A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010041

6.7 Environmental Statement – Appendix 9.20 Biodiversity No Net Loss Assessment

Part A

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

June 2020

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

The A1 in Northumberland: Morpeth to Ellingham

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Environmental Statement - Appendix

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A1 IN NORTHUMBERLAND: MORPETH TO FELTON

Appendix 9.20 Biodiversity No Net Loss Assessment

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CONTEXT

The A1 in Northumberland: Morpeth to Felton Scheme, hereafter referred to as 'the Scheme', aims to increase capacity along an approximately 12.6 km section of the existing A1 between Morpeth and Felton in Northumberland, by widening the existing single carriageway to a dual carriageway. It includes approximately 6.5 km of online widening and approximately 6.1 km of new offline highway. Most of the work would take place within the highway boundary, however, some additional land would be required alongside the A1 to enable additional lanes to be constructed. The Order Limits, hereafter referred to as 'the Site' is shown in **Appendix C**.

The A1 M2F Scheme has adopted the Defra metric to quantify the biodiversity baseline of the Scheme and provide an indication of the biodiversity value of onsite landscape planting and ecological mitigation after construction. The figures in **Appendix C** provide the boundary of the Scheme and the geographic extent of the onsite landscape planting and ecological mitigation.

Highways England produced a Chief Highways Engineer (CHE) memorandum (Highways England, 2018) which guides the standardised reporting of biodiversity information on Highways England projects. The CHE Memo does not follow the full Defra metric and is only for internal Highways England reporting. An assessment in accordance with the CHE memo is included in **Appendix D**.

AIMS

This report aims to:

- Establish the total number of baseline biodiversity units (BU) and linear units (LU) within the Site.
- Establish the total number of BU and LU which will be retained, reinstated or created under the proposed Landscape Mitigation Masterplan.
- Determine whether the Scheme would result in a net loss, no net loss or a net gain for biodiversity for Habitats of Principle Importance (HPI) and other non-HPI habitats.

KEY FINDINGS

Results of the BNG assessment show that construction of the Scheme and following management would result in:

- A 289% net gain in BU for area-based HPI
- An 18% net loss in LU for Hedgerow HPI
- No net loss in length of River HPI
- A 31% net loss in BU for area-based non-HPI, compensated for by the gain in HPI.

Table 1 - Summary of BNG calculation results

Habitat Type	Baseline	Post-Development	Change	Outcome
HPI Lowland mixed deciduous woodland	11.52 BU	105.37 BU	+93.85 BU	**Net Gain (+815%)**
HPI Lowland meadow	36.96 BU	297.97 BU	+261.01 BU	**Net Gain (+706%)**
HPI Arable field margins	58.92 BU	22.68 BU	-36.24 BU	**Net Loss (-61%)**
HPI Pond	3.48 BU	4.99 BU	+1.51 BU	**Net Gain (+43%)**
Area-based HPI total	110.88 BU	431.01 BU	+320.13 BU	**Net Gain (+289%)**
Area-based non-HPI total	550.56 BU	377.98 BU	-172.58 BU	**Net Loss (-31%)**
HPI Hedgerow	66994.5 LU	54870.5 LU	-12124.0 LU	**Net Loss (-18%)**
HPI River	3911.0 m	3711.0 m	-200.0 m	**No Net Loss (-5%)**

Overall, the Scheme is categorised as achieving a biodiversity net loss due to:

1) Net loss of Hedgerow HPI LU and Arable field margin HPI BU.
2) Loss of irreplaceable ancient woodland habitats within the River Coquet and Coquet Valley Woodlands Site of Special Scientific Interest (SSSI) and the Coquet River Felton Park Local Wildlife Site (LWS). The ES sets out a bespoke scheme for compensation of this irreplaceable habitat, though this is outside of the scope of the BNG assessment.

The Scheme would result in a total loss of 0.68 ha irreplaceable ancient woodland habitat. This loss of irreplaceable habitat comprises: 0.27 ha within the River Coquet and Coquet Valley Woodlands SSSI; as well as 0.41 ha within the Coquet River Felton Park LWS. The latter area has assumed ancient woodland habitat status as it supports ancient woodland characteristics. This loss of irreplaceable habitat would be compensated for by creation of 8.16 ha of woodland compensation. The areas associated with this loss and compensation

have been excluded from the BNG assessment calculations in accordance with best practice guidelines.

Despite the proposals achieving a scheme-wide biodiversity net loss, there may be opportunities to achieve like-for-like or like-for-better replacement for HPIs through additional on or off-site measures. Additional creation or enhancement of hedgerow and Arable field margin HPIs could help ensure a quantitative net gain for all non-irreplaceable habitats. It should be noted that the assessment of Arable field margin HPI is based on an assumed presence of a 2m buffer strip around each arable field boundary that could be further refined at the detailed design stage.

It is important to recognise that the quantification of biodiversity units is one of a number of factors to be considered when assessing the impact of the Scheme on biodiversity.

1 INTRODUCTION

1.1 BIODIVERSITY NET GAIN

1.1.1. Biodiversity net gain (BNG) is the end result of a process applied to development so that overall, there is a positive outcome for biodiversity. The process itself follows the mitigation hierarchy, which sets out that everything possible must be done to firstly avoid, secondly minimise and thirdly restore / rehabilitate losses of biodiversity on site. Only as a last resort, residual losses are compensated for using biodiversity offsets, which are distinguished from other forms of mitigation in that they are off the development site and require measurable conservation outcomes.

1.1.2. Adopting a BNG approach can account for biodiversity losses not fully covered by legal and planning systems. Whilst some species are extensively protected, many are not; with the consequence that development can be 'legally compliant' but still result in biodiversity loss. The BNG approach guards against this, enabling development to contribute towards the national and global target of halting biodiversity loss by 2020 and towards local and national strategies for conserving and enhancing wildlife.

1.1.3. For BNG to be used appropriately and to generate long-term gains for nature, the good practice principles established by the Business and Biodiversity Offset Programme (BBOP) can be used. These principles have been established in the context of UK development by the Construction Industry Research and Information Association (CIRIA), the Chartered Institute for Ecology and Environmental Management (CIEEM) and the Institute of Environmental Management and Assessment (IEMA) (refer to **Appendix A**). The BNG process for the A1 Morpeth to Felton (M2F) assessment adheres to these principles.

1.2 PROJECT CONTEXT

1.2.1. The Scheme aims to increase capacity along an approximately 12.6 km section of the existing A1 between Morpeth and Felton in Northumberland, by widening the existing single carriageway to a dual carriageway. It includes approximately 6.5 km of online widening and approximately 6.1 km of new offline highway in a predominately rural area. Most of the work would take place within the existing highway boundary, however, some additional land would be required alongside the A1 at certain points to enable the additional lanes to be constructed. **Appendix C** shows the Order Limits, hereafter referred to as 'the Site'.

1.2.2. The purpose of the Scheme is to provide additional capacity by widening the carriageway to four lanes as a means of reducing traffic congestion and delays along the corridor. These proposals are hereafter referred to as 'the Scheme'.

1.2.3. The Scheme has adopted the Defra metric to undertake a baseline and preliminary post-development biodiversity unit (BU) and linear unit (LU) calculation to quantify the biodiversity which would be lost due to the Scheme. This assessment will provide an indication of the biodiversity which would be replaced through onsite compensation once

the Scheme has been built. This information will be used to indicate whether the Scheme is likely to meet a net loss, no net loss or net gain for biodiversity.

1.2.4. The biodiversity assessment provides a quantitative benchmark to inform avoidance, mitigation and compensation measures designed to mitigate for habitat loss due to the Scheme. This includes informing habitat restoration and reinstatement proposals as well as new habitat creation.

1.3 SCOPE OF REPORT

1.3.1. This report contains the Biodiversity Net Gain (BNG) assessment using the DEFRA metric and:

a. Establishes the total number of baseline BU and LU within the Site.
b. Establishes the total number of BU and LU which will be retained, reinstated or created under the proposed **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**).
c. Determines whether the Scheme would result in a net loss, no net loss or a net gain for biodiversity, broken down by Habitats of Principle Importance (HPI) and other non-HPI habitats.

1.3.2. This report provides details of the methodology and results of the BNG assessment for the Site. It should be noted that this report looks at the BNG assessment results only and does not provide any recommendations to enable a reduction in biodiversity losses and to maximise biodiversity gains.

1.3.3. The Scheme has sought to achieve BNG for HPIs as a minimum and to achieve not net loss where possible within the Site. For the purpose of this report, the outcomes of the BNG assessment for HPIs and all other habitat types have been reported separately to evaluate whether the Scheme achieves this goal.

1.3.4. This BNG report does not cover requirements of the Scheme arising from potential impacts on protected species and designated sites. This information will be covered within **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/ APP/6.2**).

1.4 BIODIVERSITY NET GAIN POLICY

HIGHWAYS ENGLAND

1.4.1. Highways England manages England's strategic road network which covers an area of 25,000 ha including around 8,500 miles of road. The road network contains a range of protected habitats including species rich grasslands, woodlands and wetlands. It supports and affects a number of rare and protected flora and fauna, including peregrine falcon, dormouse, rare orchids and other wild plants. In 2015, Highways England published their biodiversity plan, which aims to ensure that the strategic road network positively supports the health of England's wildlife.

1.4.2. The biodiversity net gain approach can help avoid, minimise and, as a last resort, compensate for residual adverse impacts on biodiversity arising from a development. The Government's Road Investment Strategy (RIS) (Department for Transport, 2015) states that by 2020, Highways England must deliver a reduction in the net loss of biodiversity on its estate and reach no net loss of biodiversity by 2025. By 2040 Highways England must deliver a net gain in biodiversity, which is reflected within their biodiversity plan (Highways England, 2015).

1.4.3. Highways England's RIS Delivery Plan 2016-2017 (Highways England, 2016) states *"Highways England will achieve a reduction in the net loss of biodiversity by end of the first Road Period (2020) on an ongoing annual basis"; and "be fully transparent about our performance in relation to biodiversity and will produce a report".*

1.4.4. Highways England produced a Chief Highways Engineer (CHE) memorandum (Highways England, 2018) which guides the standardised reporting of biodiversity information on Highways England projects. The CHE Memo does not follow the full Defra metric and is only for internal Highways England reporting. An assessment in accordance with the CHE memo is included in Appendix D.

NATIONAL POLICY STATEMENT FOR NATIONAL NETWORKS

1.4.5. The National Policy Statement for National Networks (2014) (NPS NN) paragraph 5.23 states that:

> *"The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests."*

1.4.6. Maintaining no net loss of biodiversity as a result of the Scheme is consistent with the policy aims of Paragraph 5.25 of the NPS NN, which states:

> *"As a general principle, and subject to the specific policies below, development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. The applicant may also wish to make use of biodiversity offsetting in devising compensation proposals to counteract any impacts on biodiversity which cannot be avoided or mitigated. Where significant harm cannot be avoided or mitigated, as a last resort, appropriate compensation measures should be sought."*

1.4.7. This sets out that any loss should be compensated for to achieve no net loss or net gain by replacing habitats, exploring the potential for enhancing them, and managing retained features.

NATIONAL PLANNING POLICY FRAMEWORK

1.4.8. Although not currently a legal obligation, the revised National Planning Policy Framework (NPPF) (2019) refers to biodiversity and environmental net gains in the following paragraphs:

a. Transport Infrastructure

i. Paragraph 102. "*Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: d) the environmental impacts of traffic and transport infrastructure can be identified assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains*."

b. Planning Decisions

i. Paragraph 118 "*Planning decisions and planning policy should a) encourage multiple benefits from both urban and rural land … and taking opportunities to achieve net environmental gains - such as developments that would enable new habitat creation*."

ii. Paragraph 170 "*Planning policies and decisions should contribute to and enhance the natural and local environment by: … d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*"

iii. Paragraph 174 "*To protect and enhance biodiversity and geodiversity plans should b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity*."

iv. Paragraph 175 "*When determining planning applications, local planning authorities should apply the following principles: a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts) adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; … and d) … opportunities to incorporate biodiversity improvements in and around developments, especially where this can secure measurable net gains for biodiversity*."

1.4.9. In addition, on 14th March 2019, Her Majesty's Treasury confirmed that following consultation, the government will use the forthcoming Environment Bill to mandate BNG for development in England, ensuring that the delivery of much-needed infrastructure and housing is not at the expense of vital biodiversity. Additionally, the 25 Year Environment Plan states the UK Government intention to, "*seek to embed a 'net environmental gain' principle for development to deliver environmental improvements*".

LOCAL BIODIVERSITY ACTION PLAN

1.4.10. In this case, the public authority mentioned in the NERC Act (2006) Section 40 (1) is deemed to be the local planning authority (Northumberland County Council) within which the Scheme will reside.

1.4.11. Within the Northumberland Biodiversity Action Plan a list of Habitats of Principal Importance are recorded as priority habitats. These priority habitats are then referred in the following local plans.

1.4.12. The Northumberland Local Plan Core Strategy was withdrawn in April 2017 in favour of the Northumberland Local Plan (in draft) but states that:

a. Section 3.18. There should be "*no net loss of biodiversity, with the creation of new priority habitats and green infrastructure*"; and that

b. Section 8.22. "*Moving from a net loss of biodiversity to achieving net gains for nature is central to sustainable development and that contributing to conserving and enhancing the natural environment is a core planning principle*".

1.4.13. Within the draft Northumberland Local Plan, net gains for biodiversity and priority habitats are mentioned as follows:

a. Policy STP 3 states that a development should adhere to principles that "*Contribute to net gains for biodiversity and establish a coherent and resilient ecological network*";

b. Section 10.9. "*Moving from a net loss of biodiversity to achieving net gains is central to sustainable development and that contributing to conserving and enhancing the natural environment is a core planning principle*";

c. Policy ENV 2 (1) states that "*Development proposals affecting biodiversity and geodiversity will minimise their impact and net gains for biodiversity will be secured by: a) Avoiding significant harm through location and / or design. Where significant harm cannot be avoided, applicants will be required to demonstrate that adverse impacts will be adequately mitigated or, as a last resort compensated for; b) Securing net biodiversity gains and / or wider ecological enhancements through new development*";

d. Policy ENV 2 (4) states that "*The conservation, restoration, enhancement, creation and / or (where appropriate) the re-creation of priority habitats*" will follow an ecosystem approach; and

e. Policy MIN 1 states that "*The conservation and enhancement of nature conservation and geological sites, including internationally, nationally and locally designated sites, priority habitats and protected and priority species – applicants will be required to demonstrate that their proposal will deliver a net gain for biodiversity where possible through the creation of priority habitats and by contributing to the creation of a coherent and resilient ecological network and that there will be no unacceptable adverse effects on national or international nature conservation designations or irreplaceable habitats*".

2 METHODOLOGY

2.1 OVERVIEW

2.1.1. WSP has produced a six-step process for carrying out a BNG assessment of a Scheme (refer to **Appendix B** for the full six step process). The work set out in this report is covered by step two with the relevant sections provided below:

STEP 2 INITIAL BIODIVERSITY ASSESSMENT

i. **Survey baseline habitats and their condition.** Ideally, a habitat condition assessment is undertaken during Phase 1 Habitat survey. If primary Phase 1 Habitat data is not available, condition assessment can be undertaken retrospectively through interpretation of Phase 1 target notes, consultation with surveyors, or employing a number of assumptions.

ii. **Identify irreplaceable habitat.** Following Defra guidance, irreplaceable habitats within the Scheme boundary must be identified and excluded from the biodiversity unit calculations.

iii. **Calculate baseline biodiversity units using the biodiversity metric.** This calculation includes all habitats (minus irreplaceable habitats) within the Scheme boundary prior to development and is informed by Phase 1 Habitat data and results of the condition assessment. The baseline biodiversity unit calculation may be run on a number of scheme options if the scheme is at options appraisal stage.

iv. **Calculate post-development biodiversity units using the biodiversity metric.** This calculation accounts for all of the proposed habitats (including retained habitats and habitats lost or created as a result of the development) within the Scheme boundary post-development. The calculation excludes irreplaceable habitats. The calculation is informed by scheme design, the **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/ APP/6.5**), and proposed ecological mitigation. The assessment is based upon the target state (type, size and condition) of habitats being created.

v. **Produce a 'Biodiversity Assessment' report.** The report sets out the BNG process in the context of the Scheme and includes the method and results of initial baseline and post-development biodiversity unit calculations.

IRREPLACEABLE HABITATS

2.1.2. The Site includes approximately 0.68 ha of ancient woodland, which is considered to be an irreplaceable habitat. All efforts have been made to avoid and reduce impacts to this habitat.

2.1.3. Following Defra guidance, irreplaceable habitats have been excluded from this biodiversity unit calculation (see Principle 2 of CIRIA, CIEEM & IEMA Good Practice Principles). It is

important to note that BNG or NNL cannot be achieved for the Scheme as a whole if there is loss of an irreplaceable habitat.

2.1.4. Defra guidance dictates that any compensation offered to address impacts on irreplaceable habitats should be agreed directly with the statutory nature conservation agency (in this case Natural England (NE)). The baseline habitat which is identified for such compensation and the biodiversity units resulting from this compensation should also be excluded from biodiversity unit calculations.

2.1.5. Unavoidable impacts on irreplaceable habitats should not undermine the BNG process for the other habitats. Projects in this situation should aim to achieve BNG or NNL of non-irreplaceable habitats.

HABITATS OF PRINCIPLE IMPORTANCE

2.1.6. Of the non-irreplaceable habitats found on site and proposed in the post-development **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**), a number are defined as HPIs. Since the NERC Act (2006) and the Northumberland County Council's local plan recommends their compensation, this assessment determines the outcome for each HPI impacted as a result of the Scheme. The following table (**Table 2.1**) is used to identify the HPI in the baseline and post-development **Landscape Mitigation Masterplan** (**Figure 7.8**, **Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**). These are identified throughout the results tables and summarised at the end.

Table 2.1 – JNCC Phase 1 Habitat Types and their Associated HPI Description

JNCC Phase 1 Habitat type	Habitat of principle importance
A1.1.1 Broadleaved woodland - semi-natural	Lowland mixed deciduous woodland
A1.3.1 Mixed woodland - semi-natural	
B2.2 Neutral grassland - semi-improved	Lowland meadows
G1.1 Standing water - eutrophic	Ponds
G2.1 Running water	Rivers
J1.1 Cultivated / disturbed land - arable (high distinctiveness)	Arable field margins
J2.1.1 Hedgerow - native species rich (intact)	Hedgerows
J2.1.2 Hedgerow - native species poor (intact)	
J2.2.2 Hedgerow - native species poor (defunct)	
J2.3.2 Hedgerow with trees - native species poor (intact)	

LINEAR HABITATS

2.1.7. Defra recognise that hedgerows are a very important feature in terms of biodiversity value: 'Their contribution, by area, to biodiversity in the landscape is far greater than even the most biodiversity rich habitats' (Defra, 2012a). Hedgerows therefore cannot be treated as other area-based habitats and are considered in terms of LU rather than BU, both are arbitrary units which are not directly comparable with each other.

2.2 BASELINE BIODIVERSITY UNIT CALCULATION

EXTENT AND SOURCES OF BASELINE HABITAT DATA

2.2.1. The baseline assessment was based upon the extended Phase 1 Habitat survey (**Appendix C**) undertaken in June 2016 as well as the supplementary Phase 1 Habitat surveys conducted in March, April and June 2018. The survey followed JNCC (2010) and CIEEM (2017) best practice guidance and was used to inform the ecological appraisal (EA) for the Scheme. Habitat condition assessment (HCA) data was gathered during site surveys in March, April and June 2018. Since the surveys were commissioned prior to the publication of the CHE Memorandum 422/18, the HCA principally followed DEFRA guidance which requires habitat condition to be assessed using the system presented in Natural England's Farm Environment Plan (FEP) manual. Where there were gaps in primary HCA data, for example from limited access to land, professional judgement was applied to retrospectively assess habitat condition. Both Phase 1 and HCA datasets were used to quantify the biodiversity baseline of the Site.

2.2.2. The extent of habitat losses was defined by a combination of the following boundaries (**Appendix C**):

a. The temporary and permanent loss of control of the land to the Scheme (HE551459-WSP-HGN-M2F-M2-CH-0894 - Temporary Boundary; HE551459-WSP-HGN-M2F-M2-CH-0895 - Permanent Boundary). This land represents the limit within which the contractor shall be able to operate and clear as required for construction operations. Since the detailed design of these operations has yet to be determined it is assumed that all habitats within these boundaries will be cleared except where clearly described as being retained. The DCO boundary was not used as it included areas of land over which easements have been negotiated which would result in no clearance, creation or enhancements of habitat.

b. The extent of retained habitats detailed within the **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**). These habitats are proposed to be retained for ecological and landscape mitigation purposes with no further enhancements.

c. The extent of losses described in this report are likely to be a conservative estimate that can be further reduced at the detailed design stage.

2.2.3. The BNG calculation covered all habitats (linear and non-linear) within the Site (Appendix C of this report contains a map of the Scheme extent within the Site boundary and Phase 1

Habitat survey data). The following Phase 1 Habitat typologies present within the Site which, in the context of BNG, are not considered 'habitats':

a. Buildings
b. Hardstanding
c. Fence
d. Wall
e. Dry ditch
f. Boundary removed
g. Earth bank

2.2.4. These habitat typologies do not generate BU or LU and so are excluded from BNG calculations. However, the total areas of buildings and hardstanding are reported in results tables to show the total area of the Site has been considered in both baseline and post-development calculations.

2.2.5. Running water has also been excluded from the baseline linear unit calculation at this stage in the BNG process. The reason for this is the lack of available information to undertake accurate condition assessments of these habitats; both in terms of field data for the watercourses in question, and standardised guidance as to the most appropriate means of assessing condition of these habitats. For the baseline and post-development assessment, running water is expressed simply as a length in metres.

2.2.6. For area-based habitats, hectares are reported to two decimal places. For linear habitats, length is reported to the nearest half metre.

2.2.7. The Phase 1 Habitat survey was undertaken following Joint Nature Conservation Committee (JNCC, 2010) survey methodology and are reported in full within **Appendix 9.1: Extended Phase 1 Habitat Survey Report, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**) (Jacobs, 2018).

DEFRA BIODIVERSITY UNIT CALCULATION

2.2.8. A baseline biodiversity unit calculation was completed for all areas of permanent and temporary land take within the operational footprint of the Scheme. Habitat area or length, distinctiveness and condition were used to calculate baseline BU and LU, providing a measure of the biodiversity on site before development. This calculation is in accordance with Defra's technical paper, guidance for developers and guidance for offset providers (Defra 2012 a, b and c). This is the standard metric used for calculating BU and LU in the UK.

2.2.9. Distinctiveness and condition are given numerical 'scores' which are multiplied, together with hectares (ha) or length in metres (m) of habitat to give the number of units.

DISTINCTIVENESS

2.2.10. Habitat distinctiveness is defined as a collective measure of biodiversity and includes parameters such as the number and variety of species found within the habitat (richness

and diversity), how rare the species are, and how many species the habitat supports that are not common elsewhere.

2.2.11. To determine habitat distinctiveness, Phase 1 Habitat types were transposed into the standard habitat distinctiveness typology and bands issued by Defra ('the Defra habitat type'). For some habitat types, multiple distinctiveness bands can apply, depending on the quality of the habitat. Decisions on which distinctiveness band to assign were based on criteria listed in Appendix C of the Building Research Establishment's (BRE) Guidance Note 36: BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route 2 (BRE, 2018). This document enables consistent assessment of distinctiveness for all habitat parcels.

2.2.12. Where no directly comparable habitat type was available to match the vegetation recorded by Phase 1 Habitat survey (e.g. tall ruderal vegetation), the closest approximation was selected.

2.2.13. The Defra distinctiveness bands and associated scores are described in **Table 2.2**.

Table 2.2 – Habitat distinctiveness bands and scores

Distinctiveness Band	Distinctiveness Score	Habitat Types Included
High	**6**	HPIs i.e. those which meet the criteria to qualify as habitats of principle importance (JNCC, 2011). This excludes ancient woodland and other habitats which are considered irreplaceable.
Medium	**4**	Other semi-natural habitats that do not fall within the scope of habitats of principle importance definitions, i.e. all other areas of woodland other grassland (e.g. species poor semi-improved), other uncultivated field margins, road verge and railway embankments (excluding those that are intensively managed).
Low	**2**	Improved grassland, arable fields (excluding any uncultivated margins), domestic gardens, regularly disturbed bare ground (e.g. quarry floor, landfill sites etc.), verges associated with transport corridors.

2.2.14. All hedgerows are assumed to be of High distinctiveness because the vast majority of hedgerows will meet HPI criteria. For this reason, distinctiveness is not included as part of the linear unit calculation. This follows the approach set out by Defra.

CONDITION

2.2.15. Condition, in the context of BNG, is defined as the quality of a particular habitat. For example, a habitat is in poor condition if it fails to support the rare or notable species for which it is valued, or if it is degraded as a result of pollution, erosion, invasive species or other factors.

2.2.16. The Defra metric requires habitat condition to be assessed using the system presented in Natural England's Farm Environment Plan (FEP) manual (Natural England, 2010).

2.2.17. Habitat condition scores were assigned based on the criteria in **Table 2.3**.

Table 2.3 – Habitat condition bands and scores

Condition Band	Condition Score	Criteria for Assigning Condition
Good	**3**	Any habitat which **passes all** FEP criteria.
Moderate	**2**	Any habitat which **fails one** FEP criterion.
Poor	**1**	Any habitat which **fails two or more** FEP criteria.

DERIVING THE TOTAL NUMBER OF BASELINE BIODIVERSITY UNITS

2.2.18. Following the scoring of all habitat parcels for habitat distinctiveness and condition, the total number of baseline BU was calculated for each area-based habitat using the following formula:

Distinctiveness x Condition x Area (ha) = BASELINE BIODIVERSITY UNITS

2.2.19. The scores generated by each individual habitat parcel were then summed to provide the total number of BU generated by the baseline habitat parcels. It is important to set out the BU for the individual habitats so that these can be compared with the post-development BU for the same habitat type.

2.2.20. The number of baseline LU present should be calculated for hedgerows as follows:

Length of linear habitats lost (m) x Condition = BASELINE LINEAR UNITS

2.2.21. For the baseline BNG calculation, running water is expressed simply as a length in metres.

2.3 POST-DEVELOPMENT BIODIVERSITY UNIT CALCULATION

2.3.1. The post-development biodiversity value was quantified using the Site's **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**) (**Appendix C**). This approach quantifies the biodiversity units expected on site post-development after habitat retention, reinstatement and creation.

2.3.2. BU and LU resulting from the Site's **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**) (**Appendix C**), are referred to as post-development BU / LU.

LINEAR HABITATS

2.3.3. In the post-development calculation, linear habitats have been kept separate from units calculated for area-based habitats; this mirrors the approach for baseline unit calculations. The risk factors described below are only applicable to the area-based habitat calculation. They are not included in the calculation for linear habitats. This is because the risks associated with creating linear habitats are considered to be taken into account within the condition multiplier used to calculate the baseline LU.

2.3.4. Post-development LU are therefore expressed simply as the length (m) created for new species rich hedgerow or new species rich hedgerow with trees:

Length (m) = POST-DEVELOPMENT LINEAR UNITS

2.3.5. For the post-development BNG calculation, running water is expressed simply as a length in metres.

APPLYING RISK FACTORS TO AREA-BASED CALCULATIONS

2.3.6. In the post-development calculation, BU are calculated in a similar way to baseline BU. However, in addition to area, condition and distinctiveness of the proposed habitats, the key risks to delivery are taken into account through the incorporation of risk factors.

2.3.7. The application of risk factors in the calculation of post-development biodiversity units for reinstated and created habitats is calculated as follows:

> ***Habitat Creation.*** *When habitats within a scheme boundary are cleared for construction and new habitats created post-development, risk factors are applied to all the potential biodiversity units generated from the newly created habitat. Such that:*

Potential Biodiversity Units =

Target Habitat Area (ha) × Target Distinctiveness × Target Condition

Habitat Creation Biodiversity Units =

Potential Biodiversity Units × (Risk Factors)

2.3.8. It is assumed that all habitats (except where explicitly retained) are cleared and then created afresh. No enhancement is assumed for retained habitats.

2.3.9. The Defra metric sets out three risk factors: distance from scheme (spatial risk); how difficult it is to create or enhance any given habitat (delivery risk); and time taken for created or enhanced habitats to reach target condition (temporal risk).

SPATIAL RISK

2.3.10. Spatial risk is the risk associated with delivering compensation for the loss of a habitat at a distance from that loss. The further from the site of the loss, the greater the risk.

2.3.11. It is assumed that all habitat retention, recreation and creation would be delivered within the Order Limits or within the same ecological network as the loss occurs. Therefore, the spatial risk factor is set as 1 for all habitats and will not be included within the post-development biodiversity unit calculations.

DELIVERY RISK

2.3.12. Delivery risk is the risk associated with the difficulty to create or restore any specific habitat. Appendix 1 of Defra's Technical Paper (Defra, 2012a) provides an indicative guide to broad categories of risk for different habitats. For habitat types not listed in Defra's guidance, Appendix C of the BRE Guidance Note 36 was used to determine the appropriate level of delivery risk. This was informed by delivery risk levels assigned to similar habitat types by Defra. **Tables 2.4** and **2.5** show the risk factors assigned to each level of delivery risk and type of habitat created or restored within the Scheme.

Table 2.4 – Defra Delivery Risk Factors

Difficulty of Recreation or Restoration	Delivery Risk Factor
Very High	0.10
High	0.33
Medium	0.67
Low	1.00

Table 2.5 – Delivery Risk for Reinstated or Created Habitats

JNCC Phase 1 Habitat Type	Difficulty of Creation	Delivery Risk Factor
A1.1.1 Broadleaved woodland - semi-natural	Medium	0.67

JNCC Phase 1 Habitat Type	Difficulty of Creation	Delivery Risk Factor
A1.1.2 Broadleaved woodland - plantation	Low	1
A1.3.1 Mixed woodland - semi-natural	Medium	0.67
A1.3.2 Mixed woodland - plantation	Low	1
A2.1 Scrub - dense / continuous	Low	1
A3.1 Parkland / scattered trees - broadleaved	Low	1
B2.1 Neutral grassland - unimproved	Medium	0.67
B2.2 Neutral grassland - semi-improved	Low	1
B4 Improved grassland	Low	1
B5 Marsh / marshy grassland	Medium	0.67
B6 Poor semi-improved grassland	Low	1
C3.1 Other tall herb and fern - ruderal	Low	1
F2.1 Marginal and inundation - marginal	Low	1
G1.1 Standing water - eutrophic	Low	1
I2.2 Spoil	Low	1
J1.1 Cultivated/disturbed land - arable	Low	1
J1.2 Cultivated/disturbed land - amenity grassland	Low	1
J4 Bare ground	Low	1
J5 Other habitat	Low	1

TEMPORAL RISK

2.3.13. In delivering compensation for loss of habitats, the timing of impact may not coincide with the new habitat reaching the required quality or level of maturity which could result in loss of biodiversity for a period of time. This risk is accounted for by applying a 'temporal risk' multiplier to the biodiversity unit calculations.

2.3.14. Defra has no set guidance on the time taken to reach a specific condition for each habitat type. Therefore, this information was taken from Appendix C of the BRE Guidance Note 36 as outlined in **Tables 2.6** to **2.7**, using professional judgment as appropriate.

2.3.15. For created and reinstated habitats, an additional two years has been added to time to target condition to account for the fact the habitats would be lost during the two-year construction period.

Table 2.6 – Temporal Risk Factors

Years to Target Condition Category	Temporal Risk Factor
Under 1 year	1
1	0.97
2	0.93
3-5	0.83
6-10	0.71
11-15	0.59
16-20	0.50
21-25	0.42
26-30	0.35
32+	0.33

Table 2.7 – Temporal Risk for Reinstated and Created Habitats

JNCC Phase 1 Habitat Type	Time to Target Condition +2 Years	Temporal Risk Factor
A1.1.1 Broadleaved woodland - semi-natural	32+ yrs	0.33

JNCC Phase 1 Habitat Type	Time to Target Condition +2 Years	Temporal Risk Factor
A1.1.2 Broadleaved woodland - plantation	21-25 yrs	0.42
A1.3.1 Mixed woodland - semi-natural	32+ yrs	0.33
A1.3.2 Mixed woodland - plantation	21-25 yrs	0.42
A2.1 Scrub - dense / continuous	6-10 yrs	0.71
A3.1 Parkland / scattered trees - broadleaved	21-25 yrs	0.42
B2.1 Neutral grassland - unimproved	11-15 yrs	0.59
B2.2 Neutral grassland - semi-improved	6-10 yrs	0.71
B4 Improved grassland	3-5 yrs	0.83
B5 Marsh / marshy grassland	6-10 yrs	0.71
B6 Poor semi-improved grassland	3-5 yrs	0.83
C3.1 Other tall herb and fern - ruderal	3-5 yrs	0.83
F2.1 Marginal and inundation - marginal	3-5 yrs	0.83
G1.1 Standing water - eutrophic	2 yrs	0.93
I2.2 Spoil	2yrs	0.93
J1.1 Cultivated/disturbed land – arable (field margin)	3-5 yrs	0.83
J1.1 Cultivated/disturbed land - arable	2 yrs	0.93
J1.2 Cultivated/disturbed land - amenity grassland	3-5 yrs	0.83
J4 Bare ground	2 yrs	0.93
J5 Other habitat	16-20 yrs	0.50

2.4 CALCULATING THE CHANGE IN BIODIVERSITY UNITS AS A CONSEQUENCE OF THE SCHEME

2.4.1. The baseline and post-development biodiversity units (excluding irreplaceable habitats and their compensation) were compared to assess whether the Scheme achieves net gains for non-irreplaceable biodiversity on site. This was further broken down for HPIs to demonstrate compliance with NERC Act (2006) and the Northumberland Local Plan.

2.4.2. The following formula is used to calculate the change in BU as a consequence of the Scheme:

Change in Biodiversity Units =

Post-Development Biodiversity Units (created and retained) – Baseline Biodiversity Units

2.4.3. If this resulting score is negative, there is a loss in biodiversity for area-based habitats. If the score is close to zero (with the post-development BU being within 95%-104% of the baseline BU) there is no net loss of biodiversity for area-based habitats. If there is an increase in the BU of 5% or more the project is capable of delivering net gain for biodiversity for area-based habitats. The percentage should be rounded to the nearest whole percentage point (0.5 and above is to be rounded up to 1 and anything below 0.5 should be rounded down).

2.4.4. The same formula and process applies to calculating the change in linear units and length of watercourse. Subsequently, a quantitative biodiversity net gain or no net loss outcome can only be achieved if BU, LU and watercourse length achieve the same outcome.

2.4.5. Since the Site ES concluded that the Scheme would have a likely significant effect on ancient woodland habitat and on the River Coquet and Coquet Valley Woodlands SSSI and the Coquet River Felton Park LWS, a categorical scheme-wide outcome of no net loss or net gain cannot be achieved. However, specific quantitative outcomes of the BNG assessment calculations can be reported in line with **Table 2.8**.

Table 2.8 – Quantitative Outcomes of BNG Calculations

Result from the Calculation	Predicted Scheme-Wide Outcome
Less than 95% of the initial value	Net loss for biodiversity
95% - 104%	Biodiversity No Net Loss in design
105% or more	Biodiversity Net Gain in design

3 ASSUMPTIONS AND LIMITATIONS

3.1 DATA

3.1.1. The BNG Assessment was based on Phase 1 Habitat survey data collected, reported and digitised by Jacobs. Assumptions and Limitations associated with the Phase 1 Habitat survey can be found in **Appendix 9.1: Extended Phase 1 Habitat Survey Report**, **Volume 7** of this ES (**Application Document Reference**: **TR010041/APP/6.7**) (Jacobs, 2018). Verification of the suitability of the existing Phase 1 Habitat survey data for BNG Assessment was completed during the supplementary Phase 1 Habitat surveys. The following points are specific assumptions and limitations raised during data collation for the assessment.

3.1.2. In the absence of field data to the contrary, a 2 m buffer strip around the boundary of each arable field was assumed to be arable field margin of HPI quality. This is a precautionary approach that may overestimate the baseline value of the site but was deemed a suitable assumption given the likely presence and value of these habitats.

3.1.3. The baseline GIS data provided was run through a quality assurance protocol to ensure the digitised habitat data was fit for use in the BNG assessment. Where overlaps or gaps in the baseline data were identified, they were resolved by trimming polygons to aerial survey data and defining Phase 1 Habitat types using the surrounding Phase 1 Habitat type survey data. The baseline Phase 1 Habitat data was then extracted for all habitats within the Scheme boundary. The Scheme boundary is defined for this assessment as the Temporary (HE551459-WSP-HGN-M2F-M2-CH-0894) and Permanent Boundary (HE551459-WSP-HGN-M2F-M2-CH-0895) plus areas of existing retained habitat (**Figure 7.8: Landscape Mitigation Masterplan, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)).

3.1.4. Post-development habitat areas as defined by the Site's **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** (**Application Document Reference: TR010041/APP/6.5**) of this ES were translated from CAD.dwg files into GIS shapefiles and then extracted for all habitats within the Scheme boundary. Due to differences in the programmes used for mapping habitat areas for baseline and post-development habitats, there will be a minor discrepancy between the area covered by the Scheme's boundary and the total area of habitats within this boundary. As the difference in total area between baseline and post-development plans is less than 1%, the effect on the BNG assessment is considered to be negligible.

3.1.5. The ES identified 0.68 ha of woodland habitats within the Order Limits that could be considered to be, or have characteristics of, ancient semi-natural woodland. These were found in Dukes Bank Wood, designated as ancient semi-natural woodland, within the River Coquet and Coquet Valley Woodlands SSSI and the woodland of the Coquet River Felton Park LWS.

3.2 BASELINE BIODIVERSITY AND LINEAR UNIT CALCULATIONS

3.2.1. The following assumptions were made for the baseline biodiversity unit and linear unit calculations. Assumptions were made using expert opinion and guided by BREEAM GN36 Appendix C (BRE, 2018).

DISTINCTIVENESS

3.2.2. The baseline area-based HPIs on site and their attributed Phase 1 Habitat types are listed in **Table 3.1** alongside their distinctiveness and condition categories:

Table 3.1 – Baseline HPI and their Associated Baseline Phase 1 Habitat Types

Baseline HPI Type	JNCC Phase 1 Habitat type	Habitat Distinctiveness	Habitat Condition
Lowland mixed deciduous woodland	A1.1.1 Broadleaved woodland - semi-natural	High (6)	Poor (1)
	A1.3.1 Mixed woodland - semi-natural	High (6)	Good (3)
			Moderate (2)
Lowland meadows	B2.2 Neutral grassland – semi-improved	Medium (4)	Moderate (2)
			Poor (1)
Ponds	G1.1 Standing water - eutrophic	High (6)	Moderate (2)
Arable field margins	J1.1 Cultivated / disturbed land - arable	High (6)	Moderate (2)
Hedgerows	J2.1.1 Hedgerow – intact native species rich	n/a	Good (3)
	J2.1.2 Hedgerow - native species poor (intact)	n/a	Good (3)
	J2.2.2 Hedgerow - native species poor (defunct)	n/a	Moderate (2)
	J2.3.2 Hedgerow with trees - native species poor (intact)	n/a	Moderate (2)
River	G2 Running Water	n/a	n/a

3.2.3. The baseline area-based Phase 1 categories for non-HPI habitat types on site are listed in **Table 3.2** alongside their distinctiveness and condition categories:

Table 3.2 – Baseline non-HPI Area-based Phase 1 Habitat Types

JNCC Phase 1 Habitat Type	Habitat Distinctiveness	Habitat Condition
A1.1.2 Broadleaved woodland - plantation	Medium (4)	Moderate (2)
		Poor (1)
A1.2.2 Coniferous woodland - plantation	Low (2)	Good (3)
		Moderate (2)
		Poor (1)
A1.3.2 Mixed woodland - plantation	Medium (4)	Good (3)
		Moderate (2)
		Poor (1)
A2.1 Scrub - dense / continuous	Medium (4)	Good (3)
		Moderate (2)
		Poor (1)
A2.2 Scrub - scattered	Medium (4)	Good (3)
		Moderate (2)
		Poor (1)
A3.1 Parkland / scattered trees - broadleaved	Medium (4)	Moderate (2)
		Poor (1)
B4 Improved grassland	Low (2)	Poor (1)
B5 Marsh / marshy grassland	Low (2)	Poor (1)
B6 Poor semi improved grassland	Low (2)	Poor (1)
C3.1 Other tall herb and fern - ruderal	Low (2)	Poor (1)
J1.1 Cultivated / disturbed land - arable	Low (2)	Poor (1)
J1.2 Cultivated / disturbed land - amenity grassland	Low (2)	Poor (1)
J3.6 Building	NA	NA
J4 Bare ground	Low (2)	Poor (1)
J5 Other habitat	Medium (4)	Moderate (2)
Hardstanding	NA	NA

CONDITION

3.2.4. HCA data was not complete across all habitats. Where condition data had not been collected in the field, the following assumptions were made:

a. All Low distinctiveness habitats were allocated a condition score of Poor.
b. All Medium and High distinctiveness habitats were allocated a condition score of Moderate.
c. All habitats classed as J5 Other habitat due to being inaccessible have been allocated a condition score of Moderate as the habitat is assumed to be Medium distinctiveness.
d. All hedgerows are assumed to be in Good condition. The exception to this rule is defunct hedgerows. Defunct hedgerows fail one of the FEP condition assessment criteria by nature of being defunct.

3.3 POST-DEVELOPMENT BIODIVERSITY AND LINEAR UNIT CALCULATIONS

3.3.1. The following assumptions were made for post-development biodiversity unit and linear unit calculations. Assumptions were made using expert opinion and guided by BREEAM GN36 Appendix C (BRE, 2018). The Phase 1 Habitat types of habitats present in the Site's **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**) are detailed in **Table 3.3** alongside their distinctiveness and target condition categories as well as the associated habitat creation risk multipliers. It is assumed that there would be no enhancement of retained habitats and that all post-development habitats are created following clearance of baseline habitats for development.

Table 3.3 – The Proposed Post-Development Habitats Created on Site Including Distinctiveness Category, Condition Category, Difficulty to Create and Time to Creation

Landscape Element	Landscape Plan Description	JNCC Phase 1 Habitat Type	Habitat Distinctiveness	Habitat Condition	Difficulty to Create	Time to Creation +2 Years
LE 1.1 - Amenity grass areas	Proposed amenity grassland	J1.2 Cultivated / disturbed land - amenity grassland	Low (2)	Poor (1)	Low (1)	2 yrs (0.93)
LE 1.3 - Species rich (or conservation) grassland	Proposed conservation grassland	B2.1 Neutral grassland - unimproved	High (6)	Good (3)	Medium (0.67)	6-10 yrs (0.71)
LE 2.1 - Woodland	Proposed Woodland	A1.1.1 Semi-natural woodland -broadleaved	High (6)	Good (3)	Medium (0.67)	32+ yrs (0.33)
LE 2.2 - Woodland edge	Proposed Woodland	A1.1.1 Semi-natural woodland -broadleaved	High (6)	Good (3)	Medium (0.67)	32+ yrs (0.33)
LE 2.4 - Linear belts of shrubs and trees	None	A2.1 Scrub - dense / continuous	Medium (4)	Good (3)	Low (1)	6-10 yrs (0.71)
LE 2.5 - Shrubs with intermittent trees	Proposed shrub – ecological mitigation	A2.1 Scrub - dense / continuous	Medium (4)	Good (3)	Low (1)	6-10 yrs (0.71)
LE 2.6 - Shrubs						

Landscape Element	Landscape Plan Description	JNCC Phase 1 Habitat Type	Habitat Distinctiveness	Habitat Condition	Difficulty to Create	Time to Creation +2 Years
LE 2.7 - Scattered trees	Proposed coronation avenue trees AND Proposed individual trees (where not associated with a hedge)	A3.1 Parkland / scattered trees - broadleaved	Medium (4)	Good (3)	Low (1)	21-25 yrs (0.42)
LE 4.3 - Native species rich hedgerow	LE 4.3 - Native species rich hedgerow	J2.1.1 Hedgerow - native species rich (intact)	N/A	N/A	N/A	N/A
LE 4.4 - Native hedgerows with trees	LE 4.4 - Native hedgerows with trees	J2.3.1 Hedgerow with trees - native species rich (intact)	N/A	N/A	N/A	N/A
LE 5.1 - Individual trees	LE 5.1 - Individual trees	A3.1 Parkland / scattered trees - broadleaved	Medium (4)	Good (3)	Low (1)	21-25 yrs (0.42)
LE 6.1 - Water bodies and associated plants	Marginal planting / wetland	F2.1 Marginal and inundation - marginal	High (6)	Good (3)	Low (1)	3-5 yrs (0.83)
LE 6.2 - Banks and ditches	Grass verge central reservation	J1.2 Cultivated / disturbed land -	Low (2)	Poor (1)	Low (1)	3-5 yrs (0.83)

Landscape Element	Landscape Plan Description	JNCC Phase 1 Habitat Type	Habitat Distinctiveness	Habitat Condition	Difficulty to Create	Time to Creation +2 Years
		amenity grassland				
LE 6.3 - Reed beds	These habitats are displayed within the key on the **Landscape Mitigation Masterplan** (**Figure 7.8** of Volume 2 (**Application Document Reference: TR010041/APP/6.2**) of the ES, however they are not required for this iteration of the calculations.					
LE 6.4 - Marsh and wet grassland						
None	Arable field margins	J1.1 Cultivated / disturbed land - arable	High (6)	Good (3)	Low (1)	3-5 yrs (0.83)

3.3.2. Where habitat is temporarily lost during the construction period, it is assumed that it would be reinstated back to the original habitat type on completion of construction. The exception to this is where the **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)) or scheme design identify creation of a different habitat type.

TARGET DISTINCTIVENESS

3.3.3. For created habitats types with multiple options of distinctiveness, assumed target distinctive is as per assumed distinctiveness of baseline habitat types (refer to **Section 3.1**).

TARGET CONDITION

3.3.4. For retained habitats and those habitats which are reinstated after works, there was assumed to be no change to baseline condition. For created habitats, target condition assumptions are as follows:

a. All Low distinctiveness habitats were assigned a target condition rating of Poor.
b. All Medium and High distinctiveness habitats were assigned a target condition rating of Good.
c. All habitats classed as J5 Other habitat have been allocated a condition score of Good as the habitat is assumed to be Medium distinctiveness.
d. In the absence of HCA data for hedgerows, hedgerows were assumed to be in Good condition. The exception to this rule is defunct hedgerows. Defunct hedgerows fail one of the FEP condition assessment criteria by nature of being defunct, therefore all defunct hedgerows were assumed to be in Moderate condition.

3.3.5. Some habitat areas within the **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)) are under temporary control by the Applicant and would therefore be returned to landowners following the reinstatement or creation of the intended habitats. The intended habitat type and target conditions defined within this report for the temporarily controlled habitat areas are targets set by Highways England. However, these targets may not be reached if landowners alter the maintenance of habitats or change the habitat usage.

RISK FACTORS

3.3.6. The difficulty to create risk factors have been extracted directly from BREEAM GN36 Appendix C (BRE, 2018) as per best practice guidelines (**Appendix A**).

3.3.7. All habitat within the Order Limits is assumed to be cleared for the two-year construction period, unless identified as 'retained' in the **Landscape Mitigation Masterplan** (**Figure 7.8** Volume 5 of this ES (**Application Document Reference: TR010041/APP/6.5**)). Since most temporal risk multipliers are based on five-year bands, such lag is not expected to affect which band each habitat types falls in. Should this change then smaller temporal risk multipliers may be applied and a reduction in the biodiversity value of onsite habitat creation would be expected. The time to target habitat condition for each habitat type present on site post-development was extracted from BREEAM GN36 Appendix C (BRE, 2018). Where

there were deviations to this these were justified and where not available these were provided based on professional judgement.

3.3.8. It is assumed that all habitat retention, recreation and creation would be delivered within the Order Limits or within the same ecological network as the loss occurs. Therefore, the spatial risk factor is set as 1 for all habitats and will not be included within the post-development biodiversity unit calculations.

3.3.9. As a precautionary approach, habitats classed as J5 Other habitat have been allocated medium distinctiveness, good condition, low difficulty to create and a time to target condition of 16-20 years.

LIMITATIONS

3.3.10. Any amendments to the current scheme design and **Landscape Mitigation Masterplan** (**Figure 7.8**, **Volume 5** of this ES (**Application Document Reference: TR010041/APP/ 6.5**)) used to inform this BNG assessment will necessitate re-running of the biodiversity unit calculations to determine the biodiversity impacts of the Scheme. Specifically, the inclusion of Limits of Deviation (LoD) and assessment parameters in the Scheme design implies that there may be some amendments to the **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)) depending on land capture and the final Scheme design. If the Scheme design is altered within the LoDs or assessment parameters, the biodiversity net gain assessment will need to be re-run to accommodate these amendments.

3.3.11. The BU and LU calculations do not account for indirect impacts to habitats outside of the Order Limits as a result of the proposed works. Given all required construction compounds and accesses are included within in the Order Limits, this limitation is unlikely to have any effect on the BNG calculations.

4 RESULTS OF BASELINE BIODIVERSITY AND LINEAR UNIT CALCULATIONS

4.1 OVERVIEW

4.1.1. Section 4 displays the results of the baseline BU and LU calculations.

4.1.2. Within the Site, the baseline assessment identified habitats which are considered: irreplaceable habitats; area-based and linear habitats of principle importance; and other non-irreplaceable area-based habitats. **Figure 1** in Appendix C contains a Phase 1 map of the Scheme's baseline habitats.

4.1.3. The majority of the Site comprised arable land (37%), poor semi-improved grassland (17%) and improved grassland (15%). The remainder of the Site is a mix of habitats, including woodland habitat types, semi-improved neutral grassland, scrub, standing water, amenity grassland, marshy grassland, ruderal vegetation, inaccessible habitat (assigned J5 Other habitat), hardstanding and bare ground.

4.2 IRREPLACEABLE HABITATS

4.2.1. Development of the Scheme would result in a loss of all the irreplaceable ancient woodland habitat on site.

4.2.2. Ancient woodland totalling 0.68 ha is present at the northern end of the Scheme along the banks of the River Coquet. These habitat areas have been excluded from the baseline BU calculations. There are no other irreplaceable habitats on site.

4.3 HPI

4.3.1. The Site contained a number of habitats of principal importance with the following values: 10.77 ha and 110.88 BU of area-based habitats; 33245.0 m and 66994.5 LU of hedgerows; and 3911.0 m of watercourses.

4.3.2. **Tables 4-1** to **4-3** show the baseline habitat types and the number of BU and LU attributed to existing habitats within the Order Limits.

Table 4.1 – Summary of Baseline BU Calculation: Area-Based HPI

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
A1.1.1 Broadleaved woodland - semi-natural	High (6)	Poor (1)	0.12	0.72
A1.3.1 Mixed woodland - semi-natural	High (6)	Good (3)	0.60	10.80
B2.2 Neutral grassland - semi-improved	Medium (4)	Moderate (2)	4.39	35.12

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
		Poor (1)	0.46	1.84
G1.1 Standing water - eutrophic	High (6)	Moderate (2)	0.29	3.48
J1.1 Cultivated / disturbed land - arable	High (6)	Moderate (2)	4.91	58.92
Total:			**10.77**	**110.88**

Table 4.2 – Summary of Baseline LU Calculation: Hedgerows

JNCC Phase 1 Habitat Type	Condition Score	Length (m)	LU
J2.1.1 Hedgerow - native species rich (intact)	Good (3)	241.5	724.5
J2.1.2 Hedgerow - native species poor (intact)	Good (3)	9277.0	27831.0
	Moderate (2)	3209.0	6418.0
	Poor (1)	6292.5	6292.5
J2.2.2 Hedgerow - native species poor (defunct)	Good (3)	24.5	73.5
	Moderate (2)	2809.0	5618.0
	Poor (1)	1999.5	1999.5
J2.3.2 Hedgerow with trees- native species poor (intact)	Good (3)	3887.5	11662.5
	Moderate (2)	870.5	1741.0
	Poor (1)	4634.0	4634.0
Total:		**33245.0**	**66994.5**

Table 4.3 – Summary of Baseline Watercourse Length

JNCC Phase 1 Habitat Type	Length (m)
G2 Running water	3911.0
Total:	**3911.0**

4.4 NON-HPI

4.4.1. The total area of non-HPI within the biodiversity assessment boundary for the Site is 220.67 ha, with a total of 550.56 BU.

4.4.2. **Table 4-4** shows the baseline habitat types and the number of BU attributed to existing habitats within the Order Limits. **Figure 1** of **Appendix C** contains a Phase 1 map of the Scheme's baseline habitats.

Table 4.4 – Summary of Baseline BU Calculation: Area-Based non-HPI

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
A1.1.2 Broadleaved woodland - plantation	Medium (4)	Moderate (2)	3.82	30.56
		Poor (1)	0.92	3.68
A1.2.2 Coniferous woodland - plantation	Low (2)	Good (3)	0.85	5.10
		Moderate (2)	0.41	1.64
		Poor (1)	1.77	3.54
A1.3.2 Mixed woodland - plantation	Medium (4)	Good (3)	2.60	31.20
		Moderate (2)	7.28	58.24
		Poor (1)	1.53	6.12

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
A2.1 Scrub - dense / continuous	Medium (4)	Good (3)	0.08	0.96
		Moderate (2)	0.92	7.36
		Poor (1)	1.69	6.76
A2.2 Scrub - scattered	Medium (4)	Good (3)	0.18	2.16
		Moderate (2)	0.87	6.96
		Poor (1)	1.03	4.12
A3.1 Parkland / scattered trees - broadleaved	Medium (4)	Moderate (2)	0.39	3.12
		Poor (1)	0.09	0.36
B4 Improved grassland	Low (2)	Poor (1)	34.99	69.98
B5 Marsh / marshy grassland	Low (2)	Poor (1)	1.62	3.24
B6 Poor semi-improved grassland	Low (2)	Poor (1)	38.24	76.48
C3.1 Other tall herb and fern - ruderal	Low (2)	Poor (1)	2.29	4.58
J1.1 Cultivated / disturbed land - arable	Low (2)	Poor (1)	84.55	169.10
J1.2 Cultivated / disturbed land - amenity grassland	Low (2)	Poor (1)	1.34	2.68
J3.6 Buildings	N/A	N/A	0.04	0.00
J4 Bare ground	Low (2)	Poor (1)	0.47	0.94

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
J5 Other habitat	Medium (4)	Moderate (2)	6.46	51.68
Hardstanding	N/A	N/A	26.24	0.00
Total:			**220.67**	**550.56**

4.5 SUMMARY

4.5.1. There is 0.68 ha of ancient woodland habitat on site. This habitat is defined as irreplaceable and has been excluded from this assessment but is considered separately within the Scheme's mitigation plan.

4.5.2. A summary of the baseline BUs and LUs and watercourse length generated by HPI and non-HPI is detailed in **Table 4.5**.

Table 4.5 – Summary of the Baseline BNG Assessment

Source	Baseline BU	Baseline LU	Baseline Watercourse Length (m)
HPI	110.88	66994.5	3911.0
Non-HPI	550.56	NA	NA
Total:	**661.44**	**66994.5**	**3911.0**

5 RESULTS OF POST-DEVELOPMENT BIODIVERSITY AND LINEAR UNIT CALCULATIONS

5.1 OVERVIEW

5.1.1. Section 5 displays the results of the post-development BU and LU calculations for the Scheme. These results have been split to show the habitats which are: irreplaceable; retained; reinstated; and created.

5.1.2. During the development of the Site, habitats would be temporarily and permanently lost to the Scheme. The landscape planting measures expected on site after construction are based on the **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)) as set out in **Chapter 9: Biodiversity, Volume 2** of this ES (**Application Document Reference: TR010041/APP/ 6.2**). These habitats have been translated into Phase 1 Habitat types for use in post-development BU and LU calculations, and are presented in **Appendix C**.

5.1.3. The **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)) identifies proposed post-development which are considered: irreplaceable habitats; area-based and linear HPIs; area-based non-HPI habitats.

5.1.4. On completion of the Scheme, the majority of the Site would comprise hardstanding (22%), unimproved neutral grassland (17%), semi-natural broadleaved woodland (11%) and arable land (17%). The remainder of the Site would be a mix of habitats, including woodland, semi-improved neutral grassland, scrub, standing water, amenity grassland, marshy grassland, marginal vegetation, ruderal vegetation and bare ground.

5.2 IRREPLACEABLE HABITATS

5.2.1. To compensate for the loss of 0.68 ha irreplaceable ancient woodland habitat, the **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)) includes provision of an 8.16 ha ancient woodland mitigation area.

5.2.2. The baseline habitat which this ancient woodland mitigation area would replace consists of existing arable land and less than 0.01 ha of Arable field margin HPI.

5.2.3. Neither the baseline habitat or the ancient woodland mitigation area have been included in the BNG assessment for baseline or post-development calculations, respectively.

5.3 RETAINED HABITATS

HPI

5.3.1. The **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** (**Application Document Reference: TR010041/APP/6.5**) of this ES) includes the retention of baseline area-based

HPIs totalling 4.00 ha and 41.64 BU; Hedgerow HPI totalling 9982 m and 22276 LU; and 3711.0 m of River HPI.

5.3.2. **Tables 5-1** and **5-2** show the BU generated by area-based HPIs and Hedgerow HPI which are to be retained from baseline to post-development.

5.3.3. It is important to note that 3711.0 m of existing watercourse is within the Site boundary and would be retained in its current state. These loss of approximately 200 m of watercourse habitat would result in no net loss of biodiversity value.

NON-HPI

5.3.4. The **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**)) includes the retention of a number of non-HPI area-based habitat types which total 73.02 ha and 220.72 BU.

5.3.5. **Table 5-3** shows the biodiversity from habitat types within the Scheme's boundary which are being retained.

Table 5.1 – Summary of Post-Development BU Calculation: Retained Area-Based HPI

JNCC Phase 1 Habitat Type	Distinctiveness	Condition	Area (ha)	Post-Development BU
A1.1.1 Broadleaved woodland - semi-natural	High (6)	Poor (1)	0.12	0.72
A1.3.1 Mixed woodland - semi-natural	High (6)	Good (3)	0.22	3.96
B2.2 Neutral grassland - semi-improved	Medium (4)	Moderate (2)	1.22	9.76
		Poor (1)	0.26	1.04
J1.1 Arable field margins	High (6)	Moderate (2)	1.89	22.68
G1.1 Standing water - eutrophic	High (6)	Moderate (2)	0.29	3.48
Total:			**4.00**	**41.64**

Table 5.2 – Summary of Post-Development LU Calculation: Retained Hedgerow HPI

JNCC Phase 1 Habitat Type	Length (m)	Post-Development BU
J2.1.1 Hedgerow - native species rich (intact)	82.5	247.5
J2.1.2 Hedgerow - species-poor (intact)	5430.5	10861.0
J2.2.2 Hedgerow - species-poor (defunct)	1493.0	2239.5
J2.3.2 Hedgerow - species-poor with trees	2976.0	8928.0
Total:	**9982.0**	**22276.0**

Table 5.3 – Summary of Post-Development Watercourse Length

JNCC PHASE 1 HABITAT TYPE	LENGTH (m)
G2 Running water	3711.0
Total:	**3711.0**

Table 5.4 – Summary of Post-Development BU Calculation: Retained Area-Based Non-HPI

JNCC Phase 1 Habitat Type	Distinctiveness	Target Condition	Area (ha)	Post-Development BU
A1.1.2 Broadleaved woodland - plantation	Medium (4)	Good (3)	0.77	9.24
		Moderate (2)	0.53	4.24
		Poor (1)	3.32	13.28
A1.3.2 Mixed woodland - plantation	Medium (4)	Good (3)	0.18	2.16
		Moderate (2)	2.40	19.20

JNCC Phase 1 Habitat Type	Distinctiveness	Target Condition	Area (ha)	Post-Development BU
		Poor (1)	1.16	4.64
A2.1 Scrub - dense / continuous	Medium (4)	Good (3)	0.17	2.04
		Moderate (2)	0.69	5.52
		Poor (1)	0.94	3.76
A3.1 Parkland / scattered trees - broadleaved	Medium (4)	Moderate (2)	0.03	0.24
		Poor (1)	0.18	0.72
B4 Improved grassland	Low (2)	Good (3)	0.10	0.60
		Moderate (2)	8.43	33.72
		Poor (1)	0.16	0.32
B5 Marsh / marshy grassland	Low (2)	Poor (1)	0.10	0.20
B6 Poor semi-improved grassland	Low (2)	Poor (1)	15.62	31.24
C3.1 Other tall herb and fern - ruderal	Low (2)	Poor (1)	0.08	0.16
I2.2 Spoil	Low (2)	Poor (1)	0.57	1.14
J1.1 Arable	Low (2)	Poor (1)	34.73	69.46
J1.2 Amenity Grassland	Low (2)	Poor (1)	0.37	0.74
J4 Bare Ground	Low (2)	Poor (1)	0.13	0.26
J5 Other habitat	Medium (4)	Moderate (2)	2.23	17.84

JNCC Phase 1 Habitat Type	Distinctiveness	Target Condition	Area (ha)	Post-Development BU
J3.6 Building	N/A	N/A	0.00	0.00
Hardstanding	N/A	N/A	0.13	0.00
Total Area:			**73.0273.02**	**220.72**

5.4 REINSTATED HABITATS

HPI

5.4.1. The **Landscape Mitigation Masterplan** (**Figure 7.8**, **Volume 5** (**Application Document Reference: TR010041/APP/6.5**) of this ES) does not include any reinstatement of HPI habitat.

NON-HPI

5.4.2. The **Landscape Mitigation Masterplan** (**Figure 7.8, Volume 5** (**Application Document Reference: TR010041/APP/6.5**) of this ES) includes the reinstatement of a number of non-HPI area-based habitats types which total 35.75 ha and 59.35 BU.

5.4.3. **Table 5-4** shows the BU generated by non-HPIs within the Scheme's boundary which are being reinstated post-development to baseline conditions following removal during the construction period.

Table 5.5 – Summary of Post-Development BU Calculation: Reinstated Area-Based Non-HPI

JNCC Phase 1 Habitat Type	Distinctiveness	Target Condition	Area (ha)	Difficulty Risk	Temporal Risk	Post-Development BU
B4 Improved grassland	Low (2)	Poor (1)	2.01	Low (1)	3-5 yrs (0.83)	3.34
B6 Poor semi-improved grassland	Low (2)	Poor (1)	0.67	Low (1)	3-5 yrs (0.83)	1.11
J1.1 Cultivated / disturbed land - arable	Low (2)	Poor (1)	3.08	Low (1)	2 yrs (0.93)	5.73
		Total Area:	**5.76**		**Total BU:**	**10.18**

5.5 CREATED HABITATS

HPI

5.5.1. The **Landscape Mitigation Masterplan** (**Figure 7.8**, **Volume 5** (**Application Document Reference: TR010041/APP/6.5**) of this ES) includes the creation of 66.03 ha of area-based HPI, which generates 389.37 BU, and creation of 32594.5 m hedgerow HPI which generates 32594.5 LU.

5.5.2. **Tables 5-5** and **5-6** show the biodiversity from HPI types within the Scheme's boundary which are being created post-development.

NON-HPI

5.5.3. The **Landscape Mitigation Masterplan** (**Figure 7.8,** Volume 5 (**Application Document Reference: TR010041/APP/6.5**) of this ES) includes the creation of a number of area-based non-HPIs which total 89.89 ha and generate 147.08 BU.

5.5.4. **Table 5-7** shows the biodiversity from non-HPIs within the Scheme's boundary which are being created post-development.

Table 5.6 – Summary of Post-Development BU Calculation: Created Area-Based HPI

JNCC Phase 1 Habitat Type	Distinctiveness	Target Condition	Area (ha)	Difficulty Risk	Temporal Risk	Post-Development BU
A1.1.1 Broadleaved woodland - semi-natural	High (6)	Good (3)	25.30	Medium (0.67)	32+ yrs (0.33)	100.69
B2.1 Neutral grassland - unimproved	High (6)	Good (3)	40.64	Medium (0.67)	11-15 yrs (0.59)	287.17
G1.1 Standing water - eutrophic	High (6)	Good (3)	0.09	Low (1)	2 yrs (0.93)	1.51
		Total Area:	**66.03**		**Total BU:**	**389.37**

Table 5.7 – Summary of post-development LU calculation: created hedgerow HPI

JNCC Phase 1 Habitat Type	Length (m)	Post-Development BU
J2.1.1 Hedgerow - native species rich (intact)	32594.5	32594.5
Total:	**32594.5**	**32594.5**

Table 5.8 – Summary of post-development BU calculation: created area-based non-HPI

JNCC Phase 1 Habitat Type	Distinctiveness	Target Condition	Area (ha)	Difficulty Risk	Temporal Risk	Post-Development BU
A2.1 Scrub - dense / continuous	Medium (4)	Good (3)	0.33	Low (1)	6-10 yrs (0.71)	2.81
F2.1 Marginal and inundation - marginal	High (6)	Good (3)	6.32	Low (1)	3-5 yrs (0.83)	94.42
J1.2 Cultivated / disturbed land - amenity grassland	Low (2)	Poor (1)	30.03	Low (1)	3-5 yrs (0.83)	49.85
Hardstanding	N/A	N/A	53.21	N/A	N/A	0.00
		Total Area:	**89.89**		**Total BU:**	**147.08**

5.6 RESULTS SUMMARY

5.6.1. The Scheme would result in a loss of 0.68 ha ancient woodland habitat that would be compensated for by the provision of an 8.16 ha ancient woodland mitigation area.

5.6.2. A summary of results of the biodiversity net gain calculations for HPI and non-HPI habitats is detailed in **Table 5.8**, along with the percentage change from baseline for each habitat type.

5.6.3. The results show that construction of the Scheme would result in:

a. A 289% net gain in BU for area-based HPI
b. An 18% net loss in LU for Hedgerow HPI
c. No net loss in length of River HPI
d. A 31% net loss in BU for area-based on-HPI compensated for by the gain in HPI.

Table 5.9 – Summary of BNG Calculation Results

Habitat Type	Baseline	Post-Development	Change	Outcome
HPI Lowland mixed deciduous woodland	11.52 BU	105.37 BU	+93.85 BU	Net Gain (+815%)
HPI Lowland meadow	36.96 BU	297.97 BU	+261.01 BU	Net Gain (+706%)
HPI Arable field margins	58.92 BU	22.68 BU	-36.24 BU	Net Loss (-61%)
HPI Pond	3.48 BU	4.99 BU	+1.51 BU	Net Gain (+43%)
Area-based HPI total	110.88 BU	431.01 BU	+320.13 BU	Net Gain (+289%)
Area-based non-HPI total	550.56 BU	377.98 BU	-172.58 BU	Net Loss (-31%)
HPI Hedgerow	66994.5 LU	54870.5 LU	-12124.0 LU	Net Loss (-18%)
HPI River	3911.0 m	3711.0 m	-200.0 m	No Net Loss (-5%)

MITIGATION HIERARCHY

5.6.4. The scheme design for the A1 M2F has been an iterative and a multidisciplinary collaborative process, with feedback from the impact assessments (including biodiversity and landscape) informing the scheme design. This process has involved the implementation of the mitigation hierarchy (avoid, minimise, reinstate) with the aim of achieving a net gain for HPIs and no net loss in biodiversity scheme-wide. Below is a summary of primary actions taken under each stage of the hierarchy:

Avoidance

5.6.5. During design, ecologists and landscape teams have come together to reduce effects on the baseline biodiversity by:

a. Retaining areas of existing vegetation where possible, primarily restricted to areas of woodland and hedgerows.
b. Designing the River Coquet Bridge in a way that avoids the need for permanent or temporary supports within the watercourse.
c. Locating the north detention basin to the east of the carriageway rather than the west, to avoid loss of habitat within close proximity to a great crested newt population.

Minimisation

5.6.6. There has also been effort to minimise aspects of the Scheme which would negatively impact biodiversity on site. This has been achieved by:

a. Reducing the size and extent of the scheme or individual elements of the Scheme to reduce land-take and the subsequent clearance of habitats.
b. Locating temporary compounds within habitats of lower biodiversity value (e.g. arable farmland) rather than other habitats along the Scheme.
c. Timing and reducing, where possible, the duration of construction activities to minimise impacts to biodiversity.

Reinstatement

5.6.7. It is not possible to avoid or minimise all impacts on biodiversity during the construction period and as such it is necessary for some habitats to be reinstated post-development as a form of mitigation. Specifically, this has been achieved by:

a. Reinstating habitat following the removal of temporary site compounds that are present during construction. This habitat reinstatement follows the principle of like-for-like or better i.e., defunct hedgerows lost to the Scheme will be replaced with native species rich hedgerows.
b. Reinstating habitats which are required for construction works but are not designated as hardstanding. For example, reinstating removed Arable field margin HPI at a 10 m width rather than 2 m widths to promote biodiversity post-development.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

6.1.1. The Scheme would result in a net loss of 0.68 ha irreplaceable, ancient woodland habitat within the River Coquet and Coquet Valley Woodlands SSSI and the Coquet River Felton Park LWS, which would be compensated for by an 8.16 ha woodland compensation area. The areas associated with this baseline and compensation habitat have been excluded from baseline and post-development BNG calculations. A Scheme-wide biodiversity net gain cannot be achieved because of these impacts to an irreplaceable habitat and statutory designated site for nature conservation.

6.1.2. This biodiversity assessment seeks to determine whether the Scheme has achieved net loss, no net loss or net gain for HPIs and non-HPIs. **Table 5.9** summarises results of the BNG assessment for HPI and non-HPI habitats.

6.1.3. The Scheme is categorised as achieving an overall net loss in biodiversity due to:

a. Net loss of Hedgerow HPI LU and Arable field margin HPI BU.
b. Loss of irreplaceable ancient woodland habitats within the River Coquet and Coquet Valley Woodlands SSSI and the Coquet River Felton Park LWS. The ES sets out a bespoke scheme for compensation of this irreplaceable habitat, though this is outside of the scope of the BNG assessment.

6.2 RECOMMENDATIONS

6.2.1. The Scheme has followed the mitigation hierarchy (**paragraph 5.6.4**) but under current design proposals it is unable to achieve a scheme-wide biodiversity net gain. The BNG assessment shows a potential net gain of biodiversity for Lowland mixed deciduous woodland HPI, Lowland meadow HPI and Pond HPI, but net loss of biodiversity for Arable field margin HPI and Hedgerow HPI. Additional habitat creation or enhancement of hedgerow and arable field margins could help ensure a quantitative net gain for all non-irreplaceable habitats. Though it should be noted that the assessment of Arable field margin HPI is based on assumed presence of a 2m buffer strip around each arable field boundary that could be further refined at the detailed design stage.

6.2.2. Highways England produced a Chief Highways Engineer (CHE) memorandum (Highways England, 2018) which guides the standardised reporting of biodiversity information on Highways England projects. The CHE Memo is only for internal Highways England reporting. An assessment in accordance with the CHE memo is included in **Appendix D**.

7 REFERENCES

Business and Biodiversity Offsets Programme (BBOP). (2012). BBOP Principles on Biodiversity Offsets. Available: http://bbop.forest-trends.org/documents/files/bbop_principles.pdf

BRE Group (2018). GN36 BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route. Available: https://bregroup.com/brebreeam/wp-content/uploads/sites/3/2018/06/GN36-v0.0-BREEAM-CEEQUAL-HQM-Ecology-Calculation-Methodology-Route-2.pdf

CIEEM, CIRIA & IEMA. (2016). Biodiversity Net Gain: Good practice principles for development. https://www.iema.net/assets/newbuild/documents/IEMA%20Biodiversity%20Net%20Gain.pdf

CIEEM. (2017). Guidelines for Preliminary Ecological Appraisal, 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester

Department for Environment, Food and Rural Affairs (Defra). (2011). Biodiversity 2020: A strategy for England's wildlife and ecosystem services. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf .

Department for Environment, Food and Rural Affairs (Defra). (2012a). Technical Paper: the metric for the biodiversity offsetting pilot in England. Available: https://www.gov.uk/government/publications/technical-paper-the-metric-for-the-biodiversity-offsetting-pilot-in-england

Department for Environment, Food and Rural Affairs (Defra). (2012b). Biodiversity Offsetting Pilots: Guidance for offset providers. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69530/pb13742-bio-guide-offset-providers.pdf

Department for Environment, Food and Rural Affairs (Defra). (2012c). Biodiversity Offsetting Pilots: Guidance for developers. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69528/pb13743-bio-guide-developers.pdf

Department for Environment, Food and Rural Affairs (Defra). (2018). 25 Year Environment Plan. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

Department for Transport. (2014). National policy statement for national networks. Available: https://www.gov.uk/government/publications/national-policy-statement-for-national-networks

Highways England. (2015). Our plan to protect and increase biodiversity. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/441300/N150146_-_Highways_England_Biodiversity_Plan3lo.pdf

Highways England. (2016). Highways England Delivery Plan 2016 to 2017. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/538130/S160049_Highways_England_Delivery_Plan_2016_Final_-_Digital_version.pdf

Highways England. (2018). Chief Highways Engineer Memorandum 422/18, Supporting Transparency around our Biodiversity Performance.

HMSO. (2006). Natural Environment and Rural Communities Act. HMSO, Norwich. Available: https://www.legislation.gov.uk/ukpga/2006/16/pdfs/ukpga_20060016_en.pdf

Jacobs. (2018). Extended Phase 1 Habitat Report (TR010041/APP/6.2).

JNCC. (2010). Handbook for Phase 1 Habitat Survey: a Technique for Environmental Audit.

JNCC. (2011). UK Biodiversity Action Plan Priority Habitat Descriptions. Available: http://jncc.defra.gov.uk/PDF/UKBAP_PriorityHabitatDesc-Rev2011.pdf

Ministry of Housing, Communities and Local Government. (2019). National Planning Policy Framework. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf

Natural England. (2010). Higher Level Stewardship Farm Environment Plan (FEP) Manual Technical Guidance on the completion of the FEP and identification, condition assessment and recording of HLS FEP features. Third Edition. NE. Peterborough.

Northumberland County Council. (2017). Northumberland Local Plan. Core Strategy - Consolidated document showing proposed modification to Pre-Submission Draft.

Northumberland County Council. (2019). Northumberland Local Plan. Publication Draft Plan (Regulation 19).

The European Commission. (2011). Our life insurance, our natural capital: an EU biodiversity strategy to 2020. Available: http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm

Appendix A

CIEEM, CIRIA AND IEMA UK BIODIVERSITY NET GAIN GOOD PRACTICE PRINCIPLES

Biodiversity Net Gain

Good practice principles for development

Biodiversity Net Gain is development that leaves biodiversity in a better state than before. It is also an approach where developers work with local governments, wildlife groups, land owners and other stakeholders in order to support their priorities for nature conservation. These ten principles set out good practice for achieving Biodiversity Net Gain and must be applied all together, as one approach.

Principle 1. Apply the Mitigation Hierarchy

Do everything possible to first avoid and then minimise impacts on biodiversity. Only as a last resort, and in agreement with external decision-makers where possible, compensate for losses that cannot be avoided. If compensating for losses within the development footprint is not possible or does not generate the most benefits for nature conservation, then offset biodiversity losses by gains elsewhere.

Principle 2. Avoid losing biodiversity that cannot be offset by gains elsewhere

Avoid impacts on irreplaceable biodiversity - these impacts cannot be offset to achieve No Net Loss or Net Gain.

Principle 3. Be inclusive and equitable

Engage stakeholders early, and involve them in designing, implementing, monitoring and evaluating the approach to Net Gain. Achieve Net Gain in partnership with stakeholders where possible, and share the benefits fairly among stakeholders.

Principle 4. Address risks

Mitigate difficulty, uncertainty and other risks to achieving Net Gain. Apply well-accepted ways to add contingency when calculating biodiversity losses and gains in order to account for any remaining risks, as well as to compensate for the time between the losses occurring and the gains being fully realised.

Principle 5. Make a measurable Net Gain contribution

Achieve a measurable, overall gain[1] for biodiversity and the services ecosystems provide while directly contributing towards nature conservation priorities.

1 Net Gain has been described as a measurable target for development projects where impacts on biodiversity are outweighed by a clear mitigation hierarchy approach to first avoid and then minimise impacts, including through restoration and / or compensation. Adhering to these Net Gain principles (i.e. pursuing all principles together) will help in under-pinning good practice for achieving and sustaining Net Gain.

Principle 6. Achieve the best outcomes for biodiversity

Achieve the best outcomes for biodiversity by using robust, credible evidence and local knowledge to make clearly-justified choices when:

- Delivering compensation that is ecologically equivalent in type, amount and condition, and that accounts for the location and timing of biodiversity losses
- Compensating for losses of one type of biodiversity by providing a different type that delivers greater benefits for nature conservation
- Achieving Net Gain locally to the development while also contributing towards nature conservation priorities at local, regional and national levels
- Enhancing existing or creating new habitat
- Enhancing ecological connectivity by creating more, bigger, better and joined areas for biodiversity

Principle 7. Be additional

Achieve nature conservation outcomes that demonstrably exceed existing obligations (i.e. do not deliver something that would occur anyway).

Principle 8. Create a Net Gain legacy

Ensure Net Gain generates long-term benefits by:

- Engaging stakeholders and jointly agreeing practical solutions that secure Net Gain in perpetuity[2]
- Planning for adaptive management and securing dedicated funding for long-term management
- Designing Net Gain for biodiversity to be resilient to external factors, especially climate change
- Mitigating risks from other land uses
- Avoiding displacing harmful activities from one location to another
- Supporting local-level management of Net Gain activities

Principle 9. Optimise sustainability

Prioritise Biodiversity Net Gain and, where possible, optimise the wider environmental benefits for a sustainable society and economy.

Principle 10. Be transparent

Communicate all Net Gain activities in a transparent and timely manner, sharing the learning with all stakeholders.

2 Biodiversity compensation should be planned for a sustained Net Gain over the longest possible timeframe. For development in the UK, the expectation is that compensation sites will be secured for at least the lifetime of the development (e.g. often 25-30 years) with the objective of Net Gain management continuing in the future.

Appendix B

WSP BIODIVERSITY NET GAIN PROCESS

WSP BIODIVERSITY NET GAIN PROCESS

Step 1 – Set the Scope

i. **Produce a biodiversity net gain (BNG) strategy.** A short memo report setting out client commitments to BNG, scope of the BNG work, and the proposed steps required.

i. **Workshop 1 or 1-2-1 meetings – strategy meetings.** Early engagement with key stakeholders, likely to include local conservation NGOs, local authorities and government agencies such as Natural England. Early engagement is essential to present, discuss and develop the BNG strategy; including setting the BNG good practice principles into a scheme context and agreeing local priorities for biodiversity.

Step 2 – Initial Biodiversity Assessment

i. **Survey baseline habitats and their condition.** Ideally, a habitat condition assessment is undertaken during Phase 1 Habitat survey. If Phase 1 Habitat data has been collected prior to initiating the BNG process, condition assessment can be undertaken either a) retrospectively through interpretation of Phase 1 target notes, consultation with surveyors, or employing a number of assumptions; or b) during an additional site visit.

ii. **Identify irreplaceable habitat.** Following Defra guidance, irreplaceable habitats within the scheme boundary must be identified and excluded from the biodiversity unit calculations. It is important to note that biodiversity net gain or no net loss cannot be achieved for the scheme as a whole if there is a negative impact on an irreplaceable habitat.

iii. **Calculate baseline biodiversity units using the biodiversity metric.** This calculation includes all habitats (minus irreplaceable habitats) within the scheme boundary prior to development and is informed by Phase 1 Habitat data and results of the condition assessment. The baseline biodiversity unit calculation may be run on a number of scheme options if the scheme is at options appraisal stage.

iv. **Calculate post-development biodiversity units using the biodiversity metric.** This calculation accounts for all of the proposed habitats (including retained habitat and habitat lost or created as a result of the development) within the scheme boundary post-development. The calculation is informed by scheme design, landscape plans, and proposed ecological mitigation. The assessment is based upon the target state (type, size and condition) of habitats being created.

v. **Produce an 'Initial Biodiversity Assessment' report.** The report sets out the BNG process in the context of the scheme, and includes the method and results of initial baseline and post-development biodiversity unit calculations.

Step 3 – Detailed Scheme Assessment

i. **Inform options appraisal.** If baseline biodiversity units have been calculated for a number of scheme options, results will be used to inform options appraisal.

ii. **Inform the mitigation proposals.** Results of biodiversity unit calculations performed under Step 2 are used to inform the extent and habitat type of on-site ecological mitigation and compensation land required for the scheme to meet no net loss or net gain targets.

iii. **Update biodiversity unit calculations.** Following finalisation of the scheme design and ecological mitigation proposals, the biodiversity units are updated to reflect any changes. Calculations may also be re-run if updated Phase 1 Habitat data becomes available.

iv. **Estimate the biodiversity compensation required.** The difference between baseline and post-development biodiversity units indicates the number of units required for the scheme to deliver no net loss or net gain for biodiversity. This in turn can be used to identify the extent and habitat type of compensation required. A rough cost estimate for potential compensation can be provided at this stage.

v. **Workshop 2 – compensation/offset workshop.** Work with stakeholders to gather suggestions to identify candidate compensation sites and providers. These sites could be offset sites, which are compensation sites that are situated outside the project boundary. This workshop also provides an opportunity to update stakeholders on BNG progress.

Step 4 – Assessment of Candidate Offset Sites

i. **Initial assessment of feasibility.** Any candidate offset sites which are considered not feasible for any reason are scoped out at this stage.

ii. **Survey candidate offset sites** to identify existing habitat type, extent and condition.

iii. **Calculate potential biodiversity units** deliverable by each candidate offset. Using the same methods employed for calculating baseline and post-development biodiversity units for the scheme as a whole, calculate baseline and post-development biodiversity units for offset sites to determine potential biodiversity units deliverable.

iv. **Hold one-to-one meetings with potential offset providers to:**

a) Identify suitable locations for candidate offset sites and determine what habitats and species they could support;

b) Determine how offsets can contribute to local biodiversity objectives and fit within ecological networks;

c) Set out the type of agreement that would be acceptable to offset providers (e.g. long-term agreement for management of the land); and

d) Collate information to feed in to offset scoring templates and offset summary sheets.

v. **Score candidate offsets** using the offset scoring template. This takes into account ecological factors, financial factors, and wider benefits and opportunities.

vi. **Produce offset summary sheets** describing each offset site in its present state and the habitats and species the proposed offsets will support. Details of land ownership, access provisions and proposed management agreements are also included in summary sheets.

vii. **Panel review of potential offset sites** to include relevant stakeholders. Decisions are made as to which candidate offset sites to take forward.

Step 5 – Completion of Biodiversity Assessment

i. **Final update of biodiversity unit calculations.** If there have been changes to the scheme design (including environmental mitigation proposals) since calculations were last updated, biodiversity units are updated to reflect any changes.

ii. **Workshop 3 – final workshop.** A third stakeholder engagement workshop is recommended to update all stakeholders on BNG progress since the last workshop, and inform them of any decisions made.

iii. **Produce a 'Full Biodiversity Assessment' report and associated GIS data.** This will detail the approach and outcomes of Steps 1 to 4, importantly, how the project has met the BNG good practice principles. It will set out candidate offset sites and enable the client to decide which offsets to support and whether to aim for no net loss or net gain.

Step 6 – Delivering Biodiversity Net Gain

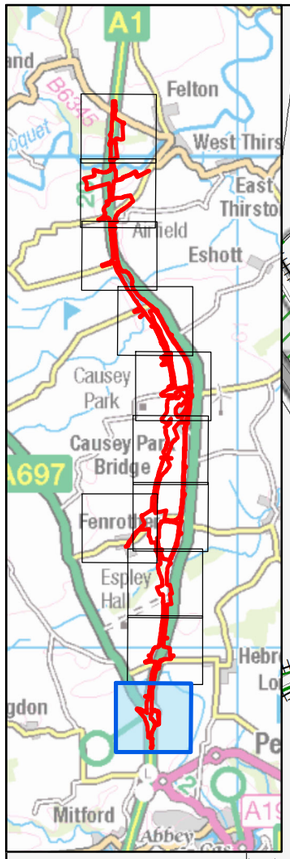
i. **Implement BNG during the construction phase.** This will involve: updating the biodiversity baseline; including BNG within construction documents; training key staff; reducing the time-lag between losses and gains; acting on risks and opportunities; and collecting evidence and data.

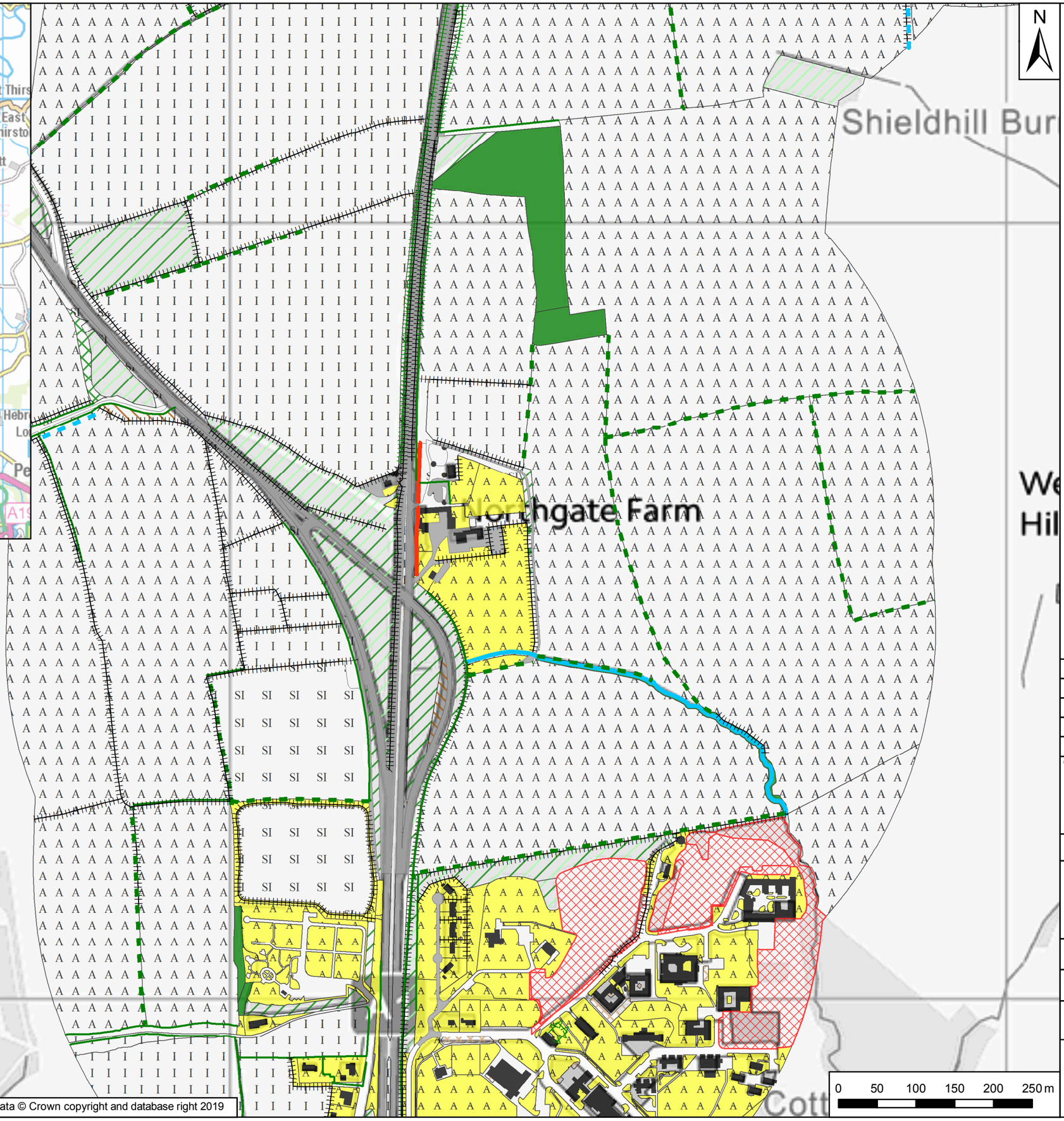
ii. **Set up offsets.** Once offset sites to be delivered have been selected, and fine details of the scope of each offset agreed, legal agreements will be set up with offset providers to manage offsets over a set time frame (generally between 15 and 30 years). Further information on the agreement types can be provided on request.

iii. **Monitor and report** to ensure the offsets are delivered to the standard required. Monitoring and reporting is undertaken at key points throughout the management agreement (e.g. once every two or three years).

Appendix C

FIGURES





N

Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Broadleaved Parkland/scattered trees
- Improved grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Hard standing
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Introduced shrub
- Buildings
- Bare ground
- Not accessed land
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Wall
- Dry ditch

Rev	Date	Description	By	Chk'd	App'd
P04	18/09/18	Updated Following Site Visit	GH	JF	KS
P03	28/08/18	Third Issue	PM	JM	KS
P02	21/08/18	Second Issue	PM	JM	KS
P01	20/08/18	First Issue	PM	JM	KS

Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title:
Appendix C
Figure 1 Baseline Phase 1 Habitat Map
Page 1 of 11

Scale	Drawn	Checked	Approved	Authorised
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Drawing Status: For Information

Suitability: S1

Drawing Number / Project: HE551459 | Originator: WSP | Volume: 6.3

Location: M2F | Type | Role | Number

Project Ref. No.: 70044136

Revision: P04

Cottage

Beacon Hill

129

Hebron Hill

High Highlaws Cottage

Strafford House

A1

A697

A19

Felton

West Thirs

East Thirsto

Eshott

Causey Park

Causey Park Bridge

Fenrother

Espley Hall

Mitford

Abbey

N

Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Mixed woodland - plantation
- Scrub - dense/continuous
- Broadleaved Parkland/scattered trees
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Hard standing
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Wall
- Dry ditch
- Boundary removed

0 50 100 150 200 250 m

Rev	Date	Description	By	Chk'd	App'd
P04	18/09/18	Updated Following Site Visit	GH	JF	KS
P03	28/08/18	Third Issue	PM	JM	KS
P02	21/08/18	Second Issue	PM	JM	KS
P01	20/08/18	First Issue	PM	JM	KS

Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title: Appendix C
Figure 1 Baseline Phase 1 Habitat Map
Page 2 of 11

Scale	Drawn	Checked	Approved	Authorised
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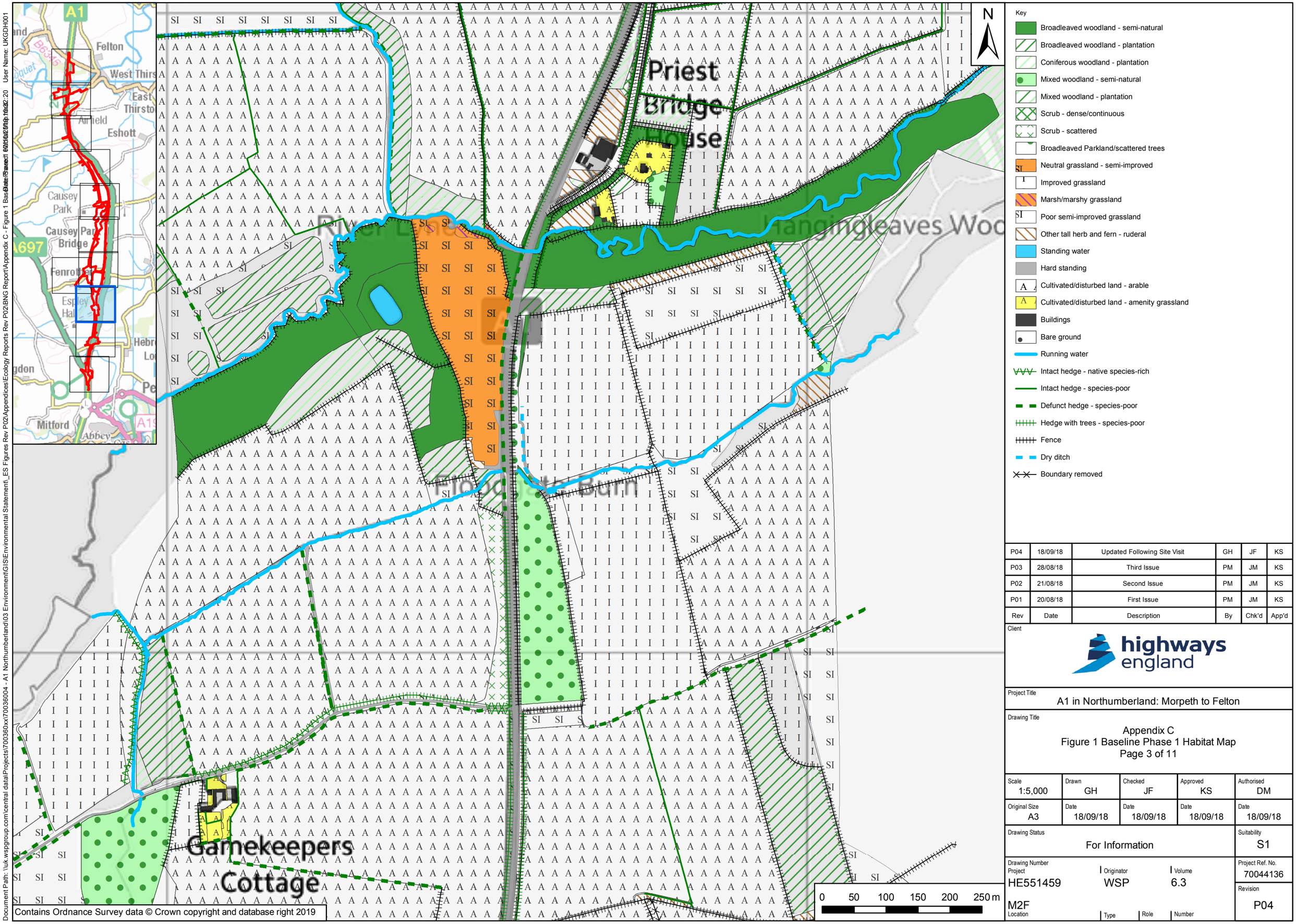
Drawing Status: For Information

Suitability: S1

Drawing Number: Project HE551459 | Originator WSP | Volume 6.3 | Location M2F | Type | Role | Number

Project Ref. No.: 70044136

Revision: P04



Key

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- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- Broadleaved Parkland/scattered trees
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Hard standing
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Boundary removed

Rev	Date	Description	By	Chk'd	App'd
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Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title: Appendix C
Figure 1 Baseline Phase 1 Habitat Map
Page 3 of 11

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Suitability: S1

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Project Ref. No.: 70044136

Revision: P04

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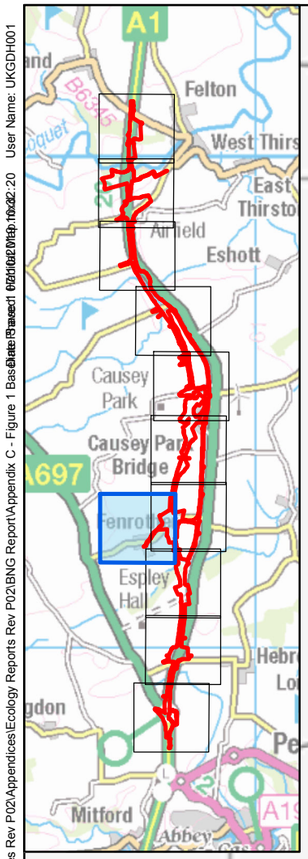

Key

- Broadleaved woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- Improved grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Hard standing
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Boundary removed

Rev	Date	Description	By	Chk'd	App'd
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P01	20/08/18	First Issue	PM	JM	KS

Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

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Appendix C
Figure 1 Baseline Phase 1 Habitat Map
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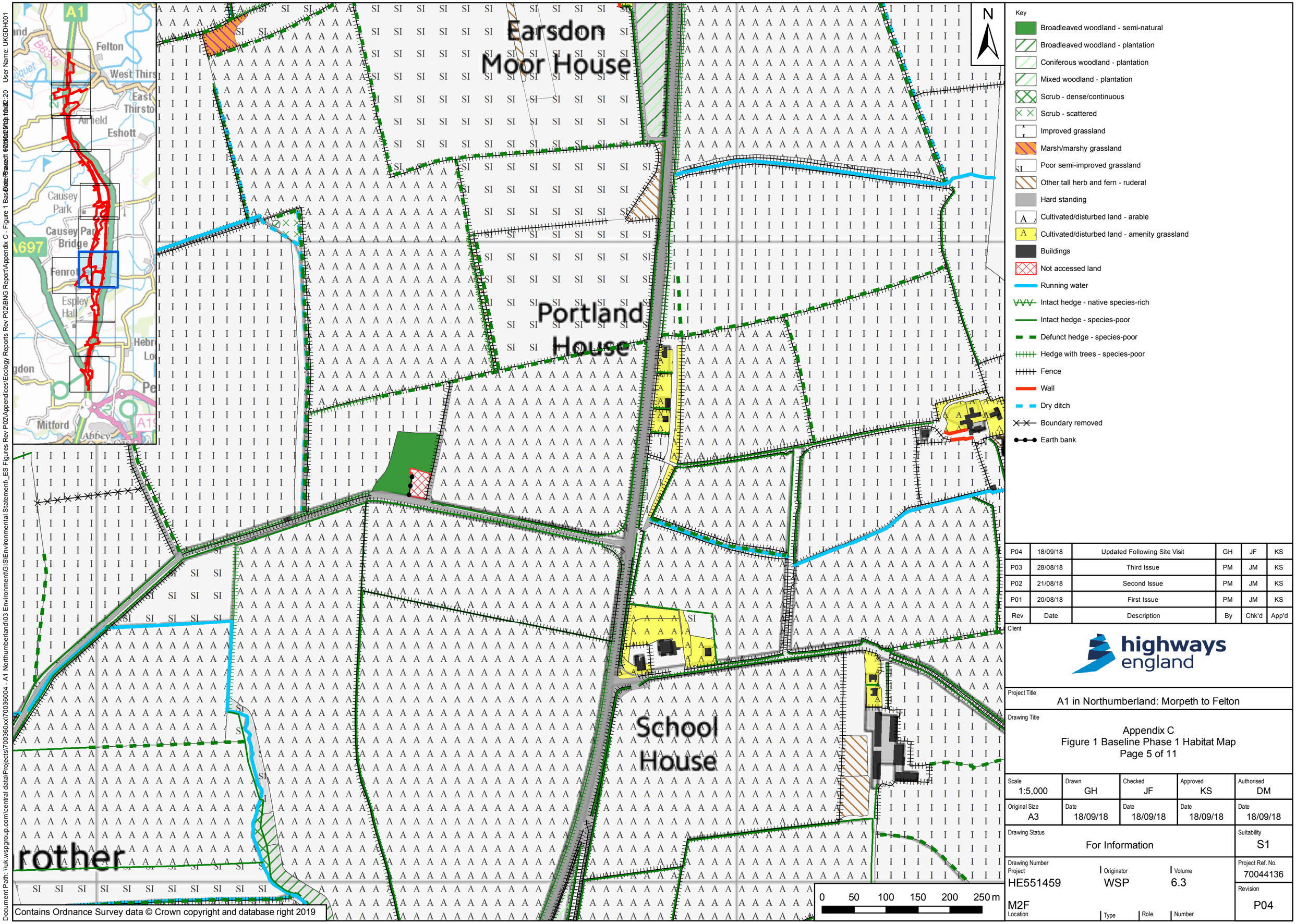
Project Ref. No.: 70044136

Revision: P04



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P01	20/08/18	First Issue	PM	JM	KS

Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title: Appendix C
Figure 1 Baseline Phase 1 Habitat Map
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M2F Location	**Type**	**Role**	**Number**
			Revision: P04

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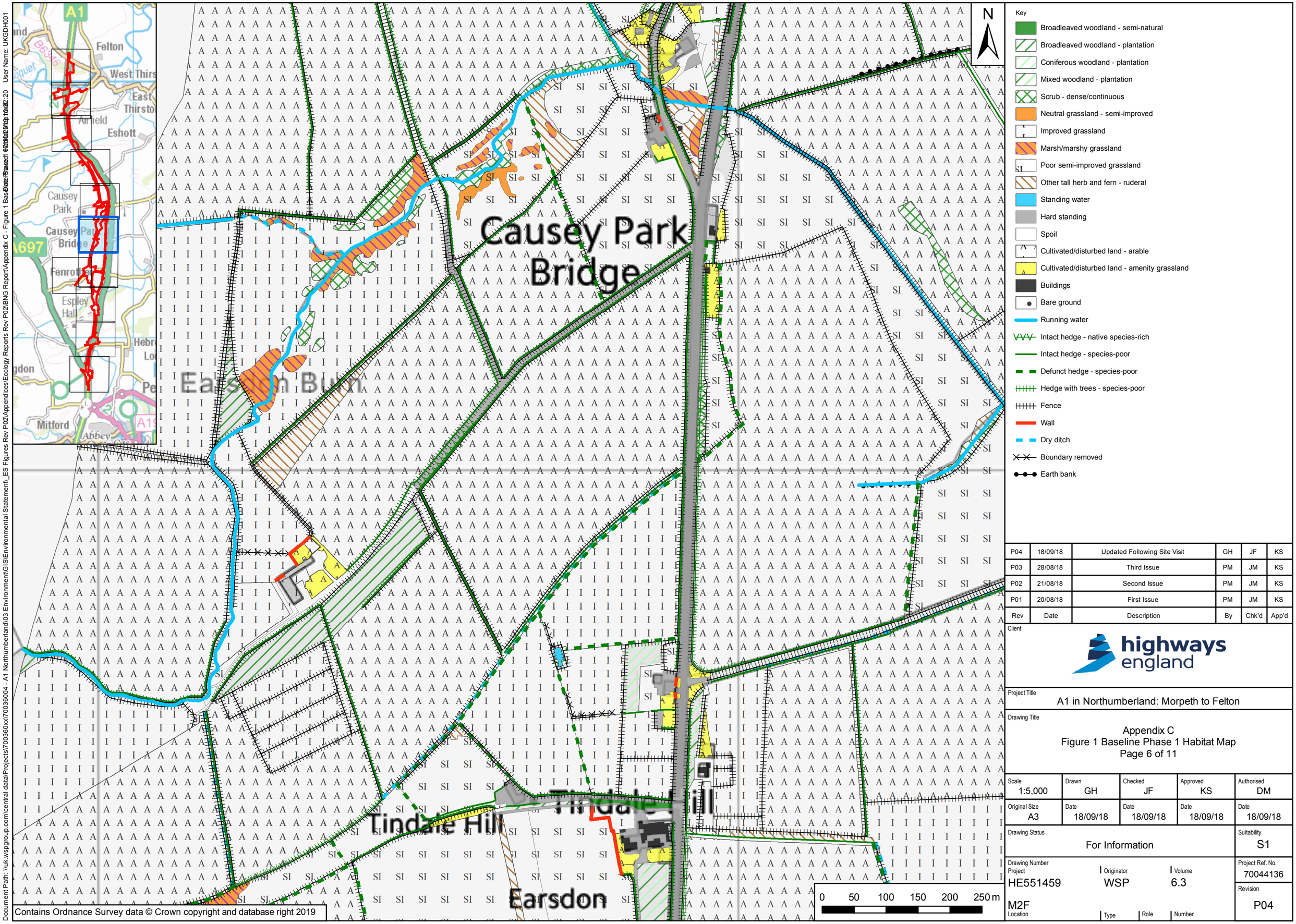

Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Hard standing
- Spoil
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank

Rev	Date	Description	By	Chk'd	App'd
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Project Title: A1 in Northumberland: Morpeth to Felton

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Figure 1 Baseline Phase 1 Habitat Map
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Project Ref. No.: 70044136

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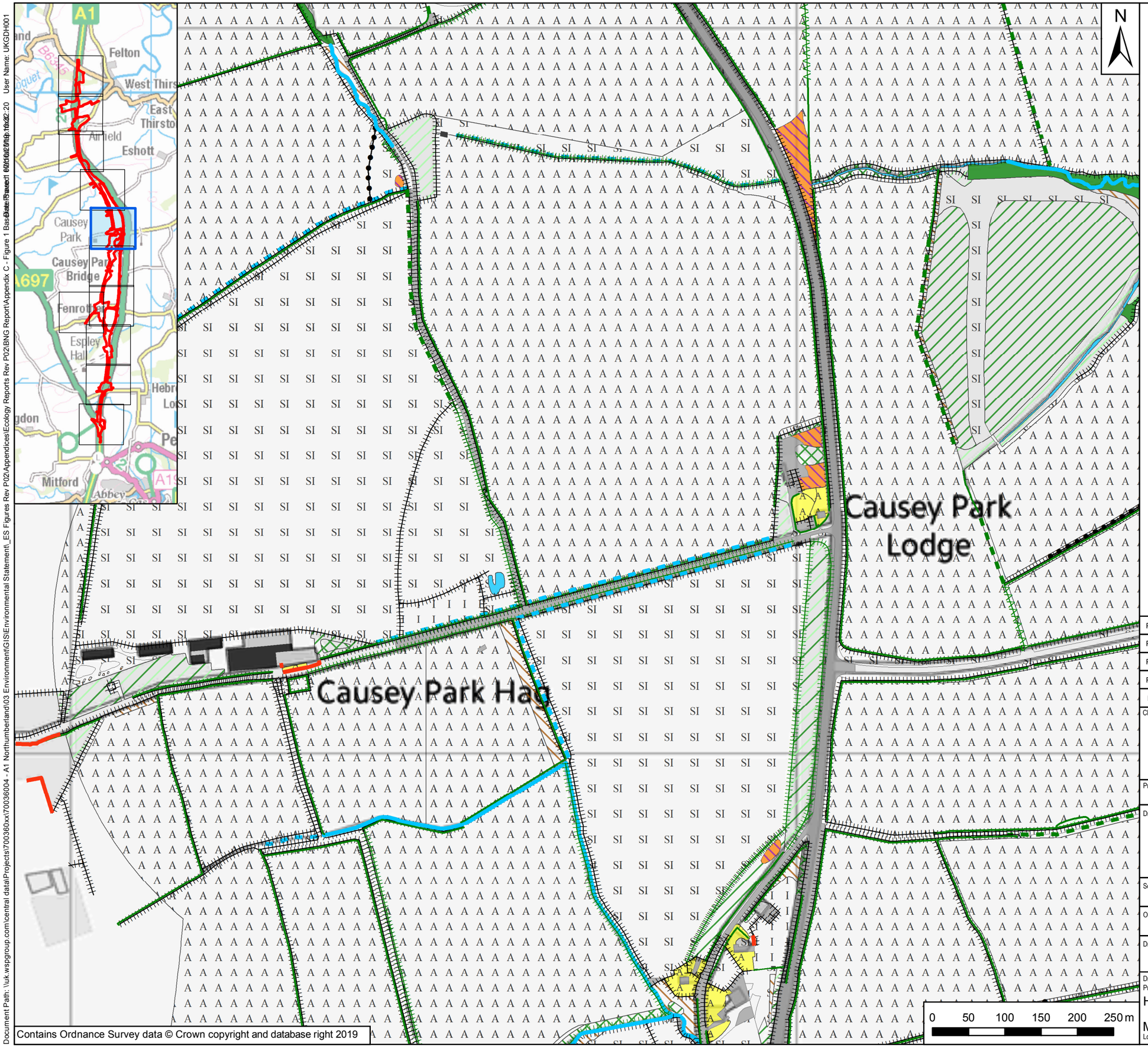
Revision: P04



Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Standing water - eutrophic
- Hard standing
- Spoil
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Wall
- Dry ditch
- Earth bank

Rev	Date	Description	By	Chk'd	App'd
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Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title:
Appendix C
Figure 1 Baseline Phase 1 Habitat Map
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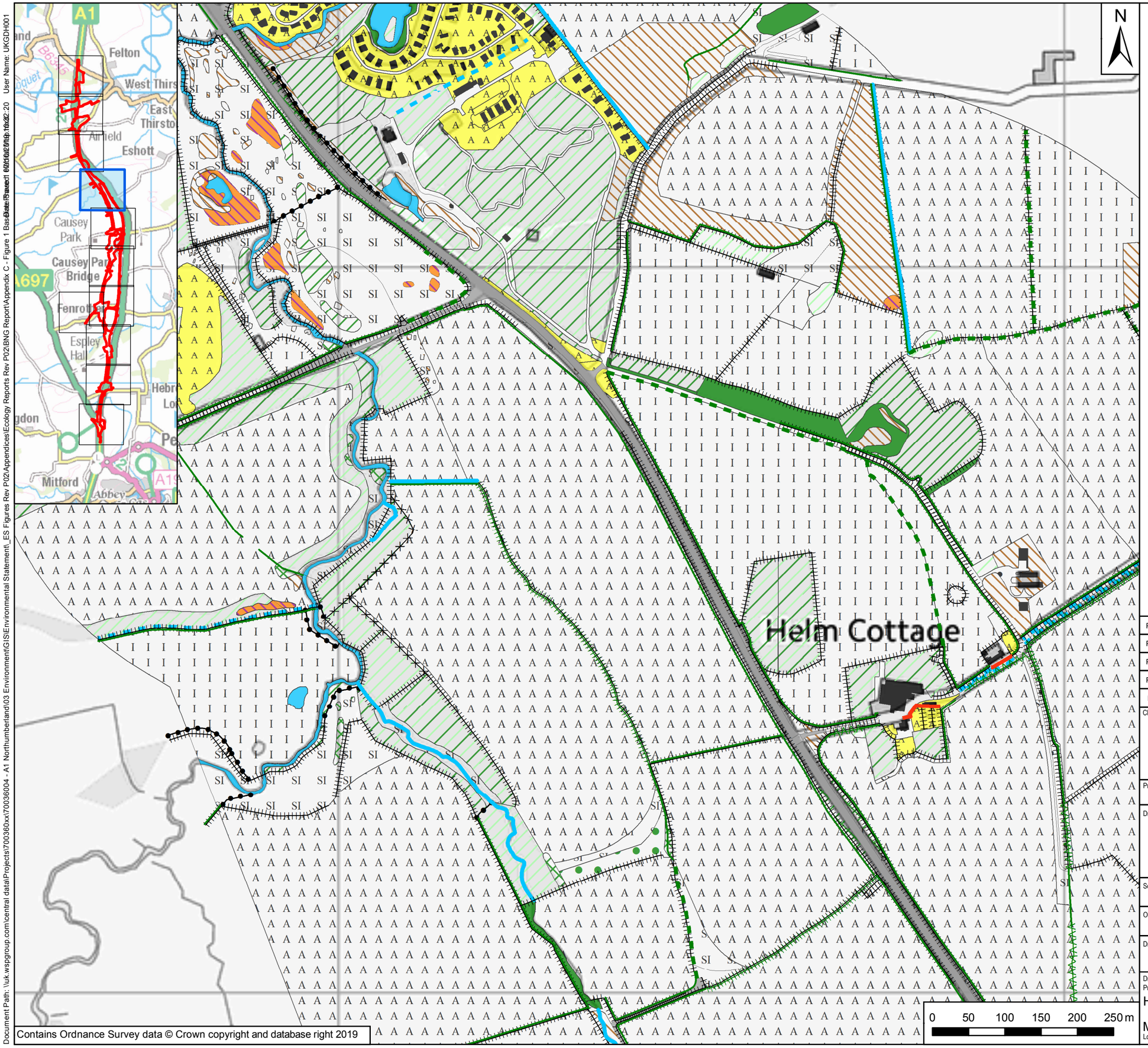
Project Ref. No.: 70044136

Revision: P04



Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Broadleaved Parkland/scattered trees
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Hard standing
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank

Rev	Date	Description	By	Chk'd	App'd
P04	18/09/18	Updated Following Site Visit	GH	JF	KS
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Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title:
Appendix C
Figure 1 Baseline Phase 1 Habitat Map
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Scale	Drawn	Checked	Approved	Authorised
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Drawing Status: For Information

Suitability: S1

Drawing Number: Project HE551459 | Originator WSP | Volume 6.3 | M2F | Location | Type | Role | Number

Project Ref. No.: 70044136

Revision: P04

West Moor House

Blackwood Hall

Rosie's Barn

Felton
West Thirston
East Thirston
Eshott
Causey Park
Causey Park Bridge
Fenrother
Espley Hall
Mitford
Abbey
A1
A697
A1

N

Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- SI Neutral grassland - semi-improved
- I Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Hard standing
- Spoil
- A Cultivated/disturbed land - arable
- A Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank

0 50 100 150 200 250 m

Rev	Date	Description	By	Chk'd	App'd
P04	18/09/18	Updated Following Site Visit	GH	JF	KS
P03	28/08/18	Third Issue	PM	JM	KS
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P01	20/08/18	First Issue	PM	JM	KS

Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title:
Appendix C
Figure 1 Baseline Phase 1 Habitat Map
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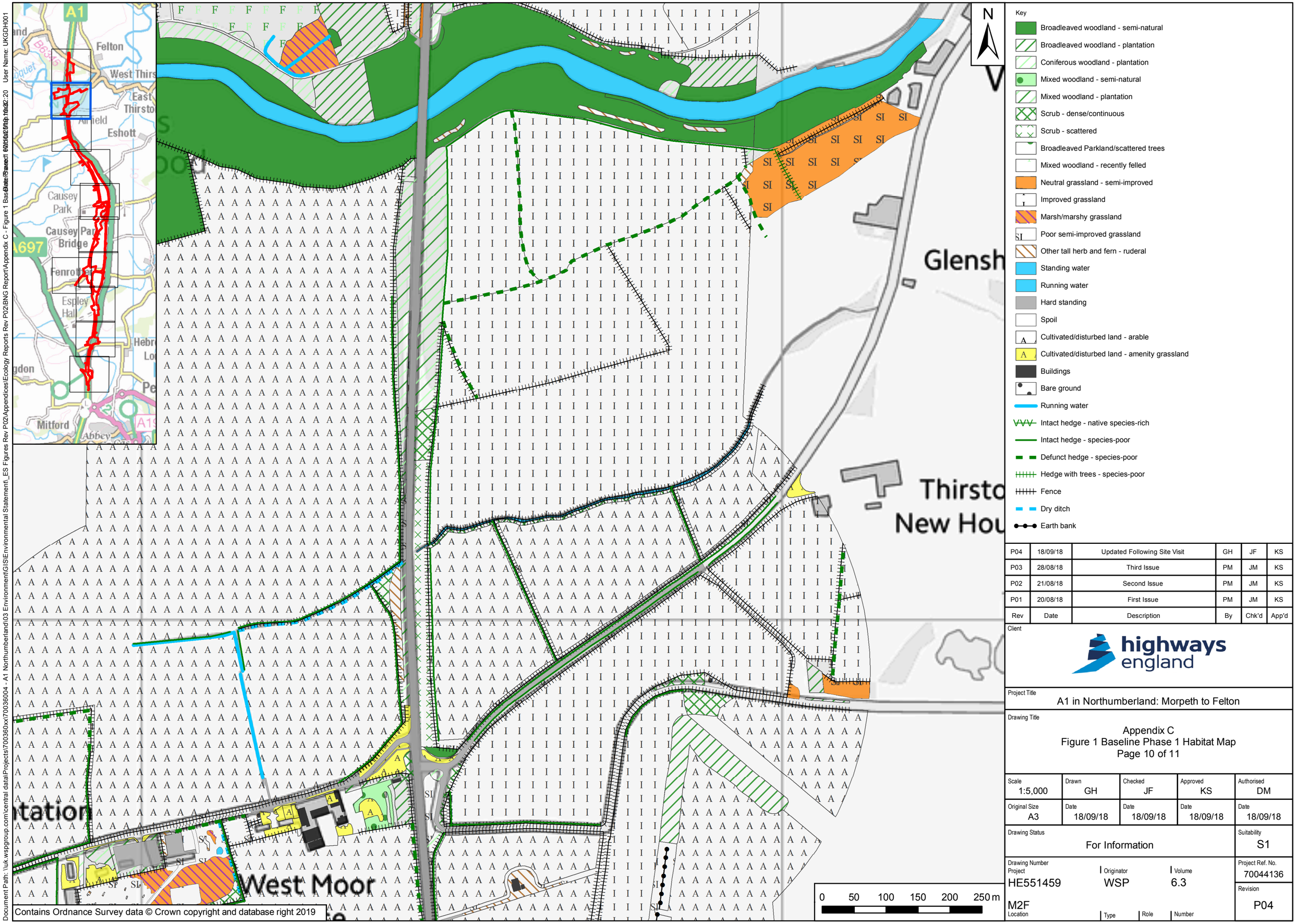

Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- Broadleaved Parkland/scattered trees
- Mixed woodland - recently felled
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Running water
- Hard standing
- Spoil
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Earth bank

Rev	Date	Description	By	Chk'd	App'd
P04	18/09/18	Updated Following Site Visit	GH	JF	KS
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Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title:
Appendix C
Figure 1 Baseline Phase 1 Habitat Map
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Suitability: S1

Drawing Number Project	Originator	Volume	Project Ref. No.
HE551459	WSP	6.3	70044136
M2F Location	Type	Role	Number	Revision: P04

Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Mixed woodland - plantation
- Scrub - dense/continuous
- Coniferous woodland - recently felled
- Mixed woodland - recently felled
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Other tall herb and fern - ruderal
- Standing water
- Running water
- Hard standing
- Cultivated/disturbed land - arable
- Cultivated/disturbed land - amenity grassland
- Buildings
- Bare ground
- Running water
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - species-poor
- Fence
- Wall

Rev	Date	Description	By	Chk'd	App'd
P04	18/09/18	Updated Following Site Visit	GH	JF	KS
P03	28/08/18	Third Issue	PM	JM	KS
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P01	20/08/18	First Issue	PM	JM	KS

Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title:
Appendix C
Figure 1 Baseline Phase 1 Habitat Map
Page 11 of 11

Scale	Drawn	Checked	Approved	Authorised
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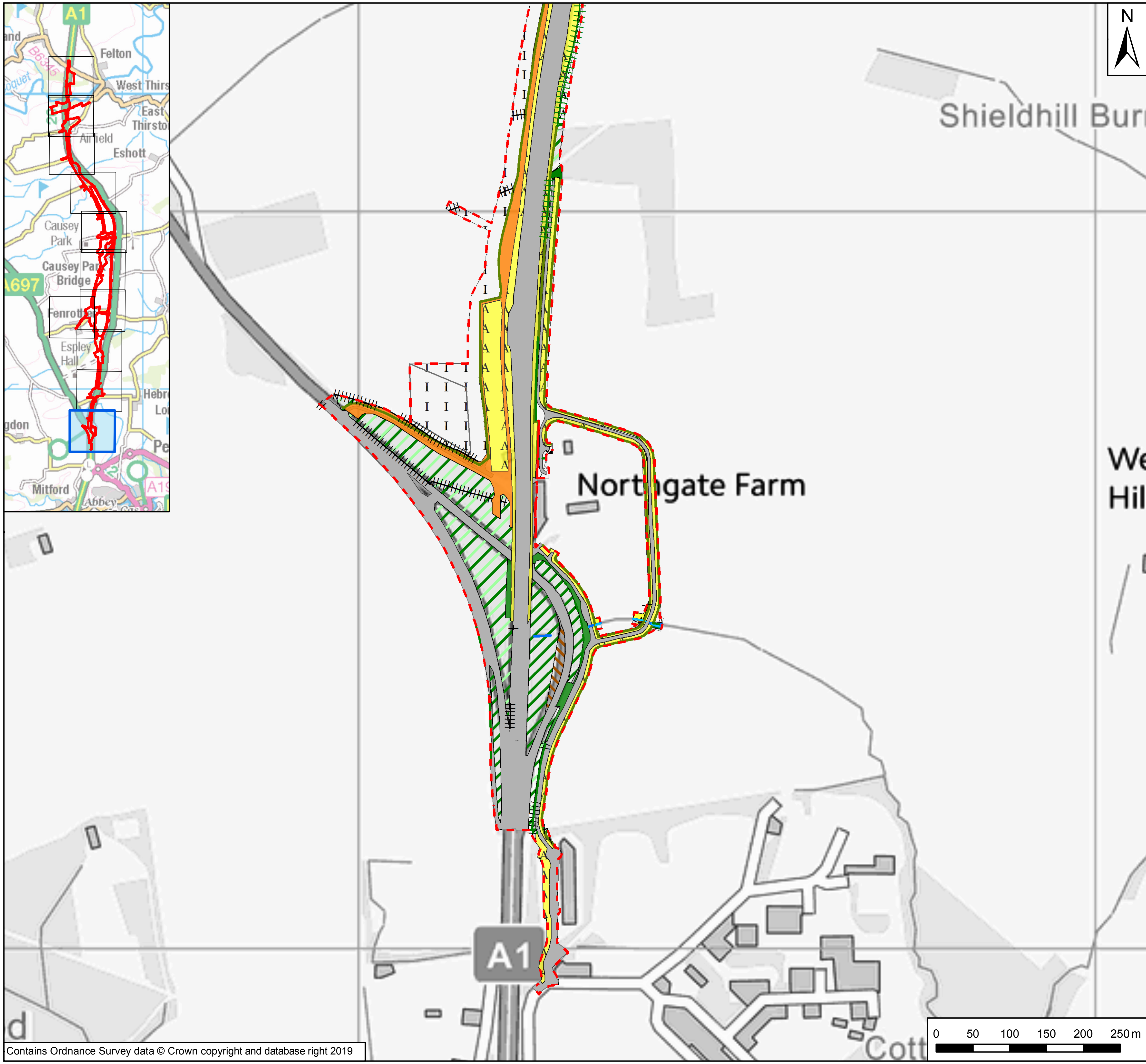
Revision: P04



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Key

- BNG Boundary
- Broadleaved Woodland - Semi-Natural
- Broadleaved Woodland - Plantation
- Coniferous Woodland - Plantation
- Mixed Woodland - Semi-Natural
- Mixed Woodland - Plantation
- Scrub - Dense/Continuous
- Scrub - Scattered
- Broadleaved Parkland/Scattered Trees
- Neutral Grassland - Unimproved
- Neutral Grassland - Semi-Improved
- Improved Grassland
- Marsh/Marshy Grassland
- Poor Semi-Improved Grassland
- Other Tall Herb and Fern - Ruderal
- Inundation Vegetation
- Standing Water
- Hardstanding
- Spoil
- Arable Land
- Amenity Grassland
- Buildings
- Bare Ground
- Other Habitat
- Boundary Removed
- Defunct Hedge - Species-Poor
- Dry Ditch
- Earth Bank
- Fence
- Hedge with Trees - Species-Poor
- Intact Hedge - Native Species-Rich
- Intact Hedge - Species-Poor
- Running Water
- Wall

Rev	Date	Description	By	Chk'd	App'd
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Client: highways england

Project Title: A1 in Northumberland: Morpeth to Felton

Drawing Title: Appendix C
Figure 2 Post-Development Phase 1 Habitat Map
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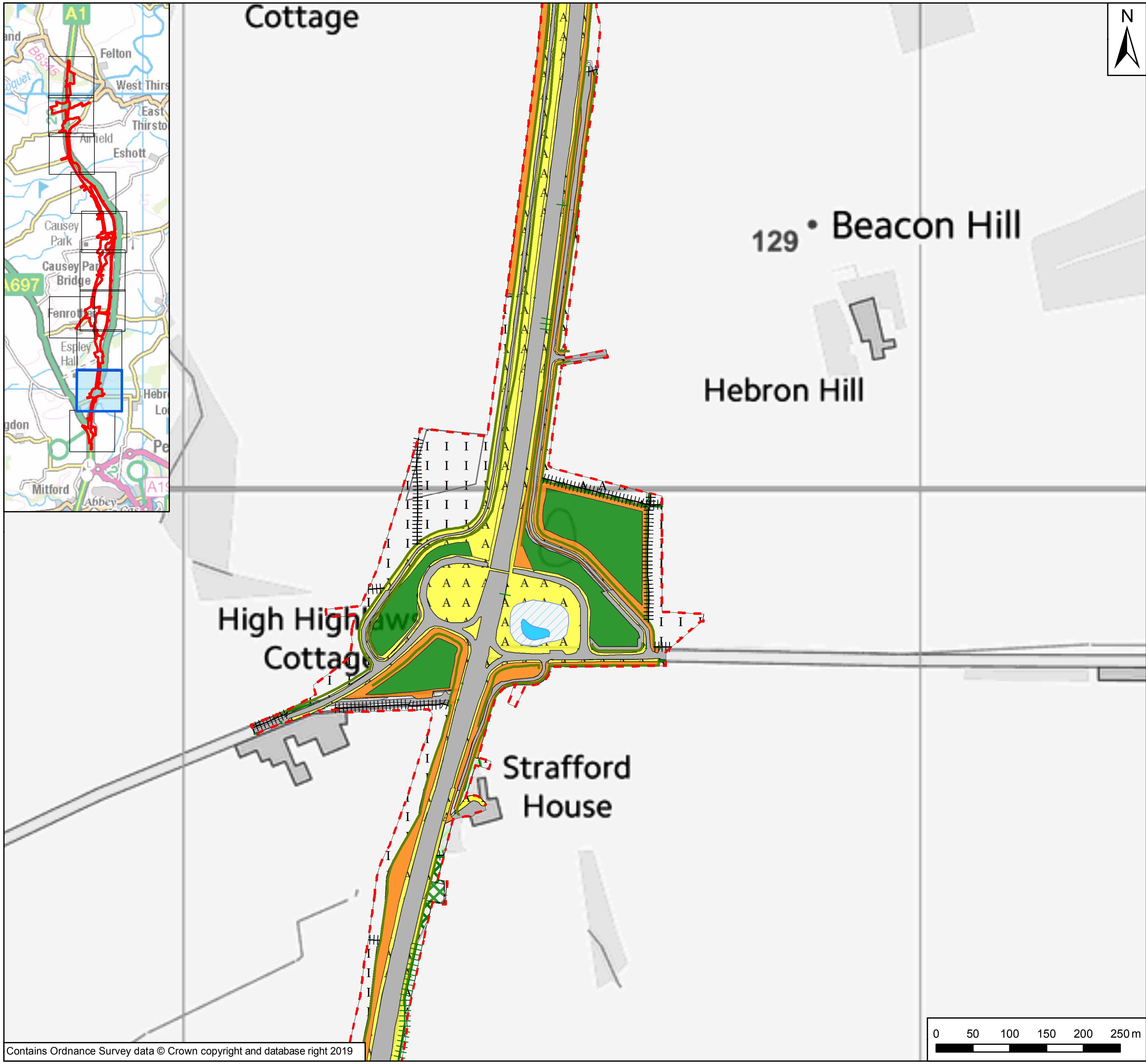
Revision: P01



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- Improved Grassland
- Marsh/Marshy Grassland
- Poor Semi-Improved Grassland
- Other Tall Herb and Fern - Ruderal
- Inundation Vegetation
- Standing Water
- Hardstanding
- Spoil
- Arable Land
- Amenity Grassland
- Buildings
- Bare Ground
- Other Habitat
- Boundary Removed
- Defunct Hedge - Species-Poor
- Dry Ditch
- Earth Bank
- Fence
- Hedge with Trees - Species-Poor
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- Intact Hedge - Species-Poor
- Running Water
- Wall

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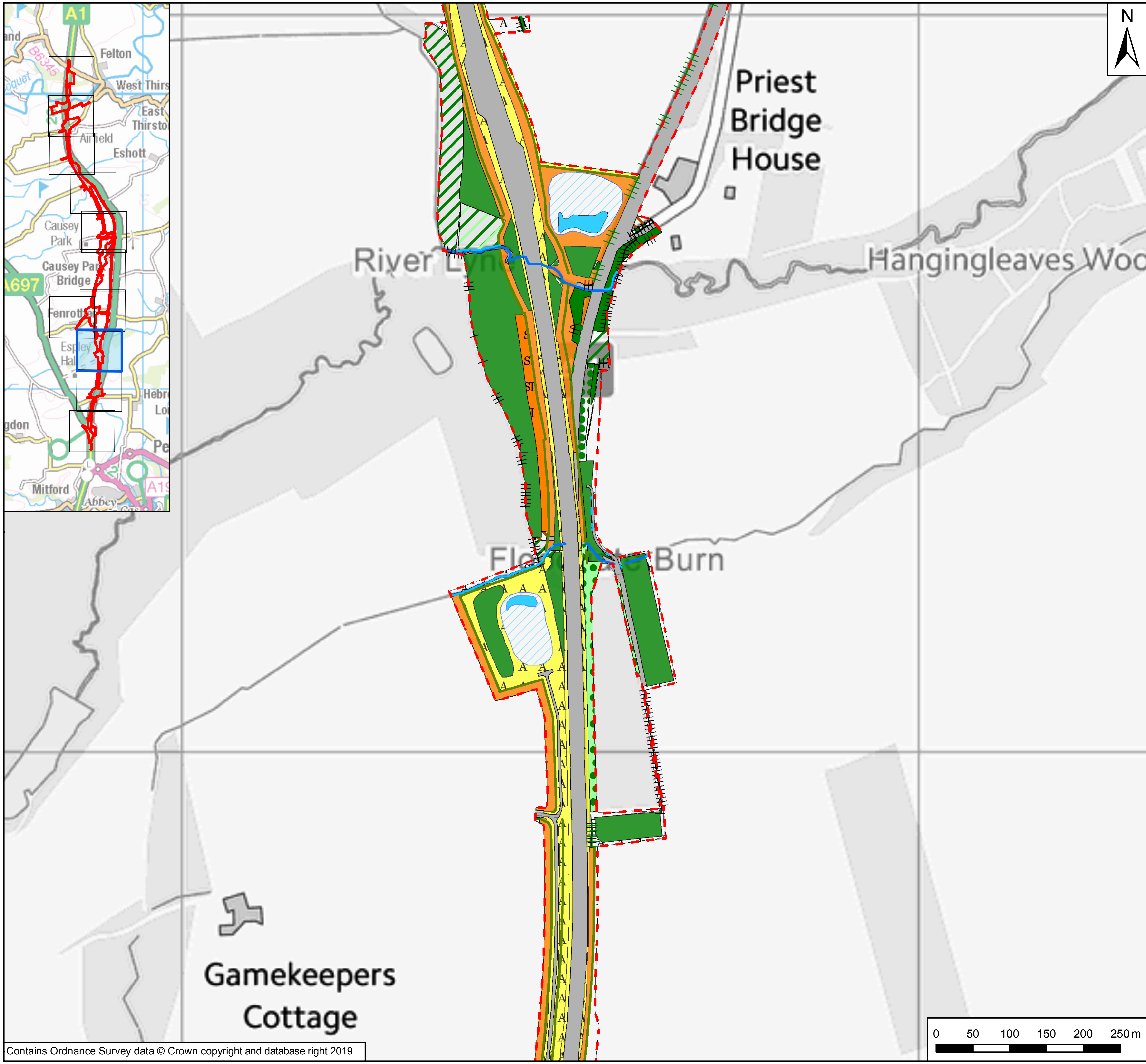

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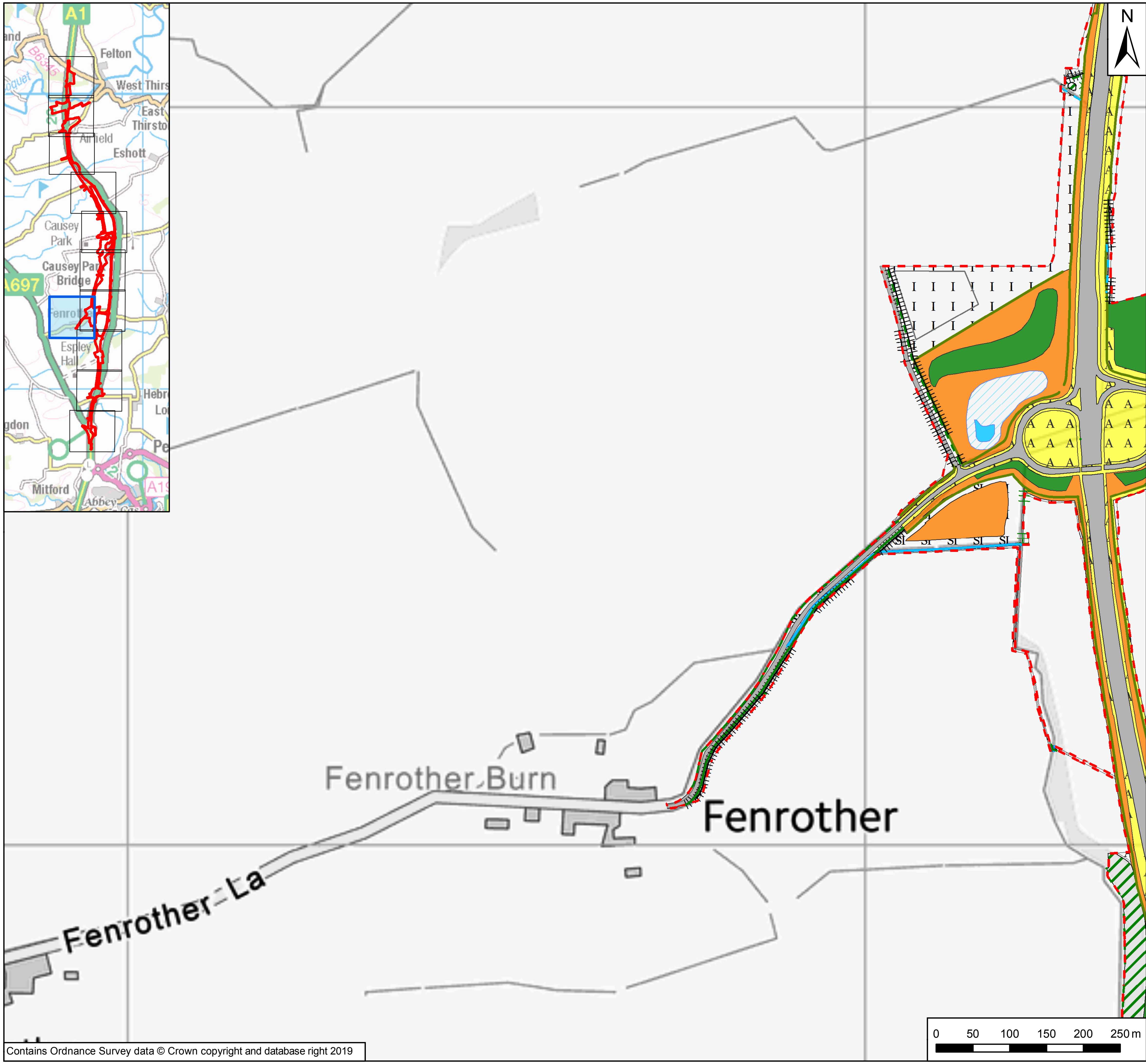

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Project Ref. No. 70044136

Revision P01

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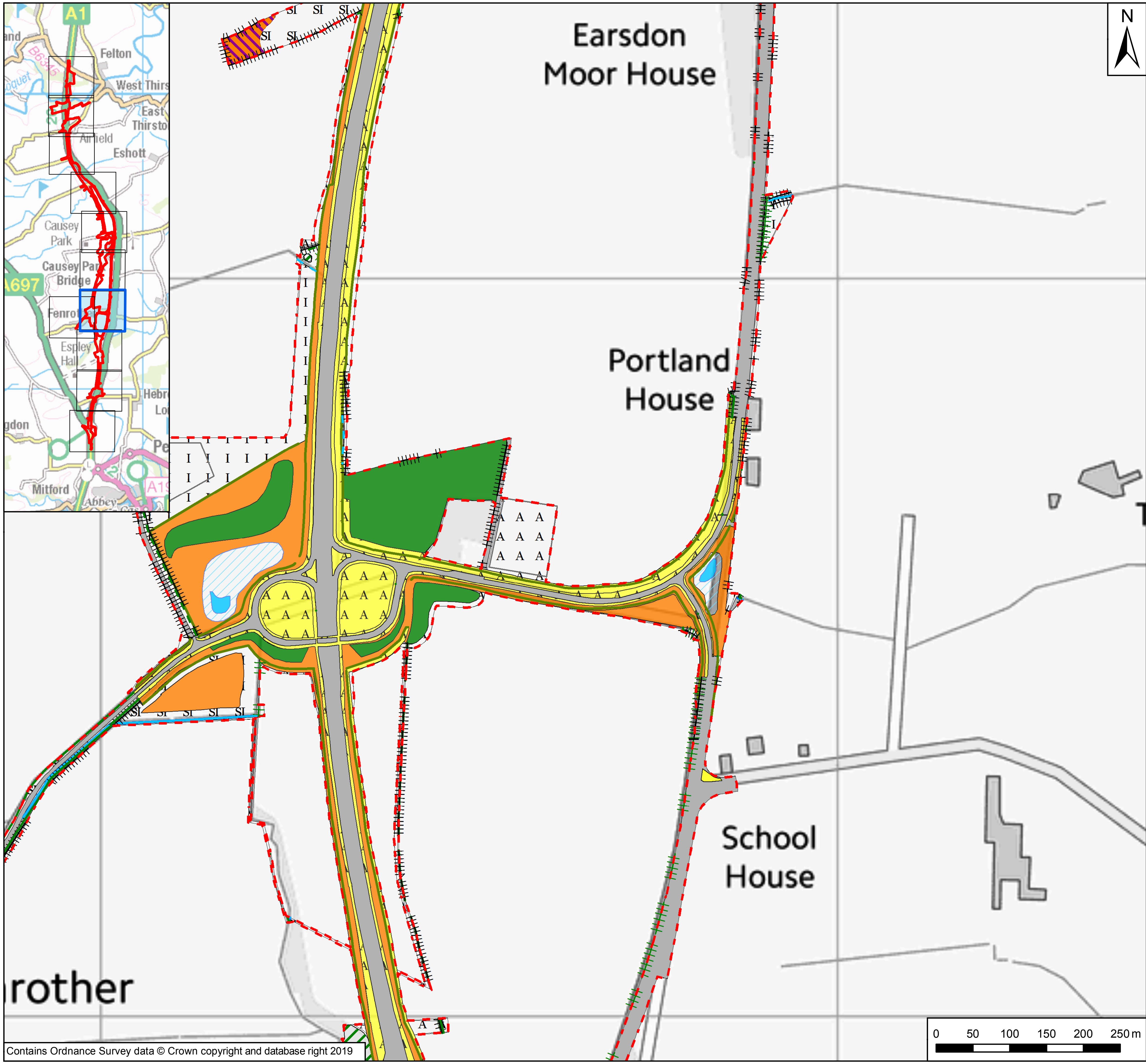

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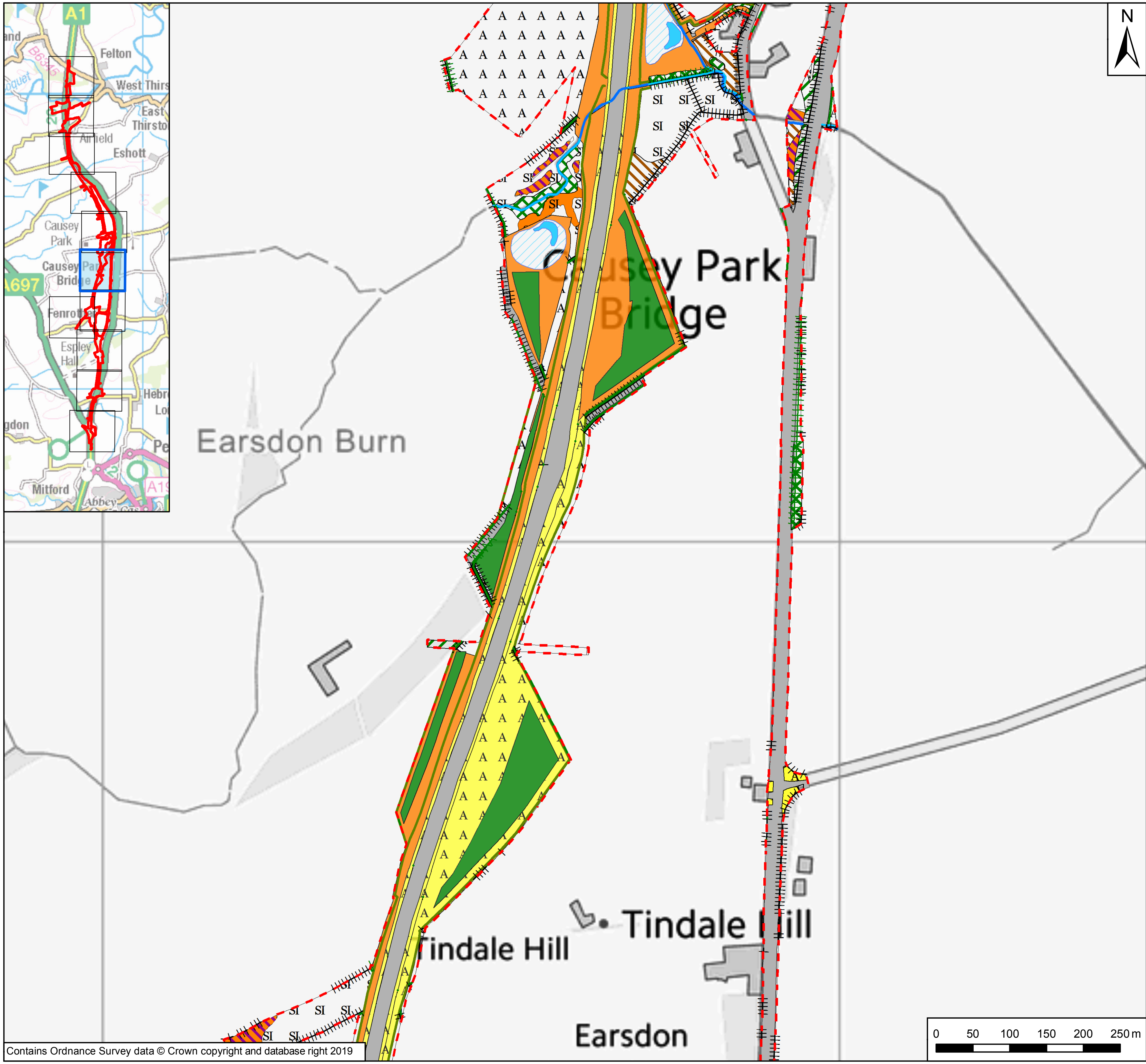

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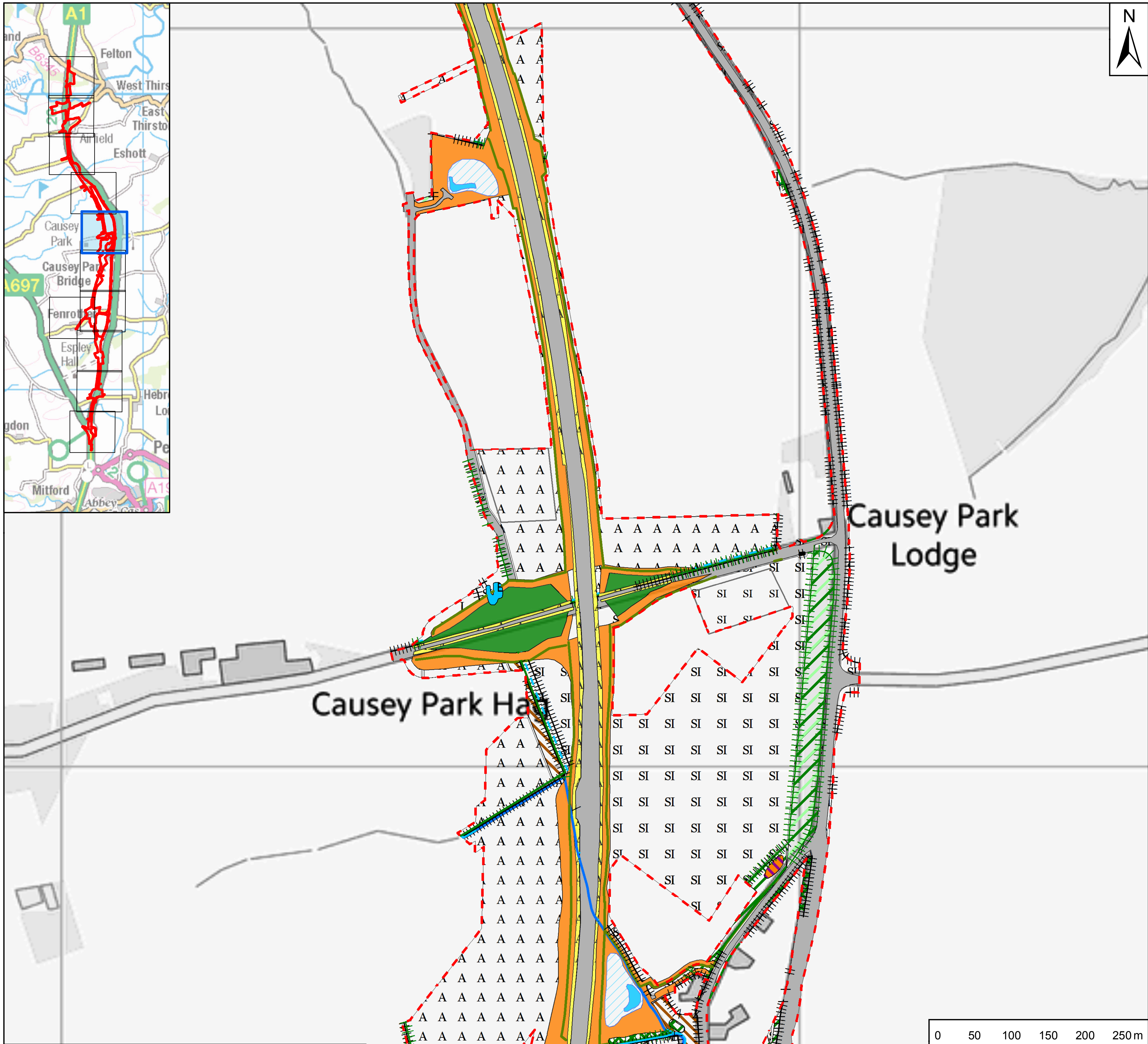

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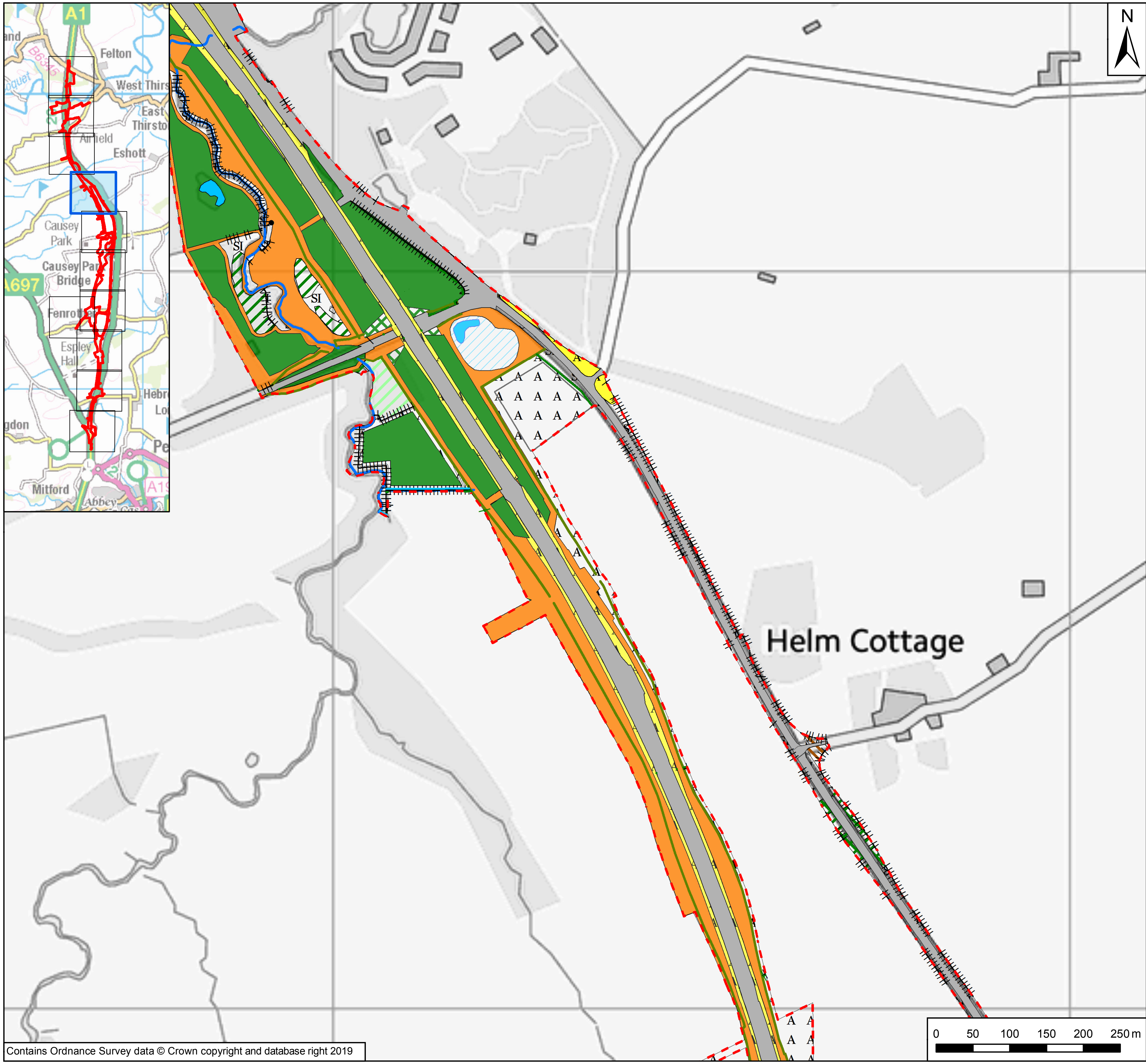

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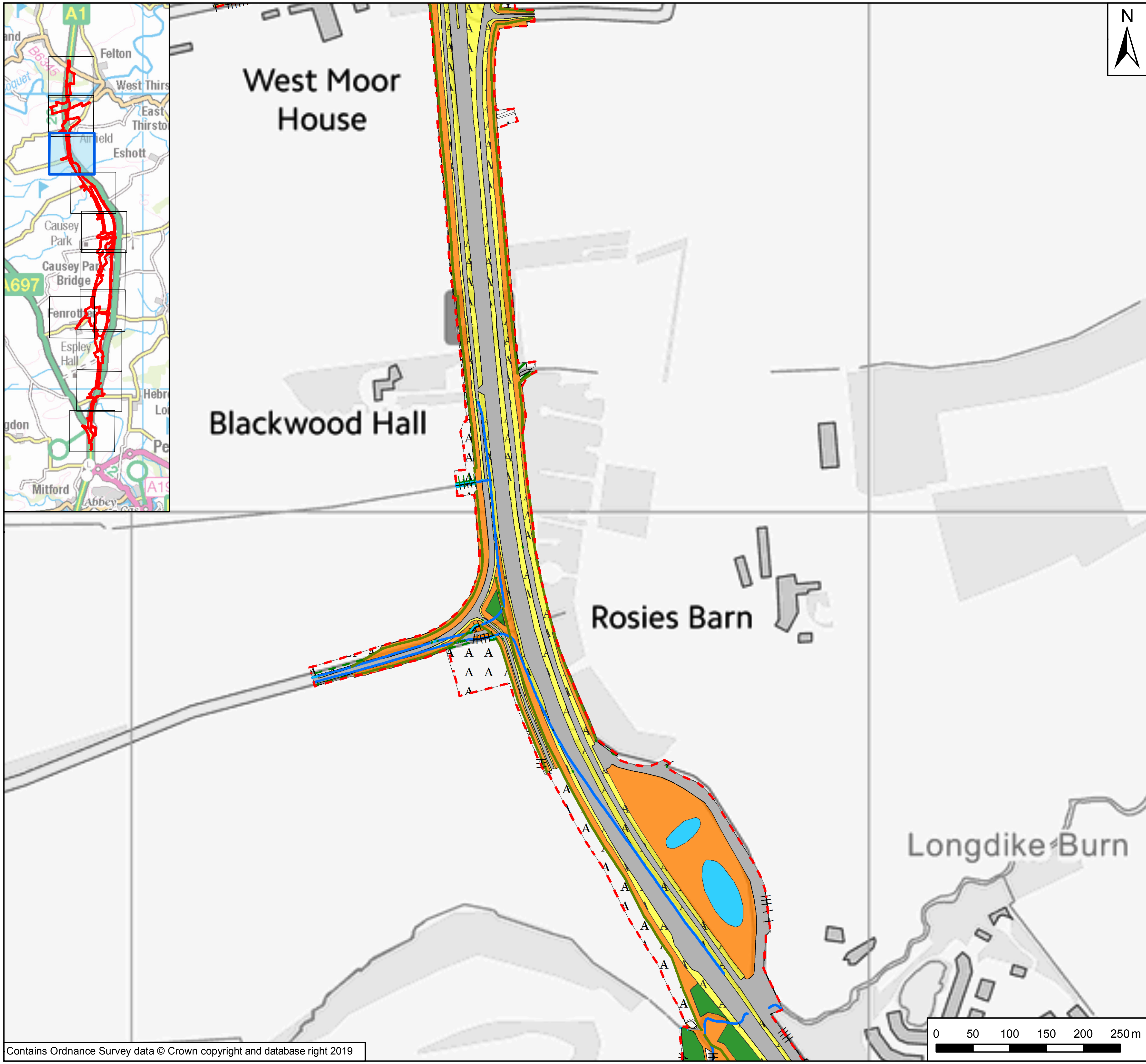

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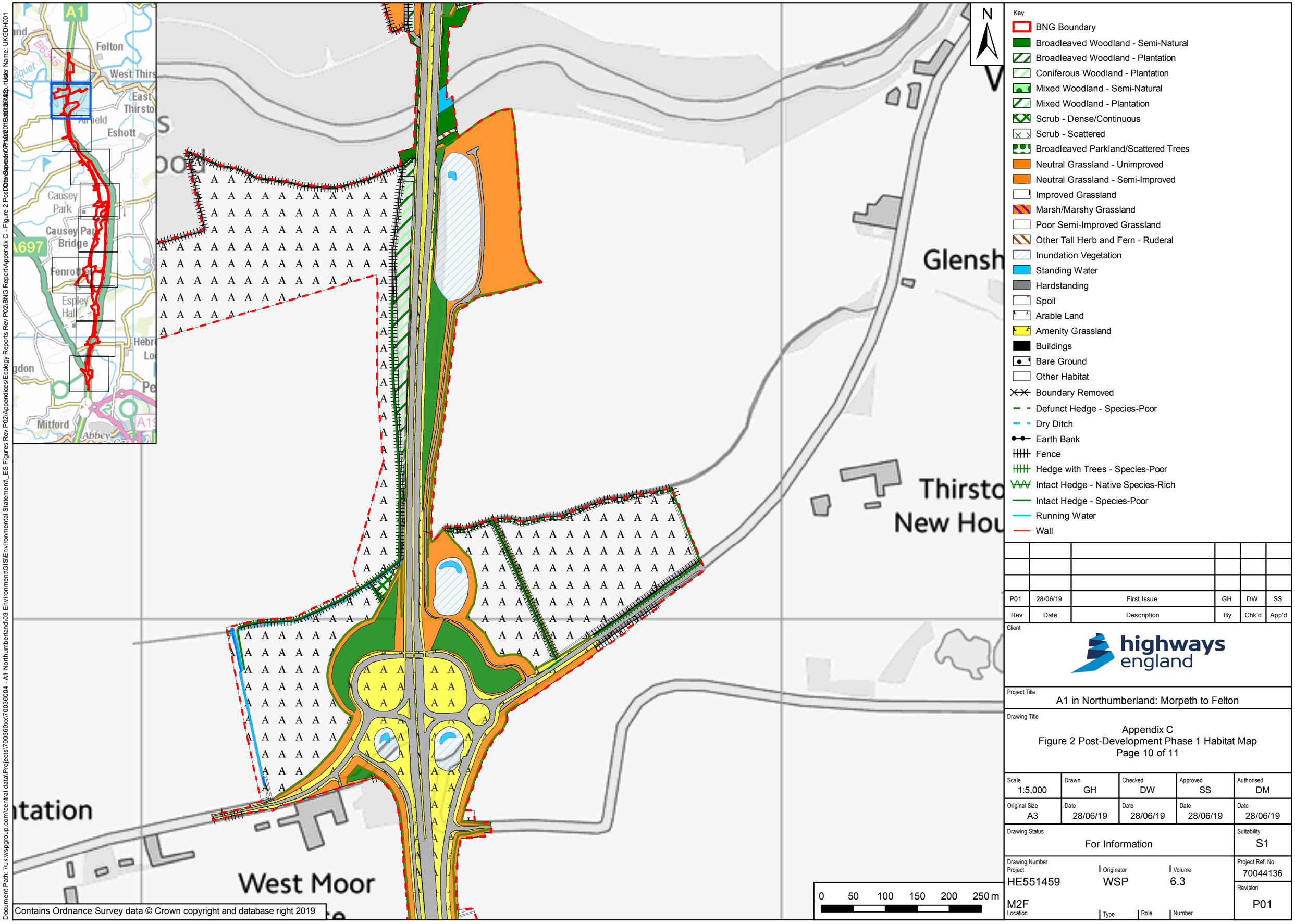

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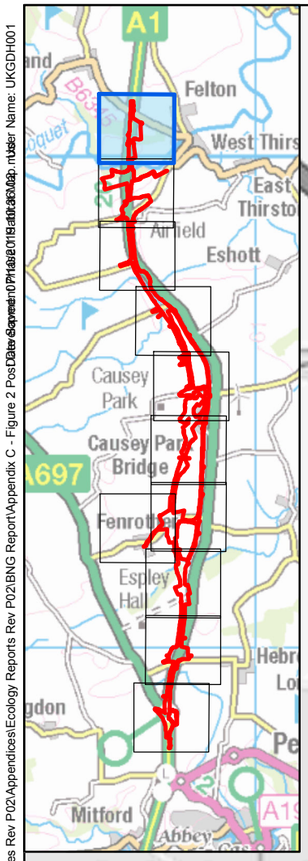

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Revision: P01

Appendix D

CHE MEMO

INTRODUCTION

In March 2018, Highways England (HE) published the Chief Highways Engineer Memorandum 422/18, Supporting Transparency Around our Biodiversity Performance (CHE Memorandum 422/18) which supports the consistent reporting of biodiversity units, where project teams are gathering biodiversity data.

Overview of Methods

The CHE Memorandum 422/18 recommends that projects report on biodiversity units using the following method (page 3):

- "1. Report biodiversity units before works by:
- Recording the areas of habitat plots (in hectares) using standard habitat categories listed within Annex B; and
- Evaluating and reporting the condition of these habitat plots, using condition assessment stated within Annex B.
- 2. Report biodiversity units after works by:
- Recording the areas of habitat plots (in hectares) using standard habitat categories listed within Annex B; however
- Habitat condition will be assigned by Highways England's SES Environment Group centrally."

Annex B of the CHE Memorandum 422/18 stipulates that the calculation of biodiversity units before and after development follows this formula:

Distinctiveness score x Condition score x Area (hectares) = Baseline or Post-Development biodiversity units

The methods for calculating hedgerow linear units and reporting lengths of watercourse are the same as the methods detailed within Section 2 of the main report.

The CHE Memorandum 422/18 does not use the Farm Environment Plan (FEP) methodology for assessing condition and has developed assessment criteria for each habitat type which are listed in full within Annex B of CHE Memorandum 422/18. Since the habitat condition assessment was commissioned prior to the publication of the CHE Memorandum 422/18, it principally followed DEFRA guidance and followed the Natural England's Farm Environment Plan (FEP) manual. Where there were gaps in primary HCA data, for example from limited access to land, professional judgement was applied to retrospectively assess habitat condition (refer to Section 2 and 3 of the main report).

RESULTS

Baseline Biodiversity Units

Tables 1, 2 and 3 show the number of baseline biodiversity units, hedgerow linear units and watercourse metres within the Order Limits.

Table 1 – Baseline Biodiversity Units (BU)

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
A1.1.1 Broadleaved woodland - semi-natural	High (6)	Poor (1)	0.12	0.72
A1.1.2 Broadleaved woodland - plantation	Medium (4)	Moderate (2)	3.82	30.56
A1.1.2 Broadleaved woodland - plantation	Medium (4)	Poor (1)	0.92	3.68
A1.2.2 Coniferous woodland - plantation	Low (2)	Good (3)	0.85	5.10
A1.2.2 Coniferous woodland - plantation	Low (2)	Moderate (2)	0.41	1.64
A1.2.2 Coniferous woodland - plantation	Low (2)	Poor (1)	1.77	3.54
A1.3.1 Mixed woodland - semi-natural	High (6)	Good (3)	0.60	10.80
A1.3.2 Mixed woodland - plantation	Medium (4)	Good (3)	2.60	31.20
A1.3.2 Mixed woodland - plantation	Medium (4)	Moderate (2)	7.28	58.24
A1.3.2 Mixed woodland - plantation	Medium (4)	Poor (1)	1.53	6.12
A2.1 Scrub - dense / continuous	Medium (4)	Good (3)	0.08	0.96

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
A2.1 Scrub - dense / continuous	Medium (4)	Moderate (2)	0.92	7.36
A2.1 Scrub - dense / continuous	Medium (4)	Poor (1)	1.69	6.76
A2.2 Scrub - scattered	Medium (4)	Good (3)	0.18	2.16
A2.2 Scrub - scattered	Medium (4)	Moderate (2)	0.87	6.96
A2.2 Scrub - scattered	Medium (4)	Poor (1)	1.03	4.12
A3.1 Parkland / scattered trees - broadleaved	Medium (4)	Moderate (2)	0.39	3.12
A3.1 Parkland / scattered trees - broadleaved	Medium (4)	Poor (1)	0.09	0.36
B2.2 Neutral grassland - semi-improved	Medium (4)	Moderate (2)	4.39	35.12
B2.2 Neutral grassland - semi-improved	Medium (4)	Poor (1)	0.46	1.84
B4 Improved grassland	Low (2)	Poor (1)	34.99	69.98
B5 Marsh / marshy grassland	Low (2)	Poor (1)	1.62	3.24

JNCC Phase 1 Habitat Type	Distinctiveness Score	Condition Score	Area (ha)	Baseline BU
B6 Poor semi improved grassland	Low (2)	Poor (1)	38.24	76.48
C3.1 Other tall herb and fern - ruderal	Low (2)	Poor (1)	2.29	4.58
G1.1 Standing water - eutrophic	High (6)	Moderate (2)	0.29	3.48
J1.1 Cultivated / disturbed land - arable	High (6)	Moderate (2)	4.91	58.92
J1.1 Cultivated / disturbed land - arable	Low (2)	Poor (1)	84.55	169.10
J1.2 Cultivated / disturbed land - amenity grassland	Low (2)	Poor (1)	1.34	2.68
J3.6 Building	NA	NA	0.04	NA
J4 Bare ground	Low (2)	Poor (1)	0.47	0.94
J5 Other habitat	Medium (4)	Moderate (2)	6.46	51.68
HS Hardstanding	NA	NA	26.25	NA
Total:			**231.45**	**661.44**

Table 2 – Baseline Hedgerow Linear Units (LU)

JNCC Phase 1 Habitat Type	Condition Score	Length (m)	LU
J2.1.1 Hedgerow - native species rich (intact)	Good (3)	241.5	724.5
J2.1.2 Hedgerow - native species poor (intact)	Good (3)	9277.0	27831
J2.1.2 Hedgerow - native species poor (intact)	Moderate (2)	3209.0	6418
J2.1.2 Hedgerow - native species poor (intact)	Poor (1)	6292.5	6292.5
J2.2.2 Hedgerow - native species poor (defunct)	Good (3)	24.5	73.5
J2.2.2 Hedgerow - native species poor (defunct)	Moderate (2)	2809.0	5618.0
J2.2.2 Hedgerow - native species poor (defunct)	Poor (1)	1999.5	1999.5
J2.3.2 Hedgerow with trees- native species poor (intact)	Good (3)	3887.5	11662.5
J2.3.2 Hedgerow with trees- native species poor (intact)	Moderate (2)	870.5	1741.0
J2.3.2 Hedgerow with trees- native species poor (intact)	Poor (1)	4634.0	4634.0
Total:		**33245.0**	**66994.5**

Table 3 – Baseline Length of Watercourse

JNCC Phase 1 Habitat Type	Length (m)
G2 Running water	3911.0
Total:	**3911.0**

POST-DEVELOPMENT BIODIVERSITY UNITS

Tables 4, 5 and 6 show the number of post-development biodiversity units, hedgerow linear units and watercourse metres within the Order Limits.

Table 4 – Post-Development Biodiversity Units (BU)

JNCC Phase 1 Habitat Type	Mitigation Action	Distinctiveness Score	Condition Score	Area (ha)	BU
A1.1.1 Broadleaved semi-natural woodland	Retain	High (6)	Poor (1)	0.12	0.72
A1.1.2 Broadleaved plantation woodland	Retain	Medium (4)	Good (3)	0.77	9.24
A1.1.2 Broadleaved plantation woodland	Retain	Medium (4)	Moderate (2)	0.53	4.24
A1.1.2 Broadleaved plantation woodland	Retain	Medium (4)	Poor (1)	3.32	13.28
A1.3.1 Mixed woodland - semi-natural	Retain	High (6)	Good (3)	0.22	3.96
A1.3.2 Mixed plantation woodland	Retain	Medium (4)	Good (3)	0.18	2.16
A1.3.2 Mixed plantation woodland	Retain	Medium (4)	Moderate (2)	2.40	19.20
A1.3.2 Mixed plantation woodland	Retain	Medium (4)	Poor (1)	1.16	4.64
A2.1 Dense/continuous scrub	Retain	Medium (4)	Good (3)	0.17	2.04

JNCC Phase 1 Habitat Type	Mitigation Action	Distinctiveness Score	Condition Score	Area (ha)	BU
A2.1 Dense/continuous scrub	Retain	Medium (4)	Moderate (2)	0.69	5.52
A2.1 Dense/continuous scrub	Retain	Medium (4)	Poor (1)	0.94	3.76
A3.1 Broadleaved parkland/scattered trees	Retain	Medium (4)	Moderate (2)	0.03	0.24
A3.1 Broadleaved parkland/scattered trees	Retain	Medium (4)	Poor (1)	0.18	0.72
B2.2 Semi-improved neutral grassland	Retain	Medium (4)	Moderate (2)	1.22	9.76
B2.2 Semi-improved neutral grassland	Retain	Medium (4)	Poor (1)	0.26	1.04
B4 Improved grassland	Retain	Low (2)	Good (3)	0.10	0.60
B4 Improved grassland	Retain	Low (2)	Moderate (2)	8.43	33.72
B4 Improved grassland	Retain	Low (2)	Poor (1)	0.16	0.32
B5 Marshy grassland	Retain	Low (2)	Poor (1)	0.10	0.20
B6 Poor semi-improved grassland	Retain	Low (2)	Poor (1)	15.62	31.24

JNCC Phase 1 Habitat Type	Mitigation Action	Distinctiveness Score	Condition Score	Area (ha)	BU
C3.1 Tall ruderal	Retain	Low (2)	Poor (1)	0.08	0.16
G1 Standing water	Retain	High (6)	Moderate (2)	0.29	3.48
I2.2 Spoil	Retain	Low (2)	Poor (1)	0.57	1.14
J1.1 Arable	Retain	Low (2)	Poor (1)	34.73	69.46
J1.1 Arable	Retain	High (6)	Moderate (2)	1.89	22.68
B4 Improved grassland	Re-instate	Low (2)	Poor (1)	2.01	4.02
B6 Poor semi-improved grassland	Re-instate	Low (2)	Poor (1)	0.67	1.34
J1.1 Arable	Re-instate	Low (2)	Poor (1)	3.08	6.16
A1.1.1 Broadleaved semi-natural woodland	Create	High (6)	Good (3)	25.30	455.40
G1 Standing water	Create	High (6)	Good (3)	0.09	1.62
A2.1 Dense/continuous scrub	Create	Medium (4)	Moderate (2)	0.33	2.64

JNCC Phase 1 Habitat Type	Mitigation Action	Distinctiveness Score	Condition Score	Area (ha)	BU
B2.1 Unimproved neutral grassland	Create	High (6)	Good (3)	40.64	731.52
F2.1 Marginal vegetation	Create	High (6)	Good (3)	6.32	113.76
J1.2 Amenity grassland	Create	Low (2)	Poor (1)	30.03	60.06
Total:				**182.63**	**1620.04**

Table 5 – Post-Development Hedgerow Linear Units (LU)

JNCC Phase 1 Habitat Type	Mitigation Action	Condition Score	Length (m)	LU
J2.1.1 Hedgerow - native species rich (intact)	Retain	Good (3)	82.5	247.5
J2.1.1 Hedgerow - native species rich (intact)	Create	N/A (1)	32594.5	32594.5
J2.1.2 Hedgerow - species-poor (Intact)	Retain	Good (3) Moderate (2) Poor (1)	5430.5	10861.0
J2.2.2 Hedgerow - species-poor (defunct)	Retain	Good (3) Moderate (2) Poor (1)	1493.0	2239.5
J2.3.2 Hedgerow - species-poor with trees	Retain	Good (3)	2976.0	8928.0
Total:			**42576.5**	**54623.0**

Table 6 – Post-Development Length of Watercourse

JNCC Phase 1 Habitat Type	Length (m)
G2 Running water (retained)	3711.0
Total:	**3711.0**

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