A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010041

6.10 Scoping Report Part A

Planning Act 2008

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

Regulations 5(2)

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The A1 in Northumberland: Morpeth to Ellingham

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SCOPING REPORT PART A

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A1 Northumberland
Morpeth to Felton

Environmental Impact Assessment
Scoping Report

January 2018

Infrastructure Planning

Planning Act 2008

A1 Northumberland Morpeth to Felton Development Consent Order 2018

Environmental Impact Assessment
Scoping Report

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APPENDICES

1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

1.1.1. This Scoping Report has been prepared in accordance with Section 10 of the EIA Regulations.

1.1.2. The purpose of this Scoping Report is to set out the proposed scope of the EIA. This report has been prepared to support a request for a Scoping Opinion from the Planning Inspectorate (PINS). This process will provide feedback on any additional information to be provided in the Environmental Statement (ES) in support of an application for a Development Consent Order (DCO) to be submitted to PINS in due course.

1.1.3. The main objectives of this Scoping Report are to:

- Provide a description of the Scheme and to inform the key stakeholders;
- Identify the topics and issues that are proposed to be the focus of the environmental assessment (i.e. those that are 'scoped in');
- Eliminate those topics and issues not requiring further consideration and which would therefore not be taken further in environmental assessment (if appropriate) (i.e. those that are 'scoped out');
- Determine the level of assessment needed for each topic area whether Simple or Detailed;
- Define the technical, spatial and temporal scope of the study for each of the topics and issues to be considered;
- Define the approach to, and methodologies for, conducting baseline studies;
- Define the approach to, and methodologies for, predicting environmental impacts and for evaluating the significance of environmental effects;
- Provide details of the consultation strategy to be applied to the environmental assessment process; and
- Provide the mechanism through which comments from key stakeholders can be sought.

1.1.4. The information provided in this Scoping Report is based on best available information at the time of writing.

1.2 OVERVIEW OF THE PROJECT

1.2.1. Highways England (HE) has identified the need to improve the existing A1 in Northumberland between Morpeth and Felton, hereafter referred to as "the Scheme".

1.2.2. The Scheme is located in Northumberland, extending for 12.6 km between Warreners House Interchange at Morpeth to the dual carriageway at Felton, and comprises the continuous, high-quality dualling of the existing single carriageways. Refer to **Figure 1.1: Location Plan** in **Appendix B.**

1.2.3. The Scheme includes approximately 6.6 km online widening and approximately 6 km of new offline highway. The existing carriageway would be widened on its current line up to Priest's Bridge, from where the proposed offline section of the Scheme would move west of the current road and pass west of Tindale Hill and Causey Park Bridge. Just north of Burgham Park, it would re-join the line of the existing carriageway and widening would continue along the existing road northwards, until it meets the existing dual carriageway north of Felton.

1.2.4. A new bridge over the River Coquet is proposed in parallel to the existing bridge. Three grade separated junctions are proposed, at Highlaws, Fenrother and West Moor. Two accesses would be closed, at Bywell shooting grounds and Low Espley, with new accesses / new local roads provided to the new junctions. Some minor roads would be diverted to join the new dual carriageway at the new junctions.

1.2.5. A new parallel road will link the existing A1 with Westmoor junction. This will provide local traffic with an unbroken link between the Fenrother and Westmoor junctions. The current A1 will be de-trunked and retained as a local road between Priests Bridge and Felmoor Park to allow access to the villages and properties along the route.

1.2.6. The Scheme would comprise temporary site compounds and balancing ponds. The diversion of an existing National Grid high-pressure gas mains, and potentially a section of Northern Gas Networks pipeline and a Northern Powergrid overhead electricity line, would also be undertaken as part of the Scheme.

1.2.7. The Scheme is defined as a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(h) and Section 22 of the Planning Act 2008 (PA2008) (as amended by the Highway and Railway (Nationally Significant Infrastructure Project) Order 2013), due to the requirement for Orders for land and an Environmental Statement (ES), and as:

- It comprises the construction of a highway;
- The highway to be constructed is wholly in England;
- The Secretary of State is the highway authority for the highway; and
- The speed limit is 50mph or greater and the area for construction of the highway is greater than 12.5 hectares.

1.2.8. Therefore in accordance with the legislation a Development Consent Order (DCO) is required to allow the construction and operation of the Scheme. The Scheme Footprint includes all temporary and permanent land required to deliver the Scheme. The Scheme Footprint is defined by the red line shown on **Figure 1.2 Environmental Constraints Plan**, which can be found in **Appendix B**. The red line is hereafter referred to as the Scheme Footprint.

THE SCHEME FOOTPRINT

1.2.9. The Scheme Footprint includes all temporary and permanent land required to deliver the Scheme. The Scheme Footprint is defined by the red line shown on **Figure 1.2 Environmental Constraints Plan**, which can be found in **Appendix B**. The red line is hereafter referred to as the Scheme Footprint.

1.2.10. The Scheme Footprint currently allows for some flexibility as the design progresses and the optimum alignment is considered. It currently includes:

- Options for temporary construction site compounds;
- Options for balancing ponds; and
- Allowance for variation in the alignment of a section of the proposed offline bypass.

1.2.11. The Scheme Footprint (refer to **Figure 1.1 Location Plan** in **Appendix B**) was updated, from that which is currently considered in this Scoping Report, in December 2017. In order to meet timescales for submission of the Scoping Report to the Planning Inspectorate, the Scoping Report was not updated. However, it was confirmed by all specialists that the scope of assessment would not change as a result of this update. The key amendments comprise refining due to workstream designs being progressed (e.g. drainage solutions),

inclusion of land parcels that have the potential to be severed or where design is not certain at this stage, and potential options for temporary construction compound locations.

1.3 LEGISLATIVE AND POLICY FRAMEWORK

1.3.1. The determination of whether a project requires EIA under the EIA Directive 2014/52/EU and the subsequent notification requirements in accordance with the Infrastructure Planning (EIA) Regulations 2017 is known as 'Screening'.

1.3.2. An EIA Screening exercise (**Ref 1.1**) was completed for the Scheme at the Preliminary Design stage. It was identified that Environmental Impact Assessment is mandatory for the Scheme, and an Environmental Statement (ES) will be prepared, on the basis that it exceeds the relevant thresholds within Annex I of Directive 2011/92/EU as amended by Directive 2014/52/EU. Specifically, EIA is required for "all projects listed in Annex I" as these are considered as having significant effects on the environment and require an EIA (e.g. motorways and express roads)".

1.3.3. The Infrastructure Planning (EIA) Regulations 2017 (hereinafter referred to as the EIA Regulations), Descriptions of development for the purposes of the definition of "Schedule 1 development" Regulation 2(1), Paragraph 7 states:

> *(c) Construction of a new road of four or more lanes, or realignment and/or widening of an existing road of two lanes or less so as to provide four or more lanes, where such new road, or realigned and/or widened section of road would be 10 kilometres or more in a continuous length."*

1.3.4. Further information on relevant policies are presented within each topic specific section within this Scoping Report.

1.4 PROJECT ROLES

THE DESIGNER

1.4.1. WSP has been commissioned by Highways England under their Collaborative Delivery Framework (CDF) to undertake the preliminary design of the Preferred Option, which includes undertaking the EIA for the Scheme.

THE DEVELOPER

1.4.2. Highways England, a Government owned company is the Developer of the Scheme.

1.5 REPORT STRUCTURE

1.5.1. This Scoping Report is structured as follows:

- Section 2 provides an overview of the Scheme;
- Section 3 details information on the need for the Scheme, a description of the Scheme and the Scheme objectives;
- Section 4 details the assessment of alternatives;
- Section 5 details any previous and proposed consultation;
- Section 6 details the approach to the environmental assessment;
- Sections 7-16 details the proposed scope of the individual environmental assessments;
- Section 17 details the proposed scope of the cumulative effects assessment;
- Section 18 provides a summary of the findings; and
- Section 19 sets out the next steps.

2 OVERVIEW OF THE PROJECT

2.1 CONTEXT TO THE SCHEME

2.1.1. A Feasibility Study was undertaken in 2014 to consider engineering, environmental constraints and economic aspects of options for improvement along the entire A1 route between its junction with the A19 at Seaton Burn and the Scottish border. The proposed improvement works were announced in the Roads Investment Strategy (RIS) in December 2014. Following this, an Options Identification Study, early public engagement in May 2016, and a Preliminary Economic Assessment were progressed in order to refine the options.

2.1.2. In September 2016, the Options Selection stage commenced to further consider the options. A public consultation on the options was held in November 2016. Three options for the Scheme (referred to during consultation as “Section A”) were taken through from Option Identification to Option Selection. Refer to Section 3 for further details.

2.1.3. Following the Options Selection stage, (which is expanded on in Section 4: Assessment of Alternatives) the Green (offline) option for the Scheme has been taken forward as the Preferred Option for progression into the Preliminary Design stage. The Preferred Route Announcement was issued in September 2017 by Highways England. Details can be found at the following location https://www.gov.uk/government/news/multi-million-upgrade-for-a1-in-northumberland

2.1.4. This Scoping Report falls within the Preliminary Design stage.

3 THE SCHEME

3.1 NEED FOR THE SCHEME

3.1.1. The A1 is one of the longest roads in the country, connecting London to Newcastle and Edinburgh. The route currently consists of motorway standard and dual carriageway standard, with some single carriageway sections running between Morpeth and Ellingham and north of Ellingham to Berwick.

3.1.2. In Northumberland the A1 runs through an extensive rural landscape, close to the coastline. This section of the A1 is used by a wide variety of road users for many different reasons. These include business users travelling long distance between Newcastle and Edinburgh, local traffic accessing rural areas where there is no public transport, and tourists who come to visit the many historic attractions and coastline.

3.1.3. Over the last decade there have been significant upgrades to the A1 south of Newcastle, with many sections upgraded to motorway standard, and there are further plans to improve the section of the A1 around Newcastle itself.

3.1.4. There have been long standing calls to Government from key stakeholders and businesses to progress plans to dual the A1 in Northumberland. The 2014 Feasibility Study (**Ref 3.1**) considered the problems experienced by users of the A1 in Northumberland. The following problems were identified:

- Drivers face a lack of alternative routes for their journeys;
- Varying carriageway standards on the route. This can lead to confusion for long distance drivers;
- Poor junction standards and layout – there are many different types of junctions along the route which can be confusing for those who are not familiar with the route;
- A large number of junctions and private accesses, resulting in delays and potential accidents when vehicles exit or enter the main carriageway;
- Average traffic speeds on the single carriageway sections of the route are significantly lower than sections that have been upgraded to dual carriageway;
- A high proportion of heavy goods and agricultural vehicles north of Alnwick resulting in reduced speeds for following vehicles; and
- Lack of overtaking opportunities on single carriageway sections of the route which slows down traffic; and peak-hour traffic speeds are significantly slower than when traffic is free flowing.

3.1.5. The Scheme is designed to address these issues and improve the safety and speed of journeys along the route.

3.1.6. In February 2014, a Feasibility Study was undertaken to consider the full route of the A1 in Northumberland between its junction with the A19 at Seaton Burn and the Scottish border. The study included engineering and economic aspects and the identification of environmental constraints. It was determined that this Scheme should be taken forward into the Roads Investment Strategy (RIS) for delivery in the current roads period.

3.2 SCHEME OBJECTIVES

3.2.1. The Scheme's objectives are to:

1. Improve journey times on this route of strategic national importance;

2. Improve network resilience and journey time reliability;
3. Improve safety;
4. Maintain access for local traffic whilst improving the conditions for strategic traffic;
5. Facilitate future economic growth;
6. Avoid, mitigate and compensate for potential impacts upon the built and natural environment;
7. To seek to support the aim of no net loss of biodiversity;
8. To ensure effective measures are in place to protect watercourses from pollutant spillage on the highway; and
9. To investigate and encourage the use of environmentally friendly operations and products throughout the project life cycle.

3.2.2. In addition, decisions made on the Scheme will be made in the context of the Performance Specification set out for Highways England in the Roads and Investment Strategy (RIS) which identifies Key Performance Indicators, targets and requirements relating to the environment and to cyclists, walkers and other vulnerable users of the network (e.g. horse riders).

3.3 SCHEME LOCATION

3.3.1. The Scheme is located within the County of Northumberland and forms part of Highways England's strategic road network. The Scheme is located between Warreners House Interchange at Morpeth and the dual carriageway at Felton and is approximately 12.6 km in length (refer to **Figure 1.1** in **Appendix B**).

3.3.2. The area within a 1km buffer of the Scheme, as shown on **Figure 1.2 Environmental Constraints Plan** within **Appendix B,** is characterised by predominantly rural land uses, with the existing A1 running adjacent to arable and pasture fields (Grade 3 agricultural land) and near woodlands. The soils associated with the Scheme and surrounding agricultural land are primarily described as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. The southern extent of the Scheme is located within designated Green Belt (refer to **Figure 9.2: Green Belt** in **Appendix B**).

3.3.3. The towns of Morpeth and Felton constitute the main urban areas near to the Scheme with smaller hamlets or villages, such as Hebron, Fenrother and Espley near to the A1 and interspersed throughout its length. Isolated residential and commercial properties lie within close proximity to the Scheme, the Tritlington Church of England First School is located adjacent to the Scheme. A network of Public Rights of Way (PRoW) surrounds and, at some locations, crosses the existing A1. Two Noise Important Areas lie adjacent to the Scheme.

3.3.4. The Scheme crosses, or is near to, 31 watercourses with the River Coquet and Longdike Burn (located north of Causey Park Bridge) designated as Main Rivers. Review of the Environment Agency Flood Map for Planning (Rivers and Sea) indicates that the majority of the Scheme alignment is located in the low-risk Flood Zone 1. However, the Scheme does include sections located in the medium risk Flood Zone 2 and the high-risk Flood Zone 3.

3.3.5. The River Coquet, located to the north of the Scheme, is designated as an Area of High Landscape Value (AHLV) and as the River Coquet and Coquet Valley Woodlands Site of

Special Scientific Interest (SSSI), the Coquet River Felton Park Local Wildlife Site (LWS) and the Dukes Bank Ancient Woodland. The Scheme and surrounding area also contains a variety of biodiversity resources, including multiple priority or notable habitats and records of, or potential for, numerous protected or notable species.

3.3.6. There are a number of listed buildings within close proximity to the Scheme, 7 of which lie on or adjacent to the carriageway (medium value as all are Grade II).

3.3.7. Proposed other developments within and near to the Scheme, that have been granted planning permission, include housing developments near to Northgate Hospital in Morpeth and also to the west of Burgham Park in Felton.

3.4 SCHEME DESCRIPTION

3.4.1. The Scheme includes approximately 6.6 km online widening and approximately 6 km of new offline highway to provide more lanes and increase capacity. The national speed limit will apply along the Scheme and the de-trunked A1.

3.4.2. The works are planned to start in March 2020. The Scheme would open to traffic in 2023.

3.4.3. A detailed description of the Scheme is provided in the following paragraphs.

BETWEEN WARRENER'S HOUSE AND PRIEST'S BRIDGE

3.4.4. Dualling of the existing single carriageway section of the A1 would begin at the termination of the existing A1 dual carriageway, where it meets the A697 near Northgate Hospital, Morpeth. Between the A679 junction and Priest's Bridge, the existing A1 would be used as the southbound carriageway and a new northbound carriageway would be constructed to the west. Access to residential properties from the A1 around Warrener's House would be removed / stopped, and new access arrangements would be provided to the east and south.

3.4.5. At Highlaws Junction, the existing at-grade staggered junction would be replaced by a new grade-separated junction with a new bridge over the A1. Accommodation works would be provided for properties on the east side of the A1 that would lose direct access onto the A1.

BETWEEN PRIEST'S BRIDGE AND BURGHAM PARK

3.4.6. At Priest's Bridge, approximately 5.7 km of new dual carriageway would diverge from the existing line of the A1 towards the west, bypassing to the west of Earsdon Moor, passing east of Fenrother and Causey Park and tying-back into the line of the existing A1 adjacent to Burgham Park on the west and Felmoor Park on the east.

3.4.7. A new grade-separated junction with a bridge over the A1 would be constructed where the new road crosses the side road between the existing A1 and Fenrother. Connectivity from Causey Park across the new dual carriageway would be maintained by providing a new overbridge on the line of the existing side road to Causey Park. An underbridge would be constructed to enable the road from Longhorsley to the existing A1 to pass under the new road.

BETWEEN BURGHAM PARK AND PARKWOOD

3.4.8. Between the point of tying back in to the existing line of the A1 to the location of the existing Bywell Lane, the A1 would be widened to dual carriageway. From Bywell Lane northwards to the end of the Scheme, the existing A1 (including the existing bridge over the River Coquet) would form the new northbound carriageway and a new southbound carriageway

would be built on the east side. This would require construction of a new bridge over the River Coquet, adjacent, and in parallel, to the existing bridge.

3.4.9. A new grade-separated junction with a bridge over the new A1 would be constructed at West Moor, to replace the existing at-grade junction.

BYPASSED SECTION OF EXISTING A1 / NEW LOCAL ACCESS ROAD

3.4.10. Between Priest's Bridge and Felmoor Park, the existing line of the A1 would be bypassed by the new dual carriageway. The existing road in this area would cease to be a trunk road and would be handed over to Northumberland County Council (NCC) for future maintenance. This section of road would be used as a local access road for communities, properties and businesses in this area. This would be extended northwards between Felmoor Park and the new West Moor grade separated junction, by construction of a new section of local access road, parallel to the new A1. Access to the strategic road network for those residents in the middle of the section would therefore be via the local access road and West Moor Junction if travelling to or from the north, and the local access road and Fenrother Junction if travelling to or from the south.

NATIONAL GRID DIVERSION

3.4.11. The Scheme requires the diversion of the National Grid Feeder 13 gas pipeline, which is a high-pressure gas main. In order to accommodate this, a section of Northern Gas Networks pipeline and a Northern Powergrid overhead electricity line may also require diverting ahead of the National Grid diversion. If diversions are required these works would be part of the enabling works associated with the Scheme and therefore will be considered through the EIA, as part of the Scheme design.

3.4.12. Ground moving activities likely to be required as part of the works include the excavation of a gas pipe trench and the establishment of temporary compound areas, access roads and other work areas.

CULVERTS

3.4.13. There are a total of eight culverts along the Scheme. These comprise three new culverts (Priest Bridge, Burgham and Causey Park) and five existing culverts (Bockenfield, Glenshotton, Shieldhill, Parkwood culverts and Parkwood subway).

TRAFFIC COMMUNICATION

3.4.14. The Scheme would use existing traffic communication technology (such as Variable Messaging Signs (VMS), CCTV cameras, Motorway Incident Detection Automatic Signalling, etc.). Where the existing technology does not meet current standards, it would be replaced to current standards to ensure operational expectations are met.

LIGHTING

3.4.15. A TA49/07 (Appraisal Of New And Replacement Lighting On The Strategic Motorway And All Purpose Trunk Road Network) is currently being undertaken, which considers the requirement for lighting on both economic and safety grounds.

3.4.16. At this stage it is considered that road lighting would not be required due to the economic and safety case not being sufficient.

DRAINAGE

3.4.17. In the absence of detailed drainage design, indicative drainage proposals have been considered in accordance with guidance contained within the Design Manual for Roads and Bridges (DMRB) HD 33/16 – Section 2 (**Ref 3.2**).

3.4.18. The existing drainage system along the A1 would not be used, other than potentially the outfalls. The Scheme would be divided into drainage catchments, primarily on a topographic basis (i.e. draining from high points to low points). The drainage system for each catchment would feed an outfall into a watercourse. At this stage, the total number of catchments and therefore outfalls is not finalised, although potential locations have been considered. At each outfall location, a balancing pond or ponds would be provided to ensure that the rate of flow will be attenuated to greenfield rates. The capacity of each pond would be calculated to include an appropriate allowance for climate change.

3.4.19. Preliminary results from the Ground Investigation have indicated the presence of high water tables along the full length of the Scheme. This information, although in provisional form at present, suggests that ponds may not be feasible at a number of locations. As an alternative strategy at these locations, storage within swales, underground pipework, and/or below ground modular storage, will be considered. Where the water table is close to finished road level, these alternative systems would be at relatively shallow depths. It is possible that, in some cases, storage within sealed upsized pipework maybe the necessary storage solution.

3.4.20. Due to the topography of the River Coquet crossing, a balancing pond in this location may not be a feasible option. This is because the road falls towards the river within a lengthy cutting, so that the surrounding ground, and local water-table, levels are above the road level, while the river itself is in a gorge approximately 30 m below carriageway level. Alternative attenuation methods will be considered, including widening the verge on the east side to allow inclusion of swales. Run-off through the embankments from the high water table in this area would be intercepted and diverted to local run-off.

3.4.21. Treatment of water quality would primarily be provided through sedimentation in the balancing ponds, swales, vegetated channels, or alternative attenuation features. If necessary, the ponds and/or swales could be increased in size and reed beds incorporated to achieve sufficient sediment removal. Such features are most likely to be required where large catchments are required to discharge into small watercourses, so that there is little dilution. The use of oil traps and hydrodynamic vortex separators may also need to be considered.

PEDESTRIANS, CYCLISTS AND EQUESTRIANS (NON-MOTORISED USERS)

3.4.22. The proposed new section of dual carriageway would result in the severance of a number of local public footpaths and the removal of a footway that currently runs alongside one side of the existing A1 for parts of its length. Unused severed PROW's will be stopped up. However, all other paths would be diverted to, and across, the new grade-separated junctions.

3.4.23. As it is currently difficult and dangerous to cross the A1 due to the volume and speed of traffic, the existing road forms a barrier between Non-Motorised Users (NMUs) to the east and west. The proposed new grade separated junctions will be designed to facilitate ease and safety of movement across the Scheme. In addition, the retention and use of the

existing A1 as a local access road would make north-south movements for NMUs easier and safer than the current situation, due to the significant reduction in traffic.

TEMPORARY COMPOUNDS

3.4.24. The Scheme would include temporary site compounds. A number of options for temporary compounds are being considered, as illustrated on **Figure 1.1 Location Plan** in **Appendix B**.

4 ASSESSMENT OF ALTERNATIVES

4.1 ALTERNATIVES ASSESSMENT METHODOLOGY

4.1.1. The development of options followed Highways England's Project Control Framework (PCF) methodology steps as follows:

- PCF Stage 0 - Strategy, Shaping & Prioritisation
- PCF Stage 1 - Option Identification
- PCF Stage 2 - Option Selection
- PCF Stage 3 – Preliminary Design (the current Stage)

4.1.2. Each stage was subject to a Stage Gate review (SGAR) prior to commencing to the next stage. This culminated in the preferred route announcement. The sections below set out the process and findings at each stage leading to this point.

PCF STAGE 0 - STRATEGY, SHAPING & PRIORITISATION

4.1.3. In February 2014, a Feasibility Study (**Ref 3.1**) was undertaken to consider the full route of the A1 in Northumberland between its junction with the A19 at Seaton Burn and the Scottish border. The study included engineering and economic aspects and the identification of environmental constraints. The feasibility of conceptual options was appraised using sifting tools.

4.1.4. This Study led to the definition of a scope of work for improvement to the A1 in Northumberland as announced in the Roads Investment Strategy (RIS) in December 2014, which was progressed to the Options Identification Stage.

PCF STAGE 1 – OPTION IDENTIFICATION

4.1.5. The scope of work for the improvement to the A1 in Northumberland was refined at this stage. Three route options were identified, taking into account the environmental constraints previously identified in the feasibility study.

4.1.6. Early-stage designs were developed and potential locations for overtaking sections and junction improvements were identified and assessed.

4.1.7. An early public engagement exercise was undertaken in May 2016 to obtain feedback which would aid the development and consideration of the three route options. This led to significant changes to the proposals at certain locations.

4.1.8. A Preliminary Economic Assessment was also progressed at this stage, in order to refine the options.

PCF STAGE 2 – OPTION SELECTION

4.1.9. In September 2016, the Option Selection stage commenced to further consider the options.

4.1.10. Three options were taken through from Option Identification to Option Selection:

- Orange (online) Option: widening of the existing A1, four new grade separated junctions at Highlaws, Fenrother, Earsdon and West Moor, and construction of a new bridge over the River Coquet parallel to the existing bridge;
- Blue (hybrid) Option: widening the existing A1 as with the Orange Option, except for two bypass sections of entirely new dual carriageway, one section to the east of the existing A1 near Causey Park Bridge and one to the west of the existing A1 between Helm and Felmoor Park. Four new grade separated junctions, at Highlaws, Fenrother Earsdon

and West Moor; and construction of a new bridge over the River Coquet parallel to the existing bridge; and

- Green (offline) Option: significant deviation from the existing A1 in the middle of the section. As with the Orange Option, the A1 would be widened on its existing line up to Priest's Bridge. From here, the new A1 would move west of the current road and pass west of Tindale Hill and Causey Park Bridge. Just north of Burgham Park, it would re-join the line of the existing A1 and widening would continue along the existing road northwards, as on the Orange Option, until it meets the existing dual carriageway north of Felton. Three grade separated junctions proposed, at Highlaws, Fenrother and West Moor. Includes construction of a new bridge over the River Coquet parallel to the existing bridge.

4.1.11. The Option Selection stage Environmental Assessment Report (EAR) (**Ref 4.1**) presents the options assessment. The assessments undertaken for the options were referenced against the Scheme Objectives to determine whether, relevant to each technical component, the Scheme would achieve them or not. For some environmental topics, particularly ecology, landscape and heritage, the Green Option was identified as being the most adverse option, although this difference may be relatively small. For others, such as noise impacts on residents, the Green Option is likely to be the best option. In particular, it offers potential benefits, such as reduced visual impact and less impact on Coronation Avenue than either of the other options.

CONSULTATION

4.1.12. A public consultation on the options was held in November 2016, where the above options were presented to the public and other stakeholders for comment. Consultation events were held in Morpeth, Alnwick, Belford and Berwick-upon-Tweed, at which Scheme and environmental information was presented and expert staff were on hand to answer questions. Information was also available in written and online form and numerous questions have been addressed in writing subsequent to the events.

4.1.13. The consultation identified strong support for the upgrading of the A1 to dual carriageway. Overall for the Morpeth to Felton section, the Green Option attracted the strongest support from the public as the preferred route. In addition consultation with the landowners identified that the Green Option was preferred to maintain access to the A1 during construction and to facilitate the east west flow of local traffic. Refer to **Section 5.1** for further details. In addition the 2017 Consultation Report (**Ref 4.2**) has been referenced to inform this Scoping Report.

PREFERRED OPTION SELECTION (PCF STAGE 3)

4.1.14. Following the Option Selection stage, the Preferred Option has been taken forward as the Green (offline) option for the Scheme for progression into the Preliminary Design stage. The key reasons for this are:

- Buildability - It is considered that the Green route will offer the greatest benefits with regards to buildability, in terms of efficiency and worker safety;
- Safety - In addition to safety during construction, it is considered that the green route offers a greater level of safety to the road user due to the geometric standards and during maintenance as a result of the retention of the A1 as an alternative route;
- High quality dual carriageway - the route has the greatest compliance with geometric standards and offers a high quality alignment;

- Network resilience - the retention of the A1 in the Green Option offers an alternative route should closures be required;
- Non-Motorised Users (NMUs) - In the Green Option the existing A1 is retained to provide a north south route for local traffic; and
- The Green route effects fewer landowners, although more agricultural land is affected by this option.

4.1.15. The Preferred Route Announcement was issued in September 2017 by Highways England. Details can be found at the following location https://www.gov.uk/government/news/multi-million-upgrade-for-a1-in-northumberland.

4.1.16. This Scoping Report considers the preferred route only.

4.2 ALTERNATIVE DESIGN CONSIDERATIONS

4.2.1. As part of the EIA, alternative design options will be considered and the findings reported in the Environmental Statement. This assessment will be undertaken in accordance with DMRB Volume 11 Section 2, Part 5 Assessment and Management of Environmental Effects. The assessment of alternatives would include consideration of technology, design, size, scale, demand, delivery, scheduling and mitigation, as appropriate. Options for these elements would be appraised in order to determine potential significant environmental effects, and ultimately inform the Scheme (e.g. in relation to the River Coquet bridge structure). Alternative design considerations will be reported in the ES.

5 CONSULTATION

5.1 PREVIOUS CONSULTATION

5.1.1. An early public engagement exercise was undertaken in May 2016 in association with the Options Identification stage, to obtain feedback which would aid the development and consideration of the three route options. This led to significant changes to the proposals at certain locations.

5.1.2. Public consultation was then undertaken between November and December 2016 in relation to the Option Selection stage. Highways England presented three options for the section of dualling from Morpeth to Felton. The options were presented to the public and other stakeholders for comment. Six consultation events were held in Morpeth, Alnwick, Belford and Berwick-upon-Tweed, at which Scheme and environmental information was presented and expert staff were on hand to answer questions. Information about the proposed options and the feedback form was also available on the Highways England website (www.highways.gov.uk/A1inNorthumberland), and was sent to stakeholders and residents close to the Scheme. The consultation was advertised in the local press.

5.1.3. Following consultation, 220 responses were received from across the Scheme area and beyond. Responses were received from a broad range of residents, with most respondents being frequent users of the A1 in Northumberland. Nearly all respondents were car drivers and live in the local area.

5.1.4. On the Morpeth to Felton section, 41% said that the Green option was their preferred option, 29% preferred the Blue option and 12% preferred the Orange option. The main reasons given for preferring each option were:

- Green option – it would have less impact/disruption during construction and leave the current A1 as a local road maintaining the existing access and links between communities;
- Blue option – it has the least impact on wildlife/environment/land take; and
- Orange option – it does not take/takes less agricultural land.

5.2 PROPOSED CONSULTATION

PUBLIC CONSULTATION

5.2.1. As required by Section 47 of the Planning Act 2008 (as amended) Highways England will prepare a Statement of Community Consultation (SoCC) for publication in early 2018. The SoCC will outline how Highways England intends to formally consult with the local community about the Scheme. Highways England will first consult the relevant local authorities on the draft SoCC.

5.2.2. Preliminary Environmental Information (PEI), which will take account of the PINS Scoping Opinion received, will be provided for statutory consultation which is proposed to take place between April and May 2018.

5.2.3. Responses received during consultation will be carefully considered and taken into account in the development of the Scheme, in accordance with Section 49 of the Planning Act 2008, and this will be detailed in the Consultation Report submitted with the DCO application. The Consultation Report will demonstrate how Highways England has complied with the consultation requirements of the Planning Act 2008.

ENVIRONMENTAL CONSULTATION

5.2.4. Highways England has notified PINS that the Scheme is EIA development under Regulation 8(1)(b) of the EIA Regulations, and that it proposes to submit an Environmental Statement as part of the DCO application. Following receipt of this notification PINS will have notified the consultation bodies that Highways England intends to provide an ES for the Scheme. PINS will also have notified the consultation bodies of their duties under regulation 9(3) of the EIA Regulations. PINS has provided Highways England with a list of the notified consultation bodies and any regulation 9(1)(c) persons (other interested parties), and any non-prescribed consultation bodies, if appropriate.

5.2.5. Highways England will use this list to inform who they will consult during their pre-application consultation under s42 of the Planning Act. Information and views obtained from this consultation will inform the EIA.

5.2.6. The following consultees have been contacted prior to the submission of this Scoping Report, and any initial comments have been addressed, where received and appropriate, in this report:

- Natural England in relation to the proposed Ground Investigation (GI) works at the River Coquet, and the need for an 'Assent' approval to work within the SSSI, and also in relation to the options for the proposed bridge structure;
- Environment Agency in relation to the proposed GI at the River Coquet, and the potential requirement for a permit, and the construction of the proposed bridge within the floodplain. Also in relation to the Road Drainage and Water Environment assessment;
- Lead Local Flood Authority (LLFA) in relation to the Road Drainage and Water Environment assessment;
- NCC County Archaeologist in relation to the geophysical survey location and method. Also in relation to the Cultural Heritage Assessment;
- NCC County Ecologist in relation to the Biodiversity Assessment;
- NCC Environmental Health Officer (EHO) in relation to the Air Quality Assessment, the Noise and Vibration Assessment and the Geology and Soils Assessment;
- NCC Waste team in relation to the Materials Assessment;
- NCC in relation to the Landscape and Visual Assessment;
- NCC in relation to the People and Communities Assessment; and
- Natural England in relation to geologically designates sites.

5.2.7. During the EIA, it is proposed that the following consultees will be consulted. This list may be subject to change and would be further informed by the list of the notified consultation bodies identified by PINS:

- County Archaeologist;
- British Horse Society;
- Northumberland Wildlife Trust;
- Environment Agency;
- Northumberland County Council:
  - Environmental Health Officer (EHO)
  - LLFA officer
- Public Rights of Way (PRoW) officer
- Historic England;
- Natural England;

- The Forestry Commission;
- The Ramblers; and
- Sustrans.

5.2.8. The Environmental Statement (ES) will be submitted as part of the DCO application at which point there will also be a further opportunity for comment.

6 APPROACH TO THE ENVIRONMENTAL ASSESSMENT

6.1 SURVEYS AND PREDICTIVE TECHNIQUES AND METHODS

6.1.1. Each individual topic specific section presents details of data collection and survey work that has been undertaken to inform this Scoping Report. Furthermore, each section sets out the further work proposed to be undertaken to inform the ES.

6.2 GENERAL ASSESSMENT ASSUMPTIONS AND LIMITATIONS

6.2.1. Topic specific limitations and assumptions are set out in the relevant sections of this Scoping Report. The following key limitations apply to a number of topic areas:

- This scoping report is based on currently available information (including the lack of complete ecological surveys), and can be subject to change as the design progresses;
- Valid traffic data are currently not available; and
- The red line boundary used for the purposes of this Scoping Report has since been update (refer to Section 1.2 for further details).

6.2.2. The following assessment years are assumed for the purposes of this Scoping Report:

- Baseline Year (2015)
- Opening Year (2023)
- Future Year (2038)

6.3 APPROACH TO THE ASSESSMENT AND SIGNIFICANCE CRITERIA

6.3.1. The DMRB, including any Interim Advice Notes, will be used as the main source of guidance, with relevant discipline specific guidance used as appropriate. In particular the guidance contained in DMRB Volume 11 Environmental Assessment will be used. DMRB Volume 10 which contains guidance on Environmental Design and Management will also be used to inform topic areas as appropriate.

6.3.2. The approach to assessment has been based on the guidance in DMRB Volume 11 Section 2 Part 5 (HA205/08) (**Ref 6.1**) Assessment and Management of Environmental Effects.

6.3.3. DMRB Volume 11, Interim Advice Note 125/15 Environmental Assessment Update (**Ref 6.2**) advises on the environmental topics to be included in the environmental assessment and the method to be used for each assessment. In accordance with Interim Advice Note (IAN) 125/15, this Scoping Report provides information on the topic areas that will be covered in the environmental assessment for the Scheme as follows:

- Air Quality;
- Noise and Vibration;
- Landscape and Visual;
- Cultural Heritage;
- Biodiversity;
- Road Drainage and the Water Environment;
- Geology and Soils;
- People and Communities;
- Materials; and
- Climate (included as a topic to adhere to the EIA Regulations).

6.3.4. In accordance with the DMRB the assessment will cover the likely significant effects arising from the permanent and temporary, direct, indirect, secondary, cumulative, short, medium and long-term, positive and negative impacts of the Scheme.

6.3.5. The significance of an effect score is determined by looking at what the changes would be against the existing, or predicted, baseline as a result of both the construction and operation of the Scheme, and combining the value (or sensitivity) of a receptor with the magnitude (degree of change) of the predicted effect upon that receptor. The greater the environmental sensitivity or value of the receptor or resource, and the greater the magnitude of impact, the more significant the effect. Volume 11 Section 2, Part 5 of the DMRB (specifically Tables 2.1, 2.2, 2.3 and 2.4) provides advice on typical descriptors of environmental value, magnitude of change and significance of effects.

6.3.6. It is normal practice to state that impacts of moderate or above significance are regarded as significant impacts.

6.3.7. The approach to the assessment of each of these topics is detailed in the relevant sections of this Scoping Report.

HEAT AND RADIATION

6.3.8. Schedule 4 Part 5 of the EIA Regulations details the requirement for a description of the likely significant effects on the environment resulting from, amongst others, the emission of heat and radiation.

6.3.9. The Scheme is a major highways improvement project as described in Section 1. Due to the scale and nature of the Scheme, it is not anticipated that there will be any significant sources of heat or radiation either during construction or operation of the road. The consideration of heat and radiation emissions has therefore been scoped out of the assessment and has not been considered further in this Scoping Report.

HEALTH

6.3.10. Schedule 4 Part 5 of the EIA Regulations details the requirement for a description of the likely significant effects on the environment resulting from, amongst others, the risks to human health.

6.3.11. There is no consolidated methodology or practice for the assessment of health in EIA. However the scope of the assessment is considered to be covered by existing Highways England Guidance as set out below. This recognises the specific requirements of the National Policy Statement for National Networks (NPS NN) for consideration of health, specifically within paragraphs 4.79-4.82 (**Ref 6.3**). This will address health by utilising the guidance associated with the following topic assessments:

- Air Quality (HA 207/07, IAN 185/15, IAN 175/13, IAN 174/13, IAN 170/12) as reported in Section 7);
- Noise and Vibration (HD 213/11, IAN 185/15) as reported in Section 8;
- Road Drainage and The Water Environment (HD 45/09) as reported in Section 12; and
- People and Communities (DMRB Volume 11 Section 3 Part 8) as set out in Section 14.

6.3.12. In addition to the guidance detailed above, emerging best practice, professional judgement and experience, and established research will inform the methodology for health.

6.3.13. The identification of environmental impacts through these topic assessments, alongside the determination of effects of likely significance, the implication of any associated mitigation or

enhancement measures, and identification of residual impacts will closely correlate to the significance of any associated human health effects.

6.3.14. In addition, where human health effects are identified in these topic assessments, whether significant or not, these effects will be incorporated into the cumulative effects assessment of human health. All sources of information used to inform the assessment of human health will be presented in tabular form in the ES.

MAJOR ACCIDENTS AND HAZARDS

6.3.15. Schedule 4 Part 5 of the EIA Regulations details the requirement for a description of the likely significant effects on the environment resulting from, amongst others, the risks to human health, cultural heritage or the environment (for example due to disasters).

6.3.16. The assessment of major accidents and disasters, hereafter referred to as "major events", as required by the EIA Regulations should cover:

- Vulnerability of the project to risks of major accidents and or/disasters; and
- Any consequential changes in the predicted effects of that project on environmental topics.

Definitions

6.3.17. In the absence of a current industry definition of major events in the context of EIA, the following definitions have been used to inform the identification of potential major events related to the Scheme.

6.3.18. The Control of major accidents and hazards (COMAH) 2015 (**Ref 6.4**) Regulations define major accidents as follows:

"Major accident" means an occurrence such as a major emission, fire, or explosion … leading to serious danger to human health or the environment;

6.3.19. Serious danger to human health means a risk of death, physical injury or harm to health, e.g.: (a) a substantial number requiring medical attention; (b) some people seriously injured, requiring prolonged treatment.

6.3.20. Serious danger to the environment includes accidents with the potential to result in:

- The death or adverse effects on local populations of species or organisms, with lower thresholds for high-value or protected species;
- Contamination of drinking water supplies, ground or groundwater;
- Damage to designated areas, habitats or populations of species within the areas;
- Damage to listed buildings;
- Damage to widespread habitats; and
- Damage to the marine or aquatic environment.

6.3.21. The United Nations Office for Disaster Risk Reduction defines disaster as follows:

"A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources".

6.3.22. As such major accidents and disasters are very closely linked. They can be natural or man-made and may include:

- Severe weather e.g. floods; earthquakes, hurricanes, storms, drought, tsunamis, extremes of temperature – hot and cold;

- Transport accidents e.g. rail accidents, motorway pileups, plane crash;
- Industrial e.g. explosions, pollution, fire;
- Terrorism; and
- Disease outbreaks.

6.3.23. With regards to the Scheme, the following potential major events have been identified:

- Severe weather (storms and floods); and
- Transport accidents (road):

6.3.24. These were identified based on the site location, nature of the Scheme, likelihood of occurrence and surrounding land uses. They were also informed by the Options Selection stage risk register and health and safety risk register.

6.3.25. An assessment of significance will be carried out for the vulnerability of the Scheme to major events identified. A qualitative assessment will be carried out and reported within the relevant individual environment topics as detailed in **Table 6-1** below.

Table 6-1 - Major events and associated environmental assessment topics

Major Event	Potential Environmental Impacts	Environmental Assessment Topic
Storms	Flooding High winds causing damage to environmental receptors and structures	Climate Road Drainage and the Water Environment Flood Risk Assessment Geology and Soils Biodiversity
Floods	Flooding	Road Drainage and the Water Environment Flood Risk Assessment Climate Biodiversity
Transport accidents	Environmental pollution incidents; emissions to air, ground and water	Air Quality Biodiversity Materials Road Drainage and the Water Environment Geology and Soils People and Communities

TRANSBOUNDARY EFFECTS

6.3.26. Schedule 4 Part 5 of the EIA Regulations requires a description of the likely significant transboundary effects to be provided in an ES.

6.3.27. The nearest European Economic Area (EEA) State to the Scheme is Ireland, located approximately 330 km to the west.

6.3.28. It is considered that the Scheme would not generate significant effects upon any other EEA States, as reported in the Screening Matrix (Planning Inspectorate Advice Note 12, December 2015 (**Ref 6.5**)) in **Appendix C**. Transboundary effects are therefore scoped out of the ES.

6.4 DUPLICATION OF ASSESSMENT

6.4.1. In accordance with the EIA Regulations, the ES will contain information of how it has been prepared, particularly with reference to how duplication between individual environmental topic assessments has been avoided. Furthermore, it will contain reference to how duplication between different assessments (including, for example, the ES, Habitat Regulations Assessment (HRA) Screening and the Flood Risk Assessment (FRA)) has been avoided.

6.5 STRUCTURE OF THE ES

6.5.1. The ES for the Scheme is likely to comprise of three Volumes as follows:

- Volume 1: Non-Technical Summary;
- Volume 2: Environmental Statement; and
- Volume 3: Figures and Technical Appendices.

6.5.2. The main Environmental Statement (ES) (Volume 2) will be a concise document that is appropriate and proportionate to the Scheme. Technical or supporting documents will, where appropriate, be contained in Volume 3 so that the main ES provides clear and focussed information.

6.5.3. The anticipated structure of Volume 2 of the ES is as follows (although may be subject to change):

- Introduction;
- The Project;
- Assessment of Alternatives;
- Environmental Assessment Methodology;
- Individual chapters for each environmental topic scoped into the assessment;
- Assessment of Cumulative Effects;
- Summary;
- References and Glossary;
- Figures; and
- Appendices.

7 AIR QUALITY

7.1 INTRODUCTION

7.1.1. This section considers the implications of the Scheme on local and regional air quality during the construction and operational phases and any potentially significant effects. It sets out the proposed methodology for the air quality assessment and identifies those impacts that can be scoped out of the EIA.

7.1.2. This section has been informed by the results of the Options Selection Stage air quality assessment (**Ref 4.1**) and the methodology set out in DMRB HA207/07 (Ref 7.1) and associated Interim Advice Notes.

7.1.3. The NPS NN (2014) (**Ref 6.3**);requires that the air quality impacts of a scheme are assessed in relation to relevant statutory air quality thresholds set out in domestic and European legislation. In particular, detailed consideration should be given to impacts within or adjacent to Air Quality Management Areas (AQMAs), roads identified as exceeding, or being at risk of exceeding, EU Limit Values or sites designated for nature conservation.

7.2 STUDY AREA

7.2.1. The study area for the construction impacts will include areas within 200m of the Scheme boundary for the duration of the build.

7.2.2. The study area for operational impacts will be determined by analysis of the Preliminary Design Stage traffic data (not available at the time of writing) to identify the affected roads network (ARN). The criteria for defining affected roads are set out in DMRB HA207/07.

- Road alignment will change 5m or more;
- Daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) flows or more;
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more;
- Daily average speed will change by 10km/h or more; and
- Peak hour speed will change by 20km/h or more.

7.2.3. For the regional assessment the criteria that defines the affected roads are:

- A change of more than 10% in AADT;
- A change of more than 10% in the number of HDVs; or
- A change in daily average speed of more than 20km/hr.

7.2.4. For operation, the study area consists of a 200m corridor either side of all roads in the ARN.

7.3 BASELINE CONDITIONS

7.3.1. Baseline air quality has been assessed with reference to the following data sources:

- Local Air Quality Management (LAQM) Reporting undertaken by NCC (2013 to 2015);
- National modelling undertaken by Defra using the Pollution Climate Mapping (PCM) model;
- Nitrogen deposition and nitrogen oxides modelling provided by the online Air Pollution Information System (APIS) for ecological sites; and
- Project-specific nitrogen dioxide diffusion tube monitoring undertaken between February 2017 and July 2017.

LOCAL AUTHORITY MONITORING

7.3.2. As a result of the findings of previous Air Quality Review and Assessments, Progress Reports and Annual Status Updates, together with the results of air quality monitoring across the region, undertaken as part of the Local Air Quality Management regime, NCC has not declared any AQMAs within its boundary. As such, no part of the Scheme is located within an AQMA, nor do any of the potential routes that may be affected by the Scheme lie within an AQMA.

7.3.3. NCC undertake air quality monitoring using a combination of automatic (continuous) and passive (diffusion tube) techniques. There have been no exceedances of the relevant objectives at any monitored location within the past five years in the NCC area.

7.3.4. The closest NCC administered monitoring sites are located in Morpeth (Site CM2, approximately 2.1km south of the Scheme) and Alnwick (Site 8N, approximately 2.3km south of the Scheme). **Table 7-1** summarises the monitoring results within their administrative area for the last three available years.

Table 7-1 - NO_2 monitoring results within Northumberland County

ID	Location Name	Annual Mean NO_2 Concentration ($\mu g/m^3$)		
		2013	2014	2015
BL	Blyth Library	N/A	N/A	N/A
CR	Cowpen Road	27	22	25
8N	Bondgate Without, Alnwick	28	30	30
B1	Waterloo Road, Blyth	29	27	29
B3	Cowpen Road West, Blyth	33	32	32
B5	Cowpen Road East, Blyth	24	24	23
B11	Blyth YMCA, Blyth	25	26	26
B12	Bridge Street, Blyth	25	24	24
B15	South Newsham Road	21	20	19
C1	High Pit Road, Cramlington	24	25	23
C9	Trebor, Cramlington	21	22	20
C10	Bay Horse (B1505)	28	27	23
C11	Storey Street (B1505)	29	22	19
CM2	Newgate Street, Morpeth	22	23	19
CM4	Bridge Street, Morpeth	28	26	22
CM5	Thorpe Avenue, Morpeth	N/A	N/A	21

CM6	Telford Bridge, Morpeth	N/A	N/A	25
CM7	Greystoke Cottage, Clifton	N/A	N/A	26
W17	Front Street East, Bedlington	27	28	20
W21	Newbiggin Road, Ashlington	N/A	21	24
SD1	Salvation Army, Seaton Delaval.	26	25	25

7.3.5. There were no exceedances of the Air Quality Objective for annual mean NO_2 at any monitoring location within the county in the past three years.

BACKGROUND CONCENTRATIONS

7.3.6. Background concentrations for the grid squares covering the Scheme have been collated and summarised in the table below. Background pollutant concentrations of NO_x, NO_2, PM_{10} and $PM_{2.5}$ for base year (2015), and an opening year of 2023. All of the annual mean background concentrations are well below the relevant limit values.

Table 7-2 - Annual mean background pollutant concentrations from Defra mapped data for, 2015 and 2023.

Year	Nitrogen Oxides NOx	Nitrogen Dioxide NO_2	Particulate Matter PM_{10}	Particulate Matter $PM_{2.5}$
Limit Value	30 µg/m^3	40 µg/m^3	40 µg/m^3	25 µg/m^3
Total Pollutant Concentrations (µg/m^3)				
2015	6.54	5.05	11.81	7.99
2023	5.28	4.16	9.79	6.19

7.3.7. Average concentrations of all pollutants are well below the relevant limit values. The difference between the background concentrations with and without road-contribution is small, which suggests other pollutant sources have a larger influence on pollutant concentrations in the vicinity of the Scheme.

7.3.8. The Pollution Climate Mapping (PCM) model is a collection of models designed to fulfil part of the UK's EU Directive requirements to report on the concentrations of particular pollutants in the atmosphere. The pollutants reported on through the PCM include NO_x, NO_2, PM_{10} and $PM_{2.5}$ for a 1 x 1 km grid of background conditions plus around 9000 roadside values. The PCM model is also used for scenario assessment and population exposure calculations as well as to produce mapped data of background pollutant concentrations.

7.3.9. PCM data for 2015 are available from Defra's UK-Air website (**Ref 7.2**). The data indicates that roadside concentrations less than 31 µg/m3 for annual mean NO_2, which is well below the EU limit value. Future year concentrations are even lower, reducing the risk of non-compliance with the EU limit values even further.

SCHEME SPECIFIC MONITORING

7.3.10. Project specific monitoring was undertaken by Jacobs, using NO_2 diffusion tubes, between February 2017 and July 2017 at 8 sites within or near the study area.

7.3.11. Concentrations of NO_2 along the A1 are well below the annual mean NO_2 air quality objective threshold. The maximum measured annual mean concentration was 28.8 µg/m3.

7.3.12. A summary of the diffusion tube locations and the monitoring concentrations are presented in **Table 7-3** below (refer to **Figure 7.1 Scheme Specific Air Quality Monitoring Locations in Appendix B**).

Table 7-3 - Summary of bias adjusted annual mean NO_2 results

ID	Location (m)			Distance to A1 (m) a b	Annual Mean NO_2 Concentration (µg/m3)
	X	Y	Z		
A1	418239	588637	2.6	8	21.2
A2	418349	589725	2.4	5.9	19.7
A3	418841	592312	2.6	33	15.3
A4	418935	593684	2.3	16.3 (6.5)	28.8
A5	418945	594352	2.7	4.6	22.4
A6	419038	595322	2.5	39 (3.9)	10.5
A7	417861	597325	0.9	3.8	25.5
BG (A)	417351	596921	0.4	N/A	6.2
a – approximate distance calculated using Grid Reference Finder					
b – distance in parentheses are to the nearest local road					

ECOLOGICAL RECEPTORS

7.3.13. The following ecological receptors have been identified within 200m of the Scheme. **Table 7-4** below indicates that background concentrations of NO_x over the River Coquet and Coquet Valley Woodlands SSSI are below the air quality limit value of 30 µg/m3. Nitrogen deposition exceeds the critical load.

Table 7-4 - Background NOx and nitrogen deposition rates for designated ecological sites in the Study Area

Site	Sensitive Habitat	minimum Critical Load (kgN/ha/yr)	Background Deposition (kgN/ha/yr)	Critical Level (µg/m3)	Background NO_X (µg/m3)
River Coquet and Coquet Valley Woodlands SSSI	Broad-leaved, mixed and yew woodland	10	27.7	30	7.3

7.4 POTENTIAL IMPACTS

7.4.1. The potential impacts during the construction of the Scheme are likely to be temporary with increased dust and particulate matter (PM_{10}) generation due to onsite activities.

7.4.2. The potential significant effects as a result of the operation of the Scheme are anticipated to comprise:

- Potential change in pollutant concentrations (notably NO_2) due to exhaust emissions from road traffic generated during the operational phase of the Scheme; and
- Potential increase in nitrogen deposition on nearby sensitive designated ecological sites above the critical load as a result of increased traffic capacity.

7.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

7.5.1. As noted previously, best practice mitigation will be required to control dust and emissions from construction works and plant. These measures will be set out in the Scheme Construction Environmental Management Plan (CEMP).

7.5.2. Any requirements for consideration of air quality within the specification of traffic management measures during construction will be determined as the Scheme design progresses.

7.5.3. No Scheme specific mitigation or Scheme Air Quality Action Plans are likely to be required for the operation of the Scheme.

7.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

7.6.1. No significant air quality effects are anticipated with mitigation, subject to the update of revised traffic data and modelling.

7.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

7.7.1. The Options Selection Stage assessment did not assess the potential construction effects as a result of the Scheme. However, with existing ambient particulate matter concentrations likely to be very low, the likely temporary nature of potential construction impacts and application of mitigation in the form of a CEMP, significant impacts are not considered likely. It is therefore proposed that this element is **scoped out** of the EIA.

7.7.2. The operation of the Scheme has the potential to change traffic volumes and speeds on the public highway. Whilst no significant effects were assessed at the Options Selection Stage assessment, a revision to the traffic model (due to the Options Selection Stage data comprising both Section A, Morpeth to Felton, and Section B, Alnwick to Ellingham, of the A1 Northumberland improvements) is currently being undertaken. It is therefore proposed that the assessment of operational traffic on local and regional air quality is **scoped in**, and assessed with a **Simple Level Assessment** as defined in DMRB, with a focus on a small number of receptors in the areas with the greatest change in vehicle flows as a result of the Scheme.

7.7.3. In relation to highways schemes and emissions from vehicular traffic, the pollutants of greatest concern are oxides of nitrogen and particulate matter. The focus of the assessment will be the impacts on oxides of nitrogen since this is the pollutant where vehicle emissions are the most likely to give rise to pollutant levels near to or above air

quality limit values. The area is rural in nature, and whilst there is no particulate monitoring near to the Scheme, and very low background concentrations (refer to **Table 7-2** above), it is considered that there is very little risk of exceedance of the air quality limit values. As a result, consideration of particulate matter is **scoped out** of the EIA.

7.7.4. Whilst the Scheme is not considered likely to exceed the critical level for ambient NOx, the River Coquet and Coquet Valley Woodlands SSSI will be included in the assessment due to current exceedance of the critical load. Therefore this assessment is **scoped in** to the ES.

7.7.5. A simple level assessment as set out in HA207/07 will be undertaken to demonstrate that the revised traffic data leads to no significant impacts. The evidence will be presented as part of the ES. Should potential significant impacts be identified as part of the simple level assessment, a detailed assessment shall be undertaken.

POLICY AND PLANS

7.7.6. Policy and plans relevant to the Scheme will be considered within the ES and will consist of the following elements:

- Relevant national, regional, county and local policies; and
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

7.7.7. The National Policy Statement for National Networks (NPS NN) sets out the Government's policies to deliver the development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks. Paragraph 5.12 and 5.13 provide advice to the decision maker to be used when determining whether a scheme should receive consent:

"The Secretary of State must give air quality substantial weight where, after taking into account mitigation, a project would lead to a significant air quality impact in relation to EIA and / or where they lead to a deterioration in air quality in a zone / agglomeration.

The secretary of state should refuse consent where, after taking into account mitigation, the air quality impacts of the scheme will:

- Result in a zone / agglomeration which is currently being reported as being compliant with the Air Quality Directive becoming non-compliant; or

-Affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision"

7.7.8. In order to provide all required information to in the decision maker, the simple level assessment will determine the significance, or lack thereof, of potential air quality impacts in the study area. In addition, a comparison of predicted pollutant concentrations against Air Quality Directive limit values to demonstrate the compliance of zones / agglomerations within the study area. The methodology set out in IAN 175/13 (**Ref 7.3**) will be used to assess the implications of the Scheme for EU limit value compliance in conjunction with the Defra Pollution Climate Mapping model.

METHODOLOGY

7.7.9. The initial step will be to undertake a scoping level assessment as set out in HA207/07, to determine the extent of the affected road network in order to define the study area for operational impacts.

7.7.10. Further work on the air quality impacts of the Scheme will be undertaken as a simple level assessment, as set out in HA207/07. A simple level assessment is proposed due to the low

risk of exceedance of the air quality limit values and low risk of potentially significant effects as identified in the assessments previously undertaken at the Options Selection Stage. As previously stated, should potential significant impacts be identified as part of the simple level assessment, further calculations will be carried out to determine the first year in which the criteria would be achieved, and a detailed assessment undertaken.

7.7.11. ADMS Roads will be used to calculate pollutant concentrations at sensitive receptor locations in the study area using 24 hr AADT traffic data complied as part of the Transport Assessment for the Scheme. Pollutant concentrations will be calculated at properties within 200m of the affected road network in areas with the greatest change in vehicle flow as a result of the scheme as well as properties which are likely to have the highest pollutant concentrations in the area.

7.7.12. The base year model results will then be compared with measured concentrations as collected in the project specific diffusion tube survey (see Section 7.3.10) and adjusted as necessary in accordance with Defra's Technical Guidance TG (16) (**Ref 7.4**). The adjusted modelled concentrations will then be compared with the air quality criteria.

7.7.13. The methodology takes into account the following Interim Advice Notes (IANs):

- IAN 170/12v3 (**Ref 7.5**) Updated Air Quality Advice on the Assessment of Future NO_x and NO2 projects for users of DMRB Volume 11, Section 3 Part 1 'Air Quality';
- IAN 174/13 (**Ref 7.6**) Updated Advice for Evaluating Significant Local Air Quality Effects for DMRB Volume 11, Section 3, Part 1 'Air Quality';
- IAN 175/13 (**Ref 7.3**) Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for users of DMRB Volume 11, Section 3 Part 1 'Air Quality'; and
- IAN 185/15 (**Ref 7.7**) Updated Traffic, Air Quality and Noise Advice on the Assessment of Link Speeds and Generation of Vehicle Data into 'Speed bands' for Users of DMRB Volume 11, Section 3, Part 1 'Air Quality'; and Volume 11, Section 3, Part 7 Noise.

7.7.14. IAN 170/12 includes projection factors for annual mean NO_2 and NO_X concentrations between 2008 and 2030, which were updated by Highways England in May 2015. These updated factors reflect the latest predicted long-term trends from the introduction of Euro 6/VI (termed LTTE6).

7.7.15. IAN 175/13 has been withdrawn pending issue of updated advice. However, in the absence of published updated advice, IAN 175/13 will be used to assess the impact of the Scheme on compliance with the EU Directive on ambient air quality for the EIA.

7.7.16. IAN 185/15 includes vehicle emission rates for NO_x, PM_{10} and CO_2, for use in air quality assessments, which were updated by Highways England in November 2016. These updated factors reflect the latest available vehicle emissions testing data. Barring any update, these factors will be used in the EIA.

Operational Phase

7.7.17. HA207/07 states that "the worst year in the first 15 years from opening needs to be assessed" in relation to local air quality. For the Scheme, this covers any year between 2023 and 2038, although it is generally assumed to be the opening year of the Scheme. With the assessment being set at a simple level, the future year impacts will not be assessed as it is assumed that the opening year will be the worst.

7.7.18. The local air quality assessment will consider the following scenarios:

- Baseline Year (2015)
- Opening Year (2023) - Do Minimum
- Opening Year (2023) - Do Something

7.7.19. The regional assessment will consider the following scenarios:

- Opening Year (2023) and Future Year (2038) - Do Minimum
- Opening Year (2023) and Future Year (2038) – Do Something

7.7.20. Traffic data to be input into the model (ADMS Roads) will be used to derive emission rates for each road link. Vehicle emissions will be taken from HA IAN 185/15.

7.7.21. In order to account for the uncertainty in forecast vehicle emission rates and the real world performance of vehicles, the gap analysis methodology set out in HA IAN 170/12 will be used as a correction to future year concentrations.

7.7.22. The methodology set out in HA IAN 175/13 will be used to assess the implications of the Scheme for EU limit value compliance in conjunction with the Defra Pollution Climate Mapping model.

7.7.23. The assessment will also consider potential impacts at sensitive ecological receptors identified as likely to be impacted by the Scheme, as set out in HA207/07 Annex F.

Human Health

7.7.24. HA 207/07 states that compounds released into the atmosphere by road vehicles are involved in a variety of health and environmental effects over different time periods, and on different geographical scales. This assessment will consider air quality with respect to the UK Air Quality Strategy, which covers ten pollutants, along with the strategies objective to reduce the pollutant and the European Directive target value. Although no Scheme-specific mitigation measures are likely to be required, best practice mitigation will be required to control dust and emissions from construction works and plant.

7.7.25. The assessment of likely significant effects on human health in relation to air quality is inherent in the health based objectives on which the assessment is based. These objectives have been established to protect individuals in a population, and as such they define the standard below which health effects are unlikely to be experienced even by the most sensitive members of the population. Above these, worse health outcomes may be predicted.

7.7.26. The human health findings of the assessment will, therefore be based on the criteria set out in IAN 174/13 Updated Advice for Evaluating Significant Local Air Quality Effects and will be summarised qualitatively in the assessment section of the topic chapter. Where concentrations lie within the air quality objectives and an impact is determined not to be significant under IAN 174/13, there will be no significant health impacts.

7.7.27. Where human health effects are identified in this and any other topic, whether significant or not, these effects will be incorporated into the cumulative effects assessment of human health.

SIGNIFICANCE CRITERIA

7.7.28. The significance criteria contained within IAN 174/13 Updated Advice for Evaluating Significant Local Air Quality Effects for DMRB Volume 11, Section 3, Part 1 ‘Air Quality’, will be used for the assessment of air quality.

7.7.29. The significance of effects upon ecological receptors will be determined in accordance with the HA207/07 Annex F.

Value (Sensitivity)

7.7.30. HA207/07 does not explicitly refer to the concept of receptor value (sensitivity), nor does it define a value for receptors. The assessment is based on the selection of sensitivity receptors which are defined in LAQM.TG(16) (**Ref 7.4**). Sensitive receptors can include residential properties, schools and hospitals.

7.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

7.8.1. This scoping report is based on currently available information, and the approach can be subject to change as the design progresses.

7.8.2. The modelling of future air quality has associated uncertainties. In future years, one such uncertainty relates to the projection of vehicle emissions and, in particular, the rate at which emissions per vehicle will improve over time. The guidance set out in IAN 170/12 advises on the adjustment of modelled concentrations of NO_2 (and NO_X) to take account of recent trends on roadside pollutant concentrations and evidence on future vehicle emissions. However, current projections are only available until 2030, 8 years before the end of the range of possible “worst year” assessment period set out in DMRB HA207/07. It is an assumption of this report that emission rates will remain constant during this period.

8 NOISE AND VIBRATION

8.1 INTRODUCTION

8.1.1. This section considers the implications of the Scheme on noise and vibration during construction and operation and details any potentially significant effects. It sets out the proposed methodology for noise and vibration and identifies those impacts that can be scoped out of the EIA.

8.1.2. This section has been informed by the result of the Options Selection Stage noise assessment (**Ref 4.1**) and the methodology set out in DMRB HD 213/11 (**Ref 8.1**) and associated Interim Advice Note 185/11 (**Ref 8.2**).

8.2 STUDY AREA

8.2.1. The study area for the noise and vibration assessment will be defined in accordance with the guidance provided in HD 213/11 which is as follows:

1. Identify the start and end points of the physical works associated with the Scheme;
2. Identify the existing routes that are being bypassed or improved, and any proposed new routes, between the start and end points;
3. Define a boundary one kilometre from the carriageway edge of the routes identified in (ii) above;
4. Define a boundary 600m from the carriageway edge around each of the routes identified in (ii) above and also 600m from any other affected routes within the boundary defined in (iii) above. This area is called the “calculation area”;
5. Identify any affected routes beyond the boundary defined in (iii) above; and
6. Define a boundary 50m from the carriageway edge of the routes identified in (v) above.

8.2.2. An affected route is where there is a possibility of a change of 1 dB $_{LA10,\ 18hr}$ or more in the short term (i.e. on opening) or 3 dB $_{LA10,\ 18hr}$ or more in the long term.

8.2.3. The study area will ultimately be defined through details emerging from the revised traffic modelling and will, therefore, be based on a combination of the Scheme Footprint and the predicted change in traffic flows.

8.3 BASELINE CONDITIONS

BASELINE NOISE SURVEY

8.3.1. A baseline noise survey was not undertaken for the Options Selection Stage EAR and existing noise levels at receptors within the study area were established using predicted traffic data for the modelled opening year (2023), without the preferred route option in place. This may underestimate the overall noise levels at noise sensitive receptors in more rural locations away from busy roads with free-flowing traffic.

8.3.2. Baseline traffic data will be verified through the EIA by a noise measurement survey, subject to consultation with Northumberland County Council (NCC). The baseline noise survey will also validate the noise model used to predict future road traffic noise levels. The survey will be undertaken at locations close to the A1 for model verification purposes. The results of

this survey will be used to confirm that the noise model accurately reflects the existing scenario and will be reported as part of the assessment.

8.3.3. The proposed route passes through a rural area and is likely to have a relatively low existing baseline noise and vibration climate. As well as road traffic noise from the A1, other arterial roads in the area, such as the A697, B6345 and B1340, are expected to dominate the existing noise and vibration environment for many sensitive receptors. The contribution of road traffic noise to existing baseline noise and vibration levels will be dependent on distance to roads, and the traffic flow, composition and speed on those roads.

NOISE SENSITIVE RECEPTORS

8.3.4. In accordance with the DMRB HD 213/11, examples of sensitive receptors include dwellings, hospitals, schools, community facilities, designated areas (e.g. Areas of Outstanding Natural Beauty (AONB), National Park, Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), Scheduled Monuments), and Public Rights of Way (PRoW). Sensitive receptors will be defined once the ARN is available.

8.3.5. The DMRB does not explicitly refer to the concept of receptor sensitivity, nor does it define sensitivity levels for the above receptors. Rather, it refers to the magnitude of impact based upon the level of change in the noise environment. In the context of EIA, however, it is typical to compare the magnitude of impact with the sensitivity of the receptor to obtain the likelihood of significant effects. As the Scheme passes through a rural area all residential, educational and cultural heritage assets would typically be assigned a sensitivity level of 'high' (based on professional experience). The sensitivity of receptors will be confirmed within the ES.

NOISE IMPORTANT AREAS

8.3.6. The current Noise Action Plan (DEFRA, 2014) (**Ref 8.3**) outlines a number of Noise Important Areas (NIA) at Round 2 of the UK noise mapping project, identified in accordance with the requirements of the EU Environmental Noise Directive. The Round 2 NIA's denote the top 1% of the population, in terms of exposure to road traffic noise ($L_{A10,18h}$).

8.3.7. The Round 2 NIA's for both Highways England and local authority maintained roads are available under the Open Government Licence (DEFRA, 2015) (**Ref 8.4**). There are two Highways England NIA's within the noise study area (refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**), these being:

- IA_ID 10003, at Northgate Farm, adjacent to the southbound side of the A1 just north of Morpeth; and
- IA_ID 10002, also adjacent to the southbound side of the A1, at Field View.

8.3.8. In each case, the noise climate at receptors within the NIA would typically be dominated by the primary road traffic route running through the NIA. Where there is more than one primary road traffic route then the noise from one or more roads could influence the noise levels at each receptor.

8.4 POTENTIAL IMPACTS

8.4.1. The potential construction and operational noise and vibration impacts as a result of the Scheme will be verified upon receipt of valid traffic data, undertaking of the baseline noise survey, and once detailed mitigation can be considered.

CONSTRUCTION EFFECTS

8.4.2. Overall, the proximity of likely sensitive receptors to the Scheme, allied to the scale and complexity of the works, means that there is potential for some disruption, albeit temporary, during the construction phase. This includes residential receptors in close proximity to the National Grid diversion works at Causey Park. This conclusion would be reinforced should any night-working be required. The potential effects associated with the construction of the Scheme are likely to include:

- The generation of noise from on-site activities during the construction phase potentially causing a disturbance to proximate sensitive receptors; and
- An increase in noise emissions from road traffic and non-road mobile machinery (NRMM) (during the construction phase), which may potentially cause a disturbance to proximate sensitive receptors.

OPERATIONAL EFFECTS

8.4.3. The potential adverse and beneficial effects associated with operation of the Scheme are likely to include:

- The generation of operational road traffic noise, increased flows and associated effect on local sensitive receptors adjacent to the proposed Scheme alignment; and
- A reduction of operational road traffic noise and associated beneficial effect on local receptors adjacent to the current A1 alignment, which will be bypassed by the Scheme.

8.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

8.5.1. In line with the aim of government noise policy to minimise adverse impacts on health and quality of life as far as is sustainable, the magnitude of noise increases and the number of people adversely affected by them will seek to be minimised by noise mitigation integrated into the Scheme.

8.5.2. Where changes in noise levels equating to a minor magnitude of effect and above (both beneficial and adverse) are noted, mitigation measures will be implemented where possible to reduce noise impacts but are subject to buildability and value for money considerations.

8.5.3. Appropriate mitigation will be determined once detailed assessments have been undertaken through the EIA. However, is likely to include the following:

- Construction phase: best practice mitigation set out in the Scheme CEMP; and
- Operational phase: the careful design of the alignment and cuttings, the use of low noise road surfacing, landscaped earthworks and installation of noise fence barriers at specific locations.

8.5.4. If any residential properties situated close to the Scheme qualify for noise insulation works under the Noise Insulation Regulations 1975 (as amended 1988), the combination of mitigation integrated into the Scheme (e.g. low noise surfacing and noise barriers) together with noise insulation would avoid significant observed adverse effects (i.e. avoid significant adverse impact on health and quality of life in line with government noise policy).

8.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

8.6.1. Potential significant effects will be explored in detail through the EIA with a view to minimising and, where necessary and possible, eliminating these potential significant effects.

8.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

8.7.1. The following elements are **scoped in** to the noise and vibration assessment:

- Temporary (i.e. construction noise and vibration) effects;
- Permanent traffic noise effects (including nighttime noise effects);
- Permanent traffic nuisance effects;
- Permanent traffic induced vibration effects; and
- Cumulative effects.

8.7.2. No topics have been **scoped out** of the noise and vibration assessment

POLICY AND PLANS

8.7.3. Policy and plans relevant to the Scheme will be presented in the ES and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies; and
- A commentary setting out the significance of the impact of the Scheme on relevant policy objectives.

8.7.4. The following policy and guidance will underpin the assessment and will be described in more detail in the assessment:

- National Planning Policy Framework (NPPF) and Planning Practice Guidance (**Ref 8.5**);
- Noise Policy Statement For England (**Ref 8.6**) which is the overarching noise policy for England;
- National Policy Statement for National Networks (**Ref 6.3**);
- Road Investment Strategy: for the 2015/16 - 2019/20 Road Period (Department of Transport, March 2015) which sets out policies relating to the strategic planning and funding of the road network: and
- Highways England Licence.

8.7.5. Guidance contained in these policies will be used to determine the potential significant effects upon noise and vibration as a result of the Scheme, and is presented in the section below.

METHODOLOGY

8.7.6. The assessment of noise and vibration will be undertaken in accordance with DMRB HD 213/11 – Revision 1. All road traffic noise predictions will be undertaken in accordance with the calculation methodology presented in the former Department of Transport/Welsh Office technical memorandum Calculation of Road Traffic Noise (CRTN) (**Ref 8.7**).

8.7.7. The Options Selection Stage work concluded that there was potential for significant effects. As such, upon receipt of appropriate traffic flow information, it is proposed that a **Detailed Level** assessment will be undertaken in accordance with guidance contained with HD 213/11.

8.7.8. Consideration will be given to both the “short-term” and “long-term” effects, which are defined as those occurring during the year of opening (short-term) and between the year of opening and the worst case year within 15 years of the year of opening (long-term), which is typically the 15th year. Currently, the year of opening is taken to be 2023, whilst the worst case year is taken to be 2038.

8.7.9. The assessment includes a requirement to determine the change in road traffic noise level at each dwelling (and other sensitive receptors) within the study area. A computerised 3D road traffic noise model will be used to facilitate the assessment.

Construction Effects

8.7.10. HD 213/11 states when considering the need for further assessment of potential noise and vibration effects during the construction phase, the potential for exceeding the criteria provided in BS 5228 (**Ref 8.8**) should be considered.

8.7.11. BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise includes a method for assessing construction noise based upon the level of pre-construction ambient noise at the receptor (the 'ABC Method' - Annex E, Section 3.2). The method involves a comparison between the predicted noise level arising from construction operations, and the pre-construction ambient noise level. A significant effect is deemed to occur where the predicted construction noise level exceeds the thresholds summarised in **Table 8-1**.

Table 8-1 - Example threshold of potential significant effect at dwellings

Assessment Category and Threshold Value Period	Threshold Values, in decibels (dB)		
	Category A)	Category B)	Category C)
Nighttime (2300 – 0700)	45	50	55
Evenings and Weekends D)	55	60	65
Daytime (0700 – 1900) and Saturdays (0700 – 1300)	65	70	75
NOTE 1: A significant effect has been deemed to occur if the total LAeq, T noise level arising from the site exceeds the threshold level for the Category appropriate to the ambient noise level. NOTE 2: If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total LAeq noise level for the period increases by more than 3 dB due to construction activity. NOTE 3: Applied to residential receptors only.			
A) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. B) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values. C) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values. D) 1900 – 2300 weekdays, 1300 – 2300 Saturdays and 0700 – 2300 Sundays.			

8.7.12. BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration includes a method for assessing construction vibration. The method involves a comparison between predicted vibration levels and the threshold levels presented in **Table 8-2** in order to determine the level of perception and disturbance in occupied residential properties.

Table 8-2 - Guidance on effects of vibration levels

Vibration Level (PPV) (mm.s-1)	Description of Effect
< 0.3	Unlikely to be perceptible in residential environments.
0.3 to 1.0	Onset of perceptibility in residential areas.
1.0 to 10	Onset of complaints in residential environments.
> 10	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Operational Effects

8.7.13. An assessment of potential magnitude of impacts and associated significance of effects will be undertaken with respect to predicted noise level changes in the short term and long term, using guidance presented in the DMRB HD 213/11.

8.7.14. The DMRB states that the determination of appropriate levels of assessment for operational road traffic and noise and vibration effects should be undertaken with reference to the following thresholds:

- A permanent change in daytime road traffic noise of ±1 dB $_{LA10,18h}$ in the Short Term (i.e. on opening);
- A permanent change in daytime road traffic noise of ±3 dB $_{LA10,18h}$ in the Long Term (typically 15 years after project opening);
- A permanent change in nighttime road traffic noise of ±3 dB $_{LA10,18h}$ in the Long Term, where the predicted level also exceeds 55 dB $_{LA10,18h}$; and
- A rise in vibration levels to above 0.3 mm/s Peak Particle Velocity (PPV) or any increase above an existing level of 0.3 mm/s PPV.

8.7.15. The DMRB further states that where it is unclear whether the threshold values will be met or exceeded (either because of a lack of suitable information, or a borderline result), then the assessment must proceed to the Simple Level. However, where it is clear that the threshold values will be exceeded then the assessment must proceed to the Detailed Level.

8.7.16. Threshold values are likely to be exceeded where any of following conditions are met:

- The road project alters the alignment of any existing carriageways. This would include new sections of road, additional junctions and slip roads, and hence could result in the introduction of a new noise or vibration source, or a change to noise or vibration levels from an existing road source;
- Changes in traffic volume on existing roads or new routes may cause either of the daytime threshold values for noise to be exceeded. A change in noise level of 1 dB $_{LA10,18h}$ is equivalent to a 25% increase or a 20% decrease in traffic flow, assuming other factors remain unchanged and a change in noise level of 3 dB $_{LA10,18h}$ is equivalent to a 100% increase or a 50% decrease in traffic flow;
- Changes in traffic speed or proportion of heavy vehicles on the existing roads or new routes may cause a change in the noise level of 1 dB $_{LA10,18h}$ in the short-term or 3 dB $_{LA10,18h}$ in the long-term either during construction, including temporary diversion routes, or when the road project is completed;

- If sufficient traffic flow information is available, then it is acceptable to use this to determine whether there is likely to be a change of 1 dB $L_{A10,18h}$ in the short-term or 3 dB $L_{A10,18h}$ in the long-term which will result from a combination of traffic flow, speed and composition, instead of using ii) and iii) above in isolation;
- Changes in traffic volume, composition and speed on existing roads or new routes during the night may cause the long-term nighttime threshold value to be exceeded; and
- Any physical changes to the infrastructure surrounding the road or any change in the way in which the existing road is used that could cause a change in noise level of 1 dB $L_{A10,18h}$ in the short-term or 3 dB $L_{A10,18h}$ in the long-term. This could include, but not be restricted to, such works as re-surfacing, congestion management schemes, bridge building and barrier installation. Where necessary advice shall be sought from the Overseeing Organisation to agree whether such Projects could cause a change in the noise level of 1 dB $L_{A10\ 18h}$ in the short-term or 3 dB $L_{A10,18h}$ in the long-term.

8.7.17. As previously indicated, a **Detailed Level** assessment will be undertaken within the ES.

8.7.18. In addition to the above requirements of the DMRB, Highways England also requires analysis of Significant Observed Adverse Effect Levels (SOAEL[1]), in accordance with the Noise Policy Statement for England (NPSE) and referenced in the Planning Practice Guidance for Noise (**Ref 8.5**). Where a receptor is exposed to SOAEL and experiences an increase in noise levels of ≥1 dB $L_{A10,18h}$ as a result of the Scheme (in the short or long term), a significant effect in terms of EIA is deemed to have occurred.

8.7.19. Noise changes in NIAs will also need careful scrutiny given the strategic policy objective to reduce noise levels in NIAs Refer to Section 7.5 for a list of the NIAs that are within the 1 km corridor of the Scheme as defined at the Options Selection Stage.

Human Health

8.7.20. As set out in HD 213/11, a link has been identified between noise impacts and effects on both mental and physiological health. Further research is required to define exposure parameters for a quantitative analysis of such symptoms. Therefore, this assessment will consider noise levels with respect to the Noise Policy Statement for England and in particular its first aim, which is to "avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development". The measurement of SOAEL takes into account of the health effects of noise. Where noise exceeds the SOAEL due consideration will be given to measures that might be adopted to limit the number of locations so affected and minimise the road traffic noise levels at these locations. The assessment will also consider the noise index for nighttime noise, which is recognised by the World Health Organisation (WHO) as an indicator of impact from nighttime noise on health.

8.7.21. Where human health effects are identified in this and any other topic, whether significant or not, these effects will be incorporated into the cumulative effects assessment of human health.

[1] Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.

SIGNIFICANCE CRITERIA

Construction

8.7.22. A significant effect during construction would occur where the thresholds listed in **Table 8-1** or **Table 8-2** is exceeded.

Operation

8.7.23. The following criteria will be used to determine the assessment of operational road traffic noise. These criteria are taken from the DMRB.

Value (Sensitivity)

8.7.24. The DMRB does not explicitly refer to the concept of receptor value (sensitivity), nor does it define a value for the above receptors. Rather, it refers to the magnitude of impact based upon the level of change in the noise environment. In the context of Environmental Impact Assessment (EIA), however, it is typical to compare the magnitude of impact with the value of the receptor to obtain the likelihood of significant effects. All residential, educational and cultural heritage assets would typically be assigned a value of 'high'. The sensitivity of receptors will be confirmed within the ES.

Magnitude of Impact

8.7.25. The short-term noise level changes have been determined by comparison of the 'do minimum opening year 2023' and the 'do something opening year 2023' scenarios. The long-term noise level changes have been determined by comparison of the 'do minimum opening year 2023' and the 'do something design year 2038' scenarios.

8.7.26. **Table 8-3** below summarises the classification of the magnitude of noise impacts associated with short and long-term changes in noise levels, as set out in DMRB HD 213/11. Both adverse and beneficial changes are considered in the assessment.

Table 8-3 - Classification of Magnitude of Noise Impacts (DMRB HD 213/11)

Noise Change dB ($L_{A10,18h}$)		Magnitude of Impact
Short-term	Long-term	
0	0	No change
0.1 – 0.9	0.1 – 2.9	Negligible
1.0 – 2.9	3.0 – 4.9	Minor
3.0 – 4.9	5.0 – 9.9	Moderate
+5.0	+10.0	Major

8.7.27. For the purpose of this assessment, changes in noise levels equating to a minor magnitude of effect and above (both beneficial and adverse) have been considered as potentially significant, in line with the DMRB HD 213/11 guidance. Insignificant effects will not be reported at this stage unless they are within an NIA. Significant beneficial and adverse effects will be reported. Noise and vibration nuisance will also be determined in line with the DMRB HD 213/11.

8.7.28. As required by the DMRB HD 213/11, changes in nighttime road traffic noise of ±3 dB $L_{A10,18h}$ in the long-term, where the predicted level also exceeds 55 dB $L_{A10,18h}$ will be considered a significant effect, depending on the sensitivity of the receptor.

8.7.29. Where the traffic flow falls below 1,000 vehicles in the 18-hour period, the CRTN methodology cannot be applied (as indicated in the guidance, as the methodology would not be accurate below this level). In circumstances where the traffic volume on any particular link falls below the threshold in all scenarios, the link will be excluded from the analysis. However, where the traffic volume falls below the threshold in one scenario, but above in another, that link will be considered further to ensure that potentially significant effects are not overlooked.

8.7.30. Operational road traffic groundborne vibration will be addressed qualitatively and will reference the DMRB HD 213/11 whereby a level above 0.3 mm/s Peak Particle Velocity (PPV) or any increase above an existing level of 0.3 mm/s PPV may result in a significant effect, depending on the sensitivity of the receptor.

8.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

8.8.1. This scoping report is based on currently available information, and can be subject to change as the design progresses.

8.8.2. Valid traffic data are currently not available.

8.8.3. The study area cannot be determined until the noise modelling has been undertaken which will define the roads which trigger a significant noise effect.

8.8.4. The noise modelling will incorporate many different data sources. The outcome of the modelling is, therefore, reliant on the quality of these data sources. Any limitations of these data sources will be reported in the noise and vibration assessment of the ES, along with any implications.

8.8.5. The BS 5228 calculation methods enable the level of noise during various construction activities to be determined. However, the precision of any such predictions is necessarily limited by the number of assumptions that have to be made regarding the number and type of plant to be utilised, their location and detailed operating arrangements. Some of this information will be clarified as the scheme design progresses and later when a contractor is appointed and resources are mobilised, but other information (such as exactly where the plant operates and for how long) would remain uncertain, even after works have commenced.

9 LANDSCAPE AND VISUAL

9.1 INTRODUCTION

9.1.1. This section considers the impacts of the Scheme on the landscape and visual amenity during the construction and operational phases, and it sets out the scope and proposed methodology to be adopted when carrying out the Scheme specific Landscape and Visual Impact Assessment (LVIA).

9.1.2. Landscape and visual assessments are separate although linked processes, describing closely related but distinct sets of effects.

9.1.3. Landscapes are an important component of the distinctiveness of any local area; they take their character from a combination of elements, including landform, land use and pattern, land cover/vegetation, open space and cultural heritage influences. Landscape effects describes the likely nature and scale of these changes within a defined geographical area.

9.1.4. Visual effects relate to changes in available views and how this is perceived by receptors. A view, its components and context can have a great effect on the quality of peoples' lives. The landscape and visual assessment will assess potential changes in the existing views, taking into account the extent to which the Scheme would be visible.

9.1.5. This Scoping Report has been informed by the results of the Options Selection Stage EAR (**Ref 4.1**) and the methodology set out in IAN 135/10 (**Ref 9.1**) and GLVIA3 (**Ref 9.2**).

9.2 STUDY AREA

9.2.1. The study area for the visual assessment will be the area from which the road, its structures or traffic on it can be seen (by definition visual effects can only occur where the Scheme can be seen), which will be defined by computer modelling a Zone of Theoretical Visibility (ZTV) (referred to as Zone of Visual Influence in DMRB) (see paragraph 9.2.3 below).

9.2.2. The landscape study area will be based on the visual study area but widened out to include the whole of distinct areas of landscape potentially affected, not just the parts of these areas from which there may be visibility, in order to take account of potential indirect effects.

9.2.3. A computer-generated ZTV will be produced for a national high sided vehicle (4.5 m) along the main line centreline, plus the high points of all overbridges, to understand the extent of visibility of the Scheme including the traffic on it. This will be a ‘bare-ground’ ZTV (taking no account of screening by trees, woodlands, buildings or structures) based on a viewer eye height of 1.5m and using the Ordnance Survey Terrain 5 digital terrain model. This will then be ground-truthed through site based assessments during the Preliminary Design Stage.

9.2.4. Inclusion of an area within the ZTV is not an indicator that all potential receptors within the area will experience views of the Scheme, but rather establishes the area where there would be a view in the absence of any above-ground features. Many views from potential receptors within the ZTV will be screened or filtered by features such as individual buildings, hedgerows, small copses or localised variations in landform.

9.2.5. The assessment will build on the work carried out at the Options Selection Stage, which identified an initial visual envelope (see **Figure 9.1 Visual Envelope** in **Appendix B)** which gives a reasonable indication of the area from which there are likely to be views of the Scheme. Whilst accurate at time of the original assessment subsequent design changes have resulted in the red line boundary extending beyond the Options Selection Stage visual

envelope, indicating that the final Scheme may result in effects being encountered beyond the area previously identified.

9.2.6. The ZTV will define the area from which representative viewpoint locations will be selected from and will initially be established within a 2km buffer from the centreline. Experience from similar developments suggests that significant adverse landscape and visual effects are unusual beyond about 1 km from a project of this scale, except where traffic noise affects the perception of a tranquil landscape. In principle, therefore, the study area for the visual assessment will be the area defined by the ZTV (refer to **Figure 9.1 Visual Envelope** in **Appendix B**), and likely refined to 1km when identifying significant effects associated with specific visual receptors i.e. individual properties and PRoW.

9.2.7. Taking a precautionary approach, the study area for the landscape assessment will be cut off at a distance of 5 km from the highway centre-line.

9.2.8. Both these limits will be tested and revised if necessary (and in consultation with statutory consultees) during the early stages of the EIA.

9.3 BASELINE CONDITIONS

9.3.1. The following sources have been used to gather baseline data:

- Northumberland Consolidated Planning Policy Framework and saved policy documents from the previous authorities;
  - Alnwick Landscape Character Assessment Supplementary Planning Document (SPD) 26;
  - Castle Morpeth District Local Plan; and
  - Alnwick District Local Development Framework.
- Northumberland Landscape Character Assessment: Part A Landscape Classification 22;
- National Character Areas from Natural England 23;24;25;
- The MAGIC map website (**Ref 9.3**);
- Google (**Ref 9.4**) and Bing Maps (**Ref 9.5)** (including online copies of Ordnance Survey mapping on Bing);
- National Trust Land Map (**Ref 9.6**);

LANDSCAPE BASELINE

Landscape designations

9.3.2. There are no statutory designated landscapes within the study area.

9.3.3. Non statutory designations within the study area include the areas of High Landscape Value as identified under Policy RE17 and C3 within the Alnwick District Local Framework Development (1997) and the Castle Morpeth District Local Plan (February 2003) respectively. Refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**.

9.3.4. In 2007, Policy RE17 was further supported by Policy S13 within the Alnwick District Local Development Framework, (Adopted October 2007). Policy S13 states that "*All proposals for development and change will be considered against the need to protect and enhance the distinctive landscape character of the district. All proposals will be assessed in terms of their impact on landscape features and should respect the prevailing landscape quality, character and sensitivity of each area as defined in the Alnwick District Landscape Character Assessment Supplementary Planning Document*. The Northumberland Consolidated Planning Policy Framework, November 2017 report states, the 2007 Alnwick

District Local Development Framework, Core Strategy Development Plan does not supersede the 'Saved Policies but is in addition. Policy RE17 may be perceived to carry more weight than that of S13 given no time limit is imposed on policy RE17, whereas the Core Strategy document is limited to 2021.

9.3.5. Within the 2003 Castle Morpeth District Local Plan areas of High Landscape Value were defined under saved Policy C3. The associated policy justification does not give any detailed rationale for the selection of these areas, other than that they are "*important to their particular locality and to the county as a whole in terms of their special character and greater than average visual quality*".

9.3.6. These areas of landscape policy lead designations will be used to help determine the sensitivity value assigned to each of the Landscape Character Areas, to which they apply. Where areas of 'High Landscape Value' have been designated, these Landscape Character Areas will be awarded a higher sensitivity value than those areas where such a designation is not included. Indicative Landscape Character Area sensitivity values to be used within the EIA are identified within **Table 9-3** below.

9.3.7. In addition to the above the study area falls within an area of 'proposed extension to the Green Belt' as identified within the Northumberland County and National Park Joint Structure Plan, Policy S5 – Extension to the Green Belt (refer to **Figure 9.2 Green Belt** in **Appendix B**).

Landscape Context

9.3.8. The study area lies some 10km from the Northumberland coast. The area is moderately elevated (generally between about 80 m and 150 m Above Ordnance Datum (AOD)) and gently rolling with the land generally falling towards the coast to the east.

9.3.9. There are numerous watercourses in the study area, primarily the River Coquet and its tributaries, and the River Lyne and its tributaries. The River Coquet is noticeably incised with steep wooded banks creating local enclosure.

9.3.10. Overall, it is a generally open landscape of medium to large scale intensive farmland with arable and pasture fields enclosed by hedgerows, some tree-lined, and some stone walls. There are numerous small blocks of woodlands both conifer plantations and broadleaf woodland. Some areas of woodland block have been identified as Ancient Woodland as shown on **Figure 1.2 Environmental Constraints Plan** in **Appendix B**.

9.3.11. This farmland is crossed by two of the county's major roads; the A1 from Newcastle to Berwick and the A697 to Coldstream. These high-speed roads have a substantial influence on the landscape character due to visual and aural intrusion as well as through actual severance.

9.3.12. Settlement is concentrated at Felton, just east of the northern end of the Scheme and at Fair Moor, just south of the south end. Through the rest of the study area, there is relatively even and quite dense scatter of individual farms and farmhouses, steadings and small hamlets.

9.3.13. There is a dense network of minor roads and Public Rights of Way (PRoWs) connecting the hamlets and scattered settlements. St Oswald's Way, a long-distance path (156 km) from Lindisfarne to Hadrian's Wall follows the northern bank of the River Coquet.

9.3.14. Rows of individual trees are present along sections of the A1, known as Coronation Avenue (between National Grid Reference NZ182887 and NZ185909). Originally planted in1937 to

celebrate the coronation of George VI, it was extended southwards to near Morpeth to commemorate the coronation of Elizabeth II in 1953. The avenue, which today comprises over 300 trees up to 80 years old, has a substantial value locally in both present-day landscape and in cultural/historic landscape terms. It provides a sense of formality along the A1 through the southern half of the study area, as well as helping filter views of traffic from the surrounding area.

Landscape Character

National Character Areas

9.3.15. The Scheme lies entirely in National Character Area (NCA) 12: Mid Northumberland. The NCA is bounded to the east, within the wider landscape study area by the Northumberland Coastal Plain (NCAs 1, North Northumberland Coastal Plain & 12, Southeast Northumberland Coastal Plain).

Regional Character Areas

9.3.16. Landscape Character Areas at a Regional Level have been derived from the following studies; Northumberland Landscape Character Assessment Part A Landscape Classification (August 2010) (**Ref 9.7**).The 2010 Northumberland Landscape Assessment supersedes former studies carried out at a District level including the 2006 joint study covering Alnwick and Castle Morpeth. The Scheme travels through both the former Alnwick and Castle Morpeth district boundary. Whilst the 2006, Landscape Assessment study for the districts have been superseded by the 2010 Northumberland Landscape Character Assessment, SPD Alnwick Landscape Character Assessment (Adopted 2010) is still considered material consideration, with respect to planning.

9.3.17. *"Landscape character is the distinct, recognisable and consistent pattern of elements that makes one area of landscape different from another. Variations in geology, soils, landform, land use, vegetation, field boundaries, settlement patterns and building styles all help give rise to different landscapes, each with its own distinctive character and 'sense of place'. These differences are the product of both natural and human influences."* (**Ref 9.8**).

9.3.18. At a County level, the study area lies within Landscape Character Types (LCT) No.35 Broad Lowland Valley and No.38 Lowland Rolling Farmland. These are further sub-divided within the study area into Landscape Character Areas. Within the study area Landscape Character Areas are defined as *"geographically discrete examples of a particular LCT. Landscape character areas share the same elements as the landscape character type, but also have their own individual character and identity" (**Ref 9.9**).* Those Landscape Character Areas directly affected by the scheme are 35a Coquet Valley and 38b Longhorsley.

9.3.19. At a District level (formally the former Alnwick District), the northern section of the study area associated with Felton is located within Landscape Character Areas No.16 Coquet Valley.

9.3.20. For the purpose of the assessment landscape effects will be assessed against those landscape character areas identified at a County level. Where applicable revisions to LCA boundaries and associated descriptions will be made following further additional detailed assessment and field work carried out as part of the EIA approach to reflect additional LCAs at a scale appropriate to the Scheme.

Landscape Sensitivity

9.3.21. Landscape sensitivity is derived from the combination of a landscape's quality and value, as well as the degree to which the particular element or characteristic can be replaced or substituted"(**Ref 9.10**).

9.3.22. Landscape quality relates to the intrinsic aesthetic appeal demonstrated by a character zone or feature / composition within the landscape, including the relative condition of the landscape and features therein.

9.3.23. There is no specific guidance in IAN 135/10 regarding landscape quality criteria. **Table 9-1** below therefore sets out indicative criteria for the assessment of landscape quality that will be used in the EIA, based upon professional judgement.

Table 9-1 - Landscape quality criteria

Rating	Criteria
Outstanding	Areas comprising a clear composition of valued landscape components in robust form and health, free of disruptive visual detractors and with a strong sense of place. Areas containing a strong, balanced structure with distinct features worthy of conservation.
Very attractive	Areas primarily of valued landscape components combined in an aesthetically pleasing composition and lacking prominent disruptive visual detractors. Areas containing a strong structure with noteworthy features or elements, exhibiting a sense of place.
Good	Areas primarily of valued landscape components combined in an aesthetically pleasing composition with low levels of disruptive visual detractors, exhibiting a recognisable landscape structure.
Ordinary	Areas containing some features of landscape value but lacking a coherent and aesthetically pleasing composition with frequent detracting visual elements, exhibiting a distinguishable structure often concealed by mixed land uses or development. Such areas would be commonplace at the local level and would generally be undesignated, offering scope for improvement.
Poor	Areas lacking valued landscape components or comprising degraded, disturbed or derelict features, lacking any aesthetically pleasing composition with a dominance of visually detracting elements, exhibiting mixed land uses which conceal the baseline structure. Such areas would generally be restricted to the local level and identified as requiring recovery.

9.3.24. Landscape value relates to areas of particular scenic quality or those displaying important historic and cultural associations. Landscape value is frequently addressed by reference to international, national, regional and local designations. An absence of a formal designation does not, however, determine that a landscape is necessarily of low value; factors such as accessibility and local scarcity can render areas of unremarkable quality highly valuable as a local resource.

9.3.25. Combined landscape value and quality create landscape sensitivity. **Table 9-2** below is taken from IAN 135/10 and sets out the indicative criteria for the assessment of landscape sensitivity that will be used in the EIA.

Table 9-2 - Landscape sensitivity criteria

Rating	Criteria
High	Landscapes which by nature of their character would be unable to accommodate change of the type proposed. Typically these would be: Of high quality (very attractive or outstanding quality) with distinctive elements and features making a positive contribution to character and sense of place. Likely to be designated, but the aspects which underpin such value may also be present outside designated areas, especially at the local scale. Areas of special recognised value through use, perception or historic and cultural associations. Likely to contain features and elements that are rare and could not be replaced.
Moderate	Landscapes which by nature of their character would be able to partly accommodate change of the type proposed. Typically these would be; Comprised of commonplace elements and features (of good or ordinary quality) creating generally unremarkable character but with some sense of place. Locally designated, or their value may be expressed through non-statutory local publications Containing some features of value through use, perception or historic and cultural associations Likely to contain some features and elements that could not be replaced.
Low	Landscapes which by nature of their character would be able to accommodate change of the type proposed. Typically theses would be; Comprised of some features and elements that are discordant, derelict or in decline (of poor quality), resulting in indistinct character with little or no sense of place. Not designated. Containing few, if any, features of value through use, perception or historic and cultural associations. Likely to contain few, if any, features and elements that could not be replaced.

9.3.26. **Table 9-3** below lists the Landscape Character Areas (LCAs) defined at a County level (see para 9.3.17) which will be considered in the landscape assessment along with a preliminary assessment of the sensitivity of each LCA.

Table 9-3 - Sensitivity of Landscape Character Area

Landscape character area	Sensitivity
35a Coquet Valley	High

Landscape character area	Sensitivity
38b Longhorsley	Moderate
2b Lower Coquet	High
35b Font and Wansbeck Valleys	Moderate
38a Longframlington	Moderate
39a Coastal Coalfields	Moderate /Low
17 Coquet Valley (Alnwick District SPD)	High

VISUAL BASELINE

General Visual Amenity

9.3.27. The gently undulating landform and sporadic small-scale mixed woodlands and plantations limit long distance views and restrain views towards the A1 even from a relatively short distance. However, the undulating landform occasionally provides extensive views towards the uplands in the west.

9.3.28. **Figure 9.1** shows the current assessment of the visual envelope associated with the Scheme which will be reviewed and updated during the EIA. Whilst not all the red line boundary is included within the current visual envelope, following design changes since the previous assessment was carried out, it indicates the degree of visual influence the Scheme is likely to have upon the surrounding area, indicating that effects are unlikely to occur beyond 2km from the centre line.

9.3.29. Prior to a more detailed assessment being carried out as part of the EIA, the current nature of views available within the area can be described as follows:

- *Views from the east of the A1 between Hebron Hill Farm near Hebron and Morpeth have greater visibility of the A697 further west than the A1, as it is on higher ground than the A1.*
- *The southern part of the existing A1 to the west and east is screened by vegetation and landform.*
- *The area west of Espley to the west of the A1 is screened by plantation blocks.*
- *The area between Earsdon and Hebron east of the A1 is screened by blocks of woodland, plantations and topography.*
- *Land to the east of the A1 north of Earsdon Junction (in particular from Helm House, Helm Cottage and House Cottage) has open views to the south and west.*
- *The area west and south of Burgham Park Golf Club west of the A1 is screened by blocks of woodland.*
- *The area between Thirston and Earsdon east of the A1 is screened by topography and vegetation.*
- *The area around the River Coquet including at Felton is screened by vegetation and topography along the valley".*

Visual Receptors

9.3.30. For the purposes of assessment, whilst it is the people who live, work and take part in recreational activities in the area, along with those simply visiting the area for recreational purposes thus actively enjoying the visual amenity of a given area, it is the places they may occupy that are mapped and described as the 'visual receptors'.

9.3.31. The potential visual receptors of the Scheme have been identified, and can be categorised as follows:

- Residential receptors;
- Recreational receptors;
- Transport receptors; and
- Commercial receptors.

Visual Sensitivity

9.3.32. As noted in GLVIA3, visual sensitivity is a function of the susceptibility of the different visual receptors to changes in the view and visual amenity they enjoy, and the value attached to particular views.

9.3.33. **Table 9-4** below sets out indicative criteria for the judgement of visual sensitivity that will be used in the EIA. This table is based on Table 1 of Annex 2 IAN 135/10, and subsequently developed and expanded upon in accordance with guidance given in GLVIA3. It is considered that the ratings and criteria contained within this table are more appropriate to the scale and nature of the Scheme. For example, not all PRoW can be considered of equal value, e.g. St Oswalds Way is a long distance trail and therefore deemed to be of higher value that one used by local residents primarily for access purposes. These criteria will be reviewed and updated in the ES.

Table 9-4 - Visual Sensitivity

Rating	Indicative Criteria
High	Residents at home (views from principal aspects) even where the actual view enjoyed may not be particularly valued, and communities or settlements where views are an important contribution to the landscape setting People enjoying outdoor recreation where the view is important to the experience (eg, users of long-distance trails and scenic public rights of way and cycle routes, walkers on National Trust or other access land, visitors to Country Parks Visitors to recognised viewpoints and to heritage assets or other attractions where views of the surroundings are an important contributor to the experience Users of scenic roads, railways or waterways identified as designated tourist routes.
Moderate	People enjoying outdoor recreation where the view is secondary to the activity (e.g. people playing outdoor sports, users of public rights of way where the main activity is exercise or getting from A to B) Schools and other institutional buildings, and their outdoor areas. Users of local roads and rail passengers (where views form an intrinsic part of the experience).

Rating	Indicative Criteria
	People at work and commercial premises where the view is an important contribution to the quality of the workplace (e.g. certain business parks, hotels and restaurants designed to take advantage of a scenic setting)
Low	People at work and commercial premises (except where noted above) Users of recreational facilities where the purpose of that recreation is not related to the view (e.g. indoor sports facilities, football pitches and stadia). Users of trunk roads and main railway routes where highly transient views are afforded.

9.3.34. For the purpose of this assessment, Table 9-4 deviates from those sensitivity criteria as outlined with IAN 135/10 following an outline assessment of the nature and type of visual receptors identified within the study area. As in all cases a degree of professional judgement would be adopted and explained when identifying receptor sensitivity.

Residential Receptors

9.3.35. As noted in **Table 9-4** above residential receptors whose principle view from ground floor windows and outdoor spaces is of the Scheme will be considered as having a high sensitivity. Where views are restricted to first floor windows the sensitivity of receptor will be reduced to moderate given the duration and time of day the view is likely to be experienced, i.e. first thing in the morning, last thing at night when, depending on the time of year, light levels may provide a degree of distortion, reducing sensitivity. Residential receptors likely to be affected by the Scheme are presented below:

- Earsdon (a number of properties)
- Felton- residential properties on the outskirts
- West Moor House
- Thirston (new houses)
- Felmoor Park
- Bywell Cottages
- Burgham Park
- Helm
- West Forest
- Causey Park Lodge
- Fieldhead
- Causey Park Bridge
- Earsdon Hill
- Portland House
- The Old School
- Fenrother
- Priest Bridge House
- Low Espley
- Beacon Hill / Hebron Hill
- Strafford House
- Low Heighley / High Highlaws Cottage
- Northgate Farm

- Fair Moor (a number of properties)
- Hebron
- West Shield Hill
- A number of other scattered residential properties not named on the OS maps

Recreational and Educational Receptors

9.3.36. Highly sensitive recreational receptors likely to be affected by the Scheme include:

- St Oswald's Way (long distance footpath); and
- Campsite at Felmoor (this could be considered analogous to a residential receptor).

9.3.37. In both instances a high sensitivity value has been awarded given the principal reason for using the receptors is associated with the enjoyment of the outdoors where the views are important to the experience.

9.3.38. Recreational / educational receptors of medium sensitivity likely to be affected by the Scheme include:

- Burnham park golf course;
- Local public rights of way; and
- Tritlington School.

9.3.39. At this time, users of local PRoW, have been identified as moderate due to their proximity to the existing A1 and A697, detracting from the overall experience when travelling along the route. Secondly, users are likely to be predominantly local residents of the nearby settlements who utilise the routes more for convenience given their proximity to their residential property rather than actively travelling to a given area for the purpose of recreational engagement of the countryside.

9.3.40. During the site visit to be undertaken as part of the EIA, refinement of the sensitivity awarded to PRoW at a local scale may be subject to change where PRoW are found to be parts of more widely advertised walks, to have views of particular value or to have particular local cultural value.

9.3.41. Recreational receptors of low sensitivity likely to be affected by the Scheme include:

- The shooting ground at Bywell
- Northumberland County Zoo; and
- Heighley Gate Garden Centre.

Transport Receptors

9.3.42. As noted in **Table 9-4** above transport receptors are normally considered to be of medium sensitivity. Where exceptions may arise this is in relation to those roads considered as being formal or informal scenic routes. Within the study area this applies to those roads that run horizontally between the existing A1 and the A691 to the west. Within the study area, these routes are principally single track lanes, sign posted at either end as alternative routes to the main A1 and A697. Due to their nature the speed of travel along such routes is expected to be slower than that of the main commuter corridors and thus a higher value is assigned to the views experienced on route. Principal views experienced along these routes are of the open countryside and thus are deemed to be visually attractive.

Commercial Receptors

9.3.43. Commercial receptors likely to be affected by the Scheme, all considered to be of low sensitivity, include:

- Thirston Airfield;
- Northgate hospital; and
- Jackson J K and sons garage.

VIEWPOINT LOCATIONS

9.3.44. The following table lists the viewpoint locations proposed to illustrate the visual assessment, with detail of the visual receptors at the viewpoint and a preliminary assessment of their sensitivity (subject to consultation / agreement with NCC and the Northumberland National Park Authority).

Table 9-5 - Visual receptor sensitivity

Viewpoint No	Visual Receptors	Sensitivity
Viewpoint 1: View looking north, along online section of the A1, within the vicinity of Northgate cemetery	Visitor to the cemetery / users of the A1	Moderate / Low
Viewpoint 2: view looking west from Public right of way (407/010)	Public right of way users	Moderate
Viewpoint 3: view looking west from unnamed road within the vicinity of Church of St Cuthbert	Road users / nearby residential properties	Moderate / High
Viewpoint 4: view looking south-west from Public right of way at Beacon Hill	Public right of way users/ nearby residential properties	Moderate/High
Viewpoint 5 : view looking north-west from the University of Newcastle Upon Tyne – Cockle Park	Users of the educational facility	Moderate
Viewpoint 6: view looking west along Public right of way (423/001)	Public right of way users	Moderate
Viewpoint 7: view looking north-east from Fenrother	Nearby residential properties	High
Viewpoint 8:view looking west from Public right of way at Tritlington (423/002)	Public right of way users/ nearby residential properties	Moderate/High
Viewpoint 9: view looking south –west from Public right of way (423/009)	Public right of way users	Moderate
Viewpoint 10: view looking east at Earsdon Hill Farm	Residential property / road user (informally scenic road)	High/ High

Viewpoint No	Visual Receptors	Sensitivity
Viewpoint 11:view looking west from Causey Park	Residential properties	Moderate
Viewpoint 12:view looking south-west from Public right of way (422/018)	Public right of way	Moderate
Viewpoint 13:View looking east from Public right of way (422/011) adjacent to Burgham Park Golf & Leisure Club	Public right of way users/ Recreational user	Moderate/Moderate
Viewpoint 14:view looking north-west from public right of way (422/018) eastern edge of airfield	Public right of way users	Moderate
Viewpoint 15: view looking south-west from St Oswald's Way (long distance footpath)	Public right of way users	High
Viewpoint 16: view looking south-east from St Oswald's Way (long distance footpath)	Public right of way users	High
Viewpoint 17: view looking north-from Public right of way (115/009)	Public right of way users	Moderate

9.3.45. Visual Effect Schedules will be prepared for different receptor groups (residential, recreational, transport and commercial) beyond that of the representative, specific and illustrative viewpoint locations noted above. Where properties have similar views, or where their impacts are identified as being the same, visual receptors will be grouped together.

9.3.46. For the purpose of the assessment it is proposed that visual effect schedules will be produced for all properties within 1km of the Scheme centreline. All remaining properties will be excluded from detailed assessment.

9.3.47. The findings of the more detailed visual receptor assessments to accompany the visual effects schedules will be presented on standalone Visual Effects Drawings (VED).

9.4 POTENTIAL IMPACTS

POTENTIAL LANDSCAPE EFFECTS

9.4.1. The Scheme may affect the landscape in the following ways:

Construction Effects

- Direct loss of landscape features such as hedges, trees and woodlands (including potential loss of Ancient Woodland);
- Temporary alteration to field boundaries;
- Temporary alteration to natural or cultural heritage features of interest; and

- Temporary localised landscape impacts from the presence of construction compounds and temporary spoil heaps.

Operational Effects

- The introduction of a large linear feature within a rural setting (offline section of Scheme);
- The increase in scale of the online section of the existing A1 carriageway, increasing its prominence within the landscape;
- Alteration to existing landform, (cuttings and embankments);
- Alteration to existing landscape pattern through the addition of a strong linear feature that cuts across the 'grain' of the landscape;
- Alteration to field boundaries;
- Alteration to natural or cultural heritage features of interest.
- Reduction of tranquillity within those areas associated with the offline section of the Scheme through the introduction of movement and noise;
- Increase in tranquillity along section of existing A1 to be de-trunked through the reduction of vehicle usage along effected section of the Scheme;
- Introduction of light pollution from vehicles at night into previously dark areas; and

POTENTIAL VISUAL EFFECTS

9.4.2. The Scheme is anticipated to impact the visual amenity in the following ways:

Construction Effects

- The temporary installation of large construction compounds;
- The temporary movement and activity of large construction machinery, usually with flashing hazard lights;
- Temporary views of cranes;
- Introduction of embankments (e.g. that cut across the Earlsdon Burn) and cuttings (e.g. the approaches to the bridge over the River Coquet), particularly noticeable because of changes over a short time-scale, given the extent of visible bare earth;
- Temporary spoil heaps and potentially borrow pits and disposal areas;
- Temporary traffic management;
- Floodlighting of areas for evening and morning working during the winter;
- Structures that stand out in the view, such as the Highlaws, Fenrother and West Moor junctions; and
- Felling of trees that leads to the opening of new views.

Operational Effects

- The introduction of movement (of traffic) into a comparatively tranquil area;
- The removal of movement (of traffic) from the de-trunked section;
- The increased visual presence of the road; and
- Vehicle lights changing the nighttime view.

9.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

9.5.1. Indicative high-level mitigation proposals are described below. These incorporate a range of measures to integrate the Scheme into the surrounding landscape, thereby limiting effects on landscape character and visual receptors. These will be further explored during the detailed assessment process as part of the EIA and through an iterative design process within the design team:

- Minimise loss of existing vegetation;
- Replace existing woodland blocks, hedgerows and individual trees lost during the construction phase;
- Planting of native tree and shrub species in keeping with local landscape character;
- Introduce species-rich grassland to increase local biodiversity;
- Design to include landscape areas that provide habitat links between existing and proposed vegetation;
- Screen planting around significant road embankments and around junctions to break up the scale of the road and screen structures, traffic and lighting;
- Retain views to local landmarks to help create a sense of place for drivers, where this does not conflict with visual mitigation;
- Slacken and round off earthworks where possible to reduce their abruptness in the landscape; and
- Consider the introduction of false cuttings to help provide screening where it is not practical or appropriate to use screen planting.

9.5.2. The key mitigation planting would include:

- Woodland and shrub planting, with a choice of species reflecting local conditions that, where possible, integrate into existing woodland areas and help to provide screening;
- Linear belts of trees and shrubs to recreate boundaries and to mitigate hedgerow losses as a result of construction; and
- Replacement avenue trees along Coronation Avenue.

9.5.3. It is currently proposed to replace trees lost with new trees west of the new carriageway. In order to accelerate the replication of the avenue, trees should be individually selected, of at least 25-30cm girth at 1m above ground level and about 10-15m in height at the time of planting.

9.5.4. Ancient Woodland is an irreplaceable resource of great importance for its wildlife, biodiversity, soils, recreation, cultural value, and the contribution it makes to our diverse landscapes. Mitigation proposals would be developed in more detail through the EIA in tandem with mitigation for potential significant ecological impacts. Detailed consultation with Natural England will be undertaken to discuss potential site-specific bespoke mitigation proposals and obtain early agreement from Natural England on the approach to the Ancient Woodland.

9.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

LANDSCAPE

9.6.1. The Scheme has the potential to generate the following significant landscape effects:

- Loss of ancient semi-natural woodland and loss and disturbance of a locally valued landscape at the crossing at the River Coquet;
- Partial loss of the Coronation Avenue trees;
- Landform changes with the introduction of three new raised junctions; and
- The offline section would be a new and visible intrusion in LCT38: Lowland Rolling Farmland.

9.6.2. Most of these effects would be greatest at completion, lessening over time as mitigation planting develops. However, for the Coronation Avenue mitigation planting would need to mature for at least 60 years to eliminate the effect.

9.6.3. The effects of disturbance to the landscape would be greater during construction because of the active nature of change.

VISUAL

9.6.4. The Scheme has the potential to generate the following significant visual effects:

- Adverse impacts on views for residents of the scattered settlements and users of PRoWs to the west;
- The offline section would have permanent adverse impacts on views from properties at Fenrother;
- From the east it would be more visible than the existing A1 from Earsdon and The Helm as it would be located on higher and more visible ground;
- Effects would be worse for residential properties along Coronation Avenue; and
- Several visual receptors leading to beneficial impacts due to a reduction of traffic on the existing A1, hence fewer moving elements in the view.

9.6.5. A further detailed assessment of residual effects will be carried out through the EIA.

9.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

9.7.1. A simple level landscape assessment was undertaken at Options Selection Stage and the resulting EAR identified potential significant landscape and visual effects. In accordance with IAN 135/10, a detailed level landscape and visual assessment (LVIA) is therefore considered appropriate to be undertaken through the EIA. No elements of the assessment are scoped out.

POLICY AND PLANS

9.7.2. The planning context for the Scheme will be compiled from the planning documents listed below:

- Northumberland Consolidated Planning Policy Framework and saved policy documents from the previous authorities;
  - Alnwick Core Strategy (October 2007)
  - Alnwick District Wide Local Plan (April 1997) – saved policies
  - Castle Morpeth District Local Plan (February 2003) – saved policies
  - Northumberland County and National Park Joint Structure Plan (February 2005) saved policy S5
  - Morpeth Neighbourhood Plan (May 2016)
  - Alnwick and Denwick Neighbourhood Plan (July 2017)
  - Alnwick Landscape Character Assessment Supplementary Planning Document (SPD) 26;
  - Northumberland Landscape Character Assessment.

9.7.3. Policy and plans relevant to the Scheme will be presented within the ES and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies; and
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

METHODOLOGY

9.7.4. The methodology will be primarily informed by the guidance provided in IAN 135/10 supported and updated as appropriate by GLVIA3, where the latter places greater emphasis on the explanation and justification for assessment criteria and conclusions, appropriate to the Scheme being assessed.

9.7.5. The assessment will build on the baseline information acquired for the Options Selection Stage EAR and this Scoping Report and assess the potential landscape and visual impacts of the Scheme on individual receptors through the following:

- ZTV to inform and define the extent of the study areas;
- Desk study and fieldwork to identify the character of the landscape, including its condition, value and sensitivity to change;
- Desk study and fieldwork to identify the visual receptors, including noting their nature, context and sensitivity;
- Review and update the baseline information including relevant planning policies, regional and district landscape character guidance;
- Review the Landscape Character Areas (LCAs) and determine if there have been any substantial landscape change since they were defined that may require revision of boundaries or descriptions, and consider the landscape of the road corridor to determine if any assessment at a finer grain is required;
- Appraise the sensitivity of landscape to the change anticipated to arise from the introduction of the Scheme, then assess the magnitude of impact to determine the significance of landscape effects;
- Assess the magnitude of visual impacts and determination of the significance of visual effects;
- Develop a landscape strategy to avoid, reduce or mitigate adverse effects, enhance the road landscape and integrate ecological mitigation.

9.7.6. The assessment will address the effect on the landscape caused by the loss of trees to the Scheme. There will also be a separate Arboriculture Assessment to accompany the ES.

Landscape Assessment

9.7.7. Effects on landscape character will be assessed by considering the components that define character and their sensitivity to the type, scale and duration of the proposed change, taking into account any mitigation measures.

9.7.8. The assessment will be undertaken for both day and nighttime situations and compared against the situation that would exist if the project were not to proceed (i.e. the 'Do Minimum'), using the following scenarios:

- In the winter of the year of opening (to represent a maximum effect situation, before any planted mitigation can take effect), taking account of the completed project and the traffic using it, and:
- In the summer of the fifteenth year after project opening, (to represent a least effect scenario, where any planted mitigation measures can be expected to be reasonably effective), taking account of the completed project and the traffic using it.

9.7.9. In line with IAN 135/10 (Annex 1), nighttime assessments will be carried out in order to identify the potential impacts of vehicle lights during the operation of the Scheme. Where it is safe to do so, a dusk or nighttime photograph of the existing situation (baseline

conditions) will be captured from viewpoint locations agreed through consultation, by which to make assessments against.

Visual Assessment

9.7.10. When considering the impacts of the Scheme (magnitude of change) upon the respective visual receptors the following scenarios will be assessed:

- Construction Phase – During the construction period, assuming a maximum perceived change situation (i.e. when construction activity is at its peak for any given view), and noting how long that period is likely to last;
- Winter (year 1) – A winter's day in the year that the project would open to traffic or be fully operational (i.e. with noise/visual screens and mounds in place but before any planted mitigation has begun to take effect); and
- Summer (year 15) – A summer's day in the fifteenth year after opening (i.e. when the planted mitigation measures can be assumed to be substantially effective). This is usually a reflection of the near fully mitigated scenario under normal conditions;

Viewpoints and Photography

9.7.11. Photography will be undertaken as part of the fieldwork. Photomontages may be produced where there are particular elements to be illustrated or particularly sensitive views to be assessed. The requirement for, and number of, photomontages will be agreed with NCC and the Northumberland National Park Authority, prior to the detailed assessment being carried out.

9.7.12. Where required and where they will inform the assessment, accompanying photography will be presented following guidance as outlined within industry best practise guidance including; the Landscape Institute's Technical Guidance Note 02/17 Visual Representation of Development Proposals (March 2017) (**Ref 9.11**) and the Landscape Institute Advice Note 1/11 Advice on Photography and Photomontage (amended 2013) (**Ref 9.12**)[2].

9.7.13. Representative photographs, during both winter and summer, to accompany the assessment will be taken as far as possible in clear sunny weather, free from conditions which might obscure the horizon or adversely affect the view of the Scheme. All images, whether in single frame or panoramic format, will be taken in landscape orientation and from photographer's eye level (approximately 1.5m above ground level).

9.7.14. Viewpoints are selected to represent the nature and type of visual amenity from a given area or direction of view. It is not offered as the 'only view' but is used to inform a greater understanding of the extent of visibility and the nature of change.

9.7.15. Suggested viewpoints to illustrate the Scheme are identified within Section 9.3.

9.7.16. As noted above, the number and location of viewpoints and the number and location of any photomontages will be agreed with NCC and the Northumberland National Park Authority in advance of the detailed assessment being carried out.

9.7.17. It should be noted that the assessment will describe and assess the landscape and visual effects in a holistic manner, rather than relying on the assessment of representative viewpoints.

[2] This is currently under review: photography guidance current at the time of assessment will be used.

SIGNIFICANCE CRITERIA

9.7.18. The significance criteria given in IAN 135/10 will be used when determining receptor sensitivity, the magnitude of impact and the overall significance of effect upon the landscape and visual amenity.

9.7.19. Where deviation from the assessment criteria associated with sensitivity of receptors has been identified in response to updated industry best practice guidance in the form of GLVIA3, this has been described within **Table 9-4** above.

9.7.20. In all cases the assessment criteria is to be used as a guide with professional judgment being applied where appropriate.

9.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

9.8.1. This scoping report is based on currently available information, and can be subject to change as the design progresses.

9.8.2. The landscape and visual effects of introducing a new development of this scale and nature are normally considered to be of an adverse nature. Beneficial effects may also occur, for example where traffic is removed from the existing road, reducing the degree to which a roadside property has views of moving vehicles.

9.8.3. The magnitude of landscape effects is dependent on the scale at which the landscape is considered. The Scheme is likely to completely transform the landscape of a single field that it traverses whilst it may have a minor or moderate effect on a single defined unit of a single landscape character type and no effect on the landscape of the County as a whole. In this assessment the landscape will be assessed at the scale of Landscape Character Areas. Locally more severe effects on pockets of particular landscape value may be identified if appropriate.

9.8.4. An assumption will be made that any tree planting would achieve a height of 4.5m by year 15, allowing for an average growth rate of 30 cm per annum.

10 CULTURAL HERITAGE

10.1 INTRODUCTION

10.1.1. This section considers the implications of the Scheme on cultural heritage during the construction and operational phases and the potentially significant effects that may arise. It sets out the proposed methodology for the cultural heritage assessment and identifies those elements that have been scoped in and out of the EIA.

10.1.2. This section has been informed by the results of the Options Selection Stage assessment (**Ref 4.1**) and the methodology set out in DMRB Volume 11, Section 3, Part 2 'Cultural Heritage' (HA208/07) (**Ref 10.1**).

10.2 STUDY AREA

10.2.1. Two study areas will be applied for the assessment within the EIA. A study area of 300m from the Scheme footprint will be applied to non-designated assets, and a wider study area of 1km for statutory designated assets, conservation areas and historic landscapes. The study areas are based on accepted best practice and due to the scale and nature of the development.

10.3 BASELINE CONDITIONS

10.3.1. The Options Selection Stage EAR identified a total of 118 heritage assets within the 300m and 1 km study areas, including 56 archaeological assets, 51 historic buildings, 10 historic landscape types and one conservation area. This was based upon the NCC Historic Environment Record and relevant Historic England datasets. Refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**.

BELOW-GROUND ARCHAEOLOGICAL REMAINS AND EARTHWORKS

10.3.2. Five assets believed to be of prehistoric date (pre-AD43) were identified within the study area and include the earthwork remains associated with a burial mound (Historic Environment Record (HER) ref 11349/12218), and six areas of cropmarks (HER Refs 11113/11974, 11220/12082, 11405/12276, 11409/12280, 11367/12236 and NMR Ref 1338137,) which although of uncertain date are likely to represent enclosures and other occupational activities.

10.3.3. Cropmarks defining an enclosed settlement at Fenrother (HER Ref 22693/22450) is the only asset within the study area believed to be of Romano-British date (AD43 to 410). It is likely to represent a native farmstead surrounded by defensive ditches.

10.3.4. Twenty-three assets believed to be of medieval period (AD 1066 to 1540) have been identified in the study area and comprise largely of ridge and furrow earthworks. Further earthworks at Helm are believed to represent the traces of a deserted village (HER Ref 11353/12222). The sites of four bridges or fords (HER Refs 17400/17108, 17397/17105, 17399/17107 and 17380/17088)) have been identified and are located on or close to the modern A1. These assets are likely to have been disturbed during the construction of the A1.

10.3.5. The sites of St Cuthbert's Chapel (National Monuments Record (NMR) Ref. 23468) and Helm Chapel (HER Ref. 11347/12216) are considered to be possible locations for demolished chapels built to commemorate a place where the monks carrying the body of St Cuthbert rested during their passage to Lindisfarne in 1069. A documentary source from

1240 records the existence of a chapel at Causey Park, and it is believed to have fallen into disuse in the 16th century. No obvious surface trace was observed at either location during the site inspection, although worked stone in field boundaries near the Helm Chapel site may be evidence for a structure nearby; and surface finds of medieval pottery (HER Ref 11362/12231) close to the same location indicate activity during this time.

10.3.6. A total of 71 assets associated with the Post-medieval period (AD1540 to1750) and Industrial period (1750 to 1901) have been identified within the study area and include; wells or springs (HER Refs. 18230/17950, 18214/17934, 11221/12083, 17394/17102, 17393/17101, 11413/12284, 17389/17097, 17383/17091, 17382/17090, 17379/17087, 17099/16808 and 17086 16795)), horse gins, mills, quarries and brick or tile works (HER Refs 11419/12290, 17388/17096, 17100/16809, 17085/16794 and NMR Ref. 1565397) the Cow Causey and Buckton Burn Turnpike road; and bridges, inns, schools and farmsteads (HER ref 18226/17946, 17392/17100, 21755/21475, 11371/12240, 17082/16791 and 17065/16773).

10.3.7. The remains of the former RAF military base at Eshott is the only modern (AD1901 to the present) asset within the study area.

HISTORIC BUILDINGS, CONSERVATION AREAS AND HISTORIC LANDSCAPES

10.3.8. Of the historic buildings identified in the study area, one is Grade I listed, two are Grade II* listed and 42 are Grade II listed.

10.3.9. The Grade I and II* Listed Buildings include:

- Church of St Michael and All Angels, Felton, Grade I;
- Bockenfield Farmhouse, Grade II*; and
- Greenhouse 120m east of Felton Park with Potting Shed at rear, Grade II*.

10.3.10. The Grade II listed buildings include seven mileposts along the route of the Cow Causey and Buckburn Turnpike road. The Felton Conservation Area is located 650m east of the existing A1 at the northern end of the study area. It includes the historic core of Felton village and parts of the designed landscape of Felton Park, as well as encompassing a number of listed buildings.

10.3.11. The Historic Landscape types present in the study area include:

- HLT1 Historic Settlement;
- HL2 Modern Settlement ;
- HLT3 Post-Medieval Enclosure;
- HLT4 Modern Fieldscapes;
- HLT5 Ornamental Designed Landscape;
- HLT6 Woodland;
- HLT7 Airfield;
- HLT8 Modern Road;
- HLT9 Modern Recreation; and
- HLT10 Rivers.

10.4 POTENTIAL IMPACTS

BELOW-GROUND ARCHAEOLOGICAL REMAINS AND EARTHWORKS

Construction Effects

10.4.1. All direct impacts on buried archaeological remains would be permanent and irreversible. Works that have the potential to impact upon any remains present include ground levelling, topsoil stripping, the removal of existing road surfaces, the proposed National Grid Diversion, construction of temporary compounds and haulage roads, and the installation of infrastructure items such as lighting columns, manholes, culverts or chambers, utilities cables, drainage pipes, balancing ponds and so forth. Any form of landscaping, including the planting of trees for screening, also has the potential to disturb buried archaeological remains.

10.4.2. Those below-ground assets which have been identified within the footprint of the Scheme have potential to be partially or wholly disturbed as a result of those construction activities listed above. These include the regionally important remains of an RAF military camp and the sites of four locally important assets that include the Helm Chapel (HER Ref. 11347/12216); Causey Park Lodge wood enclosure (HER Ref. 11371/12240) and a well near Causey Park Bridge (HER Ref. 17379/17087).

10.4.3. The route of the National Grid Diversion has the potential to impact on the proposed site of St Cuthbert's Chapel (NMR Ref. 23468) which is potentially of national importance, a rectilinear enclosure at Causey Park Hag (HER Ref. 11367/12236) of potential regional importance which could date from the Prehistoric period. The locally important sites of a nineteenth-century brick and tile yard (HER Ref. 17100/16809) and a post- medieval well (HER Ref. 17379/17087) may extend into the route of the potential powerline diversion.

10.4.4. Seven areas of ridge and furrow earthworks of local value have the potential to be flattened or removed in the construction phase.

10.4.5. The baseline data suggest that there is potential for hitherto unknown remains associated with the Prehistoric period onwards to survive below the ploughed soil in undisturbed ground. Findspots (artefacts that have been identified and subsequently removed) are often good indicators of archaeological potential and include a Mesolithic flints scatters in the north of the Scheme at West Moor farm and Bank Wood.

10.4.6. Neither the importance nor the heritage significance of hitherto unknown buried archaeological remains can be determined prior to intrusive investigation. However, physical impacts upon buried archaeological remains could prove to be significant, the degree of which will be determined by intrusive investigation.

Operational Effects

10.4.7. No impacts on archaeological remains are predicted as a result of the operation of the Scheme.

HISTORIC BUILDINGS

Construction Effects

10.4.8. It is anticipated that construction would result in the removal of a Grade II listed milepost (List Entry No. 1153544), located on the grass verge east of the A1 at Low Espley.

10.4.9. Noise caused by machinery and passing construction traffic in addition to the presence of visually intrusive compound areas is likely to result in a temporary adverse impact on the

setting of Bockenfield Farmhouse (List Entry No. 1371020) a Grade II* listed building (and therefore of national importance) located 300m east of the Scheme.

10.4.10. A number of Grade II listed buildings (and therefore of national importance) are also located close to the Scheme, and their settings are also likely to be harmed as a result of construction-related noise and visual intrusion. The assets include Causey Park House (List Entry No. 1370647), Longfield Cottage (List Entry No. 1041875, Roman Catholic Church of St Mary (List Entry No. 1371126) and Felton Park (List Entry No. 1303774), along with the non-designated Highlaws Farm and Newhouses Farm (identified during the Options Selection Stage EAR).

10.4.11. The route of the National Grid Diversion has the potential to impact a Grade II listed milepost (List Entry No. 1370646), however a site inspection in 2016 assessed the asset as missing.

Operational Effects

10.4.12. Once the Scheme is operational, the settings of those designated assets listed above are likely to be permanently harmed by a combination visual intrusion resulting from the introduction of new structures, materials and movement and a degradation of tranquillity caused by increases in traffic noise.

HISTORIC LANDSCAPE

Construction Effects

10.4.13. It is likely that the construction of the Scheme would result in the loss of a number of locally important field boundaries that are likely to be protected under the Hedgerows Regulations Act 1997. These boundaries and associated land parcels are a strong characteristic of post-medieval enclosure (HLT3) and part of the historic landscape of Northumberland.

Operational Effects

10.4.14. The introduction of the Scheme, which will follow a course through an extensive swath of farmland and which will introduce considerable noise and movement to the current rural scene, is likely to have a detrimental impact on the setting of the historic landscape which comprises historic settlement (HLT1), post-medieval enclosure field systems (HLT3) and areas of woodland (HLT6).

10.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

BELOW-GROUND ARCHAEOLOGICAL REMAINS AND EARTHWORKS

10.5.1. It is recommended that the sites of the regionally important remains of a RAF military camp, the sites of four locally important assets that include the Helm Chapel (HER Ref. 11347/12216), Causey Park Lodge wood enclosure (HER Ref. 11371/12240), and a well near Causey Park Bridge (HER Ref. 17379/17087) are avoided in order to avoid harm to these assets. If this is not possible then initially a programme of archaeological investigation should be implemented to determine the presence, extent, level of survival of the assets.

10.5.2. Non-intrusive archaeological investigation in the form of a geophysical survey is currently underway within the Scheme Footprint including the National Grid Diversion area. It is likely that a programme of pre-construction trial trenching will follow the geophysical survey and the extent of this investigation will be agreed with the County Archaeologist at Northumberland County Council (NCC) pending the geophysical survey results. An

archaeological watching brief will be required during any pre-construction geotechnical ground investigations trial pits/trenches.

10.5.3. The results of these investigations can be used to devise a suitable programme of mitigation where applicable. Mitigation measures in addition to the investigation recommended should be devised in consultation with the County Archaeologist at NCC.

10.5.4. Planning permission will need to be sought through the DCO before any sections of field boundaries likely to be protected under the Hedgerows Regulations Act 1997 are removed and any archaeological mitigation will be devised in consultation with the County Archaeologist at NCC. This is likely to take the form of excavated sections through the boundaries and the archaeological recording of these.

10.5.5. For the ridge and furrow earthworks, a Level I earthwork survey should be undertaken in accordance with Historic England guidelines. Earthwork surveys should be programmed to occur before any trial trenching or other invasive investigations took place.

HISTORIC BUILDINGS AND LANDSCAPES

10.5.6. Construction may result in the removal of the Grade II listed milepost (List Entry No. 1153544). It is proposed that this asset be subject to photographic recording prior to the start of construction to create a permanent record of its existing setting. This would be followed by the careful removal of the asset and its safe storage during construction and conservation as appropriate to prevent deterioration in its condition. On completion of construction, the milestone should be reinstated as close as possible to its original location to maintain its relationship with the road. Any mitigation should be devised in consultation with Historic England and the Milestone Society.

MITIGATION FOR THE POTENTIAL IMPACT UPON SETTINGS

10.5.7. Historic England guidelines (**Ref 10.2**) for mitigation of the impact of a development on the setting of a heritage asset (including historic landscapes) suggest that in the first instance impacts are best mitigated for either by the relocation of the development or changes to its design. Where relocation of the development is not possible, good design alone may be capable of reducing the harm.

10.5.8. Options for reducing the harm arising from development may include the relocation of a development or its elements, changes to its design, the creation of effective long-term visual or acoustic screening, or management measures secured by planning conditions or legal agreements. For some developments affecting setting, the design of a development may not be capable of sufficient adjustment to avoid or significantly reduce the harm, for example where impacts are caused by fundamental issues such as the proximity, location, scale, prominence or noisiness of a development. In other cases, good design may reduce or remove the harm, or provide enhancement, and design quality may be the main consideration in determining the balance of harm and benefit.

10.5.9. Enhancement may be achieved by actions including:

- Removing or re-modelling an intrusive building or feature;
- Replacement of a detrimental feature by a new and more harmonious one;
- Restoring or revealing a lost historic feature or view;
- Introducing a wholly new feature that adds to the public appreciation of the asset;
- Introducing new views (including glimpses or better framed views) that add to the public experience of the asset, or

- Improving public access to, or interpretation of, the asset including its setting.

10.5.10. Where attributes of a development affecting setting may cause some harm to significance and cannot be adjusted, screening may have a part to play in reducing harm. As screening can only mitigate negative impacts, rather than removing impacts or providing enhancement, it ought never to be regarded as a substitute for well-designed developments within the setting of heritage assets. Screening may have as intrusive an effect on the setting as the development it seeks to mitigate, so where it is necessary, it too merits careful design.

10.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

10.6.1. Potential effects on above or below-ground archaeology during the operation phase will be negated through mitigation measures such as preservation by record or preservation in situ. Potential effects are expected as result of direct impacts on the setting of designated heritage assets during the operation phase. The significance of these effects will be known following the completion of a setting assessment.

10.6.2. Following the implementation of mitigation measures such as good design, screening and enhancement the adverse impact on the setting of assets may be reduced, although design and enhancement will not render any impact to negligible and the impact on setting may remain significant for some assets. This statement may be revised following the undertaking of the Detailed assessment.

10.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

10.7.1. In accordance with DMRB, Cultural Heritage comprises World Heritage Sites (WHS), Scheduled Monuments (SM), Listed Buildings (all grades), Conservation Areas (CA), Registered Parks and Gardens, Historic Battlefields, the Historic Landscape and non-statutory designated heritage assets including below-ground and earthwork archaeological remains.

10.7.2. No WHS, SMs, Registered Parks and Gardens or Historic Battlefields have been identified within the Study Area and therefore these groups of assets are **scoped out**.

10.7.3. Listed Buildings, CAs, the Historic Landscape and non-statutory designated heritage assets including below-ground and earthwork archaeological remains are **scoped in**.

POLICY AND PLANS

10.7.4. Policy and plans relevant to the Scheme will be considered within the EIA and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies, including;
  - National Planning Policy Framework (NPPF) 2012 (**Ref 8.5**)
  - National Policy Statement for the National Networks (NPS NN) 2014 (**Ref 6.3**)
  - Alnwick District Wide Local Plan Saved Policy BE2 1997;
  - Alnwick District Local Development Framework Policy S15 2007; and
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

METHODOLOGY

10.7.5. The assessment will be undertaken in line with DMRB guidance and in compliance with the NPSNN, NPPF. The methodologies used will adhere to the following relevant professional guidelines: Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Historic Environment Desk-based Assessment (2014) and CIfA Code of Conduct (2014).

10.7.6. A **detailed level** desk-based assessment (DBA) as outlined in DMRB Vol 11 Section 3 Part 2 Chapter 5 will be undertaken in accordance with CIfA Standards (**Ref 10.3**) at the Preliminary Design Stage. The DBA will discuss the importance or sensitivity of the heritage assets and their settings in an international, national, county, regional or local context and present their significance using the prescribed National Planning Policy Framework values (aesthetic, archaeological, architectural and historical). The historical and archaeological context of the Scheme will be also be presented as will a strategy for further site investigation where necessary; and outline suitable mitigation measures, where possible at this stage, to avoid, reduce, or remedy adverse impacts. The assessment would include a setting assessment which would consider the impact of the Scheme on designated assets, conservation areas and historic landscapes within a 1km study area. This assessment will be undertaken in accordance with Historic England guidelines (Historic England Good Practice in Planning: 3, 2015) (**Ref 10.2**).

10.7.7. Sources of information to be utilised will include:

- The National Heritage List England (NHLE);
- The Northumberland Historic Environment Record (NHER);
- Historic mapping;
- Online academic sources; and
- Easily available secondary sources.

Terminology

10.7.8. The technical terminology to be applied in the assessment process is based on that contained within Historic England guidance, Historic Environment Good Practice Advice in Planning Note 3 (Historic England, 2015) and the Cultural Heritage Section (Volume 11, Section 3, Part 2) of the Design Manual for Road and Bridges (DMRB) (Highways Agency, 2007). This latter document has been widely adopted throughout the heritage industry as a standard.

SIGNIFICANCE CRITERIA

10.7.9. Initially, the value or importance of a heritage asset is judged from very high to uncertain based on the criteria set out in DMRB (Volume 11 Section 3 Part 2 Annex 5 (Table 5.1), Annex 6 (Table 6.1) and Annex 7 (Table 7.1). These present a general guide to the attributes of cultural heritage assets and it should be noted that not all the qualities listed need be present in every case and professional judgement is used in balancing the different criteria.

10.7.10. The CIfA 'Standard and Guidance for Historic Environment Desk-based Assessment' (2014) (CIfA 2014), considers that an assessment of the significance of heritage assets should identify the potential impact of proposed or predicted changes on the significance of the asset and the opportunities for reducing that impact. Policy 129 of NPPF states that this evidence should be taken into account when considering the impact of a proposal.

10.7.11. The level of harm to cultural heritage significance of the asset, or the magnitude of the impact as prescribed by DMRB, is the basis of assessing impact. In order to assess the level of harm or potential impact of any future development on built heritage or buried archaeological remains, consideration will be afforded to:

- Assessing any impact and the significance of the effects arising from any future development of the study area;
- Reviewing the evidence for past impacts that may have affected the archaeological sites of interest identified during the desk-based assessment; and
- Outlining suitable mitigation measures, where possible at this stage, to avoid, reduce, or remedy adverse impacts.

10.7.12. Key impacts have been identified as those that would potentially harm the significance of the heritage asset. Each potential impact will be determined as the predicted deviation from the baseline conditions, in accordance with current knowledge of the site and the scheme options.

10.7.13. The magnitude, or scale of an impact is often difficult to define, but will be termed as major, moderate, minor or negligible, based on the criteria set out in DMRB (Volume 11 Section 3 Part 2 Annex 5 (Table 5.3), Annex 6 (Table 6.3) and Annex 7 (Table 7.3).

10.7.14. The interaction between the value of the heritage asset and the potential magnitude of impact produce the impact significance. The overall significance of impact is then determined using the matrix presented in Table 5.1 of the DMRB (HA208/07).

10.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

10.8.1. This scoping report is based on currently available information, and can be subject to change as the design progresses.

10.8.2. The data used to compile the baseline includes information from secondary sources and is assumed to be reasonably accurate. The records from secondary sources relate to the recording of discoveries of an archaeological or cultural heritage nature and do not represent the full record of the historic environment.

11 BIODIVERSITY

11.1 INTRODUCTION

11.1.1. This section considers the implications of the Scheme on biodiversity during the construction and operational phases and the potentially significant effects. It sets out the proposed methodology for the biodiversity assessment and identifies those elements that have been scoped in and out of the EIA.

11.1.2. This section has been informed by the results of the Options Selection Stage assessment (**Ref 4.1**) and the methodology set out in Guidelines for Ecological Impact Assessment (**Ref 11.1)** and Highways Agency's Interim Advice Note 130/10 (IAN 130/10) (**Ref 11.12**), which supplements the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 (**Ref 11.3**).

11.2 STUDY AREA

11.2.1. For the purpose of the desk study exercise, the search radii were selected following Assessment Methods in DMRB guidance (**Ref 11.4**) and Guidelines for Preliminary Ecological Appraisal (**Ref 11.5**). The following search radii from the Scheme Footprint were used:

- Protected and noteworthy species - 2km buffer;
- Bat species - extended up to a 5km buffer;
- Non-statutory designated sites and statutory designated sites of national importance - 2km buffer; and
- Statutory designated sites of international and European importance – extended up to a 10km buffer (and 30 km for bats in relation to Special Areas of Conservation (SAC)).

11.2.2. The survey area for the Phase 1 habitat survey (including priority and notable, and other, habitats) and the majority of the field surveys undertaken for protected and/or notable species was a 500m buffer around the Scheme. Bat roost potential surveys have been carried out within a 100m buffer around the Scheme. These study areas may have been amended during the surveys to accommodate species-specific requirements (to be confirmed upon completion of surveys and receipt of survey reports).

11.3 BASELINE CONDITIONS

11.3.1. The baseline for the Scheme has been determined and appraised through a combination of desk-based study and field surveys of the study area, as presented within the following 2016/2017 Options Selection Stage reports. As these are based upon a previous red line boundary, once survey reports are available they will be reviewed to ensure validity against any revisions to the Scheme and its red line boundary.

- Options Selection Stage Environmental Assessment Report (EAR) (March 2017);
- Ecological constraints walkover (February 2016);
- Extended Phase 1 habitat survey (June 2016);
- Badger survey (December 2016);
- Bat roost potential and habitat assessment (December 2016);
- Great Crested Newt (GCN) Habitat Suitability Index (HIS) assessment and environmental DNA (eDNA) analysis report (April 2016);
- Otter and Water Vole survey report (Oct 2016, updated 2017); and
- Breeding bird survey report (June 2016).

11.3.2. The baseline information will be supplemented by any additional field surveys undertaken during 2017/2018.

11.3.3. Refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**.

11.3.4. Refer to section 11.7 and Table 11-4 for the method used to determine the values of the baseline receptors.

DESK STUDY

Designated Sites - European Designated Sites

11.3.5. At Options Selection Stage a desk-based study was carried out of the historic records of protected and notable species covering a 2km buffer (5km for bat species). Historic records within this area were collated from a range of online and third-party sources as follows:

- National Biodiversity Network – NBN Gateway;
- The Multi-Agency Geographic Information for the Countryside (MAGIC);
- Google Maps;
- Alnwick and District Natural History Society;
- Alnwick Wildlife Group;
- Environmental Records Information Centre (ERIC) North East;
- North East England Butterfly Conservation;
- Northumberland Moth Group;
- Northumberland Bat Group;
- Northumberland Badger Group; and
- Northumberland and Tyneside Bird club (NTBC).

11.3.6. No statutory European / internationally designated sites were identified within the desk study search radius of 2km (10km for European sites and 30km for European sites where bats are one of the qualifying interests). The Options Selection Stage: Assessment of Implications on European Sites Screening Report (Jacobs, April 2017) concluded that there would be no impacts to European Sites as a result of the Scheme, during construction and operation and therefore that Appropriate Assessment is not required. This HRA Screening Assessment is currently being reviewed and updated to take account of potential hydrological links with the Northumbrian Coast Ramsar / Special Protection Area (SPA), the North Northumberland Dunes Special Area of Conservation (SAC) and the amended boundary of the Northumberland Marine SPA, although the outcome is not anticipated to change. The findings will be incorporated within the EIA.

Designated Sites - Other Designated Sites

11.3.7. There are five statutory designated and five non-statutory designated sites within 2 km of the Scheme, as detailed in **Table 11-1** below:

Table 11-1 - Statutory and non-statutory designated sites within 2 km of the Scheme

Site Name	Reason for Designation	Distance from the Scheme	Nature conservation value
Statutory designated sites			
Longhorsley Moor (SSSI)	Best example of lowland sub-Atlantic heath which remains in Northumberland.	1.8 km west	National (High) Importance

Site Name	Reason for Designation	Distance from the Scheme	Nature conservation value
River Coquet and Coquet Valley Woodlands (SSSI)	River Coquet is an unmodified fast-flowing upland river supporting characteristic fauna and flora. Woodlands near to the river are semi-natural and ancient woodland sites, representative of valley woodlands in Northumbria. SSSI Units 5 (Swarland Burn to Coquet Mouth) and 13 (Duke's Bank Wood) of the SSSI are within the Scheme Footprint. Unit 13 is classified as ancient woodland, considered to be an irreplaceable resource. Unit 5 is in an unfavourable recovering condition due to sources of diffuse pollution affecting water quality, woodland management practices and deer grazing.	Within the Scheme Footprint.	National (High) Importance
Scotch Gill Wood (LNR)	Mature broadleaved woodland site.	2 km south of the Scheme.	County (Medium) Importance
Davies Wood (LNR)	Mature broadleaved woodland with song birds, small mammals and ground flora.	1.3 km south-east of the Scheme.	County (Medium) Importance
Bracken Bank (LNR)	Urban fringe site containing various flora, fauna and woodland trees.	1.3 km south-east of the Scheme.	County (Medium) Importance
Non-statutory designated sites			
Coquet River Felton Park (LWS)	Parkland site contiguous with the River Coquet.	Within the Scheme Footprint.	Local (Low) Importance
Longhorsley Moor (LWS)	Mix of heathlands, scrub and woodland that adjoin Longhorsley Moor SSSI.	2 km west of the Scheme.	Local (Low) Importance
Coquet River	Parcel of land adjacent to right bank of	1.9 km	Local (Low)

Site Name	Reason for Designation	Distance from the Scheme	Nature conservation value
Moldshaugh (LWS)	the River Coquet at West Thirston.	east of the Scheme.	Importance
Font River Woods (LWS)	Woodland lining the River Font between Mitford and Stanton.	1.7 km south west of the Scheme.	Local (Low) Importance
Cotting Woods (LWS)	Area of ancient semi-natural woodland containing houses and associated gardens.	1.2 km south west of the Scheme.	Local (Low) Importance

11.3.8. In addition, the Dukes Bank Ancient Woodland is represented within the River Coquet and Coquet Valley Woodlands SSSI, which lies within the Scheme Footprint. It is considered to be of National (High) Importance. This is the only Ancient Woodland considered within the biodiversity section of this Scoping Report. The other Ancient Woodland areas are not considered further due to distance from the Scheme, although are presented on **Figure 1.2 Environmental Constraints Plan** in **Appendix B** for context.

FIELD SURVEY

Priority and Notable Habitats

11.3.9. **Table 11-2** lists all habitats within the study area and whether they are Habitats of Principal Importance (HPI) or listed within the Local Biodiversity Action Plan (LBAP) habitats.

Table 11-2 - Habitats identified within the study area

Habitat	Habitat of Principal Importance	Local Biodiversity Action Plan Habitat
Broadleaved semi-natural woodland	ü	ü
Broadleaved/mixed/coniferous plantation woodland	ü	ü
Dense/continuous and scattered scrub		ü
Running water	ü	ü
Standing Water	ü	ü
Scattered broadleaved trees		ü

Species-poor hedge with trees	ü	ü
Species-poor intact hedge	ü	ü
Species-poor defunct hedge	ü	ü
Species-rich intact hedge	ü	ü

Other Habitats

11.3.10. Other habitats recorded within the study area include the following:

- Amenity grassland;
- Arable farmland;
- Bare ground;
- Continuous bracken;
- Dry ditch;
- Improved grassland;
- Introduced shrub;
- Marginal vegetation;
- Marshy grassland;
- Poor semi-improved grassland;
- Recently felled broadleaved woodland;
- Semi-improved neutral grassland;
- Spoil;
- Tall Ruderal; and
- Walls.

Protected and/or Notable Species Receptors

11.3.11. The desk study and initial surveys identified signs of, or potential for, the presence of protected and/or notable species.

- Badger *Meles Meles*;
- Bats;
- Amphibians including Great crested Newt (GCN) *Triturus cristatus*;
- Riparian mammals: otter *Lutra lutra* and water vole *Arvicola amphibius*;
- Breeding Birds;
- Barn Owl;
- Wintering Birds;
- Reptiles;
- Red squirrel *Sciurus vulgaris*;
- Terrestrial invertebrates;
- Aquatic invertebrates, including White-clawed crayfish *Austropotamobius pallipes*;
- Fish;
- Brown hare *Lepus europaeus*; and
- Invasive species.

11.3.12. **Table 11-3** below provides a summary of the ecological receptors identified, survey effort undertaken and existing baseline knowledge gathered at this stage. The valuation of these receptors has been undertaken in accordance with criteria set out in Section 11.7 and **Table 11-4**.

Table 11-3 - Table Summarising Survey Effort

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
Preliminary Ecological Appraisal	Biological Desk Study (BDS) and Phase 1 habitat survey. BDS of data from relevant online and third party sources including: Information on statutory designated sites within 10 km and non-statutory designated sites within 2 km; and Species and habitat records within 2 km, which was extended up to 5 km for bats. Phase 1 habitat survey of habitats within 500 m of scheme footprint carried out in line with JNCC (2010) guidance.	June 2016	In total, 35 different habitats were recorded within the survey area, including seven priority habitats (listed under Section 41. Of the NERC Act 2006): Arable field margins; Hedgerows; Inland rock; Lowland heath; Lowland mixed deciduous woodland; Rivers and streams; and Standing water. Habitats with the potential to support a number of protected and/ or noteworthy species were recorded within the survey area.
NVC	Survey of habitats within 500 m buffer of scheme footprint carried out in line with JNCC (2006) guidance.	March-September 2017 (estimation)	To be confirmed following specific survey. Results of the survey yet to be received.
Badgers	Survey of area within 500 m buffer of scheme	December 2016	The desk study returned 72 records of badger within the study area. In total, 21 setts were recorded

[3] At this current time Jacobs have supplied a summary of the methodologies used for a number of survey efforts (highlights as estimate in date completed column) but the full report/results have yet to be supplied.

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
	footprint to identify evidence of badgers and badger setts, in line with DMRB (2001) guidance and Neal & Cheeseman (1996).		during the field surveys consisting of seven main, three annex, four subsidiary and seven outlier badger setts. Evidence of other mammal activity was also recorded within the survey area. One main sett was recorded on the proposed route.
	Return visits to setts identified in previous survey in 2016 to undergo bait marking surveys in line with Delahey et al. (2007).	February-April & October 2017 (estimation)	To be confirmed following specific survey. Results of the survey yet to be received.
Bats	Assessment of all trees, buildings and structures within 100 m of scheme footprint for their potential to support roosting bats in line with BCT good practice guidance (Collins 2016).	December 2016	The desk study returned 186 bat roosts of eight known species within the study area. A total of four woodlands and 195 trees were identified within the survey area as having low or above potential to support roosting bats. 4 woodlands were of low potential; 137 trees – low potential; 45 trees – moderate potential; and 13 trees – high potential. A total of 99 buildings and structures were surveyed: 43 – negligible; 25 – low; 21- moderate; 7 – high; and 3 confirmed roosts in Buildings
	Activity surveys including static detector surveys, as well emergence and re-entry surveys of all trees, buildings and structures	April-October 2017 (estimation)	To be confirmed following specific survey. Results of the survey yet to be received.

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
	identified as having potential to support roosting bats. These surveys were carried out in line with BCT good practice guidance (Collins 2016).		
Amphibians	GCN eDNA and Habitat Suitability Index (HSI) of all ponds within 500 m of the scheme footprint in line with Oldam et al. (2010) and Biggs et al. (2014).	April 2016	The desk study returned 80 records of GCN within the study area. In total, 22 ponds with suitability for GCN were identified within 500 m of the Scheme options during the HSI assessments. Of these 22 ponds, the eDNA results returned a positive result for a single pond, negative results for 14 ponds and five ponds were not surveyed.
	GCN presence/absence and population class size estimate surveys of all ponds that returned a positive eDNA result; all ponds within 250 m of the proposed option that were not separated by barriers; and all ponds within 500 m not separated by barriers and that had a HSI score of good (0.7) and above. These surveys were carried out in line with the great crested newt mitigation	March-June 2017 (estimation)	To be confirmed following specific survey. Results of the survey yet to be received.

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
	guidelines (English Nature 2001).		
Otter and Water Vole	Surveys of suitable water courses within 250 m of the scheme footprint in line with the Water Vole Conservation handbook (Strachan & Moorhouse 2011) and Chanin (2003).	Oct 2016	In total, 38 records of recent otter field signs within the study area were returned in the desk study. No records of water vole were returned. During the otter surveys undertaken otter field signs were noted in three watercourses, namely: the River Coquet; Longdike Burn (at Bockenfield); and Earsdon Burn (at Causey Park). The majority of the field signs were spraints, with other signs such as pathways through vegetation noted. No otter holts were identified. Field signs for water vole were recorded on four watercourses; River Coquet, Longdike Burn Fenrother Burn and Earsdon Burn. American mink (predator of water vole) was also recorded on two of these watercourses, namely Longdike Burn and Earsdon Burn.
Breeding Birds	Surveys for breeding birds carried out over habitat suitable for breeding birds within 500 m of the scheme footprint in line with Gilbert, Gibbons & Evans (1998).	June 2016	Records of 115 species were obtained through the desk study, of which 69 were of conservation concern. Two designated sites are also partly designated for breeding birds; The River Coquet and Coquet Valley Woodlands SSSI and Longhorsley Moor SSSI. A total 86 bird species, not including incidental sightings were observed in the survey area. These included 46 species of birds of conservation4, and four additional species of conservation concern recorded as

[4] N.B. the total number of species of conservation concern recorded takes into account species that are listed under multiple conservation designations.

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
			incidental sightings during other surveys carried out in connection with the Scheme. 9 species listed on Annex 1 of the Birds Directive; 15 species listed on Schedule 1 of the WCA 1981 (as amended); 25 species of principal importance (NERC Act 2006); 36 Northumberland LBAP species; 31 species on the BoCC Red list; and 30 species on the BoCC Amber list. It is considered that 76 species are likely to be breeding within the survey area (32 species confirmed, 30 probably, 14 possibly) with breeding evidence found for three Schedule 1 species: barn owl *Tyto alba*, common crossbill *Loxia curvirostra* and kingfisher *Alcedo atthis*. The breeding bird assemblage is considered to be of District Importance; however, the assemblage is considered to be of County Importance overall due to the populations of yellow wagtail *Motacilla flava* and willow tit *Poecile montanus* as they represent substantially more than 1% of their respective Northumbria populations.
Barn Owl	Desktop survey identify suitable structures and trees suitable for nesting/roosting barn owls within 1.5 km of scheme footprint. Survey of all suitable structures identified to search for signs of barn owls in accordance with the Barn Owl	June-August 2017	Six records of barn owl were returned within the study area during the desk study. Several buildings which held suitability for barn owl within 500 m of the options were identified, as well as several mature or veteran trees that could support nesting/roosting barn owl. Barn Owls were originally recorded as incidental sightings on surveys for other works in connection with the Scheme in 2016. Further results to be confirmed following specific survey. Results of the survey yet to be received.

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
	Conservation Handbook (Barn Owl Trust 2008).		
	Activity surveys for barn owls within 1.5 km of the scheme footprint in accordance with the Barn Owl Conservation Handbook (Barn Owl Trust 2008).	2017 (estimation)	To be confirmed following specific survey. Results of the survey yet to be received.
Wintering Birds	Surveys for wintering birds carried out over habitat suitable for wintering birds within 500 m of the scheme footprint in line with Gilbert, Gibbons & Evans (1998).	October 2016-March 2017 (estimation)	To be confirmed following specific survey. Results of the survey yet to be received.
Reptiles	Surveys of areas of optimal reptile habitat in line with the herpetofauna works manual (Gent and Gibson 2003) and Natural England guidance (2014).	April-May & September 2017 (estimation)	Nine records of adder *Vipera berus* and 37 records of common lizard *Zootoca vivipara* were returned in the desk study within the study area. Results to be confirmed following specific survey. Results of the survey yet to be received.
Red squirrel	Surveys of woodland areas identified as having the potential to support red squirrel within 500 m of the scheme footprint in line with Gurnell, Lurz	2017 (estimation)	A total of 327 records for red squirrel within the study area were returned in the desk study. Several areas of woodland are located within the study area that could potentially support red squirrel populations. Results to be confirmed following specific survey. Results of the survey yet to be received.

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
	& Pepper (2009).		
Terrestrial invertebrates	Surveys involving observational transects, sweep netting and finger-tip searching of suitable habitats for invertebrate in line with Drake et al. (2007).	N/A	One notable terrestrial invertebrate species was identified in the desk study; Dingy Skipper Erynnis tages which is listed as a Species of Principle Importance (SoPI) and as a priority species on the Northumberland LBAP. Habitats within the survey area have the potential to support a range of protected and/or notable terrestrial invertebrate species, especially in the more diverse habitats such as woodland, scrub and hedgerow.
Aquatic invertebrates; including White-clawed Crayfish	Walkover surveys of watercourses that are crossed by the scheme or are within 500 m of the scheme footprint to identify needs for further survey.	August 2017 (estimation)	To be confirmed following specific survey. Results of the survey yet to be received.
	Invertebrate surveys of water courses identified as requiring further survey will be carried out involving kick-sampling, white clawed crayfish surveys and exposed riverine sediment surveys. These surveys will be in line with the Water Framework Directive and	August 2017 (estimation)	The aquatic habitats in the study area are considered to be suitable to support a range of aquatic invertebrate species. Records of the following species were identified through online data sources[5]: Freshwater pearl mussel *Margaritifera margaritifera*; Yellow mayfly *Potamantus luteus*; Pond mud snail *Omphiscola glabra*; Depressed river mussel *Pseudanodonta complanata*; Shiny ramshorn snail *Segmentina nitida*; Large mouthed valve snail *Valvata macrostoma*;

[5] Species are listed either on the annexes or schedules of the Habitats Directive/ Habitats and Species Regulations 2010 (as amended); Wildlife and Countryside Act 1981 (as amended) or Section 41 of the NERC Act 2006)

Receptor/Survey	Methodology[3]	Date Completed	Summary of Baseline Data
	Environment Agency guidance (1999).		Fen raft spider *Dolomedes plantarius*; Medicinal leech *Hirudo medicinalis*; Lesser silver water beetle *Hydrochara caraboides*; and White-clawed crayfish. Results to be confirmed following specific survey. Results of the survey yet to be received.
Fish	Surveys of watercourses identified as suitable to support protected fish species in line with Natural England guidance (2014).	July-August 2017 (estimation)	The watercourses in the study area were considered suitable to support a range of fish species. Records of the following species were identified through online data sources2: Atlantic salmon *Salmo salar*; Brown/sea trout *Salmo trutta*; European eel *Anguilla*; Bullhead *Cottus gobio*; Sea lamprey *Petromyzon marinus*; River lamprey *Lampetra fluviatilis*; and Brook lamprey *Lampretra planeri*. Results to be confirmed following specific survey. Results of the survey yet to be received.
Invasive species	Recorded during the Phase 1 habitat survey.	June 2016	The desk study returned records of several species listed on Schedule 9 of the WCA 1981 (as amended): Japanese knotweed *Fallopia japonica*; New Zealand pygmy weed *Crassula helmsii*; Montbretia Crocosmia *x crocosmiiflora*; Rhododendron ponticum; and Yellow archangel *Lamiastrum galeobdolon subsp. Argentatum.* All of the above species were also recorded within the survey area during the Phase 1 habitat survey.
Brown hare	N/A	N/A	In total, 14 records of brown hare within the study area were identified during the desk study. The farmland throughout the study area has the potential to support brown hare.

11.4 POTENTIAL IMPACTS

11.4.1. At this stage-specific potential impacts to ecological receptors cannot be fully assessed as the results of the full suite of surveys have not been reviewed. However, the key biodiversity issues have been identified, therefore, a brief summary of the potential impacts during both construction and operational/post-construction is provided below.

CONSTRUCTION

11.4.2. Potential impacts that would likely effect important ecological features as a result of the Scheme include:

- Direct loss/disruption of wildlife habitats including:
  - HPIs and Ancient Woodland;
  - River Coquet SSSI;
  - Badger foraging and sett building habitat, and existing badger setts;
  - Bat foraging habitat;
  - Otter and water vole habitat;
  - Barn owl foraging territory;
  - Nesting bird habitat; and
  - Reptile habitat.
- Damage to retained habitats during construction, as a result of, for example, accidental pollution, discharge of materials or hydrological effects;
- Indirect impacts upon habitats and protected/notable species as a result of disturbance (e.g. noise, vibration and lighting);
- Impacts on bats and birds through additional road lighting during the construction phase of the Scheme (e.g. lighting in close proximity to suitable habitat for bats such as the trees adjacent to the roadside or in close proximity to watercourses used by migratory fish);
- Disruption of local watercourses and drainage patterns; and
- Destruction or disturbance of badger setts, if located within 100 m of the Scheme.

OPERATIONAL/POST-CONSTRUCTION

11.4.3. The effects on ecological receptors, which would potentially occur as a result of the operation of the Scheme include:

- Severance, by dividing habitats or wildlife corridors such as:
  - Badger commuting routes;
  - Bat commuting routes;
  - Barn owl foraging territory;
  - Otter and water vole commuting and foraging routes; and
  - Amphibian and reptile dispersal routes.
- Disturbance to species (e.g. bats) from increased levels of light, noise and pollution;
- Fragmentation of existing roadside habitat as a result of the construction of the Scheme;
- Direct mortality of birds and mammals (including bats) through construction activities and traffic accidents;
- Polluted road runoff affecting the water environment of roadside stream and drains;

- Impacts on bats and birds through potential changes in lighting dynamics, e.g. from road users along the offline section of the Scheme, in close proximity to suitable habitat for bats such as the trees adjacent to the roadside or in close proximity to watercourses used by migratory fish; and
- Impacts on vegetation adjacent to the A1 from polluted spray from road traffic

11.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

11.5.1. Avoidance and mitigation measures will be further investigated, once Scheme specific details are known and associated impacts assessed through the EIA.

11.5.2. Where planting is required, it should be native species and locally sourced (where practicable). This ensures that the planting is suitable for local species likely to use them.

11.5.3. The Scheme should seek to achieve no net loss in biodiversity in line with Highways England Road Improvement Strategy 1 and as promoted under the NPPF (2012) and the Biodiversity Plan **(Ref 11.6**). An assessment of the Scheme in relation to the Highways England No Net Loss requirements will be undertaken.

11.5.4. Enhancement of existing and/or replacement habitats lost, as well as those included in additional landscaping should focus on the provision of locally sourced native tree species, which support large numbers of invertebrates, to maximise foraging and commuting resources for bats and birds.

11.5.5. Early stakeholder engagement (including Natural England, landowners Northumberland Wildlife Trust and potentially the Environment Agency) will be critical at this Preliminary Design Stage to determine the level of appropriate mitigation required to offset the impacts to the SSSI and Ancient Woodland. An indicative mitigation strategy, which will be developed following further stakeholder engagement and the results of relevant surveys, to off-set the potential impacts to Ancient Woodland is provided within the Options Selection Stage Environmental Assessment Report (Jacobs,2017), and includes:

- Land purchase for woodland replacement planting;
- Soil translocation in conjunction to the above to transfer the seedbank for sensitive woodland ground flora and ancient woodland indicator species;
- Coppiced stump translocation; and
- Dead wood re-location/creation of standing dead wood.

11.5.6. A detailed management plan may also be required to ensure long-term viability of any created habitat. The loss of Ancient Woodland may require additional botanical surveys moving forward in order to address the potential impacts and influence mitigation proposals.

11.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

11.6.1. Following provision of the field survey results, the findings will be evaluated and presented in the Environmental Impact Assessment (EIA) describing methodologies employed; results of consultation and field surveys; potential impacts; mitigation measures required to ameliorate identified potential impacts; and an assessment of significant impacts. Potential significant impacts on biodiversity will be assessed and suitable enhancement measures will be recommended to ensure a minimum target of 'no-net loss' of biodiversity is achieved and where possible, provide a biodiversity gain.

11.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

11.7.1. All designated sites of international importance are **scoped out**, based upon the findings of the Options Selection Stage EAR and HRA Screening Report (**Ref 11.17**). The HRA Screening is currently being reviewed and updated. It is considered that the Scheme is not likely to generate significant impacts upon these sites. It is considered that there would be no potential significant effects as a result of this Scheme due to the distance between the European sites. The HRA Screening will be reviewed and updated to take account of traffic data and the Highways Agency Water Risk Assessment Tool (HAWRAT), and will be subject to consultation with Natural England. However, this review and update is not anticipated to alter the conclusion.

11.7.2. One statutory designated site of national importance and a single non-statutory designated site have been **scoped in**. These are the River Coquet and Coquet Valley Woodlands SSSI and the Coquet River Felton Park LWS, respectively. The Scheme runs through both of the sites. All other statutory and non-statutory designated sites are scoped out due to their distance from the Scheme (over 1 km) and the absence of any significant functional connectivity (both habitats or species supported). Due to these factors, the Scheme is not likely to incur direct or indirect impacts to these sites.

11.7.3. The SSSI designation also contains Ancient Woodland habitat which falls within the Scheme Footprint, and has therefore been **scoped in** to the assessment. It is considered that ancient woodlands that lie outside of a 50 m buffer of the Scheme Footprint would not be directly impacted by the Scheme, and are therefore **scoped out**. This buffer was adopted in January 2018 to sufficiently meet the revised Standing Advice from Natural England. This advice recommended "*leaving a buffer zone at least 15 times larger than the diameter of a veteran tree or 5 m from the edge of its canopy, if that's greater*". This advice has subsequently been withdrawn and replaced by a 15 m buffer. However, as this is subject to consultation and formal adoption, the larger buffer of 50 m has been adopted for the purposes of this Scoping Report.

11.7.4. As there is not anticipated to be direct loss of priority habitats outside of the Scheme Footprint, these have been **scoped out**. The following priority habitats have been **scoped in** as they were found within the Scheme Footprint:

- Arable field margins;
- Hedgerows;
- Inland rock;
- Lowland heath;
- Lowland mixed deciduous woodland;
- Rivers and streams; and
- Standing water.

11.7.5. The following protected and or notable species are **scoped in** as they were recorded within the survey area as identified at Options Selection Stage:

- Badger;
- Bats;
- Great Crested Newt;
- Otter;
- Water Vole;

- Birds, including Barn Owl;
- Reptiles;
- Red squirrel;
- Terrestrial invertebrates;
- Aquatic invertebrates; including White-clawed Crayfish;
- Protected fish species; and
- Brown Hare.

11.7.6. Hazel Dormice *Muscardinus avellanarius* are **scoped out** as no records were found within the study area and the study area falls outside the species known UK distribution.

11.7.7. The following invasive plant species are **scoped in** as they were recorded within close proximity to the Scheme:

- Japanese knotweed *Fallopia japonica*;
- New Zealand pygmy weed *Crassula helmsii;*
- Montbretia Crocosmia *x crocosmiiflora*;
- Rhododendron ponticum; and
- Yellow archangel *Lamiastrum galeobdolon* subsp. Argentatum

11.7.8. The invasive vertebrate species, American mink *Neovison vison* has been **scoped in** as evidence of the species was recorded within the survey area.

POLICY AND PLANS

11.7.9. Policy and plans relevant to the Scheme will be considered within the EIA and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies, including:
  - The Conservation of Habitats and Species Regulations 2017 as amended (Habitats Regulations);
  - The Wildlife and Countryside Act 1981 (as amended) (WCA);
  - Countryside Rights of Way (CRoW) Act 2000;
  - The Natural Environment and Rural Communities (NERC) Act 2006;
  - The Protection of Badgers Act 1992;
  - The Hedgerow Regulations 1997;
  - The Wild Mammals (Protection) Act 1996;
  - The UK Post-2010 Biodiversity Framework (2011-2020) (JNCC and DEFRA, 2012);
  - Biodiversity 2020: A strategy for England's wildlife and ecosystem services (DEFRA, 2011);
  - UK Biodiversity Action Plan (UKBAP);
  - The National Planning Policy Framework (NPPF) 2012 (DCLG, 2012);
  - Environment Act 1995;
  - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (1992);
  - Council Directive 2009/147/EC on the Conservation of Wild Birds (2009);
  - Local planning policy and guidance; and
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

METHODOLOGY

11.7.10. Following completion of ecological surveys, the ecological assessment will be undertaken using a modified approach combining those detailed in the CIEEM Guidelines for Ecological Impact Assessment and Highways Agency's Interim Advice Note 130/10 (IAN 130/10), which supplements the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3.

SIGNIFICANCE CRITERIA

11.7.11. In order to characterise and assess the impacts of the Scheme, IAN130/10 will be used as the current best approach, building on existing advice as set out in DMRB Volume 11, Section 3, Part 4.

11.7.12. In order to characterise ecological impacts, the most valuable ecological resources that may be impacted by the Scheme are identified. The value given to an ecological receptor takes into account any statutory or non-statutory designations, the intrinsic value of the receptor and whether it supports legally protected or notable species. Consideration will be given to the value of the species or habitat and its conservation status at a geographic level taking population size, life cycle, rarity and/or distribution into account. Each ecological resource will be assessed as being valuable, or potentially valuable, within a geographic frame of reference as set out in the resource valuation guidance in IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment. **Table 11-4** sets out examples of resource valuation based on geographical level (adapted from IAN 130/10 due to changes in policy and guidance including the replacement of the UK Biodiversity Action Plan (BAP) with the UK Post-2010 Biodiversity Framework). The resource valuation is further informed by CIEEM's Guidelines to improve further the value classification accuracy.

Table 11-4 - Factors for Assessing the Value of Ecological Resources

Level of Value	Examples
International or European	Natura 2000 sites including: Sites of Community Importance (SCIs); Special Protection Areas (SPAs); potential SPAs (pSPAs); Special Areas of Conservation (SACs); candidate or possible SACs (cSACs or pSACs); and Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Resident, or regularly occurring, populations of species which may be considered at an International or European level where: the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or the population forms a critical part of a wider population at this scale; or the species is at a critical phase of its life cycle at this scale.
UK or National	Designated sites including: Sites of Special Scientific Interest (SSSIs); Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNRs).

Level of Value	Examples
	Areas which meet the published selection criteria e.g. JNCC (1998) for those sites listed above but which are not themselves designated as such. Habitats of Principal Importance in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006). Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or the population forms a critical part of a wider population at this scale; or the species is at a critical phase of its life cycle at this scale.
Regional	Habitats of Principal Importance; areas of key/priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and Species of Principal Importance where: the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or the population forms a critical part of a wider population; or the species is at a critical phase of its life cycle.
County	Designated sites including: Sites of Nature Conservation Importance (SNCIs); County Wildlife Sites (CWSs); and Local Nature Reserves (LNRs) designated in the county or unitary authority area context. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent). Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: the loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area; or the population forms a critical part of a wider population; or the species is at a critical phase of its life cycle.
Local	Designated sites including: Local Nature Reserves (LNRs) designated in the local context.

Level of Value	Examples
	Trees that are protected by Tree Preservation Orders (TPOs). Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

11.7.13. Once the evaluation of ecological resources has been carried out, the assessment will identify potential changes arising from proposed activities during the construction and operation of the Scheme that may affect receptors. In accordance with the DMRB and CIEEM, this will take account of design mitigation measures only (i.e. in the absence of any other mitigation), thus providing clear information regarding the unmitigated impacts to inform the identification of appropriate mitigation and/or compensation requirements.

11.7.14. Characterisation of ecological impacts upon each receptor requires the determination of a range of parameters to inform the determination of impact significance. The criteria presented in Table 2 in IAN 130/10 will be used to characterise the ecological impact. These criteria take account of both direct loss of habitat and ecological resources through land take, and also perceived indirect impacts such as pollution and habitat fragmentation.

11.7.15. Once impacts are characterised, proposals for mitigation, compensation and enhancement will be considered, with the aim of avoiding or reducing the significance of impacts. Subsequent to the mitigation proposals, the overall residual significance of impacts on each receptor will be assessed. Using the receptor value ascertained from **Table 11-4** above, and the characterisation impact table presented in Table 2 of IAN 130/10, an overall significance of effect category can be determined. This approach is presented in Table 3 of IAN 130/10.

11.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

11.8.1. This scoping report is based on currently available information (particularly relating to the lack of complete ecological surveys), and can be subject to change as the design progresses.

11.8.2. As previously indicated, the full suite of ecological survey findings are not yet available. This scoping report is based upon the initial survey findings discussed in this Section, which currently have gaps as a result of access restrictions.

11.8.3. Where full ecological baseline information cannot be obtained due to access, the precautionary principle will be applied to any assessment of Important Ecological Features.

12 ROAD DRAINAGE AND THE WATER ENVIRONMENT

12.1 INTRODUCTION

12.1.1. This section considers the implications of the Scheme on the water environment during the construction and operational phases. It sets out the proposed methodology for the road drainage and the water environment assessment, summarises potentially significant effects and identifies those elements that have been scoped in and out of the EIA.

12.1.2. This section has been informed by the results of the Options Selection Stage assessment (**Ref 4.1**), consultation with Northumberland County Council (NCC) and the methodology set out in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 10 (HD45/09) (**Ref 12.1**).

12.2 STUDY AREA

12.2.1. The study area will encompass surface water features up to a minimum of 0.5km from the Scheme. This distance is considered appropriate for the assessment of direct effects (i.e. associated with overland migration of pollutants directly to surface features, pollutants conveyed in drainage systems, and works within the river channel).

12.2.2. Features that are in hydraulic connectivity with the study area will also be considered, including surface water abstractions and downstream watercourses. Based on the professional judgement of the assessor and current knowledge of the area, features located up to a distance of approximately 1km from the Scheme will be considered. This distance is considered appropriate for the assessment of indirect effects, although if sensitive features located further than 1km from the Scheme are identified to be at risk, these features will also be considered within the assessment.

12.2.3. The study area will encompass groundwater features within approximately 0.5km of the Scheme and groundwater abstractions up to a minimum of 1km from the Scheme. This distance is considered appropriate for the assessment of surface-borne pollutants migrating to groundwater features.

12.3 BASELINE CONDITIONS

12.3.1. Information regarding baseline conditions has been obtained from the Options Selection Stage EAR, review of OS mapping, review of the NCC Level 1 Strategic Flood Risk Assessment (SFRA) and consultation with NCC. Further information will be obtained to supplement and verify the baseline conditions during the course of the EIA. Refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**.

SURFACE WATER FEATURES

12.3.2. Review of OS mapping indicates that the Scheme alignment crosses or is located in close proximity to approximately 31 watercourses within 0.5km. All of the watercourses flow in an approximate west to east direction. Two of the watercourses identified within 0.5km of the Scheme, the River Coquet and the Longdike Burn, are classified as a main river and therefore under the jurisdiction of the Environment Agency. All of the other watercourses are classified as ordinary watercourses under the jurisdiction of NCC as Lead Local Flood Authority (LLFA).

12.3.3. All watercourses within the study area form part of the Northumbria River Basin District.

12.3.4. Ecological and chemical quality of a number of the watercourses and tributaries within the study area is assessed by the Environment Agency in accordance with the objectives of the Water Framework Directive (WFD).Table 12-1 shows the WFD classifications (as assessed in 2016) for the watercourses within the study area, or that receive flow from watercourses within the study area.

Table 12-1 - Water Framework Directive classifications

Watercourse	Chemical	Ecological
River Lyne	Good	Poor
Longdike Burn	Good	Moderate
River Coquet	Good	Good

12.3.5. The River Coquet forms part of the River Coquet and Coquet Valley Woodlands Site of Special Scientific Interest (SSSI). The SSSI has been divided into 16 units by Natural England. Unit 5 'Swarland Burn to Coquet Mouth' is located within the study area. Natural England undertook an assessment of this area in 2010, which determined this unit to be 'Unfavourable - Recovering.' As a result of the assessment, a Diffuse Water Pollution (DWP) plan was agreed with the Environment Agency to tackle sources of diffuse pollution throughout the catchment. The SSSI is discussed in more detail in **Section 11 Biodiversity**.

12.3.6. Aquatic surveys were undertaken as part of the Options Selection Stage EAR including fish, aquatic invertebrates, otter and amphibians. The current situation in relation to these surveys are discussed in **Section 11: Biodiversity**.

12.3.7. Review of OS mapping indicates that there are 9 other surface water features within 0.5km of the Scheme (refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**). They have no known designations, and the use, quality and ecological value of these features are currently unclear. This will be assessed further in the EIA. The ponds are located within predominantly rural areas and have no known significant recreational value or value to the economy.

12.3.8. Review of OS mapping indicates that there are two covered reservoirs within 1km of the Scheme. The Hebron Reservoir is located to the north of Hebron, approximately 1km to the east of the existing A1. An unnamed covered reservoir is located to the north-east of Helm, approximately 0.9km to the east of the existing A1.

12.3.9. Two priority outfalls were identified within the study area with an overall status of 'X' (Risk Addressed) and 'Not determined'. The reasons for this classification will be discussed with Highways England during the EIA. No Priority A or B outfalls (high priority) were identified.

12.3.10. Analysis of the existing highway drainage system indicates there are existing highway drains that discharge to local watercourses along the A1 and local access roads. Further information will be obtained during the course of the EIA.

GROUNDWATER FEATURES

12.3.11. Review of the British Geological Survey (BGS) mapping indicates that the Scheme is underlain by bedrock geology of the Yoredale group comprising limestone, sandstone, siltstone and mudstone.

12.3.12. Review of the Environment Agency Groundwater map indicates that the majority of the bedrock geology is classified as Secondary A Aquifer, described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. A very small seam of Secondary B Aquifer is located to the north of Causey Park Bridge, described as predominantly lower permeability layers which may store and yield amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

12.3.13. Review of BGS mapping indicates that superficial deposits within the study area are mostly glacial till with small areas of glacial sands and gravels.

12.3.14. Review of the Environment Agency Groundwater map indicates that the majority of the superficial deposits are classified as Secondary (Undifferentiated) Aquifer. A small section of superficial deposits classified as Secondary A Aquifer is located along the River Coquet and Longdike Burn.

12.3.15. Review of the Environment Agency Groundwater map indicates that the southern section of the study area, just to the north of Morpeth, is located within a total catchment (Zone 3) groundwater Source Protection Zone (SPZ). Total catchment (Zone 3) is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. SPZs are typically used to protect abstractions for public water supply. Certain land uses will be restricted in order to protect groundwater quality within the area.

12.3.16. A high-level review of historic borehole scans within the study area indicates groundwater depths of between two and eight metres.

FLOODING

12.3.17. Review of the Environment Agency Flood Map for Planning (Rivers and Sea) indicates that the majority of the Scheme alignment is located in the low-risk Flood Zone 1 where the risk of flooding from fluvial sources is less than 1 in 1000 (0.1%) in any year. However, the Scheme does include sections located in the medium risk Flood Zone 2, where the risk of fluvial flooding is between 1 in 1000 (0.1%) and 1 in 100 (1%) in any year, and the high-risk Flood Zone 3, where there is a greater than a 1 in 100 (1%) risk of fluvial flooding in any year. The identified fluvial flood risk is associated with the following watercourses: the River Coquet, Longdike Burn (and the Poxtondean Burn that discharges into the Longdike Burn), Earsdon Burn, the River Lyne and Floodgate Burn.

12.3.18. Historic flood incidents were identified during public consultation undertaken to inform the Options Selection Stage assessment. An existing outfall from the A1 surface water drainage system is understood to discharge into the Back Burn via a settlement pond but without any attenuation. Anecdotal evidence suggests that the discharge has contributed to flooding at nearby properties. Another historic flooding issue was highlighted to have occurred approximately 500m to the west of the existing A1. Anecdotal reports suggest that this flooding event occurred along the length of the field north from Fenrother Lane and was associated with the unnamed tributary of Fenrother Burn. The LLFA and Environment Agency will be consulted during the EIA and FRA to verify this information and identify any other historic flood events within the study area.

12.3.19. Consultation with NCC has highlighted a number of issues regarding fluvial flooding from ordinary watercourses that will be considered further during the course of the EIA and FRA:

- Flooding issues in Morpeth relating to the Cotting Burn, Benbridge Burn and Wansbeck;

- Flooding issues in Felton relating to the Bradley Brook, Back Burn and other watercourses; and
- Performance of attenuation features associated with the existing alignment of the A1 near Felton.

12.3.20. The NCC Level 1 SFRA indicates significant flooding within the North East Northumberland river catchments from fluvial and pluvial sources since 1744. A number of significant flood events are attributed to the River Coquet and impacted settlements and roads within the study area.

12.3.21. Review of the Environment Agency Flood Risk from Surface Water map indicates that sections of the Scheme are at high, medium and low risk of flooding from surface water sources. Flooding from surface water is typically associated with natural overland flow paths and local depressions in topography where surface water runoff can accumulate during or following heavy rainfall events. The Flood Risk from Surface Water map can also indicate fluvial flood risk from watercourses with a catchment of less than c.3km2 that are too small to be mapped on the Environment Agency Flood Map for Planning.

12.3.22. The Highways England Drainage Data Management System (HADDMS) was consulted during the Options Selection Stage assessment to identify any existing surface water flood risk issues that may be associated with the current carriageway. The Morpeth to Felton section of the existing A1 has 8 documented historical flood events of which 2 are detailed as high severity events resulting in the total closure of the carriageway.

12.3.23. Review of the Environment Agency Flood Risk from Reservoirs map indicates that the River Coquet is located at the downstream extent of the area identified to be at risk of flooding from the potential failure of Rayburn Lake located approximately 9.3km to the south-west of where the existing A1 crosses the River Coquet. As the Scheme is located a significant distance from the reservoir, and the likelihood of reservoir failure is considered to be very small, the risk to the Scheme is not deemed to be significant.

VALUE OF BASELINE RECEPTORS

12.3.24. The value of the identified surface water and groundwater features will be determined following a more detailed review of available information and in consultation with the relevant authorities (i.e. Environment Agency and NCC). An initial review of the importance of identified features is provided below in **Table 12-2** based on the significance criteria outlined in Table A4.3 of Annex IV of Volume 11, Section 3, Part 10 of the DMRB (HD 45/09), as set out in the Methodology section below. The attributes of each receptor have been taken into consideration in the overall assignment of the importance value.

Table 12-2 - Importance of baseline receptors

Receptors	Description	Value
Watercourses	Watercourses within the study area include ordinary watercourses with no known designations, recreational value or value to the economy. However, the River Coquet is a designated site of national and county-wide importance, and a number of watercourses within the study area are monitored against the objectives of the WFD and form part of wider catchments assessed to have	Medium to Very High

Receptors	Description	Value
	good and moderate ecological quality.	
Ponds	They have no known designations, and the use, quality and ecological value of these features is currently unclear. The ponds are located within predominantly rural areas and have no known significant recreational value or value to the economy.	Low
Groundwater resources	The majority of the scheme alignment is underlain by Secondary A Aquifer and is not located within a SPZ. The scheme alignment to the south around Morpeth is located in Zone 3 of a SPZ.	Medium
Flood risk receptors	The proposed highway	Very High
	Residential receptors	High
	Agricultural land	Medium

12.4 POTENTIAL IMPACTS

CONSTRUCTION

12.4.1. During construction, it is considered likely that the Scheme could generate the following significant effects upon surface water features, groundwater features and flood risk:

- Increased pollution risks from spillage of fuels or other harmful substances that may migrate to local surface water and groundwater receptors;
- Increased sedimentation within watercourses caused by surface water runoff from areas of bare earth, construction materials such as aggregate and stockpiles of topsoil;
- Impacts to the hydromorphological, chemical and ecological quality of watercourses associated with works within or in close proximity to watercourses such as the installation and alteration of culverts, bridges and outfalls as well as realignment of watercourses, including longer-term changes associated with sediment deposition; and
- Increased flood risk associated with temporary works within areas of fluvial flood storage, works to existing watercourse alignments and culverts, and associated with changes to catchment permeability and hydrology.

OPERATION

12.4.2. During operation, it is considered likely that the Scheme could generate the following significant effects upon surface water features, groundwater features and flood risk:

- Polluted surface water runoff containing silts and hydrocarbons that may migrate or be discharged to surface water features or groundwater resources via the proposed highway drainage system;
- Permanent impact to the hydromorphological and ecological quality of water features associated with works within or in close proximity to water features such as the installation and alteration of culverts, bridges and outfalls as well as realignment of watercourses;

- Permanent impacts to catchment hydrology caused by the introduction of a barrier to natural overland flow and changes to natural catchment dynamics associated with the proposed highway drainage system and proposed watercourse diversions;
- Increased rates and volumes of surface water runoff from an increase in impermeable area or changes to the existing drainage regime leading to a potential increase in flood risk; and
- Increased flood risk to the scheme and to people and property elsewhere caused by displacement of flood water storage or crossing of watercourses thus impacting flood flow conveyance.

12.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

CONSTRUCTION

12.5.1. A Construction Environmental Management Plan (CEMP) will be prepared for the works that will include method statements for the proposed works, details of materials to be used, and an emergency response plan. The full CEMP will contain measures to protect both surface and groundwater quality, and other water resource aspects.

12.5.2. During the construction phase, consideration will be given to potential impacts to catchment hydrology and flow within existing watercourses. Temporary diversions may need to be established prior to undertaking the works to maintain existing catchments and flow regimes. Temporary drainage systems may also be required to capture, manage and attenuate flow prior to discharge to prevent increased flood risk.

OPERATION

12.5.3. To mitigate potential impacts during the operational phase, a robust surface water drainage system would be provided to ensure discharge from the Scheme does not increase flood risk elsewhere up to and including the 1 in 100 (1%) annual probability rainfall event, allowing for climate change effects. In sections where online improvements are proposed, consideration must also be given to the ability of the existing drainage systems to receive any additional flows. In sections where offline improvements are proposed, consideration will be given to the provision of new drainage systems that provide sufficient attenuation and restrict the rate and volume of discharge to a rate agreed with NCC as the LLFA. The Scheme may offer an opportunity for betterment, for example if attenuation can be introduced in areas where attenuation is currently not provided prior to discharge. This potential mitigation will be clarified as the design progresses.

12.5.4. Isolated sections of the Scheme are identified to be at risk of surface water flooding due to natural depressions in topography and overland flow paths, typically associated with the watercourses that are crossed by the Scheme. In order to protect the Scheme, consideration will be given to maintaining these overland flow paths and localised raising of ground levels to mitigate the potential impact of surface water flooding on the highway and to its users. The works also present an opportunity to reduce existing surface water flood risk to the highway alignment through enhancement of the existing drainage system. This potential mitigation will be clarified as the design progresses.

12.5.5. Widening of existing highway culverts and bridge crossings and watercourse diversions would maintain hydraulic capacity and, where possible, explore opportunities to provide betterment. New crossings of watercourses and new watercourse channels would maintain the capacity of the channel, ensure no increased flood risk up to the 1 in 100-year event

considering the potential effects of climate change, be designed in accordance with DMRB guidance, and be sensitive to ecological requirements.

12.5.6. Surface water runoff is likely to contain high levels of sediment and hydrocarbons that can pollute surface water and groundwater features through direct migration or via the surface water drainage system. A robust treatment system will be required. Existing drainage arrangements and water treatment provision is currently being investigated. The works may provide an opportunity to provide betterment. Multi-stage proposals that maximise passive treatment through the use of Sustainable Drainage Systems (SUDS) will be considered.

12.5.7. Parts of the Scheme are located within the high-risk Flood Zone 3. Any loss of fluvial flood storage would be compensated on a like-for-like basis to ensure no increased risk of flooding to the Scheme or elsewhere up to the 1 in 100-year event considering the potential effects of climate change.

12.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

12.6.1. Potential significant effects will be explored in detail through the EIA with a view to minimising and, where necessary and possible, eliminating potential significant effects. It is unlikely that all potential impacts during the construction phase can be fully mitigated due to the proximity of the works to the identified surface water features. However impacts during construction are likely to be temporary with no permanent adverse effect. Due to measures that will be integrated into the design of the Scheme, potential effects during the operation phase are not likely to be significant.

12.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

12.7.1. All surface water features and groundwater features identified within the baseline condition section are scoped in the assessment. The aspects of the water environment that will be considered within this section include the ecological, chemical and hydromorphological quality of surface water features, flood risk and groundwater quality in so far that groundwater may be affected by surface-borne pollutants for both the construction and operation phases.

12.7.2. Surface water features and groundwater features that are located outside of the 0.5km study area or are considered to not be hydraulically connected to the Scheme will not be considered in the assessment and are therefore scoped out.

12.7.3. Potential impacts to groundwater associated with impacts to groundwater quantity, groundwater flows and the release of contaminants contained in the ground will be assessed in the Geology and Soils chapter. Similarly, impacts to ecology, including sensitive and/or important aquatic species and habitats, will be assessed in Section 11 Biodiversity.

POLICY AND PLANS

12.7.4. Policy and plans relevant to the Scheme will be presented within the ES and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies; and
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

METHODOLOGY

12.7.5. The assessment will be undertaken in accordance with the DMRB Volume 11, Section 3, Part 10 (HD 45/09) and will involve a desk-based review of existing information, a site visit and assessment of the Scheme effects in relation to flood risk and the quality of surface water and groundwater features.

Construction

12.7.6. The assessment of potential effects that may arise during construction will be a qualitative assessment that considers risks to the chemical quality of surface water and groundwater features associated with pollutants typically experienced during construction.

12.7.7. Changes in flood risk during the construction phase will be assessed qualitatively based on professional judgement and any necessary mitigation proposed. The assessment will also consider the anticipated temporary drainage solution which will be implemented during the construction phase of the Scheme.

Operation

12.7.8. The assessment of potential effects to the water quality that may arise during operation will be informed by the methods outlined in HD 45/09 (namely Methods A, B, C and D) to assess potential effects to surface water and groundwater quality, including risks associated with spillage.

12.7.9. Method A will be used to undertake a simple assessment of the potential impact of routine runoff on the chemical quality of receiving surface waters. This will indicate if there is likely to be a risk of pollution that should be explored further or if the risks can be considered sufficiently low not to warrant any further investigation. If further assessment is required, Method B can be used to undertake a detailed assessment of the potential impact. It is considered unlikely that sampling of baseline water quality will be required to inform the assessment and that, if necessary, catchment descriptors from similar rural and upstream catchments can be used.

12.7.10. Method C will be used to assess the risk of pollution impacts from routine runoff on groundwater quality and is based on an assessment of the source-pathway-receptor protocol used in risk assessment procedures. This will be undertaken if soakaway drainage or unlined drainage channels are proposed.

12.7.11. Method D will be used to determine the potential impacts from accidental spillages predominantly due to road collisions involving the spillage of a potentially polluting substance somewhere on the length of the Scheme. It calculates the risk, assuming a spillage has occurred, that the pollutant will reach and impact on the receiving watercourse. This method considers local collision data, existing incident response arrangement and the vulnerability of receiving water bodies.

12.7.12. In addition to the core aspects of assessment as defined within DMRB (HD 45/09), the assessment of potential impacts to the water environment will also consider potential impacts to the hydromorphological quality of surface water features, as required under the WFD. This is likely to be associated with the introduction of new structures such as culverts and bridges, potential realignment of existing watercourses, and potential changes to watercourse hydrology associated with the introduction of a linear barrier or diversion of natural flow caused by the proposed surface water drainage system or cuttings that could affect baseflow to rivers. The findings of this assessment will also contribute to the

assessment of potential ecological effects assessed within the Biodiversity chapter. It is proposed that this assessment is qualitative and informed by desk-based study, site walkover and consultation with the Scheme ecologist.

Flood Risk Assessment

12.7.13. A standalone Flood Risk Assessment (FRA) will be prepared to support the EIA in accordance with the NPPF (March 2012), Planning Practice Guidance (PPG) and the National Policy Statement for National Networks (NPSNN) (December 2014), and will be reported within the ES. Paragraphs 5.92 to 5.97 of the NPSNN provide guidance on flood risk assessment for nationally significant road schemes and will be used to inform the preparation of the FRA. The FRA will assess the potential implications of the Scheme on flood risk to people and property, as well as assess the potential risk of flooding to the Scheme. It is proposed that the following aspects will be considered:

- Potential impacts to flood flow conveyance in watercourses crossed by the Scheme associated with the construction of new culverts, bridges and embankments and diversion of watercourses;
- Potential impacts to the Scheme from all sources of flooding, including fluvial, surface water, groundwater, drainage systems and artificial sources; and
- Potential impacts to fluvial and surface water flooding associated with an increase in impermeable surfacing and/or changes to catchment hydrology associated with the proposed surface water drainage system.

12.7.14. Hydraulic modelling is proposed to inform the FRA for the most significant watercourses likely to be affected by the Scheme. At this stage, it is considered likely that hydraulic modelling will be undertaken to inform the assessment of risk and mitigation for the River Coquet (dependent on the design of the proposed bridge structure), Longdike Burn, Earsdon Burn, River Lyne and an unnamed tributary of the Cotting Burn at the southern extent of the Scheme. Further modelling may also need to be undertaken if catchments are to be altered and the surface water regime changed. The need for hydraulic modelling will be discussed and agreed with the Environment Agency and NCC once further information is available on the design of potential crossings/culverts and catchments for surface water have been determined. Model output data will include detailed and calibrated hydraulic model flood extent outlines for the 20, 100, 100 plus climate change and 1000 year return period events for the operational phase, and the construction phase in line with further consultation with the Environment Agency once the construction methodology is available.

12.7.15. The floodplain extents associated with other watercourses and as illustrated within the Level 1 SFRA have been determined through broad-scale national hydraulic modelling techniques. The outputs of these models will be requested to inform the EIA and Flood Risk Assessment (FRA).

12.7.16. It is proposed that a simplified approach is taken to inform the assessment of risk and mitigation for other watercourses affected by the Scheme, using hand calculations or software such as Culvert Master to inform the appropriate sizing and design of proposed diversions and watercourse crossings.

12.7.17. All assessments will take into account the potential effects of climate change. For watercourses with a catchment of greater than c.3km^2, it is proposed to use the Higher Central allowance for the increase in peak flow to inform the design of the works. A climate change allowance of 20 to 25% has been discussed as acceptable with the Environment

Agency and NCC. Sensitivity testing will be undertaken using the Upper-End climate change allowance to test the resilience of the design. For watercourses with a catchment of less than c.3km², it is proposed to use the peak rainfall intensity guidance, using the Central allowance to inform the design on the works, and the Upper-End allowance to test the resilience of the design. This approach will be further developed following consultation with the Environment Agency and NCC, and will be confirmed within the FRA and ES.

Water Framework Directive

12.7.18. An assessment of the potential works against the objectives of the Water Framework Directive (WFD) will also be undertaken. A standalone WFD Assessment will be prepared, and the findings presented within the ES.

HUMAN HEALTH

12.7.19. As set out in HD 45/09, the methodology for the assessment of effects on humans associated with road drainage and the water environment takes the form of a risk assessment approach of the following:

- Flood risk, whether to the Scheme, or to other areas as a result of the Scheme.

12.7.20. However, this Scheme will not generate discharges to groundwater and surface water. Therefore, for the purpose of this assessment, the risk assessment will focus on flood risk only. The risk assessment will be summarised qualitatively in the assessment section of the topic chapter.

12.7.21. Where human health effects are identified in this and any other topic, whether significant or not, these effects will be incorporated into the cumulative effects assessment of human health.

SIGNIFICANCE CRITERIA

12.7.22. In order to assess the significance of effects from the Scheme on the water environment, the guidelines within Annex IV of Volume 11, Section 3, Part 10 of the DMRB (HD 45/09) will be followed. This promotes the following approach:

- Estimation of the importance of the attribute;
- Estimation of the magnitude of the impact; and
- Assessment of the significance of the impact based on the importance of the attribute and magnitude of the impact.

12.7.23. The importance (Very High, High, Medium, or Low) of the receptors will be described using the criteria and typical examples as outlined in Table A4.3 of the guidance.

12.7.24. The magnitude (Major adverse, Moderate adverse, Minor adverse, Negligible, Minor beneficial, Moderate beneficial, Major beneficial) of the predicted effect on the receptors will be described using the criteria and examples as outlined in Table A4.4 of the guidance.

12.7.25. The identification of significant effects will align to the matrix in Table A4.5 of the guidance. Where an effect is considered not to be significant or have no influence, irrespective of other effects, it will be classified as neutral.

12.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

12.8.1. This scoping report is based on currently available information, and can be subject to change as the design progresses. This is of particular importance when considering

potential impacts associated with the quality of surface water runoff, hydromorphology and channel hydraulics, and flood risk.

12.8.2. It is assumed that further drainage information will become available within the Preliminary Design Stage, through further investigation and consultation. This will be essential to the detailed assessment of risks associated with water quality and increased flood risk.

12.8.3. As of the time of writing this Scoping Report, valid traffic data is not available.

13 GEOLOGY AND SOILS

13.1 INTRODUCTION

13.1.1. This section considers the implications of the Scheme on geology and soils during the construction and operational phases. It sets out the proposed methodology for the geology and soils assessment, summarises potentially significant effects and identifies those elements that have been scoped in and out of the EIA.

13.1.2. This section has been informed by the Preliminary Sources Study Report (PSSR) (Jacobs, 2017) (Ref 13.1). A1 in Northumberland Morpeth to Felton, PSSR) and guidance document Soils and Geology DMRB Volume 11, Section 3, Part 11 (**Ref 13.2**).

13.2 STUDY AREA

13.2.1. The study area will include the full Scheme Footprint plus a buffer of 250m beyond. Based on professional judgement it is considered that this is the extent of the area that would be affected in terms of geology and soils.

13.3 BASELINE CONDITIONS

13.3.1. Baseline conditions have been defined within the PSSR and supplemented with data held by the National Soil Resource Institute. A summary of baseline conditions is provided below. Refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**.

SOIL QUALITY

13.3.2. The soils associated with the Scheme and surrounding agricultural land are primarily described as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, classified as Grade 3 Moderate quality.

13.3.3. No sensitive soils (e.g. peats, heath) have been reported to have been observed at the surface of the Scheme Footprint. Given the agricultural nature of the Site, they are considered unlikely to be present at shallow depth and therefore are considered not to represent a potential receptor within the assessment. However, this will be confirmed post ground investigation.

GEOLOGY

13.3.4. British Geological Survey BGS mapping and available historical ground investigations records for the area record the following geological sequence at the Site.

MADE GROUND

13.3.5. Made Ground was previously recorded at the surface, and described as dark grey/black clayey sand and gravel and dark grey-brown slightly sandy gravelly clay. Significant thicknesses were identified at Causey Park area. Potentially deeper deposits may be encountered associated with infilled ponds/quarries along the Scheme.

SUPERFICIAL DEPOSITS

13.3.6. The following superficial deposits are identified:

- Alluvium – localised deposits adjacent to watercourses crossing the Scheme. Generally described as very soft dark grey very sandy clay.
- Glaciofluvial Deposits – occur directly below alluvium, or at depth interlayered with glacial till and laminated glacial clay. Typically slightly clayey slightly silty slightly gravelly sand, varying in distribution, thickness and lateral extent.

- Glaciolacustrine Deposits – located between an upper and lower glacial till. Typically varied clay and silt with an absence of coarse particles.
- Glacial Till – typically encountered as weathered brown mottled red clay, underlain by grey basal till.

BEDROCK

13.3.7. The Pennine Lower Coal Measures Formation overlie the Stainmore Formation, cropping into the base of the glacial till to the east of the route. This is typically identified as a sequence of mudstone, shales, siltstones, sandstones and coal. Coal seams up to 0.5m thick occur between 13m – 17m bgl at Causey Park. Thin coal seams are observed between 30-35m bgl south of Felton.

13.3.8. Stainmore Formation and Upper Limestone series of the Yoredale Formation is encountered as interbedded sandstone, siltstone, mudstone, shale, coal and fireclay, and intercepted between 2.3m bgl and unproven at 26m bgl across the Scheme Footprint.

13.3.9. Causey Park Dyke is a tholeiitic discordant intrusion crossing the Scheme east-west in the north of the Scheme.

MINING

13.3.10. Coal Authority records state that there are two areas of coal workings, one at Causey Park Hag and the other adjacent to the airfield at the northern end of the Scheme Footprint. A Mine Plan was obtained for the coal workings at Causey Park Hag, and a geophysical survey was undertaken (as included within the PSSR). There are nine mine entries along the route. Unrecorded mine entries may occur in addition to these. Proposed bridge structures will be treated as areas where possible unrecorded workings would pose an unacceptable risk.

HYDROGEOLOGY

13.3.11. The underlying Alluvium and Glaciofluvial Deposits are classified by the Environment Agency as Secondary A Aquifers. Glacial Till has been defined as a Secondary Undifferentiated Aquifer.

13.3.12. The Stainmore Formation, Pennine Lower Coal Measures Formation and Corbridge Limestone are classified as Secondary A aquifers. The Northern England Carboniferous Tholeiitic Dyke Swarm is classified as a Secondary B Aquifer.

13.3.13. The far southern extent of the Scheme is within a Groundwater Source Protection Zone (SPZ) 3.

13.3.14. Information relating to private groundwater abstraction has been requested from NCC.

HYDROLOGY

13.3.15. Fifteen surface watercourses either cross or are located adjacent to the Scheme. These are summarised in **Table 13-1** below.

Table 13-1 - Surface Watercourses Crossing or Adjacent to the Site

Name	Existing A1 carriageway crossing type	Tributary of
Unnamed	Culvert	Benridge Burn
Cotting Burn	N/A	Shieldhill Burn

Name	Existing A1 carriageway crossing type	Tributary of
Shieldhill Burn	Culvert	Cotting Burn
Floodgate Burn	Culvert	River Lyne
River Lyne	Bridge	N/A
Fenrother Burn	N/A	Earsdon Burn
Earsdon Burn	Bridge	River Lyne
Unnamed	N/A	Earsdon Burn
Longdike Burn	Bridge	Thirston Burn
Bywell Letch	N/A	Longdike Burn
Unnamed	Culvert	Unknown
Unnamed	Culvert	Thirston Burn
River Coquet	Bridge	N/A
Unnamed	Culvert	Back Burn
Minto's Dean	Culvert	Back Burn

13.3.16. Of these, three are monitored as part of the EU Water Framework Directive (WFD); River Coquet, Longdike Burn and River Lyne.

13.3.17. The area to the north of Causey Park Bridge is in a Surface Water Safeguard Zone for metaldehyde, a pesticide.

UNEXPLODED ORDNANCE (UXO)

13.3.18. A detailed desk study assessment was undertaken for the Site. Strategic targets in the general area of the Scheme include Eshott Airfield (located immediately east of the Scheme), and, public utilities and infrastructure. It is estimated that there is the potential for up to six unexploded bombs, six incendiary bombs and seven high explosive bombs to have been dropped on the study area between 1940 and 1941. The UXO hazard plan provided within the Zetica report presents the site as low risk with respect to UXO, it is stated that the requirements for further risk mitigation will be dependent upon the tolerance to risk.

DESIGNATED SITES

13.3.19. No geological related designations have been identified within the Study Area.

13.3.20. The River Coquet and Coquet Valley Woodland SSSI intersect the scheme in the north. It is designated due to it being a relatively unmodified fast flowing river that supports a wide range of flora and fauna.

POTENTIAL SOURCES OF CONTAMINATION

13.3.21. Based on a review of the PSSR the following potential sources of contamination have been identified within the study area:

- Existing road network (A1), embankment fill materials (potentially pulverised fuel ash (PFA)), oils and fuels;

- Agriculture – slurry, pesticides, herbicides, fertilisers;
- WW2 airfield and associated buildings – asbestos, aviation fuel, gasoline, diesel, antifreeze, radium-226 dials, solvents, fire-fighting agents, PCBs, hydraulic fluid, heavy metals (5m northeast);
- Garage and historical filling station – oils/fuels (located immediately adjacent to the existing carriageway in the south of the study area);
- Infilled ponds and quarries – filled with unknown Made Ground (various located within 250m of existing carriageway);
- Historical landfills, (Eshott 90m northeast) – industrial, commercial, household and liquids/sludge wastes and The Helm, Fetton 0-20m northeast - inert wastes);
- Foot and mouth burial pits – 70m west;
- Above ground storage tank, (1973-1996);
- Shallow Mine Workings at Causey Park Hagg;
- Hazardous mine gases;
- Hazardous ground gas associated with areas of infilled ground; and
- General Made Ground.

POTENTIAL ENVIRONMENTAL RECEPTORS

13.3.22. Soils and Geology related receptors that are likely to be considered within the EIA are summarised in **Table 13-2**. For the purposes of this Scoping Report, these values are based upon guidance contained within R&D Publication 66: 2008 Volume 1 (**Ref 13.3**). The sensitivity criteria will be confirmed and reported in the ES.

Table 13-2 - Soils and Geology receptors

Aspect	Sensitive Receptor	Sensitivity*
Human Health	Construction workers; Adjacent site users (visitors/workers); Future site users; and Below ground maintenance workers	Medium
Controlled waters	Surrounding watercourses; and Groundwater (Secondary A Aquifer)	Medium
Soil	Agricultural soil	Low
*Sensitivity based on professional experience		

13.4 POTENTIAL IMPACTS

13.4.1. The impacts on the Geology and Soils are considered likely to be most significant during the construction phase of the Scheme. Potential impacts are summarised below

CONSTRUCTION

- Loss of agricultural soil;
- Impacts to human health caused by exposure to contaminated ground and mine gas and buried UXO;

- Impacts to Human Health associated with ground instability; and,
- Impacts to controlled water from the release of physical and chemical contaminants.

OPERATION

- Impacts to Human Health caused by expose to contamination exposed on any grass verges; and
- Impacts to controlled water from the release of uncontrolled spillages from vehicles.

13.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

13.5.1. The likely mitigation measures to be applied to the Scheme to avoid, prevent or reduce potentially significant effects to Soil and Geology related environmental receptors are likely to include:

- Implementation of a Construction Environmental Management Plan (CEMP) to mitigate risks associated with the construction phase. To include measures to;
  - Mitigate physical and chemical surface water contamination
  - Limit chemical spillages, and
  - Provide guidance on suitable health and safety practices.
- UXO mitigation measures – either (for zero risk tolerance) obtain a clearance certificate or (where risk tolerance is higher) train groundworkers/staff relating to risks and possible on site indicators and implement a scheme for actions to take if UXO is encountered;
- Earthworks being completed in accordance with a CL:AIRE compliant Materials Management Plan (MMP) to ensure re-used material does not present a risk to human health or the Environment;
- Ensuring construction workers wear appropriate PPE and use monitoring equipment where appropriate. Respiratory Protective Equipment (RPE) will be utilised where required to mitigate the potential risk of exposure to hazardous gas/vapour and/or depleted oxygen;
- Incorporating a temporary drainage strategy during the construction phase as part of the design solution which will include pollution control measures;
- Temporary shoring associated with loose or unstable ground; and
- Pollution control measures incorporated within the Scheme drainage system.

13.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

13.6.1. It is anticipated that permanent mitigation and environmental enhancement measures are to be incorporated into the design of the Scheme and temporary mitigation measures will be implemented during the construction phase. As such the potential effects are not considered to be significant, subject to the findings of the ground investigation.

13.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

13.7.1. The following elements have been **scoped out** of the assessment:

- The effect on statutory and non-statutory sites of geological importance, as no sites have been identified within the Site or surrounding area.

13.7.2. The following elements have been **scoped in** the assessment:

- Coal mining related Impacts associated with ground stability, and release of hazardous mine gas;

- Contaminated land exposure risks associated with disturbance of Made Ground associated with the former MOD airfield and industrial land uses;
- Impacts associated with piling bridge abutments and creating of preferential contaminant pathways;
- Impacts on agricultural soil quality;
- Impacts associated with major earthworks associated with construction of the highway; and,
- Impacts associated with construction activities, the use and maintenance of heavy machinery, fuel storage and potential spills.

POLICY AND PLANS

13.7.3. Policy and plans relevant to the Scheme will be presented within the ES and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies, including;
  - National Planning Policy Framework (NPPF) 2012 (**Ref 13.4**)
  - Relevant Local Policies, specifically those relating to contaminated land and mineral resources policies.
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

METHODOLOGY

13.7.4. A **detailed level** assessment of Soil and Geology (i.e. full EIA) will be undertaken in accordance with DMRB Volume 11, Section 3 Part 11 Soils and Geology. The detailed elements will include:

- Review information on the agricultural quality of land;
- Review baseline soil, geological and environmental information for the corridor, including historical mapping, to enable an assessment of potential constraints associated with land contamination;
- Review detailed site survey and ground investigation works to confirm attribute importance and facilitate assessment of potential contaminant linkages, as required;
- List and assess potential impacts;
- Assess the sensitivity of the attributes; and,
- List and assess the likely significance of effects.

13.7.5. The potential impacts will take into consideration both the construction and operational phases of the Scheme. Contaminated land related issues will be assessed in accordance with Model Procedures for the Management of Contaminated Land (CLR11) (**Ref 13.5**). The document advocates the use of a conceptual site model in an attempt to establish the links between a hazardous source and a sensitive receptor via an exposure pathway. The concept behind this approach is that, without each of the three fundamental elements (source, pathway and receptor), there can be no risk from contamination. Thus, the mere presence of a contamination hazard at a particular site does not necessarily imply the existence of associated risks.

Guidance Documents

13.7.6. The assessment will be undertaken in accordance with the following principal guidance:

- Soils and Geology DMRB Volume 11, Section 3, Part 11;
- Part 2A of the Environmental Protection Act, 1990;

- The Water Environment (Water Framework Directive) (England and Wales) Regulations, 2003;
- Environment Agency (2004) Model Procedures for the Management of Contaminated Land (CLR11);
- Construction Industry Research and Information Association (CIRIA) 665 (2007), Assessing Risks Posed by Hazardous Gases to Buildings;
- Dangerous Substances Directive (Amendment), 2006;
- Environmental Damage and Liability (Prevention and Remediation) Regulations, 2009;
- Control of Asbestos Regulations, 2012;
- Contaminated Land (England) (Amendment) Regulations, 2012;
- Construction (Design & Management) (CDM) Regulations, 2015; and
- Groundwater Protection Technical Guidance, 2017.

Scope of Assessment

13.7.7. The following elements of the Scheme are considered to be relevant to the assessment of effects on Soils and Geology:

- Land Take – as part of the construction phase of the Scheme, areas of existing land use (e.g. agricultural) to be converted to Highway;
- Earthworks - as part of the construction and preparation phase of the Scheme there will be elements of soil excavation and ground preparation;
- Land Uses - highway and areas of soft landscaping (i.e. embankments) where contaminated soils may be present at/or near the surface; and
- Construction of foundations (e.g. piles) and below ground utility infrastructure - creation of enclosed spaces and placing below ground structure/services into the ground.

SIGNIFICANCE CRITERIA

13.7.8. The likely significant environmental effects are assessed based on consideration of the sensitivity of receptors and the predicted magnitude of the potential effects. The magnitude of the affected receptor/receiving environment is assessed as substantial, moderate, minor or negligible and the sensitivity is assessed on a scale of high, medium, low and negligible. Example receptor sensitivity and magnitude of impact scenarios based on professional experience are provided in **Table 13-3** and **Table 13-4** respectively (these criteria will be confirmed and reported within the ES).

Table 13-3 - Geology and soil sensitivity impact criteria

SENSITIVITY	DESCRIPTION
High	Areas containing geological, hydrological or habitat features considered to be of national or international interest, for example SSSIs. Agricultural soil classified as Grade 1 and 2 (excellent and very good. Highly permeable superficial deposits allowing free transport of contaminants to groundwater and surrounding surface waters. Site located within a Source Protection Zone (SPZ) 1 or 2. Wetland/watercourse of Good Ecological and or Chemical Potential (WFD).
Medium	Areas containing features of designated regional importance, for example Regionally Important Geological and Geomorphological Sites

	(RIGS), considered worthy of protection for their educational, research, historical or aesthetic importance. Site Located within an SPZ Zone 3. Moderately permeable superficial deposits allowing some limited transport of contaminants to groundwater and surrounding surface waters. Wetland/watercourse of Moderate Ecological and/or Chemical Potential (WFD). Impact on agricultural soil classified as Grade 3 a and b (Good to moderate).
Low	Geological features not currently protected and not considered worthy of protection. Low permeability superficial deposits likely to inhibit the transport of contaminants. Site not located within an SPZ. Wetland/watercourse of Poor Ecological and/or Chemical Potential or no WFD classification. Impact on agricultural soil classified as Grade 4 (Poor).
Negligible	No sensitive environmental receptors identified.

Table 13-4 - Geology and soil magnitude impact criteria

SENSITIVITY	DESCRIPTION
Substantial	Significant (greater than 50%), or total loss of a site of recognised geological importance, Significant contamination identified, in excess of relevant thresholds for protection of Controlled Waters. Loss of Grade 1 (Excellent) and Grad 2 (very Good) Agricultural Land. Significant impact upon human health.
Moderate	Partial loss (between approximately 10% to 50%) of a site of recognised geological importance. Localised or marginal contamination or potential but not proven contamination. Loss of Grade 3 (Good to Moderate) Agricultural Land. Moderate impact on human health.
Minor	Minimal effect (a loss of up to 10%) on a site of recognised geological importance. No significant contamination identified, or could reasonably be expected based on desk study findings. Loss of Grade 4 (Poor) Agricultural Land. Minor/insignificant impact upon human health.
Negligible	Very slight change from baseline conditions. Change hardly discernible, e.g. short-term compaction from machinery movements. No contamination above relevant thresholds identified, or could

	reasonably be expected based on desk study findings. Loss of Grade 5 (Very Poor) Agricultural Land.

13.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

13.8.1. This scoping report is based on currently available information, and can be subject to change as the design progresses.

13.8.2. A suitably scoped Ground Investigation has recently been undertaken across the Scheme Footprint. The information obtained as part of the ground investigation will be utilised to further refine the baseline conditions and characterise potential risks prior to completion of the EIA. The findings of the Ground Investigation will inform the design of the Scheme and ensure that appropriate measures are put in place during both the construction phase and operational phase to minimise identified risks associated with geology and soils.

13.8.3. As part of the ground investigation a programme of ground gas and water monitoring will be undertaken to assess the potential presence of hazardous ground gas and mobile contaminants in groundwater.

14 PEOPLE AND COMMUNITIES

14.1 INTRODUCTION

14.1.1. This section considers the implications of the Scheme on people and communities during the construction and operational phases, and the potentially significant effects. It sets out the proposed methodology for the people and communities assessment and identifies those elements that have been scoped in and out of the EIA.

14.1.2. This section has been informed by the results of the Options Selection Stage assessment (**Ref 4.1**). It follows the updated DMRB topic structure contained within IAN 125/15 (**Ref 14.1**). This combines published guidance in DMRB Volume 11, Section 3, Parts 6 (Land Use) (**Ref 14.2**), 8 (Pedestrians, Cyclists, Equestrians and Community Effects) (**Ref 14.3**) and 9 (Vehicle Travellers) (**Ref 14.4**) into one assessment of People and Communities.

14.1.3. This topic describes the potential effects on people and communities in accordance with the following themes: effects on travellers (non-motorised users and vehicle travellers), effects on communities (community amenity and severance, and physical assets) and effects on people (economy and employment and recreational activities).

14.2 STUDY AREA

14.2.1. DMRB Volume 11, Section 3 (Part 6, Part 8 and Part 9) does not specify a scheme assessment area when considering the effects of a road project on all travellers, communities and people. Assessment areas have therefore been selected based on professional experience of road development schemes.

EFFECTS ON ALL TRAVELLERS

Non-motorised Users

14.2.2. A study area of 500 m will be used to assess potential direct impacts on Public Rights of Way (PRoWs) and journey amenity experienced by pedestrians, cyclists and equestrians.

Vehicle Travellers

14.2.3. Potential impacts on vehicular travellers could be widespread, influenced by changes in traffic flow as well as infrastructure, and not limited to a certain buffer area around the Scheme. For the purpose of traffic modelling and the driver stress assessment, the study area includes the existing A1 and the links in close proximity to the A1.

EFFECTS ON COMMUNITIES

Community Amenity and Severance

14.2.4. There is no defined study area for the assessment of community amenity and severance. Potential impacts could be widespread (influenced by changes in traffic flow as well as infrastructure) and not limited to a certain buffer area around the Scheme. With this in mind, the study area for this assessment extends to those facilities within the communities of Morpeth and Felton, as well as any important community facilities further afield that could experience an impact.

Physical Assets

14.2.5. Commercial (including private agricultural landholdings) assets and community assets within the immediate vicinity of the Scheme will be considered.

EFFECTS ON PEOPLE

Economy and Employment

14.2.6. The assessment of impacts on the economy and employment during the construction phase focuses on the local authority of Northumberland.

Recreational Activities

14.2.7. There is no defined study area for recreational activities. For the purposes of the assessment, a study area of 500m will be used to assess potential recreational resources.

14.3 BASELINE CONDITIONS

14.3.1. Refer to **Figure 1.2 Environmental Constraints Plan** in **Appendix B**.

EFFECTS ON ALL TRAVELLERS

Non-motorised Users

14.3.2. There are no national cycle routes in close proximity to the Scheme. The nearest are National Cycle Route 155 (Morpeth and Newbiggin-by-the-sea), which runs east-west and follows the A197 at Morpeth to Newbiggin-by-the-sea, and the Coast and Castles South cycle route (Sustrans Route 1) which runs along the Northumberland coastline and crosses the A1 approximately 20 km north of Alnwick.

14.3.3. A network of PRoWs surrounds the existing A1 and the Scheme. A number of PRoWs provide access between residential properties and residential areas. In particular, to the west of the existing A1, where the offline section of the Scheme is proposed, PRoWs link several residential properties. Overall, PRoWs in the study area do not form a coherent network, but there are sections where PRoWs may form peripheral parts of a coherent network lying further to the east or west, or small sections of the study area where PRoWs link up (sometimes with local roads) to form a localised network of community or recreational importance (e.g. to the west and north-west of Causey Park Bridge, extending westwards to the A697 and Longhorsley).

14.3.4. Side road junctions with the A1 provide crossroads or staggered junctions with the potential to link recreational networks one side of the A1 with networks on the other side. While some of these locations may in principle be attractive to NMUs, there is a high potential for suppressed demand due to the volume and speed of traffic making crossing difficult.

14.3.5. **Table 14-1** provides a qualitative description of the PRoWs within the study area. Key routes have been determined by professional judgement based on the location of the PRoWs.

Table 14-1 - Summary of PRoWs within the study area

PRoW ref.	PRoW Type	Description
407/010	Bridleway	Connects Northgate Farm and A697 with North Gate and the local road network.
407/013	Footpath	Connects Fair Moor with PRoW 407/012 (bridleway) and Heighley Wood, which jointly form a potential circuit with a minor local road.
407/012	Bridleway	Forms a potential circuit with PRoW 407/013 and a minor local

PRoW ref.	PRoW Type	Description
		road.
407/018	Footpath	Leads from the existing A1 to Hebron via The Bungalows.
407/001	Footpath	The PRoW does not seem to link any communities. However, part of the footpath runs parallel to Floodgate Burn and could be used for recreational purposes. Appears to have some relationship with features of a remnant designed landscape associated with Espley Hall.
407/002	Footpath	Connects with PRoW 407/001.
423/001	Footpath	Connects Fenrother to the A1, near The Old School.
423/002	Footpath	Runs along a track from near residential properties adjacent to A1 to a farm at Tritlington Broom and on to the village of Tritlington. This is potentially an important community route.
423/006	Footpath	Leads from the bend in footpath 423/007 (below) westwards to agricultural land to the west of the existing A1, terminating at a track running south to a local road (Fenrother Lane) which links the A1, Fenrother and the A697.
423/007	Footpath	Leads from the A1, including Earsdon Moor Farm, westwards before turning north to New Houses Farm, where it also links with a track that leads west into agricultural land and north-east to the A1 near Causey Park Bridge.
423/008	Footpath	The footpath runs in the valley of the Earsdon Burn, linking the A1 near Causey Park Bridge with a minor road near Earsdon West Farm/Earsdon. Via a potential at-grade crossing of the A1, it continues the same line as footpaths 423/017 and 423/013. Together with local roads/tracks and footpath 423/009, it could form part of a wider network linking up a dispersed community and providing opportunities for circular walks.
423/013	Footpath	Connects Causey Park Bridge with Causey Park. Additionally, the footpath seems to form part of a wider PRoWs network and part of the same line as 423/008 and 423/017.
423/017	Footpath	Very short path through Causey Park Bridge, forming a short section of a single continuous line with 423/008 (east of the A1) and 423/013 (west of Causey Park Bridge).
422/018	Byway	Runs from the A1 south of Felmoor Park to and across Thirston Airfield, on a sinuous route to the east of the A1. Links with several minor roads and tracks and with another footpath (outside the study area) that runs on to West Thirston and Felton.
422/011	Footpath	Connects A1, Burgham Park and a local road to the west of the existing A1, which then provides further links on to other

PRoW ref.	PRoW Type	Description
		footpaths and bridleways outside the study area.
422/002	Footpath	Runs westwards from the A1 along the upper edge of the wooded River Coquet gorge on its south side, linking with other footpaths and tracks further west. Also links to 422/020 running eastwards from the A1 via an A1 crossing. Walking groups are known to use the footpaths in the River gorge.
422/020	Footpath	Runs eastwards from the A1 to Felton, along the upper edge of the wooded River Coquet gorge on its south side, linking with 422/002 (see above). Possibly an important recreational route. Walking groups are known to use the footpaths in the River gorge. However, the A1 crossing can be considered dangerous.
115/009	Footpath	Connects Felton westwards to a wider PRoWs network passing below the north end of the existing A1 bridge over the River Coquet gorge. The PRoW runs along the top of the north side of the River Coquet gorge through a wooded area. It also forms part of the following long distance routes: St Oswald's way, Tops of the North (Carlisle and Cheviot to Cat and Fiddle) and Inn Way to Northumberland. Therefore, this PRoW has been considered as a key recreational route. Walking groups are known to use the footpaths in the River gorge. However, the A1 crossing can be considered dangerous.
115/008	Footpath	Runs westwards from Felton through woodland to the A1, where it is severed by a cutting from 115/016, which would otherwise provide an onward connection to Park Wood and the continuation of 115/009, which forms part of several long-distance trails. There is a subway just to the north passing beneath the A1 which is not a public right of way, but which is reported to be used by walkers (feedback from public awareness event).
115/016	Footpath	Runs westwards from the A1 past the south side of Park Wood to provide a link with the continuation of 115/009, which forms part of several long-distance trails.
N/A	On road cycle path/ pavement	Approximately 2.5km road cycle path/ pavement on the east side of the A1 between the junction with the A192 and the junction turning to Hebron in Lower Espley
N/A	On road cycle path/ pavement	Approximately 3km on the east side of the A1 between the Shield Green/ Tritlington Road junction with the A1, and the west road junction north of Causey Park.

14.3.6. In addition to the PRoWs, there are footways along several sections of the existing A1, including much of the southern third of the section, around Tritlington and Causey Park Bridge and on the bridge over the River Coquet.

14.3.7. **Table 14-2**, taken from the Options Selection Stage EAR, below shows pedestrian and cyclist movements recorded by NMU surveys which were carried out between July and September 2016. The surveys suggest that the most popular PRoWs were the Byway 422/011 (Felmoor Park) and Footpath 115/009 (north side of River Coquet). Whilst busy pedestrian movements on non-PRoWs were recorded on West Moor junction and Causey Park Bridge South, the most popular cycling routes were at Highlaws/Hebron junction and West Moor junction.

14.3.8. On the days that the surveys were undertaken, there was very limited movement by equestrians, with only two recorded on the Morpeth to Felton section; one at the Highlaws/Hebron junction and one at the southern end of the section. In both cases, the equestrians were noted to be moving away from the A1.

Table 14-2 - Summary of NMU movements within the study area

Area/ward name	Site NMU total	Pedestrians	Cyclists	Horse riders
Highlaws/ Hebron junction	33	10	21	2
Footpath 407/001 and track to Espley Hall	3	3	0	0
Tritlington Junction and Footpath 423/001, footpath and bus stop	15	8	7	0
Fenrother Junction	10	7	3	0
Footpath 423/002	8	7	1	0
Earsdon Moor Farm/Footpath 423/007	7	7	0	0
Earsdon West Farm junction	3	3	0	0
Causey Park Bridge south	13	13	0	0
A1/Footpath 423/013	6	6	0	0
Causey Park Bridge/Footpath 423/013	49	39	10	0
Causey Park North/track to Earsdon Hill	7	5	2	0
Junction to east north of Causey Park	9	3	6	0
Causey Park Hag Lodge junction	11	5	6	0
Helm junction	12	8	4	0
Byway 422/018	91	82	9	0
Longhorsley East Road	13	10	3	0
Footpath 422/011	10	9	1	0
Junction with road west to Bywell Cottage	6	1	5	0
West Moor Junction	104	54	50	0
Footpaths 422/002 and 422/020 south	10	8	2	0

Area/ward name	Site NMU total	Pedestrians	Cyclists	Horse riders
of River Coquet				
Footpaths 115/009, passing under bridge north of River Coquet	79	78	1	0
Footpath 115/008	6	6	0	0

14.3.9. This indicates that the great majority of users were concentrated at five locations:

- Highlaws Junction;
- Causey Park Bridge (off the line of the A1);
- Byway north of Helm;
- West Moor Junction; and
- St Oswald's Way, in the River Coquet Valley.

Vehicle Travellers

14.3.10. The existing A1 experiences slight delays under baseline conditions. Delays are more problematic along the minor roads that join the A1 due to drivers having to wait for a gap in the traffic to join the A1.

14.3.11. During current baseline operation, driver stress along Morpeth to Felton section is considered to be 'moderate' or 'high', based on the three point descriptive scale outlined in the DMRB Volume 11 Section 3, Part 9 – Vehicle Travellers.

EFFECTS ON COMMUNITIES

Wards and Parishes

14.3.12. The Scheme is located within nine ward boundaries (in accordance with the 2011 Census ward boundaries).

14.3.13. Within these nine wards there are 18 parishes. The largest proportion (around 50% of the length of the route) falls into Chevington and Longhorsley. In 2013 the ward was restructured geographically and the name was changed to Longhorsley.

14.3.14. An asterisk (*) indicates that the route passes directly through the ward. Other wards that are captured within the Scheme boundary are also shown in **Table 14-3**.

Table 14-3 - Parishes and wards in proximity with the Scheme

Parishes	Ward
Acklington	Amble West with Warkworth
Felton*	
Longframlington	Shibottle
Newton-on-the Morro and Swarland*	
Brinkburn	
Thirston*	Chevington and Longhorsley
East Chevington	

Longhorsley	
Tritlington and West Chevington*	
Netherwitton	Ponteland North
Meldon	
Mitford	Ulgham
Hebron	
Ulgham	
Widdrington Station and Stobswood	
Longhirst	Pegswood
Pegswood	
Morpeth	Morpeth North
	Morpeth Kirkhill
	Morpeth Stobill

Population Data

14.3.15. Data on population size and density are provided in **Table 14-4**. These data are based on the 2011 Census; however, the ONS data confirms that inward and outward migration to Northumberland is relatively stable, so population in individual wards is unlikely to have changed significantly. The number of residents in each ward ranges from around 4,000 to around 6,000, averaging at around 4,700 residents per ward.

14.3.16. Northumberland is sparsely populated with 63 people per km². 51% of the population live in the 3% of urban land based mainly in the south east of the county. The high population density in the three Morpeth wards is balanced out by very low population densities in other wards.

Table 14-4 - Area and ward population size and density (2011 Census)

Area / ward name	All usual residents	Density (number of persons per hectare)
England	53,012,456	4.1
North East Region	2,596,886	3.0
Northumberland	316,028	0.6
Amble West with Warkworth	4,172	1.0
Chevington with Longhorseley	5,596	0.6
Morpeth Kirkhill	5,207	17.1
Morpeth North	4,416	12.3
Morpeth Stobhill	4,115	17.9

Area / ward name	All usual residents	Density (number of persons per hectare)
Pegswood	3,869	2.4
Ponteland North	4,454	0.2
Shilbottle	4,925	0.5
Ulgham	5,238	0.7

Community Amenity and Severance

14.3.17. The community receptors located within the main population hubs of Morpeth, Felton and Longhorsley are predominantly comprised of schools, churches and medical facilities, as illustrated in **Table 14-5.**

Table 14-5 - Community facilities in Morpeth, Felton and Longhorsley

Community	Facilities
Morpeth	Morpeth NHS Centre
	Newminster Middle School
	Morpeth Rugby Football Club
	St Mary Magdalene Mitford
	St George's Hospital
	The King Edward VI School
	Chantry Middle School
	All Saint C of E First School
	Northumberland Head Injuries Unit
Felton	St Michael & All Angels Church
	Felton URC Church
	Felton First School
	Post Office
	Felton Park
	Blackwood Hall
Longhorsley	Longhorsley Village Hall
	Longhorsley Mission Free Church
	St Helen's Church
	St Thomas of Canterbury Roman Catholic Church
	Longhorsley First School

14.3.18. In addition to the community facilities in Table **14-5**, the Tritlington Church of England First School is located adjacent to the Scheme, with access from an unnamed road between the A1 and Tritlington.

Physical Assets

14.3.19. The residential properties of Strafford House, Portland House, Welbeck House and Blackwood Hall as well as a number of residential properties in North Gate are located adjacent to the A1. None of these residential properties currently have direct access to the A1. A number of other properties lie very close to the A1 but not directly adjacent.

14.3.20. The following businesses are located directly on the east side of A1 within the Scheme:

- Jackson G K & Sons, garage services and vehicle recovery; with both direct access to the A1 and also access via a separate access road;
- Felmoor Park, holiday accommodation; accessed via a road leading between the A1 and Eshott Heugh Animal Park;
- Coquet Cottages, holiday cottages; accessed via a road leading between the A1 and Eshott Heugh Animal Park; and
- Bockenfield Holiday Park; accessed via a road off of the A1.

14.3.21. The following businesses are located directly on the west side of the A1 within the Scheme:

- The Oak Inn, a country pub; accessed via a loop road off of the A1; and
- Burgham Park Golf & Leisure Club, accessed via Burgham Park Road, itself accessed via a road off of the A1.

14.3.22. The Scheme passes through at least 40 agricultural fields. The Agricultural Land Classification for the Scheme is predominantly Grade 3. An ALC survey is currently being undertaken to determine whether the land is BMV. The soil quality aspects of this assessment will be reported within Geology and Soils Chapter of the ES. The land take of farmholdings and impacts on farmholdings / viability of farm businesses will be reported in the People and Communities Chapter of the ES.

EFFECTS ON PEOPLE

Economy and Employment

14.3.23. The Labour Market Profiles hosted on the NOMIS website for each local authority area compare the indicators of a number of economic and educations statistics for each area with the national average. The profile brings together data from several sources. The information for Northumberland is presented as follows.

Economic Activity

14.3.24. Baseline data were collected to illustrate the level of economic activity in the area. The economic activity rate measures the proportion of the working age population (aged between 16 and 74 years old) who are active or potentially active members of the labour market. A high economic activity rate means that a high proportion of the population is working or is available for work or training.

14.3.25. The data indicates that in comparison to the national average, a smaller percentage of the population of Northumberland are in employment. Also, a higher percentage of the population of Northumberland is unemployed, compared to the national average. This data

further indicates that the local economy in Northumberland is performing poorly compared to the national average.

14.3.26. As shown in **Table 14-6**, Pegswood and Ponteland North have higher rates of economic activity than the national average. Three wards have a significantly higher proportion of economically inactive people than the national average: Amble West with Warkworth, Morpeth North and Chevington with Longhorseley.

Table 14-6 - Economic activity data (Morpeth to Felton), 2011

Area / ward name	All usual residents aged 16 to 74	Economically active	Economically inactive
England	38,881,374	69.9%	30.1%
North East	1,924,206	66.1%	33.9%
Northumberland	233,224	67.9%	32.1%
Amble West with Warkworth	3,180	63.3%	36.7%
Chevington with Longhorseley	4,428	58.9%	41.1%
Morpeth Kirkhill	3,686	66.4%	33.6%
Morpeth North	3,120	62.5%	37.5%
Morpeth Stobhill	2,968	66.3%	33.7%
Pegswood	2,867	71.4%	28.6%
Ponteland North	3,245	70.9%	29.1%
Shilbottle	3,678	67.8%	32.2%
Ulgham	3,901	68.2%	31.8%

Employment by Industry Data

14.3.27. According to 2011 Census data, Ponteland North has a considerably higher proportion of people employed in agriculture (6.9%) compared to the national average (0.8%) and the regional figure (2.5% for Northumberland).

14.3.28. Morpeth Stobhill has a lower than average proportion of people employed in the construction industry (4.6% compared to the national average of 7.7%), which is offset by higher proportions in “Public administration and defence; compulsory social security” and “Human health and social work activities”.

14.3.29. Ponteland North is the only ward that does not have a much higher proportion of people employed in “Public administration and defence; compulsory social security” than the national average. In the wards (with the exception of Ponteland North), the proportion of people working in this industry ranges from 9.8% to 16.0%, compared to the national figure of 5.9%.

14.3.30. “Human health and social work activities” employs a high proportion of people in numerous wards including Chevington with Longhorseley (16.2%), Morpeth Kirkhill (17.5%), Morpeth

North (18.0%), Morpeth Stobhill (17.9%), Pegswood (20.0%) and Ulgham (18.3%). The national figure for this industry is 12.5%. The high figures are attributable in part to the specialist medical facilities in the region, including St George's Hospital and the Northumberland Head Injuries Unit in Morpeth.

14.3.31. The proportion of people employed in Morpeth North and Ponteland North in "Professional, scientific and technical activities" is much higher, 8.4% and 7.9%, compared to the other wards within the Scheme and the regional picture.

Table 14-7 - Employment by industry in the Morpeth to Felton study area, 2011

Industry	Amble West with Warkworth	Chevington with Longhorseley	Morpeth Kirkhill	Morpeth North	Morpeth Stobhill	Pegswood	Ponteland North	Shilbottle	Ulgham
A Agriculture, forestry and fishing	2.4%	3.0%	0.7%	0.3%	0.8%	1.2%	6.9%	4.3%	2.8%
B Mining and quarrying	1.1%	1.4%	0.3%	0.4%	0.4%	0.4%	0.5%	1.0%	1.8%
C Manufacturing	6.4%	7.0%	7.1%	6.4%	6.1%	7.5%	7.1%	6.0%	7.5%
D Electricity, gas, steam and air conditioning supply	0.7%	0.2%	0.5%	0.5%	0.6%	0.4%	0.4%	0.3%	0.3%
E Water supply; sewerage, waste management and remediation activities	0.6%	0.6%	0.7%	0.8%	0.5%	1.5%	0.3%	0.3%	0.5%
F Construction	8.0%	8.9%	6.2%	5.9%	4.6%	7.2%	7.2%	8.0%	7.6%
G Wholesale and retail trade; repair of motor vehicles and motor cycles	13.1%	12.0%	13.1%	12.8%	12.5%	15.9%	13.7%	13.1%	12.4%
H Transport and	3.6%	3.3%	3.2%	2.1%	3.7%	3.7%	4.1%	3.4%	3.8%

Industry	Amble West with Warkworth	Chevington with Longhorseley	Morpeth Kirkhill	Morpeth North	Morpeth Stobhill	Pegswood	Ponteland North	Shilbottle	Ulgham
storage									
I Accommodation and food service activities	6.4%	5.4%	4.8%	5.5%	7.4%	6.0%	6.9%	7.6%	3.7%
J Information and communication	2.2%	1.8%	1.9%	2.9%	3.2%	2.4%	2.9%	2.2%	3.0%
K Financial and insurance activities	2.2%	1.7%	2.6%	2.4%	3.0%	1.8%	2.4%	1.2%	2.3%
L Real estate activities	1.6%	1.3%	1.7%	1.4%	1.1%	0.9%	2.3%	1.5%	1.4%
M Professional, scientific and technical activities	6.0%	4.5%	6.2%	8.4%	5.6%	4.6%	7.9%	6.7%	6.0%
N Administrative and support service activities	3.3%	4.0%	3.2%	3.0%	3.6%	3.9%	3.5%	3.6%	3.3%
O Public administration and defence; compulsory social security	12.8%	16.0%	11.1%	10.0%	11.8%	9.8%	5.4%	10.7%	10.4%

Industry	Amble West with Warkworth	Chevington with Longhorseley	Morpeth Kirkhill	Morpeth North	Morpeth Stobhill	Pegswood	Ponteland North	Shilbottle	Ulgham
P Education	10.5%	8.0%	14.3%	14.6%	12.2%	7.8%	9.7%	11.4%	10.5%
Q Human health and social work activities	14.2%	16.2%	17.5%	18.0%	17.9%	20.0%	12.6%	13.3%	18.3%
R, S, T, U Other	4.8%	4.6%	5.1%	4.6%	5.0%	5.0%	6.4%	5.4%	4.4%
All categories	1,882	2,366	2,313	1,845	1,818	1,903	2,218	2,362	2,501

Recreational Activities

14.3.32. A variety of recreational activities are known to be undertaken within the vicinity of the Scheme Footprint, for example angling on the River Coquet.

HUMAN HEALTH

14.3.33. This section sets out the baseline conditions in relation to health, comprising local population and facilities information, and indicators of the status of local health, social and economic factors.

Northumberland PHE Health Profile 2017

14.3.34. The PHE Health Profiles for each local authority area compare the indicators of a number of population health statistics for each area with the national average. The information for Northumberland is presented as follows.

Population Health

Table 14-8 - Indicators of Population Health for Northumberland Compared with England

Indicator	Period	Local Value	England Value
Obese children (Year 6)	2015/16	19.6	19.8
Excess Weight in Adults	2013-15	69.8	64.8
Life Expectancy at birth – Males	2013-15	79.2	79.5
Life Expectancy at birth – Females	2013-15	82.6	83.1
Under 75 Mortality: Cardiovascular	2013-15	69.2	74.6
Under 75 Mortality: Cancer	2013-15	141.2	138.8

14.3.35. The profile indicates that excess weight in children for Northumberland is similar to the national average; however in adults it is higher than the national average. Life expectancy at birth for both males and females in Northumberland is only slightly lower than the national averages. Mortality rates for under 75 year olds from cardiovascular diseases are lower than the national average, but mortality rates for under 75 year olds from cancer are higher than the national average.

14.3.36. The PHE health profile data therefore indicate that the population health for Northumberland is similar to the national average.

Health Inequality

Table 14-9 - Difference in life expectancy between most and least deprived areas 2013-2015

Indicator	Male	Female
Life expectancy gap between most and least deprived areas	9.5 years	7.1 years

14.3.37. The profile indicates that the difference in life expectancy between the most and least deprived areas in high. If there was no inequality in life expectancy, the difference would be zero.

14.3.38. The PHE health profile data therefore indicates that there is health inequality in Northumberland.

Deprivation

Table 14-10 - Indicator of Deprivation for Northumberland Compared with England

Indicator	Period	Local Value	England Value
Deprivation (Index of Multiple Deprivation)	2015	20.5	21.8

14.3.39. The profile indicates that deprivation for Northumberland is lower compared to the national average.

14.3.40. The PHE health profile data therefore indicate that Northumberland is a less deprived area than the national average.

14.3.41. The picture of deprivation in the vicinity of Morpeth is mixed: there are several Lower Super Output Areas (LSOAs) with a high level of deprivation, including a small area to the north-east of Morpeth, which is within the 21% to 30% most deprived category; however, further north, along the south-north route of Morpeth to Felton, there are several LSOAs with very low levels of deprivation.

Lifestyle

Table 14-11 - Indicators of Lifestyle for Adults in Northumberland Compared with England

Indicator	Period	Local Value	England Value
Smoking Prevalence in Adults	2016	16.9	15.5
Percentage of Physically Active Adults	2015	55.2	57.0

14.3.42. The profile indicates that smoking prevalence in Northumberland is higher than the national average. The proportion of physically active adults is smaller in Northumberland in comparison to the national average.

14.3.43. The PHE health profile data therefore indicates that the adult population in Northumberland has a less healthy approach to lifestyle behaviour than the national average.

Children

Table 14-12 - Indicators of Childhood Health in Northumberland Compared with England

Indicator	Period	Local Value	England Value
Children in Low Income Families (under 16s)	2014	18.9	20.1
Obese Children (Year 6)	2015/16	19.6	19.8
GCSEs Achieved	2015/16	55.4	57.8

14.3.44. The proportion of children in low income families in Northumberland is lower than the national average. The incidence of obesity amongst children in Northumberland is similar to the national average. The GCSEs achieved in Northumberland are lower than the national average.

14.3.45. The PHE health profile data therefore indicate that the level of health of children in Northumberland is similar to the national average, but the level of education of children is worse than the national average.

Collisions Risk

Table 14-13 - Indicator of Collision Risk in Northumberland Compared with England

Indicator	Period	Local Value	Great Britain Value
Killed and Seriously Injured on Roads	2013-2015	47.4	38.5

14.3.46. The population of Northumberland appears to experience a higher number of fatalities or instances of being seriously injured on roads than the national average.

14.3.47. The PHE health profile data therefore indicate that roads in Northumberland are less safe than the national average.

14.4 POTENTIAL IMPACTS

EFFECTS ON ALL TRAVELLERS

Non-motorised Users

14.4.1. Fourteen PRoWs identified within the study area have the potential to experience adverse impacts. Eight PRoWs would be directly affected by the Scheme and would be temporarily closed or diverted during construction. Users of the remaining six PRoWs within the 500m study area could experience loss or reduction of amenity due to noise and air quality effects, particularly for any that pass within 100m of the Scheme.

14.4.2. A summary of potential significant effects (without mitigation) on PRoWs within the study area is shown in **Table 14-14**.

Table 14-14 - Summary of potential effects (without mitigation) on PRoWs within the study area

PRoW ref.	PRoW Type	Description
407/001	Footpath	Adverse effects as footpath will be severed and there would be no method in place to cross the proposed A1
423/001	Footpath	Adverse effects because of 300m diversion to the north, increasing journey times. A1 dualling would sever this route with no provision for NMUs.
423/002	Footpath	Footpath will be locally diverted on the eastern side to tie into the proposed grade separated crossing leading to slightly positive effects.
423/006	Footpath	Adverse effect as footpath will be severed by the offline option, but these footpaths do not tie into a wider network and are relatively short, therefore will be stopped-up.
423/007	Footpath	Adverse impact as footpath will be severed by the offline option, but these footpaths do not tie into a wider network and are relatively short, therefore will be stopped-up on the western side of the A1.
423/013	Footpath	Footpath to remain. Users will have access to cross Causey Park overbridge and then join diverted footpath on the eastern side of the new A1 alignment.
422/011	Footpath	There is no grade separated NMU route at this location and users would face a diversion to the North to tie-in with proposed access track which links to West Moor Junction.
422/002	Footpath	Adverse impacts: The footpaths to the southern side of the River Coquet cross the A1 at-grade with no proposed grade separated option. This grade separation is currently provided via an underpass on the northern side. Dualling will sever this already dangerous crossing point.
422/020	Footpath	Adverse impacts: The footpaths to the southern side of the River Coquet cross the A1 at-grade with no proposed grade separated option. This is currently provided on the northern side with an underpass. Dualling will severe this already dangerous crossing point.
115/008	Footpath	There is an underpass in close proximity to the route and, whilst it is not a designated PRoW, it is used by NMUs. Upgrading this route to a recognised PRoW would assist NMUs in crossing the A1 at this point.
115/016	Footpath	There is an underpass in close proximity to the route and, whilst it is not a designated PRoW, it is used by NMUs. Upgrading this route to a recognised PRoW would assist NMUs in crossing the A1 at this point

PRoW ref.	PRoW Type	Description
407/010	Bridleway	Bridleway between a farm and adjacent road network could be affected by proposed access roads, which could lead to an increase in traffic, increasing the risk of collision with NMU's, particularly equestrians
422/018	Byway	A busy NMU cross route junction located on the eastern side of the A1, which could link to an adjacent western side road junction further north, primarily for pedestrians based on the NMU survey data. Felmoor camp/lodge site is located on the eastern side of the A1 and would be an attractor for some NMUs.
422/011	Byway	A staggered crossroad junction with a footpath on the western side. Recorded NMU movements could be related to Felmoor campsite to the south. There is no grade separated NMU route at this location and users would face a diversion of approximately 1km to access a grade separated crossing point, increasing journey times and thus leading to adverse effects.
N/A	On road cycle path/ pavement	Approximately 2.5km road cycle path/ pavement on the east side of the A1 between the junction with the A192 and the junction turning to Hebron in Lower Espley.
N/A	On road cycle path/ pavement	Approximately 3km on the east side of the A1 between the Shield Green/ Tritlington Road junction with the A1, and the west road junction north of Causey Park.

14.4.3. There is no pavement or cycle path along the section of the A1 which would be affected by the Scheme.

Vehicle Travellers

14.4.4. Given that the Scheme involves offline construction, the extent of disruption to traffic flows on the existing A1 would be minimised. However there may be some temporary increase in driver stress where traffic management is required.

14.4.5. The section of the existing A1 that is to be bypassed would be de-trunked (i.e. would cease to be a trunk road and pass from the care of the Secretary of State to that of the County Council as local highway authority) and form a local access road. Once in operation, the new arrangement would serve to separate strategic, long-distance traffic from local traffic, reducing driver stress for local journeys and making local journeys safer.

14.4.6. During construction, there could be a short-term increase in driver stress levels as a result of temporary roadworks.

14.4.7. During operation, driver stress for new or improved routes, which are designed in accordance with current standards is generally expected to be 'moderate' or 'low' for the whole route. This is anticipated to represent a beneficial effect on driver stress / vehicle drivers. Where the Scheme follows the alignment of the existing A1, there may be sections where driver stress will be 'moderate' or 'high'.

EFFECTS ON COMMUNITIES

Community Amenity and Severance

14.4.8. For the construction phase, there is a potential for a change in amenity value in terms of noise, dust and disruption to views. Changes to availability of the recreational resource (both spatially and temporally) and access may include disruption to routes due to construction activities / vehicles and increases in journey length / decrease of the recreational resource (spatially and temporally).

14.4.9. During construction, traffic management systems and diversion routes may lead to some traffic being rerouted onto local roads and in particular the A697. These diversions, and the associated congestion, could potentially exacerbate existing problems of community severance along that route. However, this would be a short-term effect.

14.4.10. During the operational phase, there are potential changes to the amenity of the recreational resource (both spatially and temporally) and access to the resource within the immediate area of the Scheme Footprint (e.g. through the new alignment of the Scheme). This may increase amenity value for some areas, particularly those in the vicinity of the A697, but also reduce amenity value for routes closer to the Scheme. However, overall during operation, traffic would be attracted off other, unsuitable roads, relieving community severance along that route in the long term, resulting in an overall beneficial effect.

Physical Assets

14.4.11. Certain properties, such as Earsdon Moor Farm and Causey Park Lodge, would no longer be accessed directly from the new A1 during operation. New access would be provided via the proposed grade-separated junctions, thus allowing for safer access to and from the A1 for these residents.

14.4.12. During the construction and operational phases, commercial assets (holiday accommodation, a car repair garage, a country pub and a golf club) could experience disruption in access, which could potentially result in loss of passing trade. There is also a potential effect during construction and operational phases on community facilities (e.g. the Tritlington Church of England First School). No demolition of privately owned properties is proposed as part of the Scheme.

14.4.13. As more than 20 ha of the best and most versatile agricultural land is likely to be required for the Scheme (anticipated to be approximately 61ha), an Agricultural Impact Assessment will be undertaken. This will consider the impact of the Scheme on the existing agricultural business affected by the loss, and the future viability of any land which is severed by the Scheme. The Agricultural Impact Assessment will be undertaken in conjunction with a consultation with Defra, and the affected land owners during the EIA process. The findings will be considered through the EIA.

EFFECTS ON PEOPLE

Economy and Employment

14.4.14. During construction there would be potential significant effects in relation to direct, indirect and induced employment opportunities as well as through expenditure within the local supply chain.

Recreational Activities

14.4.15. During construction and operation of the Scheme, there is a potential for a change in amenity value and disruption to recreational activities, such as angling, in terms of noise, dust and disruption to views.

HUMAN HEALTH

14.4.16. The Scheme has the potential to impact upon a number of receptors across the study area in the following way:

- Direct impact on population and health through changes in driver stress;
- Indirect impact on population and health through changes in community severance;
- Direct impact on population and health through changes in accessibility;
- Direct impact on population and health through changes in route safety;
- Indirect impact on population and health through changes in amenity value; and
- Indirect impact upon health of the local population through changes in the status and function to the employment and commercial land, affecting the local economy as well as employment status of the local population.

14.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

14.5.1. The following sections present a preliminary consideration of design and mitigation measures.

EFFECTS ON ALL TRAVELLERS

Non-motorised Users

14.5.2. The following measures may be incorporated into the design of the Scheme, which would reduce the above identified impacts upon non-motorised users during operation:

- NMU facilities would be provided on the proposed Highlaws/Hebron compact grade separated crossing, with suitable links into the side roads and to the replacements for the current bus-stops, and with clear intervisibility through the tight road curves. The facilities from the side roads and across the bridge will be designed to accommodate pedestrians, cyclists and equestrians without the need to dismount;
- NMU facilities would be provided on the proposed Fenrother compact grade separated crossing, with suitable links into the side roads. The facilities from the side roads and across the bridge will be designed to accommodate pedestrians, cyclists and equestrians without the need to dismount, including the provision of equestrian parapets.
- Divert footpath 423/001 northwards to meet the side road immediately western and eastern side of the new Fenrother compact grade separated junction;
- Stop-up footpath 423/006;

- Stop-up footpath 423/007 on the western side of the new A1. PRoW to remain on the eastern side;
- The proposed Causey Park overbridge will be designed to cater safely for pedestrians, cyclists and horse riders as well as vehicular traffic, including through the provision of equestrian parapets;
- The proposed Burgham underbridge will be designed to cater safely for pedestrians, cyclists and horse riders as well as vehicular traffic, with clear visibility for all users;
- NMU facilities would be provided on the proposed West Moor compact grade separated crossing, with suitable links into the side roads and to the replacements for the current bus-stops, and with clear intervisibility through the tight road curves. The facilities from the side roads and across the bridge will be designed to accommodate pedestrians, cyclists and equestrians without the need to dismount, including the provision of equestrian parapets;
- The existing St Oswald's Way path passing under the A1 bridge over the River Coquet will be extended so that it also passes under the new bridge, maintaining the connectivity of this long-distance route; and
- Footpaths 115/008 and 115/016 will be diverted to pass through the extended Parkwood underpass, to maintain the connectivity of these routes crossing the A1 north of the River Coquet.

14.5.3. There are additional opportunities to mitigate impacts on NMUs or to enhance facilities for them in association with the Scheme, which are being considered at this stage:

- Bridleway 407/010, south of Warreners House, is affected by the Scheme at its extreme southern/eastern end, where it is a dead end with no connectivity. There is the opportunity to provide rights on the new access road to Warreners House, thereby mitigating the severance and enhancing the bridleway by providing connectivity;
- Provision of a footway across the new bridge over the River Coquet, linked to the footpaths either side;
- Provision of a path linking footpaths 422/020 and 422/002 across the line of the new A1, passing beneath the two bridges in a similar way to the St Oswald's Way path, subject to consideration of feasibility given the much steeper slope and the need to avoid increasing the impact on the ancient woodland; and
- Works would be timed to ensure that the underpass is never closed at the same time as St Oswald's Way, so that there is always a route with a grade-separated crossing by which users can cross the A1 west of Felton and north of the River Coquet.

Vehicle Travellers

14.5.4. No further mitigation is expected to be required.

EFFECTS ON COMMUNITIES

Community Amenity and Severance

14.5.5. Traffic management systems and, potentially, diversion routes would be put in place to maintain access to the identified community facilities, residential properties / communities, businesses and private land holdings.

Physical Assets

14.5.6. Direct access on to the A1 is considered to be less safe for motorists and residents and more disruptive to traffic than alternative access, and has therefore been avoided wherever possible in the design of the Scheme, whilst also maintaining connectivity of residents and businesses. The Scheme design includes direct access to Warreners House, an access track to Northgate Farm, an access track for Stafford House, an access track for New House Farm and an access track at Felmoor Park.

14.5.7. Landowners would be compensated for land required either temporarily during construction or permanently for the operation of the Scheme.

14.5.8. Land required for temporary works only would be reinstated to its former use following the completion of construction.

14.5.9. Although agricultural land required within the footprint of the route will be lost permanently, the following measures could be implemented during construction:

- Wherever possible, land required in addition for construction, for example for site compounds, would be returned to agricultural use;
- Severance during construction to be minimised through careful siting of construction compounds and lay down areas, and careful planning of construction activities through consultation with landowners;
- Crop loss can be reduced by giving advanced warning to enable farmers to plan ahead;
- Consideration of field drainage impacts during the design phase; and
- Noise and dust to be kept to a minimum and within acceptable working limits, using best practice methods to be outlined in the CEMP.

EFFECTS ON PEOPLE

Economy and Employment

14.5.10. Measures would be put in place, where possible, to maximise the potential for the workforce and project supply chain, to be sourced locally.

Recreational Activities

14.5.11. It is anticipated that any disturbance will be mitigated through careful timing of works and the implementation of a CEMP.

14.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

14.6.1. Where a best practice approach is adopted to maximise enhancement and minimise adverse effects through mitigation, potential effects may still occur but would typically be expected not to be significant. Likely significant effects will be explored in detail through the Peoples and Communities Chapter within the ES.

14.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

14.7.1. The following topics and elements of topics are to be **scoped out**:

- There is no community land or development land lying immediately adjacent to the Scheme and therefore no assessment of these land uses will be undertaken;

- During construction and operational phases of the Scheme, there is a potential for a change in view from the road for users of the A1. However, with the implementation of mitigation (particularly in relation to planting), no significant changes in the quality of existing driver's views and the overall quality of the driving experience are anticipated during both phases. As such, effects will not be considered further within the ES; and
- Impacts on the economy and labour market are not expected to be significant during operation of the Scheme and will not be considered in the ES.

14.7.2. The following topics and elements of topics are to be **scoped in**:

- The surrounding land use is predominantly agricultural, with scattered villages and farms. The consideration of land-take and associated impacts on private agricultural landholdings (including farm businesses) will be reported within the ES;
- Given the surrounding network of PRoW and non-designated public routes, effects on NMUs (including pedestrians, cyclists, and equestrians), changes to the accessibility and usability of NMU routes, changes to journey lengths and changes to journey amenity will be reported within the ES;
- Given the nature of the Scheme (as transport infrastructure), there are potential impacts on ability of people to enjoy their surroundings and the indirect effects on feelings of wellbeing. The assessment of community amenity considered the potential for impacts such as reduced air quality and increased noise to have a combined effect on a community settlement. Impacts in relation to community amenity and severance will be reported within the ES. Additional effects on human beings will be addressed in other Sections of the ES including Air Quality (although currently scoped out); Health; Noise and Vibration; Landscape and Visual Amenity; and Materials;
- Effects on vehicle users are anticipated to arise from the Scheme in relation to traffic, delay time and driver stress (due to delays). Impacts on vehicle users will be reported within the ES;
- Effects upon recreational activities will be considered in the ES, as required in IAN 125/15 and in the National Planning Practice Guidance; and
- Impacts on the economy and labour market during construction of the Scheme and will be considered in the ES, as required in IAN 125/15.

POLICY AND PLANS

14.7.3. Policy and plans relevant to the Scheme will be presented within the ES and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies, including;
  - National Planning Policy Framework (NPPF) 2012 (**Ref 14.6**)
  - National Policy Statement for National Networks (NPS NN) (**Ref 14.7**)
  - Alnwick Core Strategy (October 2007)
  - NCC Local Transport Plan
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

METHODOLOGY AND SIGNIFICANCE CRITERIA

14.7.4. This section was developed with reference to the following parts of DMRB Vol 11 Section 3: Part 6 Land Use; Part 8 Pedestrians, Cyclists, Equestrians & Community Effects and Part 9 Vehicle Travellers. DMRB Interim Advice Note 125/15 sets out the requirement to combine the current DMRB Vol 11 Section 3 Parts 6, 8 and 9 into one chapter.

14.7.5. With the implementation of best practice mitigation, together with consideration of enhancement opportunities, it is anticipated that potential effects are not likely to be significant. A Simple Level assessment will therefore be undertaken for People and Communities will be undertaken in line with the guidance within each of the DMRB Volume 11 Chapters 6, 8 and 9, and IAN 125/15.

14.7.6. Agricultural land take for the Scheme is likely to be at least 62ha, and therefore a detailed agricultural impact assessment will be required, including consultation with DEFRA.

14.7.7. A qualitative high level assessment of the health of residents in the administrative area will be carried out using publicly available data, as required by the new Environmental Impact Assessment (EIA) Regulations 2017).

Effects on All Travellers

Non-Motorised Users

14.7.8. The methodology will be based upon DMRB Volume 11, Section 3, Part 8 and 9 and the application of DMRB Volume 5, Section 2, Part 5, HD 42/17 (**Ref 14.5**), and will consider:

- The impact of the Scheme on the journeys that NMUs make in its locality;
- The impact on existing usage of the community facilities and routes by pedestrians and others;
- Changes in safety and amenity value of routes which may be affected by the Scheme route; and
- The effects of the junction options on community severance.

14.7.9. The assessment will comprise a desk study to identify likely NMU activity during construction, as well as how local community facilities are likely to be affected as a result of the Scheme, whether adverse or beneficial.

14.7.10. The level of new severance will use the criteria in DMRB Volume 11, Section 3, Part 8 which categorises severance as Slight, Moderate or Severe.

Vehicle Travellers

14.7.11. Driver Stress is the adverse mental and psychological effects experienced by a driver traversing a road network. Stress can induce in driver's feelings of discomfort, annoyance, frustration, or fear culminating in physical or emotional tension that detracts from the value and safety of the journey. Volume 11 Section 3 Part 9 Vehicle Travellers of the DMRB indicates that with increased driver stress, a drop in driving standards occurs, which may be expressed as an increase in aggression towards other road users, or a diminished response to visual and other stimuli.

14.7.12. The level of stress experienced by a driver may be affected by a number of factors including: road layout and geometry; surface riding characteristics; junction

frequency and speed; and flow per lane. There are three main components of driver stress as follows:

- Driver frustration - caused by an inability to drive at a speed consistent with the standard of the road, and increases as speed falls in relation to expectations;
- Driver fear - the main factors are the presence of other vehicles, inadequate sight distances and the likelihood of pedestrians, particularly children, stepping into the road. Fear is highest when speeds, flows and the proportion of heavy vehicles are all high, becoming more important in adverse weather conditions; and
- Driver uncertainty - caused primarily by signing that is inadequate for the individual's purposes.

14.7.13. The measurable aspect of driver stress is associated with frustration due to delays. The level of Driver Stress will be determined through a qualitative assessment of the factors listed in paragraph 14.7.18, with consideration of the assessment tables provided within Chapter 4 of DMRB Part 9. A three point descriptive scale of as Slight, Moderate or Severe will be used, as recommended under the criteria in DMRB Part 9.

Effects on Communities

Community Amenity and Severance

14.7.14. Amenity is defined in the DMRB as 'the relative pleasantness of a journey'. This encompasses, but is not limited to, changes in journey length, route and time. It takes into account a number of other factors depending on the user. For walkers, the amenity will include footpath width, distance from traffic, barriers between pedestrians and traffic and the quality of street furniture and any planting. For cyclists there can be positive factors such as the clear signing of alternative routes and the provision of subways or cycle crossings as well as negative factors such as junctions where vehicles and cyclists are not separated. For both pedestrians and cyclists these are in addition to the degree and duration of exposure to traffic, and the impact of the road itself.

14.7.15. A qualitative high level desk based assessment will be carried out for each of the elements, as described in DMRB guidance within Volume 11, Section 3, Part 8. Using DMRB guidance and professional judgement, the effects related to community amenity and severance will be described under a three point descriptive scale, as Slight, Moderate or Severe (Section 3, Part 8, Chapter 6).

Physical Assets

14.7.16. A qualitative high level desk based assessment will be carried out for each of the elements, as described in DMRB guidance within Volume 11, Section 3, Part 6.

14.7.17. The assessment will focus on the importance of the land (i.e. whether it is imperative to a business operation), the availability of alternative land within the vicinity and proportion of the land-take as an overall of each land holding. In the absence of overall significance criteria within Part 6, the effects related to physical assets will be described using a three point descriptive scale, as Slight, Moderate or Severe (Section 3, Part 8, Chapter 6).

Effects on People

Economy and Employment

14.7.18. A qualitative high level desk based assessment will be carried out for the local economy using publicly available data, including NOMIS and Census 2011. There is no formal guidance on the assessment of the local economy and this will be based on professional judgement and best practice. The assessment method will be developed further through the EIA, however the framework will be in accordance with DMRB Volume 11 Section 2, Part 5.

14.7.19. The anticipated number of jobs generated during the construction phase will be based upon an evaluation of the total construction cost against the average gross output per worker. This figure will be evaluated against the total number of employees in Industry Sector F (Construction) at the local and regional levels to determine the magnitude of change.

14.7.20. Generation of indirect and induced employment opportunities associated with the construction phase will be calculated using an assumed multiplier of 1.5 on the basis that the level of multiplier effects is considered to be 'medium' as there are anticipated are to be 'average linkages' associated with the Scheme. At this stage, it is not possible to isolate the Industry Sector where the impact may occur. Therefore, these figures will be evaluated against the total number of employees in all Industry Sectors within the local and regional levels to determine the magnitude of change.

Recreational Activities

14.7.21. The assessment will comprise a desk study and consultation to identify recreational activities and assess how local community facilities are likely to be affected as a result of the Scheme, whether adverse or beneficial. The assessment method will be developed further through the EIA, however the framework will be in accordance with DMRB Volume 11 Section 2, Part 5.

Human Health

14.7.22. The assessment of likely significant effects on human health in relation to People and Communities will be undertaken in accordance with DMRB Vol 11 Section 3: Part 8. It covers aspects such as journey time and pleasantness for both motorised and non-motorised users, amenity, fitness, community severance and access to facilities. Many of these aspects have a bearing on human health in relation to things like access to facilities necessary for the maintenance or enhancement of health and wellbeing, in terms of availability, accessibility, stress and safety.

14.7.23. Where human health effects are identified in this and any other topic, whether significant or not, these effects will be incorporated into the cumulative assessment of human health.

14.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

14.8.1. The DMRB Volume 11, Section 3, Part 8 methodology is over 20 years old (published in 1993) and some aspects may not be as relevant to the assessment of road schemes today. The guidance is currently being revised.

14.8.2. This scoping report is based on currently available information, and can be subject to change as the design progresses.

14.8.3. The assessment will rely, in part, on data provided by third parties (e.g. OS Mapping, Local Authorities, ONS and PHE) which are the most up-to-date, available at the time of the assessment. No significant changes or limitations in these datasets have been identified that would affect the robustness of the assessment for EIA purposes.

14.8.4. It is not possible on the basis of information available at this stage to determine whether there would be significant impacts on farm businesses. Further investigation into this will be undertaken to determine the impact on farm businesses.

14.8.5. The assessment of the NMU route amenity relies on qualitative descriptions by the assessor which is subjective. Where subjective assessments are presented, attempts to reconcile against evidence will be made throughout.

14.8.6. The DMRB method for driver stress calculations applies only to individual road links, but is most effectively interpreted in terms of multiple links making up complete journeys through the network.

14.8.7. The assessment will resolve population impacts down to the lowest defined population group according to ONS survey outputs (lower super output areas).

14.8.8. Any limitations found or assumptions used in the final assessment will be highlighted within the ES.

15 MATERIAL RESOURCES

15.1 INTRODUCTION

15.1.1. This section considers the implications of the Scheme on the consumption of materials resources (which includes recovered site arisings), and the generation and disposal of waste. It sets out the proposed methodology for assessment and identifies those impacts that can be scoped out of the EIA.

15.1.2. The assessment methodology to be used is based on guidance set out in Interim Advice Note (IAN) 153/11 (Highways Agency, 2011) Environmental Assessment of Material Resources (**Ref 15.1**). IAN153/11 sets out the process and information required for the assessment of significant effects from material resources and waste.

15.1.3. Materials resources are defined in IAN 153/11 as "the materials and construction products required for the construction, improvement and maintenance of the road network. Materials resources include primary raw materials such as aggregates and minerals, and manufactured construction products. Many material resources will originate off site, purchased as construction products, and some will arise on site such as excavated soils or recycled road planings".

15.1.4. IAN 153/11 does not include a definition of waste, however the EU Waste Framework Directive (**Ref 15.2**) defines it as "any substance or object that the holder discards or intends or is required to discard".

15.2 STUDY AREA

15.2.1. The primary study area comprises the Scheme Footprint (the red line boundary), including the National Grid diversion works which will be undertaken as part of the enabling activities for the Scheme.

15.2.2. The secondary study area extends to the availability of construction materials and capacity of recycling and waste management infrastructure within North East England (Northumberland, Tyne & Wear, Durham and the Tees Valley).

15.3 BASELINE CONDITIONS

15.3.1. The operation and maintenance of the current A1 Morpeth to Felton assets will require the consumption of some materials, and will generate some arisings that may need to be disposed of as waste.

15.3.2. **Sections 15.3.3 – 15.3.23** describe baseline material consumption and waste disposal for the current assets, and provide regional/national information and data in the context of which subsequent environmental impact assessment will be undertaken.

MATERIALS

Materials Currently Required

15.3.3. The operation and maintenance of the existing A1 assets require a small number of specialist components (for example, light bulbs, signage, steelwork for replacement barriers) as well as some bulk material (asphalt for minor re-surfacing) for routine works and repairs of the highway and ancillary infrastructure.

15.3.4. The current consumption of construction and other materials within the Scheme Footprint is, however, deemed negligible.

15.3.5. The do-minimum option (no scheme pursued) would be unlikely to change the current consumption of materials within the Scheme Footprint.

UK and Regional Perspective of Construction Materials

15.3.6. **Table 15-1** (**Refs 15.3, 15.4, 15.5, 15.6 and 15.7**) provides a summary of the availability of the main construction materials in North East England and the UK, as required to deliver typical highways schemes. The overview provides a context in which the assessment of impacts and significant effects from material consumption on the Scheme can be undertaken.

Table 15-1 - Materials availability in the North East of England and the UK

Material Type	Availability (2015 unless otherwise stated)	
	NORTH EAST	UK
Sand and gravel +	1.2Mt	52.5Mt
Permitted crushed rock *	3.1Mt	99.3Mt
Concrete blocks #	241,000m3 (2014)	5.4Mm3 (2014)
Primary aggregate *	6.0Mt	183Mt
Recycled and secondary aggregate *	1.25Mt (2013)	63Mt
Ready-mix concrete +	0.6Mm3	25.2Mm3
Steel +	(no data)	7.6Mt
Asphalt *	0.9Mt	26.3Mt

stocks
+ production
* sales

15.3.7. The North East has – in general – a lower availability of construction materials by comparison with other regions in England. This has the potential to increase sensitivity, particularly where adverse cumulative impacts are realised.

15.3.8. However, the availability of construction materials typically required for highways construction schemes in the North East of England and across the UK, indicates that stocks/production / sales remain buoyant. Using professional judgement, the sensitivity of materials for the Scheme is therefore assessed to be low.

SITE ARISINGS

Site Arisings Currently Generated

15.3.9. Current routine operation and maintenance works on the existing A1 assets generate negligible volumes of site arisings.

15.3.10. The do-minimum option (no scheme pursued) would be unlikely to change the current generation of site arisings within the Scheme Footprint.

National and Regional Perspective: Transfer, Recovery and Recycling

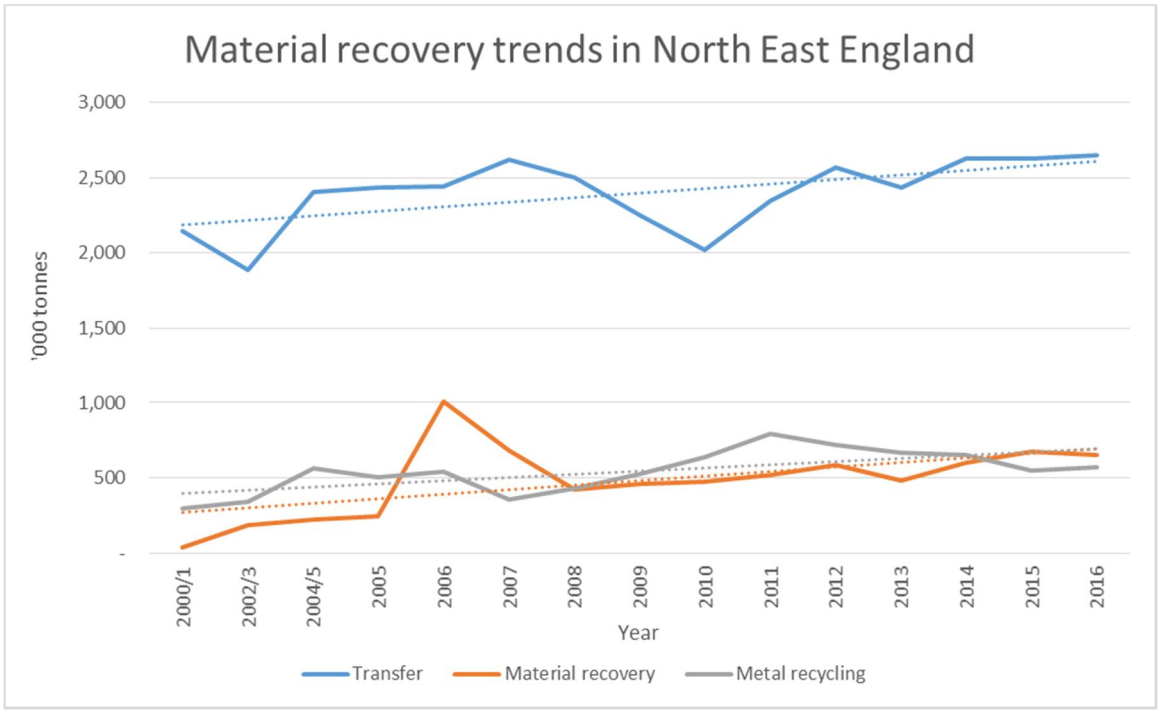
15.3.11. Defra data (**Ref 15.8**) (**Table 15-2**) show that within England, the recovery rate for non-hazardous construction and demolition arisings have remained above 90% since 2010. This exceeds the EU target of 70%, which the UK must meet by 2020.

15.3.12. As stated in Section 15.8.3, no regional data for construction, demolition and excavation production or recovery rates are currently available for the north east of England.

Table 15-2 - Non-hazardous construction and demolition arisings recovery in England

YEAR	Generation (Mt)	RECOVERY (Mt)	RECOVERY RATE (%)
2010	43.9	39.7	90.5%
2011	44.1	39.9	90.6%
2012	45.3	41.3	91.1%
2013	46.3	42.1	91.1%
2014	49.1	44.9	91.4%

15.3.13. **Graph 15.1** shows that rates of material transfer (non-civic), recovery and metal recycling within the north east of England have risen steadily over the 16 years. Data provided reflect the recovery of all potential waste types in the region and hence will include, but are not specific to, construction, demolition and excavation arisings.



Graph 15.1 - Transfer, material recovery and metal recycling in the North East of England

15.3.14. Available data demonstrate that transfer, recovery and metal recycling shows a general, consistent and upward trend within the North East. These data are compounded by the number of licensed recovery facilities (all waste, not just Construction, Demolition and Excavation (CDE)) in the north east in 2016, as follows:

- 181 transfer facilities (137 accepted inputs in 2016);
- 145 treatment facilities (103 accepted inputs in 2016);
- 155 metal recovery facilities (71 accepted inputs in 2016); and
- 7 use of waste[6] facilities (3 accepted inputs in 2016)

15.3.15. Data indicates that there is likely to be regional infrastructure and capacity for the transfer and recovery of CDE arisings from the Scheme. Construction and demolition recovery trends across England (Table 15-2) demonstrate further capacity in this context.

15.3.16. The availability of materials recovery infrastructure in the North East, and across England, suggests that there is strong potential to divert from landfill site arisings generated by the Scheme. Using professional judgement, both the importance (positive value) of materials transfer and recovery infrastructure and (hence) the potential to maximise the re-use/recycling value of site arisings, are assessed to be positive and high.

WASTE GENERATION AND DISPOSAL

Waste Currently Generated and Disposed of

15.3.17. The operation and maintenance of the existing A1 assets currently generates small volumes of waste from routine maintenance, in combination with littering, light replacement, signage replacement, replacement of reflective road studs (cats' eyes), vegetation from verge clearance and minor barrier refurbishments. The anticipated effects of disposing of this waste are, however, deemed negligible in the context of available regional capacity.

Regional Perspective: Remaining Landfill Capacity

15.3.18. At the end of 2015, the north east landfill sites presented in **Table 15-3** were recorded as having remaining capacity (**Ref 15.9**).

[6] Use of waste facilities abide by standard rules permits for the use of waste in construction, reclamation and manufacture of timber

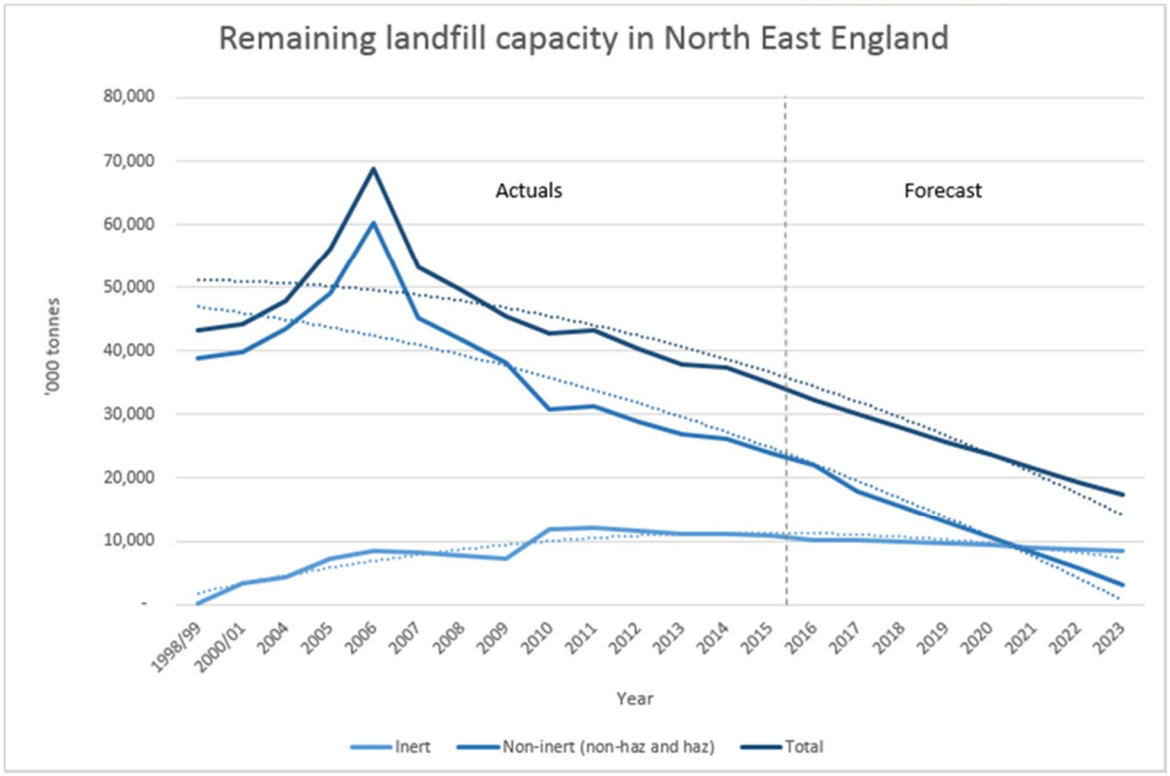
Table 15-3 - Landfill sites in the north east of England

Facility name	Former planning sub region	Landfill Site type	Remaining capacity end of 2015 (m^3)
Port Clarence landfill Site (Haz)	Tees Valley Unitary Authorities	Hazardous Merchant Landfill	5,010,912
ICI NO 3 Teesport	Tees Valley Unitary Authorities	Hazardous Merchant Landfill	1,875,903
Bishop Middleham Quarry 2	Durham	Inert Landfill	4,309,592
Old Quarrington Quarry Landfill	Durham	Inert Landfill	1,979,768
Crime Rigg Quarry	Durham	Inert Landfill	1,746,000
Marsden Quarry Landfill	Tyne & Wear	Inert Landfill	1,528,002
Hollings Hill Quarry Landfill	Northumberland	Inert Landfill	784,240
Field House Quarry	Tyne & Wear	Inert Landfill	437,366
Aycliffe Quarry Landfill	Durham	Non-Hazardous Landfill With Stable Non-Reactive Hazardous Waste cell	1,908,320
Ellington Road Landfill Site	Northumberland	Non-Hazardous Landfill With Stable Non-Reactive Hazardous Waste cell	1,220,373
Seaton Meadows	Tees Valley Unitary Authorities	Non-Hazardous Landfill With Stable Non-Reactive Hazardous Waste cell	1,006,822
Blaydon Quarry Landfill Site	Tyne & Wear	Non-Hazardous Merchant Landfill	2,304,721
CLE 3/8 Landfill Site	Tees Valley Unitary Authorities	Non-Hazardous Merchant Landfill	1,876,805
Houghton-Le-Spring Landfill Site	Tyne & Wear	Non-Hazardous Merchant Landfill	1,719,969
Joint Stocks Landfill Phase 2	Durham	Non-Hazardous Merchant Landfill	1,700,000

Facility name	Former planning sub region	Landfill Site type	Remaining capacity end of 2015 (m^3)
Path Head Landfill Site	Tyne & Wear	Non-Hazardous Merchant Landfill	1,691,192
Cowpen Bewley Landfill	Tees Valley Unitary Authorities	Non-Hazardous Merchant Landfill	1,650,393
ICI NO 2 Teesport	Tees Valley Unitary Authorities	Non-Hazardous Merchant Landfill	1,049,067
Port Clarence Non-Hazardous Landfill Site	Tees Valley Unitary Authorities	Non-Hazardous Merchant Landfill	645,094
Springwell Quarry	Tyne & Wear	Non-Hazardous Merchant Landfill	222,934
Coatham Stob Quarry (Area 6)	Tees Valley Unitary Authorities	Non-Hazardous Merchant Landfill	184,965
Alcan Ash Lagoons 1-4	Northumberland	Non-Hazardous Merchant Landfill	15,500
TOTAL CAPACITY			34,867,938

15.3.19. Environment Agency data (**Ref 15.10**) confirm that at the end of 2016, remaining landfill capacity in the north east was: 10.2Mm^3 for inert (0.6Mt down from 2015), 15.2Mm^3 for non-hazardous (2Mt down from 2015), and 7.0Mm^3 for hazardous waste (0.2Mt up from 2015).

15.3.20. Using the most up to date information available, the baseline regional landfill capacity is detailed in Graph 15.2. Simple statistical forecasting (Microsoft Excel forecasting function) has been used to demonstrate the long term void capacity to the year of planned Scheme completion (2023) in the absence of future provision.



Graph 15.2 - North East England Remaining Landfill Capacity (2000/1-2023)

15.3.21. Baseline data indicates that total and non-inert landfill capacity is likely to become an increasingly sensitive receptor over the life of the Scheme to the first full year of operation. Simple forecasting (using Microsoft Excel's forecasting function) indicates that, by comparison with 2016 data and in the absence of future provision, inert capacity may fall by as much as 18%, non-inert capacity by 85%, and total capacity by 46%.

15.3.22. There is currently no guidance on setting sensitivities (value) or magnitude of impact. Using professional judgement, the sensitivities of different landfill capacity types over the lifetime of the Scheme are assessed to be inert (low), non-inert (very high) and total (medium). On average, the sensitivity of landfill capacity is assessed to be medium.

15.4 POTENTIAL IMPACTS

15.4.1. The Scheme has the potential to consume material resources (including those recovered from site arisings), and produce and dispose of waste during the demolition, site preparation, and construction phases of the carriageways and associated infrastructure.

15.4.2. The associated potential environmental impacts (both direct and indirect) will occur principally during construction, and potentially in the first year of operation. Impacts arising further into the operational lifecycle are expected to be negligible, and hence (as described in Section 15.7.2) have been scoped out.

15.4.3. The effects associated with the described impacts include those associated with the production, processing, consumption and disposal of material resources.

15.4.4. The effects of the Scheme from material resources (including recovered site arisings) and waste generation and disposal, are likely to occur on-site, off-site within the UK and, potentially, internationally.

15.4.5. In response to the requirements set out in IAN 153/11 (paragraph 3.2.1) a summary of the environmental impacts that material resource consumption and waste generation and disposal are expected to generate, is provided in **Table 15-4**. To help justify the scoping in or out of materials (or any sub-element therein), an indication of whether significant effects are likely as a result of identified impacts, is also provided.

Table 15-4 - Potential impacts of consuming material resources and disposing of waste, and the potential for significant effects

Element	Use of material resources, and potential to generate significant effects	Production and disposal of waste, and potential to generate significant effects
Demolition	No potential significant impacts (or resultant effects) are identified with regards to material resources use during demolition.	Wastes generated during demolition are likely to include: ¡ Broken out concrete, cut steel and road surface planings. ¡ Hazardous or contaminated material found on or beneath the Scheme. ¡ Other demolition wastes. Waste in this phase of the works would be produced during the breaking out of parts of the proposed 6.6km online highway, concrete crash barriers, areas of the central reserve, and (potentially) in the closure of the Bywell Shooting Grounds and Low Espley access roads. As far as possible, arisings from demolition will be reused and/or recycled on or off-site, with beneficial results. Where diverting site arisings from landfill is not possible, the impacts associated with disposing of waste would be adverse, permanent and direct. The potential for significant effects from waste disposal is associated with the commensurate reduction in landfill capacity. Landfill capacity is increasingly considered a sensitive receptor in the UK. The demolition of highway and associated assets is likely to result in a considerable volume of arisings, a proportion of which (after the potential for reuse and recycling has been maximised) may need to be disposed of. Where demolition waste needs to be disposed of, and in combination with other the on-site phases, there is potential for significant adverse effects.

Element	Use of material resources, and potential to generate significant effects	Production and disposal of waste, and potential to generate significant effects
Site remediation and preparation	The following material resources are expected to be consumed as part of the site remediation and preparation phase: ¡ Timber and other products required for the erection of perimeter fencing and temporary barriers; ¡ Aggregate and stone for ground improvement at site (particularly for the 6.0km offline highway), prior to use by heavy plant and equipment. Any impacts associated with material resource consumption would be adverse, permanent and direct. There is potential to generate significant adverse effects from material resource consumption during site remediation and preparation.	Wastes likely to be generated during site preparation include: ¡ Vegetation (potentially, including invasive weeds) and other above ground materials produced by site clearance. ¡ Surplus topsoil or subsoil material. ¡ Hazardous or contaminated material found on or beneath the Scheme. The presence or extent of any hazardous or contaminated substances is currently unknown, but will be informed by Ground Investigation. The potential for waste to be produced and disposed of during site preparation works is potentially considerable, especially with regard to the 6.0km offline highway. Any impacts would be adverse, permanent and direct. Some impacts may be precluded where arisings e.g. top soil and sub soil, can be reused. Where waste from site remediation and preparation does need to be disposed of, there is potential for significant adverse effects.
Scheme construction	Material resources will be required for the construction of the Scheme, including (but not limited to): the 6.6km online and 6.0km offline highways, the new bridge over the River Coquet, three grade separated junctions, new accesses and local roads to new junctions, diversion of minor roads, and a new parallel road linking the existing A1 with Westmoor junction. Construction materials required are anticipated	Waste is anticipated to be generated during the construction of the Scheme, particularly during the construction of new lanes, structures and associated assets. It is anticipated that the following wastes would be generated: ¡ Timber from formwork and fencing; ¡ Concrete, bricks and aggregate waste; ¡ Road paving materials including sub-base and bituminous materials; ¡ Hazardous or contaminated material found or generated on site;

	to include: ¡ Bulk materials for earthworks (volumes will be dependent on the cut and fill balance); ¡ Road paving materials, including sub-base and bituminous materials; ¡ Steel – for structures, sheet piling and fencing; ¡ Concrete including for pre-cast and prefabricated elements; ¡ Bricks and aggregate; ¡ Timber for fencing and formwork; ¡ New street furniture and signage; ¡ Cabling; and ¡ Other general construction materials. The volumes of material resources required for the Scheme will be identified and assessed within the ES. Volumes of bulk earthworks, road paving, steel, concrete and aggregate are expected to be significant. The main impacts as a result of the use of material resources are the consumption of natural resources. Impacts would be considered adverse, direct and permanent, and would result in the following effects: ¡ Depletion of natural resources and local/regional stocks; and ¡ Degradation of the natural environment. Based on the scale and nature of the works i.e.	¡ Surplus cabling; ¡ Redundant street furniture and signage; ¡ Steel waste e.g. safety barriers; and ¡ General construction waste e.g. packaging, ducting, damaged goods. The volumes of waste likely to be generated and disposed of as result of the Scheme will be identified and assessed through the EIA. Impacts as a result of waste generation would be adverse and direct, and are generally accepted to be permanent in nature. The resultant adverse effects would be a reduction in landfill void capacity. As far as possible, all site arisings (with the potential to become waste) would be targeted for reuse or recycling either on, or off, the Scheme. Where this is not possible, disposal is likely to be required. Based on the scale and nature of the works, it is anticipated that there is potential for significant adverse effects from the generation and disposal of waste.

	major improvement to an existing highway including offline sections and other major changes, it is anticipated that the consumption of material resources has the potential to have significant adverse effects.	
Operation and maintenance of asset	In the first year of operation, minor amendments and changes to the Scheme assets may be required. Depending on the extent of these changes, there is potential to consume material resources (including recovered site arisings), and produce and dispose of waste, which could result in adverse environmental impacts. Where these impacts can be forecast for the first year of operation, they will be included in the EIA. Although the extent of changes within the first year of operation is not currently known, professional judgement would indicate that adverse environmental impacts are likely to be negligible and the (resultant) potential effects insignificant. For the same reasons, and beyond the first year of operation, it is predicted that environmental impacts would be negligible. . The assessment of impacts and effects during operation and maintenance have therefore been scoped out.	

15.5 DESIGN, MITIGATION, ENHANCEMENT AND MONITORING MEASURES

15.5.1. Specific design, mitigation and enhancement measures to avoid and mitigate adverse impacts from materials consumption and the generation and disposal of waste, and to encourage beneficial outcomes from the recovery and reuse of site arisings, may include those set out in **Table 15-5**.

15.5.2. At the time of publication, the benefit of applying specific enhancement or mitigation measures has not been quantified. The process of confirming and quantifying measures that have been taken forward (or that will be considered for adoption) will be undertaken as part of the development of the Environmental Statement, and during detailed design.

Table 15-5 - Potential design, mitigation and enhancement measures

Project Activity	Enhancement and mitigation measures	Lifecycle stages in which measures will be applied
Materials	Identification and specification of materials that can be acquired responsibly, in accordance with BES 6001 Responsible Sourcing of Construction Products (**Ref 15.11**).	Design, construction
	Design for resource optimisation: simplifying layout and form, using standard sizes, balancing cut and fill, maximising the use of renewable materials, and materials with recycled or secondary content, and setting net importation as a scheme goal.	Design
	Design for off-site construction: maximising the use of pre-fabricated structures and components, encouraging a process of assembly rather than construction	Design
	Design for the future: considering how materials can be designed to be more easily adapted over an asset lifetime, and how deconstructability and demountability of elements can be maximised at end-of-first-life.	Design
Site arisings	Design for recovery and reuse: identifying, securing and using materials at their highest value, whether they already exist on site, or are sourced from other schemes.	Design
	Identify opportunities to minimise the export and import of materials.	Design, construction
	Working to a proximity principle, ensuring arisings	Design,

Project Activity	Enhancement and mitigation measures	Lifecycle stages in which measures will be applied
	generated are handled, stored, managed and re-used or recycled as close as possible to the point of origin.	construction
	Forecast and identify the volume and type of woodland and other vegetative arisings that will be generated, and establish opportunities for high-value re-use and recycling, both on and off-site.	Design, construction
	Identify areas for stockpiling and storing arisings that will minimise quality degradation and leachate, and will minimise damage and loss.	Design, construction
	Ensure potential arisings and waste are properly characterised before or during design, to maximise the potential for highest value reuse.	Design
	As part of a Construction Environmental Management Plan (CEMP), capture information and data on site arisings recovered and diverted from landfill, by developing a Design Site Waste Management Plan once a preferred option has been selected.	Design
	As part of a Construction Environmental Management Plan (CEMP), implement a Materials Management Plan in accordance with the CL:AIRE 7 Definition of Waste: Code of Practice.	Construction
Waste to landfill	Engage early with contractors to identify possible enhancement and mitigation measures, and to identify opportunities to reduce waste through collaboration and regional synergies.	Design, Procurement

15.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

15.6.1. It is anticipated that, with the implementation of effective mitigation measures, including designing out waste, and the implementation of a CEMP, SWMP and MMP on site, that there would be no significant effects associated with material resources.

15.6.2. However, this assertion will be tested fully during the detailed assessment, as part of the Scheme Environmental Impact Assessment.

[7] CL:AIRE is the acronym for 'Contaminated Land: Applications in Real Environments'

15.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

15.7.1. The following topics have been **scoped in** to the assessment:

- The consumption of material resources (from primary, recycled or secondary, and renewable sources, and including products offering sustainability benefits) including the generation and use of arisings recovered from site; and
- The production and disposal of waste to landfill.

15.7.2. The following elements have been **scoped out** of the assessment:

- Lifecycle assessment (including embodied carbon and water) of materials and site arisings, and waste. The effort and resources required to undertake a full lifecycle assessment of these elements are deemed disproportionate to the benefit they would offer the assessment of the significance of effect.
- The consumption of material resources, and site arisings and waste production beyond the first year of scheme operation have been scoped out, as their impacts and associated effects are deemed to be not significant; and
- Impacts and effects as a result of the transportation of material resources and waste to and from site, will not be assessed within the Material Resources Chapter. Instead, they will be considered in the air quality, people and communities, noise, water and drainage, and climate chapters - as appropriate to these specialist topics. Issues of contamination and resource sterilisation are discussed in the Geology and Soils chapter.

POLICY AND PLANS

15.7.3. Policy and plans relevant to the Scheme will be presented within the ES and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies; and
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

15.7.4. It is expected that (as a minimum) the following policy documents will be reviewed and impacts on their objectives determined:

- National Planning Policy for Waste (2014) (**Ref 15 12**);
- National Policy Statement for National Networks (2014) (**Ref 15.13**);
- Waste Management Plan for England (2013) (**Ref 15.14**);
- National Policy Statement for Hazardous Waste (2013) (**Ref 15.15**); and
- Northumberland Waste Local Plan (2001), Saved Policy (**Ref 15.16**).

METHODOLOGY

15.7.5. The primary guidance that will be used to inform the assessment process is IAN153/11 Environmental Assessment of Material Resources.

15.7.6. IAN153/11 states that a detailed assessment of impacts and effects is *"most likely to be used for complex capital maintenance, improvement and large new construction projects." As the Scheme comprises online (6.6km) and offline highway (6.0km) sections, a new bridge over the River Coquet, three grade separated junctions, new accesses and local roads to new junctions, diversion of minor roads, and a new parallel road linking the existing A1 with Westmoor junction, it is classed as 'major*

improvement works (**Ref 15.17**). Accordingly, a **Detailed Level** assessment of materials will be undertaken.

15.7.7. The following methodology will be used to assess the significance of effects from materials and waste.

15.7.8. As part of the detailed assessment, the following assessment tasks will be carried out:

a) Relevant waste legislation, policies and guidance will be reviewed to identify material use and waste management objectives, commitments and targets;

b) The likely types of material resources (including site arisings) and waste will be identified, and quantities estimated for the proposed Scheme; for waste, inert and non-inert (including hazardous) forecasts will be made;

c) Details of the source and origin of materials (including resources won on and off-site) will be provided and quantified, and a cut and fill balance calculated;

d) Any materials, site arisings or waste falling under regulatory control will be identified and listed, by type and quantity.

e) Where material resource can be stockpiled and/or pre-treated in preparation for re-use, recycling or diversion from landfill, spatial and logistical details will be identified and set out.

f) Impacts will be evaluated against the regional and national materials markets and the capacity of regional (or if appropriate, national) waste management infrastructure;

g) Opportunities to eliminate, reduce, re-use, recycle or recover material resources, site arisings and (potential) waste, will be identified through a review of the Scheme (including proposed building materials, construction methods and design, where available) and in accordance with industry best practice; and

h) Identification of viable circular economy opportunities in design will be made.

15.7.9. The Environmental Statement will take into account the nature of impacts (adverse/beneficial, permanent/temporary, direct/indirect) from material resources. Significance of effects will be determined using professional judgement, taking into account any scheme data acquired, and the relative scale and nature of the Scheme.

15.7.10. The significance criteria and methodology for assessing material resources will be developed and reported in the ES, recognising the requirements of the NPS NN and with consideration of DMRB Volume 11 Section 2 Part 5 HA 205/08 (**Ref 15.18**). .

15.7.11. The main outputs from the detailed assessment will be:

a) The identification of the environmental impacts and the significance of effects associated with material resources (including site arisings) and waste; and

b) The measures which will be implemented to eliminate or mitigate impacts, and to fulfil resource efficiency and circular economy opportunities.

15.7.12. Assessment results will be presented in Table C of Annex 2 (Detailed Assessment Reporting Matrix) and Table D of Annex 3 (Mitigation Measures Reporting Matrix) as set out in IAN 153/11, or in an otherwise agreed format.

15.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

15.8.1. Baseline data and information for the assessment are (unless otherwise stated) only available to 2016. Capacity data for individual landfill operator sites are available to 2015.

15.8.2. UK landfill operators can claim commercial confidentiality for their data at time of submission; data for sites with a commercial confidentiality in place are therefore unavailable for the analyses presented in this assessment.

15.8.3. As referred to in **Section 15.3.12**, the Department for Environment, Food and Rural Affairs (Defra) has been consulted to determine whether generation and recovery rates for CDE arisings were available by region.

15.8.4. Defra confirmed that it does not publish CDE figures at a regional level, and only national (England) data are accessible through the publically available Waste Data Interrogator Database (**Ref 15.19**). The database is held and operated by the Environment Agency. It was quoted that:

"The methodology used to generate these figures is complex, in order to take into account the inherent double-counting and data gaps that are present within waste system data, and it would not be feasible to reproduce these on a regional basis."

15.8.5. Until such a time that CDE generation and recovery rates by region are available, transfer (non-civic), recovery and metal recycling data (available through the Waste Data Interrogator Database) will be used as the closest possible proxy.

16 CLIMATE

16.1 INTRODUCTION

16.1.1. This section considers the implications of the Scheme on climate throughout the lifecycle of the Scheme and any potentially significant effects having applied appropriate enhancement and mitigation measures. It sets out the proposed assessment methodology for climate and identifies those impacts that can be scoped out of the EIA.

16.1.2. There are two components to the climate assessment - greenhouse gas (GHG) emissions and climate resilience.

- The GHG assessment will consider the contribution of the Scheme to climate change; and
- The climate resilience assessment will consider the impact of projected climate changes on the Scheme itself as well as human receptors within the project area (e.g. operators and users of project infrastructure).

16.2 STUDY AREA

16.2.1. The GHG assessment is not restricted by geographical area but instead includes any increase or decrease in emissions as a result of the Scheme. This includes:

- Construction and decommissioning emissions in the area of the Scheme Footprint but also related to the transport of materials to and from the site, their manufacturing and disposal; and
- Operational emissions resulting from the new Scheme infrastructure but also emissions (or reduction in emissions) which result from the end-use of the Scheme and any shifts in transport modes/patterns which may occur.

16.2.2. The study area for the climate resilience assessment comprises the footprint of the Scheme. For the greenhouse gas assessment, the areas from which the construction materials are sourced in the UK is also included.

16.2.3. For the resilience assessment, the UK Climate Projections (UKCP09) (**Ref 16.1**) programme currently provides probabilistic projections for the whole of the UK, at regional level and at local level. This assessment will adopt the local level projections, which are set out by UKCP09 using a 25km^2 grid. The grid reference for the projections used in this assessment is Area 965 and contains the anticipated geographical extent of the Scheme.

16.3 BASELINE CONDITIONS

GREENHOUSE GAS EMISSIONS

16.3.1. In the baseline (do nothing) scenario, GHG emissions occur constantly and widely as a result of human and natural activity including energy consumption (fuel, power), industrial processes, land use and land use change. The GHG assessment will only consider where the Scheme results in additional or avoided emissions in comparison to the baseline scenario and its assumed evolution.

16.3.2. The operation and management of the current Scheme assets is likely to require a small number of volume specialist components (for example, light bulbs and signage) as well as some bulk material (cement, concrete, sand and gravel) for

minor works and repairs of the highway and ancillary infrastructure. These materials will have embodied emissions associated with them. Due to the small materials quantities required, however, emissions are assessed to be of minor significance.

16.3.3. The total end-user GHG emissions from traffic flows in the 'do nothing' (baseline) scenario are modelled as part of the air quality assessments (in accordance with the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 Air Quality; HA 207/07). The modelling includes the total GHG emissions for all traffic using the strategic and local road network (covered by the traffic model) in the area of the proposed Scheme and its surrounding region. At present, data for the end-user emissions is not available for inclusion in the baseline conditions.

CLIMATE RESILIENCE

16.3.4. The baseline for the climate resilience assessment comprises the recent historical (1961 to 1990) as well as the future projections for key climate parameters, as presented in **Table 16-1**. All figures are taken from the UK Climate Projections 2009 (**Ref 16.2**) which cover the UK split into a grid of 25 kilometre squares. Future projections are provided for the 2020s (corresponding to the construction period) and the 2080s (during the operational design life of the Scheme).

Table 16-1 - Baseline (historical and future) climate data for the study area [UKCP09 Location 965]

Climate Category	Climate parameter With recent baseline (1961-1990)		Projection for 2020s[8] (2010-2039)		Projection for 2050s (2040-2069)		Projection for 2080s (2070-2099)	
			Medium (50%)	Range	Medium (50%)	Range	Medium (50%)	Range
Temperature [°C]	Mean daily winter min	0.8	2.1	1.3 to 3.0	2.9	1.6 to 4.7	3.7	2.0 to 6.7
	Mean winter daily	3.5	4.7	3.9 to 5.5	5.5	4.3 to 6.9	6.1	4.8 to 8.3
	Change on coldest winter day	N/A	+1.3	0.5 to 2.2	+2.1	0.8 to 3.9	+2.9	1.2 to 5.9
	Mean	17.	19.2	18.1	20.5	18.4	21.8	18.5

[8] Note - projections for medium and high emissions scenario and 50% probability level. Projection range for low emission scenario at 10% probability level to high emission scenario at 90% probability level.

	daily summer max	5		to 20.5		to 23.4		to 26.6
	Mean summer daily	13.5	15.0	14.3 to 16.0	16.1	14.6 to 18.2	17.2	14.8 to 20.7
	Change on warmest summer day	N/A	+1.7	0.5 - 3.0	+3.0	0.9 to 5.9	+4.3	1.0 to 9.1
Rainfall [mm/day]	**Winter mean daily**	2.1	2.1	1.9 to 2.4	2.3	1.8 to 2.7	2.4	2.0 to 3.2
	Summer mean daily	1.9	1.9	1.7 to 2.2	1.7	1.4 to 2.0	1.6	1.4 to 2.0
	% change on wettest winter day	N/A	+5.7%	-8.8% to 24.9%	+14.4%	-4.9% to 38.7%	+19.9%	-2% to 56.2%

16.3.5. All individual environmental topics for the Scheme will consider how the climate projections may affect their assessments, and report any impacts within their ES Chapter. A summary will be provided within the Climate Chapter.

16.4 POTENTIAL IMPACTS

GREENHOUSE GAS ASSESSMENT

16.4.1. The impacts of GHG relate to their contribution to global warming and climate change. These impacts are global and cumulative in nature, with every tonne of GHG contributing to impacts upon natural and human systems.

16.4.2. GHG are natural and man-made gases occurring in the atmosphere, which absorb and emit infrared radiation thereby maintaining the Sun's energy within the Earth's atmosphere. There is an overwhelming scientific consensus that the major increase in the concentration of GHG from man-made sources is contributing to global warming and climate change.

16.4.3. The seven main GHG defined by the Kyoto Protocol are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride. In combination, these GHG emissions are commonly expressed in terms of carbon dioxide equivalents according to their relative global warming potential. For this reason the shorthand 'carbon' may be used to refer to GHG.

16.4.4. It is expected that most emissions will occur during construction and operation. During construction, large sources of emissions are anticipated to be embedded carbon in materials including those associated with the pavement for road widening and the new dual carriageway and junction (i.e. asphalt and aggregate) and also the bridge (i.e. structural and reinforced steel and concrete). During operation, the main emissions source will be from end-users.

CLIMATE RESILIENCE

16.4.5. The impacts in relation to climate resilience relate to how the changing climate may affect the Scheme itself, in terms of the construction and operation of the infrastructure, its ability to function and the end-users.

16.4.6. **Table 16-2** presents potential impacts of climatic changes during the construction and operation period. These are not exhaustive and further assessment is required to identify the extent of impacts.

Table 16-2 - Potential impacts during the construction and operation period

Phase of Scheme	Climate event	Impact (hazards or benefits)
Construction	Increased temperatures, prolonged periods of hot weather	Warm and dry conditions exacerbate dust generation and dispersion, health risks to construction workers
	Increased precipitation, and intense periods of rainfall	Flooding of works and soil erosion Increased risk of contamination of waterbodies Disruption to supply of materials and goods
Operation	Increased precipitation, especially in Winter	Flooding Water scour causing structural damage Weakening or wash-out of structural soils Change in ground water level and soil moisture
	Temperature extremes	Stress on structures Stress on surfaces e.g. difficulties with maintaining required texture depth during construction and operation. Challenges for maintenance regimes

16.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

16.5.1. As 'climate' is a new topic, assessment of mitigation and enhancement measures was not undertaken during the previous assessment stages. Mitigation and enhancement measures will, therefore, be identified through the completion of the environmental assessment.

16.5.2. It is expected that a number of design, mitigation and enhancement measures will be considered as the Scheme progresses into detailed design, construction and operation. These could include:

- Specification of materials and products with reduced embodied GHG emissions including through material substitution, recycled or secondary content and from renewable sources;
- Recovery and re-use / recycling of site arisings (ideally, on-site); and
- Selection and engagement of materials suppliers and construction contractors taking into account their policies and commitments to reduction of GHG emissions, including embodied emission in materials.

16.5.3. The exact measures to be adopted will be considered through the EIA.

16.6 DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS

16.6.1. As 'climate' is a new topic, an assessment of potential significant effects was not undertaken during the previous assessment stages. Potential significant effects will, therefore, be identified through the completion of the environmental assessment.

16.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

Greenhouse Gas Assessment

16.7.1. There are multiple GHG emissions sources associated with each lifecycle stage of the Scheme. The following emissions sources, outlined in **Table 16-3**, are **scoped in**.

Table 16-3 - Emissions sources that are in scope

Sub-stage of lifecycle	Reasoning
Construction	
Product stage; including raw material supply, transport and manufacture	Emissions from construction materials typically form the greatest proportion of a scheme's emissions. Main works include: On-line widening 6 km carriageway (single to dualled carriageway) Off-line construction of 6.6 km new dual carriageway 3 new grade-separated junctions (Highlaws, Fenrother, West Moor). New bridge over River Coquet
Construction process stage; including transport to/from works site and construction/installation processes.	Emissions from the construction stage typically form a large proportion of a scheme's emissions, and would include such emissions sources as fuel/energy consumption.
Land use, land use change and forestry (LULUCF).	The new dualled carriageway will lead to a change in emissions associated with the loss of agricultural grassland.

Sub-stage of lifecycle	Reasoning
Operation	
Use of the infrastructure by the end-user	End-user emissions from the surrounding network will change (increase or decrease).
Repair and refurbishment	The Scheme is anticipated to be resurfaced twice (assuming a 20 year design life).

16.7.2. Emissions sources that are not included within the scope of this assessment, and the reasons why they have been scoped out, are presented in **Table 16-4**.

Table 16-4 - Emissions sources that are out of scope

Sub-stage of lifecycle	Reasoning [likely significance of net emissions at this stage]
Operation	
Operation and maintenance	There are no Information Technology Services included in this Scheme. The rural dual carriageway is not anticipated to be lit.
Replacement	Cross over with repair
End of life	
Deconstruction	Decommissioning will happen several decades into the future and well beyond the period for which the UK Government has set agreed carbon budgets. The uncertainty about the future decommissioning process and associated emissions is sufficient to scope this lifecycle stage out of the emissions assessment.
Transportation of waste arisings	
Waste processing for recovery	
Disposal	

Climate Resilience

16.7.3. Within the assessment of resilience to climate change, the following Scheme elements set out in **Table 16-5** are **scoped in**.

Table 16-5 - Potential vulnerable scheme receptors

Element	Aspects
Geotechnics	Erosion
	Stability of earthworks and compaction
	Earthworks construction across existing landslip
	Increased scour and erosion of earthworks
	Stability of slopes, change in water levels/pore pressure

Element	Aspects
	Drainage ditches
Pavements	Design of foundations
	Materials integrity, specification and construction details
	Construction - laying surface dressing, microsurfacing, temperature susceptible materials
	Skid resistance
	Maintenance
Restricting network use	High winds
	Flooding
Restraint systems	Renewal and repair
Signs and signals	Stability
	Renewal and repair
Soft estate	Landscape, ecology
Structures (including gantries)	Thermal actions (loads) applied to superstructure
	Wind actions (loads) applied to superstructure
	Increased thermal range giving rise to increased earth pressures for integral bridges
	Earth pressures used in design affected by change in ground water level
	Foundation settlement affected by change in ground water level
	Design for increased scour risk for foundations
	Design of structure drainage
	Use of temperature sensitive components or materials in construction or rehabilitation (e.g. epoxies used in fibre reinforced plastic (FRP) strengthening)
	Design, management and maintenance of bearings and expansion joints
	Climatic constraints on construction and maintenance activities
	Optimum timing of maintenance interventions, in response to changes in deterioration rates

16.7.4. **Table 16-6** outlines those elements that have been **scoped out** of the assessment of resilience to climate change and the reasoning behind this.

Table 16-6 - Scheme receptors outside the scope of assessment.

Element / Receptor	Aspects	Reasoning
Drainage	Surface water drainage systems	The climate effects on Road Drainage and the Water Environment will be assessed separately as described in Section 12 of this Scoping Report.
	Cross-culverts	
	Road-edge drainage	
	Attenuation	
	Outfalls	
	Drainage ditches	
Incident management	Breakdowns	Outside scope of design works
	Road user incidents/ accidents	
	Third party incidents	

16.7.5. The effect of climate change during the decommissioning of the Scheme has been scoped out due to uncertainty of requirements and processes at the Scheme's end of life.

POLICY AND PLANS

16.7.6. Policy and plans relevant to the Scheme will be presented within the ES and will consist of the following aspects:

- A schedule of the relevant national, regional, county and local policies, including;
  - United Nations Framework Convention on Climate Change (UNFCCC) (**Ref 16.3**);
  - National Planning Policy Framework (**Ref 16.4**);
  - National Policy Framework For National Networks (**Ref 16.5**); and
  - Local Plan policies and any relevant energy strategies.
- A commentary setting out the significance of the impact of the Scheme on each policy objective.

METHODOLOGY

Greenhouse Gas Assessment

16.7.7. The GHG assessment is based on the following guidance:

- TAG Unit A3 Environmental Impact Appraisal (DfT, 2015). Chapter 4 Greenhouse Gases; and
- PAS 2080:2016 Carbon management in infrastructure (**Ref 16.6**).

16.7.8. For all lifecycle stages and sub-stages of the Scheme, the detailed assessment will include the following:

- Collection of available data/information on the scale of GHG emitting activities for the baseline scenario and for the project. In each case this will cover the trend for the whole study period; and

- Calculation of the GHG emissions using a standard emissions calculation methodology applying a suitable emissions factor.

16.7.9. At this stage, limited information is available to assess GHGs during construction and operation. For example, a materials bill of quantities is not available and traffic modelling is not sufficiently advanced to complete any further assessment of end user GHG emissions. Therefore, a detailed assessment will be undertaken through the EIA. The lifecycle stages and corresponding emissions sources that could be included in the detailed assessment are outlined in **Table 16-7**.

Table 16-7 - Scheme Lifecycle stages and key emissions sources

Scheme Lifecycle stage	Sub-stage of lifecycle	Potential sources of emissions (not exhaustive)	Indicative assessment of key emission sources
Construction	Product stage (manufacture and transport of raw materials to suppliers)	Embodied emissions associated with the required raw materials. For example: Pavement: asphalt, aggregate Wew bridge over River Coquet, steel, concrete Cut and fill 3 new grade-separated junctions (Highlaws, Fenrother, West Moor).	6.0km / 4.8 ha of online widening (dualling) (454 tCO2e) 6.6km/ 10.6 ha new off-line dualled highway (1,302 tCO2e) Manufacturing and supply of drainage, barriers, signs, lighting – data not available but assumed not significant
	Construction process stage (transport of materials and arisings to/from site; construction process, earth movements)	Activities for organisations conducting construction work (i.e. fuel/electricity construction) Delivery of materials for new bridge and three grade-separated junctions Export and	Delivery of materials for carriageway (737tCO2e) Delivery and installation of drainage, barriers, signs and lighting – data not available but assumed not significant.

Scheme Lifecycle stage	Sub-stage of lifecycle	Potential sources of emissions (not exhaustive)	Indicative assessment of key emission sources
		disposal of site excavations	
	Land use, land use change and forestry	Change in emissions associated with loss of agricultural grassland	.
Operation	End-user emissions (regional traffic flows)	Vehicles using highways infrastructure	Change in end-user emissions expected from surrounding network.
	Operation and maintenance	Lighting	Negligible change in emissions (energy) for lighting and controls.
	Repair, replacement, refurbishment	Activities and materials for organisations conducting repairs.	12.6 kilometres / 15.4 hectares of new road surface to be maintained/repaired.

Emissions Calculations

16.7.10. Emissions calculations will be completed within an industry recognised carbon calculation tool which focuses on emissions throughout the project lifecycle. For this particular assessment, Highways England's carbon tool will be used. Values will be reported as tonnes of carbon dioxide equivalents (tCO2e).

SIGNIFICANCE OF EFFECTS

16.7.11. In line with the National Policy Statement for National Networks (2014), significance of impacts will be assessed by comparing estimated GHG emissions arising from the Scheme with UK carbon budgets, and the associated reduction targets.

Climate Resilience

16.7.12. The Scheme comprises on-line widening, a new off-line dualled highway and three new grade-separated junctions, for which there is potential for significant effects. The design of the highways improvement is not, however, sufficiently advanced to complete any further assessment of climate resilience at this stage, and will therefore be assessed through the EIA. The process for assessing the risk of climate change effects to potentially vulnerable receptors will be applied to the construction and operational phases of the Scheme. Historical (baseline) local climate data from the UK climate projections programme (UKCP) will be used to identify climatic trends currently impacting the Scheme.

16.7.13. The assessment will address the resilience assessment of the Scheme to climate change impacts. The assessment will include infrastructure and assets associated with the Scheme. It will assess resilience against both gradual climate change, and the risks associated with an increased frequency of extreme weather events.

16.7.14. The assessment will assume that the Scheme will be designed to be resilient to impacts arising from current weather events and climatic conditions, and designed in accordance with current planning, design and engineering practice and codes. The assessment will also identify and take into account the existing resilience and adaptation measures for each risk either already in place or in development for infrastructure and assets.

16.7.15. The degree to which the frequency of these potential hazards may change as a result of climate change is explained in the UKCP09 climate change projections.

SIGNIFICANCE OF EFFECTS

16.7.16. In line with the EIA Regulations 2017 (Schedule 4, Part 5), a description of the likely significant effects of the Scheme on the environment, resulting from the vulnerability of the Scheme to climate change, will be provided in the ES.

16.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

16.8.1. This scoping report is based on currently available information, and can be subject to change as the design progresses.

16.8.2. Key indicator information has been considered, including the length (km) and area (hectares) of new road surface for the Scheme which gives a useful indication of the scale of raw materials and construction activity which will be required. To gain an indication of emissions associated with the transportation of materials, distances have been estimated; 20 km for transportation of materials.

16.8.3. The GHG emissions for the manufacture and delivery of materials for the key construction element – new carriageway surface – have been estimated on the basis of the surface areas provided for each option. An assumption has been made regarding the quantity of aggregate (0.734 tonnes) and bitumen (0.016 tonnes) required for the construction of each m2 of carriageway surface – using standard estimates from previous road projects. Assumptions have also been applied for carriageway widths; 8m for single lane highway and 16m for dual-carriageway.

16.8.4. No information is available on the quantities of materials in other construction elements such as major structures (e.g. grade-separated junctions and bridge), however, these materials are considered to be a significant source of emissions. No

information is available to estimate the emissions from the construction process (e.g. from vehicles and construction plant).

16.8.5. There is currently no specific guidance or carbon emissions threshold to determine significance.

16.8.6. No information is available for baseline or forecast end-user emissions.

17 ASSESSMENT OF CUMULATIVE EFFECTS

17.1.1. This section considers the cumulative effects of the Scheme. The proposed assessment methodology for cumulative effects is detailed and the scope of the cumulative effect assessment for the Preliminary Design stage is identified.

17.1.2. For the purpose of this cumulative assessment, the following terms are defined as follows:

- "Combined effects" are defined as cumulative impacts from a single project; and
- "Cumulative effects" are defined as cumulative impacts from different projects (in combination with the project being assessed).

17.1.3. This section describes the study area, potential impacts, potential significant effects, and the methodology prescribed for the cumulative effects assessment for the EIA.

17.1.4. Previously, cumulative effects were qualitatively discussed at the Options Selection stage. A full assessment of the cumulative effects will be carried out at the Preliminary Design stage as part of the ES.

17.2 STUDY AREA

17.2.1. The DMRB guidance on the assessment of cumulative effects requires that the spatial boundary of the receptor/resource with potential to be affected directly, or indirectly, is considered.

17.2.2. In defining the study area consideration is given to schemes with planning permission that:

- Occur at times prior to, during or after construction of the Scheme;
- Are 'in proximity' to the Scheme; or
- Are considered likely to result in environmental effects which could act in synergy with effects arising from the Scheme.

17.2.3. The study area for combined effects has been defined for each individual topic area in line with DMRB guidance.

17.2.4. With reference to the guidance within DMRB Vol.11 Section 2 HA 205/08, the spatial extent for the review of Planning Applications is defined as the Scheme Footprint and a 500m study area for non-traffic related topics. For traffic related topics developments with potential traffic impacts will be included where they fall within the ARN developed for the traffic model.

17.3 ASSESSMENT METHODOLOGY

17.3.1. The cumulative assessment will be based upon expert professional judgement. The assessment will follow the guidance contained in DMRB Volume 11 Section 2 Part 5 (HA 205/08) (**Ref 17.1**), and consider the nature of the affected receptor and of the impact concerned. This assessment is also informed by the National Policy Statement for National Networks (2014) (**Ref 17.2**), and the Planning Inspectorate Advice Note 17 (**Ref 17.3**).

CUMULATIVE EFFECTS METHODOLOGY

17.3.2. The DMRB (HD 205/08) guidance suggests cumulative effects should be considered for all 'reasonably foreseeable' projects and to encompass all schemes which are 'committed', including (but not necessarily limited to):

- Trunk Road projects which have been confirmed (i.e. gone through the statutory processes) in proximity to the Scheme; and
- Development projects with valid planning permissions for which statutory EIA is a requirement or a non-statutory EIA has been undertaken.

17.3.3. In addition to the above, we will carry out a review of those aspects outlined in the PINS Advice Note 17, including:

- Other developments under construction;
- Permitted application(s), whether under PA2008 or other regimes, but not yet implemented;
- Submitted application(s) whether under PA2008 or other regimes, but not yet determined;
- Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted;
- Other developments identified in the relevant Development Plan (and Emerging Development Plans); and
- Other developments identified in other plans and programmes (as appropriate) which set the framework for future development consents/approval, where such development is reasonably likely to come forward.

17.3.4. Consultation with Northumberland County Council (NCC) will be undertaken to determine whether there are any other projects in the vicinity of the Scheme that should be taken into consideration.

17.3.5. The assessment will differentiate between permanent, temporary, direct, indirect and secondary effects, positive or negative.

17.3.6. When considering significance criteria, the assessment will take into account the requirements set out in the National Policy Statement for National Networks (NPS NN) (2014) and PINS Advice Note 17.

17.3.7. In accordance with HA 205/08, the assessment will cover the most likely significant cumulative effects, rather than reporting every potential interaction. The criteria outlined in HA 205/08 Table 2.6, will be used alongside professional judgement to determine the significance of cumulative effects.

COMBINED EFFECTS METHODOLOGY

17.3.8. Each technical chapter will assess the categories of receptors and/or specific named receptors relevant to that topic's methodology. In some instances, the same receptor or resource may be assessed in more than one technical chapter. In these cases there is the possibility that several individual effects on the same receptor may add up to create a significant cumulative effect. Thus, when considering the combined effects on a given receptor, several technical chapters will be reviewed.

ASSUMPTIONS AND LIMITATIONS

17.3.9. An update of planning applications in the surrounding area (within 500m centred on the Scheme Footprint) will be undertaken through the EIA.

17.3.10. In order to complete the cumulative effects assessment, the list of schemes to be considered as part of the traffic assessment will be finalised in April 2018. Any schemes, projects or other relevant developments announced after this date would therefore not be included in the traffic assessment.

17.3.11. The assessment of cumulative effects is widely recognised to be limited by the availability of baseline information and relevant environmental assessments, as well as lack of compatibility of the assessments with the other schemes. Where different schemes have employed different methodologies or criteria in their assessments, difficulties in determining the interactions between effects from different schemes can arise.

HEALTH

17.3.12. The Environmental Statement will consider impacts on human health using a cross topic approach covering air quality; noise and vibration; road drainage and the water environment; and people and communities. To enable appropriate conclusions to be drawn, a qualitative assessment of the information collected via the individual topic assessments listed above will be undertaken and presented within the Cumulative Effects section of the ES. The assessment will draw on a baseline health profile comprising social, community and health statistics to ensure that the effects of health inequalities and deprivation are accounted for in the assessment.

17.4 ASSESSMENT OF COMBINED EFFECTS

17.4.1. **Table 17-1** presents the receptors identified in the topic sections of this Scoping Report as having the potential to be cumulatively affected by the Scheme. The receptors only include those that are likely to experience potential residual significant effects from more than one topic area.

Table 17-1 - Combined effects from the Scheme

Receptor/ Resource	Notes	Air quality	noise and vibration	Landscape and visual	cultural heritage	biodiversity	road drainage and the water environment	geology and soils	people and communities	material resources	climate
Public Rights of Way	Changes to noise levels and views during construction and operation.		P	P							
River Coquet and Coquet Valley Woodlands SSSI	Changes to landscape character during construction and operation, and loss of habitat.	P	P	P		P					
Dukes Bank Wood Ancient and Semi-Natural Woodland	Changes to landscape character during construction and operation, and loss of habitat.			P		P					
Local residential receptors	Changes to views and noise levels during construction and	P	P	P							

and community facilities.	operation.										

17.4.2. There is the potential for residual cumulative effects from the following:

- During construction and operation, a number of PRoW, residential receptors and community facilities within the vicinity of the Scheme could experience adverse impacts as a result of increased noise levels and visual intrusion;
- The River Coquet and Coquet Valley Woodlands SSSI and the Dukes Bank Wood Ancient and Semi-Natural Woodland have the potential to experience significant effects relating to a change in the landscape character, habitat loss and noise during construction;
- Watercourses such as the River Coquet, which would be crossed by the Scheme, could experience potential accidental pollution/discharge of materials, which would impact the water quality and ecological attributes; and
- In relation to flooding, there could be a significant impact on human safety associated with surface water flooding.

17.4.3. These potential significant residual combined effects will be reviewed and updated through the EIA.

17.5 ASSESSMENT OF CUMULATIVE EFFECTS

17.5.1. Where other improvement and construction projects are delivered at the same time as, and in proximity to the Scheme, the potential for cumulative adverse impacts and effects exists. Conversely, beneficial opportunities to maximise synergies between projects (balancing cut and fill across different schemes, for example) may also present themselves. Only topic areas in this Scoping Report that conclude there is potential for significant effects are considered.

17.5.2. **Table 17-2** presents proposed applications identified to inform this Scoping Report (November 2017), for consideration of cumulative effects likely to be delivered at the same time and in proximity to the Scheme. This will be reviewed and updated through the EIA.

Table 17-2 - Applications for consideration of cumulative effects

Application Ref	Site Description	Application Description	Decision Issue Date	Approx. Distance from Scheme Footprint	EIA req'd (y/n)
14/02477/FUL*	Land West of Burgham Park, Burgham Park, Felton	Change of use to residential (C3) by way of erecting an enabling development of 14. Detached executive homes	05 Jan 2016	500m west	N
13/02105/OUT**	Land South West of Northgate Hospital	Outline Planning Application for the proposed development of	23 Jul 2014	200m south east	N

Application Ref	Site Description	Application Description	Decision Issue Date	Approx. Distance from Scheme Footprint	EIA req'd (y/n)
	A192 District Boundary to Northgate Roundabout	approximately 255 residential dwellings with associated access			
14/02318/REM***	Northgate Hospital, Northgate	Reserved matters application for outline application for planning permission 11/01439/FUL for the access, appearance, landscaping, layout and scale for residential dwellings and respective associated landscaping, parking, amenity space and waste recycling.	17 Oct 2014	Adjacent, east	N
N/A****	A1 Alnwick to Elingham improvement scheme***	On-line dualling of the existing A1 between Alnwick and Elingham	N/A	12km	Y

* https://publicaccess.northumberland.gov.uk/online-applications/simpleSearchResults.do?action=firstPage
**https://publicaccess.northumberland.gov.uk/online-applications/applicationDetails.do?keyVal=MQ0OTUQS2L000&activeTab=summary
***https://publicaccess.northumberland.gov.uk/online-applications/applicationDetails.do?keyVal=N8P940QS0FV00&activeTab=summary
****http://roads.highways.gov.uk/projects/morpeth-to-ellingham-dualling/

17.5.3. The Burgham Park application relates to the development of 14 residential dwellings. Given the scale of the development, that it is adjacent to an area of existing

residential dwellings and the distance of the development from the Scheme, it is not anticipated that there would be any significant cumulative effects.

17.5.4. The Northgate Hospital applications relate to the creation of new residential dwellings (including accesses, landscaping etc) at land south of Northgate Hospital, east of the Morpeth start point of the Scheme. Construction is underway for Phase 1 in the southern section, and is anticipated to be complete by 2020. Phase 2 would then follow. The application is accompanied by various environmental assessments. Given the proximity of the application to the Scheme, there is the potential for cumulative impacts upon:

- Landscape and visual;
- Noise and vibration; and
- Road drainage and the water environment.

17.5.5. The A1 Alnwick to Ellingham (A1 A2E) improvement scheme forms part of Highways England's wider A1 improvement programme and involves dualling of the existing carriageway. The project is currently at Preliminary Design Stage. This scheme will be assessed as part of the traffic related topics of Air Quality, Noise and Vibration and Road Drainage, the Water Environment and People and Communities. Due to the distance between the Schemes, it is not anticipated that there would be any significant cumulative effects, although this will be assessed through the EIA.

18 SUMMARY

18.1.1. A summary of the environmental topics which have been scoped into the assessment, including the level of assessment (simple or detailed); and those topics that have been scoped out of the assessment and a justification to support this is provided below in **Table18-1**.

Table 18-1 - Summary of environmental topics' scope

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Air Quality				
Construction		X	Scoping assessment to provide evidence for scoping out (will be appended to ES).	With mitigation significant impacts are not considered likely.
Operation – local and regional air quality	X		Simple Level	
Operation – particulate matter		X	Scoping assessment to provide evidence for scoping out (will be appended to ES).	In relation to highways schemes and emissions from vehicular traffic, the pollutants of greatest concern are oxides of nitrogen and particulate matter. The area is rural in nature, and whilst there is no particulate monitoring near to the Scheme, and very low background concentrations, it is considered that there is very little risk of exceedance of the air quality limit values.
Nitrogen deposition	X		Simple level	

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
upon ecological receptors				
Noise and Vibration				
Construction noise and vibration	X		Detailed	
Road traffic noise	X		Detailed	
Road traffic vibration	X		Qualitative	
Road traffic nuisance	X		Detailed	
Landscape and Visual				
Landscape and Visual	X		Detailed	
Cultural Heritage				
Listed Buildings, CAs, the Historic Landscape and non-statutory designated heritage assets including below-ground and earthwork archaeological remains	X		Detailed	
WHS, SMs, Registered Parks and Gardens or Historic Battlefields		X		No WHS, SMs, Registered Parks and Gardens or Historic Battlefields have been identified within the Study Area and therefore these groups of assets are scoped out.
Biodiversity				

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Designated sites of international importance		X		All designated sites of international importance are scoped out as, based upon the Options Selection Stage EAR, the Scheme is not likely to generate significant impacts upon them.
River Coquet and Coquet Valley Woodlands SSSI & Coquet River Felton Park LWS	X		Detailed*	
All priority habitats in the study area	X		Detailed*	
Protected and notable species in the study area	X		Detailed*	
Invasive plant species in the study area	X		Detailed*	
Hazel Dormice Muscardinus avellanarius		X		No records were found within the study area.
Road Drainage and the Water Environment				
Water quality of surface water and groundwater features during construction and operation	X		Qualitative	

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Hydromorphological quality of surface water features during construction and operation	X		Qualitative	
Impacts to catchment hydrology during operation	X		Qualitative & quantitative	
Flood risk associated with temporary works during construction	X		Qualitative	
Flood risk associated with permanent works during operation	X		Quantitative	
Flood risk associated with proposed drainage system during operation	X		Quantitative	
Water Framework Directive assessment	X		Qualitative	
Geology and Soils				
Construction aspects excluding statutory and non- statutory sites of geological importance	X		Detailed*	

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Operation aspects excluding statutory and non-statutory sites of geological importance	X		Detailed*	
Statutory/non-statutory sites of geological importance		X		No sites have been identified within the Scheme or surrounding area.
People and Communities				
Vehicle travellers – driver stress	X		Simple	
Vehicle travellers – views from the road		X		During construction and operational phases of the Scheme, there is a potential for a change in view from the road for users of the A1. However, with the implementation of mitigation (particularly in relation to planting etc), no significant changes in the quality of existing driver's views and the overall quality of the driving experience are anticipated during both phases.
Impacts on the economy and labour market – during construction	X		Qualitative	
Impacts on the economy and labour market – during operation		X		Not expected to be significant.
NMUs and community severance / amenity	X		Simple	

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
during construction and operation				
Agricultural land	X		Simple	
Development land and community land		X		There is no community land or development land lying immediately adjacent to the Scheme and therefore no assessment of these land uses will be undertaken.
Recreational activities	X		Qualitative	
Materials				
Materials and waste	X		Detailed	
Lifecycle assessment of materials and waste		X		The effort and resources required to undertake a full lifecycle assessment of these elements are deemed disproportionate to the benefit they would offer the assessment of significance of effect.
Materials and waste production during operation beyond the first year of operation		X		The impacts associated with the Scheme have been deemed to be not significant.
Climate				
Emission sources during construction	X		Detailed**	
Emission sources during operation	X		Detailed**	

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Climate resilience (except those elements detailed below)	X		Detailed**	
Emission sources at as end of life (decommissioning) stage e.g. deconstruction and management of materials, arisings and waste; and air quality impacts associated with emissions.		X		Decommissioning will happen several decades into the future and well beyond the period for which the UK Government has set agreed carbon budgets. The uncertainty about the future decommissioning process and associated emissions is sufficient to scope this lifecycle stage out of the emissions assessment.
Climate resilience with regards to drainage, incident management, managed motorways		X		The climate effects on Road Drainage and the Water Environment will be assessed separately as described in Section 12 of this Scoping Report.
Cumulative Effects				
Combined effects	X		Detailed	
Cumulative effects	X		Detailed	
*It should be noted that the DMRB does not make a distinction for the level of assessment for these topics. This level of assessment is therefore based on professional judgement which has been informed by the nature and scale of the Scheme. **The DMRB does not currently contain any guidance for the assessment of climate. The level of assessment is therefore based on professional emerging guidance and industry best practice.				

19 NEXT STEPS

19.1 SCOPING CONSULTATION

19.1.1. This Scoping Report will be submitted to the Planning Inspectorate, which will then consult the statutory bodies under The Infrastructure Planning (Environmental Impact Assessment) Regulations to receive input that will be used to inform its Scoping Opinion. The Scoping Opinion will then be used to inform what issues the Environmental Statement should address.

19.2 PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

19.2.1. A Preliminary Environmental Information Report (PEIR) will be published during the statutory consultation period in Spring 2018. The PEIR will be informed by this Scoping Report and the Planning Inspectorate's Scoping Opinion. The purpose of the PEIR is to enable the local community to understand the environmental effects associated with the Scheme so as to inform their response. The report will contain a Scheme overview and a summary of the environmental impacts associated with the Scheme.

19.3 ENVIRONMENTAL IMPACT ASSESSMENT

19.3.1. An Environmental impact Assessment (EIA) will be undertaken in line with the Scoping Report and Scoping Opinion to assess the environmental impacts of the Scheme.

REFERENCES

- **Ref 1.1** WSP (November 2017) A1 M2F EIA Screening Determination HE551459-WSP-GEN-M2F-RP-LE-0290-P01
- **Ref 3.1** Jacobs (2014) A1N Feasibility Study, B1980200 Rev 1.
- **Ref 3.2** Design Manual for Roads and Bridges Volume 4, Section 2, Part 3 HD 33/16 – Section 2 (Design of Highway Drainage Systems)
- **Ref 4.1** Jacobs (2017) A1 in Northumberland PCF Stage 2 EAR, Version 1.0, B2104700
- **Ref 4.2** OD/248 – A1 Northumberland Improvements, Report on the Public Consultation, Highways England, April 2017, B2104700 Version 3.0
- **Ref 6.1** Highways England (2008) Design Manual for Roads and Bridges (DMRB) Volume 11 Section 2 Part 5 (HA 205/08) Assessment and Management of Environmental Effects.
- **Ref 6.2** Highways England (2015) Interim Advice Note 125/15 Environmental Assessment Update.
- **Ref 6.3** Department for Transport (2014) National Policy Statement for National Networks. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf
- **Ref 6.4** http://www.hse.gov.uk/pubns/books/l111.htm.
- **Ref 6.5** The Planning Inspectorate. (2015) Advice Note 12. Transboundary Impacts
- **Ref 7.1** HA207/07 DMRB Volume 11 Section 3 Part 1, May 2007 Paragraph C3.1 http://www.standardsforhighways.co.uk/dmrb/
- **Ref 7.2** http://uk-air.defra.gov.uk/data/gis-mapping accessed 24/04/2017
- **Ref 7.3** IAN 175/13, June 2013, http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian175.pdf
- **Ref 7.4** DEFRA Local Air Quality Management Technical Guidance (TG16), April 2016 https://laqm.defra.gov.uk/technical-guidance/index.html
- **Ref 7.5** IAN 170/12v3, November 2013 http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian170v3.pdf
- **Ref 7.6** IAN 174/13, June 2013 http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian174.pdf
- **Ref 7.7** IAN 185/15, January 2015 http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian185.pdf
- **Ref 8.1** Highways Agency. (2011). Design Manual for Roads and Bridges, Volume 11, Section 3 – Part 7 HD213/11, Noise and Vibration (November 2011). London: Highways Agency.
- **Ref 8.2** Highways Agency (2015) Interim Advice Note 185/15 Updated traffic, air quality and noise advice on the assessment on link speeds and generation of vehicle data into 'speed-bands' for users of DMRB Volume 11, Section 3, Part 1 'Air Quality and Volume 11, Section 3. Part 7 Noise.
- **Ref 8.3** Department for Environment, Food and Rural Affairs, January 2014. Noise Action Plan: Roads (Including Major Roads) Environmental Noise (England) Regulations 2006, as amended.
- **Ref 8.4** https://data.gov.uk/data/map-preview?url=http%3A%2F%2Fenvironment.data.gov.uk%2Fds%2Fwms%3FSERVICE%3DWMS%26INTERFACE%3DENVIRONMENT--a0c730ad-1366-4d22-bb04-244e18f216b4%26request%3DGetCapabilities&n=55.8&w=-5.7&e=1.8&s=50.0
- **Ref 8.5** Communities and Local Government (March 2012) National Planning Policy Framework and Planning Practice Guidance https://www.gov.uk/government/publications/national-planning-policy-framework--2
- **Ref 8.6** DEFRA (2010) Noise Policy Statement for England https://www.gov.uk/government/publications/noise-policy-statement-for-england
- **Ref 8.7** Department of Transport (1988) Calculation of Road Traffic Noise
- **Ref 8.8** BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise and Part 2: Vibration.
- **Ref 9.1** Highways Agency (2010) DMRB Interim Advice Note 135/10 Landscape and Visual Effects Assessment

- **Ref 9.2** Guidelines for Landscape and Visual Impact Assessment, 3rd Edition 2013, Landscape Institute & IEMA
- **Ref 9.3** DEFRA Magic Map [Link]
- **Ref 9.4** Google Maps [Link]
- **Ref 9.5** Bing Maps [Link]
- **Ref 9.6** National Trust Land Map [Link]
- **Ref 9.7** http://www.northumberland.gov.uk/NorthumberlandCountyCouncil/media/Planning-and-Building/planning%20policy/Studies%20and%20Evidence%20Reports/Landscape%20Green%20Spaces%20Studies/1.%20Landscape%20Character/Landscape-Character-Part-A.pdf
- **Ref 9.8** Northumberland Landscape Character Assessment Part A Landscape Classification (August 2010) p3
- **Ref 9.9** Northumberland Landscape Character Assessment Part A Landscape Classification (August 2010) p6
- **Ref 9.10** Guidelines for Landscape and Visual Impact Assessment (Third Edition) – Landscape Institute and Institute for Environmental Management and Assessment – 2013, para 7.17
- **Ref 9.11** https://www.landscapeinstitute.org/wp-content/uploads/2016/01/02-17-Visual-Representation.pdf
- **Ref 9.12** https://www.landscapeinstitute.org/PDF/Contribute/LIPhotographyAdviceNote01-11.pdf
- **Ref 10.1** Design Manual for Roads and Bridges. Volume 11 Section 3 Part 2 HA 208/07.
- **Ref 10.2** Historic England, 2015 The Setting of Heritage Assets, Historic Environment Good Practice in Planning: 3, 12
- **Ref 10.3** Chartered Institute for Archaeologists (CIfA) (2014) Standard and Guidance for Historic Environment Desk-based Assessment.
- **Ref 11.1** CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Chartered Institute of Ecology and Environmental Management, Winchester
- **Ref 11.2** Highways England (2010) Interim Advice Note 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment
- **Ref 11.3** Highways Agency (1993) Design Manual for Roads and Bridges. Volume 11, Section 3, Part 4. Ecology and Nature Conservation.
- **Ref 11.4** Highways Agency (1993) Design Manual for Roads and Bridges. Volume 11, Section 4, Part 1. Assessment Methods.
- **Ref 11.5** Chartered Institute of Ecology and Environmental Management (CIEEM). 'Guidelines for Preliminary Ecological Appraisal' (2013).
- **Ref 11.6** Highways England (2015) Our Plan to Protect and Increase Biodiversity. https://www.gov.uk/government/publications/biodiversity-plan
- **Ref 11.7** Jacobs (April 2017) A1 in Northumberland PCF Stage 2 Assessment of Implications on European Sites Screening Report, B2104700/OD/261 Version 3.0
- **Ref 12.1** Highways Agency. (2009) Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 10 (HD45/09), Road Drainage and the Water Environment.
- **Ref 13.1** A1 in Northumberland Morpeth to Felton Preliminary Sources Study Report, HAGDMS No. 29386 V3, completed by Jacobs in January 2017
- **Ref 13.2** Highways Agency. (1993) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 11, Soils and Geology
- **Ref 13.3** R&D Publication 66: 2008 Volume 1. Guidance for the Safe Development of Housing on Land Affected by Contamination http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf
- **Ref 13.4** Communities and Local Government (March 2012) National Planning Policy Framework and Planning Practice Guidance
- **Ref 13.5** Environment Agency (2004) Model Procedures for the Management of Contaminated Land (CLR11)
- **Ref 14.1** Highways England (2015) Interim Advice Note 125/15 Environmental Assessment Update
- **Ref 14.2** Highways Agency. (2001) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 6, Land Use

- **Ref 14.3** Highways Agency. (1993) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 8, Pedestrians, Cyclists, Equestrians and Community Effects
- **Ref 14.4** Highways Agency. (1993) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 9, Vehicle Travellers
- **Ref 14.5** Highways Agency. (2017) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 2, Part 5 HD 42/17, walking, cycling & horse-riding assessment and review
- **Ref 14.6** Communities and Local Government (March 2012) National Planning Policy Framework and Planning Practice Guidance
- **Ref 14.7** Department for Transport (2014) National Policy Statement for National Networks. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf
- **Ref 15.1** Highways Agency (2011) Interim Advice Note (IAN) 153/11 – Guidance on the Environmental Assessment of Material Resources [Link]
- **Ref 15.2** The EU Waste Framework Directive, European Directive 2006/12/EC, as amended by Directive 2008/98/EC. [Link]
- **Ref 15.3** Department for Business Innovation & Skills, Monthly Bulletin of Building Materials and Components - January 2016. [link]
- **Ref 15.4** North East Aggregates Working Party Annual Aggregates Monitoring Report (2015) [link]
- **Ref 15.5** Department for Business Innovation & Skills, Monthly Bulletin of Building Materials and Components - January 2016. [link]
- **Ref 15.6** British Geological Society, Minerals produced in the UK (2014) [link]
- **Ref 15.7** Mineral Products Association, The Mineral Products Industry at a Glance (2016) [link]
- **Ref 15.8** Defra (2016) UK Statistics on Waste [Link]
- **Ref 15.9** Environment Agency (2015) Remaining Landfill Capacity – Operator Site Submissions [link]
- **Ref 15.10** Environment Agency, Waste Management and Remaining Landfill Capacity 2016 in England data table [link]
- **Ref 15.11** British Research Establishment (BRE) BES 6001 The Framework Standard for Responsible Sourcing of Construction Products (Version 3.1 2014) [link]
- **Ref 15.12** DCLG (2014) National Planning Policy for Waste [link]
- **Ref 15.13** Department for Transport (2014) National Policy Statement for National Networks [link]
- **Ref 15.14** Defra (2013) Waste Management Plan for England [link]
- **Ref 15.15** Defra (2013) National Policy Statement for Hazardous Waste [link]
- **Ref 15.16** Northumberland County Council, Northumberland Waste Local Plan (2001), Saved Policy [link]
- **Ref 15.17** Highways England (2017) *A1 Morpeth to Ellingham Dualling* [link]
- **Ref 15.18** DMRB Volume 11 Section 2 Part 5 HA 205/08 Determining Significance of Effects, Table 2.4, page 20 of 27
- **Ref 15.19** Environment Agency, Waste Interrogator Database [link]
- **Ref 16.1** UK climate Projections 2009 (UKCP09) [Link]
- **Ref 16.2** UK Climate Projections, produced by British Atmospheric Data Centre, Environment Agency, Marine Climate Change Impacts Partnership, Met Office, National Oceanography Centre, Newcastle University, Tyndall Centre, University of East Anglia, 2009.
- **Ref 16.3** https://unfccc.int/2860.php
- **Ref 16.4** Communities and Local Government (March 2012) National Planning Policy Framework and Planning Practice Guidance
- **Ref 16.5** Department for Transport (2014) National Policy Statement for National Networks. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf
- **Ref 16.6** BSI (2016) *PAS 2080:2016 Carbon management in infrastructure* [Link]
- **Ref 17.1** Highways Agency (2008) Design Manual for Roads and Bridges (DMRB) Volume 11 Section 2 Part 5 (HA 205-08) Assessment and Management of Environmental Effects.
- **Ref 17.2** Department for Transport (2014) National Policy Statement for National Networks.
- **Ref 17.3** The Planning Inspectorate. (2015) Advice Note 17. Cumulative Effects Assessment relevant to Nationally Significant Infrastructure Projects.

Appendix A

GLOSSARY AND ABBREVIATIONS

GLOSSARY OF ABBREVIATIONS

A1 A2E	A1 Northumberland Alnwick to Elingham improvement scheme
AOD	Above Ordnance Datum
AADT	Annual Average Daily Traffic
AHLV	Area of High Landscape Value
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
ARN	Affected Roads Network
BMV	Best and Most Versatile
BS	British Standards
BDS	Biological Desk Study
BGS	British Geological Survey
CA	Conservation Areas
CCTV	Closed-circuit television
CDM	Construction Design and Management
CDE	Construction Demolition and Excavation
CEMP	Construction Environment Management Plan
CIEEM	Chartered Institute for Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
COMAH	Control of Major Accidents and Hazards
CRTN	Calculation of Road Traffic Noise
CWS	County Wildlife Sites
dB	Decibels
DBA	Desk Based Assessment
DCO	Development Consent Order
Defra	Department for Environment, Forestry and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DWP	Diffuse Water PPollution
EA	Environment Agency
EAR	Environmental Appraisal Report
eDNA	Environmental DNA
EAA	European Economic Area
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ES	Environmental Statement
ESR	Environmental Study Report
FRA	Flood Risk Assessment
GCN	Great Crested Newt
GHG	Greenhouse Gas

GLVIA	Guidelines for Landscape and Visual Impact Assessment
HADDMS	Highways Agency Drainage Data Management System
HDV	Heavy Duty Vehicle
HE	Highways England
HIA	Health Impact Assessment
HPI	Habitats of Principal Importance
IANs	Interim Advice Notes
IEMA	Institute of Environmental Management and Assessment
km	Kilometre
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LCA	Landscape Character Area
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Sites
MPA	Marine Protected Areas
MCZ	Marine Conservation Zones
MMP	Materials Management Plan
NHLE	National Heritage List England
NHER	Northumberland Historic Environment Record
NCA	National Character Area
NCC	Newcastle City Council
NIA	Noise Important Area
NMU	Non Motorised User
NN NPS	National Networks National Policy Statement
NNR	National Nature Reserve
NO_2	Nitrogen dioxide
NOEL	No Observed Effect Level
NO_x	Nitrogen oxide
NPPF	National Planning Policy Framework
NPSE	Noise Policy Statement for England
NRMM	Non-road mobile machinery
ONS	Office of National Statistics
OS	Ordnance Survey
PCF	Project Control Framework
PCM	Pollution Climate Mapping
PEIR	Preliminary Environmental Information Report
PSSR	Preliminary Sources Study Report
PHE	Public Health England
PINS	Planning Inspectorate
PM_{10}	Particulate matter - PM10 and smaller. particulate matter of diameter less than or equal to 10 micrometres (microns)
PPV	Peak Particle Velocity

PRoW	Public Rights of Way
RIS	Road and Investment Strategy
RIGS	Regionally Important Geological and Geomorphological Sites
RPE	Respiratory Protective Equipment
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SM	Scheduled Monument
SNCI	Sites of Nature Conservation Importance
SFRA	Strategic Flood Risk Assessment
SOAEL	Significant Observed Adverse Effect Level
SOCC	Statement of Community Consultation
SPA	Special Protected Area
SoPI	Species of Principal Importance
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Urban Drainage System
SWMP	site Waste Management Plan
TPO	Tree Preservation Order
UKCP	UK climate projections programme
UXO	Unexploded Ordnance
VMS	Variable Message Signs
WFD	Water Framework Directive
WHS	World Heritage Sites
ZTV	Zone of theoretical visibility

Appendix B

FIGURES

Appendix B.1

FIGURE 1.1 LOCATION PLAN

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Document Path: \\uk.wspgroup.com\central data\Projects\700360xx\700360xx\700360004 - A1 Northumberland\03 Environment\GIS\Scoping\Figure 1.1 - Location Plan.mxd

N

Key

Extents of Scheme

Option for Temporary Construction Area

River Coquet

Option for Potential Maintenance Access Track

River Coquet Bridge Construction Area and Potential Environmental Mitigation Area

West Moor Junction

Options for Potential Construction Site Compound

Start/Finish of De-trunking Section

Potential Re-Alignment Section

Option for Potential Construction Site Compound

National Grid Diversion and Associated NPG and NGN Diversions

Existing A1 De-Trunking Section

Fenrother Junction

Proposed Public Right of Way

Start/Finish of De-trunking Section

Potential Access Improvements

Highlaws Junction

Warrener's House

Druridge Bay

Druridge Bay

NORTH SEA

ASHINGTON

MORPETH

0 1 2 3 4 5 km

Rev	Date	Description	By	Chk'd	App'd
P02	30/10/17	Red Line Boundary Updated	GH	NM	KS
P01	02/08/17	First Issue	GH	NM	KS

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Client: highways england

Project Title: A1 NORTHUMBERLAND, MORPETH TO FELTON

Drawing Title: Figure 1.1 Location Plan

Scale	Drawn	Checked	Approved	Authorised
1:75,000	GH	NM	KS	NR
Original Size	Date	Date	Date	Date
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Drawing Status: First Issue

Suitability: S1

Drawing Number: HE551459 | Originator: WSP | Volume: M2F | Type | Role | Number

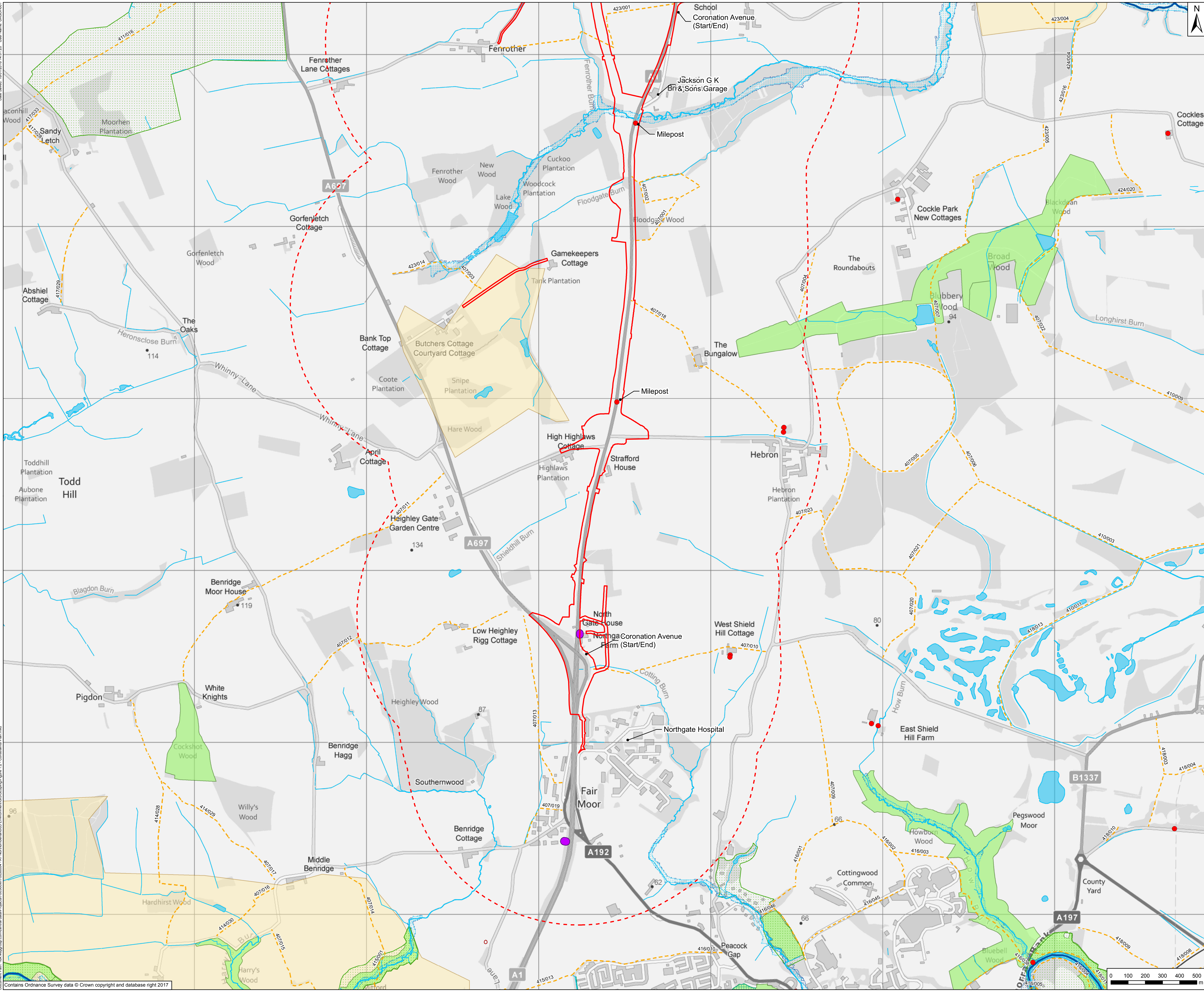
Location

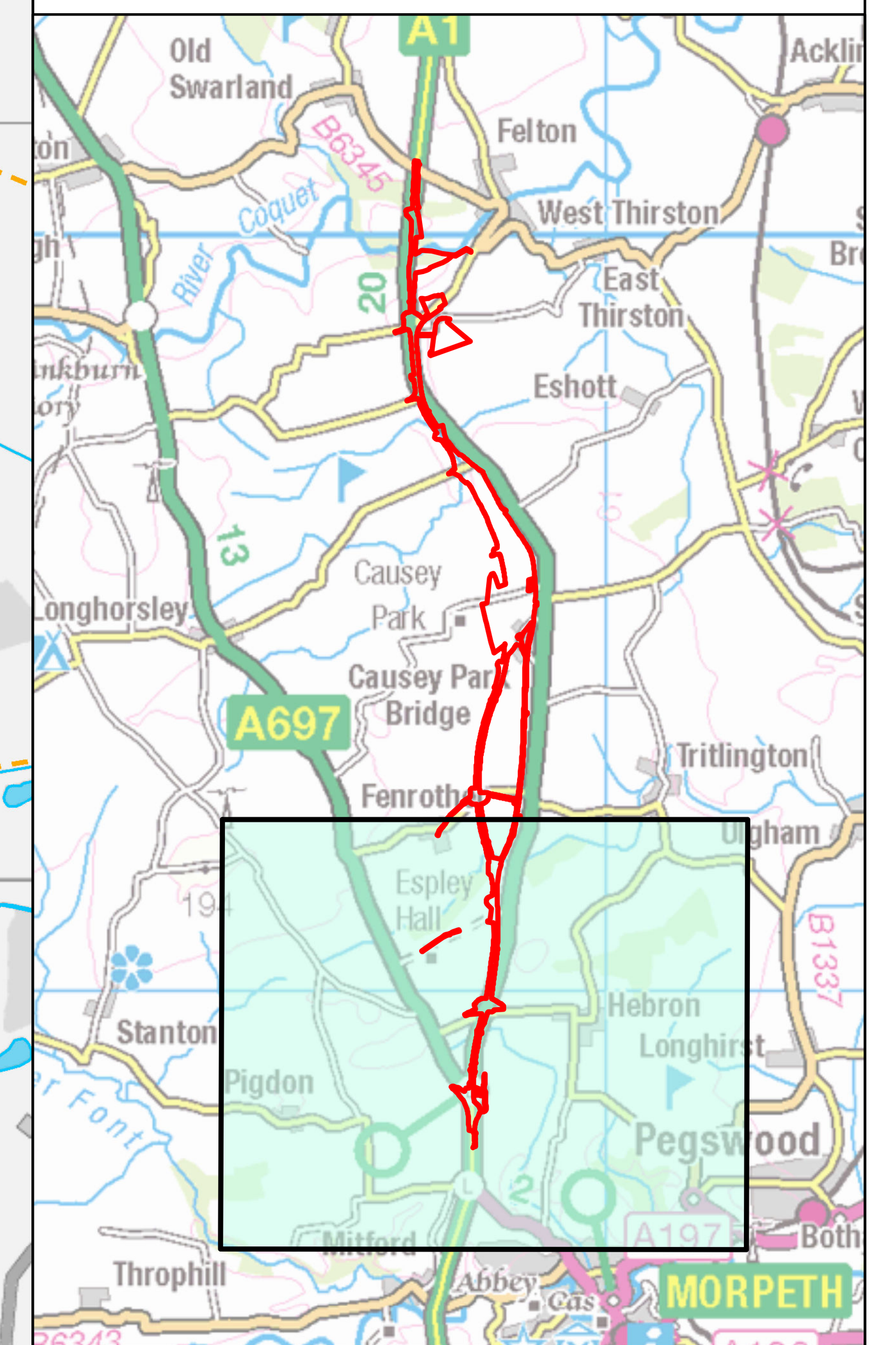
Project Ref. No.

Revision: P02

Appendix B.2

FIGURE 1.2 ENVIRONMENTAL CONSTRAINTS PLAN





N

Key

- Extents of Scheme
- 1km Study Area
- Ancient Woodland Inventory
- Local Nature Reserve
- Local Wildlife Sites
- Area of High Landscape Value
- Listed Building
- Scheduled Monument
- Noise Action Planning Important Area
- Public Rights of Way
- Statutory Main Rivers
- Surface Watercourses
- Surface Water Bodies
- Flood Zone 2
- Flood Zone 3

Please refer to Figure 9.2 for the area of Green Belt.

Rev	Date	Description	By	Chk'd	App'd
P02	30/10/17	Red Line Boundary Updated	GH	NM	KS
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Page 1 of 3

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Original Size	Date	Date	Date	Date
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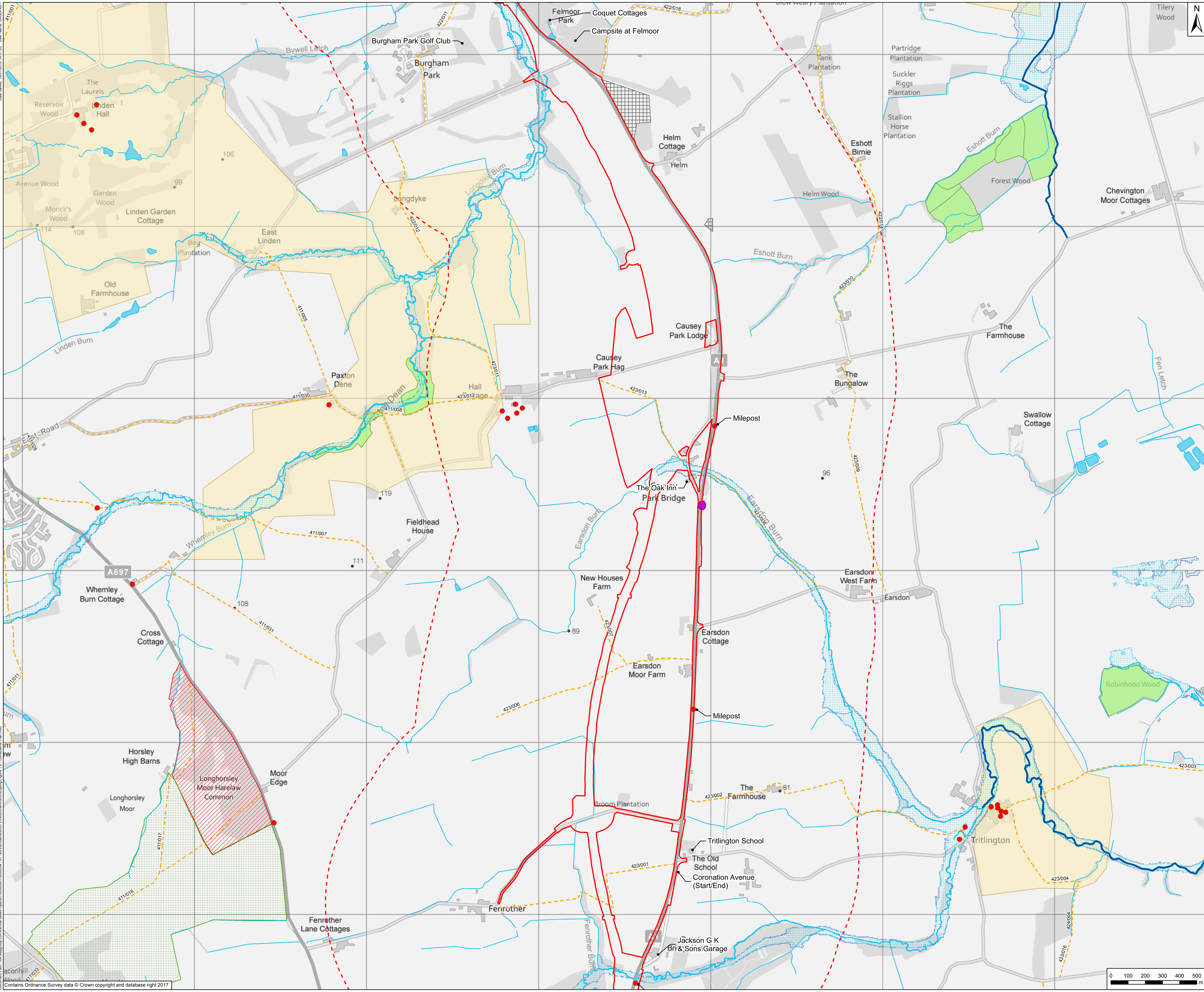
Drawing Status: Draft Issue
Suitability: S1

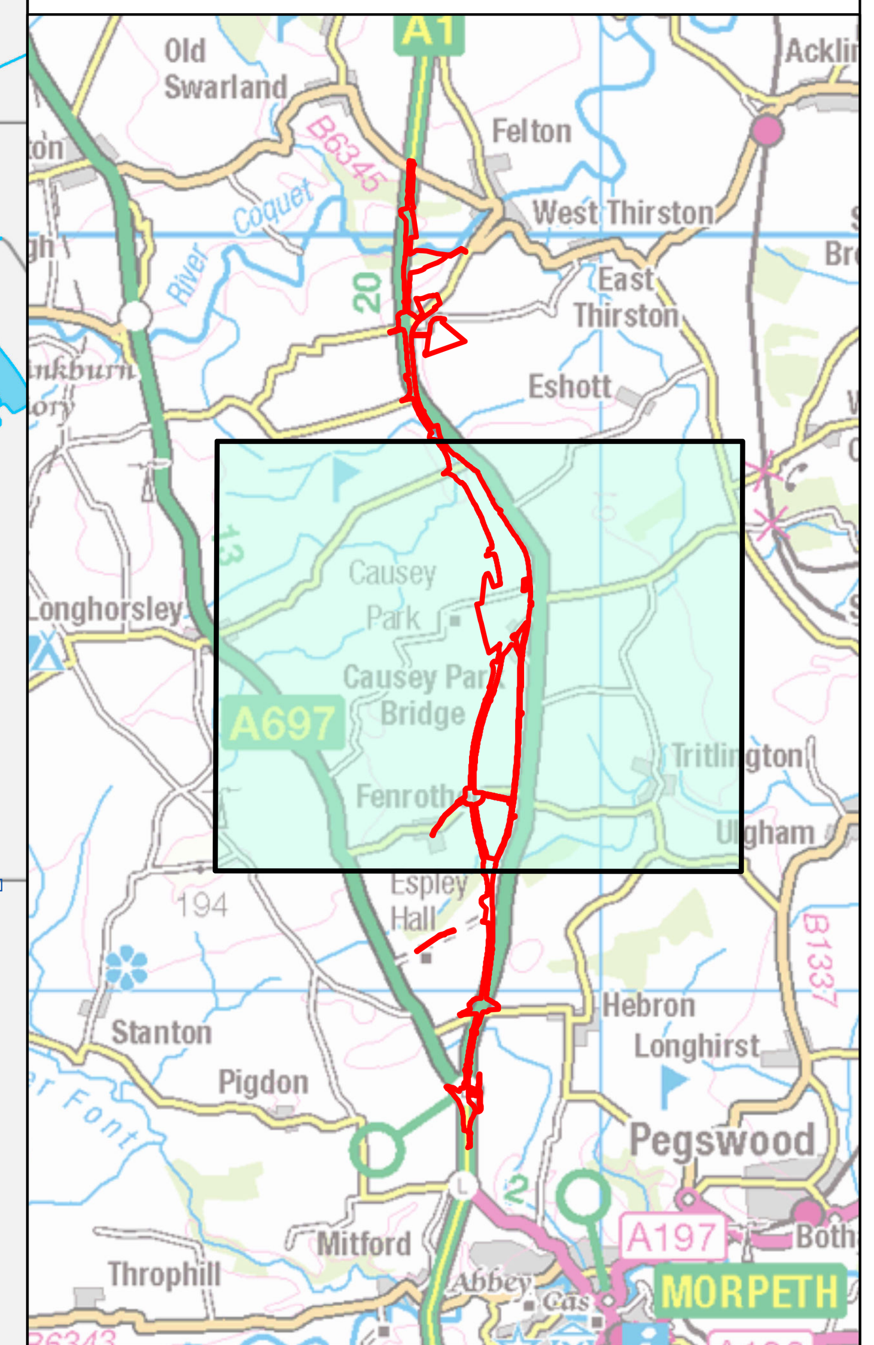
Drawing Number
Project: HE551459 | Originator: WSP | Volume
Location: M2F | Type | Role | Number
Project Ref. No.: 70036004
Revision: P02



Key

- Extents of Scheme
- 1km Study Area
- Site of Special Scientific Interest
- Ancient Woodland Inventory
- Local Wildlife Sites
- Area of High Landscape Value
- Landfill
- Listed Building
- Noise Action Planning Important Area
- Public Rights of Way
- Statutory Main Rivers
- Surface Watercourses
- Surface Water Bodies
- Flood Zone 2
- Flood Zone 3

Please refer to Figure 9.2 for the area of Green Belt.



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P02	30/10/17	Red Line Boundary Updated	GH	NM	KS
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Drawing Title
Figure 1.2 Environmental Constraints Plan
Page 2 of 3

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Drawing Status: Draft Issue | Suitability: S1

Drawing Number
Project: HE551459 | Originator: WSP | Volume | Project Ref. No.: 70036004
Location: M2F | Type | Role | Number | Revision: P02

Key

- Extents of Scheme
- 1km Study Area
- Site of Special Scientific Interest
- Ancient Woodland Inventory
- Local Wildlife Sites
- Area of High Landscape Value
- Landfill
- Listed Building
- Scheduled Monument
- Conservation Area
- Public Rights of Way
- Statutory Main Rivers
- Surface Watercourses
- Surface Water Bodies
- Flood Zone 2
- Flood Zone 3

Please refer to Figure 9.2 for the area of Green Belt.

Church of St Michael and All Angels
St Oswald's Way
Greenhouse 120m East of Felton Park with Potting Shed at Rear
River Coquet
Milepost
Bockenfield Farmhouse
Shooting Ground
Thirston Airfield
Longdike Burn
Bockenfield Bridge
Coquet Cottages
Campsite at Felmoor
Burgham Park Golf Club

Rev	Date	Description	By	Chk'd	App'd
P02	30/10/17	Red Line Boundary Updated	GH	NM	KS
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Page 3 of 3

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Drawing Status: Draft Issue
Suitability: S1

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Project: 70036004
Originator: WSP
Volume:
Location: M2F
Type:
Role:
Number:
Revision: P02

0 100 200 300 400 500 m

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Appendix B.3

FIGURE 7.1 SCHEME SPECIFIC AIR QUALITY MONITORING LOCATIONS

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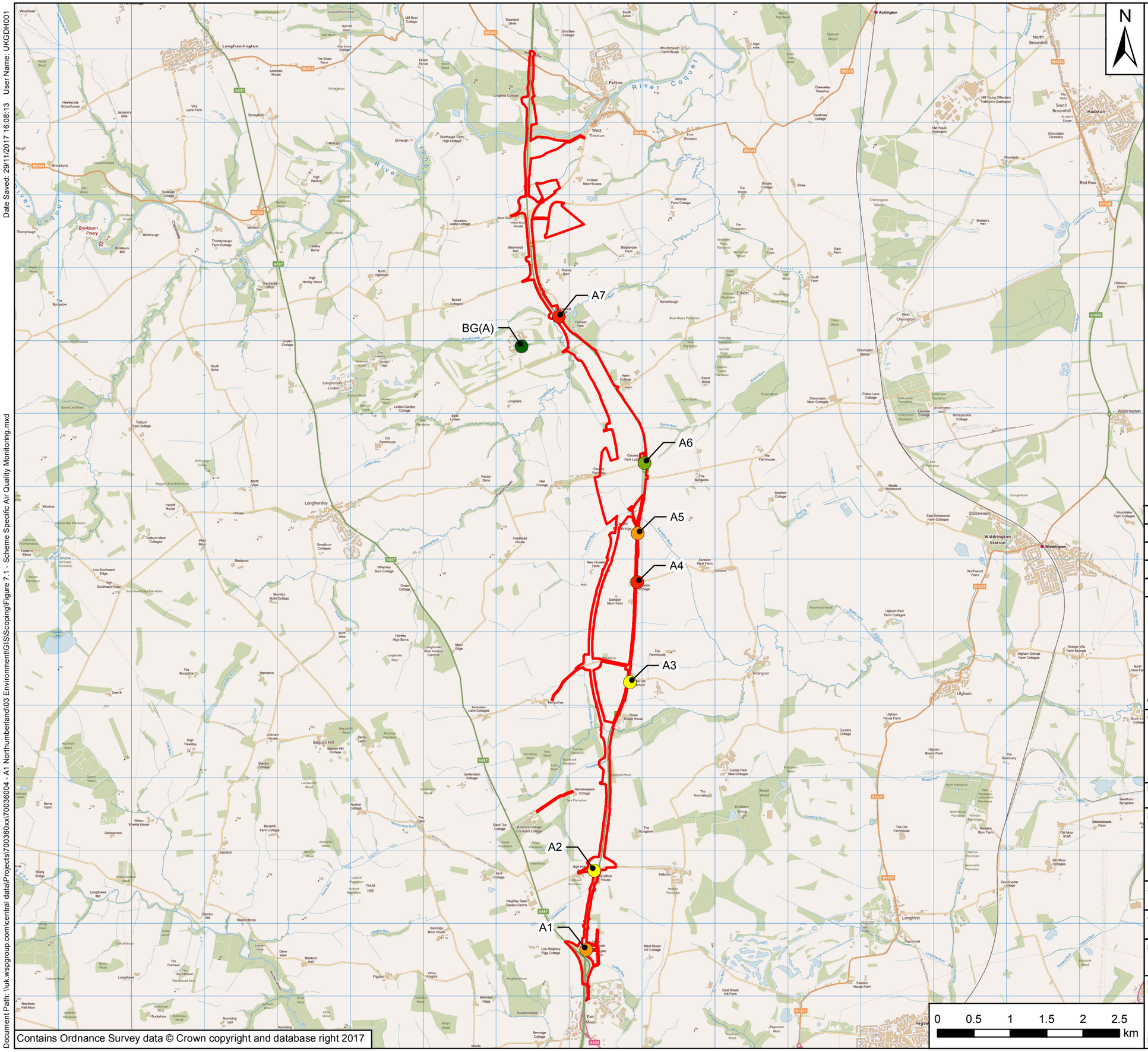

N

Key

Extents of Scheme

Scheme Specific Air Quality Monitoring Location

NO_2 Concentration (µg/m3)

- < 10
- 10 - 15
- 15 - 20
- 20 - 25
- 25 - 30

0 0.5 1 1.5 2 2.5 km

Rev	Date	Description	By	Chk'd	App'd
P01	29/11/17	First Issue	GH	NM	KS

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Project Title: A1 NORTHUMBERLAND, MORPETH TO FELTON

Drawing Title: Figure 7.1 Scheme Specific Air Quality Monitoring Locations

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Drawing Status: First Issue

Suitability: S1

Drawing Number: Project HE551459 | Originator WSP | Volume | Location M2F | Type | Role | Number

Project Ref. No.

Revision: P01

Appendix B.4

FIGURE 9.1 VISUAL ENVELOPE

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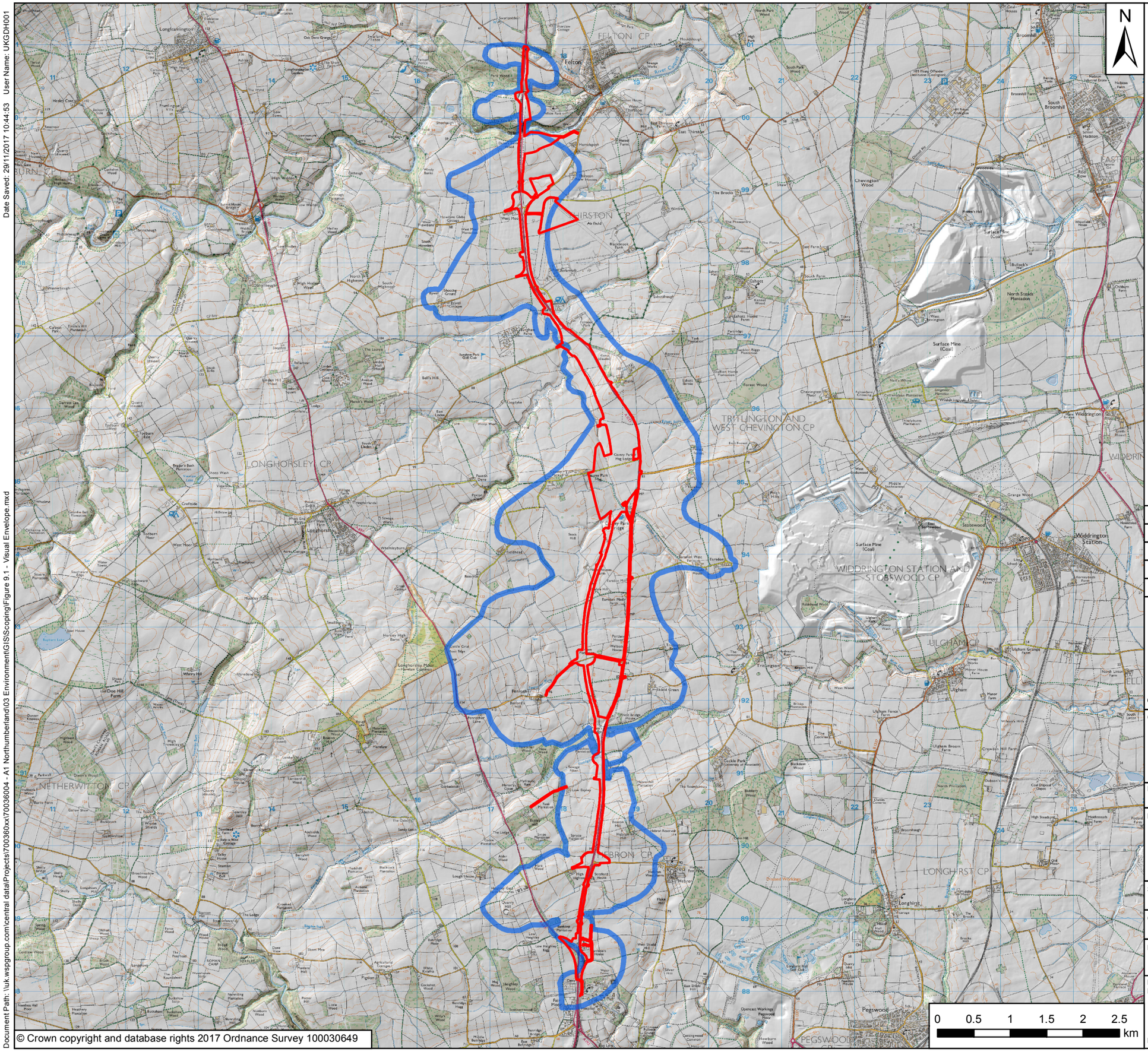

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Key

- Extents of Scheme
- Visual Envelope Derived by Site Inspection as Part of the Stage 2 EAR

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P01	08/11/17	First Issue	GH	AF	KS

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Drawing Title: Figure 9.1 Visual Envelope

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Drawing Status: First Issue

Suitability: S1

Drawing Number: Project HE551459 | Originator WSP | Volume M2F | Location | Type | Role | Number

Project Ref. No.

Revision: P01

Appendix B.5

FIGURE 9.2 GREEN BELT

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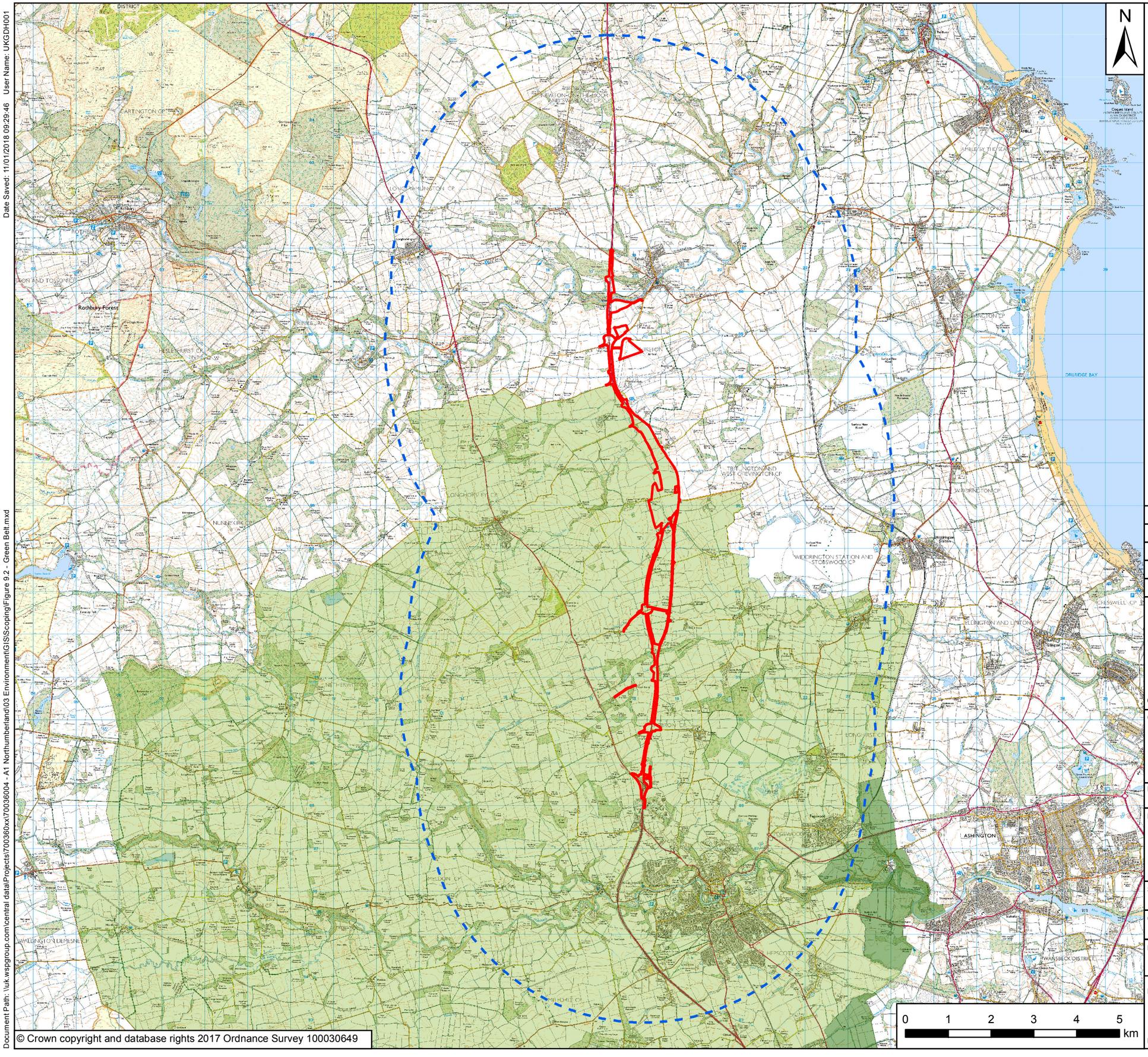

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Drawing Title: Figure 9.2 Green Belt

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Drawing Status: First Issue

Suitability: S1

Drawing Number
Project: HE551459
Originator: WSP
Volume:
Location: M2F
Type:
Role:
Number:

Project Ref. No.:

Revision: P01

Appendix C

TRANSBOUNDARY EFFECTS SCREENING MATRIX

Criteria	Relevant Considerations
Characteristics of the development	The Scheme comprises widening approximately 12.6km of the existing A1 between Morpeth and Felton to create a dual carriageway, which would comprise: · Approximately 6.6 km of online widening · Approximately 6 km of offline widening · Detrunking part of the existing A1 · Junction improvements · A new bridge over the River Coquet · Temporary site construction compounds · Soil storage areas · Drainage works · Statutory Diversions and diversion of part of a National Grid gas main · Signage Some of the resources required for the construction of the Scheme are likely to be obtained from the global market, e.g. steel, but it is likely that materials would be obtained locally wherever possible. No waste, nuisances or accidents are likely that would extend beyond the border of the UK. No novel technologies are proposed that have potential for transboundary impacts.
Geographical area	It is not anticipated that any impacts are likely to extend beyond the jurisdiction of the UK, with the exception of the potential release of greenhouse gas emissions (as discussed in Section 16 of this Scoping Report).
Location of the development	The Scheme is located in Northumberland, North East England, crossing predominantly rural existing land uses. The Scheme is located wholly within the UK. The Scheme is not part of the Trans-European transport network. The closest EAA state is Ireland, approximately 330 km west of the Scheme.
Cumulative Impacts	Section 17 of the Scoping Report identifies a number of cumulative developments proposed in the area surrounding the Scheme. Additionally, the Highways England Alnwick to Ellingham dualling project is located approximately 12 km north of the Scheme. The traffic model developed to assess impacts for the Scheme includes assumptions on traffic generation from proposed development in the area. The potential cumulative effect upon transport emissions from the Scheme and proposed development will therefore be accounted for in the Scheme EIA. However it is not anticipated that there is potential for cumulative transboundary effects from these developments other than greenhouse gas emissions.
Carrier	Impacts arising from greenhouse gas emissions would be carried by air.
Environmental importance	As reported in Section 9 of the Scoping Report, the landscape value of some areas surrounding the Scheme is considered to be of high sensitivity and therefore could experience potential significant effects. Furthermore, Section 10 of the Scoping Report identifies that a total of 118 heritage assets within the study area. Section 10.4 of the Scoping Report outlines the assets likely to be impacted. These include potential buried archaeological remains, removal of a Grade II listed milepost, potential impacts to the setting of Grade II Listed Buildings and impacts to locally important historic landscape features.

	The River Coquet and Coquet Valley Woodlands SSSI, the Coquet River Felton Park Local Wildlife Site and the Dukes Bank Ancient Woodland are located within the Scheme Footprint, and are likely to experience significant effects. A HRA Screening Assessment for the Scheme is currently being updated to consider potential hydrological links with European Designated Sites, together with traffic volumes, as described in Section 11 of this Scoping Report. However, potential effects upon European Designates Sites are not anticipated to be significant. Section 12 of the Scoping Report identifies three Water Framework Directive waterbodies within the Scheme extent (the River Lyne, Longdike Burn and the River Coquet.), which have the potential to experience significant effects. No environmental values of other EEA states will likely be impacted.
Extent	The only pathway of potential effect to another EEA Member State would be the release of greenhouse gas emissions. With the consideration of the design measures built into the Scheme and the implementation of mitigation measures and best practice (in line with regulatory body requirements), it is not anticipated that the release of greenhouse gas emissions would have a significant impact on another EEA Member State.
Magnitude	The likely magnitude of change to greenhouse gas emissions would be negligible, on the basis that the UK's construction industry emits approximately 101. 1m tonnes of carbon dioxide equivalent gases (2011 data, ONS) and the UK as a whole emitted 634. 8m tonnes of carbon dioxide equivalent. The Scheme would make a negligible contribution to the overall amount. It is proposed to calculate the likely greenhouse gas emissions as part of the EIA.
Probability	The probability of the Scheme to contribute to greenhouse gas emissions is likely and would occur as a consequence of the construction processes and typical operating conditions of such a Scheme.
Duration	The impact of greenhouse gas emissions is likely to occur during both construction and operation of the Scheme and be a long-term negligible impact.
Frequency	The frequency of impact is likely to be constant.
Reversibility	The impact is considered irreversible within human lifetimes.