Haweswater Aqueduct Resilience Programme - Proposed Bowland Section

Volume 6

Proposed Ribble Crossing

Chapter 9A: Terrestrial Ecology

June 2021

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Project No:	B27070CT
Document Title:	Volume 6 Proposed Ribble Crossing, Chapter 9A: Terrestrial Ecology
Document No.:	LCC_RVBC-BO-ES-009-01
Revision:	0
Document Status:	Final
Date:	June 2021
Client Name:	United Utilities
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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved

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9. Ecology – 9A Terrestrial Ecology

9.1 Introduction

1) This chapter presents the approach and findings of the ecological impact assessment (EcIA) of potential impacts on nature conservation features arising from the Proposed Ribble Crossing on Terrestrial Ecology. Effects on aquatic ecology are assessed within Chapter 9B. This is a supplemental report to the main Terrestrial ES Chapter for the Proposed Bowland Section. This Environmental Statement has been produced separately to the main document because the Proposed Ribble Crossing was developed later in the scheme design process.

2) The legislation and planning policies relevant to Ecology are considered in Section 9A.3 of the Proposed Bowland Section ES.

3) This chapter begins by outlining the study area and methods for the assessment. The nature, value and sensitivity of the existing baseline environment are then identified before an assessment is made of the potential effects on Terrestrial Ecology from the Proposed Ribble Crossing. Mitigation measures have been proposed to avoid, reduce or offset any potential effects and these embedded mitigation and best practice measures have been taken into account in the assessment, which are mentioned in Chapter 3: Design Evolution & Development Description. Additional mitigation measures are further outlined in Section 9A.7.

4) This assessment covers the Proposed Ribble Crossing, located in Lancashire between National Grid References SD 74507 43827 and SD 73354 44003. The study area for the Proposed Ribble Crossing is north of Clitheroe and lies between West Bradford Road / Clitheroe Road and West Bradford Road / Waddington Road, with the B6478 to the west.

5) The construction of the Proposed Bowland Section would require access for vehicles to and from the Newton-in-Bowland Compound via the existing highway network from the A59. The Proposed Ribble Crossing is one of two options to allow the movement of construction vehicles around the Clitheroe area. A full description of the proposed construction traffic routes and the consideration of alternatives is provided in Chapter 3, a description of the other option is provided in the main ES and details of highways improvements (some of which are required for both options) are provided in Volume 5 Part I and Part II.

6) The Proposed Ribble Crossing comprises a temporary road to link West Bradford Road and Pimlico link road that would avoid vehicle movements through Clitheroe, Chatburn, West Bradford and would avoid the centre of the village of Waddington. This route would still require the movement of vehicles through the north of Waddington between West Bradford Road and Slaidburn Road.

7) The road would be a two lane carriageway 7.7m wide and 1450m in length. The road would be suitable for heavy duty use and would be surfaced with a tarmac construction based on a stone aggregate foundation. The road would be temporary and would be in place for the duration of the enabling, construction and commissioning phases of the Proposed Bowland Section. The road would be fully removed and the land reinstated on completion of the main works. The road would be reserved for the use of construction traffic. Public access to the road would be prohibited through the provision of vehicle barriers at either end of the road.

8) A temporary bridge crossing of the River Ribble would be incorporated in the road. The bridge would be a Bailey bridge type clear span construction supported on columns either side of the river, of approximately 70m in length. The bridge would extend over the adjacent flood plain with additional bridge sections either side of the river bridge. Overall the bridge would be approximately 175m in length. Earthwork abutments would be required either side of the bridge.

9) With the exception of the bridge the road would be constructed to suit the existing topography. Cuttings and embankments would be kept to a minimum and would only be made to create a suitable profile for the road,

10) Drainage would be provided to keep the road surface and foundations free from water. A drainage system would be put in place that would attenuate and treat the water prior to discharge into the River Ribble at a rate not exceeding greenfield run off.

11) Temporary laydown areas would be established for the construction and removal of the road, but these would not be present when the road is in use.

12) The construction of the road would require removal of topsoil and sub-surface material where required. These materials would be stockpiled adjacent to the road at intervals and they would be re-used to reinstate the land once the road is removed.

13) The study area for baseline field surveys encompassed varied buffers according to the target feature (discussed further in Section 9A.4.2), while the study area for desk-based assessment encompassed a buffer of up to 5 km from the red line boundary.

9.2 Scoping and Consultations

9.2.1 Scoping

14) Details of scoping are provided in the Main ES which confirms the Proposed Ribble Crossing was included in the EIA Scoping Addendum in February 2021. Further details regarding scoping and consultation are presented at Section 4.3 and scoping comments and responses are outlined in Appendix 4.1.

9.2.2 Consultation

15) During the course of this assessment, consultation has taken place with relevant statutory and non-statutory consultees, stakeholders and third parties, through both correspondence and face-to-face meetings. This has been summarised in Section 4.3 in Appendix 4.1.

9.3 Key Legislation and Guidance

16) Please refer to Section 9.3 of the main ES (LCC-RVBC-BO-009-01) for details on relevant legislation and guidance.

9.4 Assessment Methods and Assessment Criteria

9.4.1 Assessment Methods

17) With the exception of section 9.4.2 'Establishing the Baseline' which is provided in the following text and table, please refer to Section 9.4 of the main ES (LCC-RVBC-BO-009-01) for details on assessment methods.

9.4.2 Establishing the Baseline

18) Table 9A.1 summarises the desk and field based surveys completed to establish and describe the baseline for terrestrial ecology at the Proposed Ribble Crossing. The table provides references to the relevant Appendices for technical data and Figures for presentation of results for each respective survey. No habitats were identified as requiring NVC survey.

Table 9A.1: Baseline Surveys

Survey	Summary and Timing	Standard	Appendix	Figure
Desk-based Assessment (DBA)	Search of Natural England data inventories via MAGIC[7] for the following: Statutory designations within 5 km Priority habitats within 1 km Ancient woodlands within 1 km Data request to Lancashire Environment Record Network (LERN) for the following: Non-statutory designations within 2 km	CIEEM Guidelines for Preliminary Ecological Appraisal[8]	Appendix 9A.1	Figures 9A.1 to 9A.4

Survey	Summary and Timing	Standard	Appendix	Figure
	Pre-existing records for protected species, SPI and other notable species			
Extended Phase 1 habitats	Field survey within the extent of the Proposed Ribble Crossing and, where accessible, land up to 200 m. Supplemented by review of DBA, Ordnance Survey maps and aerial photography. Target notes recorded for each habitat feature of note. December 2020	Handbook for Phase I Habitat Survey[9]	Appendix 9A.2	Figure 9A.5
Hedgerows	The location and preliminary JNCC Phase 1 categorisation of hedgerows was undertaken during the habitat survey. A Hedgerow Regulations Assessment survey was undertaken in May 2021.	Hedgerow Survey Handbook[10] Hedgerow Regulations Assessment (1997)	Appendix 9A.2	Figure 9A.6
Badgers	During the extended Phase 1 habitat survey no evidence of badger activity was identified within or up to 30m from the Proposed Ribble Crossing.	N/A	N/A	N/A
Ground-based assessment (GBA) of bat roosts in trees	Ground based assessment of trees (individual, hedgerow and woodland edge trees) in and within 50 m of the Ribble Crossing. December 2020	Bat Surveys for professional Ecologists: Good Practice Guidelines[18]	Appendix 9A.3	Figure 9A.7
Wintering birds	Seven daytime walkovers encompassing the Proposed Marl Hill Section. Transect routes pre-determined to sample all key habitats. Bird species seen or heard and activity patterns were mapped using standard symbology. September, October, November, December 2019 and January, February, March 2020	Bird Census Techniques[23] BTO EWBS Method[24] Fuller, R.J. (1980)[25] Birds of Conservation Concern 4[26]	Appendix 9A.4	Figures 9A.8 to 9A.11
Great crested newts	eDNA samples from all ponds up to 500 m from the Proposed Ribble Crossing. May 2021	Great Crested Newt Mitigation Guidelines[27]	Appendix 9A.5	Figure 9A.12

9.4.3 Assumptions and Limitations

19) Likely ecological effects described in this EcIA are based on the Proposed Ribble Crossing development as described in Chapters 2 and 3.

20) This EcIA has been completed on the basis of a reasonable worst-case that takes account of the proposed route of the temporary road and bridge alongside the compounds and working areas required for construction. The red line boundary is wider than required for the works but where retention of features is certain, due to location along boundaries for example or because of a commitment to protect a high value feature, this is reflected in the assessment. All other features within compounds are recorded as lost, although there is a commitment to minimise these losses were possible when compound layouts are updated. Habitat losses that United Utilities aspires to avoid but cannot guarantee at this stage are included in the EcIA impact calculations.

21) Assumptions have been made with regard to the quantification of habitat features. Numbers of individual trees are quantified from the Arboricultural survey (Appendix 6.6). However, it should be noted that other assessments, for example ground-based assessment of trees for bat roost suitability, may include additional trees that are not identified by the Arboricultural survey as they may be hedgerow features or occur within groups. Consequently, quantification of individual trees may differ according to the target feature being assessed. Linear hedgerow or watercourse measurements and woodland and other habitat area

measurements are calculated from digitised field survey data using GIS. All measures quantified in this EcIA are considered reasonable estimates.

22) The habitat survey was carried out in December which is sub-optimal, however, given the habitat types present this is not considered a significant constraint to this assessment. There have been no breeding bird surveys. Bat roost assessments and wintering bird surveys have been undertaken within the correct season. Nevertheless, the surveys only identify habitats and plants present at the time of survey. Additionally, most species investigated are mobile and will move into and out of areas over time. For these reasons a precautionary approach has been taken in the prediction of impacts. Where there is any doubt, except where specifically noted, species are assumed present and the impact is given the higher level of significance.

23) Information provided by third parties, including publicly available information, is correct at the time of publication.

9.4.4 Characterising Effects

24) Characterising effects is as described in the main ES Table 9A.4.

9.4.5 Embedded Mitigation and Good Practice

25) Embedded mitigation is inherent to the design, and good practice measures are those which are standard industry practice used to manage commonly occurring environmental effects. The assessment of likely significant effects in Section 9.6 takes into account the application of both embedded mitigation and good practice measures as set out in this section. For ease of reference, the term and 'embedded measures' is used which include both embedded mitigation and good practice measures.

26) The need for any additional topic-specific essential mitigation (generally for effects likely to be significant in the context of the EIA Regulations) identified as a result of the assessment in Section 9.6 is then set out separately in Section 9.7.

Embedded Mitigation

27) Chapter 3: Design Evolution and Development Description explains the evolution of the design with input from the environmental team, including mitigation workshops and the use of GIS based constraints data. Embedded mitigation of particular relevance to Terrestrial Ecology is set out below..

28) The route of the temporary haul road and location of associated working areas has been designed to try to avoid or reduce potential adverse effects upon important ecological features. The high level routing exercise sought to avoid designations and woodland and the detailed routing design sought to avoid tree loss and minimise impacts on the River Ribble. The River Ribble bridge crossing avoids the removal (and retains an appropriate buffer zone) of one veteran tree (T67 (T22), Category A3).

Good Practice Measures

29) In addition to the above design considerations to deliver avoidance measures, a series of common approaches to facilitate feature avoidance has been developed to ensure legal compliance and to accord with industry standards and best practice. Details of these measures are provided within the Construction Code of Practice (CCoP) (Appendix 3.2). Those measure of most relevance to important ecological features include, but may not be limited to, the following:

- Section 5.2.2 'Protection of trees' requires appropriate tree and hedgerow protection measures to be implemented in accordance with current standards (BS 5837:2012) for all retained woodland, trees and hedgerows to avoid risk of incidental damage and disturbance to the habitats and the species they support during site clearance and construction
- Section 5.3.3.1 'Geomorphology – General Provisions' requires works to be avoided in or on the floodplains of Main Rivers and Ordinary Watercourses where practical and, where this is not practicable, the CCoP requires a minimum distance of 10 m to be provided between the works and the banks of the watercourse

- Section 5.3 'Water Environment' and Section 5.6 'Soils, Geology and Land Quality' set out a series of measures to preserve existing surface water run-off rates and land drainage rates and protect surface and groundwater flows, levels and quality
- Section 5.10 'Noise and Vibration' specifies a range of measures that, while focussed primarily on human receptors, would also reduce the potential for disturbance effects upon ecological features
- Section 4.5 'Lighting' requires that artificial lighting , where unavoidably required for safety and security during the construction phase, is designed in accordance with best practice to minimise potential impact upon the environment, including ecological features
- Section 5.11.1 requires the production and implementation of a Dust Management Plan (DMP) with subsequent sections under Section 5.11.2 'Measures to reduce potential impacts on air quality' requiring a range of avoidance or control measures to reduce the impact of dust and other adverse effects upon air quality
- Sections 5.2.1 Landscape management – general provisions', 5.4.1 'Ecological management – general provisions' and 5.4.2 'Measures to reduce potential impacts on ecological resources' in combination require updated pre-commencement surveys to be completed, vegetation removal to be minimised as far as practical, removal / translocation of habitats and other habitat features to be subject to ecological watching briefs, procedures for unanticipated discoveries or disturbance of protected species or important habitats and for accidental pollution incidents that may affect valued ecological features
- Sections 5.4.1 'Ecological management – general provisions' and 5.4.2 'Measures to reduce potential impacts on ecological resources' in combination require habitat re-instatement and restoration to be implemented at the earliest appropriate time and to deliver at least like for like (quantity and quality) for all valued habitats and habitat features requiring permanent or temporary removal. Any habitat creation as a result of BNG offsetting is reported separately and the approach is summarised in Section 9A.7.12.
- Section 4.4 specifies the fencing around compounds. Screening to dampen noise and dust effects are also included in the CCoP. These measures would help to reduce noise and visual disturbance effects upon sensitive fauna from certain activities within the compounds.

30) Throughout the document the term embedded mitigation will be used as shorthand to describe embedded mitigation and best practice measures.

9.5 Baseline Conditions

9.5.1 Information Sources

31) Information from the following sources have been used to inform this EcIA for the Proposed Ribble Crossing:

- Haweswater Aqueduct Resilience Programme –Proposed Bowland – EIA Scoping Report (Jacobs, October 2019)
- Haweswater Aqueduct Resilience Programme –Proposed Bowland – EIA Scoping Addendum (Jacobs, February 2021)
- Lancashire Environment Record Network (LERN), including boundaries and site information for non-statutorily designated sites such as Biological Heritage Sites (BHS) and pre-existing species records within 2 km of the Proposed Ribble Crossing
- Natural England habitat and species inventories[1] including:

[1] MAGIC [Accessed May 2020] *op. cit*

- land-based statutory designated wildlife sites in England, including Ramsar sites, proposed Ramsar sites, Special Areas of Conservation (SAC), Possible SACs, Special Protection Areas (SPA), Potential SPAs, Sites of Special Scientific Interest (SSSI), SSSI units, SSSI Impact Risk Zones (IRZ), National Nature Reserves (NNR) and Local Nature Reserves (LNR)
- Inventory of Ancient Woodland (IAW)
- Priority Habitat Inventory (PHI)
- European Protected Species Licences (EPSL)

- RSPB reserve boundaries
- RSPB 'Important Bird Areas' (IBA)
- Plantlife International 'Important Plant Areas' (IPA)
- Ecology Survey Data Reports produced by The Environment Partnership for the Proposed Ribble Crossing (Appendices 9A.2 to 9A.4) and supporting plans (Figures 9A.5 to 9A.12)
- Haweswater Aqueduct Resilience Programme Proposed Bowland Habitats Regulation Assessment (The Environment Partnership) (Doc Ref LCC/RVBC-BO-APP-010)
- Haweswater Aqueduct Resilience Programme Proposed Bowland SSSI Report (The Environment Partnership) (Doc Ref LCC/RVBC-BO-APP-009)
- Haweswater Aqueduct Resilience Programme Proposed Ribble Crossing AIA (Jacobs) (Appendix 6.6) and supporting plans (Figures 6.5 and 6.6).

9.5.2 Designated Sites

32) There are 5 statutorily designated wildlife sites of national importance located within 5 km of the Proposed Ribble Crossing. The interest features of all five SSSIs are geological in nature and therefore impacts upon these SSSIs are not considered further as part of this EcIA for Terrestrial Ecology.

- Clitheroe Knoll Reefs SSSI (2.3 km south east of the proposals)
- Coplow Quarry SSSI (0.7 km south east of the proposals)
- Hodder River Section SSSI (4.8 km south west of the proposals)
- Little Mearley Clough SSSI (4.0 km south east of the proposals)
- Salthill and Bellmanpark Quarries SSSI (1.3 km south east of the proposals).

33) No internationally important designated sites or other nationally designated sites are present within 5 km of the Proposed Ribble Crossing.

34) The Proposed Ribble Crossing falls within the IRZ from Langcliffe Cross Meadows, Field Head Meadow, Bell Sykes Meadows and Standridge Farm Pasture SSSIs. The IRZ identifies risk categories relating to air pollution and combustion processes.

35) No NNR were identified within 5 km of the Proposed Ribble Crossing. Two LNR were identified within 2 km of the Proposed Ribble Crossing. These include Cross Hill Quarry LNR (0.2 km south of the proposals) and Salthill Quarry LNR (1.3 km southeast of the proposals). No other statutory wildlife site was identified within 5 km from the Proposed Ribble Crossing.

36) A summary of the site features is presented at Table 9A.2. Further information relating to these sites is provided at Appendix 9A.1.

37) A total of 15 Biological Heritage Sites (BHS) were identified within 2 km of the Proposed Ribble Crossing. Two Local Geodiversity Sites were also identified within 2 km of the Proposed Ribble Crossing but as these designations are geological in nature, impacts upon these sites are not considered further as part of this EcIA for Terrestrial Ecology.

38) The Proposed Ribble Crossing lies adjacent to the Bowland Fells IBA which lies to the north of West Bradford / Waddington Road.

39) No other non-statutory wildlife site, including RSPB reserves or IPAs, were identified within the search area. These non-statutory sites are summarised in Table 9A.2.

Table 9A.2: Designated Wildlife Sites

Wildlife Site	Proximity to Proposed Ribble Crossing and Site Area	Summary Features
Statutorily Designated Wildlife Sites Within 5 km of the Proposed Ribble Crossing		
Cross Hill Quarry LNR	0.2 km south of the proposals 9.6 ha	Cross Hill is a good example of natural change on a man-made site and has since become an exceptional refuge for wildlife. Once quarrying ceased, the thin soils and exposed rock became revegetated through stages of succession from flower-rich grasslands, to hawthorn scrub and finally woodland. Examples of each stage can still be seen within the site.
Salthill Quarry LNR	1.3 km southeast of the proposals 8.6 ha	At the southeast corner of the reserve, the soil is at its earliest stage of development and supports a sparse vegetation of plants well adapted to the harsh conditions. Bee Orchid, Carline Thistle and Milkwort can be seen growing here in June. You can see Autumn Gentian flowering later in the year in August and September. On the more established soils you will be able to see Cowslips. Ash and Hawthorn trees dominate the woodland. There are also a variety of butterflies and birds. Fossilized rocks are abundant in several areas of the reserve.
Non-Statutorily Designated Wildlife Sites Within 2 km of the Proposed Ribble Crossing		
River Ribble from London Road Bridge Preston, in West, to County Boundary, in East BHS (hereafter referred to as River Ribble BHS)	Adjacent/crossed by the proposals 298.12 ha	The site comprises the River Ribble and associated semi-natural habitats from the county boundary at Paythorne downstream to London Road Bridge, Walton-le-Dale, Preston. Throughout the length of the River Ribble the General Quality Assessment is Very Good and Good (A and B) with a localised section with the Fairy Good (C) classification. The river is important for salmon, sea trout, otter and water vole. Along the riverbanks sandy cliffs provide nesting habitat for sand martin and kingfisher, and single banks provide suitability for nesting waders such as oystercatcher, common sandpiper, little ringed-plover and ringed plover. Much of the land associated with the river comprises woodland, grassland and, locally, swamp and tall-herb communities. UK BAP Priority Habitats & Species include Lowland Mixed Woodland, Wet Woodland, Lowland Meadow, Fen, Water Vole, Otter and Reed Bunting. A single record of freshwater pearl-mussel dated 1974 came to light in 2003 for a section of the river upstream of Clitheroe.
Bowland Fells IBA	Circa 0.01km on the north side of West Bradford/Waddington Road	An important landscape for upland birds including hen harrier, ring ouzel, whinchat, curlew, golden plover, lapwing, merlin, oyster catcher, peregrine, red grouse,

Wildlife Site	Proximity to Proposed Ribble Crossing and Site Area	Summary Features
		redshank, snipe and stonechat. Other notable wildlife recorded across the landscape includes brown hare, bats (eight species resident in Lancashire) and moths (among the more notable include common heath, emperor, Manchester treble bar, northern spinach, red twin-spot carpet).
Waddington Brickworks Old Working BHS	0.05 km north of the proposals 2.70 ha	The site comprises of old workings colonised by species-rich, semi-natural neutral grassland and used as pasture. The topography is undulating with dry grassy mounds and a low lying, damp, central basin area.
Cross Hill Quarry BHS	0.2 km south of the proposals 10.29 ha	The site comprises of the disused Cross Hill limestone quarries and the adjoining Brungerley Park and supports a mosiac of semi-natural habitats including limestone grassland, scrub and woodland. The site includes Cross Hill Quarry LNR.
Hospital Wood BHS	0.4 km northwest of the proposals 8.46 ha	Semi-natural clough woodland listed in the Lancashire Inventory of Ancient Woodland (Provisional), (English Nature, 1994). The site adjoins Feazer Wood BHS.
Coplow Quarry and Pimlico Road Grasslands BHS	0.7 km southeast of the proposals 6.25 ha	The site comprises of areas of species-rich, semi-natural calcareous grassland and developing scrub at Coplow Quarry. The site includes Coplow Quarry geological SSSI.
Dog House Wood BHS	0.7 km south of the proposals 1.39 ha	The site comprises a small semi-natural wood situated on a steep south facing river cliff above the River Ribble.
Drakehouse Wood BHS	0.7 km north of the proposals 19.18 ha	Ancient, semi-natural woodland. The wood is listed in the Lancashire Inventory of Ancient Woodland (Provisional), (English Nature, 1994).
Sherburn Wood BHS	1.0 km southwest of the proposals 2.41 ha	The site comprises a long band of semi-natural woodland on a south facing river cliff above a sweeping curve of the River Ribble. The river bank is lined by alder where the ground flora includes hemlock water-dropwort, butterbur, alternate-leaved golden-saxifrage and green figwort, a species included in the Provisional Lancashrie Red Data List of Vascular Plants.
Boy Bank BHS	1.0 km south of the proposals 1.82 ha	The site comprises a small, semi-natural woodland known as Boy Bank Wood and a contiguous area of species-rich grassland. To the west the wood merges into species-rich, semi-natural grassland on the steep slope between the river and improved pasture above.
Bellman Farm Marsh BHS	1.1 km southeast of the proposals 6.01 ha	The site comprises the land adjoining Pimlico Brook from near Pimlico Link Road to the wet fields associated with Bellman Farm. The site also includes the area around the old kiln and the adjacent embankment. The wet fields have an underlying peaty soil, indicative of a historical wetland habitat. Formerly managed as meadowland, their vegetation is essentially fen meadow. The wet fields flood in winter attracting mallard, teal, snipe and water rail with lesser whitethroat sedge warbler and reed

Wildlife Site	Proximity to Proposed Ribble Crossing and Site Area	Summary Features
		bunting present through the summer. The site is considered an important moult and roost site for passerines.
Feazer Wood BHS	1.2 km northwest of the proposals 4.89 ha	A semi-natural clough woodland most of the wood is included in the Lancashire Inventory of Ancient Woodland (Provisional), (English Nature, 1994). The site adjoins Hospital Wood BHS.
Salthill Quarry BHS	1.3 km southeast of the proposals 8.31 ha	The site comprises of a mosaic of habitats including limestone grassland, scrub and developing woodland surrounding a former limestone quarry which has been developed as an industrial estate. The main areas of interest are the exposed outcrops and stony ground which have been colonised by a diverse flora. A number of Lancashire BAP birds use the site such as Bullfinch, Lesser Redpoll, Lesser Whitethroat, Linnet, Spotted Flycatcher, Tree Sparrow and Willow Warbler. The Labyrinth Spider occurs here. The site is within the Salthill & Bellmanpark Quarries Geological SSSI and includes much of the Salthill Quarry LNR.
West Clough Wood BHS	1.3 km northeast of the proposals 9.50 ha	Ancient semi-natural woodland listed in the Lancashire Inventory of Ancient Woodland (Provisional), (English Nature, 1994). The site is in the Forest of Bowland Area of Outstanding Natural Beauty (AONB).
Clitheroe Castle Knoll BHS	1.7 km south of the proposals 1.03 ha	The site consists of several rock outcrops and steep sloping areas of limestone grassland, scrub and developing woodland below Clitheroe Castle.
Bellman Park Quarry BHS	1.8 km southeast of the proposals 4.25 ha	Bellman Park Quarry is cut into one of a series of limestone hills, and is a link in a chain of calcareous habitats and features between Clitheroe and Downham. It forms part of the Salthill and Bellmanpark geological SSSI. Common frog, palmate newt and brown hare have been observed on the site.

9.5.3 Habitats and Flora

40) Table 9A.3 summarises the habitat features present within and surrounding the Proposed Ribble Crossing. Further details of habitat survey and assessment results are presented at Appendix 9A.2.

41) No potential GWDTE habitats were identified within 100 m of the route of the Proposed Ribble Crossing.

42) No plant species of note were identified within the Proposed Ribble Crossing. Given the timing of the survey it cannot be confidently assumed no notable plant species are present but the habitat types and management make it unlikely.

43) Non-native invasive plant species (Sch9) were not identified within the Proposed Ribble Crossing. Due to the timing of the survey this will require re-survey to be confident, although significant stands are considered unlikely.

Table 9A.3: Habitats present at the Proposed Ribble Crossing

Habitat	Extent *		Summary Features	Status
	Ribble Crossing	Offsite		
Broadleaved semi-natural woodland	Not present	Present < 50 m 50 m – 250 m	A narrow belt of broadleaved semi-natural woodland is present along the River Ribble on its southern edge adjacent to the southern boundary of the site. A further narrow belt of woodland is present off site on the north side of West Bradford/Waddington Road A small parcel of woodland associated with Waddington Brickworks Old Working BHS lies approximately 100m north of the site. More extensive areas of woodland are present in the wider landscape typically over 200m from the site.	HPI LBAP
Broadleaved plantation woodland	Not present	Present 50 m – 250 m	A band of broadleaved plantation woodland is located approximately 30m to the southeast of the Proposed Ribble Crossing	None
Mixed plantation woodland	Not present	Present 50 m – 250 m	Small parcels of mixed plantation woodland appear to be present in the wider area, generally associated with urban planting.	None
Conifer plantation	Not Present	Present 50 m – 250 m	Small parcels of conifer plantation woodland appear to be present in the wider area, generally associated with urban planting.	None
Dense / continuous scrub	0.18 ha	Present < 50 m 50 m – 250 m	This habitat is present within the north east of the site where a thicket of dense blackthorn scrub has encroached from an outgrown species rich hedge (TN9).	None
Scattered broadleaved trees and scrub	205 no. individual and 97 no. groups (or	Present < 50 m 50 m – 250 m	Pockets of scattered scrub are present across the site. Along the edge of Coplow Brook lies some bramble scrub scattered along the embankment, within the semi improved grassland sward. Small patches of hawthorn scrub lie along the edge of one of the central fields, likely the remains of an old remnant hedge.	NPPF: veteran trees

Habitat	Extent *		Summary Features	Status
	Ribble Crossing	Offsite		
	part of groups)		Scattered broadleaved trees are present mainly across the field boundaries (either fence lines or hedgerows) and along the watercourses across the site. Frequently occurring species include ash and alder. The majority of the trees are mature in age. Two veteran trees are located within the Ribble Crossing. Both are ash trees present on the south side of the River Ribble. T67(T22) lies within the improved field just south of the tree line. T129 (T18) lies in the southeast corner of the same field.	
Native hedgerows	1860m	Present < 50 m (50 m – 250 m	There are a number of native hedgerows across the field boundaries associated with the site. These range in their species diversity and associated features, including stream and wet/ dry ditch. There are five native species rich hedges (RC.H17, RC.H18, RC.H20, RC.H22 and RC.H27) (TN5, TN6, TN7) which are concentrated in the east of the site, north of River Ribble. There is one species rich hedge with trees along Greg Sike at TN10 (RC.H16). There are four species-poor intact hedges (TN8) (RC.H5, RC.H2, RC.H11 and RC.H21), one species-poor hedge with trees (RC.H1) and four species poor defunct hedges (RC.H3, RC.H4, RC.H10 and RC.H19) including one along the southern section of Coplow Brook. A Hedgerow Regulations Assessment identified three of the hedgerows to be ecologically Important. This included RC.H2 at the western end of the route adjacent to West Bradford Road, RC.H20 adjacent to the route on the north side of the River Ribble at the eastern end of the route and RC.H27 in the northeast corner of the site adjacent to Clitheroe Road.	HPI LBAP Hedgerow Regulations
Improved grassland	28.59 ha	Present < 50 m 50 m – 250 m	This habitat is present throughout the Ribble Valley and across the majority of the site. The intensively sheep grazed fields are dominated by perennial ryegrass Lolium perenne with occasional occurrences of other coarse grasses. The sward comprises very few herbs, and those present are nutrient tolerant i.e. white clover Trifolium repens.	None
Semi-improved neutral grassland	0.16 ha	Present < 50 m 50 m – 250 m	Strips of this semi-improved grassland are present along the edge of the River Ribble (around 6-8m wide on the northern side), as well as along the embankments of Coplow Brook (c.2m wide) within the northern part of the site. Left un-grazed and un-cut, the swards of these field and watercourse edges have become dominated by rank, coarse grasses with tall perennial and biennial herbs, indicative of more nutrient rich soils.	None

Habitat	Extent *		Summary Features	Status
	Ribble Crossing	Offsite		
Bare ground with scattered tall ruderals	0.14 ha	Present < 50 m	This habitat lies along the southern bank of the River Ribble. Regularly walked and within the drawdown of the River, the ground has become bare / muddy with scattered ruderal herbs establishing.	None
Bare ground	0.10 ha	Present < 50 m 50 m – 250 m	This habitat is associated with a track coming from a farm to the west of the site (off B6478), directed towards Coplow Brook.	None
Buildings and hardstanding	0.12 ha	Present < 50 m 50 m – 250 m	A farm and associated sheds / out-houses is present just outside the southern boundary of the site, off West Bradford Road The only buildings with the redline line is a barn, situated along the eastern side of Coplow Brook within the north of the site (TN2). Hardstanding is associated with the roads that just fall within / along the site boundaries; including West Bradford Road and an access road off B6478 to a house and onto the barn within the site boundary.	None
Ponds	Not Present	Present < 50 m	No ponds are present within the Proposed Ribble Crossing. Only one pond is present within 500m of the Proposed Ribble Crossing approximately 40 m east of the site beyond West Bradford/Clitheroe Road.	HPI LBAP
Running water (mesotrophic)	0.50 ha (River Ribble) 732 m (other watercourses)	Present < 50 m 50 m – 250 m	The River Ribble flows west across the southern section of the site. At the time of survey the river was in spate. A number of streams and ditches are present along field boundaries, some at the base of the hedgerows. Coplow Brook flows south from West Bradford Road within the west of the site, down to the River Ribble. Greg Sike also flows south into the River Ribble, down the centre of the site (TN6, TN7 and TN8). Valuation and impact assessment are provided in Chapter 9B.	HPI LBAP
Wet ditch	534 m	Present < 50 m 50 m – 250 m	As described for hedgerows, several wet ditches accompany hedgerows across the site.	None

Habitat	Extent *		Summary Features	Status
	Ribble Crossing	Offsite		
Dry ditch	60 m	Present < 50 m 50 m – 250 m	All ditches on site held water apart from a dry ditch that is present along a field boundary within the centre of the site.	None
Walls	241 m	Present < 50 m 50 m – 250 m	A dry stone wall is present along the site boundary in the south of the site, leading from the farm north to the River Ribble.	None

9.5.4 Fauna

44) Table 9A.4 provides a summary of the baseline from fauna surveys completed across the Proposed Ribble Crossing. Detailed survey findings are described in the relevant Appendix and illustrated on the relevant Figures, as directed by Table 9A.1.

Table 9A.4: Species and species groups present at the Proposed Ribble Crossing

Species / Group	Summary Features	Status
Bats: roost sites	Several records for confirmed bat roosts were identified within 2 km of the Proposed Ribble Crossing from within the past 10 years. Species included common pipistrelle, soprano pipistrelle, Daubenton's bat and whiskered bat. One building with high bat roost suitability is present within the Proposed Ribble Crossing. Several trees with bat roosting potential are present within the Proposed Ribble Crossing. This includes: 23no.: High roosting potential (T130 (BT4), T120 (BT5), T67 (BT22), T118 (BT34), G13 (BT49), T126 (BT51), T152 (BT56), T149 (BT57), T121 (BT67), T196 (BT72), T183 (BT74), T166 (BT75), T165 (BT76), T176 (BT78), T182 (BT82), T192 (BT85), T157 (BT88), T170 (BT95), T167 (BT96), G76 (BT97), T115 (BT104), T70 (BT105), T23 (BT112)). 18 no.: Moderate roosting potential (T54 (BT23), T49 (BT30), T95 (BT31), T134 (BT35), G14 (BT48), T128 (BT50), T150 (BT55), T109 (BT66), T177 (BT77), T174 (BT79), T175 (BT80), T179 (BT81), T190 (BT86), T188 (BT87), G76 (BT98), G73 (BT100), G22 (BT108), T14 (BT110)). 20no.: Low roosting potential (T89 (BT21), T68 (BT24), T77 (BT25), T39 (BT29), T13 (BT45), T12 (T46), T15 (BT47), T116 (BT68, 68A & 68B), T185 (BT83), T194 (BT84), G76 (BT99), G69 (BT101), T141 (BT102), T135 (BT103), T71 (BT106), T52 (BT107), G24 (BT109), G4 (BT113), T9 (BT114), T25 (BT115)).	Conservation of Habitats and Species Regulations 2017 (as amended) Wildlife and Countryside Act 1981 (as amended) SPI (certain species only) LBAP
Bats: flyways and foraging	Several records for common pipistrelle, soprano pipistrelle, Daubenton's bat and whiskered bat were identified as field records in the desktop data. Habitats within the Proposed Ribble Crossing are dominated by pasture, but have varied boundary features that comprise of scattered mature trees, scrub, hedgerows and watercourses which can offer foraging opportunities for bat species. Adjacent habitat corridors exist in the form of linear woodland blocks and the River Ribble that provides stronger connectivity with and across the wider landscape. Following a review of the habitats within and across the surrounding landscape of the Proposed Ribble Crossing and an assessment of likely impacts from the works, bat activity surveys have been scoped out. Bat Surveys for professional Ecologists: Good Practice Guidelines[18]	SPI (soprano pipistrelle, brown long-eared bat and noctule) LBAP (all bet species)

Species / Group	Summary Features	Status
Badgers	No setts were identified within 30 m of the Proposed Ribble Crossing. Footprints and snuffle holes were observed along the field boundaries to the south of the River Ribble. A badger sett was identified over 350m south of the proposals in woodland associated with Cross Hill Quarry LNR/BHS (TN4). Footprints and snuffle holes were also observed in this area and the local farmer confirmed badger have been observed throughout the woodland. Habitats within the Proposed Ribble Crossing survey area offer suitable habitat for the excavation of badger setts, including embankments, tree lines and hedgerows. Many of the habitats offer suitable foraging habitat for badger.	Protection of Badgers Act 1992
Brown hare	Brown hare was recorded at one location within the Proposed Ribble Crossing (RC TN8). Suitable habitats, notably pasture and other grasslands, are present within and surrounding the Proposed Ribble Crossing.	SPI LBAP
Hedgehog	Records reveal presence within 2 km of the Proposed Ribble Crossing Habitats within and surrounding the Proposed Ribble Crossing include suitable habitats and features that could support this species, although foraging habitats are limited to improved pasture, which is likely to be sub-optimal. Offsite nearby woodlands are likely to provide the most optimal habitat.	SPI
Breeding birds	The River Ribble section crossed by the proposals falls within the Lancashire County Heritage Site: River Ribble from London Road Bridge Preston, in west, to County boundary, in East LSRRI. The description for this long section of river states that sandy cliffs of the river are suitable for nesting kingfisher and sand martin and where present the shingle banks provide habitat for nesting waders such as oystercatcher, common sandpiper, little ringed plover and ringed plover. Suitable adjacent fields also support breeding lapwing and curlew and mature trees and woodlands adjacent to the river provide for nesting goosander. A record of curlew directly north of the site has been provided and from within the km^2 containing the north east corner of the site, although it is unknown what time of year these birds were recorded. Kingfisher have been recorded on a small watercourse just over 1 km south west of the site and barn owl have been recorded approximately 1 km west. A review of habitats found that the section of the river that the proposals cross and run alongside does not contain suitable banks for nesting kingfisher or sand martin, nor do they contain suitable shingle banks for nesting waders such as common sandpiper, little ringed plover and ringed plover. Adjacent fields are enclosed by hedges and trees and contain improved grassland, sub-optimal for wader species such as curlew. The grassland within or near to the site could potentially support small numbers of breeding oystercatcher. A range of common passerine species are likely to nest within the trees and hedgerows present, including SPI and BoCC species such as dunnock, house sparrow, song thrush and tree sparrow.	Wildlife and Countryside Act 1981 (as amended) SPI (certain species) BoCC (certain species)[2] LBAP (certain species)

[2] Eaton, M.A. *et. al* (2015) As Reference **Error! Bookmark not defined.**

Species / Group	Summary Features	Status
Wintering birds	A total of 52 no. bird species were recorded for the Proposed Ribble crossing. Of these, 26 no. species are BoCC: black headed gull, common gull, great black-backed gull, greylag goose, kestrel, lesser black-backed gull, mallard, meadow pipit, mute swan, oystercatcher, snipe, stock dove (Amber), kingfisher (amber and Schedule 1 breeding only), dunnock (amber and SPI), grey wagtail, mistle thrush (Red), fieldfare, redwing (Red and Schedule 1 breeding only), curlew, herring gull, house sparrow, lapwing, song thrush, starling and tree sparrow (Red and SPI). The wider assemblage was reported to be typical of the habitats present. Wader species recorded included curlew, lapwing, oystercatcher and snipe. Lapwing were only recorded in March with a peak count of 13 no. 10 of which were recorded in flight only. Curlew were recorded in February and March, with a peak count of 6 no. recorded in March and oystercatcher were recorded in January and March, with a peak count of 4 no. recorded in March. The peak counts recorded late in the season indicates that the birds were likely on passage from wintering grounds such as the Ribble Estuary to suitable breeding grounds. A single snipe was recorded in February and March each time noted in the same field to the west of the proposed route. Wildfowl species included mallard, which were recorded in December, January, February and March with a peak count of 19 no. recorded in March, 7 no. goosander recorded in February and a single greylag goose recorded in January and mute swan recorded in February. A number of gull species were recorded to use the survey areas, including black headed gull, common gull, herring gull, great black-backed gull and lesser black-backed gull. Only low numbers were generally recorded, although 156 no. black headed gull were recorded in March with the majority of birds recorded in the fields to the south of the proposed route.	SPI (certain species) BoCC (certain species) LBAP (certain species)
Reptiles	No records of reptiles were returned as part of the desk study. The improved pasture that dominates the Proposed Ribble Crossing is considered to be sub-optimal reptile habitat. Shelter habitat / features include scattered scrub, trees and hedgerows.	Wildlife and Countryside Act 1981 (as amended)
Amphibians, including great crested newts: breeding ponds	No records for great crested newt were identified in the desktop study. Records for common toad and common frog were returned. No permanent ponds are present within the Proposed Ribble Crossing. There are two ponds within 500 m of the Proposed Ribble Crossing. The closest pond is approximately 40 m east of the red line boundary beyond West Bradford Road, the other is an ornamental pond associated with Hanson Cement works also on the opposite side of the West Bradford Road over 200 m from the Proposed Ribble Crossing. The great crested newt eDNA survey returned a negative eDNA result for Ponds 1 and 2 with Ponds 4 and 5 being dry. No surveys for other amphibians have been undertaken.	SPI (common toad) LBAP (common toad)
Amphibians, including great crested newts:	Pond density across the local landscape is generally very low and consequently amphibian terrestrial habitat densities are likely to be low also, although the pond immediately east of the Proposed Ribble Crossing could provide a localised concentration of terrestrial amphibian presence. Suitable terrestrial habitats within the Proposed Ribble Crossing are limited	SPI (common toad) LBAP (common toad)

Species / Group	Summary Features	Status
terrestrial habitats	to scattered trees and scrub, hedgerow habitat and watercourses, with the improved pasture that dominates these areas is sub-optimal.	
Terrestrial invertebrates	Various records of notable butterfly and moth species including 7 no. SPI (buff ermine, dusky brocade, ghost moth, green-brindled crescent, small heath, small square-spot and wall). The limited range of habitats and floral diversity within the Proposed Ribble Crossing is unlikely to support significant populations of terrestrial invertebrates (individual species or assemblages). Scrub, scattered trees and hedgerows may provide localised foraging and sheltering habitat for terrestrial invertebrates. However, Cross Hill Quarry LNR offsite to the south presents the most optimal habitats for terrestrial invertebrates and consequently this offsite area is more likely to support viable populations than habitats present within the Proposed Ribble Crossing.	Wildlife and Countryside Act 1981 (as amended) (certain species) SPI (certain species) LBAP (certain species) Nationally Rare / Notable (certain species)

Future baseline

45) It is assumed for the purposes of this EcIA that the current land uses within and adjacent to the Ribble Crossing would remain as they were at the time of the field surveys, except in cases where planning permission has already been granted for development. For consented developments, it is assumed that the developments would take place. These have been considered in the cumulative assessment in Chapter 19 of the main ES.

9.5.5 Identification and Valuation of Ecological Features

46) Table 9A.5 summarises the ecological features which comprise the EcIA baseline which may potentially be affected by the Proposed Ribble Crossing and their ecological importance.

Table 9A.5: Valuation of Terrestrial Ecology Features Present at the Proposed Ribble Crossing

Ecological Feature	Description	Value
Scattered and dense scrub	Rare within the Proposed Ribble Crossing (0.18 ha). A generally common and widespread habitat across the wider landscape. Of limited diversity but contributes towards the interest and function of the immediate local ecological network.	Less than Local
Scattered broadleaved trees (veteran trees)	Two veteran Category A3 ash trees present on the south side of the River Ribble (T67 (BT22) and T129). The broadleaf species are typical in the landscape, with additional mature and veteran trees and areas of Ancient & Semi-Natural Woodland identified locally.	County
Scattered broadleaved trees (non-veterans)	Relatively frequent across the Proposed Ribble, particularly along field boundaries and within hedgerows. The broadleaf species are typical in the landscape. Their value is generated both from individual features and the habitat unit they form within the wider habitat network.	County
Native hedgerows	Relatively common within the Proposed Ribble Crossing (1860 m), dissecting the majority of the field boundaries.	Local

Ecological Feature	Description	Value
	Relatively common and widespread, with an integrated network, across the landscape.	
Improved grassland	Extensive within the Proposed Ribble Crossing (28.59 ha). Common and widespread habitat locally of limited diversity although provides permeability within the immediate ecological network for a range of mobile species.	Less than Local
Semi-improved neutral grassland	Rare within the Proposed Ribble Crossing (0.16 ha), limited to small linear sections on the edge of watercourses and the edge of the River Ribble. Relatively common and widespread in the local landscape. Contributes to the interest and function of the wider local ecological network.	Less than Local
Bare ground with scattered tall ruderals	Rare within the Proposed Ribble Crossing (0.14 ha), limited to small fragments on the edge of the southern bank of the River Ribble. A generally common and widespread habitat across the wider landscape. Generally, botanically impoverished but provides limited and localised structural and habitat diversity within the immediate habitat mosaic.	Less than Local
Bare ground	Rare within the Proposed Ribble Crossing (0.10 ha), limited to farm tracks and parking areas. Common and widespread across the wider landscape. Artificial (access track) habitat type of negligible value with negligible contribution to immediate, local or wider ecological networks.	Immediate site
Buildings and hardstanding	Rare within the Proposed Ribble Crossing, limited to a single agricultural building (0.12 ha). Common and widespread across the wider landscape. Artificial habitat type of negligible value with negligible contribution to immediate, local or wider ecological networks.	Immediate site
Running water (mesotrophic)	Four watercourses are present across the site, including the River Ribble (which qualifies as HPI). Coplow Brook, Greg Sike and an unnamed watercourse all cross the Proposed Ribble Crossing and flow into the River Ribble. Several smaller watercourses are also present. Watercourses are common in the wider landscape. Further details, evaluation and assessment of watercourses are presented in Chapter 9B.	Refer to Chapter 9B
Wet ditch	Several wet ditches accompany hedgerows across the site. Relatively common and widespread across the landscape. Artificial habitat type, common across landscape, of negligible inherent value with limited contribution to immediate, local or wider ecological networks. May provide localised foraging or ranging / dispersal opportunities for some species.	Less than Local
Dry ditch	One dry ditch is present within the Proposed Ribble Crossing associated with a hedgerow within the centre of the site. Relatively common and widespread across the landscape. Artificial habitat type, common across landscape, of negligible inherent value with limited contribution to immediate, local or wider ecological networks.	Less than Local

Ecological Feature	Description	Value
	May provide localised foraging or ranging / dispersal opportunities for some species.	
Walls	Rare within the Proposed Ribble Crossing (241 m). Relatively common and widespread across the landscape. Artificial habitat type, relatively common across landscape, of negligible inherent value with limited contribution to immediate, local or wider ecological networks. May provide localised shelter or ranging / dispersal opportunities for some species.	Less than Local
Bats: roost sites	Several records for confirmed bat roosts were identified within 2 km of the Proposed Ribble Crossing. Suitable roost habitats (buildings and trees) are present within and bordering Proposed Ribble Crossing.	Local
Bats: flyways and foraging	The River Ribble is a key landscape corridor feature that would be crossed by the Proposed Ribble Crossing. Localised features (hedges, walls, tree / scrub lines and watercourses) are also present across the Proposed Ribble Crossing which also have some connectivity value. Foraging habitats within the site are primarily limited to the same features.	Local
Badgers	Setts likely to be occasional in wider landscape, absent from the Proposed Ribble Crossing and 30 m buffers. Habitats in the Proposed Ribble Crossing `offer permeability and foraging opportunities, but evidence of use is low. Common and widespread species, statutorily protected for welfare reasons.	Local
Brown hare	Confirmed present by incidental observations during Phase 1 survey, likely to be at moderate densities given habitats present across Proposed Ribble Crossing. Widespread but declining species.	Local
Hedgehog	Present within local landscape according to records. Suitable habitats present within Proposed Ribble Crossing but more optimal habitats occur offsite. Widespread but declining species.	Less than local
Breeding birds	Due to the low suitability of the habitats present there are unlikely to be significant numbers of ground nesting species such as lapwing, oystercatcher or skylark present within the site. The trees and hedgerows are likely to support a range of nesting passerine species, including SPI and BoCC species, however it is highly unlikely that these would be present in numbers notable at County level.	Local
Wintering birds	No significant numbers of waders, wildfowl, gulls, wintering thrushes, farmland passerines or other notable species were recorded utilising habitats within the Proposed Ribble Crossing. None of the species recorded were present in numbers that would be notable at a County level. No qualifying species for the Bowland SPA were recorded.	Local
Reptiles	No reptile species identified in the desktop study. Optimal habitats within the Proposed Ribble Crossing is limited. Any reptile species present likely to be common and widespread and at low density.	Less than local
Amphibians: terrestrial habitats	Amphibian breeding ponds are absent within the Proposed Ribble Crossing. There are two ponds within 500 m of the Proposed Ribble Crossing but both are on the opposite site of the road. With suitable terrestrial habitat present around the ponds it is unlikely amphibians	Less than local

Ecological Feature	Description	Value
	would be motivated to cross the road to reach the predominately improved pasture fields within the Proposed Ribble Crossing. Great crested newt were confirmed absent from the two ponds that were wet during the 2021 survey season. The ponds are isolated from other naturalised ponds in the wider landscape, the closest being c40 m away and a large man-made pool associated with Hansons Cement works. Great crested newt typically require a cluster of ponds to thrive and usually stay within 250m of a breeding pond. Suitable terrestrial habitats within the Proposed Ribble Crossing is limited to small areas of semi-improved grassland and hedgerow/tree habitat, with the improved pasture that dominates considered sub-optimal. Considering the low density at which suitable breeding habitats are located across the surrounding landscape, densities of terrestrial amphibians are likely to be low.	
Terrestrial invertebrates	Habitats identified from the phase 1 habitat survey that have the potential to support notable species or assemblages of terrestrial invertebrates, are located outside of the Proposed Ribble Crossing.	Less than local
Non-native invasive species	Not of ecological conservation concern but there is a statutory duty to avoid the introduction or spread of species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).	n/a

47) In line with the requirement for a proportionate approach to EIA, only ecological features identified as having at least local value are taken forward for individual impact assessment.

9.6 Assessment of likely significant effects

9.6.1 Enabling Works Phase

Proposed Activities

48) Enabling works are anticipated to last a duration of 11 weeks and would include the following activities that have potential to result in biophysical changes to important ecological features:

- Setting up of the contractor's compound (comprising site office, welfare facilities and car park/laydown area) to include site clearance work, minor earthworks operations to level the site and pavement works (compacted stone) for the car park/laydown area
- Temporary construction access to the contractor's compound
- Fencing installation around the construction area as necessary (comprising stock-proof post and wire, silt/sediment fences to prevent sediment reaching watercourses and higher security fences at compounds)
- Tree, scrub and hedgerow removal, where unavoidable. In accordance with the AIA (Appendix 6.7), the following losses would be unavoidable:
  - Trees / hedgerows / groups to be removed / partially removed (red):
    a) H11 (HRC.H2), T65, G34, T101, T92, T86, T82, T78, G38, G55, T117, G48 (HRC.H19)
  - Trees at risk of removal aiming to retain (amber):
    b) T59, T49, T72

- All other trees, woodlands and hedgerows would be retained and protected in accordance with avoidance and mitigation methods embedded through the CCoP Part A Section 5.2.2
- Temporary removal of walls
- Possible overhead service diversions (undertaken in advance of the main construction works) involving some excavation and concrete works for foundations or footings
- Below ground services would require protection (undertaken in advance of the main construction works) involving excavation to locate services and install concrete protection slabs
- Construction of a bridge launch platform to allow assembly and installation of the temporary bridge

Effects Scoped Out

49) Potential effects upon internationally designated sites are detailed within the HRA (LCC/RVBC-BO-APP-010) and potential effects on sites of special scientific interest are detailed in the SSSI report (LCC/RVBC-BO-APP-009), both reports confirm no likely significant effects on these levels of designation would be anticipated.

50) There would be no physical land take within any of the non-statutory designations. Loss of habitats within all these designations and resulting impacts upon species for which the non-statutory sites are designated are therefore also avoided and are scoped out from further assessment.

51) Apart from Cross Hill Quarry LNR & BHS, the River Ribble BHS and the Waddington Brickworks Old Working BHS the remaining locally designated sites are located over 200 m from the proposed Ribble Crossing. This is sufficiently distant that no likely significant effects in respect of noise, vibration, light disturbance or the integrity of the local ecological network would be anticipated. With the exception of Dog House Wood BHS, Boy Bank BHS and Sherburn Wood BHS which all lie downstream of the proposals with the River Ribble acting as a potential pathway for indirect adverse effects to occur. However embedded mitigation (described above) would ensure degradation of these sites does not occur.

52) No significant fragmentation or isolation effects on the statutory or non-statutory wildlife sites in the local ecological network are anticipated as a consequence of enabling works for the Proposed Ribble Crossing. Effects on the aquatic ecological environment including the River Ribble BHS are considered at Chapter 9B.

53) The Air Quality assessment (Appendices 18.1 and 18.2) concludes that no significant changes to air quality would arise along the haulage or site traffic routes as a consequence of the site traffic journeys during any of the project phases. Effects of increased emissions from traffic are therefore scoped out for the enabling phase.

54) Degradation in quality or function of habitats resulting from dust deposition during bulk earthworks and generated from bulk soil storage would be avoided or reduced to non-significant levels by embedded mitigation (further details of embedded measures to protect sensitive features from dust deposition are provided within Section 5.11 of the CCoP). Therefore, dust impacts are scoped out of this assessment.

55) Degradation in quality or function of habitats resulting from surface water changes, site run-off (including sedimentation or wash-out/erosion effects) would be avoided or reduced to non-significant levels by embedded mitigation (further details of embedded measures to protect surface water features, maintain surface water run-off rates and ensure surface and site run-off water quality are provided within Section 5.3 and 5.6 of the CCoP.

56) Potential effects upon watercourses, including construction of temporary outfalls and effects of uncontrolled surface water run-off, are considered in Chapter 9B and consequently watercourses are not considered further as important ecological features within this EcIA for Terrestrial Ecology. However, discussion of or reference to watercourses may be included for context in characterising effects upon important (terrestrial) ecological features.

57) Risk of spreading invasive species has been scoped out, none have been identified to date and embedded measures in the CCoP would be sufficient to prevent introduction from offsite.

58) The important ecological features or impact pathways discussed above are therefore scoped out from the EcIA for the enabling works.

Effects Carried Forward for Assessment

- Physical loss of habitats. The reasonable worst case to facilitate levels, construction platforms and laydown/storage area requirements assumes:
  - temporary land take requiring loss of all habitat areas except
    a) boundary features would be retained with appropriate standoffs (2 m for hedgerows, appropriate root protection for trees as recommended by the AIA (Appendix 6.6)
    b) watercourse crossings (impacts upon watercourses are described and assessed in Chapter 9B)
  - No permanent habitat losses are proposed
- Damage, degradation or modification of retained habitats including:
  - watercourses requiring temporary new or upgraded culverts or other modifications for crossings and construction of temporary outfalls for the discharge of surface water (impacts upon watercourses are described and assessed in Chapter 9B, but any resulting impacts which have the potential to affect any valued terrestrial features through which the watercourses flow are considered in this chapter)
- Fragmentation and isolation of retained habitats:
  - temporary localised effects until habitat reinstatement is implemented (during the construction and commissioning phases) and habitat becomes re-established
- Habitat loss, exclusion, obstruction of movement and habitat fragmentation affecting mobile species:
  - habitat losses, fragmentation of dispersal / migratory corridor features and installation of barrier effects would prevent access to or between habitats by species using those habitats for foraging, breeding or shelter
  - habitat loss and fragmentation may also contribute to higher mortality in species due to increased exposure from loss of shelter or corridor features leading to higher predation risks or loss of foraging habitat
- Killing, injury or entrapment risk of terrestrial fauna:
  - species that may range across or utilise localised habitats within the Proposed Ribble Crossing, passerine birds nesting in trees, scrub and hedgerows, ground nesting birds utilising open grassland habitats and bats roosting in trees would be at risk from vegetation removal and ground works, if present at the onset of works
  - open excavations and mesh or wire fencing may pose an entrapment or entanglement risk to fauna species such as brown hare, hedgehog, badgers, reptiles and amphibians
- Disturbance of species through noise, visual or vibration effects:
  - noise, visual and vibration effects might cause desertion of occupied breeding or shelter sites
  - disturbances might also cause needless expenditure of energy and may expose species to increased risk of predation

59) Habitat reinstatement works would be implemented during the decommissioning phase of the Ribble Crossing, which would occur after the commissioning phase of the Bowland Section. This would result in the reversal of the majority of effects arising from habitat loss and fragmentation that occurs during the enabling phase. A reasonable worst-case scenario assumes removal of the temporary Ribble Crossing road & bridge and associated habitat reinstatement would commence in 2029 due to the need for an outage on the aqueduct to facilitate commissioning of the new aqueduct. Habitat establishment timescales would vary according to the complexity of the target habitat. The vast majority of habitat losses would comprise improved grassland with smaller areas of species poor hedgerows and scattered trees. Establishment of grassland habitats would be anticipated in one to three years (medium term), while establishment of hedgerows would be anticipated in five years (medium to long term) and trees would be anticipated to require more than five years (long term). However, given that habitat losses will occur at the start of the

Ribble Crossing enabling phase (Q2 2023) and may be absent for at least 6 years before reinstatement, the duration of temporary habitat loss impacts to establishment are all classed as long-term.

60) Effects arising prior to mitigation (but with due consideration of embedded mitigation as described at Section 9A.6.1) upon the important ecological features are summarised in Table 9A.6. Only those important ecological features where effects have been identified are included in the table.

Table 9A.6: Summary of Enabling Works Effects

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Crosshill Quary LNR/BHS	County	Although within 200 m of the Proposed Ribble Crossing, this designation lies over 200m from any of the enabling works and a large farm complex lies between the works and the designation. It is unlikely that enabling activities would have a significant disturbance effect on the site or the species it supports. Degradation in the quality or function resulting from changes to surface water flows or air quality arising from run off or dust deposition during bulk earthworks and generated from bulk soil storage would be avoided or reduced to non-significant levels by embedded mitigation measures, including but not limited to provision of buffers, surface water management and dust suppression measures (further details of which are provided in the CCoP Sections 5.3, 5.6 and 5.11.	Not significant
River Ribble BHS	County	This designation partly falls within the Proposed Ribble Crossing. Enabling works adjacent to the BHS are relatively small scale with compounds located outside the designation. However, preparation of the launch platform would include activities which could cause disturbance to riverine species locally. Impacts on aquatic habitats and the species they support would be considered in Chapter 9B.	Please see Chapter 9B Water Environment
Waddington Brickworks Old Working BHS	County	Visual, noise or vibration disturbance impact. Although within 200 m of the Proposed Ribble Crossing, this designation lies over 200 m from any of the enabling works. It is unlikely that enabling activities would have a significant disturbance effect on the site or the species it supports. Degradation in the quality or function resulting from changes to surface water flows or air quality arising from run off or dust deposition during bulk earthworks and generated from bulk soil storage would be avoided or reduced to non-significant levels by embedded mitigation measures, including but not limited to provision of buffers, surface water management and dust suppression measures (further details of which are provided in the CCoP Sections 5.3, 5.6 and 5.11.	Not significant
Bowland Fells IBA	County	Although the far edge of this extensive IBA falls within 200 m of the Proposed Ribble Crossing, this designation lies on the north side of West Bradford / Waddington Road, which is an active single carriageway bordered by substantial hedgerows on both sides of the road. There would be no direct impacts on this designation and it is considered unlikely that enabling activities would have a significant disturbance effect on the site or the species it supports.	Not significant

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Scattered broadleaved trees (non-veteran)	County	Unavoidable removal of 9 no. trees/tree groups and potential removal of 3 no. trees/tree groups to allow access for set up of the construction compounds and construction of the of the bridge launch platform. Reversible (with intervention). Reducing to Not significant in the long term following reinstatement. Damage or degradation of trees retained within or adjacent to construction areas (including habitat reinstatement areas) from surrounding enabling activities (e.g. soil compaction, erosion, root or tree damage, wash out etc.) would be avoided by embedded measures outlined in the CCoP (Section 5.2).	Significant Adverse Local Reducing to Not significant
Scattered broadleaved trees (veteran)	County	A number of trees fall within the construction compounds including one tree with veteran features, however all of these trees would remain in-situ (there will be no losses of veteran trees). Damage or degradation of trees retained within or adjacent to construction areas (including habitat reinstatement areas) from surrounding enabling activities (e.g. soil compaction, erosion, root or tree damage, wash out etc.) would be avoided by embedded measures outlined in the CCoP (Section 5.2).	Not significant
Native hedgerows	Local	Temporary unavoidable loss totalling circa 130 m of native Important hedgerow (H11 (HRC.H2), species-poor intact) to form compounds and construction access to the site. This loss is based on the worst-case scenario of the entire length of the compound requiring removal. It is likely hedgerow removal would be reduced to what will be required to accommodate access and future road visibility splay. Minor fragmentation of local hedgerow network as a consequence. Reversible (with intervention). Reducing to Not significant in the long term following reinstatement.	Significant Adverse Less than Local Reducing to Not significant
Bats: roosts	Local	Visual, noise, lighting or vibration disturbance impact. Four trees with high, moderate or low bat roost suitability are present within the construction compounds. There would be no loss of these trees and they would be adequately protected by embedded measures (including mitigation to reduce light disturbance of bats) outlined in the CCoP (Sections 4.5, 5.4 and 5.10).	Not significant
		Desktop records identified no bat roosts within or adjacent to the Proposed Ribble Crossing. The closest offsite roost is a pipistrelle roost over 400 m west of the closest construction compound. Habitat losses identified above would not result in fragmentation of flyway habitat associated with roost sites in the wider landscape. Disturbance effects on offsite roost sites is not likely to be significant during the enabling phase. Severance or commuting routes as a consequence of vegetation removal is considered unlikely.	Not significant

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Bats: flyways and foraging	Local	Temporary loss of scattered trees (8 no. trees/tree groups and potential removal of 4 no. trees/tree groups) in addition to temporary loss of semi-improved neutral grassland (0.01 ha) associated with the bridge launch platform could result in localised reduction of foraging habitat or localised fragmentation of foraging habitat and commuting routes. However, the River Ribble and connected tree lines and hedgerows, which provide some of the highest value habitat for commuting and foraging bats within the Proposed Ribble Crossing, would remain unaffected throughout the works and would provide longitudinal connectivity in the wider landscape. The severance effect is therefore not anticipated to significantly impact upon bat flyways or foraging routes. Overall, small scale local reductions of available foraging habitat would occur, but key landscape features (hedgerows, tree lines and the River Ribble) and interconnectivity would be retained locally and over the wider landscape.	Not significant
Badgers	Local	Risk of killing or injury of a badger. Embedded avoidance measures outlined in Section 5.4 of the CCoP would prevent risk of killing/injury, obstruction and disturbance of badgers or their habitats. These embedded measures also include pre-commencement inspections and acquisition of an appropriate licence, which would enforce additional control measures to comply with legal protection of this species.	Not significant
		Vegetation clearance and other enabling phase activities would result in the loss of foraging habitats. This includes the estimated loss of Improved grassland (3.21 ha) and semi-improved neutral grassland (0.01 ha). Badgers utilising retained habitats in the wider landscape around the Proposed Ribble Crossing may be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement from retained habitats. Fenced construction zones would also create localised barrier effects, resulting in exclusion from retained habitats. However, given the availability of similar habitats and the duration and location of the enabling works in relation to known setts, no significant effects are anticipated.	Not significant
Brown hare	Local	Vegetation clearance, soil stripping and handling, excavations and other enabling phase activities would put these species at risk of killing or injury or entrapment in excavations or temporary mesh fencing. However, embedded measures outlined out in Section 5.4 of the CCoP would avoid or reduce these risks in combination with other embedded measures outlined for other small animals such as terrestrial amphibians and reptiles and badgers.	Not significant
		Vegetation clearance and other enabling phase activities would result in the temporary but long-term loss of foraging and shelter habitats. This includes loss of trees (8 no. trees/tree groups and potential removal of 4 no. trees/tree groups), semi-improved neutral grassland (0.01 ha), and improved grassland (3.21 ha). Species utilising retained habitats on or offsite could be subject to disturbance from noise, visual or vibration effects,	Significant Adverse Less than local

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
		resulting in possible localised displacement from retained habitats. Fenced construction zones would also create localised temporary but potentially long-term barrier effects, resulting in exclusion from retained habitats. Reversible (with intervention). Reducing to Not significant in the long term following reinstatement. Disturbance events, at least until habituation might occur, may also result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Irreversible (loss of individuals).	Reducing to Not significant
Breeding birds	Local	It is likely that small numbers of common bird species nest within the scattered trees, scrub and short sections of hedgerow within the site, and it is possible that a pair of oystercatcher may nest within open grassland within the site. Vegetation clearance could result in disturbance of nests and while the destruction of active nests would be avoided through embedded mitigation the clearance works would result in the loss of some potential nesting habitat, although this is not extensive in the context of the wider landscape (reversible with intervention). Reducing to Not significant in the long term following reinstatement.	Significant Adverse Less than local Reducing to Not significant
		Species nesting in retained habitats offsite, or utilising habitats within or surrounding the compounds to support nesting, may be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement. Reversible (with intervention). Disturbance events may result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Although the extent and duration of disturbance is not significant. Irreversible (loss of individuals).	Significant Adverse Less than local
Wintering birds	Local	No significant numbers of waders, wildfowl, gulls, wintering thrushes, farmland passerines or other notable species were recorded utilising habitats within the Proposed Ribble Crossing. Vegetation clearance could result in the loss of foraging and shelter habitats. Reversible (with intervention). Reducing to Not significant in the long term following reinstatement.	Significant Adverse Less than local Reducing to Not significant
		Species utilising offsite habitats to rest or forage may be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement from retained habitats. Reversible (with intervention). Disturbance events may result in needless expenditure of energy and may expose species to increased risk of predation, resulting in increased mortality of individuals. Irreversible (loss of individuals).	Significant Adverse Less than local

9.6.2 Construction Phase

Proposed Activities

61) Construction activities are anticipated to continue for a period of 19 weeks. Habitat reinstatement works relating to construction compound areas (improved grassland habitat) would be undertaken on completion of the temporary road and bridge. Habitat reinstatement for the remainder would only occur during the Proposed Ribble Crossing decommissioning phase, anticipated to be in 2029.

62) Activities anticipated during the construction phase which have the potential to give rise to significant ecological effects are summarised as follows:

- Construction of the temporary haul road to include:
  - Topsoil stripping of areas occupied by the roads, cuttings, embankments and associated structures to depths defined for each particular location
  - Stockpiling of stripped topsoil outside of the flood plain until reinstatement
  - Earthworks would be kept to a minimum as far as reasonably practicable but would involve some cut and fill.
  - Filled areas would be placed in layers and compacted by rollers
  - Potential excavation of rock which may require removal by bulldozer or hydraulic breaker
- Retained trees, woodlands and hedgerows would be protected in accordance with avoidance and mitigation methods embedded through the CCoP Section 5.2
- It is anticipated that SuDS would be used for carriageway drainage comprising a dry swale running parallel to the carriageway providing both attenuation and filtering of any surface runoff. Construction would include:
  - Excavation of the drain with material being deposited adjacent to the drain in the road verge or transported for reuse or disposal
  - Gravel bedding would be placed at the bottom of the excavated trench and the drainage pipes placed on top. Filter material (crushed rock) is then placed over the pipe
  - Filter drains would have a geotextile surround to prevent sediment ingress into the filter material
  - If the drainage pipe crosses the road carriageway, it would have a concrete surround which would then be backfilled with acceptable earthworks material
- Five outfalls would be constructed from the carriageway drainage network to appropriate adjacent watercourses. Construction would include:
  - Installation of a headwall at the point of discharge (insitu concrete with a facing/finish in keeping with the area)
  - Excavation to form the base of the headwall, steel fixing, shuttering, concreting and backfilling operations.
  - During excavations, temporary diversion or damming of the watercourse may be required
- Temporary watercourse crossings (impacts upon watercourses are described and assessed in Chapter 9B)
- Following pavement construction, any necessary safety barriers and signs would be installed:
  - Safety barrier installation involves driving steel posts into the ground or excavating small footings and placing concrete into which the posts are set.
  - Sign installation would involve excavation for the foundations which are concrete and setting the posts
  - Some signs may be lit and would require cabling to be passed through the service ducts

- Installation of the temporary bailey bridge over the Ribble would incorporate a deck, supported on piers and abutments which in turn are supported by foundations. Construction would include:
  - Piled foundations (assumed driven piles using a pile driver)
  - Concrete bridge piers (including placing and vibrating concrete into formwork)
  - Concrete abutments (compacting formwork by vibration)
- The bridge deck would be a modular system that would be assembled upon the south bank:
  - A section of frame (beams and joists) would be assembled upon the working platform
  - Once complete the section of frame would be jacked from this launch area towards the opposite bank, creating the space to assemble the next section
  - This would be repeated until the river has been spanned by the steel work
  - The decking to the frame would then be progressively installed working from one river bank to the other
  - A crane would be used to lift steel work and bridge decking in place
- Topsoiling and seeding or construction compound areas no longer required for the operation of the temporary road would be undertaken as soon as possible after the road and bridge construction is completed (enabling subsoil to be sealed preventing sediment run-off)

Effects Scoped Out

63) Effects scoped out for the construction phase due to embedded mitigation are similar to those for the enabling phase. Additional items are described in the following paragraphs.

64) Land take for the sections of road that fall within the temporary construction compounds as well as areas associated with the bridge installation (including launch platform) has been accounted for in the enabling phase in Section 9A.6.2.

65) De-watering operations during construction would involve attenuation of surface waters from across the temporary haul road and subsequent discharge to temporary outfalls that would discharge into existing watercourses, the effects of which are considered in Chapter 9B. De-watering operations during the construction phase are therefore not considered further in this EcIA in respect of watercourses.

66) The Air Quality assessment (Appendices 18.1 and 18.2) concludes that potential effects of increased emissions arising from operation of generators within the compound would lead to imperceptible increases in pollutant concentrations at human and ecological locations.

Effects Carried Forward for Assessment

67) In the absence of additional mitigation, potential effects upon important ecological features during the construction phase would include:

- Damage, degradation or modification of retained habitats including:
  - Temporary bridge crossing is required to cross the River Ribble (impacts upon watercourses are described and assessed in Chapter 9B, but any resulting impacts which have the potential to affect any valued terrestrial features through which the watercourses flow are considered in this chapter)
  - Three other watercourses requiring temporary modular bridge crossings (impacts upon watercourses are described and assessed in Chapter 9B, but any resulting impacts which have the potential to affect any valued terrestrial features through which the watercourses flow are considered in this chapter)
  - Five outfalls would be installed for the discharge of surface water from the temporary haul road (4 discharge locations at the River Ribble, 1 discharge location at Coplow Brook) effects from which are assessed under Chapter 9B

- Fragmentation and isolation of retained habitats:
  - localised temporary effect until habitat reinstatement is completed (during the decommissioning phase) and habitat replacements (hedgerows, trees, watercourses (assessed in Chapter 9B), scrub, grassland and dry-stone walls) become re-established
- Habitat exclusion, obstruction of movement and habitat fragmentation affecting mobile species:
  - Habitat losses, fragmentation of dispersal/migratory corridor features and installation of barrier effects would prevent access to or between habitats by species using those habitats for foraging, breeding or shelter
  - Habitat loss and fragmentation may also contribute to higher mortality in species due to increased exposure from loss of shelter or corridor features leading to higher predation risks or loss of foraging habitat
- Killing, injury or entrapment risk of terrestrial fauna:
  - Storage of certain arisings e.g., top soil, sub soil, could create potentially attractive habitat features for a range of species such as badger, hedgehog, reptiles and amphibians. Subsequent removal of these materials and reuse in habitat reinstatement could put such species at risk, were they able to gain access to the stockpiles and be present at the time materials are recovered
  - Temporary fencing used to demarcate working or stockpile areas outside of the compounds or excavations may pose an entrapment or entanglement risk for terrestrial fauna
- Disturbance of species through noise, visual, lighting or vibration effects:
  - Noise, visual and vibration effects might cause desertion of occupied breeding or shelter sites
  - Lighting disturbance may cause habitat fragmentation for bats, disrupting commuting routes between roost and foraging sites, and may effect behavioural changes in other nocturnal fauna (certain birds and invertebrates, for example)
  - Disturbances might also cause needless expenditure of energy and may expose species to increased risk of predation

68) In the absence of mitigation, but with due consideration of embedded mitigation measures described at Section 9A.6.1 and detailed in the CCoP, construction effects on the important ecological features are presented in Table 9A.7 below. Only those important ecological features where effects have been identified are included in the table.

Table 9A.7: Summary of Construction Phase Effects

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Crosshill Quary LNR/BHS	County	Visual, noise or vibration disturbance impact. Although within 200 m of the Proposed Ribble Crossing, this designation lies over 200m from any of the construction works and a large farm complex lies between the works and the designation. It is unlikely that construction activities would have a significant disturbance effect on the site or the species is supports. With the implementation of embedded measures outlined in the CCoP (Sections 4.5, 5.4 and 5.10), no additional construction phase effects are anticipated.	Not significant
River Ribble BHS	County	Construction of the temporary bridge across the Ribble would shade small areas of bankside habitats within the BHS boundaries (approximately 0.01 ha semi-improved neutral grassland and 0.01 ha bare ground with scattered tall ruderals). This shading would continue into the operational phase resulting in assumed loss of habitat until reversed following the removal of the bridge and habitat reinstatement. However, given the very small areas of bankside habitat involved in the context of the designation c 300 ha in total) these long term temporary losses are not significant. Impacts on aquatic habitats and the species they support are considered in Chapter 9B.	Not significant Please see Chapter 9B Aquatic Ecology
Waddington Brickworks Old Working BHS	County	Although within 200 m of the Proposed Ribble Crossing, this designation lies approximately 140 m from the temporary haul road construction works. This BHS is designated for the habitats it supports. While these habitats are likely to support a range of invertebrate, bird and mammal species, it is unlikely that construction activities would have a significant disturbance effect on the site or the species it supports. With the implementation of embedded measures outlined in the CCoP (Sections 4.5, 5.4 and 5.10), no additional construction phase effects are anticipated.	Not significant
Bowland Fells IBA	County	No additional effects are anticipated to arise from the construction phase.	Not significant
Scattered broadleaved trees (veteran and non-veteran)	County	Damage or degradation of retained trees within or adjacent to construction areas from surrounding construction activities (e.g., soil compaction, erosion, root or tree damage, wash out etc.) would be avoided by embedded measures outlined in the CCoP (Sections 5.3, 5.6 and 5.7).	Not significant
Native Hedgerows	Local	Habitat reinstatement would reverse habitat losses incurred during enabling phase, in the long term once established. With the implementation of embedded measures outlined in the CCoP Sections 5.3, 5.6 and 5.7), no additional adverse effects are anticipated to arise from the construction phase.	Not significant

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Bats: roosts	Local	There are no trees with high, moderate or low bat roost suitability present within the construction route for the temporary haul road. There are several trees in the wider survey area but there would be no loss of these trees and they would be adequately protected by embedded measures (including mitigation to reduce light disturbance of bats) outlined in the CCoP (Sections 5.3, 5.6 and 5.7). Desktop records identified no bat roosts within or adjacent to the Proposed Ribble Crossing. The closest offsite roost is a pipistrelle roost over 400 m west of the closest construction compound. Potential disturbance of retained roost habitat (trees and the barn building at Target Note TN2) may result from noise, light or vibration effects during construction activities. Embedded mitigation to reduce light disturbance of bats is outlined in the CCoP at Section 5.4. Measures outlined in the CCoP Part A relating to noise and vibration may not be effective for ecological features within / adjacent to compounds as these measures are primarily focussed on human receptors beyond the compounds. Reversible (with intervention).	Significant Adverse Less than Local
Bats: flyways and foraging	Local	There would be no additional loss of bat habitats during the construction phase but additional disturbance of foraging and commuting bats may result from new temporary artificial lighting introduced during the construction phase. Embedded lighting measure should avoid significant effects. In-combination with the localised habitat fragmentation, this additional disturbance may result in disruption of foraging or commuting patterns of small numbers of bats. Primary corridors such as those formed by the River Ribble and various offsite woodlands would remain unaffected by these minor disturbances. Although a new bridge would be installed across the River Ribble, the bridge would be open span and located at an elevated position above the river banks. It is anticipated that there may be an initial short-term visual disturbance as the bridge is constructed but this would not preclude the ability of this mobile species to be able to navigate around the bridge and remain unaffected by its presence. Reversible (with intervention).	Significant Adverse Less than local
Badgers	Local	Badgers utilising retained habitats in the wider landscape around the Proposed Ribble Crossing may be subject to disturbance from noise, visual or vibration effects, resulting in possible localised displacement from retained habitats. Fenced construction zones would also create localised barrier effects, resulting in exclusion from retained habitats and excavation could cause entrapment. Risks are low given location of known setts and embedded avoidance measures outlined in Section 5.4 of the CCoP would prevent risk of killing / injury, obstruction and disturbance of badgers or their habitats.	Not significant

Ecological Feature	Value	Potential Effect(s) Prior to Mitigation	Significance (Pre-Mitigation)
Brown hare	Local	Construction activities introduce risks of killing, injury, or entrapment within construction areas including stockpiles which may create attractive habitat features. Disturbance from noise, light, vibration or visual effects resulting in possible localised displacement from retained habitats. Given the likely levels of this species and availability of suitable surrounding habitats, the embedded measures outlined in the CCoP for these species would, however, be anticipated to prevent or reduced these risks.	Not significant
Breeding birds	Local	Small additional loss of improved grassland habitat (along the road route) during the construction phase, although some improved grassland will be reinstated (at the construction compounds) on completion of this phase (effects not significant). Disturbance / displacement effects commenced during the enabling phase will continue.	Significant Adverse Less than local
Wintering birds	Local	Small additional loss of improved grassland habitat (along the road route) during the construction phase, although some improved grassland will be reinstated (at the construction compounds) on completion of this phase (effects not significant). Disturbance / displacement effects commenced during the enabling phase will continue.	Significant Adverse Less than local

9.6.3 Operational Phase

69) During the operation of the temporary road and bridge no significant additional effects are anticipated on terrestrial ecological features. The road would be unlit (other than at the junctions with the main road network), would have a speed limit and use out of usual working hours would be unlikely (due to restrictions on delivery times to the Newton in Bowland Compound) with the potential exception of the workers shift change. The road will have crossing points for walkers and farmers and their cattle and will not pose a barrier to wildlife due to the absence of a raised curb or other roadside barrier (that would be impermeable to local wildlife).

70) Killing and injury of species is considered unlikely not least because of the speed limit, but disturbance / displacement effects described for the construction phase would likely continue during the operation of the temporary road. Given the homogenous nature of the surrounding field network and the potential for some degree of habituation, disturbance / displacement effects on species would likely to be insignificant and any changes will be reversed when the road is decommissioned and habitats reinstated. Effects on wildlife associated with the River Ribble are discussed within Chapter 9B.

9.6.4 Decommissioning Phase

71) The temporary haul road and bridge crossing would remain in place until 2029. The positive effect of habitat reinstatement implemented during the decommissioning phase is covered under the enabling phase assessment table and taking account of embedded mitigation measures, no effect over and above those described for the enabling, construction and operational phases are anticipated.

9.7 Mitigation and Residual Effects

72) Details for embedded mitigation measures, where they describe industry standards for best practice, for example, are outlined in the CCoP Part A (Appendix 3.3). The following sections summarise the suite of additional essential mitigation measures proposed to reduce the significant adverse ecological effects described for enabling, construction and operational phases. These additional essential measures are collated into the Environmental Master Plan (EMP) outlined in the CCoP Part B (Appendix 3.3).

9.7.1 General Measures

73) Embedded measures outlined in the CCoP Part A at Section 5.4.1 would require pre-commencement surveys and monitoring during each development phase to be carried out as part of the watching brief to confirm progress and identify any change on site. Subject to the findings of these surveys and monitoring, updates to the EMP outlined in the CCoP Part B may be appropriate.

9.7.2 Designated Sites and GWDTE

74) Short lengths of the bankside habitats associated with the River Ribble BHS will be subject to shading which may result in vegetation dying off leaving bare earth. If this occurs, measures to stabilise the ground conditions would be implemented to minimise soil runoff into the Ribble during periods of heavy rain and / or flooding. This could installation of a hessian or similar membrane across areas of bare ground.

9.7.3 Habitats

75) In addition to the standard measures incorporated as embedded mitigation, summarised in Section 9A.6.1 and detailed in the CCoP (Sections 5.2 and 5.4), a number of site-specific mitigation approaches are required for impacts on habitats and trees:

- Temporary construction routes would be finalised to avoid or minimise impacts to hedgerows, trees, watercourses and other sensitive features where practically possible by marking out and micro-siting construction activities with the ECoW prior to works commencing

- Working areas (including storage areas and accesses) would be segregated from adjacent habitats using appropriate fencing or other appropriate form of demarcation with informative warning signs attached, to protect retained habitats and features
- Locations for stockpiling cut vegetation arisings (e.g., logs, brash, grass) would be discussed and agreed in advance with the ECoW to avoid degradation of existing valued habitats (e.g., shading out, nutrification)
- Topsoil and subsoil would be conserved where possible and be stored separately (top and sub soils kept separate for each habitat type) for subsequent re-use for habitat reinstatement.
- There would be prompt reinstatement of habitats to their former condition or better, which could include measures to enhance species diversity
- Methods and timings for habitat reinstatement and creation/enhancement would vary according to the target habitat. Planting plans (Appendix 20.3) would be produced for all habitats and habitat features to be reinstated and replaced. Habitat reinstatement and creation/enhancement would utilise locally appropriate native species matching existing botanical diversity and seeking, where possible, to increase diversity. Without reducing habitat quality, seed mixes for reinstatement of agricultural fields would be agreed with landowners but in summary the following approach would be used:
  - Improved grassland would be reinstated with a rye grass dominated seed mix
  - Scattered trees and scrub within fields would generally be reinstated within field boundaries unless landowners or landscape considerations specified otherwise
- Tree loss at temporary outfalls would be avoided through micro-siting and special construction measures (e.g., a surface level pipe or hand digging the pipeline route) to avoid damage to tree roots, as detailed within an Arboricultural Method Statement (AMS)
- Existing trees to be retained would be subject to protection measures in compliance with BS5837:2012 standards for tree protection detailed within the AMS. The AMS would consider all aspects of detailed design (drainage, utilities etc.) and would detail the special mitigation measures required to minimise avoid/minimise impacts on the root system and any notable characteristics of the retained trees
- Opportunities for advanced, additional and / or enhanced habitat creation on offsite locations within United Utilities ownership are discussed under Section 9.7.12 in relation to the Biodiversity Net Gain strategy.
- Wherever practicable, arisings from tree lopping or felling and hedgerow or scrub removal would be used to create habitat piles of dead and decaying wood, ground-based and standing dead wood. These would be appropriately sited, as advised by the ECoW, to maximise benefit to wildlife.

9.7.4 Bats

76) Suitable bat roost habitat features have been identified in numerous trees within and adjacent to the Proposed Ribble Crossing, some of which would require removal during the enabling and construction works phases. Embedded measures already described and outlined in the CCoP (Section 5.4) include RAMs for avoiding loss of bat tree roosts, the installation of bat boxes to replace loss of suitable tree roost habitat and general approach to sensitive lighting (operational lighting is limited to junctions with the existing road network). Essential lighting principals have been produced and include the identification of sensitive ecological features (including potential bat roosting, foraging and commuting habitat) describing how lighting would take account of these. If bat roosts are confirmed in any trees requiring removal, mitigation under licence from Natural England would be implemented as appropriate to the species and status of the roost(s). No further mitigation is anticipated to be required in respect of roosting bats.

77) Habitat reinstatement measures would replace foraging habitats and flyways used by local bat populations and would be effective in the long-term accounting for the time between habitat loss and habitat reinstatement, including establishment periods.

9.7.5 Badgers

78) No setts were identified within or within influence of the Proposed Ribble Crossing. Badger activity levels were minimal. Embedded measures outlined in the CCoP (Section 5.4) include RAMs for avoiding accidental killing, injury, entrapment during enabling and construction phases. Embedded measures outlined in the CCoP (Section 5.4) also include pre-commencement and monitoring surveys to confirm the status of and evidence of sett occupation within influence of the proposed works. Should occupied sett(s) be confirmed prior to the start of the enabling phase (or at any point during monitoring subsequently), additional essential avoidance measures (e.g., demarcation zones, temporary shelter or habitat links etc.) would be implemented as advised by the ECoW according to site conditions at the time. If unavoidable, mitigation under licence from Natural England would be implemented to partially or fully close the affected sett.

79) Habitat reinstatement would replace foraging and ranging habitats for local badger populations. Habitat reinstatement measures would be effective in the long-term accounting for the time between habitat loss and habitat reinstatement, including establishment periods.

9.7.6 Other Mammals

80) Suitable habitats for brown hare occur across the Proposed Ribble Crossing in varied patches and brown hare is known to be present in the wider area. RAMs for brown hare would be implemented as set out in the CCoP (Section 5.4) which, in combination with embedded measures for other wildlife would avoid or reduce risk such as accidental killing, injury, entrapment within works areas.

81) Habitat reinstatement would replace foraging, ranging and shelter habitats for local populations of brown hare. Habitat reinstatement measures would be effective in the long-term accounting for the time between habitat loss and habitat reinstatement, including establishment periods.

9.7.7 Nesting and Wintering Birds

82) The Proposed Ribble Crossing is unlikely to support significant species or assemblages of breeding birds, although small numbers of noteworthy BoCC species could be present in localised habitats within and adjacent. RAMs to avoid the destruction of nests and the killing / injury or disturbance of nesting birds (passerine and ground nesting species) within and surrounding the works would be implemented as detailed in the CCoP.

83) The Proposed Ribble Crossing did not support significant species or assemblages of overwintering birds, although small numbers of noteworthy BoCC species were recorded in localised habitats adjacent. Disturbance of riparian habitat, tree and hedgerow features and open fields suitable for wintering birds would be kept to a minimum. The installation of visual and / or noise barriers may be advised by the ECoW on a localised basis according to monitoring evidence collected during watching briefs. Further details for RAMs to avoid noise or visual disturbance of nesting or wintering birds are provided in the CCoP.

84) Habitat reinstatement would replace, nesting, foraging and overwintering habitats for local bird populations. Habitat reinstatement measures would be effective in the long-term accounting for the time between habitat loss and habitat reinstatement, including establishment periods.

9.7.8 Terrestrial Amphibians and Reptiles

85) Embedded measures outlined in the CCoP (Section 5.4.3.7) would avoid or prevent accidental killing, injury and entrapment of terrestrial amphibians or reptiles during works.

86) Creation of habitat piles as previously described would provide shelter and foraging and overwintering habitat for amphibians. Habitat reinstatement would replace foraging, shelter and overwintering habitats for local amphibian and reptile populations. Habitat reinstatement measures would be effective in the long-term accounting for the time between habitat loss and habitat reinstatement, including establishment periods.

9.7.9 Terrestrial Invertebrates

87) The habitat reinstatement implemented during the decommissioning phase would offset any habitat losses for terrestrial invertebrates. Where practical, use of arisings from vegetation removal would be utilised to

create additional habitat for invertebrates, especially dead wood features. Soil bunds and small areas of retained grasslands adjacent to the temporary haul road that would not be subject to grazing during the construction phase could also provide new habitats for terrestrial invertebrates if left unmanaged.

9.7.10 Biosecurity

88) Embedded measures for avoiding the spread of Schedule 9 non-native invasive species and general biosecurity measures are outlined in the CCoP (Section 5.4.3.10). A site specific invasive species management plan would be produced that would detail any appropriate additional measures, subject to confirmation of location of non-native invasive species in relation to the final construction design and risk of disturbance or spread. Additional essential mitigation includes, but may not be limited to, implementation of control or eradication measures and establishment of exclusion zones.

9.7.11 Residual Effects

89) A summary of the residual ecological effects (beneficial or adverse) is presented in Table 9A.8. Only ecology features identified as having significant effects in Table 9A.6 (enabling phase) and Table 9A.7 (construction phase) are taken forward into the residual effects table. This table summarises the ecological effects anticipated to arise as a consequence of the development proposals, the mitigation and compensation measures to be implemented and confirms whether the residual effect remains significant.

90) No significant adverse residual effects are anticipated to arise in the long term, providing the suite of embedded and essential mitigation measures are implemented as described.

91) Significant positive residual effects are not identified at this stage, however, the proposed Ribble Crossing would achieve 10% net gain through additional habitat creation on offsetting sites and this is discussed further under section 9.7.12 which details compensation and offsetting measures

Table 9A.8: Summary of Mitigation and Residual Effects

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
Enabling Phase					
Scattered broadleaved trees (non-veteran)	County	Loss of 12 no. trees/tree groups and potential removal of 3 no. trees/tree groups Reversible (with intervention) Adverse effect significant at local level.	Replacement tree planting to be implemented during decommissioning phase on like for like basis (quantity and quality) or better.	Habitat reinstatement during the decommissioning phase would reduce enabling phase effects to non-significant levels in the long term (replacement of mature specimens is compensation not mitigation).	Not significant
Native hedgerows	Local	Temporary loss of 130 m of Important hedgerow. Reversible (with intervention) Adverse effect significant at less than local level.	130 m represents the entire length of hedge and only that required to provide a safe junction (including visibility splays) will be removed. Habitat reinstatement to be implemented during decommissioning phase on like for like basis (quantity and quality) or better.	Habitat reinstatement during the decommissioning phase would reduce enabling phase effects to non-significant levels in the long term.	Not significant
Brown hare	Local	Loss of foraging and shelter habitats. Disturbance / displacement effects resulting from enabling phase activities would generally be reversible. Some habituation may be anticipated over time. Adverse effect significant at less than local level.	Habitat reinstatement to be implemented during decommissioning phase on like for like basis (quantity and quality) or better.	Habitat reinstatement during the decommissioning phase would reduce enabling phase effects to non-significant levels in the long term.	Not significant
Breeding Birds	Local	Loss of foraging and nesting habitats, affecting small numbers of generally common and widespread species as well as a pair of oystercatcher.	Habitat reinstatement to be implemented during decommissioning phase on like for like basis (quantity and quality) or better.	Habitat reinstatement during the decommissioning phase would reduce enabling phase effects to non-significant levels in the long term.	Not significant

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
		Disturbance / displacement resulting from enabling phase activities would generally be reversible. Some habituation may be anticipated over time. Adverse effect significant at less than local level.	If identified as necessary visual / noise screening and / or exclusion buffers could be employed.	Use of appropriate measures should adverse impacts be identified in addition to some measure of habituation would prevent significant effects occurring.	
Wintering birds	Local	Loss of foraging and sheltering habitats, affecting small numbers of generally common and widespread species Disturbance resulting from enabling phase activities would generally be reversible. Some habituation may be anticipated over time. Adverse effect significant at less than local level.	Habitat reinstatement to be implemented during decommissioning phase on like for like basis (quantity and quality) or better. If identified as necessary visual / noise screening and / or exclusion buffers could be employed.	Habitat reinstatement during the decommissioning phase would reduce enabling phase effects to non-significant levels in the long term. Use of appropriate measures should adverse impacts be identified in addition to some measure of habituation would prevent significant effects occurring.	Not significant
Construction Phase					
Bats: roost habitat	Local	Potential disturbance of retained roost habitat may result from noise or vibration effects during construction activities. Embedded measures to reduce noise / vibration effects may not be of relevance to ecological features retained on / adjacent to the compounds. Reversible (with intervention) Significant Adverse effect at less than local level.	Should bat roosts be confirmed during embedded pre-start surveys within the influence of the construction works, additional essential measures would be identified to avoid and mitigate disturbance effects.	Mitigation would prevent significant effects occurring.	Not significant

Ecological Feature	Value	Effect Pre-Mitigation	Mitigation	Residual Effect	Significance
Bats: flyways and foraging	Local	Lighting impacts in combination with habitat losses could affect habitat, flyways and foraging habitat. Reversible (with intervention) Significant Adverse effect at less than local level.	In addition to the general approach to sensitive lighting, essential lighting principals have been produced and include the identification of sensitive ecological features and describing how lighting would take account of these.	Mitigation would prevent significant effects occurring.	Not significant
Breeding Birds	Local	Disturbance resulting from construction phase activities would generally be reversible. Some habituation may be anticipated over time. Adverse effect significant at less than local level.	If identified as necessary visual / noise screening and / or exclusion buffers could be employed.	Use of appropriate measures should adverse impacts be identified in addition to some measure of habituation would prevent significant effects occurring.	Not significant
Wintering birds	Local	Disturbance resulting from construction phase activities would generally be reversible. Some habituation may be anticipated over time. Adverse effect significant at less than local level.	If identified as necessary visual / noise screening and / or exclusion buffers could be employed.	Use of appropriate measures should adverse impacts be identified in addition to some measure of habituation would prevent significant effects occurring.	Not significant
Operational Phase					
All terrestrial ecology features	N/A	Disturbance / displacement and habitat losses would continue to be experienced during the operational phase as described for the enabling and operational phases.	Avoidance / mitigation measures as described for and delivered during the enabling and operational phases, together with habitat reinstatement as described for the enabling and operational phases and delivered during the decommissioning phase would reduce these effects to not significant.		Not significant
Decommissioning Phase					
All terrestrial ecology features	N/A	N/A	N/A	N/A	N/A

9.7.12 Compensation and Offsetting Measures

92) The residual effects described previously do not take account of the measures detailed in this section. Compensation and offsetting are distinct from the embedded mitigation and essential measures previously outlined. Where it would not be possible to avoid or mitigate Adverse effects or where difficulty, uncertainty or other risks to achieving net gain would remain, compensation measures provide appropriate and proportionate offsetting and contingencies.

9.7.13 Biodiversity Net Gain Compensation

93) Details on the biodiversity net gain strategy is as detailed in the main ES chapter.

9.7.14 Very High Distinctiveness Habitats

94) The BNG metric does not allow consideration of habitats categorised as very high distinctiveness. None are affected by the Proposed Ribble Crossing.

9.7.15 Veteran Trees and Ancient Woodland

95) Veteran trees and ancient woodland are excluded from the BNG process. Neither habitat is affected by the Proposed Ribble Crossing.

9.7.16 Other Habitat Enhancement Measures

96) At the time of writing, no additional measures had been agreed with landowners.

9.8 Cumulative Effects

97) The assessment undertaken for the main ES (Chapters 9A and 19, Proposed Bowland Section) already includes a cumulative assessment that is applicable to this addendum. However, because several elements of the proposed development are assessed in separate documents (Main ES, Ribble Crossing and Highways Improvements) it is necessary to bring together the various assessments to ascertain whether in combination they change any of the findings. This combined assessment is provided within the summary of ES Chapter 9A for the Proposed Bowland Section.

9.9 Conclusion

98) This chapter of the ES together with the Habitats Regulation Assessment LCC/RVBC-BO-APP-010 and the SSSI report (LCC/RVBC-BO-APP-009 considers the potential terrestrial ecology impacts associated with enabling, construction, operational and decommissioning phases of the Proposed Ribble Crossing.

99) The ES confirms that enabling, construction, operational and decommissioning phase activities, in the absence of embedded and essential mitigation have the potential to cause:

- physical temporary loss of non-designated habitats;
- damage, degradation or modification of retained habitats as a consequence of changes to groundwater quality or pathways (flows/levels);
- damage / degradation / modification of retained habitats including as a consequence of reduced surface water quality from site run-off;
- fragmentation and isolation of retained habitats / network;
- habitat loss, exclusion, obstruction of movement and habitat fragmentation for mobile species;
- killing, injury or entrapment risk of fauna;
- disturbance of species through noise, dust, visual, lighting or vibration effects; and
- risk of introducing or spreading invasive species.

100) A series of embedded mitigation measures are proposed to avoid and reduce significant effects on ecological features. These include targeted pre-construction surveys undertaken by an experienced ecologist

to update existing data, oversight of ecologically sensitive works by an Ecological Clerk of Works, temporary fencing to avoid incursion into sensitive retained habitats, implementation of the Environment Agency's Pollution Prevention Guidelines and United Utilities' Biosecurity Policy, and adherence to industry-standard environmental safeguards as detailed in the CCoP, AMS, and lighting strategy. In addition, enabling and construction works would be undertaken wherever practicable outside of breeding and / or hibernation seasons (e.g., for birds, bats, and amphibians). Wherever practicable, all habitats would be restored to pre-construction conditions with elements of enhancement included where feasible.

101) In the long term no significant effects upon ecology features is anticipated to arise from the Proposed Ribble Crossing.

9.10 Glossary and Key Terms

102) Key phrases and terms used within this technical chapter relating to Terrestrial Ecology are defined within Appendix 1.2: Glossary and Key Terms.