REPORT N^{O} HA551462-WSP-EAC-BCH-RP-EN-0000_061

A1 BIRTLEY TO COAL HOUSE

ENVIRONMENTAL IMPACT ASSESSMENT-SCOPING REPORT

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Highways England

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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	P01	P02		
Date	07/11/17	07/11/17		
Prepared by	Nicola Ashworth	Nicola Ashworth		
Signature		[redacted] Digitally signed by Ashworth, Nicola DN: cn=Ashworth, Nicola, ou=Newcastle (Amber Court), email=Nicola.Ashworth@wsp.com Date: 2017.11.07 16:23:28 Z		
Checked by	Kevin Stubbs	Kevin Stubbs		
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Authorised by	Nigel Rawcliffe	Nigel Rawcliffe		
Signature		[redacted] Rawcliffe, Nigel 2017.11.07 16:32:58 Z		
Project number	70015226	70015226		
Report number	HA551462-WSP-EAC-BCH-RP-EN-0000_061	HA551462-WSP-EAC-BCH-RP-EN-0000_061		
File reference	\\Uk.wspgroup.com\central data\Projects\70015xxx\70015226 - A1 Birtley to Coal house PCF 2\C Documents\Reports\70015226 BCH Environmental\Scoping Report	\\Uk.wspgroup.com\central data\Projects\70015xxx\70015226 - A1 Birtley to Coal house PCF 2\C Documents\Reports\70015226 BCH Environmental\Scoping Report		

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APPENDIX A **GLOSSARY OF ABBREVIATIONS**
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1 INTRODUCTION

1.1 INTRODUCTION TO THE SCHEME

1.1.1 The Birtley to Coal House improvement scheme (the Scheme) aims to increase capacity along this section of the A1. The existing road would be widened to provide a three lane carriageway; additional lanes would be provided between junctions to help manage traffic joining and leaving the A1.

1.1.2 Modifications would be made to the existing structures at junction 65 (Birtley), junction 66 (Eighton Lodge) and junction 67 (Coal House) to accommodate the additional lanes.

1.1.3 Allerdene Railway Bridge would be replaced with a wider structure and additional lanes to improve capacity. The height of the bridge and road at this section would also be raised to ensure the bridge meets current standards.

1.1.4 Most of the work will take place within the highway boundary; however, some additional land would be required at points along the route.

1.1.5 The Scheme is a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008. As such Highways England will submit an application for a Development Consent Order (DCO) to allow the Scheme to be constructed.

1.1.6 An EIA Screening exercise was undertaken and it was identified that an Environmental Impact Assessment (EIA) would be required for the Scheme.

1.1.7 This Scoping Report has been produced in accordance with the Infrastructure Planning (EIA) Regulations 2017 and the Design Manual for Roads and Bridges (DMRB). The report identifies those topics that would be the subject of the environmental assessment (those topics that have been “scoped in”) and those topics that will not be taken further in the environmental assessment (those topics that have been “scoped out”).

1.2 SCHEME LOCATION

1.2.1 The Scheme is situated in North East of England and is located in the Metropolitan Borough of Gateshead between J65 (Birtley) and J67 (Coal House) as shown on **Figure 1.1 Location Plan**, which can be found in **Appendix B**.

1.2.2 The area within the Schemes 1km buffer, as shown on **Figure 1.2 Environmental Constraints Plan** within **Appendix B**, is characterised by a combination of residential, rural, industrial, recreational, open space and urban fringe land uses. Much of the area falls within designated Green Belt land, namely the Tyne and Wear Green Belt around Gateshead and Newcastle within the Gateshead district. The A1 and East Coast mainline sever the whole area and form strong visual and audible elements of the landscape.

1.2.3 The area to the north of Junction 67 is characterised by Team Valley Trading Estate.

1.2.4 To the west and north-west of Junction 67 lies Ravensworth Conservation Area, which includes several listed buildings. This area comprises Lady Park which includes a small number of residential properties.

1.2.5 To the east of Junction 67 lies Allerdene Bridge which carries the A1 over the East Coast mainline and provides the most important engineering constraint to the Scheme.

1.2.6 The central area between Junction 67 and Junction 66 is dominated by the A1. The area to the south of the A1 is designated greenbelt. Longacre wood Local Wildlife Site (LWS) lies directly south of the A1. Other land uses include Lamesley Conservation Area (and listed buildings) and large areas of agricultural land. Longacre Dene ancient woodland lies close to Junction 66 to the south. The River Team runs underneath Junction 67 and continues to flow in a northerly direction through Team Valley Trading Estate where it is heavily modified. The River Team floodplain occupies areas from the outskirts of Birtley in the south, through Lamesley and around Coal House roundabout, and continues through Team Valley. The River Team wildlife corridor, largely to the south of, but also crossing, the A1, is made up of Lamesley Pastures LWS, Tyne Marshalling Yard, Lamesley reed beds mine water treatment area, Bowes Railway Scheduled Monument (SM) and bridleway and Longacre Wood LWS.

1.2.7 To the north of the central section between Junction 67 and 66 lie the residential areas of Chowdene, Allerdene, Harlow Green and Eighton. To the east lies the Angel of the North, Ravensworth golf course, Angel View Inn public house, Eighton Lodge Care Home and residential properties to the outskirts.

1.2.8 Bowes Railway SM, which is one of the earliest and best preserved examples of a rope haulage system, and Bowes Railway LWS, crosses the 1km buffer from the north east to the south west just south of Junction 66. This route is also a bridleway for most of its length.

1.2.9 The area to the south of Junction 66 is dominated by residential properties in Birtley. Birtley Conservation Area lies on the edge of the 1km buffer to the south west. Two schools lie in this area.

1.2.10 The area to the east and south east of Junction 66 is designated greenbelt and is dominated by agricultural and recreational land uses. A number of footpaths and bridle paths cross this area. The Follingsby wildlife corridor, consisting of Sheddons Hill, Dunkirk Pond, Dunkirk Farm west and Bowes Railway Line, lies largely to the north east of the A1.

1.2.11 The area to the south west of Junction 65 is dominated by Portobello industrial estate and residential land uses. The area to the south east of Junction 65 is dominated by industrial land uses, residential areas of Ayton, Blackfell and Oxclose, and two schools.

1.3 THE SCHEME FOOTPRINT

1.3.1 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.

1.3.2 The Scheme Footprint was updated following a review on 5 October 2017 which took place after this Scoping Report was completed. 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.

1.4 ENVIRONMENTAL IMPACT ASSESSMENT

1.4.1 An EIA Screening exercise has been completed for the Scheme under the EIA Directive 2011/92/EU as amended by EIA Directive 2014/52/EU "the EIA Directive" and the Infrastructure Planning (EIA) Regulations 2017[1], hereafter referred to as "the EIA Regulations".

1.4.2 On the basis of the relevant thresholds, the Scheme falls within Annex II 10(b)(e) of the EIA Directive which covers the "construction of roads, harbours, and port installations, including fishing harbours (projects not included in Annex I)" of the EIA Directive.

1.4.3 The Screening determination carried out by Highways England concluded that that the Scheme is likely to result in significant environmental effects and that an EIA is required. It should also be noted that the Scheme has been identified as being in a "sensitive area" due to the location of the Bowes Railway Scheduled Monument within the Scheme Footprint.

1.5 PURPOSE OF THE REPORT

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

1.5.2 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 under Regulation 8 of the EIA Regulations 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.

1.5.3 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 subject of the environmental assessment – those topics that are "scoped in";
- Eliminate those topics and issues not requiring further consideration and which would therefore not be taken further in environmental assessment – those topics that are "scoped out";
- Determine the level of assessment needed for each topic area, for example, 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 undertaken to date and to be undertaken during PCF Stage 3; and
- Provide the mechanism through which comments from key stakeholders can be sought.

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

1.6 PROJECT ROLES

THE DESIGNER

1.6.1 WSP has been commissioned by Highways England under their Project Support Framework (PSF) to undertake the Preliminary Design of the Preferred Route, which includes undertaking the EIA for the Scheme. This work forms Stage 3 (Preliminary Design) of Highways England Project Control Framework (PCF).

THE DEVELOPER

1.6.2 Highways England, a government company is the Developer of the Scheme.

1.7 REPORT STRUCTURE

1.7.1 This Scoping Report is structured as follows:

- Sections 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 findings of the individual environmental assessments;
- Section 17 details the findings of the cumulative effects assessment; and
- Section 18 provides a summary the findings.

2 OVERVIEW OF THE PROJECT

2.1.1 A Feasibility Study was undertaken in 2014 to determine the existing issues on the route and prioritise the sections which most urgently need attention. A Strategic Outline Business Case was produced for the options which performed well at the Options Assessment Stage, as follows:

- J65 (Birtley) - J67 (Coal House) A1 Birtley to Coal House (including Allerdene Railway Bridge); and
- J74 (Scotswood) - J79 (North Brunton) A1 Scotswood to North Brunton.

2.1.2 Both schemes were announced in the Autumn Statement in December 2014 as schemes that should be taken forward into the Roads Investment Strategy (RIS), for delivery in the current roads period. The completion of the Feasibility Study concluded PCF Stage 0 (Strategy, Shaping and Prioritisation) for both schemes.

2.1.3 Following PCF Stage 0, the following PCF Stages have been undertaken:

- PCF Stage 1 (Option Identification) concluded in April 2016; and
- PCF Stage 2 (Option Selection) concluded in July 2017.

2.1.4 Further information regarding the options considered at PCF Stage 1 and 2 can be viewed in **Section 4: Assessment of Alternatives.**

2.1.5 This Scoping Report falls within PCF Stage 3 (Preliminary Design).

3 THE SCHEME

3.1 NEED FOR THE SCHEME

3.1.1 The A1 is a critical part of the road network and the A1 Newcastle Gateshead Western Bypass (NGWB) is one of the most congested sections of highway in the North East with more than 110,000 vehicles using the route every day on the busiest section.

3.1.2 Currently this section of the A1 suffers congestion, particularly during peak hours, which can result in unreliable journey times. It is anticipated to become busier with traffic expected to grow as a result of new housing and employment developments planned for the area. Road improvements are needed to support this growth.

3.1.3 As part of the Scheme, Allerdene Railway Bridge which carries the A1 over the East Coast Mainline will be replaced. The current bridge was built nearly 40 years ago and requires regular maintenance that can cause disruption to traffic.

3.1.4 A Feasibility Study was undertaken in 2014 to determine the existing issues on the route and prioritise the sections which most urgently need attention. 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 objectives of the Scheme are to:

- Reduce congestion;
- Improve the reliability of people's journeys;
- Make journeys safer;
- Help support economic growth; and
- Support the government's initiative for growth in the North East by improving the Team Valley Employment Zone.

3.2.2 The overall environmental aims of the Scheme are as follows:

- Reduce carbon by providing more free flowing traffic;
- Reduce the noise environment in 3 Noise Improvement Areas and along the whole Scheme; and
- Work with stakeholders to improve the water environment.

3.2.3 In addition, the design of the Scheme will be carried out in the context of the Performance Specification set out for Highways England in the Department for Transport's (DfT) RIS which identified Key Performance Indicators (KPIs), including targets and requirements relating to the environment, cyclists, walkers and other vulnerable users of the network.

3.3 SCHEME DESCRIPTION

3.3.1 The Scheme will consist of widening of the existing carriageway between J65 (Birtley) and J67 (Coal House) to provide more lanes and increase capacity. The widening will be mainly online widening, with a section of re-alignment to the south at Allerdene Bridge between J66 (Eighton Lodge) and J67 (Coal House); the new bridge will replace existing crossing over the East Coast Mainline and both junctions will be retained.

3.3.2 The southbound carriageway to Smithy Lane will be 50mph with an urban all-purpose cross section, and beyond this, to J65 (Birtley), the speed limit will be 70mph with a rural all-purpose cross section. A lane gain at J67 (Coal House) provides 4 lanes until the lane is dropped again at J65 (Birtley). The northbound carriageway will be a dual 3-lane urban all-purpose road with lane gain / lane drops are proposed between the junctions. The speed limit of 50mph will be retained on the northbound carriageway for the length of the Scheme.

3.3.3 To retain the existing northbound carriageway edge, the widening between J65 (Birtley) and J66 (Eighton Lodge) is generally proposed to be adjacent to the southbound carriageway. North Dene Footbridge will be replaced and Longbank Bridleway underbridge extended to accommodate the widening.

3.3.4 The three underbridges at J66 (Eighton Lodge) interchange are to be widened. The proposed slip roads at J66 (Eighton Lodge) are to tie into the existing so that the existing roundabout geometry can be retained.

3.3.5 The A1 is to be re-aligned approximately 60m to the south in the vicinity of Allerdene Bridge to allow continuous provision for traffic on the existing bridge during construction. The existing structure will be demolished once traffic has been diverted onto the new alignment. Demolition of the existing structure is, therefore, not programme critical to the Scheme.

3.3.6 Kingsway Viaduct which carries the A1 over J67 (Coal House) roundabout will be retained and widened to accommodate the additional lanes. Impact to J67 (Coal House) roundabout will be minimised by tying into the existing slip roads and making use of retaining structures between the mainline and the slip roads.

3.3.7 The Scheme will look to 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 meeting current standards, it will be replaced to current standards to ensure operational expectations are met.

3.3.8 The works are planned to start in September 2020 with construction duration estimated to be 30 to 36 months. The Scheme will open to traffic by 2023.

3.3.9 The proposed site compound is located adjacent to Lamesley Road in a plot of land that was formerly an underground gas storage facility. Temporary compounds would also be set up at the existing Allerdene Bridge and Longbank Bridleway for the works associated with these structures. All compounds are subject to change until the Order Limits are confirmed on submission of the DCO application.

4 ASSESSMENT OF ALTERNATIVES

4.1 ALTERNATIVE ASSESSMENT METHODOLOGY

4.1.1 The development of options followed Highways England 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 A feasibility study was carried out to determine the viability of potential improvements following WebTAG methodology, this can be found at the following location: https://www.gov.uk/government/publications/a1-newcastle-gateshead-western-bypass-feasibility-study-overview

PCF STAGE 1 – OPTION IDENTIFICATION

4.1.4 At PCF Stage 1 three options, as detailed in section 4.2.3 below, were identified within the corridor and an environmental desk based assessment was prepared which identified environmental constraints. The assessment followed DMRB methodology and highlighted the key environmental issues for each option and the potential further environmental assessment work required at the next stage.

PCF STAGE 2 – OPTION SELECTION

4.1.5 At PCF Stage 2 a further Scoping exercise was carried out in accordance with DMRB methodology to review the scope of assessment identified at PCF Stage 1 to ensure it was still appropriate and proportionate in line with the principles of Interim Advice Note125/15 Environmental Assessment Update[2]. This scoping exercise took place in a meeting between Highways England Regional Environmental Advisor, and WSP | Parsons Brinckerhoff (now WSP) Environmental Coordinator on 3 May 2016. It was considered that for traffic related topics, i.e. Air Quality, Noise, and Water and Drainage, where no traffic data was available at Stage 1, a Screening and Scoping assessment would be sufficient to highlight the differences between options, identify any risks and propose the likely level of assessment at PCF Stage 3. For other topic areas,

namely Landscape, Nature Conservation, Materials and People and Communities, the assessment proposal from PCF Stage 1 was amended to cover only the differences between options, or to explore further issues that presented a risk to the further development of the Scheme. For example, there is little difference between options in relation to heritage, but understanding and reporting on the views of Historic England in relation to Bowes Railway Scheduled Monument, was considered worthy of reporting. For the remaining topics, Geology and Soils and Cultural Heritage, there are no significant differences between options, and the PCF Stage 1 assessment was considered valid for PCF Stage 2.

4.2 ALTERNATIVES ASSESSMENT FINDINGS

PCF STAGE 0

4.2.1 In 2014, a Feasibility Study was undertaken to determine pre-existing issues on the A1 in order to prioritise the road sections which most urgently require upgrading. During this study the feasibility of conceptual options was appraised using sifting tools.

4.2.2 The Feasibility Study led to the definition of the scope of work for improvement to the A1 Birtley to Coal House from junction 65 to 67 (including Allerdene Bridge) as announced in the Roads Investment Strategy (RIS) in December 2014, which was progressed to the Options Identification Stage (PCF Stage 1).

PCF STAGE 1

4.2.3 Three options were identified at PCF Stage 1 (Option Identification); each with the same alignment and cross section between J66 (Eighton Lodge) and J65 (Birtley), where widening of existing structures was possible. The main difference was the approach to replacing Allerdene Bridge, either in the existing footprint or to the south of the existing structure. The options were as follows:

- Option 1 - Allerdene Railway Bridge would be replaced in its current location. This would require a temporary bridge to be constructed to carry traffic over the A1 while the new bridge is constructed. This option would be a more complex scheme to construct requiring more traffic management and a longer construction period;
- Option 2 - Allerdene Railway Bridge would be reconstructed south of its current location, improving the existing road alignment and improving safety. To accommodate the new alignment there may be a requirement to replace Smithy Lane overbridge; and
- Option 3 - Replacement of Allerdene Railway Bridge approximately 200m to the south of the existing structure, which would require the section between Eighton Lodge and Coal House (junction 66 to junction 67) to also be offline. This option would require significant additional land to be purchased and would result in a completely new layout of Coal House junction with the

existing structure at junction 67 (Kingsway Viaduct) being demolished and replaced.

4.2.4 PCF Stage 1 concluded that Option 3 should be omitted from further assessment. The benefits for all three options were similar but the costs for Option 3 were significantly higher with more land take and a larger impact on the surrounding environment. Consequently, this option offered better value for money compared to Options 1 and 2. This assessment is more fully described in the Technical Appraisal Report[3].

PCF STAGE 2

4.2.5 At PCF Stage 2 (Option Selection) the two remaining options from PCF Stage 1 (Option Identification), Option 1 and 2, were progressed. At this stage the options were renamed as follows:

- Option 2 renamed as Option 1A; and
- Option 1 renamed as Option 1B.

4.2.6 The outcome of the PCF Stage 2 assessment highlighted that the Scheme would have potential significant environmental effects for water, heritage and noise. Mitigation strategies for these potential impacts would be developed at PCF Stage 3.

4.2.7 Overall there were no significant differences between the two options. However the likelihood is that Option 1a would have a more negative effect on landscape and biodiversity around Allerdene due to the permanent relocation of the structure towards Lamesley.

CONSULTATION

4.2.8 A public consultation event was held in September 2016. The following options were presented to the public and other stakeholders for comment:

- Option 1a – Offline Replacement of Allerdene Railway Bridge; and
- Option 1b – Online Replacement of Allerdene Railway Bridge.

4.2.9 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.

4.2.10 The public consultation identified that 73% of respondents preferred Option 1a. The primary reasons given for choosing Option 1a were a shorter construction period resulting in potentially less disruption and the Scheme was generally considered less complex to construct. The outcome of the consultation was reported in the Report on Public Consultation[4] produced in April 2017.

ENGINEERING PERSPECTIVE

4.2.11 From an engineering perspective the following provides a summary of the comparison of the options:

- Both options have potential to affect construction employment and amenity value of recreational routes and public spaces.
- The quantity of earthworks, ground improvement and treatment of shallow mine works is likely to be less for Option 1b.
- Option 1a offers less constraints for the construction of Allerdene Bridge resulting in improved buildability - there are fewer constraints to foundation design/location, fewer modifications required to existing earthworks and increased working room.
- Option 1a has less risk to the construction programme as the demolition of the existing Allerdene Bridge is not on the critical path.
- Option 1a has reduced temporary works complexities.
- The overall cost/programme of the scheme would be significantly reduced for Option 1a.
- Option 1a offers an improved geometrical alignment.
- Option 1a is generally a better option in respect of driver stress as the speed/lane restrictions will be significantly less than Option 1b during construction.

ECONOMIC PERSPECTIVE

4.2.12 Both options have Benefits to Cost Ratios (BCR) that fall into the very high value for money category for both core and optimistic scenarios and high for pessimistic. There is a more favourable BCR for Option 1a as a result of the lower Scheme costs and reduced construction programme.

4.2.13 **Table 4-1** below summarises the conclusions of the assessments completed and shows a comparison of Options 1a and 1b. Green indicates where an option is comparably better than the other and red shows which is worse, (red is not an indication that an option has failed an assessment) amber shows where there is no difference between the two options.

Table 4-1 - Comparison of the options

ASSESSMENT	OPTION 1A	OPTION 1B
Requirements	Meets the requirements/objectives as set out in the Client Scheme Requirements. There would be no difference in the end produce that the options provide.	Meets the requirements/objectives as set out in the Client Scheme Requirements. There would be no difference in the end produce that the options provide.
Quality	Meets the quality requirements. There would be	Meets most of the quality requirements. There would be

ASSESSMENT	OPTION 1A	OPTION 1B
	no difference in additional functionality that both options can offer.	no difference in additional functionality that both options can offer. As the demolition and replacement of Allerdene Bridge is on the critical path, construction duration is 8 months longer than option 1a and the level of impact on road users, due to the scale and nature of traffic management required is likely to be more significant than option 1a.
Cost	£228,974,901	£256,149,151
BCR (Core)	5.07	4.59
Time	Start of work by March 2020 meeting RIS target. Construction duration of 36 months	Start of work by March 2020 meeting RIS target. Construction duration of 44 months
Affordability	Delivery of option is well within budget (delivery plan target)	Delivery of option is well within budget (delivery plan target)
Risk Profile	Medium/High Risk - can mitigate with early involvement of consultees and advanced work around structures and GI	High Risk – can mitigate with early involvement of consultees and advanced work around structures and GI however the replacement of Allerdene Bridge is on the critical path requiring disruptive possessions.
Noise	Adverse	Adverse
Air Quality	Adverse	Adverse
Greenhouse Gases	Adverse	Adverse
Landscape	Moderate Adverse	Slight Adverse
Heritage of Historic Resources	Moderate Adverse	Moderate Adverse
Biodiversity	Moderate Adverse	Moderate Adverse
Water Environment	Moderate Adverse	Moderate Adverse
Public Preference	73% of the vote	10% of the vote

4.2.14 Option 1a was selected as the Preferred option and this was announced in July 2017 details can be found at the following location: http://roads.highways.gov.uk/projects/a1-birtley-to-coal-house/

PCF STAGE 3

4.2.15 Following PCF Stage 2, the Preferred Option has been taken forward as the Option 1a progression into PCF Stage 3 (Preliminary Design – the current stage).

4.2.16 Therefore this Scoping Report has only considered Option 1a of the proposed improvements to the Scheme.

ALTERNATIVE DESIGN CONSIDERATIONS

4.2.17 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[5]. The assessment of alternatives would include consideration of technology, design, size, scale, demand, delivery, scheduling and mitigation, as appropriate.

4.2.18 Further design work during PCF Stage 3 is required to evaluate the alignment between junction 65 (Birtley) and junction 66 (Eighton Lodge) to determine if residential land take can be reduced or eliminated.

5 CONSULTATION

5.1 PREVIOUS CONSULTATION

PUBLIC CONSULTATION

5.1.1 Highways England carried out public consultation for six weeks from 26th August 2016 to 7th October 2016 in order to explain the nature of the options to members of the public and obtain their comments and views of the Scheme. All responses were reviewed and assessed and helped to inform selection and further development of a preferred improvement option.

5.1.2 Views and comments received during public consultation were used to:

- Produce a Scheme that will have minimal adverse impact on the community and environment;
- Ensure the Scheme design is updated with relevant responses, where applicable; and
- Record how the feedback has been considered to develop the Scheme further.

ENVIRONMENTAL CONSULTATION

5.1.3 At PCF Stage 2 the following environmental consultation was carried out:

- Meeting with Historic England and Newcastle City Council (NCC) in 18 May 2016 to agree the level of assessment for Cultural Heritage. It was agreed in the meeting that the following scope of assessment would be sufficient to identify and record any historic features and allow further consideration of investigation or mitigation:
  - Desk-based assessment (Detailed) and walkover survey of the area of Bowes railway; and
  - Desk-based assessment (Detailed) and walkover survey of the areas of land take for both options with the aim of determining the presence or otherwise of archaeological remains.
- Meeting with the Environment Agency (EA) in 30th June 2016 to obtain water modelling data and discuss Lamesley pastures; and
- Consultation with the EA on 15th August 2016 to obtain river model data for the River Team.

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 Winter 2017/2018. 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) will be provided for statutory consultation which will take place in Spring 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. 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 appropriate in this report:

- Lead Local Flood Authority (LLFA) in relation to the Road Drainage and Water Environment assessment;
- Environment Agency in relation to the Road Drainage and Water Environment assessment;
- Defra with regards to the availability of regional waste data for the Materials assessment; and
- Historic England in relation to potential enhancement measures for the Cultural Heritage assessment.

5.2.7 During the EIA at PCF Stage 3, the following consultees will be consulted. This list would be further informed by the list of the notified consultation bodies identified by PINS:

- County Archaeologist;
- British Horse Society;
- Durham Wildlife Trust;
- Environment Agency;
- Gateshead Council:
  - Environmental Health Officer (EHO)
  - Lead Local Flood Authority (LLFA) officer
  - Public Rights of Way (PRoW) officer
- Historic England;
- Natural England;
- The Ramblers;
- Sunderland Council; and
- Sustrans.

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

6 APPROACH TO THE ENVIRONMENTAL ASSESSMENT

6.1 INTRODUCTION

6.1.1 The Design Manual for Roads and Bridges (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.

6.1.2 The description of the approach to assessment has been based on the guidance in DMRB Volume 11 Section 2 Part 5 (HA205/08)[6] Assessment and Management of Environmental Effects.

6.1.3 DMRB Volume 11, Interim Advice Note 125/15 Environmental Assessment Update[7] advises on the environmental topics to be included in the environmental assessment and the method to be used for each assessment. In accordance with 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;
- Cultural Heritage;
- Landscape and Visual;
- Biodiversity;
- Geology and Soils;
- Materials;
- Noise and Vibration;
- People and Communities;
- Road Drainage and the Water Environment; and
- Climate Change.

6.1.4 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.

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

6.2 HEAT AND RADIATION

6.2.1 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.

6.2.2 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.

6.3 HEALTH

6.3.1 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 NNNPS for consideration of health, specifically within paragraphs 4.79-4.82[8]. 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 Chapter 7);
- Noise and Vibration (HD 213/11, IAN 185/15) as reported in Chapter 13;
- Road Drainage & The Water Environment (HD 45/09) as reported in Chapter 15; and
- People and Communities (DMRB Volume 11 Section 3 Part 8) as set out in Chapter 14.

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

6.3.3 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.

6.3.4 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.

6.4 MAJOR ACCIDENTS AND HAZARDS

6.4.1 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).

6.4.2 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

6.4.3 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.

6.4.4 The Control of major accidents and hazards (COMAH) 2015[9] 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;

6.4.5 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.

6.4.6 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.

6.4.7 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".

6.4.8 *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.

6.4.9 *With regards to the Scheme, the following potential major events have been identified:*

- Severe weather: storms, floods;
- Transport accidents: road and rail.

6.4.10 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 PCF Stage 2 ESR, the PCF Stage 2 Safety Plan and the PCF Stage 2 Health and Safety Risk Register.

6.4.11 An assessment of significance would be carried out for the major events identified for the Scheme. A qualitative assessment would 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 Change Road Drainage and the Water Environment
Floods	Flooding	Road Drainage and the Water Environment Flood Risk Assessment
Transport accidents – road and rail	Environmental pollution incidents; emissions to air, ground and water	Air Quality Biodiversity Materials Road Drainage and the Water Environment

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.

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 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 PCF Stage 2 air quality assessment[10] and the methodology set out in DMRB HA207/07[11] and associated Interim Advice Notes.

7.1.3 The National Policy Statement for National Networks (NPSNN) 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 operational impacts will be determined by analysis of the PCF Stage 3 traffic data (not available at time of writing) to produce an ARN. The criteria for defining affected roads are set out in HA207/07:

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

7.2.2 The study area consists of 200m corridors either side of all roads in the ARN.

7.2.3 At PCF Stage 2, the study area for the Scheme covered the A1 from Junction 65 in the south to J75 in the north, together with minor routes running parallel to the A1 and some radial routes into Newcastle/Gateshead centres. However, the traffic model did not extend to the south and east of Junction 65 and some links at the edge of the model were “affected” by the Scheme.

7.2.4 The traffic model is being extended at PCF Stage 3 and it is anticipated that the revised Affected Road Network (ARN) will extend to the south and the east of junction 65 (along the A1 and A194 respectively) for at least two junctions and will, therefore, include Gateshead AQMA No 2 (Birtley).

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 Newcastle City Council (NCC) and Gateshead Council (GC) (2013 to 2015);
- Project-specific nitrogen dioxide diffusion tube monitoring under taken by Highways England between March 2015 and March 2016;
- National modelling undertaken by Defra using the Pollution Climate Mapping (PCM) model; and
- Nitrogen deposition and nitrogen oxides modelling provided by the online Air Pollution Information System (APIS) for ecological sites.

LAQM REPORTING

7.3.2 The Scheme is not located within an AQMA, nor do any of the routes affected by the PCF Stage 2 assessment of the Scheme lie within an AQMA. However, with the expansion of the modelling to the south and east of the Scheme, it is anticipated that the ARN will extend as far as Gateshead AQMA No 2 (Birtley) (see **Figure 7.1** in **Appendix B**). This AQMA lies within 100m of the west of the M1, adjacent to Washington Services and was declared by Gateshead City Council as a result of annual mean exceedances of the NO2 air quality objective.

7.3.3 The majority of the local authority monitoring sites, for both passive and continuous monitoring, are located within or in the vicinity of the AQMAs and of limited relevance to the study area. There are five automatic monitoring sites in Newcastle and three in Gateshead, monitoring nitrogen dioxide and particulate matter. One automatic monitoring station, operated by GC that also includes triplicate diffusion tubes is located in Dunston alongside the A1 at the façade of residential premises **(Table 7-1)**. This station represents the relevant exposure nearest to the southbound section of the A1 (at Junction 70). All monitored concentrations are within the air quality objective for annual mean NO_2 in all years. Within the extended affected roads network (ARN), there are an additional two diffusion tubes, within the Birtley AQMA, both of which show no exceedances of the air quality objective for annual mean NO_2.

Table 7-1 - Local authority monitoring in the Study Area of annual mean nitrogen dioxide concentrations (µg/m^3)

LOCATION	2011	2012	2013	2014	2015
Continuous Monitoring					
A1 Dunston (Automatic monitoring station)	36.8	33.3	35.8	30.6	27.0
Passive (Diffusion Tubes) Monitoring					

LOCATION	2011	2012	2013	2014	2015
A1 Dunston (G35 Diffusion Tube)[1]	No Data	No Data	30.8	32.5	26.2
A1 Dunston (G40 Diffusion Tube)[1]	No Data	No Data			25.7
A1 Dunston (G41 Diffusion Tube)[1]	No Data	No Data			25.6
Portobello Terrace	35	36.6	32	No Data	27
Penshaw View, Portobello	32	34.5	34.3	No Data	28.3

[1] Diffusion tube data have been bias adjusted using the local bias adjustment factor

DEFRA POLLUTION CLIMATE MAPPING

7.3.4 The Pollution Climate Mapping (PCM) model is used by Defra, in combination with monitoring data, for the assessment of compliance with EU limit values.

7.3.5 The pollutant concentration at any location has two components, namely a contribution from the local (modelled) sources and a contribution from more distant sources. Background pollutant concentrations for this assessment, i.e. those resulting from distant sources and pollutant transport; have been taken from the mapped PCM data provided by Defra on a 1km x 1km grid covering the UK, interpolated to the locations of the selected receptors.

7.3.6 The background data are provided by Defra as predictions for all years from 2010 to 2030 from the output of their PCM Model.

7.3.7 The PCM model also includes a module for the hindcast/prediction of roadside pollutant concentrations. PCM model projections are available for three scenarios, namely the “Baseline” scenario, a “with Clean Air Zone” scenario, and a “with Clean Air Zone + additional measures” scenario. Around 18,000 links are included in the model in the UK, 15 of which are within the study area. Defra provide roadside projections of pollutant concentrations at annual intervals between 2015 and 2030.

7.3.8 PCM data for 2015 are available from Defra's UK-Air website[12]. The data indicate maximum roadside annual mean NO2 concentrations for the A1 in the study area in the range of 50 – 60 µg/m^3, in exceedance of EU limit values.

7.3.9 By 2023 (Scheme opening year), there are no projected exceedances of the limit value. The maximum annual mean NO_2 concentration in 2023 (Scheme opening year) on any PCM road link within the study area is 38 µg/m^3, along the A1 between junctions 74 and 75, and is compliant with the limit value. These data do not take account of the implementation of any Clean Air Zones, as set out by Defra in their 2017 Air Quality Plan[13].

7.3.10 Of the links within Defra's PCM model, ten were considered within the PCF Stage 2 assessment. There is one additional PCM model link (ID: 70357) on the A1 within the anticipated Stage 3 ARN, although concentrations along this link are well below the EU limit value (27 µg/m^3) in 2015, and are expected to fall further in the future. There are also additional links to the south and east of Junction 65 (where the extension is anticipated for Stage 3), which were not included within the PCF Stage 2 assessment area. Some of these links exceed the EU limit value for 2015, although none exceed this limit by 2023.

ECOLOGICAL RECEPTORS

7.3.11 The only ecological receptor within the assessment area for the Scheme was Shibdon Pond SSSI. Background concentrations of NO_X over Shibdon Pond are well within the critical level (and air quality objective) of 30 µg/m^3 (**Table 7-2**). Nitrogen deposition exceeds the critical load.

Table 7-2 - Background NOx and nitrogen deposition rates for designated ecological sites in the Study Area

SITE	SENSITIVE HABITAT	CRITICAL LOAD (KGN/HA/YR)	BACKGROUND DEPOSITION (KGN/HA/YR)	CRITICAL LEVEL (µG/M^3)	BACKGROUND NO_X (µG/M^3)
Shibdon Pond SSSI	Fen, Marsh & Swamp	15	17.78	30	19.63

HIGHWAYS ENGLAND MONITORING

7.3.12 Project specific monitoring was undertaken by Highways England, using NO_2 diffusion tubes, between 3rd March 2015 and March 2016 at 40 sites within or near the study area.

7.3.13 Concentrations of NO_2 are elevated along the A1 but, in general, below the air quality threshold. Exceedances occur most widely at the roadside near Junctions 69, 68 and 66. At urban background locations, monitored concentrations are well below the air quality objective (<20 µg/m^3).

7.3.14 The data are consistent with the local authority monitoring which showed that NO_2 concentrations in Dunston are below the air quality objective threshold (30< µg/m^3).

7.3.15 A summary of the Highways England diffusion tube locations and the monitored concentrations used within the verification of the PCF Stage 2 assessment are presented in **Table 7-3**, below.

Table 7-3 - Monitored NO2 concentrations (2015) used within the verification of the Stage 2 assessment

DIFFUSION TUBE ID	X(M)	Y(M)	MONITORED NO2 (µG/M^3)
N15	420346	566962	24.6
N16	420514	566859	33.3

N17	420637	566670	28.0
N18	419936	565888	29.5
N19	419831	565565	25.4
N20	419602	565356	38.3
N21	419567	565288	**48.4**
N22	419534	565350	29.6
N23	419444	565152	**41.9**
N24	419390	564847	34.5
N25	419607	565709	**48.5**
N26	419690	565721	31.4
N27A	419732	565787	29.9
N27B	419732	565787	31.6
N27C	419732	565787	32.4
N28	419799	562488	25.1
A1 Dunston A	422505	561937	27.8
A1 Dunston B	422505	561937	28.1
A1 Dunston C	422505	561937	28.6
N32	419649	565469	**45.1**
N33	419502	565130	**43.0**
N34	419599	565649	**41.8**
N35	419556	565407	**51.8**
N36	419491	565268	**46.1**
N37	419536	565730	**49.2**
S1	422547	561951	33.7
S2	422558	561797	28.8
S3	422918	561682	25.9
S4	423102	561535	27.3
S5	422982	561719	32.3
S6A	423242	561530	33.8
S6B	423242	561530	33.4
S6C	423242	561530	33.6
S7	423681	560784	33.6
S8	423678	560700	**41.2**
S9	423772	560474	23.8
S10	424726	558532	28.8
S11	426721	557580	**41.2**
S12	427083	557303	24.3

S13	427529	557070	28.2
S23	423178	561586	**44.5**
S24	423727	560633	37.7

7.4 POTENTIAL IMPACTS

7.4.1 The Scheme is expected to result in changes to emissions of oxides of nitrogen (NO_X) and NO_2 along the A1 and linked routes as a result of changes in traffic flows and speeds.

7.4.2 Improvements to the A1, while leading to an increase in flow on the A1 and potentially an overall increase in traffic within the ARN, are also expected to reduce congestion and provide a more consistent traffic speed. The latter impact may partially offset the impacts of increased flows on emissions. Conversely, where traffic re-routes from roads parallel to the A1 onto the A1, traffic flows, and emissions from traffic, will decrease.

7.4.3 Therefore, the Scheme is anticipated to result in both beneficial and adverse changes to local air quality depending on the specific changes to emissions from road traffic in the vicinity of individual receptors.

7.4.4 Traffic management measures during construction may also lead to changes in vehicle emissions which may, in turn, result in impacts on local air quality.

7.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

7.5.1 Based on the outcome of the PCF Stage 2 assessment, the Scheme is not expected to give rise to significant effects on local or regional air quality.

7.5.2 No Scheme specific mitigation or Scheme Air Quality Action Plans are likely to be required for the operation of the Scheme, although should there be a requirement, the Scheme air quality action plan will be produced in accordance with the guidance set out in IAN 175/13.

7.5.3 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 CEMP.

7.5.4 Any requirements for consideration of air quality within the specification of traffic management measures during construction will be determined within the EIA.

7.6 RESIDUAL EFFECTS

7.6.1 No significant residual air quality effects are anticipated subject to 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 No significant effects relating directly to construction works and plant were identified in the PCF Stage 2 assessment. Best practice mitigation measures will be required to ensure no significant effects and will be set out in the Construction Environment Management Plan (CEMP). However, no requirement for site-specific measures was identified and, as such, the further assessment of direct construction impacts is **scoped out** of the EIA.

7.7.2 The assessment of the impacts due to traffic management measures during construction is **scoped in**. The PCF Stage 2 assessment identified an on-going risk of exceedances of air quality objectives for nitrogen dioxide at receptors close to the A1. Since the construction period will extend beyond 6 months, following HA207/07 (para 3.6) the effects of traffic management measures should be assessed. However, due to the absence of formal traffic modelling and the availability of reliable construction traffic data this assessment will be qualitative.

7.7.3 The operation of the Scheme has the potential to change traffic volumes and speeds on the public highway. A potential worsening of exceedances of both air quality objectives and EU limit values, was identified during the PCF Stage 2 assessment although it is unlikely to constitute a significant effect. In addition, the previous assessment was undertaken using the previous version of Defra's PCM model, which has since been updated. Notwithstanding this, taking into account the risk of exceedances of standards, the assessment of operational traffic on local air quality is **scoped in.**

7.7.4 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 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 standards. Concentrations of particular matter are below the air quality standards and at no risk of exceeding the standards. As a result, consideration of particulate matter is **scoped out** of the EIA.

7.7.5 The assessment of impacts on regional level emissions is **scoped out** of the EIA, due to the limited scope for changes to emissions at the regional scale, although they will be assessed and reported within the WebTAG appraisal.

POLICY AND PLANS

7.7.6 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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

7.7.7 Following the conclusions set out in the PCF Stage 2 report, further work on the air quality impacts of the Scheme will be undertaken at the detailed level, as set out in the HA207/07, and in line with the requirements of NNNPS. A **detailed** level assessment, wherein traffic data are specified for each peak period, rather than a daily average, is warranted due to the risk of exceedance of air quality standards and the nature of the scheme (peak hour congestion relief).

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

- IAN 170/12v3 Updated Air Quality Advice on the Assessment of Future NOx and NO2 Projections for Users of DMRB Volume 11, Section 3, Part 1 'Air Quality'
- IAN 174/13 Updated Advice for Evaluating Significant Local Air Quality Effects for DMRB Volume 11, Section 3, Part 1, 'Air Quality'
- IAN 175/13 Updated air quality advice on risk assessment related to compliance with EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for user of DMRB Volume 11, Section 3, Part 1 'Air Quality'
- IAN 185/15 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.

7.7.9 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).

7.7.10 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.

7.7.11 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.

7.7.12 The local air quality assessment will consider the following scenarios:

- Baseline (2017);
- Opening Year (2023) Do Minimum; and
- Opening Year (2023) Do Something.

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.

HEALTH

7.7.13 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, such that 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.

7.7.14 The human health findings of the assessment will therefore be summarised qualitatively in the assessment section of the topic chapter. A cumulative assessment (**Chapter 17**) will also be undertaken to take account of cumulative changes in air quality arising from the proposed Scheme and other committed developments.

7.7.15 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.

7.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

7.8.1 This Scoping Report is based on the data available during the PCF Stage 2 assessment for the Scheme. Where possible, the limitations of this assessment have been addressed.

7.8.2 It was a limitation of the PCF Stage 2 assessment that roads at the edges of the Traffic Reliability Area (TRA) trigger the DMRB affected routes criteria, specifically at Junction 65 where the TRA ends to the north of the merge of the A1 with the A194(M). It is an assumption of this report that future traffic modelling will be extended to capture all links affected by the Scheme.

7.8.3 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.

8 CULTURAL HERITAGE

8.1 INTRODUCTION

8.1.1 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.

8.2 STUDY AREA

8.2.1 Two study areas will be applied in the EIA.

- A study area of 1km from the Scheme Footprint for statutory designated assets and their context, conservation areas and locally listed buildings; and
- A study area of 500m from the Scheme Footprint will be applied for non-designated assets.

8.2.2 The extent of the study areas are based on accepted best practice and due to the scale and nature of the development.

8.3 BASELINE CONDITIONS

8.3.1 A simple cultural heritage assessment was undertaken at PCF Stage 2 in December 2016. Using data obtained for Newcastle Historic Environment Record, a number of designated and non-designated heritage assets were identified that were potentially at risk of harm resulting from the proposed scheme. Through evaluation of baseline information the following key receptors have been identified:

- Scheduled monuments, listed buildings, locally listed buildings and conservation areas within the 1km study area (these can also be viewed on **Figure 1.2** –Environmental Constraints Plan in **Appendix B**); and
- Non-designated heritage assets within the 500m study area.

8.3.2 These are presented in **Table 7-1** and

8.3.3 **Table** 8-2 - Non-designated heritage assets within the 500m study area

8.3.4 below and the locations of the assets are presented on Figures 8.1 and 8.2 which can be found in Appendix B.

Table 8-1 - Scheduled monuments, listed buildings, locally listed buildings and conservation areas within the 1km study area

HERITAGE ASSET TYPE	ASSET NAME	VALUE

HERITAGE ASSET TYPE	ASSET NAME	VALUE
Scheduled Monument (SM)	Ravensworth Coal Mill (1015922) and Bowes Railway (1003723). The latter appears on the Historic England Heritage at Risk Register (HARR). It is listed as being in very bad condition and at risk of further deterioration or loss of fabric.	**High**
Conservation Areas	Lamesley Village (11883); Ravensworth Park (646); Birtley (11878) and Chowdene (11885).	**High**
Grade II Listed Buildings	Arch and walls adjoining South Lodge (1025189); South Lodge (1025188); Kenmore, the Old Vicarage (1355108); Temple Meads (1025153) ; Church of St. Andrew (1025154); Tomb of Robert Moscrop (1355109); Ravensworth Park Farmhouse (1185135); Statue of Em Perkins (1025203); Birtley Cenotaph, memorial shelters, and garden wall including gate piers and railings (1433563); Church of St Joseph (1431020).	**Medium***
Locally Listed Buildings	Team Valley Trading Estate (7636), The Angel of the North (11053)	**Low**
* It is acknowledged that Grade II listed buildings are of national importance but that they are more common than Grade I and Grade II* listed buildings.		

Table 8-2 - Non-designated heritage assets within the 500m study area

SMR NUMBER	DESCRIPTION	PERIOD	VALUE
3907	Whin Pit	Industrial	Medium
3909	Birtley, Shaft	Industrial	Medium
3002	Boundary Pit	Industrial	Medium
3865	Corn Pit	Industrial	Medium
3768	Lamesley Bridge	Industrial	Medium
669	Lamesley Bridge	Industrial	Medium
3870	Rush Pit	Industrial	Medium
3871	Nelly Pit	Industrial	Medium
3861	Chance Pit	Industrial	Medium
3766	Nanny Pit	Industrial	Medium
3767	Betty Pit	Industrial	Medium
3867	Lamesley, Engine House	Industrial	Medium
3773	Lamesley, Workshop	Industrial	Medium
3776	Corner Pit	Industrial	Medium
3860	Green Pit	Industrial	Medium
3859	Lamesley, Coal Shaft	Industrial	Medium
3772	Dean Pit	Industrial	Medium
3862	George Pit	Industrial	Medium
3872	Dam	Industrial	Medium
3873	Flat Pit	Industrial	Medium

SMR NUMBER	DESCRIPTION	PERIOD	VALUE
658	Eighton, hermitage	Industrial	Low
3901	Coal Shaft	Industrial	Medium
3902	Way Pit	Industrial	Medium
1237	Black Fell	Industrial	Medium
659	Chapel	Industrial	Low
671	Lamesley Manor	Late Medieval	Low
667	Lamesley Mills	Industrial	Medium
5384	Site of Washington Mill	Industrial	Medium
5394	Pillbox	Modern	Medium
5563	Searchlight	Modern	Medium
5831	WW2 road block	Modern	Medium
11052	Viewing Platform	Modern	Medium
11194	War memorial	Modern	Medium
11195	War memorial	Modern	Medium
12200	Medieval grave slabs	Late Medieval	Low
12964	Roman bridge abutments	Romano-British	Medium
11220	Longacre Dene, an area of ancient woodland	Prehistoric	Medium
15237	A194(M)	Modern	Medium
15241	A1(M) Birtley By-pass	Modern	Medium
3741	Team (Colliery) wagonway	Industrial	Medium
3749	Team wagonway	Industrial	Medium
4125	Newcastle to Durham Road	Industrial	Medium
276	Gateshead to Chester-le-Street Roman road	Romano-British	Medium
3910	Birtley wagonway	Industrial	Medium
3908	Birtley wagonway	Industrial	Medium
2616	Washington wagonway	Industrial	Medium
3010	Harton wagonway	Industrial	Medium
3774	Lamesley wagonway	Industrial	Medium
4124	Lamesley wagonway	Industrial	Medium
4123	Lamesley wagonway	Industrial	Medium
1908	Possible hollow way	Industrial	Medium
12965	Team Valley Railway	Industrial	Medium
3010	Wagonway	Industrial	Medium
3764	Allerdene Brick and Tile Works	Industrial	Medium

SMR NUMBER	DESCRIPTION	PERIOD	VALUE
3771	Allerdene Colliery	Industrial	Medium
3869	Reservoirs	Industrial	Medium
356	Team Colliery	Industrial	Medium
3866	Meadow Pit	Industrial	Medium
3874	Street Pit	Industrial	Medium
3876	Longbank Quarry	Industrial	Medium
3875	Lamesley Quarry	Industrial	Medium
3903	Borehole Pit	Industrial	Medium
2615	Mill Pit	Industrial	Medium
3915	Blackfell Engine	Industrial	Medium
4929	Ridge and furrow at Lamesley, (disturbed)	Late Medieval	Medium
1672	Long Acre Farm	Industrial	Low
3904	Lamb Pit	Industrial	Medium
3900	Hill Pit	Industrial	Medium
5081	North Farm	Industrial	Low
7516	Birtley East Primary School	Industrial	Low
7864	Site of Lady Ravensworth Almshouses	Industrial	Low
7491	Ravensworth Arms Hotel	Industrial	Low
7536	Church Hall at Lamesley,	Industrial	Low
7425	Lady Park Lodge	Industrial	Low
7424	Lady Park Lodge, gate piers	Industrial	Low
9730	Crowther Industrial Estate	Modern	Low
9725	Oxclose	Modern	Low
9716	Blackfell	Modern	Low
9658	Harlow Green, Church of St. Ninian	Modern	Low
11905	Redholme	Industrial	Low
11906	The Cottages	Industrial	Low
11908	Meadowgate	Modern	Low
11909	Orpington House and Blacksmith's Cottage	Industrial	Low
5141	Smithy	Industrial	Low
11910	Woodhurst	Industrial	Low
8628	Elisabethville	Modern	Low
15783	Northside Farm House	Post-medieval	Low

SMR NUMBER	DESCRIPTION	PERIOD	VALUE
15783	Northside Farm, stables and barns	Post-medieval	Low
17222	Methodist Chapel	Industrial	Low
3741	Team wagonway branch through Allerdene	Industrial	Medium
3749	Team wagonway	Industrial	Medium
5942	Donnison's or Great Grindstone Way	Industrial	Medium
5935	Rudston's Way (wagonway)	Industrial	Medium
4122	Urpeth / Ouston Colliery (wagonway)	Industrial	Medium
2616	Old Washington (Broomy) Way	Industrial	Low
3010	Humble's wagonway	Industrial	Medium
3910	Birtley Old wagonway	Industrial	Medium
17090	Urpeth to Poulter's Close wagonway	Industrial	Medium
2624	New Washington (Usworth) Way to Cox Green	Industrial	Low
17097	Humble's wagonway	Industrial	Medium
664	Site of Lamesley village	Late Medieval	Medium
661	Site of Eighton village	Late Medieval	Medium
670	Site of Birtley Village	Late Medieval	Medium
12021	Site of Ravensworth	Industrial	Medium

8.4 POTENTIAL IMPACTS

8.4.1 The Scheme has the potential to affect cultural heritage during construction and operation as follows:

CONSTRUCTION

8.4.2 Outlined below are potential impacts resulting from the construction phase of the Scheme:

- Changes and harm to the setting of Bowes Railway SM, Lamesley Village CA(11883); Ravensworth Park CA (646); Birtley CA (11878) and Chowdene (11885) CA; ten Grade II listed buildings (detailed in **Table 8-1)** and the locally listed Team Valley Trading Estate (7673) and Angel of the North. Construction related noise, lighting and vibrations in addition to the siting of temporary compound areas have the potential to have a detrimental impact on the appreciation and historical significance of the asset.

- The partial loss and disturbance of known non-designated below ground archaeological assets that include the remains of Eighton Village (661) and Ravensworth Village (12021); the site of two wagonways (4122 and 5935); the site of Lady Ravensworth Almshouses (7864) and a section of the Chester-le-Street to Gateshead Roman Road (276). Harm to these assets are likely to be caused by ground moving activities such a top soil stripping, ground levelling and excavations for drainage, compounds and other construction related activities.
- The HER identifies an area of medieval ridge and furrow (4929) to the north of Lamesley Village conservation area. This area however has been subject to remediation and the asset no longer survives.
- The loss and disturbance of hitherto unknown buried/surface archaeological remains spanning from the Prehistoric to the Modern period to survive within areas of previously undisturbed ground. Harm to any surviving archaeology is likely to be caused by ground moving activities such a top soil stripping, ground levelling and excavations for drainage, compounds and other construction related activities.

OPERATION

8.4.3 Outlined below are potential impacts resulting from the construction phase of the scheme:

- The enhancement of the setting and interpretation of the Bowes Railway SM resulting from the design of Longbank Bridleway underbridge.
- The Scheme has the potential to increase current traffic noise levels, and lighting that has the potential to have a detrimental effect on the appreciation of Bowes Railway SM, Lamesley Village CA (11883); Ravensworth Park CA (646); Birtley CA (11878) and Chowdene CA (11885); ten Grade II listed buildings (detailed in **Table 8-1.**); and the locally listed Team Valley Trading Estate (7673) and Angel of the North.

8.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

8.5.1 The Scheme has aimed to minimise the requirements for new land take by remaining largely within the existing alignment of the A1. Where new land take cannot be avoided, an investigation strategy will be devised in consultation with the County Archaeology Officer at Gateshead Council. This is likely to comprise a geophysical survey followed by a programme of intrusive trial trenching or archaeological monitoring.

8.5.2 It is likely that any geotechnical ground investigation works will need to be monitored if within an area of archaeological sensitivity.

8.5.3 It is possible that a Historic England standard building investigation may need to be undertaken prior to any work taking place at Longbank Bridleway underbridge.

8.5.4 SM consent will need to be sought from Historic England ahead of any works taking place within the Bowes Railway SM.

8.5.5 There is potential inter-visibility, historical and functional relationship between Bowes Railway SM, conservation areas and built heritage in the vicinity of the Scheme and therefore careful design of new structures, such as Longbank Bridleway underbridge, would be required.

8.5.6 Bowes Railway SM is considered by Historic England to be currently at risk of degradation due to poor maintenance and vandalism. Historic England are in the process of being consulted on potential enhancement measures which could include facilitating the understanding of the asset through signage and improvement of its current condition through good design.

MONITORING

8.5.7 Monitoring parameters and programme shall be developed in PCF Stage 3 through the completion of the ES and Outline Environmental Management Plan (EMP). Any geotechnical trial pits undertaken in Stage 3 will need to be monitored if within an area of archaeological sensitivity.

8.6 RESIDUAL EFFECTS

8.6.1 Residual 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. Residual 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.

8.6.2 Following the implementation of mitigation measures such as the careful design of Longbank Bridleway underbridge and the introduction of signage, the setting of the SM, may be enhanced, thus leaving a positive residual effect. Negative residual effects are also expected on any conservation area, listed or locally listed buildings whose setting is considered to be harmed as a result of the proposed scheme. This statement may be revised following the undertaking of the detailed assessment and the settings assessment.

8.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

8.7.1 In accordance with DMRB[14], Cultural Heritage encompasses Archaeological Remains, Historic Buildings and Historic Landscapes. These comprise; 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.

8.7.2 SM, CA, Listed Buildings (Grade II) and non-designated historic assets including below-ground and earthwork archaeological remains have been **scoped in** to the EIA.

8.7.3 Historic Landscapes have been **scoped out** of the EIA as construction works will be largely confined to the existing highways boundary or within its immediate vicinity and no structures of height are anticipated that may have an impact on the wider setting.

8.7.4 No WHS, Registered Parks and Gardens, Historic Battlefields, Grade I or II* listed buildings have been identified in the study area.

POLICY AND PLANS

8.7.5 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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

8.7.6 As part of the PCF Stage 2 consultations with the regional representative of Historic England, it was agreed that the EIA should be informed by a detailed desk-based assessment of the Scheme that features Bowes Railway SM. It was considered that a desk-based assessment would be sufficiently adequate to identify the significant effects of the Scheme and allow further consideration of investigation or mitigation in order to minimise direct impacts.

8.7.7 A detailed desk-based assessment (DDBA) undertaken in accordance with DMRB Volume 11, Section 3, Part 2, HA208/07 will be carried out at PCF Stage 3. The DDBA will discuss the value of the heritage assets and their settings and their cultural heritage significance 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.

8.7.8 NPSNN Policy 5.127: states that the applicant should describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant Historic Environment Record should have been consulted and the heritage assets assessed using appropriate expertise. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should include an appropriate desk-based assessment and, where necessary, a field evaluation. Policy 5.128: reads in determining applications, the Secretary of

State should seek to identify and assess the particular significance of any heritage asset that may be affected by the proposed development (including by development affecting the setting of a heritage asset), taking account of the available evidence.

8.7.9 Of particular importance will be the impact of the Scheme on both the setting and physical structure of Bowes Railway SM. Scheduled Monument consent is required for works at Bowes Railway within the SM.

DATA COLLECTION

8.7.10 The setting assessment would follow Historic England Guidance. Sources of information for the detailed DBA will include:

- The Tyne and Wear Historic Environment Record;
- The National Heritage List for England;
- The Tyne and Wear Archive;
- Historic mapping including the Ordnance Survey;
- Online academic sources; and
- Easily available secondary sources.

TERMINOLOGY

8.7.11 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.

STANDARDS AND GUIDANCE

8.7.12 The assessment will be written in compliance with the relevant national, regional and local policies and in accordance with the following relevant professional guidelines:

- Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Historic Environment Desk-based Assessment (2014);
- CIfA Code of Conduct (2014);
- Historic England guidance, Historic Environment Good Practice Advice in Planning Note 3; and
- DMRB Volume 11 Section 3 Part 2 HA208/07.

SENSITIVITY OR IMPORTANCE OF THE ASSET

8.7.13 Initially, the sensitivity or importance of a heritage asset is judged in a neighbourhood, local, regional, national and international context, which results in the cultural heritage sensitivity of the asset being determined (**Table 8-3**).

Table 8-3 - Criteria Used to Determine Importance of Heritage Assets

CULTURAL IMPORTANCE/ SENSITIVITY	CRITERIA
Very high	World Heritage Sites; Sites of International Importance.
High	Scheduled Monuments; Listed Buildings (Grade I, II* ; Registered Parks and Gardens. Areas of Archaeological Importance; Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments; Conservation Areas containing very important buildings
Medium	Grade II listed buildings; Conservation Areas containing buildings that contribute significantly to their historic character. Designated or non-designated assets that contribute to regional research objectives;
Low	Locally listed buildings. Archaeological sites and remains with a local or borough interest for education, cultural appreciation; Assets which contribute to local or cultural understanding of the area.
Negligible	Relatively numerous types of remains, of some local importance; Isolated findspots with no context; Areas in which investigative techniques have revealed no, or minimal, evidence of archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated.
Uncertain / Potential	Potential archaeological sites for which there is little information. It may not be possible to determine the importance of the site based on current knowledge. Such sites are likely isolated findspots, place names or cropmarks identified on aerial photographs.
→ Source: DMRB Volume 11 Section 3 Part 2 HA208/07	

8.7.14 **Table 8-3** is 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.

POTENTIAL IMPACT

8.7.15 DMRB states that an impact is defined as a change resulting from the scheme that affects the archaeological resource. The baseline from which this change is measured should be the condition that would prevail in a 'do-nothing' scenario, that is, it should take into account changes that would happen anyway if the scheme was not built (insofar as this can be predicted). It goes on to state that an impact is defined as a change arising from the scheme that would affect the historic building resource.

8.7.16 For historic landscapes DMRB states as historic landscapes are ubiquitous, it follows that they cannot be destroyed; impacts on them can change their character, but not leave a hole in the historic landscape map. An impact is, therefore, defined as a change as a result of the proposed scheme that would not otherwise have occurred, and which alters the historic landscape character.

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

8.7.18 The magnitude, or scale of an impact is often difficult to define, but will be judged from Major to No change as shown below in **Table 8-4.**

Table 8-4 - Criteria Used to Determine Magnitude of Impact

IMPACT MAGNITUDE	DESCRIPTION
Major	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit. Change to most or all key archaeological materials, such that the resource is totally altered. Comprehensive changes to setting. Change to most or all key archaeological materials, such that the resource is totally altered. Comprehensive changes to setting. Change to key historic building elements, such that the resource is totally altered. Comprehensive changes to the setting.
Moderate	Changes to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, noticeable differences in noise or sound quality, considerable changes to use or access; resulting in moderate changes to historic landscape character. Changes to many key archaeological materials, such that the resource is clearly modified. Considerable changes to setting that affect the character of the asset. Change to many key historic building elements, such that the resource is significantly modified. Changes to the setting of an historic building, such that it is significantly

IMPACT MAGNITUDE	DESCRIPTION
	modified.
Minor	Changes to few key historic landscape elements, parcels or components, slight visual changes to few key aspects of historic landscape, limited changes to noise levels or sound quality; slight changes to use or access: resulting in limited changes to historic landscape character. Changes to key archaeological materials, such that the asset is slightly altered. Slight changes to setting. Change to key historic building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.
Negligible	Very minor changes to key historic landscape elements, parcels or components, virtually unchanged visual effects, very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character. Very minor changes to archaeological materials, or setting. Slight changes to historic buildings elements or setting that hardly affect it.
No change	No change to elements, parcels or components; no visual or audible changes; no changes arising from in amenity or community factors. No change. No change to fabric or setting.
→ Source: DMRB Volume 11 Section 3 Part 2 HA208/07	

8.7.19 The interaction between the importance of the heritage asset **Table 8-3** and the potential scale of harm Table 8-4. Produce the impact significance. This may be determined using the matrix shown in **Table 8-5.**

Table 8-5 - Significance of effects

		MAGNITUDE OF IMPACT (DEGREE OF CHANGE)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
HERITAGE ASSET SENSITIVITY (VALUE)	**Very High**	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

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

8.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

8.8.1 This scoping report is based on the design and construction information available PCF Stage 2. As such these findings may be subject to change as the design progresses. The setting assessment and assessment of the significance of effects will be undertaken as part of PCF Stage 3.

9 LANDSCAPE AND VISUAL

9.1 INTRODUCTION

9.1.1 The Landscape and Visual Impact Assessment (LVIA) considers the two related topics of landscape and visual amenity. 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.

9.1.2 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 from the surrounding residential properties, footpaths, open spaces, educational buildings and commercial and retail estates.

9.2 STUDY AREA

9.2.1 The study area has been defined as 1km offset from the Scheme Footprint. It is considered unlikely that potentially significant effects would arise beyond 1km due to the surrounding build form within the urban areas e.g. Birtley and Team Valley Trading Estate and the wider undulating landscape to the South. This landform creates shortened views and a smaller zone of influence associated with the Scheme.

9.2.2 The selection of the study area is a product of professional judgement and guidance in accordance with paragraph 3.14 Baseline of Highways England DMRB Volume IAN 135/10 Landscape and Visual Effects Assessment, and the Guidelines for Landscape and Visual Impact Assessment (GLVIA).

9.3 BASELINE CONDITIONS

TOPOGRAPHY AND GEOLOGY

9.3.1 The Southern end of the Scheme Footprint lies at 100m AOD, falling to 10m AOD into the Team Valley at its northern end.

9.3.2 The local landscape topography rises to the northeast at Springwell situated 2km from the Scheme Footprint to approx.150m AOD. The land also rises to approx. 210m AOD at Marley Hill, to the 4km west of the A1 at the northern end of the Scheme Footprint.

LAND USE AND OPEN SPACES

9.3.3 There is a marked contrast in land use associated with the study area. Residential land use extends west and north of Junction 67 forming the suburbs of Lobley Hill and Dunston Hill respectively. To the south of Junction 65 further residential land use forms the suburb of Birtley.

9.3.4 North of Junction 67 and extending to the north and east of the A1 is the Team Valley Trading Estate, an extensive area of offices, light industrial, warehousing and retail parks, representing one of the main local land uses.

9.3.5 The A1 represents the main demarcation between the urban land uses, associated in the main with the Team Valley Trading Estate to the north and east and the open farmland to the west and south.

9.3.6 This open farmland to the west and south contains open agricultural land with large, regular fields, many of which are bounded by hedgerows with hedgerow trees. Woodland, bordering the A1 and extending into the wider landscape forms a significant land cover bounding fields that are a mixture of arable and grazing.

9.3.7 Within this open farmland and to the south of Junction 67 is the Tyne Marshalling Yard, comprising several railway sidings associated with the East Coast Mainline Railway, this represents a marked but localised change in land use.

9.3.8 Open spaces within Birtley have been used for housing infill in the past few years. However there is some evidence of urban fringe land uses including smaller paddocks for pony grazing around Birtley and Eighton Lodge. There are also recreational facilities, including a golf course and fishing lakes.

9.3.9 To the north of Junction 66 is the iconic statue of the Angel of the North, this highly conspicuous landmark forms a gateway to the wider Newcastle conurbation. The statue is surrounded by open space; however views towards the A1 are largely screened by vegetation.

CONNECTIVITY

9.3.10 The study area contains a good number of footpaths and bridleways, especially to the north-east of the A1 (where the urban areas are connected to the surrounding countryside) although there are fewer footpaths within the open space to the south-west of the A1 around Birtley.

9.3.11 A summary of Public Rights of Way (PRoW) within the study area (as shown on **Figure 1.2** – Environmental Constraints Plan, in **Appendix B**) is as follows:

- National Trails - none within the study area;
- Bridleways - 7 Bridleways within the study area;
- BOAT (byways open to all traffic) - none within the study area;
- Footpaths - 22 footpaths within the study area; and

- Restricted byways - none within the study area.

9.3.12 The footpaths and bridleways enable good connectivity between the urban and rural areas to the south of Harlow Green; however east-west links are severed by the A1 corridor, the East Coast Mainline and the River Team. There are points for pedestrians to cross these features: on Smithy Lane/ Lamesley Road; Moor Mill Lane; and the A167 but the only off-road connection is a Bridleway.

9.3.13 Three Sustrans routes lie within the study area:

- Sustrans Regional Route 11;
- Sustrans National Cycle Network - Local Route 2; and
- Sustrans Local Routes.

9.3.14 As with the PRoW, there is some off-road connectivity for cyclists around Harlow Green. However, off-road east-west links are limited to Route 11 which follows the line of the SM and a separated cycle path at the roundabout with the A167, which joins an on-road cycle route into Birtley. Alternative crossing points are Smithy Lane. The residential areas at Birtley are poorly connected to the settlement to the east; cyclists needing to access this area are required to use the A1231.

VEGETATION

9.3.15 Linear belts of semi-mature broadleaf tree and shrub planting are located along the A1 including around junctions. This vegetation has been assessed from Google imagery, and a site visit carried out in July 2016. The vegetation within the highway boundary integrates with vegetation in the surrounding area and acts as screening for nearby visual receptors. There are several, now fragmented areas of woodland cover along the length of the Scheme, these are: Longacre Wood; Longacre Dene; Robins Wood, Lady Park and several unnamed areas that tie into the adjacent A1 corridor.

9.3.16 There are several landscape designations within the study area as detailed below and illustrated on **Figure 9.1,** in **Appendix B.**

LANDSCAPE DESIGNATIONS

9.3.17 There are no National Parks or Areas of Outstanding Natural Beauty within or adjacent to the study area.

9.3.18 Watergate Forest Park lies approximately 600m to the west of Junction 67. This country park lies to the north of the A692 and forms the western edge of Lobley Hill that forms a visual barrier with the A1 corridor.

GREEN BELT

9.3.19 Much of the study area falls within designated Green Belt land, namely the Tyne and wear Green Belt around Gateshead and Newcastle within the Gateshead district.

CONSERVATION AREAS

9.3.20 This part of the A1 runs through or adjacent to three conservation areas.

- Ravensworth Conservation Area is to the west of the Team Valley. This contains the remains of a medieval castle and its boundary reflects the nineteenth century Ravensworth Estate. The boundary of the Conservation Area is immediately adjacent to the A1 corridor.
- Lamesley Conservation Area lies approximately 300m to the south and west of the A1 adjacent to the East Coast Mainline railway; and
- Birtley Conservation Area lies approximately 800m to the south west of the study area. It covers the historic centre of Birtley village.
- Chowdene Conservation Area lies approximately 520m to the east of the study area.

NATIONAL CHARACTER AREAS

9.3.21 To assess a new development there must be understanding of both landscape character and the quality of the surrounding areas. The Scheme sits within National Character Area (NCA) 14 - Tyne and Wear Lowlands. This extends from Newcastle upon Tyne and Tynemouth in the north to Durham in the south and is centred on the lower valleys of the Tyne and Wear, characterised by broadleaved woodlands. NCA 14 is densely populated and its history of urban settlement and industry has had a significant impact on its character. NCA 14 is crossed by major north-south transport routes including the A1 and the East Coast Mainline railway.

LOCAL LANDSCAPE CHARACTER AREAS

9.3.22 The majority of the study area lies within the Metropolitan Borough of Gateshead, with a small section of the study area lying within the City of Sunderland.

9.3.23 Gateshead Council has two existing Landscape Character Assessments which are not adopted. The most recent assessment was undertaken in 2007 by White Young Green[15]. This divided the borough into six broad Landscape Character Types. The Scheme sits within the Team Valley Landscape Character Area (LCA).

9.3.24 The assessment then subdivides this Character Area into 33 smaller LCAs, (these were assessed individually in terms of their landscape character and condition, architecture and settlement form and given a landscape sensitivity and capacity assessment). These are illustrated on **Figure 9.2, in Appendix B**.

9.3.25 Gateshead Council further commissioned their *'Made in Gateshead'* Urban Character Assessment in 2011. These are illustrated on **Figure 9.2, in Appendix B**.

VISUAL RECEPTORS

9.3.26 **Table 9-1** details all visual receptors identified surrounding and their distance the Scheme. These are illustrated on **Figure 9.3**, in **Appendix B.**

Table 9-1 - Visual receptors

VISUAL RECEPTOR	DISTANCE
Properties along A1231 in Birtley	
Approx. 55 properties on Brightlea	between 165m and 285m
Approx. 41 properties on Northside	between 20m and 300m
Approx. 14 properties on Banesley Lane	between 100m and 235m
Approx. 18 properties on Coach Road	Between 18m and 44m
Birtley East -	
Approx. 57 properties on Malone Gardens	between 85m and 225m
Approx. 42 properties on Crathie	between 45m and 155m
Approx. 39 properties on Dene Court	between 300m and 50m
Approx. 78 properties on North Dene	between 300m and 60m
Approx. 37 properties Long Bank	between 265m and 30m
Eighton -	
Properties around Eighton Lodge and on Durham Road	150m
Properties on Durham Road 'Angel View House'	200m
28 properties on Cowen Gardens	265m
Rural -	
Property at Fishing tackle shop	60m
Residential properties at Angel of the North Fishing Lakes	185m
Residential property near Northside Farm	80m
Northside Farm	130m
Farm near Northside Farm	445m
Properties near Northside Farm	435m
Willowbeds Farm	90m
The Courtyard (Lamesley Road)	380m
Allerdene -	
Properties along Woodford	200m
Properties along Salcombe Gardens	175m
Lamesley Village -	
Properties at Lamesley Village	600m
Properties at South Farm	295m
Recreational -	
Angel of the North Fishing Lakes	approx. 150m
Users of the footpath and cycle network which link settlements and the surrounding countryside	Varied
Users of the Cycle networks	Varied
Visitors to Angel of the North	300m
Employment, retail/commercial or light industrial -	
Team Valley Trading Estate	from 80m
Educational: Primary School -	
Ravensworth Terrace Primary School	945m
St Joseph's RC Primary School	1225m
Birtley East Community Primary School	230m

St Anne's RC Primary School	885m
Harlow Green Community Primary School	670m
Blackfell Primary School	775m
Oakfield Infant School	800m
Oakfield Junior School	925m
Joseph Swan Academy	765m

VALUE OF THE LANDSCAPE AND VISUAL RECEPTORS

9.3.27 The landscape receptors identified from the baseline above have been assessed within PCF Stage 2 for their sensitivity and value in **Table 9-2**.

Table 9-2 - Landscape receptor sensitivity

RECEPTOR	DISTANCE	ENVIRONMENTAL VALUE (SENSITIVITY)
Green Belt	Within and Adjacent to the Scheme	High
Trees and Vegetation	Adjacent to Scheme	High
Local Landscape Character	Surrounding the Scheme	High
Character of Conservation areas	Adjacent to Scheme to 530 m	High

9.3.28 The visual receptors have been assessed within PCF Stage 2 for their sensitivity and value as detailed in **Table 9-3.**

Table 9-3 Sensitivity value of visual receptors

RECEPTOR	DISTANCE	SENSITIVITY VALUE
Residential Properties along A1231 in Birtley	between 20m and 300m	High
Residential Properties along A1231 in Birtley East	between 85m and 225m	High
Residential Properties in Eighton	between 150m	High
Residential Properties - Rural residential viewpoints	between 60m and 445m	High
Residential Properties in Allerdene	between 175m and 200m	High
Residential Properties in Lamesley Village	between 295m and 600m	High
Users of Public Rights of Way and other recreational trails	Varies	High
Users of the fishing lakes near Northside Farm	between 200-400m	High
Visitors to the Angel of the North	300m	High
Users of the East Coast Main Line	between 0-1000m	Medium
Users of primary and secondary schools	between 50m-950m	Medium
Users of Team Valley Trading Estate	80m +	Low

9.4 POTENTIAL IMPACTS

POTENTIAL CONSTRUCTION EFFECTS

9.4.1 The effects on visual receptors and landscape which would occur as a result of the construction of the Scheme include:

- Temporary and permanent inclusion of new features for the Scheme including land profiling and the provision and location of the site compound(s) (Geotechnical Investigations and main site works);
- The removal and replanting of some of the vegetation for the Scheme which currently provides integration and filtering of views from and to the surrounding areas, to allow the construction, especially those that directly affect nearby properties;
- Effects on Long Acre Wood and Bowes Railway LWS during construction through loss of vegetation within LWS or adjacent to it;
- Visual effects as a result of construction operations including site hoardings, construction compounds and construction traffic for the Scheme;
- Effects of temporary lighting of the construction area for the Scheme during the construction period; and
- Temporary construction impact upon the setting and views to the Angel of the North from the existing A1.

POTENTIAL OPERATIONAL EFFECTS

9.4.2 Effects which would potentially occur as a result of the operation of the Scheme include:

- Potential changes in landscape character due to the scale of the Scheme, introduction of new features including the Allerdene Bridge;
- The Scheme would potentially create permanent changes in local landscape character due to the removal of maturing highway woodland and vegetation connection to Longacre Wood;
- Visual changes would potentially affect residential properties and would occur from the operation of the Scheme, including the proposed Allerdene Bridge on the southern side;
- Potential impact upon the setting and views to the Angel of the North from the existing A1;
- Landscape and visual effects of possible additional permanent road lighting (although this is likely to utilise LED technology with dimming capability for future integration of the Highways England Motorway Road Lighting Control System (MoRLiCS), signage and gantries in-line with the A1 NGWB Signing Strategy and lighting; and
- Impact from the establishment of mitigation planting implemented as part of the Scheme, which over time would add screening and character benefits.

9.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

9.5.1 The change in character of the landscape in the proposed offline section could be mitigated with the use of well thought out landscape planting to reflect the local character of the Study Area. The mitigation landscape planting may also perform a visual screening role where vegetation has been removed to enable the works or where the new road corridor will have potential adverse effects on visual receptors. Consideration will be given to the setting of the Angel of the North, Ravensworth, Birtley and Lamesley Conservation Areas. The retention of existing vegetation where possible will help to reduce potentially adverse effects on these receptors.

9.5.2 Views to the Angel of the North from the A1 are paramount to its success as a piece of public art. Approximately 90,000 cars pass the Angel each day; it is necessary that the links and views between the A1, the East Coast Mainline and the Angel of the North are maintained.

9.5.3 Opportunities exist for further enhancement of the wider landscape character. Local woodland identified in the baseline contributes to the wider landscape character and has visual screening properties associated with it. There is scope to replace and extend areas where vegetation is removed as a result of the Scheme and provide additional mitigation planting to further reduce potentially significant effects. Space created through the decommissioning of parts of the existing road corridor and bridge will be considered during preliminary design as part of the overall mitigation strategy to offset potential effects, and integrate the Scheme within the landscape and surrounding woodlands.

MONITORING

9.5.4 Monitoring requirements will be determined once Scheme specific details are known, associated impacts assessed and mitigation requirements understood.

9.6 RESIDUAL EFFECTS

9.6.1 The PCF Stage 2 assessment of the Scheme found that overall the likely Landscape effect would be Large adverse during construction and Moderate adverse during operation and the likely Visual effect would be Moderate adverse during construction and operation. The residual effects identified at PCF Stage 2 have been outlined below.

9.6.2 There would be likely permanent residual effects in the perception of landscape character due to the scale of the Scheme; the introduction of new features including the Allerdene Bridge, lighting and removal of maturing highway woodland and vegetation connection to Longacre Wood are likely to contribute towards significant landscape effects.

9.6.3 Visual changes such as the proposed new Allerdene Bridge and gantries, new signage, technology assets and lighting, would likely result in residual effects on residential properties as well as views to the Angel of the North.

9.6.4 A further detailed assessment of residual effects will be carried out at PCF Stage 3.

9.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

9.7.1 A Simple landscape assessment was undertaken at PCF Stage 2. Landscape and visual topics were identified as potentially giving rise to significant effects and a detailed assessment is considered appropriate for PCF Stage 3 as outlined below.

9.7.2 Following consideration of the likely impacts associated with the Scheme it is proposed that a detailed assessment of landscape effects, in accordance with IAN 135/10 would be required as the potential impacts have been deemed to be potentially significant.

9.7.3 It is deemed likely that visual effects will arise from the Scheme, essentially from the removal of vegetation close to residential properties, resulting in newly exposed views of the corridor and moving traffic therein. It is proposed therefore that a detailed visual assessment of the Scheme is undertaken in accordance with IAN 135/10.

9.7.4 The assessment will be undertaken in accordance with the above guidance and the methodology outlined in Section 9.7.

POLICY AND PLANS

9.7.5 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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

9.7.6 The EIA will be carried out in accordance with guidance within DMRB Volume 11, Section 3, Part 5, IAN 135/10 Landscape and Visual Effects Assessment[16], and the Guidelines for Landscape and Visual Impact Assessment (GLVIA)[17].

9.7.7 The study area has been defined as 1km from the Scheme Footprint. It is considered unlikely that significant effects would arise beyond 1km due to the surrounding built form within the urban areas e.g. Birtley and Team Valley Trading Estate and the wider undulating landscape to the South. This landform creates shortened views and a smaller zone of influence associated with the Scheme.

9.7.8 The detailed assessment would build on the baseline information acquired for the PCF Stage 2 assessment and assess the potential landscape and visual impacts of the Scheme on individual receptors, by completing the following:

- Undertake detailed desk study and fieldwork to identify the character of the landscape, including its condition and value, and the nature and sensitivity of the visual receptors that may be affected by the project;
- A review and update of the baseline information including relevant planning policies, regional and district landscape character guidance;
- A review of the LCAs and determine if any changes are needed to the boundaries and descriptions considering new development / demolition within the study area;
- Undertake a landscape sensitivity assessment of the LCAs as to the degree that the proposed changes could be accommodated without altering landscape character;
- Undertake a detailed assessment of the magnitude of landscape impact to determine the significance of landscape impact upon the LCAs;
- Assessment of the visual impacts of the Scheme. Undertake a Zone of Visibility, identify visual receptors and determine the magnitude and significance of visual impact through site survey and assessment. For the sensitive views, photomontages will be used to illustrate the potential change; and
- Mitigation to avoid, reduce or remedy the changes should be taken into consideration in determining the significance of resultant effects. A detailed landscape mitigation strategy will be developed.

9.7.9 The LVIA will take account of the legislation relevant to landscape and visual issues, including the European Landscape Convention.

9.7.10 The LVIA will refer to the National Planning Policy Framework (NPPF), which forms the wide, national policy context for the Scheme. The relevant NPPF's planning principles and objectives will be identified and referenced in the report.

9.7.11 The method for defining the significance of effects follows guidance within Highways England DMRB Volume IAN 135/10 Landscape and Visual Effects Assessment.

9.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

9.8.1 In accordance with IAN 135/10 two basic assumptions have been made:

- The observer eye height has been assumed to be 1.5m; and
- The visual intrusion has been occasioned by traffic on the road (assumed maximum height of 4.5m) as well as by the road and associated structures.

9.8.2 Within the assessment it will be assumed that any planting would, by year 15, have achieved a minimum height of 4.5m. This assumption is based on predicted growth rates of 0.3m per annum which, given the application of appropriate planting and management techniques, is considered to be a conservative estimated height. This predicted growth rate is also based on experience from comparable highway schemes. The screening effect of vegetation would be less effective in winter in comparison to the summer months.

10 BIODIVERSITY

10.1 INTRODUCTION

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

10.1.2 DMRB Volume 11 Section 3 Part 4[20] defines the objectives for nature conservation as follows:

"The maintenance of the diversity and character of the countryside, including its wildlife communities and important geological and physical features; and

The maintenance of viable populations of wildlife species, throughout their traditional ranges, and the improvement of the status of rare and vulnerable species."

10.1.3 This section has been informed by the results from the PCF Stage 2 biodiversity assessment and the methodology set out in the Guidelines for Ecological Impact Assessment[18] and Highways Agency's Interim Advice Note 130/10[19] (IAN 130/10), which supplements the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3[20].

10.2 STUDY AREA

10.2.1 For the purpose of the desk study exercise, the search radii were selected following Assessment Methods in DMRB guidance[21] and Guidelines for Preliminary Ecological Appraisal[22]. The following search radii from the Scheme Footprint (provided December 2016) were used:

- 1km radius for protected species records;
- 1km radius for bats;
- 2km radius for statutory and non-statutory designated sites;
- 10km radius for European designated sites, including sites with hydrological connections; and
- 30km for SACs designated for Bats.

10.2.2 The study area for the field survey comprises the land previously identified as being within the Scheme Footprint (provided in December 2016), this included the A1 J65-67, the verges of the northbound and southbound carriageways under Highways England control and the area proposed for a new road to be constructed south west of J66-67 (hereafter referred to as the 'Study Area'). Land outside of the Scheme Footprint was not included within the field survey as impacts were considered unlikely. This study area applied to the Preliminary Ecological Appraisal (PEA) and the reptile survey.

10.2.3 For other detailed surveys, the Study Area was amended as follows, based on likely effects resulting from the Scheme:

- Land within the Scheme Footprint, which is most likely to be impacted by the Scheme, plus 30m from the Scheme Footprint for Bat Activity Survey;
- Scheme Footprint plus 500m from the Scheme Footprint for Great Crested Newt (GCN) surveys;
- Land within the Scheme Footprint, which is most likely to be impacted or lost, plus 50m from the Scheme Footprint for trees and buildings with potential to support bat roosts;
- Habitat suitable for red squirrel within the Scheme Footprint, which is most likely to be impacted or lost, plus 30m from the Scheme Footprint where access is available; and
- Habitat suitable for badger within the Scheme Footprint which is most likely to be impacted or lost, plus 50m from the Scheme Footprint where access is available.

10.3 BASELINE CONDITIONS

DESK STUDY

10.3.1 A desk study exercise was undertaken at PCF Stage 2 during March and April 2015 to review existing ecological baseline information available in the public domain and to obtain information held by relevant third parties in relation to the Scheme Footprint. The desk study information has not been updated to inform this scoping assessment; however it will be updated for the environmental assessment at PCF Stage 3. Whilst not considered in date (as per PEA guidelines (CIEEM, 2016)), it is considered unlikely that the provision of up-to-date desk study data, would significantly affect the scope of this assessment.

10.3.2 There are a number local wildlife sites (LWS) forming two wildlife corridors identified within the Study Area. These can be viewed in **Figure 1.2** – Environmental Constraints Plan in **Appendix B**. The following LWS form the an area called the River Team wildlife corridor; Lamesley Pastures, Tyne Marshalling Yard, Lamesley reedbeds, Bowes Railway Walk and Longacre Wood. The Follingsby wildlife corridor consists of; Sheddons Hill, Dunkirk Pond, Dunkirk Farm west and Bowes Railway Line.

10.3.3 Fourteen non-statutory LWS were identified within the 2km desk study search radius. The table below summarises those in closest proximity to the Scheme Footprint.

Table 10-1 - Non statutory nature conservation sites closest to the scheme footprint

Site Name	Distance	Designation Criteria
Sheddons Hill LWS	340m north of J65	This site is designated for its habitats, specifically herb rich meadow and acid grassland species
Dunkirk Pond (Fox's Pond) LWS	530m north of J65-J66	This site is designated for its open water plant community and large numbers of damselflies breeding in the pond as well as common frog, smooth and palmate newts.
Dunkirk Farm West LWS	10m east of J65-J66	This site is designated for its grassland habitat and the open grassland, tall-herb communities, scrub and hedgerow habitat along the disused wagon way.
Bowes Railway LWS	10m west of J65-J66	This site is designated due to its importance as a wildlife corridor and mosaic of habitats along its length.
Long Acre Dene LWS	Within the Scheme Corridor at J66	This site is designated due to its status as ancient semi-natural woodland in an urban area where ASNW is scarce.
Long Acre Wood LWS	Within the Scheme Corridor at J66-J67	This site is designated for its habitats and provision of habitat in an urban setting.
Lamesley Meadows LWS /Lamesley Pastures SNCI	500m south west of J66-J67	This site is designated due to its habitats and its provision for a variety of breeding wading birds.
Key: ASNW – Ancient Semi Natural Woodland LWS – Local Wildlife Site SNCI - Site of Nature Conservation Importance		

10.3.4 No European or UK statutory 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 Habitats Regulations Assessment Report (WSP, 2017) concluded that there would be no impacts to European Sites as a result of the Scheme, during construction and operation. Therefore Appropriate Assessment is not required.

10.3.5 The desk-top review of the WSP Preliminary Ecological Assessment Report identified notable and protected species records within 1km of the Scheme footprint, citing records of badger, bat species (4), bird species (83), otter, water vole, red squirrel, hedgehog, brown hare, amphibian species (4) (including GCN), and invertebrate species (7).

FIELD SURVEY

10.3.6 The Preliminary Ecological Appraisal (PEA) survey undertaken in 2015 covered the Study Area (as described in the 'study area' section; and where access allowed). The survey identified a Study Area dominated by broadleaved plantation woodland, scrub and grassland with less dominant habitats comprising hedgerow, bracken, hardstanding, shrub and both standing and running water.

10.3.7 **Table 10-2** 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 10-2 - Habitats identified within the study area

Habitat	Habitat of Principal Importance	Local Biodiversity Action Plan Habitat
Broadleaved semi-natural woodland	✓	✓
Broadleaved plantation woodland		✓
Mixed plantation woodland		✓
Dense scrub		✓
Scattered scrub		
Scattered broadleaved trees		
Scattered mixed trees		
Semi-improved neutral grassland		
Improved grassland		
Scattered bracken		
Tall ruderal vegetation		
Standing water	✓	✓
Running water	✓	✓
Amenity grassland		
Species poor intact hedge		✓
Species poor defunct hedge		✓
Buildings and hard standing		

SPECIES

10.3.8 The 2015 PEA and subsequent surveys identified habitat suitable for a number of species/species groups:

- Badger;
- Bats;
- Breeding birds;
- Wintering birds;
- Brown hare;
- Amphibian;
- Great crested newt;
- Hedgehog;
- Riparian Mammals, including Otter and Water vole;
- Red squirrel; and
- Reptiles.

10.3.9 Update surveys carried out in 2016 identified the River Team had negligible potential to support water vole on this particular stretch. At the time of the update survey the river could support otter commuting and foraging activity, though this was considered unlikely given the presence of a significant stretch of culvert (over 1 km) leading to this section of the river. No potential holts or resting sites were identified within the Survey Area.

10.3.10 During follow up surveys a bird of conservation concern (Lapwing *Vanellus Vanellus)* was observed and a review of publically available information was carried out and informed the need for wintering bird surveys[23].

10.3.11 Following update surveys in 2016, bats, great crested newts, badger, red squirrel and reptile surveys were undertaken as shown in **Table 10-3.**

Table 10-3 - Survey effort

Survey	Methodology	DATES	FINDINGS
Preliminary Ecological Assessment	Walkover of the Study Area in order to map and identify habitats, with regards to Guidelines for Preliminary Ecological Appraisal (CIEEM, 2013).	Undertaken March-April 2015	Habitats of varying importance identified. No further vegetative surveys required but further protected/notable species surveys required.
Badger	Walkover of appropriate areas of the Study Area in accordance with Harris *et al.* (1989).	October/ November 2017	To be confirmed following specific survey
Bats	Bat Activity Survey	June-September 2017	Assessment ongoing
	Bat Roost Potential Checks. Assessment of trees, buildings and structures for features offering potential as bat roosts.	July-present 2017	Ongoing
Breeding birds	Walkover transect of appropriate areas of the Study Area in accordance with Bird Census Techniques guidelines (Gilbert *et al* . 1998)	March – May 2018	To be confirmed following specific survey
Wintering birds	Walkover transect of appropriate areas of the Study Area in accordance with Bird Census Techniques guidelines (Gilbert *et al*, 1998)	October 2017 - February 2018	To be confirmed following specific survey
Great Crested Newts	Desk based assessment of waterbodies within 500m of the Scheme.	April 2015	16 waterbodies were recorded and underwent assessment. Eight waterbodies require further survey
	Habitat suitability index assessment of 8 waterbodies	April 2017	All 8 required further survey for GCN
	Environmental DNA assessment of 8 waterbodies	April-May 2017	Two waterbodies returned positive eDNA results. The remaining waterbodies

Survey	Methodology	DATES	FINDINGS
			returned negative results.
	Presence/absence surveys of 8 of the ponds within 500m of the scheme. Surveys in accordance with great crested newt mitigation guidelines (English Nature 2001).	April-May 2017	Amphibians recorded include great crested newt, smooth newt, palmate newt, common toad. Impacts to be confirmed following final scheme details.
Riparian Mammals	Walkover survey of the River with reference to Dean *et al* (2016), Strachan *et al* (2011) and Chanin *et al*. (2003).	April 2017	Small length of suitable habitat isolated between significant lengths where the river is culverted. Riparian mammals likely absent, no further survey required.
Red Squirrel	Walkover survey of the woodlands with reference to Practical Techniques for Surveying and Monitoring Squirrels Forestry Commission, 2009.	October-November 2017	To be confirmed following specific survey
Reptile	Strategic placement and monitoring of refugia tiles. Methodology based upon 'Herpetofauna Worker's Manual' (Gent and Gibson, (2003)) and 'Froglife Advice Sheet 10' (Froglife, (1999)).	June –July 2017	No reptiles identified. Likely absent. No further survey required

10.4 POTENTIAL IMPACTS

10.4.1 At this stage specific impacts to ecological receptors cannot be fully assessed as the final Scheme details are not yet confirmed. A brief summary of the potential impacts during both construction and operational/post-construction is provided below.

CONSTRUCTION

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

- Direct and indirect effects on legally protected and/or priority species will also result due to general construction site activities, through severance, fragmentation, dividing of habitats and reduction in biodiversity. Disturbance, displacement and potential mortality/injury of species may result through construction activities.

- Direct habitat loss, damage, fragmentation and loss of biodiversity are likely to occur during construction of the Scheme. The loss of woodland habitat would potentially impact bats, badger, red squirrel and nesting birds. Loss of grassland habitat would potentially impact badger and great crested newt whilst loss of scrub would potentially impact bats, great crested newts and nesting birds. Disturbance to species potentially retained habitats will occur during construction. Noise, light, visual and vibration pollution will impact the habitats and further increase disturbance to surrounding habitats.
- Pollution of retained habitats (in the form of dust, run-off and material deposition) would potentially impact protected and/or notable species occupying habitats. This may reduce habitat suitability for certain species.
- Damage to retained habitats and adjacent water courses (River Team and other water courses culverted beneath the A1) during construction, as a result of, for example, accidental pollution, discharge of materials or hydrological effects.
- Direct impacts on Longacre Wood LWS due to vegetation clearance directly adjacent to the highway boundary.

OPERATIONAL/POST-CONSTRUCTION

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

- Disturbance to species (e.g. bats) from increased levels of light, noise and pollution;
- Direct hydrological effects to Longacre Dene ancient woodland;
- Direct mortality through traffic collisions; and
- Effects on vegetation from polluted traffic spray from road traffic and surface water drainage.

10.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

10.5.1 Avoidance and mitigation measures will be further investigated, once Scheme specific details are known and associated impacts assessed during PCF Stage 3.

10.5.2 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.

10.5.3 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[24]. An assessment of the Scheme in relation to the Highways England No Net Loss requirements will be undertaken.

10.5.4 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.

10.5.5 Enhancements may include, but will not be limited to:

- Planting of native trees and hedgerows to enhance the wildlife corridors between Long Acre Wood LWS and Long Acre Dean LWS;
- Planting of native trees and hedgerows to enhance the Dunkirk Farm West LWS and Bowes Railway LWS wildlife corridors; and
- Additional planting of strategically placed native hedgerows to increase diversity of native species and strengthen wildlife corridors.

MONITORING

10.5.6 Monitoring requirements will be determined once Scheme specific details are known, associated impacts assessed and mitigation requirements understood.

10.6 RESIDUAL EFFECTS

10.6.1 Field surveys will be undertaken during the appropriate season to allow results to be used during the assessment. The findings of the proposed field survey work will be evaluated and presented in the Environmental Impact Assessment (EIA) describing methodologies employed; results of consultation and field surveys; potential impacts; differences between the options; mitigation measures required to ameliorate identified potential impacts; and an assessment of remaining residual impacts. Residual 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.

10.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

10.7.1 The following has been **scoped in to** the assessment:

- Local wildlife sites (LWS), due to their proximity to the Scheme include;
  - Dunkirk Farm West LWS (approximately 10 m from the Scheme Corridor);
  - Bowes Railway LWS (approximately 10 m from the Scheme Corridor);
  - Long Acre Dean LWS (within the Scheme Corridor);
  - Long Acre Wood LWS;
- All habitats within the field survey Study Area (see **paragraph 10.2.2**);
- The presence of three Section 41 Habitats of Principal Importance and eight Local Biodiversity Action Plan habitats; and

- Protected and notable species.

10.7.2 The following have been **scoped out** of the assessment:

- The River Tyne (Northumbria coast) Special Protection Area (SPA) and Special Area of Conservation (SAC).

10.7.3 The River Tyne (Northumbria coast) SPA and SAC has been scoped out of the assessment due to its distance from the Scheme (>15km) and the lack of hydrological connectivity (c. 23km downstream of the Scheme).

POLICY AND PLANS

10.7.4 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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

10.7.5 Following completion of ecological surveys, the ecological assessment will be undertaken using a modified approach detailed in the CIEEM Guidelines for Ecological Impact Assessment[18] and Highways Agency's Interim Advice Note 130/10[19] (IAN 130/10), which supplements the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3[21]. The assessment approach will ensure that legislation surrounding the protection afforded to habitats/species is not contravened. The assessment will include the ecological features within the study area listed below.

10.7.6 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.

10.7.7 In addition to the guidance detailed above, the assessment of ecological impacts will be undertaken in accordance with the following guidance:

- Institute of Environmental Assessment (IEA) (1995) Guidelines for Baseline Ecological Assessment;
- Highways Agency (2001) Design Manual for Roads and Bridges (DMRB) Volume 10 Section 4 Nature Conservation;
- Highways Agency (March 2006) Best Practice in Enhancement of Highways Design for Bats; and
- Highways Agency (Oct 2008) IAN 116/08 Nature Conservation Advice in Relation to Bats.

10.7.8 Characterisation of ecological impacts is a process that starts with the 'evaluation of ecological resources', which identifies the most valuable resources that may be impacted by the Scheme.

10.7.9 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 Table 1 of IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment. The resource valuation will be further informed by CIEEM's Guidelines[18].

10.7.10 Once the evaluation of ecological resources has been carried out, the assessment will identify potential biophysical 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.

10.7.11 Characterisation of ecological impacts upon each receptor requires the determination of a range of parameters as shown in **Table 10-4** to inform the determination of impact significance. **Table 10-4** has been produced with reference to Table 2 in IAN 130/10.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.

Table 10-4 - Characterisation of impact for ecology and nature conservation

Impact Character	Description
SI – Sign	Positive (Beneficial) or Negative (Adverse).
PO – Probability of Occurring	Certain, Probable, Unlikely.
CO – Complexity	Direct, Indirect, Cumulative.
EC – Extent	Area measures and percentage of total (e.g. area of habitat/ territory lost).
SZ – Size	Description of level of severity of influence (e.g. complete loss, number of animals affected).
RE – Reversibility	Reversible or Not Reversible (can the effect be reversed, whether or not this is planned?).
DU – Duration	Permanent (P) or Temporary (T) in ecological terms. Where differing timescales are determined in relation to the life-cycle of the receptor, these should be defined.
TF – Timing and Frequency	Important seasonal and/ or life-cycle constraints and any relationship with frequency considered.

10.7.12 Having characterised impacts, 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.

10.7.13 Using the receptor value ascertained from Table 1 of IAN 130/10 and the characterisation impact table from **Table 10-1**, it is possible to assign an 'overall significance category'. Table 3 of IAN 130/10 illustrates the approach taken to relating significant impacts at different levels of value.

10.7.14 Desk study data will be gathered from the following sources:

- Environmental Records and Information Centre North East (ERIC NE) - for protected sites and species;
- Durham Bird Club - for bird records;
- Durham Badger Group - for badger records;
- Durham Bat Group - for bat records; and
- Gateshead Council.

10.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

10.8.1 Access to waterbody 14 was not granted following the completion of the environmental DNA (eDNA) testing for great crested newt. The implications of this will be assessed once further design detail is available at PCF Stage 3.

10.8.2 Access permission for great crested newt surveys to waterbodies 15, 16, and 17 was removed following the completion of both the eDNA testing and the first population class size assessment. Again, the implications of this will be assessed once further design detail is available at PCF Stage 3.

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

11 GEOLOGY AND SOILS

11.1 INTRODUCTION

11.1.1 This section sets out the methodology to assess the potentially significant environmental effects on geology and soils related receptors. It sets out the proposed methodology for the geology and soils assessment and identifies those impacts that can be both scoped in and out of the EIA.

11.1.2 This section has been informed by the Preliminary Sources Study Report (PSSR, WSP 2015), and guidance document Soils and Geology DMRB Volume 11, Section 3, Part 11.

11.2 STUDY AREA

11.2.1 The study area will incorporate the Scheme Footprint plus a buffer of 250m beyond the Scheme Footprint (red line boundary). It is considered that this is the only area that would be affected in terms of geology and soils.

11.3 BASELINE CONDITIONS

11.3.1 Baseline conditions have been informed by the PSSR report[25] and checked in accordance of the current Scheme Footprint.

GEOLOGY

11.3.2 British Geology Survey (BGS) maps show a large area of Made Ground beneath the existing carriageway east of Junction 67 and south of Smithy Lane overbridge for approximately 300m and 400m respectively. The proposed route is also underlain by Made Ground south of Smithy Lane overbridge for approximately 100m to the east.

11.3.3 Drift deposits are shown to comprise Alluvium along the route of the River Team underlying the existing carriageway for approximately 250m at Junction 67. The remainder of the site is underlain by Glacial Till along the side of the Team Valley to Junction 65 in the south.

11.3.4 Solid geology comprises the Pennine Middle Coal Measures, indicated to underlie the length of the road and primarily comprising of the High Main Post Member (sandstone), over sandstones, mudstones, siltstones, and coal. A number of coal seams are indicated to sub-crop below the existing and proposed carriageways.

11.3.5 Coal Authority records state that the site is within the likely zone of influence from workings in thirteen seams of coal from shallow to 240m bgl. Numerous pits, shafts and adits, both associated with the main collieries, and individuals, are present on and in close proximity to the site. The Coal Authority records eleven shafts and two adits on or within close proximity to the site. From review of the Ordnance Survey, geological mapping, abandonment plans, and coal seam plans it is considered that seventeen shafts / adits may be present on, or in close proximity to the site.

HYDROGEOLOGY

11.3.6 The underlying alluvium is classified by the Environment Agency as a Secondary A Aquifer, and the Glacial Till as Unproductive Strata. The underlying Middle Coal Measures are classified as a Secondary A Aquifer.

11.3.7 The site is not within a Groundwater Source Protection Zone (SPZ), nor is one present within 250m of the site. There are no licenced groundwater abstraction points on site or within 250m of the site.

11.3.8 Groundwater strikes were recorded in available historical borehole records within the superficial deposits between 1.80 m bgl and 7.62 m bgl (pre-construction of existing A1 levels).

HYDROLOGY

11.3.9 There are a number of surface water features on site these include the following:

- River Team; which flows south to north under Junction 67;
- A below surface culverted drain; east of Junction 67 slip roads (this is referred to as the ordinary watercourse associated with the Allerdene Culvert in Chapter 15 – Road Drainage and the Water Environment);
- A culvert; 150 m southeast of Smithy Lane Bridge;
- A culvert; 400 m southeast of Smithy Lane Bridge;
- A culvert; immediately to the northwest of Junction 66 (this is referred to as the ordinary watercourse in the Longacre Dene in Chapter 15 – Road Drainage and the Water Environment);
- A culvert; 500 m southeast of Junction 66; and
- Bassett's Pond (a Secondary River) flowing to the northeast is culverted beneath the A1 to the north of Junction 65.

11.3.10 Pertinent off site surface water features comprise of:

- Foxpond Fishery to the immediate east of Junction 65 and
- Bowes Lake and Lookout Lake; north of Junction 65.

UNEXPLODED ORDNANCE

11.3.11 A desk based unexploded ordnance (UXO) assessment has been commissioned for the site and identified a Moderate Risk associated with encountering below ground UXO, subject to further more detailed analysis.

DESIGNATED SITES

11.3.12 There are no geological SSSIs within the study area shown in the Defra 'Magic' map application. We are still waiting for confirmation from the Local Authority regarding local geological designations (RIGS); any sites identified will be included within the assessment.

POTENTIAL SOURCES OF CONTAMINATION

11.3.13 Based on a review of publically available desk based information the following potential sources of contamination have been identified:

- One recorded historical landfill on site described as Ravensworth Anne Pit Heap, located south of Smithy Lane and to the east of the East Coast Main Line;
- One historical landfill (Northside Eighton Banks) located off site approximately 250m to the north of the carriageway between J65 and J66;
- Contamination arising from fuel/oil spillages from vehicles using the existing carriageway;
- Mine gases; and
- Areas of Made Ground.

POTENTIAL CONTAMINANT PATHWAYS

11.3.14 Potential pathways include:

HUMAN HEALTH

- Direct contact, soil ingestion and inhalation; and
- Migration and accumulation of ground gas in excavations and inhalation/asphyxiation by site preparation, earthworks, construction and maintenance workers.

CONTROLLED WATERS

- Infiltration of rainwater and leaching of contamination to shallow groundwater;
- Migration from groundwater into surface water bodies (main drains, network drains, ponds); and
- Lateral and vertical leaching of contaminants into underlying Secondary A Aquifer.

ENVIRONMENTAL RECEPTORS

11.3.15 Soils and Geology related receptors are summarised in **Table 11-1** considered to be:

Table 11-1 - Environmental 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	Surface water courses (primarily River Teen); and Groundwater (Secondary A Aquifer).	Medium
Soil	Agricultural Land Grade 3 undifferentiated.	Low
* Sensitivity based on professional experience.		

11.4 POTENTIAL IMPACTS

11.4.1 The impacts on the Geology and Soils are considered likely to be most significant during the construction phase of the Scheme, which will include major earthworks. Potential impacts are summarised below:

CONSTRUCTION

- Impacts on soils quality;
- Impacts to human health caused by exposure to contaminated ground, mine gas and buried UXO;
- Impacts to Human Health associated with ground instability; and
- Impacts to controlled waters from the release of physical and chemical contaminants.

OPERATION

- Impacts to controlled water from the release of uncontrolled spillages from vehicles.

POTENTIAL SIGNIFICANT EFFECTS

11.4.2 During construction, the potential significant effects are considered to be as follows:

- Loss of agricultural land via land take;
- Reduced soil quality, organic matter decline, erosion, over-compaction and sealing;

- Disturbance of contaminated ground during earthworks phase resulting in mobilisation of contaminants impacting controlled water bodies;
- Disturbance of contaminated ground resulting in release of contaminated soil dust to the surrounding environment;
- Disturbance of the ground resulting in release of mine gases into enclosed spaces (utility chambers, excavations);
- Potential exposure to contamination associated with the ground and effects on human health (e.g. ground workers and third parties);
- Disturbance of the geological strata which could lead to changes in the groundwater regime;
- Potential for ground instability and potential effects on construction workers; and
- The construction works being a potential source of contamination via the use of heavy plant and potential for associated fuel/oil spills.

11.4.3 During operation, the potential significant effects are considered to be as follows:

- Use as a highway and potential for there to be fuel/oil spills and spills of hazardous loads;
- Potential exposure of future road users to contamination and effects on human health (e.g. third parties);
- Disturbance of the geological strata which could lead to changes in the groundwater regime; and
- Highway construction and operation can have a significant effect on geological and soil resources. Therefore it is important to understand the potential significant effects of the Scheme on sensitive soil and geological related receptors. The converse also applies, in that the existing soil conditions of a site can impose constraints on a proposed development; for example, where land has been contaminated due to a past industrial use. Potential sources of contamination are identified in **Section 11.3.12.**

11.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

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.

- 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 monitoring equipment and 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.
- Pollution control measures incorporated within the Scheme drainage system.

MONITORING

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

11.6 RESIDUAL EFFECTS

11.6.1 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 residual effects are considered to be low to negligible, subject to the findings of the ground investigation.

11.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

11.7.1 The following elements have been **scoped in**:

- Coal mining related impacts associated with ground stability and release of hazardous mine gas;
- Impacts on agricultural soil quality;
- Contaminated land exposure risks associated with disturbance of Made Ground, including an on-site landfill;
- Impacts associated with piling bridge abutments and creation of preferential contaminant pathways;
- Impacts associated with major earthworks (construction of new embankments and retaining structures);
- Impacts associated with construction activities, the use and maintenance of heavy machinery, fuel storage and potential spills;

- Impacts associated with continued use of the study area as a highway, to include fuel/oil spills, loss of hazardous loads and fire water.

11.7.2 The following elements have been **scoped out**:

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

POLICY AND PLANS

11.7.3 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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

11.7.4 A detailed 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;
- Undertake 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.

11.7.5 The potential impacts will take into consideration both the construction and operation phase of the Scheme. Contaminated land related issues will be assessed in accordance with Model Procedures for the Management of Contaminated Land (CLR11). 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.

11.7.6 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 within **Table 11-1** and **Table 11-2** respectively, these will be developed as the assessment progresses.

Table 11-2 - Geology and soil sensitivity 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 3 (undifferentiated) and Grade 4 (Poor).
Negligible	No sensitive environmental receptors identified.

Table 11-3 - 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.

SCOPE OF ASSESSMENT

11.7.7 The following elements of the Scheme will be assessed:

- 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, embankment creation 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.

GUIDANCE DOCUMENTS

11.7.8 The Assessment will also be undertaken in accordance with the following principal guidance documentation:

- Agricultural Land classification of England and Wales (MAFF, 1988);
- 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.

11.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

11.8.1 It has been assumed that a suitably scoped ground investigation will be undertaken prior to undertaking the assessment to further refine the baseline conditions and characterise potential risks, including coal mining, in the context of the Scheme.

12 MATERIAL RESOURCES

12.1 INTRODUCTION

12.1.1 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 and identifies those impacts that can be scoped out of the EIA.

12.1.2 The assessment methodology proposed in this assessment is based on guidance set out in Interim Advice Note (IAN) 153/11 (Highways Agency, 2011) Environmental Assessment of Material Resources[26]. IAN153/11 sets out the process and information required for the assessment of significant effects from material resources and waste.

12.1.3 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*".

12.1.4 IAN 153/11 does not include a definition of waste, however the EU Waste Framework Directive[27] defines it as "any substance or object that the holder discards or intends or is required to discard".

12.2 STUDY AREA

12.2.1 The primary study area comprises the Scheme Footprint.

12.2.2 The secondary study area extends to the availability of construction and recovered material resources within the UK and North East England (Northumberland, Tyne & Wear, Durham and the Team Valley), and the capacity of waste management facilities in the North East of England.

12.3 BASELINE CONDITIONS

12.3.1 The operation and maintenance of the current A1 Birtley to Coalhouse assets will require the consumption of some material resources, and will generate arisings that may need to be disposed of as waste.

12.3.2 **Sections 12.3.3 – 12.3.18** describe baseline material consumption and waste disposal for the current assets, and provide a regional / national information and data in the context of which the subsequent environmental impact assessment will be undertaken.

MATERIAL RESOURCES

MATERIALS CURRENTLY REQUIRED

12.3.3 The operation and maintenance of the current A1 Birtley to Coal House assets requires a small number of specialist components (for example, light bulbs, signage steelwork for replacement barriers) as well as some bulk products (asphalt for minor re-surfacing) for routine works and repairs of the highway and ancillary infrastructure.

12.3.4 The current consumption of construction and other material resources within the Scheme Footprint is, however, deemed negligible.

12.3.5 The do-minimum option (no scheme pursued) would be unlikely to change the current consumption of material resources within the Scheme Footprint, although it has been noted that the regular maintenance works on the Allerdene Bridge are likely to consume more material resources per unit time than comparable (but newer) structures.

UK AND REGIONAL PERSPECTIVE: AVAILABILITY OF CONSTRUCTION MATERIALS

12.3.6 **Table 12-1**[28] [29] [30] [31] [32]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 12-1 - Construction materials availability in the North East of England and the UK

MATERIAL TYPE	AVAILABILITY (2015 UNLESS OTHERWISE STATED)	
	NORTH EAST	UK
Sand and gravel +	23.5Mt	52.5Mt
Permitted crushed rock *	3.1Mt	99.3Mt
Concrete blocks #	241,000m^3 (2014)	5.4Mm^3 (2014)
Primary aggregate *	6.0Mt	183Mt
Recycled and secondary aggregate *	1.1Mt	63Mt
Ready-mix concrete +	0.6Mm^3	25.2Mm^3
Steel +	(no data)	7.6Mt
Asphalt *	0.9Mt	26.3Mt
# stocks + production * sales		

12.3.7 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.

12.3.8 However, 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. The sensitivity of materials for the Scheme is assessed to be low.

SITE ARISINGS CURRENTLY GENERATED

12.3.9 Current routine operation and maintenance works on the A1 Birtley to Coalhouse assets generate negligible volumes of site arisings.

NATIONAL AND REGIONAL PERSPECTIVE: TRANSFER, RECOVERY AND RECYCLING

12.3.10 Environment Agency data[33] (**Table 12-2)** 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[34].

12.3.11 No regional data for construction, demolition and excavation production or recovery rates are currently available for the north east of England.

Table 12-2 - 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%

12.3.12 **Figure 12-1** shows that rates of material transfer (non-civic), recovery and metal recycling within the north east of England have risen steadily over the last 15 years. Data provided include all waste types in the region and hence will include, but are not specific to, construction, demolition and excavation arisings.

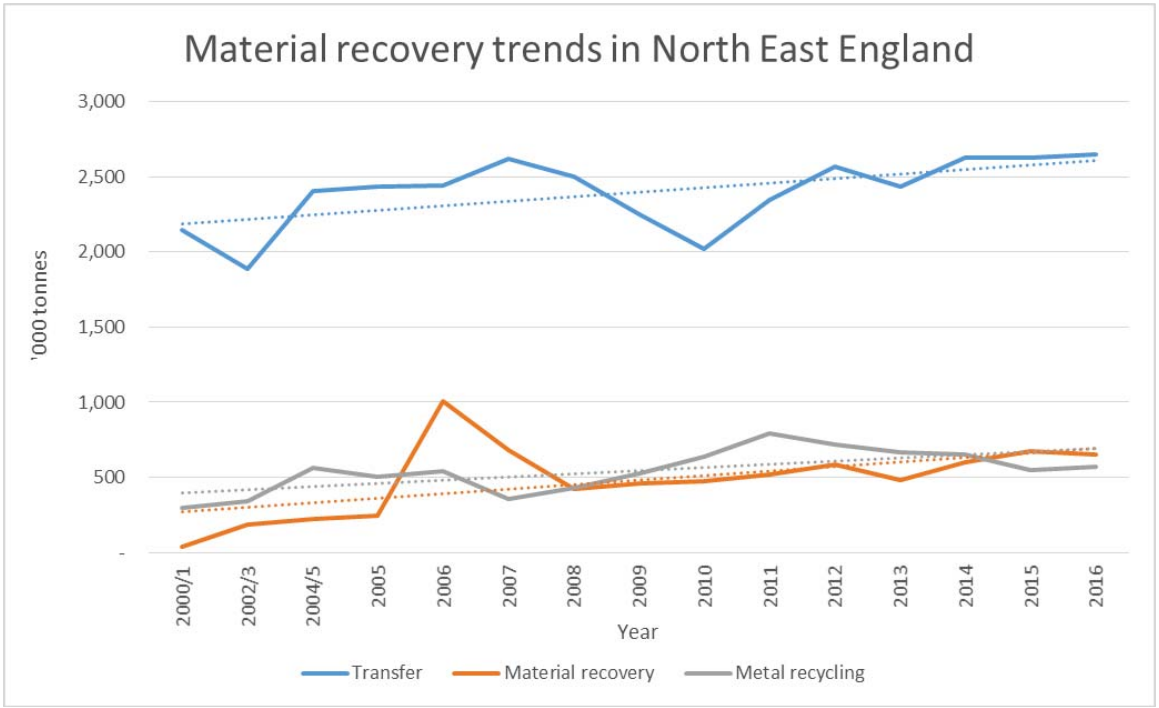

Figure 12-1 Transfer, material recovery and metal recycling in the North East of England

12.3.13 Available data demonstrate that transfer, recovery and metal recycling trends generally remain consistent within the North East. These data also show that there is likely to be regional infrastructure and capacity for the transfer and recovery for construction, demolition and excavation arisings from the Scheme. Construction and demolition recovery trends across England **(Table 12-2)** demonstrate further capacity in this context.

12.3.14 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. Both the importance (positive value) of this infrastructure and (hence) the potential to maximise the re-use / recycling value of site arisings are assessed to be high.

WASTE GENERATION AND DISPOSAL

WASTE CURRENTLY GENERATED AND DISPOSED OF

12.3.15 The operation and maintenance of the A1 Birtley to Coal House assets currently generates small volumes of waste from routine bridge 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 deemed negligible in the context of available regional capacity.

REGIONAL PERSPECTIVE: REMAINING LANDFILL CAPACITY

12.3.16 At the end of 2015, the north east landfill sites presented in **Table 12-3** were recorded as having remaining capacity[35].

Table 12-3 - 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

FACILITY NAME	FORMER PLANNING SUB REGION	LANDFILL SITE TYPE	REMAINING CAPACITY END OF 2015 (M^3)
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
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**

12.3.17 Environment Agency data[36] 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).

12.3.18 Using the most up to date information available the baseline regional landfill capacity is detailed in **Figure 12-2**. Simple statistical forecasting (Microsoft Excel forecasting function) has been used to demonstrate long term void capacity to the year of planned Scheme completion (2023/24) in the absence of future provision.

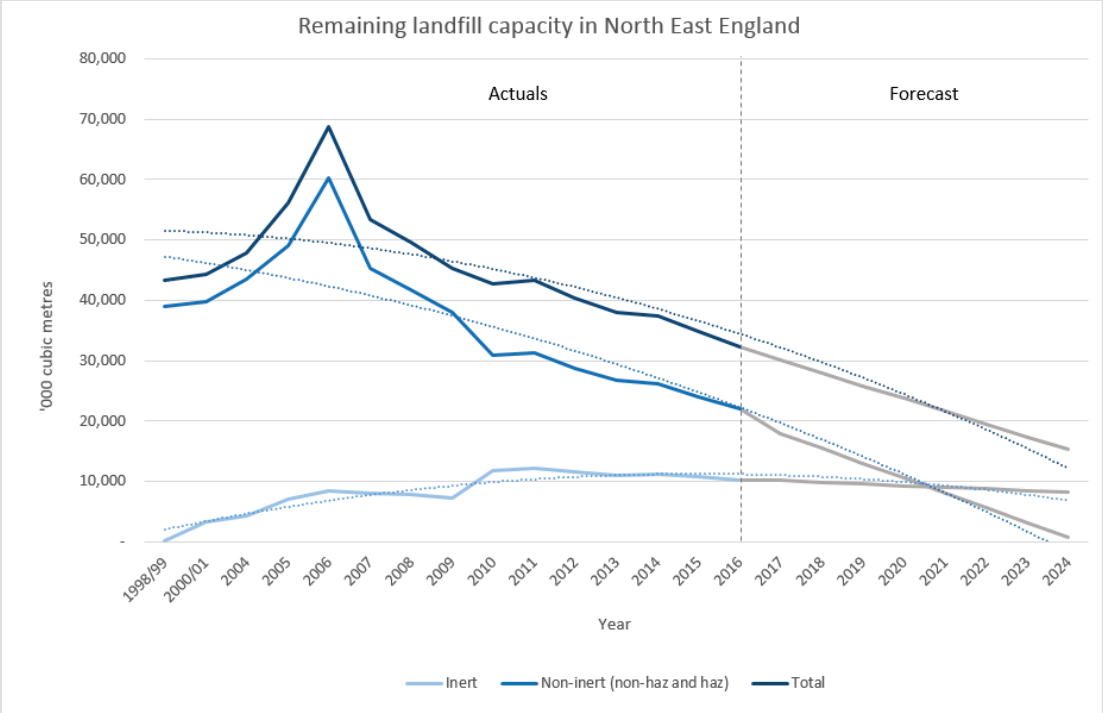

Figure 12-2 North East England Remaining Landfill Capacity (2000/1-2024)

12.3.19 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 indicates that, by comparison with 2016 data and in the absence of future provision, inert capacity may fall as much as 20%, non-inert capacity by 97%, and total capacity by 53%.

12.3.20 Individually, the sensitivity of different landfill capacity types over the lifetime of the scheme is assessed to be inert (low), non-inert (very high) and total (high). On average, the sensitivity of landfill capacity is assessed to be high.

12.4 POTENTIAL IMPACTS

12.4.1 The Scheme has the potential to consume material resources (including those recovered from site arisings), and produce and dispose of waste during the construction of the carriageway and its supporting infrastructure.

12.4.2 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 12.1.6**) have been scoped out of this assessment.

12.4.3 The effects associated with the described impacts include those associated with the production, processing, consumption and disposal of material resources.

12.4.4 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.

12.4.5 It is important to note that direct and indirect 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.

12.4.6 In response to the requirements set out in IAN 153/11 (paragraph 3.2.1) a summary of the potential for material resource consumption and waste generation and disposal to generate significant environmental effects, is provided in **Table 12-4.** Where appropriate, the potential influence of recovering and reusing/recycling site arisings is also included within **Table 12-4**.

Table 12-4 Potential impacts and effects of consuming material resources and disposing of waste

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 effects 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 site. → Other demolition wastes. → Waste in this phase of the works would, for example, be produced during the demolition of Allerdene Bridge and associated carriageway, and the removal of the North Dene Footbridge (although the intention is to re-use this structure), concrete crash barriers, and areas of the central reserve. → As far as possible, arisings from demolition will be reused and / or recycled on or off site, with beneficial effect. 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 bridge structures and other highway assets will result in considerable volumes 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 does need to be disposed of, and in combination with other the on-site phases, there is potential for significant adverse effects.
Site remediation and preparation	→ The following material resources are expected to be consumed as part of the site remediation and preparation phase:	Wastes likely to be generated during site preparation include: → Vegetation and other above ground materials produced by site clearance (potentially, including invasive weeds).

	→ Timber and other products required for the erection of perimeter fencing. → Aggregate and stone for ground improvement at site, prior to use by heavy plant. → Any impacts associated with material resource consumption would be adverse, permanent and direct. There is potential to generate significant effects associated with material resource consumption during site remediation and preparation.	→ Surplus topsoil or subsoil materials. → Hazardous or contaminated material found on or beneath the site. → 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 considered limited. However, any impacts would be adverse, permanent and direct. Some impacts might be precluded where arisings can be reused e.g. top soil and sub soil. Where waste from site remediation and preparation does need to be disposed of, and in combination with other the on-site phases, there is potential for significant adverse effects.
Scheme construction	→ Material resources will be required for the construction of the Scheme including: replacement of the Allerdene and North Dene bridges, construction of new the carriageway and structures, and extension of Kingsway Viaduct. → Construction materials required are anticipated 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 and sheet piling → Concrete including for pre-cast or prefabricated elements → Bricks and aggregate → Timber for fencing and formwork → New street furniture and signage → Cabling	Waste is anticipated to be generated during the construction of the Scheme, for example, during the replacement of the Allerdene Bridge and the construction of new lanes, structures and associated assets. It is anticipated that the following wastes would be generated: → Waste from vegetation clearance → Timber → Concrete, bricks and aggregate waste → Road paving materials including sub-base and bituminous materials → Hazardous or contaminated material found or generated on site → Cabling → Redundant street furniture and signage → Steel waste e.g. safety barriers → General construction waste e.g. packaging, ducting. The volumes of waste likely to be generated and disposed of as result of the Scheme will be identified and assessed at PCF Stage 3. Impacts as a result of waste generation would be adverse and direct, and are generally accepted to be permanent in nature. The resultant adverse

	→ Other general construction materials The volumes of material resources required for the Scheme will be identified and assessed at PCF Stage 3. 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. major improvement to an existing road, it is anticipated that the consumption of material resources has the potential to have significant adverse effects.	effects would be the reduction of 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 significance adverse effects from the generation and disposal of waste.
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, the potential to consume material resources (including recovered site arisings), and produce and dispose of waste may be required. Where these changes can be forecast within the first year of operation, they will be included in the environmental assessment. The extent of changes within the first year of operation is not currently known, but professional judgement would indicate that there are unlikely to be significant effects. Similarly, and beyond the first year of operation, it is predicted that there will no significant effects. This element has therefore been scoped out of the assessment.	

12.5 DESIGN, MITIGATION, ENHANCEMENT AND MONITORING MEASURES

12.5.1 To date, specific design measures to avoid and mitigate adverse impacts from material resources consumption and site arisings, and the generation and disposal of waste, include:

- A design aspiration has been established for the Scheme to use a 'family of structures' for the circa 25 sign and technology gantries that will be required. This approach has been successfully adopted on previous programmes of work (A19 A1058 Coast Road junction improvement) and the standard design template could be used as each structure would require similar loading. The use of a family of structures would facilitate off-site construction, and thereby reduce the production of on-site waste.
- As far as possible material resource efficiency and waste minimisation strategies would be incorporated into the design as follows:
  - Design for resource optimisation: simplifying layout and form, using standard sizes, balancing cut and fill, maximising the use of renewable material resources, and materials with recycled or secondary content, and setting net importation as a scheme goal;
  - Design for off-site construction: maximising the use of pre-fabricated structures and components, encouraging a process of assembly rather than construction;
  - Design for the future: considering how material resources 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; and
  - Design for recovery and reuse: identifying, securing and using material resources at their highest value, whether they already exist on site, or are sourced from other schemes.
- As far as possible, material resources from demolition would be re-used in the construction of the new road.
- It is the intention of the project to deconstruct / dismount the North Dene Bridge structure so that it can be re-used elsewhere on the highway network. The feasibility of doing this will be explored and confirmed as the design phase progresses.
- All variable message signs (VMS), and other road signs and posts, will be constructed off-site. The North Dene footbridge replacement is also likely to benefit from the use of pre-constructed elements, though this will be confirmed later in the design development.
- The main highway has been realigned to preclude the need to demolish Smithy Lane; this will reduce demolition waste, and reduce the volume of primary / other material resources that need to be consumed.
- The use of site arisings as fill, sourced from a flood alleviation scheme adjacent to the current A1 Birtley to Coalhouse highway, is being investigated;

viability will be determined following the results of a ground investigation to establish that material is suitable for use in as fill. If successful, this enhancement measure will reduce the volume of imported primary material required.

- Material resources would be designed and specified to minimise the amount of embedded carbon in order to minimise environmental impact.
- A CEMP, incorporating a Site Waste Management Plan (SWMP) and Materials Management Plan (MMP) would be implemented in order to identify, monitor and manage material resources and waste arisings on site.

12.6 RESIDUAL EFFECTS

12.6.1 It is anticipated that, with the implementation of effective mitigation measures, including designing out waste, and implementing a CEMP, SWMP and MMP on site, that there would be no significant residual effects associated with material resources.

12.6.2 However, this assertion will be tested fully during the detailed assessment, as part of the Scheme environmental impact assessment.

12.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

12.7.1 The following topics have been **scoped in** to the assessment process:

- 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.

12.7.2 The following elements have been **scoped out** of the assessment process:

- 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 significance of effect.
- The consumption of materials resources, and site arisings and waste production beyond the first year of operation have been scoped out, as their impacts and associated effects have been deemed to be not significant.

POLICY AND PLANS

12.7.3 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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.

12.7.4 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)[37];
- National Policy Statement for National Networks (2014)[38];
- Waste Management Plan for England (2013)[39];
- National Policy Statement for Hazardous Waste (2013)[40]; and
- Newcastle City Council Strategic Policy CS21 Waste (2015).[41].

METHODOLOGY

12.7.5 The primary guidance that will be used to inform the assessment process is IAN153/11 Environmental Assessment of Material Resources.

12.7.6 As the proposed works comprise road widening and improvements, and the replacement of the Allerdene railway bridge (which carries the A1 over the East Coast Mainline) and the North Dene Bridge, the Scheme meets the IAN153/11 guidance definition of 'complex improvement and large new construction works'. In accordance with the requirements for complex works set out in the guidance, a detailed assessment of material resources shall be undertaken.

12.7.7 As stated in **Table 12-4**, the consumption of material resources and production / disposal of waste beyond the first year of Scheme operation, has been scoped out because forecasts anticipate negligible impacts and effects.

12.7.8 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 forecasts will be made;

c) Impacts will be evaluated against the regional and national materials markets and the capacity of regional (or if appropriate, national) waste infrastructure;

d) 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

e) Identification of viable circular economy opportunities in design will be made.

12.7.9 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 Table 2.4 in DMRB Volume 11 Section 2 Part 5 HA 205/08 [42] whilst also taking into account the requirements of the National Policy Statement for National Networks (2014) [43]

12.7.10 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.

12.7.11 Assessment results will be presented in Table C of Annex 2 (Detailed Assessment Reporting Matrix) as set out in IAN 153/11.

12.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

ASSUMPTIONS

12.8.1 No assumptions have been made within the preparation of this assessment.

LIMITATIONS: AVAILABILITY OF BASELINE DATA

12.8.2 Baseline data and information for the assessment are (unless otherwise stated) only available to 2016.

12.8.3 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.

LIMITATIONS: AVAILABILITY OF CDE DATA

12.8.4 The Department of the Environment, Food and Rural Affairs has been consulted to determine whether generation and recovery rates for Construction, Demolition and Excavation (CDE) arisings were available by region.

12.8.5 Defra confirmed that it does not publish Construction Demolition Excavation figures at a regional level, and only national (England) data are accessible through the publically available Waste Data Interrogator Database[44]; 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."

12.8.6 Until such a time that Construction Demolition Excavation 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.

13 NOISE AND VIBRATION

13.1 INTRODUCTION

13.1.1 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.

13.1.2 This section has been informed by the result of the PCF Stage 2 noise assessment[45] and the methodology set out in DMRB HD 213/11[46] and associated Interim Advice Note 185/11[47].

13.2 STUDY AREA

13.2.1 The study area will be defined in accordance with the guidance in DMRB, Volume 11, Section 3, Part 7 (HD 213/11 - Revision 1), as follows.

- Identify the start and end points of the physical works associated with the road project;
- Identify the existing routes that are being bypassed or improved, and any proposed routes, between the start and end points;
- Define a boundary one kilometre from the carriageway edge of the routes identified in (ii) above;
- 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';
- Identify any affected routes beyond the boundary defined in (iii) above; and
- Define a boundary 50m from the carriageway edge of the routes identified in (v) above.

13.2.2 An affected route is where there is a possibility of a change of 1 dB $L_{A10,18h}$ or more in the short term or 3 dB $L_{A10,18h}$ or more in the long term.

13.2.3 The traffic model is being extended at PCF Stage 3 and it is anticipated that the revised ARN will extend to the south and the east of junction 65 (along the A1 and A194 respectively) for at least two junctions.

13.2.4 The above study area applies to the operational noise effects. Construction noise and vibration effects and operational vibration effects are expected to encompass a reduced study area which will, itself, be within the area defined for the operational noise effects.

13.3 BASELINE CONDITIONS

NOISE-SENSITIVE RECEPTORS

13.3.1 In accordance with the DMRB HD 213/11, examples of sensitive receptors include dwellings, hospitals, schools, community facilities, designated areas (e.g. AONB, National Park, SAC, SPA, SSSI, SAM), and Public Rights of Way (PRoW).

13.3.2 The study area encompasses residential areas in the south of Gateshead, the north of Birtley, and western areas of Washington, as well as other, smaller conurbations and villages along the route. A summary of potentially sensitive receptors identified during the PCF Stage 2 assessment is provided in **Table 13-1** below. The study area and sensitive receptors will be re-visited during the PCF Stage 3 assessment.

Table 13-1 - Potentially sensitive receptors

	Receptor
Residential Areas	
	Lamesley
	Gateshead (Allerdene, Harlow Green, Eighton Banks)
	Birtley
	Springwell
	Washington (Armstrong and Crowther)
	Lady Park
Nursey and Infant Schools	
	Oakfield Infant School
	Oxclose Community Nursery School
Primary Schools	
	Oakfield Junior School
	Harlow Green Community Primary School
	St Anne's RC Primary School
	Birtley East Primary School;
	Blackfell Primary School
	Ravensworth Terrace Country Primary School
	Blackfell Primary School
	Holly Park Primary School
	Saint John Boste RC Primary School
	Oakfield Junior School
	Harlow Green Community Primary School
	St Anne's RC Primary School
	Birtley East Primary School
	Blackfell Primary School
	Ravensworth Terrace Country Primary School
	Blackfell Primary School
	Holly Park Primary School
	Saint John Boste RC Primary School
Secondary Schools, Colleges and Further Education (FE)	
	The Joseph Swan School
	Lord Lawson of Beamish School
	Oxclose Community Academy
Places of Worship	

	Saint Andrew's Church, Lamesley
	Cromer Avenue URC Church
	The Church of Jesus Christ of Latter-Day Saints
	Saint Anne's RC Church
	Oxclose Church
Scheduled Monuments	
	Ravensworth Coalmill
	Ravensworth Castle
	Bowes Railway LWS
Other Cultural Assets	
	The Angel of the North
	Other Receptors
	Longacre Wood LWS

13.3.3 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 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. All residential, educational and cultural heritage assets, as listed above, would typically be assigned a sensitivity level of 'high' (based on professional experience). However, Longacre Wood is considered less sensitive and would be assigned a sensitivity level of ‘low’ as a result of its occasional and transient use.

NOISE IMPORTANT AREAS

13.3.4 The current Noise Action Plan for major roads (DEFRA, 2014[48]) outlines a number of Noise Important Areas (NIA's) at Round 2 of the UK noise mapping project, identified in accordance with the requirements of the EU Environmental Noise Directive and associated English regulations. The Round 2 NIA's include the top 1% of the population, in terms of exposure to road traffic noise ($L_{A10,18h}$).

13.3.5 The Round 2 NIAs for both Highways England and local authority maintained roads are available under the Open Government Licence (DEFRA, 2015[49]). The Round 2 NIAs within or partially within the study area defined for the PCF Stage 2 assessment are set out below. Note that this list will be updated once the PCF Stage 3 study area has been defined.

Table 13-2 - Ownership of Noise Important Area (NIAs) defined for PCF Stage 2

NIAs on the A1	
Number	**Owner**
NIA 2498	Highways England
NIA 2451	Highways England
NIA 6633*	Highways England and Gateshead Council

NIAs on Surrounding Roads	
Number	**Owner**
NIA 6629	Highways England
NIA 6630	Highways England
NIA 2498	Highways England
NIA 2449	Gateshead Council
NIA 2450	Gateshead Council
NIA 6631	Gateshead Council
NIA 6632	Gateshead Council
NIA 10048	Gateshead Council
NIA 2453	Gateshead Council
NIA 6634*	Highways England and Sunderland Council
NIA 6633*	Highways England and Gateshead Council

13.3.6 In accordance with the provisions of the Round 2 Noise Action Plan for Roads and the objectives of the RIS Highways England has instructed (via the Major Projects' Instruction) that specific consideration of NIAs be included in this assessment, and that potential improvements to the noise environment in these areas be incorporated into a scheme design, even where a scheme itself does not cause a worsening of impact.

13.3.7 Noise Important Areas can be viewed in **Figure 1.2** – Environmental Constraints Plan in **Appendix B**.

EXISTING NOISE CLIMATE

13.3.8 The existing noise climate varies across the study area, be that the area for PCF Stage 2 or 3. The noise climate across much of the study area is dominated by road traffic noise, particularly the areas close to the A1 and other major roads such as Durham Road and those that fall within NIAs. However, the study area also includes relatively large spaces where there are no major roads and, as such, these areas are exposed to much lower noise levels.

13.3.9 The existing road traffic noise climate was determined at PCF Stage 2 using a 3D noise model populated with traffic flow data.

13.4 POTENTIAL IMPACTS

CONSTRUCTION EFFECTS

13.4.1 It is well known that certain construction activities, such as piling, breaking/demolition, can cause high levels of noise and vibration. Whether such levels might cause significant effects, depends on other factors such as the time of day, duration and proximity of receptors.

13.4.2 However, overall, the proximity of 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 conclusion would be reinforced should any night-working be required.

OPERATIONAL EFFECTS

13.4.3 A summary of effects with respect to operational road traffic noise is set out in **Table 13-2**. These effects were determined during the PCF Stage 2 noise and vibration assessment and are, therefore, relevant to the PCF Stage 2 traffic model. Please see **paragraph 13.2.3** regarding the changes to the extent of the traffic model for PCF Stage 3.

Table 13-3 - Summary of effects - operational road traffic

Aspect	Summary of Effects	Mitigation
Direct short term beneficial effects	Short term significant beneficial effects along parts of the Scheme.	None required.
Direct short term adverse effects	Short term significant adverse effects along parts of the Scheme including Longacre Wood	3 metre high noise barrier adjacent to the A1 northbound carriageway in the Birtley area.
Indirect short term beneficial effects	Short term significant beneficial effects on Saltwell Road South and Hertford.	None required.
Indirect short term adverse effects	None identified.	None required.
Direct long term beneficial effects	None identified.	None required.
Direct long term adverse effects	Long term significant adverse effects along parts of the Scheme.	3 metre high noise barrier adjacent to the A1 northbound carriageway in the Birtley area.
Indirect long term beneficial effects	None identified.	None required.
Indirect long term adverse effects	None identified.	None required.

13.4.4 With the information available at PCF Stage 2, it is considered that the Scheme with the proposed mitigation met the three aims of the Noise Policy Statement for England (NPSE), as set out below.

13.4.5 "Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- → *Avoid significant adverse impacts on health and quality of life;*
- → *Mitigate and minimise adverse impacts on health and quality of life; and*
- → *Where possible, contribute to the improvement of health and quality of life."*

13.4.6 Meeting these aims is subject to the installation of the noise barrier adjacent to the northbound carriageway of the A1 in the Birtley area (which is committed mitigation for the Scheme) and also develop mitigation during preliminary design in NIA 2498 in Ladypark and consider mitigation at Longacre Wood.

13.4.7 The PCF Stage 3 assessment will reconsider whether the Scheme meets the aims of the NPSE.

13.4.8 Additionally, this statement is dependent on the potential changes in the NIAs being re-visited at PCF Stage 3 with mitigation specified, where appropriate.

13.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

13.5.1 The following mitigation measures for operational noise have been incorporated into the design and were identified during PCF Stage 2:

- Low noise TSCS for all sections of the A1 and slip roads up to the roundabouts but excluding the roundabout circulatory; and
- A 3 metre high noise barrier adjacent to the A1 northbound carriageway in the Birtley area.

13.5.2 The following areas have been identified as possibly requiring mitigation. This will be determined during the PCF Stage 3 assessment:

- There is an existing 2.5 metre high barrier at the northern extent of the Scheme in the Ladypark area which was included in the PCF Stage 2 assessment. This is within NIA 2498 and the PCF Stage 2 assessment indicated that long term noise level increases between 1 dB and 3dB would be experienced at dwellings comparing the do minimum opening year and do something design year scenarios. Additional mitigation measures for this area will be given further consideration during PCF Stage 3 given the policy objective to avoid noise level increases in NIAs; and
- Longacre Wood is located in an area that experiences a change in noise level as a result of the Scheme. The sensitivity of this area is considered to be relatively low due to its use being transient and occasional. This allied to the fact that it is already exposed to a dominant road traffic noise source (the A1) and the predicted change in noise level being no more than +2 dB in the usable areas of the woodland means that mitigation has not been considered further at this stage but this should remain a consideration during PCF Stage 3).

13.5.3 Mitigation for temporary construction phase effects will be identified during PCF Stage 3.

MONITORING

13.5.4 A baseline noise survey has been 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 PCF Stage 3 assessment.

13.6 RESIDUAL EFFECTS

13.6.1 Due to the proximity of the dwellings in Birtley to the Scheme, it is expected that there may be residual construction phase effects. However, a construction noise and vibration assessment will be undertaken during PCF Stage 3 and mitigation measures will be identified with a view to minimising and, where possible and feasible, eliminating.

13.6.2 The potential operational residual noise effects, if any, are expected to be limited to Longacre Wood and possibly the NIA in the Ladypark area. However, these potentially significant effects will be explored in detail at PCF Stage 3 with a view to minimising and, where necessary and possible, eliminating.

13.6.3 At this stage, no residual vibration effects are expected. However, this will be considered further during the PCF Stage 3 assessment.

13.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

13.7.1 The following topics have been **scoped in** to the noise and vibration assessment:

- Construction noise;
- Construction vibration;
- Road traffic noise impact of the Scheme; and
- Qualitative road traffic vibration impact of the Scheme.

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

PLANNING POLICY, PLANS AND GUIDANCE

13.7.3 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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.

13.7.4 The following policy and guidance will underpin the assessment and will be described in more detail in the PCF Stage 3 assessment. Where any document has particular relevance to this scoping report, details are set out below.

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

NOISE POLICY STATEMENT FOR ENGLANd

13.7.5 The Noise Policy Statement for England (NPSE) was published in March 2010 by the Department for Environment Food and Rural Affairs (DEFRA) and is the overarching statement of noise policy for England.

13.7.6 The Explanatory Note to the NPSE introduces three concepts to the assessment of noise in England:

- NOEL - No Observed Effect Level - This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.
- LOAEL - Lowest Observable Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL - Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.
- None of these three levels are defined numerically in the NPSE and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent a SOAEL for noise is acknowledged and the NPSE asserts that not stating specific SOAEL values provides policy flexibility in the period until further evidence and guidance is published.
- Planning Practice Guidance;
- National Policy Statement for National Networks; and
- Road Investment Strategy: for the 2015/16 - 2019/20 Road Period.

13.7.7 The Department for Transport document Road Investment Strategy: for the 2015/16 - 2019/20 Road Period (RIS) was published in March 2015 and sets out policies relating to the strategic planning and funding of the road network.

13.7.8 The RIS identifies a capacity to improve noise levels through the management and redevelopment of Highways England assets, via low noise road surfacing, noise barriers etc. It is expected that Highways England will deliver mitigation measures to at least 1,150 NIAs, helping to improve the quality of life of around 250,000 people by the end of the first road period.

HIGHWAYS ENGLAND: LICENCE

METHODOLOGY

13.7.9 The assessment of noise and vibration will be undertaken in accordance with the requirements of DMRB HD 213/11 - Revision 1. In this regard, it is proposed that a 'detailed' assessment will be undertaken in accordance with guidance contained with HD 213/11 and also considering the further work identified at PCF Stage 2.

CONSTRUCTION NOISE AND VIBRATION

13.7.10 HD 213/11 states when determining the need for assessment of potential noise and vibration effects during the construction phase that the potential for exceeding the criteria provided in BS 5228[50] should be considered. This will also include the effects of any road closures resulting from construction works.

13.7.11 BS 5228 Part 1 refers to two methods for assessing construction noise based on the level of pre-construction ambient noise at the receptor. Method 1, the ABC method, uses the pre-construction ambient noise level to determine an appropriate threshold value, with a significant effect being indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the pre-determined threshold value. Method 2, the 5 dB(A) change method, indicates a potentially significant effect if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values, which are dependent on the time of day. BS 5228 Part 1 also mentions that potentially significant effects could be indicated if a fixed noise level, which depends on the nature of area in which the works are occurring, is exceeded.

13.7.12 As information on the construction activities and associated plant emerges during PCF Stage 3, consideration will be given as to which BS 5228 Part 1 assessment method outlined is most appropriate to the specific circumstances of the Scheme and this method will then be adopted.

13.7.13 BS 5228 Part 2 provides guidance on identifying the likely significance of construction vibration. **Table 13-4** (Table B.1 from BS 5228 Part 2) includes threshold levels, in terms of Peak Particle Velocity (PPV), which relate sequentially to the likelihood of vibration being imperceptible, perceptible, the cause of complaints and ultimately intolerable.

Table 13-4 - Guidance on effects of vibration levels

VIBRATION LEVEL	EFFECT
0.14 $mm.s^{-1}$	Vibration might be just perceptible in most sensitive situation for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 $mm.s^{-1}$	Vibration might just be perceptible in residential environments.
1.0 $mm.s^{-1}$	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation

VIBRATION LEVEL	EFFECT
	has been given to residents.
> 10 mm.s^{-1}	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

13.7.14 The construction vibration assessment will follow the guidance from BS 5228 Part 2, as presented above. A significant vibration effect may arise at levels above 1 mm/s PPV, depending on the sensitivity of the receptor to vibration.

OPERATIONAL NOISE AND VIBRATION

13.7.15 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.

13.7.16 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 $L_{A10,18h}$ in the Short Term (i.e. on opening).
- A permanent change in daytime road traffic noise of ±3 dB $L_{A10,18h}$ in the Long Term (typically 15 year after project opening).
- A permanent change in night-time road traffic noise of ±3 dB $L_{A10,18h}$ in the Long Term, where the predicted level also exceeds 55 dB $L_{A10,18h}$.
- A rise in vibration levels to above 0.3 mm/s PPV or any increase above an existing level of 0.3 mm/s PPV.

13.7.17 The short term noise level changes will be determined by comparison of the 'do minimum opening year' and the 'do something opening year' scenarios. The long term noise level changes will be determined by comparison of the 'do minimum opening year' and the 'do something design year' scenarios.

13.7.18 The classification of magnitude of noise impacts associated with short and long term changes in noise levels will be determined in accordance with **Table 13-5** below. Both adverse and beneficial changes will be considered in the assessment.

13.7.19 The PCF Stage 2 work concluded that there were potentially significant noise level changes and also potential for significant effects with respect to the first two criteria in the bullet pointed list above. As such, a Detailed assessment will be undertaken at PCF Stage 3.

13.7.20 In addition to the above requirements of the DMRB, Highways England also requires consideration of Significant Observed Adverse Effect Levels (SOAELs). Where a receptor is exposed to SOAEL (please see following section for definition) in the 'do minimum opening year' scenario and experiences an increase in noise levels of ≥1 dB $LA_{10,18h}$ as a result of the Scheme (in the short or long term) a significant effect is deemed to have occurred.

13.7.21 The former Department of Transport/Welsh Office technical memorandum Calculation of Road Traffic Noise (CRTN) methodologies will be adopted.

13.7.22 The Department for Transport document Road Investment Strategy: for the 2015/16 - 2019/20 Road Period (RIS) was published in March 2015 and sets out policies relating to the strategic planning and funding of the road network. The RIS identifies a capacity to improve noise levels through the management and redevelopment of Highways England assets, via low noise road surfacing, noise barriers etc. It is expected that Highways England will deliver mitigation measures to at least 1,150 NIAs, helping to improve the quality of life of around 250,000 people by the end of the first road period.

13.7.23 Noise changes in NIAs will need careful scrutiny given the strategic policy objective to reduce noise levels in NIAs Please see the Baseline Conditions section below for a list of the NIAs that are within the 1 kilometre corridor of the Scheme as defined at PCF Stage 2.

13.7.24 The extended road network in the transport model, particularly to the south of the Scheme in Birtley, will be reflected in the PCF Stage 3 noise assessment work.

13.7.25 In line with the assessment undertaken at PCF Stage 2, the following criteria will be used for the assessment of operational road traffic noise. These criteria are taken from the DMRB.

Table 13-5 - Classification of magnitude of Noise Impacts (DMRB HD 213/11)

Noise Change dB ($LA_{10,18h}$)		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

13.7.26 Changes in noise levels equating to a minor magnitude of effect and above (both beneficial and adverse) will be considered as potentially significant, in line with the DMRB HD 213/11 guidance. Insignificant effects will not been reported, unless they are within a Noise Important Area (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.

13.7.27 As required by the DMRB HD 213/11, changes in night-time 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.

13.7.28 Where the traffic flow falls below 1,000 vehicles in the 18-hour period, the CRTN methodology is not valid. 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.

13.7.29 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.

HUMAN HEALTH

13.7.30 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 as set out in paragraph 13.7.20. 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 night time noise, which is recognised by the WHO as an indicator of impact from night time noise on health.

13.7.31 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.

DATA SOURCES

13.7.32 The following data sources will inform the noise and vibration assessment:

NOISE MODELLING

- Ordnance Survey (OS) MasterMap base mapping layer;
- 3d engineering drawings to the Scheme topography and road alignments;
- LiDAR or OS Terrain 5 to derive a topographical layer for the study area;
- Traffic flow data;
- Construction phase information (e.g. construction plant lists and methodologies);
- Road surface information provided by A-one+; and
- Open Government Licence (DEFRA, 2015) for Noise Important Areas.

13.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

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

13.8.2 The noise modelling incorporates many different data sources, as listed above. The outcome of the modelling is, therefore, reliant on the quality of these data.

13.8.3 Any limitations of these data sources will be reported in the noise and vibration assessment, along with any associated implications.

13.8.4 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.

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 any potentially significant effects. It sets out the proposed methodology for the assessment and identifies those impacts that can be scoped out of the EIA.

14.1.2 This section follows the updated DMRB topic structure contained within IAN 125/15. This combines published guidance in DMRB Volume 11, Section 3, Parts 6 (Land Use), 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and 9 (Vehicle Travellers) into one assessment of People and Communities. This section also incorporates “land”.

14.2 STUDY AREA

EFFECTS ON ALL TRAVELLERS

MOTORISED TRAVELLERS

14.2.1 The study area for both views from the road and driver stress is the extent of the road network within the Scheme Footprint, in compliance with DMRB guidance within Volume 11, Section 3, Part 9.

NON-MOTORISED USERS

14.2.2 The assessment of effects on pedestrians, equestrians and cyclists (Non-Motorised Users (NMUs)) considers the impact of the route options on local journeys made by people on the local Public Rights of Way (PRoW) network.

14.2.3 The study area for the assessment of impact on NMUs includes those PRoW and NMU routes directly affected by the Scheme and any feeder PRoWs between likely destinations, as described in DMRB guidance within Volume 11, Section 3, Part 8. The following have been considered in order to inform the study area:

- Journey lengths, times and local travel plans;
- Amenity; and
- Physical fitness.

EFFECTS ON COMMUNITIES

COMMUNITY SEVERANCE

14.2.4 Community severance is defined as the separation of residents from facilities and services that they use within their community, in this case as a result of the Scheme.

14.2.5 The study area for 'community severance' will include communities that may potentially be directly affected by the Scheme, for example, through severance, as described in DMRB guidance within Volume 11, Section 3, Part 8.

COMMUNITY LAND

14.2.6 Community land is any area of public open space and other facilities such as schools, hospitals, libraries and recreation facilities relied upon for community health and well-being. The study area consists of any community land that is directly affected within the Scheme Footprint, as described in DMRB guidance within Volume 11, Section 3, Part 6.

AGRICULTURAL LAND

14.2.7 The study area consists of any agricultural land that is directly affected within the Scheme Footprint, and the land holdings they fall within, as described in DMRB guidance within Volume 11, Section 3, Part 6.

EFFECTS ON PEOPLE

LOCAL ECONOMY

14.2.8 Publicly available data has been gathered for the local authority, Gateshead, according to the data sets within available Office National Statistics (ONS) data sets. Information will also be drawn from other topic assessments where applicable.

14.3 BASELINE CONDITIONS

EFFECTS ON ALL TRAVELLERS

MOTORISED TRAVELLERS: VIEWS FROM THE ROAD

14.3.1 Views from the road within the study area are categorised according to the categories within DMRB Volume 11, Section 3, Part 9 as outlined in **Table 14-1.**

Table 14-1 - Views from the road within the footprint of the Scheme

APPROXIMATE LOCATION	DESCRIPTION OF VIEW	CATEGORY
Views Heading Southbound		
Grid ref NZ243586 to NZ246585 Western extent of	From the western extent of the Scheme, heading southbound on the A1, there are **no views** to the right (south) due to erected screening lining the carriageway. To the left (north), there are **restricted** views of the Team Valley Estate, with the	No view Restricted View

the Scheme, to the J67 southbound exit	road screened by intermittent vegetation.	
Grid ref NZ246585 to NZ252585 J67 southbound exit to J67 southbound entry	Past the southbound exit at J67, the A1 rises in elevation and views on both sides (north and south) are **open** and extend out over the wider landscape until the J67 southbound entry slip road joins with the A1.	Open views
Grid ref NZ252585 to NZ254585 J67 southbound entry to bridge over the East Coast Mainline	Continuing southbound, the A1 begins to gradually descend in elevation. Views to the left (north) become **restricted** by vegetation screening. Views to the south west remain open over the wider landscape, with some intermittent vegetation screening in the near view.	Restricted view
Grid ref NZ254585 to NZ263576 Bridge over the East Coast Mainline to southbound exit for J66	From the East Coast Mainline, the A1 is bordered to the left (north east) by an embankment and dense vegetation and to the right (south west) by dense vegetation, providing **no view**.	No view
Grid ref NZ263576 to NZ266575 Southbound exit for J66 to J66 overbridge	Past the southbound exit for J66, views remain **restricted** on the left (north east) by dense vegetation. The elevation of the surrounding land to the right (south west) drops to allow more extended **intermittent** views, with some vegetation screening.	Restricted views Intermittent views
Grid ref NZ266575 to NZ270573 J66 overbridge to J66 southbound entry to A1	Vegetation becomes denser on the left (north east) so that there is **no view**. Views on the right (south west) are a mixture of **open** extended views, and **intermittent** with some vegetation screening.	No view Open / Intermittent views
Grid ref NZ270573 to NZ279568 J66 southbound entry to A1 to J65 southbound exit	Views on both sides are restricted by vegetation screening.	Restricted views
Grid ref NZ279568 to NZ283562 J65 southbound exit to merge with A194 (southern extent of the	On the approach to where the A1 crosses under the A1231, the A1 goes into a cutting and views are screened on both sides (**no view**). This continues until the A1 merges with the A194.	No view

Scheme)		
Views Heading Northbound		
Grid ref NZ283563 to NZ278569 Northbound on the A1, from the departure from the A194 (southern extent of the scheme) to northbound entry slip road for J65.	Dense vegetation screening and embankments on either side result in no views.	No view
Grid ref NZ278569 to NZ268574 From the J65 northbound entry slip road to the approach to J66.	Views on both sides are restricted by vegetation screening.	Restricted views
Grid ref NZ268574 to NZ266575 From the approach to J66 to the northern side of J66	Vegetation becomes denser on the right (north east) so that there is no view. Views on the left (south west) are a mixture of open extended views, and intermittent with some vegetation screening, as the topography drops.	No view Open / intermittent views
Grid ref NZ266575 to NZ263576 Northern side of J66 to crest of the hill between J66 and J67.	Past the southbound exit for J66, views are restricted on the on both sides by dense vegetation. At the crest of the hill to the right, the Angel of the North is visible above the tree tops.	Restricted views
Grid ref NZ263576 to NZ254584 North of the crest of the hill between J66 and J67 to the overbridge over the East Coast Mainline	Views either side of the road are blocked by vegetation (no view).	No view
Grid ref NZ254584 to NZ251585 Overbridge over East Coast Mainline to the	Views to the left (south) are **open** over the wider landscape. Views to the right (north) are **intermittent** with some vegetation screening.	Open views Intermittent views

approach to the Team Valley Estate and J67		
Grid ref NZ251585 to NZ243586 From the northbound exit road for J67 to the western extent of the Scheme	Heading towards the western extent of the Scheme, there are **no views** to the left (south) due to erected timber screening lining the carriageway. To the right (north), there are **restricted** views of the Team Valley Estate, with the road screened by intermittent vegetation.	No view Restricted views

MOTORISED TRAVELLERS: DRIVER STRESS

14.3.2 The Newcastle Gateshead Western Bypass (NGWB), running from north to south along the west of Tyne and Wear acts a bottleneck, where substantial congestion is experienced during some periods of the day.

14.3.3 Main routes connecting to the A1 in the vicinity of the Scheme are:

- A194(M);
- A1231 which connects to Sunderland;
- A167 Durham Road;
- B1296 Old Durham Road; and
- Lamesley Road / Chowdene Bank / Kingsway South / Banesley Lane.

14.3.4 Smaller roads link the A1 into Birtley from Newcastle Bank to the south of the A1 and access to the Team Valley Trading Estate is located in the north of the Scheme Footprint.

NON-MOTORISED TRAVELLERS: JOURNEY LENGTH AND AMENITY

14.3.5 The main PRoW and non-designated public routes (i.e. footpaths which are used by the local community but are not formally designated as a Public Right of Way) in the vicinity of the Scheme are shown on **Figures 1.2 Environmental Constraints Plan** and **Figure 14.1** People & Communities in **Appendix B** and are as follows:

14.3.6 Those PRoW that fall within the footprint of the Scheme are as follows:

- Non-designated footways around Lamesley Roundabout;
- Non-designated footway on southern side of Smithy Lane;
- Non-designated footways surrounding the Durham Road / A167 / B1296 junction;
- National Cycle Network: Route 725 uses the A167 and Durham Road, and therefore crosses under the A1 on the Durham Road / A167 / B1296 junction;

- Bridleway Lamesley 72, which crosses underneath the A1. This is also forms part of Regional Cycle Route 11;
- Footpath Lamesley 43, which appears from aerial photography to join with the A1, but there is no safe crossing, and therefore is assumed to end at this location;
- Footpath Birtley 16,which crosses the A1 via a footbridge;
- Non-designated footways on the south of the A1, north of Birtley; and
- Non-designated footway on north bound carriageway of A1231, which crosses the A1 over a road bridge.

EFFECT ON COMMUNITIES

COMMUNITY SEVERANCE

14.3.7 There are a number of communities on either side of the Scheme, accessed by the local road network and PRoW. **Sections 14.3.8 to 14.3.21** describe the local communities within the study area and those community facilities and services which serve the local communities and are likely to be trip generators. Community areas and facilities are shown in **Figure 14.1**, in **Appendix B**.

TEAM VALLEY TRADING ESTATE & RETAIL PARK

14.3.8 This is a large trading estate with many business premises. Within this area are a number of fast food shops, a pharmacy and a convenience store.

14.3.9 It is likely that the majority of customers and employees drive to the trading estate, and access it from the A1 at J67, Coal House roundabout. Local residents are likely to access it via Chowdene Bank from the north or from Lamesley Road from the south. There are pedestrian footways on both of these feeder roads.

LAMESLEY

14.3.10 Lamesley is a small area of housing south of the A1. There are no community facilities within Lamesley, other than a public house.

14.3.11 It is likely that the majority of services required by residents of Lamesley are sought in either Birtley (via Greenford Lane) or Harlow Green (via Smithy Lane).

HARLOW GREEN

14.3.12 Harlow Green is a residential area located east of Durham Road, and north of the A1 J66. There are the following facilities in the locality:

- Two primary schools;
- One children's nursery;
- An academy;

- One doctor's surgery;
- One dentistry practice;
- One pharmacy;
- Two convenience stores; and
- Two pubs.

14.3.13 These services are likely to serve most of the local communities' requirements, and any not catered for by those facilities present are likely to be served by facilities nearer to Gateshead, via Durham Road, or Springwell Village to the east.

CHOWDENE

14.3.14 Chowdene is a residential area located between Durham Road and the Team Valley Trading Estate. It has one secondary school and two primary schools.

14.3.15 It is thought the majority of services will be accessed from facilities within Harlow Green (via local roads) and the Team Valley Trading Estate (via Chowdene Bank or Eastern Avenue, both of which have pedestrian footways).

BIRTLEY

14.3.16 Birtley is a residential area situated south of the A1, either side of Durham Road. It has the following community facilities:

- Six primary schools;
- Four convenience stores;
- Two opticians;
- Two dentistry practices;
- A secondary school;
- Six churches; and
- Numerous pubs and restaurants.

14.3.17 The majority of services can be accessed within Birtley on foot or by vehicle.

CROWTHER

14.3.18 Crowther is a residential area east of Birtley and the A1. Within the area are the following community facilities:

- Four primary schools;
- One secondary school;
- Two churches; and

→ A convenience store.

Further services may be accessed in Washington, to the east via Castle Road, which has a pedestrian footway. It is likely that the majority of journeys outside of Crowther will be made via vehicle.

ARMSTRONG

14.3.19 Armstrong is an area of land between the Washington Highway, the Sunderland Highway and the A194. Within this area there is a primary school and a convenience store. It is likely that the majority of services are sought elsewhere. The nearest communities are Crowther to the south, Washington to the south east and Great Usworth to the north east. It is likely that the majority of journeys outside of Armstrong will be made via vehicle.

LOW EIGHTON

14.3.20 Low Eighton is a small, sparsely populated area north of the A1 and east of J66. There are no community facilities in this area for residents. Services are most likely to be sought from Birtley, Springwell Village or Harlow Green by vehicle via Long Bank or Newcastle Bank.

COMMUNITY LAND

14.3.21 Longacre Wood is classified locally as Policy CFR23 'Public Open Space Protection' and Policy CFR26 'Accessible Natural Greenspace'.

14.3.22 There is a sports field located to the east of Longacre Wood and to the north of the A1, which is listed under Policy CFR17 'Retention of Facilities' of the Local Plan.

14.3.23 There is no land within the search area registered under the Countryside Rights of Way Act 2000 as common land or open access land.

14.3.24 There are no allotments within the search area.

AGRICULTURAL LAND

14.3.25 Agricultural land has been classified by the Ministry for Agriculture, Fisheries and Food (MAFF), now the Department for Environment, Food and Rural Affairs (DEFRA), by grade according to the extent to which chemical and physical characteristics impose long term limitations on agricultural use for food production. In accordance with DMRB guidance, only land potentially falling within Agricultural Land Classification (ALC) grades 1, 2 and 3a, are considered to be Best and Most Versatile (BMV) land. BMV land is best suited to adapting to the changing needs of agriculture and maintaining the competitiveness of UK agriculture against international competitors.

14.3.26 The Agricultural Land Classification for the Scheme is predominantly 'Urban' with an area of undifferentiated Grade 3 land either side of the A1 carriageway from the Birtley junction up to the Lamesley Road / Chowdene Bank / Kingsway South / Banesley Lane / A1 junction. It is proposed as part of the assessment to carry out agricultural land classification to determine whether the land is BMV.

14.3.27 It is anticipated that there will be some temporary and permanent agricultural land required to accommodate the Scheme, particularly in the area of Lamesley Pastures (there is one land parcel in this location that will be directly affected south of the A1 and east of the Lamesley Road). There is also some partial land take of seven land parcels north of the A1, east of J66 required mainly for temporary works. At this stage it is not known how much land is required for permanent works, however, it is thought that this will amount to less than 20ha of land.

EFFECTS ON PEOPLE

14.3.28 The following list of data sources were consulted to inform this Scoping assessment at this stage:

- Local Authority Labour Market Profiles - NOMIS. The profiles bring together data from several sources, such as annual survey data from the ONS;
- Publically available GIS and mapping information; and
- Local authority policies and reports.

LOCAL ECONOMY

14.3.29 According to the Office of National Statistics (ONS) labour market statistics website, known as NOMIS, Gateshead had a resident population of 200,000 in 2013 which has increased by approximately 8,849 since 2001. The latest population projections estimate the population of Gateshead will continue to grow, increasing by approximately 8,000 by 2030. 63.8% of Gateshead's population is aged between 16 and 64, which is on par with the averages across the North East (63.9%) and Great Britain (63.8%)[51].

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

QUALIFICATIONS

Table 14-2 - Comparison of proportion of Adults obtaining recognised Qualifications in Gateshead with England

QUALIFICATION	PERIOD	% WINCHESTER ADULT POPULATION	% ENGLAND ADULT POPULATION
NVQ 4 and above	2016	30.1	38.2
NVQ 3 and above	2016	53.4	56.9
NVQ 2 and above	2016	76.4	74.3

NVQ 1 and above	2016	86.6	85.3

14.3.31 The adult population of Gateshead is observed to hold a lower proportion of professional qualifications than the adult population in England for NVQ 3 and above. However, the proportion of adults in Gateshead with NVQ 1 and 2 and above is higher than the national average.

14.3.32 The data therefore indicates that there is a mixed picture in relation to the qualifications held by the Gateshead workforce compared to the national average.

EARNINGS

14.3.33 Earnings statistics for the Gateshead District provide information on the average weekly wage of the population currently employed (thus providing an indication of the local economy).

Table 14-3 - Comparison of Average Weekly Wage in Gateshead with England

GROSS WEEKLY PAY	PERIOD	AVERAGE WEEKLY WAGE IN GATESHEAD	AVERAGE WEEKLY WAGE ENGLAND
Full-time	2016	£485.5	£541.6
Full-time Male	2016	£499.5	£581.2
Full-time Female	2016	£447.9	£481.1

14.3.34 Average weekly wages in Gateshead are observed to be lower than the England average. Average weekly wages indicate that full-time male workers in Gateshead earning approximately £80 less than the national average. Full-time female workers in Gateshead earn approximately £30 less than the national average.

14.3.35 The data therefore indicates that the local economy in Gateshead is performing poorly compared to the national average.

14.3.36 The Indices of Multiple Deprivation[52] use a combination of information relating to income, employment, education, health, skills and training, barriers to housing and services and crime to create an overall score of deprivation. As a lower score indicates greater deprivation, the most deprived area is indicated by a rank of 1. In 2010, Gateshead District had a rank of 43 out of 326 local authorities in England[52]. According to the NOMIS[53] in October 2013 to September 2014, 75.9% of the population in Gateshead were economically active, which is higher than the regional average at 74.8% in the North East but lower than the national average of 77.3%. Unemployment levels are particularly high within the wards around the north of the Scheme Footprint and gradually increase towards the southern areas of the Scheme Footprint.

EMPLOYMENT

14.3.37 Historically, Gateshead economy was reliant on traditional heavy industries, including shipbuilding and coal mining. Over recent decades, there has been a shift towards service sectors, but industrial areas remain an important contribution to economic diversity. Team Valley Trading Estate lies to the north of the Scheme.

14.3.38 Employment statistics for the Gateshead District provide information on the percentage of the population currently employed (thus providing an indication of the local economy).

Table 14-4 - Comparison of Employment Status in Gateshead with England

EMPLOYMENT STATUS	PERIOD	GATESHEAD DISTRICT	ENGLAND
In Employment	2016	73.1%	74.0%
Employees	2016	65.7%	63.1%
Self Employed	2016	7.3%	10.6%
Unemployed	2016	6.3%	4.8%

14.3.39 The data indicates that in comparison to the national average, a smaller percentage of the population of Gateshead are in employment. Also, a higher percentage of the population of Gateshead is unemployed, compared to the national average. This data further indicates that the local economy in Gateshead is performing poorly compared to the national average.

14.3.40 The Team Valley Trading Estate area is identified as a primary employment site under Saved Policy JE1.5 of the LDP.

HEALTH

14.3.41 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.

GATESHEAD PHE HEALTH PROFILE 2017

14.3.42 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 Gateshead is presented as follows.

POPULATION HEALTH

Table 14-5 - Indicators of Population Health for Gateshead Compared with England

INDICATOR	PERIOD	LOCAL VALUE	ENGLAND VALUE
Obese children (Year 6)	2015/16	23.2	19.8
Excess Weight in Adults	2013-15	69.4	64.8
Life Expectancy at birth – Males	2013-15	77.7	79.5
Life Expectancy at	2013-15	81.4	83.1

birth – Females			
Under 75 Mortality: Cardiovascular	2013-15	93.1	74.6
Under 75 Mortality: Cancer	2013-15	158.7	138.8

14.3.43 The profile indicates that excess weight in children and adults for Gateshead is higher compared to the national average. Life expectancy at birth for both males and females in Gateshead is lower than the national averages. Mortality rates for under 75 year olds (cardiovascular and cancer) are also much higher than the national averages.

14.3.44 The PHE health profile data therefore indicates that the population health for Gateshead is worse than the national average.

HEALTH INEQUALITY

Table 14-6 - Difference in life expectancy between most and least deprived areas 2013-2015

INDICATOR	MALE	FEMALE
Life expectancy gap between most and least deprived areas	9.9 years	8.7 years

14.3.45 The profile indicates that the difference in life expectancy between the most and least deprived areas is high. If there was no inequality in life expectancy, the difference would be zero.

14.3.46 The PHE health profile data therefore indicates that there is health inequality in Gateshead.

DEPRIVATION

Table 14-7 - Indicator of Deprivation for Gateshead Compared with England

INDICATOR	PERIOD	LOCAL VALUE	ENGLAND VALUE
Deprivation (Index of Multiple Deprivation)	2015	25.9	21.8

14.3.47 The profile indicates that deprivation for Gateshead is high compared to the national average.

14.3.48 The PHE health profile data therefore indicates that Gateshead is a more deprived area than the national average.

LIFESTYLE

Table 14-8 - Indicators of Lifestyle for Adults in Gateshead Compared with England

INDICATOR	PERIOD	LOCAL VALUE	ENGLAND VALUE
Smoking prevalence in adults	2016	17.9	15.5
Percentage of physically active adults	2015	46.3	57.0

14.3.49 The profile indicates that smoking prevalence in Gateshead is higher than the national average. The proportion of physically active adults is smaller in Gateshead in comparison to the national average.

14.3.50 The PHE health profile data therefore indicates that the adult population in Gateshead has a less healthy approach to lifestyle behaviour than the national average.

CHILDREN

Table 14-9 - Indicators of Lifestyle for Children in Gateshead Compared with England

INDICATOR	PERIOD	LOCAL VALUE	ENGLAND VALUE
Children in low income families (under 16s)	2014	22.6	20.1
Obese children (Year 6)	2015/16	23.2	19.8
GCSEs achieved	2015/16	56.9	57.8

14.3.51 The proportion of children in low income families in Gateshead is higher than the national average. The incidence of obesity amongst children in Gateshead is also observed to be higher in comparison to the national average. The GCSEs achieved in Gateshead is lower the national average.

14.3.52 The PHE health profile data therefore indicates that the level of health and education of children in Gateshead is worse than the national average.

COLLISIONS RISK

Table 14-10 - Numbers of Fatalities and Injuries on Roads

INDICATOR	PERIOD	LOCAL VALUE	ENGLAND VALUE
Killed and seriously injured on roads	2013-2015	30.3	38.5

14.3.53 The population of Gateshead appears to experience a fewer number of fatalities or instances of being seriously injured on roads than the national average.

14.3.54 The PHE health profile data therefore indicates that roads in Gateshead are safer than the national average.

14.4 POTENTIAL IMPACTS

EFFECTS ON TRAVELLERS

MOTORISED USERS

14.4.1 There may be some temporary disruption to MTs on the A1 and the surrounding local road network during construction, due to traffic management and construction works. This is likely to cause a temporary increase in driver stress.

14.4.2 Views from the road are anticipated to be mostly unchanged in the long term. In the short term, vegetation screening may be reduced until mitigation planting

reaches maturity. This may extend the views in some locations, but may result in a less pleasant road user experience in some locations.

14.4.3 It is likely therefore that there will be direct adverse (temporary, during construction) and beneficial (permanent, during operation) impact on population and health through changes in driver stress.

NON-MOTORISED USERS

14.4.4 During construction there may be temporary diversions or closures required for PRoW affected by the Scheme, e.g. the footbridge over the A1, Lamesley Bridleway 72 and access to footways in the vicinity of junctions 65 and 66. This may result in increases in journey length. There will not be any diversions required during operation.

14.4.5 There may be some temporary reduced amenity for NMUs when using PRoWs and non-designated footpaths in the vicinity of construction works.

EFFECTS ON COMMUNITIES

COMMUNITY SEVERANCE

14.4.6 There may be some temporary disruption to local MTs and NMUs accessing local community facilities during construction as traffic management measures are implemented and PRoWs are diverted.

PRIVATE ASSETS AND DEMOLITION OF PRIVATE PROPERTY

14.4.7 It is anticipated that approximately 16 private land parcels will be directly affected by the Scheme, and eight of which are agricultural. There will be some temporary land loss during the construction period. There will also be some permanent land loss on a number of these parcels for permanent works. during operation. The extent of land required temporarily and permanently will be determined within the assessment.

It is not anticipated at this stage that there will be any demolition of privately owned assets. Any agricultural land that may be impacted will be dealt with separately under Agricultural Land.

COMMUNITY LAND

14.4.8 There is an area of woodland north of Smithy Lane owned by Gateshead Council, known as Longacre Wood, which is listed under their countryside sites and country parks, and falls under Policy ENV51 as Wildlife Corridor in the Gateshead Local Plan. Parts to the south of Smithy Lane are also listed under Policy CFR26 Accessible Green Space and to the north east under Policy CFR23 as Open Space. These areas fall within the Scheme Footprint and therefore there is potential for impacts on this land. There are no other community land resources within the footprint of the Scheme.

AGRICULTURAL LAND

14.4.9 It is likely that there will be some permanent (during construction and operation) and temporary (during construction) land take of agricultural land. The majority of agricultural land take is from one land parcel in the area known as the Lamesley Pastures, in addition to partial land take of seven land parcels north of the A1, east of J66. Although it is not clear the exact quantity required at this stage, it is not anticipated to be more than 20ha. It will be determined for the assessment whether the land to be affected will be BMV land or not.

EFFECTS ON PEOPLE

ECONOMY

14.4.10 There is potential for a beneficial impact during construction on the local economy as expenditure within the local supply chain is likely to increase during the construction works.

14.4.11 There is potential that traffic management measures during the construction works could cause disruption to commuters and business travel on the local road network. During operation, reduced delays on the road network have the potential to provide beneficial impacts to the local economy with improved commuter and delivery journey times.

14.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

EFFECTS ON ALL TRAVELLERS

MOTORISED TRAVELLERS

14.5.1 The Scheme would aim to improve the experience of MTs using the route and connecting roads. The following mitigation and enhancement measures would contribute to an improved experience for MTs:

14.5.2 Where overriding landscape or design constraints do not restrict this, the view from the road for MTs should not be further obstructed by new structure(s) (for example roadside screening), and open views of the surrounding countryside should be retained.

14.5.3 Signage and layout would be clear to understand and avoid creating route uncertainty. Any diversions or closures undertaken during construction would be clearly advertised, and any diversionary routes would be clearly signposted and not lead to uncertainty. Details of and traffic management measures would be listed within a Traffic Management Plan (TMP).

NON-MOTORISED USERS

14.5.4 The Scheme would aim to accommodate NMUs, and either retain or improve the existing access arrangements. For example, the existing footpaths should be retained and where crossed by the route, provided with proper means of access to prevent severance (for example the footbridge from Birtley). Any temporary diversionary works or closure of NMU routes (for example for the footbridge over the A1, Lamesley Bridleway 72 and access to footways in the vicinity of junctions 65 and 66) would be undertaken following proper consultation with affected groups or individuals, and the required consent obtained.

14.5.5 Use of best practice design with regards to the safety of NMUs, including lighting, will improve the amenity of users of the footpaths in the surrounding areas. Additionally, landscaping that can provide screening of the road where possible and reduce noise level for the wider network of PRoW will also improve amenity for users.

EFFECTS ON COMMUNITIES

COMMUNITY SEVERANCE

14.5.6 Existing footpaths and NMU routes should be retained, and where crossed by the route, provided with proper means of access to prevent severance.

14.5.7 Existing roads should be incorporated into the Scheme, allowing for crossing points within the design.

PRIVATE ASSETS AND DEMOLITION OF PRIVATE PROPERTY

14.5.8 Landscape planting would be incorporated into the design as much as practicable to reduce the visual and noise impacts on residential properties in the vicinity of the Scheme. More detail on landscape mitigation is provided in Section 8.

14.5.9 Landowners should be compensated for any land lost to the Scheme, whether temporarily or permanently.

14.5.10 Land required for temporary works only should be reinstated to its former use following the completion of construction.

COMMUNITY LAND

14.5.11 Should land identified as Public Open Space (at Longacre Wood) be required permanently, compensatory land is likely to be required. Land use will need to be returned to original use and condition where temporary land take is required.

AGRICULTURAL LAND

14.5.12 Although agricultural land required within the footprint of the route will be lost permanently, the following measures would 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 would be minimised through careful siting of construction compounds and lay down areas, and careful planning of construction activities through consultation with landowners;
- Crop loss would be reduced by giving advanced warning to enable farmers to plan ahead;
- Consideration of field drainage impacts during the detailed 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

LOCAL ECONOMY

14.5.13 Measures would be put in place, where possible, to maximise the potential for the workforce and project supply chain, to be sourced locally.

14.5.14 Effective traffic management would be put in place through a Traffic Management Plan (TMP) during construction works to minimise disruption to road network users.

MONITORING

14.5.15 It is not anticipated that any specific monitoring would be carried out. Monitoring in relation to air quality, landscape and noise and vibration are detailed in **Sections 7, 9 and 13** respectively.

14.6 RESIDUAL EFFECTS

14.6.1 It is anticipated that there will be no permanent significant effects on motorised or non-motorised travellers during operation of the Scheme.

14.6.2 It is anticipated that there will not be any new severance during operation.

14.6.3 There is likely to be permanent (during construction and operation) and temporary (during construction) land take of Public Open Space at Longacre Wood, but this is not likely to be significant.

14.6.4 Although there is likely to be some private land take required for temporary (during construction) and permanent works (during construction and operation), it is not anticipated that there will be significant effects.

14.6.5 There may be some significant effects on agricultural land owners depending on the extent and type of temporary and permanent works required on agricultural land.

14.6.6 It is not expected that there will be any significant effects on the local economy during operation.

14.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

14.7.1 The following elements of DMRB Volume 11, Section 3, Parts 6 (Land Use) (except for Water Restoration Projects as described below), 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and 9 (Vehicle Travellers) guidance have been **scoped in**:

- Motorised travellers (MTs);
- Assessment of Non-Motorised Users (NMUs) during construction;
- Assessment of community severance during construction;
- Community land;
- Private Land;
- Agricultural land; and
- The assessment will also consider any impacts that the Scheme may have on people including local economy and employment.

14.7.2 The following elements have been scoped out:

- The assessment of NMUs during operation as there are not anticipated to be significance effects and there is potential betterment through Scheme improvements.
- Community severance during operation as there is not anticipated to be any new severance as a result of the operation of the new road.
- Demolition of private property as it is not anticipated that there will be any impacts to these assets as a result of the Scheme.
- Tourism and recreation as there are not anticipated to be significant effects on the existing tourism and recreational assets. View from the Angel of the North will be covered in the landscape assessment.
- Housing – any impacts on residents will be covered under the Air Quality assessment (Chapter 7) and Noise Assessment (Chapter 13).
- Development land – no development land will be affected by the Scheme.
- The existing A1 route crosses the River Team at J67 and there are no plans for restoration of this watercourse. It is proposed that this element (Waterway Restoration Projects, under Volume 11, Section 3, Part 6 of DMRB guidance) is scoped out of the assessment of the Scheme. Impacts on groundwater and flood risk will be assessed in the Road Drainage and the Water Environment assessment.

METHODOLOGY

POLICY AND PLANS

14.7.3 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 and will consist of the following aspects as set out in IAN 125/15:

- 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.

14.7.4 The following national policy and legislation will be adhered to when carrying out the assessment:

- National Policy Statement for National Networks (NPSNN);
- National Planning Policy Framework;
- Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations); and
- The Countryside and Rights of Way Act 2000 (CROW ACT).

14.7.5 In addition to the above, Gateshead Council Local Plan[54] will be consulted.

EFFECTS ON ALL TRAVELLERS

14.7.6 A simple level of assessment for People and Communities will be undertaken, as prescribed for Stage 3 assessments within each of the DMRB Volume 11 Chapters 8 and 9, as is considered it is unlikely the Scheme will result in significant effects on travellers.

EFFECTS ON COMMUNITIES

14.7.7 A simple level of assessment for People and Communities will be undertaken, as prescribed for Stage 3 assessments within each of the DMRB Volume 11 Chapter 6, as is considered it is unlikely the Scheme will result in significant effects on communities.

14.7.8 An assessment of potential effects on private land will be carried out in accordance with DMRB Volume 11 Chapter 6.

14.7.9 In accordance with DRMB guidance, if the quantity of BMV agricultural land lost as a result of the Scheme exceeds 20ha, a detailed Agricultural Impact Assessment may be required, including consultation with DEFRA. The agricultural land take within the Scheme Footprint is not likely to exceed 20ha of BMV land, and therefore a significant effect is not anticipated. For this reason a simple assessment is proposed at this time for agricultural land.

EFFECTS ON PEOPLE AND HEALTH

14.7.10 There is currently no formal methodology for the assessment of impacts on people and populations in EIA.

14.7.11 The assessment of likely significant effects on human health in relation to People and Communities covers aspects such as journey times and pleasantness for both motorised and non-motorised users, amenity, fitness, community severance and access to facilities, including agricultural land. 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.

14.7.12 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.

EFFECTS ON ALL TRAVELLERS

MOTORISED TRAVELLERS: VIEWS FROM THE ROAD

14.7.13 The DMRB Volume 11, Section 3, Part 9 describes 'Views from the Road' as "…*the extent to which travellers, including drivers are exposed to the different types of scenery through which a route passes*." Aspects to be considered are:

- The types of scenery or the landscape character as described and assessed for the baseline studies;
- The extent to which travellers may be able to view the scene;
- The quality of the landscape as assessed for the baseline studies; and
- Features of particular interest or prominence in the view.

14.7.14 Views from the road will be categorised by the criteria defined in DMRB Volume 11, Section 3 Part 9. The magnitude of impact on views from the road will be assessed using the criteria in **Table 14-11.**

Table 14-11 - DMRB Impact Criteria for Views from the Road

MAGNITUDE OF IMPACT	BENEFICIAL	ADVERSE
No Change	Views remain the same	
Minor	No view – restricted	Restricted – no view
	Restricted - Intermittent	Intermittent – Restricted
	Intermittent – Open	Open – Intermittent
Moderate	No View – Intermittent	Intermittent – No View
	Restricted - Open	Open - Restricted
Major	No View – Open	Open – No View

MOTORISED TRAVELLERS: DRIVER STRESS

14.7.15 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 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.

14.7.16 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.

14.7.17 The measurable aspect of driver stress is associated with frustration due to delays. The level of Driver Stress will be determined in accordance with a simple assessment and therefore a qualitative assessment of the factors listed in **Section 14.7.16**, under a three point descriptive scale, as recommended under DMRB guidance, as Low, Moderate or High.

NON-MOTORISED USERS

14.7.18 The methodology will be based on the procedures set out in the DMRB Volume 11, Section 3, Part 8 and 9 and the application of DMRB Volume 5, Section 2, Part 5, HD42/05, and has considered:

- 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.

14.7.19 The assessment will involve a desk study to identify likely NMU activity during construction, as well as how local community facilities are likely to be affected by the proposed options and the potential adverse and beneficial effects.

14.7.20 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.

EFFECTS ON COMMUNITIES

14.7.21 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.

14.7.22 A simple assessment for the assessment of impacts on agricultural land is proposed at this time.

EFFECTS ON PEOPLE

LOCAL ECONOMY

14.7.23 A qualitative high level desk based assessment will be carried out for the local economy using publicly available data. There is no formal guidance on the assessment of the local economy and this will be based on professional judgement and best practice.

HEALTH

14.7.24 The assessment of likely significant effects on human health in relation to People and Communities covers aspects such as journey times and pleasantness for both motorised and non-motorised users, amenity, fitness, community severance and access to facilities, including agricultural land. 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.

14.7.25 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 assessment of the NMU route amenity relies on qualitative descriptions by the assessor which is subjective. There is also a degree of subjectivity in the assessment of views. Where subjective assessments are presented, attempts to reconcile against evidence will be made throughout.

14.8.2 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.

14.8.3 The assessment will rely, in part, on data provided by third parties (e.g. local authorities, Natural England) 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 Any limitations found or assumptions used in the final assessment will be highlighted within the EIA.

14.8.5 The assessment to date has been compiled from desk based study only, using publicly available data. 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.

14.8.6 Vulnerable groups have been assumed to be present throughout the study area.

15 ROAD DRAINAGE AND THE WATER ENVIRONMENT

15.1 INTRODUCTION

15.1.1 This section outlines the scope of the assessment required for the PCF Stage 3 detailed assessment and the potential effects of the Scheme on water and drainage. The guidance contained in the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 10 (HD45/09)[55] has been followed for this assessment.

15.1.2 This section has been informed by the simple assessment carried out at PCF Stage 2 and additional data that has become available for the Scheme since completion of that assessment.

15.1.3 This section outlines the assessment methodology, assumptions and limitations, and the baseline information. Potential impacts of the Scheme have been identified including a brief summary of the mitigation which could be applied at PCF Stage 3.

15.2 STUDY AREA

15.2.1 The overall study area for this assessment comprises the extent of works (i.e. the redline boundary) plus a 1km buffer area as in accordance with HD45/09[59]. The highway surface water drainage network which receives the runoff from the Scheme will also be considered together with the River Team and the ordinary watercourse in the Longacre Dene.

15.2.2 The mechanisms for assessing the impacts on the receiving waterbodies as a result of the Scheme differ for each of the assessed elements (surface water quality and flood risk). This has resulted in the same study area adopted for the assessment but with a different focus area for each assessment element. The focus of the study area for each assessment method is detailed below.

WATER QUALITY

15.2.3 The Water Quality study area considered for this assessment is the permeable and impermeable areas of the Scheme draining into the highway drainage, and the River Team and ordinary watercourse in the Longacre Dene. Drainage investigations are presently being undertaken which may show that highway runoff from the Scheme does not discharge to the watercourse in the Longacre Dene. If this is the case, this watercourse will not be included in the study area.

FLOOD RISK

15.2.4 The flood risk study area covers the Scheme area and the watercourses (fluvial flood risk) along with the land immediately adjacent to the Scheme which could convey surface water flows (pluvial flood risk) onto the Scheme.

15.3 BASELINE CONDITIONS

RECEPTORS

15.3.1 The following receptors have been identified and outlined based on a desk study carried out in 2017 and using information from the following data sources:

- Review of the Environment Agency Flood Maps and associated information;
- Review of the Environment Agency water quality data; and
- Review of Highways Agency Drainage Data Management System (HADDMS).

15.3.2 Receptors previously scoped out (see **Paragraph 15.7.2**) are not included below.

15.3.3 **Figure 1.2** – Environmental Constraints Plan in **Appendix B** presents main rivers and flood zones in close proximity to the Scheme.

WATER QUALITY

15.3.4 The current Northumbria River Basin Management Plan (RBMP), as shown by the Environment Agency's Catchment Data Explorer, shows that the River Team is a 'heavily modified waterbody'. The Northumbria RBMP classified the current Ecological and Chemical Quality of the River Team as Moderate and Fail, respectively. The overall waterbody status is classified as Moderate with an objective for Good by 2027.

15.3.5 The other watercourses within the study area, including the ordinary watercourse in the Longacre Dene, have not been assessed as part of the Northumbria RBMP. Given that most of the watercourses within the Scheme Extents discharge into the River Team, the water quality of the ordinary watercourse in the Longacre Dene is assumed to be similar to the River Team.

15.3.6 The Highways Agency Drainage Data Management System does not show any outfalls draining the Scheme Footprint which is believed to be due to an absence of data rather than an absence of outfalls. Based on OS contours and the direction of flow through drainage assets (shown on HADDMS), two locations were identified at PCF Stage 2 where it is possible surface water discharges from the Scheme:

- Junction 67 and the stretch of the A1 between Junction 66 and 67 are believed to drain west to the Coal House Junction (Junction 67). Based on the topography and the flow direction of assets shown on HADDMS, it is likely that surface water from the road discharges at Junction 67 into the River

Team. Based on the level topography in this area, an outfall may also exist in proximity to the railway culvert into the small watercourse/drain shown on OS mapping. This drain ultimately discharges into the River Team. With respect to water quality, given the moderate WFD status of the River Team, it has been classified as of Medium importance.

- From the east of the Scheme up to Junction 66, the topography suggests that the road drains west to Junction 66. OS mapping indicates the presence of an outfall to the south of Junction 66 into an ordinary watercourse/drain in Longacre Dene (designated as Ancient Woodland). This could not be identified during the site visit at PCF Stage 2 but its presence cannot be ruled out. The ultimate discharge of this watercourse would be the River Team. Given the designation of Longacre Dene, this watercourse has been classified as of High importance with respect to water quality.

15.3.7 Longacre Dene, to the south of Junction 66, falls under the Ancient Woodland Inventory and the Priority Habitats Inventory, and is therefore considered as a sensitive receptor. OS mapping indicates the presence of an outfall into Longacre Dene where a small ordinary watercourse is shown. It is not clear from the mapping whether this outfall serves drainage from the road, or if it relates to the outlet of a culvert or sewer. Highways Agency Drainage Data Management System (HADDMS) shows Eighton Lodge Culvert in this location with an outlet into the Longacre Dene watercourse. An outfall could not be identified during the site visit at PCF Stage 2 but its presence has not been ruled out.

15.3.8 It is also possible that the entirety of the Scheme drains west to the River Team.

15.3.9 A small drain/watercourse passes under the Allerdene Bridge. This watercourse is considered as a receptor as it is possible that road runoff discharges here, however this drain discharges into the River Team (the ultimate receptor).The Scheme proposes to extend this culvert and realign the downstream channel. With respect to flood risk, this watercourse has been classified as of High importance as this watercourse may pass through residential areas upstream. With respect to water quality, the watercourse has been classified as of Medium importance.

FLUVIAL FLOOD RISK

15.3.10 The River Team (classified as a Main River and under the jurisdiction of the Environment Agency) is culverted under Junction 67 (Coal House). The River Team flows from south to north and joins the Tyne Estuary approximately 4.5km downstream of Junction 67. The Scheme crosses over the fluvial floodplain of the River Team, land designated as both Flood Zone 2 and 3.There are no designations relating to the River Team in the vicinity of the study area. The floodplain of the River Team has been classified as of High importance with respect to human safety.

PLUVIAL FLOOD RISK

15.3.11 The following areas have been identified as being at medium to high risk of pluvial flooding:

- Pluvial flooding is predicted along the highway at Junction 67 in the 1 in 30 year event with depths below 300mm predicted for the southbound slip road, and depths between 300 and 900mm on the northbound slip road.
- The western part of the Junction 67 roundabout is shown to be at risk of surface water flooding to depths of 300 to 900mm in the 1 in 100 year event.
- Pluvial flooding is also predicted at depths below 300mm in the 1 in 30 year event on Allerdene Bridge (between Junction 67 and 66).
- An area at high risk of surface water ponding is also predicted on one of the slip roads at Junction 65, with depths up to 900mm predicted by the Environment Agency's Risk of Flooding from Surface Water Map.

15.3.12 The safety of human motorists with respect to the pluvial flooding and changes to surface water runoff has been classified as of High importance. The sensitivity of the pluvial floodplain has been assessed to be low.

15.3.13 There are no other known standing-water features (ponds, pools, reservoirs, lakes) within the Scheme Footprint or study area that may constitute potential receptors, which have not previously been scoped out.

15.3.14 The sensitivity of the receptors identified above has been assessed based on the criteria and typical examples as outlined in Table A4.3 of HD 45/09 as follows:

Table 15-1 - Sensitivity of the baseline receptors

WATER QUALITY	RECEPTOR	SENSITIVITY
Water Quality	River Team – Water quality	Medium
	Ordinary watercourse in the Longacre Dene – Water quality	High
	Watercourse in Allerdene culvert – Water Quality	Medium
Flood Risk	River Team – Fluvial floodplain	Medium
	River Team - Human safety	High
	Watercourse in Allerdene culvert - Floodplain	High
	Allerdene culvert – Human safety	High
	Pluvial Floodplain	Low
	Pluvial flood risk -- Human Safety	High
	Surface water runoff - Human safety	High

15.4 POTENTIAL IMPACTS

CONSTRUCTION

15.4.1 The potential effects of construction on road drainage and the water environment could include the following:

- Impacts on water quality of receiving water bodies, from mobilised suspended solids or spillage of fuels, lubricants, hydraulics fluids and cements from construction;
- Increased runoff into surface water drainage systems, with potential impacts on flood risk;
- Interception of overland flood flow routes, which could cause localised flooding of low lying road segments;
- The Scheme could affect the existing fluvial flood risk at the site as a result of construction works in proximity to the River Team; and
- Possible impacts on the water quality of the drain/ditch under the Allerdene Bridge due to construction works associated with the extension of the culvert and realignment of the ditch.

OPERATION

15.4.2 The potential effects of the operation phase on road drainage and the water environment could include the following:

- An increased chance of diffuse pollution if the Scheme discharges to the Longacre Dene, should suitable mitigation measures not be incorporated. Diffuse pollution can damage and contaminate existing ecosystems;
- The Scheme will result in an overall increase in impermeable area thereby increasing the surface water runoff from the Scheme Footprint, should attenuation measures not be incorporated within the design;
- As a result of the change in impermeable area, pollution may occur during flood events if pollution interceptor devices are overwhelmed;
- Potential risk to the safety of motorists associated with discrete areas at high risk of pluvial flooding at Junction 67, between Allerdene Bridge and Smithy Lane and at Junction 65;
- Potential increased risk of fluvial flooding from the River Team due to the widening of the carriageway at Junction 67, if suitable mitigation is not incorporated into the design; and
- Potential impacts on the flood risk and WFD status of the drain/ditch under the Allerdene Bridge due to the extension of the culvert and realignment of the ditch.

15.5 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

CONSTRUCTION

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

OPERATION

15.5.2 The following design, mitigation and enhancement measures will need to be developed during PCF Stage 3:

- Mitigation measures may be needed to reduce the impacts of sediment-bound pollutants. The need for which will be determined upon the completion of investigations into the location of outfall to the River Team.
- Mitigation measures may be required to prevent impacts on the watercourse at Longacre Dean should the Scheme discharge to it.
- Floodplain compensation may be required at the Allerdene Culvert and the River Team culverts at Junction 67 if hydraulic modelling demonstrates a detrimental impact on flood levels. This could include alterations to the weir or culvert opening and/or changes to the highway embankment. Alternatively Highways England could look to partner with other flood risk management authorities to join the delivery of a wider strategic flood alleviation schemes are proposed by the local in the vicinity of Junction 67.
- With respect to pluvial flood risk, measures will be incorporated into the design to ensure the risks to users can be appropriately managed. Mitigation measures which could be incorporated within the design are oversized flow conveyance channels or suitable grading of the highway to ensure this water is contained to suitable running lanes for the return period. Alternatively, if the Scheme will involve active management or similar CCTV observation measures, it may be possible to reduce the risk to users through appropriate management measures that involve lane closures.
- A Flood Risk Assessment and surface water drainage strategy will be undertaken to ensure that water can be stored appropriately/ leave the highway to prevent ponding and the risk to the safety of motorists.
- With respect to the pluvial flood risk on the Allerdene Bridge, in the current design, it is proposed that the Allerdene Bridge is reconstructed south of its current location. Therefore the road could be re-profiled/changes to the drainage regime included as part of the design in such a way as to reduce the risk of surface water flooding through the replacement of the structure.
- A surface water drainage strategy will be developed for the Scheme as part of the PCF Stage 3 works. Consultation with Gateshead Council as LLFA will be undertaken. Surface water attenuation (i.e. attenuation ponds) will be required

to be designed up to the 1 in 100 year plus 20% climate change event to account for restricting the flows associated with the increase in impermeable area to greenfield runoff rates. A sensitivity test will be undertaken for the 1 in 100 plus 40% climate change.

MONITORING

15.5.3 The monitoring parameters and programme shall be developed in PCF Stage 3 through the completion of the ES and Outline Environmental Management Plan (EMP).

15.6 RESIDUAL EFFECTS

CONSTRUCTION

15.6.1 The scale of construction works around the River Team and the Allerdene Bridge is expected to be large. With the inclusion of the proposed mitigation measures, there is the potential for adverse impacts of slight significance with respect to the impacts of construction upon the water quality of the River Team. All other residual construction impacts are considered to be neutral.

OPERATION

15.6.2 There is a residual risk that sufficient maintenance is not undertaken on the fluvial and drainage aspects of the Scheme. This could result in blockage and associated flooding or water quality impacts.

15.6.3 With respect to pluvial flooding, there could be a significant impact on human safety associated with surface water flooding. Mitigation will be developed during PCF Stage 3 through the Flood Risk Assessment and Surface Water Drainage Strategy.

15.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

15.7.1 The following receptors/topics have been **scoped in**:

- The impacts of the Scheme on the water quality of the receiving watercourses will be assessed for both construction and operation for both the River Team and the ordinary watercourse in the Longacre Dene. The ordinary watercourse in the Longacre Dene is currently scoped in however, as HADDMS does not include details of any hydraulic connectivity, it is likely that this will be scoped out following completion of the CCTV survey;
- The impact of the construction stage on flood risk will be assessed;
- The impacts of the operation of the Scheme on fluvial flood risk from the River Team will be assessed;

- The flood risk and water quality impacts associated with modifications to the Allerdene culvert and realignment of the associated drainage ditch will be assessed;
- The risk of pluvial flooding will be reassessed at PCF Stage 3 based on the latest design, including an assessment of the risks to human safety; and
- The risk of changes to surface water runoff will be assessed at PCF Stage 3 based on the latest design, including an assessment of the risks to human safety.
- The impact of the construction stage on groundwaters in relation to the deep excavations required for bridge pier extension at the River Team crossing.

15.7.2 The scoping guidance in paragraph 6.8 of HD45/09 have been considered, this confirms that a degree of assessment is required for the water aspects of the scheme, as it will affect existing watercourses and it is located within an indicative flood plain amongst others. However, following works completed to date it has been possible for the following receptors/topics to be **scoped out** from further assessment:

- The following receptors were scoped out at PCF Stage 1 due to no hydraulic connectivity - Bowes Lake, Lookout Lake and other ponds located to the north of Junction 65, Foxpond Fishery located to the east of Junction 65 and the group of ponds to the west of the River Team.
- Several receptors were scoped out from further assessment at PCF Stage 2, when further investigation confirmed no hydraulic connectivity. This includes Norwood Nature Park Local Nature Reserve, The Northumbria Coast SPA and SAC and the culverted drains/watercourses between Junction 66 and 67, and to the north of Junction 67.
- A culvert 500m southeast of Junction 66 and Bassett's Pond, (a Secondary River) culverted beneath the A1 to the north of Junction 65, have been scoped out due to no outfalls shown on HADDMS and.no hydraulic connectivity.
- No assessment of the impact of routine runoff on groundwater, in accordance with Method C of the DMRB guidance[55], was required as no discharges to ground are currently in place or are proposed. This was scoped out at PCF Stage 1.
- Groundwater flood risk was scoped out from further assessment at PCF Stage 2 as the risk of groundwater flooding to the Scheme was assessed to be low.
- Reservoir flood risk was scoped out from further assessment at PCF Stage 2 as the risk of the Scheme flooding due to reservoir failure was assessed to be negligible.
- There are no licensed groundwater or surface water abstractions within the study area and, as such, these have been scoped out from further assessment.

POLICY AND PLANS

15.7.3 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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

15.7.4 The methodology at PCF Stage 3 will follow the guidance defined in DMRB, Volume 11, Section 3, Part 10 (H45/09)[59] and will involve a desk based review of existing information and assessment of the Scheme effects in relation to flood risk and water quality. The proposed level and scope of the assessment is Detailed.

15.7.5 The baseline review of data will involve:

- Review of the Environment Agency Flood Maps and associated information;
- Review of the Environment Agency water quality data; and
- Review of existing drainage data on the HADDMS.

15.7.6 The following assessment methodology will be undertaken for the construction and operation phases:

CONSTRUCTION

ASSESSMENT OF THE SCHEME EFFECTS ON FLOOD RISK

15.7.7 Changes in flood risk during the construction phase will be assessed qualitatively (and in the case of the River Team, quantitatively) 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. Where hydraulic modelling is required this will be undertaken in accordance with Methods E and F of HD45/09.

ASSESSMENT OF THE SCHEME EFFECTS ON WATER QUALITY

15.7.8 Changes in water quality will be assessed qualitatively for the construction phase using professional judgement. The assessment will be based on an evaluation of the activities which could reduce water quality and the anticipated temporary drainage solution and CEMP which will be implemented as part of the Scheme. The assessment will be completed in line with the Environmental Permitting (England and Wales) Regulations and Water Environment (Water Framework Directive) Regulations.

OPERATION

ASSESSMENT OF THE SCHEME EFFECTS ON FLOOD RISK

RIVER TEAM

15.7.9 Hydraulic modelling (detailed in methods E and F of HD45/09) was undertaken at PCF Stage 2 with respect to fluvial flooding of the River Team at Junction 67 using the Environment Agency's InfoWorks ICM model. This modelling assumed a conservative worst case scenario, including a lengthening of the southern culvert and a widening of the overpass bridge structure.

15.7.10 The latest Scheme design proposes to avoid changes to the culverts at Junction 67. Widening of the main carriageway is still proposed, however this will be within the existing highway land. It is expected that this will be elevated above the flood level; this will be confirmed against the Environment Agency's modelled flood levels. No further assessment will be required if this is the case. Should a potential impact be predicted at PCF Stage 3, the Environment Agency's hydraulic model would be used (in accordance with methods E and F of HD45/09) to assess the baseline and proposed scenario for the 1 in 100 year plus 20% climate change event. A sensitivity test will be undertaken for the 1 in 100 year plus 50% climate change event.

15.7.11 Initially a screening WFD assessment would be undertaken for the proposed works to the River Team culvert to identify how adverse impacts to the River Team can be avoided and any enhancement measures that can be implemented.

WATERCOURSE ASSOCIATED WITH THE ALLERDENE CULVERT

15.7.12 The latest Scheme design proposes lengthening of the Allerdene culvert between Junctions 67 and 66 and associated realignment of the drainage ditch that feeds into the River Team. The PCF Stage 3 assessment will seek to confirm the source of this watercourse in consultation with Northumbrian Water and the LLFA. Flood risk implications will be discussed with the LLFA and the Environment Agency.

15.7.13 Further assessment of flood risk at the Allerdene culvert will need to be undertaken to support the production of the Flood Risk Assessment (FRA); this will involve the construction of a new hydraulic model (in accordance with methods E and F of HD45/09). A WFD assessment should be undertaken to confirm that there will be no adverse impact to the quality or flood risk of the watercourse as a result of the changes to the culvert and the possible realignment of the channel.

PLUVIAL FLOOD RISK

15.7.14 With respect to surface water flood risk, the PCF Stage 2 assessment identified areas at risk of surface water flooding as outlined in the baseline section.

15.7.15 The areas of high and medium risk could represent a health and safety risk for motorists if this is not mitigated at PCF Stage 3.

15.7.16 As part of the PCF Stage 3 works, it is proposed that the risk of surface water flooding is re-assessed against the latest Scheme design. Localised hydraulic modelling (in broad compliance with methods E and F of HD45/09, as these do not cover pluvial flooding, which has significantly evolved since the publication of this document) will be undertaken to refine the flow paths and flooding mechanisms to provide a better understanding of the risks. The will accompany the Flood Risk Assessment.

SURFACE WATER RUNOFF

15.7.17 The increase in impermeable surfaces as a result of the Scheme along with the likely increase in rainfall as a result of climate change over the lifetime of the Scheme would increase flood risk if not mitigated. Therefore a surface water drainage strategy will be developed during PCF Stage 3.

15.7.18 The increase in impermeable area may result in an increase in localised flooding in addition to a potential threat of pollution if pollution control devices are bypassed during high intensity rainfall events. Therefore, a Flood Risk Assessment and surface water drainage strategy will be undertaken during PCF Stage 3.

ASSESSMENT OF THE SCHEME EFFECTS ON WATER QUALITY

15.7.19 The potential impacts of the operation phase on water quality will be assessed quantitatively following the guidelines (Methods A and D) within the DMRB, Volume 11, Section 3, Part 10 (H45/09)[59] .

15.7.20 Information relating to outfalls and the exact discharge locations and receptors will be confirmed, through site investigations and through consultation with Northumbrian Water and the LLFA. These will also aim to determine if there any pollution control or spillage containment devices within the existing drainage network will need to be completed at PCF Stage 3. This will enable refinement of the assumptions made at PCF Stage 2 in Method A, as outlined below.

15.7.21 With respect to the potential impact of the Scheme on water quality due to routine runoff, a Method A assessment was undertaken at PCF Stage 2. This showed that the River Team passes with respect to soluble and sediment bound pollutants. However, as outfall locations are unconfirmed and, due to possible presence of a structure downstream of the outfall location, the Method A and D assessments will need to be completed again at PCF Stage 3, once further drainage information is available. It is considered unlikely that the River Team will fail the Method A assessment however, should this be the case, further assessment may be required (to be undertaken in line with Method B of the DMRB HD45/09).

15.7.22 At PCF Stage 2, the ordinary watercourse in the Longacre Dene failed the Method A assessment with respect to soluble and sediment bound pollutants in addition to long term impacts. Drainage investigations to be undertaken at Stage 3 may show that the road does not discharge at this location. However, if the road does discharge here, at PCF Stage 3 Method A will need to be repeated and mitigation measures identified. Further assessment may be required (to be undertaken in line with Method B of the DMRB HD45/09[59]) should the risk to this watercourse remain.

ASSESSMENT OF VALUE, MAGNITUDE AND SIGNIFICANCE OF IMPACT

15.7.23 In order to assess the significance of effects from the Scheme on the drainage and water environment, the guidelines within Annex IV of Volume 11, Section 3, Part 10 of the DMRB (HD 45/09)[59] will be followed.

15.7.24 The sensitivity or value (Very High, High, Medium, or Low) of the receptors will be described using the criteria and typical examples as outlined in A4.3 of the guidance[55].

15.7.25 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[55].

15.7.26 The identification of significant effects will to the matrix in Table A4.5 of the guidance[59.] Where an effect is considered not to be significant or have no influence, irrespective of other effects, it will be classified as neutral.

HUMAN HEALTH

15.7.27 The methodology for the assessment of effects on human health associated with road drainage and the water environment takes the form of a risk assessment approach of the following, as set out in HD 45/09[59]:

- Pollution on human health via impacts to surface water supplies of drinking water; and
- Flood risk, whether to the scheme, or to other areas as a result of the Scheme.

15.7.28 However, this Scheme will not generate discharges to groundwater. 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.

15.7.29 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.

15.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

15.8.1 There is an absence of drainage data for the Scheme Footprint, with HADDMS showing no outfalls within the Scheme area. In the absence of this data, at PCF Stage 2, it was conservatively assumed that the Scheme drains to the Longacre Dene at Junction 66 and/or the River Team at Junction 67. It is possible that part or all of the surface water draining to the River Team discharges to the smaller watercourse at the Allerdene Railway Bridge before discharging to the River Team.

15.8.2 The drainage system is currently being surveyed to determine further information about the location and condition of the drainage assets (i.e. including outfall locations). Further consultation is also being undertaken with Northumbria Water and the LLFA. This information is needed to determine whether further assessment and/or mitigation is needed with respect to discharge to the Longacre Dene, and whether further assessment is needed for the River Team due to the presence of a downstream structure.

15.8.3 No design of the relocation of the Allerdene culvert is currently available or the extents of the catchment. The associated approach for the assessment will be scoped as this information becomes available.

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 emissions and climate resilience.

16.1.3 The greenhouse gas assessment will consider the contribution of the Scheme to climate change.

16.1.4 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).

16.1.5 This assessment has been developed based on information from the Stage 2 design.

16.2 STUDY AREA

16.2.1 The greenhouse gas assessment is not restricted by geographical area but instead includes any increase or decrease in emissions as a result of the proposed 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 comprises the anticipated maximum physical extent of the Scheme Footprint. 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[56]) 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 1004 and contains the anticipated geographical extent of the Scheme.

16.3 BASELINE CONDITIONS

GREENHOUSE GASES

16.3.1 The Scheme will require the consumption and transportation of materials which will generate emissions. The baseline conditions set out in this section describe the likely emissions sources from the current operational study area. Commentary is provided to describe how this baseline would be likely to change in both a 'do-minimum' and 'do-something' scenario.

16.3.2 One of the primary reasons for proposing the Scheme works is to reduce the amount of minor maintenance works required on the Allerdene Bridge. As such, emissions associated with the day-to-day (routine) works has been considered as part of the baseline conditions.

CURRENT EMISSIONS SOURCES

16.3.3 The operation and management of the current Scheme assets is likely to require a small number or volume specialist components (for example, light bulbs, signage; and for the bridge: cement; steelwork; and possibly brickwork) 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.

16.3.4 The do-minimum option (no scheme pursued) would be unlikely to change the current consumption of materials within the current land boundary of the Scheme, though it has been noted that the regular maintenance works required on the Allerdene Bridge is likely to consume more materials per unit time than comparable (but newer) structures.

16.3.5 In the do-something scenario, the Scheme will require the consumption of new materials in order to facilitate the construction of highway widening and improvements, and bridge replacement.

16.3.6 In terms of user emissions, the Scheme suffers congestion, particularly during peak hours, which can result in unreliable journey times. Traffic is also expected to grow with new housing and employment developments planned for the area.

16.3.7 As described in the A1 Birtley to Coal House Environmental Summary Report (ESR)[57], during operation of the Scheme *"there are aspects of the Scheme that implicitly act to reduce the impacts of vehicle emissions alongside the A1. For example, the Scheme is designed to increase capacity, this results in a reduction in emissions per vehicle where congestion is relieved. Furthermore, speed restrictions along sections of the A1 may result in a reduction in emissions per vehicle, particularly during inter-peak and off-peak hours in current high speed areas.*

16.3.8 *However, the benefits of reduced emission per vehicle are partly offset by increases in vehicle flows and, on some sections, by an increase in vehicle emissions due to an increase in vehicle speeds."*

16.3.9 As such, total CO_2 emissions are expected to increase between 2020/21 (opening year) and 2038 (design year). This is due to the effects of increased vehicles (traffic growth) dominating over improvements to vehicle emission rates, in terms of the overall mass of CO_2 emissions.

16.3.10 However, the impact of the Scheme is less than 3% of the total mass of [traffic] emissions from the assessed area, and for all pollutants including CO_2. Whilst, the Scheme does not give rise to significant 'air quality' effects, further consideration of the contribution from end-user emissions together with the emissions associated with the construction phase of the Scheme will be undertaken.

CLIMATE RESILIENCE

16.3.11 The baseline for the climate resilience assessment comprises the recent historical (1961-1990) as well as the future projections for key climate parameters, and are presented in **Table 16-1**. All figures are taken from UKCP09 and future projections are provided over the Scheme's design life (40 years).

Table 16-1 - Baseline (historical and future) climate data for the study area (Location 1004)

CLIMATE PARAMETER WITH RECENT BASELINE (1961-1990)			PROJECTION FOR 2020S1 (2010-2039)		PROJECTION FOR 2050S (2040-2069)		PROJECTION FOR 2080S (2070-2099)	
			High; 50%	Range	High; 50%	Range	High; 50%	Range
Temperature [°C]	Mean daily winter min	0.9	2.2	1.4 to 3.1	3.3	1.7 to 4.8	4.5	2.1 to 6.7
	Mean winter daily	3.5	4.6	4.0 to 5.6	5.7	4.4 to 6.9	6.7	4.8 to 8.4
	Mean summer daily	14	15.5	14.7 to 16.5	17.0	15.1 to 18.7	18.6	15.3 to 21.2
	Mean daily summer max	17.7	19.4	18.2 to 20.7	21.2	18.6 to 23.6	23.1	18.6 to 26.9
	Change on warmest summer day	*N/A*	*+1.9*	*-1.6 to +5.6*	*+4.0*	*-1.2 to +10.0*	*6.2*	*-1.4 to +15.3*
Rainfall [mm/day]	Winter mean daily	1.8	1.9	1.7 to 2.0	2.0	1.7 to 2.4	2.2	1.8 to 2.8
	Summer mean daily	1.9	1.8	1.6 to 2.1	1.6	1.4 to 2.0	1.5	1.3 to 1.9
	% change on wettest winter day	*N/A*	*+7.1*	*-7.7 to +23.0*	*+14.8*	*-4.2 to +35.4*	*+25.2*	*-1.2 to +55.0*

[1] Note - projections for 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.

16.3.12 The environmental assessment topics for this Scheme will take into account the potential for in-combination impacts and effects in relation to these climate change projections.

16.4 POTENTIAL IMPACTS

GREENHOUSE GASES

16.4.1 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 Allerdene Bridge (i.e. Structural and reinforced steel and concrete) and pavement materials (i.e. asphalt and aggregate). During operation, the main emissions source will be from end-users.

CLIMATE RESILIENCE

16.4.2 It is expected that the impacts from climate change on the Scheme are likely to occur during the construction and operational lifecycle stages of the Scheme.

16.4.3 **Table 16-2** and

16.4.4 **Table** 16-3 present 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 construction period

CLIMATE EVENT	IMPACT (HAZARDS OR BENEFITS)
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

Table 16-3 - Potential impacts during operation period

CLIMATE EVENT	IMPACT (HAZARDS OR BENEFITS)
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 and technology 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 PCF stages. Mitigation and enhancement measures will, therefore, be identified in PCF Stage 3 through the completion of the environmental assessment.

16.5.2 It is expected that a number of design, mitigation and enhancement measures could be applied to the Scheme to ensure designs are focussed upon reduction of emissions from end-user vehicle movement (traffic) for example:

- by providing the conditions for efficient low-carbon vehicles and driving practices, such as increasing capacity, which would potentially result in a reduction in emissions per vehicle where congestion is relieved;
- Reduce the GHG emissions intensity of raw materials by specifying best-in-class products with reference to information published in Environmental Product Declarations (EPDs);
- Use of less carbon intensive concrete blends;
- Reduce embedded GHG emissions through designing-out materials to minimise the quantities of materials required by the Scheme;
- Adoption of vehicles with best-in-class efficiency for construction, delivery, maintenance and de-construction;
- Adoption of efficient logistics management for transport of construction materials and excavated material;
- Adoption of plant and processes with best-in-class efficiency for construction, maintenance and repair activities; and
- Specification of best-in-class energy efficient systems for operations e.g. lighting and signage.

16.5.3 It is also anticipated that the project will adhere to the resource efficiency hierarchy set out in DMRB 11.3.14 (Materials and Waste), in order to reduce whole lifecycle emissions embodied in raw materials (and resulting from material disposal), including:

- Maximising the consumption of materials and products with recycled or secondary content, from renewable sources, and those offering low carbon benefits;
- Maximising the recovery and re-use / recycling of site arisings (ideally, on-site); and
- The monitoring parameters and programme will be established in PCF Stage 3 through the completion of the Environmental Statement and Outline EMP.

MONITORING

16.5.4 As part of the monitoring activities, Highways England's supply chain is responsible for providing monthly or quarterly carbon data returns using its Carbon Tool. As such, it is anticipated that during the construction phase, actuals data would be collected for materials and fuel/electricity consumption, which would enable embedded GHG emissions and emissions from energy to be monitored.

16.6 RESIDUAL EFFECTS

16.6.1 As 'climate' is a new topic, an assessment of residual effects was not undertaken during the previous PCF stages. Residual effects will, therefore, be identified in PCF Stage 3 through the completion of the environmental assessment.

16.7 ASSESSMENT METHODOLOGY

TOPICS AND ELEMENTS OF TOPICS TO BE SCOPED IN AND OUT

CLIMATE – GREENHOUSE GAS ASSESSMENT

16.7.1 There are multiple greenhouse gas (GHG) emissions sources associated with each lifecycle stage of the Scheme. The following emissions sources are considered to be **scoped in (Table 16-4)**.

Table 16-4 - Emissions sources that are scoped In

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: • Widening existing carriageway between J65 (Birtley) and J67 (Coal House), including lane gain/drop; • Replacement of North Dene footbridge; • Widening of Longbank Bridleway underbridge; and • Replacement of Allerdene bridge.
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.
Operation	
Use of the infrastructure by the end-user	As described in the A1 Birtley to Coal House Environmental Summary Report (ESR)[58], total CO_2 emissions are expected to increase between 2020/21 (opening year) and 2038 (design year). This is due to the effects of increased vehicles (traffic growth) dominating over improvements to vehicle emission rates, in terms of the overall mass of CO_2 emissions.

SUB-STAGE OF LIFECYCLE	REASONING
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 16-5** below.

Table 16-5 - Emission sources that are scoped out

SUB-STAGE OF LIFECYCLE	REASONING (LIKELY SIGNIFICANCE OF NET EMISSIONS AT THIS STAGE)
Construction	
Land use, land use change and forestry (LULUCF).	The Scheme is predominantly widening of an existing carriageway, with a lane gain/drop, and so net land use change considered not significant.
Operation	
Operation and maintenance	The route is currently lit and will continue to be lit. Replacement of street lighting technology should see an improvement in the energy efficiency therefore contribution to climate change is expected to be minor positive.
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 are **scoped in (Table 16-6)**.

Table 16-6 - 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
	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	High winds

ELEMENT	ASPECTS
use	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 Including these elements within the scope represents a comprehensive and good practice approach to assessing the significance of impacts and effects arising from climate change on the Scheme. It also creates an environment in which opportunities to identify and implement enhancements are encouraged alongside the reduction of adverse effects.

16.7.5 **Table 16-7** outlines those elements that have been **scoped out** of the assessment of resilience to climate change and the reasoning behind this.

Table 16-7 - Scheme receptors outside the scope of assessment

ELEMENT	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 14 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	
Managed motorways	Technology	Managed motorways does not form part of the Scheme
	Traffic officers	
	Regional Control Centres	

16.7.6 The effects 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

16.7.7 Policy and plans relevant to the Scheme will be presented at PCF Stage 3 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 - GREENHOUSE GAS ASSESSMENT

16.7.8 The Scheme comprises road widening and improvements, and the replacement of the Allerdene railway bridge (which carries the A1 over the East Coast Mainline). There is potential for significant effects, for which a further assessment of GHG emissions will be completed.

16.7.9 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.

16.7.10 The lifecycle stages and corresponding emissions sources that will be included in the detailed assessment are outlined in **Table 16-8**.

Table 16-8 - Lifecycle stages and emissions sources to be included in the detailed assessment

MAIN STAGE OF PROJECT LIFECYCLE	SUB STAGE OF LIFECYCLE	POTENTIAL SOURCES OF EMISSIONS (NOT EXHAUSTIVE)	EXAMPLES OF ACTIVITY DATA
Construction	Product stage; including raw material supply, transport and manufacture	Embodied emissions associated with the required raw materials.	Materials quantities including: Asphalt, Aggregate, Cut and fill, Bridge - steel, concrete.
	Construction process stage; including transport to/from works site and construction/installation processes.	Activities for organisations conducting construction work.	Fuel/electricity consumption. Construction activity type/duration. Transportation of materials from point of purchase to site, mode/distance.
Operation	Use of the infrastructure by the end-user.	Vehicles using highways infrastructure.	Traffic count/speed by vehicle type for highway

MAIN STAGE OF PROJECT LIFECYCLE	SUB STAGE OF LIFECYCLE	POTENTIAL SOURCES OF EMISSIONS (NOT EXHAUSTIVE)	EXAMPLES OF ACTIVITY DATA
			links.
	Repair	Activities and materials for organisations conducting repairs.	Number of replacements / repairs to assets over design life.

EMISSIONS CALCULATIONS

16.7.11 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 (tCO_2e).

SIGNIFICANCE OF EFFECTS

16.7.12 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. In line with the IP 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.

METHODOLOGY - CLIMATE RESILIENCE ASSESSMENT

16.7.13 The Scheme comprises road widening and improvements, and the replacement of the Allerdene railway bridge (which carries the A1 over the East Coast Mainline); it is hence classed as 'major improvement works'[59]. As there is potential for significant effects, a detailed assessment of resilience shall be completed.

16.7.14 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.

16.7.15 Historical (baseline) local climate data from the UK climate projections programme (UKCP) will be used to identify climatic trends currently impacting the Scheme.

16.7.16 This assessment will address the resilience assessment of the proposed Scheme to climate change impacts. The assessment will include all infrastructure and assets associated with the proposed Scheme. It will assess resilience against both gradual climate change, and the risks associated with an increased frequency of extreme weather events.

16.7.17 The assessment will assume that the proposed 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.

16.7.18 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.

16.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

16.8.1 There is currently no specific guidance or carbon emissions threshold, which, if exceeded, is considered significant.

16.8.2 UKCP09 has been used to identify climate projections using the high emissions scenario and the central estimate (50% probability).

17 ASSESSMENT OF CUMULATIVE EFFECTS

17.1 INTRODUCTION

17.1.1 This chapter 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 PCF Stage 3 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 chapter 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, a cumulative assessment was carried out (July 2017) as part of the PCF Stage 2[60]. The potential impacts and potential residual effects described in this Scoping Report were based on the PCF Stage 2 assessment. A full assessment of the cumulative effects will be carried out at PCF Stage 3.

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 was given to associated schemes that:

- Occur at times prior to or during 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 For the purposes of the cumulative effects assessment, 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) [61], 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)[62], The Planning Inspectorate Advice Note 17[63] and by the findings of the assessment carried out at PCF Stage 2[64].

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 carried out in the PINS Advice Note 17, these will include:

- 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 the Local Planning Authority (LPA) 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 (NPSNN) (2014)[62] and PINS Advice Note 17[63].

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. At PCF Stage 2, to assist this process, the potentially relevant chapters were identified for broad categories of receptor, as set out in **Table 17-1** below.

ASSUMPTIONS AND LIMITATIONS

17.3.9 For PCF Stage 2, an assessment of combined effects on Geology and Soils, the Historic Environment, Health and Climate Change were not conducted. A full assessment of the potential combined effects will be conducted in PCF Stage 3.

17.3.10 The assessment of cumulative effects is based on the information provided in PCF Stage 2. An update of planning applications in the surrounding area (within 500m centred on the Scheme Footprint) will be undertaken in PCF Stage 3.

17.3.11 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 January 2018. Any schemes, projects or other relevant developments announced after this date would therefore not be included in the traffic assessment.

17.3.12 The assessment of cumulative effects is widely recognised to be limited by available 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.

17.3.13 At PCF Stage 2 no cumulative schemes were assessed by the air quality and noise disciplines. However, cumulative effects have been assessed insofar as these assessments have utilised traffic flow data which have included committed schemes provided for the 'do something design year 2038' scenario. The criteria for identifying developments was based on those within 2km of the Scheme, these were then subject to a WebTAG uncertainty log exercise to assess the likelihood of development and subsequent inclusion in the core, optimistic and pessimistic forecasts. As detailed in **Table 17-2**, the following applications for consideration of cumulative effects; Scotswood to North Brunton and Birtley Northside have been included in the traffic model.

HEALTH

17.3.14 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 collated via the topic assessments listed above will be undertaken and presented within the Cumulative Effects section of the ES. This 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 At PCF Stage 2 the additive or amplified effects resulting from environmental effects on ‘’shared receptors’ were considered. In addition, where sources of effects from different components of the Scheme may combine to be of greater significance than when considered alone, the cumulative effects were determined.

17.4.2 **Table 17-1** presents the receptors identified at PCF Stage 2 and updated for this Scoping Report as having the potential to be cumulatively affected by the Scheme.

Table 17-1 - Combined effects from the Scheme

RECEPTOR/ RESOURCE	NOTES	AIR QUALITY	CULTURAL HERITAGE	LANDSCAPE AND VISUAL	BIODIVERSITY	GEOLOGY AND SOILS	MATERIALS	NOISE AND VIBRATION	PEOPLE AND COMMUNITIES	ROAD DRAINAGE AND THE WATER ENVIRONMENT	CLIMATE CHANGE
Viewpoints on public access footpath	Changes to views due to proposed 3m high noise barrier during construction & operation.			✓					✓		
Residences near 3m noise barrier	Changes to air quality, views and noise levels during construction.	✓		✓				✓	✓		
Residences near 3m noise barrier	Changes to air quality, views and noise levels during operation.	✓		✓				✓	✓		
Local road users	Effects on traffic flows and driver stress on surrounding roads due to 'rat running' during construction. Effects on roads not directly affected by construction works would also potentially result in reduced air quality, increased noise, and reduced amenity.	✓						✓	✓		
Users of PRoW, cycle routes and areas of amenity	Effects for users of cycle ways and areas of amenity value as a result of noise during construction.							✓	✓		
Long Acre Dene Woodland LWS	Unknown impacts due to potential changes to water quality / volumes / pollution				✓					✓	

RECEPTOR/ RESOURCE	NOTES	AIR QUALITY	CULTURAL HERITAGE	LANDSCAPE AND VISUAL	BIODIVERSITY	GEOLOGY AND SOILS	MATERIALS	NOISE AND VIBRATION	PEOPLE AND COMMUNITIES	ROAD DRAINAGE AND THE WATER ENVIRONMENT	CLIMATE CHANGE
	events at the outfall (to be confirmed in PCF Stage 3 in Road Drainage and Water Environment assessment)										
Consumption of resources	Consumption/sterilisation of primary and/or non-renewable resources (material assets) during construction and operation.					✓	✓				
Watercourses (River Team and others)	Potential accidental pollution/discharge of materials impacting on water quality and ecology of receiving watercourses during construction.				✓					✓	
Watercourses (River Team and others)	Creation of new pathways between contaminated ground, if any, and groundwater or surface water and Scheme users during construction.					✓				✓	

17.4.3 There is the potential for residual cumulative effects from the following:

- During construction, the 3m high noise barrier adjacent to the A1 northbound carriageway in the Birtley area has the potential to impact on the residents in terms of landscape, air quality and noise aspects. The potential positive effects include the reduction of dust, noise and vibration. However, the noise barrier does provide a visual intrusion to local residents and members of the public. Further, there may also be the requirement for temporary land take to enable the delivery of ancillary works, such as compounds, diversions and material storage.
- During the operational phase cumulative impacts associated with the installation of the proposed noise barrier. Positive impacts relating to air quality and associated noise levels. Negative impacts include the visual intrusion of the barrier and the impact on local views.
- From the consumption of materials, management of site arisings, and production and disposal of waste during construction.
- From construction works upon the water quality of the River Team around Allerdene Bridge.
- During operation, there is a residual risk that sufficient maintenance is not undertaken on the fluvial and drainage aspects of the Scheme. This could result in blockage and associated flooding or water quality impacts.
- With respect to pluvial flooding, there could be a significant impact on human safety associated with surface water flooding. Mitigation will be developed during PCF Stage 3 through the Flood Risk Assessment and Surface Water Drainage Strategy.

17.4.4 During the assessment of combined effects at PCF Stage 2 and updated for this Scoping Report, no significant residual effects were identified.

17.5 ASSESSMENT OF CUMULATIVE EFFECTS

17.5.1 Where other major 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 major projects (balancing cut and fill across different schemes, for example) may also present themselves.

17.5.2 **Table 17-2** presents proposed applications identified at PCF Stage 2 and reviewed for this Scoping assessment for consideration of cumulative effects likely to be delivered at the same time and in proximity to the Scheme.

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)
DC/16/01335/FUL	Team Valley Retail Park Tenth Avenue West Gateshead*	Erection of new commercial units within existing car park (use classes A1 and A3) new pedestrian walkways, landscaping and alterations to car park layout (additional information received 24/01/17, 07/03/17, 08/03/17 and 19/04/17 and amended 07/03/17 and 19/04/17)	12 May 2017	20m north at closest point	N
DC/15/00404/FUL	Northside Birtley*	Erection of 147 dwellings with associated parking and landscaping (amended plans including increased site area and additional information received 12/06/15 and 22/07/15, amended plans and additional information received 14/08/15 and additional information received 18/08/15 and 07/09/15, amended document received 21/09/15)	15Jan 2016	250m west	N
N/A	A1 Scotswood to North Brunton (Junction 74 to 79) improvement scheme	The proposed A1 Scotswood to North Brunton improvement scheme involves narrow lane widening to three lanes between Junction 74 and Junction 78, and a lane gain/drop as required by predicted traffic flow with full widening to three lanes between Junction 78 and Junction 79.	N/A	8km	N

* http://public.gateshead.gov.uk/online-applications/caseDetails.do?caseType=Application&keyVal=OIHSOFHKGK400
**http://public.gateshead.gov.uk/online-applications/applicationDetails.do?activeTab=details&keyVal=NN5V5QHK0BP00
***http://roads.highways.gov.uk/projects/a1-scotswood-to-north-brunton/

17.5.4 The Team Valley Retail Park application relates to the provision of four units for food and drink to be located within the existing car park area. Construction timeframes are currently unknown, however due to the scale of the works it is not anticipated that there would be any cumulative effects with the Scheme and as such it was not considered further in the cumulative effects assessment.

17.5.5 For the Birtley Northside application, Phase 1 has been completed and Phase 2 is currently in construction. Construction is due for completion by February 2020 which is before the anticipated start of construction for the Scheme (2020/21). As such cumulative effects during construction were not considered further in the cumulative effects assessment.

17.5.6 A high level assessment of the potential cumulative effects of these two schemes (Birtley Northside) during operation (completed before the start of Scheme construction) and Scotswood to North Brunton during construction and operation was carried out**.** The cumulative assessment indicates that the following topic areas show no significant impact from the proposed schemes during construction or operation. These include:

- Air quality;
- Landscape and visual;
- Materials;
- Noise and vibration; and
- Road drainage and the water environment.

17.5.7 The findings are based upon the assumption that best practice and embedded mitigation will be implemented.

17.5.8 The following topics have the potential to be impacted (during the construction or operation phase) by these two schemes:

BIODIVERSITY

17.5.9 The Scotswood to North Brunton scheme has the potential to effect areas of woodland habitat alongside the carriageway, some of which may be homogenous with habitat to be affected on Birtley to Coal House, however the two schemes are approximately 8km apart meaning none of the habitats to be effected are directly linked. As with Birtley to Coal House, a full ecological assessment has been undertaken on the Scotswood to North Brunton scheme to determine the likely effects on ecological receptors. It is anticipated that any habitats to be lost to either scheme would be replaced and that appropriate mitigation or off-setting will be employed for any effects on protected or notable species.

PEOPLE AND COMMUNITIES

17.5.10 Given the location and nature of the Scotswood to North Brunton scheme relative to the Scheme, the potential cumulative effects are considered to relate to employment effects and driver stress during the construction phase. Depending on the programme of works there is the potential that there may be additional employment opportunities for the local population which could generate positive benefits upon local economic receptors. Furthermore, there is a potential increase in spending in the local economy by contractors. Such multiplier effects would be both in terms of the sourcing of local supplies (indirect employment across wider supply chains), and local spend by on-site workers (induced employment), e.g. during lunch times.

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 **Table 18-1**.

Table 18-1 - Summary

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Air Quality				
Construction – direct construction impacts		X		No significant effects relating directly to construction works and plant were identified in the PCF Stage 2 assessment. Best practice mitigation measures, to be applied with consideration to the site layout, will be required to ensure no significant effects and will be set out in the Construction Environment Management Plan (CEMP). However, no requirement for Scheme specific measures was identified and the further assessment of direct construction impacts is therefore scoped out.
Construction – diversion routes	X		Detailed	
Operation – local air quality	X		Detailed	
Operation – particulate matter		X		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 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 standards. Concentrations of particular matter are below the air quality standards and at no risk of exceeding the standards. As a result, consideration of particulate matter is scoped out.
Operation – impacts on regional air quality		X		No significant effects were identified at a regional level at PCF Stage 2 assessment. An assessment of the magnitude and impact of emissions at a regional scale will be undertaken as part of the WebTAG assessment.
Cultural Heritage				

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
SM, CA, Listed Buildings (Grade II), the historic landscape and non-designated historic assets	X		Detailed	
The historic landscape		X		Construction works will be largely confined to the existing highways boundary or within its immediate vicinity and no structures of height are anticipated that may have an impact on the wider setting.
WHS, Registered Parks and Gardens, Historic Battlefields, Grade I and Grade II* listed buildings		X		No WHS, Registered Parks and Gardens, Historic Battlefields, Grade I or II* listed buildings have been identified in the study area.
Landscape and Visual				
Landscape and Visual	X		Detailed	
Biodiversity				
Local wildlife sites close to the Scheme (Dunkirk Farm, Bowes Railway, Long Acre Dene, Long Acre Wood)	X		Detailed	
All habitats in the field study area	X		Detailed	
Protected and notable species	X		Detailed	
The River Tyne (Northumbria Coast) SPA and SAC		X		Taking into consideration the intervening distance, no impacts on the European sites are anticipated as a result of the size and scale of the Scheme during the construction or operational stages.
Geology and Soils				
Construction aspects excluding statutory and non-statutory sites of geological importance	X		Detailed*	
Operation aspects excluding statutory and non-statutory sites of geological importance	X		Detailed*	
Non statutory sites of		X		No sites have been identified within the Scheme or surrounding area.

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
geological importance				
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.
Noise and Vibration				
Construction noise and vibration	X		Detailed	
Road traffic noise	X		Detailed	
Road traffic vibration	X		Qualitative	
People and Communities				
Motorised travellers	X		Simple	
NMUs and community severance during construction	X		Simple	
Community land	X		Simple	
Agricultural land	X		Simple	
Impacts on people including local economy, employment, health, inequality and population	X		Simple	
NMUs during operation		X		There are not anticipated to be significance effects and there is potential betterment through Scheme improvements.
Community severance during operation		X		There is not anticipated to be any new severance as a result of the operation of the new road.

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Private assets and demolition of private property	X			It is not anticipated that there will be any demolition of private property; however there are potential impacts to private land as a result of the Scheme.
Tourism and recreation		X		There are not anticipated to be significant effects on the existing tourism and recreational assets. View from the Angel of the North will be covered in the landscape assessment.
Housing		X		Any impacts on residents will be covered under the Air Quality assessment (Chapter 7) and Noise Assessment (Chapter 13).
Development land		X		No development land will be affected by the Scheme.
Waterway and restoration projects		X		There are no plans for restoration of any watercourses.
Road Drainage and the Water Environment				
Water quality during construction	X		Qualitative	
Water quality during operation	X		Quantitative (determined through HAWRAT)	
Flood risk during construction	X		Qualitative	
Fluvial flood risk during operation	X		Quantitative if sufficient changes to the watercourses to be assessed within the EA flood model, if only minor pier alteration then will be Qualitative	
Pluvial flooding	X		Quantitative	
Risk of changes to surface water runoff	X		Qualitative	
The following receptors are scoped out - Bowes Lake, Lookout Lake and other ponds located to the north of Junction 65, Foxpond		X		These receptors were scoped out due to no hydraulic connectivity.

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
Fishery, Norwood Nature Park Local Nature Reserve, The Northumbria Coast SPA and SAC and the culverted drains/watercourses between Junction 66 and 67, and to the north of Junction 67.				
Assessment of the impact of routine runoff on groundwater		X		No discharges to ground are currently in place or are proposed.
Groundwater flood risk		X		The risk of groundwater flooding to the Scheme was assessed to be low.
Reservoir flood risk		X		Flooding due to reservoir failure was assessed to be negligible.
Climate Change				
Emission sources during construction	X		Detailed**	
Emission sources during operation	X		Detailed**	
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		
Climate resilience with regards to drainage and incident management.		X		
Cumulative Effects				
Combined effects	X		Detailed	
Cumulative effects	X		Detailed	

Environmental Topic and Element	Scoped In	Scoped Out	Level of Assessment	Justification for Topics Scoped Out
*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 change. The level of assessment is therefore based on professional emerging guidance and industry best practice.				

18.2 NEXT STEPS

SCOPING CONSULTATION

18.2.1 This Scoping Report will be submitted to the Planning Inspectorate, which will then consult 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 contain.

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

18.2.2 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 will be aimed at the local community. 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.

ENVIRONMENTAL IMPACT ASSESSMENT

18.2.3 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.

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Appendix A

GLOSSARY OF ABBREVIATIONS

GLOSSARY OF ABBREVIATIONS

AOD	Above Ordnance Datum
AADT	Annual Average Daily Traffic
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
CA	Conservation Areas
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
D2AP	Dual two lane all purpose
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
EA	Environment Agency
eDNA	Environmental DNA
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPD	Environmental Product Declarations
ERIC NE	Environmental Records and Information Centre North East
ES	Environmental Statement
ESR	Environmental Study Report
GC	Gateshead Council
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
IEA	Institute of Environmental Assessment
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
MAFF	Ministry for Agriculture, Fisheries and Food
MMP	Materials Management Plan
MoRLiCS	Motorway Road Lighting Control System
MPI	Major Project Instructions
MTs	Motorised Travellers
NCA	National Character Area
NCC	Newcastle City Council
NGWB	Newcastle Gateshead Western Bypass
NIA	Noise Important Area
NMU	Non Motorised User
NPSNN	National Policy Statement for National Networks
NO_2	Nitrogen dioxide
NOEL	No Observed Effect Level
NO_x	Nitrogen oxide
NPPF	National Planning Policy Framework
NPSE	Noise Policy Statement for England
ONS	Office of National Statistics
OS	Ordnance Survey
PCF	Project Control Framework
PCM	Pollution Climate Mapping
PEA	Preliminary Environmental Assessment
PEA	Preliminary Ecological Appraisal
PEIR	Preliminary Environmental Information 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
PSF	Project Support Framework
RIS	Road and Investment Strategy
RPE	Respiratory Protective Equipment
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SM	Scheduled Monument
SOAEL	Significant Observed Adverse Effect Level
SOCC	Statement of Community Consultation
SPA	Special Protected Area

SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SWMP	site Waste Management Plan
TAG	Transport Appraisal Guidance
TMP	Traffic Management Plan
TPO	Tree Preservation Order
TRA	Traffic Reliability Area
TSCS	Thin Surface Course Systems
UKCP	UK climate projections programme
UXO	Unexploded Ordnance
VMS	Variable Message Signs
WebTAG	Web Transport Analysis Guidance
WFD	Water Framework Directive
WHS	World Heritage Sites

Appendix B

FIGURES

APPENDIX B - FIGURES

Figure 1.1 Location plan

Figure 1.2 Environmental constraints plan

Figure 7.1 PCM data and baseline monitoring, 2013 Annual Mean NO2

Figure 8.1 Heritage constraints plan designated sites

Figure 8.2 Heritage constraints plan designated sites

Figure 9.1 Landscape designations

Figure 9.2 Landscape character areas

Figure 9.3 Visual Receptors

Figure 14.1 Community Facilities and Public Rights of Way

N

Key

Scheme Footprint

Rev	Date	Description	By	Chk'd	App'd
P02	16/10/17	Red Line Boundary Updated	GH	NA	KS
P01	24/07/17	First Issue	GH	NA	KS

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Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 1.1 Location Plan

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Drawing Status: For Comment

Suitability: S1

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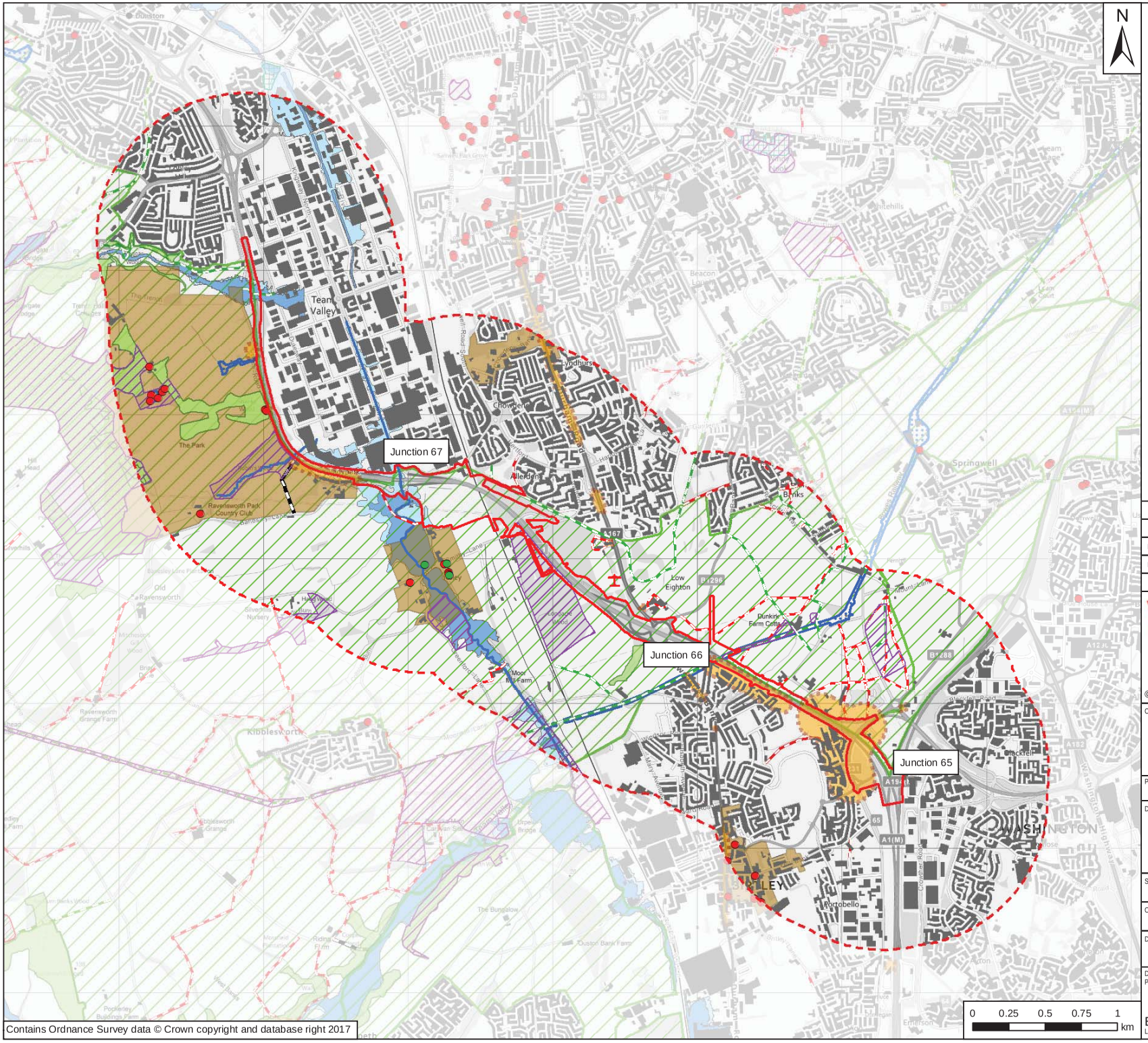
Project Ref. No.: 70015226

Revision: P02



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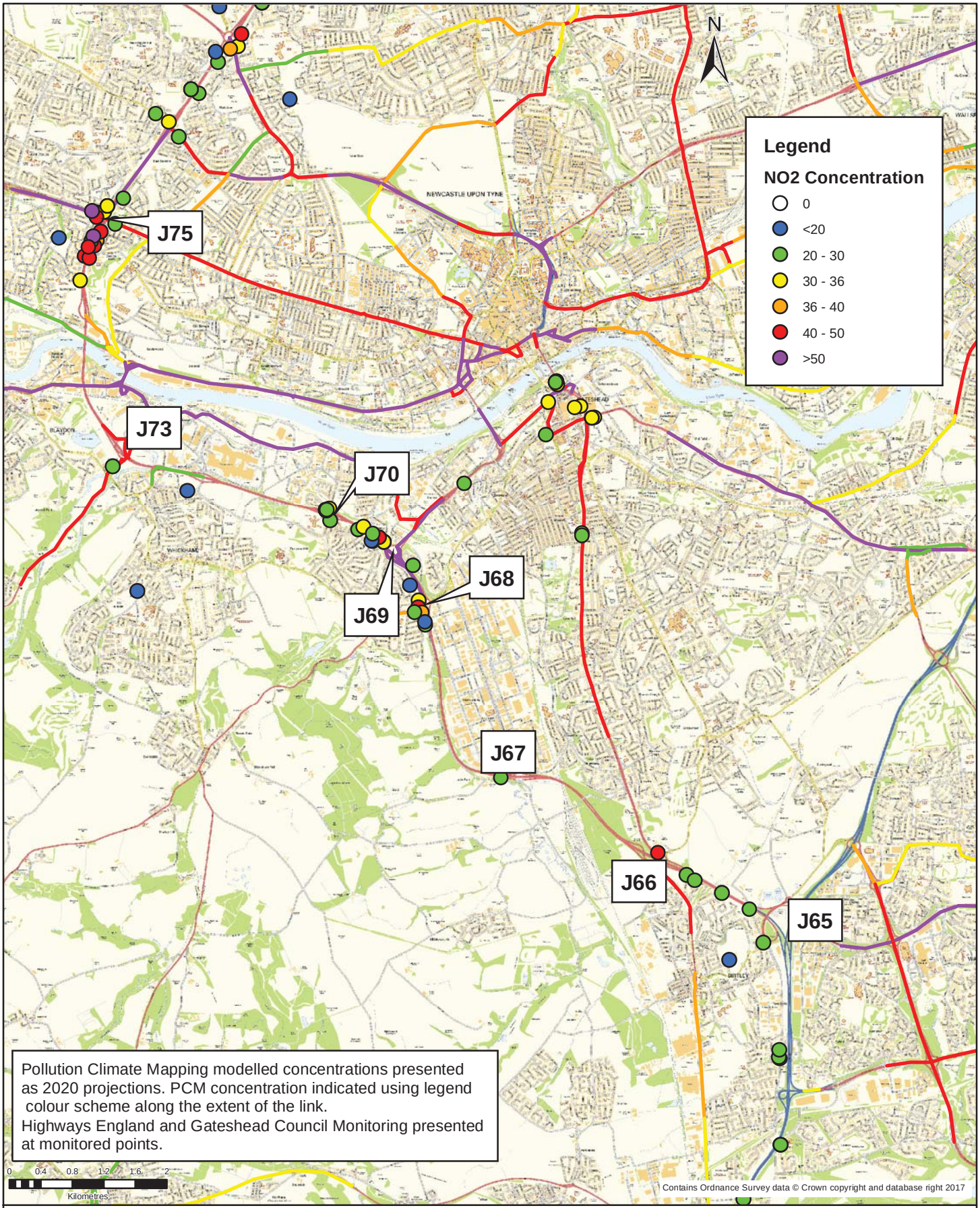

WSP House, 70 Chancery Lane
London, WC2A 1AF
Tel: 020 7314 5000

• CLIENT/PROJECT

A1 BIRTLEY TO COAL HOUSE

• TITLE

FIGURE 7.1: PCM Data and Baseline Monitoring, 2013 Annual Mean NO_2

• DATE 23/08/2017

• SCALE AT A4 1:64,668

PRODUCED BY SH

CHECKED LP

APPROVED BTJ

• DRAWING NUMBER

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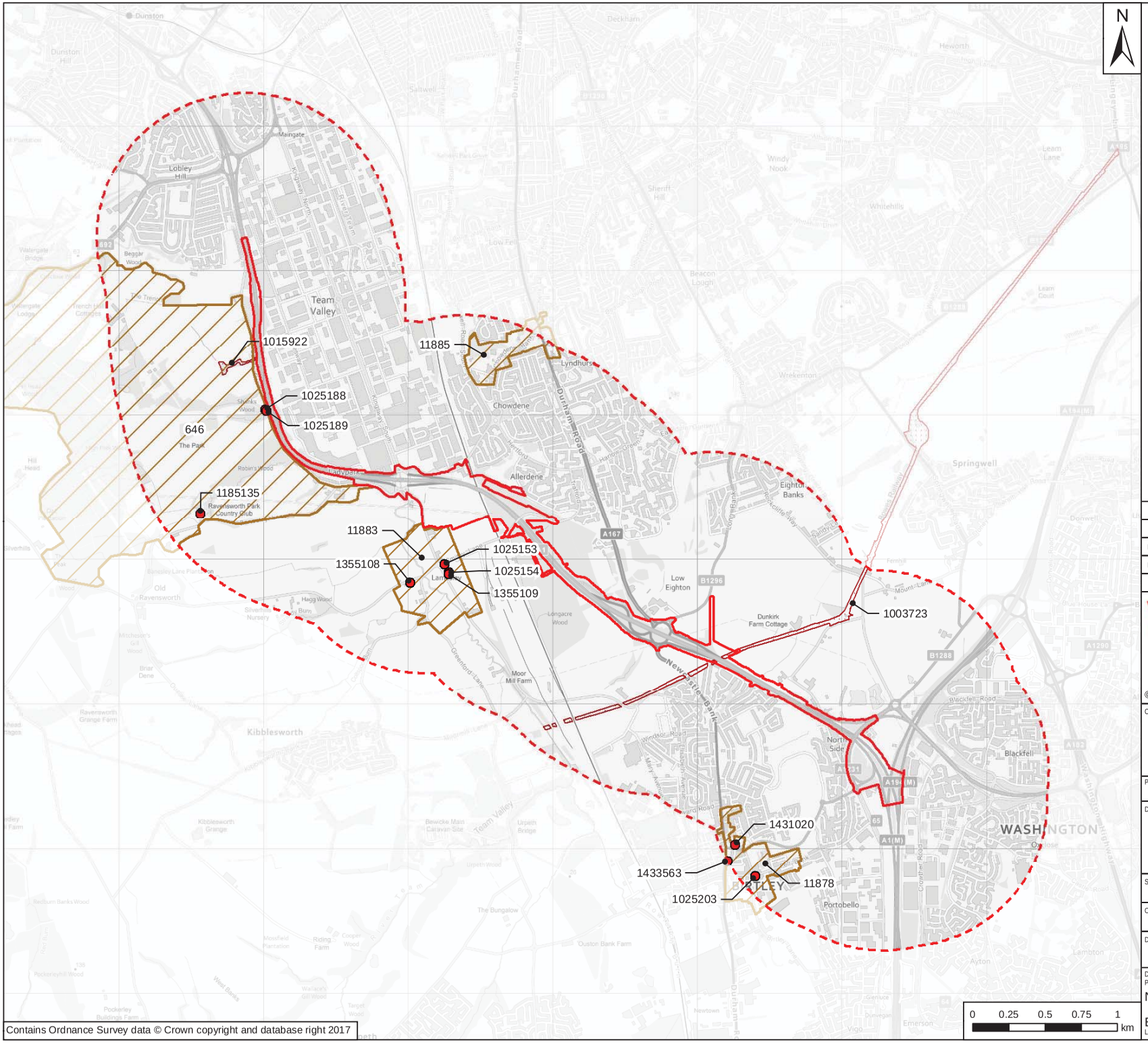

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Drawing Title: Figure 8.1 Heritage Constraints Plan: Designated Heritage Assets

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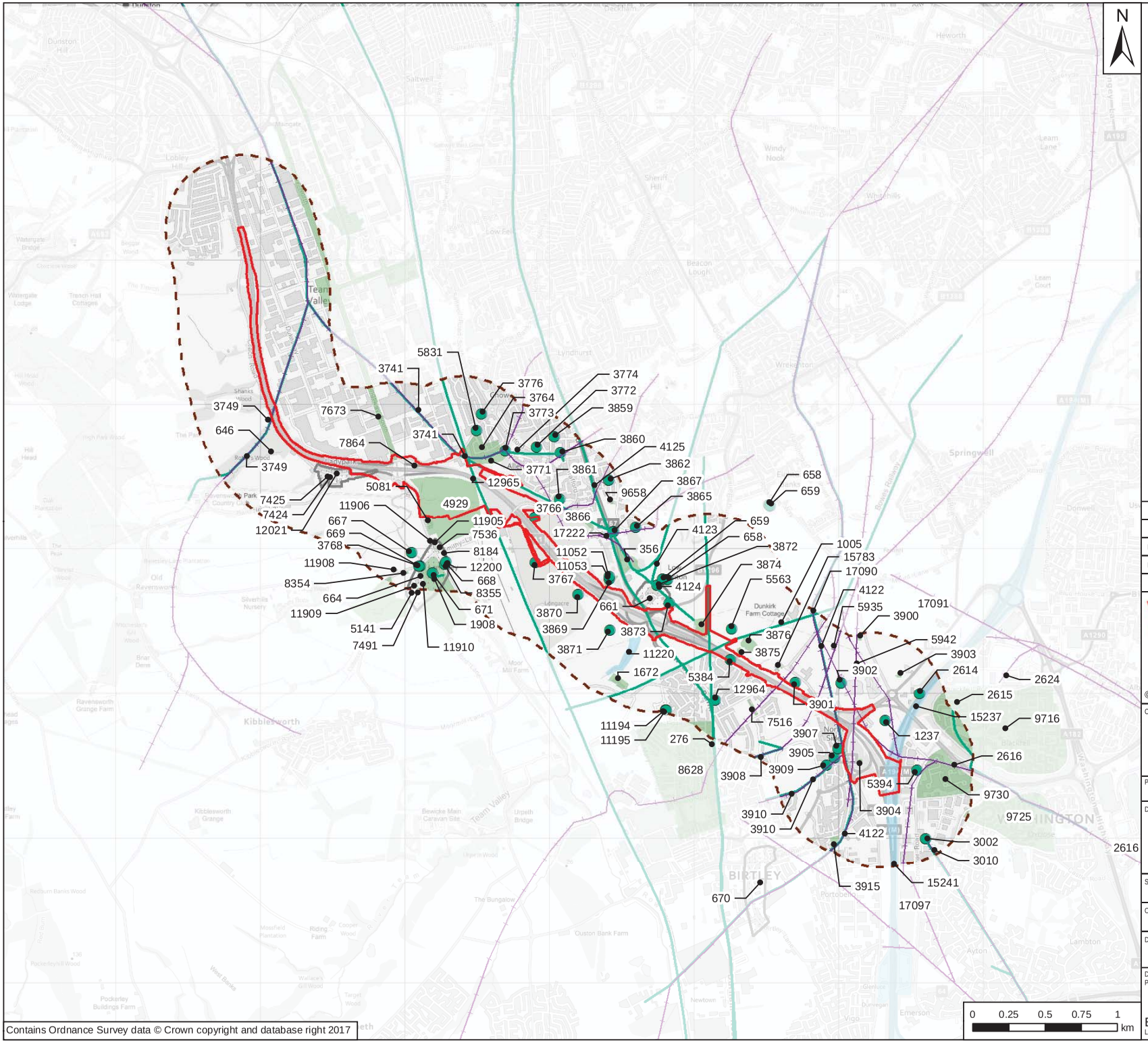

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Drawing Title: Figure 8.2 Heritage Constraints Plan: Non-Designated Heritage Assets

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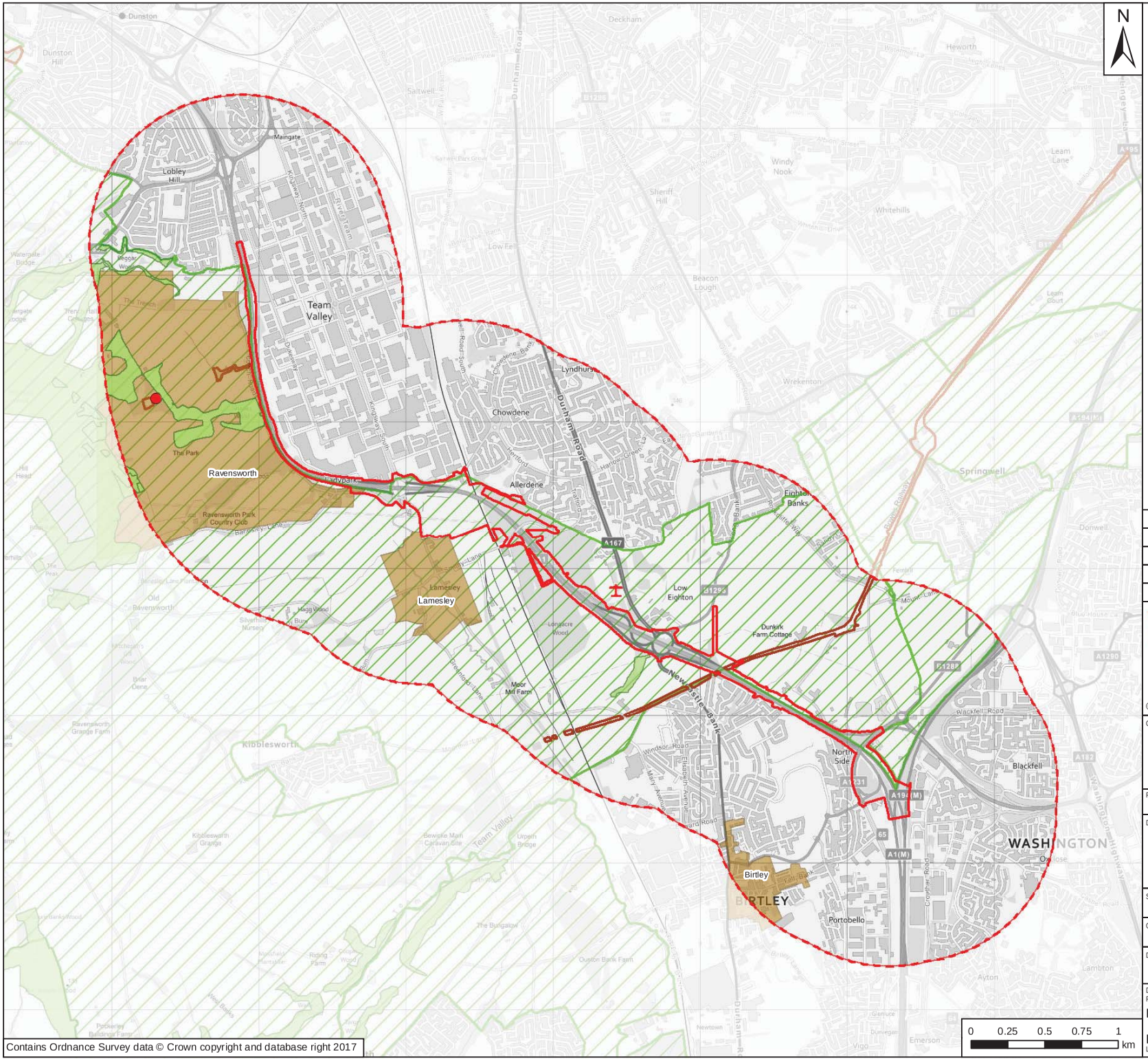

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Drawing Title: Figure 9.1 Landscape Designations

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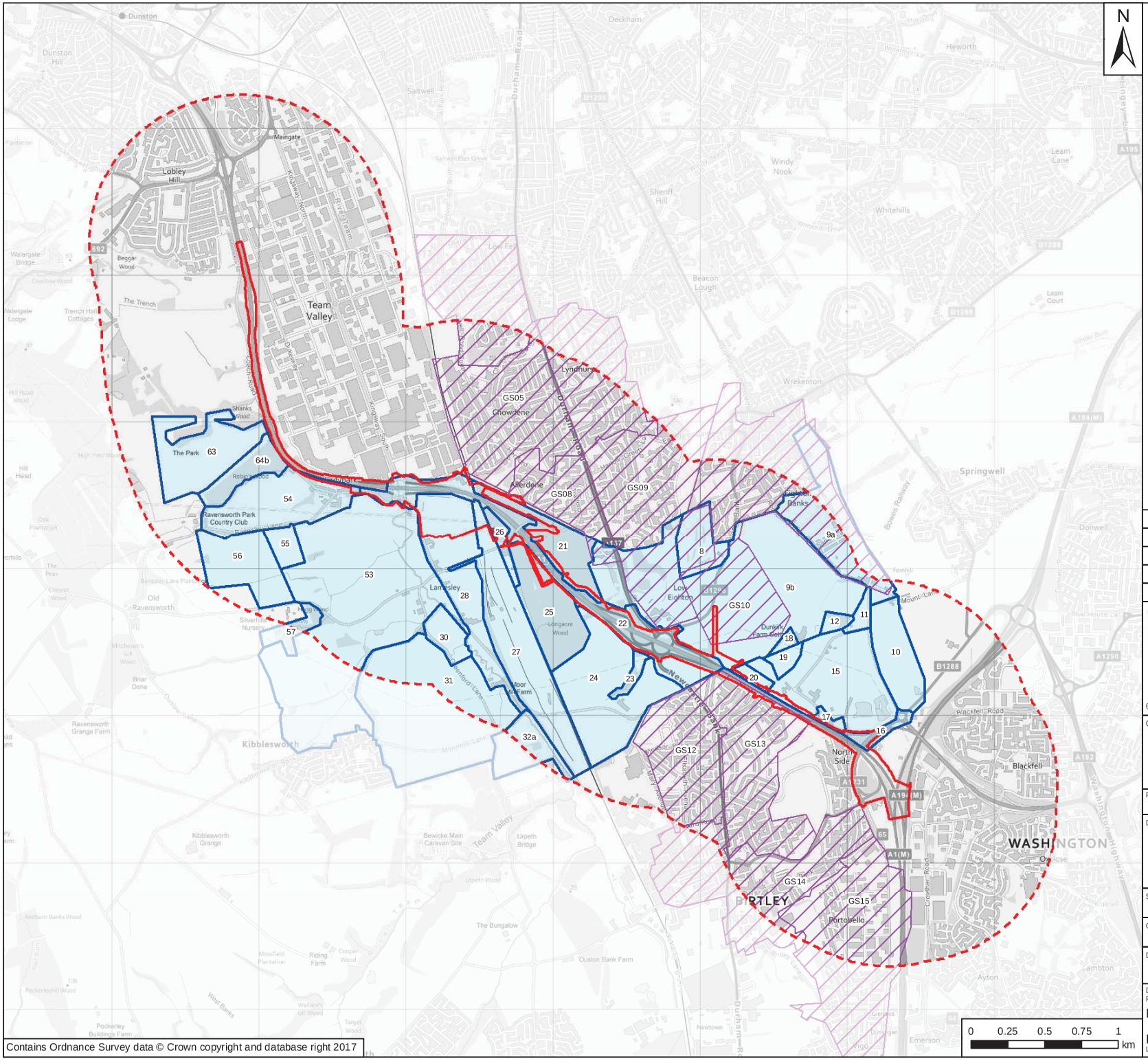

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Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 9.2 Landscape Character Areas

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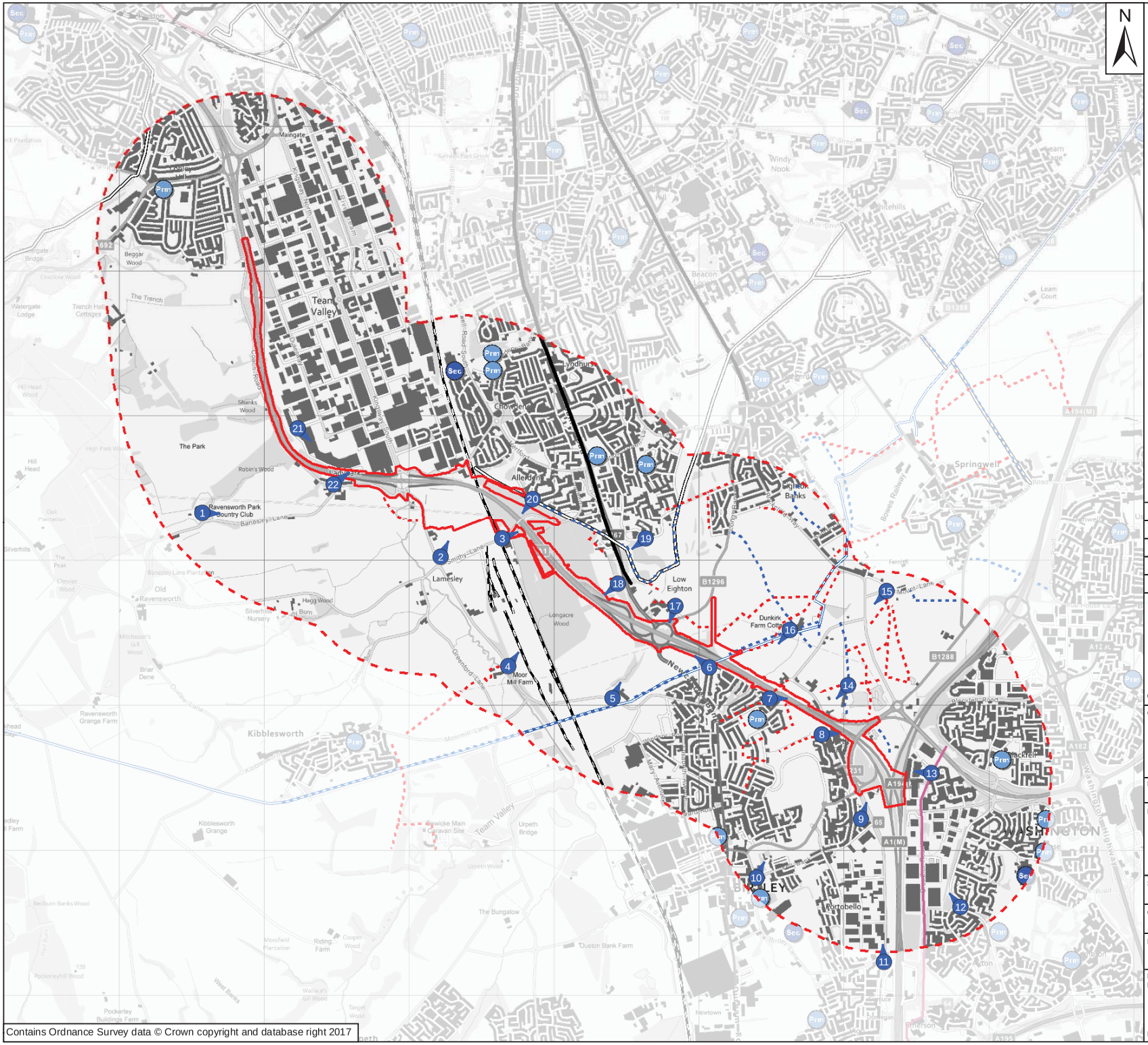

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Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 9.3 Visual Receptors

Scale	Drawn	Checked	Approved	Authorised
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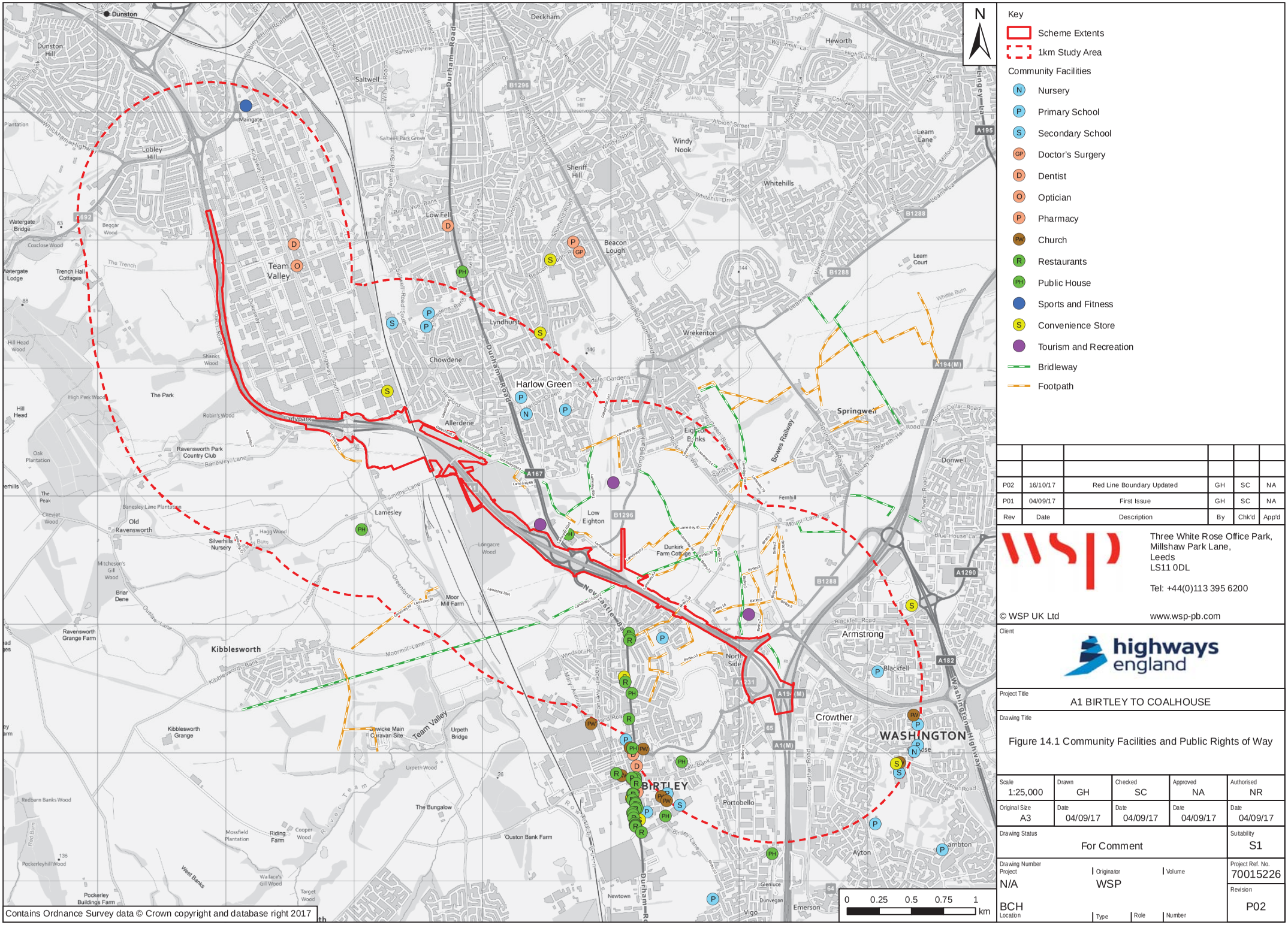
Project Ref. No.: 70015225

Revision: P02



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Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 14.1 Community Facilities and Public Rights of Way

Scale	Drawn	Checked	Approved	Authorised
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Suitability: S1

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Project Ref. No.: 70015226

Revision: P02