A66 Northern Trans-Pennine Project
TR010062

7.43 Metric Calculation Report

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010

Deadline 7

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7.43 METRIC CALCULATION REPORT

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TECHNICAL APPENDICES

1 Introduction

1.1.1 This report provides the findings of the Metric Calculation (Defra Metric 3.1) undertaken to inform the A66 Northern Trans-Pennine Project (the Project). It has been produced using Defra Metric 3.1[1] (published in April 2022) and updates the Metric 2.0 calculations[2] that were used to inform the preparation of the mitigation design presented in the DCO application (which was the prevailing guidance when the mitigation design was fixed in March 2022 ahead of the DCO submission in June 2022). This Report therefore updates the metric calculation undertaken for the purposes of the Project's No Net Loss objective in-line with a later iteration of the metric tool and guidance from DEFRA and Natural England[3].

1.1.2 The Metric 3.1 calculation updates have not altered the mitigation design submitted with the DCO application in June 2022.

1.1.3 This report and the Metric 3.1 calculations do not affect the assessment of likely significant effects reported in Chapter 6 of the Environmental Statement [document reference 3.2, APP-049] and do not form an assessment of likely significant effects for EIA purposes. They relate to the separate matter of the Project's No Net Loss objective, which is secured under the Project Design Principles measure BNG01 [REP6-015]. A draft of this Metric 3.1 Calculation Report has been shared with consultees for their review and comment.

1.2 Aims of the report

1.2.1 The aims of the report using Metric 3.1 are to:

- Calculate the Project's baseline biodiversity value and post-development biodiversity value.
- Determine the change in biodiversity units as a result of the Project.

1.2.2 The report provides the total net % change calculated using Metric 3.1 for all three habitat groups:

- Habitat (Area) biodiversity units.
- Hedgerow (Linear) biodiversity units.
- River (Linear) biodiversity units.

[1] Biodiversity Metric 3.1: Calculation tool (spreadsheet) April 2022. Available at http://nepubprod.appspot.com/publication/6049804846366720

[2] Crosher, I., Gold, S., Heaver, M., Heydon, M., Moore, L., Panks, S., Stone, D., White, N., (2019) the Biodiversity Metric 2.0: auditing and accounting for biodiversity value. User guide (Beta Version, July 2019. Natural England.

[3] Panks, S., White N., Newsome, A., Nash, M., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Cashon, C., Goddard, F., Scott, S.J., Heaver, M., Scott, S.H., Treweek, J., Butcher, B. and Stone, D. (2022). Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England

Project objective

1.2.3 The Project is to achieve No Net Loss for biodiversity while maximising opportunities for enhancement, measured by the relevant Defra Biodiversity metric.

1.3 Report structure

1.3.1 This report has been subdivided into the following sections:

- Section 1: Introduction
- Section 2: Methodology
- Section 3: Results
- Section 4: Discussion and Conclusion

1.4 Project description

1.4.1 Between the M6 and the A1(M) the existing A66 is approximately 80km in length. Along this length it is intermittently dualled, with approximately 30km of single carriageway, in six separate sections, making the route prone to accidents and unreliable.

The route carries high levels of freight traffic and is an important route for tourism and connectivity to local communities. The variable road standards, together with the lack of available diversionary routes when incidents occur, affects road safety, reliability, resilience and attractiveness of the route. The Project is designed to dual the remaining sections of single carriageway to form a dual carriageway between Scotch Corner and M6 Junction 40. The Project comprises eight schemes to improve the A66 between M6 J40 at Penrith and A1(M) J53 at Scotch Corner. The Project would involve improving the junctions on the M6 and A1 as well as improving six separate single carriageway lengths of road to dual carriageway standard and making improvements to the junctions within each of those lengths. The nature of the planned improvements includes online widening (adjacent to the existing road) of the carriageway as well as offline construction (new lengths of road following different routes but reconnecting into existing lengths of the A66 that are already dualled). For a full project description see ES Chapter 2: The Project (Document Reference 3.2, APP-045).

Background information

1.4.2 The route carries local slow moving agricultural and other traffic making short journeys, which can have an impact on other users, especially on the single carriageway sections. The variable road standards, together with the lack of available diversionary routes when incidents occur, affects road safety, reliability, resilience and attractiveness of the route.

1.4.3 The A66 lies within an area of rolling landscape. From Penrith the road corridor generally passes through gentle valleys characterised by large regular fields and areas of deciduous woodland. The road generally follows a similar route to the River Eamont and the River Eden as far as Appleby-in-Westmorland. Moving east the elevation rises rapidly from approximately 170m above ordnance datum (AOD) at Brough to a high point of

approximately 440m AOD as it passes over Bowes Moor, before gradually descending again to an elevation of approximately 150m AOD at Scotch Corner.

1.4.4 The majority of the surrounding land is agricultural with a number of farms lying adjacent and having direct accesses onto the A66. Some of this land is classified as being Grade 2 which is defined as 'very good' agricultural land.

1.4.5 Temporary and permanent habitat loss will occur across the Project. The types of habitat lost permanently are predominantly improved grassland, arable land, hedgerows, woodland and semi-improved grassland.

1.4.6 The remainder of the area included in the Order Limits boundary that falls outside the permanent land take will be used for temporary construction compounds, haul and access routes, storage and borrow pits and other ancillary activities. Temporary land take areas will be reinstated post-construction taking account of disturbance and compaction.

1.4.7 The construction period is expected to last between 2024 to 2029.

1.4.8 For further details see ES Chapter 2: The Project (Document Reference 3.2, APP-045) and ES Chapter 6: Biodiversity (Document Reference 3.2, APP-049).

Overall design principles

1.4.9 Typically, each carriageway will comprise two standard 3.65m wide lanes in each direction, 1m hardstrips and a central reserve. Unless there are specific constraints identified, a minimum verge width of 2.5m will be provided, which will be increased as required to provide adequate visibility splays, highway drainage, communication ducts, boundary treatment, signage and other associated works and infrastructure. Where sections of the existing route are to be replaced on a new alignment, the intention is that the replaced section of road ceases to be a part of the trunk road network.

1.4.10 Where practicable, the central reserve will be grass with appropriate allowance for surface water channels and barriers. Large areas of hardstanding within the central reserve will be avoided where practicable.

Construction activities

1.4.11 The construction methodology for each scheme comprises the widening of the original carriageway in places, with new/improved underpasses or overbridges. Construction of new sections of carriageway and associated infrastructure will be required for offline sections.

1.4.12 For the road widening, upgrades or new construction elements, material recovered from the site will be used where suitable to profile the new vertical and horizontal geometry, with imported aggregate, cementitious/asphalt bound aggregate or pre-cast products used for the road construction.

1.4.13 Throughout the Project, material will need to be excavated and placed to construct the desired road alignments. Each scheme has been designed as far as practicable to minimise the need to move material between schemes,

however this has not been practicable in all cases. Where practicable all excavated material will be reused in the construction of the road itself or included in the landscaping proposals to reduce the environmental effects of the Project (for further details see ES Chapter 2: The Project (Document Reference 3.2, APP-045).

1.4.14 Due to the number of schemes and the scale of the road upgrade works, there will be sizeable earthworks at most of the scheme locations, with achieving a cut and fill balance forming a key imperative of the design. Due to traffic management restrictions and the logistics of constructing elements online and offline, it is not practicable to excavate and place material directly in some instances, therefore, there will be a requirement to store it on site in bunded areas. Storage areas will be proposed where large fill requirements are needed or where key structures are required. These will be located along the scheme within the Order Limits. The footprint area of the stored material will generally be returned to their former use, unless incorporated in the schemes landscaping design. Material movements will be programmed to reduce storage periods and subsequent movements after placement.

1.4.15 The Order Limits boundary includes land that will be required for each scheme across the Project (the Indicative Site Clearance Boundary; Application Document 3.2 ES Figure 2.2), proposed species and habitat mitigation, landscape design, drainage, flood compensation storage, site compounds, material storage/ movement along with the construction/ upgrade of the new A66 and associated connections.

1.4.16 Three extents were derived from the construction activities to predict the impacts on habitats, they are as follows:

- Engineering extent (including grassed verges): this is the area of road construction, and for the purposes of the Metric all habitat within this extent is assumed to be lost from the baseline.
- Permanent acquisition and temporary possession extent: the majority of habitat is lost unless it has been retained for landscape or ecology mitigation. The engineering extent (including grassed verges) and permanent and temporary possession extents together comprise the Indicative Site Clearance Boundary (Application Document 3.2 ES Figure 2.2).
- Land used for landscape and ecology mitigation within the Order Limits but outside of the two extents above.

1.4.17 Landscape and ecology mitigation that was devised during the drafting of the ES (ES Chapter 6: Biodiversity (Document Reference 3.2, APP-049)) and details of the habitat and landscape proposals are included in the Landscape and Ecological Management Plan (LEMP) (Document Reference 2.7, APP-021).

1.5 Legal and Policy context

1.5.1 The following key legislation and policy is applicable to this report:

Environment Act 2021

1.5.2 The Environment Act received Royal Assent on 09 November 2021. Schedule 15 of this Act contains provisions about biodiversity gain in relation to development consent for Nationally Significant Infrastructure Projects. The Act sets out the framework for biodiversity gain requirements whilst leaving some detail to be provided through secondary legislation, policy, and guidance[4].

1.5.3 The Act's biodiversity gain provisions include Nationally Significant Infrastructure Projects (NSIPs) consented under the Planning Act 2008. This will only take effect for NSIPs after the UK Government has published a biodiversity gain statement, or statements, setting out the objective for biodiversity gain and how the objective is to be met, including transitional arrangements.

1.5.4 These provisions relating to biodiversity gain for NSIPs are not currently in effect. The UK Government has indicated that it intends to bring the biodiversity gain requirements for NSIPs into effect for terrestrial projects no later than November 2025.

National Policy Statement for National Networks

1.5.5 The primary policy document relevant to determining the Project is the National Policy Statement for National Networks (NPSNN) (Department for Transport, 2014)[5], which sets out policies applicable to highways NSIPs including on how the effects of national networks infrastructure should be considered by the relevant decision maker (being in this case, the Secretary of State for Transport). The policies for biodiversity and ecological conservation include statements that:

"Development proposals potentially provide many opportunities for building in beneficial biodiversity or geological features as part of good design. When considering proposals, the Secretary of State should consider whether the applicant has maximised such opportunities in and around developments (paragraph 5.33[6])."

1.5.6 The NPSNN also advises:

"In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and other species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment." (NPSNN paragraph 5.26).

[4] DEFRA (2022) Consultation on Biodiversity Net Gain Regulations and Implementation
[5] Department for Transport (2014) National Policy Statement for National Networks
6 Department for Transport (2014) National Policy Statement for National Networks

Draft National Policy Statement for National Networks

1.5.7 The draft revised National Policy Statement for National Networks was released for consultation in March 2023[7] and includes the following new policies relating to Biodiversity gain:

'4.20 Biodiversity net gain is an approach to development that delivers measurable improvements for biodiversity by creating or enhancing habitats in association with developments. Applicants should therefore not just look to mitigate direct harms, but also identify and deliver appropriate opportunities for nature recovery and wider environmental opportunities for enhancements by providing net gains for biodiversity.

4.21 Applicants should use the most appropriate version of the Department of Environment, Food and Rural Affairs (Defra) biodiversity metric (as advised by Defra) to calculate their biodiversity baseline and inform their biodiversity net gain outcomes, and to present this data as part of their application. Biodiversity net gain should be applied in conjunction with the mitigation hierarchy and does not change or replace existing environmental obligations.

4.22 Biodiversity net gain can be delivered onsite or wholly or partially off-site and should also be set out within the application for development consent. When delivering biodiversity net gain off-site, developments should do this in a manner that best contributes to the achievement of relevant wider strategic outcomes, for example by increasing habitat connectivity or enhancing other ecosystem service outcomes. Reference should be made to any Local Nature Recovery Strategy (which should be the primary reference point for those delivering biodiversity net gain off-site) and other relevant national or local plans and strategies, such as green infrastructure strategies, used to inform Biodiversity net gain delivery.

4.23 A government Biodiversity Gain Statement will set out the concept for Biodiversity net gain for NSIPs. The Secretary of State will need to be satisfied that the biodiversity gain objective in any relevant biodiversity gain statement has been met'.

1.5.8 In respect of the draft revised NPSNN provisions on Biodiversity Net Gain (BNG), the Applicant notes that a Biodiversity Gain Statement has not yet been published by Government and therefore there is no biodiversity gain statement to be met currently regarding the Project. Accordingly, the draft revised NPSNN provisions relating to BNG are not yet applicable to the Project.

1.5.9 However, this Report demonstrates how the Defra Metric was used as a tool alongside the development of the environmental mitigation design to evaluate against the Project's objective of achieving No Net Loss and to

[7] Department for Transport (2023) Draft National Policy Statement for National Networks

seek opportunities to maximise net gains where practicable. This has been applied in conjunction with the mitigation hierarchy which is outlined in ES Chapter 6 Biodiversity (Document Reference 3.2, APP-049) and secured in the Environmental Management Plan (Document Reference 2.7, REP3-004, D-BD-05).

National Planning Policy Framework

1.5.10 The revised *National Planning Policy Framework (NPPF)* (Ministry of Housing, Communities and Local Government, 2021)[8] was published in July 2021. Paragraph 5 of the NPPF states: "*The Framework does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework). National policy statements form part of the overall framework of national planning policy, and may be a material consideration in preparing plans and making decisions on planning applications*." In the overall objectives of the NPPF, set out at paragraph 8, the environmental objective includes improving biodiversity. Section 15 of the NPPF deals with conserving and enhancing the natural environment including at paragraph 174, 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*." Under habitats and biodiversity paragraph 179 reference is also made to Circular 06/2005 which provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

[8] Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework

2 Methodology

2.1.1 The Biodiversity Metric uses habitats as a proxy to measure biodiversity. Habitats are converted into measurable 'Biodiversity Units'. These are separated into:

- Habitat Units.
- Hedgerow Units.
- River Units.

2.1.2 The metric provides a score for each of the habitat parcels and linear features based on their distinctiveness and adjusts their value according to the condition and strategic significance of the habitat. The habitat distinctiveness values are based on the species richness, rarity (local, regional, national and international scales) and degree to which the habitat supports species rarely found in other habitats. Full details relating to criteria for distinctiveness scores and condition scores can be found in the User Guide (Panks *et al*., 2022)[9].

2.1.3 It is an important rule of the metric that the three types of biodiversity units are unique and cannot be summed, traded or converted. When reporting biodiversity gains or losses with the metric, the three biodiversity unit types must be reported separately and not summed/combined to give an overall biodiversity unit value (or percentage change).

2.1.4 The metric provides Biodiversity Unit values for the following scenarios:

- Baseline scenario (pre-intervention).
- Post-development scenario (post-intervention).

2.1.5 The metric calculation requires the calculation of Biodiversity Units to be based on the following factors:

- Area (hectares) of habitat type or length (km) for linear features.
- Distinctiveness score (very high, high, medium, low) based on UKHab types.
- Condition score (good, moderate, poor) based on habitat condition assessment.
- Strategic significance (within area formally identified in local strategy, location ecologically desirable but not in local strategy, area/compensation not in local strategy/no local strategy) based on habitat location in relation to designated sites, local plans (e.g. priority areas for nature conservation), UK Biodiversity Action Plan (BAP) and local BAP priorities.
- Time till target condition – period in years until the target condition will be achieved.
- Difficulty of creation/restoration – a score applied to account for risk associated with different types of habitat creation/restoration.

[9] Panks, S., White N., Newsome, A., Nash, M., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Cashon, C., Goddard, F., Scott, S.J., Heaver, M., Scott, S.H., Treweek, J., Butcher, B. and Stone, D. (2022). Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England.

2.1.6 Habitats within the Project Order limits boundary have been mapped in a Geographic Information System (GIS) software to calculate the area/length of each habitat.

2.1.7 Due to the scale of the project (approximately 900 ha) an automation tool was utilised to collate and process habitat parcel information, which produced output that was subsequently inputted to the metric. The automation tool was originally designed to deal with the parameters of Metric 2.0. A digital rules-based approach was adopted to update the parameters of the spatial data to ensure compatibility with Metric 3.1.

2.1.8 The following sections summarise elements of the metric calculation, data collection, habitat conversion using field data, condition assessment/reassessment, post-development habitat and condition conversion, and trading. The automation tool outputs generated as a result of this process were utilised in the Metric 3.1 calculation. The results of this iteration of Metric 3.1 are presented in Section 3 of this report. This iteration follows on from draft metric calculations that were generated in March 2022, prior to the DCO submission based on Metric 2.0 guidance (Crosher *et al*., 2019).

2.1.9 The figures are provided in Appendix A (identified as 'work in progress' to reflect the iterative nature of this Report) and this iteration of Metric 3.1 (in the form of a separate Excel spreadsheet) which contains the inputs and results is provided in Appendix B.

Statutory protected sites approach

2.1.10 Statutory protected sites including Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites, National Nature Reserves (NNRs) and Local Nature Reserves (LNRs), are areas of nature conservation that receive protection through national and European legislation.

2.1.11 There are only two statutory sites within the Order Limits:

- River Eden SAC.
- River Eden and Tributaries SSSI.

2.1.12 These designated sites share the same boundary. For full details relating to these sites see ES Chapter 6 Biodiversity (Document Reference 3.2, APP-049) and Habitats Regulations Assessment (HRA) Stage 2 Statement to Inform Appropriate Assessment (Document Reference 3.6, APP-235). Bespoke mitigation is not required relating to these sites and habitats within these designated sites have been added to the Metric and treated as any other habitat, because there is no change in biodiversity value as a result of the Project.

Irreplaceable habitats approach

2.1.13 Irreplaceable habitat is habitat that, once lost, cannot be recreated elsewhere, within a reasonable timeframe, such as ancient woodland and active peatland. For the purpose of the 3.1 metric updates, the draft National

Policy Statement for National Networks definition of irreplaceable habitats has been used as set out in paragraph 5.52:

'In taking decisions, the Secretary of State should ensure that appropriate weight is attached to: designated sites of international, national, and local importance; irreplaceable habitats[i] ; protected species habitats; other species of principal importance for the conservation of biodiversity; local nature recovery strategies; and to biodiversity and geological interests within the wider environment.

"[i]Habitats which would be technically very difficult (or take a very significant time) to restore, recreate or replace once destroyed, taking into account their age, uniqueness, species diversity or rarity. They include ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, sand dunes, salt marsh and lowland fen."

2.1.14 The Metric 3.1 User Guide (Panks et al., 2022[10]) provides instruction on how to deal with irreplaceable habitats and very high distinctiveness habitats in the metric.

"Biodiversity metric 3.1 is not designed to adequately address losses of very high distinctiveness habitat or irreplaceable habitat. If very high distinctiveness habitat entered into the metric is lost, then the metric will highlight that losses of very high distinctiveness habitats are likely to require an agreement for bespoke assessment and compensation. An 'unacceptable loss' error message will flag until a 'yes' is entered into the 'Bespoke compensation agreed for unacceptable loss' column. Reference to the bespoke measures should be provided in the notes."

"Note: any losses to very high distinctiveness habitats are removed from the baseline and any bespoke measures to address such losses should be given wider consideration outside the scope of the metric (i.e. these should not be included within the post-development sections of the metric)." i Habitats which would be technically very difficult (or take a very significant time) to restore, recreate or replace once destroyed, taking into account their age, uniqueness, species diversity or rarity. They include ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, sand dunes, salt marsh and lowland fen.

2.1.15 The Consultation on BNG Regulations and Implementation document (DEFRA, 2022[11]) provides additional instruction on how to deal with irreplaceable habitats in the metric:

"When a development results in losses of both irreplaceable and non-irreplaceable habitat, the biodiversity net gain requirement will still apply to any affected non-irreplaceable habitat. The area of irreplaceable habitat, and

[10] Panks, S., White N., Newsome, A., Nash, M., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Cashon, C., Goddard, F., Scott, S.J., Heaver, M., Scott, S.H., Treweek, J., Butcher, B. and Stone, D. (2022). Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England.
[11] DEFRA (2022) Consultation on Biodiversity Net Gain Regulations and Implementation.

the bespoke compensation agreed for this area, should be omitted from the main biodiversity metric calculation for the development."

"We propose that any developer proposing development on irreplaceable habitat would still be required to submit, for the planning authority's information, a version of a biodiversity gain plan providing information about irreplaceable habitats present before and after development (which may be recorded using the biodiversity metric) and the steps taken to minimise adverse effects on these habitats. This information will be helpful in assessing impacts on irreplaceable habitats, informing decision making and may contribute in part (alongside professional advice) to designing any appropriate compensation."

"Where there are no direct or indirect negative impacts on an irreplaceable habitat, appropriate enhancements could [be] made to it as part of a net gain plan. These enhancements would be included as part of the overall biodiversity metric calculation."

2.1.16 A summary of the irreplaceable habitat present within the Order Limits is provided in the results section. No irreplaceable habitat is being lost as a result of the Project (See ES Biodiversity Chapter 6 (Document Reference 3.2, APP-049) for full details) and the retained irreplaceable habitat within the baseline is included in the assessment.

Very high distinctiveness habitats approach

2.1.17 Distinctiveness categories are pre-determined in the metric. The distinctiveness score is based on the type of habitat and its distinguishing features including species richness, rarity (at local, regional, national and international scales), the extent to which it is protected by designations and the degree to which a habitat supports species rarely found in other habitats. The distinctiveness categories as provided in the Metric 3.1 User Guide (Panks *et al*., 2022[12]) and are shown in Table 2.1.

Table 2-1: Area habitat distinctiveness categories

Category	Definition
Very high	Priority Habitats as defined in Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006) that are highly threatened, internationally scarce and require conservation action, e.g. blanket bog. Small amount of remaining habitat with a high proportion unprotected by designation. Endangered or critical European red list habitats.
High	Priority Habitats as defined in Section 41 of the NERC Act requiring conservation action. Remaining Priority Habitats not in very high distinctiveness band and other red list habitats.

[12] Panks, S., White N., Newsome, A., Nash, M., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Cashon, C., Goddard, F., Scott, S.J., Heaver, M., Scott, S.H., Treweek, J., Butcher, B. and Stone, D. (2022). Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England.

Category	Definition
Medium	Semi-natural habitats not classed as a Priority Habitat but with significant wildlife benefit, e.g. mixed scrub. Arable field margins (Priority habitat) only.
Low	Habitat of low biodiversity value e.g. temporary grass and clover ley. Agricultural and urban land of lower biodiversity value.
Very low	Little or no biodiversity value e.g. hard standing or sealed surface.

2.1.18 As detailed above relating to irreplaceable habitat (paragraph 2.1.14), the Metric 3.1 User Guide instructs that when very high distinctiveness habitat is lost, the metric generates an error message which requires an agreement for bespoke assessment and compensation. An 'unacceptable loss' error message will flag until a 'yes' is entered into the 'Bespoke compensation agreed for unacceptable loss' column.

2.1.19 For the purpose of this assessment, where habitat of a very high distinctiveness is lost it has been omitted from the metric in the baseline and correspondingly, bespoke compensation for its loss is omitted from the post-development scenario i.e., the loss and compensation is dealt with outside of the metric (See Paragraph 2.1.14). The specific technical details of the manual edits to the data are provided within the assessor columns (Appendix B) of the Project metric.

2.1.20 A summary of the very high distinctiveness habitats present within the Order Limits is provided in the results section (Section 3.3). Details of the bespoke measures to address the loss of very high distinctiveness habitats are provided within ES Biodiversity Chapter 6 (Paragraph 6.10.150, Document Reference 3.2, APP-049) and subsequent note produced during Examination following the NVC surveys (Document Reference, Deadline 3 Submission, REP3-051).

2.2 Data collection

2.2.1 Field data for the Project was collected between September 2020 and September 2022 (See ES Biodiversity Chapter 6 (Document Reference 3.2, APP-049) for further details).

2.2.2 The following datasets were used to inform the latest Metric 3.1 calculation.

Survey Dataset 1 – Phase 1 habitat survey 2020 to 2021

2.2.3 Land was surveyed using JNCC Phase 1 habitat classification (Joint Nature Conservation Committee, 2010)[13] between late 2020 and September 2021. The aim of Phase 1 habitat survey is to provide a relatively rapid record of semi-natural vegetation and artificial habitats over large areas of land. Every parcel of land is classified and recorded in accordance with JNCC guidelines. The habitat classification used is based principally on vegetation to identify broad-habitat types. The Phase 1 methodology suggested further

[13] Joint Nature Conservation Committee (2010) Handbook for Phase 1 habitat survey - a technique for environmental audit.

detailed Phase 2 botanical survey were required to determine the plant communities within certain habitats.

2.2.4 There were several data gaps, due to optioneering and land access issues etc. Gaps in field survey data were addressed pre-DCO submission.

Survey Dataset 2 – UKHab and Phase 1 habitat surveys 2021 to 2022

2.2.5 Once the preferred route was identified, additional surveys were required to fill in gaps where field survey had not been undertaken. Further habitat surveys were therefore completed over winter 2021/2022.

2.2.6 All un-surveyed habitat parcels were digitised using online mapping resources and were subsequently ground-truthed with field surveys. Surveys were carried out in accordance with UKHabs Classification (Butcher et al., 2020)[14] which is utilised within the DEFRA Metric. The UKHab classification system is a unified and comprehensive approach that is compatible with other major classification systems, such as Phase 1 habitat survey. It has been chosen for its use in the biodiversity metric because unlike Phase 1 it includes Priority Habitat types and Habitats Directive Annex types. It also has scope to incorporate assessments of condition, origin and management regimes.

2.2.7 Habitat condition information was collected in accordance with Metric 2.0 technical guidance, which was the current guidance at the start of the survey. Therefore habitat condition information continued in accordance with Metric 2.0 for the remaining surveys for consistency (Crosher et al., 2019)[15]

Survey Dataset 3 – MoRPh 2021

2.2.8 A Modular River Physical Survey (MoRPh) survey (Gurnell et al., 2019)[16] characterises the physical structure of a river channel and its margins at a scale that complements biological surveys. The surveys are typically conducted over a river length of 10m to 40m. Data are analysed by trained surveyors using Cartographer[17] to determine the condition value of rivers and streams within the project.

2.2.9 MoRPh surveys were undertaken during the spring and summer of 2021. The location of these surveys and survey effort was focused on watercourses where the Project was likely to have the greatest impact. All survey teams included at least one accredited MoRPh surveyor.

[14] Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1.
[15] Crosher, I. Gold, S., Heaver, M., Heydon, M., Moore, L., Panks, S., Scott, S., Stone, D., & White, N. (2019) The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: technical supplement (Beta version, July 2019). Natural England.
[16] Gurnell, A., England, J., Shuker, L., Wharton, G. (2019) The MoRPh Survey Technical Reference Manual.
[17] https://cartographer.io

Survey Dataset 4 – Hedgerow survey 2021/2022

2.2.10 The objectives of hedgerow surveys are to document the distribution, character and special attributes of hedgerows in an area, establish the state of a hedge (i.e. length and condition), identify hedgerows of particular importance, and provide a baseline to allow future changes to be detected and evaluated (Department for Environment, Food and Rural Affairs, 1997)[18].

2.2.11 These surveys were undertaken to support the ES and were undertaken over winter 2021/2022.

Survey dataset 5 – National Vegetation Classification (NVC) 2022

2.2.12 NVC surveys were undertaken in the summer of 2022, post-DCO application submission, following baseline habitat surveys conducted during 2020, 2021 and 2022. The results of the NVC report presented examples of vegetation of potentially above-average interest or nature conservation value. The NVC results were used to inform baseline habitats and condition scores used in Metric 3.1.

2.3 Baseline scenario scores

Habitat distinctiveness scores

2.3.1 The metric assigns each type of biodiversity unit (Habitat Units, Hedgerow Units and River Units) a level of distinctiveness from Low to Very High with a corresponding distinctiveness score (Table 2-2: Distinctiveness score). This is pre-determined in the metric and cannot be changed by the user.

Table 2-2: Distinctiveness score

Distinctiveness	Score
Very High	8
High	6
Medium	4
Low	2

2.3.2 The distinctiveness score is independent of habitat condition and is a set value within the metric assigned to each habitat type. The same distinctiveness values are automatically applied to each habitat type at both the baseline (pre-intervention) and post-development stage.

Strategic significance

2.3.3 Strategic significance relates to the spatial location of a habitat parcel or linear length and works at a landscape scale. It gives additional biodiversity unit value to habitats that have been identified as habitats of strategic importance to the that local area. The table below shows the multiplier that applies to both pre-intervention and post-intervention calculations.

[18] Department for Environment, Food and Rural Affairs (1997) Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. 2nd Edition. Defra, London.

Table 2-3: Strategic significance scores

Strategic significance	Score
High strategic significance - High potential - area/action formally identified within a local plan, strategy or policy.	1.15
Medium strategic significance - Good potential - location ecologically desirable but area/action not identified in local plan, strategy or policy.	1.1
Low strategic significance - Low potential - area/action not identified in any local plan, strategy or policy; or - No local strategy in place.	1

2.3.4 Each habitat parcel or linear length was assigned strategic significance based on published local plans and objectives such as Nature Recovery Areas, local biodiversity plans, National Character Area objectives and green infrastructure strategies.

2.3.5 Cumbria County Council is currently running a pilot Cumbria Local Nature Recovery Strategy, which includes all UK BAP habitats. Initial habitat networks identified along the project route include Lakes, Lowland Fens, Purple Moor Grass Pasture, Reed Beds, Traditional Orchards, Upland Heathland, Wood Pasture and Parkland, Woodland and Hay Meadows (Cumbria Biodiversity Data Centre, 2022)[19].

2.3.6 Durham County Council have included all UK BAP habitats within their *Biodiversity Action Plan* (North East England Nature Partnership, 2017)[20] and have also added Other Broadleaved woodland as a LBAP habitat, but otherwise it had no local initiatives regarding habitats which would be impacted by the scheme.

2.3.7 North Yorkshire County Council have included all UK BAP habitats within their Biodiversity Action Plan. The scheme does not fall under any North Yorkshire County Council designated landscapes or Green Infrastructure priority areas (North Yorkshire and York, 2012)[21]. However, one area within the order limits of the Stephen Bank to Carkin Moor scheme has been identified in the desk top study as being a Biodiversity Opportunity Area.

2.3.8 For the purposes of the Project the following criteria were applied:

- Each distinct habitat polygon/line that is located within a designated site (statutory or non-statutory); listed as a priority habitat either in the Cumbria, Durham or North Yorkshire LBAP; or is included within a published local biodiversity initiative or relevant local plan as a priority area for nature conservation are assigned a high strategic significance as an "area formally identified in local strategy".
- Habitat polygons/lines that do not meet the criteria above in that location are assigned low strategic significance (Table 2-3: Strategic significance scores).

[19] Cumbria Biodiversity Data Centre (2022) Cumbria Local Nature Recovery Network
[20] North East England Nature Partnership (2017) Durham County Council Biodiversity Action Plan
[21] North Yorkshire and York (2012) Local Nature Partnership Strategy

2.3.9 For the purpose of the assessment, any habitats within a designated site are included within the metric to provide a full account of the biodiversity units within the scheme. The only habitats within a statutory designated site are sections of watercourse within the River Eden SAC and River Eden and Tributaries SSSI. These have been assigned high strategic significance within the metric.

2.3.10 Determining strategic significance for post-development habitats follows the same process.

Baseline habitat conversion

Metric 2.0

2.3.11 Prior to running the draft project-wide metric, (before DCO submission), a baseline dataset had to be created. This involved converting Phase 1 habitat data into UKHab categories where field survey had not been completed using the UKHabs approach. In the first instance, field notes and photographs from all relevant survey datasets were assessed against the UKHab Field key (v2.1) to determine the appropriate habitat type.

2.3.12 Habitat parcels that did not undergo any field survey were categorised using aerial Imagery provided by ESRI[22] to create a complete habitat basemap.

2.3.13 The ecology team used the Phase 1 habitat information for evaluation to select the most appropriate UKHab habitat classification. The Phase 1 data was updated by the ecologist who used professional judgment to choose the most appropriate Metric 2.0 habitat type that matched the UKHab classification. On rare occasions the translation tab in the metric was used by the ecology team, if available data was insufficient. However, the precautionary approach of choosing a higher distinctiveness band or condition score in most cases overrode the use of the translation tool.

2.3.14 Key indicators of habitat type were used; for instance, grazed or cut short sward grassland, or dominance of perennial rye grass, indicated managed grassland of likely low diversity. These habitats were therefore categorised as "modified grassland" within the metric. Similarly, woodland that could be clearly identified in aerial imagery as comprising 80% or more conifer was assigned "other conifer woodland" and those with 21%-80% conifer cover were categorised as "mixed woodland". Significant presence of alder and willow (over 50%) was used as an indicator of wet woodland.

2.3.15 Where information was too limited to assign habitat based on either the UK Habitat Key or using key indicators, then under the precautionary principle the likely habitat with the highest distinctiveness value was assigned. For instance, Lowland Mixed Deciduous Woodland was assigned to woodlands where conifers were confirmed to be absent, but species composition or plantation could not be ascertained. Lowland Beech and Yew Woodland, although generally restricted to southern England, is known from north England so has been categorised as such where it has sufficient similarity of

[22] Imagery data layer provided by: ESRI Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community 0

species composition and is not clearly a plantation on the precautionary principle. This was to ensure habitats were not undervalued and a worst-case scenario was assessed in the metric.

2.3.16 Habitat surveys undertaken after July 2021 were completed using UK Habitat Classification methodology meaning no translation of habitat types was required.

Condition assessment

2.3.17 Each habitat parcel or linear length recorded on site is assigned a condition score at the baseline (pre-intervention) and post-development stages. The criteria are based on parameters (e.g. species diversity, vegetation cover, level of disturbance) against which each distinct area of habitat type can be compared (Table 2-4: Condition scores).

Table 2-4: Condition scores

Condition	Score
Good	3
Fairly Good	2.5
Moderate	2
Fairly Poor	1.5
Poor	1

2.3.18 Baseline conditions were initially assessed according to the DEFRA condition tables in The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: technical supplement (Beta version, July 2019)[14].

2.3.19 Metric 2.0 condition assessments were undertaken in the field and are included in survey dataset No.2. Condition assessments undertaken remotely by the desk-based ecology team used all available information such as target notes, species information and survey photographs, as well as aerial imagery and Google Street View, where sufficiently recent, where practicable (See Section 2.2).

2.3.20 Where field survey notes and accompanying photographs were sufficient for full condition assessment to be completed, this was done assessing all Metric 2.0 criteria in the technical supplement. Where survey evidence was less comprehensive, key indicators of condition were used, for example:

- Proportion of perennial rye grass over 25% was assumed if listed in field notes as dominant or abundant; was the only recorded species; or was listed first in the field notes. This criteria automatically resulted in poor condition being assigned to grasslands.
- If grasses comprised over 70% of the sward, good condition was not assigned to grassland habitats.
- Woodland clearly noted or visible in images as plantation (i.e. trees evenly spaced in distinct lines) was assigned poor condition.
- A visible lack of standing deadwood within woodland habitat parcels meant good condition was not assigned.

2.3.21 Other habitats also had key indicators useful for condition assessment. Professional judgements were made by suitably qualified ecologists with experience in detailed botanical surveys and familiar with UK Habitat classification.

2.3.22 Habitat surveys after July 2021 were undertaken using The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: technical supplement (Beta version, July 2019) methodology, and therefore condition scores were based strictly on condition assessment undertaken in the field.

2.3.23 Survey datasets 1 and 2 were combined with the condition assessments and strategic significance to create the baseline information for Metric 2.0.

Metric 3.1 digital rules-based approach

2.3.24 This Metric 3.1 iteration used all survey datasets 1, 2 and 5 and is informed by survey datasets 3 and 4. None of these surveys involved undertaking Metric 3.1 condition assessments in the field. All Metric 3.1 condition assessments have been undertaken using the digital rules-based approach outlined below.

2.3.25 An assessment was undertaken to understand the differences between Metric 2.0 and Metric 3.1, prior to re-designing the automation tool for Metric 3.1. In addition, the GIS data standards[23] were reviewed. The digital rules-based approach was used to inform and make changes to habitats between Metric 2.0 and Metric 3.1 to the automation tool.

2.3.26 Habitat parcels were selected for re-assessment if the baseline habitat type, distinctiveness or condition values are likely to have changed as a result of the update to Metric 3.1. Broadly, all habitats that were not grassland in poor condition or cropland in the latest Metric 2.0 iteration were reassessed.

2.3.27 The re-assessment of the condition values of relevant habitat parcels used the updated DEFRA Metric 3.1 condition assessment methodology. The Metric 3.1 condition re-assessment used existing desk-based information including aerial imagery, alongside existing field survey data including site notes and photos (where available) to determine condition score.

2.3.28 The digital rules-based approach for Metric 3.1 uses the strategic significance criteria described above in this section but adjusts the automation tool to separate out strategic significance for broadleaved woodland within the county of Durham. All broadleaved woodland habitat parcels in Durham are BAP habitat (North East England Nature Partnership, 2022)[24], which have been assigned the 'formally identified in local strategy' strategic significance score. This has been changed in the automation tool.

[23] Department for Environment, Food and Rural Affairs (2021) Biodiversity Metric 3.1 - GIS data standard XLSX
[24] North East England Nature Partnership (2022) North East England Nature Partnership, Woodland and Scrub Action Plan

Baseline linear units

2.3.29 Survey datasets 3 (hedgerow survey) and 4 (MoRPh survey) were used to formulate the baseline and post-development sections of the metric.

Metric 2.0

Rivers

2.3.30 MoRPh surveys were undertaken in 2021, which focused on sections of watercourses likely to be directly impacted by the Project.

2.3.31 Determination of river type/distinctiveness was consistent with the approach set out in the Biodiversity Metric guidance. The distinctiveness categories for rivers and streams are based on two classifications: Priority Habitats as defined by JNCC and 'River Naturalness.' Priority Habitat includes several river types:

- Chalk rivers.
- Watercourses with water crowfoot assemblages (Habitats Directive Annex I habitat H3260).
- Active shingle rivers.
- Headwater streams (unmodified).

2.3.32 The Natural England Priority River Habitat (Natural England, 2017a)[25] or Headwater Area (Natural England, 2017b)[26] was consulted to determine whether the watercourses on site were mapped as Priority Habitat. If a watercourse is not found to be a Priority Habitat, it is placed into one of the other distinctiveness categories:

- River and streams (other).
- Canals.
- Ditches.
- Culverts.

2.3.33 Lengths of river subject to Project impacts were assigned a condition score based on survey results for the nearest reach surveyed under MoRPh. In some cases, professional judgement had to be used by the MoRPh accredited aquatic ecology team where MoRPh data was not available for a specific reach. To achieve an accurate baseline score, all watercourse lengths within the Project had to be added to the metric, including those not subject to direct impact, which had not undergone MoRPh survey.

Hedgerows

2.3.34 Hedgerow types were derived from the Phase 1 data (survey dataset 1) and condition criteria were applied. Where hedgerow survey information (dataset 4) was available, this was used to verify and confirm the hedgerow type assigned.

[25] Natural England (2017) Priority River Habitat - Rivers (England)
[26] Natural England (2017) Priority River Habitat – Headwater Areas (England)

2.3.35 The hedgerow length included in the metric baseline is based on the total length of all hedgerow types recorded during the Phase 1 Habitat survey, combined with the hedgerow dataset.

Metric 3.1

2.3.36 Survey datasets 3 and 4 were used to formulate the baseline and post-development sections of the metric.

Rivers

2.3.37 Condition values for features determined to be river or stream are based on existing condition values in Metric 2.0 since the methodology for these has not changed.

2.3.38 The main difference from Metric 2.0 to Metric 3.1 is that culverts and ditches are now incorporated as individual features separate from other river and stream habitat types. In Metric 2.0 ditches are mapped as area features and in Metric 3.1 they are mapped as linear features. A review of desk-based information (e.g. aerial imagery) and survey data (e.g. fish/aquatic habitat mapping, MoRPh survey and associated survey images) was undertaken to distinguish ditches from river or stream habitat. Ditch condition assessments were undertaken with the Metric 3.1 condition sheet and based on Phase 1 data, survey information, aerial photography and MoRPh data.

Hedgerows

2.3.39 The baseline hedgerow information was derived from an amalgamated dataset using survey dataset 1 (Phase 1 data) and survey dataset 4 (hedgerow survey data). Condition criteria were applied using field notes, site photos and aerial imagery. Where a particular criterion could not be confidently scored based on the data available, a precautionary approach was taken by applying the highest score for that feature.

2.4 Post-development scenario scores

2.4.1 The post-development scenario applies the same strategic significance information used within the baseline.

Temporal risk

2.4.2 The risk associated with creating new habitats is applied through a temporal risk multiplier at the post-development stage only. After a habitat impact has occurred there is an inevitable time lag between loss of existing habitats and maturation of newly created habitat. This is referred to as the 'Time to target condition multiplier'. The temporal risk can be reduced if habitats are created in advance of impact.

2.4.3 The time until target condition multiplier for each created habitat is automatically assigned within the metric, based on the habitat type and targeted condition. The metric multipliers are shown in Table 2-5: Time until target condition multipliers. This is pre-determined in the Metric and cannot be changed by the user.

Table 2-5: Time until target condition multipliers

Years	Multiplier
0	1.000
5	0.837
10	0.700
15	0.586
20	0.490
25	0.410
30	0.343

Difficulty of creation/restoration

2.4.4 The difficulty of creation or restoration of a habitat is automatically applied based on one of four categories within the metric, each of which is assigned a multiplier (Table 2-6: Time until target condition multipliers).

Table 2-6: Time until target condition multipliers

Difficulty of recreation/ restoration	Multiplier
Very high	0.1
High	0.33
Medium	0.67
Low	1

2.4.5 The difficulty of creation or restoration is assumed to be achievable without specific management practices following the construction phase for all difficulty of creation categories of medium or low and is outlined in the LEMP. For difficulty of creation categories of high and very high, ongoing management instructions suitable for achieving the target condition is outlined in the LEMP and more detailed management instructions will be included in the LEMP documentation (For further details see LEMP (Document Reference 2.7, APP-021).

Advanced and delayed habitat creation

2.4.6 Metric 3.1 includes a function that can adjust the time to target condition, where habitat creation can be either advanced (i.e., habitat is created prior to construction activities and loss of baseline habitats) or is delayed (i.e. where a time lag will occur between habitat loss and creation of mitigation habitat).

2.4.7 For the purpose of this assessment, it has been assumed that the delayed habitat creation is 3 years, which is half of the proposed construction programme (2024 to 2029), and that no habitat will be created in advance. This assumption will be refined during at detailed design. The construction period of 6 years is for all schemes.

Habitat biodiversity units

2.4.8 The impacts on habitats depend on the construction activities within the main extents within the Order Limits. The summary of losses and creation are summarised below:

- Engineering extent: It has been assumed that all habitats within the engineering extent are lost from the baseline.
- Permanent (for environmental mitigation) and temporary (for temporary access roads, compounds and temporary utilities connections) possession extents: It has been assumed that the majority of habitat within these extents is lost unless it has been retained for landscape or ecology mitigation.
- Land outside the above extents but located within the Order Limits has been identified as landscape and ecology mitigation and is marked as being retained.

2.4.9 The automation tool adopts a worst-case scenario approach. The habitats not listed as being retained above are dealt with as being lost, and then habitat that is not retained is then dealt with as created in the post-intervention scenario. This is specifically in relation to how the formulas in the metric spreadsheet deal with how habitats are lost and created. The automation tool incorporates lost and created habitat information, which is inputted into the metric by an ecologist.

2.4.10 Metric 3.1 has used the landscape and ecology mitigation that was devised during the drafting of the ES (Application Documents 3.1, 3.2, 3.3 and 3.4) to inform the post-development assessment.

2.4.11 For those areas within the temporary land take areas, where habitats would be lost during construction but then reinstated, the reinstated habitat is assumed to be of the same type and condition present in the baseline.

2.4.12 The post development habitat types, condition scores and strategic significance values have been transferred from Metric 2.0 to Metric 3.1. There have been very limited manual edits to the future scenario data layer (i.e., the landscape and ecology mitigation information and data), as this ensures the calculation is consistent with the information submitted with the DCO.

2.4.13 The LEMP was designed with Metric 2.0 condition assessments in collaboration with the landscape and ecology team. To achieve moderate or good condition with Metric 3.1, the proposed grassland habitat would need to be a specific UKHab grassland type. As the Metric 3.1 update was done after the mitigation designed for the purposes of the DCO application, the incorporation of specific UKHab grassland type will be incorporated at detailed design. This is provided for within the LEMP (Section B1.7, Application Document 2.7, REP3-003) and EMP (Table 3-2: D-LV-01, Document Reference 2.7, REP3-004). Therefore, for the purposes of the Metric 3.1 report, a precautionary approach was adopted by applying a rule to the automation tool to classify created other neutral grassland as poor.

2.4.14 Habitat types within the post-development metric are also required to be recorded in UKHab type (or DEFRA Metric 3.1 habitat type where there is variation). UK Habs Classification was used as the basis for ecological mitigation. Non ecological mitigation and design was translated to UK Habitats by consultation with the landscape team (Appendix C) to agree

habitat composition and matching with the closest appropriate UK Habitat, for instance open grassland was assumed to be managed and regularly maintained so categorised as modified grassland; flower rich mixes, less regular management and maintenance strips where topsoil was not being replaced were categorised as other neutral grassland.

2.4.15 The condition scores assigned to post-construction habitats is based on management prescriptions and species mixes as defined in the LEMP, assessed according to the condition tables in the metric technical supplement (Crosher et al., 2019)[27].

2.4.16 The following assumptions have been made in relation to condition values of habitats post-development and were used to inform the mitigation design and LEMP provided as part of the DCO application submission (See LEMP for further details (Document Reference 2.7, APP-021)):

- Grassland within maintenance areas will not have topsoil replaced and will allow a diverse neutral grassland sward to develop, however due to maintenance activities this is likely to achieve poor condition only. The assumption for maintenance areas is that it can only achieve other neutral grassland, not a specific type, therefore cannot achieve better than poor. As the designs are refined during detail design, opportunities will be sought to increase the condition of grassland creation.
- Lowland mixed deciduous and wet woodland will be achieved through planting of suitable tree species, for instance oak, birch and small leaved lime in lowland woodland, or alder and willow in wet woodland, alongside suitable understory species. Siting has generally been chosen based on proximity of existing woodlands to allow colonisation. Newly created woodlands are unlikely to achieve mature trees or significant deadwood over 20cm diameter within the timeframes allowed (30 years for other broadleaved woodland, 32+ for lowland mixed deciduous woodland) and therefore are unlikely to meet the required criteria for good condition. These woodlands have been assigned moderate condition.
- Where it has been established that woodland proposed for creation already contains mature or potentially mature trees, the target condition has been set as good. This includes areas where a sufficient number of mature trees and deadwood can be incorporated from freestanding trees or hedgerows to provide a mature structure initially, or areas of mature scrub which will be assisted to succeed into woodland as this cannot be treated as succession or enhancement due to issues with the metric so is treated as creation.
- Upland heathland is only being created adjacent to existing heathland where removal of grazing pressures would eventually allow natural succession to this habitat. Therefore, due to assumed suitability of soils and likelihood of additional natural species colonisation, good condition is considered achievable.

[27] Crosher I A, Gold S B, Heaver M D, Heydon M A, Moore L D, Panks S A, Scott S C, Stone D A, and White N A (2019) The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: technical supplement (Beta version, July 2019)

- Open mosaic habitat will naturally form where disturbance is caused and restoration landscaping is avoided and therefore is considered achievable in the timescales. Condition has been assessed as good where existing structures are being removed, as some of this will be retained (for instance sections of low wall/ hard standing) replicating natural decay processes; and continued disturbance is assured, e.g. due to high rabbit population. Fairly good condition is assigned where some structural features will be retained but these may not be extensive or continued disturbance is less assured. Moderate condition is assigned where no structures currently exist in the location and therefore artificial disturbance will need to be undertaken.
- Created very high distinctiveness habitats are assumed to be under more specific management regimes through management plans which will be either adopted by NH where ownership remains with them, or incorporated into land management agreements where ownership passes back to existing landowners. Very high distinctiveness created habitat is omitted from the metric (See assessor comments in Appendix B).

2.4.17 Subsequent iterations of the LEMP will be refined during the detailed design stage.

Linear biodiversity units

Rivers

2.4.18 The main direct impacts are culverting of watercourses beneath new or widened sections of road and shading as a result of the construction of new bridges.

2.4.19 For each individual bridge crossing, the numerical indicators within MoRPh were adjusted to see if increased shading would affect the condition score at the post-works stage. Based on this assessment, it was determined that none of the river condition scores changed as a result of shading.

2.4.20 For locations where new culverts were required, these were designed to retain the width and nature of the watercourse and contain enhancements to assist mammal and fish movements along them. The numerical indicators within MoRPh were adjusted to see if culverts of this nature would affect the condition score at the post-works stage. Based on this assessment, it was determined that none of the river condition scores changed as a result of these enhanced culverts and these have been input as created other rivers and streams in the metric calculation. Where extension of existing culverts was required it was assumed that these would be continuations and therefore are treated as culverts in the calculations.

2.4.21 Opportunities to improve condition of rivers within the Order Limits shall be addressed within detailed design as part of hydrology and drainage considerations.

Hedgerows

2.4.22 It has been assumed that all hedgerows within the engineering extent are lost as a result of the Project.

2.5 Trading rules

2.5.1 Trading rules which are applied by the metric require that any loss of habitat is replaced on a 'like for like' or ‘like for better' principle. Trading rules applied for individual habitats are based on their distinctiveness, as outlined in the Table 2-7: Habitat distinctiveness trading rules in Metric 3.1.

Table 2-7: Habitat distinctiveness trading rules in Metric 3.1

Baseline habitat distinctiveness	Replacement habitat required by trading rules
Very high	Losses are not permitted within the metric Bespoke assessment and compensation required
High	Must be replaced with biodiversity units of the same habitat type
Medium	Must be replaced with: Medium distinctiveness habitat from same broad habitat type OR Any habitat from a higher distinctiveness band
Low	Must be replaced with: Same distinctiveness habitat OR Any habitat from a higher distinctiveness band
Very low	Replacement not required

2.5.2 The ecology project team collaborated with the wider design teams throughout optioneering and prior to submission of the DCO application to avoid and/or minimise potential impacts on both irreplaceable habitats, very high distinctiveness habitat, and high and medium distinctiveness habitat.

2.6 Assumptions and limitations

2.6.1 The following assumptions or limitations apply to the Metric 3.1 calculation.

2.6.2 During the creation of the metric baseline, some data had to be cleaned to create a single baseline dataset to enable the metric calculations to be ran. All currently surveyed habitats within the Order Limits boundary were measured using 2D mapping software, grouped by habitat, and the total area per habitat in m2 (metres squared) calculated and then converted to hectares (Ha). For linear features this was in metres (m) calculated and then converted to kilometres (km). The majority of road infrastructure, hard standing paths and tracks, and large areas of built environment have not been mapped; any areas within the Order Limits boundary not accounted for under habitats are assumed to be developed land/sealed surface. Where area-based data was converted into linear data for the purpose of creating a baseline, the boundaries of the adjacent habitats either side were moved to fill in the gaps. Survey gaps were digitised remotely to enable the metric calculations to be run.

2.6.3 Gaps in mapping of plots have been filled when the gap is less than 2m using GIS technology, snapping the habitats together along the median line. Where the gap was larger than 2m the gap was filled manually by adjusting plot boundaries to aerial photographs and OS map boundaries.

2.6.4 Where survey data is lacking a desktop assessment has been made using aerial photographs and MAGIC[28] map habitat information. Approximately 20% of the Order Limits was not subject to field surveys, therefore the habitat parcels were assessed using desk study resources and combined field knowledge from field surveyors. Where the habitat cannot be reasonably assessed, using a precautionary approach, the highest value likely habitat and condition has been assumed.

2.6.5 For this Metric 3.1 iteration all the habitat information and condition assessments were either derived from available information by the ecology team remotely or selected automatically using the rules-based approach for area habitats. Where information was too limited to assign a habitat based on either the UK Habitat Key or using key indicators, then under the precautionary principle the likely habitat with the highest distinctiveness value was assigned. This was to ensure habitats were not undervalued and a worst-case scenario was assessed in the metric. The results for the habitat parcels are therefore considered to be robust.

2.6.6 The UKHab and Phase 1 habitat surveys (survey dataset no.2) and the hedgerow surveys (survey dataset no.4) were undertaken during the winter of 2021/2022. These field surveys were undertaken outside the optimal survey period. Consequently, it is possible that plant species present within the survey area, including invasive species, grasses, herbs and species indicative of sub-optimal condition were not evident or under-recorded. These limitations are acknowledged by the field surveyors. Where the habitat could not be reasonably assessed, a precautionary approach was adopted to select the highest value likely habitat and condition.

2.6.7 Habitats beneath linear features have been treated as indicated in UK Habitats guidance, for example hedgerows are assumed to have no width and adjacent habitats are assumed to meet under the hedge.

2.6.8 River habitat condition has been assessed from the nearest Modular River Physical (MoRPh) survey location assuming this is consistent along the length of the river. Where there was no survey data these have been assumed to be of moderate condition; this applies only to eight ditches across the Order Limits.

2.6.9 It has been assumed that there is no over deepening of rivers and streams in the baseline assessment at this stage as a precautionary measure, but this aspect will be considered during detailed design.

2.6.10 The baseline period of this metric iteration is based upon the survey data collected between 2020 and September 2022.

2.6.11 For the purpose of this report the baseline is regarded as the time period of when the evidence was collected, which is documented in Section 2. This evidence was collected before commencement of construction works. Evidence and data on existing biodiversity is referred to as the ‘baseline’, which is a snapshot of the current or recent circumstances. However, all

[28] Natural England (2022) MAGIC (Multi-Agency Geographic Information for the Countryside)

areas of potentially above-average interest or nature conservation value have recently been assessed within the NVC surveys undertaken during the summer of 2022. In addition, for future iterations of the metric, a professional ecologist may need to assess the lifespan of data to understand whether there have been significant changes to the habitats present as a result of management change or changes in ecological conditions, functions or ecosystem. Based on the knowledge of the Project and the dominance of agriculture across the landscapes that span the Order Limits it is considered unlikely that management would have changed significantly during the baseline period to adversely affect any metric calculations.

2.6.12 Areas of temporary possession within the indicative site clearance boundary have been assumed to be topsoil stripped and therefore the restored habitat is considered as created. Restored habitat is assumed to be the same habitat type and condition as the baseline with topsoil and subsoil stored separately during temporary use and that none of these areas are of more than low difficulty of creation; standard time to creation modifiers are assumed to account for any potential minor loss of condition. Areas of temporary possession outside the indicative site clearance boundary (for example utilities clearance) have been assumed to be retained.

2.6.13 The automation tool assumes that any habitat within the landscape and ecology mitigation extent that could be enhanced has been treated the same as created as a precaution. Potential opportunities to enhance habitats will be assessed during the detailed design process.

3 Results

3.1.1 The outputs from the automation tool have been inputted into Metric 3.1 and the results of this iteration are provided in the results tables below. The Metric spreadsheet which contains the inputs and the results shown below is provided in Appendix B, which incorporates the ecology and landscape mitigation presented in the Landscape and Ecological Management Plan (LEMP) (Document Reference 2.7, APP-021).

3.1.2 An additional Metric spreadsheet has been provided in Appendix D which presents potential options for river opportunities not included in the Landscape and Ecological Management Plan (LEMP) (Document Reference 2.7, APP-021).

3.1.3 Sections 3.2 and Sections 3.3 provides results of statutory and irreplaceable habitats found across the Project, Section 3.4 provides summary metric results and detailed results for habitat biodiversity units, hedgerow biodiversity units and rivers biodiversity units.

3.1.4 It should be noted there are no off-site habitat impacts or off-site habitat creation associated with the Project.

3.2 Statutory sites

3.2.1 Table 3-1 summarises the location of linear (rivers) statutory sites within the Order Limits.

Table 3-1: Summary of linear (rivers) Statutory Sites results*

Linear feature	Scheme	Type	Comments
River Eden SAC River Eden and Tributaries SSSI	Temple Sowerby to Appleby	Statutory sites	No direct habitat loss. There is shading as a result of an open span viaduct over Trout Beck located approximately at NY6499924457. The shading does not result in the reduction of a condition score. There are other discrete areas of the Statutory Sites adjacent to the Project, but they are not directly impacted upon by the Project. Approximately 160m is within the Order Limits, of which approximately 28m is underneath the open span viaduct.

* See Application Document 3.2 ES - Chapter 6 and Application Document 3.5 Habitat Regulations Assessment (HRA) Stage 1 for further details.

3.3 Irreplaceable and very high distinctiveness habitats

3.3.1 Table 3-2 identifies the presence of very high distinctiveness habitat and irreplaceable habitat across the Project. Details of consultation and bespoke mitigation relating to irreplaceable and very high distinctiveness habitat is provided in ES Biodiversity Chapter 6 (Document Reference 3.2, APP-049) and subsequent note produced following the NVC surveys (Document Reference, Deadline 3 Submission, REP3-051). Furthermore, appropriate measures are reflected and secured in the Environmental Mitigation Plan (EMP) (Document Reference 2.7, APP-019; D-RDWE-06) and Project Design Principles Document (Document Reference 5.11, Ref APP-302

(06.13, 09.09). Prior to the start of works of a particular part of the Scheme, a second iteration EMP must be consulted on by National Highways and then submitted for approval by the Secretary of State. As part of this, a detailed Landscape and Ecological Management Plan (the LEMP) must be developed, which will include on-going management measures for these areas. The Scheme must be carried out in accordance with these approved documents.

Table 3-2: Summary of irreplaceable habitat results*

Area habitat type	Scheme	Type	Comments
Fen	Temple Sowerby to Appleby	V.high distinctiveness	The approximate location of this parcel is at NY6242426872 and is being avoided.
Fen	Temple Sowerby to Appleby	V.high distinctiveness	This area of fen is being avoided. The approximate location is NY6480625385. Bespoke advice has been provided resulting in approximately 1.97ha of fen being retained and impacts avoided.
Fen	Appleby to Brough	V.high distinctiveness	Fen is located at approximately NY7365717076. The Project does impact of fen habitat parcels at this location. Advice was given to the Project in the first instance to avoid impact. Approximately 1.61ha is currently being lost. This is the worst-case scenario. During detailed design opportunities will be sought to refine the designs (where practicable). Prior to submission of the DCO, preliminary consultations were undertaken with the statutory authorities, who agreed in principle to the proposed fen mitigation proposals.
Purple moor grass and rush pasture	Appleby to Brough	V.high distinctiveness	The approximate location of these parcels is at NY7611515532. NVC surveys confirmed presence of this habitat broadly in the locality, but not specifically within the Order Limits. As a precaution two habitat parcels (approximately 0.10ha) either side of this minor road have been classed as purple moor grass and rush pasture.
Fen	Appleby to Brough	V.high distinctiveness	Flitholme Fen. The approximate location is NY7671015069. This area has been subjected to further detailed NVC surveys, as a result the total area (hectares) of fen has significantly reduced due to reclassification. The Project does impact fen habitat parcels at this location. Approximately 0.11ha is currently being lost.
Ancient woodland	Cross Lanes to Rokeby	Irreplaceable / High distinctiveness (lowland mixed	The approximate location is NZ0817713191 and 0.06ha is within the Order Limits. Some small-scale drainage works affecting 0.01ha are proposed in a small area of ancient woodland.

Area habitat type	Scheme	Type	Comments
		deciduous woodland)	Impacts on ancient woodland have been avoided through consultation with Natural England and bespoke mitigation agreed and secured within the EMP (Document Reference 2.7, APP-019; D-BD-05,MW-BD-23).
Wood pasture and parkland	Cross Lanes to Rokeby	V.high distinctiveness	Rokeby Park The approximate location is NZ0801113814 and 0.10ha is within the Order Limits but it is unaffected; therefore, it is retained in the Project metric and not lost.
Fen	Stephen Bank to Carkin Moor	V.high distinctiveness	Developing fen The approximate location is NZ1218710266. This former coniferous woodland plantation has been subjected to more detailed NVC surveys. The results indicate that some of the habitat parcels are changing to fen. Approximately 2.36ha is now classified as fen. Options to avoid and reduce the amount of fen impacted by the Project have been assessed. Consultation with Natural England and bespoke mitigation relating to this habitat is reflected and secured in the Environmental Mitigation Plan (Document Reference 2.7, APP-019) and Project Design Principles Document (Document Reference 5.11, Ref APP-302).

*See ES Biodiversity Chapter 6 (Document Reference 3.2, APP-049) and the Environmental Mitigation Plan (EMP) (Document Reference 2.7, APP-019) for further details

3.4 Summary and detailed results

Summary results

3.4.1 The table (Table 3-3) below shows the summary results from Metric 3.1 taken from Appendix B (excluding the river opportunities, Appendix D).

Table 3-3: Metric headline results

	Biodiversity unit group	No. of units / %
On-site baseline	Habitat units	2407.89 units
	Hedgerow units	431.42 units
	River units	179.96 units
On-site post-intervention	Habitat units	2470.47 units
	Hedgerow units	743.68 units
	River units	160.04 units
Total net unit change	Habitat units	+ 62.58 units
	Hedgerow units	+ 312.25 units
	River units	- 19.92 units
Total net % change	Habitat units	+ 2.60 %
	Hedgerow units	+ 72.38 %
	River units	- 11.07 %

3.4.2 The Project achieves a total net % change of +2.60 % for area habitat biodiversity units and +72.38% for hedgerow units.

Detailed results

Habitat units

3.4.3 The results below show the detailed results for habitat biodiversity units from this iteration of Metric 3.1 (from Appendix B).

Table 3-4: Detailed results for area habitats

Habitat Group	Baseline		Post development on site		Onsite change	
	Existing area (Ha)	Existing value (unit)	Proposed area (Ha)	Proposed value (unit)	Area change (ha)	Onsite unit change
Cropland	202.84	407.10	7.78	15.06	-195.06	-392.04
Grassland	521.00	1391.56	514.96	1601.69	-6.03	210.13
Heathland and Scrub	7.20	53.61	57.80	345.67	50.61	292.06
Lakes	0.39	2.37	0.50	5.09	0.10	2.72
Sparsely vegetated land	0.00	0.00	0.00	0.00	0.00	0.00
Urban	102.03	31.26	195.80	97.79	93.77	66.52
Wetland	2.09	56.40	2.09	56.40	0.00	0.00
Woodland and forest	60.36	465.58	116.97	348.77	56.61	-116.82

3.4.4 The results show that as a result of the design that there is an increase of +210.13 habitat biodiversity units in the grassland broad habitat group. There is a surfeit of +292.06 habitat biodiversity units for heathland and scrub and a surfeit of +66.52 habitat biodiversity units for urban habitats. There is an overall deficit of minus -116.82 habitat biodiversity units for woodland and forest, but within that there is a surfeit of +34.43 habitat biodiversity units of broadleaved woodland.

3.4.5 The trading deficit shows the main woodland habitat biodiversity unit losses are lowland mixed deciduous woodland (-71.66) and upland mixed ashwoods (-48.35).

3.4.6 The deficits of high distinctiveness woodland are considered to be most likely as a result of: the changes in the habitat requirements to satisfy the trading rules between Metric 2.0 and Metric 3.1 (e.g. a great proportion of habitats having a selected time to target condition greater than 30 years); changes in the reclassification of some woodland following the NVC survey results in 2022; and adjustments to assumptions made to the automation tool to take into account this iteration following submission of the DCO application. The ES landscape and ecology mitigation proposals submitted as part of the DCO application were informed using Metric 2.0 information, which varies from Metric 3.1. Notwithstanding, this Metric 3.1 calculation

does not alter the mitigation designs submitted with the DCO application and there is no new proposed mitigation as a result of this Metric 3.1 calculation.

3.4.7 Opportunities will be explored where practicable during detailed design to adjust the surfeits and deficits to offset this trading deficit.

Hedgerow linear units

3.4.8 The results below show the detailed results for hedgerow biodiversity units from this iteration of Metric 3.1 (Appendix B). The results show a total net percentage change of +72.38% for hedgerows (Table 3-3).

3.4.9 The hedgerow types have been summarised and coded with distinctiveness category in brackets as follows:

- H1 Native Species Rich Hedgerow with trees - Associated with bank or ditch (V.high)
- H2 Native Species Rich Hedgerow with trees (High)
- H3 Native Species Rich Hedgerow - Associated with bank or ditch (High)
- H4 Native Hedgerow with trees - Associated with bank or ditch (High)
- H5 Native Species Rich Hedgerow (Medium)
- H6 Native Hedgerow - Associated with bank or ditch (Medium)
- H7 Native Hedgerow with trees (Medium)
- H8 Line of Trees (Ecologically Valuable) (Medium)
- H9 Line of Trees (Ecologically Valuable) - with Bank or Ditch (Medium)
- H10 Native Hedgerow (Low)
- H11 Line of Trees (Low)
- H12 Line of Trees associated with bank or ditch (Low)
- H13 Hedge Ornamental Non-Native (V.low)

Table 3-5: Detailed results for hedgerows

Hedgerow type	Baseline		Post development on site		Onsite change	
Summarised code	Existing length (km)	Existing value (unit)	Proposed length (km)	Proposed value (unit)	Length change (km)	Onsite unit change
H1 V.High	0.27	5.54	0.23	4.64	-0.04	-0.90
H2 High	6.60	97.95	1.26	18.27	-5.34	-79.68
H3 High	0.66	12.54	0.00	0.03	-0.65	-12.50
H4 High	0.54	8.22	0.09	1.87	-0.45	-6.35
H5 Medium	13.51	127.07	88.54	690.26	75.04	563.20
H6 Medium	0.24	1.29	0.13	0.58	-0.12	-0.71
H7 Medium	5.89	54.31	0.79	7.66	-5.10	-46.65
H8 Medium	0.38	3.68	0.00	0.01	-0.38	-3.67
H9 Medium	0.16	1.96	0.00	0.01	-0.16	-1.96
H10 Low	18.89	88.67	2.44	11.88	-16.44	-76.79
H11 Low	7.06	26.51	1.69	6.74	-5.37	-19.77
H12 Low	0.87	3.46	0.43	1.74	-0.43	-1.73
H13 V.Low	0.22	0.22	0.00	0.00	-0.22	-0.22

3.4.10 As detailed design information was not available it has been assumed that the majority of the hedgerows are lost, unless they were identified as retained by the landscape team.

3.4.11 During detailed design opportunities will be sought to further reduce avoidable losses (where practicable) as the design is refined. The results presented above are the worst-case scenario.

3.4.12 The reason the net gain percentage for hedgerows is +72.38% is because a precautionary approach was adopted during the design of the landscape proposals. In summary, the majority of hedgerows lost are species-poor in poor condition, with proposals to replace them with native species-rich hedgerows in good condition.

River linear units

3.4.13 The table below shows the detailed results for rivers, from this iteration of Metric 3.1 (Appendix B) but exclude the river opportunities (Appendix D).

Table 3-6: Detailed results for rivers

River type	Baseline		Post development on site		Onsite change	
River Type / Distinctiveness	Existing length (km)	Existing value (unit)	Proposed length (km)	Proposed value (unit)	Length change (km)	Onsite unit change
Priority Habitat / Very high	4.6	83.8	4.5	79.8	0.0	-4.0
Other Rivers and Streams / High	3.6	45.5	3.1	39.0	-0.5	-6.5
Ditches / Medium	7.4	44.9	4.7	29.5	-2.7	-15.4
Canals / Medium	0.0	0.0	0.0	0.0	0.0	0.0
Culvert / Low	2.9	5.8	6.4	11.7	3.5	6.0

3.4.14 The results show a total net percentage change of -11.07% (Table 3-3); this is largely due to culverting of waterbodies, principally ditches but also small lengths of rivers, where existing culverts are being extended and therefore reducing the ability to create enhanced culverts which do not change river conditions (See ES Chapter 6 for the assessment of impacts relating to culverts as a result of the Project (Document Reference 3.2, APP-049). The percentage change of -11.07% equates to a total net unit change of -19.92 river biodiversity units (Table 3-3).

3.4.15 The Project results in a river biodiversity unit change of -19.92, which comprises of: -4.0 river units for priority habitat, -6.5 river biodiversity units for other rivers and streams (-4.0 + -6.5 = -10.5 for priority habitat and other rivers and streams combined); -15.4 river units for ditches; and +6.0 river units for culverts (Table 3-6).

River opportunities

3.4.16 The total change of -19.92 river biodiversity units will be addressed by applying the below river opportunities and incorporating ecological features within an appropriate length of ditch as outlined below. The river (other rivers and streams) opportunities are provided in Table 3-7 and the corresponding metric spreadsheet is provided at Appendix D.

3.4.17 In advance of detailed design, where river restoration / enhancement opportunities will be fully developed, an initial assessment of the potential river and stream units that could be gained through identified enhancement opportunities has been undertaken. The opportunities were identified during site surveys and consist of a combination of river restoration / enhancement of existing open river channel and de-culverting or "daylighting" of lengths of river/stream that have been covered through historic (non-Project related) culverts. The result of this assessment is presented in Table 3-7.

3.4.18 "Baseline" and "post-enhancement" units were calculated for lengths of stream that would not be subject to Project impacts (i.e. lengths of stream within the Order Limits, that lie outside of the Project "footprint"). Baseline river "condition" was determined using MoRPh survey data; "post-enhancement" river "condition" was assumed based on precautionary principles. A maximum condition of "Fairly Good" (as opposed to "Good") was applied when calculating the post-enhancement units. The river opportunities are for high distinctiveness river habitats, not very high distinctiveness, as they are all within 'other rivers and streams'.

3.4.19 It is estimated that +10.72 river biodiversity units of other rivers and streams (high distinctiveness) could be generated from these river enhancement opportunities.

3.4.20 The river opportunities from the below table are also provided in a standalone metric (Appendix D).

Table 3-7: Estimated results for river and stream enhancement

River type	Baseline		Post development on site		Onsite change	
River Name / Opportunity Code	Existing length (km)	Existing value (unit)	Proposed length (km)	Proposed value (unit)	Length change (km)	Onsite unit change
Thacka Beck (OP 1)	0.10 (river)	1.035	0.115 (river)	1.59	0.015	0.55
Unnamed Tributary of Light Water Culvert 3.1 (OP 2)	0.04 (culvert)	0.09	0.04 (river)	0.37	0.0	0.28
Unnamed Tributary of Light Water 3.1 Culvert (OP 3)	0.145 (culvert)	0.33	0.145 (river)	1.35	0.0	1.02

River type	Baseline		Post development on site		Onsite change	
River Name / Opportunity Code	Existing length (km)	Existing value (unit)	Proposed length (km)	Proposed value (unit)	Length change (km)	Onsite unit change
Light Water (OP 4)	0.2 (river)	2.76	0.2 (river)	3.19	0.0	0.43
Unnamed Tributary of River Eamont 3.3 (OP 6)	0.37 (river)	4.44	0.37 (river)	5.13	0.0	0.69
Swine Gill (OP 7)	0.26 (river)	3.12	0.26 (river)	3.61	0.0	0.49
Unnamed Tributary of Trout Beck 4.6 (OP 8)	0.22 (culvert)	0.51	0.32 (river)	2.86	0.1	2.35
Unnamed Tributary of Trout Beck 4.2 (OP 9)	0.175 (river)	1.58	0.175 (river)	2.19	0.0	0.61
Unnamed Tributary of Mire Sike 6.12 (OP 10)	0.19 (river)	2.62	0.19 (river)	3.03	0.0	0.41
Cringle Beck (OP 11)	0.36 (river)	4.97	0.375 (river)	5.9	0.015	0.94
Eastfield Sike (OP 12)	0.017 (culvert)	0.039	0.017 (river)	0.16	0.0	0.12
Unnamed Tributary of Lowgill Beck 6.7 (OP 13)	0.09 (river)	0.54	0.09 (river)	0.98	0.0	0.44
Unnamed Tributary of River Greta 7.3 (OP 14)	0.295 (culvert)	0.59	0.295 (river)	2.39	0.0	1.8
Unnamed Tributary of Punder Gill 8.1 (OP 15)	0.27 (river)	3.24	0.28 (river)	3.84	0.01	0.6
Total amount of river units potentially available through enhancement.						+10.72

3.4.21 The Project results in a unit change of -15.4 biodiversity units (Table 3-6) for ditches. A large proportion of the 4.7km of ditch creation within the results comprises of ditch creation from the attenuation basins/ponds (for the treatment of road run-off) that connect to watercourses. An additional 15.44 ditch units could be generated by the Project by modifying 4km of the proposed cut-off ditches. Cut-off ditches, which are in abundance in the designs (Environmental Mitigation Maps, Document Reference 2.8, APP-041), located across the Project could be ecologically enhanced, for instance

by retaining water for more than 4 months of the year. Opportunities to refine these ditches will be considered at detailed design in conjunction with hydrological and other design requirements. The cut-off ditches and ditch opportunities will be included in the Project metric (Appendix B), LEMP or Appendix D in due course. Ditches are relatively straightforward to create, therefore it is considered highly likely that 4km of ecological enhancement ditches can be created across the Project.

3.4.22 Table 3-8 below provides a summary calculation that adds the predicted river biodiversity units from the river opportunities (Table 3-7) and ditch opportunities to the total net unit change (Table 3-3) from the Project metric.

3.4.23 The river and ditch opportunities presented are those identified to date, based on current design, to evidence that appropriate, sufficient No Net Loss opportunities exist. It is likely that additional or alternative opportunities will be available and these will continue to be explored as required at detailed design.

Table 3-8: The predicted river biodiversity unit change after the application of the river opportunities and ditch opportunities

Description of total / action	Predicted river unit change
Total net unit change river units from the Project metric (Table 3-3, Appendix B)	-19.92 units
Action: Total amount of river units potentially available through enhancement (Appendix D, Table 3-7)	+10.72 units
Action: Refinement of ditch opportunities. Predicted condition of poor. Modify approximately 4km of cut-off ditches by changing the management, so they also provide ecological benefits. Sub-total (river opportunities 10.72 + ditch opportunities 15.44) = 26.16 units	+15.44 units
Predicted total unit change after adding the river opportunities units and ditch opportunities units together (-19.92 + 10.72 + 15.44 = 6.24)	+6.24 units

3.4.24 Table 3-8 above predicts that it is possible to generate an overall surfeit of 6.24 river habitat units with the proposed river and ditch opportunities.

3.4.25 These opportunities assume the delay in starting habitat/creation is 0 years.

4 Discussion and Conclusions

Discussion

4.1.1 Habitat units would be higher as a result of the Project, which represents a total net percentage change of +2.60%. The majority of this is from the provision of other neutral grassland within the permanent acquisition of land. The trading deficit shows the main habitat losses are lowland beach and yew woodland (-2.20 habitat units); lowland mixed deciduous woodland (-71.66 habitat units); upland mixed ashwoods (-48.35 habitat units); wet woodland (-6.02 habitat units); cropland medium distinctiveness (-2.82 habitat units); and ponds (-2.31 habitat units). Opportunities during detailed design will be looked for within the current surfeit of broadleaved woodland, scrub and other neutral grassland to change a proportion of this habitat creation in appropriate locations to: Ponds - Priority Habitats; Lowland Beech and Yew Woodland; and high distinctiveness woodlands, to offset the deficits. Creation of Lowland Beech and Yew woodland in particular will be prioritised, which is of very restricted distribution in the north of England.

4.1.2 Biodiversity units for hedgerows would be higher as a result of the Project. This represents a total net percentage change of +72.38%. The main reason for this is the creation of 677.38 hedgerow units, which derives of 80.30 km of native species hedgerow in good condition and 7.00km of native species hedgerow in poor condition. This surfeit will be refined during detailed design.

4.1.3 Biodiversity units for rivers would be lower as a result of the Project (Appendix B, Table 3-3). This represents a total net percentage change of -11.07%, which equates to a total unit change of -19.92 river biodiversity units (Table 3-3). Opportunities to improve condition of rivers within the Order Limits have been presented in Section 3 (Table 3-7) to provide an additional +10.72 for river biodiversity units for other rivers and stream, along with options to refine existing ditch creation incorporating ecological measures. It is estimated that +15.44 river biodiversity units can be generated from modifying ecological features of cut-off ditches. The predicted total unit change is 26.16 river biodiversity units which results in the predicted total net unit change of +6.24 river biodiversity units (Table 3-8) following the application of the river and ditch opportunities. The proposed opportunities represent a swing for total net unit change from -19.92 units (Table 3-3) to +6.24 units (Table 3-8).

Conclusion

4.1.4 To ensure conformity with the NPSNN, the primary driver informing the environmental mitigation design submitted as part of the DCO application was to ensure that mitigation is provided for impacts on protected species and designated sites, and that replacement habitats are provided for those lost, as presented in ES Biodiversity Chapter 6 (Document Reference 3.2, APP-049). Opportunities to maximise biodiversity as part of this have been sought where practicable.

4.1.5 The Project objective is to achieve No Net Loss. Based on the environmental mitigation design submitted as part of the DCO application, the updated 3.1 metric calculations demonstrate that the Project will deliver a total net percentage change of +2.60% for habitat biodiversity units and +72.38% hedgerow biodiversity units. While a total net percentage change of -11.07% is reported relating to biodiversity units for rivers, additional enhancement opportunities have been identified to gain up to an additional +26.16 river biodiversity units with recognition that ditches could be ecologically enhanced during detailed design; therefore there are opportunities to achieve a No Net Loss outcome as a minimum which can be secured within the Project.

4.1.6 Flexibility exists within the Order Limits to accommodate further opportunities and refinement at detailed design stage.

4.1.7 The Applicant notes that the Project is committed to achieving the Project Design Principles BNG01 and BNG02 [REP6-015]. These Principles are set out below and are secured under the DCO in accordance with Article 49 and Article 54, the latter of which requires that the authorised development must be designed in detail and carried out so that it is compatible with the design principles (among others) [REP5-012]. Accordingly, the Project is committed to achieving No Net Loss, and this Report demonstrates that there are sufficient opportunities within the Order Limits to secure that objective.

- BNG01: The Project is to achieve No Net Loss for biodiversity while maximising opportunities for enhancement, measured by the relevant Defra biodiversity metric.
- BNG02: The Project is also committed to ensuring that woodland of conservation value that is required to be removed to facilitate the Project will be replaced at a suitable ratio to account for the longevity of that habitat. The ratio is to be dictated by the relevant Defra Biodiversity metric. Any very high value habitats which are considered to be irreplaceable need bespoke mitigation to be developed in consultation with Natural England. Any additional planting for landscape purposes will be reviewed to maximise opportunities for biodiversity enhancement.

4.1.8 It should be noted that the metric results presented are based on the engineering and environmental mitigation designs submitted as part of the DCO application which has assumed a reasonable worst-case scenario. It is anticipated that the metric calculation will be re-run at detailed design stage in order to update against the detailed design. Such refinement is expected to result in a further improvement to the current metric units being delivered by the Project.

A Drawings

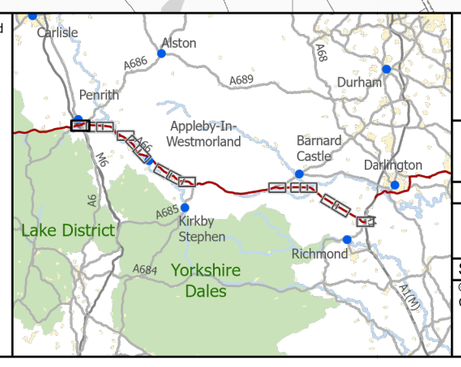
WORK IN PROGRESS

Existing A66
Order Limits

Hedgerows
- Line of Trees
- Native Hedgerow
- Native Species Rich Hedgerow

Rivers
- Priority Habitat
- Other Rivers and Streams
- Culverts

Baseline Habitats
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Blackthorn Scrub
- Heathland and Shrub - Mixed Scrub
- Heathland and Shrub - Bramble Scrub
- Heathland and Shrub - Hawthorn Scrub
- Heathland and Shrub - Hazel Scrub
- Lakes - Ornamental Lake or Pond
- Lakes - Ponds (Non- Priority habitat)
- Urban - Open Mosaic Habitats on Previously Developed Land
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Lowland Beech and Yew Woodland
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Scot's Pine Woodland
- Woodland and Forest - Other Coniferous Woodland



national highways

3 Piccadilly Place
Manchester
M1 3BN

Revision	Created	Checked	Reviewed	Approved	Authorised
P01	First Issue				
	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

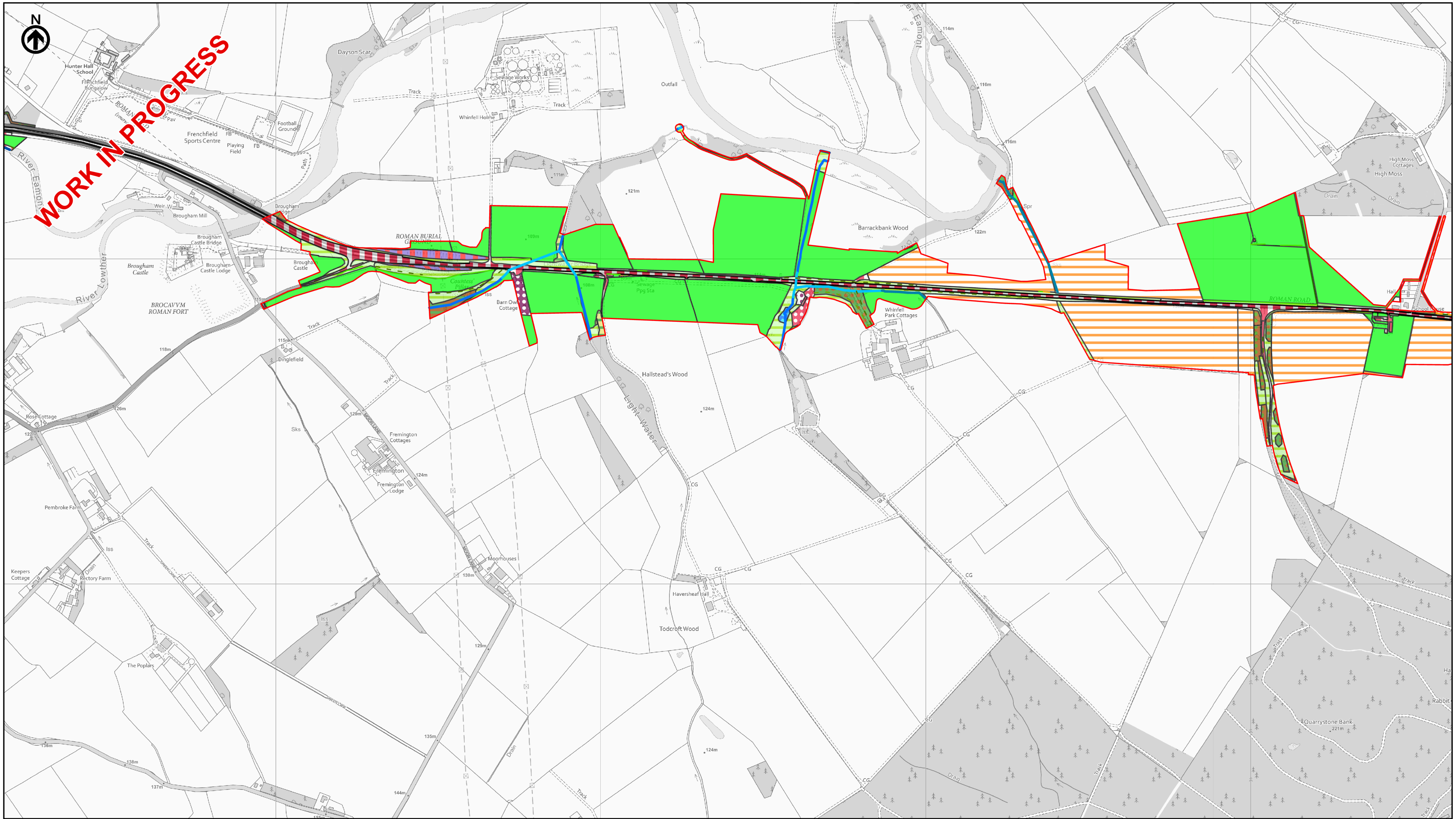
Project Name
A66 Northern Trans-Pennine Project

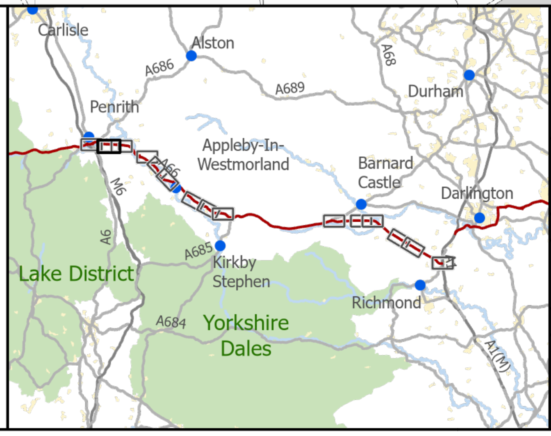
Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 0102, M6 Junction 40 to Kemplay Bank
Sheet 1 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003656

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01





Legend		
Existing A66	Baseline Habitats	Woodland and Forest - Wet Woodland
Order Limits	Cropland - Cereal Crops	Woodland and Forest - Lowland Mixed Deciduous Woodland
Hedgerows	Cropland - Non-Cereal Crops	Woodland and Forest - Other Woodland; Broadleaved
Line of Trees	Grassland - Bracken	Woodland and Forest - Other Woodland; Mixed
Line of Trees (Ecologically Valuable)	Grassland - Other Neutral Grassland	Woodland and Forest - Other Coniferous Woodland
Native Hedgerow	Grassland - Modified Grassland	
Native Hedgerow with trees	Heathland and Shrub - Mixed Scrub	
Native Species Rich Hedgerow	Heathland and Shrub - Gorse Scrub	
Native Species Rich Hedgerow with trees	Heathland and Shrub - Hawthorn Scrub	
Rivers	Lakes - Ponds (Non- Priority habitat)	
Priority Habitat	Urban - Developed Land; Sealed Surface	
Other Rivers and Streams	Urban - Vacant/Derelict Land/Bareground	
Ditches	Urban - Vegetated Garden	
Culverts	Urban - Artificial Unvegetated, Unsealed Surface	

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Revision	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 03, Penrith to Temple Sowerby
Sheet 2 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003657

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

N

Existing A66
Order Limits

Hedgerows
- Line of Trees
- Line of Trees (Ecologically Valuable)
- Native Hedgerow
- Native Hedgerow with trees
- Native Species Rich Hedgerow
- Native Species Rich Hedgerow with trees

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts

Baseline Habitats
- Cropland - Arable Field Margins Cultivated Annually
- Cropland - Cereal Crops
- Cropland - Non-Cereal Crops
- Grassland - Bracken
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Heathland and Shrub - Bramble Scrub
- Lakes - Ponds (Non- Priority habitat)
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Woodland and Forest - Wet Woodland
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland

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3 Piccadilly Place
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Revision	Created	Checked	Reviewed	Approved	Authorised
P01	First Issue				
	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 03, Penrith to Temple Sowerby
Sheet 3 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003658

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

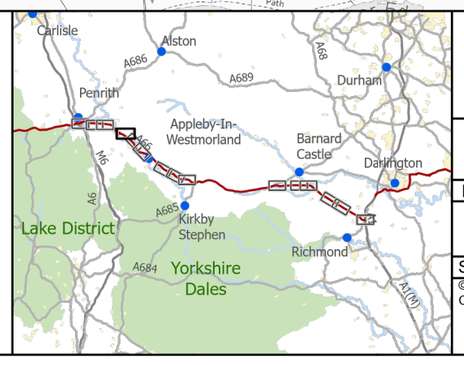
WORK IN PROGRESS

Existing A66
Order Limits

Hedgerows
Line of Trees
Line of Trees - Associated with bank or ditch
Native Hedgerow
Native Hedgerow with trees
Native Species Rich Hedgerow
Native Species Rich Hedgerow with trees

Rivers
Priority Habitat
Other Rivers and Streams
Ditches

Baseline Habitats
Cropland - Arable Field Margins Tussocky
Cropland - Cereal Crops
Cropland - Non-Cereal Crops
Wetland - Fens (Upland and Lowland)
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Heathland and Shrub - Mixed Scrub
Urban - Developed Land; Sealed Surface
Urban - Vacant/Derelict Land/Bareground
Urban - Artificial Unvegetated, Unsealed Surface
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Other Woodland; Mixed
Woodland and Forest - Other Coniferous Woodland



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3 Piccadilly Place
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Revision	First Issue				
	KBIG	MNEL	PKEL	AMIT	KWHA
P01	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
	Created	Checked	Reviewed	Approved	Authorised

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 0405, Temple Sowerby to Appleby
Sheet 4 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003659

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

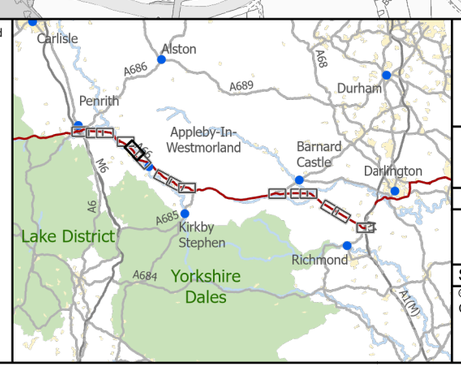
WORK IN PROGRESS

Existing A66
Order Limits

Hedgerows
- Line of Trees
- Line of Trees (Ecologically Valuable)
- Line of Trees (Ecologically Valuable) - with Bank or Ditch
- Line of Trees - Associated with bank or ditch
- Native Hedgerow
- Native Hedgerow with trees
- Native Hedgerow with trees - Associated with bank or ditch
- Native Species Rich Hedgerow
- Native Species Rich Hedgerow with trees
- Native Species Rich Hedgerow with trees - Associated with bank or ditch

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts

Baseline Habitats
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops
- Cropland - Non-Cereal Crops
- Wetland - Fens (Upland and Lowland)
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Heathland and Shrub - Hawthorn Scrub
- Urban - Developed Land; Sealed Surface
- Urban - Vacant/Derelict Land/Bareground
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Wet Woodland
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Scot's Pine Woodland
- Woodland and Forest - Other Coniferous Woodland



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3 Piccadilly Place
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Revision	First Issue				
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P01	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
	Created	Checked	Reviewed	Approved	Authorised

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 0405, Temple Sowerby to Appleby
Sheet 5 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003660

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

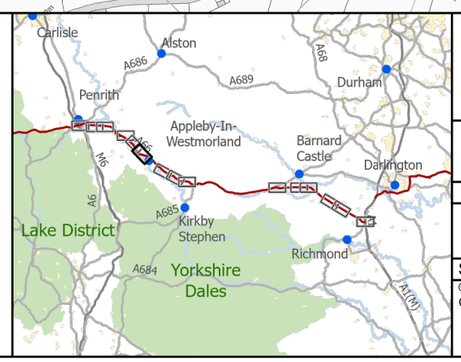
WORK IN PROGRESS

Existing A66
Order Limits

Hedgerows
- Line of Trees
- Line of Trees - Associated with bank or ditch
- Native Hedgerow
- Native Hedgerow with trees
- Native Species Rich Hedgerow
- Native Species Rich Hedgerow with trees

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts

Baseline Habitats
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops
- Cropland - Non-Cereal Crops
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Urban - Developed Land; Sealed Surface
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Upland Mixed Ashwoods
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Scot's Pine Woodland



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3 Piccadilly Place
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	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 0405, Temple Sowerby to Appleby
Sheet 6 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003661

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

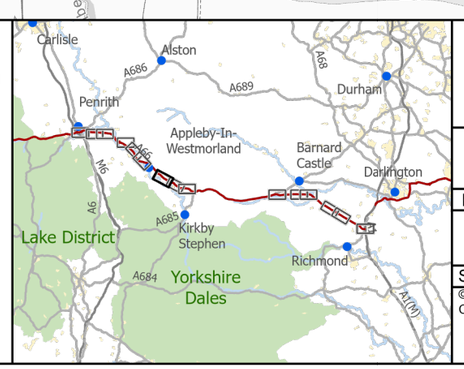
WORK IN PROGRESS

- Existing A66
- Order Limits

Hedgerows
- Hedge Ornamental Non Native
- Line of Trees
- Native Hedgerow
- Native Hedgerow - Associated with bank or ditch
- Native Hedgerow with trees
- Native Species Rich Hedgerow

Rivers
- Priority Habitat
- Ditches
- Culverts

Baseline Habitats
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops Winter Stubble
- Cropland - Cereal Crops
- Wetland - Purple Moor Grass and Rush Pastures
- Wetland - Fens (Upland and Lowland)
- Grassland - Other Lowland Acid Grassland
- Grassland - Bracken
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Heathland and Shrub - Bramble Scrub
- Heathland and Shrub - Upland Heathland
- Lakes - Ponds (Non- Priority habitat)
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Woodland and Forest - Wet Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland



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3 Piccadilly Place
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Revision	First Issue				
	KBIG	MNEL	PKEL	AMIT	KWHA
P01	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
	Created	Checked	Reviewed	Approved	Authorised

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 06, Appleby to Brough
Sheet 7 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003662

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

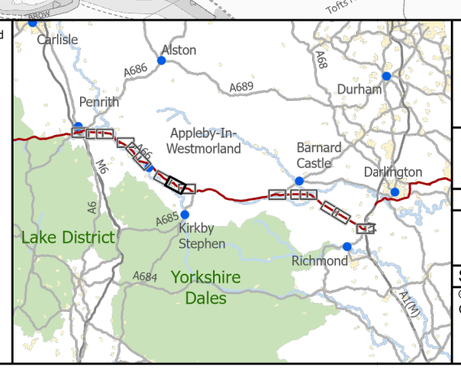
WORK IN PROGRESS

- Existing A66
- Order Limits

Hedgerows
- Hedge Ornamental Non Native
- Line of Trees
- Line of Trees - Associated with bank or ditch
- Native Hedgerow
- Native Hedgerow with trees
- Native Hedgerow with trees - Associated with bank or ditch
- Native Species Rich Hedgerow
- Native Species Rich Hedgerow with trees

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts

Baseline Habitats
- Cropland - Cereal Crops
- Cropland - Intensive Orchards
- Wetland - Purple Moor Grass and Rush Pastures
- Wetland - Fens (Upland and Lowland)
- Grassland - Other Lowland Acid Grassland
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Heathland and Shrub - Bramble Scrub
- Lakes - Sustainable Urban Drainage Feature
- Lakes - Ponds (Non- Priority habitat)
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Wet Woodland
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland



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3 Piccadilly Place
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	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 06, Appleby to Brough
Sheet 8 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003663

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

N

Existing A66
Order Limits

Hedgerows
- Line of Trees
- Native Hedgerow
- Native Hedgerow with trees
- Native Hedgerow with trees - Associated with bank or ditch
- Native Species Rich Hedgerow
- Native Species Rich Hedgerow with trees

Rivers
- Priority Habitat
- Ditches
- Culverts

Baseline Habitats
- Cropland - Temporary Grass and Clover Leys
- Wetland - Purple Moor Grass and Rush Pastures
- Wetland - Fens (Upland and Lowland)
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Rhododendron Scrub
- Lakes - Ponds (Non- Priority habitat)
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland

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3 Piccadilly Place
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Revision	Created	Checked	Reviewed	Approved	Authorised
P01 First Issue	KBIG 22/11/22	MNEL 22/11/22	PKEL 23/11/22	AMIT 23/11/22	KWHA 23/11/22

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 06, Appleby to Brough
Sheet 9 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003664

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

N

Existing A66
Order Limits

Hedgerows
- Line of Trees
- Line of Trees - Associated with bank or ditch
- Native Hedgerow
- Native Hedgerow - Associated with bank or ditch
- Native Hedgerow with trees
- Native Hedgerow with trees - Associated with bank or ditch
- Native Species Rich Hedgerow
- Native Species Rich Hedgerow with trees
- Native Species Rich Hedgerow with trees - Associated with bank or ditch

Rivers
- Other Rivers and Streams
- Ditches
- Culverts

Baseline Habitats
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Lakes - Ponds (Non- Priority habitat)
- Urban - Open Mosaic Habitats on Previously Developed Land
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Upland Mixed Ashwoods
- Woodland and Forest - Other Woodland; Mixed

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3 Piccadilly Place
Manchester
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Revision	Created	Checked	Reviewed	Approved	Authorised
P01 First Issue	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 07, Bowes Bypass
Sheet 10 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003665

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

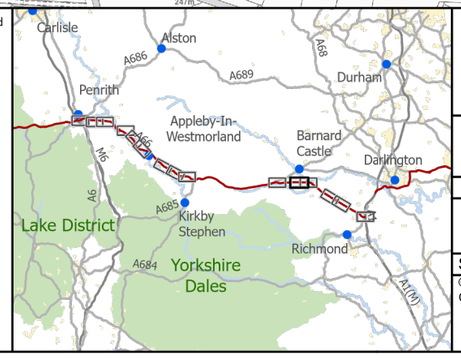
N

Existing A66
Order Limits

Hedgerows
- Line of Trees
- Native Hedgerow
- Native Hedgerow with trees
- Native Hedgerow with trees - Associated with bank or ditch
- Native Species Rich Hedgerow
- Native Species Rich Hedgerow - Associated with bank or ditch
- Native Species Rich Hedgerow with trees
- Native Species Rich Hedgerow with trees - Associated with bank or ditch

Rivers
- Other Rivers and Streams
- Ditches
- Culverts

Baseline Habitats
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops
- Cropland - Intensive Orchards
- Cropland - Horticulture
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Lakes - Ponds (Non- Priority habitat)
- Urban - Developed Land; Sealed Surface
- Urban - Vacant/Derelict Land/Bareground
- Urban - Other Green Roof
- Urban - Vegetated Garden
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Upland Mixed Ashwoods
- Woodland and Forest - Other Woodland; Mixed



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3 Piccadilly Place
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	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

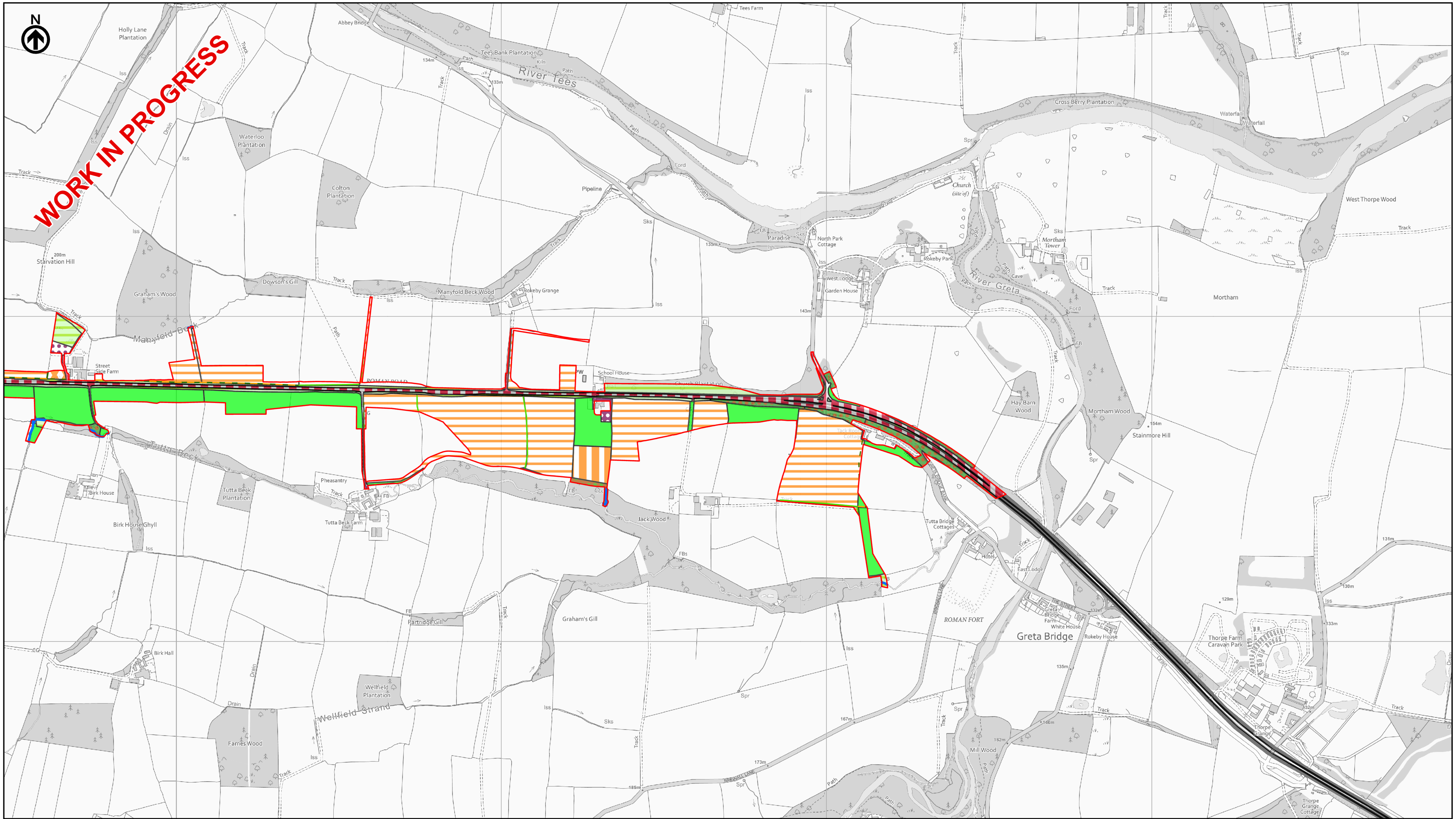
Project Name
A66 Northern Trans-Pennine Project

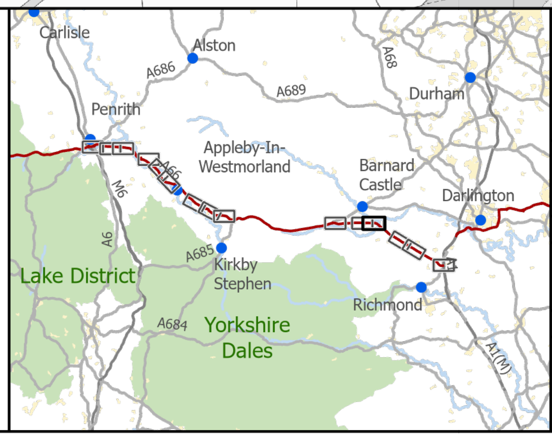
Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 08, Cross Lanes to Rokeby
Sheet 11 of 15

Map Number

Project	Originator	Volume			
HE565627	- AMY	- EBD	- S00	- MP	- LB - 003666
			Location	Type	Role Number

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01





Existing A66
Order Limits
Hedgerows
Line of Trees
Native Hedgerow
Native Hedgerow with trees - Associated with bank or ditch
Native Species Rich Hedgerow
Native Species Rich Hedgerow with trees
Rivers
Other Rivers and Streams

Baseline Habitats
Cropland - Temporary Grass and Clover Leys
Cropland - Cereal Crops
Cropland - Intensive Orchards
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Urban - Developed Land; Sealed Surface
Urban - Vacant/Derelict Land/Bareground
Urban - Vegetated Garden
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Wood-Pasture and Parkland
Woodland and Forest - Other Woodland; Mixed

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3 Piccadilly Place
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	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 08, Cross Lanes to Rokeby
Sheet 12 of 15

Map Number

Project	Originator	Volume
HE565627 -	AMY -	EBD -

Location	Type	Role	Number
S00 -	MP -	LB -	003669

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

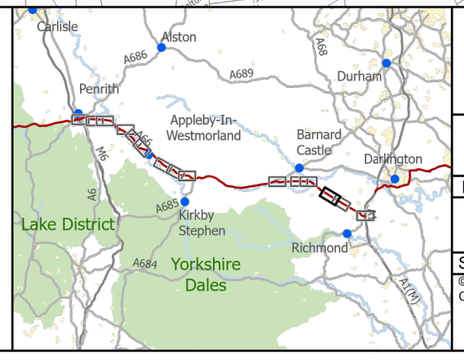
N

Existing A66
Order Limits

Hedgerows
Line of Trees
Native Hedgerow
Native Hedgerow with trees
Native Species Rich Hedgerow
Native Species Rich Hedgerow - Associated with bank or ditch
Native Species Rich Hedgerow with trees

Rivers
Other Rivers and Streams
Ditches
Culverts

Baseline Habitats
Cropland - Temporary Grass and Clover Leys
Cropland - Cereal Crops Winter Stubble
Cropland - Cereal Crops
Cropland - Non-Cereal Crops
Wetland - Fens (Upland and Lowland)
Grassland - Other Lowland Acid Grassland
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Heathland and Shrub - Blackthorn Scrub
Heathland and Shrub - Mixed Scrub
Urban - Developed Land; Sealed Surface
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Other Woodland; Mixed
Woodland and Forest - Other Coniferous Woodland



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3 Piccadilly Place
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	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

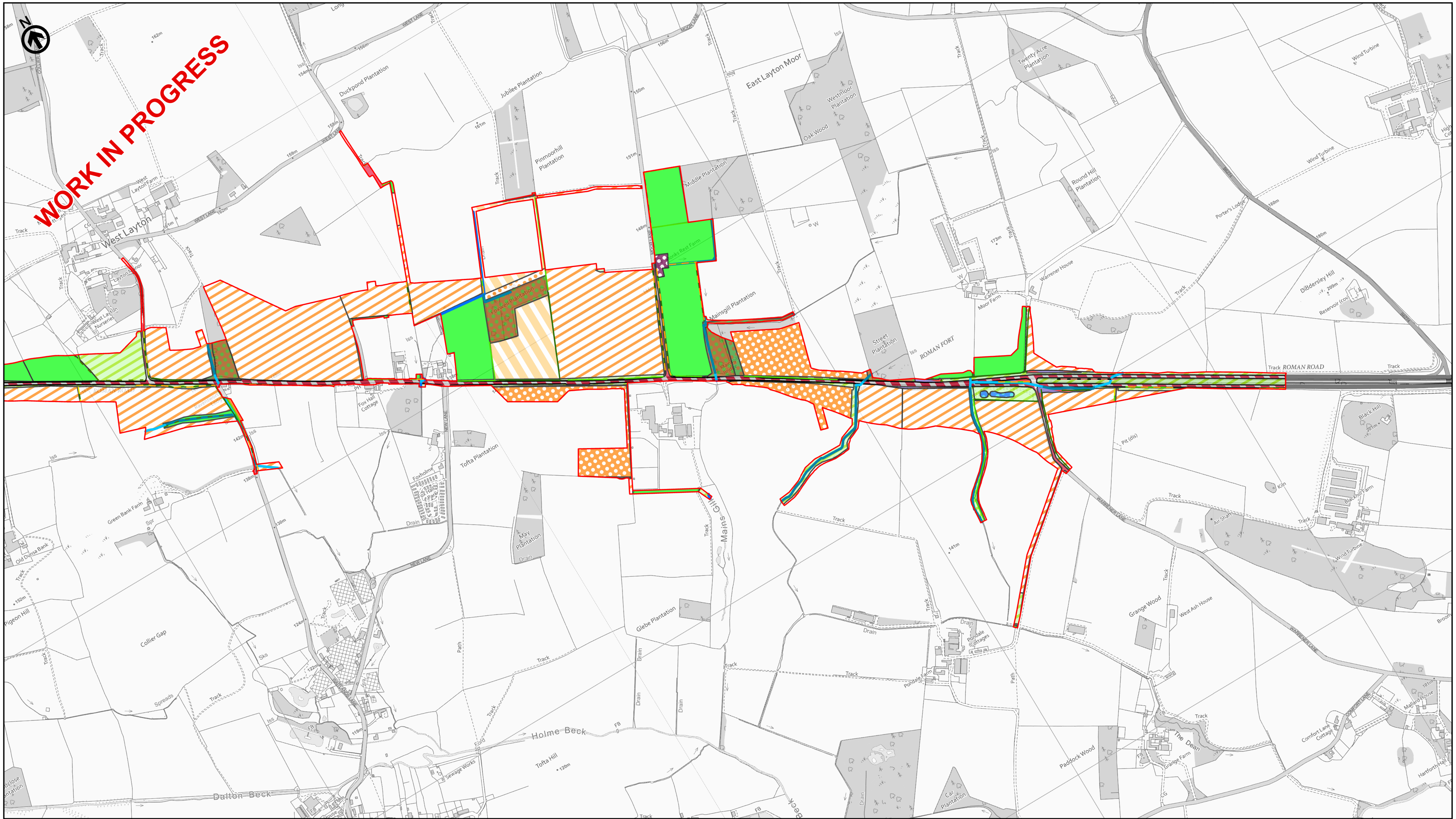
Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 09, Stephen Bank to Carkin Moor
Sheet 13 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003667

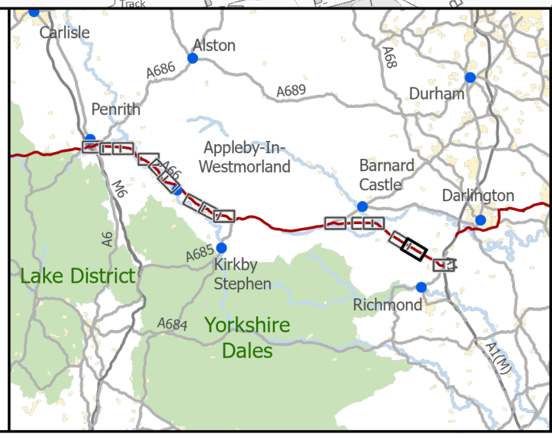
Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01



Existing A66	
Order Limits	
Hedgerows	
Hedge Ornamental Non Native	
Line of Trees	
Native Hedgerow	
Native Hedgerow - Associated with bank or ditch	
Native Hedgerow with trees	
Native Species Rich Hedgerow	
Native Species Rich Hedgerow - Associated with bank or ditch	
Native Species Rich Hedgerow with trees	
Rivers	
Other Rivers and Streams	
Ditches	
Culverts	

Baseline Habitats

- Cropland - Arable Field Margins Pollen & Nectar
- Cropland - Arable Field Margins Tussocky
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops Winter Stubble
- Cropland - Cereal Crops
- Cropland - Non-Cereal Crops
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Lakes - Ponds (Non- Priority habitat)
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland



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3 Piccadilly Place
Manchester
M1 3BN

Revision	Created	Checked	Reviewed	Approved	Authorised
P01	First Issue KBIG 22/11/22	MNEL 22/11/22	PKEL 23/11/22	AMIT 23/11/22	KWHA 23/11/22

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 09, Stephen Bank to Carkin Moor
Sheet 14 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003668

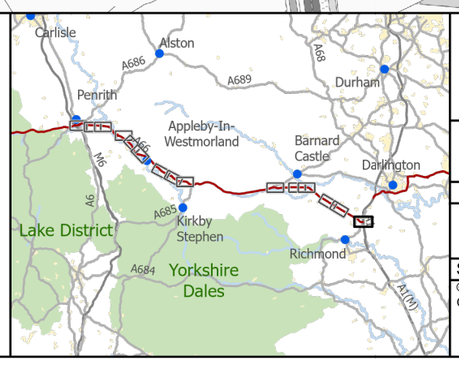
Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

N

Existing A66
Order Limits

Baseline Habitats
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Urban - Developed Land; Sealed Surface
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed



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3 Piccadilly Place
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Revision	Created	Checked	Reviewed	Approved	Authorised
P01 First Issue	KBIG 22/11/22	MNEL 22/11/22	PKEL 23/11/22	AMIT 23/11/22	KWHA 23/11/22

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

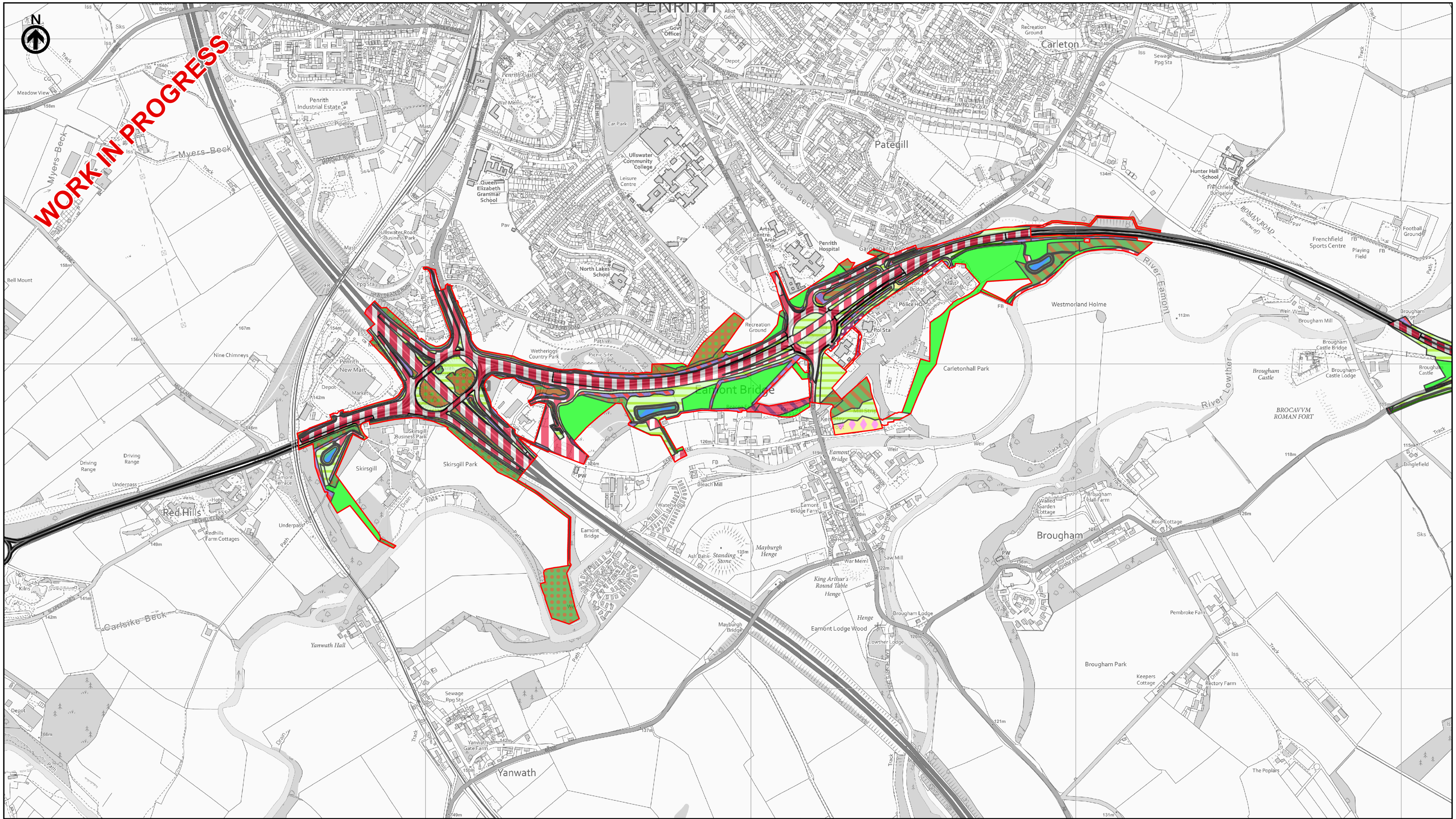
Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 1
Baseline Habitats (Nov 2022)
Scheme: 11, A1(M) Junction 53 Scotch Corner
Sheet 15 of 15

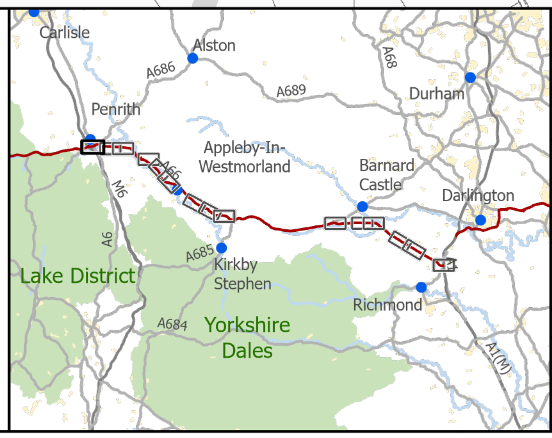
Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003670

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01



Legend	
Existing A66	Post Construction Habitats
Order Limits	Wetland - Purple Moor Grass and Rush Pastures
Hedgerow	Grassland - Other Neutral Grassland
Native Species Rich Hedgerow	Grassland - Modified Grassland
Rivers	Heathland and Shrub - Blackthorn Scrub
Priority Habitat	Heathland and Shrub - Mixed Scrub
Other Rivers and Streams	Heathland and Shrub - Bramble Scrub
Ditches	Heathland and Shrub - Hawthorn Scrub
Culverts	Heathland and Shrub - Hazel Scrub
Canals	Lakes - Ornamental Lake or Pond
	Lakes - Sustainable Urban Drainage Feature
	Ponds (Priority Habitat)
	Urban - Open Mosaic Habitats on Previously Developed Land
	Urban - Developed Land; Sealed Surface
	Urban - Vegetated Garden
	Woodland and Forest - Lowland Beech and Yew Woodland
	Woodland and Forest - Wet Woodland
	Woodland and Forest - Lowland Mixed Deciduous Woodland
	Woodland and Forest - Other Woodland; Broadleaved
	Woodland and Forest - Other Woodland; Mixed
	Woodland and Forest - Other Scot's Pine Woodland
	Woodland and Forest - Other Coniferous Woodland



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Revision	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

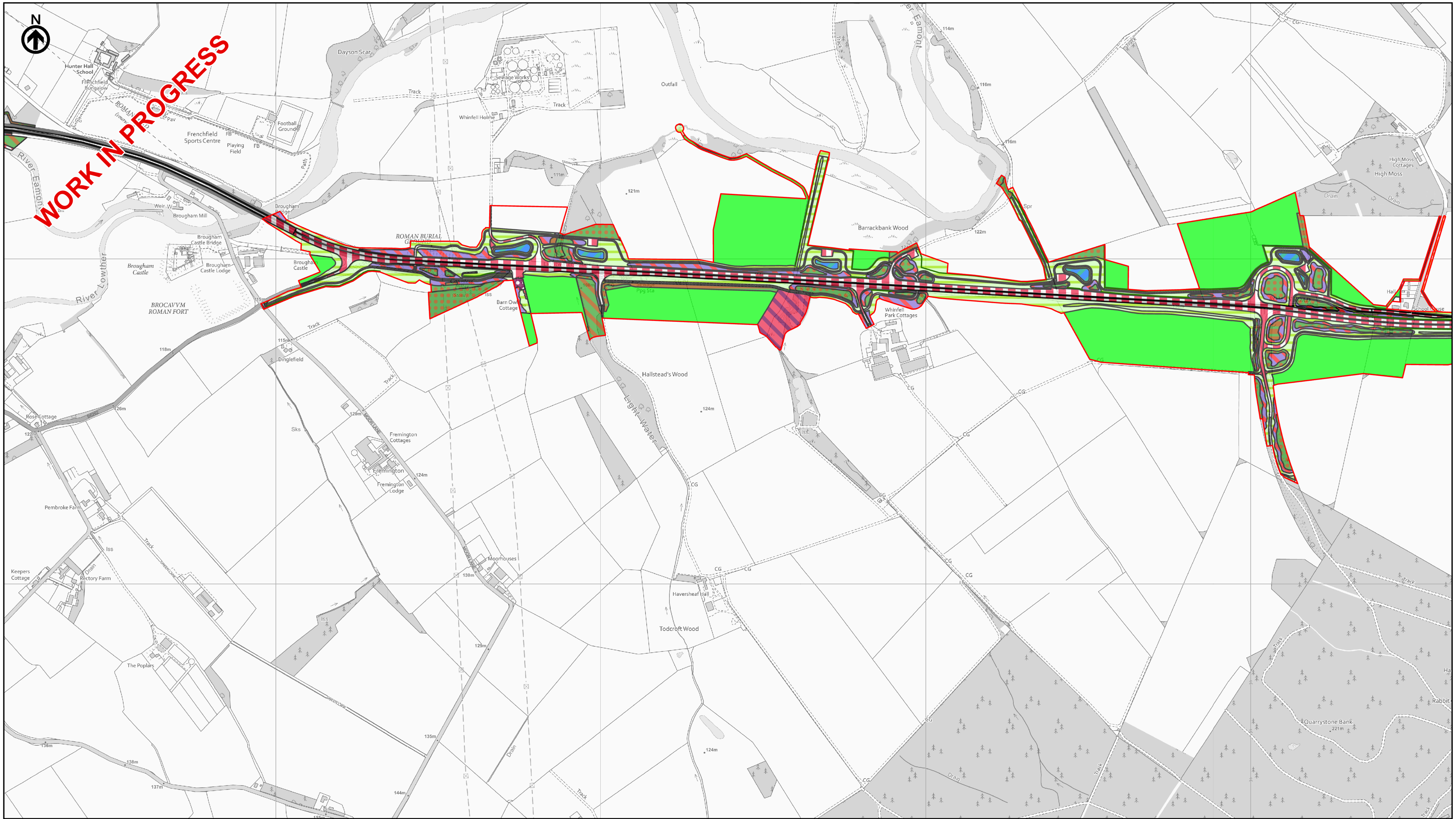
Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 0102, M6 Junction 40 to Kemplay Bank
Sheet 1 of 15

Map Number

Project	Originator	Volume
HE565627	AMY	EBD

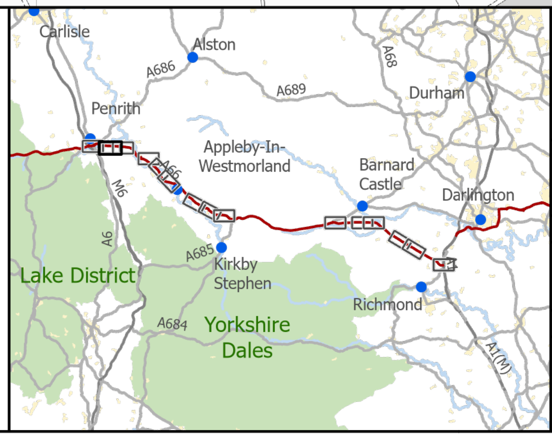
Location	Type	Role	Number
S00	MP	LB	003671

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01



- Existing A66
- Order Limits
- Hedgerow
  - Native Species Rich Hedgerow
- Rivers
  - Priority Habitat
  - Other Rivers and Streams
  - Ditches
  - Culverts
  - Canals

Post Construction Habitats
- Cropland - Cereal Crops
- Cropland - Non-Cereal Crops
- Grassland - Bracken
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Lakes - Sustainable Urban Drainage Feature
- Urban - Open Mosaic Habitats on Previously Developed Land
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Woodland and Forest - Wet Woodland
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland



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Revision	Created	Checked	Reviewed	Approved	Authorised
P01	First Issue				
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	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 03, Penrith to Temple Sowerby
Sheet 2 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003672

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

N

Existing A66
Order Limits
Hedgerow
Native Species Rich Hedgerow
Rivers
Priority Habitat
Other Rivers and Streams
Ditches
Culverts
Canals

Post Construction Habitats
Cropland - Arable Field Margins Cultivated Annually
Cropland - Cereal Crops
Cropland - Non-Cereal Crops
Grassland - Bracken
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Heathland and Shrub - Mixed Scrub
Lakes - Sustainable Urban Drainage Feature
Lakes - Ponds (Priority habitat)
Urban - Developed Land; Sealed Surface
Urban - Vegetated Garden
Woodland and Forest - Wet Woodland
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Other Woodland; Mixed
Woodland and Forest - Other Coniferous Woodland

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Revision	First Issue				
	KBIG	MNEL	PKEL	AMIT	KWHA
P01	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 03, Penrith to Temple Sowerby
Sheet 3 of 15

Map Number

Project	Originator	Volume			
HE565627	AMY	EBD	S00	MP	LB - 003673
Location			Type	Role	Number

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

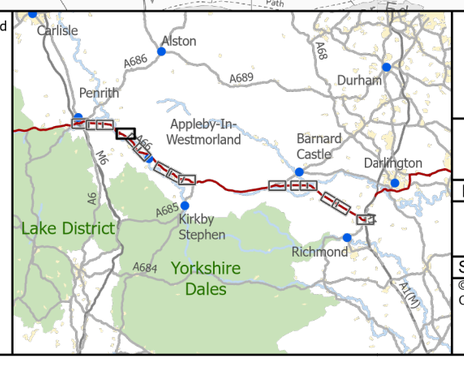
N

Existing A66
Order Limits

Hedgerow
Native Species Rich Hedgerow

Rivers
Priority Habitat
Other Rivers and Streams
Ditches
Culverts
Canals

Post Construction Habitats
Cropland - Arable Field Margins Tussocky
Cropland - Cereal Crops
Cropland - Non-Cereal Crops
Wetland - Fens (Upland and Lowland)
Grassland - Other Lowland Acid Grassland
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Heathland and Shrub - Mixed Scrub
Urban - Developed Land; Sealed Surface
Urban - Vacant/Derelict Land/Bareground
Urban - Artificial Unvegetated, Unsealed Surface
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Other Woodland; Mixed
Woodland and Forest - Other Coniferous Woodland



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	First Issue				
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	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 0405, Temple Sowerby to Appleby
Sheet 4 of 15

Map Number

Project	Originator	Volume			
HE565627	AMY	EBD			
S00		MP	LB	003674	
Location		Type	Role	Number	

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

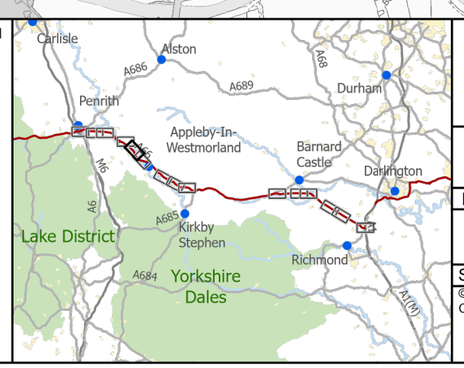
WORK IN PROGRESS

- Existing A66
- Order Limits

Hedgerow
- Native Species Rich Hedgerow

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts
- Canals

Post Construction Habitats
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops
- Cropland - Non-Cereal Crops
- Wetland - Fens (Upland and Lowland)
- Grassland - Other Lowland Acid Grassland
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Heathland and Shrub - Hawthorn Scrub
- Urban - Developed Land; Sealed Surface
- Urban - Vacant/Derelict Land/Bareground
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Wet Woodland
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Scot's Pine Woodland
- Woodland and Forest - Other Coniferous Woodland



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Revision	First Issue				
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P01	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 0405, Temple Sowerby to Appleby
Sheet 5 of 15

Map Number

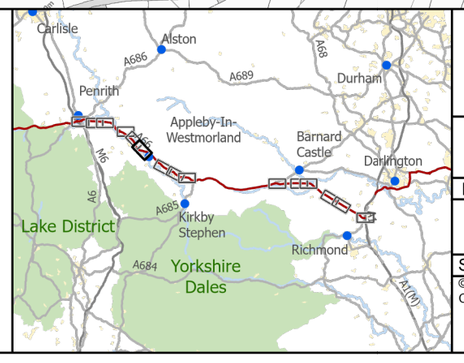
Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003675

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

Existing A66
Order Limits
Hedgerow
Native Species Rich Hedgerow
Rivers
Priority Habitat
Other Rivers and Streams
Ditches
Culverts
Canals

Post Construction Habitats
Cropland - Temporary Grass and Clover Leys
Cropland - Cereal Crops
Cropland - Non-Cereal Crops
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Heathland and Shrub - Mixed Scrub
Urban - Developed Land; Sealed Surface
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Upland Mixed Ashwoods
Woodland and Forest - Other Woodland; Mixed
Woodland and Forest - Other Scot's Pine Woodland



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Revision	Created	Checked	Reviewed	Approved	Authorised
P01 First Issue	KBIG 22/11/22	MNEL 22/11/22	PKEL 23/11/22	AMIT 23/11/22	KWHA 23/11/22

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 0405, Temple Sowerby to Appleby
Sheet 6 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003676

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

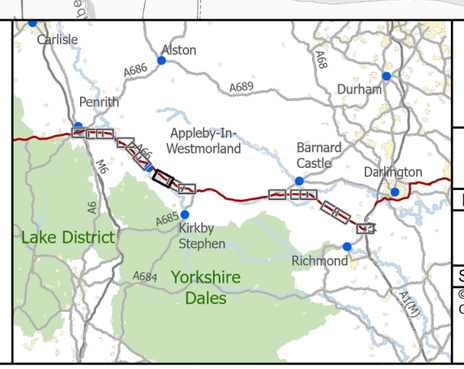
WORK IN PROGRESS

Existing A66
Order Limits

Hedgerow
Native Species Rich Hedgerow

Rivers
Priority Habitat
Other Rivers and Streams
Ditches
Culverts
Canals

Post Construction Habitats
Cropland - Temporary Grass and Clover Leys
Cropland - Cereal Crops Winter Stubble
Cropland - Cereal Crops
Wetland - Purple Moor Grass and Rush Pastures
Wetland - Fens (Upland and Lowland)
Grassland - Other Lowland Acid Grassland
Grassland - Bracken
Grassland - Other Neutral Grassland
Grassland - Upland Acid Grassland
Grassland - Modified Grassland
Heathland and Shrub - Mixed Scrub
Heathland and Shrub - Bramble Scrub
Heathland and Shrub - Upland Heathland
Ponds (Priority Habitat)
Lakes - Ponds (Priority habitat)
Urban - Developed Land; Sealed Surface
Urban - Vegetated Garden
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Other Woodland; Mixed
Woodland and Forest - Other Coniferous Woodland



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Revision	First Issue				
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P01	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 06, Appleby to Brough
Sheet 7 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003677

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

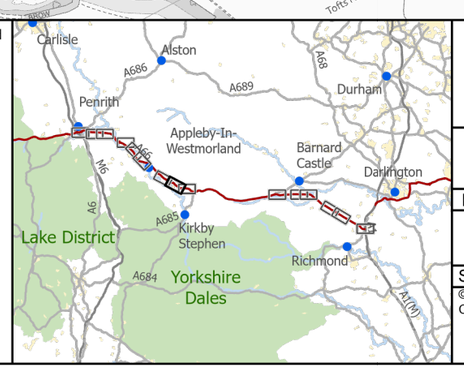
WORK IN PROGRESS

- Existing A66
- Order Limits

Hedgerow
- Native Species Rich Hedgerow

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts
- Canals

Post Construction Habitats
- Cropland - Cereal Crops
- Wetland - Purple Moor Grass and Rush Pastures
- Wetland - Fens (Upland and Lowland)
- Grassland - Other Lowland Acid Grassland
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Heathland and Shrub - Bramble Scrub
- Ponds (Priority Habitat)
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Wet Woodland
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland



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	First Issue				
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Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 06, Appleby to Brough
Sheet 8 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003678

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

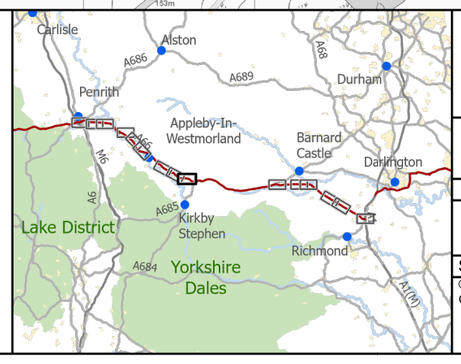
N

Existing A66
Order Limits

Hedgerow
Native Species Rich Hedgerow

Rivers
Priority Habitat
Other Rivers and Streams
Ditches
Culverts
Canals

Post Construction Habitats
Cropland - Temporary Grass and Clover Leys
Wetland - Purple Moor Grass and Rush Pastures
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Heathland and Shrub - Mixed Scrub
Urban - Developed Land; Sealed Surface
Urban - Vegetated Garden
Urban - Artificial Unvegetated, Unsealed Surface
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Other Woodland; Mixed
Woodland and Forest - Other Coniferous Woodland



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	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
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Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

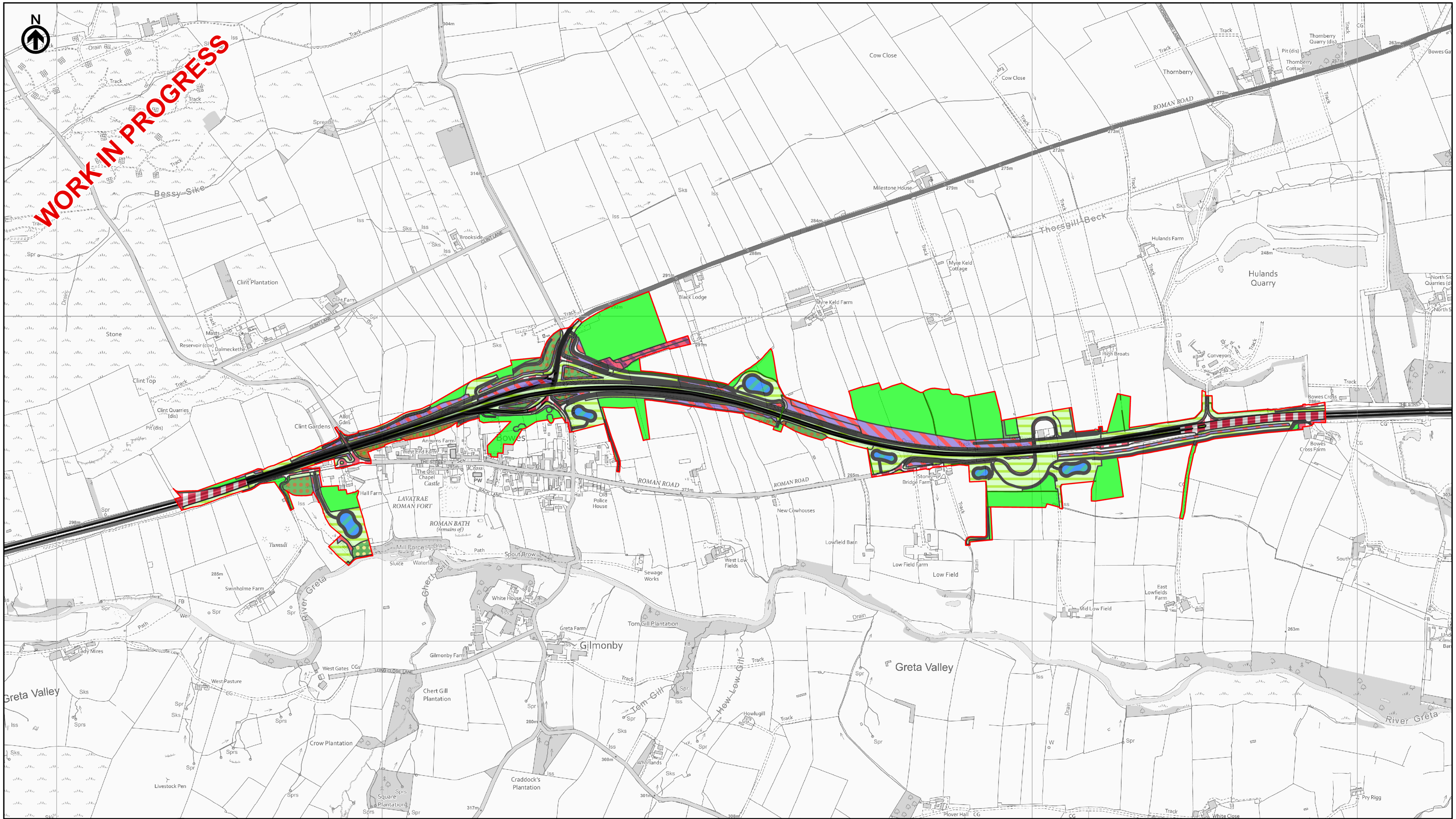
Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 06, Appleby to Brough
Sheet 9 of 15

Map Number

Project	Originator	Volume
HE565627 - S00	AMY -	EBD - MP - LB - 003679
Location	Type | Role | Number	

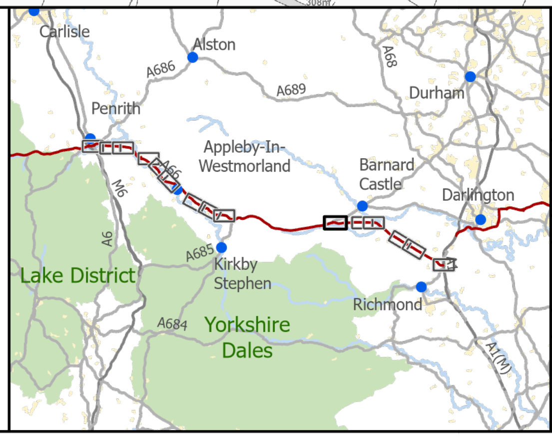
Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01



Legend	
Existing A66	
Order Limits	
Hedgerow	
Native Species Rich Hedgerow	
Rivers	
Priority Habitat	
Other Rivers and Streams	
Ditches	
Culverts	
Canals	

Post Construction Habitats

- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Lakes - Sustainable Urban Drainage Feature
- Urban - Open Mosaic Habitats on Previously Developed Land
- Urban - Developed Land; Sealed Surface
- Urban - Vegetated Garden
- Urban - Artificial Unvegetated, Unsealed Surface
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Upland Mixed Ashwoods
- Woodland and Forest - Other Woodland; Mixed



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Revision	First Issue				
P01	KBIG 22/11/22	MNEL 22/11/22	PKEL 23/11/22	AMIT 23/11/22	KWHA 23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

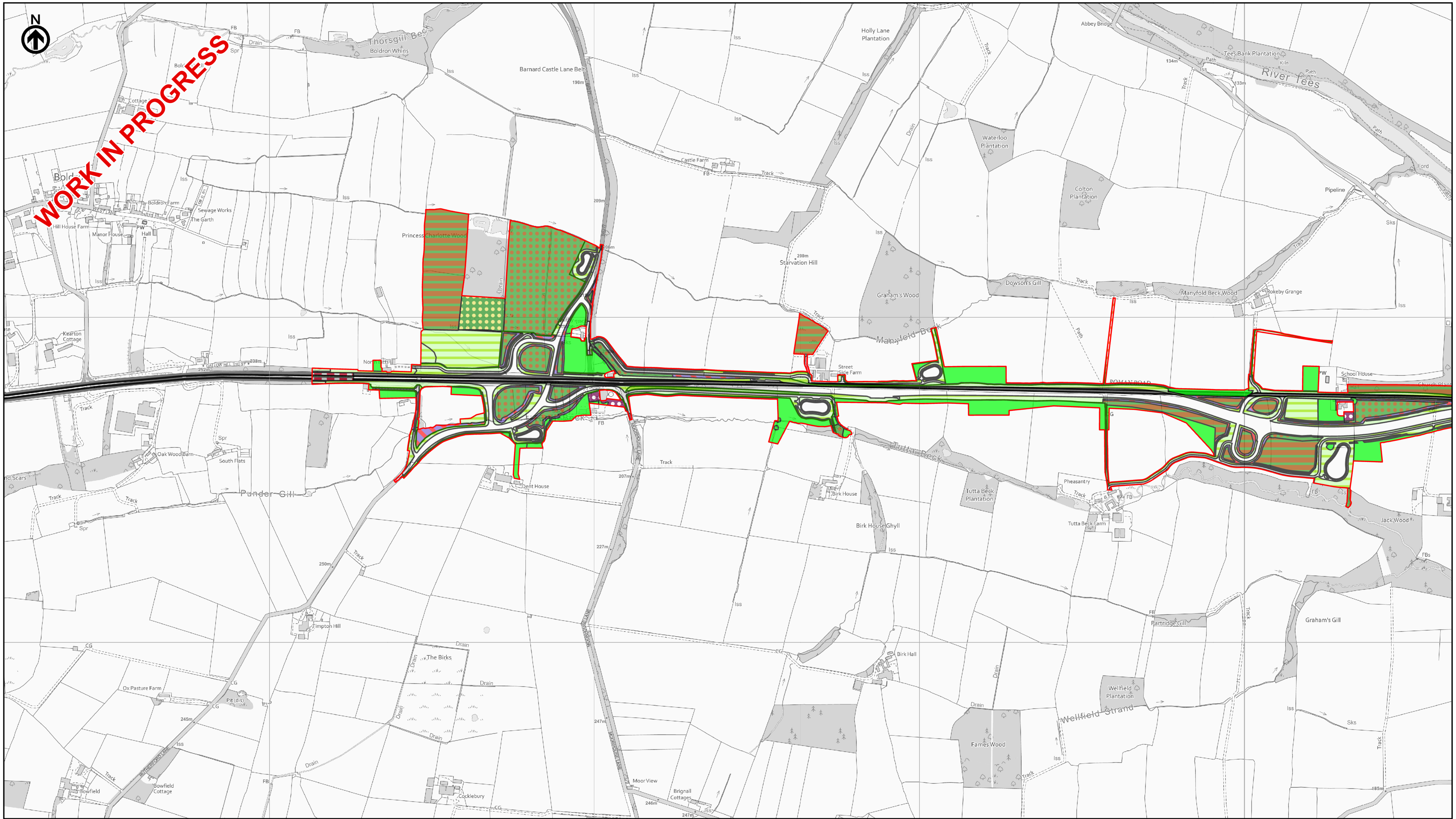
Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 07, Bowes Bypass
Sheet 10 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003680

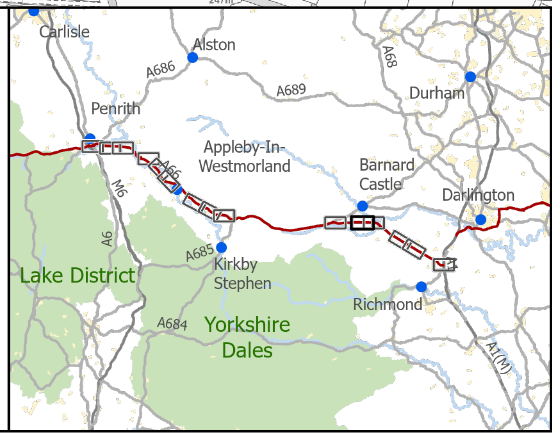
Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01



Existing A66	
Order Limits	
Hedgerow	
Native Species Rich Hedgerow	
Rivers	
Priority Habitat	
Other Rivers and Streams	
Ditches	
Culverts	
Canals	

Post Construction Habitats

- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops
- Cropland - Intensive Orchards
- Cropland - Horticulture
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Urban - Developed Land; Sealed Surface
- Urban - Vacant/Derelict Land/Bareground
- Urban - Other Green Roof
- Urban - Vegetated Garden
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Upland Mixed Ashwoods
- Woodland and Forest - Other Woodland; Mixed



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Revision	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
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Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

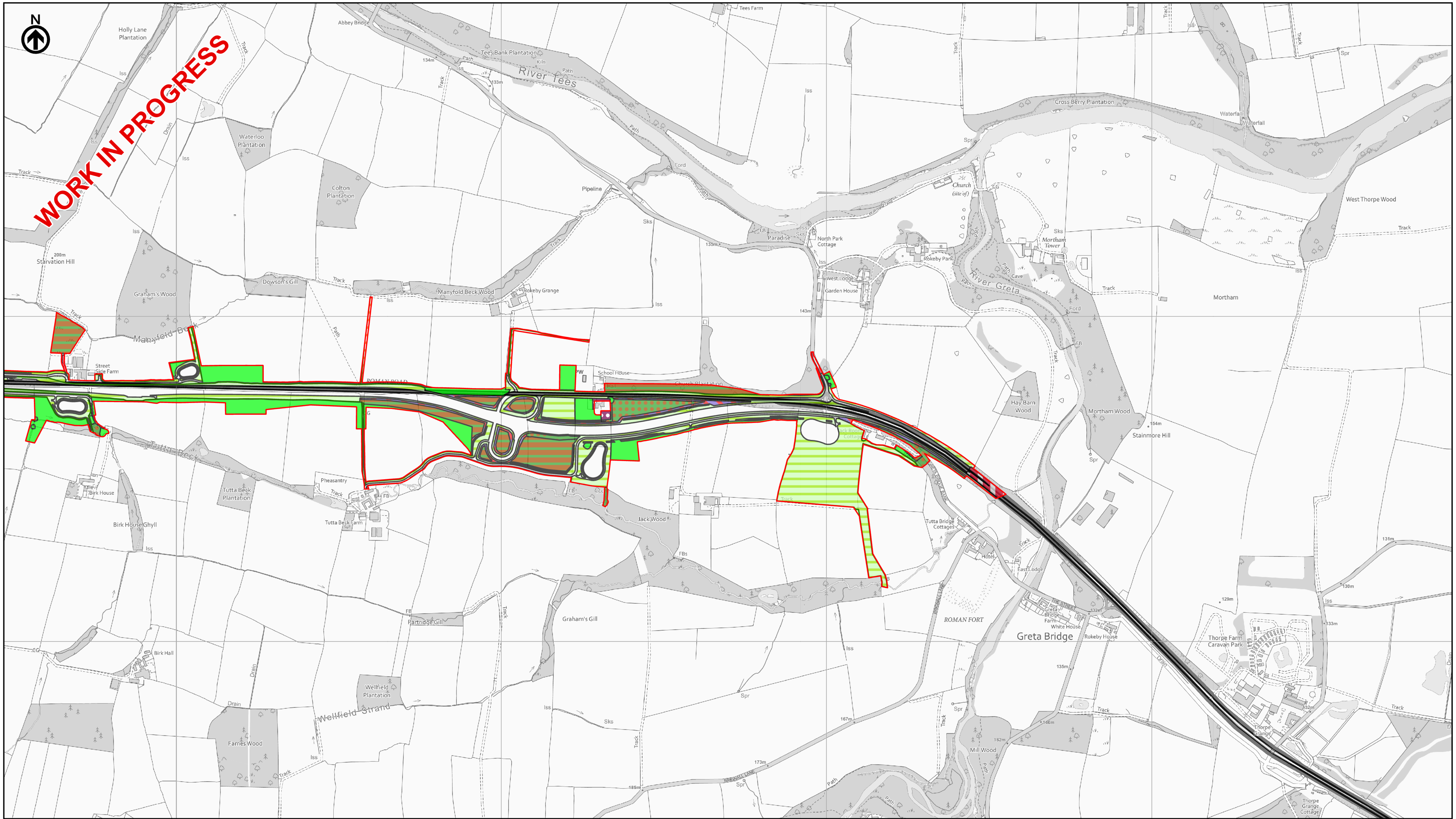
Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 08, Cross Lanes to Rokeby
Sheet 11 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003681

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

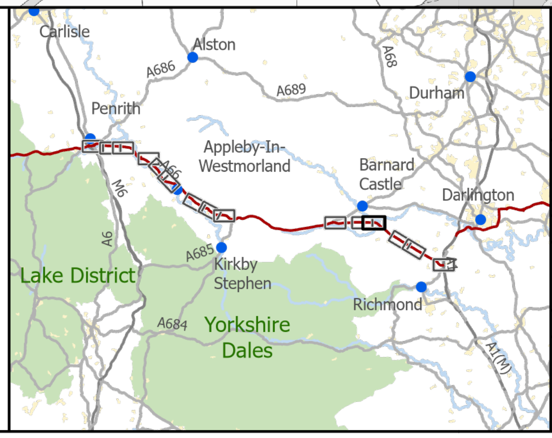


- Existing A66
- Order Limits

Hedgerow
- Native Species Rich Hedgerow

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts
- Canals

Post Construction Habitats
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops
- Cropland - Intensive Orchards
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Urban - Developed Land; Sealed Surface
- Urban - Vacant/Derelict Land/Bareground
- Urban - Vegetated Garden
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Wood-Pasture and Parkland
- Woodland and Forest - Other Woodland; Mixed



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3 Piccadilly Place
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Revision	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

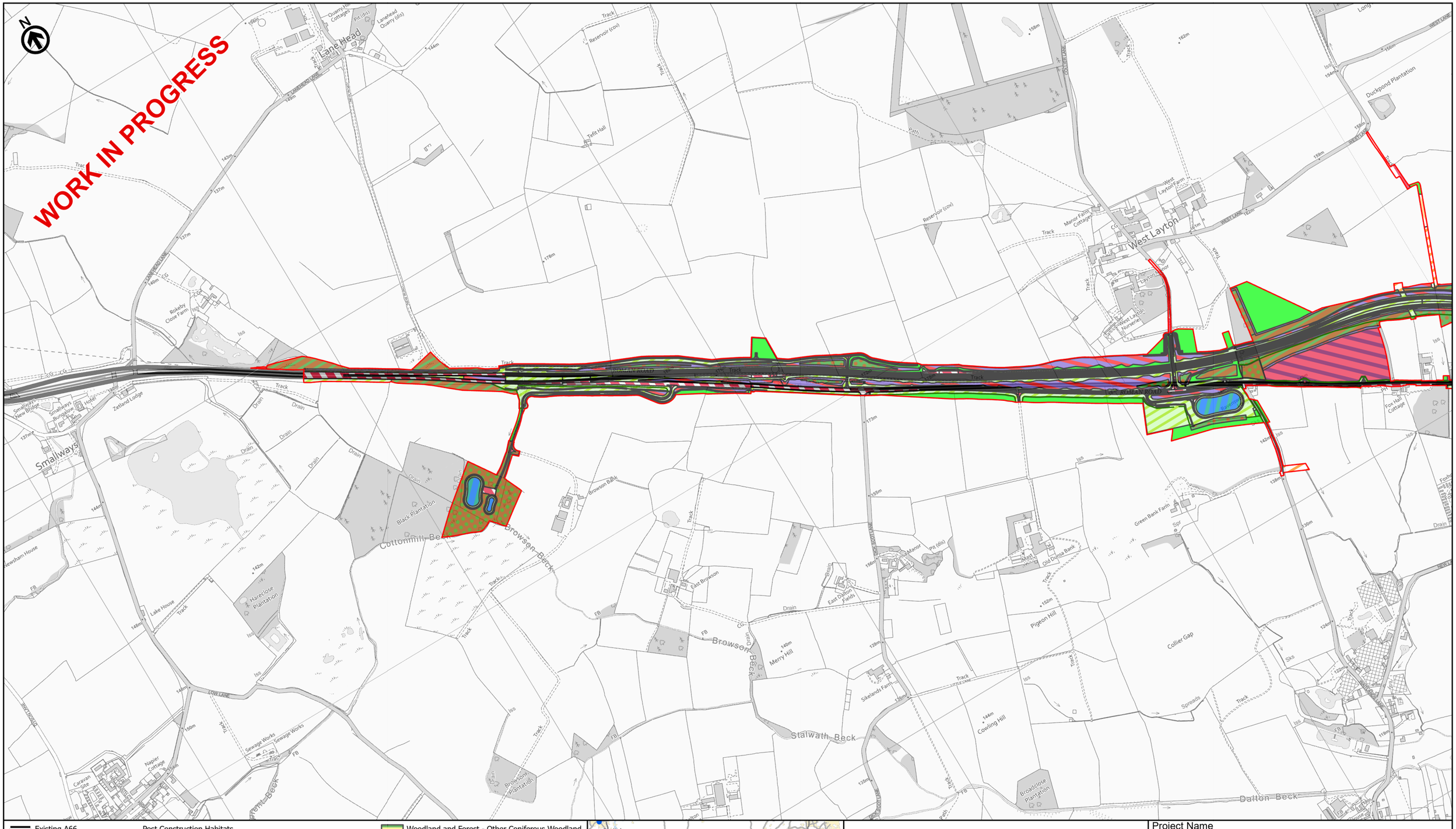
Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 08, Cross Lanes to Rokeby
Sheet 12 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003684

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

WORK IN PROGRESS

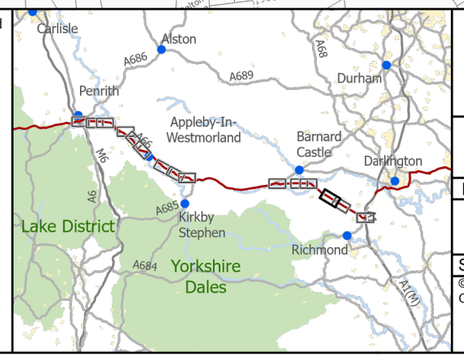


- Existing A66
- Order Limits

Hedgerow
- Native Species Rich Hedgerow

Rivers
- Priority Habitat
- Other Rivers and Streams
- Ditches
- Culverts
- Canals

Post Construction Habitats
- Cropland - Temporary Grass and Clover Leys
- Cropland - Cereal Crops Winter Stubble
- Cropland - Cereal Crops
- Cropland - Non-Cereal Crops
- Wetland - Fens (Upland and Lowland)
- Grassland - Other Neutral Grassland
- Grassland - Modified Grassland
- Heathland and Shrub - Mixed Scrub
- Lakes - Sustainable Urban Drainage Feature
- Urban - Open Mosaic Habitats on Previously Developed Land
- Urban - Developed Land; Sealed Surface
- Woodland and Forest - Lowland Mixed Deciduous Woodland
- Woodland and Forest - Other Woodland; Broadleaved
- Woodland and Forest - Other Woodland; Mixed
- Woodland and Forest - Other Coniferous Woodland



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	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22
Revision	Created	Checked	Reviewed	Approved	Authorised

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

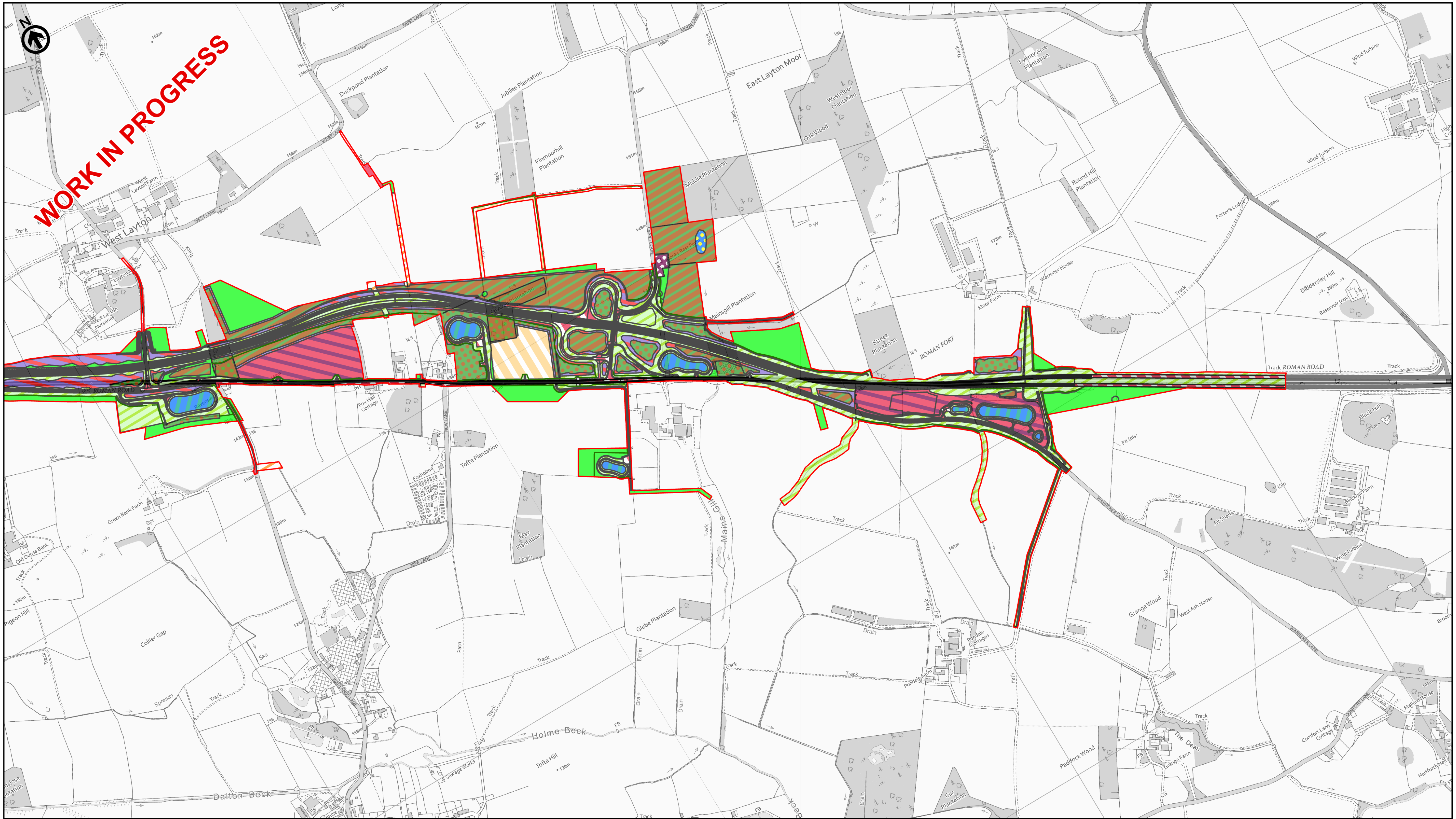
Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 09, Stephen Bank to Carkin Moor
Sheet 13 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003682

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01



Existing A66

Order Limits

Hedgerow

Native Species Rich Hedgerow

Rivers

Priority Habitat

Other Rivers and Streams

Ditches

Culverts

Canals

Post Construction Habitats

Cropland - Arable Field Margins Pollen & Nectar

Cropland - Arable Field Margins Tussocky

Cropland - Temporary Grass and Clover Leys

Cropland - Cereal Crops Winter Stubble

Cropland - Cereal Crops

Cropland - Non-Cereal Crops

Grassland - Other Neutral Grassland

Grassland - Modified Grassland

Heathland and Shrub - Mixed Scrub

Lakes - Sustainable Urban Drainage Feature

Lakes - Ponds (Priority habitat)

Urban - Open Mosaic Habitats on Previously Developed Land

Urban - Developed Land; Sealed Surface

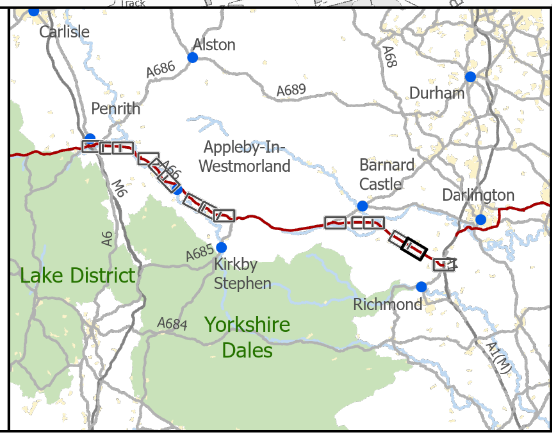
Urban - Vegetated Garden

Woodland and Forest - Lowland Mixed Deciduous Woodland

Woodland and Forest - Other Woodland; Broadleaved

Woodland and Forest - Other Woodland; Mixed

Woodland and Forest - Other Coniferous Woodland



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Revision	Created	Checked	Reviewed	Approved	Authorised
	First Issue				
P01	KBIG	MNEL	PKEL	AMIT	KWHA
	22/11/22	22/11/22	23/11/22	23/11/22	23/11/22

Kilometres
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Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 09, Stephen Bank to Carkin Moor
Sheet 14 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003683

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

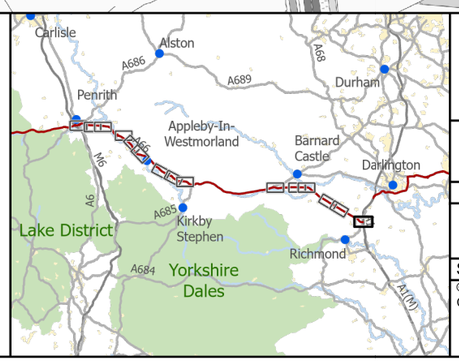
WORK IN PROGRESS

N

Existing A66
Order Limits

Rivers
Priority Habitat
Other Rivers and Streams
Ditches
Culverts
Canals

Post Construction Habitats
Grassland - Other Neutral Grassland
Grassland - Modified Grassland
Heathland and Shrub - Mixed Scrub
Urban - Developed Land; Sealed Surface
Woodland and Forest - Lowland Mixed Deciduous Woodland
Woodland and Forest - Other Woodland; Broadleaved
Woodland and Forest - Other Woodland; Mixed



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Revision	Created	Checked	Reviewed	Approved	Authorised
P01 First Issue	KBIG 22/11/22	MNEL 22/11/22	PKEL 23/11/22	AMIT 23/11/22	KWHA 23/11/22

Kilometres
0 0.25 0.5

Scale @ A3: 1:11,000 | Project Ref No HE565627 | Stage: Stage 3

Project Name
A66 Northern Trans-Pennine Project

Map Title
Figure 2
Post Construction Habitats (Nov 2022)
Scheme: 11, A1(M) Junction 53 Scotch Corner
Sheet 15 of 15

Map Number

Project	Originator	Volume	Location	Type	Role	Number
HE565627	AMY	EBD	S00	MP	LB	003685

Suitability	Suitability Description	Revision
S4	FIT FOR STAGE APPROVAL	P01

B Metric (provided as a separate Excel document)

C Landscape Code to Metric Habitat Type

BNG Code	Env element code	Env / Lnv Element Description
Cropland - Arable field margins game bird mix	LE1.6	Open grassland
Cropland - Arable field margins pollen & nectar	LE1.3	Species rich (or conservation) grassland
Cropland - Arable field margins tussocky	LE1.3	Species rich (or conservation) grassland
Cropland - Intensive orchards	LE2.6	Shrubs
Cropland - Temporary grass and clover leys	LE1.6	Open grassland
Cropland - Traditional orchards	LE2.7	Scattered trees
Grassland - Bracken	LE1.3	Species rich (or conservation) grassland
Grassland - Floodplain Wetland Mosaic	LE6.4	Marsh and wet grassland
Grassland - Lowland calcareous grassland	LE1.3	Species rich (or conservation) grassland
Grassland - Lowland dry acid grassland	LE1.3	Species rich (or conservation) grassland
Grassland - Lowland meadows	LE1.3	Species rich (or conservation) grassland
Grassland - Modified grassland	LE1.6	Open grassland
Grassland - Other lowland acid grassland	LE1.3	Species rich (or conservation) grassland
Grassland - Other neutral grassland	LE1.3	Species rich (or conservation) grassland
Grassland - Tall herb communities	LE1.3	Species rich (or conservation) grassland
Grassland - Upland acid grassland	LE1.3	Species rich (or conservation) grassland
Grassland - Upland calcareous grassland	LE1.3	Species rich (or conservation) grassland
Grassland - Upland hay meadows	LE1.3	Species rich (or conservation) grassland
Heathland and shrub - Blackthorn scrub	LE2.8	Scrub
Heathland and shrub - Bramble scrub	LE2.8	Scrub
Heathland and shrub - Gorse scrub	LE2.8	Scrub
Heathland and shrub - Hawthorn scrub	LE2.8	Scrub
Heathland and shrub - Hazel scrub	LE2.8	Scrub
Heathland and shrub - Lowland Heathland	LE1.5	Heath and moorland
Heathland and shrub - Mountain heaths and willow scrub	LE1.5	Heath and moorland
Heathland and shrub - Rhododendron scrub	E4.2	Legislated pests
Heathland and shrub - Sea buckthorn scrub	LE2.8	Scrub
Heathland and shrub - Sea buckthorn scrub (non-priority habitat)	LE2.8	Scrub
Heathland and shrub - Upland Heathland	LE1.5	Heath and moorland
Lakes - Aquifer fed naturally fluctuation water bodies	LE6.1	Water bodies and associated plants
Lakes - Ditches	LE6.2	Banks and ditches
Lakes - High alkalinity lakes	LE6.1	Water bodies and associated plants
Lakes - Low alkalinity lakes	LE6.1	Water bodies and associated plants
Lakes - Marl lakes	LE6.1	Water bodies and associated plants
Lakes - Moderate alkalinity lakes	LE6.1	Water bodies and associated plants
Lakes - Peat lakes	LE6.1	Water bodies and associated plants
Lakes - Ponds	LE6.1	Water bodies and associated plants
Lakes - Ponds (non-Priority Habitat)	LE6.1	Water bodies and associated plants
Lakes - Reservoirs	E2.2	Surface-water outfalls
Lakes - Temporary lakes, pools and ponds	LE6.1	Water bodies and associated plants
Sparsely vegetated land - Calaminarian grasslands	LE1.3	Species rich (or conservation) grassland
Sparsely vegetated land - Inland rock outcrop and scree habitats	LE1.4	Rock and scree
Sparsely vegetated land - Limestone pavements	LE2.3	High forest
Sparsely vegetated land - Other inland rock and scree	LE1.4	Rock and scree
Sparsely vegetated land - Ruderal	LE1.3	Species rich (or conservation) grassland
Urban - Amenity grassland	LE1.1	Amenity grass areas
Urban - Bioswale	E2.3	Soakaways
Urban - Brown roof	LE1.6	Open grassland
Urban - Built linear features	LE7	Hard landscape features
Urban - Cemeteries and churchyards	LE1.3	Species rich (or conservation) grassland
Urban - Developed land; sealed surface	LE7	Hard landscape features
Urban - Extensive green roof	LE1.6	Open grassland
Urban - Open Mosaic Habitats on Previously Developed Land	LE1.3	Species rich (or conservation) grassland
Urban - Orchard	LE2.6	Shrubs
Urban - Street Tree	LE5.1	Individual trees
Urban - Sustainable urban drainage feature	E2.3	Soakaways
Urban - Un-vegetated garden	LE7	Hard landscape features
Urban - Vegetated garden	LE1.1	Amenity grass areas
Urban - Woodland	LE2.1	Woodland
Wetland - Blanket bog	LE6.4	Marsh and wet grassland
Wetland - Depressions on Peat substrates	LE6.4	Marsh and wet grassland
Wetland - Fens (upland & lowland)	LE6.4	Marsh and wet grassland
Wetland - Lowland raised bog	LE6.4	Marsh and wet grassland
Wetland - Oceanic Valley Mire	LE6.4	Marsh and wet grassland
Wetland - Purple moor grass and rush pastures	LE1.5	Heath and moorland
Wetland - Reedbeds	LE6.3	Reed beds
Wetland - Transition mires and quaking bogs	LE6.4	Marsh and wet grassland
Woodland and forest - Felled	LE2.1	Woodland
Woodland and forest - Other coniferous woodland	LE2.1	Woodland

Woodland and forest - Other Scot's Pine woodland	LE2.1	Woodland
Woodland and forest - Other woodland; broadleaved	LE2.1	Woodland
Woodland and forest - Other woodland; mixed	LE2.1	Woodland
Woodland and forest - Other woodland; Young Trees planted	LE2.1	Woodland
Woodland and forest - Wood-pasture and parkland	LE2.7	Scattered trees
Woodland and forest - Lowland mixed deciduous woodland	LE2.1	Woodland
Woodland and forest - Lowland beech and yew woodland	LE2.1	Woodland
Woodland and forest - Upland birchwoods	LE2.1	Woodland
Woodland and forest - Upland mixed ashwoods	LE2.1	Woodland
Woodland and forest - Upland oakwood	LE2.1	Woodland
Woodland and forest - Wet woodland	LE2.1	Woodland
Heathland and shrub - Mixed scrub	LE2.2	Woodland edge

D River opportunities metric (Provided as a separate Excel document)