

A57 Link Roads TR010034

6.3 Environmental Statement Chapter 8 Biodiversity

APFP Regulation 5(2)(a)

Planning Act 2008 Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009



Infrastructure Planning

Planning Act 2008

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

A57 Link Roads Scheme

Development Consent Order 202[x]

6.3 ENVIRONMENTAL STATEMENT

CHAPTER 8 BIODIVERSITY

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010034
Application Document Reference	TR010034/APP/6.3
Author:	A57 Link Roads Scheme Project Team, Highways England

Version	Date	Status of Version
Rev 1.0	June 2021	DCO Application

Table of Contents

Chapter	Pages
8. Biodiversity	4
8.1 Introduction	4
8.2 Legislative and Policy Framework	4
8.3 Assessment Methodology	14
8.4 Assessment Assumptions and Limitations	29
8.5 Study Area	31
8.6 Baseline Conditions	34
8.7 Potential Impacts	64
8.8 Design, Mitigation and Enhancement Measures	70
8.9 Assessment of Likely Significant Effects	82
8.10 National Policy Statement for National Networks (NPS NN) compliance	92
8.11 Monitoring	92
8.12 Summary	93

Tables

Table 8-1 - NPSNN policies relevant for the biodiversity assessment	5
Table 8-2 - Regulatory and Policy Framework for biodiversity	9
Table 8-3 - Data search requests	15
Table 8-4 – Summary of Ecological Surveys	18
Table 8-5 - Biodiversity Resource Importance	23
Table 8-6 - Level of Impact	26
Table 8-7 - Significance matrix	29
Table 8-8 – Desk and survey area for each ecological receptor	32
Table 8-9 - Statutory designated sites for nature conservation within 2 km of the Scheme	34
Table 8-10 - Non-statutory designated sites of importance for nature conservation within 2 km of the Scheme	35
Table 8-11 - Watercourse survey summaries	43
Table 8-12 – Pond survey summaries	46
Table 8-13 – Receptors scoped out of the assessment	56
Table 8-14 - Nature Conservation Value of resources in relation to the Scheme	61
Table 8-15 – Notable habitat losses and gains	71
Table 8-16 – Assessment of likely significant effects	84

8. Biodiversity

8.1 Introduction

- 8.1.1 This chapter presents the biodiversity assessment associated with the Scheme. It has been prepared in accordance with best practice guidance for ecological impact assessment of road schemes including the Design Manual for Roads and Bridges (DMRB) LA 108¹, LA 105², LD 118³, LA104⁴ and the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment⁵.
- 8.1.2 Desk study and field survey data were used to inform the detailed assessment of nature conservation receptors that were considered likely to be affected by the Scheme. This chapter provides the ecological baseline, an evaluation of the nature conservation receptors relevant to the Scheme, and an assessment of the significant effects on those receptors after mitigation, as a result of the Scheme.
- 8.1.3 To accompany this chapter, a Habitats Regulations Assessment (HRA) (TR010034/APP/5.3) has been prepared to assess whether likely significant effects as a result of the Scheme will occur on any European or international sites, as required by the Conservation of Habitats and Species Regulations 2017 (as amended). The assessment has been undertaken following guidance in the DMRB LA 115 'Habitats Regulations Assessments' (2020)⁶.
- 8.1.4 This chapter should be read in conjunction with Appendix 8.1 and Appendix 8.3 (TR010034/APP/6.5), which provides a full account of the methodology, baseline conditions and a preliminary assessment of various ecological receptors, Chapter 5: Air Quality, Chapter 7: Landscape and visual effects, and Chapter 13: Road Drainage and the water environment.
- 8.1.5 In compliance with the Protection of Badgers Act 1992⁷, and to prevent the release of badger sett locations, all desk study and detailed survey information related to badgers is presented in a confidential appendix (Appendix 8.2, TR010034/APP/6.5) This confidential appendix will only be released to the Planning Inspectorate and to other individuals as deemed appropriate (upon request).

8.2 Legislative and Policy Framework

- 8.2.1 This assessment has been undertaken in accordance with relevant legislation, along with national, regional and local plans and policies and guidance relating to nature conservation.

¹ DMRB LA 108 Biodiversity (formerly Volume 11, Section 3, Part 4 Ecology and Nature Conservation and IAN 130/10) Revision 1.

² DMRB LA 105 Air quality which supersedes HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13 and part of IAN 185/15.

³ DMRB LD 118 Biodiversity Design (formerly LA 118 which superseded HA 59/92, HA 67/93, HA 80/99, HA 81/99, HA 84/01, HA 97/01, HA 98/01, HA 116/05, IAN 116/08, IAN 116/08(W)) Revision 0.

⁴ DMRB LA 104 Environmental assessment and monitoring (formerly HA 205/08, HD 48/08, IAN 125/15, and IAN 133/10) Revision 1.

⁵ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

⁶ DMRB LA 115 Habitats Regulations Assessment (formerly HD 44/09) Revision 1

⁷ <https://www.legislation.gov.uk/ukpga/1992/51/contents>

Legislation

8.2.2 The following legislation is of direct relevance to the assessment of biodiversity:

- Conservation of Habitats and Species Regulations 2017 (as amended)
- The Ramsar Convention 1971
- Wildlife and Countryside Act 1981 (as amended)
- Countryside and Rights of Way Act 2000
- The Natural Environment and Rural Communities (NERC) Act 2006 (Section 40 and 41)
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
- Protection of Badgers Act 1992
- The Hedgerows Regulations 1997
- Wild Mammals (Protection) Act 1996.

Planning Policy

8.2.3 The primary basis for deciding whether or not to grant a Development Consent Order (DCO) is the National Policy Statement for National Networks (NPSNN)⁸ which sets out policies to guide how DCO applications would be decided and how the impacts of national networks infrastructure should be considered. Table 8-1 identifies the NPSNN policies relevant to the biodiversity assessment and where in this ES chapter or appendices information is provided to address these policy requirements.

Table 8-1 - NPSNN policies relevant for the biodiversity assessment

NPSNN paragraph	Requirement of the NPSNN	Location where information addresses policy requirements
4.22	Prior to granting a Development Consent Order, the Secretary of State must, under the Habitats Regulations, consider whether it is possible that the project could have a significant effect on the objectives of a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects.	Refer to HRA report (TR010034/APP/5.3).
4.23	Applicants are required to provide sufficient information with their applications for development consent to enable the Secretary of State to carry out an Appropriate Assessment if required. This information should include details of any measures that are proposed to minimise or avoid any likely significant effects on a European site. The information provided may also assist the Secretary of State in concluding that an appropriate assessment is	Refer to HRA report (TR010034/APP/5.3).

⁸ Department for Transport (2014) National Policy Statement for National Networks. Presented to Parliament pursuant to Section 9(8) and Section 5(4) of the Planning Act 2008

	not required because significant effects on European sites are sufficiently unlikely that they can be excluded.	
5.22	Where the project is subject to EIA [Environmental Impact Assessment] the applicant should ensure that the environmental statement clearly sets out any likely significant effects on internationally, nationally and locally designated sites of ecological or geological conservation importance (including those outside England) on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity and that the statement considers the full range of potential impacts on ecosystems.	Refer to Section 8.9 'Assessment of Likely Significant Effects'. Refer to Chapter 9 'Geology and Soils' for geological conservation interest.
5.23	The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests	Refer to Section 8.8 'Design, mitigation and enhancements' Refer to Chapter 9 'Geology and Soils' for geological conservation interest.
5.24	The Government's biodiversity strategy aims to halt overall biodiversity loss; support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people. This aim needs to be viewed in the context of the challenge of climate change.	Refer to Section 8.8 'Design, mitigation and enhancements' and Appendix 8.1 (TR010034/APP/6.5) for Biodiversity Metric Calculations. Refer to Chapter 9 'Geology and Soils' for geological conservation interest.
5.25	Development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. Where significant harm cannot be avoided or mitigated, as a last resort, appropriate compensation measures should be sought.	Refer to Chapter 3: Assessment of Alternatives and Section 8.8 'Design, mitigation and enhancements'
5.26	In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and other species of principal importance (HPIs and SPIs) for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment.	Refer to Section 8.3 'Assessment Methodology' and Section 8.6 'Baseline Conditions'. Refer to Chapter 9 'Geology and Soils' for geological conservation interest.
5.27	The most important sites for biodiversity are those identified through international conventions and European Directives. The Habitats Regulations provide statutory protection for European sites. The National Planning Policy Framework states that the following wildlife sites should have the same protection as European sites: potential Special Protection Areas and	Refer to Section 8.3 'Assessment Methodology' and Section 8.6 'Baseline Conditions'.

	possible Special Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation and listed or proposed Ramsar sites.	
5.28	Many Sites of Special Scientific Interest (SSSIs) are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection. All National Nature Reserves are notified as SSSIs.	Refer to Section 8.3 'Assessment Methodology' and Section 8.6 'Baseline Conditions'.
5.29	Where a proposed development on land within or outside a SSSI is likely to have an adverse effect on a SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect on the site's notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs.	Refer to Section 8.6 'Baseline Conditions' and Section 8.9 'Assessment of Likely Significant Effects'.
5.31	Sites of regional and local biodiversity and geological interest (which include Local Geological Sites, Local Nature Reserves [LNR] and Local Wildlife Sites [LWS] and Nature Improvement Areas) have a fundamental role to play in meeting overall national biodiversity targets, in contributing to the quality of life and the well-being of the community, and in supporting research and education. The Secretary of State should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent	Refer to Section 8.6 'Baseline Conditions', Section 8.8 'Design, Mitigation and Enhancements' and Section 8.9 'Assessment of Likely Significant Effects'. Refer to Chapter 9 'Geology and Soils' for geological conservation interest.
5.32	Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated. The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss. Aged or veteran trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Where such trees would be affected by development proposals, the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons for this.	Refer to Section 8.6 'Baseline conditions', Section 8.8 'Design, Mitigation and Enhancements', and Section 8.9 'Assessment of Likely Significant Effects'.
5.33	Development proposals potentially provide many opportunities for building in beneficial biodiversity or geological features as part of good design. When	Refer to Section 8.8 'Design, Mitigation and Enhancement'.

	<p>considering proposals, the Secretary of State should consider whether the applicant has maximised such opportunities in and around developments. The Secretary of State may use requirements or planning obligations where appropriate in order to ensure that such beneficial features are delivered.</p>	<p>Refer to Chapter 9 'Geology and Soils' for geological conservation interest.</p>
5.34	<p>Many individual wildlife species receive statutory protection under a range of legislative provisions.</p>	<p>Refer to Section 8.8 'Design, Mitigation and Enhancements' and Section 8.10 'Assessment of Likely Significant Effects'.</p>
5.35	<p>Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and therefore requiring conservation action. The Secretary of State should ensure that applicants have taken measures to ensure these species and habitats are protected from the adverse effects of development. Where appropriate, requirements or planning obligations may be used in order to deliver this protection. The Secretary of State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits of the development (including need) clearly outweigh that harm.</p>	<p>Refer to Section 8.8 'Design, Mitigation and Enhancements'</p>
5.36	<p>Applicants should include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how these will be secured. In particular, the applicant should demonstrate that:</p> <ul style="list-style-type: none"> • during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; • during construction and operation, best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised (including as a consequence of transport access arrangements); • habitats will, where practicable, be restored after construction works have finished; • developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where reasonable; • opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals, for example through techniques such as the 'greening' of existing network crossing points, the use of green bridges and the habitat improvement of the network verge. 	<p>Refer to Section 8.8 'Design, Mitigation and Enhancements'</p>
5.38	<p>The Secretary of State will need to take account of what mitigation measures may have been agreed between the applicant and Natural England and/or the MMO, and whether Natural England and/or the MMO has granted or refused, or intends to grant or refuse, any relevant licences, including protected species mitigation licences.</p>	<p>Mitigation measures have been developed to inform the derogation licences and has been used to inform this assessment.</p>

		<p>Consultation has been undertaken with Natural England regarding the results of the Habitat Regulation Assessment Screening Report and regarding the methodology for the derogation licence for bats. Details of consultation undertaken to inform the Biodiversity assessment are presented in the Introduction chapter (Chapter 1) of the ES and the Consultation Report (TR010034/APP/5.1).</p>
--	--	--

Other relevant policies, regulations and guidance

8.2.4 Other relevant policies and regulations have been considered as part of the biodiversity assessment where these have informed the identification of receptors and resources and their sensitivity, the assessment methodology, the potential for significant environmental effects, and any required mitigation. These are provided in Table 8-2.

Table 8-2 - Regulatory and Policy Framework for biodiversity

Regulation	Summary of requirements
National Planning Policy Framework (NPPF) (June 2019) ⁹	Section 15 paragraphs 170-177 Conserving and enhancing the Natural Environment (including protection and enhancement of biodiversity; provision of measurable net gain for biodiversity; and creating/ maintaining coherent ecological networks). In relation to biodiversity, the NPPF contains similar provisions to the NPSNN although a key difference is the removal of references to “avoiding net loss of biodiversity” and the inclusion of “minimising impacts and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures”. The NPPF has weight as a relevant and important matter when making a decision on the DCO application.
National Planning Practice Guidance for the Natural Environment (2016-2018) ¹⁰	This document provides context to the NPPF and advises on how the consideration of biodiversity can inform planning decisions.
Biodiversity 2020: A Strategy for England’s	This biodiversity strategy for England provides a comprehensive picture of how the government is implementing the international and EU commitments. It sets out the strategic direction for biodiversity policy for 2020 onwards on land (including rivers and lakes) and at sea.

⁹ National Planning Policy Framework - GOV.UK (www.gov.uk)

¹⁰ National Planning Practice Guidance. Ministry of Housing, Communities and Local Government (2016-2018). (www.gov.uk)

Wildlife and Ecosystem Services ¹¹	
Government 25-year Environment Plan ¹²	<p>Chapter 1, Section 1, includes aspirations to strengthen the requirement on local authorities to ensure environmental net gains across their areas, enable those authorities to ‘develop locally-led strategies to enhance the natural environment, creating greater certainty and consistency and avoiding increased burdens on developers’ This is expected to have a net positive impact on overall development. Immediate ambitions include:</p> <ul style="list-style-type: none"> • Working in partnership with other Government bodies, local planning authorities and developers to mainstream the use of existing biodiversity net gain approaches • Updating the tools that underpin biodiversity net gain approaches and reduce process costs on developers • Further streamlining of protected species licencing. <p>Future ambitions include expanding the net gain approaches used for biodiversity to include wider natural capital benefits, such as flood protection, recreation and improved water and air quality. With a view to enabling local planning authorities to target environmental enhancements that are needed most in their areas and give flexibility to developers in providing them.</p> <p>Chapter 1, Section 5, “Reducing risks from flooding and coastal erosion” states that the Environment Agency will use its role in statutory planning consultations to seek to make sure that new developments are flood resilient and do not increase flood risk, and that the relevant protections in the National Planning Policy Framework will be strengthened.</p> <p>Chapter 2, “Recovering nature and enhancing the beauty of landscapes” set out the role of National Parks as planning authorities, and their role in shaping the way development is used to contribute to their social, economic and environmental enhancement. It states that ‘While development is not prohibited in National Parks or AONBs, major development should take place only in exceptional circumstances.’</p> <p>Chapter 2, Section 3.i “Creating more green infrastructure” states that a national framework for green infrastructure standards will be created to:</p> <ul style="list-style-type: none"> • Ensure that new developments include accessible green spaces; and • Ensure any area with little or no green space can be improved for the benefit of the community.
Department for Transport Road Investment Strategy 2015-2020 (RIS)	Section 6 includes aspirations by 2040 to have improved environmental outcomes, including a net gain in biodiversity from the Company’s (Highways England) activities.
Highways England’s Biodiversity Action Plan 2015 ¹³	Proposes a local approach to improving biodiversity surrounding the road network and encourages management activities to be guided by the principles of Natural England’s The Mosaic Approach: Managing Habitats for Species ¹⁴ , including efforts to target priority habitats and species.

¹¹ Department for Environment, Food and Rural Affairs (2011) Biodiversity 2020: A strategy for England’s wildlife and ecosystem services. Available online at: <https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-forengland-s-wildlife-and-ecosystem-services>

¹² Available at: [25-year-environment-plan.pdf \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/434222/25-year-environment-plan.pdf)

¹³ Highways England (2015) Our plan to protect and increase biodiversity.

¹⁴ <http://publications.naturalengland.org.uk/publication/6415972705501184>

<p>Highways England: Strategic Business Plan 2015 to 2020¹⁵</p>	<p>A commitment to continue to ‘manage land immediately surrounding the network to improve biodiversity’. Delivering better environmental outcomes:</p> <ul style="list-style-type: none"> • KPI: Delivery of improved biodiversity, as set out in the Company’s Biodiversity Action Plan. <p>Target: The Company should publish its Biodiversity Action Plan by 30 June 2015 (published), and report annually on how it has delivered against the Plan to reduce net biodiversity loss on an ongoing annual basis</p>
<p>The Highways England Environmental Strategy 2018¹⁶</p>	<p>This strategy is designed to communicate the approach to improving the environment to key stakeholders to promote positive change and to strive for the best possible environmental outcomes. The aspiration is: <i>“a strategic road network working more harmoniously with its surroundings to deliver an improved environment.”</i></p>
<p>Greater Manchester Biodiversity Action Plan (Greater Manchester Ecology Unit) 2009¹⁷</p>	<p>The Greater Manchester Biodiversity Action plan (GMBAP) aims to provide an over-arching document across all ten districts in Greater Manchester. The overall aim of the GMBAP is:</p> <p><i>“To promote the conservation, protection and enhancement of biological diversity in Greater Manchester for current and future generations”.</i></p> <p>The Greater Manchester audit identified those species and habitats that are of local conservation importance and require action in order to conserve and protect them. Those habitats and species selected for the GMBAP were included for the following reasons:</p> <ul style="list-style-type: none"> • They are priority habitat or species within the UK BAP and occur in the GM area. • They are considered to be of conservation concern locally within GM.
<p>Peak District Biodiversity Action Plan (The Peak District National Park Authority) 2011-2020¹⁸</p>	<p>Based on principles derived from the Lawton Review, the Peak District Biodiversity Action Plan (2011-2020) aims to:</p> <ul style="list-style-type: none"> • enhance our landscapes with mosaics of good quality, diverse habitats which are suitable to support a range of species; • concentrate our efforts not just on high quality sites such as Sites of Special Scientific Interest and nature reserves, but also on the land surrounding them; • buffer important sites, creating larger areas of semi-natural habitats and linking habitats together, which should also enhance the visual characteristics of the landscape; • enable species to move and adapt in the face of climate change, and increase biodiversity; • restore habitats such as peat bogs, moorlands and woodland, which help to absorb carbon, purify our water supplies, and reduce run-off, thereby helping to mitigate the effects of climate change. <p>The Peak District BAP is based largely on the three National Character Areas (NCA) of the Dark Peak, White Peak and South West Peak. Each of these areas is defined by its landscape and a distinctive and characteristic mosaic of habitats and species that sets them apart from other areas of England. The Peak District BAP area includes the entirety of the Peak District National Park. The</p>

¹⁵ Available at: <https://www.gov.uk/government/publications/highways-england-strategic-business-plan-2015-to-2020>

¹⁶ Available at: <https://www.gov.uk/government/publications/highways-england-environment-strategy>

¹⁷ Available at: https://www.gmwildlife.org.uk/projects/gm_bap/

¹⁸ Available at: <https://www.peakdistrict.gov.uk/looking-after/biodiversity/biodiversity-action-plan>

	<p>BAP area also incorporates some small parts of adjacent NCAs not covered by other Local BAPs.</p>
<p>The Thameside Unitary Development Plan Written Statement (Adopted November 2004)¹⁹</p>	<p>The Unitary Development Plan (UDP) is a land use planning document which the Council is required to produce by law, adopt and keep under review. Its purpose is to provide a framework for development and conservation over the whole of the Thameside area, to set out the main considerations on which planning applications in the Borough are determined, and to guide land use decisions by the Council and other agencies.</p> <p>The following policies relevant to nature conservation are outlined below:</p> <p><u>Policy N1a International Nature Conservation Sites</u></p> <p>Development which may affect a Special Protection Area or proposed Special Area of Conservation will be subject to the most rigorous examination.</p> <p>Development that is not connected with or necessary to the management of the site for nature conservation, which is likely to have significant effects on the site (either individually or in combination with other plans or projects) and where it cannot be ascertained that the proposal would not adversely affect the integrity of the site, will not be permitted unless:</p> <ul style="list-style-type: none"> (a) there is no alternative solution, and (b) there are imperative reasons of over-riding public interest for the development. <p>Where the site concerned hosts a priority natural habitat type and/or a priority species, development or land use change will not be permitted unless the authority is satisfied that it is necessary for human health or public safety or for beneficial consequences of primary importance for nature conservation.</p> <p><u>Policy N2 Locally Designated Nature Conservation Sites</u></p> <p>The Council will not permit development adversely affecting a Site of Biological Importance, without a proper assessment being made of the nature conservation value of the site in relation to the benefits of the development.</p> <p>The objective should be to retain the habitat provided by the designated site, either by exclusion from the area of the development or incorporation within the development site where practical, in either case with suitable measures taken to protect the site during construction and once the development is completed.</p> <p>Where loss or damage would occur to the nature conservation value of the site, and on balance it is accepted that the need for the development outweighs the protection of the habitat in-situ, this must be compensated for by habitat re-creation or enhancement of an equivalent or greater area elsewhere within the site or the surrounding area.</p> <p>Development unconnected with the management of the site will not be permitted on Local Nature Reserves which have been formally designated under the National Parks and Access to the Countryside Act 1949.</p> <p><u>Policy N3 Nature Conservation Factors</u></p> <p>When considering development proposals which could have an impact on wildlife, plant life or geological features (whether or not these are currently designated for protection) the Council will wish to be satisfied that the potential benefits to nature conservation have been fully taken into account in the design of the scheme and</p>

¹⁹ Available at: [https://www.tameside.gov.uk/Planning/Unitary-Development-Plan-\(UDP\)](https://www.tameside.gov.uk/Planning/Unitary-Development-Plan-(UDP))

	<p>arrangements for subsequent maintenance or management, including any opportunities to help create or enhance wildlife habitats and increase biodiversity in both urban and rural locations. Nature conservation factors should be addressed in the design of new areas of tree or shrub planting and landscaping, and in schemes for environmental improvement and reclamation of derelict land, particularly in wildlife corridors and areas which are deficient in wildlife habitats.</p> <p>Consideration of these factors should be informed by the Council's Nature Conservation Strategy and the evolving Greater Manchester Biodiversity Action Plan.</p> <p><u>Policy N6 Protection and Enhancement of Waterside Areas</u></p> <p>The Council will permit developments alongside watercourse so long as they:</p> <ul style="list-style-type: none"> (a) allow for the retention or creation of a "green" corridor following the watercourse, wherever possible and at least along one side, and (b) include improvements where appropriate to existing waterside features, and (c) enable the waterside environment and its ecology to be enhanced generally, avoiding the creation of a backyard character, and (d) do not involve watercourses being culverted and, where appropriate and in accordance with Environment Agency policy, include the removal of existing culverts, and (e) avoid erosion or destruction of established habitats and associate species, and (f) encourage the provision of new habitats in appropriate locations, and (g) protect valuable floodplain habitats from development, and (h) open up waterside land and frontages to public access where appropriate. <p><u>Policy N7 Protected Species</u></p> <p>The Council will not permit development which would have an adverse impact on badgers or species protected by Schedules 1, 5 and 8 of the Wildlife and Countryside Act as amended, unless it can be demonstrated by the applicant that any such impact can be successfully mitigated and the population status of the species be maintained at current levels.</p>
<p>High Peak Local Plan (Adopted April 2016)²⁰</p>	<p>The Local Plan was adopted on 14 April 2016 and sets out the council's vision and strategy for the borough until 2031. The following policy is relevant to nature conservation:</p> <p><u>Policy EQ5 Biodiversity</u></p> <p>The biodiversity and geological resources of the Plan Area and its surroundings will be conserved and where possible enhanced by ensuring that development proposals will not result in significant harm to biodiversity or geodiversity interests.</p> <p>This will be achieved by:</p> <ul style="list-style-type: none"> • Conserving and enhancing sites of international, European, and national importance. On these sites the Council will not permit any development proposal that has an adverse effect on the integrity of a European site (or wildlife site given the same protection as European sites under the NPPF) either alone or in combination with other plans or projects. Conserving and

²⁰ Available at: <https://www.highpeak.gov.uk/article/646/The-Adopted-Local-Plan-2016>

	<p>enhancing any Sites of Special Scientific Interest. On these sites the Council will not permit any development proposal which would directly or indirectly (either individually or in combination with other developments) have an adverse effect on a Site of Special Scientific Interest</p> <ul style="list-style-type: none">• Conserving and enhancing regionally and locally designated sites. On these sites the Council will not permit any development proposal which would directly or indirectly result in significant harm to geological and biodiversity conservation interests, unless it can be demonstrated that:<ul style="list-style-type: none">○ there is no appropriate alternative site available; and○ all statutory and regulatory requirements relating to any such proposal have been satisfied; and○ appropriate conservation and mitigation measures are provided, such mitigation measures should ensure as a minimum no net loss and wherever possible net gain for biodiversity;○ or if it is demonstrated that this is not possible;○ the need for, and benefit of, the development is demonstrated to clearly outweigh the need to safeguard the intrinsic nature conservation value of the site and compensatory measures are implemented• Encouraging development to include measures to contribute positively to the overall biodiversity of the Plan Area.• Working with partners to help meet the objectives and targets in the Peak District Biodiversity Action Plan or its successor.• Working with partners to protect and enhance watercourses.• Identifying local ecological networks and supporting their establishment and protection in accordance with Local Plan Policy EQ8, preferentially creating biodiversity sites where they have the potential to develop corridors between habitats (both terrestrial and freshwater).• Working with partners in the public, private and voluntary sectors to develop and secure the implementation of projects to enhance the landscape and create or restore habitats of nature conservation value, and to secure the more effective management of land in the Plan Area and its surroundings.
--	---

8.2.5 The policies and regulations, as outlined in Table 8-2 above, have been considered as part of this biodiversity assessment by informing the identification of ecological receptors, the assessment methodology, and the potential for significant ecological effects. Where any significant effects have been identified, the required mitigation measures have been provided (as outlined within Section 8.8: Design, Mitigation and Enhancement Measures).

8.3 Assessment Methodology

Consultation and scoping responses

8.3.1 Details of consultation undertaken to inform the Biodiversity assessment are presented in the Introduction chapter (Chapter 1) and the Consultation Report (TR010034/APP/5.1).

8.3.2 An overview of the Planning Inspectorate’s Scoping Opinion on the proposed scope of the biodiversity assessment is provided in Appendix 4.1 (document reference TR010034/APP/6.5). Any additional consultation responses or changes to assessment methodology due to the latest DMRB standards or design changes are also detailed in Appendix 4.4 (document reference TR010034/APP/6.5).

Desk Study

8.3.3 A biological record search has been undertaken for records of protected and priority species in the UK, locally important species of conservation concern and statutory and non-statutory designated sites of nature conservation interest according to a pre-determined desk study area (study areas are provided within Section 8.5). Only records returned within the last ten years were assessed (specifically 2010 onwards) as these were considered most relevant to the ecological assessment.

8.3.4 The Multi-Agency Geographic Information for the Countryside (MAGIC) website²¹ was used to obtain information on statutory designated sites, notable habitats, Ancient Woodland and any granted European Protected Species (EPS) mitigation licences within 2 km of the Scheme²². This was extended to 30 km for any Special Protection Areas (SACs) where bats are a qualifying features²³.

8.3.5 Desk study records for non-statutory designated sites of nature conservation interest, notable and legally protected species were obtained from the relevant Local Environmental Record Centre (LERC) or local conservation group. These records, including distances obtained, are outlined within Table 8-3.

Table 8-3 - Data search requests

Data source	Type and date of consultation	Information requested/issues discussed
Derbyshire Biological Records Centre (DBRC)	By email – 4 October 2019 By email – 1 October 2020 (for non-statutory site citations for nature conservation) By email – 17 March 2021 (for an update since original request)	Data received 8 October 2019 for protected and notable species records within a 2 km (extended to 5 km for notable bird species due to the more mobile nature of these species) search radius of the Scheme where this search area fell within Derbyshire. Data received 15 October 2020 for non-statutory site citations within 50 m of the affected road network (ARN) ²⁴ as required by LA 105. Updated data was received 19 March 2021.

²¹ Magic Website: <http://www.magic.gov.uk/>. Accessed October 2019

²² <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section4/hd4409.pdf>. ‘As a general guide, consideration should be given to any European Sites within 2 km of the route corridor or project boundary’ and to ‘crossing/adjacent to upstream of, or downstream of, watercourses designated in part or wholly as SACs, cSACs, pSACs, SPAs, pSPAs or Ramsar sites

²³ <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section4/hd4409.pdf>. ‘In addition, consideration should be given to any SACs within 30km where bats are noted as one of the qualifying interests’.

²⁴ All roads that trigger the traffic screening criteria and adjoining roads within 200 m.

Greater Manchester Local Record Centre (GMLRC)	By email – 4 October 2019 By email – 28 September 2020 (for 5 km bat and notable bird records & non-statutory site citations) By email – 17 March 2021 (for an update since original request)	Data received 11 October 2019 for protected and notable species records within a 2 km (extended to 5 km for bats and notable bird species due to the more mobile nature of these species) search radius of the Scheme where this search area fell within Greater Manchester. Data received 6 October 2020 for 5 km bat and notable bird records & non-statutory site citations within 50 m of the ARN.
Derbyshire Bat Group	By email – 3 April 2020	Data received 08 April 2020 for records of bats within a 5 km search radius of the Scheme where this search area fell within Derbyshire.
Derbyshire & Nottinghamshire Entomological Society	By email – 23 March 2020	Invertebrate species records within a 1 km search radius of the Scheme. Data received on 28 January 2021.
Pennine Edge Barn Owl Group	By email – 2 September 2020	Data received 2 September 2020 for local records of barn owl.

- 8.3.6 Records of ancient, veteran and notable trees were obtained from the Woodland Trust's Ancient Tree Inventory²⁵ within 2 km of the Scheme.
- 8.3.7 Ordnance Survey maps, aerial photography and Where's the Path website²⁶ were used to identify the presence of waterbodies within 500 m of the Scheme²⁷, in order to establish if amphibians (including great crested newts) are potentially present in aquatic or terrestrial habitats within or surrounding the Scheme. This was ground-truthed during the amphibian surveys undertaken in April-June 2017.
- 8.3.8 The Environment Agency (EA) Statutory Main Rivers Map²⁸ has been undertaken to identify watercourses. Following identification of watercourses, a review of publicly available EA ecological data²⁹ and Water Framework Directive (WFD) classification data was undertaken to inform the baseline for watercourse habitats.
- 8.3.9 Following identification, watercourses were subject to a screening exercise (as detailed in Appendix 8.3 (TR010034/APP/6.5) to determine assessment requirements. The potential for direct or indirect impacts to these watercourses have been reviewed against Scheme design elements and embedded construction mitigation e.g. best practice pollution prevention measures which are to be adopted as standard and detailed in the Outline Environmental Management Plan (EMP) First Iteration.

²⁵ <https://ati.woodlandtrust.org.uk/> [Accessed 2 November 2020]

²⁶ Where's The Path website: <https://wtp2.appspot.com/wheresthepath.htm>. [Accessed 2 November 2020]

²⁷ Great crested newts can disperse up to 500 m from a pond. Therefore, water bodies within 500 m of the Scheme have been considered for their great crested newt potential

²⁸ <https://www.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386> [Accessed 2 August 2020]

²⁹ Data obtained from the Environment Agency Ecology and Fish Data Explorer website: <https://environment.data.gov.uk/ecology-fish/> [Accessed 1 September 2020]

- 8.3.10 A suite of ecological studies was undertaken in 2007 as part of the previously promoted A57/ A628 Mottram - Tintwistle Bypass scheme and the results of these were presented in a series of reports by Hyder Consulting (UK) Limited (hereafter referred to as 'Hyder'). Furthermore, an additional suite of ecological studies was undertaken in 2017/ 2018 as part of part of the A57 Trans Pennine Upgrade - Mottram Bypass scheme by Arcadis Limited (hereafter referred to as 'Arcadis'). The information provided within these reports has been reviewed as part of the desk study and used, where necessary, to inform any mitigation proposals.
- 8.3.11 In accordance with DMRB LA105³⁰, the air quality assessment should include an assessment of the impacts on "designated habitats" which, as outlined within DMRB LA 105, include: 'Ramsar' sites, Special Protection Areas (SPA), Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI), Local Nature Reserves (LNR), Local Wildlife Sites (LWS), Nature Improvement Areas (NIA), Ancient Woodland and veteran trees within 200 m of the Affected Road Network (ARN). The location of the ARN and designated habitats are provided within Figure 5.1. Further details of this methodology and assessment can be found within Chapter 05: Air Quality and Appendix 8.4 (TR010034/APP/6.6).

Biodiversity Metric Reporting

- 8.3.12 In accordance with DMRB LA108, Natural England's Biodiversity Metric 2.0 has been adopted to provide a summary of the scale and nature of biodiversity changes as a result of the Scheme. The design has ensured that opportunities to improve biodiversity have been maximised within the permanent land-take within the DCO boundary. Off-site enhancement opportunities would also be explored during the detailed design.
- 8.3.13 During the field surveys, undertaken between June and September 2020, a habitat type was assigned to each area following the methodology within the UKHab User Guide. As part of this process, a 'condition' was assigned to each habitat type according to the methodology and criteria outlined within the Biodiversity Metric 2.0 Technical Supplement³¹.
- 8.3.14 A detailed methodology is provided within Appendix 8.1 (TR010034/APP/6.5).

Field Surveys

- 8.3.15 Field surveys have been undertaken in accordance with DMRB LD 118 and other recognised best practice survey guidance (as outlined within Table 8-4) to establish a baseline against which to assess the effects of the Scheme on each of the receptors.
- 8.3.16 In line with DMRB LA 108, the biodiversity baseline should assure the age, validity, and relevance of the data available is reliable. The lifespan of any given survey also depends on the type of survey undertaken and whether conditions within the study area are likely to have changed. The survey and survey lifespans are provided within Table 8-4 along with justification of why the survey

³⁰ Chapter 2.25

³¹ Crosher, I., Gold, S., Heaver, M., Heydon, M., Moore, L., Panks, S., Scott, S., Stone, D. and White, N. (2019) The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: Technical supplement (Beta version, July 2019). Natural England

is deemed valid if outside of the recommended ‘lifespan’. Prior to the commencement of construction, a walkover survey would be undertaken to update the extended Phase 1 habitat survey information and to determine whether more detailed habitat or protected species surveys would need to be carried out.

8.3.17 Habitat and species-specific surveys have been undertaken in 2017/ 2018 through to 2019/ 2020 by The Applicant. Detailed methodologies, including the scope and guidance followed for each survey, are presented in Appendix 8.1 to 8.3 (TR010034/APP/6.5), however, a summary is provided below in Table 8-4.

Table 8-4 – Summary of Ecological Surveys

Survey	Survey description	Date undertaken	Typical lifespan of data	Guidance
Extended Phase 1 habitat survey	Extended Phase 1 habitat surveys are undertaken to locate dominant plant species and record the locations of any notable plant species. The survey was ‘extended’ to include a search for evidence of, and an assessment of the potential for each habitat to support, notable and protected species, as recommended by CIEEM ³² . Note was taken of the more conspicuous fauna, and any evidence of, or potential for the presence of protected, notable, or invasive species.	June-August 2017	18 months to 3 years	Phase 1 Habitat survey methodology ³³ CIEEM (April 2019) ³⁴
		October 2019		
NVC survey	Survey of woodland to determine whether it qualified as a habitat of principal importance identified within S41 of the NERC Act 2006. The updated extended Phase 1 habitat survey (October 2019) found that the habitats on site had not significantly changed since the survey in 2017. Due to this, it was not considered necessary to update the NVC surveys.	July 2017	18 months to 3 years	National Vegetation Classification : User’s Handbook ³⁵ JNCC website ³⁶ CIEEM (April 2019)
Biodiversity Metric condition assessments	The mapping of habitats within the Scheme and assigning a condition according to the methodology and criteria outlined within the Biodiversity Metric 2.0 technical supplement.	August and September 2020.	18 months to 3 years	UK Habitat (UKHab) Classification ³⁷ Biodiversity Metric 2.0

³² Chartered Institute of Ecology and Environmental Management (2017). *Guidelines for Preliminary Ecological Assessment*.

³³ Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit

³⁴ CIEEM (April 2019) On the Lifespan of Ecological Reports and Surveys.

³⁵ Rodwell JS (2006). National Vegetation Classification: User’s Handbook. Joint Nature Conservation Committee. Peterborough.

Available at <https://hub.jncc.gov.uk/assets/a407ebfc-2859-49cf-9710-1bde9c8e28c7> [Accessed 24/11/2020]

³⁶ <https://jncc.gov.uk/our-work/nvc/> [Accessed 24/11/2020]

³⁷ Butcher, B., Carey, P., Edmonds, R., Norton, L., and Treweek, J. (2020) *The UK Habitat Classification User Manual Version 1.1*.

Available at: <https://www.UKHab.org>. [Accessed 23/11/2020]

				technical supplement ³⁸ CIEEM (April 2019)
Hedgerow survey	Survey of hedgerows to determine their importance in accordance with the requirements of the “Wildlife and Landscape Criteria” in The Hedgerows Regulations 1997.	June 2017	18 months	Hedgerow Survey Handbook ³⁹
		October 2020		CIEEM (April 2019)
Watercourse and standing water body (ponds and lakes) walkover survey	To verify previous project data (namely RCS), further characterise aquatic habitats within the study area and inform future requirements for targeted aquatic survey e.g. Modular River Physical (MoRPh) survey.	March 2020	Typically 5 years	No specific guidance, professional judgement applied
River Corridor Survey (RCS)	Survey of watercourses and their associated corridors to record broad habitat features and vegetation types. Used to determine existing conservation interest of these features and evaluate potential threats. Data are considered relevant providing no major works to the channel or riparian zone have occurred since the survey, noting that RCS records broad biotypes and channel features.	2017	Typically 5 years	No specific guidance, professional judgement applied
		May and June 2018		
MoRPh river survey	Watercourse survey to determine habitat condition in accordance with methodology and criteria outlined within the Biodiversity Metric 2.0 User Guide (2019) and a Guide to Assessing River Condition (2020 ⁴⁰). Survey methodology and concurrent desk study enables determination of a River Condition score to be used in a BNG assessment. Data are considered relevant providing no major works to the channel or riparian zone have occurred since the survey, noting that MoRPh surveys record broad biotypes and not specific species assemblages.	2020	Typically 5 years	No specific guidance, professional judgement applied

³⁸ Crosher, I., Gold, S., Heaver, M., Heydon, M., Moore, L., Panks, S., Scott, S., Stone, D. and White, N. (2019) The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: Technical supplement (Beta version, July 2019). Natural England

³⁹ Defra (2007) *Hedgerow Survey Handbook*. A standard procedure for local surveys in the UK. Defra, London.

⁴⁰ Gurnell, A., England, J., Scott, S.J., and Shuker, L.J. (2020) A Guide to Assessing River Condition: Part of the Rivers and Streams Component of the Biodiversity Net Gain Metric. Guidance note provided to attendees on the River Condition Assessment training course delivered by the Modular River Survey team (<https://modularriversurvey.org/>).

<p>Aquatic macroinvertebrate survey</p>	<p>Detailed surveys using standard three-minute kick sampling method. Aquatic macroinvertebrate samples are used to calculate biological metrics which provide information on general community sensitivity. Environment Agency use a six-year monitoring period for WFD status assessments.</p> <p>In addition to baseline survey, a monitoring programme may be established during construction as aquatic macroinvertebrates are good indicators of water quality, flow and fine sediment pollution.</p>	<p>October 2020</p>	<p>Typically 5 years for baseline</p>	<p>No specific guidance, professional judgement applied</p>
<p>Predictive SYstem for Multimetrics (PSYM) pond survey</p>	<p>Detailed pond surveys comprising aquatic macroinvertebrate, macrophyte and water quality sampling. These data have then been processed using the PSYM programme to compare predicted plant and animal metrics with real survey metrics to determine overall ecological quality.</p> <p>Whilst individual species assemblages may change within a pond over relatively short time scales (seasonally/ annually), PSYM survey characterises the overall quality of a standing water body which takes into account biological metrics and broad assemblage types e.g. species tolerant to eutrophic conditions. Five years is therefore considered a reasonable survey period.</p>	<p>August 2020</p>	<p>5 years</p>	<p>No specific guidance, professional judgement applied</p>
<p>Amphibian survey</p>	<p>Water bodies were assessed or surveyed using one, or a combination, of the following assessments or surveys:</p> <ul style="list-style-type: none"> • Habitat Suitability Index (HSI) assessment, • environmental DNA (eDNA) sampling; and • traditional presence or likely absence survey. <p>The updated extended Phase 1 habitat survey found that the habitats (including water bodies) on site had not significantly changed since the survey in 2017. The results indicated that great crested newts were not present within both the survey and study area and are,</p>	<p>April, May, and June 2017</p>	<p>2 years</p>	<p>English Nature (2001)⁴¹</p> <p>Froglife (1999)⁴²</p> <p>Great crested newt method statement template for great crested newt mitigation licence⁴³.</p>

⁴¹ English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature, Peterborough

⁴² Froglife (1999) Reptile survey; an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth

⁴³ <https://www.gov.uk/government/publications/great-crested-newts-apply-for-a-mitigation-licence>

	therefore, considered unlikely to be present on site. Updated surveys were not considered necessary on this basis.			
Reptile surveys	Habitat assessments and presence or likely absence surveys of representative suitable habitat. The 2017 survey results indicated that reptiles were likely absent within the survey area. The updated extended Phase 1 habitat survey found that the habitats on site had not significantly changed since the survey in 2017. Updated surveys were not considered necessary on this basis.	May to September 2017	18 months to 3 years	Froglife (1999) ⁴⁴ Herpetofauna Workers Manual (2003) ⁴⁵ CIEEM (April 2019)
Breeding bird surveys	Transect surveys of suitable land to determine species assemblage, numbers of birds and patterns of habitat usage.	March to July 2017	18 months to 3 years	Common Birds Census (CBC) territory mapping methodology ^{46/47} BTO ⁴⁸ CIEEM (April 2019)
		March to July 2020		
Kingfisher survey	A habitat suitability survey along the River Etherow to determine the suitability of the bankside habitat for kingfisher.	March 2020	18 months to 3 years	CIEEM (April 2019)
Barn owl surveys	Surveys of suitable accessible buildings to assess presence or likely absence of barn owl.	June 2017, February-June 2018	18 months to 3 years	Shawyer (2011) ⁴⁹ CIEEM (April 2019)
		June and October 2020		
Bat roost inspection survey	Surveys of accessible structures to determine roosting potential. Due to the onset of COVID-19, updated bat roost inspection surveys were unable to be undertaken. This limitation has been addressed through mitigating on a worst-case scenario utilising the existing data set and updated local records search.	Throughout 2017 and 2018	12 months	Collins (2016) ⁵⁰

⁴⁴ Froglife (1999) Reptile survey; an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth

⁴⁵ Gent T and Gibson S (2003) Herpetofauna Workers Manual. JNCC, Peterborough.

⁴⁶ Gilbert, G., Gibbons, D.W. and Evans, J. (1998) Bird monitoring methods: A manual of techniques for key UK species. RSPB: Sandy.

⁴⁷ Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. (2000) Bird Census Techniques: Second Edition. Academic Press: London.

⁴⁸ Assessment was made using the "Breeding Evidence" categories webpage from the British Trust for Ornithology,

<https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence> (accessed 12/10/2020)

⁴⁹ Shawyer, C. R. 2011. Barn Owl *Tyto alba* Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting. IEEM, Winchester.

⁵⁰ Collins (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)

Bat emergence surveys	Surveys to determine presence or likely absence of bats within structures. Due to the onset of COVID-19, updated bat emergence surveys were unable to be undertaken. This limitation has been addressed through mitigating on worst-case scenario utilising the existing data set and updated local records search.	Throughout 2017 and 2018	12 months	Collins (2016)
Bat activity surveys	Surveys of bat foraging and commuting activity using transect and static monitoring surveys. Transect routes were walked once a month (April–October 2017). Static monitoring was undertaken at several locations for a minimum of five consecutive nights each month (April–October 2017).	April to September 2017	12 months	Collins (2016)
		Carried out in October 2019 and between March and September 2020		
Bat tree surveys	Surveys of accessible trees to determine bat roosting potential and determine presence or likely absence.	Carried out between July and September 2020 and between January and February 2021 (for hibernation) by Ecus Ltd on behalf of the Applicant	12 months	Collins (2016)
Otter surveys	Survey of watercourses and waterbodies to determine habitat suitability, field signs and usage of habitats.	April and September 2017	12-18 months	Chanin (2013) ⁵¹
		April and September 2020		CIEEM (April 2019);
Water vole surveys	Survey of watercourses and waterbodies to determine habitat suitability, field signs and usage of habitats.	April and September 2017	12-18 months	Dean <i>et al.</i> (2016) ⁵²
		April and September 2020		CIEEM (April 2019)
Badger walkover survey	Surveys for suitable habitats and field signs, including setts and evidence of foraging.	April 2017 & March-April 2018	12-18 months	Harris <i>et al.</i> (1989) ⁵³

⁵¹ Chanin, P., Troughton, G., (2013) Otters – The British Natural History Collection 2. Whittet Books Ltd.

⁵² Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds Fiona Matthews and Paul Chanin. The Mammal Society, London.

⁵³ Harris, S., Cresswell, P. & Jefferies, D. (1989) Surveying Badgers. Occasional Publication No.9. The Mammal Society.

⁵³ Natural England (2009) Protection of Badgers Act 1992 (as amended) Guidance on 'Current Use' in the definition of a Badger Sett.

		February 2020 (updated walkovers throughout 2020 and 2021)		CIEEM (April 2019)
Badger camera survey	Surveys to establish activity levels at certain badger setts	October-November 2020		
Badger bait marking survey	Surveys to establish badger clan territories.	Throughout March 2020	12-18 months	Delahay <i>et al.</i> (2000) ⁵⁴ CIEEM (April 2019)

8.3.18 In addition, a search for any non-native invasive species (including, but not limited to, Japanese knotweed, Himalayan balsam, rhododendron, New Zealand pygmy weed, Virginia creeper, variegated yellow archangel, and cotoneaster) was undertaken during the initial extended Phase1 habitat survey and subsequent survey visits. These species are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and subject to strict legal control.

Significance of Effects

8.3.19 The assessment process requires ecological receptors to be valued using both professional judgement based on available guidance and information on the distribution and status of the receptors that are being considered with local context applied to assign a value based on the criteria provided in DMRB LA 108. This is presented in Table 8-5.

8.3.20 Where an ecological receptor has value at more than one level, its overriding value is that of the highest level. For example, a site designated as a SAC or SPA for European important features and as a SSSI for nationally important features would be considered as being of European importance.

Table 8-5 - Biodiversity Resource Importance

International or European importance	
Sites	Sites including: 1) European or international sites (herein collectively referred to as European sites): a) Sites of Community Importance (SCIs) b) SPAs c) Potential SPAs (pSPAs) d) SACs e) Candidate or possible SACs (cSACs or pSACs) f) Wetlands of International Importance (Ramsar sites). 2) Biogenetic Reserves, World Heritage Sites (where recognised specifically for their biodiversity value) and Biosphere Reserves

⁵⁴ Delahay *et al.* (2000) The use of marked bait in studies of the territorial organization of the European Badger (*Meles meles*). Mammal Review, 30: 73-87

	3) areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.
Habitats	N/A
Species	Resident, or regularly occurring, populations of species which can be considered at an international or European level where: 1) The loss of these populations would adversely affect the conservation status or distribution of the species at an international or European scale 2) The population forms a critical part of a wider population at this scale 3) the species is at a critical phase of its life cycle at an international or European scale.
UK or national importance	
Sites	Sites including: 1) SSSIs 2) National Nature Reserves (NNRs) 3) National Parks 4) Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs) 5) areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.
Habitats	Habitats including: 1) areas of UK BAP priority habitats 2) habitats included in the relevant statutory list of priority species and habitats 3) areas of irreplaceable habitats including: a) Ancient Woodland b) ancient or veteran trees c) blanket bog d) limestone pavement e) sand dunes f) salt marsh g) lowland fen 4) areas of habitat which meet the definition for habitats listed above but which are not themselves designated or listed as such.
Species	Resident, or regularly occurring, populations of species which can be considered at an international, European, UK or national level where: 1) the loss of these populations would adversely affect the conservation status or distribution of the species at a UK or national scale 2) the population forms a critical part of a wider population at this scale 3) the species is at a critical phase of its life cycle at a UK or national scale

Regional importance	
Sites	Designated sites (non-statutory) including heritage coasts.
Habitats	Areas of habitats identified (including for restoration) in regional plans or strategies (where applicable).
Species	Species including: <ol style="list-style-type: none"> 1) resident, or regularly occurring, populations of species which can be considered at an international, European, UK or national level where: <ol style="list-style-type: none"> a) the loss of these populations would adversely affect the conservation status or distribution of the species at a regional scale b) the population forms a critical part of a wider regional population c) the species is at a critical phase of its life cycle 2) Species identified in regional plans or strategies.
County or equivalent authority importance	
Sites	Wildlife or nature conservation sites designated at a county (or equivalent) level including: <ol style="list-style-type: none"> 1) Local Wildlife Sites (LWS) 2) Local Nature Conservation Sites (LNCS) 3) Local Nature Reserves (LNRs) 4) Sites of Importance for Nature Conservation (SINCs) 5) Sites of Nature Conservation Importance (SNCIs) 6) County Wildlife Sites (CWSs)
Habitats	Areas of habitats identified in county or equivalent authority plans or strategies (where applicable).
Species	Species including: <ol style="list-style-type: none"> 1) resident, or regularly occurring, populations of species which can be considered at an international, European, UK or national level where: <ol style="list-style-type: none"> a) the loss of these populations would adversely affect the conservation status or distribution of the species at a county or unitary authority scale b) the population forms a critical part of a wider county or equivalent authority area population, for example metapopulations c) the species is at a critical phase of its life cycle 2) Species identified in a county or equivalent authority area plans or strategies.
Local Importance	
Sites	Wildlife or nature conservation sites designated at a local level including: <ol style="list-style-type: none"> 1) Local Wildlife Sites (LWS) 2) Local Nature Conservation Sites (LNCS) 3) Local Nature Reserves (LNRs) 4) Sites of Importance for Nature Conservation (SINCs) 5) Sites of Nature Conservation Importance (SNCIs) 6) Sites of Local Nature Conservation Importance (SLNCIs).
Habitats	Areas of habitat considered to appreciably enrich the habitat resource within the local context including features of importance for migration, dispersal, or genetic exchange.

Species	Populations or communities of species considered to appreciably enrich the habitat resource within the local context including features of importance for migration, dispersal or genetic exchange.
---------	---

Table source: extracted from DMRB LA 108 Table 3.9 Biodiversity resource importance.

Identifying Mitigation Measures and Assessing Residual Effects

8.3.21 The assessment of the potential effects of the Scheme considers both on-site effects and those that may occur to adjacent and more distant nature conservation receptors. Impacts on nature conservation receptors have been characterised, including consideration of whether they are positive or negative, the probability, complexity, extent, size, reversibility, duration, timing and frequency of the impacts. Impacts can be permanent or temporary and can include:

- Direct loss of habitats (including temporary loss)
- Fragmentation and isolation of habitats
- Disturbance to species from noise, light or other visual stimuli
- Changes to key habitat features
- Changes to the local hydrology, water quality and/or air quality
- Direct mortality or injury to wildlife through construction activities and/or operation.

8.3.22 In accordance with DMRB LA 108, the significance of effect on an ecological receptor is arrived at by considering the environmental sensitivity or value of the receptor and the magnitude of impact. However, effects on conservation status have only been assessed in detail for ecological receptors of local value for biodiversity or greater, and which could be affected by the Scheme. Effects on receptors of negligible or site value for biodiversity have been scoped out of further assessment. Further details on these receptors are provided within Appendix 8.1 (TR010034/APP/6.3).

8.3.23 The level of impact on biodiversity resources has been assigned in accordance with DMRB LA 108 as outlined within Table 8-6. Where more than one significance outcome is possible, professional judgement has been used to determine which is most appropriate, on a case by case basis, and ensuring regard to the precautionary principle.

Table 8-6 - Level of Impact

Level of impact (change)		Typical descriptions
Major	Adverse	1) Permanent/irreversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Permanent addition of, improvement to, or restoration of a biodiversity resource

		2) The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource
Moderate	Adverse	1) Temporary/reversible damage to a biodiversity resource 2) The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	1) Temporary addition of, improvement to, or restoration of a biodiversity resource 2) The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Minor	Adverse	1) Permanent and irreversible damage to a biodiversity resource 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
	Beneficial	1) Permanent addition of, improvement to, or restoration of a biodiversity resource 2) The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible	Adverse	1) Temporary and reversible damage to a biodiversity resource 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
	Beneficial	1) Temporary addition of, improvement to, or restoration of a biodiversity resource 2) the extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
No change		No observable impact, either positive or negative.

Table source: extracted from DMRB LA 108 Table 3.11 Level of impact and typical descriptions.

8.3.24 When determining the significance of an effect, consideration is given to whether:

- any processes or key characteristics will be removed or changed
- there will be an effect on the nature, extent, structure and function of component habitats
- there is an effect on the average population size and viability of component species.

8.3.25 Functions and processes acting outside the formal boundary of a designated site have also been considered, particularly where a site falls within a wider ecosystem, or where areas of land are functionally linked to the designated sites (for example, habitats used occasionally for grazing by notable bird species, but aren't included within the designated site boundary).

8.3.26 Some habitats and ecosystems can tolerate a degree of minor change, such as localised or temporary disturbance or changes in physical conditions, without

such changes harming their function or value. Ecological effects have considered information available about the capacity of ecosystems to accommodate change.

- 8.3.27 The conservation status of undesignated habitats and species within a defined geographical area has been used to determine whether the effects of the proposals are likely to be significant:
- For habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
 - For species, conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.
- 8.3.28 The principles of the mitigation hierarchy have been applied when considering impacts and subsequent effects on nature conservation receptors within the Ecological Zone of Influence (EZoI). The principles state that in order of preference, impacts on biodiversity should be avoided, reduced, then remediated. If there are significant residual adverse effects that cannot be mitigated, then compensation will be required. Enhancement measures are also identified to provide benefits for biodiversity above the requirements for avoidance, mitigation or compensation.
- 8.3.29 According to the principles of the mitigation hierarchy outlined in DMRB LA 104, measures to avoid or prevent adverse environmental effects have been incorporated into the Scheme design and are regarded as embedded mitigation which are considered in the assessment of the significance of effects; these measures are outlined within Chapter 2. These measures include those required to achieve the minimum standard of established good practice, together with additional measures to further reduce any negative impacts of the Scheme. These mitigation measures include those required to reduce or avoid the risk of committing a legal offence and those that support the consenting process.
- 8.3.30 Taking mitigation into account, the significance of residual effects on nature conservation receptors has been identified using professional judgement and based on criteria provided within DMRB LA 108. The significance of residual effects is defined below in Table 8-7.

Table 8-7 - Significance matrix

	Level of impact					
		No change	Negligible	Minor	Moderate	Major
Resource importance	International or European importance	Neutral	Slight	Moderate or large	Large or very large	Very large
	UK or national importance	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Regional importance	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	County of equivalent authority importance	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Local importance	Neutral	Neutral or slight	Neutral or slight	Neutral or slight	Slight

Table source: extracted from DMRB LA 108 Table 3.13 Significance matrix.

8.4 Assessment Assumptions and Limitations

- 8.4.1 Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The level of survey effort applied to the Scheme to date has enabled sufficient information to be obtained on which to assess the potential impacts and subsequent effects of the Scheme. However, due to the general mobility of some species and the environmental factors stated above, the surveys of the Scheme footprint may not have produced a complete list of plants and animals, and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. Where the presence or likely absence of particular species cannot be confirmed, a precautionary approach has been applied to the assessment, which accounts for species that are considered likely to be present as well as those that are recorded as present.
- 8.4.2 In addition to this Biodiversity chapter of the ES, several technical appendices have been prepared for habitats and species specific to the Scheme. Within each of the technical appendices is a summary of survey assumptions and limitations. The details of those are not duplicated here, but none are considered to represent a significant constraint to the preparation of the Biodiversity chapter of the ES. Assumptions have been taken into consideration throughout the assessment and are outlined below. These survey-specific assumptions and limitations are outlined within Appendix 8.1, confidential Appendix 8.2 in relation to badgers, and Appendix 8.3 in relation to Aquatic Ecology (TR010034/APP/6.5).
- 8.4.3 Certain limitations due to the onset of COVID-19 should be noted, which resulted in two surveys (badger bait marking and breeding bird surveys) originally scheduled in March and April 2020 were either cut short (badger bait marking) or

delayed slightly (breeding bird surveys) whilst sufficient safety measures⁵⁵ could be arranged and implemented, including adherence to relevant best practice guidance regarding COVID-19 and ecological surveys⁵⁶. None of the limitations identified are considered to significantly affect the assessment due to either sufficient information already having been collected or surveys still being undertaken within the recommended or suitable survey period.

- 8.4.4 In particular, due to COVID-19 restrictions, internal householder inspections and interacting with residents (i.e. door knocking) was not deemed acceptable due to the amount of properties that would need interacting with within a short period. Therefore, scoping/emergence bat surveys to update the existing data set from previous 2017 surveys were not undertaken. In consultation with Natural England, the previous data set was used, with an updated and expanded local records search, to inform the impacts upon roosting bats with mitigation provided on a 'worst-case' scenario (i.e. those species, roosts and numbers that have the potential to be impacted by the Scheme).
- 8.4.5 COVID-19 restrictions also led to the spring 2020 aquatic macroinvertebrate survey window being missed. Autumn surveys have since been undertaken to inform the baseline for watercourses. Whilst it is recognised that multi-season (spring and autumn) aquatic macroinvertebrate sampling provides a more robust assessment of species within watercourse systems, it is considered that survey during the autumn season only is sufficient to inform the assessment of baseline within this ES. Further aquatic macroinvertebrate sampling was undertaken in March 2021 for the River Etherow (WC_100), Tara Brook (WC_200) and the Hurstclough Brook (WC_300). Results are not yet available for these surveys but shall be used in conjunction with the autumn surveys as a baseline during pre and post construction watercourse monitoring.
- 8.4.6 The assessment assumed that there may be a reduction in flow volume in the Hurstclough Brook to the south of the new road alignment as a result of the interception of both surface and sub-surface flow derived from the rising topography to the north. The assessment is precautionary, identifying a potential for this to result in a reduction to the flow volume entering Hurstclough Brook within an approximate 600 m section. In the absence of any detailed hydrological modelling and understanding of recharge pathways, it has not been possible to quantify the volumetric effect. However, field observations have identified that at the time of survey (March and September) a significant proportion of the flow in the potentially affected reach was derived from the upstream channel extent - which is not affected by the Scheme since the flow path is retained by the culvert. It is therefore assumed that flow will be maintained through the affected reach by this source in operation. Any potential changes in flow associated with the interception discussed above are subsequently not considered to be of a magnitude that would result in a response beyond a minor localised adverse change in watercourse habitat availability and potential alteration to the distribution of aquatic invertebrates and macrophytes within the affected reach.

⁵⁵ This included the preparation of relevant PPE such as gloves, face masks, hand gel, organising separate transportation and ensuring surveyors had key worker letters and updated risk assessments.

⁵⁶ CIEEM (2021). Guidance on Ecological Survey and Assessment in the UK During the COVID-19 Outbreak. Version 4. Published 10 February 2021. Chartered Institute of Ecology and Environmental Management, Winchester, UK.

- 8.4.7 Surface flows and sub-surface flow derived from downslope movement will be intercepted by the new channel to the north which provides opportunity for new aquatic habitat to develop. Flow within this ditch would then be routed under the road to join Hurstclough Brook just above the existing A57. Since the flows end up back in the same system (upstream of the main river designation) there is not expected to be any loss in the overall surface water balance within the downstream receiving water bodies.
- 8.4.8 During the desk study assessment to determine whether veteran, ancient or notable trees are present within 2 km of the Scheme, the Woodland Trust's Ancient Tree database was accessed. This data source provides records where trees have been identified by members of the public and specialists and verified by the Woodland Trust. Therefore, the database does not provide an exhaustive information for ancient, veteran and notable trees in a given geographic area, but rather the locations of trees noted locally. Taking account of the extended Phase 1 habitat surveys carried out up to 500 m from the Scheme, the walked barn owl transect surveys within 1.5 km of the Scheme, and the limitations of the database, it is unlikely that ancient, notable or veteran trees will have been missed during the desk study or field survey as part of this assessment and the limitation on data from the Woodland Trust is not considered a significant limitation.
- 8.4.9 During the biodiversity metric calculations, when inputting the post-works condition it was assumed that habitats within the temporary land take would be returned to the same habitat type and condition, while habitats within the permanent land take would be subject to appropriate management for a minimum of 30 years in order to achieve their target condition.
- 8.4.10 Where access and data limitations have been encountered during the collection of baseline information for a receptor, the precautionary principle has been applied, whereby mitigation and compensation measures are provided to avoid and/ or minimise the risk of any potentially adverse impacts. Based on this approach, none of the limitations outlined above are considered significant in terms of the assessment of effects.

8.5 Study Area

- 8.5.1 The study area was identified by determining the Ecological Zone of Influence (EZol) of the Scheme. The EZol encompasses all the predicted impacts and subsequent effects of the Scheme on nature conservation receptors based on the requirements of the DMRB LA 108 and LA 104, relevant best practice guidelines, and professional judgement. This is presented as "survey area" within Table 8-8.
- 8.5.2 The EZol was used to inform the extent of the desk study and survey area. It includes the Development Consent Order (DCO) boundary⁵⁷ (as shown on Figure 2.1), but due to the relative importance of some biodiversity resources and the mobility of some species, the study and survey area have been extended from the DCO boundary to obtain information on biodiversity resources

⁵⁷ This boundary shows the limits within which works associated with the Scheme may be carried out. This includes the land required permanently and temporary for the operation and construction of the Scheme.

at difference spatial extents. The desk and survey area for each ecological receptor has been provided within Table 8-8.

Table 8-8 – Desk and survey area for each ecological receptor

Receptor	Desk study area (from the DCO boundary, unless otherwise stated)	Survey area (from the DCO boundary, unless otherwise stated)
Statutory Designated Sites: <ul style="list-style-type: none"> • SAC • cSAC • pSAC • SPA • pSPA • Ramsar sites and proposed Ramsar sites (pRamsar) • SSSI • NNR • LNR. 	2 km	N/A
	30 km for SAC where bats are noted as a qualifying feature.	
	Any European Site that has potential hydrological or hydrogeological linkage to the Scheme with a groundwater dependent terrestrial ecosystem which triggers the criteria for assessment of European sites in accordance with DMRB LA 113 ⁵⁸ .	
	200 m from the ARN for impacts arising from increases in air quality in line with DMRB LA 105 ⁵⁹ .	Further air quality survey methodology is provided within Chapter 5: Air quality.
Non-statutory designated sites: <ul style="list-style-type: none"> • SBI • LWS • Potential Local Wildlife Site (pLWS) • NIA. 	2 km	N/A
	200 m from the ARN for impacts arising from increases in air quality.	
Ancient Woodland and ancient, veteran and notable trees	2 km	50 m ⁶⁰
	200 m from the ARN for impacts arising from increases in air quality.	Further air quality survey methodology is provided within Chapter 5: Air quality.
Habitats of principal importance as listed on Section 41 of the NERC Act (hereafter refer to as S41 habitats)	500 m	50 m

⁵⁸ DMRB LA 113 Road drainage and the water environment, March 2020.

⁵⁹ Chapter 2.25 within DMRB LA 105 Air Quality (formerly HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13. Part of IAN 185/15) Revision 0.

⁶⁰ The establishment of 50 m extent is defined on a precautionary basis as it encompasses the potential requirement for root protection zones, as defined in BS5837: Trees in Relation to Design, Demolition and Construction, Recommendations (2012). The study area also goes beyond the extent of root protection zone likely for veteran trees to provide a wider context for the Scheme area.

Watercourses (main rivers ⁶¹ and ordinary watercourses ⁶²)	2 km ⁶³	Typically, within the DCO boundary but can vary depending on site suitability for survey methodology.
Standing water bodies (ponds and lakes) ⁶⁴	150 m	150 m
Great crested newts	2 km	500 m
	500 m for water bodies that may be used as breeding sites.	
Bats	5 km for data search ⁶⁵ .	500 m for habitat suitability assessment.
	500 m for habitat suitability assessment.	Bat activity surveys: 50 m.
		Bat ground level tree assessment surveys and tree climbing surveys: 50 m.
Badgers	2 km	250 m from the route, or 50 m from the DCO boundary (whichever was furthest).
		500 m from any sett which was subject to bait marking.
Birds	5 km for any notable birds	50 m for bird transect surveys
Otters	2 km	175 m for water bodies and watercourses for their suitability for otters.
Water Voles	2 km	175 m up and down stream of any water bodies and watercourses that were within 50 m of the DCO boundary.
Species of principal importance as listed on Section 41 of the NERC Act (hereafter refer to as S41 species)	2 km	50 m

⁶¹ A watercourse shown on the statutory main river map dataset. These are typically larger streams and rivers, but some of them are small watercourses of significance. They include certain structures that control or regulate the flow of water in, into or out of the channel. The Environment Agency has permissive powers, but not a duty, to carry out maintenance, improvement or construction work on designated main rivers. The Environment Agency has powers to regulate the activities of others affecting rivers and their flood plains under the Environmental Permitting Regulations 2016, the Water Resources Act 1991 and land drainage byelaws.

⁶² All other watercourses are defined as ordinary watercourses. The Lead Local Flood Authority (LLFA) or, if within an Internal Drainage District, the Internal Drainage Board (IDB) have similar permissive powers to maintain and improve ordinary watercourses. The LLFA or IDB have powers to regulate works under the provisions of the Land Drainage Act 1991 and local byelaws. Ordinary watercourses include rivers, streams, land and roadside ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.

⁶³ Along hydrologically connected watercourses that occur within 150 m of the DCO boundary. Aquatic ecology screening and study areas are defined in Appendix 8.3 (TR010034/APP/6.5).

⁶⁴ Standing water bodies include both ponds (< 2 ha) and lakes (> 2 ha) as defined in Williams, P., Biggs, J., Thorne, A., Bryant, S., Fox, G. and Nicolet, P., 1999. The Pond Book: a guide to the management and creation of ponds. Ponds Conservation Trust, Oxford.

⁶⁵ <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol10/section4/ha8099.pdf>. 'The investigations may need to be extended up to 5 km beyond the corridor for desk top studies'.

8.6 Baseline Conditions

- 8.6.1 Each ecological receptor has been assessed in line with DMRB LA 104 by being defined and described without the Scheme in place, known as ‘the baseline scenario’. Furthermore, a description of the likely evolution of the current state of the environment without implementation of the Scheme, known as the ‘future baseline scenario’, with reasonable effort on the basis of the availability of environmental information and scientific knowledge has been provided, where possible. The timeframe used is up until the end the constructional stage (anticipated to be 2023).
- 8.6.2 Baseline conditions for each nature conservation resource are described below. Table 8-14 at the end of this section provides information about the nature conservation value of the resources in relation to the Scheme.
- 8.6.3 Detailed biodiversity metric reporting is provided within Appendix 8.1 (TR010034/APP/6.5)

Statutory Designated Sites

- 8.6.4 No European sites (including any potential, possible, or candidate sites) were identified within 2 km and no SACs designated for bats were identified within 30 km of the Scheme.
- 8.6.5 The Scheme does not cross or lie adjacent to, upstream or downstream of, a watercourse which is designated in part or wholly as a European site, nor is it hydrologically or hydro-geologically linked to a European site with a groundwater dependent terrestrial ecosystem.
- 8.6.6 Two statutory designed sites (both LNRs) of importance for nature conservation lie within 2 km of the Scheme. Details of these sites are provided within Table 8-9 with locations provided in Figure 8.1 (TR010034/APP/6.4).

Table 8-9 - Statutory designated sites for nature conservation within 2 km of the Scheme

Site name and designation	Description of habitats	Importance (Reasoning)	Approximate distance and direction from scheme	Grid reference
Hurst Clough LNR	Woodland stretching into wildflower meadows where butterflies are common.	County (LNR)	345 m south	SJ987943
Great Wood LNR	Most of the trees are oak, but in places there are birch, alder beech and willow that add to the variety. Dead and dying trees are as important as live ones and the dead wood provides food and shelter for spiders, millipedes, beetles and fungi.	County (LNR)	1.3 km south	SJ984935

- 8.6.7 The Dark Peak SSSI, the Peak District Moors (South Pennine Moors Phase 1) SPA, and the South Pennine Moors SAC share the same boundary situated at its nearest point to the Scheme, approximately 2.2 km north-east, but within 200 m of the ARN. The Eastern Peak District Moors SSSI, and Huddersfield Narrow Canal SSSI are also located within 200 m of the ARN. The eastern half of the Scheme is also situated within the Dark Peak SSSI Impact Risk Zone which includes infrastructure projects that could cause changes in air pollution. Further details of the air quality assessment are provided in Chapter 5: Air Quality.
- 8.6.8 Four LNRs are located within 200 m of the ARN (Etherow Country Park LNR, Hurst Clough LNR, Werneth Low Country Park LNR, and Reddish Vale LNR). Further details of the air quality assessment are provided in Chapter 5: Air Quality.

Non-Statutory Designated Sites

- 8.6.9 There are 31 non-statutory designated sites of importance for nature conservation within 2 km of the Scheme. These are provided within Table 8-10 with locations provided within Figure 8.2 (TR010034/APP/6.4).

Table 8-10 - Non-statutory designated sites of importance for nature conservation within 2 km of the Scheme

Site name and designation	Description of habitats	Importance (Reasoning)	Approx. distance and direction from Scheme	Grid reference
Melandra Castle and Railway LWS	Habitat mosaic	County (LWS)	141 m south	SK007949
Hurtsclough SBI	Ancient Woodland	County (SBI) National (Ancient Woodland)	360 m south	SJ987941
Clough at Hattersly SBI	Woodland	County (SBI)	463 m south-west	SJ977947
Westwood Clough and Longlands Hall SBI	Woodland; Plantation woodland	County (SBI)	427 m west	SJ972953
Roe Cross Quarry SBI	Upland heathland	County (SBI)	475 m north	SJ988966
Dinting Nature Reserve LWS	Ancient semi-natural ash woodland	County (LWS) National (Ancient Woodland)	603 m south-east	SK015946
Dinting Lodge Grassland LWS	Unimproved neutral grassland	County (SBI)	818 m south-east	SK018947

Hollingworth Hall Wood SBI	Ancient Woodland; Grassland	County (SBI) National (Ancient Woodland)	850 m north-east	SK007976
Robin Wood LWS	Ancient semi-natural woodland - mixed deciduous	County (SBI)	859 m south	SK005943
Wild Bank Hill SBI	Heathland; Birds	County (SBI)	886 m north	SJ984980
Dinting Vale Reservoirs and Brook LWS	Standing open water	County (LWS)	877 m south-east	SK020944
Paradise Quarry pLWS	Habitat mosaic	County (LWS)	888 m north-east	SK018963
Woodland and Grassland at Landslow Green SBI	Woodland; Grassland	County (SBI)	924 m north-east	SK001971
Great Wood SBI	Ancient Woodland	County (SBI) National (Ancient Woodland)	937 m south	SJ983935
Hollingworth Reservoir & Swallowswood Nature Reserve LWS	Secondary broad-leaved woodland	County (LWS)	973 m north-east	SK009975
Godley Hill SBI	Woodland; Heathland; Grassland	County (SBI)	1,060 m west	SJ969950
Dinting Wood LWS	Ancient semi-natural oak woodland	County (LWS)	1,073 m south-east	SK016943
Banks Wood LWS	Habitat mosaic	County (LWS)	1,110 m east	SK023956
Clough at Madeley SBI	Ancient woodland; Grassland	County (SBI) National (Ancient Woodland)	1,115 m north-west	SJ973962
Gamesley Sidings LWS	Habitat mosaic	County (LWS)	1,210 m south	SK013940
Dinting Junction Pond LWS	Standing open water	County (LWS)	1,287 m south-east	SK022947
Brookfold Wood SBI	Ancient woodland; Grassland; Ponds	County (SBI) National (Ancient Woodland)	1330 m south-west	SJ970944
Eastwood and Acre Clough SBI	Woodland	County (SBI)	1,414 m north-west	SJ971974

Higher Gamesley Marsh pLWS	Unimproved neutral grassland	County (LWS)	1,429 m south-east	SK014939
Back Wood SBI	Ancient Woodland	County (SBI) National (Ancient Woodland)	1,470 m south-west	SJ979930
Warrastfold Bridge Complex LWS	Unimproved acid grassland	County (LWS)	1,539 m south	SJ991935
Ashes Farm Meadows pLWS	Unimproved neutral grassland	County (LWS)	1,699 m south east	SK026946
Woodseats Wood LWS	Secondary broad-leaved woodland	County (LWS)	1,840 m south	SJ989929
North Road Ponds LWS	Standing open water	County (LWS)	1,924 m east	SK030952
Tom Wood LWS	Ancient semi-natural woodland - mixed deciduous	County (LWS)	1,966 m south	SJ997931
Pond at Oaklands Hall SBI	Ponds; Amphibians	County (SBI)	1,970 m west	SJ962948

8.6.10 Furthermore, 47 non-statutory designated sites (including 25 SBIs, 16 LWS, four pLWS, and two NIA) are located within 200 m of the ARN. Full details of these sites are provided within Appendix 8.1 with locations provided on Figure 8.2 (TR010034/APP/6.4).

8.6.11 In accordance with DMRB LA 108, and due to being designated at the county level, LWS and SBIs are considered to be of county value.

8.6.12 The Dark Peak NIA is located 1.2 km north-east. NIAs were established as an opportunity to create joined up and resilient ecological networks at a landscape scale. The Dark Peak NIA covers 25,000 ha of the Peak District National Park and whilst the NIA contains habitats and species of national value, the NIAs are not designated for this purpose specifically, being focused on habitat restoration.

Ancient Woodland and Ancient, Notable, and Veteran Trees

8.6.13 No Ancient Woodland is recorded as present using the Ancient Tree Inventory^{66/67} within 500 m of the Scheme⁶⁸. However, 15 separate parcels are present within 2 km of the Scheme, with the closest parcel located 517 m west.

8.6.14 One common sycamore, classified as a notable tree, is located approximately 125 m north of the Scheme just north of Coach Road. A notable beech and a

⁶⁶ <https://data.gov.uk/dataset/9461f463-c363-4309-ae77-fdcd7e9df7d3/ancient-woodland-england>

⁶⁷ <https://ati.woodlandtrust.org.uk/>

⁶⁸ Hurts Clough SBI (within 500 m of the Scheme) is designated due to containing Ancient Woodland, however, the Ancient Woodland area is located 902 m away from the Scheme at the closest point.

veteran oak are also present approximately 1.2 km north-east of the Scheme associated with Hollingworth Hall Wood SBI.

- 8.6.15 Twenty-three areas of Ancient Woodland are present within 200 m of the ARN. Locations are provided on Figure 8.2 (TR010034/APP/6.4) with further details of these woodland provided within Appendix 8.1 (TR010034/APP/6.5).
- 8.6.16 In accordance with DMRB LA108, areas of Ancient Woodland are considered to be of national importance.

Notable Habitats

- 8.6.17 Notable habitats recorded during the extended Phase 1 habitat survey and during the desk study are described and valued below. Locations are provided on Figure 8.2 (TR010034/APP/6.4) with further details within Appendix 8.1 (TR010034/APP/6.5).

Traditional orchard

- 8.6.18 One small area of traditional orchard (approximately 0.1 ha), a S41 priority habitat⁶⁹, is located immediately adjacent to the DCO boundary north of Mottram Moor Road. This has been classified as priority habitat with low confidence on Magic Map²¹. A walkover in September 2020 found that this area contained no features to suggest traditional orchard and showed typical garden habitat consisting of amenity grassland and shrubs. It is considered that this area has been classified in error or using aerial imagery only and has been scoped out of this assessment.
- 8.6.19 A further traditional orchard (0.11 ha) is located adjacent to a farm complex approximately 64 m north-east of the Scheme. This has been classified as priority habitat with low confidence on Magic Map²¹. A review of recent aerial imagery showed that this habitat appears to contain amenity grassland with no clear orchard habitat. It is considered that this area has been classified in error or no longer contains traditional orchard habitat and has been scoped out of this assessment.
- 8.6.20 A further area of traditional orchard (approximately 0.25 ha) is located approximately 235 m north of the DCO boundary at Water Lane, Hollingworth. It is classified as medium confidence within the priority habitat inventory however a review of historic aerial imagery shows the site having suffered heavy disturbance and clearance as recently as 2009. It is considered unlikely that this habitat would contain an area of traditional orchard and has therefore been scoped out of further assessment.

Lowland mixed deciduous woodland

- 8.6.21 There are several parcels of deciduous woodland located within 500 m of the DCO boundary, within which several areas are recognised on the Priority Habitat Inventory⁷⁰ as lowland mixed deciduous woodland⁷¹. Five parcels (with a combined total area of approximately 0.78 ha) fall within the DCO boundary with

⁶⁹ <http://data.jncc.gov.uk/data/2829ce47-1ca5-41e7-bc1a-871c1cc0b3ae/UKBAP-BAPHabitats-56-TraditionalOrchards.pdf>

⁷⁰ Section 41 of the Natural Environment and Rural Communities Act 2006.

⁷¹ <http://data.jncc.gov.uk/data/2829ce47-1ca5-41e7-bc1a-871c1cc0b3ae/UKBAP-BAPHabitats-30-LowlandMixedDecWood.pdf>

the two largest areas located just east of Old Hall Lane and just west of Carr House Lane.

- 8.6.22 Lowland mixed deciduous woodland is widespread within Greater Manchester, gradually becoming sparser towards the Peak District National Park. Lowland mixed deciduous woodland is a priority habitat within the UK and in line with DMRB LA 108, is classed as being of national value. This habitat is common and widespread within the county, and the examples within the Scheme are small in extent, fragmented, and not part of any habitat designations or Ancient Woodland. Taking this into consideration, the assemblage of lowland mixed deciduous woodland within the DCO boundary is considered to be of local value.

Wet woodland

- 8.6.23 Two areas measuring approximately 0.1 ha combined of S41 priority habitat wet woodland⁷² were present within poorly drained hollows within pastoral land west of the A6018 Roe Cross Road within the Scheme. This woodland type was dense in structure and was dominated by grey willow.
- 8.6.24 In line with DMRB LA 108, wet woodland is classed as being of national value as it is a priority habitat. Wet woodland is rare in Greater Manchester, however, due to the small extent (0.1 ha) and fragmented area found within the Scheme, the wet woodland is considered to be of local value.

Lowland dry acid grassland

- 8.6.25 One area of lowland dry acid grassland (approximately 0.5 ha) a S41 priority habitat⁷³ is located within the study area approximately 300 m south of the Scheme. This area has been classified as priority habitat with low confidence on Magic Map²¹.
- 8.6.26 Within the Scheme, extents of lowland dry acid grassland were present in pastoral land west of the A6018 Roe Cross Road and north of the A57 Mottram Moor. The grassland comprises species indicative of acid grassland, including common bent, tormentil, heath bedstraw, hard-fern, bilberry, mat-grass and sheep's sorrel, with betony also present. The vegetation community has a good fit to the NVC type U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland. The greatest extent is present on the steep embankment of the A6018 Roe Cross Road but smaller extents are present on other raised topographical features and earthworks with an acidic and free-draining substrate.
- 8.6.27 In line with DMRB LA 108, lowland dry acid grassland is classed as being of national value as it is a priority habitat. However, due to the limited and fragmented areas found within the Scheme, lowland dry acid grassland is considered to be of county value.

Hedgerows

- 8.6.28 Hedgerows were frequent throughout the study area, predominantly marking field boundaries. Although these hedgerows were mostly gappy, species-poor

⁷² <http://data.jncc.gov.uk/data/2829ce47-1ca5-41e7-bc1a-871c1cc0b3ae/UKBAP-BAPHabitats-64-WetWoodland.pdf>

⁷³ <http://data.jncc.gov.uk/data/902cafc6-578f-43de-8a99-7143f00d79a2/UKBAP-BAPHabitats-26-LowlandDryAcidGrass.pdf>

(predominantly hawthorn), and heavily managed, they all meet the criteria for S41 priority habitat hedgerow⁷⁴.

- 8.6.29 Two hedgerows within the study area were assessed to meet the criteria of 'important hedgerow' in accordance with the Hedgerows Regulations 1997 (H18 and H24). Approximately 42 m of hedgerow H24 falls within the DCO boundary of the Scheme; hedgerow H18 is situated immediately north-east of the DCO boundary.
- 8.6.30 A network of 31 hedgerows with a total combined length of 3,312 m is located within the DCO boundary. These comprise:
- approximately 779 m of defunct species-poor hedgerow
 - approximately 271 m of intact species-rich hedgerow
 - approximately 1,132 m of intact species-poor hedgerow
 - approximately 37 m of species rich hedgerow with trees
 - approximately 499 m of species poor hedgerow with trees
 - approximately 594 m of lines of trees.
- 8.6.31 In line with DMRB LA 108 hedgerows are classed as being of national value as they are a priority habitat. As the hedgerows on site are predominantly heavily managed, species-poor and gappy, it is considered that the hedgerows on site are of local value.

Flood plain mire

- 8.6.32 An un-named tributary (classified as an Ordinary Watercourse (WC_210)) of the River Etherow was found to drain the hill slopes north of the A57 Mottram Moor. The riparian zone comprised marginal vegetation with varying mixtures of water-cress, brooklime, water forget-me-not, gypsywort, meadowsweet, creeping buttercup, common nettle and broad-leaved dock. Himalayan balsam was also abundant within this area. Beyond the marginal vegetation, the riparian zone comprised a narrow flood-plain supporting alluvial wetland habitat with a tall-herb fen community dominated by meadowsweet with wild angelica, soft-rush, common marsh-bedstraw, meadow vetchling, devil's-bit scabious, lesser spearwort, greater bird's-foot-trefoil and marsh thistle. This vegetation community has a good fit to the NVC type M27 *Filipendula ulmaria-Angelica Sylvestris* mire which is a key vegetation type of the alluvial wetland component of flood-plain fen.
- 8.6.33 The narrow flood-plain is underlain by wet mineral soils and is not a peatland fen system. Therefore, despite the presence of flood-plain fen vegetation, the vegetation does not conform to the JNCC UK BAP priority habitat description of lowland fen⁷⁵, which states that lowland fens are peatlands, and therefore it would not be considered to be a priority habitat nor an irreplaceable habitat as listed in the National Planning Policy Framework (NPPF) 2019. Whilst not

⁷⁴ <http://data.jncc.gov.uk/data/ca179c55-3e9d-4e95-abd9-4edb2347c3b6/UKBAP-BAPHabitats-17-Hedgerows.pdf>

⁷⁵ <https://data.jncc.gov.uk/data/6fe22f18-fff7-4974-b333-03b0ad819b88/UKBAP-BAPHabitats-27-LowlandFens.pdf>

conforming to S41 priority habitat 'lowland fen', it enriches the habitat resource within the local context and is, therefore, considered to be of local value.

Aquatic habitats and species

8.6.34 Within this ES, the importance values applied to aquatic receptors (watercourses and standing water bodies) consider the receptor importance in the context of both intrinsic habitat quality and the species it supports. Had specific notable species, or species protected under specific legislation been identified during this preliminary design stage ecological impact assessment, these may have been considered important enough to value in their own right (separately from the habitat receptor). Based on the survey results, there was no requirement for separate species/population valuation as part of the assessment of aquatic habitats. Whilst some notable fish species (namely lamprey and brown trout) were recorded within the River Etherow, lamprey were recorded in very low densities. Moreover, review of ecological data sets within the wider region indicate that brown trout are widespread within other watercourses in the area. The River Etherow and other watercourses have therefore been assigned importance values for the watercourse as a whole.

Watercourses

8.6.35 Watercourses and standing water bodies within the study area are shown on Figure 8.5 (TR010034/APP/6.4).

8.6.36 The desk study identified a total of 19 watercourses within the study area, including three main rivers and 16 ordinary watercourses. For full details of watercourses see Appendix 8.3 (TR010034/APP/6.5).

8.6.37 Following identification, watercourses were subject to a screening exercise (as detailed in Appendix 8.3 (TR010034/APP/6.5) to determine assessment requirements.

8.6.38 The screening exercise has resulted in the identification of eight watercourses potentially affected by the Scheme and thus requiring further assessment. These are:

- The River Etherow (WC_100)
- Tara Brook (WC_200)
- Hurstclough Brook (WC_300)
- Five unnamed watercourses (WC_210, WC_211, WC_212, WC_213, WC_340), all tributaries of the Tara Brook (WC_200) and Hurstclough Brook (WC_300).

8.6.39 Of these the River Etherow (WC_100) and Hurstclough Brook (WC_300) are main rivers. Noting, Hurstclough Brook is only designated main river downstream of the existing A57 alignment within the study area. All other watercourses are classified as ordinary watercourses.

8.6.40 All watercourses listed above have been screened to determine field survey requirements following the screening methods and criteria detailed in Appendix 8.3 (TR010034/APP/6.5).

Background Records

- 8.6.41 A search of the watercourses within the study area (2 km upstream and downstream of the DCO boundary on watercourses screened for assessment) identified the Hurst Clough LNR approximately 350 m downstream of the Scheme. Although this site covers the river corridor, it is noted for being important for non-aquatic receptors, namely woodland, wildflower meadows and butterflies. No other statutory or non-statutory designated watercourses or associated sites (beyond WFD designations) have been identified.
- 8.6.42 Of the watercourses screened in for assessment, the River Etherow (WC_100); and Hurstclough Brook (WC_300) are both main rivers. However, the Hurstclough Brook main river designation starts downstream of the existing A57 and outside of the DCO boundary.
- 8.6.43 The River Etherow is a WFD reportable watercourse and is split into two WFD surface water bodies within the study area:
- Etherow (Woodhead Res. to Glossop Bk.) - GB112069060780 - a Heavily Modified Water Body (HMWB) currently at moderate ecological potential
 - Etherow (Glossop Bk. To Goyt) - GB112069061050 - currently at poor ecological status.
- 8.6.44 Environment Agency biological records were only available for the River Etherow (WC_100) and not the Hurstclough Brook (WC_300) or any of the ordinary watercourses within the study area. Details of Environment Agency site locations and survey dates on the River Etherow (WC_100) are provided in Appendix 8.3 (TR010034/APP/6.5). The paragraphs below provide a summary of these data.
- 8.6.45 The WFD biological quality element for invertebrates is classified as being at good status for the two River Etherow WFD water bodies within the study area. Aquatic macroinvertebrate records on the River Etherow (WC_100) are indicative of moderate to good habitat diversity, good water quality, high flow velocity conditions and low channel sedimentation.
- 8.6.46 The WFD biological quality element for fish is classified as being at poor status within the two River Etherow WFD water bodies. The Reasons for Not Achieving Good (RNAG)⁷⁶ fish status are suspected to be linked to physical modification resulting in barriers and ecological discontinuity, the presence of invasive signal crayfish and sewage discharge within the watercourse.

⁷⁶ RNAG are reasons compiled by the Environment Agency and identify the main reasons for failure of a water body to achieve good WFD status. RNAG can be found on the Environment Agency's catchment data explorer website [Environment Agency - Catchment Data Explorer](#).

- 8.6.47 Despite being at poor status, fish are still present within the River Etherow and their presence contributes to the overall WFD status and potential to achieve WFD objectives in the future. Environment Agency records indicate that the River Etherow within the study area supports a limited number of fish species, specifically brown trout, lamprey, three-spined stickleback, minnow and stone loach.
- 8.6.48 Brown trout and the three species of lamprey in the UK are S41 priority species. Lamprey are also Annex II species⁷⁷.
- 8.6.49 Macrophytes are classified as being at moderate to good status for the two River Etherow WFD water bodies. No Environment Agency macrophyte survey data less than 10 years old are available for the River Etherow (WC_100) within the background records study area.

Field survey

- 8.6.50 Watercourse and water body survey locations are shown in Figure 8.5 (TR010034/APP/6.4).
- 8.6.51 A series of watercourse habitat surveys have been undertaken across the Scheme, comprising RCS in May and June 2018, a watercourse walkover survey in March 2020 and MoRPh surveys in September 2020. A summary of watercourse habitats for each of the watercourses screened into assessment is provided in Table 8-11. Details of field survey screening outcomes, site locations and survey dates are provided in Appendix 8.3 (TR010034/APP/6.5).

Table 8-11 - Watercourse survey summaries

Watercourse name and ID	Survey Undertaken	Survey summary
River Etherow (WC_100)	Walkover, RCS, MoRPh, aquatic macroinvertebrates	<p>Approximately 255 m of the River Etherow (WC_100) is situated within the DCO boundary flowing north to south along the eastern edge of the Scheme. The River Etherow is classified main river throughout the study area. The survey Tara Brook (WC_200) is a minor tributary of the River Etherow that flows west to east throughout the study area and DCO boundary. It is classified an ordinary watercourse. Within its upper reaches (SJ 99802 95768) the watercourse is heavily poached by horses. A bund has been positioned across the channel impounding water and creating a small ponded area used as a drinking point for livestock. Channel vegetation was dominated by the invasive non-native species Himalayan balsam.</p> <p>Further downstream the channel receives flow from incoming tributaries and runs adjacent to the existing A57. Before joining the River Etherow the watercourse has been modified and flows through a landscaped garden. Here a</p>

⁷⁷ As listed under the Habitats Directive, 1992 (as amended) which is transposed into English and Welsh law via the Conservation of Habitats and Species Regulations 2017 (as amended). This legislation was further amended in 2019 (the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019) in light of Brexit.

		<p>mixture of substrates (cobble, pebble, gravel and sand) and flow types (rippled, broken waves and chute) provide potential suitable spawning and rearing habitat for juvenile and minor species of fish.</p> <p>One aquatic macroinvertebrate survey was conducted outside of DCO boundary, downstream of potential impacts on the Tara Brook. Biological metrics are indicative of good water quality, high flow velocity conditions and slight channel sedimentation. No notable aquatic macroinvertebrate species were recorded.</p> <p>Tara Brook (WC_200) is an important feature for dispersal and connectivity for a limited range of aquatic species within the local context and has been ascribed a value of Local importance.</p>
Tara Brook (WC_200)	Walkover, RCS, aquatic macroinvertebrates	<p>Tara Brook (WC_200) is a minor tributary of the River Etherow that flows west to east throughout the study area and DCO boundary. It is classified an ordinary watercourse. Within its upper reaches (SJ 99802 95768) the watercourse is heavily poached by horses. A bund has been positioned across the channel impounding water and creating a small ponded area used as a drinking point for livestock. Channel vegetation was dominated by the invasive non-native species Himalayan balsam.</p> <p>Further downstream the channel receives flow from incoming tributaries and runs adjacent to the existing A57. Before joining the River Etherow the watercourse has been modified and flows through a landscaped garden. Here a mixture of substrates (cobble, pebble, gravel and sand) and flow types (rippled, broken waves and chute) provide potential suitable spawning and rearing habitat for juvenile and minor species of fish.</p> <p>One aquatic macroinvertebrate survey was conducted outside of DCO boundary, downstream of potential impacts on the Tara Brook. Biological metrics are indicative of good water quality, high flow velocity conditions and slight channel sedimentation. No notable aquatic macroinvertebrate species were recorded.</p> <p>Tara Brook (WC_200) is an important feature for dispersal and connectivity for a limited range of aquatic species within the local context and has been ascribed a value of Local importance.</p>
Hurstclough Brook (WC_300)	Walkover, RCS, MoRPh, aquatic macroinvertebrates	<p>Hurstclough Brook (WC_300) is located towards the western extent of the Scheme and flows north east to south-west through the study area towards Hurst Clough LNR (and SBI) and eventually the River Etherow (WC_100). Hurstclough Brook (WC_300) is classified as main river downstream of the existing A57 alignment.</p> <p>Within the study area Hurstclough Brook (WC_300) flows through rough pasture, with</p>

		<p>riparian vegetation comprising of terrestrial grasses and rushes. The channel has a small wetted width (typically < 1 m) and is comprised of predominantly fine substrates (sand dominated). MoRPh survey identified the Hurstclough Brook (WC_300) as being of moderate condition for its typology which is reflective of pressures from poaching and some modifications.</p> <p>Three aquatic macroinvertebrate surveys have been conducted on the Hurstclough Book, two within the DCO boundary and one downstream of the existing A57. Biological metrics are indicative of moderate water quality, high flow velocity conditions and a moderately sedimented to sedimented channel. No notable aquatic macroinvertebrate species were recorded.</p> <p>Hurstclough Brook (WC_300) is an important feature for dispersal and connectivity for a limited range of aquatic species within the local context and has been ascribed a value of Local importance.</p>
<p>Unnamed Watercourses (WC_210, WC_211, WC_212, WC_213 and WC_340)</p>	<p>Walkover and/or RCS</p>	<p>Minor tributary systems of the Tara Brook (WC_200) and Hurstclough Brook (WC_300). Typically field boundary ditches or modified semi-natural surface water flow paths draining hillsides <1 m wide. Limited potential for fish and other truly aquatic species. However, they provide an important aquatic linear corridor within the local agricultural landscape and are thus considered to be of Local importance.</p>

Standing water bodies

- 8.6.52 The desk study identified a total of 22 ponds within the study area, 10 of which are located within the DCO boundary (P2, P3, P4, P5, P7, P17, P27, P28, P30 and P31; see Figure 8.5). No lakes are present within the study area.
- 8.6.53 Ponds were subject to a screening exercise (as detailed in Appendix 8.3 (TR010034/APP/6.5)) to determine assessment requirements.
- 8.6.54 Eight ponds were identified as being potentially affected by the Scheme within the study area (P2, P3, P4, P5, P7, P17, P30 and P31). Walkover and earlier project HSI surveys identified P4 and P31 as defunct or dry features which no longer function as ponds. These two features were subsequently screened out of further assessment.

Background records

- 8.6.55 No desk study data are available for the remaining six ponds potentially affected by the Scheme. Therefore, all six ponds (P2, P3, P5, P7, P17 and P30) met the screening criteria to be taken forward to PSYM pond survey (as detailed in Appendix 8.3 (TR010034/APP/6.5)).

Field Survey

8.6.56 PSYM pond survey were screened as required for six ponds (P2, P3, P5, P7, P17 and P30). A habitat summary for each of the ponds screened into assessment is provided in Table 8-12. Details of field survey screening outcomes, site locations and survey dates are provided in Appendix 8.3 (TR010034/APP/6.5).

Table 8-12 – Pond survey summaries

Pond ID	Survey Undertaken	Survey summary
P2	PSYM	Provides ephemeral aquatic habitat within grazing pasture approximately 100 m ² . During survey, vegetation was recorded as predominantly terrestrial grasses suggesting either temporarily/recently wetted. P2 is not fenced off from cattle and has evidence of poaching around its margins. Emergent plant cover was low (5%) comprising soft rush. Despite an absence of shading only two other aquatic or semi-aquatic plant species were recorded (duck weed and Sphagnum moss).
P5	PSYM	Approximately 150 m ² feature. Heavily poached by cattle and used as a watering hole. It is located within grazing pasture with no surrounding scrub or trees to provide shade. Emergent plant cover was recorded as largely absent although small stands of emergent vegetation was recorded. No uncommon plant species were recorded.
P7	PSYM	A permanent farm pond approximately 200 m ² located along a field boundary within a small woodland area. It is fenced off from cattle reducing pressure of poaching. One inflow was recorded at the time of survey. Vegetation provides shade across 50% of the pond although no emergent plant cover was recorded. In total seven species of submerged and marginal plants were recorded with one noted as uncommon.
P30	PSYM	Approximately 150 m ² feature. Heavily poached by cattle and used as a watering hole. It is located within grazing pasture with no surrounding scrub or trees to provide shade. Emergent plant cover was recorded as largely absent although small stands of emergent vegetation was recorded. No uncommon plant species were recorded.

8.6.57 None of the ponds surveyed meet published criteria for definition as Priority Habitat. PSYM survey assesses each of the ponds as poor quality, reflecting their impoverished macrophyte and aquatic macroinvertebrate communities none of which are notable species. Despite only supporting a limited range of aquatic flora and fauna, collectively these ponds (P2, P5, P7 and P30) have been ascribed a value of local importance since they add habitat complexity within the landscape.

Other habitats

8.6.58 The following habitats are not priority habitats, but they provide corridors of habitat connectivity for the purpose of genetic exchange and dispersal of notable and protected species across the wider landscape. Such habitats are abundant throughout Greater Manchester and Derbyshire, ubiquitous across the UK and are considered to be of less than local value (that is of value within the Scheme area only) and are scoped out of further assessment as any potential impacts on these habitats are unlikely to be significant.

8.6.59 Further descriptions of these habitats are provided within Appendix 8.1 with locations provided within Figure 8.3 (TR010034/APP/6.4).

Amenity Grassland

8.6.60 Approximately 0.41 ha of amenity grassland was present within the DCO boundary all of which was present on land surrounding the existing M67 Junction 4 at the western end of the scheme. This grassland was characterised by a regular cutting regime, dominated by perennial rye grass and generally with a low diversity of herb species.

Bare ground

8.6.61 Areas of bare ground (approximately 0.17 ha) were present along the borders of the River Etherow and marking farm access tracks to the east of the Scheme.

Buildings and Hardstanding

8.6.62 Mottram-in-Longdendale is situated within a rural area and the study area comprised mixed-age residential dwellings and farmhouse buildings. The residential dwellings to the north of A57 at Mottram Moor comprised a row of brick-built terraced and semi-detached houses over two floors with slate roofs. The area around Old Road was more variable and modern, with a mix of commercial development and a variety of building types, such as bungalows and semi-detached residential properties. There were also several farm complexes comprising a variety of buildings and a small circular structure near to the M67 Junction 4.

8.6.63 Several areas of hardstanding were present around the survey area, mainly consisting of hardstanding road and farm access tracks.

Bracken

8.6.64 An area dominated by dense bracken, measuring approximately 0.01 ha, was present along a field boundary west of Carrhouse Lane.

Dense scrub

8.6.65 Dense scrub was widespread across the Scheme including along the embankments of the M67 and in small patches throughout the Scheme, with the largest area (approximately 0.67 ha) situated immediately south of Mottram Moor. Dense scrub habitat within the DCO boundary totalled 1.22 ha (excluding an area of willow categorised as wet woodland and addressed in the notable habitats section above) and was largely dominated by bramble but also included hawthorn and gorse.

Improved grassland

8.6.66 Improved grassland was common and widespread throughout the study area, totalling approximately 29.98 ha. Improved grassland was particularly common to the east between the A6106 (Roe Cross Road) and the A57 at Mottram Moor. It occupied intensively grazed pastoral fields and silage plots with a sward dominated by perennial rye-grass. Where herb species were present, these typically had little diversity and were made up of mostly white clover and creeping buttercup, both species indicative of nutrient enrichment.

Parkland and scattered trees

8.6.67 An area of intensively grazed pasture, measuring 0.90 ha, showed characteristics of parkland and scattered trees habitat, including open grown mature trees. An Ordnance Survey map of Cheshire, published in 1882, showed that this area was parkland of at least 19th century origin⁷⁸.

8.6.68 None of the open grown trees displayed veteran tree features, and it is therefore considered that the habitat does not conform to the description of the S41 priority habitat wood-pasture and parkland⁷⁹.

Plantation woodland

8.6.69 Approximately 0.48 ha of semi-mature coniferous plantation woodland was present to the east of Carrhouse Lane. The woodland comprised densely planted firs and spruce. The woodland was bordered to the north by a defunct, predominately hawthorn, hedgerow and by broad-leaved tree lines to the south and west.

8.6.70 Approximately 0.58 ha of semi-mature broadleaved plantation woodland also present within the central areas of the M67 Junction 4. This included a variety of mostly broadleaved species typical of highways planting.

Semi-improved grassland

8.6.71 Poor semi-improved grassland was the most common of these habitats totalling approximately 4.32 ha. Poor semi-improved grassland covers a large proportion of the fields between the M67 Junction 4 and Roe Cross Road, and those to the south-east of the A57 at Mottram Moor. Perennial ryegrass, white clover and creeping buttercup were typically abundant with varying prevalence and sometimes localised (co-)dominance of other grasses including Yorkshire-fog,

⁷⁸ <https://maps.nls.uk/view/102340957>

⁷⁹ <http://data.incc.gov.uk/data/2829ce47-1ca5-41e7-bc1a-871c1cc0b3ae/UKBAP-BAPHabitats-65-WoodPastureParkland-2011.pdf>

rough Meadow-grass, meadow foxtail, crested dog's-tail, and cock's-foot. Forb diversity was low and generally sparse but red clover, broad-leaved dock, common sorrel, ribwort plantain and dandelion were typically occasional to frequent.

Scattered scrub

- 8.6.72 A small area (approximately 0.05 ha) of scattered scrub was present north of the Scheme and bordering to the west of the A6018 Roe Cross Road. The scrub was dominated by bramble with occasional hawthorn, rowan, and Himalayan balsam.

Tall ruderal

- 8.6.73 Areas of tall ruderal vegetation, totalling 0.52 ha were present bordering the north boundary of the M67 Junction 4 and Tall ruderal vegetation also bordering A57 Woolley Lane to the south. These areas were dominated by included rosebay willow-herb, and wild angelica.

Species

Bats

- 8.6.74 Sixty-eight records of bat roosts were returned within 5 km of the DCO boundary from the GMEU, DBRC, and Derbyshire Bat Group. These included common pipistrelle, soprano pipistrelle, brown long-eared, and myotis species. Four common pipistrelle day roosts are within the DCO boundary from the 2017 surveys. Overall, 239 records of bat activity were returned within 5 km of the DCO Boundary. Species included common pipistrelle, soprano pipistrelle, Brandt's, Myotis species, noctule, Natterers', Daubenton's, brown long-eared, whiskered and several unidentified bat species.
- 8.6.75 Previous surveys in 2007 undertaken by Hyder recorded the presence of four common pipistrelle maternity roosts and one transitional roost within the DCO boundary. Updated roost surveys in 2017-2018 found nine common pipistrelle day and/ or satellite roosts within the DCO boundary, and five day and /or satellite roosts found outside the DCO boundary, but located within 50 m. No maternity roosts were found during the surveys in 2017-2018.
- 8.6.76 Bat activity surveys completed in 2017 recorded six taxa, including common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, myotis species, and brown long-eared bat.

- 8.6.77 Updated surveys in 2020 were broadly similar to what was recorded in 2017 and included four taxa: common pipistrelle, soprano pipistrelle, myotis species, and noctule. The majority of bats identified were common pipistrelle (90.4%). 6.2% of species recorded were unknown (seen not heard). The remaining taxa identified in the surveys were recorded much less frequently, and included 1.7% of soprano pipistrelle, 1.1% of myotis species, and 0.6% of noctule. Bat activity was highest in October, April, June, July and August with much lower levels of activity in September and May. The locations and species distribution are outlined within Figure 8.9 (TR010034/APP/6.4).
- 8.6.78 Commuting bats were found in areas where significant linear features were present which provided good connectivity between adjacent habitats including intact hedgerows, woodland edges, lines of trees and watercourses. A large proportion of commuting activity was recorded at:
- The River Etherow
 - Hedgerow and lines of trees to the southwest of Tara Brook Farm
 - Along wooded areas and hedgerows within the Showground
 - Residential areas and gardens included area of trees around Old Hall Lane
 - Hurstclough Brook
- 8.6.79 Foraging activity was recorded across the survey area, in particular this activity was recorded along watercourses, intact hedgerows and wooded areas. A large proportion of foraging bats were recorded at:
- The River Etherow
 - Hurstclough Brook, particularly to the west of the Cricket Ground
 - Residential areas and gardens included area of trees around Old Hall Lane
 - Along wooded areas and hedgerows within the Showground
 - Carrhouse Lane and the woodland to the east
- 8.6.80 Overall, 13 key commuting and foraging areas were identified for bats which have been outlined within Figure 8.9 (TR010034/APP/6.4).
- 8.6.81 Ninety-two trees within the study area were initially identified as having potential bat roosting suitability during ground-based tree assessments in 2020. These trees were subsequently subject to further climbing surveys to confirm this and provide an updated bat roosting suitability⁸⁰. Overall, 45 trees were assessed as having bat roosting suitability (one high, 13 moderate and 31 low suitability); the remaining trees were scoped out due to having negligible bat roosting suitability. Thirty of these trees are located within the DCO boundary with the remainder being located within 50 m. Surveys of these trees did not record any bat roosting evidence and bat roosts within trees are considered to be likely absent at the time of survey.

⁸⁰ In line with Collins (2016).

- 8.6.82 Common pipistrelles are common in the area, as indicated by the local records and history of records within the Scheme, however, all bats are considered to be of conservation importance within Greater Manchester and are included as local BAP species. As updated roost surveys (structures) were not able to be undertaken during 2020 (due to COVID-19 restrictions), a precautionary approach has been formulated, taking into consideration the previous survey data and local record data and basing the impact assessment on a likely worst-case scenario. This consists of the presence of four common pipistrelle maternity roosts and nine day and/ or satellite roosts. Due to the potential presence of four maternity colonies for common pipistrelle and the importance of these roosts, roosting bats within the Scheme are considered to be of county value, using the precautionary principle.
- 8.6.83 The habitats within the Scheme are generally considered to be sub-optimal consisting of gappy and flailed hedgerows and grazed pastoral land. However, taking a combination of the 2020 and 2017 bat activity results, 11 key commuting and foraging areas were identified across the Scheme where bats were regularly recorded utilising these habitats. Taking this into consideration and in line with the criteria provided in Wray *et al.*, (2010)^{81,82}, the commuting and foraging areas within the Scheme are considered to be of local value.
- 8.6.84 Taking into consideration the highest ecological receptor, the assemblage of bats using the Scheme is considered to be of county value.

Badger

- 8.6.85 A total of 26 badger setts were found within the survey area (three main, two annexe, eight subsidiary, and 13 outlier setts). Of these, eight setts are located within the DCO boundary (one main, one annexe, one subsidiary, and five outlier setts). Six setts were located within 30 m of the DCO boundary, which is considered to be the distance within which there is a potential risk of damage or disturbance to the sett. The remaining 11 setts were all beyond 30 m from the DCO boundary.
- 8.6.86 Four setts (S3, S5, S9, and S16) were subject to bait marking surveys, following relevant guidance⁸³, to establish badger clan territories due to potentially being main setts. Locations of the setts are discussed in the confidential technical Appendix 8.2 and exact locations will not be disclosed within this report. However, a summary of the results (including territories), impacts, and mitigation will be discussed. The results indicated the following:

⁸¹ Wray *et al.*, Valuing Bats in Ecological Impact Assessment (provided within CIEEM (2010) In Practice Number 70)

⁸² Wray *et al.*, assesses the value of foraging/commuting areas through quantifying the species present, number of bats, number of confirmed/potential nearby roosts, and the foraging habitat characteristics. Through combining these variables, a geographical frame of reference is achieved.

⁸³ Delahay RJ, Brown JA, Mallinson PJ, Spyvee PD, Handoll D, Rogers LM and Cheeseman C L (2000). The use of marked bait in studies of the territorial organisation of the European badger (*Meles meles*). *Mammal Review* 30: 73-87 and HS2 Ecological Surveys: Field Survey Methods and Standards. HS2 2012).

- S3 was originally classified as a main sett due to the large number of entrance holes. However, during the bait marking and camera trapping surveys, there were very limited signs of activity with signs of only one individual using the sett during the survey period. This sett has subsequently been classified as a subsidiary sett, however, as no main sett has been recorded within the survey area, it is possible that this sett may be an abandoned main sett and may be re-colonised in the future.
- S9 was very active throughout the bait marking period. The territory covered most of the showground area from Old Hall Lane to Mottram Moor;
- S16 showed signs of active use and displayed a territory from Mottram Moor to Carrhouse Lane; and,
- S25 showed signs of continued and active use with the territory covering most of the eastern part of the Scheme from the River Etherow to approximately 200 m east of Carrhouse Lane.

8.6.87 Overall, the bait marking results indicated at least three badger clan territories (with S3 likely consisting of one lone individual) that are spread across the survey area with no recorded cross-over in territories.

8.6.88 Widespread badger activity (in the form of latrines, runs, push-throughs, and footprints) was widely recorded throughout the survey area during various field visits in 2019 and 2020. The habitats within the study area are generally suitable for badgers, through a combination of improved grassland, broadleaved woodland, and scrub habitats. Connectivity within the survey area is generally sub-optimal, with the A57 Mottram Moor Road and M67 providing a significant barrier for dispersal; this was confirmed within the bait marking survey, which indicated that badgers are not crossing the A57 Mottram Moor Road or the M67. Furthermore, Roe Cross Road, and the residential dwellings of Mottram-In-Longdendale provide a barrier for east and west movement in the north of the Scheme, which again, marked the edges of the territory of the badger clans as indicated by the bait marking results.

8.6.89 Badgers are common and widespread within Tameside and Derbyshire and the UK, and not included as a priority species in the UK. However, due to their status and the legal requirements⁸⁴, the badger population is considered to be of local value.

Birds (excluding barn owl)

8.6.90 The 2020 bird survey recorded twenty-five notable bird species^{85/86} were observed within the study area, which included: black-headed gull, bullfinch, curlew, dipper, dunnoek, goosander, grasshopper warbler, grey heron, grey wagtail, house martin, house sparrow, kestrel, lapwing, lesser black-backed gull, linnet, mistle thrush, reed bunting, sand martin, snipe, song thrush, starling, stock dove, swift, tawny owl, and willow warbler. In addition to the above, further

⁸⁴ Badgers are protected under the Protection of Badgers Act 1992 <https://www.legislation.gov.uk/ukpga/1992/51/contents>

⁸⁵ Including S41 species and those listed as a Bird of Conservation Concern (amber and red only).

<https://www.rspb.org.uk/globalassets/downloads/documents/conservation--sustainability/safeguarding/birds-of-conservation-concern-4.pdf>

⁸⁶ Considered a 'rare or scarce breeder' within GMEU (2016) Greater Manchester Sites of Biological Importance Selection Guidelines or in the Greater Manchester Local Biodiversity Action Plan (LBAP) or the Peak District LBAP.

species of nature conservation importance, including meadow pipit and skylark have been recorded on site during the 2017 breeding bird surveys.

- 8.6.91 The following notable species have been confirmed as breeding within the survey area: dunnock, grasshopper warbler, house sparrow, reed bunting, starling, song thrush, and willow warbler. Bullfinch and mistle thrush have been identified as probable breeders.
- 8.6.92 Suitable nesting habitat for kingfishers, involving stone-free sandy soil suitable for excavating a nest burrow in riverbanks was recorded along the banks of the River Etherow in the eastern part of the Scheme. No kingfishers were recorded, or nests found, during the course of the surveys and they are considered likely absent.
- 8.6.93 Due to the presence of breeding lowland scrub and damp grassland species such as grasshopper warbler, willow warbler, and reed bunting, as well as pre-breeding populations of curlew, 'lowland scrub/damp grassland species' is taken forward as a separate ecological feature. In accordance with the Greater Manchester SBI Selection Guidelines⁹⁹ which highlight that grasshopper warblers are a 'scare breeder' in Greater Manchester and therefore of county importance, lowland scrub/damp grassland assemblage is considered to be of county importance (taking into consideration the highest ecological value).
- 8.6.94 Considering the presence of the general breeding and potential breeding bird population within the Scheme, the 'general breeding bird assemblage' is taken forward as a separate ecological feature. This includes several aforementioned species that are included on the BoCC (Amber and Red List), UKHAP, and priority species. In accordance with DMRB LA108, these species are also considered to appreciably enrich the habitat resource within the local context. The 'general breeding bird assemblage' is considered to be of local value.

Barn owls

- 8.6.95 Previous barn owl surveys undertaken in 2017, recorded a single barn owl roosting approximately 120 m south of the DCO boundary within Carrhouse Farm.
- 8.6.96 In 2020 evidence of breeding barn owls was recorded within Grange Farm (approximately 40 m north of the M67 Junction 4) within a purpose-built barn owl box. An incidental sighting of a foraging barn owl was observed during bat activity surveys in September 2020 within an arable field immediately west of Carrhouse Lane.
- 8.6.97 It is estimated that there are at least two breeding pairs within the survey area. Due to the declining nature of barn owls, and the estimated presence of 4,000-14,000 breeding pairs in the UK⁸⁷, they are considered to be of county value.

⁸⁷ Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 113: 69–104.

Otter

- 8.6.98 No records of otter were returned from the desk study within the last ten years.
- 8.6.99 Of the 15 watercourses screened in for survey, two were assessed as having high suitability, six as low suitability, and seven were unsuitable for otter. Of the 15 water bodies screened in for survey, three were assessed as having low suitability and seven assessed as unsuitable for use by otter. A further five water bodies could not be accessed due to being located within residential gardens, however, they are considered unlikely to contain natal holts, due to the small sizes and being located within small residential gardens.
- 8.6.100 During the field survey, five otter spraints in two locations were identified along Glossop Brook (WC_400), one location which had two recent spraints and a second location had two recent spraint and one old spraint. No otter resting sites were recorded within the survey area.
- 8.6.101 Based on the results of the survey and desktop search, it is considered likely that otters are using the stretch of the River Etherow (WC_100) and surrounding tributaries (both Glossop Brook WC_400 and Tara Brook WC_200) within the survey area for commuting, foraging, shelter, and resting.
- 8.6.102 Other water bodies and watercourses within the DCO boundary were considered sub-optimal for otter due to their smaller size, however, they may be occasionally used for commuting.
- 8.6.103 Otter populations have continually increased over the last 25 years and their range is expanding in England. Otters can now be considered ubiquitous, occupying sites in urban areas and in highly disturbed waterways. Given this, the otter population using the River Etherow and surrounding tributaries is considered to be of local value.

Water vole

- 8.6.104 No records of water vole were returned from the data search within the last ten years.
- 8.6.105 Previous surveys in 2017 identified the presence of water vole on the River Etherow, and Tara Brook associated with Mottram Moor Farm (outside of the DCO boundary).
- 8.6.106 Updated surveys in April and September 2020, found no evidence of water vole on any watercourses within the survey area including the locations where presence had previously been recorded. It is unclear as to the reasoning for the absence of this species, however, anecdotal evidence of mink⁸⁸ and poor aquatic connectivity to the wider environment may have negatively impacted this species.

⁸⁸ Personal communication with local farmer.

8.6.107 Water vole populations are widespread and locally common in Greater Manchester, although populations are often fragmented and susceptible to local extinctions. Water vole are both a Local and a UK Biodiversity Action Plan species and as such the water vole population (if present) would be considered to be of county importance. However, due to the likely local extinction of the water vole population within the survey area, they have been scoped out of further assessment. Enhancement measures could be implemented in order to improve habitats on site in the event that water voles are able to re-colonise in future years and these are outlined within Section 8.9.

Priority species (mammal)

8.6.108 Records of hedgehog and brown hare, which are listed as S41 priority species, were returned from the data search with the closest being 950 m from the DCO boundary for hedgehog and 1.5 km from the DCO boundary for brown hare. The habitats within the survey area are broadly suitable for these species and one incidental sighting of brown hare was recorded during the extended Phase 1 habitat survey in 2019. No sightings of hedgehog have been recorded during the various surveys however, hedgehogs are considered likely to be present due to the good terrestrial connectivity to the wider landscape and suitable habitat within the survey area.

8.6.109 Brown hares are a local and national priority species due to declines over the past 50 years. Hedgehogs are a priority species and subject to national declines⁸⁹. It is considered that priority species (mammals) are of local value.

Common toad

8.6.110 A single record of common toad, a S41 priority species, was recorded approximately 960 m south-east of the DCO boundary. However, nine water bodies (P1, P3, P7, P16, P19, P20, P21, P26, and P29) within the DCO boundary were recorded as having common toad presence during the 2017 great crested newt (GCN) surveys, including three water bodies where evidence of breeding was recorded (P7, P21, and P29), through the presence of common toad tadpoles. The habitats within the survey area were suitable for foraging, commuting and refuge as they included combinations of broadleaved woodland, improved grassland and wetland areas.

8.6.111 Common toad is a priority species in the UK and has declined continuously since the 1980s⁹⁰. Common toads are rare in Tameside⁹¹ and more generally around the foothills of the Peak District National Park. The common toad population within the Scheme is considered to be of local value.

⁸⁹ The state of Britain's Hedgehogs 2018. Emily Wilson and David Wembridge. British Hedgehog Preservation Society.

⁹⁰ Petrovan, S., Schmidt, B. R., (2016) Volunteer Conservation Action Data Reveals Large-Scale and Long-Term Negative Population Trends of a Widespread Amphibian, the Common Toad (*Bufo bufo*). Plos One.

⁹¹ Grayson *et al.*, (1991) Atlas of the Amphibians of Greater Manchester County and New Criteria for Appraising UK Amphibian Sites.

Non-native invasive species

8.6.112 The following non-native species were recorded on-site:

- A large area of Japanese knotweed was present north-east of Tara Brook Farm and the northern embankment of the M67 Junction 4. Patches of Japanese knotweed were also present along the River Etherow
- Himalayan balsam was widespread throughout the Scheme predominantly along watercourses including the River Etherow. A large area was also present adjacent to Carr House Farm
- Variegated yellow archangel and cotoneaster was recorded along with woodland belt along Old Hall Lane
- Evidence of signal crayfish was recorded along the River Etherow and associated tributaries during the otter and water vole survey.

Receptors Scoped in and out of the Assessment

8.6.113 Further to the Environmental Scoping Report (ESR) (TR010034/APP/6.6) that was submitted to the Planning Inspectorate in November 2017, a Preliminary Environmental Information Report (PEIR) was published to inform each of the statutory consultation events in November and December 2020. This PEIR included the proposed scope of the Biodiversity assessment, outlined the work which had been completed to date, set out the receptors which were proposed to be scoped in and out of the assessment, and outlined the additional work required for inclusion within the ES.

8.6.114 Based on the data obtained through desk studies, previous surveys, and updated habitat and species surveys, it is considered likely that several species or species groups are absent from the study area, are unlikely to be subject to significant impacts, or are of less than local value and can, therefore, be scoped out of further assessment. These are outlined in Table 8-13.

Table 8-13 – Receptors scoped out of the assessment

Receptor	Justification for Scoping Out
South Pennine Moors SAC & Peak District Moors (South Pennine Moors Phase 1) SPA	<p>The SAC and SPA share the same boundary and at their nearest point are located approximately 2.2 km north-east of the DCO boundary. Two of their Impact Risk Zones (IRZs) encompass the Scheme; however, road proposals do not fall into any of the categories listed as likely to cause significant adverse impact at this distance.</p> <p>Nevertheless, the Scheme’s Affected Road Network (ARN) extends along the A57 Snake Road and is adjacent or in close proximity to the SAC and SPA.</p> <p>DMRB LA 105 (para 2.97 to 2.102) provides designated habitat screening criteria for determining the need for further consideration of the impacts of nitrogen deposition. The designated habitat screening criteria are considered to be exceeded where a) total nitrogen deposition is greater than the relevant critical load, and b) the change in nitrogen deposition is both greater than 1% of the relevant critical load and is greater than 0.4 kg N/ha/yr. Traffic modelling has been undertaken, as outlined in Chapter 5: Air quality Chapter 2: Description of the Scheme which has concluded there are no exceedances of the DMRB LA 105 N dep screening criteria at any SAC or SPA (total n dep >CL, n dep change > 1% CL, n dep</p>

	<p>change > 0.4 kg/N/ha/yr), therefore, the change can be considered not to be significant at all European and international sites within the study area. The Scheme does not impact any functionally-linked land for the SPA.</p> <p>Other effects linked to traffic such as noise disturbance and the collision of vehicles with birds are considered unlikely to result in significant effects due to these being existing roads already with a high level of use.</p> <p>Potential effects on these European sites are assessed within a separate Habitats Regulations Assessment Screening Report (HRA) (TR010034/APP/5.3). The report concludes that the Scheme is unlikely to result in any likely significant effects.</p>
<p>Dark Peak SSSI Eastern Peak District Moors SSSI Huddersfield Narrow Canal SSSI</p>	<p>The Dark Peak SSSI underpins the South Pennine Moors SAC and Peak District Moors (South Pennine Moors Phase 1) SPA, however, the SSSI citation includes a greater number of habitats and species (than the SAC and SPA, respectively; separated into vegetation, birds and invertebrates categories).</p> <p>Traffic modelling has been undertaken, as outlined in the Chapter 5: Air Quality which has concluded there are no exceedances of the DMRB LA 105 N dep screening criteria at any SSSI (total n dep >CL, n dep change > 1% CL, n dep change > 0.4 kg/N/ha/yr), therefore, the change can be considered not to be significant at all national sites within the study area.</p> <p>The Scheme will not result in the direct loss of any habitats the SSSIs, and subsequently, is not considered likely to impact upon any of the species. Therefore, any impacts upon SSSIs have been scoped out of this assessment.</p>
<p>Local Nature Reserves as outlined within Table 8-9.</p>	<p>Hurst Clough LNR and Great Wood LNR are situated sufficiently far from the Scheme (approximately 350 m south) and separated by natural and anthropogenic barriers (including major roads, residential properties, and commercial buildings) that it is not considered there will be any direct impact pathways.</p> <p>Hurst Clough LNR (and SBI) is hydrologically connected to the Scheme via Hurstclough Brook, which is a tributary leading into the River Etherow. The LNR is important for non-aquatic receptors (ancient semi-natural woodland habitat, bryophytes, and fungi) which are not considered to be impacted. However, any impacts upon the water course would be safeguarded via standard best practice measures (as outlined within Section 8.8).</p> <p>Traffic modelling has been undertaken, as outlined within the Air quality chapter (Chapter 5) and the description of the Scheme chapter (Chapter 2) Chapter 5: Air Quality, which has concluded there are no exceedances of the DMRB LA 105 N dep screening criteria at any LNR (total n dep >CL, n dep change > 1% CL, n dep change > 0.4 kg/N/ha/yr), therefore, the change can be considered not to be significant at all identified LNRs within the study area.</p>
<p>Non-statutory designated sites (including LWS and SBIs as outlined with Table 8-10 and the Dark Peak NIA.</p>	<p>Due to the nature of the designations, and because these sites are situated sufficiently far from the Scheme, it is not considered that there would be any direct impact pathways. This includes fugitive dust emissions, light pollution, noise and vibration pollution, visual disturbance, accidental spillage(s) and increased sedimentation through earthworks.</p> <p>Hurst Clough SBI is hydrologically connected to the Scheme via Hurstclough Brook, which is a tributary leading into the River Etherow. The SBI is important for non-aquatic receptors (ancient semi-natural woodland habitat). However, any impacts upon the water course would be safeguarded via standard best practice measures (as outlined within Section 8.8).</p>

	<p>DMRB LA 105 (para 2.97 to 2.102) provides designated habitat screening criteria for determining the need for further consideration of the impacts of nitrogen deposition. The designated habitat screening criteria are considered to be exceeded where a) total nitrogen deposition is greater than the relevant critical load, and b) the change in nitrogen deposition is both greater than 1% of the relevant critical load and is greater than 0.4 kg N/ha/yr. As a precautionary approach, screening against the DMRB LA 105 designated habitat screening criteria was undertaken assuming a “woodland” habitat was present as there is a higher conversion rate of NO₂ concentrations to nitrogen deposition for “woodland” habitat⁹². Changes to nitrogen deposition exceeding the DMRB LA 105 designated habitat screening criteria and with a magnitude of change of the nitrogen deposition greater than 0.4 kg N/ha/yr were identified in small areas at the boundary of the following four non-statutory designated sites:</p> <ul style="list-style-type: none"> • Dark Peak NIA • Melandra Castle and Railway LWS • Peak Forest Canal North SBI • Shire Hill Ancient Woodland <p>Subsequently, further investigation by a ‘competent biodiversity expert’ (in line with DMRB LA 105) was undertaken. Following detailed site investigation by the competent biodiversity expert, two of the sites were not considered to have relevant woodland habitats sensitive to nitrogen deposition within the area of exceedance of the designated habitat screening criteria (Dark Peak NIA and Peak Forest Canal North SBI) and were subsequently scoped out. Two sites were considered for further investigation by the competent biodiversity expert (Melandra Castle and Rail LWS, and Shire Hill Ancient Woodland). However, any potential impacts have been screened out due to the area impacted not containing habitat reflective of the habitat citation, habitat not susceptible to increases in nitrogen deposition, or affecting a comparatively small area of short duration (<8 years, due to modelled vehicle emissions becoming greener in future years).</p> <p>Further detailed assessment is provided in Appendix 8.4 (TR010034/APP/6.6) with regard to impacts arising from air quality upon designated habitats.</p>
<p>Ancient Woodland and ancient, veteran, and notable trees.</p>	<p>The Scheme would not result in any loss of Ancient Woodland, nor cause any disturbance through impacting root protection zones due to the nearest Ancient Woodland being located more than 500 m from the DCO boundary. The Scheme is unlikely to cause any increased footfall within any Ancient Woodland. Due to the distance from the DCO boundary (>500 m), it is not considered that the Scheme would have any detrimental impacts upon any areas of Ancient Woodland and have therefore been scoped out of this assessment.</p> <p>The Scheme would not result in the loss of any ancient, veteran, or notable trees. The nearest tree (approximately 125 m from the DCO boundary) is located sufficiently far away from the Scheme to ensure there would be no impacts to any root protection zones. Therefore, any impacts upon these features have been scoped out of this assessment.</p> <p>A potentially significant impact was identified upon Shire Hill Ancient Woodland due to exceedances of the LA 105 nitrogen deposition screening criteria (as outlined above). A limited proportion of the designated habitat would be affected (0.1 ha potentially impacted, which is 0.4% of total Ancient Woodland area). Any subtle effects that do occur are not predicted to compromise the integrity or key features of the designated habitats. Whilst taking a precautionary view based on the</p>

⁹² Caporn, S., Field, C., Payne, R., Dise, N., Britton, A., Emmett, B., Jones, L., Phoenix, G., S Power, S., Sheppard, L. & Stevens, C. 2016. Assessing the effects of small increments of atmospheric nitrogen deposition (above the critical load) on seminatural habitats of conservation importance. Natural England Commissioned Reports, Number 210.

	<p>'Restore' approach (in the absence of information to determine an air quality attribute), in accordance with DMRB LA 108, it is considered that the Scheme would result in a negligible adverse impact on Shire Hill Ancient Woodland, leading to a neutral effect (not significant).</p> <p>Further detailed assessment is provided in Appendix 8.4 (TR010034/APP/6.6) with regard to impacts arising from air quality upon designated habitats.</p>
<p>Priority habitats outside of the DCO boundary</p>	<p>Traditional orchard: One small area was identified on Magic Map within an urban area directly adjacent to Mottram Moor Road and surrounded by residential properties to the east and west. This area has been classified as S41 priority habitat with low confidence and appeared to contain typical garden habitat during walkover surveys conducted in September 2020. Due to this area not containing any clear area of traditional orchard, any potential impacts have been scoped out. Two further areas were located approximately 65 m and 235 m from the Scheme, however, as the area is situated sufficiently far from the Scheme, it is not considered that there would be any direct impact pathways.</p>
<p>Wintering birds</p>	<p>The Scheme is not located within close proximity (within 2 km) to any SPAs designated for important assemblages of wintering birds and it is not considered likely that the habitats within the DCO boundary would be used as functionally linked habitat to such sites. The Scheme is not located in close proximity or associated with any coastal or large wetland areas that may be regularly used by wintering bird assemblages. The data search (as outlined within Table 8-3) did not return any records of important wintering bird assemblages within the study area. It is not considered that the Scheme would result in the loss of a discrete habitat features whereby habitat loss or disturbance would be significant, such as affecting a large area of wetland or large water body which is a finite resource in the wider landscape.</p> <p>An assemblage of non-breeding curlew have been recorded within the habitats within the DCO boundary early on in the year, and it is considered that they are occasionally using the habitats within the DCO boundary as a pre-breeding site on route east towards the Peak District. Mitigation for these species has been included in Section 8.9 which includes the creation of a wetland area which would provide increased habitat suitability for wintering birds. The Scheme will also see the creation of several larger water bodies that would provide enhanced habitat. These mitigation measures will provide suitable habitat for a range of wetland species, including lapwing.</p> <p>Furthermore, it is considered likely that resident bird species would use the habitats within the Scheme during the winter. Breeding bird species have been undertaken in 2020, and mitigation would be provided for the resident species, as outlined within Section 8.9. These include the creation of additional habitat (increased woodland, hedgerow, and grassland).</p> <p>Due to these reasons, any significant impacts upon wintering bird assemblages is considered unlikely and it is not considered there would be any significant effects. Therefore, this feature has been scoped out of this assessment.</p>
<p>Water vole</p>	<p>Updated water vole surveys in 2020 found no evidence of water vole within the survey area, and it is considered that they are likely absent. Whilst this is to the contrary of what was found in 2017, it is considered likely that the population recorded in 2017 has become locally extinct due to poor aquatic connectivity and predation from American mink which are known to drastically reduce water vole populations. Due to this, water vole have been scoped out of this assessment, however, embedded mitigation measures (as provided within Chapter 2) has been implemented which would provide improved habitat (such as creation of</p>

	new water bodies) and connectivity (such as culverts and crossing points) which would benefit water voles if they were to re-populate the area in future years.
White-clawed crayfish	Due to the lack of records within the study area and the presence of signal crayfish which negatively impact upon this species, it is considered highly unlikely that white-clawed crayfish are present within the Scheme. Furthermore, the use of a clear span bridge over the River Etherow removes the need to modify the existing river habitat through in-channel works. Therefore, white-clawed crayfish have been scoped out of this assessment.
Terrestrial invertebrates	No notable terrestrial invertebrates were recorded during the targeted surveys in 2001 ⁹³ , and suitable habitats within the survey area are of limited extent, likely only to support an invertebrate assemblage typical of the region. Furthermore, no notable assemblages were indicated through the data search with GMLRC, DBRC, or Derbyshire and Nottinghamshire Entomological Society. The habitats within the Scheme haven't changed significantly since the original assessment and are, therefore, scoped out of this assessment.
Great crested newts (GCN)	No GCN presence was recorded during targeted eDNA surveys of all suitable water bodies during 2017. No new water bodies have been constructed or existing water bodies changed significantly since the 2017 surveys and no new records have been identified during the desk study undertaken in 2020. The 2017 surveys were substantial and included all ponds within 500 m of the Scheme boundary. It is considered unlikely that GCN would be able to colonise from the surrounding area (i.e. beyond 500 m) due to the poor wider connectivity to the east and west of the Scheme (which includes the urban area of Manchester and Glossop, respectively), and the more unsuitable habitats to the east (which consists of more acidic upland habitats towards the Peak District which GCN are largely absent). No records were returned within 2 km of the Scheme boundary from GMBRC and DBRC, and no records were returned from any Natural England class licence returns, GCN pond surveys 2017-2019, or any GCN granted European Protected Species licences ⁹⁴ . Overall, GCN are considered to be likely absent within the locality. Subsequently, despite the latest survey data being four seasons old, it is considered unlikely that GCN are present on site and have been scoped out of further assessment.
Hazel dormouse	Due to the lack of records and geographical location of the Scheme, which is outside of any known populations, hazel dormouse is considered unlikely to be present on site.
Reptiles	No reptiles were recorded during the targeted surveys in 2017, and the habitats within the Scheme have not changed significantly since these surveys. Therefore, they are considered unlikely to be present on Site, however, it is considered possible that low numbers of grass snake may occasionally use the site for commuting or foraging. Embedded mitigation will be implemented via standard best practice measures as outlined within Chapter 2 in order to adhere to the relevant legislation ⁹⁵ .
Protected and notable plants (including fungi)	The study area supports a restricted diversity and distribution of protected and notable plants (including fungi), limited to widespread presence of bluebell within woodlands (recorded by Hyder 2007). The habitats have not changed significantly in recent years and no records were returned from the desk study.

⁹³ Hyder (2007a). A57/A628 Mottram – Tintwistle Bypass and A628/A616 Route Restraint Measures Environmental Statement. Volume 2A. Report no: 7551- NH50845-NHR-01; 9 February 2007.

⁹⁴ Utilising <https://magic.defra.gov.uk/magicmap.aspx> [Accessed 23/04/2021]

⁹⁵ Widespread reptile species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (As amended) from intentional killing and injuring.

Other habitats as outlined within Section 8.6	<p>These habitats are abundant throughout Greater Manchester and Derbyshire, ubiquitous across the UK and are considered to be of less than local value (that is of value within the Scheme area only) and are scoped out of further assessment as any potential impacts on these habitats are unlikely to be significant.</p> <p>However, the loss of these habitats has been included within the Biodiversity Metric as outlined within Appendix 8.1 (TR010034/APP/6.5).</p>
---	--

8.6.115 The features that have been scoped into the assessment are provided within Table 8-14.

Table 8-14 - Nature Conservation Value of resources in relation to the Scheme

Receptor/resources Value (in the context of the Scheme)	Value (in the context of the Scheme)	Justification
Lowland mixed deciduous woodland	Local	Lowland mixed deciduous woodland is widespread within Greater Manchester, gradually becoming sparser towards the Peak District National Park. Lowland mixed deciduous woodland is a priority habitat within the UK and in line with DMRB LA 108, is classed as being of national value. However, due to the smaller and more fragmented examples found within the DCO boundary, the assemblage of lowland mixed deciduous woodland within the DCO boundary is considered to be of local value.
Wet woodland	Local	In line with DMRB LA 108, wet woodland is classed as being of national value as it is a priority habitat. However, due to the small (0.1 ha) and fragmented area found within the Scheme, the wet woodland is considered to be of local value.
Lowland dry acid grassland	County	In line with DMRB LA 108, lowland dry acid grassland is classed as being of national value as it is a priority habitat. However, due to the limited and fragmented areas found within the Scheme, lowland dry acid grassland is considered to be of county value.
Hedgerows	Local	In line with DMRB LA 108 hedgerows are classed as being of national value as they are a priority habitat. As the hedgerows on site are predominantly heavily managed, species-poor and gappy, it is considered that the hedgerows on site are of local value.
Flood plain mire	Local	The narrow flood plain is underlain by wet mineral soils and is not a peatland fen system. Therefore, despite the presence of flood-plain fen vegetation, the vegetation does not conform to the JNCC UK BAP priority habitat description of lowland fen ⁹⁶ , which states that lowland fens are peatlands, and therefore it would not be considered to be a priority habitat nor an irreplaceable habitat as listed in the National Planning Policy Framework (NPPF) 2019. Whilst not conforming to S41 priority habitat 'lowland fen', it enriches the

⁹⁶ <https://data.jncc.gov.uk/data/6fe22f18-fff7-4974-b333-03b0ad819b88/UKBAP-BAPHabitats-27-LowlandFens.pdf>

		habitat resource within the local context and is, therefore, considered to be of local value.
Watercourses (main rivers - River Etherow)	Regional (Table 8-11)	The River Etherow (WC_100) is a mainstem river, providing principal aquatic habitat connectivity for fish and other aquatic species throughout the region and is therefore considered to be of regional value.
Watercourses (ordinary watercourses)	Local (Table 8-11)	The ordinary watercourses within the study area provide important aquatic linear corridors within the local agricultural landscape, offering habitat complexity and opportunities for species dispersal and is considered to be of local value.
Standing water bodies (ponds P2, P5, P7 and P30)	Local (see Table 8-12)	Despite only supporting a limited range of aquatic flora and fauna, collectively these ponds add habitat complexity within the local landscape and is considered to be of local value.
Bats	County	<p>Due to the potential presence of four maternity colonies for common pipistrelle and the importance of these roosts, roosting bats within the Scheme are considered to be of county value, using the precautionary principle.</p> <p>Four species of bat were recorded using the site including common pipistrelle, soprano pipistrelle myotis species, and noctule. The habitats within the scheme are considered to be generally sub-optimal consisting of gappy and flailed hedgerows and grazed pastoral land. However, 13 key commuting and foraging areas were identified across the Scheme where bats were regularly recorded utilising these habitats. Taking this into consideration and in line with the criteria provided in Wray <i>et al.</i>, (2010)⁹⁷, the commuting and foraging areas within the Scheme are considered to be of local value.</p> <p>Taking into consideration the highest ecological receptor, the assemblage of bats using the Scheme is considered to be of county value.</p>
Badgers	Local	Badgers are common and widespread within Tameside and Derbyshire and the UK, and not included as a priority species in the UK. However, due to their status and the legal requirements, the badger population is considered to be of local value.
General bird assemblage	Local	Considering the presence of breeding notable species such as dunnock (Amber List BoCC, SPI, UKBAP), house sparrow (Red List BoCC, SPI, UKBAP), and starling (Red List BoCC, SPI) the general breeding bird assemblage is taken forward as separate ecological feature. The general bird assemblage is considered to be of local value.
Barn owl	County	It is estimated that there are at least two breeding pairs within the survey area. Due to the declining nature of barn owls, and the estimated presence of 4,000-14,000 breeding pairs in the UK ⁹⁸ , they are considered to be of county value.
Lowland scrub and grassland species	County	Furthermore, due to the presence of lowland scrub and damp grassland species such as grasshopper warbler

⁹⁷ Wray *et al.*, Valuing Bats in Ecological Impact Assessment (provided within CIEEM (2010) In Practice Number 70)

⁹⁸ Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 113: 69–104.

(including grasshopper warbler)		(scarce breeder in Greater Manchester ⁹⁹ , Red List BoCC, and UKBAP) and reed bunting, lowland scrub/damp grassland species is taken forward as a separate ecological feature. Lowland scrub and damp grassland bird species are considered to be of county value.
Otters	Local	Otter populations have continually increased over the last 25 years and their range is expanding in England. Otters can now be considered ubiquitous, occupying sites in urban areas and in highly disturbed waterways. Given this, the otter population using the River Etherow and surrounding tributaries is considered to be of local value.
Priority species (mammals)	Local	Brown hares are a local and national priority species due to declines over the past 50 years. Hedgehogs are a priority species and subject to national declines ¹⁰⁰ . It is considered that priority species (mammals) are of local value.
Common toad	Local	Common toad is a priority species in the UK and has declined continuously since the 1980s ¹⁰¹ . Common toads are rare in Tameside ¹⁰² and more generally around the foothills of the Peak District. The common toad population within the Scheme is considered to be of local value.

Future Baseline

- 8.6.116 The survey area predominantly consists of intensively managed pastoral fields with clear field boundaries which would be subject to routine agricultural practices. This includes the majority of the bordering hedgerows, which have been managed consistently over previous years. Aside from the variation due to these practices, it is considered unlikely that these habitats within the survey area would vary substantially prior to construction. This is supported by historic information available from the various ecological surveys undertaken in 2007 and 2017/2018 which report similar habitats to those recorded in 2020.
- 8.6.117 Outside of the pastoral areas, it is anticipated that non-native invasive species such as Himalayan balsam and Japanese knotweed which are present along habitats such as woodland, hedgerows and watercourses (including the River Etherow) may continue to spread and gradually reduce species diversity.
- 8.6.118 It is likely that mobile species (such as badgers and otters) may change their distribution around the site, including through the creation of new badger setts, or the presence of new resting places along the River Etherow. However, it is not considered that the future baseline would change significantly from the existing baseline (with regards to population status and value) prior to construction and or operation.
- 8.6.119 Overall, it is considered unlikely that the status or distribution of ecological receptors within the survey area would vary to an extent which would

⁹⁹ GMEU (2016) Greater Manchester Sites of Biological Importance Selection Guidelines

¹⁰⁰ The state of Britain's Hedgehogs 2018. Emily Wilson and David Wembridge. British Hedgehog Preservation Society.

¹⁰¹ Petrovan. S., Schmidt, B. R., (2016) Volunteer Conservation Action Data Reveals Large-Scale and Long-Term Negative Population Trends of a Widespread Amphibian, the Common Toad (*Bufo bufo*). Plos One.

¹⁰² Grayson *et al.*, (1991) Atlas of the Amphibians of Greater Manchester County and New Criteria for Appraising UK Amphibian Sites.

significantly alter conclusions drawn in this assessment prior to construction and or operation. Similarly, it is considered unlikely that additional ecological receptors not currently considered in this assessment would vary to the extent that significant impacts upon them would be likely.

- 8.6.120 Whilst it is anticipated that other baseline receptors would remain unchanged, further species-specific surveys would be undertaken prior to construction to ensure that the proposed mitigation remains valid in the event that minor changes would occur.

8.7 Potential Impacts

Lowland mixed deciduous woodland

Effects during construction

- 8.7.1 Potential effects include permanent physical loss, damage and fragmentation of approximately 0.7 ha of broadleaved woodland located within the DCO boundary. There would also be potential for habitat damage and/ or degradation to arise during construction in the form of dust deposition and chemical pollution.

Effects during operation

- 8.7.2 There is potential for habitat degradation and/ or pollution via road drainage, fragmentation, run-off, de-icing salts, spray from road traffic, and air pollution (primarily nitrogen deposition).

Wet Woodland

Effects during construction

- 8.7.3 Potential effects include permanent physical loss of approximately 0.1 ha of wet woodland located within the DCO boundary. There would also be potential for habitat damage and/ or degradation to arise during construction in the form of dust deposition and air pollution.

Effects during operation

- 8.7.4 There is potential for habitat degradation and/ or pollution via road drainage, fragmentation, run-off, de-icing salts, spray from road traffic, and air pollution (primarily nitrogen deposition).

Lowland dry acid grassland

Effects during construction

- 8.7.5 Potential effects include permanent physical loss, damage and fragmentation of approximately 0.3 ha of lowland dry acid grassland within the DCO boundary.

Effects during operation

- 8.7.6 There is potential for habitat degradation and/ or pollution via road drainage, fragmentation, run-off, de-icing salts, spray from road traffic, and air pollution (primarily nitrogen deposition).

Hedgerows

Effects during construction

- 8.7.7 Potential effects include permanent physical loss, damage and fragmentation of 28 hedgerows measuring approximately 2,073 m in length. There would also be potential for habitat damage/ degradation to arise during construction in the form of dust deposition and air pollution.

Effects during operation

- 8.7.8 There is potential for habitat degradation and/ or pollution via road drainage, fragmentation, run-off, de-icing salts, spray from road traffic, and air pollution (primarily nitrogen deposition).

Flood plain mire

Effects during construction

- 8.7.9 Potential effects include permanent physical loss, damage and fragmentation of approximately 0.3 ha of flood plain mire habitat within the DCO boundary. There would also be potential for habitat damage/ degradation to arise during construction in the form of dust deposition and air pollution.

Effects during operation

- 8.7.10 There is potential for habitat degradation and/or pollution via road drainage, fragmentation, run-off, de-icing salts, spray from road traffic, and air pollution (primarily nitrogen deposition).

Watercourses

Effects during construction

- 8.7.11 There is potential for effects to the River Etherow (WC_100) resulting from the proposed River Etherow Bridge and bank lowering associated with flood storage compensation. Potential effects include the permanent loss of mature riparian trees and the temporary loss of riparian habitat under the structure (deck width approximately 18 m) and within the working corridor. Whilst no in-channel habitat loss is anticipated, there is the potential for noise, vibration and visual disturbance to fish during piling and other construction activities.
- 8.7.12 There is potential for effects from permanent shading of habitats of the River Etherow from the River Etherow Bridge deck, altering vegetation composition both within the river channel and riparian corridor.
- 8.7.13 Further effects to the River Etherow associated with localised disturbance to the riparian zone and loss of bankside habitat due to construction of a new drainage outfall, resulting in approximately 10 m of riparian habitat loss.
- 8.7.14 Potential effects to the Tara Brook (WC_200) result from the requirement to realign 304 m of watercourse which is positioned under the footprint of the Mottram Moor Junction and associated drainage design. The proposed

realignment is *circa* 427 m long comprising 322 m of new open channel and two new culverts totalling 105 m.

- 8.7.15 Fragmentation of habitat will occur from the introduction of the two new culverts (72 m and 33 m in length) within the realigned channel, however this will not alter the overall habitat function of the watercourse given the watercourse in this location is not suitable for fish or other migratory aquatic species.
- 8.7.16 Potential effects to the Hurstclough Brook (WC_300) will result from the realignment of 220 m of watercourse under the footprint of the Scheme. Fragmentation of habitat will occur from the introduction of a new culvert (56 m in length) within the realigned channel, however this will not alter the overall habitat function of the watercourse given the watercourse in this location is not suitable for fish or other migratory aquatic species. The new realignment will provide 220 m of open watercourse habitat.
- 8.7.17 There is potential for minor changes to the hydrology within a section (approximately 600 m) of the Hurstclough Brook as a result of the new road alignment and its associated drainage intercepting overland and sub-surface flow. Within the design, this flow is routed to a SuDS pond prior to discharge to the Hurstclough Brook approximately 600 m downstream of the new crossing (before its main river designation starts) and as such the hydrology of the downstream watercourses will not be affected. Local adjustment to the distribution of species within the section of the Hurstclough Brook that may experience changes to hydrology could occur (e.g. through an increase in vegetation cover within the channel if the feature becomes more ephemeral in nature).
- 8.7.18 There is the potential for effects on other watercourse habitats (WC_210, WC_211, WC_212, WC_213 and WC_340) comprising ditch or indistinct features through the loss of *circa* 718 m across the Scheme. A total of *circa* 2,675 m of new channel length will be created through additional drainage.
- 8.7.19 Damage to watercourse habitats and associated species may occur through dust deposition and sediment ingress associated with general construction works.

Effects during operation

- 8.7.20 There is potential for alteration to the quantity and/or quality of flow within watercourses as a result the operation of new drainage infrastructure. However, outfall rates from SuDs ponds would be restricted to existing greenfield rates and it is assumed the drainage design will meet regulatory and industry standards to ensure there are no negative effects on the water environment e.g. as assessed through the Highways England Water Risk Assessment Tool (HEWRAT) in Appendix 13.1 (TR010034/APP/6.5). As such, it is assumed that the drainage design would provide for adequate treatment, attenuation and discharge rates such that there would be no deterioration to hydro-morphology and aquatic ecology.

Standing water bodies

Effects during construction

- 8.7.21 Potential effects include physical loss of four ponds (P2, P5, P7 and P30) under the footprint of the Scheme covering a total area of approximately 600 m². There is further potential for damage to ponds lying adjacent to the Scheme. Damage to retained pond habitats may occur through dust deposition and sediment ingress associated with general construction works.

Effects during operation

- 8.7.22 No pathways for adverse effects to retained ponds adjacent to the Scheme have been identified i.e. such as those that could arise from alterations to either hydrology or chemistry.

Bats

Effects during construction

- 8.7.23 Based on a precautionary worst-case scenario, potential impacts include destruction of four maternity roosts and nine day and/ or satellite roosts for common pipistrelle. There is also potential for disturbance (from increases and changes in noise, vibration, and lighting) to five day and/ or satellite roosts for common and soprano pipistrelle roosts located within 50 m of the Scheme.
- 8.7.24 There is the potential loss and fragmentation of 11 foraging and commuting routes, as well as disturbance and degradation of habitats (including through increases of lighting, noise, and vibrations) which could cause displacement and changes in behaviour.

Effects during operation

- 8.7.25 Road lighting and visual disturbance from a more elevated and wider road may result in bats altering their use of habitat through avoidance of the road (that it becomes a partial barrier to movement), mortality through traffic collisions, or an alteration to commuting routes which may expose bats to different risks that would normally be avoided.

Badger

Effects during construction

- 8.7.26 There is one main badger sett within the DCO boundary and two in close proximity whose territories overlap with the Scheme. In total, eight setts located within the DCO boundary would be directly lost and would require closure. There are six further setts within 30 m of the DCO boundary which may be either directly impacted (through use of machinery in close proximity) or disturbed to an extent that would require closure.
- 8.7.27 Potential effects include habitat fragmentation, loss of foraging habitat, disturbance (such as increases or changes in noise, vibration, and lighting) and death or injury of individuals from construction related hazards (such as collision with construction vehicles, entrapment in excavations, etc).

Effects during operation

- 8.7.28 Impacts from an increase in noise and lighting on commuting and foraging behaviour. Increased road mortality through the creation of the new highway and potential fragmentation due to partial barriers to movement.

General bird assemblage

Effects during construction

- 8.7.29 Potential impacts include habitat loss, severance, fragmentation, mortality, injury and disturbance whilst breeding, foraging, and commuting. Increased visual (including light pollution) or noise disturbances during the construction phase could also cause displacement and changes in behaviour.

Effects during operation

- 8.7.30 Road lighting and visual disturbance from a more elevated and wider road may result in birds altering their use of habitat through avoidance of the road (that it becomes a partial barrier to movement), mortality through traffic collisions, or an alteration to commuting routes which may expose birds to different risks that would normally be avoided.

Barn Owl

Effects during construction

- 8.7.31 Potential impacts include habitat loss, severance, fragmentation, mortality, injury and disturbance whilst breeding, foraging, and commuting. Increased visual (including light pollution) or noise disturbances during the construction phase could also cause displacement and changes in behaviour.

Effects during operation

- 8.7.32 Road lighting and visual disturbance from a more elevated and wider road may result in barn owl altering their use of habitat through avoidance of the road (that it becomes a partial barrier to movement), mortality through traffic collisions, or an alteration to commuting routes which may expose barn owl to different risks that would normally be avoided.

Lowland scrub and lowland damp grassland species (including grasshopper warbler)

Effects during construction

- 8.7.33 Potential impacts include loss and severance of 6.3 ha of marshy grassland and 0.1 ha of wet woodland used for foraging and breeding.
- 8.7.34 There is a risk of mortality, injury and disturbance whilst breeding, foraging, and commuting during the constructional period. Increased visual (including light pollution) or noise disturbances during the construction phase could also cause displacement and changes in behaviour.

Effects during operation

- 8.7.35 Road lighting and visual disturbance from a more elevated and wider road may result in birds altering their use of habitat through avoidance of the road (that it becomes a partial barrier to movement), mortality through traffic collisions, or an alteration to commuting routes which may expose birds to different risks that would normally be avoided.

Otter

Effects during construction

- 8.7.36 The River Etherow is known to support commuting otter and approximately 150 m of the River extends within the DCO boundary. Potential effects include the potential for disturbance of foraging and commuting otters (such as noise, vibration, light and water pollution) and death or injury of individuals from construction related hazards (such as collision with construction vehicles, entrapment in excavations, etc). As a clear span bridge would be utilised, there would be no permanent loss of bankside habitat, however, changes in bankside vegetation composition under the bridge may occur due to an increase in shading. Minor works are proposed to a 50 m section of the River Etherow just west of Brookfield Road for a proposed outfall for highway drainage.

Effects during operation

- 8.7.37 There is potential for polluted road run-off affecting the water environment and for impacts through traffic noise and road lighting. There is also potential for increased risk of traffic collision.

Priority species (hedgehog and brown hare)

Effects during construction

- 8.7.38 Direct mortality during vegetation removal and site clearance using machinery. Leverets (young hare) would be particularly susceptible as they are left alone in forms during the day and may be reluctant to move from their places of refuge. There is also the potential for hares and hedgehogs to be killed through becoming trapped in excavations and construction equipment or from collision with construction vehicles. Clearance of wood or vegetation piles may result in killing and injuring of resting and hibernating hedgehogs. Works associated with the construction of the Scheme would also result in permanent loss and fragmentation of foraging habitat and disturbance (such as noise, vibration, light and chemical pollution).

Effects during operation

- 8.7.39 Increased risk of collision with traffic and habitat fragmentation. There is also potential for disturbance as a result of an increase in road noise, traffic movements and lighting at night which could cause changes in foraging and commuting behaviour.

Common toad

Effects during construction

- 8.7.40 Direct mortality during vegetation removal and site clearance (including clearance of wood, rubble, or vegetation piles) using machinery. There is also the potential for common toad to be killed through becoming trapped in excavations and construction equipment or from collision with construction vehicles. Works associated with the construction of the Scheme would also result in permanent loss and fragmentation of foraging habitat. Loss of breeding habitat through reduction of three water bodies that support common toad.

Effects during operation

- 8.7.41 Increased risk of collision with traffic and habitat fragmentation. There is also potential for polluted road run-off affecting the water environment and for impacts through traffic noise and road lighting.

8.8 Design, Mitigation and Enhancement Measures

- 8.8.1 The approach to mitigation for impacts on natural conservation resources is to adhere to the mitigation hierarchy, as follows:

- Avoid – impacts are avoided through measures incorporated into the design and good working practices
- Mitigate – impacts are reduced where possible to a level that the effect on the nature conservation resource is not significant through measures implemented through the design, construction and operation phases
- Compensate – impacts that are unavoidable and where mitigation does not reduce the effect to a level that is not significant are compensated for through creation or provision of new resources, such as habitat or places of shelter for animals

- 8.8.2 Where impacts cannot be avoided, measures will be used to reduce impacts on biodiversity resources to a level where the overall effect on the resource is not significant. Any additional measures to improve the biodiversity value are considered to be enhancements. Where significant residual effects on a biodiversity resource are predicted after measures to avoid or mitigate for the impacts have been adopted, then measures to compensate for the effect are proposed to be delivered as part of the Scheme.

- 8.8.3 The compound areas (which are to be built upon areas of species-poor improved grassland) would be returned to the previous land use after decommissioning, and restored to a condition equivalent to its original, in agreement with landowners. There would be an initial 5-year maintenance period for any construction defects that arise after commissioning and opening, as well as management of environmental landscaping and planting. Most impacts would occur in the construction phase and there would be few additional impacts during operation. The latter would be limited to an initial 52-week aftercare period in land restored to agriculture, during which time problems with settlement, compaction, surface stoniness and drainage will be rectified by the appointed

Principal Contractor. The restored land would then be returned to its original owners.

Embedded mitigation

- 8.8.4 Impacts during construction would be controlled through strict adherence to the embedded mitigation measures (to avoid or prevent adverse effects) which are identified in the Environmental Management Plan (First Iteration)¹⁰³ and the Register of Environment Actions and Commitments (TR010034/APP/7.3). These would be developed using best practice techniques (such as adherence to standard pollution prevention guidance)¹⁰⁴ and would also include a suite of bespoke control measures such as avoidance and minimisation of lighting from sensitive construction areas and (if the project programme allows) scheduling the most disruptive works to avoid sensitive periods for specific species or species groups (for example, the core bird breeding season). Embedded mitigation defined within the DMRB as ‘Design measures which are integrated into a project for the purpose of minimising environmental effects’ is reported as part of the Scheme description in Chapter 2: The Scheme.

Essential Mitigation and Enhancements

Habitats

- 8.8.5 The construction of the Scheme would result in both losses and gains of habitats. The permanent habitat gains are those classified as habitats created or restored as part of the Scheme. The Scheme has been designed to achieve a net gain for area-based habitats using the Defra Biodiversity Metric 2.0 Calculation Tool¹⁰⁵. Full details are provided within Appendix 8.1 (TR010034/APP/6.5).
- 8.8.6 Table 8-15 provides a summary of all habitat losses and gains within the DCO boundary. Further details on the location and structure of the created habitats are provided in the below sections.

Table 8-15 – Notable habitat losses and gains

Existing Habitat	Habitat loss	Habitat gain	Net permanent gain
Lowland mixed deciduous woodland	0.73 ha	6.08 ha	+5.35 ha
Wet woodland	0.11 ha	0.65 ha	+0.54 ha
Lowland dry acid grassland	0.31 ha	1.64 ha	+1.33 ha
Hedgerows	3,312 m	6,000 m	+2,688 m
Flood plain mire	0.3 ha	1.13 ha	+0.83

¹⁰³ <https://www.standardsforhighways.co.uk/dmrb/search/a3a99422-41d4-4ca1-bd9e-eb89063c7134> LA 120 Environmental management plans.

¹⁰⁴ Notably Pollution Prevention Guideline (PPG) 5 for Works and Maintenance in or Near Water (Environment Agency, 2014a).

¹⁰⁵ Downloaded 13/07/2020. The Defra 2.0 metric is still in beta test version with regular updates being published.

Lowland mixed deciduous woodland

- 8.8.7 The Scheme would result in the permanent loss of approximately 0.7 ha of deciduous woodland. Approximately 6.08 ha of mixed deciduous largely native woodland planting would be incorporated around the Scheme to mitigate for the loss of broadleaved woodland and provide a significant increase in deciduous woodland cover as enhancement. The woodland would be planted during the construction phase and would continue to establish during the operational phase of the Scheme.
- 8.8.8 New woodland would be species-rich, comprising a range of largely native species of local provenance adapted to a wide range of climatic conditions, ensuring it is resilient to future pressures. Sensitive management and monitoring regimes would be applied during operation to ensure maintenance and enhancement of the habitats, where necessary.
- 8.8.9 Where fragmentation would occur through the loss of an area of approximately 0.3 ha of deciduous woodland just east of Old Hall Lane through the installation of the Mottram Underpass, new planting would be incorporated within this location to ensure that a green corridor is retained. Planting here would include lower scrub and grasslands including such native species as hawthorn, blackthorn, elder, hazel, and holly.

Wet woodland

- 8.8.10 The Scheme would result in the permanent loss of approximately 0.1 ha of wet woodland located west of Roe Cross Road. Three SUDS water bodies would be created across the Scheme which provides opportunities to mitigate and enhance the coverage of wet woodland within the peripheries of these areas. On the borders of each water body, a combined total of at least 0.65 ha of wet woodland would be planted to reflect what would be lost within the DCO boundary and provide a significant increase of this habitat as an enhancement. The new wet woodland would include a mixture of willow, alder and birch species planted densely in close proximity to the new water bodies. The woodland would be planted during the construction phase and would continue to establish during the operational phase of the Scheme.

Lowland dry acid grassland

- 8.8.11 The Scheme would result in the permanent loss of approximately 0.31 ha of lowland dry acid grassland, predominantly located north of Mottram Moor within the DCO boundary. In order to mitigate, and provide an increase in cover of this habitat, an area measuring approximately 1.64 ha of new lowland dry acid grassland would be created south of the new highway east of Old Hall Lane. This area is considered suitable due to it being an area of free draining soil and would also incorporate a gravel embankment. Tree planting would be sparse in this area but would consist of more acid tolerant species such as rowan and silver birch and complimented with plugs of heather and bracken to create a greater habitat mosaic. In order to ensure the successful establishment of the new area and encourage a more rapid colonisation of vegetation, the existing lowland dry acid grassland soils would be translocated during the constructional stage to the newly proposed area. The soil will be translocated immediately from the donor

site to the proposed area, however, if timings do not allow for this, the material will be temporarily stored locally to the compensation site until the proposed area has been prepared; this is not anticipated to significantly affect the success rate of the translocated soil.

Hedgerows

- 8.8.12 Construction of the Scheme would result in the permanent loss of approximately 3,312 m of hedgerow. In order to mitigate and enhance the hedgerows within the Scheme, hedgerow planting is proposed either side of the route measuring approximately 6000 m.
- 8.8.13 New hedgerow planting would be species-rich, comprising a range of native species (including hawthorn, blackthorn, holly, and dog rose) of local provenance adapted to a wide range of climatic conditions, maximising their resilience. Sensitive management and monitoring regimes would be applied during operation to ensure maintenance and enhancement of the habitats, where necessary. Hedgerows would be largely linked to provide a network of habitats to aid connectivity across the Scheme.

Flood plain mire

- 8.8.14 The Scheme would result in the permanent loss of approximately 0.3 ha of flood plain mire, predominantly located north of Mottram Moor within the DCO boundary. In order to mitigate, and provide an increase in cover of this habitat, an area measuring approximately 1.13 ha of new flood plain mire/marshy grassland habitat would be created within the shallow depression which would be formed within the east of the Scheme as part of the flood alluviation.

Aquatic habitats and species

Watercourses

- 8.8.15 The Scheme would result in permanent and temporary losses of riparian habitat (namely mature trees, tall herbs, grasses and scrub) under the River Etherow Bridge and associated with bank lowering works. Riparian vegetation would be reinstated on completion to allow replacement habitat to establish. Mature trees lost as a result of bank lowering activities would be replaced with appropriate planting along the River Etherow corridor. During construction of the River Etherow Bridge, slow start up of piling machinery away from the watercourse would be employed to minimise impacts of noise and vibration disturbance to fish and other animals within the river and its corridor.
- 8.8.16 Channel realignment works required on the Hurstclough Brook (WC_300) and Tara Brook (WC_200) to facilitate new road crossings would not result in any permanent loss of open watercourse extent.
- 8.8.17 Realignment designs would act to improve habitat conditions over the current situation through, for example, provision of a two-stage channel, a naturalised meandering channel profile and where feasible fencing to reduce poaching pressure. The design incorporates overwide channels (approximately 3 m wide) to allow space for in channel features (e.g. shelves) and variable channel bank profiles and planforms to be incorporated during detailed design. New channels

would be designed to maximise morphological and ecological complexity through provision of diverse planforms and the appropriate sizing of channels to promote a self-sustaining channel form. Riparian planting strategies and/or natural colonisation strategies shall be determined at detailed design stage but will consider the relative costs and benefits for specific locations. Natural colonisation is the preferred option for new watercourses as it promotes the establishment of species prevalent within the locality. However, it is recognised that this approach may not be appropriate if invasive species are likely to take hold and/or if rapid plant establishment is required to stabilise the banks or for landscaping purposes.

- 8.8.18 Ecologically sensitive realignment of the Hurstclough Brook would replace 220 m of watercourse with limited habitat complexity with 220 m of improved habitat. The realignment of Tara Brook would replace 304 m of un-defined channel lost under the footprint of the Scheme with 322 m of new channel.
- 8.8.19 In addition to channel realignments, the Scheme includes *circa* 2,675 m of new drainage channels and interception channels offsetting the *circa* 718 m of minor watercourses (ditches and indistinct watercourse features) lost under the footprint of the Scheme. As per the realignments, new channels would be sensitively designed to maximise ecological potential, for example through the inclusion of varied planforms.
- 8.8.20 The Scheme would retain a section of an approximately 100 m of existing channel and incorporation into the realignment design as a backwater habitat to provide additional aquatic habitat provision.

Standing water bodies (ponds)

- 8.8.21 Ponds lost to the Scheme have been identified as having poor quality in terms of their habitat and species assemblages. The loss of four ponds (P2, P5, P7 and P30) equates to a total loss of approximately 600 m² of standing water body habitat across the Scheme.
- 8.8.22 The inclusion of three SuDS within the Scheme design provides an opportunity to mitigate for these losses through the creation of replacement pond features integrated within the 13,171 m² of area given over to SuDS design. This shall include the design of permanent and temporary pond features to reflect the habitat features lost, the creation of variable depths and pond profiles and appropriate native wetland planting.
- 8.8.23 The SuDS design would at a minimum result in no net loss of standing water body area across the Scheme. Further details of the Environmental Masterplan are provided in Figure 2.2 (TR010034/APP/6.4).

Bats

- 8.8.24 Nine confirmed small day or satellite bat roosts (S8, S10, S11, S16, S17, S18, S20, S35 and S42) recorded in 2017 and four potentially present maternity roosts recorded in 2007 (S10, S11, S16, and S19) would be lost to facilitate the Scheme.

- 8.8.25 All roosts located outside of the DCO boundary would not require removal as part of the Scheme. The roosts located outside of the DCO boundary are located within residential and/ or commercial buildings and located adjacent to existing highways (such as Mottram Moor which has high levels of congestion). It is considered that these roosts are already subject to a degree of disturbance through noise so is unlikely to have any significant impacts during the operational stage. However, there is potential that there would be increases and changes in the type of noise created through the constructional period. This would be mitigated, where possible, through the implementation of buffer zones and sensitive timings (such as undertaken outside of key periods, including the breeding and hibernation period). In order to ensure that continued roosting is available during the construction period, a variety of artificial bat boxes would be installed within retained vegetation prior to construction commencing.
- 8.8.26 A dedicated bat structure would be constructed to provide appropriate mitigation for the loss of the four potentially present maternity roosts within the DCO boundary based on a worst-case scenario. The structure would be located within the northern limits of the Scheme which ensures that it is in proximity (< 150 m) to the existing roosts to be lost, nearby to suitable habitat (broadleaved woodland and hedgerows) and is connected via several hedgerows to the wider landscape. Additional native planting would be provided on the northern and western areas surrounding the bat structure to provide additional habitat and to provide screening to aid with visual and landscaping elements.
- 8.8.27 The bat structure in this location would be situated behind retained trees with proposals for additional planting screening for local residents and associated designated heritage assets adjacent to the structure. The wider landscape context contains similar structures and planting in the local area and could add positively to the local landscape character. The location is not easily accessible from any Public Rights of Way or from any residential areas; therefore, it is not anticipated that the structure would be subject to any significant anthropogenic disturbance. Due to the distance from the proposed development (approximately 60 m), and the provision of high quality bat foraging habitats (hedgerow, woodland edge, and watercourse) adjacent to the structure, it is not considered likely that there would be a risk of traffic related mortality as bats would be encouraged to forage and commute away from the road (which would be subject to artificial lighting as well as poorer quality commuting and foraging habits (rock and scree/ open acid grassland) habitat adjacent to the road).
- 8.8.28 The size of the structure would be approximately 4-6 m high x 1-2 m width and be of cylindrical design based on existing natural stone vent structures (primarily the Mottram aqueduct air vents) within the local area (see images below). The proposed bat structure would be based on a design of this character using a cylindrical design with an appropriate roof structure.
- 8.8.29 The structure would incorporate features suitable for a range of species and roost types, however, would be mainly designed to accommodate a pipistrelle maternity colony based on a worst-case scenario. Whilst the structure may be mainly designed for pipistrelle species, it is considered that the structure would be suitable for a range of additional species that have the potential to be present (including brown-long eared, and myotis species). The proposed measures include:

- A dedicated loft space measuring approximately 2 m in diameter and including at least six internally fitted bat boxes (for example Kent bat boxes) and softwood battens to create a variety of roosting heights. At least three entrance holes or tiles would be located around the roof to allow access into the loft space with gaps in felt roof lining
- Two internal chambers with external access within the main body of the column with several access holes within the exterior to provide two further internal spaces for roosting bats
- At least one lockable door located externally and a maintenance hatch within the main column would be installed to allow monitoring by bat licensed individuals. The entrance would be designed into the structure to be inconspicuous and blend in with the structure as far as reasonably possible
- At least 10 ridged roof tiles to provide crevices for additional external roosting
- At least 10 bat bricks located within the external brick work for crevice dwelling species.

- 8.8.30 It is anticipated that this structure would be able to accommodate up to 200 bats which is considered to provide sufficient mitigation for the potential loss of three small common pipistrelle maternity roosts as well as providing an abundance of day and/ or satellite roosts.
- 8.8.31 The clear span River Etherow Bridge is proposed over the River Etherow at the eastern end of the Scheme. In order to provide additional roosting opportunities (mainly for Daubenton's or Natterer's bats) as enhancements, at least four integrated bat tubes would be installed within the bridge. These would comprise 1FR Schwegler Bat Tubes (or similar design) and would be located in suitable locations on the northern and southern aspects.
- 8.8.32 Thirty-seven trees with bat roosting suitability would be lost due to being located within the DCO boundary. Tree climbing surveys in 2020 did not record any evidence of bats and roosting bats were considered to be likely absent within the trees within the survey area at the time of the survey. In order to ensure that continued roosting spaces and to provide enhancements for roosting bats, at least 37 artificial bat boxes would be installed around the Scheme on retained trees or on artificial poles (if suitable trees aren't available). The artificial bat boxes would be installed as far as possible from the highway, in order to reduce the risk of road casualties. Bat boxes would include a mixture of Schwegler 2F, 1FF, and 2FN bat boxes to provide a range of roosting spaces. Dark corridors would be maintained around any artificial bat boxes through ensuring the minimal lighting is used and ensuring that any artificial roosts are directly illuminated. Birds frequently occupy bat boxes, but this can be reduced by the installation of bird boxes in close proximity to bat boxes to reduce competition. Therefore, for each bat box installed, an equivalent number of bird boxes would also be installed at the same location, where feasible. All bat boxes would be installed prior to construction and would be maintained for a minimum of five years.
- 8.8.33 Loss of bat foraging and roosting habitat would be mitigated through the creation of significant areas of replacement habitat, which includes a net increase in broadleaved woodland, tree and hedgerow planting and the creation of species-

rich grasslands, shrubs and scrub. Woodland planting is within several blocks resulting in an increase in woodland edge habitat generally favoured by pipistrelle species. These new habitats would support an abundance of invertebrate prey providing foraging habitat for bats. There would be an initial reduction of habitat during the constructional period, however, there is sufficient suitable habitat (consisting of hedgerows and woodland immediately adjacent to the site) that would be available until the newly created habitat matures and becomes available.

- 8.8.34 Bat hop-overs would be created at strategic locations around the Scheme which would consist of tall vegetation planted on either side of a road. The aim is to guide bats across roads at a safe height above traffic and avoid road casualties. There is evidence that bats would cross highways at greater heights in the presence of high canopy cover or roadside embankments^{106/107}. These bat hop-overs would be installed at strategic locations where bat activity transect surveys have identified important commuting and foraging corridors. The vegetation would be approximately 4-5 m high and be adjoined by additional species-rich hedgerow or woodland planting to facilitate movement. Whilst bat hop-overs would be provided, it is considered that the significant increase in woodland and grassland planting would provide enhanced foraging and commuting opportunities for bats and is considered to fully mitigate and residual impacts arising from habitat severance.
- 8.8.35 The recommendations from the Bat Conservation Trust and the Institution of Lighting Professionals, titled Guidance Note 8 Bats and Artificial Lighting¹⁰⁸, would be followed when designing the lighting schedules. This includes the following measures:
- All luminaires would lack UV elements and would not use metal halide or fluorescent sources. LED luminaires would be used due to their sharp cut-off, lower intensity, good colour rendition and dimming capability
 - A warm white spectrum (2700-3000 Kelvin) would be adopted to reduce blue light component
 - Luminaires would feature peak wavelengths higher than 550 nm to avoid the component of light most disturbing to bats. Research indicates that while lower UV components attract fewer invertebrates, warmer colour temperatures with peak wavelengths greater than 550 nm (~3000°K) cause less impacts on bats
 - Only luminaires with an upward light ratio of 0% and with good optical control would be used.
- 8.8.36 The lighting design has considered the presence of the dedicated bat structure located within the north of the Showground area. As the highway is located within a cutting, any light spill from the proposed lighting columns within this area would be reduced. Screen planting in the form of hedgerows would further provide a natural screen to provide dark corridors for bats. No lighting is proposed upon the vegetated area on the Mottram Underpass which, in

¹⁰⁶ <https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2664.2011.02068.x>

¹⁰⁷ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0038775>

¹⁰⁸ <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>

combination with the scrub planting, would provide a dark corridor encouraging bats to cross this area east and west.

- 8.8.37 The dedicated bat structure and artificial bat mitigation measures would be installed within the DCO boundary. The peak frequencies in typical construction activity spectra would normally be below the hearing threshold for bats or outside their range of audible frequencies. For construction noise to be audible for bats, construction noise levels would be required to exceed their threshold of hearing, which is not expected to occur. Therefore, no significant effects from construction or operational noise are likely for bats.
- 8.8.38 Pre-commencement surveys will be undertaken to update the current baseline. If any of the aforementioned mitigation measures are deemed not to be necessary in light of any new survey information, they would still be implemented as enhancement measures.

Badgers

- 8.8.39 There is one main badger sett (S16) located within the DCO boundary which would require closing under a Natural England licence and compensatory mitigation in the form of the creation of an artificial sett within the clan's respective territory. Two further main setts are located within the survey area, however, outside of the DCO boundary, and will be fully retained. Whilst S3 has been classified as a subsidiary sett (due to very limited use by badgers), no associated main sett has been recorded to give full confidence of this classification. It is assessed that there is potential that this sett could be re-occupied as to classify it as a main sett in the future. In the event that this would occur, an artificial main sett would be created within the west of the Scheme within the clan's territory to provide adequate compensatory mitigation.
- 8.8.40 Pre-commencement surveys would be undertaken to ensure the current baseline information is fully kept up to date.
- 8.8.41 Seven further setts are located within the DCO boundary (one annexe, one subsidiary, and five outlier setts) which would be required to be closed under a Natural England licence. No compensatory mitigation is required for the closure of these setts, due to them not being classified as a main active sett.
- 8.8.42 Six setts are located within 30 m of the DCO boundary and there is a risk that these setts may be damaged or destroyed during the constructional period. It is possible that these setts would be temporarily closed under a Natural England licence during the constructional period.
- 8.8.43 The embedded mitigation measures (as outlined within Section 2) are considered sufficient to mitigate against any potential killing, injuring, or entrapment of badgers. However, further mitigation measures are required to ensure that sufficient habitat and connectivity is provided.
- 8.8.44 In order to ensure that connectivity is maintained across the Scheme, safe crossing points will be provided to maintain connectivity during the operational stage and enable badgers access to the wider landscape as required. This will be in the form embedded mitigation through underpasses (such as Mottram

Underpass, Carr House Underpass and Old Mill Farm Underpass), as well as five purpose-built mammal crossings across the Scheme. These tunnels would be constructed of Class M 600 mm diameter concrete pipes and widened at the entrances. The entrances will be 'softened' through the use of appropriate planting to encourage badgers to use these crossing points.

- 8.8.45 Linear fencing will be utilised to prevent road mortalities and guide badgers to the aforementioned safe crossing points. Acoustic fencing is proposed around a significant portion of the Scheme (2-2.5 m in height) which would be modified (specifically through the addition of the 600 mm buried underground) to be used for both badger and acoustic fencing. In areas where acoustic fencing isn't proposed, badger fencing will be installed 500 m from each crossing point (on both sides of the road) and artificial sett. Badger fencing would be minimum standard 1 m high above ground level with a lower section buried 300 mm below ground and a further 300 mm turned away from the fence in the direction from which badgers would approach. Fencing would be designed to encourage badgers towards the crossing points through the use of indents or recesses towards each crossing entrance.
- 8.8.46 Dark corridors with no or very limited artificial lighting will be implemented at strategic locations (such as at safe crossing points) to aid movement. This will either be through controlling lighting levels, or through planting of sufficient screen planting to create darker pockets.
- 8.8.47 The loss of badger foraging habitat would be mitigated through the creation of significant areas of replacement habitat, which includes a net increase in native woodland, tree and hedgerow planting, and the creation of species-rich grasslands, shrubs and scrub. There will be an initial reduction of habitat during the constructional period, however, there is sufficient habitat located immediately adjacent to the Scheme that will be available until the newly created habitat matures and becomes available.
- 8.8.48 Assuming that badger setts constitute sensitive receptors that are subject to the DMRB LA 111 assessment criteria then the setts present in proximity to the Scheme would likely be subject to moderate or major noise increases. Badgers are known to tolerate low to moderate levels of noise¹⁰⁹ as evidenced by the diverse array of habitats they occupy, including areas subject to high levels of disturbance (such as highway embankments and railway corridors). As a consequence, it is not anticipated that badgers would be impacted by construction or operational noise. One active subsidiary badger sett (S24) has been identified that has the potential to be affected by proposed piling works during the construction period due to the close proximity. Assuming this sett is a sensitive receptor subject to the DMRB LA 111 assessment criteria, any impacts could be avoided if a rotary bored method is used as the disturbance levels would be lower. In the unlikely event that percussive piling works are proposed to be used in this locale, then the sett may be subject to a moderate magnitude of impact if used for a significant time period. In this case, S24 may require temporary closure under a Natural England mitigation licence.

¹⁰⁹ Interpretation of 'Disturbance' in relation to badgers occupying a sett, Natural England (2009)

General bird assemblage

- 8.8.49 Loss of suitable bird nesting and foraging habitats would be mitigated through net increases in native woodland, hedgerow, tree planting, watercourses and waterbodies, and the provision of species-rich grassland, shrubs and scrub.
- 8.8.50 Based on the results of the breeding bird surveys at least 10 sparrow terrace, 10 starling nest boxes, and 10 general purpose nest boxes will be installed within suitably vegetated locations within the Scheme to provide additional nesting opportunities to further enhance the suitability of habitats within the Scheme to support breeding birds. The boxes for the general breeding bird species (house sparrow and starling) will be provided in close proximity to Mottram Underpass with the retained broadleaf woodland and newly created habitats as to be close to the existing urban habitats. The River Etherow Bridge provides opportunities to provide nesting enhancements for river-based bird species including dipper and grey wagtail. This can be achieved through providing dedicated nesting boxes or ledges underneath the proposed bridge. These boxes will include at least two No. 19 Schwegler dipper and pied wagtail nest boxes or similar design.
- 8.8.51 Habitat for non-breeding waders including curlew and lapwing that were recorded during the breeding bird surveys will be created within the east of the Scheme. Areas of wet, moderately cattle grazed, rushy grassland would be provided within the proposed flood alleviation area within east of Scheme which consists of a scraped shallow depression that will be seasonally wet.
- 8.8.52 Pre-commencement surveys for kingfisher would be undertaken prior to works commencing on the River Etherow to update the current baseline.

Barn owl

- 8.8.53 Based on the results of the breeding bird and barn owl surveys, there is considered to be two barn owl pairs breeding in close proximity of the Scheme. Barn owl have also been recorded foraging and commuting within the DCO boundary.
- 8.8.54 Barn owl 'fly-overs' and taller screen planting would be created at strategic locations around the Scheme. These fly-overs and screen planting would consist of tall vegetation planted on either side of the road with the aim to encourage barn owls to cross the road at a safe height above traffic. These fly-overs and screen planting will be installed at strategic locations, including just east of the M67 Junction 4 and at the Carrhouse Lane Underpass where barn owls are breeding in close proximity or have been recorded foraging and commuting. The vegetation will be of a larger or higher specification and include pine and standard trees at a minimum of 3-4 m planted to ensure that an instant screen is available. Trees will also be incorporated into the hedge adjoining the farm access track north of the M67 Junction 4 to provide added screening in very close proximity to the recorded breeding barn owls. In order to discourage barn owls from foraging within the grassed area adjacent to the highway, these areas will include regularly mowed amenity grassland. Any areas of rough grass, which are likely to support small mammals (the food prey of barn owls), would only be located behind continuous screens to mitigate against potential road collisions.

Lowland scrub and lowland damp grassland species, including grasshopper warbler

- 8.8.55 An area of damp, marshy grassland with patches of wet woodland (approximately 0.3 ha) planting would be created adjacent to the three proposed SUDS water bodies within the eastern section of the Scheme. The peripheries of the SUDS would be planted with patches of willow scrub to compensate for the loss of wet woodland where species such as grasshopper warbler and reed bunting have been recorded breeding. This area would be relatively unmanaged to allow a denser structure to develop providing the necessary cover and protection for these species.
- 8.8.56 These habitats would be protected (through the use of fencing, dry-stone walls or screen planting) to ensure that the area does not become grazed or poached as a result of the neighbouring pastoral field use.

Otters

- 8.8.57 A clear span design will be utilised as part of the River Etherow Bridge to avoid impacts to the banks and retain aquatic connectivity within this area.
- 8.8.58 Otter-proof fencing will be installed, extending from each side of the River Etherow Bridge, to be installed on either side of the Scheme for a distance of at least 100 m in each direction, to prevent mortality through traffic collision. Fencing would be minimum standard 1 m high above ground level with a section protruding at least 0.5 m at a 45-degree angle in the direction from which otters would approach and would be installed on both sides of the road.
- 8.8.59 In order to ensure that connectivity is maintained across the site, crossing points will be provided in the form of piped culverts (five locations throughout the Scheme), underpasses (such as Mottram Underpass, Carr House Underpass and Old Mill Farm Underpass), and five purpose-built mammal crossings across the Scheme. These tunnels would be constructed of Class M 600 mm diameter concrete pipes and widened at the entrances.
- 8.8.60 The bank side habitat will be maintained for otter, an 8 m buffer either side of retained and unmodified sections of the river will be marked and fully retained. Where necessary, this buffer will be fully fenced off to prevent any machinery or personnel from using these areas.
- 8.8.61 In order to update the current baseline, pre-commencement survey on the River Etherow and watercourses on site will be undertaken prior to construction.
- 8.8.62 In order to provide enhancements for otters, an artificial otter holt would be installed along the River Etherow within a suitable location with sufficient vegetation cover. Otters have been recorded foraging and commuting within the River Etherow, however, currently no holts have been recorded within the survey area. As otters are expanding within the wider area, the creation of an artificial otter holt would provide an additional secure resting site to facilitate the expansion of this species further.

Priority mammals (including hedgehog and brown hare)

- 8.8.63 New high-quality habitat for brown hare and hedgehog will be created within the DCO boundary, including a mix of new broadleaved woodland, grassland and hedgerow planting. In order to provide dedicated habitat for brown hares, a gradual woodland boundary would be created through providing longer grassed field margins generally preferred by brown hare.
- 8.8.64 In order to ensure that connectivity is maintained across the site, crossing points will be provided in the form of underpasses (such as Mottram Underpass, Carr House Underpass and Old Mill Farm Underpass), and five purpose-built mammal crossings across the Scheme. Fencing (using a combination of acoustic and badger fencing) will be used to guide hedgehog and brown hare to these crossing points and prevent road mortality.
- 8.8.65 Hibernacula (comprised of logs or brash) will be created at strategic locations to provide continued hibernation and refuge places for hedgehog.
- 8.8.66 Pre-commencement checks for brown hare and hedgehog will be undertaken within suitable habitats prior to operations.

Common toad

- 8.8.67 Three new large SUDS water bodies will be created during the constructional period which will provide continued and enhanced breeding opportunities for common toad. New high-quality habitat (including wet woodland, marshy grassland and mixed deciduous woodland) will be created in close proximity to the water bodies.
- 8.8.68 In order to ensure that connectivity is maintained across the site, crossing points will be provided in the form of piped culverts (five locations throughout the Scheme), underpasses (such as Mottram Underpass, Carr House Underpass and Old Mill Farm Underpass), and five purpose-built mammal crossings across the Scheme. Fencing (using a combination of acoustic and badger fencing) will be used to guide common toads to these crossing points and prevent road mortality.
- 8.8.69 Hibernacula (comprised of logs or brash) will be created within close proximity to the water bodies to provide continued hibernation or refuge opportunities (measuring at least 4 m x 2 m x 1 m). The use of wildlife kerbs and 'Enkamet' climbing ladders¹¹⁰ would be installed within any constructed gully pots to mitigate against entrapment.
- 8.8.70 Pre-commencement checks for common toad within suitable habitats will be undertaken prior to operations.

8.9 Assessment of Likely Significant Effects

- 8.9.1 Table 8-16 below provides an assessment of the construction and operational impacts and subsequent effects (both positive and negative) of the Scheme on important ecological features within the final EZoI of the Scheme. The

¹¹⁰ <http://www.sussexarg.org.uk/uploads/7/1/7/1/7171006/toadladders.pdf>

assessment takes account of all mitigation measures to be included in the Scheme, therefore these are residual effects.

8.9.2 Overall, no significant adverse residual effects have been predicated as a result of the Scheme.

Table 8-16 – Assessment of likely significant effects

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
Lowland mixed deciduous woodland	Local	Construction Direct, permanent, long-term habitat loss of 0.7 ha (physical loss, damage, fragmentation and changes in environmental conditions).	Construction Planting of 6.08 ha of new species-rich broadleaved woodland throughout the Scheme. Compensatory planting where fragmentation has occurred. Establishment of root protection zones for retained habitats with use of temporary fencing as outlined within Appendix 7.3 Arboricultural Impact Assessment Report of the environmental statement TR010034/APP/6.5.	Construction The increase in woodland habitat than that lost to the Scheme would take several years to mature and would not mitigate and enhance the value of the woodland removed during construction until the operational phase of the Scheme. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Slight adverse	Not significant
		Operation No adverse impacts anticipated post construction.	Operation Habitat management.	Operation In the long-term, a net increase in the amount of woodland within the DCO boundary would be achieved. It is anticipated that the impacts will positively affect the integrity or key characteristics of the resource.	Moderate beneficial	Slight beneficial	
Wet woodland	Local	Construction Direct, permanent, medium-term habitat loss of 0.1 ha (physical loss, damage, and changes in environmental conditions).	Construction Planting of three new areas of wet woodland adjacent to the three proposed SUDS scheme to achieve a significant increase (0.65 ha) in wet woodland cover. Establishment of root protection zones for retained habitats with use of temporary fencing as outlined within Appendix 7.3 Arboricultural Impact Assessment Report of the environmental statement TR010034/APP/6.5.	Construction The increase in wet woodland habitat than that lost to the Scheme would take several years and would not mitigate and enhance the value of the woodland removed during construction until the operational phase of the Scheme. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Slight adverse	Not significant
		Operation No adverse impacts anticipated post construction.	Operation Habitat management.	Operation In the long-term, a net increase in the amount of wet woodland within the DCO boundary would be achieved. It is anticipated that the impacts will positively affect the integrity or key characteristics of the resource.	Moderate beneficial	Slight beneficial	
Lowland dry acid grassland	County	Construction Direct, permanent, medium-term habitat loss of 0.31 ha (physical loss, damage, and changes in environmental conditions).	Construction Creation of 1.64 ha of new lowland dry acid grassland to achieve an increase in cover.	Construction The increase in lowland dry acid grassland habitat than that lost to the Scheme would take several years and would not mitigate and enhance the value of the woodland removed during construction until the operational phase of the Scheme. It is anticipated that the level of impact will negatively affect the integrity or key characteristics of the resource.	Moderate adverse	Slight adverse	Not significant
		Operation No adverse impacts anticipated post construction.	Operation Habitat management.	Operation In the long-term, a net increase in the amount of lowland dry acid grassland within the DCO boundary would be achieved. It is anticipated that the impacts will positively affect the integrity or key characteristics of the resource.	Moderate beneficial	Slight beneficial	
Hedgerow	Local	Construction Direct, permanent, medium-term habitat loss of 3.3 km (physical loss, damage, fragmentation and changes in environmental conditions).	Construction Planting of 6 km of new native intact species-rich hedgerows with trees and new native intact species-rich hedgerows. Establishment of root protection zones for retained habitats with use of temporary	Construction The establishment of greater lengths of hedgerow than that lost to the Scheme would take several years and would not mitigate and enhance the value of the hedgerows removed during construction until the operational phase of the Scheme.	Minor adverse	Slight adverse	Not significant

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
			fencing as outlined within the Arboricultural Method Statement.	It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.			
		Operation No adverse impacts anticipated post construction.	Operation Habitat management.	Operation In the long-term, a net increase in the amount of hedgerow within the DCO boundary would be achieved. It is anticipated that the impacts will positively affect the integrity or key characteristics of the resource.	Moderate beneficial	Slight beneficial	
Flood plain mire	Local	Construction Direct, permanent, medium-term habitat loss of 0.3 ha (physical loss, damage, fragmentation and changes in environmental conditions).	Construction Creation of 1.13 ha of flood plain mire habitat to achieve an increase in cover.	Construction The increase in flood plain mire habitat than that lost to the Scheme would take several years and would not mitigate and enhance the value of the woodland removed during construction until the operational phase of the Scheme. It is anticipated that the level of impact will negatively affect the integrity or key characteristics of the resource.	Moderate adverse	Slight adverse	Not significant
		Operation No adverse impacts anticipated post construction.	Operation Habitat management.	Operation In the long-term, a net increase in the amount of flood plain mire habitat within the DCO boundary would be achieved. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Negligible beneficial	Slight beneficial	
River Etherow (WC_100)	Regional	Construction Permanent shading from the River Etherow Bridge deck, altering vegetation composition both within the river channel and riparian corridor. Potential permanent loss of two mature riparian trees associated with construction of the River Etherow Bridge. Additional, temporary loss of riparian vegetation during construction of the River Etherow Bridge and associated bank lowering to compensate for loss of floodplain storage. Since the River Etherow Bridge is a single 42 m span structure, no direct loss of channel or in-channel works are anticipated. There is potential for noise, vibration and visual disturbance to fish during associated piling activities.	Construction Embedded mitigation in the design to ensure a single span structure with no in-channel piers. Slow start up of piling machinery away from river channel to minimise impacts on fish. Where feasible, activities adjacent or across the River Etherow should take place outside of key sensitive periods. Reinstatement of the ground where any temporary vegetation clearance has been undertaken following construction. Planting along the River Etherow to replace trees and potentially lost. Implementation of an 8 m buffer zone along the River Etherow where no works are required.	Construction Extents of permanent and temporary vegetation loss (riparian and in-channel) are limited to a relatively small section of the watercourse under the River Etherow Bridge (bridge deck width is approximately 18 m) and associated construction working areas. The single span design avoids the need for in-channel working. Impacts are therefore not expected to affect the integrity of key habitat characteristics or the viability of key communities within the River Etherow. Permanent loss of mature riparian trees will not be offset until new trees are established which could take many years. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Slight adverse	Not significant
		Operation There is potential for alteration to the quantity and/or quality of flow within watercourses as a result the operation of new drainage infrastructure.	Operation Embedded mitigation within the drainage design would provide for adequate treatment, attenuation and discharge rates such that there would be no deterioration to hydro-morphology and aquatic ecology. The preliminary drainage design (see The Drainage Strategy Report (TR010034/APP/7.7) has been developed in accordance with the DMRB standards and will be required to achieve regulatory and industry standards e.g. through the attainment of water quality targets as assessed through the use	Operation Level of impact assessed as 'no change' in recognition that the drainage design provides adequate treatment and attenuation to ensure there are no negative effects on the water environment. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	No change	Neutral	

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
			of the Highways England Water Risk Assessment Tool (HEWRAT). Outfalls shall be restricted to existing greenfield rates. The requirement for appropriate treatment, attenuation and discharge rates are integral to the design process.				
Tara Brook (WC_200)	Local	<p>Construction</p> <p>Realignment of 304 m of watercourse under the new Mottram Moor Junction to create a 427 m channel comprising 322 m of new open watercourse and two culverts totalling 105 m in length.</p>	<p>Construction</p> <p>Ecologically sensitive realignment design to maximise channel length and improve habitat condition, inclusion of buffer to protect from livestock poaching or other land use.</p> <p>Invert level of culverts set to facilitate natural bed establishment throughout the structure.</p> <p>Loss of habitat associated with proposed new culvert to be offset through creation of greater length of channel within the realignment designs.</p>	<p>Construction</p> <p>The loss of existing watercourse (304 m) will be compensated by the creation of 322 m of new channel within the realignment design.</p> <p>The fragmentation resulting from the introduction of two culverts (72 m and 33 m long) within the watercourse is not considered to measurably alter the overall habitat function of the watercourse given the watercourse in this location is not suitable for fish or other migratory aquatic species.</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	No change	Neutral	Not significant
		<p>Operation</p> <p>There is potential for alteration to the quantity and/or quality of flow within watercourses as a result the operation of new drainage infrastructure.</p>	<p>Operation</p> <p>It is assumed that embedded mitigation within the drainage design would provide for adequate treatment, attenuation and discharge rates such that there would be no deterioration to hydro-morphology and aquatic ecology. As listed above for the River Etherow (WC_100) the drainage design shall achieve regulatory and industry standards.</p>	<p>Operation</p> <p>Level of impact assessed as 'no change' in recognition that the drainage design provides adequate treatment and attenuation to ensure there are no negative effects on the water environment.</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	No change	Neutral	
Hurstclough Brook (WC_300)	Local	<p>Construction</p> <p>Realignment of 220 m of the existing channel that will be replaced with a 276 m realignment of which 56 m is under culvert. No net loss of open channel length.</p> <p>Minor loss of riparian vegetation associated with the construction of an access road.</p>	<p>Construction</p> <p>Ecologically sensitive realignment design to maximise channel length and improve habitat condition and inclusion of buffer to protect from livestock poaching or other land use.</p> <p>Loss of habitat associated with proposed new culvert to be offset through creation of equal length of channel within the realignment designs to result in no net loss.</p> <p>Retention of a section of an approximately 100 m of existing channel and incorporation into the realignment design as a backwater habitat.</p> <p>Reinstatement of the ground where any temporary vegetation clearance has been undertaken following construction.</p> <p>Embedded mitigation within the design to ensure invert level of culverts set to facilitate natural bed establishment throughout the structure.</p> <p>As listed above for the River Etherow (WC_100) the drainage design shall achieve regulatory and industry standards.</p>	<p>Construction</p> <p>The loss of existing watercourse (220 m) will be compensated by the creation of 220 m of new channel within the realignment design and the retention of a section of channel as backwater habitat.</p> <p>The fragmentation resulting from the introduction of a 56 m long culvert within the watercourse is not considered to measurably alter the overall habitat function of the watercourse given the watercourse in this location is not suitable for fish or other migratory aquatic species.</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	No change	Neutral	Not significant

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
		<p>Operation</p> <p>Potential reduction in flow within a 600 m reach of the Hurstclough Brook as a result of the new road alignment and its associated drainage intercepting overland and sub-surface flow.</p> <p>Further potential for alteration to the quantity and/or quality of flow within watercourses as a result the operation of new drainage infrastructure.</p>	<p>Operation</p> <p>An appropriate drainage strategy will be adopted. A new channel to the north of the Scheme may intercept flows from the existing Hurstclough Brook alignment upstream of the current A57. However, new culverts under the proposed road will ensure this water is retained within the Hurstclough catchment and enters the Hurstclough Brook before its main river designation. New drainage channels along the north of the Scheme in this location will be sensitively designed to maximise ecological potential (e.g. through the provision of two-stage channels and naturalised meandering profiles).</p> <p>Embedded mitigation within the drainage design would provide for adequate treatment, attenuation and discharge rates such that there would be no deterioration to hydro-morphology and aquatic ecology.</p>	<p>Operation</p> <p>The impacts from the new road alignment and the potential for associated drainage to intercept overland and sub-surface flows to the Hurstclough Brook are considered to be minor. This is due to the preservation of flows from the upstream reach of the Hurstclough Brook in the realigned channel acting to maintain some of the habitat function of the potentially impacted reach (approximately 600 m).</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	Minor adverse	Slight adverse	
Unnamed watercourses (WC_210, WC_211, WC_212, WC_213, WC_340)	Local	<p>Construction</p> <p>Loss of a total of approximately 718 m of watercourse, comprising sections of ditch habitat and indistinct watercourse alignments (i.e. where field survey found no defined channel, but a watercourse is present on OS mapping).</p>	<p>Construction</p> <p>Across the Scheme a total of 2,675 m of new channel is to be created (excluding the Tara Brook (WC_200) and Hurstclough Brook (WC_300) realignments). Comprising:</p> <ul style="list-style-type: none"> • 546 m of new watercourse channel north of the proposed road alignment and existing Hurstclough Brook (this is additional channel not associated with the realignments of Hurstclough Brook and Tara Brook). • 2,129 m of new ditches associated with new road drainage. <p>New channels to be sensitively designed to maximise ecological potential.</p> <p>There is an additional 307 m of new watercourse and associated watercourse diversion at the top of a proposed cutting to the east of the underpass. This channel is expected to be a heavily modified interceptor ditch and as such, has not been included within the above new channel extents.</p>	<p>Construction</p> <p>Existing features provide aquatic habitat resources within the locality but are widespread throughout the Site. The overall loss of 718 m will be offset through the creation of 2,675 m (excluding the 307 m of new watercourse intercepting hillside runoff above the cutting). Although a greater channel extent is being created across the Scheme, the catchments of these unnamed watercourses are also being fragmented through the creation of new crossings/culverts. As such, on balance the impact is no change.</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	No change	Neutral	Not significant
		<p>Operation</p> <p>There is potential for alteration to the quantity and/or quality of flow within watercourses as a result the operation of new drainage infrastructure.</p>	<p>Operation</p> <p>It is assumed that embedded mitigation within the drainage design would provide for adequate treatment, attenuation and discharge rates such that there would be no deterioration to hydro-morphology and aquatic ecology.</p>	<p>Operation</p> <p>Level of impact assessed as 'no change' in recognition that the drainage design will need to meet regulatory and industry standards to ensure there are no negative effects on the water environment.</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	No change	Neutral	
Standing water bodies (P2, P5, P7 and P30)	Local	<p>Construction</p> <p>Direct and permanent loss of four ponds within the footprint of the Scheme with a total area of approximately 600 m².</p>	<p>Construction</p> <p>Creation of three SuDS of 13,171 m², designed to maximise ecological diversity. No notable species were recorded within the surveyed ponds to be lost, but if construction sequence permits, translocation of invertebrates and macrophytes could be</p>	<p>Construction</p> <p>Existing features provide aquatic habitat resources within the locality but are common throughout the Site and do not meet published criteria for the definition of Priority Habitat. The creation of 13,171 m² of SuDs ponds will provide additional standing water habitat and will be sensitively designed to encourage ecological diversity.</p>	No change	Neutral	Not significant

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
			undertaken to provide donor species to the new SuDS ponds. Maintenance of an 8 m buffer around ponds where no works to the pond are required shall be implemented.	Permanent loss will not be offset until newly created ponds and associated planting is established which is typically one to five years. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.			
		Operation No impact pathways identified	Operation N/A	Operation N/A	N/A	N/A	
Bats	County	Construction Direct and permanent habitat loss, severance and fragmentation. Permanent loss of nine structures confirmed to contain bat colonies and potential loss of up to three common pipistrelle maternity roosts. Severance and fragmentation of 11 flight paths used by foraging/commuting bats. Increased visual (including light pollution) or noise disturbance.	Construction Habitat creation and bat box provision throughout the Scheme. At least four integrated bat boxes within the clear span River Etherow Bridge. Creation of a dedicated bat roosting structure for a large common pipistrelle maternity colony. Provision of at least 37 artificial bat boxes. Pre-construction surveys. Works affecting known roosts to be undertaken in accordance with an EPS licence from Natural England. Methods to reduce noise, light and other disturbance. Methods to reduce the risk of vehicle collisions.	Construction The loss of bat roosts would be direct and permanent. Artificial bat boxes and a dedicated bat structure would be provided to mitigate the loss of suitable roost features. There is the potential loss and fragmentation of 11 foraging and commuting routes, as well as disturbance and degradation of habitats (including through increases of lighting, noise, and vibrations) which could cause displacement and changes in behaviour. There will be a temporary reduction in the amount of available habitat for bats until the replacement planting establishes and matures. Alternative high-quality habitat is available immediately adjacent to the Scheme, which is likely to sustain the population of bats in the short-term until the new planting becomes fully established. Tall vegetation (3-4 m) planting will be provided at strategic locations to encourage bats to fly higher over the carriageway and reduce the risk of vehicle collisions.	Moderate adverse	Slight adverse	Not significant
		Operation Increased visual (including light pollution) or noise disturbance. Mortality through traffic collisions, or an alteration to commuting routes which may expose bats to different risks that would normally be avoided	Operation Positioning of road within cuttings or behind screening mounds. Tall vegetation to obstruct low-level flight across the carriageway and prevent collisions with road traffic. Safe crossing points (via bat 'hop-overs') with linear planting to guide bats. Increase in habitat quality and connectivity via landscape design.	Operation In the long-term, a net increase in the amount of vegetation and roosting places (including net increases in woodland and hedgerows) within the DCO boundary would be achieved leading to a significant increase in breeding, foraging, and commuting opportunities for bats. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor beneficial	Slight beneficial	
Badgers	Local	Construction Permanent closure of seven badger setts (including two main setts), and loss and fragmentation of foraging habitat. Disturbance (such as noise, vibration, light and chemical pollution) and Mortality of individuals from construction related hazards (such as collision with construction vehicles, entrapment in excavations, etc).	Construction Creation of two artificial badger setts to mitigate for those setts to be lost. Pre-construction surveys to update current baseline. Works affecting badger setts to be undertaken in accordance with a licence from Natural England.	Construction Two artificial setts would be provided prior to the closure of any main setts. There will be a temporary reduction in the amount of available habitat for badgers until the replacement planting establishes and matures. Alternative high-quality habitat is available immediately adjacent to the Scheme, which is likely to sustain the population of badgers in the short-term until new planting becomes fully established. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Negligible adverse	Neutral	Not significant

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
		Operation Increased risk of collision with traffic. Habitat fragmentation.	Operation Safe crossing points with linear planting and fencing to guide badgers. Increase in habitat quality and connectivity via underpasses, mammal culverts and bridges.	Operation In the long-term, a net increase in the amount of vegetation within the DCO boundary would be achieved, leading to an increase in habitat quality for badgers. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Negligible beneficial	Neutral	
General breeding bird assemblage	Local	Construction Direct and permanent habitat loss, severance, fragmentation, mortality, injury and disturbance whilst breeding, foraging, and commuting. Increased visual (including light pollution) or noise disturbances during the construction phase could also cause displacement and changes in behaviour	Construction Habitat creation through net increases in broadleaved woodland and grassland. Nest box provision within suitable areas to increase breeding opportunities. Undertaking works outside the breeding season and/or pre-commencement surveys to avoid killing or injury and damage or destruction of any active nests. Methods to reduce noise, light and other disturbance during construction.	Construction Loss of suitable bird nesting and foraging habitats would be mitigated via net increases in habitats. Bird nest boxes would provide suitable nesting habitats until the new planting has established. The establishment of new habitat than that lost to the Scheme would take several years and would not mitigate and enhance the value of the habitats removed during construction until the operational phase of the Scheme. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Slight adverse	Not significant
		Operation Road lighting and visual disturbance from a more elevated and/ or wider road.	Operation Screen planting would be incorporated to create dark corridors within strategic areas.	Operation In the long-term, a net increase in the amount of vegetation within the DCO boundary would be achieved, leading to an increase in breeding and foraging opportunities for birds. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor beneficial	Slight beneficial	
Barn owls	County	Construction Direct and permanent habitat loss, severance, fragmentation, mortality, injury and disturbance whilst foraging, and commuting. Increased visual (including light pollution) or noise disturbances during the construction phase could also cause displacement and changes in behaviour	Construction Habitat creation through net increases in broadleaved woodland and grassland. Methods to reduce noise, light and other disturbance during construction neat to known active breeding sites.	Construction Loss of suitable barn owl foraging habitats would be mitigated via net increases in suitable habitats. Landscape proposals have been designed to be 'barn owl friendly' in specific locations, although as above, such new planting would take time to mature. The establishment of new habitat than that lost to the Scheme would take several years and would not mitigate and enhance the value of the habitats removed during construction until the operational phase of the Scheme. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Slight adverse	Not significant
		Operation Road lighting and visual disturbance from a more elevated and/ or wider road, mortality through traffic collisions, or an alteration to commuting routes which may expose birds to different risks that would normally be avoided.	Operation Creation of barn owl fly overs and screen planting, comprising tall vegetation to encourage barn owls to crossroads at a safe height above traffic. Barn owls would be discouraged from foraging directly adjacent to the road through vegetative screen planting. Areas of rough grass, which are likely to support small mammals, would only be located behind continuous screens to mitigate against potential road collisions	Operation In the long-term, a net increase in the amount of vegetation within the DCO boundary would be achieved, providing additional opportunities for foraging barn owl. Despite an increase in habitat, and implemented mitigation, there would still be a higher risk of vehicle collisions. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Neutral	
Lowland scrub/ lowland damp grassland species (including	County	Construction Direct and permanent habitat loss (permanent), severance, fragmentation, mortality, injury and disturbance whilst breeding, foraging, and commuting.	Construction Creation of wet woodland, marshy damp grassland adjacent to proposed SUDS within the western part of the Scheme.	Construction Loss of wet woodland and damp/marshy grassland habitats would be mitigated via net increases in these habitats. The increase in wet woodland habitat than that lost to the Scheme would take several years and would	Minor adverse	Slight adverse	Not significant

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
grasshopper warbler)		Increased visual (including light pollution) or noise disturbances during the construction phase could also cause displacement and changes in behaviour		not mitigate and enhance the value of the woodland removed during construction until the operational phase of the Scheme. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.			
		Operation Road lighting and visual disturbance from a more elevated and/ or wider road, mortality through traffic collisions, or an alteration to commuting routes which may expose birds to different risks that would normally be avoided.	Operation No actions required.	Operation In the long-term, a net increase in the amount of vegetation within the DCO boundary would be achieved, leading to an increase in breeding and foraging opportunities for these species. It is anticipated that the impacts will positively affect the integrity or key characteristics of the resource.	Moderate beneficial	Slight beneficial	
Otters	Local	Construction Permanent habitat fragmentation. Disturbance of commuting otters (such as noise, vibration, light and chemical pollution). Mortality of individuals from construction related hazards (such as collision with construction vehicles, entrapment in excavations, etc).	Construction Maintenance of 8 m buffer either side of retained and unmodified sections of watercourse. Pre-construction surveys to update the current baseline.	Construction Temporary fragmentation and habitat loss of sub-optimal watercourses may have minor temporary adverse effects. However, the key area of river habitat will be retained during the construction and operation period. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Slight adverse	Not significant
		Operation Visual disturbance from River Etherow bridge (that it becomes a barrier to movement). Increased risk of collision with traffic. Increased visual (including light pollution) or noise disturbance. Habitat degradation as a result of pollution from storm water run-off or accidental spillages from road traffic accidents.	Operation Clear spanning design of the River Etherow Bridge. Otter-proof fencing. Safe crossing points (via mammal passes and culverts) would be installed to retain connectivity throughout the Scheme. Creation of artificial otter holt on the River Etherow.	Operation In the long-term, a net increase in the amount of suitable habitat within the DCO boundary would be achieved, leading to an increase in foraging opportunities for this species. The creation of an artificial otter holt may provide enhancement breeding opportunities. It is anticipated that the impacts will positively affect the integrity or key characteristics of the resource.	Moderate beneficial	Slight beneficial	
Priority species (mammals)	Local	Construction Direct mortality and trapping during vegetation removal and site clearance using machinery. Permanent loss and fragmentation of foraging habitat and disturbance (such as noise, vibration, and light)	Construction Pre-commencement checks for brown hare/ hedgehog within suitable habitats prior to operations. Creation of high-quality habitat for brown hare and hedgehog within the DCO boundary. Creation of hibernacula for refuge opportunities.	Construction It is considered that the adoption and implementation of these measures would be sufficient to mitigate for the potential construction impacts on priority mammals (including hedgehog and brown hare). The provided habitats would take several years and would not mitigate and enhance the value of the woodland removed during construction until the operational phase of the Scheme. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Slight adverse	Not significant
		Operation Increased risk of collision with traffic and habitat fragmentation. There is also potential for disturbance as a result of road noise and traffic movements.	Operation Safe crossing points (via underpasses and culverts with mammal ledges) would be constructed with linear planting and fencing provided to guide hedgehog and brown hare towards these crossings. Hibernacula (comprised of logs and brash) will be created at strategic locations to provide continued hibernation/ refuge places for hedgehog	Operation Once the new habitats become available, there will be an increase in habitat availability for priority mammal species. Despite an increase in habitat, and implemented mitigation, there would still be a higher risk of vehicle collisions. It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.	Minor adverse	Neutral	

Nature conservation receptor	Value	Characterisation of impact	Summary of proposed mitigation/enhancement	Justification for level of impact	Level of impact	Significance of residual effects	Overall Significance of residual effects
Common Toad	Local	<p>Construction</p> <p>Direct mortality during vegetation removal and site clearance using machinery. There is also the potential for common toad to be killed through becoming trapped in excavations and construction equipment or from collision with construction vehicles. Works associated with the construction of the Scheme would also result in permanent loss and fragmentation of foraging habitat. Loss of breeding habitat through reduction of water bodies.</p>	<p>Construction</p> <p>Pre-commencement checks for common toad within suitable habitats prior to operations. Creation of new water bodies to replace those lost to provide continued breeding habitat for common toad. Creation of new high-quality habitat (including marshy grassland and woodland), especially in close location to water bodies.</p>	<p>Construction</p> <p>It is considered that the adoption and implementation of these measures would be sufficient to mitigate for the potential construction impacts on common toads. There will be a temporary reduction in the amount of available habitat (both breeding and foraging/commuting) for common toad until the replacement planting establishes and matures. Alternative high-quality habitat is available immediately adjacent to the Scheme, which is likely to sustain the population of common toad in the short-term until new planting becomes fully established.</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	Minor beneficial	Slight adverse	Not significant
		<p>Operation</p> <p>Increased risk of collision with traffic and habitat fragmentation.</p>	<p>Operation</p> <p>Safe crossing points (via underpasses and culverts with mammal ledges) will be constructed with linear planting and fencing provided to guide common toad towards these crossings. Hibernacula (comprised of logs and brash) will be created at strategic locations to provide continued hibernation and refuge. The use of wildlife kerbs and 'Enkamet' climbing ladders within any constructed gully pots to mitigate against entrapment.</p>	<p>Operation</p> <p>Once the three SUDS waterbodies fully establish, there will be a net increase in the area of breeding habitat available for common toad. In the long-term, it is considered that there will be enhanced opportunities for common toad, despite an increase risk of road collision.</p> <p>It is not anticipated that the level of impact will affect the integrity or key characteristics of the resource.</p>	Minor beneficial	Slight beneficial	

8.10 National Policy Statement for National Networks (NPS NN) compliance

- 8.10.1 The assessment for this Scheme has considered potential impacts set out in the Biodiversity and Ecological Conservation section (paragraphs 5.20 - 5.38) of the NPS NN, as summarised below.
- 8.10.2 This report provides a preliminary assessment of the significance of effects of the Scheme on nature conservation resources (i.e. internationally, nationally and locally designated sites of nature conservation importance, legally protected species, priority habitats and other priority species identified as being of principle importance for the conservation of biodiversity).
- 8.10.3 It is considered that the potential mitigation and compensation options being proposed for this Scheme demonstrate a strong effort to take opportunities to conserve and advance biodiversity. This is in line with the Government's biodiversity strategy, as set out in Biodiversity Strategy 2020: A Strategy for England's Wildlife and Ecosystem Services.
- 8.10.4 In addition, it is considered that the potential mitigation and compensation options being proposed for this Scheme comply with the bullet points listed in paragraph 5.36 of the NPS:
- *"During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works.*
 - *During construction and operation, best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised (including as a consequence of transport access arrangements).*
 - *Habitats will, where practicable, be restored after construction works have finished.*
 - *Developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where reasonable.*
 - *Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the Scheme landscaping proposals, for example through techniques such as the 'greening' of existing network crossing points and the habitat improvement of the network verge."*

8.11 Monitoring

- 8.11.1 The EMP (First Iteration) (TR010034/APP/7.2) and the Register of Environment Actions and Commitments (TR010034/APP/7.3) includes details of the committed mitigation measures and requirements for monitoring during and post-construction, and ongoing management to assess and ensure the successful establishment of new habitat creation areas (such as broadleaved woodland, species-rich grassland, hedgerows, scrub and water bodies) to monitor residual significant effects. The initial maintenance period will encompass the first five years after construction and will be handed to the Network Management Agent as part of operating and maintaining the Network Area (for Highways England).

- 8.11.2 Newly created habitats will be monitored as part of the EMP which will be delivered during the detailed design stage to ensure successful establishment. Monitoring will take the form of ecological field surveys (as required) of newly planted trees, hedgerows, woodland and species-rich grassland to inform appropriate ongoing management practices. Monitoring will be undertaken by walkover survey annually in the first two years after seeding and planting. Bird and bat boxes¹¹¹ installed within the Scheme will also be monitored, to track the effectiveness of the mitigation design for these ecological receptors. An ongoing schedule of monitoring and maintenance of newly created habitats will be agreed for at least 30 years post-construction.
- 8.11.3 Monitoring will be required as part of the licence conditions for European Protected Species for bats during the operational stage. Bat populations will be monitored in accordance with the Method Statement, which will be agreed with Natural England. This will include population assessments in comparison with what has been recorded in previous years and will be undertaken for at least two years post-construction. The monitoring will assess the effectiveness of the mitigation methods and determine if the new dedicated bat structure is effective in maintaining the distribution and abundance of this species. The results of the monitoring will be used to inform ongoing management to ensure its long-term suitability in providing suitable habitat for bats.
- 8.11.4 Monitoring will be required as part of the licence conditions for badgers upon completion of the artificial sett during the construction stage. The artificial badger setts will be monitored in accordance with a Method Statement, which will be agreed with Natural England.
- 8.11.5 Monitoring of watercourses before, during and after construction shall be undertaken to ensure any impacts to watercourses arising from construction of the Scheme are identified and remedial works undertaken if necessary. This will comprise surface water quality monitoring of watercourses affected by the Scheme. This may be supplemented by biological quality monitoring using aquatic macroinvertebrate community sampling should the assemblages present be assessed as being sensitive to construction related pressure e.g. siltation.

8.12 Summary

- 8.12.1 The potential ecological impacts of the Scheme have been assessed following appropriate methodologies. Impacts to designated sites, habitats and species within the study areas have been characterised and appropriate mitigation outlined.
- 8.12.2 During construction of the Scheme, there would be temporary adverse effects on a number of biodiversity features including notable habitats (lowland mixed deciduous woodland, wet woodland, hedgerows, lowland dry acid grassland, and flood plain mire) and protected species including bats, badgers, otter, breeding birds, and priority species (such as common toad, brown hare, and hedgehog).
- 8.12.3 Embedded mitigation measures have been incorporated into the Scheme design to avoid and prevent effects including environmental working practices to ensure adequate pollution control measures are implemented and use of precautionary

¹¹¹ By licensed individuals with a Natural England Class 2 bat survey licence only.

methods of working (PMW) during construction to minimise risks to individual animals of protected species where licences would not be required.

- 8.12.4 The Scheme would result in an increase in notable habitats in terms of area and quality to ensure that sufficient and increased habitat is provided across the Scheme. Essential mitigation has been provided for protected species through increased breeding opportunities (including a dedicated bat structure and a range of bat/bird nesting boxes) a several crossing points to aid connectivity across the Scheme. Mitigation measures under licence (for bats and badgers) will be required due the legal protection afforded to these species.
- 8.12.5 No significant adverse residual effects have been predicated as a result of the Scheme.
- 8.12.6 Monitoring, to ensure the success of the proposed mitigation measures has been provided including long-term management plans for the notable habitats and species monitoring programmes.
- 8.12.7 It is considered that the mitigation and compensation proposals that have been described in this chapter have taken into consideration the requirements of the NPS, by creating new habitats, minimising habitat fragmentation and providing sufficient essential mitigation for protected species.

© Crown copyright (2019).

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence:

visit www.nationalarchives.gov.uk/doc/open-government-licence/
write to the Information Policy Team, **The National Archives, Kew, London TW9 4DU**,
or email psi@nationalarchives.gsi.gov.uk.

Printed on paper from well-managed forests and other controlled sources.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363

