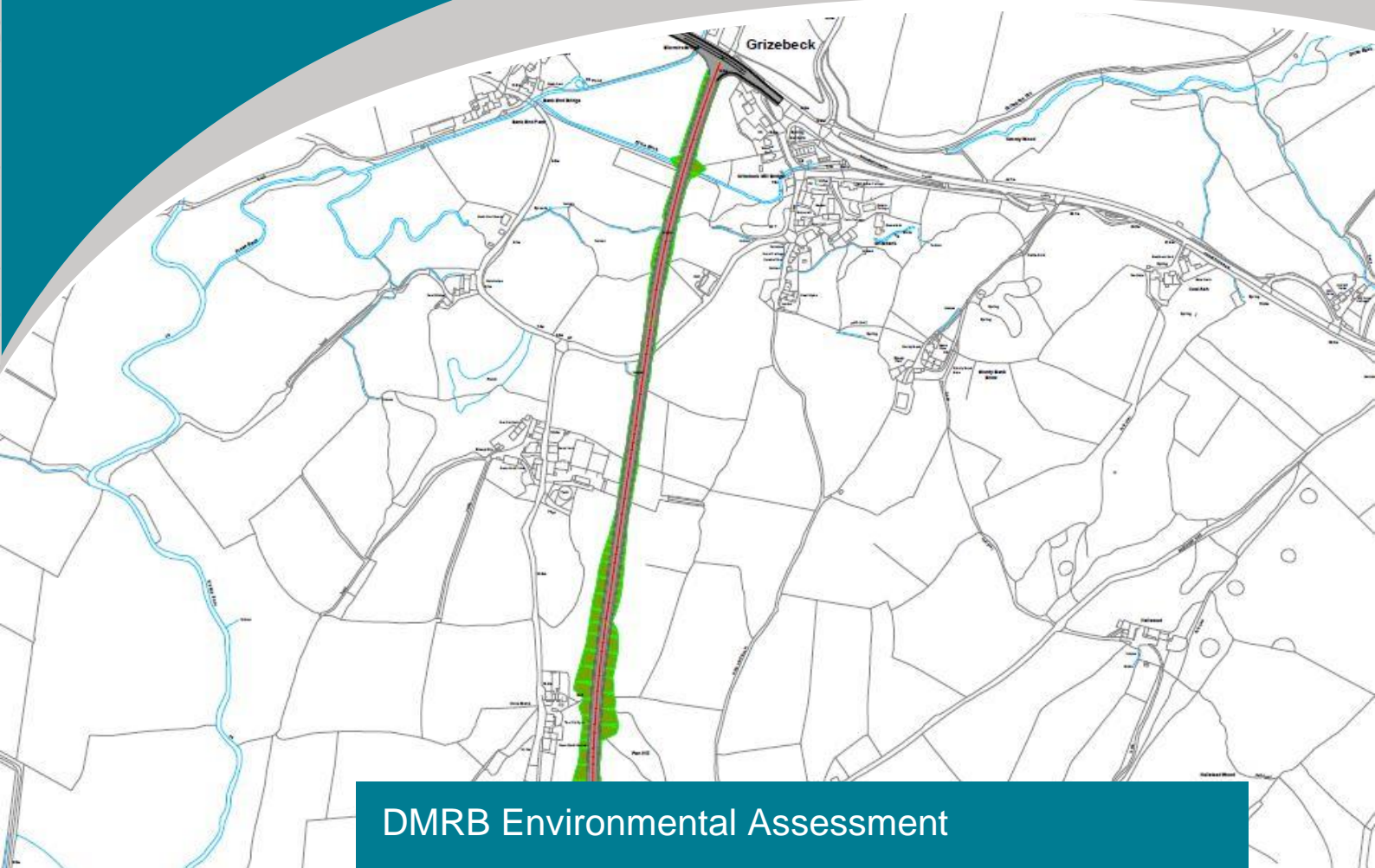


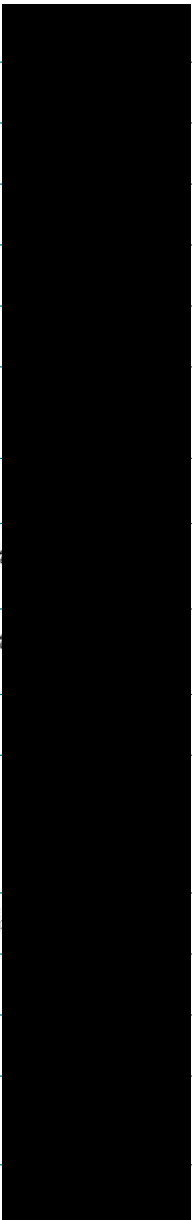
A595 Grizebeck Transport Improvement



DMRB Environmental Assessment EIA Scoping Report

A595 Grizebeck Transport Improvement

Quality Management

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1. Introduction

1.1. The Environmental Scoping Report

- 1.1.1. This Environmental Scoping Report has been prepared by Capita Property and Infrastructure Ltd (the 'Design Organisation'), acting on behalf of Cumbria County Council (the 'Overseeing Organisation').
- 1.1.2. It responds to a Screening Opinion issued by Cumbria County Council as the Local Planning Authority (LPA) on the 20th December 2019 in relation to development of a new section of highway between the villages of Grizebeck and Chapels to bypass the existing A595 in this location, known as the A595 Grizebeck Transport Improvement.
- 1.1.3. The LPA concluded in their Screening Opinion that *"Having had regard to the characteristics of the development, the environmental sensitivity of geographical areas likely to be affected by it and the characteristics of potential impact and their significance, both singularly and cumulatively, it is the County Council's opinion as Local Planning Authority that the proposed project constitutes EIA development"*.
- 1.1.4. As such, an Environment Impact Assessment (EIA) and the production of an EIA report will be required to support any future planning application for the Scheme.
- 1.1.5. The aim of the Scoping Report is to provide sufficient information to allow the LPA to state their opinion as to the scope and level of detail of the information to be provided in the EIA report (a 'scoping opinion'), to support any future planning application for the Scheme.

1.2. Purpose of the Scheme

- 1.2.1. The A595 Grizebeck Transport Improvement (the 'Scheme') if constructed will provide a route that bypasses a section of the A595 that is currently an accident black spot and pinch point at Dove Ford Farm, Grizebeck.
- 1.2.2. Crossing points would need to be provided for small two watercourses; Grize Beck and the unnamed watercourse between Grize Beck and Dove Ford Farm.
- 1.2.3. The Scheme is likely to bring significant benefits; in particular, it would:
 - **Improve road safety by reducing the number and seriousness of incidents** by rerouting traffic away from the current accident black spot and Dove Ford Farm and make the current A595 in this location, an access- only road.
 - **Improve resilience and journey time reliability** by avoiding the build- up of traffic at the current pinch point.
 - **Improve the A595 to make it suitable for freight traffic** by providing a standard 7.3m- wide carriageway in place of the current narrow alignment.
 - **Support economic growth in Cumbria** by improving journey times on the A595.
 - **Reduce the effect of severance** on Grizebeck created by the current A595 alignment.

- **Minimise adverse impacts** on the environment and reduce carbon emissions by reducing traffic and congestion.

1.3. Statement of competence

- 1.3.1. The Design Manual for Roads and Bridges (DMRB) requires that scoping requests be prepared by competent experts¹ and include statements providing evidence to this effect. The authors of this scoping report and a summary of their experience is provided in table 1.1:

Table 1.1: Competence and technical experience

Chapter/ report author(s)	Experience
Scoping report coordination, non-technical chapters and Population and Human Health: Agricultural land holdings James Lumsdon <ul style="list-style-type: none"> • BSc (Hons) Sustainable Environmental Management • MSc Environmental Protection and Management • PIEMA 	James is an environmental consultant with five years' experience in environmental assessment. Key skills include; EIA, cumulative impact assessment, environmental permitting, agricultural land-use impacts assessment, assistance with ecological surveys and public consultation.
Scoping report review Sue Kaner <ul style="list-style-type: none"> • Chartered Member of the Landscape Institute, 1990 • M. Phil Landscape Design, 1987 • BA (Hons) Architectural Studies RIBA Part 1, 1985 	Sue has over 25 years' experience in environmental assessment, design mitigation and management on large national road and rail infrastructure projects (including HS2), renewable energy and urban regeneration schemes. Sue's key skills include a strong technical knowledge supported by a good working knowledge of UK and European Planning and Environmental legislation. Sue has acted as an expert environmental witness and as a landscape witness for several private clients and local authorities in the South East. She has extensive experience of managing and coordinating large multi-disciplinary teams in the production of EIAs often providing in addition, specialist Landscape and Visual Impact Assessments.
Air quality and Climate Amy Van de Sande <ul style="list-style-type: none"> • BSc Chemistry • MSc Air pollution management and control • IAQM 	Amy is an air quality consultant with 4 years' experience of carrying out Air Quality Assessments, Feasibility Studies and Carbon Assessments for a variety of projects. Key skills include using dispersion modelling software such as ADMS, undertaking DMRB assessment, including use of the screening tool and assessing new highways schemes in line with WebTAG. Her experience includes undertaking construction dust assessments, contributing to EIA report chapters as well as standalone assessment and liaison with local authorities and other technical consultants.
Cultural heritage Cat Peters	Cat has 15 years' experience as an archaeologist covering large- and small-scale projects in both rural and urban environments. She also has extensive experience as an archaeological researcher. Cat has led on desk-based assessments, heritage impact assessments, EIA,

¹ DMRB Vol 11, Section 1, Part 1: LA101: Introduction to environmental assessment, <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section1/la101.pdf>

<ul style="list-style-type: none"> BA (Hons) (Ancient History and Archaeology) MLitt (Archaeology) ACIfA 	<p>landscape surveys, archaeological watching briefs, archaeological evaluations and archaeological building recordings. Most recently she has taken the lead on Wardell Armstrong's non-intrusive archaeological input for parts of the HS2 scheme.</p>
<p>Biodiversity</p> <p>David Milburn</p> <ul style="list-style-type: none"> BSc (Hons) Zoology Member of The Royal Entomology Society 	<p>David is a professional ecologist with 7 years' experience in conservation and private consultancy fields, and has experience carrying out a wide range of protected species surveys. This experience has included producing the scoping report for Carlisle Southern Link Road and assisting on the production for the full ES Chapter.</p> <p>He has also worked for the Environment Agency where he undertook a variety of freshwater surveys including for invertebrates, macrophytes and RHS, he was also the technical lead for freshwater pearl mussel for Cumbria and Lancashire providing advice on the species conservation to a variety of stakeholders. He also responded to planning applications, providing advice on EIAs, and advised on Appropriate Assessments under the Habitats Regulations 2017.</p>
<p>Landscape (landscape character)</p> <p>Rosie Place</p> <ul style="list-style-type: none"> BA (Hons) Landscape Architecture Postgraduate Diploma Landscape Architecture CMLI 	<p>Rosie is a Chartered Landscape Architect with 7 years' experience in landscape design and landscape visual impact assessment. Her experience covers transport infrastructure schemes, sustainable transport initiatives and large flood defence schemes amongst others. She led the landscape assessment work on the Stage 2 design development for CSLR.</p>
<p>Landscape (visual effects)</p> <p>Timothy Cousins</p> <ul style="list-style-type: none"> BA(Hons) Landscape Architecture CMLI 	<p>Timothy is a Chartered Landscape Architect with 9 years' experience in landscape and visual impact assessments, visual photography and visualisations on large infrastructure projects; landscape design, construction and environmental/ conservation contracting. He also has experience in road restraint systems (RRS), engineering and specialises in the application of Auto CAD, Civil 3D and Revit.</p>
<p>Population and Human Health: Private property and housing, community land and assets, and development land and businesses</p> <p>Neil Griffiths</p> <ul style="list-style-type: none"> BA (Hons) Town and County Planning 	<p>Neil has 33 years' experience in a variety of environmental land-based planning roles including development management and supporting the development and implementation of local plan policies in the public sector and the design, development and delivery of capital and revenue based economic development and regeneration projects. Most recent experience has included contributing towards the scoping assessment for the Carlisle Southern Link Road in respect of the effects on development land.</p>
<p>Population and human health: Walkers, cyclists and horse-riders and Population and human health: Human health</p> <p>Andrew Kenny</p> <ul style="list-style-type: none"> BSc (Hons) Environmental Sciences Graduate Member of CIEEM 	<p>Andrew has 6 years' experience in environmental assessment. Andrew's experience includes coordination of EIAs, compiling ESs and addenda, contributions to SEAs, Habitats Regulations Assessments, assessment of planning applications and sub-contractor management as well as the planning coordination and delivery of ecology surveys.</p>
<p>Noise and vibration</p> <p>Josep Simona</p>	<p>Josep has over 16 years' experience in environmental noise and vibration and has undertaken transport related noise assessments for numerous projects such as new</p>

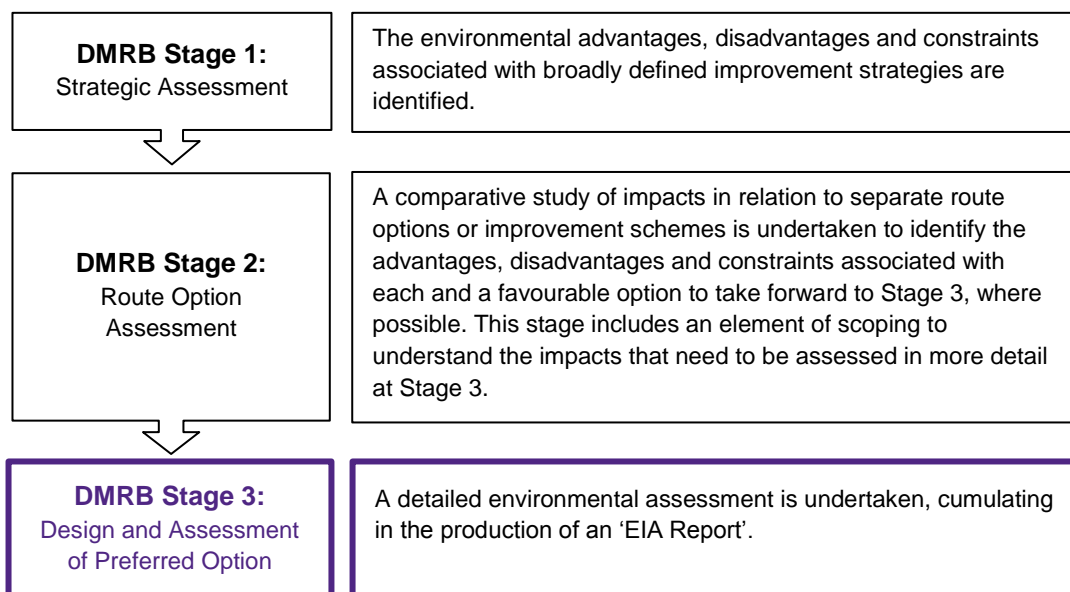
<ul style="list-style-type: none"> • BEng Environmental Chemistry • MSc Industrial Scheduling • MSc Natural Resources Engineering • CEnv MEnvSc Associate IAQM • MIOA 	<p>and altered roads, railway lines, high speed rail, park and share facilities, construction compounds, industrial facilities, urban redevelopment and residential development. Josep previously led the noise element in the smart motorway projects for the M1 J23a-25 and at the M1 J13-16 and in the A47 Improvements within Highways England's Collaborative Delivery Framework.</p>
<p>Road drainage and the water environment</p> <p>Amit Patel</p> <ul style="list-style-type: none"> • BEng Civil Engineering, • MEng Environmental Engineering • MSc Environmental Science • CEnv Chartered Environmentalist • CEng Chartered Engineer • C.WEM Chartered Water and Environmental Manager • CIWEM Chartered Member of Chartered Institute of Water and Environmental Management <p>Robin Chase</p> <ul style="list-style-type: none"> • BA(Hons) Engineering Mechanics • MSc Project Management • PGDip Agricultural Engineering (Soil & Water) • CEnv 	<p>Amit has over 17 years' experience in drainage design and assessment, wastewater network and treatment, infrastructure drainage and flood risk assessment and engineering. He is proficient in hydraulic modelling for drainage design for infrastructure development and wastewater network. He has delivered major drainage and flood alleviation schemes from conceptual to commissioning stage. He is a Technical Approval Authority for drainage element of the Infrastructure Recovery Programme for Cumbria County Council following Storm Desmond.</p> <p>Robin has over 30 years' experience in river management, river restoration, land drainage and flood risk engineering for both fluvial and coastal works. He has assessed, designed and managed flood defence infrastructure and natural flood management potential in river catchments. Robin has also produced WFD assessments for flood defence and infrastructure projects and the selection of mitigation measures for heavily modified water bodies.</p>
<p>Geology and soils</p> <p>Rachel Samuel</p> <ul style="list-style-type: none"> • MGeol Geology • MSc Engineering Geology • FGS 	<p>Rachel has over 3 years' experience in geotechnical engineering and has undertaken geology and soils related assessments for numerous highways related projects which include new and altered roads. Rachel recently conducted assessments for the Carlisle Southern Link Road Project, Grizebeck Highway Improvement and the Inverness West Link Road.</p>
<p>Material assets and waste</p> <p>Ryan Simpson</p> <ul style="list-style-type: none"> • L3 Diploma Engineering • L3 Construction in the built environment • NVQ L3 Civil Engineers for Technicians • HNC in Civil Engineering • Currently studying towards BEng Civil Engineering (1.5yr remaining) • ICE EngTech Status 	<p>Ryan has over 4 years' experience in civil engineering and has worked collaboratively with the environment team to successfully deliver infrastructure projects such as the Carlisle Southern Link Road. With this experience, he has been able to contribute his civil engineering capabilities to the assessment of materials and waste, a topic heavily dependent on engineering input.</p>

2. The Environmental Impact Assessment

2.1. The Stages of Assessment for Road Schemes

- 2.1.1. The design and development of major road schemes in the UK is carried out in accordance with legislative and best practice guidelines outlined in the Design Manual for Roads and Bridges (DMRB). Volume 5, Section 1, Part 2 of the DMRB outlines a three-stage process to scheme assessment with information from the previous stage used to inform the next. The objectives of the assessment at each stage are as shown in Figure 2.1, below.

Figure 2.1: DMRB Stages of Assessment



- 2.1.2. A Stage 1 assessment of the scheme was completed in June 2018 by AECOM Ltd,². This report identified 9 options for the proposed scheme and subjected these to a scored assessment process based on the Department for Transport's Early Assessment and Sifting Tool (EAST). The three options identified as the highest scoring (2a, 4 and 5) were recommended to be carried forward to the next stage of design.
- 2.1.3. A Stage 2 assessment was completed in August 2018 to compare the three shortlisted options³ in terms of environmental, geotechnical, design and buildability terms. Following consultation with stakeholders and the public, the "blue route" (option 4) was formally announced as the preferred route alignment on 14th March 2019.

2.2. Objectives of the Environmental Impact Assessment

- 2.2.1. DMRB Volume 5, Section 1, Part 2 identifies the purpose of the Stage 3 assessment as:
- 'providing sufficient assessment to identify clearly the advantages and disadvantages, in environmental, engineering, economic and traffic terms, of the Overseeing Department's*

² AECOM Ltd, 5th June 2018, A595 Grizebeck Stage 1 Report.

³ AECOM Ltd, 29th August 2018, A595 Grizebeck Stage 2 Options and Modelling Report

preferred route or scheme option. A particular requirement at this stage is an assessment of the significant environmental effects of the project...

2.2.2. The main objectives of the environmental impact assessment process are to:

- ensure that consideration and reporting of the likely environmental effects is undertaken by the Overseeing Organisation so that planning and design decisions can be fully informed;
- ensure that the relative importance of the likely impacts are properly evaluated;
- aid the identification of measures that could reduce the magnitude of potentially negative impacts and the scope for such mitigation; and
- to provide opportunities for stakeholders, including the public and statutory environmental bodies to comment on proposals.

2.2.3. A key principal of EIA and scheme design is the iterative process in which they operate; each running concurrently and having the ability to directly influence the other. As the environmental effects of the developing design are recognised, the design can be adjusted to mitigate against these effects. Similarly, as the design evolves the scope of assessment may change.

2.3. Legislative Framework for the Assessment

2.3.1. European and UK Legislation for Environmental Impact Assessment seeks to govern the type and scale of development projects which by law require an EIA to be carried out with the subsequent production of an EIA report.

2.3.2. At DMRB Stage 3 the EIA culminates in the production of an ES. Appropriate European and UK legislation guiding the Stage 3 assessment includes:

- European Council Directive 2014/52/EU on the assessment of effects of certain public and private projects on the environment (amending Directive 2011/92/EU) (the '*EIA Directive*'); and,
- Statutory Instrument 2017 No. 571 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the '*EIA Regulations*').

2.4. Best Practice Guidance and EIA

2.4.1. The environmental assessment at Stage 3 will principally be carried out in accordance with Volume 11 of DMRB which provides guidance specifically for the application of EIA to road schemes, including detailed and comprehensive information on the approach to assessment in relation to different environmental topics.

2.4.2. Since its initial publication, Volume 11 of DMRB has been progressively updated, with new guidance typically published first in the form of 'Interim Advice Notes' (IANs) and subsequently incorporated into the relevant sections of DMRB. Since April 2017, Highways England began updating the complete suite of documents within the manual with the review due for completion by March 2020.

- 2.4.3. During the preparation of this Scoping Report, updates to Volume 11 were incrementally released. The revised methodologies where available have therefore been adopted in this Scoping Report. In addition, where appropriate, supplementary best practice guidance has also been consulted in the assessment of specific environmental topics. Reference to these guidance documents is provided in the individual topic assessment chapters.

2.5. The Scoping Report

- 2.5.1. An applicant minded to make a planning application that constitutes EIA development may request a 'scoping opinion' from the LPA setting out the scope and level of detail of the information to be provided in the EIA report to support an application.
- 2.5.2. The EIA Regulations set out the requirements for an applicant requesting a scoping opinion from the LPA. Regulation 15(a) of the EIA Regulations require a Scoping Report to include:
- A plan sufficient to identify the land (*see Appendix A*);
 - A brief description of the nature and purpose of the development, including its location and technical capacity (*see Section 3.3*);
 - An explanation of the likely significant effects of the development on the environment (*see Part Two*); and,
 - Such other information or representations as the person making the request may wish to provide or make.
- 2.5.3. The purpose of this EIA Scoping Report is therefore to:
- Provide a summary of the proposed Scheme and alternatives considered to date;
 - Describe the baseline conditions of the environment, its sensitivities or constraints (as is currently known);
 - Outline an initial understanding of potential impacts and effects (including cumulative effects) as established in Stage 1 and 2 assessments;
 - Set out the scope of work and methodologies to be applied under each environmental discipline in carrying out the Stage 3 EIA;
 - Set out the proposed structure of the ES to be submitted with any future planning application for the Scheme.

2.6. General Approach to Assessment

Environmental Topics

- 2.6.1. DMRB Volume 11 advises on the environmental topics to be included in an EIA in relation to road schemes and sets out both the general process and the methods for assessing these individual topics. As discussed in 2.4.3, the volume is being updated with some topics merged, renamed or removed.

2.6.2. The topics identified in Volume 11 and considered for their inclusion in the EIA are:

- Air Quality
- Cultural Heritage
- Biodiversity
- Landscape and Visual Effects
- Population and Human Health
- Noise and Vibration
- Road Drainage and the Water Environment
- Geology and Soils
- Material Assets and Waste
- Climate

2.6.3. While the topic of Transport and its impacts are often considered to be a discrete topic chapter in EIA, it has not been considered in this scoping report for the following reasons:

- Transport modelling has not yet started on this scheme, and as such a scoping chapter would not be based on any established traffic baseline or quantified impacts; and,
- The impacts of, and upon, transport required for planning will be covered in a Transport Assessment separate to the EIA Report.

2.6.4. For each topic, the Scoping Report and EIA Report will consider the aspects outlined below.

Study Areas

2.6.5. Typically, no single study area is applicable to all topics. Instead, the study areas vary according to: the geographical scope of the potential effects relevant to each topic; the information required to make an appropriate assessment of these effects; any topic specific best practice guidance; and any feedback received through consultation activities.

2.6.6. A description of the study area to be applied in the assessment of the different environmental topics along with a justification for its use is provided within each topic chapter.

Baseline Data

2.6.7. Establishing the baseline environmental conditions (i.e. the environment without the Scheme) is a necessary starting point to enable any assessment of potential change resulting from the proposals. The description of the baseline accounts for any changes likely to occur before scheme construction and operation commences. This includes any independent changes that can be predicted including, changes to legislation, regulations

and policy, traffic growth and other community developments with a level of commitment established, such as planning consent gained.

- 2.6.8. The baseline therefore requires first, the identification of the existing situation and then the prediction of any likely changes to occur between the date of assessment and project commencement and operation.
- 2.6.9. Baseline conditions have been established to a limited extent by desk-based study and/or survey, and/or calculated by modelling where appropriate during the Stage 1 and 2 assessments undertaken by AECOM. During Stage 3 baseline, conditions will be reviewed, refined and amended accordingly based on further information obtained through more detailed surveys and/or modelling.
- 2.6.10. For some topics (i.e. Noise and Vibration, Air Quality, Visual Impact and Landscape Character), it will also be necessary to account for a baseline situation (or a 'do-minimum' scenario) and 15 years after scheme opening. This allows for longer term impacts to be understood and for the benefits of mitigation (i.e. planting) to be realised.
- 2.6.11. Baselines will therefore be taken at:
 - the time immediately prior to when construction is expected to start for effects arising from construction. The start of construction year for this scheme is unknown at this time;
 - the date that the scheme is expected to open to traffic for impacts arising from its operation on opening. The Opening Year for this scheme is also not defined at the present time; and,
 - a period after the scheme opens for traffic (usually taken at 15 years after opening) for impacts arising from its operation in the longer term (the Design Year for this scheme being unknown at this time) [Air Quality, Noise and Vibration, Visual Impact, and Landscape Character].
- 2.6.12. The description of the baseline and future baseline conditions will identify receptors that may be affected by the proposals. As some receptors can be more sensitive to certain impacts or can be considered to be more valuable, each identified receptor will be assigned a '**value**' (or 'sensitivity') rating, which is defined in general on a five-point scale with descriptors for; *very high*, *high*, *medium*, *low*, and *negligible* values. Reference should be made to the 'Assessment Methodology' sections within each topic chapter for the relevant 'value' (or 'sensitivity') ratings and descriptors to be applied, if applicable.

Defining Assessment Years and Scenarios

- 2.6.13. The assessment of effects compares a scenario with the scheme against one without a scheme over time. The absence and presence of the scheme are referred to as the 'do minimum' and 'do something' scenarios respectfully. The 'do minimum' scenario represents the future baseline with minimal interventions and without new infrastructure such as the proposed scheme or any alternatives. The 'do something' scenario represents the situation if the scheme is progressed.
- 2.6.14. Depending on the environmental topic, the effects will be assessed for the 'do minimum' and 'do something' scenarios in the baseline years for construction and opening. Some topics will also make an assessment in a future year which is usually taken at 15 years after

opening but may be taken in the worst year within 15 years of operation. It should be noted that in some cases the worst year in the first 15 years of operation can be the opening year. In such instances, no future year assessment will be made.

Table 2.1: General assumed assessment years and scenarios to be applied

Assessment Years	Year	Assessment Scenarios
Baseline (<i>immediately prior to construction</i>)	Unknown at this time	N/A
Opening		do minimum / do something
Future (+15 years or <i>*worst year in the 15 years following construction</i>)		do minimum / do something

Identifying Potential Impacts and Effects

- 2.6.15. Following a review of the baseline information, likely ‘*impacts*’ on the environment (i.e. the changes resulting from an action) and their ‘*effects*’ (i.e. the consequences of those impacts) will be updated/identified. This will form the basis of a ‘*Preliminary Impact Assessment*’ which identifies potential impacts and effects at an early stage of design development, without mitigation measures or enhancements in place.
- 2.6.16. The impacts and their associated effects identified will include those that are: direct, indirect or cumulative; permanent or temporary; positive (beneficial) or negative (adverse); and, short, medium or long term in nature. They may result from:
- the existence of the development;
 - the use of natural resources;
 - the emission of pollutants, the creation of nuisances and the elimination of waste; and,
 - forecasting methods used to assess the effects on the environment.
- 2.6.17. Where possible each identified impact will then be assigned a value for ‘**magnitude**’ (or extent) of change, defined in general on a four-point scale with descriptors for; *major*, *moderate*, *minor*, and *no change*. Reference should be made to the ‘Assessment Methodology’ sections within each topic chapter for the relevant ‘magnitude’ of change ratings and descriptors to be applied, if applicable.

Assessing Significance

- 2.6.18. The **significance** of an environmental effect is typically a function of the ‘**value**’ (or ‘sensitivity’) of a receptor and the ‘**magnitude**’ (or extent) of impact. Combining the environmental value of the receptor with the magnitude of impact produces a significance of effect category.
- 2.6.19. DMRB Volume 11, Section 2, Part 5 ‘Assessment and Management of Environmental Effects’ provides generic terminology and criteria for the assignment of environmental value, magnitude of impact and significance of effects. In assigning a significance category to the effect, DMRB recognises that the approach relies on reasoned argument, professional judgement and the need to take on board the advice and views of appropriate organisations.

- 2.6.20. By assigning each effect to one of five significance categories (*very large, large, moderate, slight, or neutral*) different topic issues can be placed on the same scale thus assisting the decision-making process by being comparable at whatever stage the project is at within that process. Typical descriptors for the significance of effect are provided in Table 2.2.

DMRB advocates applying the formula: the greater the environmental value (or sensitivity) of the receptor, and the greater the magnitude (or extent) of the impact, then the more significant the effect. This can be aided by use of a matrix, such as that shown in DMRB Volume 11, Section 2, Chapter 2 and replicated in

- 2.6.21. Figure 2.2.
- 2.6.22. In general, those effects assessed as moderate, large, or very large are considered 'significant' and are taken forward to the residual assessment once mitigation measures are applied.
- 2.6.23. Not all the environmental topics will use the matrix based approach as described above but will instead use numerical values to identify significance of effects (i.e. Noise and Vibration). Furthermore, some topics do not have agreed or standard methods of assessment or scales of measurement for either 'value' (or sensitivity) of a receptor or 'magnitude' (or extent) of change to assist with the matrix based approach. Where alternative bases of assessment apply, details are provided within the 'Assessment Methodology' sections within each topic chapter.

Table 2.2: Typical descriptors for the significance of effect categories

Significance category	Typical descriptors of effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Figure 2.2: Typical matrix for determining significance of effect category

Environmental Value (Sensitivity)	Magnitude of Impact (Degree of Change)					
		No change	Negligible	Minor	Moderate	Major
	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Mitigation Measures, Enhancements, and Residual Effects

- 2.6.24. Where potentially significant adverse environmental effects are identified during the 'Preliminary Impact Assessment', developing appropriate mitigation will be an iterative part of scheme development following the mitigation hierarchy of: avoidance, reduction, remediation, compensation.
- 2.6.25. The term 'enhancement' typically refers to providing measures over and above those needed to mitigate the adverse effect, and/or maximising the opportunity for beneficial effects of the scheme. Enhancement opportunities will be explored at Stage 3.
- 2.6.26. Effects that remain after mitigation are referred to as 'residual effects'. Following agreement of the mitigation and enhancement measures to be applied, environmental impact assessments will be repeated for those impacts with a significant effect, this time accounting for all agreed mitigation measures being in place. The significance of any 'residual effects' will then be reported.

Scoping recommendation

- 2.6.27. Based on the presented evidence, each chapter will recommend whether that topic should be scoped into the EIA report. DMRB LA103 requires that scoping should "*define what level of environmental assessment (simple or detailed) is to be undertaken for those environmental factors (or any elements) scoped in*". For the purposes of this report, all topics that are scoped in are done so with the intent of future detailed assessment i.e.

utilising field surveys and/ or quantified modelling where required, as opposed to simple assessment using “readily available”⁴ data.

Assessment of Cumulative Effects

- 2.6.28. The EIA Regulations require an assessment of cumulative effects; those that are the result of multiple actions on environmental receptors and resources. There are two types of cumulative effect:
1. The combined action of a number of different environmental topic-specific effects upon a single/resource receptor within a single project ('intra-project cumulative effects'); and,
 2. The combined action of a number of different projects, cumulatively with the scheme being assessed, on a single resource/receptor ('inter-project cumulative effects').
- 2.6.29. With reference to point 2) above, the EIA Regulations do not provide a detailed description of the projects that should be considered within a cumulative assessment. However, Schedule 4, Part 5(e) states an assessment should consider 'the cumulation of effects with other existing and/or approved projects'. This is interpreted in DMRB⁵ to include:
- *“roads projects which have been confirmed for delivery over a similar timeframe;*
 - *other development projects with valid planning permissions or consent orders, and for which EIA is a requirement; and,*
 - *proposals in adopted development plans with a clear identified programme for delivery.”*
- 2.6.30. DMRB further states that the assessment of cumulative effects shall:
- *“establish the zone of influence of the project together with other projects;*
 - *establish a list of projects which have the potential to result in cumulative impacts; and,*
 - *obtain further information and detail on the list of identified projects to support further assessment”.*
- 2.6.31. As the consideration of cumulative effects is mandatory in EIA reports, this Scoping report does not seek to scope them out. The full EIA report for this project will report on cumulative effects as outlined by DMRB above, using professional judgement. However, clarification is sought from the LPA as to:
- The appropriate study radius (from the scheme centreline) within which other developments, projects and proposals should be included in the cumulative effects assessment,

⁴ DMRB Vol 11 section 1, part 3; Scoping projects for environmental assessment
<http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/la103.pdf>

⁵ DMRB Vol 11 section 1, part 4; LA104: Environmental assessment and monitoring
<http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/la104.pdf>

- An appropriate cut- off data for the consideration of consented planning approvals; and,
- The threshold (e.g. in terms of size, scale and function) to be used to decide at which non- local plan planning approvals should be included in the assessment and the basis for this decision.

Assessment of major accidents and/ or disasters

- 2.6.32. Regulation 18(3) in Schedule 4 (Information for inclusion in Environmental Statements) of the EIA Directive states the requirement for an EIA to include: *“A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU F90 of the European Parliament and of the Council or Council Directive 2009/71/Euratom F91 or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.”*
- 2.6.33. DMRB LA 104 states that EIA should assess:
- The vulnerability of the project to risks of major accidents and disasters
 - any consequential changes in the predicted effects of that project on environmental factors
- 2.6.34. Major accidents and disasters are specified to include both man- made and naturally occurring events, but DMRB also notes that there is no definition of major accidents and disasters in legislation.
- 2.6.35. DMRB further states that when scoping major accidents and disasters projects should:
1. apply professional judgement, in consultation with the Overseeing Organisation, to develop project specific definitions of major events,
 2. identify any major events that are relevant to and can affect a project,
 3. describe the potential for any change in the assessed significance of the project on relevant environmental factors in qualitative terms,
 4. report the conclusions of this assessment within the individual environmental factors; and,
 5. clearly describe any assumed mitigation measures, to evidence assessment conclusions and demonstrate that likely effects have been mitigated and managed to an acceptable level.
- 2.6.36. As, like with cumulative effects, the consideration of major accidents and disasters is mandatory in EIA reports, this Scoping report does not seek to scope them out. However, clarification is sought from the LPA as to points 1 and 2 above. Once these points are

resolved, the full EIA report will identify a list of potential major accidents and disasters relevant to the Grizebeck scheme and incorporate them into the EIA so that the relevant topic chapter accounts for their impact e.g. Road Drainage and the Water Environment will consider the issue of flooding in the context of a major disaster.

Assessment of heat and radiation impacts

- 2.6.37. Regulation 18(3) in Schedule 4 of the EIA Directive requires EIAs to include; “*A description of the likely significant effects of the development on the environment resulting from, inter alia: ...the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste*”.
- 2.6.38. In regard to heat and radiation, DMRB specifies that the potential impacts must be reported within EIA reports in accordance with the Directive. However, DMRB also notes that; “*Heat and radiation is unlikely to be relevant to the scope of most motorway and all-purpose trunk road projects*”.
- 2.6.39. In concurrence with the above statement, it is considered that there is no feasible source or pathway in which the proposed highway scheme could create a heat and/ or radiation impact, and therefore this is not considered further in this report and it is recommended that the heat and radiation aspect are scoped out of the full EIA report.

3. Alternatives Considered

3.1. The Existing Conditions

- 3.1.1. The broad geographic corridor for the scheme lies on predominantly agricultural land between the villages of Grizebeck and Chapels, within 150m east of the current A595 alignment. To the north, the A595 and A5092 provide a west- east link between Millom and Kendal, and to the south the current A595 alignment provides access from this west- east corridor to the Furness Peninsula. Connectivity along this southbound route is constricted between Grizebeck and Chapels where the A595 narrows to effectively single- lane and passes through the farmyard of Dove Ford Farm, creating both a pinch point and an accident black spot.
- 3.1.2. Key features in the landscape which would need to be crossed by any new link include; Grize Beck, a nearby unnamed watercourse, the area of woodland surrounding Grize Beck to the north and northwest of Grizebeck community hall, and the north- south section of the A595 between Grizebeck and Dove Ford Farm. The topography generally steepens to the east towards Kirkby Slate Quarry, and to the west slopes gradually downwards to the Duddon Sands estuary.

3.2. Proposed Scheme History

- 3.2.1. The strategic importance of the A595 has been acknowledged by government and it is included in the Department for Transport's Major Road Network. The Secretary of State for Transport has also identified improvements to the A595 at Grizebeck as one of the first schemes to be developed further on the Major Road Network.
- 3.2.2. In September 2016 the Cumbria Local Enterprise Partnership together with Highways England and Cumbria County Council published the *West of M6 Strategic Connectivity Study*. This study examined the issues and constraints associated with the strategic road connectivity, route capability, resilience and reliability of the A595, A66 and A590 trunk roads, west of the M6 motorway. Using Stage 1 WebTAG appraisal methods, a long list of 100 transport interventions were identified, with a resulting 38 schemes prioritised for further development.
- 3.2.3. In January 2018 the *West of M6 Strategic Outline Business Case: A595 and A66* was published, further enhanced the evidence from the *West of M6 Strategic Connectivity Study* for these two route corridors. Using the DfT's Five Case Model methodology, the SOBC demonstrated the need for vital transport infrastructure improvements to support the growing economy and further expected investment of the Energy Coast, as well as strengthening resilience on the network and giving relief from congestion and severance for settlements reliant on the A595. Together with demonstrating financial and commercial viability, the economic case showed that, collectively, the identified measures provide good value-for-money against the combined capital expenditure.
- 3.2.4. In June 2018 AECOM Ltd undertook a Stage 1 assessment that developed and assessed nine route options to address the issues with the existing A595 route. Three of them (2a, 4 and 5) were taken forward to Stage 2 assessment.
- 3.2.5. In August 2018, AECOM took these three options to Stage 2 assessment for further design, review and analysis. This included environmental and geotechnical desktop studies and

traffic modelling. The findings of this assessment were taken forward for further statutory and public consultation.

- 3.2.6. Options 2a and 4 were selected to be taken forward to consultation. Three main groups of stakeholders were identified; Project Group/ Decision Makers, Internal Stakeholders and External Stakeholders. The Project Group/Decision Makers and Internal Stakeholders are made up of the A595 Grizebeck Project Review group, which includes various internal council teams; the Grizebeck Project Board and the council's departmental management team, and cabinet members; it also includes local councillors and various highways and local committee working groups.
- 3.2.7. The External Stakeholders group consists of local MPs, local district authorities, the Cumbria Local Enterprise Partnership, and Transport for the North. It also includes statutory stakeholders such as the Environment Agency, Highways England, Natural England and Historic England, and lastly, local Parish Councils, other interest groups, landowners and businesses.
- 3.2.8. The timeline of the consultation is summarised as follows:
- July 2018:
 - Workshop on preferred interventions with council members
 - September 2018:
 - Meetings with council members on upcoming consultation
 - Newsletter produced and shared with local stakeholders, parish councils and local businesses
 - October 2018:
 - Letters sent to affected landowners, businesses and other key stakeholders
 - Meetings with key landowners
 - Press release and media briefing
 - Consultation materials published
 - Start of consultation period (19th October)
 - Consultation event at Grizebeck Community Hall (19th October)
 - November 2018:
 - Consultation Event at Grizebeck Community Hall (7th November)
 - End of Consultation (16th November)
- 3.2.9. Consultation with the public strongly favoured the “blue route” (option 4a, the bypass east of Dove Ford Farm). This route was formally announced as the preferred route on 14/03/2019.

Table 3.1 Alternatives Considered

DMRB Stage	Options Considered	Options Taken Forward to Next Stage
Stage 1	<p>9 route options were considered:</p> <ul style="list-style-type: none"> 1: On-line widening of the narrow section of road to the north and south of the farm and the implementation of traffic signals to control traffic through the remaining pinch point over a length of approximately 120m. This would include a realignment of the bend to the north of the farm to create a safe alignment. 1a: This measure is the same as 1 but with a bypass of Grizebeck from north of the farm to join up with the A595 to the west of Grizebeck. 2: On-line widening of the narrow section of road including the demolition of at least two farm buildings. This would include a realignment of the bend to the north of the farm to create a safe alignment. 2a: This measure is the same as 2 but with a bypass of Grizebeck from north of the farm to join up with the A595 to the west of Grizebeck. 3: This measure would bypass the narrow section of road to the east of the existing road creating a new connection with the existing A595 south of the village of Grizebeck. This would remove the pinch point on the road. New junctions/ access would be required to maintain accesses to the properties on the existing section of road. 3a: This measure would bypass the narrow section of road to the west of the existing road creating a new connection with the existing A595 south of the village of Grizebeck. This would remove the pinch point on the road. New junctions/ access would be required to maintain accesses to the properties on the existing section of road. 4: Full bypass to the east of Farm – This is the same as Measure 3 but with a bypass of the village to join up with the A595 to the west of Grizebeck. 4a: Full bypass to the east of Farm – This is the same as Measure 3a but with a bypass of the village to join up with the A595 to the west of Grizebeck. 5: Buckhorn Lane Upgrade. Buckhorn Lane runs north from Chapels to meet the A5092 to the east of Grizebeck. This option would involve widening the existing narrow lane and realigning in locations to remove tight radii and avoid properties. The alignment would allow online widening on a quiet road and avoid complex traffic management. The junction with the A5092 has good visibility that would allow a safe junction. The route is away from flood zones to the west of Grizebeck and would not need any significant structures. However, this measure would involve upgrading an existing narrow country lane to a major road in the Cumbria road network. The route does run past at least four dwellings and the alignment would need to avoid these. It would also be necessary to downgrade the existing A595 and stop it up to avoid through traffic to and from the A595 west. The route would be approximately 750m longer than the existing A595 route and approximately 1km longer than a bypass of Grizebeck and the farm. 	<p>2a</p> <p>4</p> <p>5</p>
Stage 2	<ul style="list-style-type: none"> 2a: Widen existing A595 carriageway (to 7.3m); remove bend north of farm (requires demolition of at least 2 buildings); new 	Option 4

DMRB Stage	Options Considered	Options Taken Forward to Next Stage
	<p>offline bypass of Grizebeck to the west (new junction with A595); existing western junction in Grizebeck to be stopped.</p> <ul style="list-style-type: none"> 4: Bypass of the A595 pinch point/ Grizebeck. New junction created at the Chapels junction (A595/ Buckhorn Lane); bypass to the east of farm crossing existing A595 alignment east of pinch point; new junction with A595 created to west of Grizebeck. 5: Buckhorn Lane Upgrade - online widening of existing carriageway; section of new offline road to be created to the east of St Mary's Wall; new junction to be created at Chapels; new junction to be created with A5092 to east of Grizebeck. 	
Stage 3	The route will continue to be developed following confirmation of government funding, anticipated to be in January 2020.	N/A

3.3. The Preferred Route

3.3.1. The scheme would be 1260m in length and join into the existing A595 route north west of Smithy Cottage in Chapels and a short distance East of Ellermire Bridge in Grizebeck. A description of the route is provided below, divided by chainage (distance along the road). Reference should be made to **Appendix A**.

- **Chainage 0-150m:** Starting adjacent to Smithy Cottage, the new highway would be constructed over the existing A595 route and the adjacent fields.
- **Chainage 150-880m:** The majority of the proposed route would pass through semi-improved agricultural grassland, used for grazing livestock. The route would pass through several existing drystone wall field boundaries and isolated stands of trees.
- **Chainage 880-900m:** At this location the proposed route would cross the current A595 alignment as it leads south west from Grizebeck. The A595 will be closed off here and retained as access only for landowners.
- **900-990m:** The proposed route would pass through another agricultural field adjacent to Grizebeck Community Hall, separated from the hall by approximately 50m.
- **990- 1130m:** This section of the route would pass through a hedge, the woodland surrounding Grize Beck and the unnamed watercourse, and over the two watercourses themselves. Some woodland clearance and engineered structures would be required to enable crossing of the watercourses.
- **1130- 1260m:** The route would pass through another field before connecting to the A595 approx. 30- 40m east of Ellermire Bridge over Press Beck. The existing A595 would be upgraded to accommodate the new junction with the proposed bypass. These works would be adjacent to multiple residential properties and likely affect traffic on the A595.

3.3.2. The design is likely to experience some minor changes as detailed design progresses, though the alignment is unlikely to change significantly. Additionally, there may be some accommodation works to enable continued landowner access to fields.

Part Two Environmental Impact Assessments

4. Air Quality

4.1. Introduction

- 4.1.1. This chapter addresses the potential air quality impacts associated with the construction and operation of the proposed scheme. The key focus of the scoping will be the effects of dust during the construction and operation of the proposed scheme. In addition, the potential emissions from additional traffic movements generated on the local road network during the construction and operation of the proposed scheme are also considered.

4.2. Baseline Conditions

Local air quality management

- 4.2.1. South Lakeland District Council (SLDC) monitors air quality in the vicinity of the site. SLDC has declared one Air Quality Management Area (AQMA) for exceedances of the annual mean NO₂ National Air Quality Objective (NAQO), which is in Kendal town centre and lies 30km from the proposed scheme.

Local emissions sources

- 4.2.2. The proposed scheme is located in an area where air quality is rural in nature, however the main influences on air pollution will be road traffic associated with the A5092 and the A595.

Defra background mapping

- 4.2.3. The Department for Environment, Food and Rural Affairs (Defra) 'Background Mapping data for local authorities⁶ provides modelled background concentrations for each 1x1 km grid across all local authority areas from a base year of 2019. This data is projected up to 2030. Table 4.1 presents the estimated background concentrations for the site.

Table 2.1: 2019 Defra background mapped concentrations

Defra Grid Square Coordinates (X, Y)	Defra Background Concentration (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
323500,485500	4.2	8.1	5.2

- 4.2.4. Background concentrations for the grid squares within which the Scheme resides are all well below the annual mean NAQOs in 2019.

SLDC monitoring

- 4.2.5. SLDC only undertake automatic monitoring in Kendal which lies approximately 30km from the proposed scheme. SLDC monitors annual mean NO₂ concentrations through diffusion tube surveys at various locations within the borough. The closest diffusion monitoring that is undertaken is in Ulverston which lies approximately 9 km from the site and is not, therefore, representative of the site conditions.

⁶ <https://uk-air.defra.gov.uk/data/laqm-background-home>

Sensitive receptors

- 4.2.6. There are several sensitive human receptors in the vicinity of the proposed scheme. All residential receptors are classified as highly sensitive to dust impacts and road traffic impacts.
- 4.2.7. There are no designated ecological sites in the vicinity of the scheme.

4.3. Potential Impacts, Effects and Mitigation

- 4.3.1. The proposed scheme has the potential to impact on air quality experienced at existing receptor locations such as residential locations through different phases of the proposed scheme, including the construction phase and the operational phase.
- 4.3.2. The significance of air quality impacts are defined using the national air quality objectives (NAQOs) which are defined regarding human health impacts as described below in section 4.5. The Institute of Air Quality Management (IAQM) provides impact descriptors (based on the NAQOs) to determine the significance of any impacts to air quality and consequently, human health, as shown in Table 4.2.

Table 4.2: EPUK/ IAQM impact descriptors for individual receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to NAQO			
	1	2-5	6-10	>10
75% or less of NAQO	Negligible	Negligible	Slight	Moderate
76-94% of NAQO	Negligible	Slight	Moderate	Moderate
95-102% of NAQO	Slight	Moderate	Moderate	Substantial
103-109% of NAQO	Moderate	Moderate	Substantial	Substantial
110% or more of NAQO	Moderate	Substantial	Substantial	Substantial

- 4.3.3. Air quality impacts during the construction phase may arise from the dust associated with the construction activities. There is also the potential of impacts from HGV movements during the construction phase. Air quality impacts during the operational phase may arise from introducing traffic movements on the proposed scheme and therefore closer to some existing receptors.

4.4. Scoping Recommendation

- 4.4.1. DMRB states that an assessment should be undertaken if there is an increase in annual average daily traffic (AADT) by more than 1000 movements, or an increase in HGVs by more than 200 movements. The traffic data for the construction and operational phase will be screened against these criteria. Given that the scheme is a new road, it is likely that these criteria will be met, therefore an assessment should be undertaken using the DMRB methodology.
- 4.4.2. It is recommended that the assessment of air quality and construction dust are scoped into the EIA.

4.5. Assessment Methodology

Guidelines

4.5.1. The assessment will be undertaken in line with the following guidance:

- Local Air Quality Management Technical Guidance⁷
- Land-Use Planning & Development Control: Planning for Air Quality (2017)⁸
- Guidance on the Assessment of Dust from Demolition and Construction⁹
- Design Manual for Roads and Bridges (DMRB)

Regulatory and Policy Framework

4.5.2. Air quality is governed by a series of local, regional and national legislation and policies.

4.5.3. With regards to the potential effects of the proposed scheme, the key legislation is the NAQOs, as set out in the Air Quality Strategy (2015)¹⁰ and the Air Quality (England) Regulations (2010)¹¹. The 2015 regulations are the latest update to the legislation which transposes into UK law the requirements of the European Directives 2008/50/EC and 2004/107/EC, which apply legal responsibility to the NAQOs. The NAQOs provide targets for various pollutants, including NO₂, PM₁₀ and PM_{2.5} concentrations, as presented in Table 4.2.

Table 4.3: National Air Quality Objectives (NAQO) Source: Air Quality Strategy 2015

Pollutant	Measured As	Objective
Nitrogen dioxide (NO₂)	Annual Mean	40 µg/m ³
	1-Hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
Particles (PM₁₀) (Gravimetric)	Annual Mean	40 µg/m ³
	24-Hour Mean	50 µg/m ³ not be exceeded more than 35 times a year
Particles (PM_{2.5})	Annual Mean	25 µg/m ³

4.5.4. These air quality objectives are aimed at the protection of human health. The annual mean NAQOs apply at locations where the public may be regularly exposed, such as building facades of residential properties, schools, hospitals and care homes. The 1-hour and 24-hour mean NAQOs apply at locations where it is reasonable to expect members of the public to spend at least these periods of time, such as busy shopping streets and school playgrounds for the 1-hour mean, and hotels or residential gardens for the 24-hour mean. For full details, see Box 1.1 of LAQM TG (16)³.

⁷ Defra (February 2018); Local Air Quality Management Technical Guidance (TG16).

⁸ EPUK / IAQM (Jan 2017); Land-Use Planning & Development Control: Planning for Air Quality v1.2

⁹ IAQM (June 2016); Guidance on the Assessment of Dust from Demolition and Construction v1.1.

¹⁰ Defra (2015); The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).

¹¹ Air Quality (England) Regulations

- 4.5.5. In January 2019, the UK Government published a Clean Air Strategy¹² which outlines its aims and methods to tackle “all sources of air pollution.” This includes stronger emphasis on reducing domestic building, farming and industrial emissions on top of the existing legislative framework in place to address transport emissions. It also focuses on human exposure to fine particulate matter (PM_{2.5}), specifically to halve the number of people in the UK exposed to concentrations above 10µg/m³ by 2025.

Methodology

Construction dust

- 4.5.6. The construction dust study area will consider ecological receptors within 50 m and sensitive human receptor locations within 350 m of the site boundary and activities, and 50 m of the routes used by construction vehicles, up to 500 m along roads from the site entrances.
- 4.5.7. A desk-based risk assessment of impacts to air quality and dust soiling during the construction phase will be undertaken in accordance with the Guidance on the Assessment of Dust from Demolition and Construction published by the Institute of Air Quality Management.
- 4.5.8. The assessment considers the effects of local meteorological conditions on the dispersion of fugitive emissions of dust, the sensitivity and proximity of surrounding sensitive human and ecological receptors to construction activities, and the scale of construction activities (earthworks, construction and trackout). The risk of dust soiling and PM₁₀ impacts is determined by taking all these factors into consideration.
- 4.5.9. Based on the outcome of the assessment, the IAQM guidance recommends certain mitigation measures to be implemented. Any other mitigation measures issued within local authority / national government guidance should also be considered. Mitigation measures stipulated within the IAQM guidance would be recommended if deemed necessary.

Construction and operational traffic

- 4.5.10. The potential impact of traffic related emissions of NO₂ and PM₁₀ experienced by nearby sensitive residential receptors will be assessed using the DMRB Screening Method v1.03c. This method is widely used in the UK for this type of assessment and requires data relating to vehicles speeds, the distance of receptors from the affected roads, and proportion of HDVs using the roads. This allows the prediction of the existing and future road traffic emissions contribution to local air quality, which can be then compared to the NAQOs.
- 4.5.11. The DMRB methodology states that there are unlikely to be any significant effects on local air quality, due to road traffic, at receptors more than 200m from any roads which experience a change in traffic flow as a result of the Scheme. Traffic data required for the DMRB Screening tool comprises annual averaged daily traffic (24-hour AADT) flows, the proportion of HGVs and average speed. The method applies specific emission parameters, for road traffic sources, to predict resultant concentrations at key receptors under various assessment scenarios.

¹² Defra (2019); Clean Air Strategy 2019

Assessment of implications for health

- 4.5.12. An overall assessment of the health implications will be undertaken to determine the impact of the scheme on human health during both the construction phase and the operational phase, based on air pollution exposure.

4.6. Assumptions, Limitations and Uncertainties

- 4.6.1. The methodology used to assess the likely dust effects of the construction phase and operational phase of the Scheme is risk-based and therefore it does not allow for quantification of the effects or consider severe weather episodes and failure of mitigation measures (i.e. problems with water supply used for dust suppression).

5. Cultural Heritage

5.1. Introduction

- 5.1.1. The assessment of cultural heritage considers impacts on ‘cultural heritage assets’; a term which incorporates ‘historic monuments, historic groups of buildings and/or historic sites (including singular historic buildings and archaeological sites)’¹³. In addition, ‘an assessment of cultural heritage includes landscapes of historical, cultural or archaeological significance’¹⁴. Impacts on cultural heritage assets have been subdivided into the three standard sub-topics of archaeological remains, historic buildings and historic landscapes.

5.2. Baseline Conditions

Archaeological remains

- 5.2.1. The potential for surviving surface and subsurface remains is based on known cultural heritage assets in the vicinity derived from the cursory data collection exercise undertaken in preparation of this chapter (see Table 5.1). Six assets of unknown origin are known from the study area, four of which are enclosures identified through aerial photography, which may have early origins. A Neolithic polished axe has been recovered from the area, and medieval activity is represented by the known sites of a medieval cross and a medieval holy well. Post medieval activity is demonstrated by the recovery of a coin hoard in c. 1880 and also the relatively large number of industrial sites (including a waste disposal tip, slate quarries, one with an accompanying tram road, a disused level, a former dam, a former corn mill and two former smithies). Agricultural activity in the area is represented by existing field boundaries which are shown on modern mapping and may survive as historic hedgerows.
- 5.2.2. At this stage, all of the archaeological remains are considered to be of ‘low’ value in that they are non-designated, and their importance is unlikely to be greater than of local interest. Further study is recommended to ascertain the level of preservation and rarity to confirm their value.
- 5.2.3. There is the potential for further remains to be encountered within the study area, both through a fuller assessment of the baseline (which must include accessing the Lake District National Park Authority’s dataset and a comprehensive map regression exercise) and through any groundbreaking works which may encounter earlier, pre-cartographic remains. The number of enclosures identified through aerial photographic suggests a relatively high potential for encountering prehistoric remains.

Historic buildings

- 5.2.4. For the purpose of assessing cultural heritage, historic buildings are defined as standing historic structures that are usually formally designated (i.e. listed buildings) or have some architectural presence or historic integrity (e.g. structures shown on First Edition Ordnance Survey mapping which retain historic integrity or structures which are included within a Historic Environment Record dataset). Seven such structures have been identified from the cursory data collection exercise undertaken in preparation of this chapter (see Table 5.1). Of these, one is grade I listed (Kirkby Hall), one is grade II* listed (Ashlack Hall and outbuildings) and one is grade II listed (garden walls to Ashlack Hall). The remaining four

¹³ Highways Agency, 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA 106, Revision 0, p6

¹⁴ Highways Agency, 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA 106, Revision 0, para 1.4, p7

are undesignated, though included within Cumbria County Council's Historic Environment Record dataset and/or shown on First Edition Ordnance Survey mapping. Further study should be undertaken to confirm whether they would be worthy of local listing, and therefore considered of greater than 'low value'. South Lakeland District Council currently has no Local List in force.

- 5.2.5. In addition, there is the potential for further historic buildings to become apparent within the study area, both through a fuller assessment of the baseline (which must include accessing the Lake District National Park Authority's dataset and a comprehensive map regression exercise) and through a walkover survey to assess the area.

Historic landscapes

- 5.2.6. For the purpose of assessing cultural heritage, historic landscapes are defined as landscapes of historic, cultural or archaeological significance. The World Heritage Site of the Lake District National Park lies within the northern part of the study area (see Table 5.1), just to the north of the proposed Scheme where it joins the existing A5092 route. In addition, three areas of ancient woodland have been identified, Kirkby Park Wood, Back Springs Wood and Hallstead Wood. Ancient woodland is irreplaceable and often retains important archaeological features. Three traditional orchards, one just to the east of Dove Ford Farm, one to the east of Kirby Hall and one to the west of Press Beck, also survive within the study area, depicted on First Edition Ordnance Survey mapping. Traditional orchards are designated priority habitats and historically most farmsteads would have had one, so any impact on the setting of the orchard in relation to Dove Ford Farm would be detrimental.
- 5.2.7. The Scheme lies within Historic Landscape Character Area 15: Dunnerdale and Broughton Low Fells, as defined by the Cumbria Landscape Characterisation. The legacy of this character area is a 'mixed pattern of modern and older settlements and field enclosure with strong legibility of landscape elements of medieval origin [and] strong survival of pre-19th century industrial features'¹⁵.

Table 5.1: Summary of cultural heritage assets known from scoping exercise

Asset	Asset Type	Grid Reference
Cultural Heritage Assets		
Kirkby Ireleth cross	Archaeological Remains	323520,483520
St Mary's well	Archaeological Remains	323895,484270
Coins findspot	Archaeological Remains	323000,485000
Circular earthwork	Archaeological Remains	324300,484900
Rectangular earthwork platform	Archaeological Remains	324100,485000
Grizebeck enclosure	Archaeological Remains	324300,484600
Grizebeck enclosure	Archaeological Remains	324200,484600
Lowick enclosure	Archaeological Remains	323800,484400
Grizebeck cropmark site	Archaeological Remains	323500,485100
Axe findspot	Archaeological Remains	323700,483900
Kirkby quarries tramroad	Archaeological Remains	322910,482850
Site of former smithy at Grizebeck	Archaeological Remains	323825,485070
Site of former cornmill at Grizebeck	Archaeological Remains	323910,485040
Site of former dam	Archaeological Remains	323930,485040
Wall End slate quarries	Archaeological Remains	323590,482930

¹⁵ Cumbria County Council, 2009. *Cumbria Historic Landscape Characterisation*

Croglin level	Archaeological Remains	323980,483330
Kirkby slate quarries	Archaeological Remains	325000,484000
Wall End tip	Archaeological Remains	323490,483370
Grade II* listed Ashlack Hall and outbuildings	Historic Building	324677,485516
Grade II listed garden wall	Historic Building	324618,485526
Grade I Kirkby Hall	Historic Building	323570,483550
Hallstead	Historic Building	324280,484470
Former smithy at Chapels	Historic Building	323640,483920
Former maltkiln at Dove Bank farm	Historic Building	323550,484340
Former chapel at Grizebeck	Historic Building	323813,485053
Lake District National Park	Historic Landscape	323759,485203
Kirkby Park Wood	Historic Landscape	323606,485937
Back Springs Wood	Historic Landscape	323932,485507
Hallstead Wood	Historic Landscape	324352,484299
Orchard east of Dove Ford farm	Historic Landscape	323705,484644
Orchard east of Kirkby Hall	Historic Landscape	323610,483514
Orchard west of Gill Wood and Press Beck	Historic Landscape	323782,485507

5.3. Potential Impacts, Effects and Mitigation

Archaeological remains

- 5.3.1. Impacts on archaeological remains resulting from the construction and operation of the proposed development may include their removal (loss) and/or compaction, changes to the chemical conditions of the soil or to ground water levels resulting in damage, and damage brought about by vibrations from vehicle movements. Indirect impacts on setting may also occur as a result of the Scheme, in terms of the siting of new infrastructure and from noise intrusion.
- 5.3.2. Of the 18 thus far identified assets within the study area, none are within the footprint of the Scheme, though a thorough research exercise is likely to reveal additional assets which may lie within the footprint, and there remains the potential for as-yet unknown archaeological remains to survive below surface, also within the footprint of the Scheme. Effects on setting must also be considered.
- 5.3.3. If assets are found to be within the footprint of the Scheme, the preferred mitigation is preservation in situ, which can be achieved through design, which can also reduce impacts on setting, for example by incorporating screening. For the potential for unknown archaeological remains, further assessment and investigations should be undertaken, such as archaeological walkover surveys, geophysical surveys and possibly also trial trench evaluation to confirm the results of any geophysical surveys and help to inform on the significance of any discovered archaeological remains.
- 5.3.4. With mitigation in place, effects of greater than slight adverse significance are unlikely to occur on the known archaeological remains within the study area. Further work is required in order to fully understand the nature of the resource in terms of archaeological remains, and therefore the full effects of the Scheme.

Historic buildings

- 5.3.5. Impacts on historical buildings resulting from the construction and operation of the proposed development could include their removal (loss) or more likely, a detrimental effect on setting,

in terms of the siting of new infrastructure and from noise intrusion. No listed buildings lie within the footprint of the Scheme, and thus no direct physical damage will occur, although impacts on setting should be considered for the three listed buildings in the study area.

- 5.3.6. Four non-designated historic buildings have also been identified within the study area thus far, although a fuller assessment of the baseline may reveal additional assets. The proposed route will pass in close proximity, though presumably not require the demolition of, two of these, a former malt kiln, since converted, at Dove Bank farm and a former smithy, since converted, at Chapels. As with the designated historic buildings, impacts on setting should be considered for undesignated historic buildings in the study area.
- 5.3.7. Such impacts could be reduced through minor adjustments to the Scheme which could likely result in effects of no greater than slight adverse significance.

Historic landscapes

- 5.3.8. For the seven historic landscapes identified from the scoping exercise, adverse impacts could include partial or complete removal of historic elements (e.g. mature trees, hedgerows and field boundaries), severance of landscape elements (e.g. segregation of traditional orchard from Dove Ford farm to the west), changes to historic land use and indirect impacts resulting from noise and visual intrusion.
- 5.3.9. Measures to mitigate such effects could include, as appropriate, the sensitive design of new structures to minimise visual intrusion, landscape planting to screen the impacts and better integrate the new road into the surroundings, the translocation of historic landscape elements (such as historic hedgerows) and archaeological/ landscape recording of landscapes or identified elements of the landscape prior to changes brought about by the Scheme.
- 5.3.10. With mitigation in place, effects of greater than slight adverse significance are not anticipated for the known historic landscapes within the study area.

5.4. Scoping Recommendation

- 5.4.1. This assessment of cultural heritage has been scoped with reference to the guidelines set out in DMRB¹⁶.
- 5.4.2. It is recommended that cultural heritage is scoped into the Environmental Impact Assessment. This would constitute a full, comprehensive assessment of the baseline, as defined in 5.3.3. This should include archaeological remains, historic buildings and historic landscapes. This would result in a full baseline to 'define the existing designated and undesignated cultural heritage resource'¹⁷, through full desk-based studies. In addition, field surveys should be undertaken, to include a geophysical survey of the areas of direct impact (to include the route of the road, and any defined compound/utilities areas, lay down areas and temporary access roads etc) and a walkover survey of the same areas of direct impact, and to include a wider study area to account for a buffer zone of 200m to aid an assessment of the potential for as-yet unknown archaeological remains. The walkover survey should also incorporate visits to specified known assets, such as historic buildings and historic landscapes which may be indirectly affected by the Scheme within a wider study area.

¹⁶ Highways Agency, 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA 106

¹⁷ Highways Agency, 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA 106, para 3.8

5.5. Assessment Methodology

Guidelines

- 5.5.1. The assessment of impact on archaeological remains has been principally carried out in accordance with guidance contained in the DMRB¹⁸, the steps of which are indicated below. Additional guidance is drawn from Historic England's guidance on 'understanding place'¹⁹ and the 'setting of heritage assets'²⁰ and their 'Good Practice in Planning Notes'²¹, the Chartered Institute for Archaeologists' (CIfA) Code of Conduct²² and CIfA's Standard and Guidance for historic environment desk-based assessment²³.

Regulatory and Policy Framework

- National Planning Policy Framework (NPPF) 2019. *Section 16: Conserving and Enhancing the Historic Environment*: paragraphs 184-202 relate to planning proposals and effects on heritage assets
- South Lakeland District Council (2019), adopted March 2019. *Policy DM3: Historic Environment*: this has been designed to protect and enhance the valuable Historic Environment of the District, including all designated and non-designated heritage assets and aims to safeguard all heritage assets and their settings in a manner that is appropriate to their particular significance.

Methodology

Establishing the baseline

- 5.5.2. As outlined in DMRB, the assessment will define a study area according to the sensitivity of the receiving environment and the potential impacts of the Scheme. 'Where a new road is proposed, the study area shall include the footprint of the Scheme plus any land outside that footprint which includes any heritage assets which could be physically affected. The study area should include the settings of any designated or other cultural heritage resource in the footprint of the Scheme or within the zone of visual influence or potentially affected by noise'²⁴. For the purposes of the present scheme, it is anticipated that the study area should be 750m-1km.
- 5.5.3. A full, comprehensive desk-top study of the study area will be undertaken. This will include archaeological remains, historic buildings and historic landscapes. This will comprise a full review of the Lake District National Park Authority's and Cumbria Council's Historic Environment Records, to include a study of their archive collections and visits to relevant archive centres and local libraries to study historical maps, aerial photographs, relevant books, journals, articles, directories, previous reports and LiDAR data²⁵.
- 5.5.4. This desk-based research will be supplemented by a programme of non-intrusive work due to the potential for as-yet unknown archaeological remains of earlier periods to survive within the footprint of the Scheme. This will comprise a walkover survey of the footprint of

¹⁸ Highways Agency, 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA 106

¹⁹ Historic England, 2015. *Understanding Place*

²⁰ Historic England, 2015. *Historic Environment: Good Practice in Planning Note 3. The Setting of Heritage Assets*

²¹ Historic England, 2015. *Historic Environment: Good Practice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment*

²² Chartered Institute for Archaeologists (CIfA) 2017. *Code of Conduct*

²³ CIfA 2017. *Standard and Guidance for historic environment desk-based assessment*

²⁴ Highways Agency, 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA 106, para 3.6

²⁵ Highways Agency, 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA 106, para 3.9.1

the Scheme, incorporating a wider 200m buffer zone to aid an assessment of the potential for as-yet unknown archaeological remains to extend to within the area of direct impact. The walkover survey will also incorporate visits to specified known assets, such as historic buildings and historic landscapes within the wider study area to assess the indirect impacts of the Scheme on these cultural heritage assets. The walkover survey will record the location of any earthworks, historic structures or other cultural heritage assets using GPS and details of each asset's form and condition will be recorded along with a photographic record.

- 5.5.5. The non-intrusive work will also include a geophysical survey of the areas of direct impact (to include the route of the road, and any defined compound/utilities areas, lay down areas and temporary access roads etc). This will enable the prospection and possible extents of unknown archaeological remains within the footprint of the Scheme. This geophysical survey work will only be undertaken once a Written Scheme of Investigation (WSI) outlining the details of the survey methodology has been prepared and submitted for approval by the LPA.

Assessing the Value (or sensitivity) of the Assets

- 5.5.6. Table 5.2 sets out the measures of value (or sensitivity) which will be assigned as appropriate to the cultural heritage assets identified in the baseline.

Table 5.2: Environmental value descriptors for cultural heritage assets

Value	Descriptor
Cultural Heritage Assets	
Very High	<ul style="list-style-type: none"> • World Heritage Site (including nominated sites). • Assets of acknowledged international importance. • Assets contributing significantly to acknowledged international research objectives.
High	<ul style="list-style-type: none"> • Scheduled Monuments (including proposed sites). • Undesignated assets of schedule quality and importance. • Assets that can contribute significantly to international research objectives.
Medium	<ul style="list-style-type: none"> • Designated or undesignated assets that contribute to regional research objectives.
Low	<ul style="list-style-type: none"> • Designated and undesignated assets of local importance. • Assets compromised by poor preservation or poor survival of context. • Assets of limited value, but with potential to contribute to local research objectives.
Negligible	<ul style="list-style-type: none"> • Assets with very little or no serving archaeological interest.
Unknown	<ul style="list-style-type: none"> • The importance has not been ascertained.

Identifying Impact, their Effects and the Magnitude of Change

- 5.5.7. The impacts of the Scheme and effects on cultural heritage assets will be measured by comparing the amount of change an asset is likely to receive. Table 5.3 sets out the measures for magnitude of impact (degree of change) which will be applied.

Table 5.3: Magnitude of impact descriptors for cultural heritage assets

Magnitude of Impact	Descriptor
Cultural Heritage Assets	
Major	<ul style="list-style-type: none"> • Change to most or all archaeological materials, the resource is totally altered. • Comprehensive changes to setting.
Moderate	<ul style="list-style-type: none"> • Changes to many key archaeological materials, the resource is clearly modified. • Considerable changes to setting that affect the character of the asset.
Minor	<ul style="list-style-type: none"> • Changes to key archaeological materials, the resource is clearly modified. • Slight changes to setting.
Negligible	<ul style="list-style-type: none"> • Very minor changes to archaeological materials and/or setting.
No Change	<ul style="list-style-type: none"> • No change.

Assessing Significance of Effect

- 5.5.8. A matrix-based approach will be applied to assess the significance of effects based on a combination of the value of an asset and the magnitude of the impact. The significance of effect will be assessed on a five-point scale: 'Very Large', 'Large', 'Moderate', 'Slight' and 'Neutral', as summarised in Table 5.4.

Table 5.4: Significance of effect categories

Magnitude of Impact						
Cultural Heritage Assets						
Value of Receptor		No Change	Negligible	Minor	Moderate	Major
	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Identification of cumulative effects

- 5.5.9. The cumulative effects of the Scheme and approved developments within the area will be assessed qualitatively following the DMRB guidelines²⁶. The cumulative effects of climate change upon archaeological remains within the assessment area will also be considered²⁷.

²⁶ Highways Agency 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA104, para 4.10.1

²⁷ Highways Agency 2019. *The Design Manual for Roads and Bridges (DMRB)*, LA104, paras 3.19-3.22

For determining cumulative effects and their significance, Table 5.5 is used as a framework. This is based on tables provided in the DMRB²⁸.

Table 5.5: Significance of effects for cultural heritage assets

Significance	Effect
Cultural Heritage Assets	
Very large	Effects that the decision-maker must take into account as the asset/resource is irretrievably compromised.
Large	Effects that may become key decision-making issue.
Moderate	Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance.
Slight	Effects that are locally significant.
Neutral	Effects that are beyond the current forecasting ability or are within the ability of the resource to absorb such change.

Mitigation measures

- 5.5.10. Following the assessment of the value against the magnitude of impact upon a heritage asset, a series of mitigation measures will be identified based on industry best-practice, and further defined following consultation with the Local Planning Archaeologist (LPA). For **slight** impact and below, a low level of mitigation is anticipated. For **moderate** impact and above, a higher level of mitigation would be appropriate. In cases of a **very large** impact, development may not be agreed on, and/or a very high level of mitigation may be required.

Consultations

- 5.5.11. As well as consulting on mitigation measures regarding cultural heritage assets, the extent of the study area, and consultation and approval of the methodologies as recommended above will be sought from the LPA. Ongoing consultation with the LPA and Conservation Officers, as appropriate, regarding impacts on setting to designated historic buildings and historic landscapes will also occur.

5.6. Assumptions, Limitations and Uncertainties

- 5.6.1. The baseline information data outlined above is based predominantly on data derived from Cumbria County Council's Historic Environment Record dataset, from Historic England's online dataset on designated assets, from the known environmental constraints information provided by Capita, and from a brief scoping site visit from publicly accessible areas which revealed the potential for the Scheme to directly impact on existing hedgerows and dry stone walls. No new or comprehensive research exercise has yet been undertaken, and no data has been assessed relating to the cultural heritage resource of the Lake District National Park. The results of a comprehensive research exercise, alongside the geophysical and walkover surveys, may reveal a number of additional cultural heritage assets with the potential to have a value greater than 'low'.

²⁸ Highways Agency 2019. *The Design Manual for Roads and Bridges (DMRB), LA104, Section 3*

6. Biodiversity

6.1. Introduction

- 6.1.1. This chapter relates to the work that has been or will be carried out to facilitate an assessment of known features of ecological and nature conservation value within proximity to the Scheme. The assessment is conducted within a framework of best practice guidelines, wildlife legislation and planning policy to ensure that all potential adverse effects on ecology and nature conservation are identified and mitigated against appropriately.

6.2. Baseline Conditions

- 6.2.1. Baseline conditions were established through desktop study. This involved a review of Ordnance Survey (OS) maps; relevant national and local Biodiversity Action Plans²⁹ (BAPs); and information available from the Multi Agency Geographic Information System (MAGIC) website. Biodiversity records for protected species and sites were obtained from Cumbria Biodiversity Data Centre (CBDC). A walkover field survey of the site in the form of an Extended Phase 1 Habitat Survey, undertaken as part of a Preliminary Ecological Appraisal (PEA), was completed by AECOM in March 2019³⁰.

- 6.2.2. Following on from the desk studies and the PEA, a series of protected species and habitats surveys have been conducted throughout 2019. Surveys were undertaken between April and June 2019 by AECOM and from June 2019 onwards by PBA Applied Ecology. Further surveys, including otter surveys, will be undertaken in 2020. The field surveys undertaken are listed below. Analysis and reporting of the survey results is ongoing.

- Great Crested Newt Habitat Suitability Index (HSI) and Environmental DNA (eDNA) Surveys
- Hedgerow Surveys
- River Habitat Survey
- Aquatic Macroinvertebrate Survey
- Reptile Survey
- Breeding Bird Survey
- Bat Activity Survey
- Aquatic Macrophyte Survey
- Otter/Water Vole (field signs and habitat suitability) Survey
- Fish Surveys
- Badger Surveys (partially complete)

²⁹ Cumbria County Council, 2001 Local Biodiversity Action Plan (LBAP)

³⁰ AECOM Infrastructure & Environment UK Limited, March 2019 *Grizebeck A595 Road Realignment Scheme Preliminary Ecological Appraisal (PEA)*

- Hedgehog Surveys

6.2.3. Baseline conditions are described in more detail in the associated Preliminary Ecological Appraisal, (AECOM 2019). A summary of ecological features located within proximity of the Scheme is provided in Table 6.1, updated to include initial findings of the surveys conducted above, where available.

Table 6.1: Summary of baseline conditions for nature conservation

Receptor (Value)	Descriptor
Statutory Designations	
Morecambe Bay and Duddon Estuary Special Protection Area (SPA) (Very High)	<p>The site qualifies under Article 4.1 of the Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain populations of the following Annex I species in any season: little egret <i>Egretta garzetta</i>; whooper swan <i>Cygnus cygnus</i>; European golden plover <i>Pluvialis apricaria</i>, bar-tailed godwit <i>Limosa lapponica</i>, ruff, Mediterranean gull <i>Larus melancephalus</i>, little tern <i>Sternula albifrons</i>, sandwich tern <i>Sterna sandvicensis</i>, common tern <i>Sterna hirundo</i>.</p> <p>The site qualifies under Article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season: pink-footed goose <i>Anser brachyrhynchus</i>; common shelduck <i>Tadorna tadorna</i>; northern pintail <i>Anas acuta</i>; eurasian oystercatcher <i>Haematopus ostralegus</i>.</p> <p>The site qualifies under Article 4.2 of the Directive (2009/147/EC) as it is used regularly by over 20,000 seabirds in any season including: herring gulls, lesser black-backed gulls, sandwich terns, common terns and little terns.</p> <p>The site qualifies under Article 4.2 of the Directive (2009/147/EC) as it is used regularly by over 20,000 waterbirds in any season including all of the qualifying features listed above, as well as an additional 19 species present in numbers exceeding 1% of the GB total and/or exceeding 2,000 individuals: great white egret, Eurasian spoonbill, light-bellied brent goose (Nearctic origin), Eurasian wigeon, Eurasian teal, green-winged teal, mallard, ring-necked duck, common eider (non-breeding), common goldeneye, red-breasted merganser, great cormorant, northern lapwing, little stint, spotted redshank, common greenshank, black-headed gull, common (mew) gull and European herring gull (non-breeding).</p>

Receptor (Value)	Descriptor
Duddon Estuary Ramsar (Very High)	<p>The criterion for which the site is designated are:</p> <p>Supports nationally important numbers of the rare natterjack toad <i>Bufo calamita</i>, near the north-western edge of its range (an estimated 18-24% of the British population).</p> <p>Supports a rich assemblage of wetland plants and invertebrates- at least one nationally scarce plant and at least two British Red Data Book invertebrates.</p> <p>Site supports nationally important numbers of waterfowl during spring and autumn passage.</p> <p>Assemblages of international importance: Species with peak counts in winter: 26,326 waterfowl</p> <p>Species/populations occurring at levels of international importance: red knot, northern pintail common redshank.</p>
Morecambe Bay Special Area of Conservation (SAC) (Very High)	<p>Qualifying features include:</p> <ul style="list-style-type: none"> Estuaries Mudflats and sandflats not covered by seawater at low tide Large shallow inlets and bays Perennial vegetation of stony banks Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Humid dune slacks <p>Annex I habitats present as a qualifying feature but not a primary reason for selection:</p> <ul style="list-style-type: none"> Sandbanks which are lightly covered by sea water all the time Coastal lagoons; Reefs; Embryonic shifting dunes; Atlantic decalcified fixed dunes (<i>Calluno-Uliceta</i>) Dunes with <i>Salix repens ssp argentea</i> (<i>Salicion arenariae</i>) <p>Annex II species: Great crested newt <i>Triturus cristatus</i></p>
Duddon Mosses SAC (Very High)	<p>Qualifying features include:</p> <ul style="list-style-type: none"> Active raised bogs Degraded raised bogs still capable of natural regeneration.
Subberthwaite, Blawith and Torver Low Commons SAC (Very High)	<p>Qualifying features include:</p> <ul style="list-style-type: none"> Transition mires and quaking bogs <p>Annex I habitats present as a qualifying feature but not a primary reason for selection: Depressions on peat substances of the <i>Rhynchosporion</i>.</p>

Receptor (Value)	Descriptor
Duddon Estuary Site of Special Scientific Interest (SSSI) (High)	<p>The SSSI regularly supports 21,880 wintering waders with internationally important numbers (>1% of the European population) of redshank and knot. A further five species occur at nationally important levels (>1% of the British population): oystercatcher, ringed plover, curlew, dunlin, and sanderling on passage. The estuary also supports an average population of 5,000 wintering waterfowl with internationally important numbers of pintail, and nationally important numbers of shelduck and red-breasted merganser <i>Mergus serrator</i>. Coastal habitats also provide nesting areas for species such as ringed plover, oystercatchers and lapwings <i>Vanellus vanellus</i>. Barn owls <i>Tyto alba</i> breed on the estuary and the area is used for feeding by peregrine <i>Falco peregrinus</i> and merlin <i>Falco columbarius</i>. The site is botanically rich and includes a diverse range of coastal habitats including saltmarsh, sand dunes, limestone outcrops, and slag banks. The Duddon estuary is one of the most important areas in Britain for natterjack toad and contains between 18 – 25% of the UK population. The Duddon estuary is also of high invertebrate significance for species associated with coastal habitats.</p>
Duddon Mosses SSSI (High)	<p>The site interest includes the habitat and species listed in the EC Habitats and Species Directive (92/43/EEC) that are mentioned above in relation to Duddon Mosses SAC. The Duddon Mosses are an extensive system of raised mires situated at the head of the Duddon Estuary, and the site consists of eight discrete areas of mossland. Together the complex of mosses form, after the mosses on the south Solway Plain, the most important group of lowland raised mires in Great Britain in terms of their size and the diversity of habitats represented. The site supports areas with typical bog communities as well as areas of wet heath, scrub, broad-leaved and mixed woodland, and acid grasslands. There are also good examples of wet woodland (carr) occurring at Black, Bank End, Angerton and Shaw mosses. The Duddon Mosses display a rich fauna, roe deer <i>Capreolus capreolus</i> are frequent, and the breeding bird community includes species such as nightjar <i>caprimulgus europaeus</i>, woodcock <i>Scolopax rusticola</i>, heron <i>Ardea cinerea</i>, curlew, cuckoo <i>Cuculus canorus</i>, tawny <i>Strix aluco</i> and barn owls, and buzzard <i>Buteo buteo</i>. Herpetofauna found include the adder <i>Vipera berus</i>, common lizard <i>Zootoca vivipara</i>, common frog <i>Rana temporaria</i> and common toad <i>Bufo bufo</i>. The insect life is rich, on little white moss alone 170 species of butterfly have been recorded, including 15 notable species such as the rare large heath <i>Coenonympha tullia</i>, the small elephant hawk <i>Deilephila porcellus</i>, and the coast dart <i>Euxoa cursoria</i>.</p>

Receptor (Value)	Descriptor
Subberthwaite, Blawith and Torver Low Commons SSSI (High)	The notified features include the habitat and species listed in the EC Habitats and Species Directive (92/43/EEC) that are mentioned above in relation to Subberthwaite, Blawith and Torver Low Commons SAC. The site is situated on a broad, hilly plateau, bounded by several settlements. The underlying rock of Silurian slates and shales has given rise to an irregular landscape of rocky hills, interspersed with broad, shallow valleys. Bracken, acid grassland and heather with some areas of scrub and woodland occur on drier ground, whilst mires occur extensively on the valley bottoms, in rocky basins and on slopes. The mires are of particular interest and four main types occur within the site. Valley mires, which are peatlands with a central watercourse, are the most important, and the area contains the greatest concentration and extent of the habitat in Cumbria. Basin mires (developed in rock basins with no stream), flushes (wet hillside mires) and swamps (found on tarn edges) are also present. At least 17 different plant communities occur in these mires, sometimes in mosaics or showing transitions to other habitats such as tarns. The site supports the greatest variety of mire communities known for any mire SSSI in South Cumbria and the vegetation mosaics and transitions are particularly well displayed. The insect fauna of the site has not been thoroughly studied, but the site is known to be of importance for dragonflies. 12 species, a high number for northern England, have been recorded breeding on the mire pools, tarns and streams. These include: The black darter <i>Sympetrum danae</i> , the common darter <i>Sympetrum striolatum</i> , the four-spotted chaser <i>Libellula quadrimaculata</i> , the azure damselfly <i>Coenagrion puella</i> , and the large red damselfly <i>Pyrrosoma nymphula</i> . The pools and tarns also support several species of frog, toad and newt.
Kirkby Moor SSSI (High)	The notified feature of the site is heather moorland, a habitat restricted on an international basis to Northern Europe and a scarce habitat in South Cumbria. Kirkby Moor is the largest area of this habitat in South Cumbria, and there are no other notified examples. In addition to the moorland, other upland habitats occur, which add diversity to the site. These include wet heath, mires, flushes, acidic grassland, bracken, streams and rills. The ornithological interest of the area has not been studied, but the site is known to provide breeding areas for the typical moorland species red grouse <i>Lagopus lagopus</i> , as well as curlew and snipe <i>Gallinago gallinago</i> and to provide feeding areas for peregrine and raven <i>Corvus corax</i> .
Duddon Mosses National Nature Reserve (NNR) (High)	The site is recognised for its international importance as a raised peatland habitat, supporting specialist bog flora such as the nationally rare moss <i>Sphagnum pulchrum</i> . The flora sustains a wide variety of invertebrates including a specialist of the mosses, the bog bush cricket <i>Metrioptera brachyptera</i> . The reserve is a mixture of wetland and woodland, which offers many breeding and feeding opportunities for birds. In summer passerines arrive to make use of the scrub and woodlands. Birds of prey such as buzzard and barn owl make use of the open landscape, and water loving birds such as waders and pink-footed geese use the reserve during the winter.
Non - Statutory Designations	
Back Springs and Press Beck Wood County Wildlife Site (CWS) (Medium)	Two adjacent ancient semi-natural broadleaved woodlands.

Receptor (Value)	Descriptor
Hallstead Wood CWS (Medium)	Ancient semi-natural broadleaved woodland.
Kirkby Park Wood CWS (Medium)	Ancient replanted semi-natural woodland.
Duddon Mosses Site of Invertebrate Significance (SIS) (Medium)	Designated for its invertebrate abundance as well as the presence of scarce and rare species.
Habitats	
Habitats of Principal Importance (High)	Standing Water/Ponds; Rivers & Streams; Hedgerows; Lowland Mixed Deciduous Woodland;
Other Habitats (Medium)	As indicated in the Extended Phase 1 Habitat survey, within the PEA, and comprising of: Poor semi-improved grassland; Broadleaved woodland – plantation; Marsh/marshy grassland; Neutral grassland – semi-improved; Buildings; Acid grassland – semi-improved; Standing water; Tall ruderal; Running water; Scrub – dense/continuous; Mixed woodland – plantation; Acid grassland – unimproved; Bare ground; Broadleaved woodland - semi-natural; and Coniferous woodland – plantation.
Hedgerows (High)	A total of 17 species-rich hedgerows, comprising five or more species, and 27 species-poor hedgerows were present within the survey area. 49 hedgerows were surveyed as per the Hedgerow Regulations and DEFRA (2007) ³¹ . 13 hedgerows were classified as Important under the Hedgerow Regulations (1997). Under Section 41 of the NERC Act (2006), any hedgerow comprising 80% or more of at least one native woody species meets the criteria as priority for conservation in England. 41 hedgerows meet this criterion.
Protected and Significant Species	
White Clawed Crayfish (Very High)	The desk study records showed no historic records of white clawed crayfish <i>Austropotamobius pallipes</i> within 2km of the proposed scheme.
Freshwater Pearl Mussel (Very High)	The desk study records showed no historic records of freshwater pearl mussel <i>Margaritifera margaritifera</i> within 2km of the proposed scheme.
Terrestrial Invertebrates (High)	The woodland, scrub and rough grassland areas are expected to support a range of common terrestrial invertebrate species typical of these habitat types, however it is unlikely the site itself supports notable terrestrial invertebrate fauna. However, there are some designated sites nearby that do support notable invertebrate species, such as Duddon Mosses, and Subberthwaite, Blawith and Torver.

³¹ Department for Environment, Food and Rural Affairs (2007). *Hedgerow Survey Handbook. A Standard Procedure for local surveys in the UK*. Defra, London.

Receptor (Value)	Descriptor
Amphibians – Including Great Crested Newt and Natterjack Toad. (Very High)	<p>Two ponded areas were identified within 250m of the Scheme. HSI surveys scored the two ponds as ‘poor’ in terms of their habitat suitability for great crested newts. These ponds were subject to environmental DNA (eDNA) samples in 2019, the results of which concluded an absence of great crested newts.</p> <p>Natterjack toads are typically confined to coastal and dune systems, coastal grazing marshes and sandy heaths. Although they are known to be present in the wider environment, the habitats present within the proposed site are not considered suitable to support natterjack toads.</p>
Reptiles (High)	<p>The mosaic of semi-improved neutral grassland, marshy grassland, plantation woodland, ditches, scrub, and hedgerows south of Grize Beck, provides habitat suitable for supporting reptile species such as common lizard, slow worm, adder <i>Anguis fragilis</i>, and grass snake <i>Natrix natrix</i>. The habitats within the survey area south and east of the A595 have lower suitability to support reptiles due to the open habitat and low sward height within the grassland. No reptiles were observed during the 2019 surveys.</p>
Breeding Birds (Very High)	<p>Habitats present are suitable to support an assemblage of notable breeding birds, and there is also a known presence of barn owl and peregrines in adjacent areas, specifically the Duddon Estuary, Duddon Mosses and Kirkby Moor. There are buildings on site which may be suitable for nesting barn owl. Breeding bird surveys undertaken in 2019 recorded 41 species within the survey area. Of the 41 species recorded, eight are red list species, of which five are also NERC S41, and one is an Annex I (Council Directive 79/409/EEC on conservation of wild birds) and Wildlife and Countryside Act, (1981) Schedule 1 species.</p>
Wintering Birds (High)	<p>Open areas of agricultural land, particularly those associated with the floodplains of Grize Beck and Press Beck, may be used by overwintering species such as pink footed geese and whooper swan. Furthermore, large assemblages of overwintering species are present in nearby designated areas, specifically the Morecambe Bay and Duddon Estuary SPA, and the Duddon Estuary Ramsar.</p>
Bats (Very High)	<p>Areas of woodland, watercourses and smaller fields bounded by hedgerows in the northern part of the survey area are of higher value for foraging and commuting bats, than the southern area of the survey site, which comprises open, livestock grazed grassland. There are records of a confirmed roost at Eller Mire. Surveys at Dove Ford Farm confirmed a feeding roost and identified three buildings with low potential to support roosting bats, plus another building having high potential to support roosting bats. Species confirmed during transects and statics include; common pipistrelle <i>Pipistrellus pipistrellus</i> and soprano pipistrelles <i>Pipistrellus pygmaeus</i>, noctule <i>Nyctalus noctula</i>, natterer's <i>Myotis nattereri</i>, Daubenton's <i>Moyotis daubentonii</i> and brown long eared <i>Plecotus auritus</i>. Dove Ford Farm and the surrounding land is used as a foraging ground for common and soprano pipistrelles and the area of willow plantation to the northern end of the proposed route has a low level of activity for at least five species.</p>
Red Squirrel (High)	<p>Plantation woodland to the north offers potential habitat for red squirrel <i>Sciurus vulgaris</i>, however there are no records for red squirrel on, or adjacent to, the site, but grey squirrels <i>Sciurus carolinensis</i> are known to be present locally.</p>

Receptor (Value)	Descriptor
Otters (Very High)	Existing records of otter <i>Lutra lutra</i> exist along the Kirkby Pool and Press Beck. Surveys for otter were undertaken in Autumn 2019, this included the use of cameras. No evidence was recorded from the field surveys, or the cameras, from the October 2019 surveys of Grize Beck, Press Beck and an unnamed ditch.
Water Vole (Very High)	There are no existing records for water vole <i>Arvicola amphibius</i> . Habitats are considered to be mostly sub-optimal for this species. No field signs observed during 2019 surveys.
Badger (High)	The desk study returned records of badger <i>Meles meles</i> within 1km of the Scheme. Walkover surveys have confirmed presence with the location of setts, snuffle holes, latrines, paths and snagged guard hairs recorded. Surveys are still ongoing, but thus far the nearest main sett is around 300m to the west of the Scheme, but signs indicate badgers are crossing the area of the Scheme. Trail cameras have also recorded a single badger on two occasions.
Pine Marten (High)	There is a single record of pine marten <i>Martes martes</i> local to the scheme, this is from 2003 with no records since, and the record may be unreliable as it states ('seen by neighbours'). The majority of the route is unsuitable for this species, with the exception of the plantation woodland and tufted grassland at the north of the route.
Hedgehog (High)	Suitable habitat identified at the southern end of the route for hedgehogs <i>Erinaceus europaeus</i> , with habitat surrounding Dove Ford Farm considered to be of moderate suitability for hedgehogs. No hedgehogs were observed during the transect surveys, nor did any hedgehogs trigger the trail cameras, however droppings were identified on the bridleway to the east of the Scheme.
Fish (Very High)	Habitat for fish includes two watercourses; Press Beck and Grize Beck. Three watercourses were subject to electrofishing surveys in 2019; Press Beck, Grize Beck and an unnamed ditch. Four species were captured during surveys; Brown trout <i>Salmo trutta</i> , European eel <i>Aguilla aguilla</i> , three-spined stickleback <i>gasterosteus aculaeatus</i> and European flounder <i>Platichthys flesus</i> . No fish were recorded in the unnamed ditch.
Aquatic Invertebrates (Medium)	Aquatic macroinvertebrates were sampled at appropriate upstream and downstream sampling locations along three watercourses during the Spring and Autumn of 2019; Press Beck, Grize Beck, and an unnamed ditch. These samples were then subject to laboratory analysis. Analysis of the samples shows that the communities present within the three watercourses surveyed are of moderate to high sensitivity to pollution, and indicates good water quality.
Macrophytes (Medium)	Three watercourses were subject to a survey for large freshwater plants visible to the naked eye – macrophytes – Press Beck, Grize Beck and an unnamed ditch. Macrophytes were only present in a short reach of Press Beck, where five fairly common species were recorded; Fools watercress <i>Apium nodiflorum</i> , various leaved water – starwort <i>Callitriche platycarpa</i> , Common water – starwort <i>Callitriche stagnalis</i> , Water horsetail <i>Equisetum fluviatile</i> , and unbranched bur – reed <i>Sparganium emersum</i> .

Receptor (Value)	Descriptor
Other Species (Medium)	Suitable habitats on site for brown hare <i>Lepus europaeus</i> , and a depression on the grass indicating a resting place known as a form was identified in the broadleaved woodland to the east of the route. Brown hare are a Species of Principal Importance. A red fox <i>Vulpes vulpes</i> was also recorded during the riparian mammal surveys on Grize Beck.
Invasive Non-Native Species (High)	The Extended Phase 1 Habitat Survey undertaken as part of the PEA did not identify any known INNS flora or fauna. However, this was undertaken during March 2019, which is outside the optimal survey period. An American Mink <i>Neovision vison</i> was recorded during riparian mammal surveys on Grize Beck.

6.3. Potential Impacts, Effects and Mitigation

- 6.3.1. The Scheme extends through mostly rural farmland, but nonetheless has the potential to affect ecological receptors, including statutory designated sites, and protected and notable habitats and species. Some of these effects may be significant, even with all reasonable mitigation measures in place.

Statutory designated sites

- 6.3.2. The following designated sites are within two kilometres of the proposed scheme:
- Morecambe Bay and Duddon Estuary SPA
 - Duddon Estuary Ramsar; Morecambe Bay SAC
 - Duddon Mosses SAC; Subbertwaite, Blawith and Torver Low Commons SAC
 - Duddon Estuary SSSI; Duddon Mosses SSSI
 - Subberthwaite, Blawith and Torver Low Commons SSSI
 - Kirkby Moor SSSI; and Duddon Mosses NNR.
- 6.3.3. As a result, there is the risk the proposed scheme could result in some disruption to the structure and function of qualifying criteria, particularly during construction. Where there is a risk of impacts to European Sites or Ramsar sites an assessment of the scheme under the Habitats Regulations will be required to determine if there are any likely significant effects on the Designated Sites and if avoidance and mitigation measures can be incorporated to avoid an adverse effect on the integrity of the Designated Sites.
- 6.3.4. Noise, vibration, lighting and dust during construction could disturb species, including species of overwintering birds linked to some of these sites. Furthermore, a pollution or sedimentation event during construction of the watercourse crossings could affect aquatic life for a significant distance downstream of the event, including at the estuary. This in turn could affect the bird populations, which rely on the invertebrates for food. By adhering to best practice guidelines and legislation, such as appropriate silt control measures, it is likely most of these effects can be adequately mitigated.

Non- statutory designated sites

6.3.5. Possible effects on non-statutory sites include:

- smothering of habitats by sediments and dust during construction;
- loss of functionality due to loss of connectivity to the wider area; and
- potential adverse impacts from air pollution during construction.

It is likely best practice working methods, if implemented, during the construction phase will mitigate against any significant effects.

Habitats of principal importance

6.3.6. Hedgerows and Lowland Mixed Deciduous Woodland are the Habitats of Principal Importance that are most likely to be impacted by the Scheme in the form of direct habitat loss in the short term, smothering of habitats by sediments or dust, and the loss of functional habitat and connectivity to the wider area. It is anticipated that landscape designs will include tree planting, hedgerow planting and re-seeding to mostly mitigate against any loss. Translocation of habitats will be considered, if it is appropriate and viable.

6.3.7. Two watercourses, which are Habitats of Principal Importance, are being crossed by the scheme; Grize Beck and an unnamed watercourse. There is the potential for geomorphological changes and alterations to the sediment regime to occur as a result. Supporting habitats and species, such as fish, could be affected through any alterations to sediment regimes, as this could alter in-river habitat. Detailed geomorphological and hydrological assessments will need to be undertaken to gain further information on the possible effects. A Water Framework Directive (WFD) assessment will also need to be undertaken.

Other habitats

6.3.8. Several habitats including acid grassland, marshy grassland and semi – improved neutral grassland could be impacted by the Scheme in the form of direct habitat loss, the smothering of habitats by sediments or dust, and the loss of functional habitat and connectivity to the wider area. It is anticipated that landscape designs will incorporate planting and re-seeding to mostly mitigate against any loss. Translocation of habitats will be considered, if it is appropriate and viable.

Terrestrial invertebrates

6.3.9. Terrestrial invertebrates could be impacted by the Scheme in the form of loss and damage to terrestrial habitat which could be caused by direct means, such as site clearance and damage from vehicles, or by indirect means, such as dust or shading. Construction methodologies will be adapted where possible to ensure impacts on supporting habitats are avoided or minimised.

Amphibians (Including Great Crested Newt and Natterjack Toad)

6.3.10. Great crested newts are not present, therefore there is a low risk that the proposed scheme will affect this species. Other amphibian species could be impacted by the loss of terrestrial habitat, pollution incidents to ponds, population isolation and direct mortality. To demonstrate a precautionary approach measures will be incorporated into the construction

phase to ensure personnel are aware of amphibians during construction and the need to avoid intentional harm should they be present.

Reptiles

- 6.3.11. No reptiles were observed during the 2019 surveys. There are habitats present associated with the proposed site that are suitable to support reptile species. In addition, there are known populations of reptiles in statutory sites nearby. Potential effects include loss of habitat and wildlife corridors and population isolation. To demonstrate a precautionary approach measures will be incorporated into the construction phase to ensure personnel are aware of the species during construction and the need to avoid intentional harm should they be present.

Birds (including barn owl)

- 6.3.12. There is a risk the proposed scheme could result in significant effects upon bird species due to the potential for:
- habitat loss
 - disturbance
 - road traffic mortality
 - marginalisation of populations
 - death or loss of local populations.
- 6.3.13. Barn owls are known to utilise the adjacent areas, and to ascertain if there are nesting sites and foraging areas likely to be affected, surveys will be undertaken in 2020. Mitigation planting and earth bunds will be used where severance could be an issue to prevent mortality by road traffic.

Bats

- 6.3.14. Bats may be significantly impacted by the Scheme due to the loss of roost sites, foraging and commuting habitat, habitat fragmentation, road traffic mortality, that could lead to loss of or impacts to local populations and marginalisation of local populations. To ensure any trees identified for removal do not contain bat roosts, further surveys will be carried out on those that have moderate to high bat roost potential prior to commencement of the scheme to identify if any bat roosts are present. To ensure any buildings do not contain bat roosts, further surveys on those that have low to high bat roost potential will be undertaken. If roosts are present, and will be lost, a European Protected Species Mitigation licence application will be undertaken including a suitable mitigation strategy through consultation with Natural England.

Otter

- 6.3.15. No existing otter holts, resting areas or commuting routes of the species have been identified in locations that will be affected by the proposed scheme. In order to adopt an appropriate precautionary approach as there are records of the European Protected Species

in the vicinity of the scheme, good working practices during the construction phase will be adhered to including;

- undertaking pre-construction surveys of habitat suitable for supporting breeding and sheltering otter to gain an up-to-date assessment if any otters holts have become established where they may be impacted. Surveys will continue quarterly during 2020 to better understand otter presence/absence on Grize Beck, Press Beck and the unnamed ditch.
- use of directional lighting to avoid lighting foraging and commuting routes
- ensuring open excavations are fenced or a means of escape provided.

6.3.16. During operation, there may be the potential for road traffic mortality and thus death or loss of local populations. Otter fencing and passes may be included in the design to reduce the potential for road traffic mortality, if necessary.

Badgers

6.3.17. The Scheme will likely impact upon badgers. The most likely impacts will be in the form of:

- habitat loss
- severance of territory
- road traffic mortality
- marginalisation of local populations
- death or loss of local populations.

6.3.18. Additional pre-construction surveys will be undertaken to ascertain the usage of setts and to determine the extent of badger social group territories no more than 6 months prior to start on site. Where appropriate fencing and mammal passes may be included in the design to reduce severance issues and the potential for road traffic related mortalities.

6.3.19. If setts are to be lost, a protected species licence application will be applied for from Natural England including appropriate mitigation. Currently this is not anticipated as the nearest main sett is around 300m from the scheme, however should this become necessary, the licence will need to be in place prior to commencement of any site works and may require exclusion of badgers.

Hedgehogs

6.3.20. Hedgehogs will likely be impacted by the Scheme. The most likely impacts will be in the form of:

- habitat loss, severance of wildlife corridors
- road traffic mortality, marginalisation
- death or loss of local populations.

- 6.3.21. Where appropriate underpasses suitable for hedgehogs will be included in the Scheme design to facilitate hedgehog movement across the landscape and reduce the potential for road traffic mortalities.

Fish

- 6.3.22. Fish may be significantly impacted by the Scheme due to noise, vibration and lighting during construction of the watercourse crossings, as well as from operational use. A pollution event, or sedimentation, could result in adverse changes to water quality, or smother fish larvae, eggs or spawning beds. The spawning and migration of salmonid species could be prevented. By adhering to best practice guidelines and legislation, for example undertaking works in or adjacent to watercourses outside of the salmonid spawning season, it is likely most of these adverse effects can be mitigated effectively and would be detailed in the mitigation information.

Aquatic macroinvertebrates and macrophytes

- 6.3.23. Riverine invertebrates and plant life could be significantly impacted by the Scheme in the form of a pollution event, increased levels of sedimentation, loss of habitat, and a risk to flora from operational shading. By adhering to best practice guidelines for in-river works, including for example the use of silt control measures, most of these adverse effects can be mitigated effectively.

6.4. Scoping Recommendation

- 6.4.1. There are several ecological and nature conservation receptors that have the potential to be impacted by the Scheme, as detailed above. It is recommended therefore, that an Ecology and Nature Conservation assessment should be scoped in.

6.5. Assessment Methodology

Guidelines

- 6.5.1. The assessment will principally be undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11 LA 108 Biodiversity, which provides guidance on the criteria of assessment of the potential impacts of road projects on nature conservation resources and LA 115, which details the implications of highways projects on European Sites.
- 6.5.2. The methodology will also be based upon current legislation, planning policy, and best practice guidelines, including the guidance for Ecological Impact and Assessment (EclA) in the UK and Ireland developed by the Chartered Institute of Ecology and Environmental Management (CIEEM)³².

Regulatory and Policy Framework

- 6.5.3. Key legislation that has determined the way in which this assessment will be carried out includes, but is not limited to, the following:
- Conservation of Habitats and Species Regulations (2018)

³² 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

- Birds Directive (1979)
- Wildlife and Countryside Act (1981) (as amended)
- EU Water Framework Directive (2000)
- Countryside and Rights of Way Act (2000)
- Natural Environment and Rural Communities (NERC) Act (2006)
- Salmon and Freshwater Fisheries Act (1975)
- Protection of Badgers Act (1992)
- Wild Mammals (Protection) Act (1996)

6.5.4. Key national and local planning policy relevant to this assessment include:

- England: National Planning and Policy Framework (2019)
- Biodiversity: Code of Practice for planning and development (2013) BS 42020:2013
- Biodiversity 2020
- Biodiversity Action Plans for England
- Cumbria Local Biodiversity Action Plan
- South Lakeland District Local Plan (2018 – 2021)

Methodology

Defining the study area

- 6.5.5. The area of land assessed by ecological survey and assessment will be divided into two distinct sections; the proposed Scheme footprint (the 'Site') and a wider survey area ('the survey area'). The wider survey area comprises a large area of land including adjacent habitats and connecting corridors to allow potential effects on the behaviour of key species to be considered. The study area will be determined with reference to the guidelines outlined above and by using professional judgement and knowledge of the ecology of the receptors in question.

Establishing the baseline

- 6.5.6. The baseline conditions and the potential receptors will be established through a review of the desktop study conducted at Stage 2 and the outcomes of the protected species and habitat surveys conducted during 2019/2020. This will include:
- Preliminary Ecological Appraisal (2019)³³

³³ AECOM Infrastructure & Environment UK Limited, March 2019. *Grizebeck A595 Road Realignment Scheme Preliminary Ecological Appraisal (PEA)*

- Phase 2 Ecology Surveys (April – June 2019) Briefing Note (2019)³⁴
- Aquatic Macroinvertebrate Survey Report (2019)³⁵
- Aquatic and Riparian Ecology Report (2019)³⁶
- Terrestrial Ecology Report (2019)³⁷

How the potential impacts, and their effects, will be identified and assessed

6.5.7. The habitats, species and their key functions within the study area are known as 'ecological features'. To determine the likelihood of a significant effect, it is first necessary to identify whether an ecological feature is suitably valuable for a significant effect upon it to be material in decision making. Guidance for Ecological Impact Assessment (EclA) developed by CIEEM³⁸ assesses value in terms of biodiversity, social, community or economic values. These values are described in Table 6.2, where the sensitivity is applied by the EIA process not the CIEEM guidance:

Table 6.2: Value (or sensitivity) of ecological features

Value	Descriptor
International (Very High)	<ul style="list-style-type: none"> • A site designated or identified for designation at the international level (e.g. Special Protection Area (SPA), Special Area of Conservation (SAC), and/or Ramsar site). Proposed or candidate sites are given the same consideration as designated sites. • A sustainable area of any habitat listed in Annex I of the Habitats Directive or smaller areas of such habitat that is essential to maintain the viability of a larger whole. • Any regularly occurring population of an internationally important species (e.g. Red Data Book species), which are listed as occurring in 15 or fewer 10km squares in the UK, and that is identified as of unfavorable conservation status in Europe or global conservation concern in the UK BAP. • A regularly occurring, nationally significant population of any internationally important species.
National (High)	<ul style="list-style-type: none"> • A site protected by national designations (e.g. Sites of Special Scientific Interest (SSSI), National Nature Reserve (NNR), or Marine Protected Area or a site considered worthy of this designation). • A sustainable area of any priority habitat identified in the UK BAP, or smaller areas of such habitat that is essential to maintain the viability of a larger whole. • A feature identified as of critical importance in the UK BAP. • A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. • Any regularly occurring population of a nationally important species that is threatened or rare in that region of the County.
Regional (Medium)	<ul style="list-style-type: none"> • Sustainable areas of key habitat identified in the Regional BAP or smaller areas of such habitat that is essential to maintain the viability of a larger area.

³⁴ AECOM Infrastructure & Environment UK Limited, July 2019. *Grizebeck A595 Realignment Scheme Phase 2 Ecology Surveys (April – June 2019) Briefing Note*.

³⁵ AECOM Infrastructure & Environment UK Limited, July 2019. *A595 Grizebeck Scheme Aquatic Macroinvertebrate Survey Report*.

³⁶ PBA Applied Ecology Ltd November 2019. *Grizebeck A595 Road Realignment Scheme Aquatic and Riparian Ecology Report (July to November 2019); Interim Results*

³⁷ PBA Applied Ecology Ltd November 2019. *Grizebeck A595 Road Realignment Scheme Terrestrial Ecology Report (July to November 2019); Interim Results*

³⁸ 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

Value	Descriptor
	<ul style="list-style-type: none"> Sites which exceed the county-level designations but fall short of the SSSI selection criteria. Some non-statutory designated sites (Ancient Woodland, TPOs). Any regularly occurring, locally important population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or listed in the LBAP on account of its regional rarity or localization. A regularly occurring, locally significant population/number of a regionally important species.
County (Medium/Low)	<ul style="list-style-type: none"> Some designated sites (e.g. Local Nature Reserves). Some non-statutory designated sites (including SLNCI/CWS). A viable area of a habitat that is uncommon in the county/district or a degraded example of a habitat identified in the local BAP. Sustainable population of a species that is rare or scarce within a county or listed in the local BAP on account of its regional rarity or localisation. Sites or populations that appreciably enrich the county/district
Local >5km (Low)	<ul style="list-style-type: none"> Area of internationally or nationally important habitats, which are degraded and have little potential for restoration. Areas within the site or locally, or populations, that appreciably enrich the habitat resource within the locality, (e.g. species-rich hedgerow). Species or populations within the site or locally, that appreciably enrich the ecological resource within the locality.
Scheme Footprint (Negligible)	<ul style="list-style-type: none"> Areas of heavily managed or modified vegetation of low intrinsic interest and low value to species of nature conservation interest that do not appreciably enrich the site or locality (i.e. improved grassland and arable crops). Common and widespread species.

- 6.5.8. Where a site has multiple designations, the assessment will consider the impacts in respect of the features of each of the designations. For example, where a site is both a SSSI and an SAC, the impacts need to be assessed in respect of each of the interests, and for each of the qualifying features.
- 6.5.9. Legal protection is considered separately from value. The protection of a particular ecological feature through national or international legislation may not necessarily be taken into account when assessing ecological value. For example, whilst badgers are protected by national legislation, the presence of a single badger sett would not be properly assessed as a constraint of 'national' importance. Legislation is, however, considered in terms of mitigation.
- 6.5.10. The magnitude of effects will be assigned quantitatively where possible. The assessment will also take into account whether the effect is positive or negative, its extent (the spatial, or geographical area over which the impact may occur), its duration (this should be defined in relation to ecological characteristics, such as the life cycle of a species, as well as human timeframes), as well as the frequency and timing of any effect and whether the effect is reversible or permanent. Professional judgement will be used to assign magnitude based on the descriptors provided in table 6.3.

Table 6.3: Magnitude of impact (or change) descriptors

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

- 6.5.11. The significance of effects will be assigned quantitatively where possible. The assessment will also take into account whether the effect is positive or negative, its extent (the spatial, or geographical area over which the impact may occur), its duration (this should be defined in relation to ecological characteristics, such as the life cycle of a species, as well as human timeframes), as well as the frequency and timing of any effect and whether the effect is reversible or permanent. Professional judgement will be used to assign significance based on the matrix provided in table 6.4.

Table 6.4: Significance of effect matrix

Resource Importance	Level of Impact					
		No Change	Negligible	Minor	Moderate	Major
	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 or Equivalent Authority Importance	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Local Importance	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

How Mitigation Measures Will be Identified

- 6.5.12. Mitigation measures will be identified using best practice guidelines such as DMRB Volume 11 LA 108 Biodiversity and DMRB Volume 10: LA118 Biodiversity Design and will be formulated through a series of mitigation workshops. Consultation with Natural England, and other statutory consultees, will also be undertaken.

Consultations

- 6.5.13. Consultations will continue throughout the assessment and will include:
- Informal discussions with statutory bodies such as Natural England and the Environment Agency.
 - Public Consultation events.

6.6. Assumptions, Limitations and Uncertainties

- 6.6.1. DMRB is currently under review and being updated, this includes Volume 11: Environmental Assessment and Volume 10: Environmental Design and Management. Both are used as guidance for the methodology of this assessment. The methodology of this assessment will be reviewed once the volumes have been updated, if applicable

- 6.6.2. Protected species and habitat surveys are, in most instances, reliant upon gaining access permissions from private landowners. Where permission has not been granted this will be highlighted as a limitation within the EIA report.

7. Landscape (Landscape Character)

7.1. Introduction

- 7.1.1. The purpose of the landscape character assessment is to determine the baseline landscape character and the value of the existing landscape within the study area and consider how the proposed Scheme would affect the landscape, considering its sensitivity and value.
- 7.1.2. The European Landscape Convention (ELC) provides a definition of landscape that is adopted in the “Guidelines for Landscape and Visual Impact Assessment (Third Edition)³⁹”: *“Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/ or human factors”* (Council of Europe, 2000).
- 7.1.3. It also states that: *“Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of the landscape that make different places distinctive.”*
- 7.1.4. The Design Manual for Roads and bridges (DMRB) LA 107⁴⁰ states that a “scoping assessment shall identify and report on:
1. the likely nature, extent and scale of the project to determine effects of change and development;
 2. the likely nature and scale of landscape effects (positive, neutral or negative) during the construction and operation of the project;
 3. the likelihood of the project to affect the aesthetic and perceptual aspects of the landscape, its distinctive character and its elements; and
 4. issues likely to require further assessment together with the methods to be applied.”
- 7.1.5. DMRB LA 107 also states that *“the scoping assessment shall identify potential significant effects by answering the following questions to gain an understanding of the need to undertake further landscape assessment:*
1. is the project likely to affect designated landscapes (statutory or local designation)?;
 2. is the project likely to affect the distinctiveness of a landscape character area or type?;
 3. is the project likely to affect national, regional or local characteristics or distinctive features?;
 4. is the project likely to affect the condition or quality of a landscape?;
 5. is the project likely to affect the intrinsic character, qualities and local identity of the urban environment (sense of place)?”
- 7.1.6. Following the updates to the EIA Regulations 2017, the effects on Human Health shall be considered as a consequence of the effects on landscape.

³⁹ Landscape Institute and IEMA. April 2013. Guidelines for Landscape and Visual Impact Assessment (GLVIA3).

⁴⁰ Highways England et al. September 2019. Design Manual for Roads and Bridges LA 107 Landscape and Visual Effects.

7.2. Baseline Conditions

- 7.2.1. Within the study area, there are a number of statutory and non-statutory landscape designations that may be affected as a result of the Scheme.

The Lake District National Park / The English Lake District World Heritage Site

- 7.2.2. The study area has two statutory designations: The Lake District National Park and the English Lake District World Heritage Site. The Lake District National Park was designated in 1951 and is subject to The National Parks and Access to the Countryside Act 1949, which is the legislation protecting National Parks.
- 7.2.3. In 2017, the English Lake District was designed World Heritage Site status. The UK Government is signatory to the World Heritage Convention which was established in 1972 by UNESCO. The Convention initiated a list of World Heritage Sites. The National Planning Policy Framework ⁴¹ (NPPF) defines a World Heritage Site as a designated heritage asset. The English Lake District World Heritage Site has been designated for its outstanding universal value which *“comes from a landscape which reflects an outstanding fusion between distinctive communal farming system (including common land, hefting, stone walled field and the field system) that has been present for at least a millennium and a “designed landscape” with improvements of villa’s, picturesque planting and gardens during the 18th and 19th centuries. This combination has attracted and inspired globally recognised writers and artists.”* The Partnership’s Plan: The Management Plan for the English Lake District 2015 – 2020 ⁴².

Important Hedgerows

- 7.2.4. Under the Hedgerow Regulations 1997, Important Hedgerows are protected from removal. To qualify as important the hedgerow must conform with the following criteria;
- “The hedgerow must have a continuous length of, or exceeding, 20 metres.
 - Has a continuous length of less than 20m, but meets another hedgerow (by intersection or junction) at each end;
 - The hedgerow must be more than 30 years old.”
- 7.2.5. In addition to the above, a hedgerow must also meet one, or more of the following criteria:
1. “The hedge marks the boundary, or part of the boundary, of at least one historic parish or township; and for this purpose, ‘historic’ means existing before 1850;
 2. The hedgerow incorporates, or is within an archaeological feature;
 3. The hedgerow marks the boundary of a pre-1600 AD estate or manor, or is visibly related to any building or feature of such a manor;
 4. The hedgerow is part of, or associated with a field system pre-dating the Enclosure Acts;

⁴¹ Ministry of Housing, Communities & Local Government. June 2019. National Planning Policy Framework

⁴² The Lake District National Park Partnership. December 2015. The Partnership’s Plan The Management Plan for the English Lake District 2015 – 2020.

5. The hedgerow is adjacent to a bridleway or public footpath, not counting an adopted highway, and contains at least 4 woody species, as defined in Schedule 3 of the Regulations, plus at least 2 associated features;
 6. The hedgerow contains species listed in Part I of Schedule 1 (birds which are protected by special penalties), Schedule 5 (animals which are protected) or Schedule 8 (plants, which are protected) of the Wildlife and Countryside 1981; or categorised as a declining breeder in 'Red Data Birds in Britain'; or classified as 'endangered', 'extinct', 'rare' or 'vulnerable' in Britain in a document mentioned in the British Red Data Books or the Red Data Books of Britain and Ireland.
 7. The hedgerow includes one or more of the following with a 30m sample section:
 - a. *at least 7 woody species;*
 - b. *at least 6 woody species, and is associated with at least three associated features, (see below);*
 - c. *at least 6 woody species including black-poplar tree *Populus nigra ssp betullifolia*, large-leaved lime *Tilia platyphyllos*, small-leaved lime *Tilia cordata* or wild service tree *Sorbus torminalis*;*
 - d. *at least 5 woody species and at least 4 associated features."*
- 7.2.6. According to the Grizebeck A595 Road Realignment Scheme Phase 2 ecology surveys (April – June 2019) briefing note⁴³, there are thirteen hedgerows classified as Important under the Hedgerows Regulations within the survey area (note, this survey area is smaller than the study area that will be used for this assessment, therefore, further survey work will be required to fully assess hedgerows to be affected). The Grizebeck Phase 2 ecology surveys focus on those hedgerows important for their wildlife value. No additional surveys have been carried out to date to determine if there are further Important Hedgerows within the study area designated for their heritage value.
- 7.2.7. The significance of effects on Important Hedgerows as receptors will be assessed within the Biodiversity and Cultural Heritage chapters, however, their presence in the landscape will be considered when determining the sensitivity of the landscape character areas; and impacts on these features of green infrastructure will be considered to determine the effects on each landscape character area.

Tree Preservation Orders

- 7.2.8. Trees with a Tree Preservation Order (TPO) are protected under Part VIII of the Town and Country Planning Act 1990 and The Town and Country Planning (Tree Preservation) (England) Regulations 2012, to protect specific trees, groups of trees or woodlands in the interests of amenity. An Order prohibits the:
- *"cutting down*
 - *topping*

⁴³ Cumbria County Council. July 2019. Grizebeck A595 Road Realignment Scheme Phase 2 ecology surveys (April – June 2019) briefing note.

- *lopping*
- *uprooting*
- *wilful damage*
- *wilful destruction*

of trees without the local planning authority's written consent. If consent is given, it can be subject to conditions which have to be followed. In the Secretary of State's view, cutting roots is also a prohibited activity and requires the authority's consent."

- 7.2.9. There is one Ash tree in the rear garden at Chapels Farm, Grizebeck (grid reference 323771 483936) protected by North Lonsdale RDC TPO No 1 1972. TPO's will be considered in the context of determining the sensitivity of the landscape character areas.

Listed Buildings

- 7.2.10. Listed buildings are designated under the Planning (Listed Buildings and Conservation Areas) Act 1990.

- 7.2.11. Within the study area there are the following listed buildings or structures:

- Kirkby Hall is a Grade I listed Building
- Ashlack Hall and Outbuildings are also Grade II* listed buildings and;
- the "Garden Wall to the west and southwest of Ashlack Hall" is Grade II listed.

- 7.2.12. These assets will be considered as a part of the landscape impact assessment when determining the sensitivity of each character area, however, the direct impacts of the development on these will be considered in more detail in the Cultural Heritage chapter.

Non-statutory designations

Ancient Woodland

- 7.2.13. Ancient Woodlands are woodland that has existed continuously since 1600AD in England. They are designated by Natural England, and are afforded protection through the NPPF 2019, which states: "development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists".
- 7.2.14. However, they are not afforded statutory protection. There are several areas of Ancient Woodland within the study area but the Scheme does not appear to intersect any of these areas.

Landscape Character Areas

- 7.2.15. **Natural England National Landscape Character Areas (NCA)** – the National Character Area Profiles ⁴⁴ provide a broad assessment of the landscape character within England.

⁴⁴ Natural England. September 2014. National Character Area Profiles

Refer to drawing GRIZ-CAP-EGN-00-DR-Z-0003 to identify the national landscape character areas that relate to the study area.

7.2.16. The plan shows that the study area includes both 19. South Cumbria Low Fells and 7. West Cumbria Coastal Plain.

7.2.17. According to Natural England's NCA Profile: 19 South Cumbria Low Fells (NE404), 2015, the key characteristics of the South Cumbria Low Fells are:

- *“Undulating, rugged low fells and ridges of Silurian slates and fissile mudstones radiate in a north–south orientation from the eroded central dome of the Cumbria High Fells, dissected by U-shaped valleys, which include the large lakes of Windermere and Coniston Water.*
- *Open fells, over 300 m in height, with craggy ridges, rocky knolls and infrequent woodland and tree cover.*
- *Mosaic of fell habitats, including upland heathland, valley and basin mires, springs and flushes, lakes, tarns, juniper scrub, upland calcareous grassland and lowland dry acid grassland, among fast-flowing rocky becks, rough pasture, bracken beds, and small broadleaved and coniferous woodlands.*
- *Extensive ancient, semi-natural woodlands, especially in the central area of South Cumbria Low Fells, extending from Coniston Water and the River Crake to the Winster Valley, and contiguous with large conifer plantations and mixed woodland in Grizedale and the surrounding area.*
- *Rivers and streams drain southwards from the uplands, and flow through the area in a distinctive north–south orientation to drain into the Duddon Estuary or Morecambe Bay.*
- *A pastoral landscape, consisting of small secluded and larger open valleys and fells, with generally small- to medium-scale enclosures that increase in size towards the east.*
- *Open, semi-improved pasture on a plateau between the rivers Kent and Lune, with a shallow relief of ridges and hollows.*
- *Well-managed land with a parkland character is associated with the edges of the principal lakes, valley bottom locations and large country house estates.*
- *Villages, hamlets, farmsteads, farm buildings, villas and large country houses, with local building materials varying from limestone and slate in the south, to sandstone and slate elsewhere. Some buildings are lime-rendered, giving them a characteristic white exterior.*
- *Historic field systems dating from medieval times, with well-maintained drystone walls forming strong patterns and boundaries. Sheepwalks, (areas of grassland where sheep can roam freely) established on the fells from the 13th century, are also historic landscape features.*

- *There is an intricate pattern of undulating and twisting minor roads that serve the scattered hamlets and farmsteads.*
- *This is a significant tourism and recreational area, with large numbers of visitors attracted by the natural beauty, the wildlife, the cultural connections, and the opportunities for walking, cycling, running, climbing and water-based activities, among other pursuits.”*

7.2.18. According to Natural England's NCA Profile: NCA Profile: 07 West Cumbria Coastal Plain (NE568), 2014, the key characteristics of West Cumbria Coastal Plain are:

- *“an undulating coastal landscape of varying width with open views to the Cumbria High Fells NCA and across the Irish Sea to Galloway and the Isle of Man.*
- *The area has a diverse, open coastline ranging from depositional sand, shingle and pebble beaches and sand dunes, through low soft cliffs of glacial or industrial origin, to high sandstone cliffs with a rich and varied flora and fauna, including dune grasslands, seabird colonies and the natterjack toad.*
- *There are lowland river valleys with limited ancient semi-natural woodland, and expansive estuarine landscapes with lowland raised mires, salt marshes, mudflats and intertidal habitats with large numbers of wintering waders and wildfowl.*
- *Important areas of brownfield biodiversity, often in urban-fringe locations, are characterised by rare plants, reptiles and invertebrates including the small blue butterfly.*
- *The area includes open pastoral farmland with occasional woodlands, basin and valley fens, remnant semi-natural grasslands/meadows associated with streamsides, low-lying land, and localised pockets of arable land supporting species such as curlew and wintering hen harrier.*
- *There are areas of ancient enclosure with medium to large rectilinear fields and few hedgerow trees. They are bounded by hedges (often gappy and augmented by wire fences), stonewalls on higher ground, and stone-faced earthbanks locally known as ‘kests’ along the coast.*
- *There is limited tree cover, with most woodland to be found on steeper slopes and along river corridors. There are some plantation woodlands and shelterbelts associated with the upland margins of the area and former open cast mining sites.*
- *There is a dispersed rural settlement pattern of hamlets and isolated farmsteads with some villages.*
- *Distinctive building materials are a combination of locally quarried red sandstone, red brick and render augmented by coastal pebbles along the southern coast.*
- *Larger urban settlements and coastal towns are closely linked with the growth and location of the area’s strong industrial history of coal and iron ore mining, processing ore, smelting and ship-building.*

- *Extensive urban-fringe influence is linked to highly visible industrial past and present, including quarrying, open cast mining, restoration and reclamation initiatives, manufacturing and processing plants and the nuclear energy industry.*
- *A rich history is evident in the pattern of land use and heritage features dating from the Neolithic period onwards, including earthworks, forts and castles and all the Roman coastal forts that form part of the Hadrian's Wall World Heritage Site."*

7.2.19. **Regional Landscape Character Areas** – the Cumbria Landscape Character Guidance and Toolkit⁴⁵ provides a more detailed, regional assessment of the county's landscape character, outside of the Lake District National Park. Within the Lake District National Park, the Lake District National Park Landscape Character Assessment and Guidelines report⁴⁶ describes the different character areas within the National Park. Refer to drawing GRIZ-CAP-EGN-00-DR-Z-0004 to identify the regional landscape character areas that relate to the study area. This shows four different regional character areas within the study area. These are:

- 2b - Coastal Margins: Coastal Mosses
- 2c - Coastal Margins: Coastal Plain
- 9d – Intermediate Moorland Plateau: Ridges
- K4 – Low Fell: Moorland Ridge

7.2.20. According to Cumbria Landscape Character Guidance, the key characteristics of **2b - Coastal Margins: Coastal Mosses** are:

- *"Lowland raised mosses*
- *A mosaic of heath, Willow Carr, Birch scrub woodland and pasture*
- *High ecological value*
- *Field shapes vary, bounded by hedges and fences*
- *Some woodland around the Duddon Estuary*
- *Picturesque backdrop of the Lakeland Fells/open flat panoramic views*
- *Distinct raised edges*
- *Sense of remoteness and tranquillity."*

7.2.21. According to Cumbria Landscape Character Guidance, the key characteristics of **2c - Coastal Margins: Coastal Plain** are:

- *"Flat and slightly undulating coastal plain*

⁴⁵ Cumbria County Council. March 2011. Cumbria Landscape Character Guidance and Toolkit

⁴⁶ Chris Blandford Associates. September 2008. Lake District National Park Landscape Character Assessment and Guidelines

- *Long and narrow fields in undulating areas with larger fields in flat areas*
- *Intersected by shallow rivers and watercourses*
- *Hedges form main field boundaries*
- *Scarce tree cover*
- *Predominantly pasture with some arable in drier areas*
- *Frontiers of the Roman Empire - Hadrian's Wall World Heritage Site is a significant archaeological feature in the Solway*
- *Historic field pattern strongly linked to settlements."*

7.2.22. According to Cumbria Landscape Character Guidance, the key characteristics of **9d – Intermediate Moorland Plateau: Ridges** are:

- *"Distinct ridges*
- *Extensive areas of true heathland moorland*
- *Improved pasture with distinctive stone walls*
- *Woodland and small belts of trees form prominent features."*

7.2.23. According to the Landscape Character Assessment and Guidelines, the specific characteristics of the sub type **K4 – Low Fell: Moorland Ridge** are:

- *"Series of prominent knolls and ridges;*
- *Predominant land cover is grassland and moorland (generally open grazing common); and*
- *Strong pattern of stone walls forming field boundaries."*

7.2.24. Further details of the characteristics of the "K: Low Fell" landscape type is contained within the Landscape Character Assessment and Guidelines report.

7.2.25. To supplement the desk-based studies, field surveys shall be carried out to confirm, supplement and update the desk-based baseline data (refer to section 7.6).

7.2.26. As a baseline for the landscape assessment, the following receptors have been identified based on the regional level landscape character types:

Table 7.1: Baseline/ Receptors and their Sensitivity

Baseline/ receptor	Sensitivity
2b - Coastal Margins: Coastal Mosses	High
2c - Coastal Margins: Coastal Plain	High
9d – Intermediate Moorland Plateau: Ridges	High
K4 – Low Fell: Moorland Ridge	Very High

7.3. Potential Impacts, Effects and Mitigation

- 7.3.1. Table 7.2 provides a summary of the potential impacts of the Scheme and the adverse effects these are likely to have on the landscape.

Table 7.2: Likely landscape impacts and effects

Impact	Effect
Site compound, storage areas and temporary stockpiles and utility diversions.	Damage to vegetation cover and land use which contributes to the local sense of place. Damage to the sense of tranquillity and remoteness which are key characteristics of many of the character areas. Damage to the natural topography which is a key characteristic of many of the character areas. These changes within the landscape are likely to cause adverse effects.
Removal / damage to vegetation including: grassland, marshland, scrub, woodland, individual trees and hedgerows.	Damage to vegetation cover and land use which contributes to the local sense of place. Potential loss of green infrastructure, including mature trees and hedgerows that add value to the landscape. Removal or damage of these features is likely to cause adverse landscape effects.
Construction traffic movements.	An increase in traffic within the study area and the associated damage to vegetation cover is likely to have adverse effects on both tranquillity and quality of the landscape.
Earthworks operations including creation of steep cuttings and embankments. Engineered slopes created within the natural topography.	The natural topography strongly influences the landscape character within the study area. Changes to this are likely to have adverse effects on the quality of these landscapes, particularly during construction.
New two lane, single carriageway road with associated traffic.	Presence of a main road of this scale and appearance will adversely affect the rural characteristics of these landscapes. The wide road corridor will contrast with the narrow, rural road network that currently exist within the study area.
Lighting columns and large highways signage.	Presence of these urban features will be prominent in these rural, open landscapes and are likely to have adverse effects.
Loss of traditional, drystone wall field boundaries.	These boundary treatments have a strong influence on sense of place. Loss of these features would have an adverse effect on landscape character.
The road alignment will dissect numerous field boundaries.	Severing fields is likely to have an adverse effect on landscape pattern.
Culvert over Grize Beck/ unnamed watercourse adjacent to Grize Beck.	The scale, appearance and materials used for this section of the road is likely to have an effect on the quality of the landscape. Sense of openness is also likely to be affected.

7.3.2. Potential **mitigation** for significant effects could include:

- Replacement traditional drystone walls;
- Replacement species rich, native hedgerows;
- Replacement tree and woodland planting;
- Replacement scrub, marsh and grassland planting or seeding;
- Earthworks to be graded out and returned to agricultural use, allowing for a narrower road corridor width during operation.

7.4. Scoping Recommendation

7.4.1. LA 107 provides the following questions to gain an understanding of whether further landscape assessment is required:

1. *“is the project likely to affect designated landscapes (statutory or local designation)?”*;
2. *is the project likely to affect the distinctiveness of a landscape character area or type?;*
3. *is the project likely to affect national, regional or local characteristics or distinctive features?;*
4. *is the project likely to affect the condition or quality of a landscape?;*
5. *is the project likely to affect the intrinsic character, qualities and local identity of the urban environment (sense of place)?”*

7.4.2. Due to the presence of statutory landscape designations and the sensitivity of the baseline landscape character; combined with the potential effects on the distinctiveness and quality of the landscape and its features, it is recommended that the landscape assessment **be scoped into the EIA.**

7.5. Assessment Methodology

Guidelines

7.5.1. The following guidance documents will be used in writing the landscape impact assessment:

- Highways England et al, Design Manual for Roads and Bridges LA 107 Landscape and visual effects: September 2019.
- The Landscape Institute and Institute of Environmental Management & Assessment - The Guidelines for Visual Impact Assessment (Third Edition): 2013.
- Natural England - National Character Area profile 19 South Cumbria Low Fells: January 2015.

- Natural England - National Character Area profile 7 West Cumbria Coastal Plain: May 2014.
- Cumbria County Council - Cumbria Landscape Character Guidance and Toolkit. – March 2011.
- Chris Blandford Associates, Lake District National Park Landscape Character Assessment and Guidelines: September 2008.

Regulatory and Policy Framework

7.5.2. The National Planning Policy Framework 2019 contains the following policies that relate the value of landscape:

- *2. Achieving sustainable development*
- *8. Promoting healthy and safe communities*
- *9. Promoting sustainable transport*
- *11. Making effective use of land*
- *12. Achieving well-designed places*
- *14. Meeting the challenge of climate change, flooding and coastal change*
- *15. Conserving and enhancing the natural environment*
- *16. Conserving and enhancing the historic environment.*

7.5.3. The following planning policies within South Lakeland District Council's (SLDC) Core Strategy, October 2010, will relate to the landscape impact assessment for this Scheme:

- *CS6.6 Making effective and efficient use of land 85 and buildings*
- *CS8.1 Green infrastructure*
- *CS8.2 Protection and enhancement of landscape and settlement character*
- *CS8.3a Accessing open space, sport and recreation*
- *CS8.3b Quantity of open space, sport and recreation*
- *CS8.6 Historic environment*
- *CS8.10 Design*
- *CS9.1 Social and community infrastructure*
- *CS9.2 Developer contributions.*

7.5.4. The following planning policies within the Lake District National Park Core Strategy including Proposals Map, Adopted October 2010, will relate to the landscape impact assessment for this Scheme:

- *Policy CS01: National significance and distinctive nature of the Lake District*
- *Policy CS09: South Distinctive Area*
- *Policy CS10: Achieving design excellence*
- *Policy CS11: Sustainable development principles*
- *Policy CS12: Major developments*
- *Policy CS13: Planning obligations*
- *Policy CS14: Sustainable Transport Solutions*
- *Policy CS17: Geodiversity and biodiversity*
- *Policy CS21: Open space and recreation*
- *Policy CS25: Protecting the spectacular landscape*
- *Policy CS26: Geodiversity and biodiversity*
- *Policy CS27: The acclaimed historic environment.*

Methodology

Determining the study area

7.5.5. The study area will include a 1km buffer around the proposed road alignment. This enables the consideration of the landscape character at a national and regional scale, whilst being proportionate to the scale of the development. Cumbria County Council have been consulted as to whether they consider this to be an appropriate buffer size but have not commented at the time of writing.

Establishing the baseline

- 7.5.6. The baseline information will be collected through both desk-based research and field surveys. The baseline studies will be informed by assessing the existing landscape character at a national and regional level. Field survey will involve taking photographs and completing the worksheet found in “Appendix 4: Template for Field Survey Work” from the Cumbria Landscape Character Guidance and Toolkit.
- 7.5.7. The sensitivity of each character area will be determined as a result of both desk study and field survey. The sensitivity rating is dependent on the nature of the proposed development and the ability of the existing landscape to accommodate the perceived changes. The table below has been taken from LA 107 and has been used to determine the sensitivity of each receptor.

Table 7.3: Landscape sensitivity (susceptibility and value) and typical descriptions

Landscape sensitivity (susceptibility and value) of receptor/ resource	Typical description
Very high	Landscapes of very high international/national importance and rarity or value with no or very limited ability to accommodate change without substantial loss/gain (i.e. national parks, internationally acclaimed landscapes - UNESCO World Heritage Sites).
High	Landscapes of high national importance containing distinctive features/elements with limited ability to accommodate change without incurring substantial loss/gain (i.e. designated areas, areas of strong sense of place - registered parks and gardens, country parks).
Medium	Landscapes of local or regional recognition of importance able to accommodate some change (i.e. features worthy of conservation, some sense of place or value through use/perception).
Low	Local landscape areas or receptors of low to medium importance with ability to accommodate change (i.e. non-designated or designated areas of local recognition or areas of little sense of place).
Negligible	Landscapes of very low importance and rarity able to accommodate change.

Assessing potential impacts and effects

- 7.5.8. The impacts (action being taken) of the Scheme will be identified and the effects (consequence) on each receptor will be assessed. The judgements about size and scale of effect, the extent of area it occurs over, whether it is reversible or irreversible and whether it is short or long term in duration will all inform the determined “magnitude of effects”. To determine the magnitude of effects the following criteria will be used:

Table 7.4: Magnitude and nature of effect on the landscape and typical descriptions

Magnitude of effect (change)		Typical descriptions
Major	Adverse	Total loss or large-scale damage to existing landscape character or distinctive features or elements; and/or addition of new uncharacteristic, conspicuous features or elements (i.e. road infrastructure).
	Beneficial	Large scale improvement of landscape character to features and elements; and/or addition of new distinctive features or elements, or removal of conspicuous road infrastructure elements.
Moderate	Adverse	Partial loss or noticeable damage to existing landscape character or distinctive features or elements; and/or addition of new uncharacteristic, noticeable features or elements (i.e. road infrastructure).
	Beneficial	Partial or noticeable improvement of landscape character by restoration of existing features or elements; or addition of new characteristic features or elements or removal of noticeable features or elements.
Minor	Adverse	Slight loss or damage to existing landscape character of one (maybe more) key features and elements; and/or addition of new uncharacteristic features and elements.

	Beneficial	Slight improvement of landscape character by the restoration of one (maybe more) key existing features and elements; and/or the addition of new characteristic features.
Negligible	Adverse	Very minor loss, damage or alteration to existing landscape character of one or more features and elements.
	Beneficial	Very minor noticeable improvement of character by the restoration of one or more existing features and elements.
No change		No noticeable alteration or improvement, temporary or permanent, of landscape character of existing features and elements.

- 7.5.9. To determine the significance of effects, Table 7.5: the significance matrix (from LA 104 Environmental assessment and monitoring⁴⁷) will be used. This involves cross referencing the sensitivity of a receptor with the magnitude of impacts/ effects.

Table 7.5: Significance Matrix

	Magnitude of impact (degree of change)					
		No change	Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or Moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

- 7.5.10. Table 7.6, below, provides an explanation of how the results of this assessment will inform planning decision making.

Table 7.6: Significance categories and typical descriptions

Significance category	Typical description
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.

⁴⁷ Highways England et al. July 2019. LA 104 Environmental assessment and monitoring.

Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
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- 7.5.11. The assessment will be carried out for the construction phase and Year 1 and Year 15 of the Scheme's operation (Summer and Winter). A preliminary assessment will consider the significance of the effects without mitigation.

Identifying Mitigation Measures

- 7.5.12. Next, mitigation will be identified through desk-based study, stakeholder engagement and workshops considering other environmental topics. Mitigation will aim to reduce adverse effects wherever possible. This will be listed in a schedule, which will be able to be cross-referenced with a mitigation plan to identify locations, where applicable.

Assessment of Residual Effects

- 7.5.13. Following the identification of mitigation, the assessment will be repeated, this time incorporating the mitigation measures. The residual assessment will determine the change in significance of effects to receptors that are identified to have significant adverse effects (moderate or above) in the Preliminary Assessment. This allows for a comparison to show how adverse landscape effects can be mitigated over time.

Cumulative Effects

- 7.5.14. LA 107 defines cumulative effects as “*Impacts resulting from incremental changes caused by other present or reasonably foreseeable actions likely to occur together with the project.*”
- 7.5.15. An assessment of other developments that are “reasonably foreseeable” within the study area will be carried out to identify if this would create any additional significant effects.
- 7.5.16. For further details, refer to paragraphs 2.6.28 to 2.6.31.

7.6. Assumptions, Limitations and Uncertainties

- 7.6.1. At the time of writing, the timescales for construction and operation of the Scheme are not known.
- 7.6.2. This scoping exercise has been based on desk-study information only. No field surveys have been carried out to support this section of the report.
- 7.6.3. It has not been confirmed whether any important hedgerows with historical value are present or likely to be affected within the study area. The existing information on important hedgerows for ecological value is limited to only a portion of the study area for this assessment.
- 7.6.4. A BS5837:2012 tree and hedgerow survey has not been undertaken for the Scheme. It is expected that for a full EIA assessment this will be carried out to allow this information to inform the assessment process.
- 7.6.5. Stakeholders including Cumbria County Council, the Lake District National Park and Natural England will be consulted as part of the Environmental Impact Assessment to ensure that the baseline information is up to date and to ensure that the methodology for the assessment is agreed.

- 7.6.6. Effects on landscape can have consequential effects on human health, including both physical health and mental health and wellbeing. The Landscape Institute has published a position statement⁴⁸ which contains references to research and evidence into the impacts landscape can have on public health, provides case study projects and sets out key principles. These impacts can be caused by several factors such as damage or loss of public spaces, damage or loss to trees, woodland and other vegetation, or damage to tranquillity. Whilst it is not easy to quantify the effects on human health as a consequence of effects on landscape, as part of the Landscape Impact Assessment, comments will be made on the factors that may affect health. The effects are likely to be greatest during the construction period when the impacts on the landscape are greatest. The effects are most likely to affect residents within the study area, rather than users of Public Rights of Way, as the nature of the rural setting means that there are many alternative recreational routes that can be used by members of the public during this time period if desired. There are no areas of public open space that will be affected as part of the Scheme. During operation, it is anticipated that effects on human health can be minimised through good quality landscape design. Tranquillity is likely to be affected through the additional road network, however, the effects of construction and traffic noise will be assessed as part of the Noise Impact Assessment.

⁴⁸ Public Health and Landscape: Creating healthy places, Landscape Institute Position Statement, 2013: <https://www.landscapeinstitute.org/policy/health/>

8. Landscape (Visual Effects)

8.1. Introduction

8.1.1. The purpose of the visual impact assessment is to understand the extent and nature of the existing views and the way in which key views within the study area would be affected during construction and implementation of the proposed scheme. The assessment relates to changes to people's views which arise as a result of changes in the composition of the landscape.

8.1.2. DMRB LA 107 Landscape and Visual Effects states that a "scoping assessment shall identify and report on:

1. *the likely nature, extent and scale of the project to determine effects of change and development;*
2. *the likely nature and scale of landscape effects (positive, neutral or negative) during the construction and operation of the project;*
3. *the likelihood of the project to affect the aesthetic and perceptual aspects of the landscape, its distinctive character and its elements; and*
4. *issues likely to require further assessment together with the methods to be applied."*

8.1.3. DMRB LA 107 also states that "the scoping assessment shall identify potential significant effects by answering the following questions to gain an understanding of the need to undertake further landscape assessment:

1. *"is the project likely to affect receptors (individuals or range of people) views and the visual amenity of the area?;*
2. *is the project likely to affect the sensitivity of views to and from designated and/or valued landscapes, or from public rights of ways, public open spaces or from national trials?;*
3. *is the project likely to affect a range of viewpoints and nature of views from which the project is visible?;*
4. *is the project likely to generate significant visual effects (daytime and night time)?"*

8.2. Baseline Conditions

8.2.1. The Study Area is located immediately south of the Lake District National Park / The English Lake District World Heritage Site, To the west sits Duddon Moss Nature Reserve and to the south-east of the Scheme is a slate quarry (approximately 500 m east of Chapels).

8.2.2. The area surrounding the scheme comprises agricultural land with pockets of woodland. Fields are generally small in scale, with boundaries of hedgerows and/ or drystone dykes, which is a common feature of the surrounding landscape. Residential properties are predominantly individual or small clusters of properties. Larger settlements are typically on the A595 including Grizebeck, Chapels and Wall End.

- 8.2.3. Throughout the Study Area there is a network of PRowWs, as shown on the Cumbria County Council Definitive Map accessed December 2019.

8.3. Potential Impacts, Effects and Mitigation

- 8.3.1. Due to the sensitivity of visual receptors within a predominantly rural setting, the Scheme has the potential for adverse impacts and effects both during construction and operation.

Table 8.1: Potential impacts and effects on receptors and resources (construction)

Receptor/Resource	Potential Impact	Potential Effect
Residents in/ around the study area	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor
Walkers, cyclists and horse-riders (WCH). Recreational footpaths/ cycle routes/ public rights of way	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor
Recreational users of public open space	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor
People travelling through via the existing road network	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor
Users of commercial facilities	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor
Users of industrial facilities	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor

Table 8.2: Potential impacts and effects on receptors and resources (operation)

Receptor/Resource	Potential Impact	Potential Effect
Residents in/ around the study area.	New development visible from principal view, change in proximity to dwellings.	Change to view in/ out of study area to sensitive receptors.
	Potential loss of existing screening	Open up views with potential positive or negative impacts.
	Potential additional screening	Screen views in/ out of study area.
Walkers, cyclists and horse-riders (WCH). Recreational footpaths/ cycle routes/ public rights of way	Permanent change in outlook from paths	Change to view in/ out of study area to sensitive receptors.
Recreational users of public open space	Permanent change to outlook	Change to view in/ out of study area to sensitive receptors.
People travelling through via the existing road network	Permanent change to outlook	Change to view in/ out of study area for less sensitive receptors.
Users of commercial facilities	Permanent change to outlook	Change to view in/ out of study area for less sensitive receptors.

Receptor/Resource	Potential Impact	Potential Effect
Users of industrial facilities	Permanent change to outlook	Change to view in/ out of study area for less sensitive receptors.

- Potential Mitigation measures of relevance during construction, to be included within the Construction Environmental Management Plan (CEMP) are likely to include the following:
- Careful planning of the construction phasing and layout to ensure visually intrusive features are located away from sensitive receptors or screened appropriately;
- Works should be limited to daylight hours in the most part, with any night works to be kept to a minimum. All lighting used will be directional and all efforts should be made to avoid unnecessary light pollution;
- Stockpiles to be kept to a minimum;
- Existing trees and vegetation to be retained should be protected during the construction phase with protective fencing, where deemed necessary and should be in accordance with BS 5837;
- Careful planning of construction traffic movements.

8.3.2. These will be defined further following the outcome of the assessment.

8.3.3. Potential permanent mitigation where long term significant impacts have been identified through the construction and operational phases are likely to include the following:

- Replacement of any lost trees, shrubs and hedgerows;
- Larger embankment slopes to be planted to soften the impact on the landscape;
- Slopes on the backside of embankments to be slackened and graded back into the existing landform;
- Lighting columns to be kept to a minimum.

8.3.4. These will be defined further following the outcome of the assessment.

8.3.5. Mitigation such as replacement planting and slackened embankments may go some way to minimise visual effects for the proposed Scheme, but it is not considered that this would provide adequate screening until Year 15 when planting has matured. Further assessment will be undertaken as part of stage 3.

8.4. Scoping Recommendation

8.4.1. The scoping assessment shall identify potential significant effects by answering the following questions provided in the DMRB LA107 to gain an understanding of the need to undertake further landscape assessment:

1. “is the project likely to affect designated landscapes (statutory or local designation)?;
2. is the project likely to affect the distinctiveness of a landscape character area or type?;
3. is the project likely to affect national, regional or local characteristics or distinctive features?;
4. is the project likely to affect the condition or quality of a landscape?;
5. is the project likely to affect the intrinsic character, qualities and local identity of the urban environment (sense of place)? ”

8.4.2. It is recommended that a Visual Impact assessment is conducted as part of the EIA due to the likelihood of significant adverse effects on receptors, particularly during operation of the Scheme.

8.5. Assessment Methodology

Guidelines

8.5.1. The assessment will be carried out in accordance with guidance and techniques presented in the following documents:

- The Landscape Institute and Institute of Environmental Management & Assessment - The Guidelines for Visual Impact Assessment (Third Edition): 2013
- DMRB LA104 Environmental assessment and monitoring
- DMRB LA107 Landscape and visual effects

Regulatory and Policy Framework

8.5.2. National Planning Policy Framework (NPPF), February 2019. Policies that relate to this chapter include:

- 8. Promoting healthy and safe communities
- 11. Making effective use of land
- 12. Achieving well-designed places
- 15. Conserving and enhancing the natural environment

- 8.5.3. South Lakeland District Council Local Plan (2010). Policies that relate to this chapter include.
- CS8.1 Green infrastructure
 - CS8.2 Protection and enhancement of landscape and settlement character
 - CS8.3a Accessing open space, sport and recreation
 - CS8.10 Design
 - CS9.2 Developer contributions
- 8.5.4. Lake District National Park Core Strategy including Proposals Map. Policies that relate to this chapter include.
- Policy CS10: Achieving design excellence
 - Policy CS11: Sustainable development principles
 - Policy CS12: Major developments
 - Policy CS13: Planning obligations
 - Policy CS21: Open space and recreation
 - Policy CS25: Protecting the spectacular landscape

Methodology

Identification of resources/ receptors

- 8.5.5. The baseline will be determined by gaining an understanding of the visual amenity of the area which is informed by the area in which the development may be visible. Visual receptors likely to experience views of the development and the viewpoints where they will be affected will be established, along with the nature of the views at these points.
- 8.5.6. A Zone of Theoretical Visibility (ZTV), defined as the 'area within which the scheme may have an influence on or effect the visual amenity' (GLVIA), will be produced as part of Stage 3. The ZTV will be derived from both a Digital Terrain Model (DTM) and Digital Surface Model (DSM) to an extent of 1km (the 'study area'). The DTM provides a 'bare earth model' of the topography therefore, possible screening influences from vegetation and built structures are removed to provide a 'worst case scenario' of potential views. The DSM provides a model of the topography including surface features.
- 8.5.7. The extent of the study area will be finalised, and representative viewpoints will be selected using a combination of the ZTV, desktop study and a site visit. and agreed with the Local Planning Authority. It is anticipated that views will change at these viewpoints as a result of

development. These representative views will be used as a benchmark for assessing possible impacts and effects. The representative viewpoints will include:

- A balance of viewpoints from a variety of directions (broadly north, south, east and west);
- A range of near middle and distant views of the development.

8.5.8. The Local Planning Authority will also be consulted regarding the level of visualisations and presentation material used.

8.5.9. Mitigation measures will be refined as the design develops to reduce significant adverse impacts. Following agreement of the mitigation measures, a detailed impact assessment will be carried out to identify the residual impacts.

Determining the significance of environmental effects

8.5.10. The significance of the visual effects identified during the assessment will be derived as a function of the sensitivity of the receptor against the degree of change in the view as a result of the Scheme. These aspects will then be combined using a matrix to determine the overall significance of environmental effects.

8.5.11. Descriptors for sensitivity are provided in Table 8.3 **Error! Reference source not found.** and descriptors for magnitude of impact are provided in Table 8.4. Descriptors in table 8.4 will be used alongside the matrix (Table 8.5) to guide the assignment of significance of effects.

Table 8.3: Visual sensitivity (susceptibility and value) and typical description

Sensitivity (susceptibility and value)	Typical descriptions
Very high	1) Static views from and of major tourist attractions; 2) Views from and of very important national/international landscapes, cultural/historical sites (e.g. National Parks, UNESCO World Heritage sites); 3) Receptors engaged in specific activities for enjoyment of dark skies.
High	1) Views by users of nationally important PRoW / recreational trails (e.g. national trails, long distance footpaths); 2) Views by users of public open spaces for enjoyment of the countryside (e.g. country parks); 3) Static views from dense residential areas, longer transient views from designated public open space, recreational areas; 4) Views from and of rare designated landscapes of national importance.
Moderate	1) Static views from less populated residential areas, schools and other institutional buildings and their outdoor areas; 2) Views by outdoor workers; 3) Transient views from local/regional areas such as public open space, Scenic roads, railways or waterways, users of local/regional designated tourist routes of moderate importance; 4) Views from and of landscapes of regional importance.
Low	1) Views by users of main roads or passengers in public transport on main arterial routes; 2) Views by indoor workers; 3) Views by users of recreational/formal sports facilities where the landscape is secondary to enjoyment of the sport; 4) Views by users of local public open spaces of limited importance with limited variety or distinctiveness.

Negligible	1) Quick transient views such as from fast moving vehicles; 2) Views from industrial area, land awaiting re-development; 3) Views from landscapes of no importance with no variety or distinctiveness.
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Table 8.4: Magnitude (change) of visual effect and typical descriptions

Magnitude (change) of visual effect	Typical descriptions
Major	The project, or a part of it, would become a dominant feature or focal point of the view.
Moderate	The project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor.
Minor	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.
Negligible	Only a very small part of the project would be discernible, or it is at such a distance that it would form a barely noticeable feature or element of the view.
No change	No part of the project, or work or activity associated with it, is discernible.

Table 8.5: Significance matrix

	Magnitude of impact (degree of change)					
		No change	Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or Moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Table 8.6: Significance categories and typical descriptors

Significance category	Typical description
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.

Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
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- 8.5.12. Following the residual impact assessment, the cumulative effects of the scheme adjacent to and in conjunction with the assessed effects of the scheme will be assessed. Refer to paragraphs 2.6.28 to 2.6.31.

8.6. Assumptions, Limitations and Uncertainties

- 8.6.1. The focus of the visual impact assessment will be the perceived visual changes to the landscape brought about by the scheme using recognised methodologies as described above. The assessment sits alongside the landscape character section, however it should be noted that the landscape character assessment is conducted under different criteria, accordingly different impacts from the Scheme may be highlighted and different conclusions drawn.
- 8.6.2. The assessment will be iterative with design development, typically considering elements in more detail as the design elements become clearer.
- 8.6.3. A winter and summer survey will be undertaken which are representative of the respective seasons.
- 8.6.4. This scoping chapter has been based on desk-study information only.

9. Population and Human Health: Effects on Private Property and Housing, Community Land and Assets and Development Land and Business

9.1. Introduction

- 9.1.1. This chapter concerns an assessment of effects on three elements of the Land Use and Accessibility topic as described below.

Private Property and Housing

- 9.1.2. The assessment of the private property and housing elements seeks to identify the location and number of existing properties and residential development land allocated for future development, independent of the proposed Scheme, and assess the potential impacts and effects on those properties and areas. It considers the number of residential units, properties and sites and the effects as a result of direct land take, demolition, severance and accessibility.

Community Land and Assets

- 9.1.3. The assessment of the community land and assets elements seeks to identify the location and amount of existing community land, the location and number of community assets and the frequency of use and accessibility of community land and assets, independent of the proposed Scheme, and assess the potential impacts and effects on those areas of land and assets. It considers the amount of land and the number of assets affected in terms of the effects as a result of direct land take, demolition, severance and accessibility.

Development Land and Business

- 9.1.4. The assessment of the development land and business elements seeks to identify the location and number of existing businesses, allocated future development land, non-allocated land subject to planning applications and the level of accessibility of the land and businesses, independent of the proposed Scheme, and assess the potential impacts and effects on those properties and areas. It considers the number of businesses (and associated jobs), allocated and non-allocated land (and potential jobs) and the effects as a result of direct land take, demolition, severance and accessibility.

9.2. Baseline Conditions

- 9.2.1. The assessment is required to consider the likely effects on accessibility and severance in relation to the three elements discussed in this chapter. Any possible changes to amenity through increases in noise (from traffic), changes to local air quality and visual impact are not considered here as they will be considered by other topic chapters.
- 9.2.2. Given the nature of the effects being assessed and the alignment of the Scheme, any potential effects are considered unlikely to occur outside a 500m wide buffer around the route. Although any potential land take and/or severance of the elements being assessed are likely to be limited to a much narrower corridor the study area was chosen primarily as it

allowed the inclusion of communities, existing groups of houses and businesses (excluding agricultural) either side of the route where it was considered that accessibility could be a potential effect either to or from these properties. Therefore, a study area 500m from the Scheme boundary has been chosen; no allowance within this has been made for the extent of any temporary works areas which are unknown at this stage.

- 9.2.3. There was limited baseline information available from previous assessment stages. Where available this has been used; all the baseline information sources for the three elements are outlined in the following table.

Table 9.1: Baseline Information Sources

Chapter Element	Baseline Information Sources
Private Property and Housing	<ul style="list-style-type: none"> • South Lakeland District Council (SLDC) Local Plan • Lake District National Park Authority (LDNPA) Local Plan • Search of SLDC and LDNPA on-line planning applications databases from 2014 to date (December 2019) in order to identify approved extant planning applications and current undetermined applications that will potentially add to the stock of residential units. • Detailed Ordnance Survey mapping data
Community Land and Assets	<ul style="list-style-type: none"> • Information available from the Multi Agency Geographic Information Centre (MAGIC) website • Detailed Ordnance Survey mapping data • SLDC and LDNPA websites • Parish Council and other community websites
Development Land and Business	<ul style="list-style-type: none"> • SLDC Local Plan • LDNPA Local Plan • Search of SLDC and LDNPA on-line planning applications databases from 2014 to date (December 2019) in order to identify approved extant planning applications and current undetermined applications. • Local businesses – information from various sources including business directories, web searches and local knowledge.

- 9.2.4. The following lists the findings of the examination of the baseline information sources.

Private Property and Housing

- 9.2.5. An examination of the local plans of both SLDC and the LDNPA revealed no sites allocated for residential/housing development within the study area.
- 9.2.6. Searches of the SLDC and LDNPA online databases of residential planning applications that would add to the stock of units (as opposed to extensions etc. of existing dwellings) identified the applications listed in Table 9.2 below.

Table 9.2: Planning Applications

Address / Location	Proposal	Appl. No.
Dove Ford Farm, Grizebeck	Conversion of Barn to 2 Dwellings	SL/2017/0949 (SLDC)
Meadowbank Farm, Chapels	Erection of Agricultural Workers Dwelling	SL/2018/0361 (SLDC)
Broadley Fold, Chapels	Erection of dormer Bungalow	SL/2014/0016 (SLDC)
1&2 Malt Kiln Cottages, Grizebeck	Removal of Live/Work Condition	7/2014/5644 (LDNPA)

- 9.2.7. Whilst the boundary of the Scheme has not been determined in detail, examination of the draft extent revealed that the new north-south alignment of the proposed road (A595) would not pass through the curtilage of any residential property (excluding agricultural). The east-west re-alignment of the A595/A5092 junction is also unlikely to require any land take from the residential properties to the north of the road with any improvements being able to be accommodated in the existing highway verge or within adjacent non-residential land to the south.

Community Land and Assets

- 9.2.8. A search of the SLDC, LDNPA and MAGIC websites did not reveal the presence of any registered common land, allotments or other non-highway community land within the study area boundary.
- 9.2.9. A search of Parish Council and other community websites identified the presence of a community building asset in the study boundary. This is the Community Hall at Grizebeck located on the edge of the village. The online events calendar showed that the hall is well used with a mixture of regular community group events most days, private bookings and ad hoc community events, meetings and performances. This is an important and well used community asset within the study area serving an area beyond Grizebeck village itself. Outside the study area there are other community assets in nearby communities such as the Community Centre in Kirkby-in-Furness.
- 9.2.10. Assessing the sensitivity value of the receptor is not straightforward as it does not neatly meet any of the 5 category descriptions outlined in the most up to date DMRB guidance. In terms of the sensitivity definitions where information is available, the level of daily use would suggest a very high sensitivity, however, this is considered to be the only criterion in this category that the asset meets. Other key criteria applied to the assessment are the availability of alternative facilities in nearby communities (e.g. Kirkby-in-Furness) and the limited existing severance within the immediate Grizebeck community. It is considered appropriate to apply more weight to these criteria and in doing so assign the asset a **low to medium sensitivity**.

Development Land and Business

- 9.2.11. An examination of the local plans of both SLDC and the LDNPA revealed no sites allocated for employment development within the study area.
- 9.2.12. The searches of the SLDC and LDNPA online databases of planning applications identified no applications relating to the proposed addition of employment land or commercial property development proposals. The approved application at 1&2 Malt Kiln Cottages, Grizebeck identified in Table 9.2 is mentioned here for completeness as it removed the planning condition requiring the premises to be occupied as live/work units and therefore reduced the stock of business premises in the study area.
- 9.2.13. The list of businesses outlined in Table 9.3 below includes all those businesses (excluding farm businesses) which fall within the study area. There are other businesses based within the study area not listed below. These are primarily serving the bed and breakfast and holiday letting markets. The presence of these businesses is recognised, however, there was no reliable desk-based method to identify them.

Table 9.3: Businesses

Name	Location	Type
Gulf Filling Station	Grizebeck	Petrol Station
Post Office	Grizebeck	Post Office
The Greyhound	Grizebeck	Public House
CGP Ltd.	Grizebeck	Book Publishing
Bank End Boarding Kennels	Bank End, Grizebeck	Dog Boarding

9.3. Potential Impacts, Effects and Mitigation

- 9.3.1. The likely nature and scale of the effects described for each of the elements are assessed in this chapter as either a beneficial, neutral or adverse change as a result of the Scheme.

Private Property and Housing

- 9.3.2. There are no direct effects on private property and housing within the scope of this chapter's assessment.
- 9.3.3. The properties within the study area will experience a change in accessibility as a result of the Scheme due to the section of the existing A595 being stopped up creating two 'dead ends'. This will result in some slightly longer journey distances by road in certain directions; the level of impact due to this change in accessibility is assessed as **negligible**. The latest DMRB guidance allows this magnitude of impact to be assigned where property experiences a '*very minor introduction... of severance with ample accessibility provision*'.

Community Land and Assets

- 9.3.4. There are no direct effects on community land and assets within the scope of this chapter's assessment.
- 9.3.5. The Community Hall at Grizebeck, the only identified asset within the study area, will experience a change in indirect accessibility as a result of the Scheme due to the section of the existing A595 being stopped up creating two 'dead ends'. This will result in slightly longer journey distances by road to the hall for some users in the study area. Although the hall retains the same level of accessibility to the central part of Grizebeck village, it is an important facility serving a wide area. As such the reduction in accessibility from users further away will be perceived as less the greater distance they travel to the hall. Therefore, the level of impact due to this change in accessibility is assessed as **minor**. The latest DMRB guidance allows this magnitude of impact to be assigned where property experiences an '*introduction... of severance with adequate accessibility provision*'.

Development Land and Business

- 9.3.6. There are no direct effects on development land and business within the scope of this chapter's assessment.
- 9.3.7. The businesses identified in the baseline are concentrated in the centre of Grizebeck village and will experience a change in indirect accessibility. This is a result of the Scheme stopping up a section of the existing A595, creating two 'dead ends'. This will result in slightly longer journey distances by road to these business for a small number of local residents in the study area. Therefore, the level of impact due to this change in accessibility

is assessed as **minor**. The latest DMRB guidance allows this magnitude of impact to be assigned where property experiences an *'introduction... of severance with adequate accessibility provision'*.

Mitigation

- 9.3.8. As there are no direct effects on Private Property and Housing, Community Land and Assets or Development Land and Business no specific mitigation measures are proposed. Consideration, however, should be given to improved directional signage provision for local businesses and The Community Hall at Grizebeck during both construction and operational phases of the Scheme.

9.4. Scoping Recommendation

- 9.4.1. It is not recommended that the assessment of effects on Private Property and Housing, Community Land and Assets and Development Land and Business are scoped in at Stage 3. As detailed above, no direct adverse effects on the land and property associated with these elements was identified or likely (in terms of land take or severance). The indirect impacts were also considered not to result in any adverse effects above minor in terms of accessibility.
- 9.4.2. Whilst the information currently available suggests that no further assessment of possible impacts and effects on Private Property and Housing, Community Land and Assets and Development Land and Business should be undertaken a further initial screen of the baseline will take place at the start of the EIA to ensure that no significant changes have occurred since this scoping assessment that would change its conclusion.
- 9.4.3. Possible adverse effects identified on other elements influencing amenity will be covered by other topic chapters.

10. Population and Human Health: Agricultural land holdings

10.1. Introduction

- 10.1.1. DMRB Vol 11, section 3, part 6, LA112 Population and human health⁴⁹ requires the reporting of effects on Agricultural Land Holdings (ALHs) within the context of *Land use and accessibility*. LA112 supersedes the former part 6 (land use) in regard to effects on agricultural land.
- 10.1.2. LA112 defines ALHs as “*Land and associated infrastructure for the purpose of agricultural production, e.g. arable farming, dairy farming etc.*”. It should be noted that while many ALHs consist of the “typical” farm layout i.e. an area of infrastructure and facilities surrounded by agricultural land, much of the land in the study area is thought to consist of plots of land separate from the base farm, such as fields rented from a different landowner, that are dependent on access from the road network. Effects of the proposed scheme on these plots can still have an impact on the ALHs viability as a business even though they are a remote holding.
- 10.1.3. As required by LA112, the likely effects of changes to access, severance, and land take are identified and reported in this chapter as a positive, neutral or negative change for ALHs affected by the scheme. This chapter then identifies the methodology for future further assessment and mitigation.

10.2. Baseline Conditions

- 10.2.1. LA112 specifies that the study area for assessing effects on ALHs must consist of the construction footprint/project boundary (including compounds and temporary land take), plus a 500m buffer to be extended or reduced accordingly with the likelihood of effects occurring within that area⁴⁹.
- 10.2.2. For ALHs, the effects of highway schemes are generally limited to the holdings that are physically changed through land take, severance or changes to access that in turn have an impact on the viability of the agricultural business, regardless of whether the full extent of the holdings in question falls within a 500m buffer.
- 10.2.3. The reconnaissance- level Agricultural Land Classification (ALC) data available on MAGIC indicates that the proposed scheme is located in an area of Grade 4 land, and potentially slightly intrudes into an area of grade 3. This data predates the splitting of grade 3 into 3a and 3b and is not intended for use at field scale, so no firm conclusions about the presence of Best and Most Versatile (BMV) land can be drawn. However, it is unlikely that the scheme will affect any BMV land, but if it was identified in the small area (3.3ha) of land take needed by the current scheme design, it will not come close to the threshold of 20ha BMV land loss that requires further consultation with Defra and NE.

⁴⁹ DMRB Vol 11, section 3, part 6:

<http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/LA%20112%20Population%20and%20human%20health-web.pdf>

- 10.2.4. The land use on site is dominated by agricultural grassland for grazing cattle and sheep, and winter fodder production. No arable land is believed to be present in the Grizebeck/Chapels area.
- 10.2.5. The majority of the land likely to be affected by the scheme is linked to one farm of approx. 43ha size, of which the proposed scheme will sever approximately one third. The remainder of the affected land appears to consist of remote holdings either owned or let by two other farms to the north of Grizebeck.
- 10.2.6. The ALHs that are considered to be receptors for the purpose of this report are summarised in table 10.1. Sensitivity is assigned according to DMRB LA112 (see section 10.5).

Table 10.1: Agricultural land holding receptors

Receptor (land title number)	Description	Sensitivity	Notes
CU198711	A single 1.7 ha field between Meadowbank Farm and the current A595 alignment. Insufficient land ownership data to confirm which farm/ business this field is attached to. Evidently in agricultural use for grazing and winter fodder production, assumed to be linked to Meadowbank Farm.	Medium	This field requires access either from the Meadowbank Farm entrance or the gate directly onto the A595- no other access is currently available.
CU194143	The proposed scheme runs through Dove Ford Farm (total size approx. 43.2 ha), between the central infrastructure and the eastern third of the associated land. Land appears to be used entirely for cattle and possibly sheep production and associated fodder.	High	The farm is currently severed to an extent by the existing A595 alignment which runs through the middle of the buildings and central infrastructure. There are no known remote holdings of this business and the entire farm is thought to be located within the study area.
CU39414	Two adjoining fields (2.4 ha total) located between the northern boundary of Dove Ford Farm and the woodland west of Grizebeck. These fields appear to be a remote holding of Heathwaite Farm approx. 2.5 km north and are evidently in agricultural use for grazing and winter fodder production. Insufficient land ownership data to indicate extent of other land attached to Heathwaite Farm, but it is evidently a livestock business.	High	The eastern field has two gateways onto the A595. The western field has no road access and is dependent on the eastern field for its access. The eastern access point is preferred as it is larger and more accessible while the other access is smaller and joins the A595 close to a T junction.
CU114087	2 ha field between Press Beck and Grize Beck used for grazing and fodder production. The field is likely to be a remote holding of Tenter Bank Farm, which is evidently a livestock business. Further land ownership data will be required to confirm.	High	This field is divided from the field immediately to the west adjacent to Press Beck. This field is accessible only via the current gateway onto the A595 as there appears to be no access across Press Beck.

10.3. Potential Impacts, Effects and Mitigation

- 10.3.1. Every ALH and its management challenges are unique and affected by their own circumstances. Holdings that are remote from the main body of the farm can be particularly difficult to assess in terms of impact as their frequency of usage is difficult to gauge purely from a desk- based study alone.
- 10.3.2. There is also a level of variation in how impacts affect different types of husbandry. Typically, arable profit margins per hectare are lower than those of intensive livestock farms so arable farming is more vulnerable to the effects of land take. Conversely, arable farms are generally less affected by severance as machinery movements are relatively easy to re-route. The opposite is true for livestock (particularly dairy) farms, where land take is generally less of an issue than severance. The need for regular stock movements and the slow speed involved (2 km/h) means that there are many more limitations associated with severance.
- 10.3.3. The potential impacts listed are therefore those that are the most likely but are not a definitive statement on the impact of the scheme on farm viability, which is not appropriate at this stage without landowner consultation. The potential for mitigation to reduce the impact is also explored but is not a commitment to implement them. Magnitude is assigned according to LA112 (see section 10.5).

Table 10.2: Anticipated impacts of the scheme on Agricultural Land Holdings

Receptor (land title number)	Likely impacts	Magnitude of impact	Potential for mitigation
CU198711	<p>Negligible loss of land from eastern field boundary due to proposed route earthworks.</p> <p>Likely loss of current gateway to the A595 in eastern field boundary.</p> <p>Anticipated negligible impact on ALH viability.</p> <p>No demolition of buildings or infrastructure.</p>	Minor	<p>There is scope for the gateway, if it is essential, to be relocated further south on the A595 or on the road adjacent to Meadowbank Farm.</p>
CU194143	<p>Estimated approx. land loss of 1-2 ha due to footprint of proposed highway.</p> <p>Severance of approx. 14.7 ha of land from the central farm infrastructure.</p> <p>Potential major impact on ALH viability.</p> <p>No demolition of buildings or infrastructure.</p> <p>Potential minor or moderate beneficial impact of making existing A595 route through farmyard access only.</p>	Major	<p>There is scope for the severance created by the scheme to be significantly reduced in magnitude by incorporated into the design measures that enable agricultural traffic and livestock to cross the proposed scheme from west to east.</p>

CU39414	<p>Estimated approx. land loss of 0.2 ha due to footprint of proposed highway.</p> <p>Both sides of land parcel are likely to retain their access points, but journey from Heathwaite Farm via High Cross Road likely to be less direct and increase in duration. Approx. 0.2 ha of field east of the scheme likely to become unviable due to subdivision of field.</p> <p>Impact on viability unknown due to lack of data on size of Heathwaite Farm.</p> <p>No demolition of buildings or infrastructure.</p>	Moderate	<p>There is some scope to reduce severance and inconvenience by providing a more suitable western gateway to the field from the current A595. The land loss is not likely to be worth mitigating for as the remaining land will likely be too small an area to be of agricultural use.</p>
CU114087	<p>Estimated approx. land loss of 0.2 ha due to footprint of proposed highway.</p> <p>The field will lose its only current access point beneath the scheme footprint. The road journey to the field is unlikely to be significantly affected but gain access into the field will be. The severed area on the east side of the scheme footprint (approx. 0.4 ha) may become unviable due to subdivision of the field.</p> <p>Anticipated minor impact on ALH viability.</p> <p>No demolition of buildings or infrastructure.</p>	Moderate	<p>There is limited scope for providing mitigation to the access and severance aspects of the impact on this field. It is unlikely that the provision of new gates close to the current gate will be acceptable so close to the proposed junction. The most realistic alternative access is likely to be over Press Beck from the adjacent field, though installation of any potential river crossing will require consultation with the Environment Agency.</p>

10.4. Scoping Recommendation

- 10.4.1. It is anticipated that the proposed scheme has the potential for significant adverse residual impacts on Agricultural Land Holdings in the study area, and it is therefore recommended that the ALH aspect of *LA 112 Population and Human Health* is scoped into the EIA for detailed assessment.

10.5. Assessment Methodology

Guidelines

- 10.5.1. Within the EIA, the assessment of impacts on ALHs will be conducted in line with the guidance outlined in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 6: LA 112 Population and Human Health.

Regulatory and Policy Framework

- 10.5.2. There is no single specific policy or guidance protecting agricultural land and soils or outlining how to account for their protection in EIA, though a number of policy documents refer to their consideration in planning related matters.
- 10.5.3. Paragraph 170 of the National Planning Policy Framework (NPPF) states that: *Planning policies and decisions should contribute to and enhance the natural and local environment by... recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland*⁵⁰.
- 10.5.4. Footnote 53 to paragraph 170 clarifies that *“Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality”*. The NPPF Annex 2 (Glossary) defines BMV land as; *“Land in grades 1, 2 and 3a of the Agricultural Land Classification”*.
- 10.5.5. Whilst the NPPF does not define “significant” in terms of development of agricultural land, the Town and Country Planning (General Development Procedure) Order 2010 specifies that; where development which is not for agricultural purposes and is not in accordance with the provisions of a development plan requires the loss of 20ha of BMV land the Secretary of State for the Environment, Food and Rural Affairs must be consulted.
- 10.5.6. Natural England’s Technical Information Note TIN049: *Agricultural Land Classification: protecting the best and most versatile agricultural land*⁵¹ is an explanatory note that outlines the purpose and methods of ALC. It affirms that NE must be consulted for all applications where the loss of BMV land is 20ha or greater. However, given that it is highly unlikely that any BMV land is present on site, BMV land is not a consideration for this assessment and has not had any bearing on the methodology.
- 10.5.7. The South Lakeland District Council (SLDC) local plan⁵², sustainable development principle number 2 specifies that: *“It is vital to protect the countryside for its intrinsic beauty, diversity and natural resources and also for its ecological, geological, cultural and historical, economic, agricultural, recreational and social value”*. In the same document, the “Quality Environment” policy CS8.1 (green infrastructure) states that; *“The Core Strategy will seek to... protect the countryside from inappropriate development whilst supporting its positive use for agriculture, recreation, biodiversity, health, education and tourism”*.
- 10.5.8. As these local plan policies do not provide any specific guidance on the assessment of impacts on ALHs, they have not affected the methodology of any future assessment, though they do indicate the necessity in local policy of considering the effects of development on agricultural land.

Methodology

- 10.5.9. As described in section 10.2.2, the study area consists of all of the ALHs that are affected by the scheme in terms of land take, severance, access or viability regardless of their proximity

⁵⁰ National Planning Policy Framework, revised Feb 2019:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

⁵¹ Natural England Technical Information Note TIN049: Agricultural Land Classification: protecting the best and most versatile agricultural land, 2012

⁵² South Lakeland local plan- Core strategy, published 2010: <https://www.southlakeland.gov.uk/media/3521/cs01-core-strategy-october-2010.pdf>

to the scheme footprint. At the EIA stage, the list of identified receptors (table 10.1) will be reviewed and revised accordingly.

- 10.5.10. To establish a baseline of the current condition of the affected ALHs (in terms of size, access, husbandry, management regimes, viability and current operational challenges) it will be necessary for an experienced agriculturalist to conduct face- to- face interviews with the landowners. Their input will need to be recorded as this process will also lead into the assessment of impact magnitude. The individual characteristics of each farm unit will result in some variation in impact which can only be understood fully through the context of the occupier's experience.
- 10.5.11. The agriculturalist will use this information to conduct an independent assessment of the financial impact the proposed scheme will have on the ALH's viability as a business, which will feed into the overall assessment of impact.
- 10.5.12. As specified in LA112, effects on ALHs shall be assessed during construction and for the first year of operation (future year scenario).

Determining the sensitivity of receptors

- 10.5.13. The sensitivity of the ALH receptors will be assigned as outlined by LA112, detailed in table 10.3. Where there is any doubt as to where a receptor sits within this scale, a precautionary approach will be taken and the receptor will be assigned to the higher of the two grades in question.

Table 10.3: Receptor sensitivity and descriptions

Receptor value (sensitivity)	Description
Very high	1) areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (daily).
High	1) areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (weekly).
Medium	1) areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly).
Low	1) areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent).
Negligible	Areas of land which are infrequently used on a non-commercial basis.

Determining the magnitude of impacts

- 10.5.14. The magnitude of the identified impacts will be assigned as outlined by LA112, detailed in table 10.4. Where there is any doubt as to where an impact sits within this scale, a precautionary approach will be taken and the impact will be assigned to the higher of the two grades in question.

Table 10.4: Magnitude of impact and typical descriptions

Magnitude of impact (change)	Description
Major	1) partial loss of/damage to key characteristics, features or elements, e.g. partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision.
Moderate	1) partial loss of/damage to key characteristics, features or elements, e.g. partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision.
Minor	1) a discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g. amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision.
Negligible	1) very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g. acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings; and/or 2) very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision.
No change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

Assessing the significance of effects

- 10.5.15. To determine the significance of effects, the sensitivity of the receptor and the magnitude of the impacts will be applied to assign a descriptor of significance using the matrix based approach prescribed in DMRB Vol 11 section 2 *LA104: Environmental assessment and monitoring*⁵³. This is summarised in table 10.5.

⁵³ DMRB Vol 11, section 2, part 4: Environmental assessment and monitoring:
<http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/la104.pdf>

Table 10.5: Matrix of impact significance

		Magnitude of impact (degree of change)				
		No change	Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

- 10.5.16. Table 10.6 outlines the typical descriptions of these significance categories as defined in LA104.

Table 10.6: Significance categories and typical descriptions

Significance category	Typical description
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- 10.5.17. It should be noted that due to the location and nature of the Scheme as the construction of new highway on agricultural land, it is unlikely that there will be any beneficial impacts for ALHs.

Identification of cumulative effects

- 10.5.18. As specified in section 2.6.28, clarification is sought as to which other developments are to be included in an assessment of inter- project cumulative effects. Once these are established, the assessment of changes to land take, access, severance and viability will include for other approved projects that physically affect ALHs that are affected by this scheme.

Identification of mitigation measures

- 10.5.19. A preliminary assessment will be undertaken to determine the significance of the impacts on the Scheme baseline without mitigation, which will guide the mitigation development in reducing the magnitude of impacts wherever possible. The data gathered from the previously identified occupier interviews and desk studies will be used to identify appropriate and proportionate mitigation measures in consultation with the scheme designers.
- 10.5.20. As specified in LA112, mitigation measures shall be employed in the following hierarchy of preference; avoidance and prevention, reduction, and remediation.

10.5.21. It is likely that identified mitigation will include e.g.:

- Appropriate soil management during construction, and appropriate restoration and landscaping post- construction to restore soil functionality over time
- Construction measures such as tracked runways and weight-spreading plant tyres/ tracks to minimise soil compaction and preserve soil integrity.
- The implementation of a Soil Management Plan, to be adhered to through the works.
- The implementation of a biosecurity method statement to prevent the introduction and cross- farm transfer of contamination and/ or disease
- Provision of alternative access and crossings to remediate severance
- Restoration of drainage, water troughs and livestock handling facilities as appropriate.

10.6. Assumptions, Limitations and Uncertainties

- 10.6.1. At this stage, the baseline has been collated from publicly available land ownership data available through the HM Land Registry mapsearch⁵⁴ service. The limitations of this data have restricted this scoping assessment to identifying where the scheme takes land from, severs, or prevents access to, areas of land identifiable as discrete title numbers within the HM Land Registry service. Wherever possible, these areas of land have been linked to the farm business that appears to currently own or let these areas as additional land to the main holding.
- 10.6.2. The husbandry and management of the ALHs anticipated to be affected has been assumed from aerial photography. This is sufficient to give a reasonable estimate of the land use currently employed on the site but cannot be comprehensive without being informed by the landowners.

⁵⁴ <https://eservices.landregistry.gov.uk/mapsearch/addressSearch>

11. Population and Human Health: Walkers, cyclists and horse-riders

11.1. Introduction

- 11.1.1. The assessment of Walkers, Cyclists and Horse Riders considers activities undertaken by pedestrians, cyclists, equestrians as well as water users (i.e. anglers, kayakers), and people undertaking non-competitive recreation in an area – for example playing in a park. Jointly these are referred to as ‘Walkers, Cyclists and Horse riders’ (WCH). Effects on the routes and community facilities available to WCH are considered, specifically; the ability to make use of a site or route (the ‘access’) and the ease with which the access can be taken (the ‘accessibility’). The assessment does not extend to economic impacts on community facilities.
- 11.1.2. Typically, the assessment is reported under the three subtopics of: loss of land used by the community, changes to journey length and community severance and changes to amenity.

11.2. Baseline Conditions

- 11.2.1. The area surrounding the Scheme contains a network of Public Rights of Way (PRoW), providing access to the wider landscape and linkage to publicly accessible land. The PRoW are rural in nature, crossing for the most part agricultural land or following existing tracks and the local highway network and link to Registered Common Land both east and west of the scheme in the form of Woodland Fell (CL55) to the east and Bank End Moss (CL85) to the west. Table 11.1 lists the PRoWs in the study area, their approximate distance (at closest point), and direction from the Scheme.

Table 11.1 PRoWs within 500 m of the Scheme

PRoW and Description	Distance (m)	Direction
539044 – Bridleway Runs on a roughly north/south axis, parallel to the east of the indicative alignment of the Scheme. At the northern terminus it intersects PRoW 539094	142	East
539043 – Footpath Connects, at its western terminus, to PRoW 539044 and at its eastern extent to a wider network of PRoWs surrounding Holstead Woods and Kirkby Slate Quarries	356	East
539025 – Footpath Located on the north of the A5092, this PRoW runs in an approximately east-west vector along the course of Grize Beck before turning north towards Ashlack Hall and intersecting other PRoWs outwith the study area boundary	184	East-North-East
539094 – Footpath Connects Grizebeck’s Community Hall with PRoW 539044 and through this to a wider network of PRoWs to the east of the settlement	199	North-East
539045 – Footpath	89	West

Extends north-south, at the western extent of PRow 539046, connecting Wall End to the A595 at the properties north of the layby		
539047 – Footpath Extends north/south connecting Marsh Garth to PRow 539046	369	South-West
539046 – Bridleway Runs between Moss House Farm and the A595 south of Chapels. The western end of this bridleway connects to PRow 539045	87	South
539048 – Footpath Running on a north-east/south-west vector this PRow follows a disused railway line and connects Wall End and Marsh Side at one terminus to an unnamed road at Longlands Caravan Park at the western periphery of Kirkby Slate Quarries	462	South

- 11.2.2. There is no formal provision for cyclists on the local highway network in proximity to the Scheme although this does not preclude their use by cyclists.
- 11.2.3. There are two PRow with bridleway status; one located to the east of the Scheme and the other to the south-west, however, there are no known livery stables in proximity to the Scheme. This is not necessarily indicative of the value of these PRow to horse riders or the local community.
- 11.2.4. The watercourses in the study area, Grize Beck and Press Beck, are not navigable watercourses. Both becks are small watercourses flowing in a roughly south-westerly vector from an upland area to the north-east before reaching a confluence upstream of Bank End Farm. The becks pass through farm land and the settlement of Grizebeck. Both watercourses display a mixture of modified banks, associated with infrastructure and urban areas and thick bankside vegetation in their agricultural settings. Neither watercourse is anticipated to have recreational value for canoeists due to their lack of navigability. The potential for angling is, similarly, anticipated to be low based on the size and accessibility of the watercourses.
- 11.2.5. There is no publicly accessible land within the study area⁵⁵. This includes; Town or Village Greens, Doorstep Greens, Millennium Greens, Country Parks, Registered Common Land and Countryside Rights of Way Act land – including Section 15 Land.

11.3. Potential Impacts, Effects and Mitigation

Loss of land used by the community

- 11.3.1. As there is no publicly accessible land within the study area, the impact on land used by the community is to be scoped out of the assessment.

Changes to journey length and potential for community severance

Construction

- 11.3.2. It is not anticipated that construction activities will require closures of PRow within the study area or lead to severance of communities dependant on PRow for interconnectivity.

⁵⁵ Multi-Agency Geographic Information for the Countryside (MAGIC) Map - <https://magic.defra.gov.uk/home.htm>

- 11.3.3. It is possible that works which affect the existing highway network may impact journey times of pedestrians, cyclists and horse-riders using the highway network, along with vehicular traffic. It should be noted that no formal provision for use of the highway network by these groups currently exists, outside settlements, within the study area.
- 11.3.4. At this time, the construction impact on the local highway network is not known. If closures and diversions are required, it is likely that journey times for groups using the highway network will also be affected. It is not anticipated, however, that construction activities will lead to community severance.
- 11.3.5. Due to the nature of the watercourses present, it is not anticipated that construction will affect usability of the watercourses in the study area.

Operation

- 11.3.6. It is not anticipated that operation of the Scheme will affect journey length nor lead to severance of communities. It is likely operation of the Scheme will lead to a reduction in motorised traffic in Grizebeck village which in turn is likely to have a positive effect on WCH journey times within the settlement.

Changes to amenity

- 11.3.7. Changes to visual amenity have been discussed in more detail in Chapter 7, Landscape Character and Chapter 8, Visual Impact.

Construction

- 11.3.8. As there are no anticipated changes to receptor specific uses of PRowS during construction activities, no adverse effects on the amenity value of PRow network are anticipated.

Operation

- 11.3.9. It is not anticipated that operation of the Scheme will impact on the amenity value of the local PRow network.

11.4. Scoping Recommendation

- 11.4.1. The assessment has been scoped in-line with the guidelines set out in the DMRB⁵⁶.
- 11.4.2. It is recommended that WCH, as a sub-set of Population and Human Health, be scoped out of the Environmental Impact Assessment. This recommendation has been reached on the premise that PRowS, although of potential moderate value as receptors, are not likely to be significantly affected by either the construction or operation of the Scheme.

⁵⁶ Highways Agency, 2019. The Design Manual for Roads and Bridges (DMRB), LA 112

12. Population and Human Health: Human health

12.1. Introduction

- 12.1.1. Human health is a statutory topic under the Environmental Impact Assessment (EIA) process, as specified in the EIA Regulations⁵⁷. This chapter is a subcomponent of the Population and Human Health chapter, as specified in the Design Manual for Roads and Bridges (DMRB)⁵⁸.
- 12.1.2. The World Health Organisation defines health as: 'A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.'⁵⁹ The meaning of the term 'health' has been undergoing an emerging shift towards a more holistic definition, in the context of assessments of health impact for projects and proposals. This can include the importance of external factors, or 'determinants', which influence health.
- 12.1.3. Health determinants are factors that cause outcomes and influence our state of health. The factors can be broken down in various ways which reflect our personal characteristics and decisions, social needs and interactions, cultural influences, the economy and our surrounding environment. Determinants of health and wellbeing are summarised by Barton and Grant (2006) in Figure 12.1.
- 12.1.4. In line with the above, this assessment considers determinants and factors with the potential to significantly, negatively, affect human health and draws on a broad knowledge base including but not limited to the following chapters: Air Quality, Landscape; Visual Impact, Landscape; Character and Noise & Vibration. The impacts are not double counted.

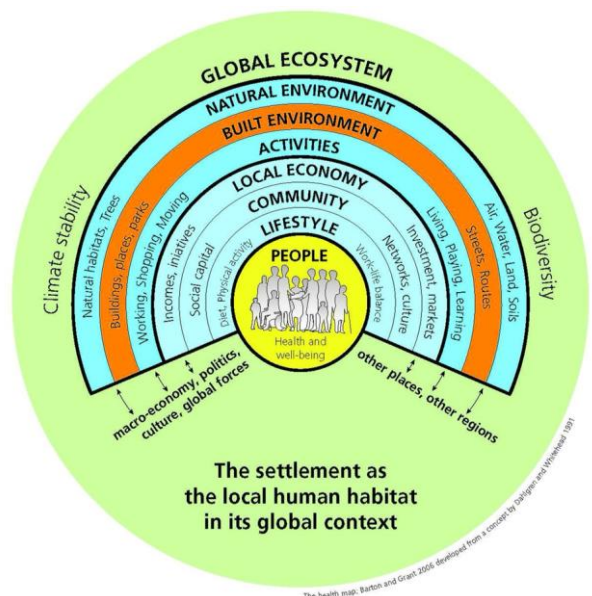


Figure 12.1: Human habitat in context

⁵⁷ Town and Country Planning (Environmental Impact Assessment) Regulations 2017

⁵⁸ Design Manual for Roads and Bridges Volume 11, Section 3, LA 112 2019, Highways England

⁵⁹ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948

12.2. Baseline Conditions

- 12.2.1. The village of Grizebeck sits within the Kirkby-Ireleth civil parish, part of the South Lakeland District, Cumbria. The civil parish also contains the settlements of Kirkby-in-Furness and Angerton amongst others. Grizebeck is a small village, in a largely rural setting with agriculture being the main land-use outwith the peri-urban fringe. The only community facility present in Grizebeck is the Community Hall. There are several accommodation businesses in and around the village and a petrol station.
- 12.2.2. There are no known key sources of pollution in the study area beyond those associated with the presence of the settlement itself. Health data for the area of the Scheme itself, Grizebeck or the other nearby settlements are unavailable. Data are available down to the district or unitary authority level, as the Scheme is located in South Lakeland these data⁶⁰ have been summarised below.
- 12.2.3. The health of people in South Lakeland is generally better than the England average. Life expectancy for both men and women is higher than the England average. However, there are health inequalities present with life expectancy circa 3 years lower for men and 4 years lower for women in the most deprived areas of South Lakeland than in the least deprived areas. Additionally, 6.9% (980) of children live in low-income families. Key health statistics are highlighted below.
- As of the 2011 census, 44,700 of the 104,500 population of South Lakeland were below the age of 16 or over the age of 65⁶¹
 - Life expectancy at birth (2015 -2017) for men is circa 82 years – approximately 2.5 years above the national average
 - Life expectancy at birth (2015 -2017) for women is circa 85 years – approximately 2 years above the national average
 - Under 75 mortality rate (2015 -2017), all causes, is lower than the national average for the same period
 - Under 75 mortality rate for all cardiovascular diseases (2016 – 2018) is lower than national and regional averages for the same period
 - Diagnosis of dementia figures (2019), in adults 65+ years, are below national and regional averages for the same period
 - Emergency hospital admissions for intentional self-harm (2017 - 2018), all ages, are below national and regional averages for the same period
 - Suicide rate (2016 -2018), age 10+, is slightly higher than the national average, 10.5 per year compared to 9.6 per year, for the same period

⁶⁰ Local Authority Health Profile: South Lakeland, Public Health England, 5th November 2019

⁶¹ Office for National Statistics <https://www.nomisweb.co.uk/reports/imp/la/1946157080/report.aspx?town=southlakeland#tabrespop>

- Number of people killed or seriously injured on roads (2015 -2017) slightly lower than the national average for the same period, 38.7 to 40.8 respectively
- 12.2.4. The DEFRA monitored background concentrations of NO₂, PM₁₀ and PM_{2.5}, for the 1 km grid squares containing the Scheme, are well below national annual mean National Air Quality Objectives for 2019. This indicates that air quality in the area around the Scheme - and by extension Grizebeck, based on nationally monitored objectives, is better than average. There is no automated monitoring of air quality in the vicinity of the Scheme and the nearest annual monitoring of NO₂, via diffusion tube, is circa 9 km away and therefore not representative of conditions in the vicinity of the Scheme. There are, however, sensitive receptors in the vicinity of the Scheme primarily in the form of residential receptors. These receptors may be affected by both the construction and operational phases of the Scheme. The assessment undertaken for the Air Quality chapter scoped this topic in for further assessment.
- 12.2.5. The study area for the Scheme is away from any major road reported in the END Strategic noise maps⁶². The average traffic flows on the A5092, to which the Scheme will connect, are just over 4,000 vehicles per day. The average traffic flows on the existing alignment of the A595, which the Scheme will replace through Grizebeck, is just under 4,000 vehicles per day with a low percentage of Heavy Goods Vehicles⁶³. Therefore, the area is likely to be subject to relatively low levels of noise with only the receptors immediately next to roads having a sound environment dominated by road traffic noise. Some sounds arising from agricultural operations and a quarry to the east of the Scheme may contribute to the baseline noise profile. However, due to the potential for construction and operational phase related noise and the uncertainty over the use of vibratory measures during construction, this topic has been scoped in.
- 12.2.6. The study area for the Scheme is set in a distinctive landscape characterised by agricultural land-use, interspersed with small pockets of woodland and delineated by distinctive field boundaries. Key features of the landscape character and visual impact assessments include, but are not limited to, consideration of; two statutory landscape designations (English Lake District World Heritage Site and Lake District National Park) and their associated views, two National Character Areas, 13 important hedgerows, cultural heritage assets and the network of Public Rights of Way (PRoW) with their associated visual amenity. Due to the sensitivity of the baseline landscape character, the presence of statutory landscape designations and the potential for the Scheme to negatively affect the distinctiveness of the landscape further assessment of both landscape character and visual impact have been scoped in.
- 12.2.7. Although there is no public access land within the study area, there is a network of PRoW present. These PRoW provide a connection to the wider landscape including the English Lake District World Heritage Site and Lake District National Park. It is not anticipated that any PRoW will be severed during construction or operation of the Scheme although there may be a loss of visual amenity for some PRoW. This assessment topic has been scoped out of further assessment.

⁶² England noise and air quality viewer on <http://www.extrium.co.uk/noiseviewer.html>

⁶³ Department for Transport, Road traffic statistics, count points 7697 and 7316 respectively (<https://roadtraffic.dft.gov.uk/#13/54.2293/-3.2147/basemap-countpoints>)

12.3. Potential Impacts, Effects and Mitigation

- 12.3.1. There are potential effects on human health through impacts on air quality and an increase in noise and vibration due to the construction and operation of the Scheme. Noise and air quality mitigation measures identified during the EIA will be considered in the human health assessment within the EIA report. It is not anticipated that construction of the Scheme will result in community severance, changes to journey length or loss of access to public open space. Resultantly, no mitigation is proposed for Walkers, Cyclists and Horse-riders (WCH) receptors. Due to the proposed alignment of the Scheme traffic will no longer pass directly through the settlement of Grizebeck and is likely to result in a reduced likelihood for people to be killed or seriously injured on the road. It is also considered likely that, by removing traffic from the settlement, the Scheme will reduce potential negative effects on vulnerable anthropogenic receptors.

12.4. Scoping Recommendation

- 12.4.1. Due to the potential for the Scheme to have significant negative effects, it is recommended that human health is **scoped in** for further assessment.

12.5. Assessment Methodology

Guidelines

- 12.5.1. This assessment has been undertaken in-line with the guidance set out in the DMRB⁶⁴. Specifically, the DMRB states:

'The scoping assessment shall identify the health profile(s) of affected communities, identifying vulnerable groups/communities.'

The scoping assessment shall identify health determinants likely to be affected by a project, specifically reporting on:

1. *environmental conditions relevant to human health, including;*
 - (a) *ambient air quality and Air Quality Management Areas (AQMA)*
 - (b) *ambient noise and areas sensitive to noise (e.g noise important areas (NIA), noise management areas (NMA)*
 - (c) *sources of pollution (e.g. light, odour, contamination etc)*
 - (d) *landscape amenity; and*
2. *severance/accessibility and the ability of communities to access community land, assets and employment;*

Where a project has the potential to result in adverse health outcomes, further assessment shall be undertaken.'

- 12.5.2. Additional guidance has been considered with respect to this assessment and is listed below.

- Department of Health, Health Impact Tools (2010)

⁶⁴ Design Manual for Roads and Bridges Volume 11, Section 3, LA 112 2019, Highways England

- NHS, Healthy Urban Planning Checklist (2017)
- NHS, Rapid Health Impact Assessment Tool (2019)

Regulatory and Policy Framework

- 12.5.3. The 2017 EIA Regulations require that ES' include consideration of potential impacts and effects on human health. This assessment has been undertaken in-line with this legislation.

Methodology

- 12.5.4. This assessment has been undertaken in-line with the guidance set out in the DMRB. As this assessment draws on technical input from the other chapters the study area is defined by the assessment criteria for these chapters respectively.
- 12.5.5. There are no formal assessment criteria set out in the 2017 EIA regulations or in the DMRB for setting the sensitivity of health receptors, the severity of impacts or likely significance values. Where specific determinants considered in this assessment have their own assessment criteria, such as air quality, those criteria were used. Overall the DMRB recommends a qualitative assessment of health impacts.

12.6. Assumptions, Limitations and Uncertainties

- 12.6.1. The following limitations and assumptions of the assessment apply: The assessment uses publicly accessible, third party data. Any inaccuracies in these data will be cascaded into this assessment. There is also limited guidance available for assessment of this topic.

13. Noise and Vibration

13.1. Introduction

- 13.1.1. Road traffic gives rise to noise. Changes in road layout, specification, and traffic (including traffic composition and speed) all have the potential to permanently affect the acoustic character of an area, while road construction and maintenance may change the acoustic character of the area only temporarily. It is worth noting that changes to the acoustic character of an area may give rise to either beneficial or adverse effects on nuisance and health.
- 13.1.2. This chapter scopes the likely noise and vibration effects of the construction and operation of the Scheme in line with the criteria in the following documents, part of the Design Manual for Roads and Bridges (DMRB):
- LA 103 Scoping projects for environmental assessment; and
 - LA 111 Noise and vibration.
- 13.1.3. It also takes account of some points in the DMRB documents *LA 104 Environmental assessment and monitoring* and *LA 119 Roadside environmental mitigation and enhancement* and discusses noise as a health determinant as per DMRB *LA 112 Population and human health*.
- 13.1.4. The requirements and procedures in DMRB *LA 103* have been followed, to reach a reasoned conclusion on the likely significant noise and vibration effects of the Scheme on the environment in line with the requirements of the EIA Directive⁶⁵. This scoping exercise has been based on the collection and assessment of data and information that is readily available.

13.2. Baseline Conditions

- 13.2.1. The proposed route will run between Chapels and the A5092 junction at Grizebeck. Fig. 1 shows the extent within 1km of the Proposed Scheme, highlighting the location of the closest buildings. This is the area chosen as the scoping study area. Receptors which are potentially sensitive to noise include, among others, dwellings, education facilities and community facilities.
- 13.2.2. DMRB *LA 111* also includes in the list of potentially noise sensitive receptors: designated or potential Quiet Areas under the Environmental Noise Directive (END)⁶⁶, and international and national or statutorily designated sites. As illustrated in Fig. 13.1, the Scheme does not fall in the area of any designated site. No designated or potential END Quiet Areas have been identified in the scoping study area.
- 13.2.3. The scoping study area is away from any major road reported in the END Strategic noise maps⁶⁷. The average traffic flows on the A5092 (to which the Scheme will connect) are just over 4,000 vehicles per day with the average traffic flows on the A595 (the Scheme) being

⁶⁵ The Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Schedule 3: Selection criteria for screening Schedule 2 development.

⁶⁶ The Environmental Noise (England) Regulations 2006.

⁶⁷ England noise and air quality viewer on <http://www.extrium.co.uk/noiseviewer.html>

just under 4,000 vehicles per day with a low percentage of HGVs (Heavy Goods Vehicles)⁶⁸. Therefore, the area is likely to be subject to relatively low levels of noise with only the receptors immediately next to roads having a sound environment dominated by road traffic noise. Some sounds arising from local farms and other agricultural activities may be present in the area. A quarry appears to be located at around 1km east of the Proposed Scheme at the area of Chapels. It is likely that noise from that quarry is not noticeable in the area of the Proposed Scheme, but this point will need to be confirmed at a later stage.

- 13.2.4. Several receptors that would be sensitive to noise and vibration have been identified in the vicinity of the Scheme. The approximate locations of these potential sensitive receptors are represented as Positions A to N in Fig 13.1.

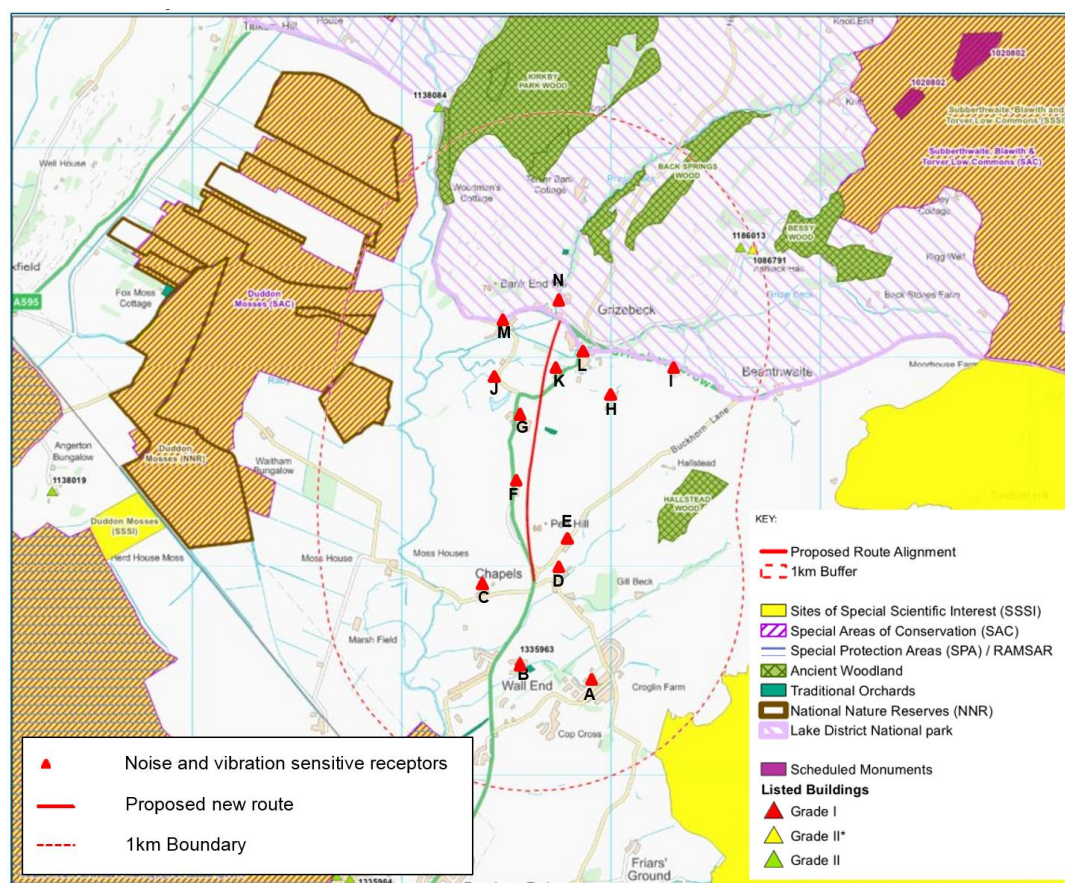


Figure 13.1: Proposed Scheme, highlighting approximate locations of potential noise sensitive receptors within 1km of the Scheme.

- 13.2.5. A site visit should be undertaken at the next stage to identify residential properties (which would be noise sensitive) and to identify buildings used for non-noise sensitive uses, such as for storage and other non-residential uses.
- 13.2.6. Receptors potentially sensitive to construction vibration have been identified within 100m of the proposed works, which is the typical area where construction works may give rise to noticeable vibration. The approximate locations of the vibration sensitive receptors are represented as Positions 1 to 4 in Fig. 13.2.

⁶⁸ Department for Transport, Road traffic statistics, count points 7697 and 7316 respectively (<https://roadtraffic.dft.gov.uk/#13/54.2293/-3.2147/basemap-countpoints>)

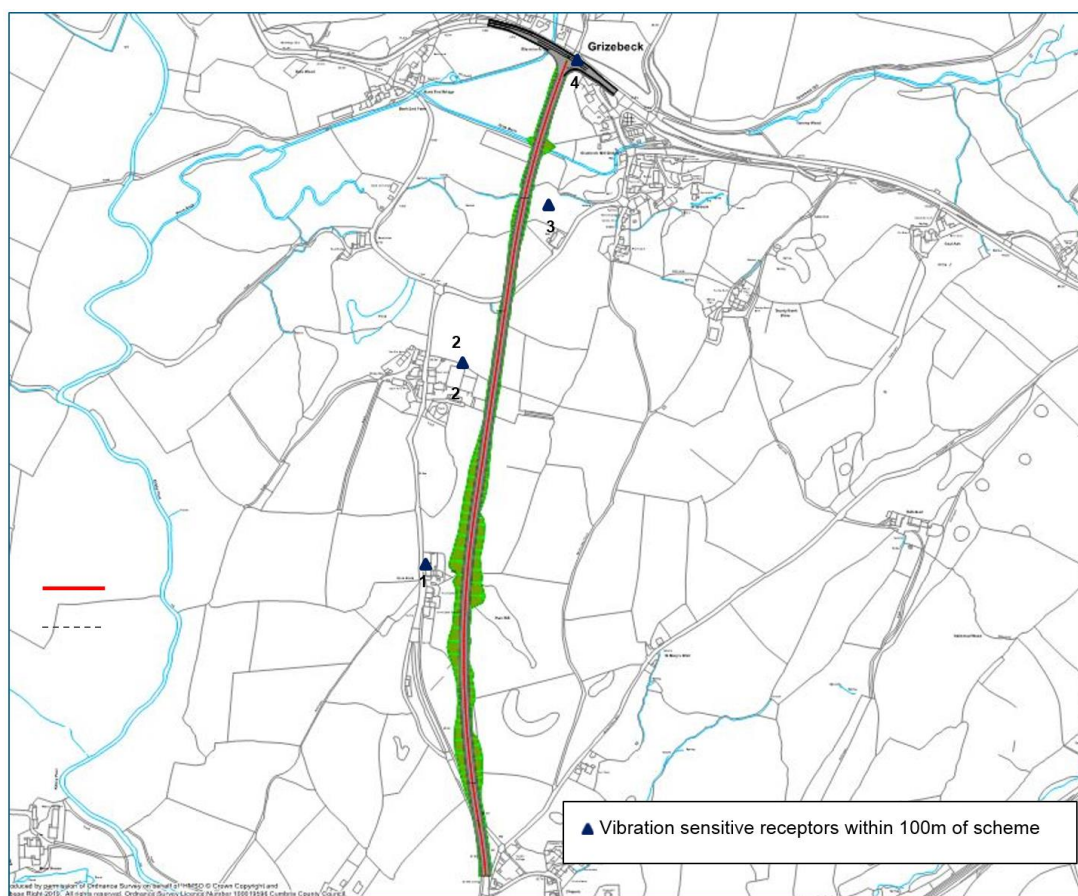


Figure 13.2: Proposed new road route, highlighting approximate locations of vibration sensitive receptors within 100m of scheme.

13.3. Potential Impacts, Effects and Mitigation

Construction site noise

- 13.3.1. The main construction activities that are likely to take place are site clearance, earthworks and road construction works.
- 13.3.2. The construction of the Scheme has the potential to result in temporary noise impacts at the closest receptors to the proposed site works. The magnitude of construction noise impacts is dependent on the nature of the proposed construction works, the timing of the works (day/evening/night – weekday/weekend) and the duration of the impact. The significance of the effects is dependent on the magnitude of the impact and the sensitivity of the receptor. The closest receptors to the main construction works involving earthworks are likely to be the dwellings in the area of Dove Bank (Receptor F in Fig 13.1) which have the potential of experiencing some adverse effects. Appropriate mitigation measures would include following general Best Practicable Means as per British Standard BS 5228. BS 5228 is the approved code of construction practice under Section 71 of the Control of Pollution Act 1974 (CoPA).

Construction traffic (including diverted traffic).

- 13.3.3. Construction traffic can have a temporary impact on sensitive receptors located along existing roads used by these vehicles. The potential for such impacts is dependent on the volume and route of construction traffic. At this stage no details on construction traffic are available. However, the scheme appears to have a relatively balanced amount of cut and filling areas with long parts of the Scheme being in cutting on one side of the proposed road and in embankment on the opposite side. Since most of the works can be undertaken off-line the need for traffic diversion during construction is likely to be low.

Construction vibration

- 13.3.4. The potential for temporary construction vibration impacts is dependent on the need for construction activities which produce potentially significant levels of vibration, such as ground improvement works using vibratory rollers or piling. The method of ground improvements works has not yet been determined. The assessment of the magnitude of construction vibration impacts will consider both structural impacts and annoyance to occupiers of sensitive receptors. Construction vibration impacts on residential properties and other non-residential sensitive buildings should be considered. Receptors that are potentially sensitive to vibration impacts have been identified as part of this scoping exercise (see Fig. 13.2). Mitigation measures would be in line the use of alternative construction methods, Best Practicable Means and the reduction of the intensity of vibration.

Operational road traffic noise

- 13.3.5. The Scheme is located further from some receptors than the existing road. Therefore, the operation of the Proposed Scheme has the potential to result in both beneficial and adverse traffic noise impacts depending on the receptor location.
- 13.3.6. The magnitude of the operational traffic noise impact at a receptor is dependent on a range of factors including the traffic flow, composition, speed, road surface, ground topography, the presence of intervening buildings/structures and the distance to the road.
- 13.3.7. It is unlikely that the Scheme results in changes to traffic flows or percentage of HGVs using the road. Nevertheless, it is understood that one of the expected benefits provided by the Scheme is the increase of average speed⁶⁹, which will represent an increase in the level of noise at the source.
- 13.3.8. Some residential receptors in the area of Dove Bank and Dove Ford (locations F and G in Fig. 13.1), which are next to the existing road, will see a change in the façade exposed to road noise due to the road moving from the west side to the east side of some of the properties. For instance, at Dove Bank, the façade that is currently facing away from the road kerb will become the façade overlooking the Proposed Scheme, with the road kerb located at a distance of just over 30m. At Grizebeck, the community Hall (see location K in Fig. 13.1) and other buildings will be located over 40m from the road kerb.
- 13.3.9. Since the scheme has the potential to give rise to some adverse effects due to the road realignment and the increase in average speed, mitigation measures will need to be considered. As in this case, once the design is fixed, the horizontal and vertical realignment will not change. The use of noise bunding seems unlikely since the amount of cutting and filling appears to be quite balanced and in locations such as Dove Bank there appears to be

⁶⁹ Cumbria County Council (2019), *Grizebeck transport improvement. Preferred route report*. Available on: <https://www.cumbria.gov.uk/elibrary/Content/Internet/544/3887/43538121335.pdf>

insufficient room between the Scheme and the receptors for further landscape works.

Therefore, the options that will need to be considered are the use of low-noise surfaces and the introduction of noise fences. The latter, for instance, could be considered in the area of Dove Bank.

- 13.3.10. Due to the relatively low traffic flows (around 4,000 vehicles per day), it is unlikely that the noise levels at dwellings substantially exceed the value of 65dB LA10,18h (free-field) during daytime where health effects due to noise start becoming relevant. It is unlikely that noise levels at dwellings are above 55dB at night unless the road follows non-average traffic patterns due to, for instance, being on the route to a major port facility (which is unlikely for the low number of HGVs recorded).
- 13.3.11. Summarising the information discussed in this section, Table 13.1 offers the response to the different scoping test questions.

Table 13.1: DMRB LA111 Noise and vibration scoping questions

Factor	Scoping question	Scoping answer
Construction site noise	1) does construction noise generated by the project have the potential to adversely affect any noise sensitive receptors?;	Yes
	2) are there any noise receptors where there would be a reasonable stakeholder expectation that a construction noise assessment would be undertaken?	Yes
Construction traffic noise (including diverted traffic)	1) does construction noise generated by the project have the potential to adversely affect any noise sensitive receptors?;	Unlikely
	2) are there any noise receptors where there would be a reasonable stakeholder expectation that a construction noise assessment would be undertaken?	Unlikely
Construction site vibration	1) does vibration from construction have the potential to adversely affect any vibration sensitive receptors?;	Unlikely
	2) does the scale of the development or type of construction mean that there will be a reasonable stakeholder expectation that a construction vibration assessment would be undertaken at any vibration sensitive receptors?	Yes
Operation traffic noise	1) is the project likely to cause a change in the BNL of 1dB LA10,18hr in the do-minimum opening year (DMOY) compared to the do-something opening year (DSOY)?;	No
	2) is the project likely to cause a change in the BNL of 3dB LA10,18hr in the do-something future year (DSFY) compared to the DMOY?;	No
	3) does the project involve the construction of new road links within 600m of noise sensitive receptors?;	Yes
	4) would there be a reasonable stakeholder expectation that an assessment would be undertaken?	Yes

13.4. Scoping Recommendation

- 13.4.1. Due to the potential significant effects and need for mitigation identified in the section above, the following topics are proposed to be scoped in:

- Construction site noise: and

- Operation traffic noise.
- 13.4.2. Due to the uncertainty that remains on whether vibratory works may be undertaken within 100m of sensitive receptors the following topic is also proposed to be scoped in:
- Construction site vibration.
- 13.4.3. Due to the majority of construction works being off-line and the relatively low amount of material that may be required to be imported for the Scheme, the following topic is proposed to be scoped out:
- Construction traffic noise (including diverted traffic).

13.5. Assessment Methodology

Guidelines

- 13.5.1. The assessment shall follow the most recent guidance listed below:
- Planning Practice Guidance on Noise (PPG-N) to the National Planning Policy Framework (NPPF);
 - British Standard BS 5228-1:2009+A1:2014 '*Noise and vibration control on construction and open sites – Part 1: Noise*'; and
 - British Standard BS 5228-2:2009+A1:2014 '*Noise and vibration control on construction and open sites – Part 2: Vibration*'.
- 13.5.2. It is also proposed that follows the methodology in DMRB for the assessment of noise and vibration on proposed road schemes. This guidance is mainly provided in DMRB *LA 111 Noise and vibration* published in November 2019. However, since this document is very recent there is limited experience on the application of the DMRB *LA 111* to schemes of this size. Additionally, some methods in DMRB *LA 111* seem not to be in line with the methodology presented in DMRB *LA 104 Environmental assessment and monitoring*. Therefore, professional judgement will be necessary on the application of the guidance in DMRB *LA 111* and *LA 104* to the environmental assessment of the Scheme.

Regulatory and Policy Framework

- 13.5.3. During the assessment, the following regulations planning policies shall be reviewed relating to noise and vibration:
- National Planning Policy Framework (NPPF)
 - Noise Policy Statement for England (NPSE);
 - Land Compensation Act 1973;
 - The Noise Insulation Regulations 1975 (as amended 1988);
 - Control of Pollution Act 1974.

Methodology

- 13.5.4. It is proposed that the level of assessment undertaken at the next stage is the one corresponding to a detailed assessment as defined in DMRB *LA103 Scoping projects for environmental assessment*. A detailed assessment involves the collection and assessment of data which require field surveys and quantified modelling techniques to understand those environmental effects.

Construction noise and vibration

- An initial study area of 300m for construction noise and of 100m for construction vibration in line with the advice in DMRB LA 111 is proposed for the environmental assessment.
- Construction noise and vibration levels for the LOAEL (lowest-observed-adverse-effect-level) and the SOAEL (significant-observed-adverse-effect-level) are proposed to be taken from those defined in DMRB LA 111.
- Specific sensitive receptors would be identified in association with the Local Authority within the study area and would be considered specifically relating to construction noise and vibration impacts.
- Construction noise and vibration would be calculated using the guidance set out in British Standard (BS) 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise' (BS5228-1) and also BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Vibration' (BS5228-2).

Operational phase

- An initial study area of 600m from the new and existing alignment in line with the calculation area advised in DMRB LA 111 is proposed for the environmental assessment.
- Road traffic noise calculations for specific receptors will be carried out under the method set out in the 'Calculation of Road Traffic Noise' (CRTN: 1988) as required under the appropriate parts of the DMRB LA 111 (including further advice on CRTN detailed in LA 111).
- As defined within the DMRB LA111, the following comparisons are proposed to be made for road traffic noise levels to consider the impacts of the Scheme in both the short and longer terms:
 1. Do-Minimum scenario in the baseline year against Do-Minimum scenario in the future assessment year (long term);
 2. Do-Minimum scenario in the baseline year against Do-Something scenario in the baseline year (short term);
 3. Do-Minimum scenario in the baseline year against Do-Something scenario in the future assessment year (long term).

Data collection and survey requirements

Definition of the acoustic character of the area

- 13.5.5. The noise assessment will include liaison with South Lakeland District Council environmental health officers with the intention of agreeing the scope and methodology of a noise survey aimed to define the acoustic character of the study area, including the influence of road traffic noise as well as of other agricultural and natural noise and any other commercial or industrial noise that may be present in the area.

Data requirements in relation to construction

- 13.5.6. A construction programme including the definition of any item of plant with the potential to give rise to noise and vibration and the period (day/evening/night, weekday/weekend) where works are likely to be carried out should be provided with enough level of detail to both allow the assessment to be undertaken and allow for the uncertainty linked to potential changes proposed in the future.

Data requirements in relation to operation

- 13.5.7. In addition to the current topography (including buildings)⁷⁰ and proposed design, the following data should be provided to allow for the production of a noise prediction model:
- Traffic data as Annual Average Weekday Traffic (AAWT) flows, including %HGVs and average speed calculated in line with DMRB LA 111 for the following scenarios:
 - Do-Minimum pre-construction year;
 - Do-Minimum opening year;
 - Do-Something opening year;
 - Do-Minimum worst year within first 15 years after opening (typically 15th year after opening); and
 - Do-Something worst year within first 15 years after opening (typically 15th year after opening).

- 13.5.8. AAWT data is typically required as 18-hour data for the period between 6am and midnight. However, if traffic flows at night are expected not to follow national patterns, for instance, due to the frequency of when the A595 is used as diversion route for the A590 (which is connected to port facilities) traffic data should also be provided for night-time periods. It is advised that traffic data requirements are agreed between the Noise and the Traffic teams once the potential traffic patterns are totally understood.

Initial mitigation measures and environmental enhancements

- 13.5.9. Construction noise and vibration are likely to require the following mitigation measures:
- Use of best practicable means.

⁷⁰ Usually provided as Ordnance Survey (OS) MasterMap topography layer (including Building Heights Attribute), OS Terrain 5, OS Highways and OS AddressBase Premium.

13.5.10. Operation noise will need to consider the feasibility and value of the following mitigation measures:

- Low-noise road surfaces; and
- Noise fences.

13.5.11. The feasibility and value of introducing noise bunds appears low at this stage but this should be revisited at the assessment stage.

13.6. Assumptions, Limitations and Uncertainties

13.6.1. The construction noise and vibration impact assessment will be based on the best available information. As with all construction noise and vibration assessments the exact details will not be available before a specific contractor is appointed to complete the works and determines their exact construction methods and programme.

13.6.2. Construction traffic (including diverted traffic during construction) is proposed to be scoped out since most of the works can be carried out off-line. However, this proposal should be revisited if further data is made available at a later stage.

13.6.3. The typical operation noise may be influenced by periods when the A595 is used as a diversion route of the A590. This will require to understand the frequency of these occurrences and how they affect traffic flows (especially traffic flows at night) and traffic composition in relation to %HGVs and average speed.

13.6.4. DMRB LA 111 proposes the use of pivoted speeds in line with the methodology in DMRB LA 105 Air quality. It will need to be considered whether this method should be applied to the calculation of speeds to be used in the noise model at the assessment stage.

13.6.5. Due to the relatively low traffic flows (around 4,000 vehicles per day), it is unlikely that the noise levels at dwellings substantially exceed the value of 65dB $L_{A10,18h}$ (free-field) during daytime where health effects due to noise start becoming relevant. It is unlikely that noise levels at dwellings are above 55dB at night unless the road follows non-average traffic patterns due to, for instance, being on the route to a major port facility (which is unlikely for the low number of HGVs recorded). A level of 65dB $L_{A10,18h}$ (free-field) would be the minimum level for a dwelling to be considered potentially part of an END Noise important areas. If it is confirmed that no dwellings are subject to daytime or night-time noise levels in the area of 65dB $L_{A10,18h}$ (free-field) and 55dB at night, health effects of noise in line with DMRB LA 112 *Population and human health* would not need to be considered.

13.6.6. The recently published DMRB LA 111 Table 3.49.1 defines the night time period as between midnight and 6am. This is unlike the typical night time period defined as 11pm to 7am. Night-time noise levels can be calculated from CRTN using TRL corrections. However, a noise level at night for the period between midnight and 6am can only be calculated in with TRL⁷¹ Method 1 which requires having the traffic flows provided as hourly traffic flows for all the 24 hours of a day. The other commonly used methods: Method 2 (traffic data in day, evening and night periods) and Method 3 (traffic data in 18h flows and typical night time patterns) give the noise levels at night for the period between 11pm and 7am rather than midnight to 6am. currently available. Therefore, careful liaison between the Noise and Traffic teams will be required to address this point introduced by DMRB LA 111.

⁷¹ Abbott, Phil & Stevenson, S. (2006). Method for converting the UK Road traffic noise index $L_{A10,18h}$ to the EU noise indices for road noise mapping.

14. Road Drainage and the Water Environment

14.1. Introduction

- 14.1.1. The purpose of this chapter is to present the significant impacts likely to arise on the water environment as a result of the Scheme including; water quality, flood risk, geomorphology, and drainage. This chapter outlines the baseline scenario, the potential construction and operational impacts, and how these are to be assessed in the full EIA report.

14.2. Baseline Conditions

- 14.2.1. 1.2.1. Two main rivers will be crossed by the Scheme, namely Grize Beck and Press Beck. These are tributaries to the WFD water body which starts at their confluence. These are summarised in Table 14.1.

Table 14.1. Baseline conditions for water bodies / features crossed by the alignment

Water body	Water Framework Directive Status (2016)	Reason for not achieving Good Status (WFD)	Flood Zone(s)	Designation(s) / Protected Area(s)
Grize Beck (tributary of Press Beck) <i>Surface water body</i>	N/A – not a WFD water body.	N/A – not a WFD water body.	Flood Zone 2 Flood Zone 3	The project sites lies within the SSSI Impact Risk Zone for Duddon Estuary SSSI and Ramsar site, and the Duddon Moss NNR, SAC as the SSSI sites are within a 2 km radius of the project site.
Press Beck (tributary of Kirkby Pool) <i>Surface water body</i>	N/A – not a WFD water body.	N/A – not a WFD water body.	Flood Zone 2 Flood Zone 3	The project sites lies within the SSSI Impact Risk Zone for Duddon Estuary SSSI and Ramsar site, and the Duddon Moss NNR, SAC as the SSSI sites are within a 2 km radius of the project site.

- 14.2.2. Kirkby Pool, the Water Framework Directive water body, is located approximately 500m west of the proposed scheme. The proposed alignment will not cross Kirkby Pool, as it is downstream of Press Beck and Grize Beck. It is understood that any adverse impacts on these watercourses will ultimately impact Kirkby Pool. The baseline conditions for Kirkby Pool are summarised in Table 14.2.

Table 14.2. Baseline conditions for water bodies / features in study area not crossed by the alignment

Water body	Water Framework Directive Status (2016)	Reason for not achieving Good Status (WFD)	Flood Zone(s)	Designation(s) / Protected Area(s)
Kirkby Pool (Duddon is the downstream water body, GB112074070130) <i>Surface water body</i>	<i>Overall:</i> Moderate <i>Ecological:</i> Moderate <i>Chemical:</i> Good	<i>Invertebrates element:</i> This is due to drought associated with natural factor. <i>Dissolved element:</i> This is due to drought associated with natural factor.	Flood Zone 2 Flood Zone 3	Subberthwaite, Blawith and Torver Low Commons Special Area of Conservation (SAC) Duddon Mosses (SAC)

- 14.2.3. Ordnance Survey maps show that there are several springs located within the study area to the north east section of the study area. Ordnance Survey maps show a well is located to the east of Dove Bank. The maps also show a pond located to the east of A595 just north of Dove Ford.
- 14.2.4. Groundwater Vulnerability is primarily Low in the southern end of the site which changes to Medium in the central section of the site. The ground water vulnerability changes to Medium High in the northern most section of the site adjacent to the Grize Beck and Press Beck.

14.3. Potential Impacts, Effects and Mitigation

Geomorphology

- 14.3.1. An Aquatic and Riparian Ecology Survey (ARES) was conducted between July & November 2019 on both Grize Beck and Press Beck. The Grize Beck survey consisted of a full 500 m survey reach starting from the confluence with Press Beck and ending within the A5092 culvert. The Press Beck survey started at the A595 road bridge and ended at the confluence with Grize Beck, the survey reaches totalled 220 m.
- 14.3.2. Both water courses show signs of significant modification.
- 14.3.3. Grize Beck has been re-routed and straightened; the previous channel alignment followed the current ditch. The surrounding land has been planted with willow and an orchard on the right bank and has a thin strip of woodland on the left bank with grazed fields dominating beyond 5 m. The straightened channel has significantly increased flow velocity compared to a meandering channel and therefore the banks show signs of erosion. At the upstream end of the survey reach the channel has been further modified with the banks canalized through concreted box sections, and six small weirs. The weirs have eel passes installed and addition fish baffles have been installed within the concrete channel.
- 14.3.4. Press Beck flows through a box culvert under the A595 before dropping down a small weir. The channel flowing through the fields has been straightened and realigned in the past. The upstream section of the survey reach is dominated by shallow riffles over cobbles and gravel before deepening. The downstream section is deeper and slower flowing with increased macrophyte density.

- 14.3.5. River habitat survey indicates that Grize Beck and Press Beck are both severely modified water bodies with habitat modification scores (HMS) of 6555 and 1970 respectively, predominantly driven by channel sectioning and at Grize Beck the presence of culverts and weirs. Habitat quality assessment (HQA) classifies Press Beck as a class 5, the poorest habitat quality class, whereas Grize Beck is allocated to class 3. These results lead to both watercourses being scored in class 5 for River Habitat Quality (RHQ) which indicates that these watercourses are in extremely poor condition and require restoration.
- 14.3.6. Crude Stream Power calculations based on the ARES data above suggests that at bank full capacity both the Grize and Press Becks are theoretically well above the erosion threshold. However, the ARES descriptions of the channel do not appear to support this, which suggests that there is either flow amelioration somewhere or the physical parameters differ. Future flood modelling as part of the full EIA will give more precise numbers to assess. From those, any re-design of the channel within the construction boundary can better determine the channel design cross section and long profile to achieve appropriate in-channel processes in accord with WFD requirements.
- 14.3.7. The EA's Initial response from December 2018 recommends that any proposals should enhance the biodiversity of the aquatic system so that it meets the WFD objectives. In that respect changes to the watercourses within the construction boundaries will need to improve the channels resilience under drought conditions and so appropriate modification to the hydromorphology with the addition of bed variation (pools and shallows) and bank variation (wet ledges) appears to be worthwhile additions. Other watercourses within the Scheme area are unlikely to require direct changes to geomorphology, as they are not to be crossed by the alignment.

Water Quality and Ecology

- 14.3.8. Following consultation, the Environment Agency have confirmed that Press Beck is a known migratory route for brown trout and European Eel and there are spawning areas located nearby. Any works within the vicinity of these becks will be subject to the in-river working window (mid-June – September). Although migratory fish and eel species have not been previously identified on Grize Beck, there are no barriers to passage downstream of Grizebeck village and so it is likely that these species are present in Grize Beck too. An electrofishing survey of the area would clarify this matter and establish the need for an in-river working window. This should therefore form part of the early investigation.
- 14.3.9. Impacts and effects on water quality and ecology during construction through pollution will be avoided primarily through the use of best practice methodologies. During operation, the potential for polluted and high sediment run-off reaching the watercourses will be minimised through the inclusion of Sustainable Drainage Systems (SuDS).
- 14.3.10. A suitable Construction Environmental Management Plan will be drawn up to cover the possibility of pollution to the watercourses from silt/run-off/fuel spills and any other pollution during the construction phase. This will require clear and adaptable methods to deal with adverse weather / site conditions (i.e. access track and roads that get a lot of plant traffic).

Flood Risk

- 14.3.11. The Scheme will result in an increase in impermeable surfaces in the area, which will in turn result in an increase in surface water run-off following rainfall events. Therefore, there is a potential for an increase in flood risk to localised areas. The drainage design will need to

consider SuDS measure that will replicate the natural drainage system aiming at improving the runoff quality and quantity from the proposed impermeable surfaces. The FRA will need to confirm that the scheme will not increase the risk of flooding anywhere else in the catchment.

- 14.3.12. Some of the highway development works will be within Flood Zone 2 and Flood Zone 3 in the vicinity of Press Beck and Grize Beck. The permanent works will displace some of the flood zone and the impacts of these development will need to be assessed on the local Flood Risk.

14.4. Scoping Recommendation

- 14.4.1. It is recommended that this chapter is scoped in to the full EIA.
- 14.4.2. A separate Water Framework Directive (WFD) Assessment will be required in order to ensure compliance by further assessing the impacts of the Scheme on geomorphology, water quality, and ecological elements.

14.5. Assessment Methodology

Guidelines

- 14.5.1. The EIA will follow the guidance and methodologies set out in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 10 – Road Drainage and the Water Environment (HD 45/09). It will also follow guidance set out by the WFD and the National Planning Policy Framework (NPPF).

Regulatory and Policy Framework

- 14.5.2. The following list sets out the principle legislation and European, national, regional, and local policies of relevance to the assessment on water quality and flood risk.
- Water Framework Directive, EU Directive 2000/60/EC
 - National Planning Policy Framework (NPPF)
 - Habitats Directive, 1992/43/EEC
 - Flood and Water Management Act, 2010
 - Department of Food and Rural Affairs (2009) South West Lakes Catchment Flood Management Plan
 - North West River Basin Management Plan (RBMP), 2015
 - South Lakeland District Strategic Flood Risk Assessment.

Methodology

- 14.5.3. For the purposes of this assessment, the geographical scope of this chapter (the 'study area') will cover the immediate extent of the proposed development area, incorporating any

waterbodies contained within it. In some instances, it will be appropriate to extend the study area in order to consider the potential impacts of the Scheme on flood risk.

14.5.4. Baseline conditions have for the most, been part established at options appraisal. At full EIA the following sources will be reviewed, and any changes incorporated:

- **Flood Zone Maps** produced by the Environment Agency. These maps display the extent of flooding that would occur on the basis that no flood defences are in place and describe the extent to which land is afforded protection by the presence of defences.
- **Surface Flood Water Maps** produced by the Environment Agency.
- **Groundwater Vulnerability Maps** produced by the British Geological Society.
- **River Basin Management Plan Interactive Maps** produced by the Environment Agency.
- **Geology in Britain Viewer** produced by the British Geological Society.
- **Reservoir Inundation Maps** produced by the Environment Agency.

14.5.5. As required by the Environment Agency (EA), a site survey of existing water features and a map of the location of all proposed engineering activities in the water environment will be included in the EIA report).

14.5.6. The identification of the baseline conditions provides an understanding of the possible pathways, receptors, and the importance of any impacts on water/runoff interactions. Following the identification of an impact, the 'magnitude' of that impact will be defined, followed by the 'sensitivity' of the receiving receptor.

14.5.7. The 'magnitude' of an impact may vary between receptors, depending on the nature of the pathway available for that impact to manifest itself.

14.5.8. The 'sensitivity' of a receptor may also vary depending on a wide range of attributes; for example, water quality, biodiversity and amenity. Multiple attributes could also be affected by one impact, for example suspended sediments can directly impact the water quality and biodiversity.

14.5.9. The prediction of effects will be carried out with reference to the construction and operational phases of the proposed development. The assessment would consider both adverse and beneficial effects on each of the relevant water environment components. These include: the effects of runoff on surface waters; the effects of runoff on groundwater; pollution impacts from spillages; and flooding impacts.

14.5.10. Determining the significance of effects identified is then essentially a function of the magnitude of an impact and the sensitivity of the receptor.

14.5.11. Cumulative effects of the proposed route and schemes within the area have been identified at Stage 2 and will be considered in further detail at Stage 3. The study area will be extended to include any schemes with planning secured that could have impacts on the local flood risk, water quality, or geomorphology. The interactions between the effects will then be assessed.

- 14.5.12. The Flood Risk Assessment should be based on appropriate hydraulic modelling which should involve investigation of the significant adverse effects associated with the proposed scheme and mitigation proposed accordingly for the lifetime of the development.
- 14.5.13. Best practice will need to be applied to develop measures to mitigate against the potential temporary and permanent impacts of the Scheme. Workshops with environmental specialists and engineers will be undertaken to identify the best possible methods. Ongoing consultation with specialists from statutory bodies will support this process.

Consultations

- 14.5.14. During options appraisal, the Environment Agency and Natural England were consulted through workshops and site visits. Workshops with representatives from the Local Flood Authority (LFA) were also carried out. Engagement with the Environment Agency and Natural England will continue throughout full EIA in order to discuss issues and potential impacts of the Scheme on the water environment (including WFD) and designations.

14.6. Assumptions, Limitations and Uncertainties

- 14.6.1. The assessments made regarding water quality impact should be based on baseline data derived from available published water quality information. The assessment made on flood risk is based on data from the EA and other relevant plans.
- 14.6.2. The assessments made regarding hydro-geomorphological impacts should be based on best-practice methods which currently utilise empirical methods to assess the hydro-geomorphological baseline and the impact from encroachment on the water environment.

15. Geology and Soils

15.1. Introduction

- 15.1.1. This chapter provides a review of baseline conditions in relation to geology, soils and potential ground contamination (related to current and past land uses) and assesses how these conditions may be affected by the proposed development.

15.2. Baseline Conditions

- 15.2.1. The baseline conditions relating to the geology and soils of the study area has been assessed using information gathered as part of the Preliminary Sources Study prepared by Capita (GRZB-CAP-HGT-00-RP-CE-0002).

Statutory and non-statutory designations

- 15.2.2. The northern tie-in of the route with the existing A595 carriageway is located on the boundary of the Lake District National Park which is a UNESCO World Heritage Site.
- 15.2.3. No designated sites are located within 500m of the route corridor. This includes Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Areas of Outstanding Natural Beauty (AONB), Local Nature Reserves (LNR) and Nitrate Vulnerable Zones.

Made ground and man- made features

- 15.2.4. A limited amount of Made Ground (associated with agricultural activity) is expected within the study area. Made Ground may be encountered in isolated pockets in areas surrounding Dove Bank House and Dove Ford Farm. Engineered fill is expected to be encountered at the northern tie-in with the A595 at Chapels and Grizebeck. Engineered fill may also be encountered where the route crosses the A595 north of Dove Ford Farm.

Topsoils

- 15.2.5. Most of the study area is located within agricultural land. According the AECOM Geology and Soils Preliminary Assessment, the soils in the area are classified as deep, stoneless soils developed in a marine alluvium, often with humose or thin peaty topsoils. The alluvium is generally silty clay but ranges from silt loam to clay. The humose surface horizons are the remnants of peat which formed under freshwater conditions.

Geology and geomorphology

- 15.2.6. The site is located within an area which was glaciated during the last ice age (Devensian). Glacial, periglacial and fluvial processes have influenced the geomorphology of the site. The study area is situated on elevated ground before giving way to low lying coastal and estuarine topography of the North Sea and Duddon Estuary to the south.
- 15.2.7. The southern tie-in to the existing A595 carriageway at Chapels is at 30m AOD. Northwards, the study area is at a similar elevation, following the topography of the hillside. At Dove Bank Farm, the study area gently slopes downwards towards Grizebeck, reaching 0m AOD at Grize Beck watercourse. The site begins to slope upwards, reaching 10m AOD at the northern tie-in to the A595 at Grizebeck. The topography is flatter to the west of the study area (0m AOD).

or less) in proximity to the Duddon Estuary. The southern fringes of Lake District are located to the north of the study area. Elevations here are in excess of 300m AOD.

- 15.2.8. The underlying geology of the site has been identified through geological maps and historical borehole logs where available.
- 15.2.9. Superficial deposits underlie most of the site except for a 100m section around Dove Bank Farm. A list of the anticipated superficial geology beneath the site is provided below:
- Alluvium (clay, silt, sand and gravel);
 - Alluvial Fan Deposits (gravel);
 - Raised Marine Beach Deposits (sand and gravel);
 - Glacial Till (clay, silt, sand, gravel, cobbles).
- 15.2.10. The bedrock geology beneath the site consists of:
- Poolscar Formation (sandstone with subordinate siltstone and mudstone)
 - Latrigg Formation (interlaminated hemipelagite, siltstone and fine-grained sandstone)
- 15.2.11. Geological maps indicate that a syncline crosses the route at approximately 1,150m from the southern end of the route alignment striking south-west to north-east. Along the route and to the west of the study area the bedrock is indicated to be overturned and dipping 74° to 83° to the south, south-east. To the north-east of the study area the bedrock indicates a 2nd phase of deformation with the beds dipping 84° to the north, north-west.
- 15.2.12. There is a complex fault structure surrounding the study area with a large transitional fault located 750m to the south of the study area called the Kirkby Fault. The Kirkby Fault has a sinistral strike slip and thrust components which have arisen from a single transpressive displacement. The Kirkby Fault is the largest of the structures to have formed at this time, with a lateral displacement of 2.5km.
- 15.2.13. A smaller fault is also located 400m to the south of the study area running south-west to north-east with a down throw to the north-west. A fault running south, south-west to north, north-east is also identified 150m to the west of the tie-in at Grizebeck which connects with the end of the syncline which crosses the study area.

Mineral reserves

- 15.2.14. The site is not within a coal mining area and no non-coal mining plans are recorded in the area. Slate quarries are located to the south-east of the site, although these are considered to be far enough from the proposed development as to be unaffected.

Contaminated land

- 15.2.15. In accordance with Part IIA of the Environmental Protection Act (1990), there are no sites which have been designated as Contaminated by South Lakeland District Council. Research undertaken for the Preliminary Sources Study identifies the existing highway corridor and verges as potential sources of contamination due to fuel and oil spillages. Contamination in the form of Polycyclic Aromatic Hydrocarbons (PAHs) and Aliphatic Hydrocarbons may be

encountered in these areas. There is a low risk of encountering soils contaminated with pesticides/herbicides due to surrounding agricultural land use.

- 15.2.16. The Preliminary Sources Study has identified several potentially contaminative land uses within 100m of the site. These are related to petrol filling stations, garage services and a boat building/repairing facility.

15.3. Potential Impacts, Effects and Mitigation

Statutory and non- statutory designations

- 15.3.1. As stated in Section 4.2.2, the northern tie-in of the route is located within the Lake District National Park boundary. Works in this area are likely to comprise widening and/or resurfacing of the existing carriageway therefore impacts are expected to be low.
- 15.3.2. There are no other environmentally sensitive sites (as listed in Section 4.2.3) within 500m of the proposed route corridor. As such, the highway scheme will have no perceived impact on these sites.
- 15.3.3. The proposed works include the construction of a culvert which will carry the highway over Grize Beck. It is considered that the construction phase of the scheme has the potential to incur impacts on Grize Beck, including the introduction of pollutants and sediments into the watercourse. The adoption of appropriate mitigation measures and best construction practice will reduce such events to a negligible level.

Made ground and man- made features

- 15.3.4. Any made ground encountered during the works will be dealt with according to current standards and best practices. There is the potential to encounter Made Ground in the areas listed in Section 15.2.4.

Topsoils

- 15.3.5. A large quantity of topsoil will be removed as part of the works. It is expected that the majority of excavated material will be reused. Therefore, it is expected that the long-term impacts will be minimal.

Geology and geomorphology

- 15.3.6. The excavation of cuttings and construction of embankments across the southern section of the route will impact the geomorphology of the site. The new road alignment has the potential to lead to instability in existing slopes and in new slopes which are formed.
- 15.3.7. The excavation of cuttings is likely to reduce superficial deposits. The deposits have limited significance therefore any effects are expected to be negligible. Embankment construction may have the ability to induce instabilities in the adjacent ground. The risk of this occurring could be reduced to negligible through designs based on an appropriate ground investigation. It should be noted that no areas of significant instability were observed during the site walkover which was conducted during the Preliminary Sources Study stage of the project.
- 15.3.8. There are no geological faults mapped beneath the proposed route corridor which the scheme would impact on.

Hydrogeology

- 15.3.9. Bedrock beneath the site has been classified as a Secondary B Aquifer (lower permeability layers which may store and yield limited amounts of groundwater due to localised features), therefore impacts to the aquifer are expected to be low.
- 15.3.10. Alluvium and Alluvial Fan deposits are classified as Secondary A aquifers. These deposits are likely to have a limited thickness however this will be determined during the ground investigation.
- 15.3.11. Groundwater levels and seasonal variations will be established during the ground investigation, as well as during long-term monitoring.

Mineral reserves

- 15.3.12. No evidence of mining or quarrying has been recorded within 500m of the site although slate quarries are located to the south-east of the study area. It is considered unlikely that the scheme will affect reserves of slate in the area.

Contaminated land

- 15.3.13. There is currently no available information with which to quantitatively assess the contaminative status of land within the route corridor. The ground investigation undertaken for the new road alignment will include sampling of soils for laboratory chemical analysis. A semi-quantitative risk assessment should then be undertaken. This involves a comparison of measured concentrations with Generic Assessment Criteria (GACs) applicable to the end-use of the site. This would allow any areas of high risk to be identified and remedial measures deemed necessary would lead to the mitigation of associated risks.
- 15.3.14. It is possible that the scheme may disturb potentially contaminated soils, leaving them exposed at the surface. The scheme also has the potential to alter drainage paths which in turn could accelerate the downward migration of pollutants.
- 15.3.15. Any Made Ground excavated during works, i.e. during the formation of cutting slopes, will require chemical assessment against Waste Acceptance Criteria for disposal off-site to a licensed facility.

15.4. Scoping Recommendation

- 15.4.1. Based on the current design of the route, is recommended that assessment of effects on geology and soils is scoped out of the EIA as no significant adverse residual effects have been identified.

16. Material Assets and Waste

16.1. Introduction

- 16.1.1. This section provides a scoping assessment of potential environmental impacts, from material use, according to the Design Manual for Roads and Bridges (DMRB); specifically, LA 110 Materials Assets and Waste (DMRB 11.2.13)⁷², Revision 0 dated August 2019. The use of materials is split into two areas; use of materials, and the management of waste.
- 16.1.2. This assessment focuses on the environmental effects associated with material assets used in construction. It also includes the expected emissions and production of waste from the scheme.
- 16.1.3. Materials extracted and processed off site are outside the scope of this assessment, including the associated impacts on quarries, landfill sites, and waste management facilities.

16.2. Baseline Conditions

- 16.2.1. A baseline data gathering exercise has not been conducted previously, therefore the aspects of material resource use and waste management that have potential to generate environmental impacts will need to be identified.
- 16.2.2. Material resources will be identified through a review of Cumbria County Council's standard details for road construction, and internal consultation with lead designers.
- 16.2.3. Waste material is defined as any substance or object which the holder disposes of, or is required to dispose of.
- 16.2.4. The road has been designed to best balance the optimal design standards against the requirements for cut and fill to minimise disposal of material from site as far as possible.
- 16.2.5. Using the most recent road plan, showing the areas of banking and cut slopes, it was possible to estimate the amount of cut and fill required. The calculations reveal the need to import 450m³ of acceptable earthworks. This is relatively well balanced in respect to the scheme's size.
- 16.2.6. The following sources of information have been consulted:
- A595 Grizebeck Improvement Preliminary Design (GRZB-CAP-EGN-00-Z-0001, Revision P01.2)
 - A595 Grizebeck Preliminary Geology and Soils Report
 - Cumbria County Council Design Guide Standard Details
- 16.2.7. The DMRB scoping assessment is primarily based on addressing the following questions to understand the need to undertake further assessment;
1. Is the project likely to recover/reuse little on site material thereby requiring materials to be imported to site?

⁷² DMRB Vol 11, Section 3, Part 10 LA110:

<http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/LA%20110%20Material%20assets%20and%20waste-web.pdf>

2. Is the project likely to use little/no recycled/secondary materials thereby requiring the majority of materials used on the project to comprise primary materials?
 3. Is the project likely to sterilise (substantially constrain/prevent existing and potential future use of) mineral sites or peat resources?
 4. Would the project generate large quantities of waste relative to regional landfill capacity?
 5. Will the project have an effect on the ability of waste infrastructure within the region to continue to accommodate waste from other sources?
- 16.2.8. At this early stage off development, it is thought that the proposed scheme would trigger “no” responses from 4 of the 5 questions listed above, the exception being question 2.

16.3. Potential Impacts, Effects and Mitigation

Material resources

- 16.3.1. The preliminary Geology and Soils information identify the presence of superficial alluvial soil deposits and sandstone/argillaceous rock outcrops. At this stage intrusive investigations have yet to be undertaken to establish depths and conditions of strata.
- 16.3.2. The southern section of the road is within an area of steep-sloping ground and would require extensive cutting.
- 16.3.3. Material resources that are likely to be used:
- Bulk earthwork excavation; clay, silt, sand, gravel & sandstone
 - Bulk aggregates deposition
 - Topsoil and subsoil (excavation, import, and deposition)
 - Bituminous materials (excavation, import, and deposition)
 - Concrete
 - Cementitious mortars
 - Geotextiles
- 16.3.4. Due to the “offline” nature of the route, and the fact that it’s a greenfield site, in-situ recycling is not possible, and materials must be imported for the use in construction.
- 16.3.5. There is potential for the scheme to reduce the demand for primary resources by utilising recycled/secondary materials for the unbound fill material of the pavement design.
- 16.3.6. The base layer (Hydraulic bound material) is a mixture of aggregate, water and binder. The following secondary materials; blast furnace slag or pulverised fuel ash, are industry by-products which can be incorporated as the binder material instead of cement.
- 16.3.7. Using primary resources however guarantees long-term performance, which in turn reduces the life cycle costs of maintenance operations. Recycling/secondary materials can

significantly downgrade the quality, increasing whole-life-costs through the operation, repair and replacement of deteriorating elements.

- 16.3.8. A balance must be struck between the use of primary materials and recycled/secondary materials to ensure the most cost effective design is delivered for the long term.
- 16.3.9. It should be noted that products that are pre-manufactured, such as paving flags, lighting columns, and street furniture, are excluded from the scope of assessment as these should have already undergone their own environmental assessments.

Waste material

- 16.3.10. In addition to surplus materials for all of the above material resources, the following wastes are likely to be generated:
- Plastics, wood, and metals from packaging and defective products
 - Bulk earthwork excavation of unsuitable material
- 16.3.11. It is expected that a high proportion of excavated material will be suitable for re-use during construction providing it is managed correctly. It may require treatment to either reduce the water content or, in dry conditions, increase it, to aid compaction.
- 16.3.12. The principal mitigation measure relating to this topic will be the development and implementation of a Construction Environmental Management Plan (CEMP). The CEMP will be developed during the detailed design phase (i.e. before the start of construction) and implemented during construction phase. The CEMP will include the following:
- Details of the approach to environmental management throughout the construction phase, with the primary aim of mitigating any adverse impacts from construction activity on the environment
 - Methods for the prevention and control of any potential short-term construction phase impacts (e.g. construction dust, and the risk of accidental spillages of contaminating materials) and also permanent impacts (e.g. disturbance to vegetation, archaeology and heritage);
 - Good materials management methods, such as location of temporary haul routes and re-use of temporary works materials from haul routes, plant and piling mattresses etc; and,
 - Risk/impact-specific method statements and strategic details of how relevant environmental impacts will be addressed throughout the scheme.
- 16.3.13. Although not required by the regulations, a Site Waste Management Plan (SWMP) should be developed and regularly updated during the scheme. The SWMP would identify, prior to the start of construction, the types and likely quantities of wastes that may be generated. It would set out how these wastes would be reduced, reused, managed and disposed of.
- 16.3.14. The SWMP would contain a Materials Management Plan (MMP) which sets out how all construction phase materials are managed.
- 16.3.15. In terms of materials, the main operational impacts are likely to be road surface repairs with possible minor repairs to other aspects of the scheme. Potential environmental impacts

associated with these materials and wastes would be managed through the operation of relevant sections of a Handover Environmental Management Plan (HEMP), which would be prepared by the contractor before the end of construction and passed over to Cumbria County Council's managing agent on completion of the construction phase

- 16.3.16. The quality plan will contain details of all a secondary material sources used in the bound materials.

16.4. Scoping Recommendation

- 16.4.1. Due to the standard construction materials and wastes used on this project. It is deemed there is limited value in conducting a full assessment and it should therefore be "scoped out" of the Environmental Impact Assessment (EIA).
- 16.4.2. The creation of a Construction Environmental Management Plan (CEMP) and Site Waste Management Plan (SWMP) will encourage the contractor to reduce and reuse materials on site.

17. Climate

17.1. Introduction

- 17.1.1. This chapter addresses the potential climate impacts associated with the construction and operation of the proposed scheme. The key focus of the scoping will be the impact of the scheme on climate in terms of greenhouse gas (GHG) emissions and the vulnerability of the scheme to climate impacts.

17.2. Baseline Conditions

- 17.2.1. Historical climate data for the 25 km grid covering the site has been obtained from the Met Office gridded observational data available from Centre of Environmental Data Analysis (CEDA) Archive⁷³ from the dataset “HadUK-Grid Gridded Climate Observations on a 25km grid over the UK for 1862-2017”. Table 5.1 present a summary of the observed climate in the study area.

Table 17.1: Historical climate data for the 25 km grid covering the scheme

Parameter	Long term average (1981 – 2010)
Duration of sun in a year (hours)	1393
Days of snow-lying (days)	11.7
Mean windspeed at 10m above ground (knots)	5.1
Rainfall in a year (mm)	1663
Mean vapour pressure (hPa)	9.7
Mean sea level pressure (hPa)	1014
Mean relative humidity (%)	81.9
Days of ground frost (days)	112.1
Mean air temperature (°C)	8.8

17.3. Potential Impacts, Effects and Mitigation

GHG emissions

- 17.3.1. The scheme has the potential to increase GHG emissions through the construction of the road in relation to material and energy use and through the operational phase due to emissions from vehicles using the proposed scheme as well as energy use from routine maintenance.

Vulnerability to climate impacts

- 17.3.2. Part of the proposed scheme does lie within a flood risk zone, therefore there is the potential of climate change impacts to the proposed scheme during both the construction and operational phases.

⁷³ <http://data.ceda.ac.uk/badc/ukmo-hadobs/data/insitu/MOHC/HadOBS/HadUK-Grid/v1.0.0.0/25km>

17.4. Scoping Recommendation

GHG emissions

17.4.1. DMRB outlines scoping criteria for when further assessment of a scheme may be required in terms of GHG emissions:

- Are construction GHG emissions, compared to the baseline scenario increasing by 1%; or
- During operation, will roads meet or exceed any of the following:
- A change of more than 10% in AADT;
- A change of more than 10% in HGVs; and
- A change in daily speed of more than 20 km/hr.

17.4.2. The proposed scheme will introduce a new road where the change in AADT and HGVs will be more than 10%, therefore further assessment in terms of GHG emissions is required and should be scoped into the EIA.

Vulnerability to climate impacts

17.4.3. In relation to the vulnerability to climate change, there is the potential that climate change will have adverse impacts on the scheme, therefore should be scoped into the EIA.

17.5. Assessment Methodology

Guidelines

17.5.1. The assessment will be undertaken in line with the DMRB LA114 Climate guidance which sets out the requirements for assessing and reporting the effects of climate on highways and the effect of schemes on climate from GHG emissions.

17.5.2. The Institute of Environmental Management and Assessment provides a framework⁷⁴ for the effective consideration of climate change resilience and adaptation in the EIA process.

Regulatory and Policy Framework

17.5.3. The EIA Directive 2011/92/EU places a requirement on infrastructure projects which could result in significant effects on the surrounding environment to consider a formal assessment of these effects. The amended EIA Directive 2014 (Directive 2014/52/EU)⁷⁵ states that EIAs shall identify, describe and assess the direct and indirect significant effects of climate change relevant to the project. The Regulations implementing this Directive were transposed into UK legislation in May 2017.

⁷⁴ Institute of Environmental Management & Assessment (IEMA) Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (November 2015)

⁷⁵ Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Available online at: <http://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=celex%3A32014L0052>

- 17.5.4. The Climate Change Act⁷⁶ incorporates a requirement to undertake climate change risk assessments and to develop a National Adaptation Programme (NAP) to address the risks from climate change. The Government commissioned the completion of the National Climate Change Risk Assessment. The Climate Change Risk Assessment provides a useful basis for assessing the likely future environment which EIAs need to consider, and provides information on the range of impacts likely to be experienced in a range of sectors:
- 17.5.5. The National Planning Policy Framework⁷⁷ recognises that planning plays a key role in managing the risks such as flood risk or drainage associated with climate change. It also recognises that local planning authorities should adopt proactive strategies to mitigate and adapt to climate change.

Methodology

GHG emissions

- 17.5.6. A comparison of GHG emissions in the form of a carbon equivalent will be calculated for the existing scheme in place (the do-minimum) scenario and with the proposed scheme in place (the do-something) scenario. Data will be collected (subject to availability) for different life cycle stages of the project such as the construction stage and the operational stage. Data may include information such as:
- Construction stage:
 - Raw material supply, transport and manufacture;
 - Transport to and from the works site;
 - Construction installation processes; and
 - Land use change.
 - Operational stage:
 - Vehicles using the proposed scheme;
 - Energy and material consumption from routine maintenance; and
 - Ongoing land use change.
- 17.5.7. The Highways England carbon calculation tool⁷⁸ will be used to complete the assessment the GHG emissions for the project life cycle and will be reported in carbon dioxide equivalents. A comparison will be made between the do minimum and the do something scenario.

Vulnerability to climate change

- 17.5.8. A baseline assessment will be undertaken to determine the projects vulnerability to climate change using published historical data to demonstrate any current climate impacts on the area. Recent weather patterns and extreme weather events will be identified to provide an indication of how the scheme will deal with climate change during the construction phase.

⁷⁶ Climate Change Act (2008)

⁷⁷ Department for Communities and Local Government (2018); National Planning Policy Framework

⁷⁸ <https://www.gov.uk/government/publications/carbon-tool>

17.5.9. Future changes to the climate baseline will then be identified using the life span of the project and the climate trends associated with the UKCP high emissions scenario projects. Examples of potential changes include:

- Construction:
- Increased frequency of extreme weather;
- Increased temperatures, prolonged periods of hot weather; and
- Increased precipitation, and intense periods of rainfall.
- Operational:
- Increased precipitation;
- Gales;
- Temperature extremes/dry periods
- Increased sea level rise and wave height; and
- Increased frequency of extreme weather events.

17.6. Assumptions, Limitations and Uncertainties

17.6.1. The assessment is largely qualitative and as such the impacts are not quantifiable. There still remains some uncertainty as to the relationship between changes in climate hazard and the response in terms of asset performance such as flood risk or drainage. The evidence relating to climate change impacts is also limited and as such the impacts are solely reliant on professional judgement.

Part Three Summary and Conclusions

18. Summaries

18.1. Summary of Scoping Recommendations

18.1.1. Table 18.1 below summarises the scoping recommendations for the Stage 3 assessment.

Table 18.1: Summary of Scoping Recommendations

Topic	In	Out	Comments
Air Quality	✓		Assessment of air quality and dust for both construction and operational phases scoped in as DMRB thresholds for annual average daily traffic increases are likely to be met.
Cultural Heritage	✓		Assessment scoped in for both construction and operational phases, to include archaeological remains, historic buildings and historic landscapes. Field surveys, walkovers and geophysical surveys required.
Biodiversity	✓		Assessment scoped in for both construction and operational phases, to include consideration of statutory and non- statutory designated sites, habitats, terrestrial invertebrates, reptiles, amphibians, birds, bats, otter, badgers, hedgehogs, fish, and aquatic macroinvertebrates and macrophytes.
Landscape (Landscape Character)	✓		Scoped in for both construction and operational phases due to the presence of statutory landscape designations, the sensitivity of the baseline landscape character, and the likely impact of the development upon these.
Landscape (Visual Impact)	✓		Scoped in for both construction and operational phases due to likely significant impact on visual receptors, particularly during operation.
Population and Human Health: Private Property and Housing		✗	Not required in EIA report as no likely direct adverse effects on private property have been identified.
Population and Human Health: Community Land and Assets		✗	Not required in EIA report as no likely direct adverse effects on community land or assets have been identified.
Population and Human Health: Development Land and Businesses		✗	Not required in EIA report as no likely direct adverse effects on development land or businesses have been identified.
Population and Human Health: Agricultural Land Holdings	✓		Assessment scoped in for both construction and operational phases due to likely significant effects on ALHs from severance, land take and impacts on farm viability.
Population and Human Health: Walker, Cyclists and Horse Riders		✗	Not required in EIA report as local PROWs, while of potential moderate value as receptors, are not likely to be significantly affected by either the construction or operation of the Scheme.
Population and Human Health: Human Health	✓		Assessment scoped in for both construction and operational phases due to potential for significant impacts from changes to air quality and noise and vibration. The WCH aspect of this topic

			is not scoped in as no likely significant effects upon these receptors is anticipated.
Noise and Vibration	✓		Assessment scoped in for potential significant effects arising from construction phase site noise, operational phase traffic noise, and construction phase vibration. The construction phase traffic noise aspect is not scoped in due to the majority of construction works being off-line.
Road Drainage and the Water Environment	✓		Assessment scoped in for both construction and operational phases due to potential impacts on geomorphology, water quality and flood risk. A separate Water Framework Directive assessment will also be produced.
Geology and Soils		✗	Not required in EIA report as no likely significant impacts have been identified upon any receptors.
Material Assets and Waste		✗	Not required in EIA report as the use of standard construction materials and wastes generated is deemed to make a full assessment of limited value.
Climate	✓		Assessment scoped in for both construction and operational phases due to potential significant impacts for GHG emissions and vulnerability to climate change.

18.2. Proposed Structure of the EIA Report

Report Structure

18.2.1. The ES will consist of the following four volumes and will be accompanied by a Non-Technical Summary (NTS):

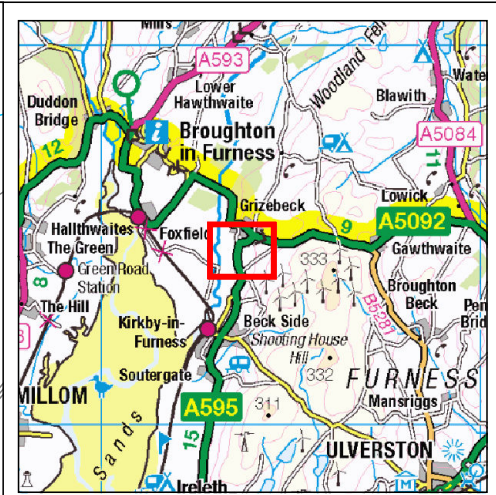
- **Volume 1 – EIA Report:** containing the introduction, detailed impact assessments for individual environmental topic chapters and a summary of the key findings. The volume is divided into three parts:
 - Part 1: Introduction
 - Part 2: Environmental Impact Assessments
 - Part 3: Summary and Conclusions
- **Volume 2 – Plans:** a plan series illustrating baseline conditions, key constraints, impacts and mitigation proposals.
- **Volume 3 – Appendices:** comprising all appendices which have been referred to in Volume 1 including, but not limited to, calculations, statistical analyses, field notes, site photographs and data records.
- **Volume 4 – Visualisations:** photographs, photomontages and wireframes taken from viewpoints selected for the visual impact assessment.

Individual Assessment Topic Reporting Structure

18.2.2. For consistency, each topic area covered in Volume 1, Part 2 of the Environmental Report will typically be structured as follows, with some variation to allow for the assessment and reporting requirements of individual topics:

- **Introduction:** defining the topic and its scope.
- **Assessment Methodology:** summarising the methodologies applied to gather baseline information, identify potential impacts and their effects and how the significance of these effects have been assessed. Reference will be made to any guidelines or best practice followed and topic specific descriptors for determining the sensitivity of receptors and the magnitude of impacts are provided where available. Any important limitations or assumptions of the assessment process will be highlighted as well as any consultation that has been undertaken to inform the assessment.
- **Baseline Conditions:** describing the current environmental conditions pertinent to the topic being assessed and within the defined study area. Findings from desktop and field surveys will be provided here.
- **Preliminary Impact Assessment and Identification:** summarising potential impacts and effects of the proposed scheme, beneficial or adverse, permanent or temporary with a preliminary assessment of significance without mitigation.
- **Mitigation:** describing proposed measures to avoid, reduce, restore or compensate for effects identified as significant during the preliminary impact assessment. Opportunities to enhance may also be considered.
- **Residual Impact Assessment and Identification:** summarising potential impacts and effects of the proposed scheme, beneficial or adverse, permanent or temporary with a residual assessment of significance with mitigation.
- **Cumulative Effects:** a consideration of the interaction of effects. These can be from a single project where the combined action of several different topic specific impacts cause an effect on a single receptor/resource or from different projects where the combined action of several different proposed projects cause an effect.
- **Summary:** providing a brief summary of the proposed scheme and its effects.

Appendix A. Figures



KEY:
— Proposed Route Alignment (centreline)

Rev	Dwn	Chk'd	App'd	Description	Date
01.2	SH	JL	IG	Data added	08/10/2019
01.1	SH	JL	IG	Created	07/10/2019

Purpose of Issue
S2 - Issued for Information

Classification
Commercial in Confidence

Client
Cumbria County Council


Project
A595 Grizebeck Improvement Preliminary Design

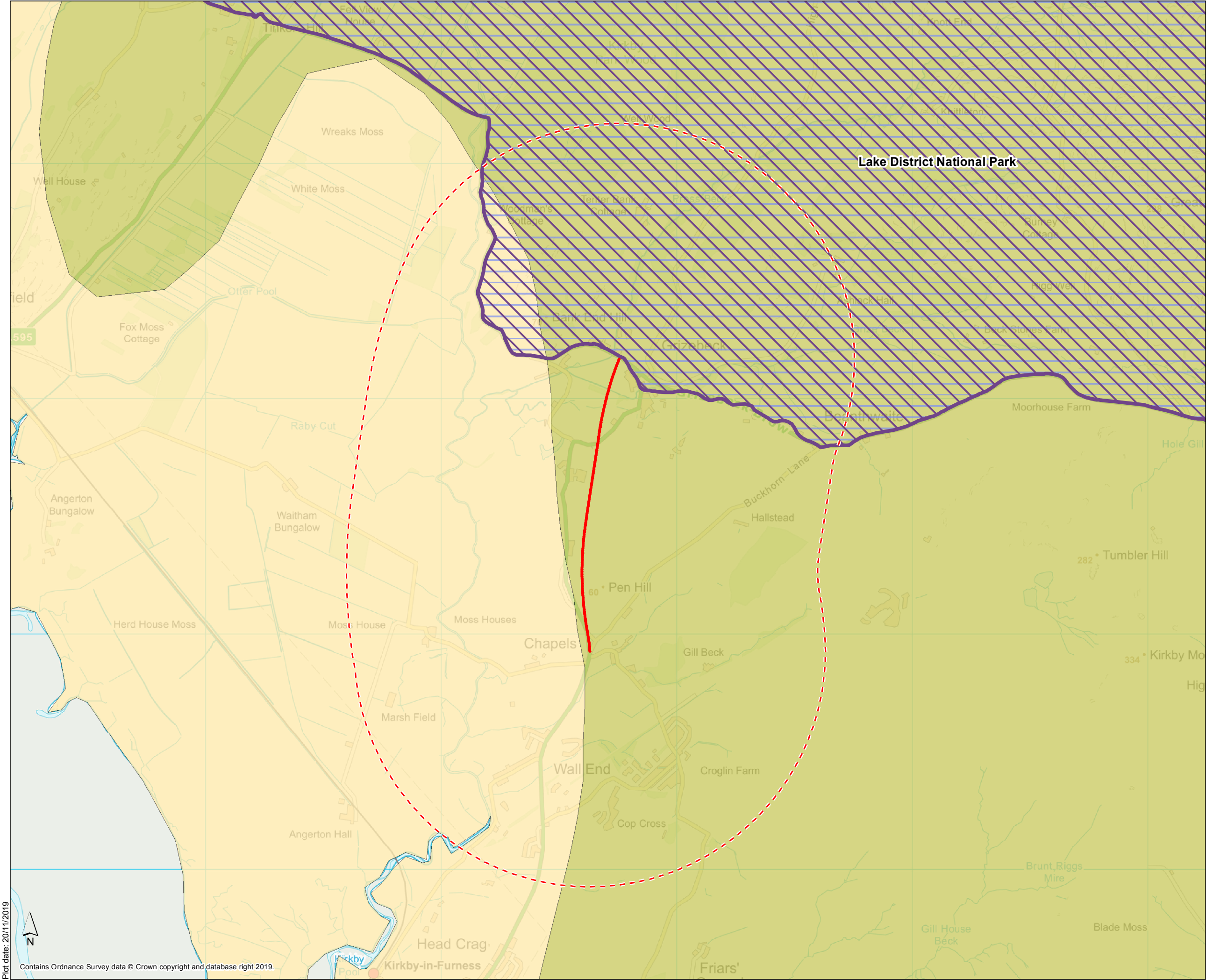
Drawing
Site Location Plan

Scale @ A3 1:5,000	Drawn SH	Checked JL	Approved IG
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Project No CS098850	Date 08/10/2019
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Drawing Identifier Project - Originator - Zone - Level - FileType - Role - Number GRZB-CAP-EGN-00-DR-Z-0001	Revision P01.2
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Capita Property and Infrastructure Ltd.



KEY:

- Proposed Route Alignment
- 1km Buffer
- Lake District National park
- World Heritage Site
- National Character Areas**
 - South Cumbria Low Fells
 - West Cumbria Coastal Plain

01.1	SH	RP	IG	Created	20/11/2019
Rev	Dwn	Chkd	Appd	Description	Date

Purpose of Issue


S2 - Issued for Information

Classification

Commercial in Confidence

Client

Cumbria County Council



Project

A595 Grizebeck Improvement Preliminary Design

Drawing

Landscape Study Area Plan (National)

Scale @ A3	Drawn	Checked	Approved
1:15,000	SH	RP	IG

Project No	Date
CS098850	20/11/2019

Drawing Identifier	Revision
Project - Originator - Zone - Level - FileType - Role - Number	
GRIZ-CAP-EGN-00-DR-Z-0003	P01.1

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Plot date: 20/11/2019



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