>	693.98
	<i>Hedgerow units</i>	47.12
	<i>River units</i>	21.23
On-site net % change (Including habitat retention, creation & enhancement)	<i>Habitat units</i>	20.00%
	<i>Hedgerow units</i>	40.90%
	<i>River units</i>	1.26%
Off-site baseline	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	<i>Habitat units</i>	0.00
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	<i>Habitat units</i>	115.67
	<i>Hedgerow units</i>	13.68
	<i>River units</i>	0.26
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	<i>Habitat units</i>	20.00%
	<i>Hedgerow units</i>	40.90%
	<i>River units</i>	1.26%
Trading rules Satisfied?	Yes ✓	

