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APPENDICES

6 Draft Habitat Regulations Screening Report

6.1 Introduction

Purpose of this Document

6.1.1 This report details the Habitats Regulations Asssesment (HRA) screening Stage 1 assessment. This report has been prepared to provide the necessary information for the competent authority to carry out an HRA under Regulation 63 of the Conservation of Habitats and Species Regulations 2017, as amended by the Conservation of Habitats and Species (amendment) (EU Exit) Regulations 2019[1], hereafter referred to as the Habitats Regulations. It is informed by contemporary Defra (Department for Environment, Food and Rural Affairs and Natural England, 2021)[2], and Ministry of Housing, Communities and Local Government (MHCLG) guidance (Ministry of Housing, Communities & Local Governent, 2019)[3] and follows the methodology within Design Manual for Roads and Bridges (DMRB) LA 115 Habitats Regulations Assessment (Highways England, 2020a)[4] and The Planning Inspectorate (PINS) (Planning Inspectorate, 2017)[5]. For the avoidance of doubt, it takes full account of the principles of case law, both EU and domestic, including the People Over Wind (Judgement of the Court, 2018)[6] judgement. It has been prepared to inform the screening process and the competent authority on the implications of the A66 Northern Trans-Pennine (NTP) project on European sites protected by the Habitats Regulations (hereafter referred to as 'the project').

6.1.2 This HRA presents information of the project based on the preliminary information available to date. Some aspects of the design of the project are still being developed, environmental information collected, impacts assessed and proposed mitigation detailed. Consequently, the information included may be subject to change as the design evolution and environmental assessment work continues.

Scheme Background

6.1.3 The A66 project covers the length of the A66 between the M6 junction 40 at Penrith to the A1(M) at Scotch Corner, which is approximately 80.5km long (see Location Plan in Figure 1.1: A66 Location and Overview Plan). Sections of the A66 have been upgraded from single carriageway to dual in a number of stages since the 1970s. However, more than 29km of single carriageway remain, making the route accident-prone and unreliable. Investment in the A66 is essential to the continued development

[1] In general, the EU Exit Regulations (see Reg. 4) retain the requirements and interpretation of, and relevance of guidance that applied to the 2017 Regulations, but with adjustments necessary to reflect the UK's exit from the European Union.
[2] Department for Environment, Food and Rural Affairs and Natural England (2021) Habitats regulations assessments: protecting a European site. https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site [accessed 10 August 2021]
[3] Ministry of Housing, Communities & Local Government (2019) Appropriate assessment. https://www.gov.uk/guidance/appropriate-assessment [accessed 10 August 2021]
[4] Highways England (2020a) Design Manual for Roads and Bridges LA 115 Habitats Regulations assessment, Revision 1.
[5] Planning Inspectorate (2017) Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects. Republished November 2017 (version 8). https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/06/Advice-note-10v4.pdf. [accessed 10 August 2021]
[6] Judgement of the Court (2018) Case C-323/17 People Over Wind v Coillte Teoranta (also referred to as the Sweetman II Judgement).

of the economy in the north of the country. Dualling between the M6 junction 40 and the A1(M) at Scotch Corner and making other improvements along its length will support local and national economic growth and development.

Scope of this Report

6.1.4 The scope of this report is to identify relevant European sites that could potentially be impacted by the project and to consider whether there are Likely Significant Effects (LSE) on these sites. This is intended to provide the information required by the competent authority for the HRA screening (Stage 1). The competent authority for the HRA will be the Secretary of State for Transport as the project is a Nationally Significant Infrastructure Project (NSIP).

6.2 Habitats Regulations Assessment

6.2.1 The following European sites are protected by the Habitats Regulations. Any proposals which could affect them will require an HRA.

- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- proposed SACs
- potential SPAs
- Ramsar sites (i.e. wetlands of international importance (both listed and proposed))
- areas secured as sites compensating for damage to a European site.

6.2.2 The assessment of a plan or project under the Habitats Regulations can be split into several sections as shown in Image 2-1: HRA screening process. There are effectively four stages to the assessment comprising:

- Stage 1 – Screening.
- Stage 2 – Appropriate Assessment and the Integrity Test.
- Stage 3 – Alternative Solutions.
- Stage 4 – Imperative Reasons of Overriding Public Interest (IROPI).

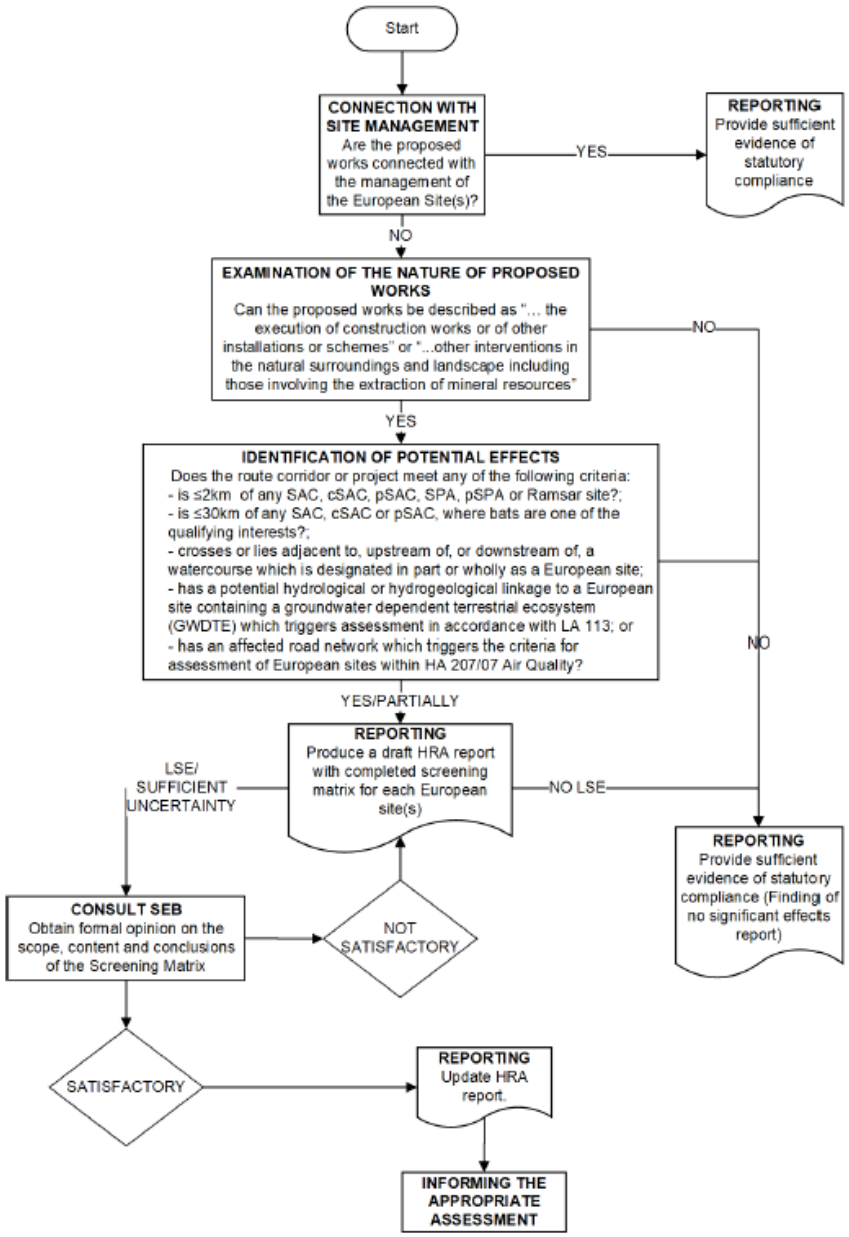


Image 6-1: HRA screening process[4]

Stage 1 - Screening

6.2.3 The first step in the HRA screening process is to consider whether the plan or project are connected with or necessary to the management of a European site. Plans and projects which are directly connected with or necessary to the management of a site are exempt from the HRA process. The plan or project must be entirely connected with or necessary to the achievement of the site's conservation objectives. Such works should include those that are:

- For conservation purposes.
- Management which is 'directly connected with or necessary' to the site.
- Solely conceived for the conservation management of a site and not direct or indirect consequences.

6.2.4 Where the plans or projects are not connected with site management, the next step is to consider whether the plans or projects are defined as a 'project'. Whilst there is no legal definition of what constitutes a plan or project for the purposes of the Habitats Regulations, PINS[5] provides some guidance for projects in the planning permission regime, including: projects that are under construction and submitted applications that are not yet determind.

Scoping of European sites

6.2.5 The European sites included within the scope of this HRA screening have been identified in accordance with *DMRB LA 115* screening criteria. These criteria state that European sites shall be included within the screening where the scheme meets any of the following:

1. Is within 2km of a European site or functionally linked land (i.e. Areas of land or sea occupied by the qualifying interests (species) of a European site that lie beyond the boundary of the site. Such areas support activities such as feeding, roosting and migration).
2. Is within 30km of a SAC, where bats are noted as one of the qualifying interests.
3. Crosses or lies adjacent to, upstream of, or downstream of, a watercourse which is designated in part or wholly as a European site.
4. Has a potential hydrological or hydrogeological linkage to a European site containing a groundwater dependent terrestrial ecosystem (GWDTE) which triggers the criteria for assessment of European sites in accordance with *DMRB LA 113 Road drainage and the water environment* (Highways England, 2020)[7].
5. Has an affected road network (ARN) which triggers the criteria for assessment of European sites in *DMRB LA 105 Air quality* (Highways England, 2020)[8].

6.2.6 For the purpose of this assessment, the criteria outlined in paragraph 6.2.5 above have been utilised to be in line with best practice for Highways England road schemes.

Identification of LSE

6.2.7 Under the Habiat Regulations an effect is likely if:

1. It cannot be excluded, in that it is capable of having an effect, on the basis of objective information
2. It is likely to undermine the site's conservation objectives.

6.2.8 Baseline information regarding the location, designation, status, sensitivity and interest features of the European sites has been obtained and reviewed to identify designated habitats and species that may be impacted by the project during its construction or operation phase. This has included review of Impact Risk Zones (IRZs), which are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks posed by development proposals to Sites of Special Scientific Interest (SSSIs), SACs, SPAs and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified

[7] Highways England (2020b) Design Manual for Roads and Bridges LA 113 Road drainage and the water environment, available from: https://www.standardsforhighways.co.uk/prod/attachments/d6388f5f-2694-4986-ac46-b17b62c21727?inline=true [accessed 10 August 2021]
[8] Highways England (2019) Design Manual for Roads and Bridges LA 105 Air Quality, available from: https://www.standardsforhighways.co.uk/prod/attachments/10191621-07df-44a3-892e-c1d5c7a28d90?inline=true [accessed 10 August 2021]

and indicate the types of development proposal which could potentially have adverse impacts.

6.2.9 This HRA covers the construction and operation phases of the project. Typically, highways projects are designed to have a materials (e.g. pavements, etc.) lifespan of between 20 and 40 years before major maintenance and upgrading is required, dependent on material properties, maintenance and usage. Elements including structural concrete and steelwork have extended design lives of up to 120 years. It is considered highly unlikely that the project will be decommissioned as the road is likely to become an integral part of the infrastructure in the area. Decommissioning will not be either feasible or desirable and is therefore not proposed to be considered in the EIA.

Mitigation and integral measures at LSE screening stage

6.2.10 In 2018 a Court of Justice of the European Union ("CJEU") ruling (referred to as the 'People over Wind' ruling) determined that 'mitigation' (i.e. measures intended to avoid or reduce the harmful effects of projects on European sites) should not be taken into account when forming a view on LSE during HRA screening. This screening report reflects the implications of that judgment and does not factor in mitigation measures in the screening of potential LSEs.

Consideration of in-combination LSE

6.2.11 Where screening concludes that significant effects are likely (alone or in-combination) or that sufficient uncertainty remains then further HRA shall be undertaken.

6.2.12 When considering 'in-combination' effects, the competent authority should take account of:

- All current and proposed plans or projects of which it is aware (and the applicant should make the authority aware of such plans or projects).
- The effects of past plans or projects, if they have an ongoing effect on the conservation objectives of the site.

6.2.13 An in-combination assessment is not included within this HRA. Due to the early stage of the project a list of current and proposed plans have not been compiled in which to undertake an in-combination assessment with. As such, all LSE(s) are assessed alone. If a credible risk of any residual effect is identified, that may give rise to a LSE in-combination or undermine the conservation objectives, this is taken forward to the Appropriate Assessment.

6.2.14 An in-combination assessment will be considered, if necessary, at the appropriate assessment stage.

6.2.15 If LSE(s) alone are ruled out within this HRA, there is no credible risk that the conservation objectives could be undermined. Therefore LSE(s) alone are ruled out entirely and consequently there is no need for an in-combination assessment.

Consultation

6.2.16 Due to the programme which the project is being developed to, the Evidence Plan process (as developed by the Major Infrastructure Environment Unit (MIEU) of Defra (Major Infrastructure and Environment Unit, 2012)[9]) has been identified as a tool that

[9] Major Infrastructure and Environment Unit (2012) Evidence plans for Nationally Significant Infrastructure Projects, available at: https://www.gov.uk/government/publications/habitats-and-wild-birds-directives-evidence-plans-for-nationally-significant-infrastructure-projects [accessed 11 August 2021]

is potentially useful to aid consultation with key stakeholders and enhance agreements reached at the pre-application process.

6.2.17 Highways England has decided to adopt the principles of the Evidence Plan process to guide the consultation and development of the HRA for the project, in relation to key areas of legislation and National Policy. The process will be led by the Integrated Project Team (IPT) (Highways England, their delivery partners and advisors).

6.2.18 The process followed in the preparation of the HRA Evidence Plan is aimed at producing a non-legally binding agreement between the developer and the relevant statutory authority(ies) and advisers, and other relevant stakeholders. This agreement aims to cover the matters to be addressed by the impact assessments undertaken, the data that will be used to support the assessments and the methodology to be applied. The agreement can also be extended to cover the outputs of the assessment and development of proposed mitigation, as appropriate.

6.2.19 An Evidence Plan is intended to be a working document that is developed by the parties involved on an on-going basis through the development of the HRA, continuing up to the point of application. The intention is for the process to be informed by the HRA scoping processes, and for it to inform and feed into the Statements of Common Ground (SoCG).

6.2.20 Appendix A: Agreement Log from TWG Meetings, provides a summary of the HRA agreement log compiled during the Technical Working Group (TWG) meetings which have been held to date.HE565627-AMY-EBD-S00-RP-LB-000003

Stage 2 – Informing the Appropriate Assessment

6.2.21 This report only addresses Stage 1 of the HRA, the Screening Report. An Appropriate Assessment (Stage 2) will follow in due course, if necessary. The following information within Sections 0 to 2.6 is for information only, in relation to stages 2 to 4 of the Habitats Regulations Assessment.

6.2.22 The Appropriate Assessment shall report on and provide evidence of examination of adverse effects on the integrity of a European site to inform the competent authority undertaking the Appropriate Assessment.

Stage 3 - Assessment of Alternative Solutions

6.2.23 Formal assessment and reporting of alternative solutions shall be undertaken where the Statement to Inform the Appropriate Assessment (SIAA) concludes that there are adverse impacts of greather than negligible magnitude or contains insufficient information on any impact.

Stage 4 – Assessment of IROPI

6.2.24 Where the alternative solutions assessment reports that there are no alternative solutions to the project and this has been agreed with the relevant Statutory Environmental Body (SEB) an assessment of IROPI shall be undertaken.

Assessment of Compensatory Measures

6.2.25 Where IROPI are established and reported an assessment of compensatory measures shall be undertaken. An asssessment of compensatory measures shall be compiled and on measures to compensate for the negative impact of the project. This should be used as basis for consultation with SEB to seek their representation of the sufficiency of the compensatory measures.

6.3 Proposed Project

Overview of the Project

6.3.1 The project includes upgrading the existing single lane sections of the A66 to dual two lane all-purpose roads with 120km per hour (kph) design speed and a speed limit of 70mph. The project also includes amendments to existing junctions and accesses within these sections, and improvements to the terminal junctions.

Alternatives

6.3.2 The project comprises the improvement of the A66 between the M6 at Penrith and the A1(M) at Scotch Corner.

6.3.3 The project has been split into eight schemes (Appendix B: Location plan of the project and scheme locations). It includes upgrading the existing six single lane sections to dual two-lane all-purpose roads with a speed limit of 70mph, with the exception of a section of the A66 from the M6 junction 40 through Kemplay Bank, which will have a speed limit of 50mph. The project also includes amendments to existing junctions and accesses within these sections.

6.3.4 Some of the eight schemes involve online widening of the carriageway and some are offline (i.e. new sections of road that follow a different route but reconnect into the main A66 alignment). Along with dualling six sections of existing single carriageway, other improvements will be made along the route, such as junction improvements at the M6 Junction 40 at Penrith and minor improvements to the existing dual carriageway sections of the A66 within the existing highway boundary (for example new signs or road markings).

6.3.5 The eight individual schemes are as follows and are described in Table 6-1: Alternative alignments assessed, and Table 6-2: Summary of key scheme features:

- M6 Junction 40 to Kemplay Bank
- Penrith to Temple Sowerby
- Temple Sowerby to Appleby
- Appleby to Brough
- Bowes Bypass
- Cross Lanes to Rokeby
- Stephen Bank to Carkin Moor
- A1(M) Junction 53 Scotch Corner

6.3.6 The design of the proposed project is ongoing. As detailed in Chapter 2: The Project of the PEI Report. The PEI Report reports on the assessment of the alternative alignments for certain schemes that have been considered since the Preferred Route Announcement for the project. A summary description of each of the schemes is provided below including alternatives that have been assessed.

Table 6-1: Alternative alignments assessed

Scheme	Alternatives
M6 Junction 40 to Kemplay Bank	Preferred Route with design refinements
Penrith to Temple Sowerby	Preferred Route with design refinements
Temple Sowerby to Appleby	Blue Route (Evolved Preferred Route) Orange (Online Alternative) Red (Offline Alternative)
Appleby to Brough	Black (Evolved Preferred Route)

Scheme	Alternatives
	Blue Alternative Section Orange Alternative Section
Bowes Bypass	Preferred Route with design refinements
Cross Lanes to Rokeby	Black (Evolved Preferred Route) Cross Lanes – Blue Alternative Junction Rokeby – Red Alternative Junction
Stephen Bank to Carkin Moor	Preferred Route with design refinements
A1(M) Junction 53 Scotch Corner	Black Route Added to the project since Preferred Route Announcement

Table 6-2: Summary of key scheme features

Scheme	Alternative	Key Features
M6 Junction 40 to Kemplay Bank	n/a	• Three-lane circulatory carriageway and new road markings on the existing M6 Junction 40 roundabout. • Widening of the A66 eastern arm from two to three lanes in each direction between the Junction 40 and Kemplay Bank Roundabout. • Widening of the M6 North, M6 South, A66 East, A66 West, and A592 Ullswater Road approach arms to provide additional lanes and a dedicated left turn facility. • New on-slip and off-slip roads at the A6 and A686. • New underpass beneath Kemplay Bank Roundabout. • The underpass off Carleton Avenue will be retained and extended to accommodate the widening of the A66. • New controlled crossings for existing shared cycle/footway connections that cross the scheme. • All existing accesses and cycleways and footways will be accommodated either through being retained or will be rerouted close by. • Reduced speed limit to 50mph between Junction 40 and Kemplay Bank Roundabout.
Penrith to Temple Sowerby	n/a	• Full dualling of the existing A66 single carriageway between Penrith and Temple Sowerby. • Widening of the existing carriageway to form one side of the new dual carriageway and constructing the second side of the carriageway north of the existing A66. • Removal of existing crossing points over the existing A66 but maintaining access for agricultural vehicles via two new private access structures, and for landowners through new access tracks north and south of the route. • New junction to replace the Centre Parks junction. • New left-in/left-out junctions with associated acceleration and deceleration lanes at the B6262, the access to the Whinfell Holme Wastewater Treatment Works, and the access to St Ninian's Church. • Amenity parking area with footway access to the Countess Pillar historic monument.

Scheme	Alternative	Key Features
Temple Sowerby to Appleby	Blue alternative (Evolved Preferred Route)	• A new offline bypass around the north of Kirkby Thore. • A new bypass to the north of Crackenthorpe. • Follows the PRA alignment from the western end of Kirkby Thore to the junction at the British Gypsum site to the north of Kirkby Thore. • A multi-span viaduct over the Trout Beck and its floodplain. • A number of new junctions, bridge structures and improvements throughout the route.
	Orange alternative (Online Alternative)	• Bypass falls slightly to the south of the existing A66 and then follows a similar alignment to the existing A66 through Kirkby Thore. • Trout Beck crossing at Bridge End. • A new bridge associated with the new A66. • Follows the PRA alignment from Long Marton junction to north of Crackenthorpe. • Upgrade Priest Lane to a 6m wide carriageway.
	Red alternative (Offline Alternative)	• Follows the PRA alignment design from the western end of Kirkby Thorpe and up to Sleastonhowe Lane. • 250m watercourse crossing of the Trout Beck. • Watercourse crossing over Keld Syke. • New junction at Long Marton. • Follows the PRA alignment design to the north of Crackenthorpe.
Appleby to Brough	Black-Black-Black route (Evolved Preferred Route)	• Online widening with a new westbound carriageway to the south of the existing carriageway between Coupland Beck and Brough. • De-trunking of sections of the existing A66. • A new left-in/left-out junction at Café 66 on the A66 westbound carriageway. • A new junction to link the B6259 to Sandford/Warcop. • New left-in/left-left out priority junctions at Warcop on the westbound and eastbound carriageways. • A left-only T-junction at Langrigg with appropriate diverge and merge tapers on the westbound carriageway. • New local roads to the south of the new A66 alignment to link with Flitholme and to the south of the new A66 from Langrigg Lane to the west to link with a new overbridge. • New underpasses at New Hall Farm, Far Bank End, Wheatsheaf Farm and east of Moor Beck. • New overbridge for walkers, cyclists and horse-riders near West View Farm within the AONB.
	Blue alternative central section	• An alternative central section of the Black route, shifting 50m south from Wheatsheaf Farm. • New A66 eastbound carriageway along the existing A66.

Scheme	Alternative	Key Features
		• A new westbound carriageway directly south of the existing alignment. • New crossing structure across the Moor Beck. • A new underpass to the east of Walk Mill Barn.
	Orange alternative eastern section	• An alternative eastern section of the Black route. • New dual carriageway south of West View Farm adjacent to the existing A66. • New crossing structure across the Lowgill Beck. • Ties back into the existing A66 at Musgrave Lane Overbridge. • A new farm access underpass on the south side of the new A66. • De-trunking of the existing A66 with a two-way connection into Main Street at Brough.
Bowes Bypass	n/a	• Widening of the existing A66 to the north of Bowes. • A new adjacent eastbound carriageway to the north between the Clint Lane Overbridge and the eastern scheme extents. • Widening of the A67 to create a staggered junction and a right turn lane for the eastbound slip road. • Realign the existing eastbound slip road to the north. • Minor improvements to the existing westbound slip road. • Upgrade of the Bowes Junction to a grade-separated junction. • Extension of Lyndale Farm Underpass and Blacklodge Farm Underpass. • New access overpass at East Bowes.
Cross Lanes to Rokeby	Black route (Evolved Preferred Route)	• Dualling of the A66 with a new adjacent westbound carriageway to the south between the B6277 junction at Cross Lanes and the existing Tutta Beck Cottage access. • New carriageways will be routed to the south of The Old Rectory and St Mary's Church, re-joining the existing A66 at Rokeby. • Upgrade of the existing Cross Lanes junction to a new compact grade-separated junction. • Realigning of the B6277 Moorhouse Lane to connect to the new Cross Lanes junction. • De-trunking of the existing A66 west of St Mary's Church to Barnard Castle Road. • A new compact grade-separated junction at Barnard Castle Road. • A new junction at to the west of The Old Rectory and St Mary's Church. • A new culvert to accommodate Tutta Beck.
	Cross Lanes – Blue	• A new link road west of the existing Cross Lanes priority junction to link Rutherford Lane to the south and the B6277 Moorhouse Lane to the north.

Scheme	Alternative	Key Features
	alternative junction	• Realigning of a section of Rutherford Lane. • Another new link road to connect Moorhouse Lane to the proposed link road west of Cross Lanes. • A new culvert to accommodate Tutta Beck.
	Rokeby – Red alternative junction	• A66 alignment leaves the existing A66 carriageway diverting south around The Old Rectory. • A new junction to pass underneath the A66 to the Barnard Castle Road. • A new eastbound slip road (merge) on the north side to connect the de-trunked A66 to the A66 mainline. • Modification of the existing priority junction (to the north) to accommodate new slip road.
Stephen Bank to Carkin Moor	n/a	• A new dual carriageway section between Stephen Bank and Carkin Moor Farm to the north of the existing A66. • A new access underpass to the north of Dick Scott Lane. • A new bridleway underpass to the north of Warrener Lane. • De-trunking of the existing A66 to be used as a collector road with a new overbridge to facilitate the revised vertical realignment of Collier Lane. • A new grade-separated junction to the western boundary of the existing alignment of Moor Lane. • Realigning of the southern section of Moor Lane and placed into a cutting beneath the proposed mainline to connect to the de-trunked existing A66. • Rerouting of the existing bridleway rerouted along the proposed realigned section of Moor Lane and along the Western Boundary of Mainsgill Farm. • A new link road to Moor Lane grade-separated junction.
A1(M) Junction 53 Scotch Corner	n/a	• Widening of the Middleton Tyas Lane approach to the A1(M) Junction 53 at Scotch Corner roundabout, from one lane to two lanes.

Programme

6.3.7 Construction works are expected to commence in 2024, with all schemes targeted for a 2029 completion or sooner depending on traffic management interface challenges. Some of the smaller or less complex schemes will be completed in a shorter duration. It is assumed that the worst-case scenario is that all of the schemes will be under construction at the same time.

6.4 Screening Assessment Results

Determination of Connection with Site Management

6.4.1 The project does not comprise works that are connected with or necessary to the management of a European site.

Examination of the Nature of Proposed Works

6.4.2 The project is considered to comprise the definition of a 'project' in HRA terms.

Scoping of European Sites

6.4.3 The following European sites meet the screening criteria in Section 0: Stage 1 – Screening, paragraph 6.2.5, and are included in this assessment:

- River Eden SAC (meets criteria 1, 3 and 5).
- Helbeck and Swindale Woods SAC (meets criteria 1).
- Moor House-Upper Teesdale SAC (meets criteria 1).
- North Pennines Moors SAC (meets criteria 1 and 5).
- North Pennine Moors SPA (meets criteria 1 and 5).
- Asby Complex SAC (meets criteria 5).

6.4.4 Conservation objectives for each European site are included within Table 6-3: Screening matrix River Eden SAC to Table 6-8: Screening matrix Asby Complex SAC.. Citations for the European sites discussed in this report are provided within Appendix C: European Designated Sites Citations. Plans indicating the locations of the above listed European sites, the scheme boundary and the ARN are provided within Appendix D: European Designated Sites Plans and Appendix E: Affected Road Network.

6.4.5 The project and all European sites listed above are located entirely within England and their boundaries do not overlap with areas of devolved administrations or with those of other European Economic Area (EEA) States.

Identification of likely Significant Effects

6.4.6 As detailed in paragraph 6.3.2 the project has been split into eight schemes for the purpose of design. Table 6-3: Screening matrix River Eden SAC to Table 6-8: Screening matrix Asby Complex SAC. sets out the screening matrices for each European sitem, in accordance with the reporting requirements of DMRB LA 115. Each impact pathway has been screened on a scheme by scheme basis to inform the HRA which is assessed on a routewide scale.

6.4.7 In addition, Appendix F: PINS Screening Matrices details the PINS Screening Matrices as required by PINS Advice Note 10.

Table 6-3: Screening matrix River Eden SAC

Project Name:	**A66 Northern Trans-Pennine**	
European Site under consideration:	River Eden SAC	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
August 2021	Tom House/Arup Yan-Yee Lau/Arup	Bernie Fleming/Fleming Ecology Ltd
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project includes upgrading the existing single lane sections of the A66 to dual two lane all-purpose roads with 120kph design speed and a speed limit of 70mph. The project also includes amendments to existing junctions and accesses within these sections, and improvements to the terminal junctions.	

	The traffic flow is anticipated to increase for the Do-Minimum (DM) scenarios from the base typically 46% between 2015 and 2046. The average additional growth on the A66 due to the scheme (i.e. Do-Something (DS) v DM) is typically between 34% and 39% across all years.
Land-take	No land-take in the SAC (or functionally linked habitats connected to the SAC) is required in the following schemes: • M6 Junction 40 to Kemplay Bank • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner. Penrith to Temple Sowerby A small section (approximately 20m) of Light Water (functionally linked to the SAC) will be impacted/degraded as a result of shading associated with the extension of the existing A66 culvert. Temple Sowerby to Appleby: The approximate areas of Trout Beck impacted as a result of the proposed crossing points for each alternative (Table 6-2: Summary of key scheme features), including riparian vegetation, are outlined below: • Orange alternative = 0.059ha • Blue alternative = 0.063ha • Red alternative = 0.058ha Appleby to Brough: Areas of river habitat considered functionally linked to the SAC will be impacted as a result of the proposed crossings of Unnamed Tributary of Mire Sike 6.12, Cringle Beck, Moor Beck, Eastfield Sike, Lowgill Beck, Woodend Sike and Yosgill Sike (Appendix D: European Designated Sites Plans). The areas of channel impacted by the Black, Blue and Orange alternatives cannot be accurately estimated given the stage of design. This will be assessed in full as part of the appropriate assessment. Impacts associated with the river crossing are detailed below.
Distance from the European Site or key interests of the site (from edge of the project assessment corridor)	M6 Junction 40 to Kemplay Bank – adjacent to scheme south Penrith to Temple Sowerby – adjacent to scheme northwest Temple Sowerby to Appleby: • Orange alternative – within River Eden SAC • Blue alternative – within River Eden SAC • Red alternative – within River Eden SAC Appleby to Brough: • Black-black-black route – 600m southwest • Blue alternative central section – 600m southwest • Orange alternative eastern section – 600m southwest Bowes Bypass – 15.9km west Cross Lanes to Rokeby – 21.6km west Stephen Bank to Carkin Moor – 28.9km west A1(M) Junction 53 Scotch Corner – 40km west ARN – crosses the SAC in numerous places
Resource requirements (from the European Site or from areas in proximity to	No resource requirements from the SAC (or functionally linked habitats connected to the SAC) in the following schemes (Appendix D: European Designated Sites Plans): • M6 Junction 40 to Kemplay Bank

the site, where of relevance to consideration of impacts)	• Bowes Bypass • Cross Lanes to Rokeby; Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* **LSE(s) alone ruled out for the schemes outlined above.** No resource requirement from the River Eden SAC is required within the schemes above as they are not hydraulically or functionally linked to the SAC. Penrith to Temple Sowerby *Construction* **LSE(s) alone cannot be ruled out** It is anticipated that the existing culvert which conveys Light Water under the A66 will be extended and lead to the reduction of habitat (through shading) which supports the sub type 2 Annex II habitat watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation. This area does not form part of the River Eden SAC, however the habitat is considered to be functionally linked (Appendix D: European Designated Sites Plans). *Operation* **LSE(s) alone cannot be ruled out** The extension of the Light Water crossing will be designed to facilitate the free movement of SAC qualifying species. However at this stage, there is no certainty on final design of the culvert. Temple Sowerby to Appleby: *Construction* **LSE(s) alone cannot be ruled out** All options include a crossing of the SAC that will result in shading of approximately 0.06ha of habitat, consisting of the river, its banks and the riparian vegetation zone. The bridge designs are anticipated to be clear span and the bridge supports will be located outside of the River Eden SAC boundary and designed/spaced to allow natural river processes to continue. The crossing will not require construction of any in channel structures and the natural bed and banks will be maintained but shaded by the new crossing. However at this stage, there is no certainty on design and the alignment, which will be informed by detailed fluvial geomorphological modelling. Therefore, this could give rise to LSE on the River Eden SAC. The approximate areas of Trout Beck impacted as a result of each of the proposed crossing points, including riparian vegetation, are outlined below: • Orange alternative = 0.059ha • Blue alternative = 0.063ha • Red alternative = 0.058ha *Operation* **LSE(s) alone cannot be ruled out** As stated above. The bridge designs are anticipated to be clear span and the bridge supports will be located outside of the River Eden SAC boundary and designed/spaced to allow natural river processes to continue and therefore not effect resource requirements. However, at this stage, there is no certainty on design and the alignment, which will be informed by detailed fluvial geomorphological modelling. Therefore, this could give rise to LSE alone on the River Eden SAC. Appleby to Brough *Construction* **LSE(s) alone cannot be ruled out** All options include crossings of watercourses that are functionally linked to the River Eden SAC. It is anticipated that watercourse crossings of

	functionally linked rivers will open span and maintain the natural river bed and banks and therefore not effect resource requirements. However, at this stage, there is no certainty on the alignment or design. Therefore this could give rise to LSE alone on the River Eden SAC. *Operation* **LSE(s) alone cannot be ruled out** All options include crossings of watercourses that are functionally linked to the River Eden SAC. The watercourse crossings are anticipated to be designed such that natural river processes will continue and the natural bed and banks will be maintained but shaded. However, at this stage, there is no certainty on the alignment or design, which will be informed by detailed fluvial geomorphological modelling. Therefore, this could give rise to LSE alone on the River Eden SAC.
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	<u>Water quality</u> The following schemes are not hydrologically or functionally connected to the River Eden SAC (Appendix D: European Designated Sites Plans): • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* **LSE(s) alone ruled out for the schemes listed above.** Habitat within these schemes are not hydrologically or functionally linked to the SAC, consequently LSE(s) are ruled out alone with no residual effects. The following schemes are hydrologically or functionally connected to the River Eden SAC (Appendix D: European Designated Sites Plans): • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough *Construction* **LSE(s) alone cannot be ruled out** Construction activities have the potential to generate water-borne pollution (e.g. fine sediment, fuels and oils), which could give rise to a LSE on the River Eden SAC. *Operation* **LSE(s) alone cannot be ruled out** Road runoff during operation of the road has the potential to generate water-borne pollution (e.g. trace metals, hydrocarbons and other organic pollutants resulting from oil/petrol spills and tyre and brake wear), which could give rise to a LSE on the River Eden SAC. <u>Air quality</u> The following schemes are located over 0.5km from the River Eden SAC (Appendix D: European Designated Sites Plans): • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* **LSE(s) alone can be ruled out** These schemes are located over 0.5km from the River Eden SAC and subsequently impacts from nitrogen deposition are ruled out based on distance.

	The following schemes are within 200m of the River Eden SAC: • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby **LSE(s) alone cannot be ruled out** *Construction and Operation* Impacts of nitrogen deposition has been considered as part of the air quality assessment, based on predicted emissions of nitrogen oxides (NOx) from vehicles in the opening year of the project. However, Highways England is developing a tool for determining the additional contribution of ammonia (NH_3) emissions from vehicles to deposited nitrogen. This is likely to result in additional nitrogen deposition. Therefore, further air quality assessment is required at the appropriate assessment stage to determine potential impacts on the Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae). Consequently, LSE(s) alone cannot be ruled out.
Excavation requirements (e.g. impacts of local hydrogeology)	The following schemes are not hydrologically or functionally connected to the River Eden SAC (Appendix D: European Designated Sites Plans): • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* **LSE(s) alone ruled out** Habitat within these schemes are not hydrologically or functionally linked to the SAC. Consequently LSE(s) are ruled out alone with no residual effects. The following schemes are hydrologically or functionally connected to the River Eden SAC (Appendix D: European Designated Sites Plans): • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough. *Construction* **LSE(s) alone cannot be ruled out** Construction activities have the potential to impact on the Water environment including surface water, groundwater quality and quantity, floodplain utilisation and floodplain extents. *Operation* **LSE(s) alone ruled out** No excavation requirements proposed for the operation stage. Consequently LSE(s) are ruled out alone with no residual effects.
Transportation requirements	See emissions above.
Duration of construction, operation, etc.	See Section 3.3: Programme
Other	None identified
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	No specific mitigation measures to mitigate impacts to the River Eden SAC are included in this assessment, in line with the People Over Wind case.
Location	N/A

Evidence for effectiveness	N/A
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	N/A
Characteristics of European Site(s) A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	River Eden SAC (UK0012643) Appendix D: European Designated Sites Plans).
Location and distance of the European Site from the proposed works	See details in "Distance from the European Site or key interests of the site (from edge of the project assessment corridor)"
European Site size	2430.39 ha (Joint Nature Conservation Committee, 2021a)[10]
Key features of the European Site including the primary reasons for selection and any other qualifying interests	Annex I habitats that are a primary reason for selection of this site: • Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* (refers to Ullswater which is outside of the biodiversity study area). • Watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation. • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) Annex II species that are a primary reason for selection of this site: • Atlantic salmon (*Salmo salar*) • Brook lamprey (*Lampetra planeri*) • Bullhead (*Cottus gobio*) • Otter (*Lutra lutra*) • River lamprey (*Lampetra fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • White-clawed crayfish (*Austropotamobius pallipes*)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The *Natura 2000 Data Form* (Joint Nature Conservation Committee, 2015)[11] identified the following threats, pressures and activities with high negative effect on the European site: • A01 Cultivation • J02 Human induced changes in hydraulic conditions • I01 Invasive non-native species • M02 Changes in biotic conditions • H02 Pollution to groundwater (point sources and diffuse sources) The following threats and pressures are taken from the Natural England Site Improvement Plan (Natural England, 2014a)[12] for the European Site: • Water pollution • Agricultural management practices • Physical modification

[10] Joint Nature Conservation Committee (2021a) River Eden Designated Special Area of Conservation, available at: https://sac.jncc.gov.uk/site/UK0012643 [accessed 11 August 2021]
[11] Joint Nature Conservation Committee (2015a) Natura 2000 Standard Data Form: River Eden SAC (UK0012643) available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0012643.pdf [accessed 11 August 2021)]
[12] Natural England (2014a) Site Improvement Plan River Eden, available at: http://publications.naturalengland.org.uk/publication/5920746052255744 [accessed 11 August 2021]

	• Invasive species • Changes in species distributions • Forestry and woodland management • Hydrological changes • Disease • Air pollution: risk of atmospheric nitrogen deposition.
European Site conservation objectives – where these are readily available	The conservation objectives aim to: Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the favourable conservation status of its qualifying features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying. natural habitats and the habitats of qualifying species rely • The populations of qualifying species • The distribution of qualifying species within the site.
Assessment criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
X See below	
Initial assessment in relation to River Eden SAC The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	**LSE(s) alone ruled out for the following schemes:** • M6 Junction 40 to Kemplay Bank • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner. *Construction and Operation* No reduction of habitat within the River Eden SAC required at the schemes outlined above. <u>Penrith to Temple Sowerby</u> *Construction* **LSE(s) alone cannot be ruled out** It is anticipated that the existing culvert within Light Water (Appendix D: European Designated Sites Plans) will be extended and lead to the reduction of habitat which supports the sub type 2 Annex II habitat watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation. This area does not form part of the River Eden SAC however, the habitat is functionally linked. *Operation* **LSE(s) alone cannot be ruled out** Poorly designed watercourse crossings have the potential to result in a reduction of habitat are during operation through altered fluvial geomorphological processes. The watercourse crossings are anticipated to be designed such that natural river processes will continue and the habitat they support with be maintained but shaded. However, at this stage, there is no certainty on the alignment or design, which will be informed by detailed fluvial geomorphological modelling. Therefore, this could give rise to LSE alone on the River Eden SAC. <u>Temple Sowerby to Appleby:</u> *Construction*

	LSE(s) alone cannot be ruled out All options include a crossing of the SAC that will result in shading of approximately 0.06 ha habitat, consisting of the river, its banks and the riparian vegetation zone. The bridge designs are anticipated to be clear span and the bridge supports will be located outside of the River Eden SAC boundary and designed/spaced to allow natural river processes to continue. The crossing will not require construction of any in channel structures and the natural bed and banks will be maintained but shaded by the new crossing. However, at this stage, there is no certainty on design and the alignment, which will be informed by detailed fluvial geomorphological modelling. Therefore, this could give rise to LSE alone on the River Eden SAC. <u>Appleby to Brough</u> **LSE(s) alone cannot be ruled out** All options include crossings of watercourses that are functionally linked to the River Eden SAC. The watercourse crossings are anticipated to be designed such that natural river processes will continue and the natural bed and banks will be maintained but shaded. However, at this stage, there is no certainty on the alignment or design, which will be informed by detailed fluvial geomorphological modelling. Therefore, this could give rise to LSE alone on the River Eden SAC.
Disturbance to key species	The following schemes are hydrologically connected or functionally linked to the SAC (Appendix D: European Designated Sites Plans): • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough *<u>Construction</u>* **LSE(s) alone cannot be ruled out** During the construction phase, potential noise, vibration and lighting disturbance may impact on all Annex II species i.e. Atlantic salmon, brook lamprey, bullhead, river lamprey, sea lamprey, white-clawed crayfish and otter may occur as a result of works within close proximity of the river channel and river banks. *Operation* **LSE(s) alone cannot be ruled out** There is the potential for LSE as a result of noise, vibration and lighting disturbance on Annex II aquatic species during operational phase i.e. Atlantic salmon, brook lamprey, bullhead, river lamprey, sea lamprey or white-clawed crayfish, as a result of the proposed options. In line with the above regarding reduction in habitat, the bridge design is anticipated to be clear span. However, there is no certainty at this stage. **LSE(s) alone ruled out for the following schemes:** • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* These schemes are not hydrologically connected or functionally linked to the SAC (Appendix D: European Designated Sites Plans) therefore no LSE alone on disturbance to key species.
Habitat or species fragmentation	**LSE(s) alone ruled out for the following schemes**: • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor

	• A1(M) Junction 53 Scotch Corner *Construction and Operation* No reduction of habitat within the River Eden SAC required at the schemes outlined above. These schemes are not hydrologically connected or functionally linked to the SAC. Consequently LSE(s) are ruled out alone with no residual effects. <u>Temple Sowerby to Appleby</u> *Construction* **LSE(s) alone cannot be ruled out** All options will result in shading of the SAC. These habitat areas will include the marginal and bank top areas of the SAC in order to construct the proposed new bridge over the river. The potential for terrestrial habitat exists as a result of the construction of the bridge for each option. During the construction phase, Annex II species may temporarily be fragmented as a result of disturbance (noise, vibration and lighting) from the project being in close proximity of the river channel and river banks. *Operation* **LSE(s) alone cannot be ruled out** There is the potential for operations phase impacts as a result of noise and light disturbance. Detailed information on the lighting design and impacts from noise are to be determined. <u>Appleby to Brough</u> *Construction* **LSE(s) alone cannot be ruled out** All options require land-take from watercourses that are functionally linked the River Eden SAC. These habitat areas will include the marginal and bank top areas in order to construct the proposed watercourses crossings. During the construction phase, populations of Annex II species may temporarily be fragmented as a result of disturbance from the project being in close proximity of the river channel and river banks. *Operation* **LSE(s) alone cannot be ruled out** There is the potential for operations phase impacts as a result of noise and light disturbance. Detailed information on the lighting design and impacts from noise are to be determined.
Reduction in species density	**LSE(s) alone cannot be ruled out** No reduction in species density is anticipated as the design of the crossing will avoid impacts to in-channel habitats and enable the natural river processes which control their distribution to maintained. However, at this stage, there is no certainty on the design.
Changes in key indicators of conservation value (water quality, etc)	The impact pathways described in this section are relevant to the following schemes which are hydrologically connected or functionally linked to the SAC: • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough *Construction* **LSE(s) alone cannot be ruled out** Changes in key indicators of conservation value may give rise to LSE. Further assessment is required at the appropriate assessment stage on potential water quality, hydrogeology, hydrological impacts and subsequently how this may impact on the conservation value and integrity of the site and the habitats it supports. In addition, further assessment of the potential for altered fluvial geomorphological processes as a result of the project and how this may

	impact on the conservation value and integrity of the site and the habitats it supports is required. In the absence of appropriate watercourse crossing design, this could give rise to LSE. **LSE(s) alone ruled out for the following schemes:** • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* These schemes are not hydrologically connected or functionally linked to the SAC, therefore no LSE alone on changes in key indicators of conservation value. Consequently LSE(s) are ruled out alone with no residual effects.
Climate change	**LSE(s) alone ruled out** The climate projections for the A66 area, that were calculated utilising Regional Climate Projection data, show both summer and winter temperatures projected to increase and mean precipitation rates in the area to change significantly through the next century. Climate projections for wind have the highest level of uncertainty. Wind speeds over the UK for the second half of the 21st century are projected to have significant impacts on the winter season (Arup, 2021)[13]. The overall vulnerability of the SAC to climate change has been assessed by (Natural England, 2015)[14] as being moderate taking into account the sensitivity, fragmentation, topography and management of its habitats. For the purpose of this assessment, climate change will be a consideration within any proposed mitigation, where required, at the Appropriate Assessment stage. However, LSE from climate change as a result of the A66 project are not considered further within this screening assessment.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	**LSE(s) alone cannot be ruled out** LSE on habitats cannot be ruled out within the SAC as a result of changes to the Water Environment including hydrogeology, hydrology and fluvial geomorphology. Further analysis is required to determine the impact the project may have on the structure of the River Eden SAC.
Interference with key relationships that define the function of the site	**LSE(s) alone cannot be ruled out** LSE on habitats cannot be ruled out within the SAC as a result of changes to hydrogeology, hydrology and fluvial geomorphology. Further analysis is required to determine the impact the project may have on the function of the River Eden SAC.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	**LSE(s) alone cannot be ruled out**
Disturbance to key species	**LSE(s) alone cannot be ruled out**
Habitat or species fragmentation	**LSE(s) alone cannot be ruled out**
Loss	**LSE(s) alone cannot be ruled out**
Fragmentation	**LSE(s) alone cannot be ruled out**
Disruption	**LSE(s) alone cannot be ruled out**
Disturbance	**LSE(s) alone cannot be ruled out**

[13] Arup (2021) Future climate baseline for construction and operation.
[14] Natural England (2015) Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England, available at: http://publications.naturalengland.org.uk/publication/4954594591375360 [accessed 11 August 2021]

Change to key elements of the site (e.g. water quality, hydrological regime, geomorphological processes etc.)	**LSE(s) alone cannot be ruled out**
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Emissions (water and air quality) Construction activities and road runoff during operation of the road have the potential to generate water-borne pollution which could give rise to LSE on the River Eden SAC. LSE(s) from changes in air quality cannot be ruled out at this stage. **Reduction of habitat area/Resource requirements** Potential loss of habitat within the River Eden SAC as a result of the proposed bridge across Trout Beck. In addition, a reduction in habitat area that supports sub type 2 watercourse located within Light Water which is functionally linked to the River Eden SAC. **Disturbance to species** The construction and operation phases have the potential for noise, vibration and lighting disturbance to cause LSEs on qualifying species of the River Eden SAC.	
Outcome of screening stage	**LSEs alone cannot be ruled out**
Are the appropriate statutory environmental bodies in agreement with this conclusion	The statutory environmental bodies (SEBs) have been consulted via a series of TWGs using an Evidence Plan approach (Appendix A: Agreement Log from TWG Meetings).The SEBs have yet to be formally consulted regarding the outcome of the screening stage.

Table 6-4: Screening matrix Helbeck and Swindale Woods SAC

Project Name:	**A66 Northern Trans-Pennine**	
European Site under consideration:	Helbeck and Swindale Woods SAC	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
August 2021	Yan-Yee Lau/Arup	Bernie Fleming/Fleming Ecology
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project includes upgrading the existing single lane sections of the A66 to dual two lane all-purpose roads with 120kph design speed and a speed limit of 70mph. The project also includes amendments to existing junctions and accesses within these sections, and improvements to the terminal junctions. The traffic flow is anticipated to increase for the Do Minimum (DM) scenarios from the base typically 46% between 2015 and 2046. The average additional growth on the A66 due to the scheme (i.e. Do Something (DS) v DM) is typically between 34% and 39% across all years.	
Land-take	None within the Helbeck and Swindale Woods SAC boundary	
Distance from the European Site or key interests of the site (from edge of the project assessment corridor)	M6 Junction 40 to Kemplay Bank – 27.2km northwest Penrith to Temple Sowerby – 21.8km northwest Temple Sowerby to Appleby: • Orange alternative - 10.3km northwest • Blue alternative – 10.3km northwest • Red alternative – 10.3km northwest Appleby to Brough: • Black alternative – 500m north • Blue alternative – 500m north	

	• Orange alternative – 700m north Bowes Bypass – 17.8km west Cross Lanes to Rokeby – 24km west Stephen Bank to Carkin Moor – 32.4km west A1(M) Junction 53 Scotch Corner – 42.5km west ARN – closest section of the ARN lies 600m north
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	<u>All schemes</u> **LSE(s) alone ruled out** No direct habitat loss required within the Helbeck and Swindale Woods SAC boundary. Consequently LSE(s) are ruled out alone with no residual effects.
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	<u>Air Quality</u> **LSE(s) alone ruled out for all schemes**: *Construction and Operation* All schemes are located over 200m from Helbeck and Swindale Woods SAC. In line with LA 105 DMRB standards, LSE from a change in air quality are ruled out. Consequently, LSE(s) are ruled out alone with no residual effects. <u>Water Quality</u> **LSE(s) alone can be ruled out for the following schemes:** • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1 (M) Junction 53 Scotch Corner *Construction and Operation* LSE(s) alone are ruled out for these schemes based on their distance to Helbeck and Swindale Woods SAC and because they do not interact with habitats that are hydrologically connected or functionally linked to the SAC. Consequently LSE(s) are ruled out alone with no residual effects. Changes to the Water Environment including surface water and groundwater quality and quantity, floodplain utilisation and floodplain extents are also ruled out as the scheme is located downstream of Helbeck and Swindale Woods SAC. No groundwater Source Protection Zone (SPZ) have been identified within the Appleby to Brough scheme. The Appleby to Brough scheme is located downstream of the SAC (the surface water WFD catchment Low Gill (Crooks Beck) starts to the west of the SAC and flows south toward the scheme) and as such there is no surface water connectivity between Appleby to Brough scheme and the SAC. Consequently LSE(s) are ruled out alone with no residual effects.
Excavation requirements (e.g. impacts of local hydrogeology)	<u>All schemes</u> *Construction* **LSE(s) alone can be ruled out** No groundwater SPZ have been identified within Appleby to Brough, which is the closest lying scheme to the site. In addition, no surface water WFD catchments provide connectivity between Appleby to Brough and the site. Due to the distance of the site from the other schemes LSE are ruled out from potential excavation requirements. Consequently LSE(s) are ruled out alone with no residual effects. *Operation*

	LSE(s) alone can be ruled out No excavation required during operation, consequently LSE(s) are ruled out alone with no residual effects.
Transportation requirements	See emissions above.
Duration of construction, operation, etc.	See Section 3.3: Programme
Other	None identified ne identified
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	No specific mitigation measures to mitigate impacts to the Helbeck and Swindale Woods SAC are included in this assessment, in line with the *People Over Wind case*.
Location	N/A
Evidence for effectiveness	N/A
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	N/A
Characteristics of European Site(s) A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	Helbeck and Swindale Woods SAC (UK0030167) Appendix D: European Designated Sites Plans
Location and distance of the European Site from the proposed works	See details in "Distance from the European Site or key interests of the site (from edge of the project assessment corridor)"
European Site size	136.9 ha (Joint Nature Conservation Committee, 2021b)[15]
Key features of the European Site including the primary reasons for selection and any other qualifying interests	Annex I habitats that are a primary reason for selection of this site: • *Tilio-Acerion* forests of slopes, screes and ravines (mixed woodland on base-rich soils associated with rocky slopes)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The *Natura 2000 Data Form* (Joint Nature Conservation Committee, 202b)[16] identified the following threats, pressures and activities with high negative effect on the European site: • K04 Interspecific floral relations • H04 Air pollution, air-borne pollutants • B02 Forest and plantation management and use The following threats and pressures are taken from the Natural England Site Improvement Plan (Natural England, 2014b)[17] for the European Site: • Forest and woodland management • Disease • Air pollution: impact of atmospheric nitrogen deposition

[15] Joint Nature Conservation Committee (2021b) Helbeck and Swindale Woods Designated Special Area of Conservation, available at: https://sac.jncc.gov.uk/site/UK0030167 [Accessed 26 July 2021]
[16] Joint Nature Conservation Committee (2015b) Natura 2000 Standard Data Form: River Eden SAC (UK0012643), available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0012643.pdf [Accessed 11 August 2021]
[17] Natural England (20104b) Site Improvement Plan River Eden, available at: http://publications.naturalengland.org.uk/publication/5920746052255744 [accessed 11 August 2021]

European Site conservation objectives – where these are readily available	The conservation objectives aim (Joint Nature Conservation Committee, 2018a)[18] to: Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the favourable conservation status of its qualifying features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats • The structure and function (including typical species) of qualifying natural habitats • The supporting processes on which qualifying natural habitats rely.
Assessment criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
See below	
Initial assessment in relation to Helbeck and Swindale Woods SAC The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	All schemes **LSE(s) alone ruled out for all schemes** *Construction and Operation* No direct habitat loss is required within the Helbeck and Swindale Woods SAC boundary for any of the schemes.
Disturbance to key species	N/A
Habitat or species fragmentation	All schemes **LSE(s) alone can be ruled out** *Construction and Operation* No habitat or species fragmentation is anticipated. Consequently, LSE(s) are ruled out alone with no residual effects.
Reduction in species density	N/A
Changes in key indicators of conservation value (water quality, etc)	All schemes **LSE(s) alone can be ruled out** *Construction and Operation* See "Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)" row regarding air quality and water quality.
Climate change	**All schemes** **LSE(s) alone can be ruled out** The climate projections for the A66 area, that were calculated utilising Regional Climate Projection data, show both summer and winter temperatures projected to increase and mean precipitation rates in the area to change significantly through the next century. Climate projections for wind have the highest level of uncertainty. Wind speeds over the UK for the second half of the 21st century are projected to have significant impacts on the winter season The overall vulnerability of the SAC to climate change has been assessed by Natural England (2015) as being low taking into account the sensitivity, fragmentation, topography and management of its habitats.

[18] Joint Nature Conservation Committee (2018a) European Site Conservation Objectives for River Eden Special Area of conservation Site Code: UK0012643 (2018, version 3), available at: http://publications.naturalengland.org.uk/file/5304322711879680 [accessed 11 August 2021]

	For the purpose of this assessment, climate change will be a consideration within any proposed mitigation, where required, at the Appropriate Assessment stage. However, LSE from climate change as a result of the A66 project are not considered further within this screening assessment.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	**LSE(s) alone can be ruled out** No direct land-take is required within the SAC therefore no direct impacts to relationships that define the structure of the site are anticipated. The SAC is located over 200m from the road. In line with LA105 DMRB standards, LSE from a change in air quality are ruled out due to distance of the site from the road.
Interference with key relationships that define the function of the site	**LSE(s) alone can be ruled out** No direct habitat loss is required within the SAC therefore no direct impacts to the key relationships that define the function of the site are anticipated. The SAC is located over 200m from the road. In line with LA105 DMRB standards, LSE from a change in air quality are ruled out due to distance of the site from the road.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	**LSE(s) alone can be ruled out**
Disturbance to key species	**N/A**
Habitat or species fragmentation	**LSE(s) alone can be ruled out**
Loss	**LSE(s) alone can be ruled out**
Fragmentation	**LSE(s) alone can be ruled out**
Disruption	**LSE(s) alone can be ruled out**
Disturbance	**LSE(s) alone can be ruled out**
Change to key elements of the site (e.g. water quality, hydrological regime etc.)	**LSE(s) alone can be ruled out**
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
None	
Outcome of screening stage	**LSE(s) alone can be ruled out**
Are the appropriate statutory environmental bodies in agreement with this conclusion	The SEBs have been consulted via a series of TWGs using an Evidence Plan approach (Appendix A: Agreement Log from TWG Meetings). The SEBs have yet to be formally consulted regarding the outcome of the screening stage.

Table 6-5: Screening matrix: Moor House-Upper Teesdale SAC

Project Name:	**A66 Northern Trans-Pennine**	
European Site under consideration:	Moor House-Upper Teesdale SAC	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
August 2021	Yan-Yee Lau/Arup	Bernie Fleming/Fleming Ecology Ltd
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project includes upgrading the existing single lane sections of the A66 to dual two lane all-purpose roads with 120kph design speed and a speed limit of 70mph. The project also includes amendments to existing	

	junctions and accesses within these sections, and improvements to the terminal junctions. The traffic flow is anticipated to increase for the Do Minimum (DM) scenarios from the base typically 46% between 2015 and 2046. The average additional growth on the A66 due to the scheme (i.e. Do Something (DS) v DM) is typically between 34% and 39% across all years.
Land-take	None within the Moor House-Upper Teesdale SAC boundary
Distance from the European Site or key interests of the site (from edge of the project assessment corridor)	M6 Junction 40 to Kemplay Bank – 13.1km east Penrith to Temple Sowerby – 6.9km northeast Temple Sowerby to Appleby: • Orange alternative – 4.7km east • Blue alternative – 4.7km east • Red alternative – 4.7km east Appleby to Brough: • Orange alternative - 1.5km north • Blue alternative - 1.5km north • Black route - 1.5km north Bowes Bypass – 11.2km northwest Cross Lanes to Rokeby – 14.4km northwest Stephen Bank to Carkin Moor – 22.5km northwest A1(M) Junction 53 Scotch Corner – 33.1km northwest ARN – closest section of the ARN lies 1.5km north
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	**LSE(s) alone can be ruled out** All schemes No direct habitat loss required within the Moor House-Upper Teesdale SAC boundary. Consequently, LSE(s) are ruled out alone with no residual effects.
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	Air Quality **LSE(s) alone ruled out for all schemes**: *Construction and Operation* All schemes are located over 200m from Moor House-Upper Teesdale SAC. In line with LA 105 DMRB standards, LSE from a change in air quality are ruled out. Consequently, LSE(s) are ruled out alone with no residual effects. Water Quality **LSE(s) alone can be ruled out for the following schemes**: • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* LSE(s) alone are ruled out for these schemes based on their distance to Moor House-Upper Teesdale SAC and because they do not interact with habitats that are hydrologically connected or functionally linked to the SAC. LSE(s) as a result of changes in the Water Environment including surface water and groundwater quality and quantity, floodplain utilisation and floodplain extents are also ruled out as the scheme is located downstream of Moor House-Upper Teesdale SAC. No groundwater SPZ have been identified within the Appleby to Brough scheme. The Appleby

	to Brough scheme is located downstream of the SAC (the surface water WFD catchment Hilton Beck starts within the SAC and flows south toward the scheme) and as such there is no surface water connectivity between Appleby to Brough scheme and the SAC. Consequently, LSE(s) are ruled out alone with no residual effects.
Excavation requirements (e.g. impacts of local hydrogeology)	All schemes *Construction* **LSE(s) alone can be ruled out** No groundwater SPZ have been identified within Appleby to Brough, which is the closest lying scheme to the site. In addition, no surface water WFD catchments provide connectivity between Appleby to Brough and the site. Due to the distance of the site from the other schemes LSE are ruled out from potential excavation requirements. *Operation* **LSE(s) alone can be ruled out** No excavation required during operation, consequently LSE alone ruled out.
Transportation requirements	See emissions above.
Duration of construction, operation, etc.	See Section 3.3: Programme
Other	None identified
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	No specific mitigation measures to mitigate impacts to the Moor House-Upper Teesdale SAC are included in this assessment, in line with the *People Over Wind case*.
Location	N/A
Evidence for effectiveness	N/A
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	N/A
Characteristics of European Site(s) A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	Moor House-Upper Teesdale SAC (UK0014774) Appendix D: European Designated Sites Plans
Location and distance of the European Site from the proposed works	See details in "Distance from the European Site or key interests of the site (from edge of the project assessment corridor)"
European Site size	38,803.22 ha (Joint Nature Conservation Committee, 2021c)[19]
Key features of the European Site including the primary reasons for selection and any other qualifying interests	Qualifying Habitats: The site supports the following habitats listed in Annex I: • Alkaline fens • Alpine and boreal heaths (alpine and subalpine heaths) • Alpine pioneer formations of the (*Caricion bicoloris-atrofuscae*) (high-altitude plant communities associated with areas of water seepage) • Blanket bogs

[19] Joint Nature Conservation Committee (2021c) Moor House – Upper Teesdale Designated Special Area of Conservation, available at: https://sac.jncc.gov.uk/site/UK0014774 [accessed 26 July 2021]

	• Calaminarian grasslands of the (*Violetalia calaminariae*) (grasslands on soils rich in heavy metals) • Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) (base-rich scree) • Calcareous rocky slopes with chasmophytic vegetation (plants in crevices in base-rich rocks) • European dry heaths • Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. (calcium-rich nutrient-poor lakes, lochs and pools) • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (tall herb communities) *Juniperus communis* formations on heaths or calcareous grasslands (juniper on heaths or calcareous grasslands) • Limestone pavements • *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (purple moor-grass meadows) • Mountain hay meadows • Petrifying springs with tufa formation (*Cratoneurion*). Hard-water springs depositing lime • Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (dry grasslands and scrublands on chalk or limestone) • Siliceous alpine and boreal grasslands (montane acid grasslands) • Siliceous rocky slopes with chasmophytic vegetation (plants in crevices on acid rocks) • Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Qualifying species: • Round-mouthed whorl snail (*Vertigo genesii*) • Marsh saxifrage (*Saxifraga hirculus*)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The *Natura 2000 Data Form* (Joint Nature Conservation Committee, 2015c)[20] identified the following threats, pressures and activities with high negative effect on the European site: • K05 Reduced fecundity/ genetic depression • K04 Interspecific floral relations • J01 Fire and fire suppression • A04 Grazing • A02 Modification of cultivation practices The following threats and pressures are taken from the Natural England Site Improvement Plan (Natural England 2014c)[21] for the European Site: • Low breeding success/poor recruitment • Managed rotational burning • Inappropriate grazing • Change in land management • Disease • Hydrological changes • Game management: grouse moors • Direct land-take from development • Air pollution: risk of atmospheric nitrogen deposition

[20] Joint Nature Conservation Committee (2015c) Natura 2000 Standard Data Form (2015): Moor House-Upper Teesdale SAC (UK0014774), available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0014774.pdf [accessed 11 August 2021]
[21] Natural England (2014c) Site Improvement Plan North Pennines Group, available at: http://publications.naturalengland.org.uk/publication/6534899699810304 [Accessed 11 August 2021]

	• Fertiliser use • Inappropriate cutting/mowing • Invasive species • Agricultural management practices • Vehicles • Vehicles: illicit • Public access/disturbance • Deer • Feature location/extent/condition unknown • Climate change
European Site conservation objectives – where these are readily available	The conservation objectives aim (Natural England, 2018)[22] to: Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the favourable conservation status of its qualifying features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.
Assessment criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
See below	
Initial assessment in relation to Moor House-Upper Teesdale SAC The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	All schemes **LSE(s) alone ruled out for all schemes** *Construction and Operation* All schemes are located over 200m from Moor House-Upper Teesdale SAC. In line with LA 105 DMRB standard, LSE from a change in air quality are ruled out. LSE(s) are ruled out alone with no residual effects.
Disturbance to key species	All schemes **LSE(s) alone c*an be* ruled out** *Construction and Operation* No anticipated impacts to hydrology within the site as a result of the project, consequently no LSE for disturbance on round-mouthed whorl snail. LSE(s) are ruled out alone with no residual effects.
Habitat or species fragmentation	All schemes **LSE(s) alone can be ruled out** *Construction and Operation* No habitat or species fragmentation is anticipated. Consequently, LSE(s) are ruled out alone with no residual effects.
Reduction in species density	All schemes **LSE(s) alone cannot be ruled out** *Construction and Operation* No reduction in species density is anticipated. Consequently, LSE(s) are ruled out alone with no residual effects.

[22] Natural England (2018) European Site Conservation Objectives for River Eden Special Area of conservation Site Code: UK0012643 (version 3), available at: http://publications.naturalengland.org.uk/publication/5889740972752896 [Accessed 11 August 2021]

Changes in key indicators of conservation value (water quality, etc)	<u>All schemes</u> **LSE(s) alone can be ruled out** *Construction and Operation* See "Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)" row regarding air quality and water quality.
Climate change	<u>All schemes</u> **LSE(s) alone ruled out** The climate projections for the A66 area, that were calculated utilising Regional Climate Projection data, show both summer and winter temperatures projected to increase and mean precipitation rates in the area to change significantly through the next century. Climate projections for wind have the highest level of uncertainty. Wind speeds over the UK for the second half of the 21st century are projected to have significant impacts on the winter season. The overall vulnerability of the SAC to climate change has been assessed by Natural England (2015) as being moderate taking into account the sensitivity, fragmentation, topography and management of its habitats. For the purpose of this assessment, climate change will be a consideration within any proposed mitigation, where required, at the Appropriate Assessment stage. However, LSE from climate change as a result of the A66 project are not considered further within this screening assessment.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	**LSE(s) alone can be ruled out** No direct land-take is required within the SAC therefore no direct impacts to relationships that define the structure of the site are anticipated. The SAC is located over 200m from all schemes. In line with LA 105 DMRB standards, LSE from a change in air quality are ruled out.
Interference with key relationships that define the function of the site	**LSE(s) alone can be ruled out** No direct habitat loss is required within the SAC therefore no direct impacts to the key relationships that define the function of the site are anticipated. The SAC is located over 200m from all schemes. In line with LA 105 DMRB standards, LSE from a change in air quality are ruled out.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	**LSE(s) alone can be ruled out**
Disturbance to key species	**LSE(s) alone can be ruled out**
Habitat or species fragmentation	**LSE(s) alone can be ruled out**
Loss	**LSE(s) alone can be ruled out**
Fragmentation	**LSE(s) alone can be ruled out**
Disruption	**LSE(s) alone can be ruled out**
Disturbance	**LSE(s) alone can be ruled out**
Change to key elements of the site (e.g. water quality, hydrological regime etc.)	**LSE(s) alone can be ruled out**
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
None	

Outcome of screening stage	**LSE(s) alone can be ruled out**
Are the appropriate statutory environmental bodies in agreement with this conclusion	The SEBs have been consulted via a series of TWGs using an Evidence Plan approach (Appendix A: Agreement Log from TWG Meetings).).The SEBs have yet to be formally consulted regarding the outcome of the screening stage.

Table 6-6: Screening Matrix: North Pennines Moors SAC

Project Name:	**A66 Northern Trans-Pennine**	
European Site under consideration:	North Pennine Moors SAC	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
August 2021	Yan-Yee Lau/Arup	Bernie Fleming/Fleming Ecology Ltd
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project includes upgrading the existing single lane sections of the A66 to dual two lane all-purpose roads with 120kph design speed and a speed limit of 70mph. The project also includes amendments to existing junctions and accesses within these sections, and improvements to the terminal junctions. The traffic flow is anticipated to increase for the Do Minimum (DM) scenarios from the base typically 46% between 2015 and 2046. The average additional growth on the A66 due to the scheme (i.e. Do Something (DS) v DM) is typically between 34% and 39% across all years.	
Land-take	None within the SAC boundary	
Distance from the European Site or key interests of the site (from edge of the project assessment corridor)	M6 Junction 40 to Kemplay Bank – 28.2km southeast Penrith to Temple Sowerby – 21.5km southeast Temple Sowerby to Appleby: • Dark orange alternative – 12.2km east • Blue alternative – 12.2km east • Option red – 12.2km east Appleby to Brough: • Orange alternative– 6.6km northeast • Blue alternative – 6.6km northeast • Black alternative– 6.6km northeast Bowes Bypass – 300m north Cross Lanes to Rokeby – 5.8km west Stephen Bank to Carkin Moor – 14km northwest A1(M) Junction 53 Scotch Corner – 24.5km northwest ARN – within North Pennine Moors SAC	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	<u>All schemes</u> **LSE(s) alone can be ruled out** *Construction and Operation* No direct habitat loss required within the SAC boundary. Consequently, LSE(s) are ruled out alone with no residual effects.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble	**LSE(s) alone ruled out for the following schemes:** • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby	

pollutants, atmospheric pollution)	• Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* Due to the distance of these schemes from North Pennine Moors SAC, LSE(s) are ruled out alone with no residual effects. **LSE(s) alone cannot be ruled out for the following schemes:** • ARN *Construction and Operation* The SAC is adjacent to the ARN. Potential impacts may arise from an increase in air pollution locally as a result of construction activities and an increase in road traffic during operation. Consequently, LSE(s) alone cannot be ruled out for the ARN.
Excavation requirements (e.g. impacts of local hydrogeology)	<u>All schemes</u> **LSE(s) alone can be ruled out** *Construction and Operation* No groundwater SPZ were identified within Bowes Bypass which is the closest scheme. One surface water WFD catchment was identified within Bowes Bypass; Greta from Sleightholme Beck to Eller Beck, however this is located south of the existing A66 and does not have any hydrological connectivity to the SAC. Consequently, LSE(s) are ruled out alone with no residual effects.
Transportation requirements	See emissions above.
Duration of construction, operation, etc.	See Section 3.3: Programme
Other	None identified
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	No specific mitigation measures to mitigate impacts to the North Pennine Moors SAC are included in this assessment, in line with the *People Over Wind case*.
Location	N/A
Evidence for effectiveness	N/A
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	N/A
Characteristics of European Site(s) A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	North Pennine Moors SAC (UK0030033) Appendix D: European Designated Sites Plans
Location and distance of the European Site from the proposed works	See details in *"Distance from the European Site or key interests of the site (from edge of the project assessment corridor)"*

European Site size	103,014.48 ha (Joint Nature Conservation Committee, 2021c)[23]
Key features of the European Site including the primary reasons for selection and any other qualifying interests	Qualifying habitats: the site hosts the following habitats listed in Annex I: • European dry heaths • *Juniperus communis* formations on heaths or calcareous grasslands • Blanket bogs (*if active bog) • Petrifying springs with tufa formation (*Cratoneurion)* • Siliceous rocky slopes with chasmophytic vegetation • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles • Northern Atlantic wet heaths with *Erica tetralix* • Calaminarian grasslands of the *Violetalia calaminariae* • Siliceous alpine and boreal grasslands • Semi-natural dry grasslands and scrubland facies on calcareous substrates *Festuco Brometalia* (*important orchid sites) • Alkaline fens • Siliceous scree of the montane to snow levels *Androsacetalia alpinae* and *Galeopsietalia ladani* • Calcareous rocky with slopes with chasmophytic vegetation Qualifying species: • Marsh saxifrage (*Saxifraga hiruculus)*
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The *Natura 2000 Data Form* (Joint Nature Conservation Committee, 2015c)[24] identified the following threats, pressures and activities with high negative effect on the European site: • A04 Grazing • J01 Fire and fire suppression • A02 Modification of cultivation practices • J02 Human induced changes in hydraulic conditions • K04 Interspecific floral relations The following threats and pressures are taken from the Natural England *Site Improvement Plan* (Natural England, 2014d)[25] for the European Site: • Low breeding success/poor recruitment • Managed rotational burning • Inappropriate grazing • Change in land management • Disease • Hydrological changes • Game management: grouse moors • Direct land-take from development • Air pollution: risk of atmospheric nitrogen deposition • Fertiliser use • Inappropriate cutting/mowing • Invasive species • Agricultural management practices • Vehicles • Vehicles: illicit • Public access/disturbance • Deer

[23] Joint Nature Conservation Committee (2021d) Norther Pennine Moor Designated Special Area of Conservation, available at: https://sac.jncc.gov.uk/site/UK0030033 [accessed 11 August 2021]
[24] Joint Nature Conservation Committee (2015c) Natura 2000 Standard Data Form: River Eden SAC (UK0012643), available at: https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9006272.pdf [accessed 11 August 2021]

[25] Natural England (2014d) Site Improvement Plan River Eden, available at: http://publications.naturalengland.org.uk/file/4746751428788224 [accessed 11 August 2021]

	• Feature location/extent/condition unknown • Climate change
European Site conservation objectives – where these are readily available	The conservation objectives aim (Natural England, 2018)[26] to: Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the favourable conservation status of its qualifying features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species • The distribution of qualifying species within the site.
Assessment criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
See below	
Initial assessment in relation to North Pennine Moors SAC The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	**LSE(s) alone ruled out for the following schemes:** • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* Due to the distance of these schemes from North Pennine Moors SAC, LSE(s) are ruled out alone with no residual effects. **LSE(s) alone cannot be ruled out for the:** • ARN *Construction and Operation* No direct habitat loss is required within the SAC boundary for any of the schemes. However, potential LSEs on the damage and subsequently reduction of habitat areas cannot be excluded at this stage, as a result of changes in air quality within the ARN.
Disturbance to key species	N/A
Habitat or species fragmentation	<u>All schemes</u> **LSE(s) alone can be ruled out** *Construction and Operation* No habitat or species fragmentation is anticipated. Consequently, LSE(s) are ruled out alone with no residual effects.
Reduction in species density	**LSE(s) alone cannot be ruled out** See 'Reduction of habitat area' which may subsequently impact on habitat which supports marsh saxifrage.

[26] Natural England (2018b) European Site Conservation Objectives for River Eden Special Area of conservation Site Code: UK0012643 (version 3), available at: http://publications.naturalengland.org.uk/publication/6361191412662272 [accessed 11 August 2021]

Changes in key indicators of conservation value (water quality, etc)	**LSE(s) alone ruled out for the following schemes**: • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* Due to the distance of these schemes from North Pennine Moors SAC, LSE(s) are ruled out alone with no residual effects. **LSE(s) alone cannot be ruled out for the:** • ARN *Construction and Operation* Further assessment is required to determine baseline habitat type and condition adjacent to the ARN and subsequently how potential changes in air quality may impact on the conservation value and integrity of the site and the habitat it supports. LSE(s) associated with changes in air quality deposition rates cannot be excluded at this stage.
Climate change	All schemes **LSE(s) alone can be ruled out** The climate projections for the A66 area, that were calculated utilising Regional Climate Projection data, show both summer and winter temperatures projected to increase and mean precipitation rates in the area to change significantly through the next century. Climate projections for wind have the highest level of uncertainty. Wind speeds over the UK for the second half of the 21st century are projected to have significant impacts on the winter season. The overall vulnerability of the SAC to climate change has been assessed by Natural England (2015) as being moderate taking into account the sensitivity, fragmentation, topography and management of its habitats. For the purpose of this assessment, climate change will be a consideration within any proposed mitigation, where required, at the Appropriate Assessment stage. However, LSE from climate change as a result of the A66 project are not considered further within this screening assessment.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	**LSE(s) alone cannot be ruled out** Further analysis is required before the risk of a significant effect (alone or in-combination) may have on the structure of the SAC.
Interference with key relationships that define the function of the site	**LSE(s) alone cannot be ruled out** Further analysis is required before the risk of a significant effect (alone or in-combination) may have on the function of habitats within the SAC.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SAC adjacent to the ARN is required to fully assess the impacts.
Disturbance to key species	**LSE(s) alone can be ruled out**
Habitat or species fragmentation	**LSE(s) alone can be ruled out**
Loss	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SAC adjacent to the ARN is required to fully assess the impacts.

Fragmentation	**LSE(s) alone can be ruled out**
Disruption	**LSE(s) alone can be ruled out**
Disturbance	**LSE(s) alone can be ruled out**
Change to key elements of the site (e.g. water quality, hydrological regime etc.)	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SAC adjacent to the ARN is required to fully assess the impacts.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Emissions (air quality), reduction of habitat area and reduction in species density. Further analysis of air quality data at the appropriate assessment stage is required before the risk of LSE (alone or in-combination) can be determined.	
Outcome of screening stage	**LSE(s) alone cannot be ruled out**
Are the appropriate statutory environmental bodies in agreement with this conclusion	The SEBs have been consulted via a series of TWGs using an Evidence Plan approach (Appendix A: Agreement Log from TWG Meetings).).The SEBs have yet to be formally consulted regarding the outcome of the screening stage.

Table 6-7: Screening matrix: North Pennine Moors SPA

Project Name:	**A66 Northern Trans-Pennine**	
European Site under consideration:	North Pennine Moors SPA	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
August 2021	Tracey McLean/ArupYan-Yee Lau/Arup	Bernie Fleming/Fleming Ecology Ltd
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project includes upgrading the existing single lane sections of the A66 to dual two lane all-purpose roads with 120kph design speed and a speed limit of 70mph. The project also includes amendments to existing junctions and accesses within these sections, and improvements to the terminal junctions. The traffic flow is anticipated to increase for the Do Minimum (DM) scenarios from the base typically 46% between 2015 and 2046. The average additional growth on the A66 due to the scheme (i.e. Do Something (DS) v DM) is typically between 34% and 39% across all years.	
Land-take	None within the SPA boundary	
Distance from the European Site or key interests of the site (from edge of the project assessment corridor)	M6 Junction 40 to Kemplay Bank – 28.2km southeast Penrith to Temple Sowerby – 21.5km southeast Temple Sowerby to Appleby: • Dark orange alternative – 12.2km east • Blue alternative – 12.2km east • Red alternative – 12.2km east Appleby to Brough: • Orange alternative – 6.6km northeast • Blue alternative – 6.6km northeast • Black alternative – 6.6km northeast Bowes Bypass – 300m north Cross Lanes to Rokeby – 5.8km west Stephen Bank to Carkin Moor – 14km northwest	

	A1(M) Junction 53 Scotch Corner – 24.5km northwest ARN – within the North Pennine Moors SPA
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	All schemes **LSE(s) alone can be ruled out** *Construction and Operation* No direct habitat loss required within the SPA boundary. Consequently, LSE(s) are ruled out alone with no residual effects.
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	All schemes **LSE(s) alone cannot be ruled out** *Construction and Operation* The SPA is located over 200m from the road. However, the site is located adjacent to the ARN. Potential impacts may arise from an increase in air pollution locally as a result of construction activities and an increase in road traffic during operation. In addition, mitigation design is to be confirmed, therefore potential impacts on functionally linked habitat cannot currently be excluded.
Excavation requirements (e.g. impacts of local hydrogeology)	All schemes **LSE(s) alone can be ruled out** *Construction and Operation* No groundwater SPZ were identified within Bowes Bypass which is the closest scheme. One surface water WFD catchment was identified within Bowes Bypass; Greta from Sleightholme Beck to Eller Beck, however this is located south of the existing A66 and does not have any hydrological connectivity to the SAC. Consequently, LSE(s) are ruled out alone with no residual effects.
Transportation requirements	See emissions above.
Duration of construction, operation, etc.	See Section 3.3: Programme
Other	None identified
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	No specific mitigation measures to mitigate impacts to the North Pennine Moors SPA are included in this assessment, in line with the *People Over Wind case*.
Location	N/A
Evidence for effectiveness	N/A
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	N/A
Characteristics of European Site(s) A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	North Pennine Moors SPA (UK9006272) Appendix D: European Designated Sites Plans
Location and distance of the European Site from the proposed works	See details in *"Distance from the European Site or key interests of the site (from edge of the project assessment corridor)"*

European Site size	147,276.11 ha (Joint Nature Conservation Committee, 2021e)[27]
Key features of the European Site including the primary reasons for selection and any other qualifying interests	Includes parts of the Pennine moorland massif between the Tyne Gap (Hexham) and the Ribble-Aire corridor (Skipton). Encompasses extensive tracts of semi-natural moorland habitats including upland heath and blanket bog. Qualifying species (breeding): • Golden plover (*Pluvialis apricaria)* • Hen harrier (*Circus cyaneus)* • Merlin (*Falco columbarius)* • Peregrine (*Falco peregrinus)* Non-qualifying species of interest (breeding): • Montagu's harrier (*Circus pygargus)* • Short-eared owl (*Asio flammeus)*
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The Natura 2000 Data Form (Natural England, 2014b)[28] identified the following threats, pressures and activities with high negative effect on the European site: • A04 Grazing • J01 Fire and fire suppression • J02 Human induced changes in hydraulic conditions • F03 Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.) • K05 Reduced fecundity/ genetic depression The following threats and pressures are taken from the Natural England Site Improvement Plan (Natural England, 2014e)[29] for the European Site: • Low breeding success/poor recruitment • Managed rotational burning • Inappropriate grazing • Change in land management • Disease • Hydrological changes • Game management: grouse moors • Direct land-take from development • Air pollution: risk of atmospheric nitrogen deposition • Fertiliser use • Inappropriate cutting/mowing • Invasive species • Agricultural management practices • Vehicles • Vehicles: illicit • Public access/disturbance • Deer • Feature location/extent/condition unknown

[27] Joint Nature Conservation Committee (2021e) Stand Data Form for sites, available at: https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9006272.pdf [accessed 26 July 2021]
[28] Natural England (2015b) Natura 2000 Standard Data Form (2015): North Pennine Moors SPA (UK9006272), available at: https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9006272.pdf [accessed 11 August 2021]
[29] Natural England (2014e) Site Improvement Plan North Pennines Group http://publications.naturalengland.org.uk/publication/6534899699810304 [accessed 11 August 2021]

	• Climate change
European Site conservation objectives – where these are readily available	The conservation objectives aim (Natural England, 2019)[30] to: Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the wild bird's directive, by maintaining or restoring: -The extent and distribution of the habitats of the qualifying features -The structure and function of the habitats of the qualifying features -The supporting processes on which the habitats of the qualifying features rely -The population of each of the qualifying features -The distribution of the qualifying features within the site.
Assessment criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
See below	
Initial assessment in relation to North Pennine Moors SPA The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	All schemes **LSE(s) alone cannot be ruled out** *Construction and Operation* No direct habitat loss is required within the SPA boundary for any of the schemes. However, LSEs associated with the reduction of habitat areas cannot be excluded at this stage as a result of changes in air quality within the ARN.
Disturbance to key species	All schemes **LSE(s) alone cannot be ruled out** *Construction and Operation* Following breeding bird surveys in 2021, one single golden plover (possibly breeding) was recorded utilising suitable habitat of the SPA within proximity to the existing ARN. The numbers of recorded pairs is <1% of the SPA population. This is defined at <1% of the SPA population which equates to less than: • 28 individual golden plover. • One hen harrier. • Two Merlin. • One Peregrine. Disturbance to a larger number of birds (i.e. >1% SPA population) would be considered a significant impact. However, confirmation of environmental mitigation design is required to rule out any residual effects, therefore LSE alone cannot be ruled out.
Habitat or species fragmentation	All schemes **LSE(s) alone cannot be ruled out** *Construction and Operation* Further analysis is required on potential air quality impacts as a result of the project which could result in a decrease in habitat quality within the SPA or outside it but functionally linked. Air pollution has the potential to decrease the quality of available breeding habitat by altering the plant species composition.
Reduction in species density	All schemes **LSE(s) alone cannot be ruled out** *Construction and Operation*

[30] Natural England (2019) European Site Conservation Objectives for North Pennine Moors SPA Site Code: UK9006272 (version 3), available at: http://publications.naturalengland.org.uk/publication/6079716435951616 [accessed 11 August 2021]

	Further analysis is required to determine habitat type and condition adjacent to the ARN and subsequently how potential changes in air quality may impact on habitat quality and extent.
Changes in key indicators of conservation value (water quality, etc)	<u>All schemes</u> **LSE(s) alone cannot be ruled out** *Construction and Operation* Further analysis is required to determine habitat type and condition adjacent to the ARN and subsequently how potential changes in air quality may impact on the conservation value and integrity of the site and the habitat it supports
Climate change	<u>All schemes</u> **LSE(s) alone can be ruled out** The climate projections for the A66 area, that were calculated utilising Regional Climate Projection data, show both summer and winter temperatures projected to increase and mean precipitation rates in the area to change significantly through the next century. Climate projections for wind have the highest level of uncertainty. Wind speeds over the UK for the second half of the 21st century are projected to have significant impacts on the winter season (Arup, 2021).[13] For the purpose of this assessment, climate change will be a consideration within any proposed mitigation, where required, at the Appropriate Assessment stage. However, LSE from climate change as a result of the A66 project are not considered further within this screening assessment.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	**LSE(s) alone cannot be ruled out** Further analysis of air quality impacts is required before the risk of a significant effect (alone or in-combination) can be determined on the structure of the site.
Interference with key relationships that define the function of the site	**LSE(s) alone cannot be ruled out** Further analysis of air quality impacts is required before the risk of a significant effect (alone or in-combination) can be determined on the function of the site.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SPA adjacent to the ARN is required to fully assess the impacts.
Disturbance to key species	**LSE(s) alone cannot be ruled out** Confirmation of environmental mitigation design is required to rule out any residual effects.
Habitat or species fragmentation	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SPA adjacent to the ARN is required to fully assess the impacts.
Loss	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SPA adjacent to the ARN is required to fully assess the impacts.
Fragmentation	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SPA adjacent to the ARN is required to fully assess the impacts.
Disruption	**LSE(s) alone cannot be ruled out**
Disturbance	**LSE(s) alone cannot be ruled out** **As 'Disturbance to key species' above**
Change to key elements of the site (e.g. water	**LSE(s) alone cannot be ruled out** Further survey work to determine habitat present within the SPA adjacent to the ARN is required to fully assess the impacts.

quality, hydrological regime etc.)	
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Emissions (air quality), disturbance to key species and reduction of habitat area Further analysis of air quality data at the appropriate assessment stage is required before the risk of LSE (alone or in-combination) can be determined. In addition, mitigation design is to be confirmed, therefore potential impacts on functionally linked habitat cannot currently be excluded	
Outcome of screening stage	**LSE(s) alone cannot be ruled out**
Are the appropriate statutory environmental bodies in agreement with this conclusion	The SEBs have been consulted via a series of TWGs using an Evidence Plan approach (Appendix A: Agreement Log from TWG Meetings).). The SEBs have yet to be formally consulted regarding the outcome of the screening stage.

Table 6-8: Screening matrix Asby Complex SAC.

Project Name:	**A66 Northern Trans-Pennine**	
European Site under consideration:	Asby Complex SAC	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
August 2021	Yan-Yee Lau/Arup	Bernie Fleming/Fleming Ecology Ltd
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project includes upgrading the existing single lane sections of the A66 to dual two lane all-purpose roads with 120kph design speed and a speed limit of 70mph. The project also includes amendments to existing junctions and accesses within these sections, and improvements to the terminal junctions. The traffic flow is anticipated to increase for the Do Minimum (DM) scenarios from the base typically 46% between 2015 and 2046. The average additional growth on the A66 due to the scheme (i.e. Do Something (DS) v DM) is typically between 34% and 39% across all years.	
Land-take	None within the SAC boundary	
Distance from the European Site or key interests of the site (from edge of the project assessment corridor)	More than 2km from the project. ARN – adjacent to Asby Complex SAC	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	<u>All schemes</u> **LSE(s) alone can be ruled out** No direct habitat loss required within the SAC boundary. Consequently, LSE(s) are ruled out alone with no residual effects.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	**LSE(s) alone ruled out for the following schemes**: • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass	

	• Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* Due to the distance of these schemes from Asby Complex SAC, LSE(s) are ruled out alone with no residual effects. **LSE(s) alone cannot be ruled out for:** • ARN *Construction and Operation* Impacts of nitrogen deposition has been considered as part of the air quality assessment, based on predicted emissions of nitrogen oxides (NOx) from vehicles in the opening year of the project. However, Highways England is developing a tool for determining the additional contribution of ammonia (NH_3) emissions from vehicles to deposited nitrogen. This is likely to result in additional nitrogen deposition. Asby Complex SAC is located within 200m of the ARN. Further air quality assessment is required at the appropriate assessment stage to determine potential impacts on the qualifying features of the site. Consequently, LSE(s) alone cannot be ruled out.
Excavation requirements (e.g. impacts of local hydrogeology)	<u>All schemes</u> **LSE(s) alone can be ruled out** *Construction and Operation* Due to the distance of the road from the SAC, LSE alone are ruled out. Consequently, LSE(s) are ruled out alone with no residual effects.
Transportation requirements	See emissions above.
Duration of construction, operation, etc.	See Section 3.3: Programme
Other	None identified
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	No specific mitigation measures to mitigate impacts to the Asby Complex SAC are included in this assessment, in line with the *People Over Wind case*.
Location	N/A
Evidence for effectiveness	N/A
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	N/A
Characteristics of European Site(s) A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	Asby Complex SAC (UK0014778) Appendix D: European Designated Sites Plans
Location and distance of the European Site from the proposed works	See details in "Distance from the European Site or key interests of the site (from edge of the project assessment corridor)"
European Site size	3134.01 ha (Joint Nature Conservation Committee, 2021f)[31]
Key features of the European Site including	<u>Qualifying habitats:</u>

[31] Joint Nature Conservation Committee (2021f) Asby Complex Designated Special Area of Conservation, available at: https://sac.jncc.gov.uk/site/UK0014778 [accessed 26 July 2021].

the primary reasons for selection and any other qualifying interests	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) • Petrifying springs with tufa formation (*Cratoneurion*) • Alkaline fens • Limestone pavements • Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. • European dry heaths • Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* Qualifying species: • Geyer's whorl snail (*Vertigo geyeri*) • Slender green feather-moss *Drepanocladus* (*Hamatocaulis*) *vernicosus*
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The *Natura 2000 Data Form* (Joint Nature Conservation Committee, 2015)[32] identified the following threats, pressures and activities with high negative effect on the European site: • I01 Invasive non-native species • A05 Livestock farming and animal breeding (without grazing) • J02 Human induced changed in hydraulic conditions • H02 Pollution to groundwater (point sources and diffuse sources) • A02 Modification of cultivation practices The following threats and pressures are taken from the Natural England Site Improvement Plan (Natural England, 2014e)[33] for the European Site: • Change in land management • Hydrological changes • Inappropriate stock feeding • Water pollution • Invasive species • Fish stocking • Air pollution: impact of atmospheric nitrogen deposition • Public access/disturbance
European Site conservation objectives – where these are readily available	The conservation objectives aim (Natural England, 2018c)[34] to: Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the favourable conservation status of its qualifying features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species

[32] Joint Nature Conservation Committee (2015) Natura 2000 Standard Data Form: Asby Complex SAC (UK0014778), available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0014778.pdf [Accessed 11 August 2021]

[33] Natural England (2014e) Site Improvement Plan Asby Complex SAC, available at: http://publications.naturalengland.org.uk/publication/5510512787849216?category=5023791411363840 [Accessed 11 August 2021]

[34] Natural England (2018c) European Site Conservation Objectives for Asby Complex Site Code: UK0014778 (version 3), available at: http://publications.naturalengland.org.uk/publication/4873120351518720 [accessed 11 August 2021]

	• The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species • The distribution of qualifying species within the site.
Assessment criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
See below	
Initial assessment in relation to Asby Complex SAC The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	**LSE(s) alone ruled out for the following schemes:** • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* Due to the distance of these schemes from Asby Complex SAC, LSE(s) are ruled out alone with no residual effects. **LSE(s) alone cannot be ruled out for:** • ARN *Construction and Operation* No direct habitat loss is required within the SAC boundary for any of the schemes. However, LSE(s) associated with the reduction of habitat areas cannot be excluded at this stage as a result of changes in air quality within the ARN. Impacts from ammonia are to be included within the air quality modelling data in addition to nitrogen, however at this stage this information was not available. Consequently, LSE(s) alone cannot be ruled out.
Disturbance to key species	**LSE(s) alone can be ruled out** No disturbance to key species is anticipated
Habitat or species fragmentation	**LSE(s) alone can be ruled out** No habitat or species fragmentation is anticipated
Reduction in species density	**LSE(s) alone ruled out for the following schemes:** • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* Due to the distance of these schemes from Asby Complex SAC, LSE(s) are ruled out alone with no residual effects. **LSE(s) alone cannot be ruled out for:** • ARN

	Construction and Operation Further analysis of air quality data at the appropriate assessment stage is required to determine LSE(s) on habitats that support qualifying species
Changes in key indicators of conservation value (water quality, etc)	**LSE(s) alone ruled out for the following schemes:** • M6 Junction 40 to Kemplay Bank • Penrith to Temple Sowerby • Temple Sowerby to Appleby • Appleby to Brough • Bowes Bypass • Cross Lanes to Rokeby • Stephen Bank to Carkin Moor • A1(M) Junction 53 Scotch Corner *Construction and Operation* Due to the distance of these schemes from Asby Complex SAC, LSE(s) are ruled out alone with no residual effects. **LSE(s) alone cannot be ruled out for:** • ARN *Construction and Operation:* Further analysis of air quality data at the appropriate assessment stage is required to determine LSE(s) on qualifying habitats.
Climate change	<u>All schemes</u> **LSE(s) alone ruled out** The climate projections for the A66 area, that were calculated utilising Regional Climate Projection data, show both summer and winter temperatures projected to increase and mean precipitation rates in the area to change significantly through the next century. Climate projections for wind have the highest level of uncertainty. Wind speeds over the UK for the second half of the 21st century are projected to have significant impacts on the winter season. For the purpose of this assessment, climate change will be a consideration within any proposed mitigation, where required, at the Appropriate Assessment stage. However, LSE from climate change as a result of the A66 project are not considered further within this screening assessment.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	**LSE(s) alone cannot be ruled out** Further analysis of air quality impacts is required before the risk of a significant effect (alone or in-combination) can be determined on the structure of the site.
Interference with key relationships that define the function of the site	**LSE(s) alone cannot be ruled out** Further analysis of air quality impacts is required before the risk of a significant effect (alone or in-combination) can be determined on the function of the site.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	**LSE(s) alone cannot be ruled out**
Disturbance to key species	**LSE(s) alone can be ruled out**
Habitat or species fragmentation	**LSE(s) alone can be ruled out**
Loss	**LSE(s) alone cannot be ruled out**
Fragmentation	**LSE(s) alone can be ruled out**
Disruption	**LSE(s) alone can be ruled out**
Disturbance	**LSE(s) alone can be ruled out**

Change to key elements of the site (e.g. water quality, hydrological regime etc.)	**LSE(s) alone cannot be ruled out**
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Emissions (air quality), reduction in species density and reduction of habitat area Further analysis of air quality data at the appropriate assessment stage is required before the risk of LSE (alone or in-combination) can be determined.	
Outcome of screening stage	**LSE(s) alone cannot be ruled out**
Are the appropriate statutory environmental bodies in agreement with this conclusion	The SEBs have been consulted via a series of TWGs using an Evidence Plan approach (Appendix A: Agreement Log from TWG Meetings). The SEBs have yet to be formally consulted regarding the outcome of the screening stage.

6.5 Summary

River Eden SAC

6.5.1 LSE(s) alone cannot be ruled out in relation to emissions (air quality and water quality), a reduction of habitat area/resource requirements and disturbance to habitats and species on River Eden SAC.

6.5.2 Further analysis is required before the risk of a significant effect (alone or in-combination) can be determined from these elements of the project.

Helbeck and Swindale Woods SAC

6.5.3 LSE(s) alone can be ruled out for Helbeck and Swindale Woods SAC.

Moor House-Upper Teesdale SAC

6.5.4 LSE(s) alone can be ruled out for Moor House-Upper Teesdale SAC.

North Pennine Moors SAC

6.5.5 LSE(s) alone cannot be ruled out in relation to emissions (air quality), a reduction of habitat area and reduction in species density on North Pennine Moors SAC.

6.5.6 Further analysis is required before the risk of a significant effect (alone or in-combination) can be determined from these elements of the project.

North Pennine Moors SPA

6.5.7 LSE(s) alone cannot be ruled out in relation to emissions (air quality) and a reduction of habitat area on North Pennine Moors SPA.

6.5.8 Further analysis is required before the risk of a significant effect (alone or in-combination) can be determined from these elements of the project.

Asby Complex SAC

6.5.9 LSE(s) alone cannot be ruled out in relation to emissions (air quality), reduction in species density and a reduction of habitat area on Asby Complex SAC.

6.5.10 Further analysis is required before the risk of a significant effect (alone or in-combination) can be determined from these elements of the project.

Conclusion

6.5.11 The following European sites are taken forward to Stage 2 Appropriate Assessment:

- River Eden SAC
- North Pennine Moors SAC
- North Pennine Moors SPA
- Asby Complex SAC

Appendix A Agreement Log from TWG Meetings

ID	Area where agreement is sought	Status (agreed/ under discussion)	Progress of agreement and required actions	Details of relevant meetings/ Correspondence (ref)
HRA01	HRA screening: sites and features/aspects	Agreed (pending update to screening report)	Currently agreed, but HRA screening to be updated based on agreed design options. The Oligotrophic to mesotrophic standing water within the River Eden and SAC refers to Ullswater. Natural England agrees that this SAC feature is outside of the biodiversity study area but notes that it still needs to be mentioned as a reason for designation (as a footnote).	TWG1 (08/2/21) TWG2 (18/3/21) Draft A66 Biodiversity Survey Strategy
HRA02	Screening of SAC sites around Affected Road Network (ARN) (e.g. River Derwent and Bassenthwaite Lake)	Agreed (pending update to screening report)	Note that updated HRA screening to include all route options and latest ARN in draft (May 2021)	TWG1 (08/2/21) TWG2 (18/3/21) Draft A66 Biodiversity Survey Strategy
HRA03	Baseline data requirements, data availability and survey requirements in relation to River Eden SAC (e.g. fish surveys of becks upstream and downstream of the A66 that are connected and functionally linked to the SAC)	Under discussion	Natural England have indicated (comment on the draft A66 NSIP scoping document) that fish surveys will be required where there is no Environment Agency data. The Draft A66 Biodiversity Survey Strategy commits to surveying all watercourses crossed by the scheme to determine presence/health of aquatic receptors that are qualifying features of the SAC. This document has been shared with the HRA TWG stakeholders and the IPT are drafting responses to comments/amending methodologies, where appropriate, in response to stakeholder feedback.	Comments on the Draft A66 Biodiversity Survey Strategy have been received from Natural England and Environment Agency
HRA04	Baseline data requirements for Annex I	Agreed	In their comments on the draft A66 NSIP scoping document (December 2020), Natural	Natural England comments on the draft

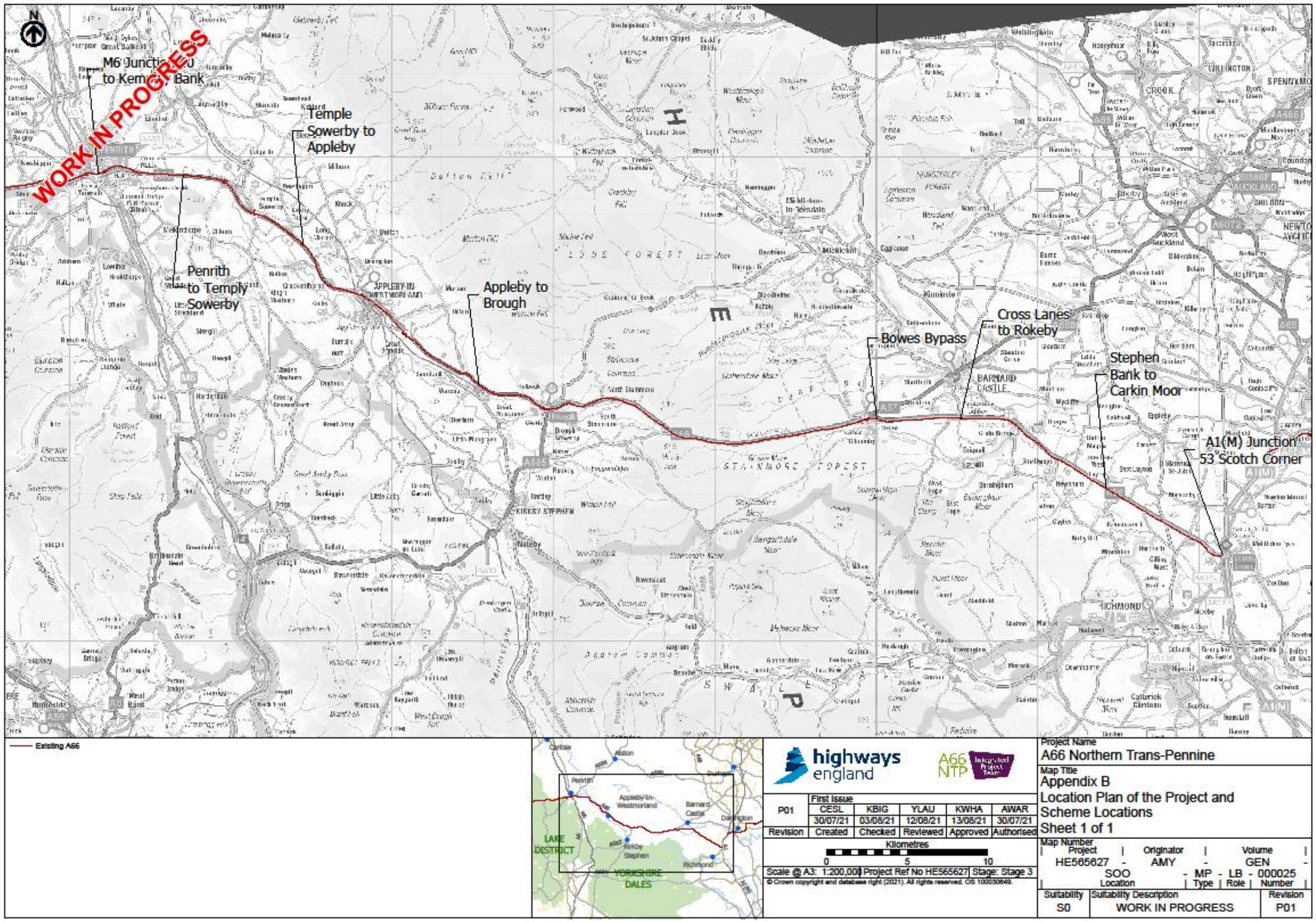
ID	Area where agreement is sought	Status (agreed/ under discussion)	Progress of agreement and required actions	Details of relevant meetings/ Correspondence (ref)
	river habitat to include the riparian zone and the supporting processes on which qualifying natural species/habitats rely.		England note that the River Eden SAC is designated for its Rivers with floating vegetation often dominated by water-crowfoot. This is the River Eden river habitat and is present thought the whole length of the SAC (except for Ullswater) and hence is present in the study area. The impact on this habitat needs to be assessed in many of the scheme areas, but in particular Schemes 4 & 5. The notified SSSI river feature (which is the same as the SAC feature) is Flowing waters - Type VI: base-rich, mesotrophic rivers in western and northern Britain, with a moderate to fast current. Natural England noted that the designated river habitat feature (whether SSSI or SAC) is taken to comprise all components of river habitat, including in-channel, marginal and riparian habitats and any adjacent floodplain habitats that are hydrologically dependent on the river. The hydrological, chemical, physical and biological elements of the river are all considered to be integral components of the notified river habitat feature, which provides the basis for direct protection of natural habitat function. Draft A66 Biodiversity Survey Strategy commits to a number of surveys (macrophyte, River Corridor Survey, NVC) to gather data to underpin the HRA. Detailed fluvial geomorphology surveys and modelling	A66 NSIP scoping document (09 December 2020). Comments on the Draft A66 Biodiversity Survey Strategy have been received from Natural England and Environment Agency

ID	Area where agreement is sought	Status (agreed/ under discussion)	Progress of agreement and required actions	Details of relevant meetings/ Correspondence (ref)
			are also proposed to underpin the HRA in terms of supporting river processes.	
HRA05	Baseline data requirements, data availability and further breeding and wintering bird surveys in relation to North Pennines SPA	Under discussion	As above the ornithology survey requirements are set out in the Biodiversity Survey Strategy and surveys are ongoing	Comments on the Draft A66 Biodiversity Survey Strategy have been received from Natural England and Environment Agency
HRA06	Potential for runoff into SAC and SAC tributaries	Under discussion	The Highways England Water Risk Assessment Tool (HEWRAT), that was designed in consultation with regulators is to be used to specify an appropriate level of treatment for road runoff. Construction related runoff will be managed using best practice techniques (such as sediment fencing and onsite filtration systems). Construction-phase mitigation (inc. construction timings) needs to be discussed with the regulator and captured in the HRA and project EMP	TBC
HRA07	Approach to assessment in relation to white-clawed crayfish (WCC) and other biosecurity aspects	Under discussion	The approach to assessment of WCC is being discussed with the regulator (see HRA12 below). Mitigation, including methods to minimise biosecurity risk during construction is tables for future HRA and IcIA TWGs.	Email Karen Slater 30 March 2021 17:45
HRA08	Potential for impacts on habitat connectivity		Surveys of the aquatic and terrestrial habitats associated with/linked to the European Sites are ongoing. A project wide *A66 Watercourse Crossing Technical Note* has been produced and shared with the design teams to ensure	Draft A66 Biodiversity Survey Strategy Environment Agency/ Natural England comments on the Draft

ID	Area where agreement is sought	Status (agreed/ under discussion)	Progress of agreement and required actions	Details of relevant meetings/ Correspondence (ref)
			connectivity for aquatic and riparian species is maintained/enhanced. The specific design solution at each crossing will be informed by this note, the emerging ecology data and technical input form the relevant species leads.	A66 Biodiversity Survey Strategy A66 Watercourse Crossing Technical Note
HRA09	Modelling scope and methodology in relation to Trout Beck crossing	Under discussion	The approach to in-channel and "out of bank" flood flow modelling has been discussed with the HRA TWG stakeholders. An updated scope of works for the modelling has been developed reviewed by Amey-Arup. This has been shared with stakeholders (May 2021). This will be reviewed by technical staff (modellers, fluvial geomorphologist and biodiversity specialists) at the Environment Agency/ Natural England and any other interested parties. The project will seek agreement for the regulator that the proposes methodology is considered adequate to underpin the HRA.	TWG1 (08/2/21) TWG2 (18/3/21) W21-0845 – A66 NTP Geomorphology Modelling – (v1.0 March 2021)
HRA10	Impact of new crossing on SAC habitats and qualifying species	Under discussion	As above, modelling to inform impact on habitats and supporting river processes. Impacts to be mitigated through sensitive watercourse crossing design as captured in A project wide *A66 Watercourse Crossing Technical Note* Parameters/design of the new crossing of Trout Beck have been discussed (TWG1 and TWG2). Future sessions will cover additional crossings in all Schemes flowing into the SAC.	TWG1 (08/2/21) TWG2 (18/3/21) W21-0845 – A66 NTP Geomorphology Modelling – (v1.0 March 2021) A66 Watercourse Crossing Technical Note

ID	Area where agreement is sought	Status (agreed/ under discussion)	Progress of agreement and required actions	Details of relevant meetings/ Correspondence (ref)
HRA11	In combination projects and plans for inclusion in assessment	Under discussion	A draft list of in combination projects and plans were not included in the Stage 2 HRA screening. This list will be drafted as part of the HRA	HRA Documentation
HRA12	Use of eDNA techniques for freshwater and riparian receptors	Under discussion	Application raised for designated funds to undertake supplementary eDNA analysis. The objective of this monitoring is to supplement presence/absence data derived from traditional survey techniques (e.g. electric fishing and manual search/trapping for WCC. Application subject to Highways England funding approval (dependant on prioritisation of funding). eDNA monitoring of watercourse agreed in July 2021.	Email Karen Slater (NE) 30 March 2021 17:45 Environment Agency/ Natural England comments on the Draft A66 Biodiversity Survey Strategy Designated Funds Tracker
TWG4	[Placeholder: to add info from TWG4 held on 12/08/21]			

Appendix B Location plan of the project and scheme locations.


WORK IN PROGRESS
M6 Junction 40 to Kemplay Bank
Temple Sowerby to Appleby
Penrith to Temply Sowerby
Appleby to Brough
Bowes Bypass
Cross Lanes to Rokeby
Stephen Bank to Carkin Moor
A1(M) Junction 53 Scotch Corner
Existing A66
highways england
A66 NTP Integrated Project Team
Project Name
A66 Northern Trans-Pennine
Map Title
Appendix B
Location Plan of the Project and Scheme Locations
Sheet 1 of 1
P01 | First Issue | CESL | KBIG | YLAU | KWHA | AWAR | 30/07/21 | 03/08/21 | 12/08/21 | 13/08/21 | 30/07/21
Revision | Created | Checked | Reviewed | Approved | Authorised
Kilometres 0 5 10
Scale @ A3: 1:200,000 Project Ref No HE565627 Stage: Stage 3
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Map Number
Project HE565627 - Originator AMY - Volume GEN - Location SOO - Type MP - Role LB - Number 000025
Suitability S0 | Suitability Description WORK IN PROGRESS | Revision P01

Appendix C European Designated Sites Citations

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	River Eden
Unitary Authority/County:	Cumbria
SAC status:	Designated on 1 April 2005
Grid reference:	NY).462237
SAC EU code:	UK0012643
Area (ha):	2463.23
Component SSSI:	River Eden and Tributaries SSSI

Site description:

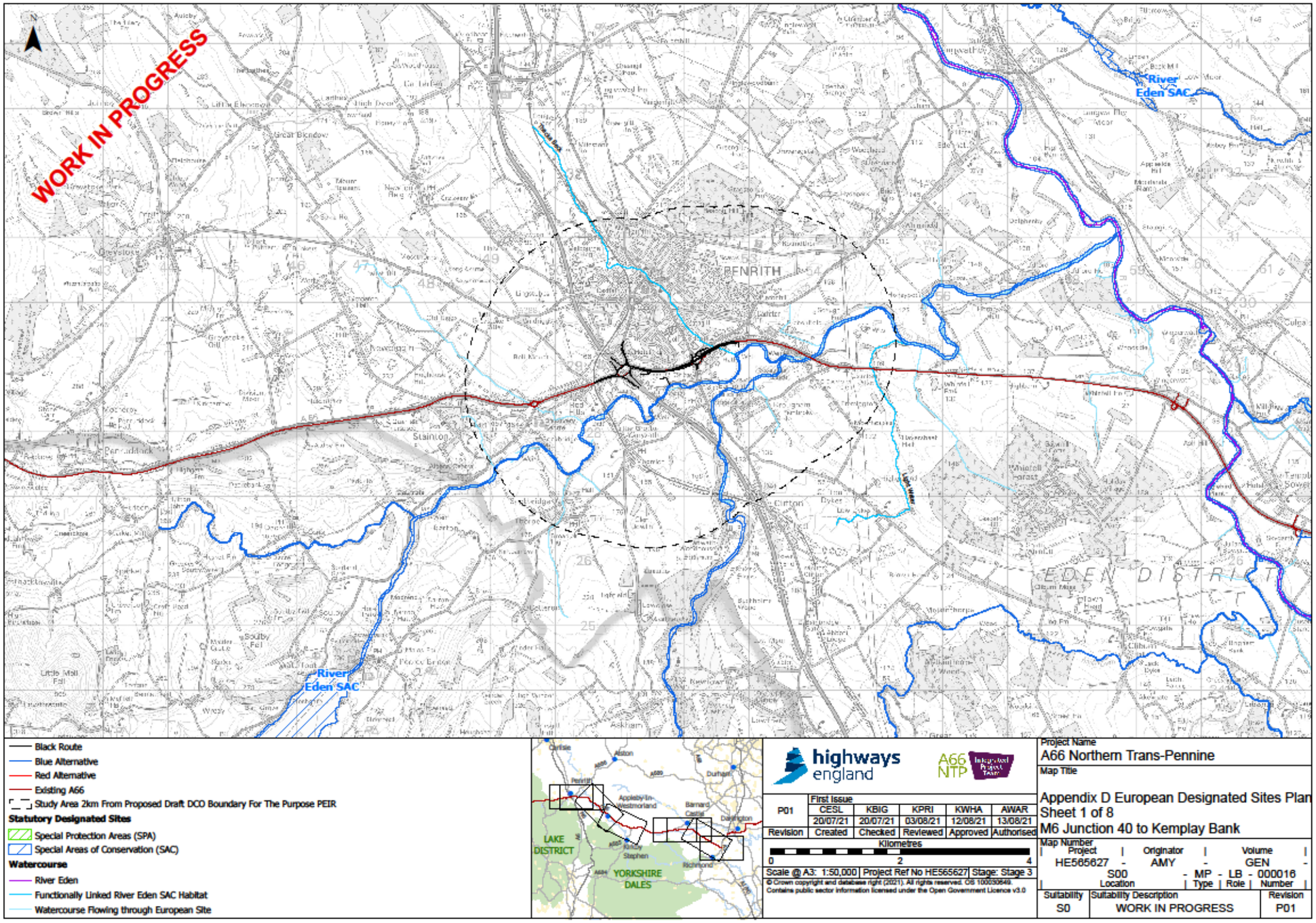
The Eden is an outstanding floristically rich, northern river on sandstone and hard limestone. The catchment includes headwaters running off the Yorkshire Dales, the North Pennines and the eastern fells of the Lake District District and the major standing water body of Ullswater. Streams flowing from limestone are calcareous, whilst those flowing off the Pennines and the Lake District fells are more acidic. The nutrient status gradually changes along the Eden's length as nutrient loadings naturally increase in the lower reaches.

The variations in the physical and chemical character of the Eden result in an unusual and exceptionally rich aquatic flora. Upstream from Appleby, it is typical of nutrient poor, rapid upland rivers, and bryophytes and algae are the main components. The middle reaches support an aquatic flora characteristic of sandstone and limestone rivers. Water-crowfoots dominate the faster flowing sections with river water-crowfoot *Ranunculus fluitans* and common water crow-foot *R. aquatilis*. Slower flowing stretches have associated species such as water-milfoils *Myriophyllum spp*, and various pondweeds including perfoliate pondweed *Potamogeton perfoliatus* and various-leaved pondweed *P. gramineus*. In the lower reaches the algae *Hildenbrandia rivularis*, *Nostoc parmelioide* and the lichen *Collema fluviatile* appear in the river. The tributaries support a variety of stream water-crowfoot *R. penicillatus ssp* in association with marginal plants such as lesser water parsnip *Berula erecta* and pink water-speedwell *Veronica anagallis-aquatica*.

Throughout the length of the River Eden stands of alder *Alnus glutinosa* and willow *Salix* spp. occur associated with backwaters and seasonally-flooded channels. The least-disturbed stands are on the tributary River Irthing, where they occur on the shingle and gravels of actively-moving channels. The ground flora includes patches of common nettle *Urtica dioica*, butterbur *Petasites hybridus* and hogweed *Heracleum sphondylium* that grade into hollows with greater tussock-sedge *Carex paniculata*.

Ullswater is a relatively deep lake with both oligotrophic (nutrient poor) and mesotrophic (moderate levels of nutrients) elements in its fauna and flora. The south-western part of the lake is surrounded by high fells of the Borrowdale Volcanics with enclosed farmland confined to the valley bottoms. The north-eastern arm is in gentler terrain with deeper soils and a greater extent of enclosed farmland. The lake flows into the River Eamont, one of the major tributaries of the River Eden. The lake has an extremely rich aquatic flora, including eight species of *Potamogeton*. These include various-leaved pondweed *P. gramineus*, red pondweed *P. alpinus* and long-stalked pondweed *P. praelongus*. The nationally scarce six-stamened waterwort *Elatine hexandra* is also found in some of the bays. Ullswater supports one of the few populations of schelly *Coregonus lavaretus* in the UK.

Appendix D European Designated Sites Plans


WORK IN PROGRESS
PENRITH
EDEN DISTRICT
River Eden SAC
River Eden SAC
Stainton
Carlton
Black Route
Blue Alternative
Red Alternative
Existing A66
Study Area 2km From Proposed Draft DCO Boundary For The Purpose PEIR
Statutory Designated Sites
Special Protection Areas (SPA)
Special Areas of Conservation (SAC)
Watercourse
River Eden
Functionally Linked River Eden SAC Habitat
Watercourse Flowing through European Site
LAKE DISTRICT
YORKSHIRE DALES
highways england
A66 NTP
P01
First issue
CESL 20/07/21
KBIG 20/07/21
KPRI 03/08/21
KWHA 12/08/21
AWAR 13/08/21
Revision Created Checked Reviewed Approved Authorised
Kilometres
0 2 4
Scale @ A3: 1:50,000 | Project Ref No HE565627 | Stage: Stage 3
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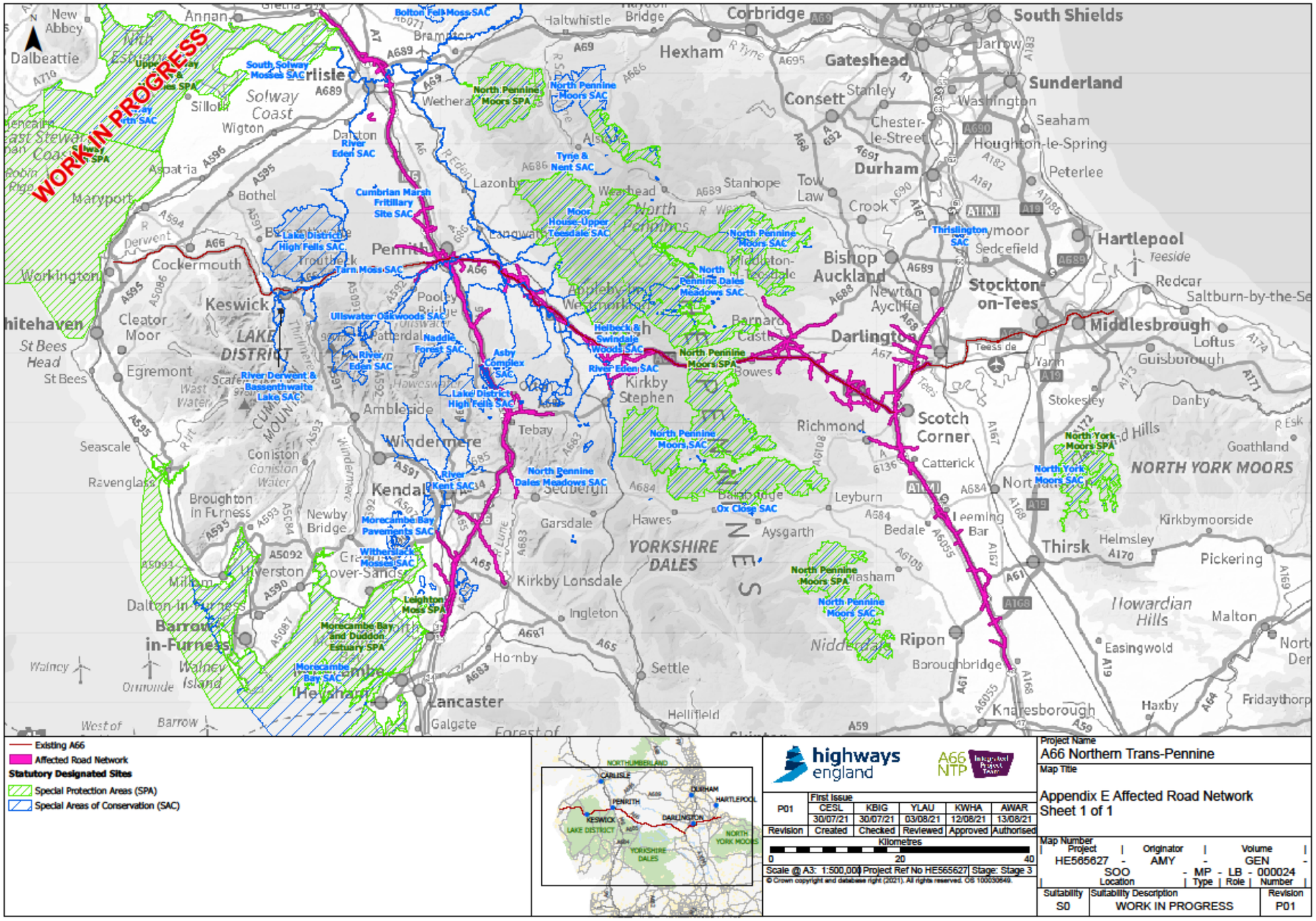
Contains public sector information licensed under the Open Government Licence v3.0
Project Name
A66 Northern Trans-Pennine
Map Title
Appendix D European Designated Sites Plan
Sheet 1 of 8
M6 Junction 40 to Kemplay Bank
Map Number
Project HE565627 | Originator AMY | Volume GEN
Location S00 | Type MP | Role LB | Number 000016
Suitability S0
Suitability Description WORK IN PROGRESS
Revision P01

Appendix E Affected Road Network


WORK IN PROGRESS
Existing A66
Affected Road Network
Statutory Designated Sites
Special Protection Areas (SPA)
Special Areas of Conservation (SAC)
highways england
A66 NTP
Project Name
A66 Northern Trans-Pennine
Map Title
Appendix E Affected Road Network
Sheet 1 of 1
P01 First Issue
CESL KBIG YLAU KWHA AWAR
30/07/21 30/07/21 03/08/21 12/08/21 13/08/21
Revision Created Checked Reviewed Approved Authorised
Kilometres
0 20 40
Scale @ A3: 1:500,000 Project Ref No HE565627 Stage: Stage 3
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Map Number
Project HE565627 - Originator AMY - Volume GEN -
Location SOO - Type MP - Role LB - Number 000024
Suitability S0
Suitability Description WORK IN PROGRESS
Revision P01

Appendix F PINS Screening Matrices

Potential Effects

Potential effects upon the European site(s)[35] which are considered within the submitted HRA report are provided in the Table F.1: Effects considered within the screening matrices below.

Table F.1: Effects considered within the screening matrices

Designation	Effects described in submission information	Presented in screening matrices as
River Eden SAC	Excavation impacts on local hydrology and hydrogeology Loss of habitat within the SAC and functionally linked habitat Disturbance from noise, vibration and lighting Nitrogen and ammonia deposition	Water quality Reduction of habitat area Disturbance to Annex II species Air quality
Helbeck and Swindale Woods SAC	LSE(s) alone ruled out. See detail in Table 6-4: Screening matrix Helbeck and Swindale Woods SAC	
Moor House-Upper Teesdale SAC	LSE(s) alone ruled out. See detail in Table 6-5: Screening matrix: Moor House-Upper Teesdale SAC	
North Pennine Moors SAC	Nitrogen and ammonia deposition Loss of habitat within the SAC Disturbance from construction/operation	Air quality Reduction of habitat area and reduction of species density Disturbance to Annex I species
North Pennine Moors SPA	Nitrogen and ammonia deposition Loss of habitat within the SAC Disturbance to key qualifying species	Air quality Reduction of habitat area
Asby Complex SAC	Nitrogen and ammonia deposition Loss of habitat within the SAC	Air quality Reduction of habitat area and reduction of species density

[35] As defined in Advice Note 10.

STAGE 1: SCREENING MATRICES

The European sites included within the screening assessment are:

- River Eden SAC
- Helbeck and Swindale Woods SAC
- Moor House-Upper Teesdale SAC
- North Pennine Moors SAC
- North Pennine Moors SPA
- Asby Complex SAC

Evidence for, or against, LSEs on the European site(s) and its qualifying feature(s) is detailed within the footnotes to the screening matrices below.

Matrix Key:

✓ = LSE **cannot** be excluded

✕ = LSE **can** be excluded

C = construction

O = operation

D = decommissioning

Table F.2: River Eden SAC PINS matrix.

Name of European site and designation: River Eden SAC															
EU Code: UK0012643															
Distance to NSIP: Within Temple Sowerby to Appleby (closest point)															
European site features	**Likely effects of NSIP**														
Effect	**Air quality**			**Water quality**			**Disturbance to Annex II species**			**Reduction of habitat**			***In combination effects***		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	*x *a*	*x *a*		*x *a*	*x *a*		*x *a*	*x *a*		*x *a*	*x *a*		*x *a*	*x *a*	
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation.	x *b	x *b		✓*d	✓*d		✗*e	✗*e		✓*f	✓*f		✓*i	✓*i	
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)	✓*c	✓*c		✓*d	✓*d		✗*e	✗*e		✓*f	✓*f		✓*i	✓*i	
Atlantic salmon	x *b	x *b		✓*d	✓*d		✓*g	✓*g		✓*f	✓*f		✓*i	✓*i	
Brook lamprey	x *b	x *b		✓*d	✓*d		✓*g	✓*g		✓*f	✓*f		✓*i	✓*i	
Bullhead	x *b	x *b		✓*d	✓*d		✓*g	✓*g		✓*f	✓*f		✓*i	✓*i	
Otter	x *b	x *b		✓*d	✓*d		✓*g	✓*g		✓*f	✓*f		✓*i	✓*i	
River lamprey	x *b	x *b		✓*d	✓*d		✓*g	✓*g		✓*f	✓*f		✓*i	✓*i	
Sea lamprey	x *b	x *b		✓*d	✓*d		✓*g	✓*g		✓*f	✓*f		✓*i	✓*i	

*a LSE(s) alone can be ruled out. Ullswater is outside of the biodiversity study area.
*b LSE(s) alone can be ruled out. Impacts from aerial nitrogen deposition on aquatic features is considered to be negligible. In line with DMRB LA105 standards, sites that have been designated as a watercourse are not included within the assessment of nitrogen deposition.
*c LSE(s) alone cannot be ruled out. Impacts of nitrogen deposition has been considered as part of the air quality assessment, based on predicted emissions of nitrogen oxides (NOx) from vehicles in the opening year of the project. However, Highways England is developing a tool for determining the additional contribution of ammonia (NH_3) emissions from vehicles to deposited nitrogen. This is likely to result in additional nitrogen deposition. Therefore, further air quality assessment is required at the appropriate assessment stage to determine potential impacts on the Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae).
*d LSE(s) alone cannot be ruled out. In the absence of mitigation construction activities and road runoff during operation have the potential to generate water-borne pollution.
*e Disturbance impacts in relation to habitats is included in 'reduction of habitat area'.
*f LSE(s) alone cannot be ruled out. It is anticipated that the existing culvert within Light Water will be extended and lead to the reduction of habitat which supports the sub type 2 Annex II habitat watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation. This area does not form part of the River Eden SAC, however the habitat is functionally linked. In addition, there is no certainty on design and alignment of the proposed bridge crossing at Temple Sowerby to Appleby.
*g LSE(s) alone from noise, vibration and lighting disturbance cannot be ruled out at this stage.
*i An in-combination assessment will be undertaken at the appropriate assessment stage if LSE(s) alone with no residual effects cannot be ruled out.

Table F.3: North Pennine Moors SAC PINS matrix.

Name of European site and designation: North Pennine Moors SAC									
EU code: UK0030033									
Distance to NSIP: Within the ARN (closest point)									
European site features	**Likely effects of NSIP**								
Effect	**Air quality**			**Reduction of habitat area and reduction of species density**			***In combination effects***		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Annex I habitats	✓*a	✓*a		✓*b	✓*b		✓*c	✓*c	
Marsh saxifrage	✓*a	✓*a		✓*b	✓*b		✓*c	✓*c	

*a LSE alone cannot be ruled out. LA 105 DMRB standard states air quality assessments must be undertaken for sites within 200m from the road. The SAC is located 300m north of Bowes Bypass. An assessment on the deposition levels up to 200m is to be undertaken for nitrogen and ammonia to determine whether the pattern of decline from deposition is sufficient to rule out LSE on North Pennine Moors SAC for this scheme. Ammonia data has not currently been included in the modelling.
*b LSE alone cannot be ruled out. No direct habitat loss is required within the SAC boundary for any of the schemes. However, potential LSEs on the damage and subsequently reduction of habitat areas cannot be excluded at this stage, as a result of changes in air quality. Any LSE(s) as a result may subsequently impact on the reduction of species density due to impact on habitats which support them.
*c An in-combination assessment will be undertaken at the appropriate assessment stage if LSE(s) alone with no residual effects cannot be ruled out.

Table F.4: North Pennine Moors SPA PINS matrix.

Name of European site and designation: North Pennine Moors SPA												
EU code: UK9006272												
Distance to NSIP: Within the ARN (closest point)												
European site features	**Likely effects of NSIP**											
Effect	**Air quality**			**Reduction of habitat area**			**Disturbance to Annex I species**			***In combination effects***		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Annex I species (qualifying breeding birds)	✓*a	✓*a		✓*b	✓*b		✓*c	✓*c		✓*d	✓*d	

*a LSE(s) alone cannot be ruled out. The SPA is located over 200m from the road. However, the site is located adjacent to the ARN. Potential impacts may arise from an increase in air pollution locally as a result of construction activities and an increase in road traffic during operation. In addition, mitigation design is to be confirmed, therefore potential impacts on functionally linked habitat cannot currently be excluded.
*b LSE(s) alone cannot be ruled out. No direct habitat loss is required within the SPA boundary for any of the schemes. However, LSEs associated with the reduction of habitat areas cannot be excluded at this stage as a result of changes in air quality within the ARN.
*c LSE(s) alone cannot be ruled out. Following breeding bird surveys in 2021, one single golden plover (possibly breeding) was recorded utilising suitable habitat of the SPA within proximity to the existing ARN. The numbers of recorded pairs is <1% of the SPA population.
This is defined at <1% of the SPA population which equates to
less than:
• 28 individual golden plover.
• One hen harrier.
• Two Merlin.
• One Peregrine.
Disturbance to a larger number of birds (i.e. >1% SPA population) would be considered a significant impact.
However, confirmation of environmental mitigation design is required to rule out any residual effects, therefore LSE alone cannot be ruled out.
*d An in-combination assessment will be undertaken at the appropriate assessment stage if LSE(s) alone with no residual effects cannot be ruled out.

Table F.4: Asby Complex SAC PINS matrix.

Name of European site and designation: Asby Complex SAC									
EU code: UK0030033									
Distance to NSIP: Within the ARN (closest point)									
European site features	**Likely effects of NSIP**								
Effect	**Air quality**			**Reduction of habitat area and reduction of species density**			***In combination effects***		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Annex I habitats	✓*a	✓*a		✓*b	✓*b		✓*c	✓*c	
Geyer's whorl snail	✓*a	✓*a		✓*b	✓*b		✓*c	✓*c	
Slender green feather moss	✓*a	✓*a		✓*b	✓*b		✓*c	✓*c	

*a LSE(s) alone cannot be ruled out. Impacts of nitrogen deposition has been considered as part of the air quality assessment, based on predicted emissions of nitrogen oxides (NOx) from vehicles in the opening year of the project. However, Highways England is developing a tool for determining the additional contribution of ammonia (NH_3) emissions from vehicles to deposited nitrogen. This is likely to result in additional nitrogen deposition. Asby Complex SAC is located within 200m of the ARN. Further air quality assessment is required at the appropriate assessment stage to determine potential impacts on the qualifying features of the site.

*b LSE(s) alone cannot be ruled out. No direct habitat loss is required within Asby Complex SAC boundary for any of the schemes. However, LSE associated with the damage and consequently reduction of habitat areas cannot be excluded at this stage as a result of changes in air quality. Any LSE(s) as a result may subsequently impact on the reduction of species density due to impact on habitats which support them.

*c An in-combination assessment will be undertaken at the appropriate assessment stage if LSE(s) alone with no residual effects cannot be ruled out.

CONTENTS

FIGURES

None

APPENDICES

None

6 Ecological Field Surveys Methodology and Study Areas

6.1.1 In order to determine baseline conditions within the study area, a range of habitat and protected species surveys have been undertaken or are currently underway

6.1.2 Survey areas for respective survey types have been informed by desktop data, best practice guidance for each feature type (as detailed in *DMRB LA 108*) and considering the likely ZoI applicable to the anticipated impacts of the project.

6.1.3 Table 6-1: Ecological field surveys methodology and study areas* sets out the methodlogy being followed for each of these surveys, the study area and the current status of the survey.

Table 6-1: Ecological field surveys methodology and study areas*

Ecological Survey	Study Area and Methodology	Status and Timing
Phase 1 Habitat survey	The study area encompasses all land up to 250m from the draft Development Consent Order (DCO) boundary of the scheme (see Figure 6.3). All accessible land plots have been subject to a Phase 1 Habitat survey using standard methodology (Joint Nature Conservation Committee, 2016)[1].	Partially complete. Surveys undertaken August to November 2020, some locations ongoing (August-October 2021)
Hedgerow surveys	Hedgerow surveys are proposed of all hedges within 50m of the draft DCO boundary. Hedgerow surveys will follow standard guidance (Department for Environment, Food & Rural Affairs, 2007)[2].	Ongoing (August-October 2021)
National Vegetation Classification (NVC)	The study area encompasses all land up to 250m from the draft DCO boundary of the scheme. NVC surveys will follow standard guidance within the British Plant Community series**Invalid source specified.**[3].	Ongoing (June to September 2021)
Predictive System for Multimetrics (PSYM)	Suitable waterbodies, where there is potential for direct or indirect impacts within 100m of each scheme will be surveyed for environmental variables, aquatic invertebrates and aquatic plants according to standard guidance from the Freshwater Habitats Trust (FHT) A Guide to monitoring the ecological quality of ponds and	Four waterbodies surveyed in June 2021 in Kirkby Thore. Remainder ongoing (July to September 2021)

[1] Joint Nature Conservation Committee (2016) Handbook for Phase 1 Habitat Survey – A technique for environmental audit
[2] Department for Environment, Food & Rural Affairs (2007) Hedgerow Survey Handbook. A standard procedure for local surveys in the UK, available at: https://www.hedgelink.org.uk/cms/cms_content/files/89_hedgerow-survey-handbook.pdf [accessed 1 September 2021]
[3] Rodwell, J.S (1991-2000) British Plant Communities Volumes 1-5

Ecological Survey	Study Area and Methodology	Status and Timing
	canals using PSYM (Fresh Water Habitats, 2019)[4].	
River Corridor Survey (RCS)	At each watercourse crossing, a 500m RCS following standard survey methodology (National Rivers Authority, 1992)[5] will be undertaken.	Ongoing (June-September 2021)
Fish Habitat Survey	Fish habitat surveys of channel length within 500m (250m upstream and 250m downstream) of the scheme centre line have been undertaken as a minimum. Where sensitive habitats were identified and/or there is potential for significant effects (for example the Trout Beck crossing), the fish habitat assessment survey length was extended as appropriate. The methodology used for fish habitat assessment and the habitat descriptions are adapted from the Environment Agency Fisheries Technical Manual 4 - Restoration of riverine salmon (*Salmo salar*) habitats (Hendry, K & Cragg-Hine, D., 1995)[6].	Completed, with the exception of potential crossings associated with the Blue alternative on the Cross Lanes to Rokeby Scheme which are ongoing.
MoRPH (River Condition) Survey	MoRPH (River Condition) surveys have been completed at all proposed new crossing locations and immediately downstream of existing crossings which are to be extended. The purpose of the surveys is to provide a baseline "River Condition" for Biodiversity Net Gain calculations. Standard survey protocol (Modular River Survey, 2020)[7] was followed and surveys were carried out in accordance with the Defra Biodiversity Metric 2 user guide (Crosher *et al.* 2019)[8].	Completed (data analysis pending), with the exception of potential crossings associated with the Blue alternative on the Cross Lanes to Rokeby Scheme (ongoing).
Bat roost (structures)	All structures within the draft DCO boundary, together with those structures within 100m of a potential key crossing point, have undergone a ground level Preliminary Bat Roost Assessment. This includes residential properties, farm buildings and infrastructure (bridges).	Preliminary assessment complete

[4] Fresh Water Habitats (2019) A Guide to monitoring the ecological quality of ponds and canals using PSYM, available at: https://freshwaterhabitats.org.uk/wp-content/uploads/2013/09/NPMN_PSYM_MANUAL_July09.pdf [accessed 1 September 2021]
[5] National Rivers Authority (1992) Guidelines for river corridor surveys in the NRA
[6] Hendry, K. & Cragg-Hine, D. (1997) 'Restoration of riverine salmon habitats'. Fisheries Technical Manual 4, Environment Agency, Bristol.
[7] Modular River Survey (2020) A Guide to Assessing River Condition, Part of the Rivers and Streams Component of the Biodiversity Net Gain Metric
[8] 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. User guide (Beta Version, July 2019)

Ecological Survey	Study Area and Methodology	Status and Timing
	Of these, all structures assessed as Moderate or High Bat Roost Potential will be subject to further roost activity surveys (emergence/re-entry surveys) (Collins, 2016)[9].	Roost activity surveys ongoing (June to September 2021)
Bat roost (trees)	All individual trees within the draft DCO boundary have undergone a ground based Preliminary Bat Roost Assessment. Of these, all trees assessed as Moderate or High Bat Roost Potential will be subject to further inspections to determine bat presence, including either climbing or emergence surveys, or both where necessary.	Preliminary assessment complete (February –July 2021) Tree inspection surveys are ongoing (August to September 2021)
Bat activity	Bat activity has been recorded through several survey techniques, as described below. The locations of these surveys were selected based on desk study information, habitat assessment and the project alignment. Activity transects undertaken in September-October 2020 (x1 repeat each) along with static detectors deployed for a five-day period. Further static detectors (total 66 units) have been deployed across all the schemes between June-September 2021. Crossing Point (CP) surveys following (Berthinussen and Altringham)[10] are being undertaken at potential locations (56 in total) where key bat flight routes predicted to be impacted on by the proposed alignments have been identified. These CP surveys will be repeated within June-August 2021, up to three repeats, where results confirm a significant crossing point under the methodology. Bat trapping and radio tracking under a project licence approved by Natural England will be undertaken throughout habitats assessed as important for local bat populations. The trapping/tracking will be repeated over three	Activity Transects Complete September to October 2020 (including static detectors) Static detectors data collection is ongoing (June to September 2021) CP surveys ongoing (June to August 2021) Bat trapping/ radiotracking surveys ongoing across the three sessions (July, August and September 2021)

[9] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition), available at: https://cdn.bats.org.uk/pdf/Resources/Bat_Survey_Guidelines_2016_NON_PRINTABLE.pdf?mtime=20181115113931 [accessed 1 September 2021]

[10] Berthinussen, A. and Altringham, J. (2015) Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure. Defra contract report WC1060, available at: http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18518 [accessed 1 September 2021]

Ecological Survey	Study Area and Methodology	Status and Timing
	survey sessions (pre-parturition- July, post parturition - August and Mating – September).	
Red squirrel (*Sciurus vulgaris*)	An initial walkover survey was undertaken where suitable habitat was identified and/or records of red squirrel indicated presence. Where field signs were found, squirrel feeders were placed on trees and a camera trap set up to monitor the feeder. Further surveys to ascertain carrying capacity were undertaken in accordance with Gurnell *et al (2009)*[11]	Red squirrel scoping surveys complete - November 2020 and January 2021. Detailed red squirrel carrying capacity surveys complete - 17– 1 May 2021 and 12 June 2021. Additional surveys ongoing for alternatives
Otter (Lutra lutra)	An otter scoping survey was undertaken of all watercourses within 250m of the draft DCO boundary. Suitable watercourses were subject to detailed otter surveys following Chanin (2009)[12]. Camera traps were also placed out on all proposed crossing points and any identified potential otter resting places/holt features that were identified.	Watercourse scoping surveys complete– Feb 2021. Detailed surveys complete – June to August 2021 (results pending).
Water vole (Arvicola amphibius)	Watercourses within 100m of the draft DCO boundary were scoped for the suitability to support water vole. Suitable watercourses were subject to detailed water vole surveys following Dean *et al*. (2016) [13] and Dean (2021)[14] with two survey visits per site. Camera traps have also been placed out on all proposed crossing points.	Watercourse scoping surveys complete – Feb 2021 Detailed surveys ongoing – June to August 2021 Additional surveys ongoing for alternatives
Badger (Meles meles)	A badger scoping survey was undertaken within 250m of the draft DCO boundary in suitable habitats and where records of badger had been identified. Where accessible setts were identified, a full sett survey was conducted in line with Harris	Badger scoping surveys complete - Nov 2020 to Jan 2021 Badger bait marking surveys complete - between 15 March – 14 April 2021

[11] Gurnell, J., Lurz, P., McDonald, R. & Pepper, H. (2009) Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission, available at: https://www.researchgate.net/publication/237529070_Practical_Techniques_for_Surveying_and_Monitoring_Squirrels [accessed 1 September 2021]
[12] Chanin, P. (2003). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, available at: http://publications.naturalengland.org.uk/file/114036 [accessed 1 September 2021]
[13] Dean, M., Strachan, R., Gow, D & Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, available at: https://assets.sussexwildlifetrust.org.uk/water-vole-mitigation-guidance-2016.pdf [accessed 1 September 2021]
[14] Dean, M. (2021) Water Vole Field Signs and Habitat Assessment- A Practical Guide to Water Vole Surveys. Pelagic Publishing.

Ecological Survey	Study Area and Methodology	Status and Timing
	et al. (1989)[15]. In addition, camera traps were installed to collect data on sett use and activity. Where the proposed routes were likely to significantly affect an identified active main sett or associated potential territory, bait marking surveys were carried out to establish extents of badger territory, following Delahay *et al*. (2000)[16].	Additional surveys may be required during correct season if alternative alignments selected
Other terrestrial mammals Pine marten (Martes martes) Polecat (Mustela putorius) Brown hare (Lepus europaeus) Hedgehog (Erinaceus europaeus) Deer	Initial scoping surveys were undertaken within 250m of the draft DCO boundary where records or suitable habitats occurred. Camera traps were also placed on identified terrestrial mammal features such as mammal paths within woodlands and on field boundaries to monitor for other terrestrial mammal species. Deer were included in the surveys due to risks associated with severance of crossing points and road traffic collision.	Scoping surveys completed – No-Dec 2020 and Jan 2021 Camera trap surveys ongoing – June to August 2021
Hazel dormouse (Muscardinus avellanarius)	Analysis of biological record data established that there were no historical records of hazel dormouse within 2km of the project and the project is outside of the core range of this species.	No surveys required
Breeding birds	A full breeding bird survey of suitable habitats up to 500m of the draft DCO boundary was undertaken across all schemes in 2021 following a Gilbert *et al*. (1998)[17] methodology adapted in accordance with industry standards. Targeted breeding sand martin (*Riparia riparia*) surveys were also undertaken. Surveys were carried out to ascertain locations and estimates of colony size, in-line with sand martin breeding season population survey methodology in Gilbert *et al*. (1998).	Completed – April to June 2021
Over-wintering birds	An initial wintering bird scoping survey was undertaken within 500m of the draft DCO boundary to determine suitable vantage point locations for each of the schemes and the	Scoping completed – Nov 2020

[15] Harris, S., Cresswell, P. & Jefferies, D. (1989) Surveying Badgers. The Mammal Society, available at: https://www.mammal.org.uk/wp-content/uploads/2016/04/Surveying_Badgers_Mammal_Society.compressed.pdf [Accessed 1 September 2021]
[16] Delahay, R., Brown, J.A., Mallinson, P., Spyvee, P., Handoll, D., Rogers, L.M. & Cheeseman, C. (2000) The use of marked bait in studies of the territorial organization of the European Badger *(Meles meles)*. Mammal Review.
[17] Gilbert, G., Gibbons, D.W. & Evans, J. (1998). Bird Monitoring Methods- A Manual of Techniques for Key UK Species. Pelagic Publishing.

Ecological Survey	Study Area and Methodology	Status and Timing
	habitats most likely to be used by notable bird assemblages during the winter months. Natural England provided additional information about potential locations (close to Kirkby Thore and Warcop) known to support significant numbers of wintering and breeding lapwing (*Vanellus vanellus*) and breeding redshank (*Tringa totanus*), oystercatcher (*Haematopus ostralegus*) and with potential for curlew (*Numenius arquata*). Wintering bird surveys were subsequently undertaken once per month in line with current guidance: English Winter Bird Survey Methodology**Invalid source specified.**[18]. In addition, targeted vantage point surveys were undertaken in selected areas with the aim of recording the presence of notable species such as raptors and waders, including those listed on the SPA citation.	Surveys completed – Dec 2020 to March 2021 (area included land associated with alternatives due to survey area boundaries)
Barn owl (*Tyto alba*)	A detailed barn owl scoping assessment has been undertaken and features within 500m of the Scheme, which are broadly suited to barn owls (i.e. specifically all suitable structures and trees), have been identified for survey. The more detailed barn owl surveys will be conducted according to current best practice methodology (Shawyer C, 2012)[19].	Scoping – completed June/July 2021 Detailed surveys ongoing – Aug and Sept 2021
Amphibians	Amphibian Habitat Suitability Index (HSI) (Amphibian and Reptile Groups of the United Kingdom, 2010)[20] and eDNA surveys have been undertaken on all accessible ponds within 250m of the draft DCO boundary following (Amphibian and Reptile Groups of the United Kingdom, 2010)[21] and **Invalid source specified.**[22]. At least two traditional survey methods **Invalid source specified.**[23] were also undertaken and these were continued to a total of six survey visits where great crested newt (*Triturus cristatus*) presence was indicated by eDNA results. Waterbodies	HSI completed Sept 2020 HSI, eDNA and traditional surveys completed April to June 2021

[18]British Trust for Ornithology (2018) English Winter Bird Survey Methodology
[19] Shawyer C, (2012) Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment.
[20] Amphibian and Reptile Groups of the United Kingdom (2010) Great Crested Newt Habitat Suitability Index
[21]Amphibian and Reptile Groups of the United Kingdom (2010) Great Crested Newt Habitat Suitability Index
[22] Biggs et al. (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt
[23] English Nature (2001) Great Crested Newt Mitigation Guidelines

Ecological Survey	Study Area and Methodology	Status and Timing
	occurring between 250m and 500m have been subject to further review for survey requirement, based on their likelihood for impacts from the project using the Natural England Great Crested Newt Method Statement for Species Licencing **Invalid source specified.** [24]. Those with red or amber risk were scoped in for survey. Ponds were scoped out for further survey where pond habitat was not evident/dry or unsuitable (e.g. slurry pit) or where great crested newt were assumed likely absent as a result of two traditional surveys and eDNA surveys returning a negative result.	
Reptiles	Reptile sites have been scoped in based on a desktop review of records and suitable habitat within 100m of the draft DCO boundary. Surveys will be undertaken to provide a habitat suitability assessment. Where detailed reptile surveys are required these will follow **Invalid source specified.** [25] and **Invalid source specified.** [26] and **Invalid source specified.**[27], **Invalid source specified.**[28]; and **Invalid source specified.**[29] for adders (*Vipera berus*). One set of detailed reptile surveys have been undertaken at Kirkby Thore.	Reptile habitat suitability assessment and further surveys ongoing – Aug/Oct 2021 Detailed surveys at Kirkby Thore – May-June 2021
Fish	Desk Species specific electric fishing survey techniques will be employed for; juvenile salmonids (*Salmo salar*), bullhead (*Cottus gobio*) and other species; and lamprey, in line with methods prescribed in the JNCC Common Standards Monitoring Guidance for Freshwater Fauna (Joint Nature Conservation Committee, 2015)[30]. In addition to traditional survey techniques, an eDNA survey will be completed to supplement fish species presence absence data.	Complete (mid-August 2021). Results pending
White Clawed Crayfish (Austropotamobius pallipes)	Manual search surveys following the Common Standards Protocol for monitoring of white-clawed	Ongoing (six surveys completed in 2020, remaining surveyed

[24] UK Government (2021) Method statement template for great crested newt mitigation licence.xlsm file, accessed details of risk criteria based on potential for impacts to great crested newts
[25] Froglife (2015) Surveying for Reptiles
[26] Herpetofauna Groups of Britain and Ireland (1998) Evaluating Local Mitigation/Translocation Programs: Maintaining Best Practice and Lawful Standards
[27] Julian, A.J. & Hand, N.K. (2018) Managing Habitat for Adders: Advice for Land Managers
[28] Gent & Gibson (1998) Herpetofauna Workers' Manual
[29] Surrey Amphibian and Reptile Group (2018) Strategic Framework
[30] Joint Nature Conservation Committee (2015) Common Standards Monitoring Guidance for Freshwater Fauna

Ecological Survey	Study Area and Methodology	Status and Timing
	crayfish (*Austropotamobius pallipes*)[31] and Peay**Invalid source specified.**[32] will be undertaken to determine presence/absence and population densities. In addition to traditional survey techniques, an eDNA survey will be completed to supplement crayfish presence absence data.	schedule for August & September 2021)
Terrestrial Invertebrates	Desktop data have been analysed using Pantheon http://www.brc.ac.uk/pantheon/ to evaluate associated habitats and resources, assemblage types (adapted from the Invertebrate Species-habitat Information System [ISIS]), habitat fidelity scores and other information. Broad habitat types and habitat information were also assessed from Phase 1 Habitat data to identify the potential Species Assemblage Types likely to be associated, which are an indicator of Invertebrate Assemblages of importance. Targeted locations were subject to Invertebrate Scoping Surveys to confirm appropriate survey methodology. Targeted surveys for terrestrial invertebrates are ongoing until October 2021. All surveys will follow current methodology of Drake *et al*.**Invalid source specified.**[33]	Scoping visits - November 2020 and March 2021 Detailed surveys ongoing – May 2021 to Oct 2021
Aquatic Invertebrates	Aquatic macroinvertebrate samples will be collected in the vicinity of all new watercourse crossings and selected existing watercourse crossing (based on habitat assessment) according to best practice guidance. The surveys will characterise the baseline macroinvertebrate assemblage and determine the presence of protected and notable species. Sample analysis will be carried out to mixed taxon level (TL5). Calculation of the following biological indices will be carried out following best practice guidance: • Whalley Hawkes Paisley Trigg (WHPT) • Average Score Per Taxon (ASPT)	Spring kick sampling completed March to May 2021. Detailed analysis of results pending. Autumn kick sampling ongoing - September to November 2021.

[31] Joint Nature Conservation Committee (2015) Common Standards Monitoring Guidance for Freshwater Fauna
[32] Peay, S. (2003). *Monitoring the White-clawed Crayfish Austropotamobius pallipes*. Conserving Natura 2000 Rivers Monitoring series No.1. English Nature, available at: http://publications.naturalengland.org.uk/publication/72042 [accessed 1 September 2021]
[33] Drake, C.M., Lott, D.A., Alexander, K.N.A. & Webb, J. (2007) *Surveying terrestrial and freshwater invertebrates for conservation evaluation.* Natural England Research Report NERR005. Natural England, available at: http://publications.naturalengland.org.uk/publication/36002 [accessed 1 September 2021]

Ecological Survey	Study Area and Methodology	Status and Timing
	• Number of Scoring Taxa (NTAXA) • Lotic-invertebrate Index for Flow Evaluation (LIFE) In addition, data will be subject to River Invertebrate Classification Tool (RICT) analysis, providing a Water Framework Directive (WFD) Ecological Quality Ratio for each macroinvertebrate sample location. The conservation value of the macroinvertebrate assemblage will also be calculated using Community Conservation Index (CCI) method**Invalid source specified.**[34] and the taxa list from each site will be screened against Conservation Designations for UK Taxa **Invalid source specified.**[35] to determine notable and protected species.	
Macrophytes (aquatic plants)	The assessment of plant community condition will be based on the assessment of ecological status using the LEAFPACS2**Invalid source specified.**[36] methodology in line with the CSM Guidance for assessment of river SSSI/SAC habitat**Invalid source specified.**[37]. This survey technique will be undertaken in combination with RCS. One LEAFPACS2 survey (100m) will be undertaken within each 500m RCS survey reach (2 x LEAFPACS surveys per watercourse crossing; one upstream and one downstream of the scheme centre line).	Ongoing - June-September 2021

*All survey areas are in accordance with industry standards/guidance or through consultation with statutory consultees

[34] Chadd, R. & Extence, C. (2004). *The conservation of freshwater macroinvertebrate populations: a community-based classification scheme. Aquatic Conservation: Marine and Freshwater Ecosystems*, Vol 14. Iss 6. p.597-624, available at: https://www.researchgate.net/publication/229475768_The_conservation_of_freshwater_macroinvertebrate_populations_A_community-based_classification_scheme/link/59e474b0a6fdcc7154e10ef1/download [accessed 1 September 2021]

[35] Joint Nature Conservation Committee (2020) Conservation Designations for UK Taxa. Available at: https://hub.jncc.gov.uk/assets/478f7160-967b-4366-acdf-8941fd33850b [accessed 1 September 2021]

[36] Water Framework Directive- United Kingdom Technical Advisory Group (WFD-UKTAG) (2014). UKTAG River Assessment Method Macrophytes and Phytobenthos Macrophytes (River LEAFPACS2), available at: https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/River%20Macrophytes%20UKTAG%20Method%20Statement.pdf [accessed 1 September 2021]

[37] Joint Nature Conservation Committee (2015). Common Standards Monitoring Guidance for Freshwater Fauna, Version October 2015, JNCC, Freshwater, ISSN 1743-8160.