highways england

A1
Birtley to Coal House
improvement scheme

Preliminary Environmental Information Report

February 2018

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1 INTRODUCTION

1.1.1. The A1 Birtley to Coal House Improvement Scheme (hereafter referred to as "the Scheme") aims to provide additional capacity by widening to four lanes between junction 65 and 67 on the southbound carriageway and three lanes with an additional lane to help manage traffic joining and leaving the A1 between junctions on the northbound carriageway.

1.1.2. This Preliminary Environmental Information Report (PEIR) has been produced in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (see **Ref 1.1**); the latter is hereafter referred to as "the EIA Regulations". The aim of this document is to provide the public, stakeholders and consultees with sufficient understanding of the design and environmental issues to be able to develop a good understanding of the Scheme, so that they can give informed responses as part of the statutory consultation. A non-technical summary of this PEIR has also been produced.

1.1.3. This document should be read alongside the A1 Birtley to Coal House Scoping Report (hereafter referred to as "the Scoping Report") – which can be found online here: Scoping Report[1] in **Appendix D** of this PEIR and the A1 Birtley to Coal House Scoping Opinion available online here: Scoping Opinion[1] or in **Appendix E** of this PEIR. Together these documents form the PEIR.

1.2 ENVIRONMENTAL IMPACT ASSESSMENT

1.2.1. The Scheme is defined as a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(h) and Section 22 of the Planning Act 2008 (as amended by the Highway and Railway (Nationally Significant Infrastructure Project (Order 2013) as:

- It comprises the alteration of a highway;
- The highway to be altered is wholly within England;
- The Secretary of State is the highway authority for the highway; and
- The speed limit is 50mph or greater and the Scheme footprint at 83 hectares is greater than the 12.5 hectares threshold.

1.2.2. Therefore in accordance with the above legislation a Development Consent Order (DCO) is required to build and operate the Scheme.

1.2.3. Its size also means the Scheme is classified as an Annex II highway development 10(b) (e) of the EIA Directive. The Screening determination (see **Section 4.1.3** for further details) carried out by Highways England concluded that the Scheme is likely to result in significant environmental effects and that an EIA is required in line with the European EIA Directive (see **Ref 1.2**) and the EIA Regulations. 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] https://infrastructure.planninginspectorate.gov.uk/projects/north-east/a1-birtley-to-coal-house-improvement-scheme/?ipcsection=docs

1.2.4. On 16 May 2017 the EIA Directive (2014/52/EU) was transposed into UK law. It should be noted that this PEIR takes account of these new regulations and implements all new requirements.

1.2.5. EIA is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account environmental and health impacts, both beneficial and adverse. EIAs for NSIPs are reported in two stages, as follows:

- A PEIR is prepared, to inform statutory consultation with the public and consultees about the Scheme; and
- Following statutory consultation with the public and consultees, an Environmental Statement (ES) is prepared to accompany the application for a DCO.

1.2.6. This PEIR in combination with the Scoping Report and the Scoping Opinion is the first stage of reporting on the likely environmental effects of the Scheme.

1.2.7. The Scoping Report was submitted to the Planning Inspectorate (PINS) on 8 November 2017 with a request for a statutory Scoping Opinion. The Scoping Opinion was received on 18 December 2017 and has been taken into account when preparing this PEIR. The Scoping Opinion will also be used to inform what topics the ES should assess.

1.3 DOCUMENT PURPOSE

1.3.1. Preliminary environmental information is defined in the EIA Regulations as information that is reasonably required to assess the environmental effects of the development.

1.3.2. This PEIR provides the initial environmental information available for the Scheme, along with descriptions of the likely environmental effects and mitigation measures envisaged for the Scheme. This document is intended to give consultees (both specialist and non-specialist) an understanding of the key issues and enable them to prepare well-informed responses to statutory consultation.

1.3.3. It should be noted that at this stage the information is “preliminary”, and is based mostly on the design information available at the time of writing along with the Scoping Report and Scoping Opinion. Further EIA work is currently being undertaken to confirm the scale and significance of predicted environmental impacts arising from the Scheme design. The final EIA work will be reported within the ES, which will accompany the DCO application to be submitted to PINS in winter 2018/2019.

1.3.4. This report includes the most up to date information on the likely environmental effects of the Scheme, and with the Scoping Report (See **Appendix D**) and Scoping Opinion (See **Appendix E**), forms the PEIR.

1.4 DOCUMENT STRUCTURE

1.4.1. This PEIR is organised into several chapters similar to that described in the Scoping Report and what will be considered in the ES. This report is in accordance with the EIA Regulations and follows the content structure set out below:

- **Section 1 –** Introduction: including the purpose of the PEIR;
- **Section 2 –** The Project: provides information on the need for the Scheme, a description of the Scheme, and the Scheme objectives;
- **Section 3 –** Assessment of Alternatives: details the assessment of alternatives;
- **Section 4 –** Environmental Assessment Methodology: summarises the EIA process;

- **Section 5 -** Overview of the Environment: gives an overall description of the local and surrounding environments.
- **Section 6 –** Assessments: details findings of the assessments of the environmental topics; and
- **Section 7 –** Assessment of Cumulative Effects: provides information on the assessment of cumulative effects.

1.5 PROPOSED PUBLICATION STRATEGY AND TIMINGS

1.5.1. An outline programme and engagement strategy is indicated below and is set out in detail in the Statement of Community Consultation (SoCC). The wider programme indicates the following estimated key project milestones:

- Informal Initial Engagement Sessions with Statutory Consultees, Non-statutory Consultees and the Public: summer/autumn 2016;
- Statutory Consultation: 8 February to 22 March 2018;
- EIA and ES Completion and submission of DCO application: winter 2018/2019;
- Pre-examination: winter 2018/2019 to spring 2019;
- Examination: spring 2019 to autumn 2019;
- Inspector's Recommendation Report: winter 2019/2020;
- Secretary of State's Decision: winter 2019/2020 to spring 2020; and
- Construction Start: Late 2020.

2 THE PROJECT

2.1 BACKGROUND TO THE SCHEME

PRELIMINARY STUDIES

2.1.1. In an attempt to fully understand and address the issues a number of studies have been undertaken in recent years and are described in the Scoping Report (see **Appendix D – Section 2, p.6, – Overview of the Project**).

2.1.2. Following a number of feasibility and traffic studies, a Strategic Outline Business Case (SOBC) was produced identifying that the Scheme should be taken forward into the Roads Investment Strategy (RIS) announced in December 2014, and was progressed in to the "Options Identification" stage.

OPTION IDENTIFICATION

2.1.3. Three options were identified at the "Option Identification" stage; each with the same alignment and cross section between junction 66 (Eighton Lodge) and junction 65 (Birtley), where widening of existing structures was possible. The main difference was the approach to replacing Allerdene Bridge, either within the existing footprint or to the south of the existing structure. In April 2016, it was concluded that one of the options should be omitted from further assessment. The benefits for all three options were similar but the costs for this option were significantly higher with more land take and a larger impact on the surrounding environment. Consequently, two options were considered at the next "Option Selection" stage.

OPTION SELECTION

2.1.4. The "Option Selection" stage concluded in July 2017, after public consultation in autumn 2016, which confirmed that Option 1a with the offline replacement of Allerdene Bridge should be the recommended route (see **Ref 2.1**) (Refer to **Section 3** for further details).

2.2 OBJECTIVES OF THE SCHEME

2.2.1. The objectives of the Scheme are to:

- Reduce congestion: making the route between Birtley to Coal House more reliable and providing capacity for future growth.
- Improve the reliability of people's journeys: by placing the right traffic on the right roads and freeing up local capacity for all types of road users, including pedestrians, cyclists and equestrians.
- Make journeys safer: designing the Scheme to modern highways standards, introducing better lane control, and providing adequate capacity for predicted traffic levels.
- Help support economic growth: by enabling major residential and commercial developments to proceed, leading to increased economic growth, regionally and nationally.
- Support the government's initiative for growth in the North East: by improving the Team Valley Employment Zone.

2.2.2. The overall environmental aims of the Scheme are as follows:

- Reduce carbon: by providing more free flowing traffic;
- Improve the noise environment: in three Noise Improvement Areas (NIA) and along the whole Scheme; and

- Work with stakeholders: to improve the water environment.

2.2.3. 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) Roads Investment Strategy (RIS) which identified Key Performance Indicators (KPIs), including targets and requirements relating to the environment, cyclists, walkers and other vulnerable users of the network.

2.3 DESCRIPTION OF THE SCHEME

OVERVIEW

2.3.1. The Scheme forms part of the Newcastle Gateshead Western Bypass (NGWB) which is located on the A1 between junction 65 (Birtley) and junction 80 (Seaton Burn). It is a part of Highways England's strategic road network (SRN) serving the metropolitan area of Tyne and Wear.

2.3.2. The A1 NGWB is one of the most congested highway links in the North East Region with more than 110,000 vehicles using the route every day on the busiest section. As a result of this travel demand on the route there are a number of issues relating to; journey time delays, journey time reliability, route resilience, safety, environmental impacts and development pressures.

2.3.3. Improvements to the A1 NGWB have long been acknowledged as a requirement for economic growth in the region within both local and national policy documents and reflected in the consensus of opinion amongst regional stakeholders that something needs to be done to address the issues to facilitate the economic growth of the region. The route has been identified as a 'hot-spot' requiring Government investment to deliver infrastructure improvements.

2.3.4. Traffic in the region is forecast to grow in the future, largely due to a number of proposed development sites to be delivered through the Newcastle Approved Plan. This additional traffic demand will further exacerbate the issues on the A1 NGWB.

2.3.5. The existing carriageways comprise:

- Northbound: Two lanes with a lane gain/lane drop between Birtley and Eighton Lodge and two lanes between Eighton Lodge and Coal House; and
- Southbound: Two lanes between Coal House and Eighton Lodge with an additional climbing lane between Smithy Lane and Eighton Lodge and three lanes between Eighton Lodge and Birtley.

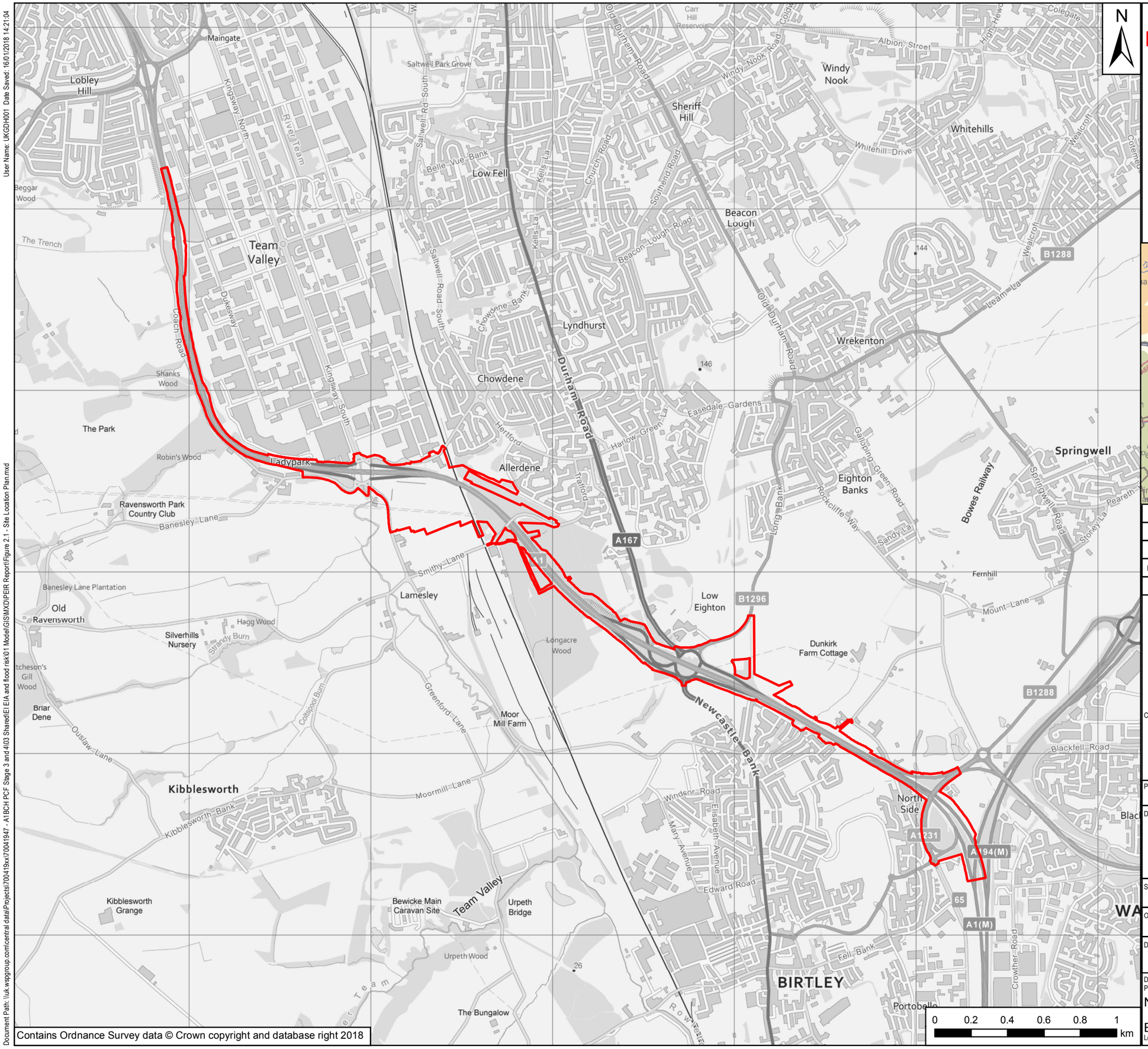
SCHEME LOCATION

2.3.6. This Scheme is located between junction 65 (Birtley) and junction 67 (Coal House) on the A1 in Gateshead and is approximately 4.2 km in length.

SCHEME FOOTPRINT

2.3.7. The Scheme Footprint, as defined by the red line in **Figure 2.1**, is made up of all of the land required to build and operate the Scheme (both temporary and permanent land).

2.3.8. The Scheme Footprint has been developed to allow for some flexibility in the design process and the EIA is considering a worst case footprint, based upon the size of the application boundary. Since submission of the Scoping Report, changes to the Scheme Footprint as shown in **Table 2-1** were made.



Rev	Date	Description	By	Chk'd	App'd
P01	12/01/18	First Issue	GH	NA	KS

Client: highways england

Project Title	A1 BIRTLEY TO COALHOUSE
Drawing Title	Figure 2.1 Site Location Plan

Scale	Drawn	Checked	Approved	Authorised
1:20,000	GH	NA	KS	NR
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Table 2 -1 Scheme Footprint Changes Log

REFERENCE	STATUS	DESCRIPTION	DATE
001	Removed	Extent of Northern Gas Networks (NGN) land plot amended to exclude plot of land part of the residential property/farm.	24/11/2017
002	Transferred	The area required for the re-alignment of the drainage ditch has been extended. Land still within the redline boundary but transferred from temporary allocation to permanent.	24/11/2017
003	Added	Additional area included (Tyne Yard) for possible diversion of overhead electric cable and/or overhead electric cables.	24/11/2017
004	Added	The width of access track increased to include small area between the redline boundary and Gateshead Council land.	24/11/2017
005	Added	Area adjacent to Eighton Lodge included as additional area for site compound.	24/11/2017
006	Added	Area around the existing path (Longbank culvert) has been included for pedestrian management and permanent works.	24/11/2017
007	Added	Area adjacent to drainage ditch (North Dene) included for construction access and pedestrian management.	24/11/2017
008	Added	Area for North Dene footbridge (south) has been extended to accommodate the new ramps and for construction works.	24/11/2017
009	Added	Area for construction access for North Dene footbridge (north) has been included.	24/11/2017
010	Removed	Area of woodland south of A194 (M) northbound overbridge has been removed as no works are expected.	24/11/2017

2.3.9. The Scheme will provide additional capacity by widening to four lanes between junction 65 and 67 on the southbound carriageway and three lanes with an additional lane to help manage traffic joining and leaving the A1 between junctions on the northbound carriageway. It also includes a replacement structure of Allerdene Railway Bridge to the immediate south of the current structure which would tie in to the existing junction 67 Coal House roundabout. Most of the work will take place within the highway boundary; however, some additional land will be required alongside the A1 at certain points.

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

2.3.11. The Scheme will also look to install electronic signage to provide driver information along the road.

2.4 PRELIMINARY DESIGN

2.4.1. Following the development of the “Option Selection” stage traffic model there was a requirement to amend the design to include four lanes southbound through junction 66 (Eighton Lodge). The current design requires asymmetrical widening whereby the southbound carriageway is now:

- North of junction 67 (Coal House) – three lanes;
- Through junction 67 (Coal House) – three lanes;
- Between junction 67 (Coal House) and junction 66 (Eighton Lodge) – four lanes;
- Between junction 66 (Eighton Lodge) and junction 65 (Birtley) – four lanes; and
- South of junction 65 (Birtley) – three lanes.

3 ASSESSMENT OF ALTERNATIVES

3.1.1. Various alternative Scheme options have been considered prior to determining that Option 1a would be taken forward as the preferred route, and these are detailed in **Section 4.2** of the Scoping Report (See **Section 4**, **p.10, Assessment of Alternatives - Appendix D**).

3.1.2. The EIA Regulations require a comparison of environmental effects of the reasonable alternatives that have been studied when providing an indication of the main reasons for selecting the chosen option.

3.1.3. Two options were shortlisted at the "Option Selection" stage (1a and 1b) and presented at a public non-statutory consultation event held in September 2016:

- **Option 1a** "Offline Replacement of Allerdene Railway Bridge" – 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 (See **Figure 3.1**); and
- **Option 1b** "Online Replacement of Allerdene Railway Bridge" – 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 (See **Figure 3.2**).

3.1.4. Options prior to non-statutory consultation undertaken in 2016 are presented in the Scoping Report (See **Section 4**, **2, p.6, Alternative Assessment Findings - Appendix D**).

3.1.5. Option 1a was taken forward as the preferred option because:

- It is the most cost effective option, providing similar or greater benefits to other options, but at lower cost;
- The non-statutory public consultation identified that 73% of respondents preferred Option 1a;
- It has a shorter construction period resulting in potentially less disruption;
- It offers less constraints for the construction of Allerdene Bridge resulting in improved buildability;
- The demolition of the existing Allerdene Bridge is less of a risk to the construction programme;
- It reduced temporary works complexities;
- It offers an improved geometrical alignment; and
- This option is generally better in respect of driver stress as the speed/lane restrictions will be significantly less than Option 1b during construction.

Figure 3.1 - Option 1a Route

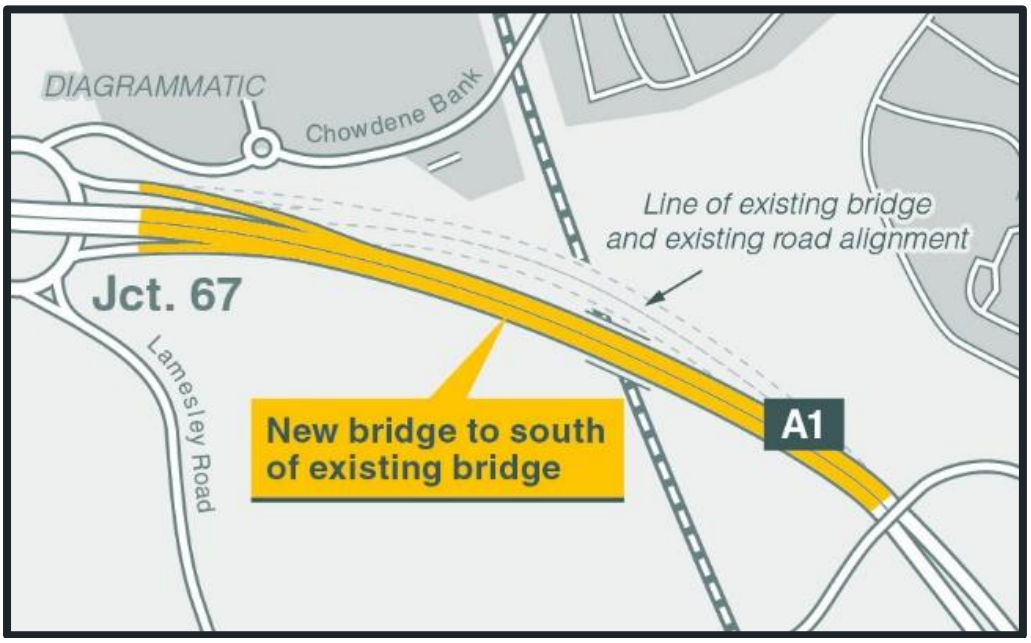


Figure 3.2 - Option 1b Route

3.1.6. The reasons for discounting Option 1b are presented in **Table 3-1**.

Table 3-1 - Comparison of the Options

	Description	Reason for taking forward or discounting
Option 1A - Offline Replacement of Allerdene Railway Bridge	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; ▪ This option 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; ▪ This option has less risk to the construction programme as the demolition of the existing Allerdene Bridge is not on the critical path; ▪ This option has reduced temporary works complexities; ▪ The overall cost/programme of the Scheme would be significantly reduced for this option; ▪ This option offers an improved geometrical alignment; ▪ This option is generally better in respect of driver stress as the speed/lane restrictions would be significantly less than Option 1b during construction; and ▪ 73% of the public voted for this option as the preferred one.
Option 1B - Online Replacement of Allerdene Railway Bridge	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.

3.1.7. The Preferred option was announced in July 2017 details can be found at the following location: www.highways.gov.uk/a1birtleytocoalhouse

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

4.1 EIA PROCESS

4.1.1. The development and design of major highway projects is governed by guidance set out in the Design Manual for Roads and Bridges (DMRB). Volume 11 (see **Ref 4.1**) of DMRB provides guidance on producing an EIA that is specifically applicable to highway projects. Volume 10 of DMRB (see **Ref 4.2**) covers environmental mitigation. Relevant Interim Advice Notes (IANs) will also be used, where applicable.

4.1.2. An EIA will be undertaken in line with DMRB and the EIA Regulations with some technical disciplines following additional best practice guidance.

SCREENING

4.1.3. An EIA Screening (Determination) aims to determine whether a project requires an EIA in line with the EIA Regulations.

4.1.4. As detailed in **Section 1** an EIA Screening exercise was undertaken and it was identified that an EIA would be required for the Scheme.

SCOPING

4.1.5. The scoping process is used to determine which environmental topics should be assessed and the level of detail that should be included in the EIA. A Scoping Report, available in **Appendix D** of this PEIR, has been prepared and was submitted to PINS on 8 November 2017 with a request for a statutory Scoping Opinion, setting out the key potential impacts and the proposed approach to the assessment (refer to **Section 1**).

4.1.6. The Scoping Opinion, available in **Appendix E** of this PEIR, was received on 18 December 2017 and has been taken into account when preparing the PEIR and will be used to inform which topics the ES should assess.

BASELINE

4.1.7. The first step in the EIA is to determine the baseline conditions. These conditions are not necessarily the same as those that exist at the current time; they are the conditions that would exist in the absence of the Scheme either (a) at the time that construction is expected to start, for impacts arising from construction or (b) at the time that the Scheme is expected to open to traffic, for impacts arising from its operation. Therefore, the identification of the baseline conditions involves predicting changes that are likely to happen in the intervening period, for reasons unrelated to the Scheme. Baseline conditions can be found in the Scoping Report (see **Appendix D**). The PEIR includes changes to or additional information since the Scoping Report was produced. A full update of the baseline will be undertaken as part of the EIA and incorporated in the ES.

PREDICTED ENVIRONMENTAL IMPACTS

4.1.8. The next stage of the EIA process is to predict the potential impacts that might arise as a result of the Scheme. Impacts are changes to the environment, compared with the baseline environment, attributable to the construction and operation of the Scheme and may be adverse or beneficial, direct or indirect, temporary or permanent. The methods of forecasting impacts vary by topic.

SIGNIFICANCE

4.1.9. The EIA process then provides an evaluation of how significant these impacts are likely to be. In considering significance, the assessment takes account of the sensitivity of the environmental receptor, the nature of the impact and whether it can be mitigated through good design or construction management.

MITIGATION AND ENHANCEMENT

4.1.10. Where adverse effects are identified, mitigation may be proposed to reduce the impacts. In some cases EIA professionals and stakeholders involved in the process may also identify and recommend enhancement opportunities for a project in order to achieve improved environmental outcomes. It is therefore important that the EIA process takes place alongside the development of Scheme design in order to make the most of such opportunities.

4.2 LIMITATIONS

4.2.1. This PEIR is based on the latest design and construction information. As such these findings may be subject to change as the design progresses. The assessment of the significance of effects will be undertaken as part of the EIA.

4.2.2. Any gaps in information identified at this PEIR stage will be considered and addressed along with specific mitigation measures as part of the assessment during the production of the ES.

4.3 STATUTORY CONSULTATION AND RESPONSES

4.3.1. At the time of writing, discussions with the Senior Conservation Officer at Gateshead Council were ongoing regarding potential enhancement measures for the Bowes Railway Scheduled Monument (SM). With the exception of the cultural heritage discipline, no further consultation has been undertaken since the Scoping Report. Refer to the Scoping Report (**Appendix D** - **Section 5, p.16, Consultation**) for details on consultation undertaken to date.

4.3.2. Scoping Opinion responses (see **Appendix E**) have been noted in this PEIR and will be taken into account in the ES.

5 OVERVIEW OF THE ENVIRONMENT

5.1.1. The Environmental Constraints Plan (see **Figure 5.1**) provides an overview of the existing environment in and around the Scheme.

5.1.2. The area surrounding the Scheme is characterised by a combination of residential, rural, industrial, recreational, open space and urban fringe land uses. Much of the central area of the Scheme falls within designated Green Belt land. The Angel of the North (adjacent to the Scheme), which is culturally significant at a national, regional and local level, lies within this central area.

5.1.3. Bowes Railway Scheduled Monument (SM) passes under the Scheme and is considered to be of high value. Ravensworth Coalmill SM is directly adjacent to the Scheme and Ravensworth Castle SM is within 1 km of the Scheme Footprint. There are 15 high value Listed Buildings, all of which are Grade II Listed and two locally Listed Buildings within 1 km of the Scheme Footprint.

5.1.4. Ravensworth Conservation Area lies partially within the Scheme Footprint. Lamesley, Chowdene and Birtley Conservation Areas lie within 1 km of the Scheme Footprint.

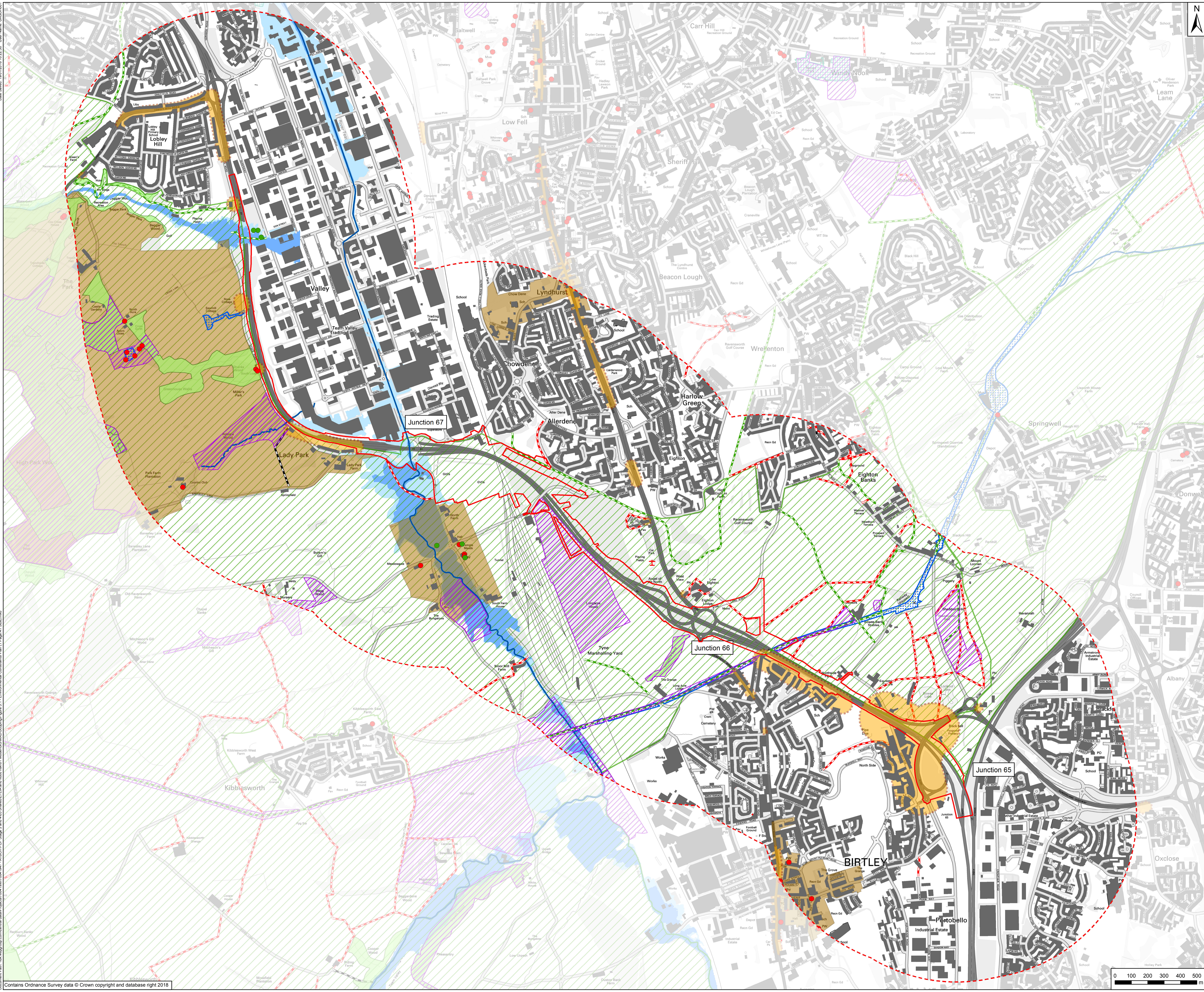
5.1.5. The key visual receptors identified include the Angel of the North, residential properties in Birtley, Birtley East, Eighton, Allerdene, Lamesley Village and individual rural properties, recreational viewpoints from Public Footpath and cycle networks, employment and commercial viewpoints within the Team Valley Trading Estate, and educational viewpoints from various schools.

5.1.6. Longacre Dene Ancient Woodland and Hill Head Ancient Woodland are adjacent to the Scheme.

5.1.7. Habitat within the Scheme has the potential to support protected and notable species. Of local value, the Lower River Team wildlife corridor and Follingsby wildlife corridor cross the Scheme Footprint. There are also two wildlife corridors (Upper Team Valley and Windy Nook and Heworth) which are within the 2 km Scheme Footprint. Of local value, Longacre Wood LWS and Bowes Railway LWS are located partially within the Scheme Footprint, whilst Dunkirk Farm West LWS, Ravensworth Ponds and Wood LWS and Longacre Dene LWS are directly adjacent to the Scheme.

5.1.8. There are six NIA within 1 km of the Scheme Footprint. There are no Air Quality Management Areas (AQMAs), or landscape designations within or near to the Scheme Footprint. The nearest AQMA is located approximately 1.2 km south of the Scheme Footprint.

5.1.9. The River Team, a main river, runs underneath junction 67 and continues to flow in a northerly direction through Team Valley Trading Estate. The Scheme crosses over the fluvial floodplain of the River Team. There are no designations relating to the River Team or River Tyne in the vicinity of the Scheme. The River Team is hydraulically connected to the Northumberland Coast Special Protected Area (SPA), Proposed Special Protected Area (pSPA) and Ramsar, although it is not currently considered that there would be any effect on these sites.



Document Path: \\uk.wspgroup.com\central data\Projects\700419xx\70041947 - A1BCH PCF Stage 3 and 4\03 Shared\EI EIA and flood risk\01 Model\GIS\MXD\Scoping\Figure 5.1 - Environmental Constraints Plan (1 Page A1 Size).mxd

Key

- Flood Zone 3
- Flood Zone 2
- Statutory Main Rivers
- Noise Action Planning Important Areas (NIA)
- Scheme Footprint
- 1km Study Area
- Angel of the North
- Local Wildlife Site
- Greenbelt
- Veteran Trees
- Residential and Industrial Properties
- Local Nature Reserve
- Ancient Woodland Inventory
- Site of Special Scientific Interest
- Listed Building
- Scheduled Monument
- Conservation Areas
- Noise Important Areas
- Bridleway
- Footpath
- Restricted Byway
- Main Rivers

Rev	Date	Description	By	Chk'd	App'd
P01	19/01/18	First Issue	GH	NA	KS

Client: highways england

Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 5.1 Environmental Constraints Plan

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1:10,500	GH	NA	KS	NR
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6 ASSESSMENTS

6.1 AIR QUALITY

INTRODUCTION

6.1.1. This section considers the implications of the Scheme on local and regional air quality during the construction and operational phases and any likely significant effects. Air quality is a significant environmental issue because poor air quality can affect human health, quality of life and the natural environment; it can also have economic impacts.

6.1.2. For the construction phase, the assessment will consider vehicular emissions from road traffic, dust generation from construction equipment, and the potential effects to receptor amenity through the deposition of dust.

6.1.3. The principal source of atmospheric pollutant during the operational phase of the Scheme would be road traffic, therefore the principal pollutant considered within the assessment of the operational phase of the project is nitrogen dioxide (NO_2).

6.1.4. Thresholds for the concentration of pollutants in ambient air to protect the environment (human health and ecosystems) are set in UK national legislation (referred to as air quality objectives) and in European Directives (referred to as limit values). For the NO_2, the limit values and objectives are numerically equivalent (see **Table 6-1**).

EXISTING BASELINE KNOWLEDGE

Sensitive Receptors

6.1.5. Receptors will be selected to represent locations where the duration of human exposure is consistent with the averaging period of the relevant air quality compliance measure, and are based on effects on human health. The air quality standard values have been set at concentrations that provide protection to all members of the public, including more vulnerable groups such as the very young, elderly or unwell. The location of all sensitive receptors will be agreed with the local planning authorities and identified in a plan accompanying the ES.

BACKGROUND AIR QUALITY DATA

6.1.6. Background pollutant concentrations for this assessment, i.e. those resulting from distant sources and pollutant transport have been taken from the mapped data provided by Defra on a 1 km x 1 km grid covering the UK, interpolated to the locations of the selected receptors.

2017 UK AIR QUALITY PLAN

6.1.7. Defra undertakes air quality modelling using their Pollution Climatic Model (PCM) to inform when zones/agglomerations comply with the EU Limit Values.

6.1.8. Modelled roadside concentrations are available for each year to 2030, the data for 2017 from Defra's UK-Air website (see **Ref 6.1**), indicates annual mean roadside NO_2 concentrations for the A1 in the study area range between 50 and 60 µg/m^3, in exceedance of EU limit values.

6.1.9. By 2023 (Scheme opening year), there are no projected exceedances of the EU limit values. The maximum roadside annual mean NO_2 concentration in 2023 (Scheme opening year) on any road link within the study area is 38 µg/m^3, along the A1 between junctions 74 and 75, and is compliant with the EU air quality limit values as shown **Table 6-1** below.

Table 6-1 Air Quality Thresholds

Pollutant	Air Quality Objective/Limit Value	
	Concentration	Averaging Period
Nitrogen Dioxide (NO_2)	40 µg/m^3	Annual Mean
	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Particles (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual Mean
Particles ($PM_{2.5}$)	25 µg/m^3	Annual Mean

The "Affected Road Network"

6.1.10. Pollutant concentrations from traffic emissions disperse rapidly away from a road, returning to background concentrations within 200 m. Relevant receptor locations are chosen based on where people may be present within 200 m of an 'affected road'. These properties would be the worst affected properties, so an assessment based on them would represent a 'worst case scenario'. The study area consists of 200 m corridors either side of all roads in the Affected Road Network (ARN).

6.1.11. Therefore, the study area for assessing operational impacts on air quality in the ES will comprise land within 200 m of "affected roads" which will be determined by analysis of the traffic data. The criteria for defining affected roads as detailed in the Design Manual for Roads and Bridges (DMRB) are as follows:

- 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.

Local Air Quality Management

6.1.12. The Scheme is not located within an Air Quality Management Area[2] (AQMA), however it is anticipated that the Affected Road Network (ARN) will extend as far as Gateshead AQMA

[2] Since December 1997 each local authority in the UK has been carrying out a review and assessment of air quality in their area. This involves measuring air pollution and trying to predict how it will change in the next few years. The aim of the review is to make sure that the national air quality objectives will be achieved throughout the UK by the relevant deadlines. These objectives have been put in place to protect people's health and the environment. If a local authority finds any places where the objectives are not likely to be achieved, it must declare an Air Quality Management Area there. This area could be just one or two streets, or it could be much bigger. Source: DEFRA https://uk-air.defra.gov.uk/aqma/

No 2 (Birtley). This AQMA lies approximately 1.2 km south of the Scheme Footprint (see **Figure 6.1**), adjacent to Washington Services and was declared by Gateshead City Council as a result of annual mean exceedances of the NO_2 air quality objective.

6.1.13. There are five automatic monitoring sites in Newcastle and three in Gateshead, monitoring air quality. One monitoring station, operated by Gateshead Council (GC) is located in Dunston alongside the A1 close to residential premises (see **Table 6-1**). 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, varying from 25.6 and 36.8 µg/m^3 between 2011 and 2016. Within the anticipated ARN as detailed in **Section 6.1.9**, 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.

HIGHWAYS ENGLAND MONITORING

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

6.1.15. 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 (<20 µg/m^3) the air quality threshold.

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

ECOLOGICAL RECEPTORS

6.1.17. The only ecological receptor within the assessment area for the Scheme is Shibdon Pond Site of Special Scientific Interest (SSSI) located approximately 5 km from the Scheme Footprint. Background concentrations of NO_X (oxides of nitrogen) over Shibdon Pond are well within the critical level (and air quality objective) of 30 µg/m^3. Critical loads for nitrogen deposition levels are set for the protection of various ecological designations. At Shibdon Pond, the critical load 15 kgN/ha/yr is currently exceeded without the Scheme by 2.78 kgN/ha/yr.

POTENTIAL IMPACTS

Construction

6.1.18. Air Quality impacts due to construction will be temporary. Impacts would typically include an increase in emissions of dust from earthworks, general construction activity and a loss of amenity due to the presence of construction traffic. In addition, traffic management measures may result in changes to emissions from vehicle exhausts and roadside pollution concentrations.

6.1.19. Whilst the potential for impacts from construction works exists, the application of the best practice measures, will ensure any effects are not significant.

N

Key

- Scheme Footprint
- Air Quality Management Area (2016)

Gateshead AQMA No.2 (Birtley)
(See Inset Map for Detail)

Portobello
Glenluce
Dunvegan
Vigo
Emerson
64

0 0.2 0.4 0.6 0.8 1 km

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Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 6.1 Air Quality Management Area

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Number:

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OPERATION

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

6.1.21. The improvements to the A1 are designed to reduce congestion and provide a more consistent traffic speed. However, the relief of congestion may attract additional vehicles onto the A1. As such, whilst congestion relief should improve emission rates per vehicle, any resulting increase in traffic flows could offset this reduction and result in a net increase in total emissions. The air quality impacts of the Scheme could, therefore, vary from beneficial to adverse depending on the balance between the effects of congestion relief and traffic flow increases.

MITIGATION

6.1.22. Should a significant adverse effect is identified, mitigation measures will be investigated during the EIA.

Construction

6.1.23. Best practice mitigation will be required to control dust and emissions from construction works and plant. These measures will be set out in the Scheme Construction Environmental Management Plan (CEMP) and will typically include the following:

- Minimisation of areas to be stripped of vegetation;
- Dampening down of dust generating activities and materials, including site roads, during dry weather, in addition to site monitoring;
- As far as possible temporary roads should be hard surfaced to reduce dust generation;
- Road sweeping to be carried out on access roads and local roads to remove any material tracked out of the site; and
- Management of stockpiled materials with the potential to generate dust by rolling, covering and / or revegetating as soon as appropriate.

Operation

6.1.24. No specific mitigation or Air Quality Action Plans are likely to be required for the operation of the Scheme. Although should there be a requirement, as a result of a significant air quality effect (as per Interim Advice Note (IAN) 174/13) or an EU Directive compliance risk (as per IAN 175/13), Scheme specific mitigations will be identified in collaboration with the traffic modellers.

LIKELY SIGNIFICANT EFFECTS

6.1.25. Following implementation of the mitigation measures, no significant residual air quality effects are anticipated during construction and operation of the Scheme, subject to an update of the revised traffic date and modelling which will be undertaken during 2018.

FURTHER WORK FOR THE EIA

6.1.26. A detailed level assessment on the air quality impacts during operation of the Scheme will be undertaken in accordance with the methodology set out in the DMRB Volume 11, Section 3, HA207/07 “Air Quality”, and in line with the requirements of the National Policy Statement for National Networks (NPSNN) (see **Ref 6.2**) against which the Scheme will be examined.

6.1.27. The assessment of potential impacts in local air quality will be undertaken to establish the change in ambient NOx (NO_2) and PM_{10} concentrations and the potential for exceedance of ambient air quality standards set out in the National Air Quality Strategy. The relevant air quality objectives are presented in **Table 6-1**.

6.1.28. In addition to the assessment detailed in the Scoping Report **(Appendix D** - **Section 7.7,p.29, – Assessment Methodology**) and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- The potential for adverse effects during the construction phase will be established through a screening risk assessment. This will be used to identify the appropriate emissions controls and mitigation of any potential adverse effects. This assessment will be undertaken in accordance with DMRB Volume 11, Section 3, HA207/07 “Air Quality”;
- An assessment of human health impacts associated with increased $PM_{2.5}$ from the Scheme with reference to the modelled impact on PM_{10}; and
- Evidence will be provided in the ES regarding potential effects from the Scheme on regional level emissions.

6.2 CULTURAL HERITAGE

INTRODUCTION

6.2.1. 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.

EXISTING BASELINE KNOWLEDGE

Archaeological Remains

6.2.2. The majority of the known cultural heritage assets derive from the Medieval period onwards. The village of Lamesley (HER 664) survives as a contracted medieval village with three (HER 4929) pockets of ridge and furrow field patterns surrounding the village core. Ravensworth Park Conservation Area (CA), which lies adjacent to the Scheme Footprint to the north west, also has Medieval origins as it was the site of a 14th century deer park. Originally it appears that Ravensworth (HER 171) was a settlement in its own right, but this is one of many examples throughout Country Durham and Tyne and Wear of villages that gradually decreased in size and were lost during the Medieval or early Post-Medieval period. Similarly, Kibblesworth (HER 648), Eighton (HER 661) and Birtley (HER 670) are all either noted as deserted or contracted villages.

6.2.3. The Industrial Revolution came during the 18th century to this area, with increased levels of coal mining and associated infrastructure from earlier operations. Within the area these included Ravensworth mine dating to the early 17th century (HER 1663), Allerdene Colliery Lamesley (HER 3771), Sheriff Hill Colliery (HER 3844), Ravensworth Ann Colliery (HER 3864, 3874) and Mount Moor Colliery (HER 3896). In between these pits, a substantial network of waggon ways was developed to transport the coal.

6.2.4. As coal extraction activity decreased, the surrounding area was developed for industrial uses, as shown by the Team Valley Trading Estate to the north and the Tyne Marshalling Yards to the south of the Scheme Footprint. Several defensive sites dating to the World War II and later are also recorded, including a Royal Observer Corps post at Springwell (HER 5878).

Historic Buildings

6.2.5. There are no World Heritage Sites or sites included on the Tentative List of Future Nominations for World Heritage Sites (July 2014), Registered Historic Parks and Gardens or Registered Battlefields within 1 km of the Scheme Footprint.

6.2.6. There is one Scheduled Monument (SM) which crosses the Scheme, Bowes Railway, which is located to the south of junction 66. Ravensworth Coalmill SM is adjacent north of junction 67. Ravensworth Castle, a ruinous Grade II* listed building and SM is located within 1 km of the Scheme Footprint to the North West. There are no listed buildings within the Scheme Footprint; however, there are 17 listed buildings including locally listed sites within 1 km of the Scheme Footprint as detailed in **Table 6-2** below. Lamesley, Ravensworth Park, Birtley and Chowdene CAs are all within 1 km from the Scheme Footprint.

6.2.7. There are a number of non-designated historic buildings close to and including the Angel of the North (NMR 1357753) and North Farm (HER 5081).

Historic Landscape

6.2.8. From a review of the Tyne and Wear Historic Landscape Characterisation Study, the historic landscape types within the Scheme Footprint include:

- Communications (areas of transport networks and associated services);
- Extractive (areas of predominately quarrying / mining); and
- Field systems (areas of enclosed fields both arable and pasture).

Sensitive Receptors

6.2.9. Scheduled Monuments (SM), listed buildings and conservation areas as detailed in **Table 6-2**, and shown on **Figure 6.2**, have been identified.

Table 6-2 - Scheduled Monuments, Listed Buildings, Locally Listed Buildings and Conservation Areas within the 1km of the Scheme Footprint

HERITAGE ASSET TYPE	ASSET NAME
Scheduled Monument (SM)	Ravensworth Castle (1016975); 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.
Conservation Areas	Lamesley Village (11883); Ravensworth Park (646); Birtley (11878) and Chowdene (11885).
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), Ravensworth Castle (1025151), Arch Walls and Towers to West of Ravensworth Castle (1025150), Stable and gate houses to east of Ravensworth Castle (1185160), Well in stable yard of Ravensworth Castle (1025191), Butler Cross (1185149).
Locally Listed Buildings	Team Valley Trading Estate (7636), The Angel of the North (11053).

6.2.10. As shown on **Figure 6.2**, there are also a number of undesignated heritage assets in the vicinity of the Scheme Footprint.

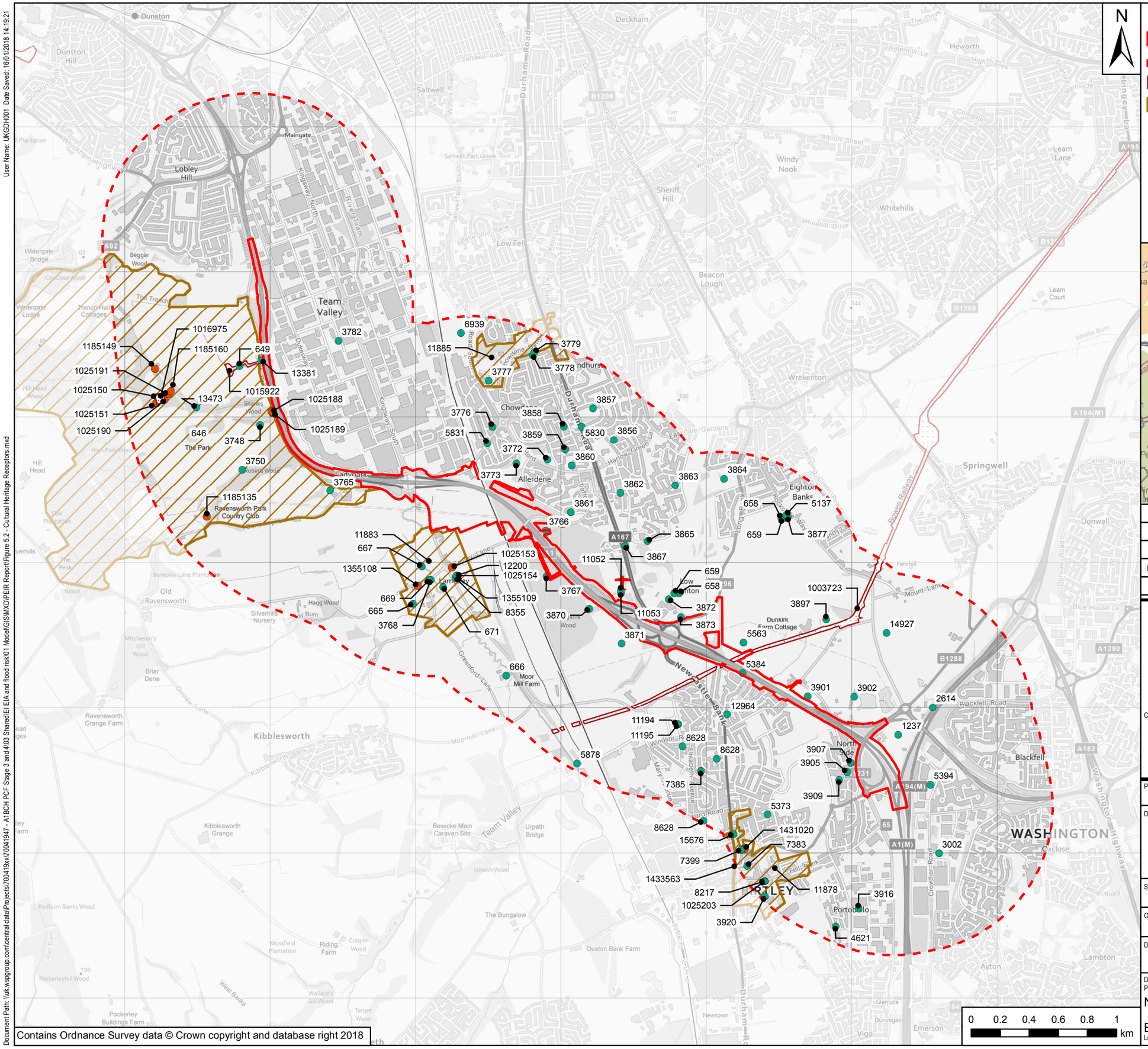
6.2.11. Other sensitive receptors include known and potential buried / surface archaeological remains (particularly from the Roman, Medieval and Post-Medieval periods).

POTENTIAL IMPACTS

Construction

6.2.12. The potential impacts of construction on Cultural Heritage could include the following:

- Changes and harm to the setting of Bowes Railway SM, Lamesley Village Conservation Area (CA) (ID: 11883); Ravensworth Park CA (ID: 646); Birtley CA (ID: 11878) and Chowdene CA (ID: 11885); ten Grade II listed buildings and the locally listed Team Valley Trading Estate (ID: 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 these assets;



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Project Title: A1 BIRTLEY TO COALHOUSE

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- There is potential for direct impact during construction to Bowes Railway SM;
- The partial loss and disturbance of known non-designated below ground archaeological assets that include the remains of Eighton Village (Historic Environment Records (HER ID: 661) and Ravensworth Village (HER ID: 12021); the site of two wagonways (HER ID: 4122 and HER ID: 5935); the site of Lady Ravensworth Almshouses (HER ID: 7864) and a section of the Chester-le-Street to Gateshead Roman Road (HER ID: 276). Harm to these assets are likely to be caused by ground moving activities such as top soil stripping, ground levelling and excavations for drainage, compounds and other construction related activities; and
- 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 as top soil stripping, ground levelling and excavations for drainage, compounds and other construction related activities.

Operation

6.2.13. Outlined below are potential impacts resulting from the operational phase of the Scheme:

- 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; and
- Traffic noise levels, and lighting have potential to effect the setting of the locally listed Team Valley Trading Estate (HER ID: 7673) and Angel of the North.

MITIGATION

6.2.14. Bowes Railway SM is considered by Historic England to be currently at risk of degradation due to poor maintenance and vandalism. The project team are currently consulting with Gateshead Council's Conservation Officer to determine potential enhancement measures which could include facilitating the understanding of the asset through signage and improvement of its current condition through good design.

Construction

6.2.15. Potential mitigation for effects on cultural heritage during construction include:

- Where permanent or temporary land take cannot be avoided, an investigation strategy will be devised in consultation with the Senior Conservation Officer at Gateshead Council. This is likely to comprise a geophysical survey followed by a programme of intrusive trial trenching or archaeological monitoring;
- Ground investigation (GI) works involving trial pits will be monitored if within an area of archaeological sensitivity;
- SM consent will need to be sought from Historic England ahead of any works taking place within the Bowes Railway SM; and
- Unknown or above or below-ground archaeology encountered during construction would be mitigated through measures such as preservation by record or preservation in situ.

Operation

6.2.16. As described above good design of the structures and provision of information and signage would facilitate the integration and enhancement of Bowes Railway SM; as would landscape planting around the extended Longbank Bridleway Underbridge.

LIKELY SIGNIFICANT EFFECTS

6.2.17. Residual effects on above or below-ground archaeology during the operation phase would be negated through mitigation measures such as preservation by record or preservation in situ. Residual effects are therefore expected as a 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.

6.2.18. Following the implementation of mitigation measures such as the careful design of Longbank Bridleway underbridge (See **Photograph 6-1**) and the introduction of signage, the setting of the Bowes Railway SM may be enhanced thus leaving a beneficial residual effect. Adverse 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 Scheme. The approach may change depending on the outcome of the detailed assessment and the settings assessment.

Photograph 6-1 - Longbank Bridleway Underbridge

FURTHER WORK FOR THE EIA

6.2.19. A detailed level of assessment on the cultural heritage impacts during construction and operation of the Scheme will be undertaken in accordance with the methodology sets out in the DMRB Volume 11, Section 3, Part 2, HA208/07 “Cultural Heritage”(see **Ref 6.3**). It will discuss the value of the heritage assets and their settings and their cultural heritage significance.

6.2.20. In addition to the assessment detailed in the Scoping Report (**Appendix D - Section 8.7, p.39, – Assessment Methodology**) and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- Of particular importance would be the impact of the Scheme on both the setting and physical structure of Bowes Railway SM and a Scheduled Monument consent would therefore be required from Historic England for works at Bowes Railway within the SM;
- The Senior Conservation Officer at Gateshead Council will be consulted regarding potential enhancement measures for the Bowes Railway SM;

- A Zone of Visual Influence (ZVI) developed for the Landscape and Visual Assessment;
- The conclusion of the noise impact assessment will confirm the potential amenity effects and refine heritage assets sensitive receptors;
- Potential impacts on Ravensworth Castle will be considered; and
- Where appropriate, alterations to drainage patterns that might affect cultural heritage assets will be considered.

6.3 LANDSCAPE AND VISUAL EFFECTS

INTRODUCTION

6.3.1. The Landscape and Visual Impact Assessment (LVIA) considers the two related topics of:

- **Landscapes:** they 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; and
- **Visual amenity**: a view, its components and context can have a great effect on the quality of people's lives.

EXISTING BASELINE KNOWLEDGE

6.3.2. Recreation and Tourism baseline can be found in the People and Communities **Section 6.8 to 6.8.17** of this PEIR.

Topography and Geology

6.3.3. The Southern end of the Scheme Footprint lies at 100 m Above Ordinance Datum (AOD), falling to 10 m AOD into the Team Valley at its northern end. The local landscape topography rises to the northeast at Springwell situated 2 km from the Scheme Footprint to approximately 150 m AOD. The land also rises to approximately 210 m AOD at Marley Hill, to the 4 km west of the A1 at the northern end of the Scheme Footprint.

Land Use and Open Spaces

6.3.4. There is a marked contrast land use surrounding the Scheme. 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.

6.3.5. 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.

6.3.6. 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. 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.

6.3.7. 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 Main Line Railway. This represents a marked but localised change in land use.

6.3.8. 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.

6.3.9. 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 / Gateshead conurbation. The statue is surrounded by open space; however views towards the A1 are largely screened by vegetation.

Connectivity

6.3.10. There are a good number of footpaths and bridleways within 1 km of the Scheme Footprint, especially to the 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. 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 Main Line 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 (Longbank Bridleway).

6.3.11. Three Sustrans cycle route types lie within 1 km of the Scheme Footprint:

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

6.3.12. As with the Public Rights of Way (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.

6.3.13. The ProW within 1 km of the Scheme Footprint and the Sustrans cycle routes are shown on **Figure 6.4**.

Vegetation

6.3.14. Linear belts of semi-mature broadleaf tree and shrub planting are located along the A1 including around junctions. 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.

Green Belt

6.3.15. Much of the Scheme Footprint falls within designated Green Belt land as shown in **Figure 6.3**, namely the Tyne and Wear Green Belt around Gateshead and Newcastle.

Conservation Areas

6.3.16. This part of the A1 is adjacent or near four conservation areas:

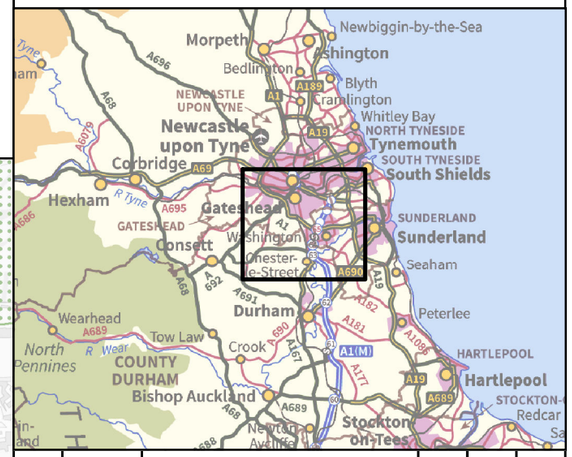
- Ravensworth Conservation Area is to the west of the Team Valley. This contains the remains of a medieval castle and its boundary reflects the nineteenth century Ravensworth Estate. The boundary of the Conservation Area is immediately adjacent to the Scheme Footprint;
- Lamesley Conservation Area lies approximately 300 m to the south and west of the Scheme Footprint;
- Birtley Conservation Area lies approximately 550 m to the south west of the Scheme Footprint. It covers the historic centre of Birtley village; and
- Chowdene Conservation Area lies approximately 530 m to the north of the Scheme Footprint.

Gateshead Urban Character Areas
GS08: Allerdene
GS09: Harlow Green
GS10: Eighton Banks
GS12: Elizabethville
GS13: Birtley East
GS14: Birtley
GS15: Vigo and Portmeads

Landscape Character Area (White Young Green)
LCA 9b: Farmland to the east of the A1 corridor.
LCA23: Longacre Dene.
LCA32a: Lamesley Reedbeds in the Valley Floodplain.
LCA57: Wooded valley along the Strandy Burn which is just within the Study Area to the west.
LCA63: Pasture and arable land around Old Ravensworth to the west of the Study Area.
LCA22: A1 Corridor north of Birtley.
LCA24: Tyne Marshalling Yard and land associated with Long Acre Farm.
LCA27: Elevated railway sidings.

N

Key
- Scheme Footprint
- 1km Study Area
- Conservation Area
- Greenbelt
- Ancient Woodland
- Gateshead Urban Character Assessment
- Landscape Character Area (White Young Green)



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Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 6.3 - Landscape Sensitive Receptors Within 1km of the Scheme Footprint

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0 0.25 0.5 0.75 1 km

N

Key

- Scheme Footprint
- 1km Study Area
- Landmark - Angel of the North

Public Right of Way

- Bridleway
- Footpath
- Primary School
- Secondary School
- Railway Line

Sustrans Local Route

- Local Route (Off Road)
- Local Route (On Road)

Sustrans Regional Route

- Regional Route (Off Road)

Sustrans National Cycle Network (<75K)

- Local Route (off road)
- Viewpoint Locations
- Direction of View

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Drawing Title: Figure 6.4 Visual Receptors Within 1km of the Scheme Footprint

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Suitability: S1

Drawing Number: Project N/A | Originator WSP | Volume BCH | Location | Type | Role | Number

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Revision: P01

National Character Areas

6.3.17. The Scheme sits within National Character Area (NCA) 14 – Tyne and Wear Lowlands which 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. This NCA 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 Main Line railway.

Local Landscape Character Areas

6.3.18. The majority of the 1 km radius from the Scheme lies within the Metropolitan Borough of Gateshead, with a small section lying within the Metropolitan Borough of the City of Sunderland. Gateshead Council has two existing Landscape Character Assessments (LCAs) which are not adopted. The most recent LCA was undertaken in 2007 by White Young Green[3]. This divided the borough into six broad landscape character types. The Scheme sits within the Team Valley LCA. The LCA then subdivides this Character Area into 33 smaller landscape character areas as detailed on **Figure 6.3**.

6.3.19. The Team Valley LCA crosses the Scheme from east to west. This LCA is bounded by Gateshead to the north and east and Birtley to the south. It includes the villages of Lamesley, parts of Birtley and Kibblesworth and its key characteristics are summarised as:

- A predominantly agricultural area, of both pastoral and arable farming;
- Evidence of rectilinear 19th century field patterns to the western valley slopes;
- A landscape dissected by the busy East Coast Main Line;
- Hedgerow field boundaries with large number of hedgerow trees remaining;
- Diverse landscape uses within the area to the south of Kibblesworth e.g. water treatment works, caravan park and reclaimed quarry; and
- Long distance views of the Angel of the North.

6.3.20. The landscape character of this LCA is described as open, with views of Gateshead and Newcastle possible. The East Coast Main Line severs the existing infrastructure and forms a strong visual and audible element of the landscape. The landscape condition of this LCA is described as being reasonably good, with the retention of hedgerows. The landscape mostly remains in agricultural use.

6.3.21. The LCAs were assessed individually in terms of their landscape character and condition, architecture and settlement form and gave a landscape sensitivity and capacity assessment.

6.3.22. Gateshead Council's *'Made in Gateshead'* Urban Character Assessment was produced in 2011. The Urban Character Areas which are within the Scheme Footprint or close to the Scheme are described in **Table 6-3** below and illustrated on **Figure 6.3**.

[3] White Young Green (2007) Landscape Character Types

Table 6-3 – Gateshead Urban Character Areas within 1 km of the Scheme Footprint

URBAN CHARACTER AREA	DESCRIPTION
GS05-CHOWDENE	Chowdene is a residential suburb located south of Low Fell. The area is dominated by housing and large estates built from the inter war period onwards. The oldest and historically most interesting properties are located on either side of Chowdene Bank. Further south the area is dominated by residential estates which are typical of those built throughout the Borough from the 1930s onwards. Joseph Swan Secondary School is an important building in terms of serving the surrounding residential neighbourhoods. Other land uses include a number of pubs, a nursing care home, residential housing and a secondary school.
AREA GS08 – ALLERDENE	Developed between the 1960s and 1980s, the character of the area is dominated by butterfly roofed houses and the landmark buildings of two tower blocks. Views out of the area include the Angel of the North, the A1 and Team Valley where the landform slopes to the west and south. Land use is predominantly residential, of homogenous housing of poor quality.
AREA GS09 – HARLOW GREEN	This is primarily a 1960s residential estate laid out in cul-de-sacs which segregate pedestrians and vehicles. To the south and north of the character area there is a pair of tower blocks. To the west of the area there is the Ravensworth Golf Course, which adds to the suburban feel of the estate. The majority of views are contained apart from the southern part of the estate where the sloping land affords open views. Durham Road runs along the west boundary of the area and the noise from this busy road and the A1 to the south have a negative impact on the area. There are some historic stone buildings which have survived.
GS10 – EIGHTON BANKS	This area is mainly residential but has a mix of architectural styles and ages, dating from the 19th century to the 1960s. Land use is mainly residential with a dominance of council housing. The area has a significant amount of green open space, including allotments and agricultural land. The landform falls away to the south, with views of the Angel of the North and beyond. Three residential roads including Springfield Avenue located just outside of the Study Area have been noted for their special character of older stone buildings, larger back gardens and deciduous trees. Long Bank is the main route through Eighton Banks.

Sensitive Receptors

6.3.23. Through evaluation of baseline information the following landscape and visual sensitive elements have been identified as shown on **Figures 6.3** and **6.4** respectively:

Landscape

- Trees and vegetation (including Longacre Dene and Hill Head Wood Ancient Woodlands);
- Local Landscape Character;
- Character of Conservation Areas; and
- Green Belt openness.

Visual

- Users of Ravensworth Golf Club;
- Users / residents of the Angel View Inn;
- Residents of the Eighton Lodge Residential Care Home;
- Residential Properties along the A1231 in Birtley (Brightlea, Northside, Banesley Lane, Coach Road) and Birtley East (Malone Gardens, Crathie, Dene Court, North Dene, Long Bank); in Eighton (Lodge and on Durham Road); in Allerdene (Woodford, Salcombe Gardens) and in Lamesley Village;
- Residential Properties – Rural residential viewpoints at fishing tackle shop, Angel of the North Fishing Lakes and near Northside farm;
- Users of Public Rights of Way and other recreational trails (cycle networks, footpaths);
- Users of the Angel of the North fishing lakes near Northside Farm;
- Visitors to the Angel of the North;
- Users of the East Coast Main Line;
- Users of primary and secondary schools (Ravensworth Terrace, St Joseph's RC, Birtley East Community, St Anne's RC, Harlow Green Community, Blackfell, Oakfield Infant School, Oakfield Junior School, Joseph Swan Academy);
- Users of Team Valley Trading Estate; and
- Visitors of the Watergate Forest Park LWS.

POTENTIAL IMPACTS

Construction

6.3.24. The potential impacts on landscape character and visual receptors could include the following:

- Temporary and permanent inclusion of new features for the Scheme including land profiling and the provision and location of the site compound(s) during construction;
- The removal for construction and replanting of some vegetation which currently provides integration and filtering of views from and to the surrounding areas, particularly affects properties near the Scheme;
- Potential loss of woodland within the Scheme Footprint or adjacent: Longacre Wood and Bowes Railway Local Wildlife Sites (LWS); Dunkirk Farm West; and Longacre Dene and Hill Head Wood Ancient Woodlands and LWS;
- 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.

Operation

6.3.25. Presently, potential impacts on landscape character and visual receptors anticipated to arise as a result of the operation of the Scheme include:

- Potential changes in landscape character due to the scale of the Scheme, including introduction of new features such as the replacement Allerdene Bridge;
- The Scheme would potentially create permanent changes in local landscape character due to the removal of maturing highway woodland and vegetation adjacent to Longacre Dene and Hill Head Wood Ancient Woodland sites;
- The Scheme would potentially create permanent changes in local landscape character due to the removal of maturing highway woodland to Longacre Wood LWS;
- Visual changes would potentially affect residential properties with views of the existing corridor and would occur from the operation of the Scheme;
- 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
- Short term effects from the delay in establishment of mitigation planting implemented as part of the Scheme up to year 15.

MITIGATION

6.3.26. Mitigation developed during the design may comprise the following measures, where appropriate:

- Use of well thought out landscape planting to reflect the local character of the Scheme;
- 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, Chowdene and Lamesley Conservation Areas. The retention of existing vegetation, where possible, will help to reduce potentially adverse effects on these receptors;
- Links and views between the A1, the East Coast Main Line and the Angel of the North will be maintained as far as possible.
- Replacing and extending areas where vegetation is removed as a result of the Scheme and provide additional mitigation planting to further reduce potentially significant adverse effects; and
- 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.

LIKELY SIGNIFICANT EFFECTS

Landscape

6.3.27. It is expected that there would be residual effects on the perception of landscape character with the potential to be significant due to:

- The scale of the Scheme;
- The introduction of new features including the replacement Allerdene Bridge and lighting; and
- Removal of maturing highway woodland and vegetation connection to Longacre Wood LWS.

Visual

6.3.28. It is expected that there would be residual effects on visual amenity with the potential to be significant due to:

- The introduction of new features including the replacement Allerdene Bridge and gantries, new signage, technology assets and lighting which would likely result in residual effects on residential properties as well as views to the Angel of the North.

FURTHER WORK FOR THE EIA

6.3.29. A detailed level assessment on the 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 will be undertaken in accordance with the guidance provided in IAN 135/10 Landscape and Visual Effects Assessment (see **Ref 6.4**), and the Guidelines for Landscape and Visual Impact Assessment (Third Edition) (see **Ref 6.5**) (GLVIA), published by the Landscape Institute and IEMA (2013).

6.3.30. In addition to the assessment detailed in the Scoping Report (**Appendix D – Section 9.7, p.54, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- Ravensworth Golf Club users / residents of the Angel View Inn, and residents of the Eighton Lodge Residential Care Home will be considered when selecting and finalising representative viewpoints with the Local Planning Authority (LPA) officers;
- The ES will describe how the Zone of Visual Influence (ZVI) will be defined and subsequently refined on site, including exploring the availability of views from sensitive receptors such as the Ravensworth Golf Course, beyond the initial 1 km study area from the Scheme Footprint;
- Locations of the viewpoints and photomontages will be agreed with Gateshead Council and views between the A1, Angel of the North and the East Coast Main Line will be included; and
- Potential impacts on Longacre Dene and Hill Head Wood Ancient Woodland will be considered as part of the Landscape and Visual Impact Assessment.

6.4 BIODIVERSITY

INTRODUCTION

6.4.1. This section considers the implications of the Scheme on biodiversity during the construction and operational phases and any potentially significant effects.

EXISTING BASELINE KNOWLEDGE

Designated Sites

6.4.2. No European designated sites[4] were identified within the desk study search radius (10 km and 30 km for European sites where bats are one of the qualifying interests). However, a single UK designated site was identified within the 2 km study area from the Scheme Footprint. Norwood Nature Park Local Nature Reserve (LNR) is approximately 1 km north of the Scheme Footprint and is designated for its areas of mature woodlands, wildflowers, rich grassland and wetlands.

6.4.3. UK statutory designated sites are those sites which are designated under UK domestic legislation such as the Wildlife and Countryside Act 1981 (as amended), which includes Sites of Special Scientific Interest (SSSI). UK non-statutory designated sites are those sites which are applied at the local level, and are not underpinned by legislation.

6.4.4. There are a total of 14 Local Wildlife Sites (LWS) previously known as Sites of Nature Conservation Importance (SNCI), as detailed in **Table 6-4** below, forming four wildlife corridors identified within the 2 km of the Scheme.

Table 6-4 – Local Wildlife Sites within 2 km of the Scheme Footprint

Gateshead Council ID – Site Name	Distance from the Scheme Footprint	Designation Criteria
GAT94 – Sheddons Hill	260 m north	Habitats, specifically herb rich meadow and acid grassland species.
GAT116 – Dunkirk Farm East	500m east	Open water plant community and large numbers of damselflies breeding in the pond as well as common frog, smooth and palmate newts.
GAT47 – Dunkirk Farm West	Within the Scheme Footprint	Grassland habitat and the open grassland, tall-herb communities, scrub and hedgerow habitat along the disused wagon way.
GAT24 – Bowes Railway	Within the Scheme Footprint	Wildlife corridor and mosaic of habitats along its length.

[4] Which are those designated under international Conventions and European Directives – principally Ramsar Sites, Special Areas of Conservation (SAC) and Special Protection Areas (SPA)

Gateshead Council ID – Site Name	Distance from the Scheme Footprint	Designation Criteria
GAT144 – Longacre Dene	Adjacent	Ancient semi-natural woodland in an urban area where ASNW is scarce.
GAT69 – Longacre Wood	Within the Scheme Footprint	Habitats and provision of habitat in an urban setting.
GAT145 – Lamesley Meadows/Lamesley Pastures	800m South West	Habitats and its provision for a variety of breeding wading birds.
GAT25 – Birtley Union Brickworks	940 m South West	Lowland mixed deciduous woodland, ponds, species-rich grassland.
GAT57 – Hagg Wood and Mitcheson's Gill	875 m South West	Lowland mixed deciduous woodland.
GAT75 – Moor Mill Farm Pastures	480 m South West	Ponds and rivers.
GAT82 – Ravensworth Ponds and Wood	Adjacent	Lowland mixed deciduous woodland, ponds.
GAT107 – Urpeth Bottoms	1.7 km South West	Information not available at the time of writing. This will be updated in the ES.
GAT141 – Watergate Forest Park Lake	1.3 km North West	Wetlands, woodlands, wildflower meadows.
GAT149 – Bowes Valley Nature Reserve	1.2 km South West	Ponds, species-rich grassland.
GAT152 – Saltwell Park Lake	1.7 km North East	Information not available at the time of writing. To be updated in the ES.

6.4.5. **Figure 6.5** below summarises those ecological designations and irreplaceable habitats, such as ancient woodland within 2 km of the Scheme Footprint.

Habitats

6.4.6. A Preliminary Ecological Appraisal (PEA) identified baseline conditions and evaluated the importance of any ecological features present (or those that could be present) within the Scheme Footprint. The main habitats identified during the Phase 1 Habitat survey within 2 km of the Scheme (See **Photographs 6-2 – 6-5**) are dominated by the following:

- Broadleaved plantation woodland;
- Scrub; and

Local Wildlife Sites

GAT24: Bowes Railway
GAT25: Birtley Union Brickworks
GAT47: Dunkirk Farm West
GAT57: Hagg Wood and Mitcheson's Gill
GAT69: Longacre Wood
GAT75: Moor Mill Farm Pasture
GAT82: Ravensworth Ponds and Wood
GAT94: Sheddon's Hill
GAT107: Urpeth Bottoms
GAT116: Dunkirk Farm East
GAT141: Watergate Forest Park Lake
GAT144: Long Acre Dene
GAT145: Lamesley Reedbeds
GAT149: Bowes Valley Nature Reserve
GAT152: Saltwell Park Lake

Wildlife Corridors

S2: Follingsby
S4: Windy Nook and Heworth
S7: Lower Team Valley
S8: Upper Team Valley

N

Key

- Scheme Footprint
- 2km Study Area
- Ancient Woodland Inventory
- Local Nature Reserve
- Local Wildlife Site
- Wildlife Corridor
- Greenbelt
- Tree Preservation Orders
- Veteran Trees

Rev	Date	Description	By	Chk'd	App'd
P01	12/01/18	First Issue	GH	NA	KS

Client: highways england

Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 6.5 Ecological Designations Within 2km of the Scheme Footprint

Scale	Drawn	Checked	Approved	Authorised
1:30,000	GH	NA	KS	NR
Original Size: A3	Date: 12/01/18	Date: 12/01/18	Date: 12/01/18	Date: 12/01/18

Drawing Status: For Comment

Suitability: S1

Drawing Number: Project N/A | Originator WSP | Volume BCH | Location | Type | Role | Number

Project Ref. No.: 70041947

Revision: P01

0 0.25 0.5 0.75 1 km

- Grassland with less dominant habitats comprising hedgerow, bracken, hardstanding, shrub and both standing and running water.

Photograph 6-2 - Swathe of woodland on verge of northbound carriageway, junction 65

Photograph 6-3 - Scrub and tall ruderal vegetation on verge of southbound carriageway

Photograph 6-4 - Lamesley Pastures, south west of the Scheme at junction 67

Photograph 6-5 - Mosaic of habitats outside the Scheme Footprint

PROTECTED SPECIES

6.4.7. Preliminary ecology surveys have been undertaken along the Scheme Footprint and its surroundings. As a result, it was considered that there is potential for the following protected species: nesting birds, reptiles, great crested newts, red squirrel, bats, badger and birds. Assumed absence of reptiles has been concluded following the full dedicated species survey. Further dedicated protected species surveys for red squirrel, badger, wintering birds, breeding birds and bats are in the process of being undertaken. **Table 6-5** provides a summary of the protected species surveys undertaken in the survey area in 2016 and 2017 to inform the ongoing environmental assessment work.

Table 6-5 – Summary of Protected Species Undertaken to Date

	Baseline Summary
PEA - Extended Phase 1 Habitat Survey	Carried out in March – April 2015. Habitats of varying importance identified. No further vegetative surveys were identified but further protected/notable species surveys were identified as detailed below. An update PEA is planned for March 2018 to update the previous survey and take into account changes to the Scheme Footprint.
Bats	Bat activity surveys were carried out during November 2017. Eight overbridges and underpasses were assessed. Six of the eight structures have 'Moderate' suitability to support roosting bats. Therefore, there is a further survey requirement (see **Section 6.4.17**), for the following structures: ▪ Eighton Lodge Slip Road; ▪ Eighton Lodge North; ▪ Eighton Lodge South; ▪ Allerdene Railway Underbridge; ▪ Smithy Lane Overbridge; and ▪ North Side Overbridge. Longbank Bridleway Underbridge was recorded as having no potential for roosting bats and was therefore assigned a negligible level of potential. However, the structure has potential to be used as a crossing point by bats.
Great Crested Newts	Out of eight waterbodies two returned positive Edna results for Great Crested Newts. The remaining waterbodies returned negative results for this species. Amphibians recorded include smooth newt, common toad, common frog and possible palmate newt. Impacts will be confirmed in the EIA.
Riparian Mammals (Otter, Water Voles)	The update surveys in 2016 identified that the River Team has negligible potential to support water vole on this particular stretch. The river could support otter commuting and foraging activity, though this is considered unlikely. No potential holts or resting sites were identified within the Survey Area. Surveys concluded that riparian mammals are likely absent and no further survey is required.
Reptile	No reptiles identified. Likely absent. No further survey required.

	Baseline Summary
Wintering Birds	At the time of writing two wintering bird surveys have taken place. A further two surveys will be carried out in February 2018.

POTENTIAL IMPACTS

Construction

6.4.8. The potential impacts of construction on ecological features could include the following:

- Direct and indirect effects on legally protected and/or priority species will result due to general construction site activities through severance, fragmentation, dividing of habitats and reduction in biodiversity. Disturbance, displacement will likely occur and there is the potential for mortality/injury of species 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 newts whilst loss of scrub would potentially impact bats, great crested newts and nesting birds;
- Disturbance to species and 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 such 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 changes in hydrology;
- Direct impacts on Longacre Wood Local Wildlife Site (LWS), Dunkirk Farm West LWS and Bowes Railway LWS due to vegetation clearance directly within the Scheme Footprint;
- Dispersal of invasive species during site clearance; and
- Indirect impacts on Longacre Dene LWS due to adjacent vegetation clearance.

Operation

6.4.9. 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 LWS and Ancient Woodland;
- Direct mortality through traffic collisions; and
- Damage or disturbance on vegetation from polluted road traffic spray and surface water drainage.

MITIGATION

6.4.10. Avoidance and mitigation measures will be further investigated once Scheme specific details are known and associated impacts assessed during the EIA. Design and enhancement measures may comprise the following, where appropriate:

- The Scheme should seek to achieve no net loss in biodiversity in line with Highways and as promoted under the National Planning Policy Framework (NPPF) (2012) and the Biodiversity Plan (see **Ref 6.6**). An assessment of the Scheme in relation to the Highways England No Net Loss requirements will be undertaken;
- Enhancement of existing habitat;
- Replacement of lost habitat;
- Provision of locally sourced native tree species which support large numbers of invertebrates, to maximise foraging and commuting resources for bats and birds;
- Planting of native trees and hedgerows to enhance the wildlife corridors between Longacre Wood LWS and Longacre 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.

Construction

6.4.11. Mitigation during construction would be likely to include the following measures:

- Disturbance during construction would include working method statements to address potential impacts on species and, where appropriate, Natural England licences would be sought;
- Buffer zone around invasive species areas to avoid spreading;
- Vegetation removal would be programmed outside the bird breeding season (approximately March to September). Any vegetation removal undertaken outside these times would be checked by a suitably qualified ecologist; and
- Directional lighting would be used to reduce adverse effects on fauna for example foraging and commuting bats.

Operation

6.4.12. Design and enhancement measures detailed in **Sections 6.4.10-11** above, would seek to minimise and, where possible, enhance biodiversity during operation.

LIKELY SIGNIFICANT EFFECTS

6.4.13. The predicted potential significant effects upon habitats likely to be affected by the Scheme is as below:

Invasive Species

- Beneficial effect due to the removal of invasive species.

Mixed Plantation Woodland

- The Scheme construction would result in the loss of a proportion of this habitat where the Scheme runs through Longacre Wood, Bowes Railway and Dunkirk Farm West LWSs. This would be permanent and is likely to present a significant adverse effect.

Improved Grassland

- The Scheme construction would result in the loss of a proportion of this habitat where the Scheme runs to the north of Sandy Lane, Lamesley. This loss will be permanent, but is unlikely to present a significant adverse effect due to the size of the area lost and the relative abundance of similar habitat in the immediate surrounds. In order to determine the significance of effects on improved grassland, an assessment of the potential impacts of the Scheme will be assessed in the EIA.

6.4.14. The predicted potential significant effects upon protected species likely to be affected by the Scheme is as below:

Bats

- Roosting bats may be present within bridges. During construction, noise and vibration from drilling and digging into the structures may affect roosting bats. The works could disturb foraging and commuting bats using affected habitats. These effects would be of temporary duration; and it is known that commuting and foraging bats are already subject to disturbance from the operation of the A1. Floodlighting used during nights works (if required) could disturb bats or prevent them from using, or cause severance of, regular commuting routes or foraging areas. The results of further surveys in addition to further design and construction information will inform the EIA.

Breeding Birds

- Loss of nesting habitat during construction works is not considered to have a significant effect on breeding birds within the majority of the Scheme. However, there is an area south of junction 65 which may result in significant effects to breeding birds should it be impacted by the Scheme. No significant effects to breeding birds are anticipated, provided that mitigation recommended within this report is followed. This will be subject to the results of the breeding bird surveys and will be assessed in the EIA.

Wintering Birds

- The Scheme construction is likely to be a source of additional noise and visual disturbance to wintering birds. This will only be temporary, however, this is an area already subject to high levels of disturbance from the current A1. There will also be temporary land take of wintering bird habitats immediately adjacent to the current A1. The impacts of this will be further assessed in the EIA following the completion of the wintering bird surveys being undertaken in February 2018.

Great Crested Newt (GCN)

- GCN may be present within the Scheme Footprint. A Natural England (NE) Rapid Risk Assessment will be undertaken in the EIA, in order to determine the significance of effects on the GCN population as a result of the Scheme.

Red Squirrel

- The habitats present within the Scheme Footprint provide suitable opportunities for red squirrel. A full survey for this species will be carried out in spring 2018. If this species is identified, it would be subject to habitat loss and to additional disturbance through construction activities.

Badgers

- Badger surveys will be undertaken in March 2018. The outcome of these surveys will enable us to identify if there are any direct or indirect impacts on badgers. This will be assessed in the EIA and appropriate, including any licensing requirement, will be identified.

FURTHER WORK FOR THE EIA

6.4.15. A detailed level assessment of potential impacts on biodiversity during the construction and operational phases will be undertaken in accordance with the methodology set out in the Guidelines for Ecological Impact Assessment (see **Ref 6.7)** and IAN 130/10 (see **Ref 6.8**)

(IAN 130/10), which supplements the DMRB Volume 11, Section 3, Part 4 “Ecology and Nature Conservation” (see **Ref 6.9**).

6.4.16. In addition to the assessment detailed in the Scoping Report (**Appendix D – Section 10.7, p.64, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- An updated Preliminary Ecological Appraisal will be undertaken during 2018, ahead of the production of the ES, including a new data search and review / assessment of that data. This update will include:
  - Re-assessment of all LWS located within the search radii;
  - Consideration of the potential impacts to Shibdon Pond SSSI;
  - A review of invertebrate data;
  - Consideration of the potential impacts to freshwater ecology, to be included within the ES, if appropriate; and
  - Consideration of the potential impacts on fish populations to be included within the ES, if appropriate.

6.4.17. The following field surveys will be undertaken during the appropriate season to allow results to be used during to inform the assessment:

- Wintering bird surveys – two further surveys will be undertaken in February 2018;
- Red squirrel survey - February 2018;
- Badger survey - February 2018;
- Updated Extended Phase 1 Habitat Survey including Invasive Species - March 2018;
- Bat surveys – two emergence / re-entry survey (a single dusk and single dawn) in May 2018; and
- Breeding bird surveys - between March and May 2018.

6.4.18. The findings of the proposed field survey work will be evaluated and presented in the ES.

6.5 GEOLOGY AND SOILS

INTRODUCTION

6.5.1. This section considers the implications of the Scheme on geology and soils during the construction and operational phases and any potentially significant effects.

EXISTING BASELINE KNOWLEDGE

Geology

6.5.2. 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 300 m and 400 m respectively. The Scheme Footprint is also underlain by Made Ground south of Smithy Lane overbridge for approximately 100 m to the east.

6.5.3. Drift deposits are shown to comprise Alluvium along the route of the River Team underlying the existing carriageway for approximately 250 m 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.

6.5.4. 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.

6.5.5. Coal Authority records state that the Scheme is within the likely zone of influence from workings in thirteen seams of coal from shallow to 240 m below ground level (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 Scheme.

HYDROGEOLOGY

6.5.6. 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.

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

6.5.8. 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

6.5.9. There are a number of surface water features within the Scheme Footprint. These include the following:

- River Team which flows south to north under junction 67;
- An ordinary watercourse associated with Allerdene culvert, a below surface culverted drain, east of junction 67 slip roads;
- A culvert 150 m southeast of Smithy Lane Bridge;
- A culvert 400 m southeast of Smithy Lane Bridge;

- An ordinary water course in the Longacre Dene – a culvert immediately to the northwest of junction 66;
- 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.

6.5.10. Relevant features outside the Scheme Footprint comprise:

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

UNEXPLODED ORDNANCE

6.5.11. A desk based unexploded ordnance (UXO) assessment identified a moderate risk associated with encountering below ground UXO, subject to further more detailed analysis to be undertaken as part of the Ground Investigation (GI) works. The GI works are currently underway and due to complete in spring / summer 2018.

DESIGNATED SITES

6.5.12. There are no geological SSSIs or Regionally Importance Geological Sites (RIGS) within 250 m of the Scheme Footprint.

POTENTIAL SOURCES OF CONTAMINATION

6.5.13. Based on a review of publically available desk based information the following potential sources of contamination have been identified within 250 m of the Scheme Footprint:

- One recorded historical landfill within the Scheme Footprint 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 outside the Scheme Footprint approximately 250 m to the north of the carriageway between junction 65 and junction 66;
- Contamination arising from fuel/oil spillages from vehicles using the existing carriageway;
- Mine gases; and
- Areas of made ground.

POTENTIAL CONTAMINANT PATHWAYS

6.5.14. 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, and 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 the underlying Secondary A Aquifer.

Sensitive Receptors

6.5.15. The following geology and soils sensitive receptors have been identified:

- Human Health: Construction workers, adjacent site users (visitors/workers), future site users and below ground maintenance workers;
- Controlled Waters: Surface water courses (primarily River Team) and Groundwater (Secondary A Aquifer); and
- Soil: Agricultural Land Grade 3 undifferentiated.

POTENTIAL IMPACTS

6.5.16. 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.

Construction

6.5.17. The potential impacts of construction on geology and soils could include the following:

- Loss of permanent and temporary agricultural land for construction of the Scheme 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.

Operation

6.5.18. During operation, the potential impacts are considered to be as follows:

- Its use as a highway and potential for 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); and
- Disturbance of the geological strata which could lead to changes in the groundwater regime.

MITIGATION

6.5.19. Mitigation may comprise the following measures, where appropriate:

- A CEMP will be produced including measures to mitigate geology and soils risks associated with the construction phase;
- Earthworks being completed in accordance with a Contaminated Land: Applications in Real Environments (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 Personal Protective Equipment (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 for the Scheme, which will include pollution control measures;
- Temporary shoring associated with loose or unstable ground; and
- Pollution control measures incorporated within the Scheme drainage system.

6.5.20. A GI is currently being carried out for the Scheme. Given the timeframe of the EIA, the GI information is unlikely to be available. However, the results of historical investigations and the findings of the Preliminary Sources Study Report (PSSR) along with any available current GI data will be used to inform the EIA and the identification of appropriate mitigation.

6.5.21. As part of the GI 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.

LIKELY SIGNIFICANT EFFECTS

6.5.22. 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 not considered to be significant, subject to the findings of the PSSR and any available GI data.

FURTHER WORK FOR THE EIA

6.5.23. A detailed level assessment of potential impacts on geology and soil during construction and operation will be undertaken in accordance with the methodology set out in the DMRB Volume 11, Section 3, Part 11 ”Geology and Soils”.

6.5.24. A suitably scoped GI is currently being undertaken which, if available, will enable the refinement of the baseline conditions which were established in the PSSR and characterise potential risks, including coal mining, in the context of the Scheme which are required in order to fully consider the potential risks, identify those which require mitigation, and provide mitigation recommendations.

6.5.25. In addition to the assessment detailed in the Scoping Report (**Appendix D – Section 11.7, p.73, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- A preliminary coal mining risk assessment has been completed and used to scope the GI. Identified mine shafts have been considered as part of the Scheme design, however further assessment will be undertaken once the GI is complete;
- The results of the UXO assessment identified during the production of the GI report will be incorporated into the ES;
- A contaminated land risk assessment will be included in the GI report with figures illustrating any contamination “hot spots”;
- A CEMP will be produced; and
- The preparation of a Soil Management Plan to support the assessment will be considered.

6.6 MATERIAL RESOURCES

INTRODUCTION

6.6.1. This section considers the implications of the Scheme on the consumption of materials resources (which includes recovered site arisings), the generation and disposal of waste.

EXISTING BASELINE KNOWLEDGE

Material resources

UK and Regional Perspective: Availably of Construction Materials

6.6.2. The North East has, in general, a lower availability of construction materials by comparison with other regions in England.

6.6.3. **Table 6-6** provides a summary of the availability of the main construction materials in the North East and the UK, required for delivery of typical highways schemes.

Table 6-6 – 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	1.2Mt (2013) *	52.5Mt +
Permitted crushed rock *	3.1Mt	99.3Mt
Concrete blocks #	241,000m3 (2014)	5.4Mm3 (2014)
Primary aggregate *	6.0Mt	183Mt
Recycled and secondary aggregate *	1.1Mt	63Mt
Ready-mix concrete +	0.6Mm3	25.2Mm3
Steel +	(no data)	7.6Mt
Asphalt *	0.9Mt	26.3Mt

stocks
+ production
* sales

National and Regional Perspective: Transfer, Recovery and Recycling

National

6.6.4. Defra data (see **Ref 6.10**) (**Table 6-7**) 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.

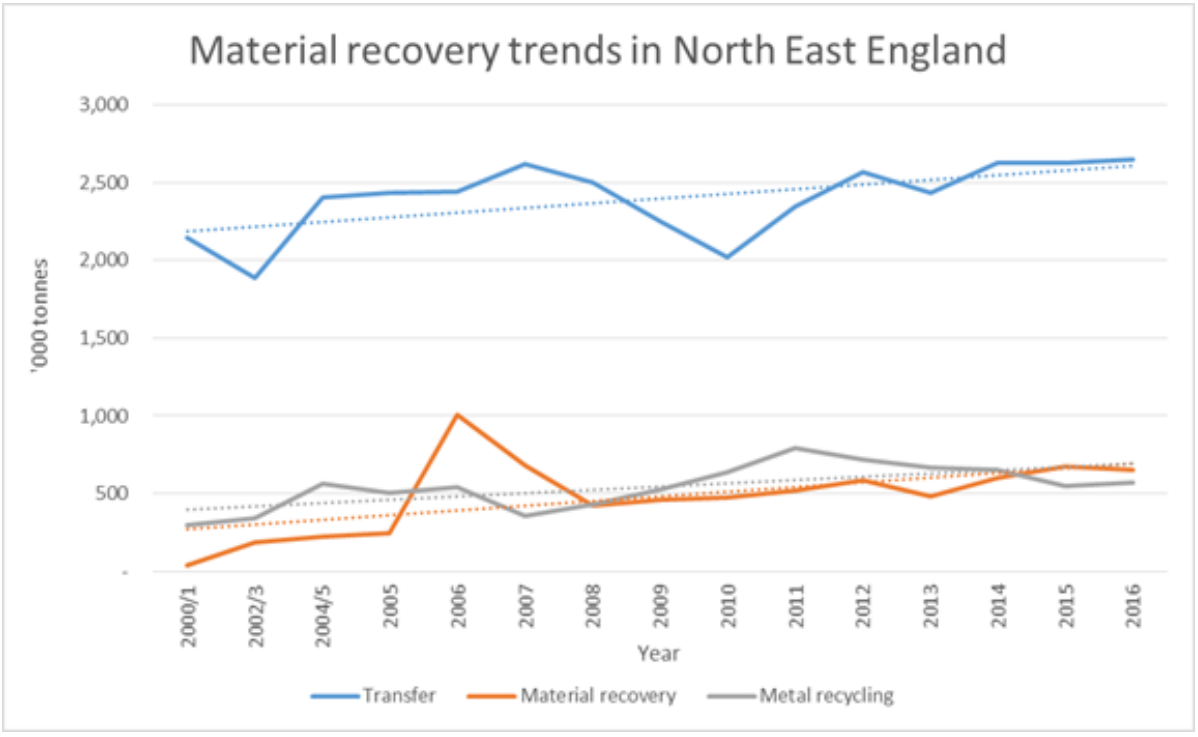
Table 6-7 – Non-hazardous Construction and Demolition Arisings Recovery in England

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%

Regional

Graph 6-1 shows that rates of material transfer (non-civic), recovery and metal recycling within the North East of England has risen steadily over the last 16 years. Data provided include all waste types in the region and hence will include, but are not specific to Construction, Demolition and Excavation (CDE) arisings.

Graph 6-1 – Transfer, material recovery and metal recycling in the North East of England



6.6.5. Available data demonstrates that transfer, recovery and metal recycling trends generally remain consistent within the North East. This data also shows 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 6-7**) demonstrate further capacity in this context.

6.6.6. 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.

Waste Generation and Disposal

6.6.7. At the end of 2015, the North East landfill sites presented in **Table 6-8** were recorded as having remaining capacity (see **Ref 6.11**).

Table 6-8 – Landfill Sites in the North East of England

FACILITY NAME	FORMER PLANNING SUB REGION	LANDFILL SITE TYPE	REMAINING CAPACITY END OF 2015 (M^3)
Port Clarence landfill Site (Haz)	Tees Valley Unitary Authorities	Hazardous Merchant Landfill	5,010,912
ICI NO 3 Teesport	Tees Valley Unitary Authorities	Hazardous Merchant Landfill	1,875,903
Bishop Middleham Quarry 2	Durham	Inert Landfill	4,309,592
Old Quarrington Quarry Landfill	Durham	Inert Landfill	1,979,768
Crime Rigg Quarry	Durham	Inert Landfill	1,746,000
Marsden Quarry Landfill	Tyne & Wear	Inert Landfill	1,528,002
Hollings Hill Quarry Landfill	Northumberland	Inert Landfill	784,240
Field House Quarry	Tyne & Wear	Inert Landfill	437,366
Aycliffe Quarry Landfill	Durham	Non Hazardous Landfill With Stable Non-Reactive Hazardous Waste cell	1,908,320
Ellington Road Landfill Site	Northumberland	Non Hazardous Landfill With Stable Non-Reactive Hazardous Waste cell	1,220,373
Seaton Meadows	Tees Valley Unitary Authorities	Non Hazardous Landfill With Stable Non-Reactive Hazardous Waste cell	1,006,822
Blaydon Quarry Landfill Site	Tyne & Wear	Non Hazardous Merchant Landfill	2,304,721
CLE 3/8 Landfill Site	Tees Valley Unitary Authorities	Non Hazardous Merchant Landfill	1,876,805

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

6.6.8. Baseline data indicates that total and non-inert landfill capacity in the North East is likely to become an increasingly sensitive receptor over the life of the Scheme to the first full year of operation. Simple forecasting to the year of Scheme operation (2023) 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%.

Sensitive Receptors

6.6.9. Through evaluation of baseline information the following key materials sensitive receptors have been identified:

- Resources in relation to the availability of construction material;
- Rate of material transfer, recovery and metal recycling; and
- Landfill Capacity.

POTENTIAL IMPACTS

Construction

6.6.10. The Scheme has the potential to generate adverse impacts from material resources during the construction phase as follows:

- During construction of the carriageway and supporting infrastructure, adverse impacts from consuming primary and other materials (including those recovered from site arisings) are expected. These impacts would be the result of consuming resources such as aggregates, concrete, bitumen, steel and timber;
- During construction, wastes would be expected to be generated from sources including, but not limited to, excavated arisings that cannot be reused or recycled (particularly during the breaking out of highway surfaces and concrete barriers), surplus cabling and timber from formwork;
- The associated potential environmental impacts (both direct and indirect) would occur principally during construction, but also (though to a lesser degree) in the first year of operation and beyond;
- The effects associated with the described impacts include those associated with the production, processing, consumption and disposal of material resources; these effects are also relevant to construction of the Scheme. Associated adverse effects include: depletion of natural resources, degradation of the environment and reduction in landfill void capacity. Beneficial effects would be realised where site arisings can be successfully diverted from landfill, and re-used or recycled; and
- 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.

Operation

6.6.11. The Scheme has the potential to generate adverse impacts from material resources during the operational phase of the Scheme:

- During operation, adverse impacts from the consumption of construction materials would be the result of minor upgrades and finishes to the Scheme, including, for example, highway patch repairs and replacement of damaged fencing or kerbing;
- During operation, adverse impacts from disposing of waste may also be expected. Any constructed asset that is damaged, contaminated or improperly specified e.g. damaged fencing or kerbstones, may need (where reuse or recycling is not possible) to be sent to landfill, for example; and
- The effects associated with the described impacts include those associated with the production, processing, consumption and disposal of material resources; these effects are also relevant to the operation of the Scheme. Associated adverse effects include depletion of natural resources, degradation of the environment and reduction in landfill void capacity. Beneficial effects would be realised where site arisings can be successfully diverted from landfill, and re-used or recycled.

MITIGATION

6.6.12. Design and construction measures may comprise the following, where appropriate:

Design

- A design aspiration has been established for the Scheme to use a 'family of structures'[5] for the circa 25 sign and technology gantries that would be required; and
- As far as possible, principles of material resource efficiency and waste minimisation would be incorporated into the design.

Construction

- As far as possible, arisings from demolition would be re-used in the construction of the new roads and associated infrastructure;
- It is the intention of the Scheme 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, would 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 Scheme, is being investigated. Viability will be determined following the results of the GI to establish that material is suitable for use 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 lifecycle environmental impact; and
- A CEMP, incorporating a Site Waste Management Plan (SWMP) and MMP would be implemented in order to identify, monitor and manage material resources and waste arisings on site.

LIKELY SIGNIFICANT EFFECTS

6.6.13. It is anticipated that, with the implementation of effective mitigation measures, including designing out waste, and implementing a CEMP, SWMP and Materials Management Plan (MMP) on site, that there would be no significant residual effects associated with material resources. However, this assertion will be tested fully during the detailed assessment, as part of the Scheme EIA.

FURTHER WORK FOR THE EIA

6.6.14. A detailed level assessment of potential impacts on material resources during the construction and operational phases of the Scheme will be undertaken in accordance with the methodology set out in IAN 153/11 (Highways Agency, 2011) Environmental Assessment of Material Resources (see **Ref 6.12**).

[5] 'Family of structures' - a limited number and configuration of designed components that are suitable for use in multiple locations, thereby reducing the breadth and complexity (and therefore potential waste) of – in this case – gantry structures.

6.6.15. In addition to the assessment detailed in the Scoping Report (**Appendix D – Section 12.7, p.89, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- Consideration of the operational impacts from the Scheme on materials.

6.7 NOISE AND VIBRATION

INTRODUCTION

6.7.1. This section considers the implications of the Scheme on noise and vibration during construction and operation and details any potentially significant effects.

EXISTING BASELINE KNOWLEDGE

Noise Environment

6.7.2. The existing noise environment within 1 km of the Scheme Footprint 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 a Noise Important Area (NIA), as detailed in **Section 6.7.4** and **6.7.5** below. However, within 1 km of the Scheme Footprint, the area also includes relatively large spaces where there are no major roads and, as such, these areas are exposed to much lower noise levels.

6.7.3. The range of values of sound pressure over which the ear can hear is enormous and for convenience the decibel scale, which is logarithmic, is used as the resulting numbers correspond generally to the noise perceived. A change in noise level of 10dB (A) represents a halving or doubling in perceived loudness. **Table 6-9** gives examples of typical sound levels.

Table 6-9 – Range of Sound Levels Commonly Found in the Environment

Sound Levels	Location
0 dB(A)	Threshold of hearing
20 to 30 dB (A)	Quiet bedroom at night
30 to 40 dB (A)	Living room during the day
40 to 50 dB (A)	Typical office
50 to 60 dB (A)	Inside a car
60 to 70 dB (A)	Typical high street
70 to 90 dB (A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB (A)	Jet aircraft on take off
140 dB (A)	Threshold of pain

Noise Important Areas

6.7.4. The current Noise Action Plan for major roads (Defra, 2014 (see **Ref 6.13**)) outlines a number of NIAs at round 2 of the UK noise mapping project. These NIAs were identified in accordance with the requirements of the EU Environmental Noise Directive (2002/49/EC) and associated English regulations.

6.7.5. There are 6 Round 2 NIAs within, or partially within 1 km of the Scheme Footprint as shown on **Figure 5.1**.

Noise Sensitive Receptors

6.7.6. In accordance with the DMRB HD 213/11 Volume 11, Section 3, Part 7 "Noise and Vibration", examples of sensitive receptors include dwellings, hospitals, schools, community facilities, designated areas (e.g. Area of Outstanding Natural Beauty (AONB), National Park, Special Area of Conservation (SAC), SPA (Special Protected Area), Site of Special Scientific Interest (SSSI), Scheduled Monument (SM), and Public Right of Way (ProW)).

6.7.7. The following noise sensitive receptors have been identified in relation to the Scheme:

- **Residential areas –** Lamesley, Gateshead (Allerdene, Harlow Green, Eighton Banks), Birtley, Springwell, Washington (Armstrong and Crowther), Lady Park;
- **Care Home –** Eighton lodge residential care home residents;
- **Nursery and Infant Schools** – Oakfield Infant School, Oxclose Community Nursery School;
- **Primary Schools –** Oakfield, Harlow Green Community, St Anne's RC, Birtley East, Blackfell, Ravensworth Terrace Country, Blackfell Holly Park, Saint John Boste RC, Oakfield Junior School, Harlow Green Community, St Anne's, Birtley East, Blackfell, Ravensworth Terrace Country, Blackfell, Holly Park, Saint John Boste RC;
- **Secondary Schools, colleges and further education –** 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; and
- **Other Assets** – The Angel of the North, Longacre Wood LWS, Ravensworth Golf Club users, the Angel View Inn, visitors to Birtley crematorium.

POTENTIAL IMPACTS

Construction

6.7.8. Construction activities, such as piling, breaking/demolition, can cause high levels of noise and vibration. In the case of this Scheme, such works are anticipated to be required at specific locations, including:

- Widening of Kingsway Viaduct would have noise impact due to the pier extension (pilling) and construction of a retaining wall adjacent to northbound merge;
- Work around the replacement Allerdene Bridge in terms of earthworks etc.;
- Construction of new North Dene Footbridge;
- Demolition of existing Allerdene Bridge;
- Widening of Eighton Lodge;
- Widening in the verge between junction 66 and junction 65;
- Installation of temporary sheet piles for excavations; and
- Rotary drilling and the grout pump for the coal mining grouting throughout the Scheme.

6.7.9. The proximity of sensitive receptors to the Scheme, in addition to the scale and complexity of the works, means that there is potential for some disruption, albeit temporary, during the construction phase. Should any night-working be required, further impacts as a result of noise would be likely.

Operation

6.7.10. A summary of potential impacts with respect to operational road traffic noise is set out below:

- Short term significant beneficial effects along parts of the Scheme (noise level reductions);
- Short term significant adverse effects along parts of the Scheme including Longacre Wood (noise level increases);
- Short term significant beneficial effects on Saltwell Road South and Hertford (noise level reductions); and
- Long term significant adverse effects along parts of the Scheme (noise level increases).

6.7.11. These effects were determined during the Options Selection stage and will be reviewed and updated in the EIA.

MITIGATION

Construction

6.7.12. Mitigation for temporary construction phase effects will be identified during the EIA and are likely to include, but not be limited to, the following:

- The use of silenced or sound reduced plant and equipment fitted with acoustic enclosures;
- Pneumatic tools to be fitted with silencers or mufflers;
- Deliveries to the Scheme site to be programmed, as far as possible, to arrive during daytime hours only. Delivery vehicles to be routed so as to minimise disturbance to local residents;
- All plant items to be properly maintained and operated according to manufacturer's recommendations in such a manner as to avoid causing excessive noise;
- All plant to be sited so that the noise impact at nearby noise sensitive properties is minimised;
- Local hoarding, screens or barriers to be erected as appropriate to shield particularly noisy activities; and
- The adoption of a considerate and neighbourly approach to relations with the local residents including works only taking place during given periods.

Operation

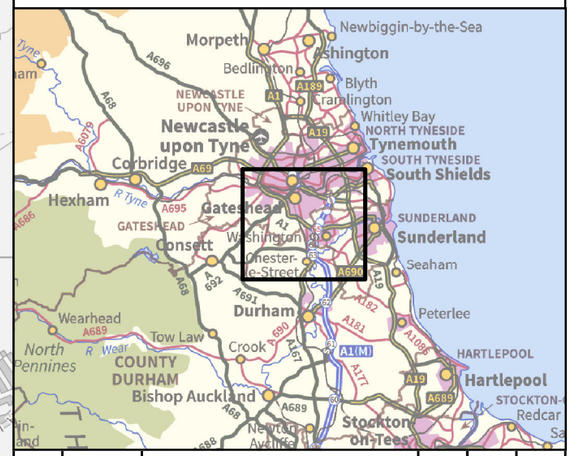
6.7.13. The following mitigation measures for operational noise have been incorporated into the design:

- Low noise Thin Surface Course System (TSCS) for all sections of the A1 and slip roads up to the roundabouts but excluding the roundabout circulatory; and
- A three metre high noise barrier adjacent to the A1 northbound carriageway (indicative location shown on **Figure 6.6**) and would likely tie into existing bunds and barriers to provide more continuous screening in the Birtley area.

N

Key

- Scheme Footprint
- Indicative Noise Barrier



Rev	Date	Description	By	Chk'd	App'd
P01	12/01/18	First Issue	GH	NA	KS

Client: highways england

Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: Figure 6.6 Indicative Noise Barrier Location

Scale	Drawn	Checked	Approved	Authorised
1:20,000	GH	NA	KS	NR
Original Size	Date	Date	Date	Date
A3	12/01/18	12/01/18	12/01/18	12/01/18

Drawing Status: For Comment

Suitability: S1

Drawing Number: Project N/A | Originator WSP | Volume | Location BCH | Type | Role | Number

Project Ref. No.: 70041947

Revision: P01

0 0.2 0.4 0.6 0.8 1 km

Photograph 6-6 - Existing Noise Barrier at along Lady Park adjacent to the A1

6.7.14. The need for these measures will be reassessed as part of the EIA, including consideration to final design and specification, with due regard to the balance of impacts (for example any associated adverse visual impacts). The final determined noise mitigation measures will be assessed as part of the EIA and reported within the ES.

6.7.15. The following areas have also been identified as possibly requiring mitigation. This will be determined during the EIA process:

- There is an existing 2.5m high barrier at the northern extent of the Scheme at Lady Park, see **Photograph 6.6**, which was included in the options stage assessment. This is within the NIA[6] 2498 and the options stage assessment indicated that long term noise level increases between one dB and three dB would be experienced at dwellings comparing the do minimum opening year (2023) and do something design year (2023) scenarios[7]. Additional mitigation measures for this area will be given further consideration during the EIA; and
- Longacre Wood LWS is located in an area that experiences a change in noise level in the options stage assessment as a result of the Scheme. The sensitivity of this area is

[6] The current Noise Action Plan for major roads (DEFRA, 2014) 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 ($L_{A10, 18h}$). In accordance with the provisions of the Round 2 Noise Action Plan for Roads, this is a requirement to seek to improve the noise environment in these areas".

[7] DMRB HD 213/11 Volume 11, Section 3, Part 7 "Noise and Vibration Paragraph 3.8 states: The objective of an assessment is to gain an appreciation of the noise and vibration climate both with and without the road project, referred to as the Do-Something and Do-Minimum scenarios respectively. These scenarios need to be assessed for a baseline year and also a future year. For operational road traffic noise the baseline year is taken as the opening year of the road project. The future assessment year for operation is typically the 15th year after the opening year of the road project, but in some circumstances this may occur before the 15th year. The future assessment year is sometimes referred to as the design year.

considered to be relatively low due to its use being transient and occasional. In addition the woodland is already exposed to a dominant road traffic noise as a result of the A1. However mitigation will remain a consideration during the EIA process.

LIKELY SIGNIFICANT EFFECTS

6.7.16. 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 the EIA process and mitigation measures will be identified with a view to minimising and eliminating effects where possible.

6.7.17. The potential operational residual noise effects, if any, are expected to be limited to Longacre Wood and possibly the NIA along Lady Park. These potentially significant effects will be explored in detail in the EIA with a view to minimising and, where necessary and possible, eliminating.

6.7.18. At this stage, no residual vibration effects are expected. However, this will be considered further during the EIA.

FURTHER WORK FOR THE EIA

6.7.19. A detailed level assessment of potential impacts on noise and vibration during the construction and operational phases of the Scheme will be undertaken in accordance with the methodology set out in DMRB HD 213/11 Volume 11, Section 3, Part 7 “Noise and Vibration” (see **Ref 6.14**) and associated IAN 185/15 (see **Ref 6.15**).

6.7.20. In addition to the assessment detailed in the Scoping Report (**Appendix D – Section 13.7, p.99, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- Currently, the extent of night time working is unknown. Where night time working is required, night time noise vibration impacts will be included in the assessment and the findings reported in the ES as would any mitigation measures which may be required to avoid adverse effects; and
- A baseline noise survey has been undertaken at locations close to the A1 and allied with professional judgment the result of the survey will be used 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 EIA.

6.8 PEOPLE AND COMMUNITIES

INTRODUCTION

6.8.1. This section considers the implications of the Scheme on people and communities during the construction and operational phases and any potentially significant effects.

EXISTING BASELINE KNOWLEDGE

Local Community

6.8.2. There are a number of communities on either side of the Scheme Footprint, accessed by the local road network and ProW. The following section lists the local communities within the vicinity of the Scheme Footprint. Further details including community facilities and services which serve the local communities can be found in the Scoping Report – **Appendix D, Section 14.3, p.111, Effect on Communities.**

6.8.3. Local communities near the Scheme include:

- Team Valley Trading Estate & retail park;
- Lamesley;
- Harlow Green;
- Chowdene;
- Birtley;
- Crowther;
- Armstrong; and
- Low Eighton.

COMMUNITY LAND

6.8.4. Longacre Wood is classified locally as Policy CFR23 ‘Public Open Space Protection’ and Policy CFR26 ‘Accessible Natural Greenspace’.

6.8.5. 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.

6.8.6. There are no allotments within the vicinity of the Scheme.

LOCAL ECONOMY

Population

6.8.7. 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%) (see **Ref 6.16**).

Earnings

6.8.8. 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 earn approximately £80 less than the national average. Full-time female workers in Gateshead earn approximately £30 less than the national average.

Employment

6.8.9. 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 Footprint.

6.8.10. The Team Valley Trading Estate area is identified as a primary employment site under Saved Policy JE1.5 of the Local Development Plan (see Ref **6.17**).

6.8.11. 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.

AGRICULTURAL LAND

6.8.12. The Agricultural Land Classification as described below for the Scheme Footprint 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.

6.8.13. 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.

ALL TRAVELLERS

Vehicle Travellers: Driver Stress

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

6.8.15. 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 / Smithy Lane / Coach Road.

Non-Motorised Users: Journey Length and Amenity

6.8.16. The main Public Rights of Way (ProW) and non-designated public routes (i.e. footpaths which are used by the local community but are not formally designated as a ProW) in the vicinity of the Scheme are shown on **Figure 6.4**. Those ProW that fall within the Scheme Footprint are as follows:

- Non-designated footways around Lamesley Roundabout;
- Non-designated footway on the 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 crosses under the A1 on the Durham Road / A167 / B1296 junction;
- Bridleway Lamesley 72, which crosses underneath the A1. This 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 the north bound carriageway of A1231, which crosses the A1 over a road bridge.

Sensitive Receptors

6.8.17. The following people and communities sensitive receptors have been identified:

All Travellers:

6.8.18. Main users of the routes connecting to the A1 in the vicinity of the Scheme are as follows:

- Users of the A194(M); A1231 which connects to Sunderland;
- Users of the A167 Durham Road;
- Users of the B1296 Old Durham Road; and
- Users of Lamesley Road / Chowdene Bank / Kingsway South / Banesley Lane / Smithy Lane / Coach Road.
- Users of the ProW and non-designated footpaths within the Scheme Footprint or in its immediate vicinity (as shown on **Figure 6-4**).
- Passengers travelling on the north-south East Coast Main Line railway.

Communities:

6.8.19. Residents and users of community facilities in the following areas in the vicinity of the Scheme are as follows:

- Team Valley Trading Estate and Retail Park;
- Lamesley, Harlow Green, Chowdene;
- Birtley, Crowther;
- Armstrong;
- Low Eighton;
- Community land such as Longacre Wood LWS and a sports field; and
- Areas of agricultural land which may be affected particularly, near Lamesley Pastures east of Lamesley Road.

People:

- Local economy.

POTENTIAL IMPACTS

Construction

6.8.20. There may be potential impacts on users of the East Coast Main Line railway due to disruptions during construction.

6.8.21. Potential changes on users' amenity will be cross-referenced with the landscape and visual ES Chapter.

6.8.22. There may be some temporary disruption to Motorised Travellers (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.

6.8.23. 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.

6.8.24. 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.

6.8.25. 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.

6.8.26. There may be some temporary reduced amenity for Non-Motorised Users (NMUs) when using ProWs and non-designated footpaths in the vicinity of construction works.

6.8.27. 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.

6.8.28. There is potential that traffic management measures during the construction works could cause disruption to commuters and business travel on the local road network.

Operation

6.8.29. 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.

6.8.30. It is likely that there would be a beneficial impact on population and health through changes in driver stress.

6.8.31. There is potential for beneficial impacts and operation on amenity of users of the footpaths in the surrounding areas.

6.8.32. There would be some permanent loss of agricultural land on a number of parcels for permanent works during operation. The extent of land required temporarily and permanently will be determined within the assessment.

6.8.33. It is not anticipated at this stage that there would be any demolition of privately owned assets.

6.8.34. Longacre Wood is “Public Open Space”, areas of land to the south of Smithy Lane are “Accessible Green Space” and land to the North East is “Open Space”. These areas fall within the Scheme Footprint and therefore there is potential for permanent loss of community land or connectivity on these lands.

6.8.35. It is likely that there would 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 junction 66. Although it is not clear the exact quantity required at this stage, it is not anticipated to be more than 20 ha. An

Agricultural Land Classification survey and assessment will be carried to determine whether the land to be affected would be Best and Most Versatile (BMV) land.

6.8.36. 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.

MITIGATION

ALL TRAVELLERS

Motorised Travellers

6.8.37. The following mitigation and enhancement measures would contribute to an improved experience for MTs:

- 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; and
- 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

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

6.8.39. Use of best practice design with regards to the safety of NMUs, including lighting, would 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 would also improve amenity for users.

COMMUNITIES

Community Severance

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

6.8.41. Existing roads would be incorporated into the Scheme, allowing for crossing points within the design.

Private Assets and Demolition of Private Property

6.8.42. 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.

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

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

Community Land

6.8.45. Should land identified as Public Open Space (at Longacre Wood) be required permanently, compensatory replacement land is likely to be required. Where possible, land use would need to be returned to original use and condition where temporary land take is required.

Agricultural Land

6.8.46. Although agricultural land required within the footprint of the route would be lost permanently, the following measures would be implemented during construction:

- Wherever possible, land required temporarily 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.

PEOPLE

Local Economy

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

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

LIKELY SIGNIFICANT EFFECTS

6.8.49. It is anticipated that there would be no permanent significant effects on MTs during operation of the Scheme.

6.8.50. It is anticipated that there would not be any new severance during operation.

6.8.51. 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.

6.8.52. 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 would be significant effects.

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

6.8.54. While the Scheme will provide beneficial effects to the local economy, the EIA will confirm the significance of these effects. However, it is not currently expected that there would be significant effects on the local economy during operation.

FURTHER WORK FOR THE EIA

6.8.55. A simple level assessment of potential impacts on people and communities during the construction and operational phases of the Scheme will be undertaken in accordance with

methodologies set out in DMRB Volume 11, Section 3, Parts 6 “Land Use”, Part 8 “Pedestrians, Cyclists, Equestrians and Community Effects” and Part 9 “Vehicle Travellers” into one assessment of People and Communities.

6.8.56. In addition to the assessment detailed in the Scoping Report (**Appendix D – Section 14.7, p.123, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- A simple assessment is proposed at this time to assess potential impacts on agricultural land;
- Potential impacts on NMUs during construction and operation will be considered; and
- Tourism and recreation assets will be identified and included in the ES assessment, if required. Cross-reference with the landscape and visual assessment will be undertaken to refine the sensitivity of receptors such as visitors to the Angel of the North.

6.9 ROAD DRAINAGE AND THE WATER ENVIRONMENT

INTRODUCTION

6.9.1. This section considers the implications of the Scheme on water and drainage during construction and operation and details any potentially significant effects.

EXISTING BASELINE KNOWLEDGE

Water Quality

6.9.2. 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.

6.9.3. The other watercourses within 2 km of the Scheme Footprint, 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 Footprint 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.

6.9.4. The Highways Agency Drainage Data Management System (HADDMS) does not show any outfalls draining from the Scheme Footprint which is believed to be due to an absence of data rather than an absence of outfalls. A CCTV survey has been recently been undertaken of which the results are currently being analysed. This will confirm the outfall locations within the Scheme Footprint. In the meantime, based on OS contours and the direction of flow through drainage assets (shown on HADDMS), two locations were identified 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 Water Framework Directive[8] (WFD) status of the River Team, it has been classified as of Medium importance; and
- 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 and priority habitats inventory). 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. This could not be identified during the last site visit but its presence cannot be ruled out and will be confirmed from the results of the CCTV survey. The ultimate discharge of this watercourse would be the River Team. Given the designation of

[8] The Water Framework Directive (WFD) (2000/60/EC) introduced a comprehensive river basin management planning system to help protect and improve the ecological health of our rivers, lakes, estuaries and coastal and groundwater.

Longacre Dene, this watercourse has been classified as of High importance with respect to water quality.

6.9.5. It is also possible that the entirety of the Scheme drains west to the River Team. Although, this remains to be confirmed as part of ongoing surveys.

6.9.6. A small drain/watercourse passes under 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

6.9.7. Fluvial flooding relates to the risk of flooding from rivers and ordinary watercourses.

6.9.8. 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 4.5 km downstream of junction 67. The Scheme crosses over the fluvial floodplain of the River Team, land designated as both Flood Zone 2 and 3. The floodplain of the River Team has been classified as of High importance with respect to human safety.

Pluvial Flood Risk

6.9.9. Surface water flooding is a result of overland flow that can follow a rainfall event before the runoff enters a watercourse or sewer. This form of flooding is usually associated with high intensity rainfall events but can also occur with low intensity rainfall or melting snow where the ground is saturated, frozen, developed or otherwise has a low permeability.

6.9.10. 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 300 mm predicted for the southbound slip road, and depths between 300 and 900 mm 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 900 mm 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); and
- 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 900 mm predicted by the Environment Agency's Risk of Flooding from Surface Water Map.

6.9.11. 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.

6.9.12. There are no other known standing-water features (ponds, pools, reservoirs, lakes) near or within the Scheme Footprint that may constitute potential receptors.

Sensitive Receptors

6.9.13. The following road drainage and water environment sensitive receptors have been identified:

- Water quality of the River Team, an ordinary watercourse in the Longacre Dene, watercourse in Allerdene culvert; and
- Flood risk at the River Team fluvial floodplain, Allerdene culvert, pluvial water and surface water runoff.

POTENTIAL IMPACTS

Construction

6.9.14. The potential impacts 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 and elsewhere 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 existing Allerdene Bridge due to demolition and construction works associated with the extension of the culvert and realignment of the ditch as part of the replacement of the bridge.

Operation

6.9.15. The potential impacts 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 would 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 (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 existing Allerdene Bridge due to the extension of the culvert and realignment of the ditch as part of the replacement of the bridge.

MITIGATION

Construction

6.9.16. A 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 CEMP would contain measures to protect both surface and groundwater quality, and other water resource aspects.

WATER QUALITY

6.9.17. The construction phase has the potential to impact upon the water environment through mobilisation of sediments due to earthworks and vehicular movements and / or as a result of potentially polluting substances such as fuel, oil, chemicals or wastewater e.g. concrete washout. The following mitigation measures may be included within the CEMP and implemented during the construction phase:

- A temporary surface water drainage strategy would be prepared for the construction stage;
- Areas with a greater risk of spillage (e.g. vehicle maintenance and storage areas for hazardous materials) would be carefully sited (i.e. away from drains or areas where surface waters may pond);
- Measures would be put in place to prevent pollution from construction plant, vehicles and machinery including refuelling in designated areas, on an impermeable surface, away from drains and watercourses; plant to be maintained in a good condition with wheel washing in place, all refuelling would be supervised and carried out in a designated area;
- All drains within the Scheme Footprint would be identified and labelled and measures implemented to prevent polluting substances from entering them;
- All fuel, oil and chemicals would be stored in a designated secure area, with secondary containment provided;
- Concrete wash out would only take place at designated concrete washout areas;
- Surface water run-off and excavation dewatering would be captured and settled out prior to disposal to sewer as appropriate. Any contaminants would be removed prior to disposal;
- Stockpiles / excavated materials would be stored in such a way to minimise silt laden runoff and / or windblown particles (e.g. by covering or seeding); and
- All loose materials would be covered so as not to give rise to a significant increase in sediment load to the drainage network.

FLOOD RISK

6.9.18. During construction there is a risk of localised flooding within the Scheme Footprint during and following heavy rainfall events, in areas identified as at high risk of surface water flooding. The following measures may be implemented to minimise risks to the water environment. These measures would be included in the temporary surface water drainage strategy and/or the CEMP:

- Surface water drainage and the area within the Scheme Footprint would be maintained in order to prevent significant ponding of surface water and to ensure the risk of localised flooding is not increased;
- Where there is a risk of localised flooding, measures would be put in place to prevent pollution e.g. by ensuring no fuel, oil or chemicals are stored in these locations, and moving plant and machinery from these areas when not attended;
- Monitoring of local weather would take place in order to be able to predict localised flooding within the Scheme Footprint during construction so that measures could be implemented;
- The contractor would be required to sign up to the Environment Agency's flood warning service and have an appropriate flood management plan in place to ensure the safety of the works in and around the River Team.

TEMPORARY SURFACE WATER DRAINAGE STRATEGY

6.9.19. Where works would lead to temporary changes in the surface water runoff regime a temporary surface water drainage strategy would be developed to ensure that there would be no increase in runoff or pollutant load during the construction phase. This would be undertaken in consultation with the Gateshead Council as Lead Local Flood Authority (LLFA).

Operation

6.9.20. The following design, mitigation and enhancement measures will need to be developed during the EIA process:

- Mitigation measures may be needed to reduce the impacts of sediment-bound pollutants. The need for which would be determined upon the completion of investigations into the location of outfalls 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. If required, Highways England could look to partner with other flood risk management authorities to join the delivery of a wider strategic flood alleviation scheme;
- 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 would involve active management or similar Closed-Circuit Television (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 (FRA) 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 replacement Allerdene Bridge, it is proposed that it 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; and
- A surface water drainage strategy will be developed for the Scheme. Statutory consultation with Gateshead Council as LLFA will be undertaken. Surface water attenuation will be required to be designed up to the one 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 one in 100 plus 40% climate change.

LIKELY SIGNIFICANT EFFECTS

Construction

6.9.21. The scale of construction works around the River Team and 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. This is not significant in EIA terms 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

6.9.22. 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.

6.9.23. With respect to pluvial flooding, there could be a significant impact on human safety associated with surface water flooding.

FURTHER WORK FOR THE EIA

6.9.24. A detailed level assessment of potential impacts water and drainage during the construction and operational phases of the Scheme will be undertaken in accordance with the methodology set out in DMRB HD45/09 Volume 11, Section 3, Part 10 “Road Drainage and the Water Environment”.

6.9.25. In addition to the methodology stated in the Scoping Report (**Appendix D – Section 15.7, p.135, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- A review of the need for a Hydrological/hydrogeological Risk Assessment. This will be discussed with the Environment Agency and the Coal Authority;
- Evidence of any risk of groundwater flooding or interactions and where necessary the provision of a high level construction risk assessment for the construction of the piers for Kingsway Viaduct;
- Further investigation will carried out into the sinkhole which appeared on the northbound carriageway between junction 67 and 68 in June 2016 to identify potential risks to the Scheme;
- Assessment of the potential for geomorphology impacts on the River Team culvert and watercourses associated with the Allerdene culvert during the construction and operation. This will include (but is not limited to) any changes to crossings, alterations to piers, extension to culverts and alterations to the bed or banks (temporary or permanent), where impacts are found, the EIA will outline how these can be mitigated; and
- Implications of the Making Spaces for Growing Places (MSGP) Policy 31:3 such as naturalising watercourse channels, improving ecological connectivity, enlarging river buffers and mitigation of diffuse urban pollution, particularly for Allerdene watercourse, which could integrate with the Team Valley Flood Alleviation scheme at Lamesley Pastures.

6.10 CLIMATE CHANGE

INTRODUCTION

6.10.1. 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.

6.10.2. There are two components to the climate assessment - greenhouse gas emissions and climate resilience.

EXISTING BASELINE KNOWLEDGE

Greenhouse Gases

6.10.3. The operation and management of the existing road asset is likely to require a small number or volume of specialist components 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, emissions are assessed to be of minor significance.

6.10.4. The total end-user CO_2 emissions are expected to increase between 2023 (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.

Climate Resilience

6.10.5. The baseline for the climate resilience assessment comprises the recent historical data (1961-1990) as well as the future projections for key climate parameters.

6.10.6. The mean daily minimum winter temperature between 1961 and 1990 is 0.9 Degree Celsius (°C) with a projected range of temperatures of 1.4 to 3.1 °C between 2010 and 2039 and 2.1 to 6.7 °C between 2070 and 2099.

6.10.7. The mean daily maximum summer temperature between 1961 and 1990 is 19.4 °C with a projected range of temperatures of 18.6 to 23.6 °C between 2010 and 2039 and 18.6 to 26.9 °C between 2070 and 2099.

6.10.8. The mean daily winter rainfall between 1961 and 1990 is 1.8 mm/day with a projected range of 1.7 to 2.0 mm/day between 2010 and 2039 and 1.8 to 2.8 mm/day between 2070 and 2099.

6.10.9. The mean daily maximum summer rainfall between 1961 and 1990 is 1.9mm with a projected range of 1.6 to 2.1mm/day between 2010 and 2039 and 1.3 to 1.9 mm/day between 2070 and 2099.

POTENTIAL IMPACTS

Greenhouse Gases (GHG)

6.10.10. During construction, large sources of emissions are anticipated to be embedded carbon in materials including those associated with the replacement Allerdene Bridge (i.e. Structural and reinforced steel and concrete) and pavement materials (i.e. asphalt and aggregate). During operation, the main emissions source would be from end-users (i.e. road vehicles).

Climate Resilience

6.10.11. There is potential for impacts from climate change on the Scheme to occur during the construction and operational lifecycle stages of the Scheme such as, increased temperatures, prolonged periods of hot weather and increased precipitation, and intense periods of rainfall.

MITIGATION

6.10.12. 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 road 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)[9];
- 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.

6.10.13. It is also anticipated that the Scheme will adhere to the resource efficiency hierarchy, 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 the EIA process through the completion of the Environmental Statement and CEMP.

LIKELY SIGNIFICANT EFFECTS

6.10.14. As 'climate' is a new topic, an assessment of residual effects was not undertaken during the previous stages. Residual effects will, therefore, be identified in the next stage through the completion of the EIA.

[9] An EPD is a declaration of a material or product's lifecycle environmental impact. - http://www.environdec.com/

FURTHER WORK FOR THE EIA

6.10.15. A detailed level assessment of potential impacts on climate during the construction and operational phases of the Scheme will be undertaken.

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

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

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

6.10.19. For all construction and operation 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 Scheme. In each case this will cover the trend for the whole study period;
- Calculation of the GHG emissions using a standard emissions calculation methodology applying a suitable emissions factor; and
- An assessment of the risk of climate change effects to potentially vulnerable receptors.

6.10.20. In addition to the methodology stated in the Scoping Report (**Appendix D - Section 16.7, p.147, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- There is currently no specific guidance or carbon emission threshold, which if exceeded, is considered to be significant. Therefore, it will be set out in the ES how the significance of effects will be reported; and
- Until the new projections are available, the UK Climate Projections released in 2009 remain the official source of information on how the climate of the UK may change over the rest of this century. Therefore, the assessment will be using UKCP09 projections if these are the best available source at the time of writing. If UKCP18 projections are released in the first half of 2018, findings in light of these new projections (UKCP09) will be discussed with the relevant local authority as appropriate.

7 ASSESSMENT OF CUMULATIVE EFFECTS

7.1 INTRODUCTION

7.1.1. This section considers the cumulative effects of the Scheme during construction and operation and details any potentially significant effects both as a result of "combined effects" and "cumulative effects" 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).

7.2 EXISTING BASELINE KNOWLEDGE

7.2.1. A review of planning applications was carried out to identify projects located within 500 m of the Scheme. Applications were only considered for 2016-2017 and will be updated for the EIA.

7.2.2. In addition, Highways England Schemes likely to be constructed in the same time period as the Scheme, with the potential to result in cumulative effects in combination with the Scheme were identified (see **Table 7-1**).

Table 7-1 - 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/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)	15 Jan 2016	250m west	N
N/A	A1 Scotswood to North	The proposed A1 Scotswood to North	N/A	8km	N

Application Ref	Site Description	Application Description	Decision Issue Date	Approx. Distance from Scheme Footprint	EIA req'd (Y/N)
	Brunton (Junction 74 to 79) improvement scheme	Brunton improvement scheme involves narrow lane widening to three lanes between Junction 74 and Junction 78, and a lane gain/drop with full widening to three lanes between Junction 78 and Junction 79.			

7.2.3. These developments will be reviewed during the EIA to identify whether they are still relevant with regards to the Scheme. In addition, the relevant Local Planning Authorities will be contacted to determine whether any additional planning applications have been submitted for determination or have been granted, that may, in combination with the Scheme, lead to potential significant effects.

Sensitive Receptors

7.2.4. The following sensitive receptors have been identified as having potential to be cumulatively affected by the Scheme:

- Viewpoint on public access footpath;
- Residences near the proposed noise barrier at Birtley;
- Local road users;
- Users of PRoW, cycle routes and areas of amenity;
- Longacre Wood LWS;
- Consumption of resources; and
- Watercourses (River Team and others).

7.3 POTENTIAL IMPACTS

7.3.1. The EIA will assess the potential impacts based upon results of baseline surveys and data collection, the information available about the key developments identified and the Scheme design.

Combined Effects

7.3.2. Potential impacts from combined effects may include:

- Changes to views due to proposed 3 metre high noise barrier during construction & operation;
- Changes to air quality, views and noise levels directly affected by construction works;

- Changes to air quality, views and noise levels during operation;
- Effects on traffic flows and driver stress on surrounding roads due to drivers using unintended shortcuts, for example, along residential side streets during construction. Effects on roads not directly affected by construction works could also potentially result in reduced air quality, increased noise, and reduced amenity; and
- Effects for users of cycle ways and areas of amenity value as a result of noise during construction.

Cumulative Effects

7.3.3. Potential impacts from cumulative effects may include:

- The Scotswood to North Brunton scheme would affect areas of woodland habitat alongside the carriageway, some of which may be homogenous with habitat to be affected on this Scheme, however the two schemes are approximately 8km apart meaning none of the habitats to be affected are directly linked. As with this Scheme, full ecological assessment is being 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.
- Given the location and nature of the Scotswood to North Brunton scheme relative to this Scheme, the potential in-combination effects are considered to relate to employment effects 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.

MITIGATION

7.3.4. Where significant cumulative effects are identified during the EIA, mitigation will be specified to avoid, reduce or offset such effects.

7.4 LIKELY SIGNIFICANT EFFECTS

Combined effects

7.4.1. There is the potential for significant combined effects from the following:

- During construction, the 3 m 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. 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 include beneficial impacts relating to air quality and associated noise levels and adverse impacts relating to the visual intrusion of the barrier and the impact on local views;
- Potential accidental pollution / discharge of materials from construction works upon the water quality of the River Team around the replacement Allerdene Bridge;

- During operation, if sufficient maintenance is not undertaken on the fluvial and drainage aspects of the Scheme that this could result in blockage and associated flooding or water quality impacts; and
- During operation, with respect to pluvial flooding, there could be an impact on human safety associated with surface water flooding.

Cumulative Effects

7.4.2. Based on the work carried out to date, it is not anticipated that there would be significant cumulative effects as a result of the Scheme, however this will be assessed in the EIA.

7.5 FURTHER WORK FOR THE EIA

7.5.1. A detailed assessment of the cumulative effects during construction and operation will be carried out in the ES. This will follow the guidance contained in DMRB HA 205/08 Volume 11, Section 2, Part 5 “Assessment and Management of Environmental Effects” (see **Ref 7.1**).

7.5.2. In addition to the methodology stated in the Scoping Report (**Appendix D - Section 17.3, p.154, – Assessment Methodology**), and in response to the Scoping Opinion (See **Appendix E**), the following will be carried out for the EIA:

- A new application was identified within 500 m of the Scheme Footprint, Longacre Wood Peaking Plant - DC/17/01054/FUL, will be considered as part of the assessment of cumulative effects; and
- The list of schemes to be considered as part of the traffic assessment will be finalised in 2018. A review of any new developments that come forward after this date, which may result in cumulative effects, will be carried out, and where they are assessed to potentially result in significant effects, they would be assessed in the EIA.

8 SUMMARY

8.1.1. This PEIR informs the public about the EIA process and the likely environmental effects of the Scheme as part of the statutory consultation. The report precedes the EIA and as such is "preliminary" and is based on the most up to date information available at the time of writing. This PEIR has been informed by the Scoping Report and Scoping Opinion received from PINS. Any comments received during the consultation will be taken into consideration in both the design of the Scheme and the EIA. The assessments carried out for the EIA will be reported within the ES, which will be submitted as part of the DCO application in winter 2018/2019.

8.1.2. The Scheme is likely to result in significant environmental effects and as a result an EIA is required.

8.1.3. EIA will be undertaken in line with the Design Manual for Roads and Bridges known as DMRB and the EIA Regulations with some technical disciplines following additional best practice guidance for example survey methodology from the CIEEM.

8.1.4. Two options were shortlisted at the "Option Selection" stage and presented at a public non-statutory consultation event held in September 2016.

8.1.5. The Scheme includes offline replacement of Allerdene Bridge south of its current location, which would have the benefit of improving the existing road alignment and improving safety, was announced in July 2017 details can be found at the following location: www.highways.gov.uk/a1birtleytocoalhouse

8.1.6. The following is a summary of the potential impacts and likely significant effects for each technical topic:

AIR QUALITY

8.1.7. There is potential for temporary impacts in the construction period due to emissions of dust from earthworks and general construction activity. Potential changes in emissions from vehicle exhausts and roadside pollution concentrations due to traffic management during construction.

8.1.8. During operation the Scheme is expected to result in changes to emissions of oxides of nitrogen including Nitrogen dioxide along the A1 and linked routes as a result of changes in traffic flows and speeds. Scheme improvements, whilst likely to result in an increase in flow, are designed to reduce congestion which may improve vehicle emission rates. The Scheme has the potential to increase traffic flows along parts of the road network as some routes become more attractive; where this happens there is a potential dis-benefit to air quality.

8.1.9. With implementation of mitigation measures, however, it is not anticipated that there would be significant residual effects associated with construction or operation of the Scheme.

CULTURAL HERITAGE

8.1.10. There is the potential for changes and harm to the setting of Bowes Railway SM, Lamesley Village CA, Ravensworth Park CA, Birtley CA, Chowdene CA, several Grade II Listed Buildings, the locally listed Team Valley Trading Estate and the Angel of the North during construction and operation. There is also the potential for partial loss and disturbance of known non-designated below ground archaeological assets during construction.

8.1.11. With mitigation including careful design of Longbank Bridleway and the introduction of signage, it is anticipated residual beneficial significant effects on the setting of Bowes Railway SM; although there may still be residual significant adverse effects on other assets such as CAs and listed buildings.

LANDSCAPE AND VISUAL

8.1.12. Some potential impacts have been identified during construction and operation of the Scheme. However, mitigation through the landscape design will be developed to integrate the Scheme into existing surroundings and seek to enhance the local environment where possible.

8.1.13. Following implementation of the mitigation measure, there may be significant residual effects from the introduction of new features including the new Allerdene Bridge, removal of maturing highway woodland and removal of vegetative connectivity to Longacre Wood LWS. Additionally, the introduction of gantries, new signage, technology assets and lighting would likely result in effects on residential properties as well as views to the Angel of the North.

BIODIVERSITY

8.1.14. Potential impacts during construction could include, but would not be limited to, impacts on species through severance, fragmentation, loss of habitat and noise, light and vibration. Direct impacts are anticipated on Longacre Wood LWS, Dunkirk Farm West LWS and Bowes Railway LWS due to vegetation clearance.

8.1.15. Impacts on biodiversity during operation are likely to include, but not be limited to, disturbance to species (e.g. bats) from increased levels of light, noise and pollution, direct mortality through traffic collisions; and damage or disturbance on vegetation from polluted traffic spray from road traffic and surface water drainage.

8.1.16. Mitigation during construction would be likely to include working method statements to address potential impacts on species and, where appropriate, Natural England licences would be sought; vegetation removal would be programmed outside the bird breeding season (approximately March to September) and the use of directional lighting to reduce adverse effects on fauna, for example bats.

8.1.17. The Scheme may include mitigation for lost habitats and enhancement of existing habitats. Landscape planting would 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. The Scheme will aim to achieve no net loss in biodiversity.

8.1.18. Likely significant effects on biodiversity are anticipated during both construction and operation as a result of habitat loss, discharge of pollutants into watercourses, mobilisation of contaminated materials, permanent or temporary severance of a route travelled by protected species and disturbance from light, dust or noise.

GEOLOGY AND SOILS

8.1.19. Potential construction impacts include, but are not limited to, loss of permanent and temporary agricultural land via land take, reduced soil quality, and disturbance of contaminated ground resulting in the release of contaminants to the environment and exposure to humans.

8.1.20. Potential impacts on geology and soil resources during operation are from fuel spills or hazardous spills, exposure of future road users to contamination, and disturbance of geological strata which could lead to changes in the groundwater regime.

8.1.21. The results of historical ground investigations along with any available current GI data will be used to inform the EIA and the identification of appropriate mitigation. A CEMP would be produced to detail mitigation measures to be implemented including a MMP. Mitigation measures during operation are likely to be standard engineering measures including, for example, incorporating interceptors to prevent hazardous substances from entering the surface water drainage system.

8.1.22. It is anticipated that, following the implementation of appropriate mitigation measures, that there would be no likely significant effects with respect to geology and soils, subject to the findings of the GI information available.

MATERIAL RESOURCES

8.1.23. Potential impacts from the Scheme during construction include the consumption of primary and other materials and the production of hazardous and non-hazardous wastes requiring disposal. Impacts are also associated with the production and processing of material resources which include depletion of natural resources, degradation of the environment and reduction in landfill void capacity. Beneficial effects would be realised however where site arisings can be successfully diverted from landfill, and re-used or recycled.

8.1.24. During operation, adverse impacts are anticipated to be minor, and would result from, for example, the consumption of materials for highway patch repairs and replacement of damaged fencing or kerbing, and associate waste produced.

8.1.25. Mitigation during construction would include, but not be limited to, use of pre-constructed elements as far as possible, implementation of a CEMP, Site Waste Management Plan, and MMP, and the identification of material resources that minimise the amount of embedded carbon.

8.1.26. It is anticipated that, with the implementation of effective mitigation measures, including designing out waste, that there would be no significant residual effects associated with material resources.

NOISE AND VIBRATION

8.1.27. Construction activities, such as piling and demolition, can cause high levels of noise and vibration. Such works are anticipated to be required at specific locations, including, for example, widening of Kingsway Viaduct and the demolition of Allerdene Bridge. Should any night-working be required, further impacts as a result of noise would be likely.

8.1.28. During operation impacts from road traffic noise may include noise level increases in the short term along parts of the Scheme including Longacre Wood, short term noise level reductions on Saltwell Road South and Hertford, and longer term noise level increase along some parts of the Scheme.

8.1.29. Mitigation during construction is likely to include, but not be limited to, the use of silenced or sound reduced plant, plant sited so that the noise impact at nearby noise sensitive properties is minimised, the use of local hoarding, screens or barriers to shield particularly noisy activities and the adoption of a considerate and neighbourly approach to relations with the local residents.

8.1.30. It is anticipated that a low noise TSCS will be incorporated into the scheme design, for all sections of the A1 and slip roads, and a noise barrier would be provided adjacent to the A1 northbound carriageway between junctions 65 to 66. The details of these measures will be confirmed in the EIA.

8.1.31. Due to the proximity of the Scheme to residential properties, for example in Birtley, it is anticipated that there may be significant residual effects during construction. The potential operational significant residual noise effects, if any, they are expected to be limited to Longacre Wood and possibly the NIA near Lady Park. No significant residual vibration effects are expected.

PEOPLE AND COMMUNITIES

8.1.32. Potential impacts during construction include disruption to users of the East Coast Main Line railway, disruption to drivers on the A1 and the surrounding local road network causing an increase in driver stress, and increases in journey times due to temporary diversions or closures of roads and footpaths. There would also be temporary and permanent land take including agricultural land, public open space which includes Longacre Wood and accessible green space to the south of Smithy Lane. There may be a temporary reduction in amenity for NMUs when using PRoWs and non-designated footpaths in the vicinity of construction works. There is also potential for a beneficial effect during construction on the local economy as expenditure within the local supply chain is likely to increase during the construction works.

8.1.33. During operation views from the road are anticipated to be mostly unchanged in the long term. In the short term however 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 other locations. It is likely that during operation there would be a beneficial effect on population and health through changes in driver stress.

8.1.34. During operation, reduced delays on the road network have the potential to provide beneficial effects to the local economy with improved commuter and delivery journey times.

8.1.35. In order to mitigate impacts on people and communities the Scheme would seek to: maintain views from the roads and open views of the countryside; provide clear signage and road layout to avoid creating route uncertainty; and ensure diversions or closures undertaken during construction are clearly advertised and signposted. Details of and traffic management measures would be listed within a TMP.

8.1.36. The Scheme would aim to accommodate NMUs, and either retain or improve the existing access arrangements including providing lighting to improve the amenity of users of the footpaths. Landscape planting would be incorporated into the design to reduce visual impacts on residential properties, and as far as possible land required for temporary works would be reinstated to its former use following the completion of construction.

8.1.37. Should public open space at Longacre Wood be required permanently, compensatory replacement land is likely to be required. Impacts to agricultural land during construction would be mitigated by, for example, careful siting of construction compounds to reduce severance, careful planning of construction activities through consultation with landowners, consideration of field drainage in the design and implementing best practice measures as detailed in the CEMP.

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

8.1.39. There may be some significant residual effects on agricultural land but this will depend on the extent and type of temporary and permanent works required. No other likely significant effects are anticipated.

ROAD DRAINAGE AND THE WATER ENVIRONMENT

8.1.40. During construction there is the potential for impacts on the water quality of nearby waterbodies from spillage of fuels, lubricants, hydraulics fluids and cements. There is also potential for increased runoff into surface water drainage systems due to de-vegetation and increased temporary hardstanding, with potential for localised flooding of low lying road segments and an increased risk of flooding of the River Team.

8.1.41. Impacts during operation could include increased surface water runoff, pollution during flood events as a result of pollution control devices being overwhelmed; and impacts to the safety of motorists in areas at risk of flooding from rainwater and potential for increased flooding of the River Team.

8.1.42. A CEMP and temporary surface water drainage strategy will be produced which would incorporate measures to protect both surface and groundwater quality. These measures would include, but not be limited to, ensuring plant and vehicles are refuelled in designated areas, wheel washing and road sweeping to be implemented, and surface water run-off and excavation dewatering would be captured and settled out prior to disposal to sewer as appropriate. Where there is a risk of localised flooding, measures would be put in place to prevent pollution e.g. by ensuring no fuel, oil or chemicals are stored in these locations, and moving plant and machinery from these areas when not attended. Monitoring of local weather would take place in order to be able to predict localised flooding within the Scheme Footprint during construction so that measures could be implemented.

8.1.43. Mitigation measures will be incorporated into the design to minimise impacts to road drainage and the water environment during operation. This would include identifying whether additional floodplain capacity is required at the Allerdene culvert and the River Team culverts at junction 67. Flood risk from rainwater will be mitigated within the design to ensure the risks to users can be appropriately managed. A FRA will be undertaken and surface water drainage strategy developed to ensure that water can be stored appropriately and can leave the highway to prevent ponding and the risk to the safety of motorists. The surface water drainage strategy will be developed in consultation with Gateshead Council as LLFA.

8.1.44. It is not anticipated that there would be significant effects due to construction. With respect to flooding due to rainwater, there could be a significant impact on human safety associated with surface water flooding during operation.

CLIMATE CHANGE

8.1.45. During construction, large sources of emissions of embedded carbon are likely to be found 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 (i.e. road vehicles).

8.1.46. During construction potential impacts from climate change may result from increased temperatures and prolonged periods of hot weather which could lead to greater dust

generation, and increased and more intense period of rainfall leading to flooding and soil erosion.

8.1.47. During operation increased temperatures or greater temperature extremes could lead to increased stress on structures, technology and surfaces e.g. road surfaces. Greater rainfall could lead to more flooding, water scour causing structural damage, weakening or wash out of structural soils and changes to ground water level and soil moisture.

8.1.48. In order to reduce potential emission impacts, design, mitigation and enhancement measures will be considered including, but not limited to, using less carbon intensive concrete, maximising the recovery and reuse of site won material and specifying energy efficient equipment for operation e.g. lighting and signage.

8.1.49. Mitigation to reduce impacts as a result of climate extremes may include ensuring that pavements, drainage systems and embankments are designed to take into account anticipated increases in peak rainfall, and increased variability of ground conditions. Design of pavement, expansion joints and other elements will consider resilience to anticipated increases in peak summer temperatures.

8.1.50. As 'climate' is a new topic, an assessment of residual effects was not undertaken during the previous stages. Residual effects will, therefore, be identified in the next stage through the completion of the EIA.

ASSESSMENT OF CUMULATIVE EFFECTS

8.1.51. During construction potential combined impacts include changes to air quality, views and noise levels; as well as changes in traffic flow on surrounding roads resulting in drivers using unintended shortcuts, for example, along residential side streets which may cause driver stress.

8.1.52. During operation, potential combined impacts on receptors from air quality, visual and noise impacts have been identified.

8.1.53. Depending on the programme of works there may be beneficial cumulative effects with the A1 Scotswood to North Brunton scheme as there is the potential for additional employment opportunities for the local population and an increase in spending in the local economy by contractors.

8.1.54. Effects during operation are not anticipated to be significant.

8.1.55. Where significant cumulative effects are identified during the EIA, mitigation will be specified to avoid, reduce or offset such effects.

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