

A19 Downhill Lane Junction Improvement

EIA Scoping Report

PCF Stage 2

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1 INTRODUCTION

1.1 Background to the Project

- 1.1.1 Highways England plans to improve the junction of the A19 Downhill Lane, near West Boldon in South Tyneside (see Figure 1.1 for location).
- 1.1.2 The A19 is a strategic route running from Doncaster to north of Newcastle via York. More locally, it links the Tyne and Wear conurbation with Teesside. From the south, it connects the A1 at Dishforth and areas in between (including Middlesbrough and Sunderland) to South Tyneside, and then on to the Tyne Tunnel to the north. From Testos junction, 1 km north of Downhill Lane, northwards, the A19 also forms part of a Tyneside eastern orbital route, crossing the River Tyne via the Tyne Tunnel and meeting the A1 again at Seaton Burn Interchange.
- 1.1.3 The A19 dual carriageway runs approximately north-south via the junction. Downhill Lane crosses above the A19 via an overbridge. The A1290 also joins this junction from the south-west.
- 1.1.4 Future developments on land to the north of the Nissan Manufacturing plant, south-west of Downhill Lane junction, are likely to increase the amount of traffic using Downhill Lane junction significantly. The current capacity of the junction would not be sufficient for the anticipated additional traffic and would therefore affect the A19 and local roads.
- 1.1.5 The current capacity of the A19 Downhill Lane junction is limited by its single bridge and lack of a full circulatory system. The proposed scheme aims to increase capacity by providing a second bridge and a full circulatory system.

1.2 Purpose of this Report

- 1.2.1 The scheme will require an Environmental Impact Assessment (EIA) in line with the European EIA Directive¹ and Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended); 'the EIA Regulations'.
- 1.2.2 The EIA will be carried out in line with the guidance set out in the Design Manual for Roads and Bridges (DMRB) (Volume 11, Environmental Assessment)².
- 1.2.3 This scoping report sets out the proposed scope of work and methods to be applied in carrying out the EIA, and the proposed coverage of the Environmental Statement (ES). Figure 1.2 is an environmental features map of the area surrounding the site location.

1.3 Roles of the Parties

- 1.3.1 Highways England has appointed Costain as their 'Early Contract Involvement' (ECI) contractor to deliver the design and construction of the scheme. Jacobs UK is Costain's design partner, and as part of that role a team of specialists from Jacobs UK will deliver the EIA. Arup have been separately appointed by Highways England to carry out traffic and economic assessments. Highways England's, Costain's and Jacobs' project management, Jacobs' engineering design teams, Jacobs' EIA team and Arup will work closely as an integrated project team. This approach will maximise opportunities for iterative engagement between the environmental team,

¹ Council Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 *on the assessment of the effects of certain public and private projects on the environment* (as amended by Directive 2014/52/EU).

² Highways Agency (1993, updated 2008). *The Design Manual for Roads and Bridges: Volume 11, Environmental Assessment*. Available from: <http://www.dft.gov.uk/ha/standards/ghost/dmr/vol11/index.htm>

the designers and the project decision-makers to avoid or minimise environmental impacts through design.

1.4 Project History

1.4.1 The improvement of Downhill Lane junction became part of the Department for Transport’s Regional Investment Strategy in 2014. Initially, Highways England considered combining the Downhill Lane junction improvements with an ongoing scheme to improve the neighbouring Testos junction. However, the Testos Junction Improvement scheme was at a more advanced stage and was therefore progressed as a separate project to ensure that the Development Consent Order (DCO) application for that scheme was not delayed whilst the proposals for the Downhill Lane junction were being developed.

1.5 Design Options Examined

1.5.1 Seven options (A to F) were shortlisted for consideration in 2016. Option A was taken to a public consultation in December 2016 as the preferred option, and the reasons for discounting options B to F were explained as identified in Table 1.1. Environmental considerations had been taken into account, including land take and effects of the River Don and its associated habitat. Option A would require the least land take of all the options and would not require work within the River Don corridor.

Table 1.1: Alternative options and reasons for rejecting

Discounted Option	Brief Description of Option	Reasons for Rejecting
B	<p>A new bridge would be constructed to the south of the existing Downhill Lane bridge creating a roundabout above the A19. To the north, there would be a northbound merge slip road to the A19 mainline. A diverge from the northbound merge slip road would merge with a northbound link road from Downhill Lane junction and provide connectivity to Testos roundabout. A19 southbound traffic for Downhill Lane junction would leave the A19 at Testos roundabout and use the southbound link road.</p> <p>To the south, there would be a southbound merge slip road and a north bound diverge slip road to and from the A19 mainline. Additional ‘segregated left turn’ lanes would be added for north bound traffic leaving the A19 and northbound traffic from the A1290, to join the A19 via Testos junction.</p>	<p>Strengthening works would be required to the River Don culvert which would increase costs</p> <p>Safety concerns over traffic interaction on the northbound link road</p> <p>Significant additional land would be required east of Make-Me-Rich farm</p> <p>Northern Powergrid overhead lines supplying the Nissan plant would need diversion works</p> <p>Maintenance access issues for the National Grid pylon</p> <p>Not directly compatible with the preferred route announced for the Testos scheme</p>

Discounted Option	Brief Description of Option	Reasons for Rejecting
C	<p>A new bridge would be constructed to the south of the existing Downhill Lane bridge creating a roundabout above the A19. To the north, the slip roads would be re-aligned to provide link roads connecting to Testos roundabout. A19 northbound traffic would leave for Testos junction via a new 'diverge' north of Downhill Lane. A1290 northbound traffic wishing to join the A19 at Downhill Lane junction would do so via Testos junction.</p> <p>To the south, there would be a southbound merge slip road and a northbound diverge slip road to and from the A19 mainline. Additional 'segregated left turn' lanes would be added for northbound traffic leaving the A19 and northbound traffic from the A1290, joining the A19 via Testos junction.</p>	<p>Strengthening and extension of the River Don culvert would be required, which would increase costs and impact on the natural habitat of the local wildlife site</p> <p>Significant additional land would be required east of Make-Me-Rich farm</p> <p>Maintenance access issues for the National Grid pylon</p> <p>Northern Powergrid overhead lines supplying the Nissan plant would need diversion works</p> <p>Not directly compatible with the preferred route announced for the Testos scheme</p>
D	<p>A new bridge would be constructed to the north of the existing Downhill Lane bridge creating a roundabout above the A19. To the north, the slip roads would be re-aligned to provide link roads connecting to Testos roundabout. A19 northbound traffic would leave for Testos junction via a new 'diverge' north of Downhill Lane. A1290 northbound traffic wishing to join the A19 at Downhill Lane junction would do so via Testos junction.</p> <p>To the south, there would be a southbound merge slip road and a northbound diverge slip road to and from the A19 mainline. Additional 'segregated left turn' lanes would be added for northbound traffic leaving the A19 and northbound traffic from the A1290, joining the A19 via Testos junction.</p>	<p>Strengthening and extension of the River Don culvert would be required, which would increase costs and impact on the natural habitat of the local wildlife site</p> <p>Poor ground conditions for construction of the new bridge to the north of the existing junction</p> <p>Significant additional land would be required east of Make-Me-Rich farm</p> <p>Northern Powergrid overhead lines supplying the Nissan plant would need diversion works</p> <p>Maintenance access issues for the National Grid pylon</p> <p>Not directly compatible with the preferred route announced for the Testos scheme</p>

Discounted Option	Brief Description of Option	Reasons for Rejecting
E	<p>A new bridge would be constructed to the south of the existing Downhill Lane Bridge to carry south bound traffic leaving the A19 on to the A1290. This option provides the same solution as the other options for southbound traffic at Downhill Lane junction. For northbound traffic a new junction would be constructed to the west of the A19 north of the Nissan plant. This roundabout provides improved access for northbound A19 traffic via new slip roads. A19 north bound traffic would leave for Testos junction via a new 'diverge' north of Downhill Lane. A1290 northbound traffic would join the A19 without having to negotiate Testos junction, unlike the other options. To the east, Downhill Lane and Washington Road are realigned allowing a larger gyratory.</p>	<p>Requires considerably more land take than all other options</p> <p>Requires a significant area of land which is earmarked for development</p> <p>Not directly compatible with the preferred route announced for the Testos scheme</p>
F	<p>New north bound exit and entry slip roads would be constructed to the south west of Downhill Lane Junction. They would be positioned in the area of land to the north of the Nissan factory and connect to the A1290. The new slip roads would provide direct access to and from the A19 northbound carriageway.</p>	<p>Does not meet the scheme objectives for improving Downhill Lane junction</p> <p>Requires a significant area of land which is earmarked for development</p> <p>Not directly compatible with the preferred route announced for the Testos scheme</p>

1.6 Road Investment Strategy

1.6.1 The Road Investment Strategy Part 1 (RIS 1) for the 2015/16 to 2019/20 Road Period, published by the Department for Transport, announced the A19 Downhill Lane as a junction to be improved to support local plans for an International Advanced Manufacturing Park (IAMP) to the north of the existing Nissan plant.

1.6.2 The Downhill Lane junction improvement scheme is being designed with the following key objectives in mind:

- **Supporting economic growth** - This will be achieved by improving the attractiveness of the area for the IAMP and other prospective developers and businesses by improving road access. The scheme will help connect key employment sites, schools, colleges and residential areas, thereby delivering major benefits.
- **A safe and serviceable network** - The scheme aims to reduce accidents, provide safer crossings for non-motorists and improve journey time reliability, leading to a reduction in driver stress.
- **A more free-flowing network** - The traffic model used to develop the scheme predicts that road users travelling through the junction will benefit significantly from reduced journey times as a result of the proposal.
- **Improved environment** - The environmental effects resulting from the scheme have been considered during the options identification stage. Measures to mitigate effects on the local environment and opportunities to provide enhancements will be further developed as the design progresses.

- **An accessible and integrated network** - The proposed scheme will provide improved connectivity with the local road network. We are investigating ways to maintain existing facilities for pedestrians, cyclists and horse-riders and to provide enhancements where possible. We will continue to work with the local access forum and user groups to develop our proposals.

2 PROJECT DESCRIPTION

2.1 Location of the Project

2.1.1 The location of Downhill Lane junction is illustrated in Figure 1.1. It is located in South Tyneside, approximately 5 km south of the Tyne Tunnel entrance at Jarrow. It lies in a narrow belt of countryside that separates the urban areas of South Tyneside and Sunderland. The next junction is 1 km to the north at Testos.

2.1.2 Residential areas lie close to the Testos junction, at Fellgate and Hedworth to the northwest, and Boldon Colliery to the northeast. A business park lies adjacent to the Testos junction, to the east. Two farms (West House Farm and Make-Me-Rich Farm) lie just west of the A19. Southeast of Downhill Lane junction is the residential area of Town End Farm.

2.2 Highways Design

2.2.1 Downhill Lane junction would be upgraded from a signalised priority, grade-separated junction with a single bridge crossing, to a two-bridge, grade-separated roundabout junction (see Figure 2.1).

2.2.2 A new overbridge would be constructed to the south of the existing A19 overbridge creating a circulatory carriageway over the A19. The improvement would require realignment of Washington Road and Downhill Lane to the east of the junction. The existing northbound diverge and southbound merge at Downhill Lane junction would be modified to provide connectivity between the A19 mainline and the proposed grade separated roundabout. A new northbound and southbound link road would connect the Downhill Lane junction to Testos roundabout, located approximately 1.2 km north of Downhill Lane junction.

2.2.3 Due to the proximity of the Testos and Downhill Lane junctions, there is insufficient length to provide a northbound merge slip road and a southbound diverge slip road to and from the A19 between the two junctions. Therefore, southbound traffic on the A19 would have to use the southbound link road for access to Downhill Lane junction and likewise traffic from Downhill Lane junction would have to use the northbound link road for access to the A19 northbound.

2.3 Structures

2.3.1 Two overbridges would be required as part of the Downhill Lane junction improvement. A new overbridge would be provided immediately south of the existing overbridge at Downhill lane junction. It has been assumed that the existing overbridge would be reused as part of the junction improvement. However, a structural assessment is to be carried out to ascertain whether it can be used in its current state, requires strengthening or needs replacing.

2.4 Earthworks

2.4.1 The improvement at Downhill Lane junction would require embankments of approximately 6.5 m. Maximum earthworks slope of 1V:2.5H would be provided through the Downhill Lane scheme.

2.5 Drainage

2.5.1 The proposed drainage for the Downhill Lane Improvement would generally follow existing drainage patterns. The mainline and all four slip roads would drain to the north to outfall to the Don via a proposed attenuation pond. It is currently proposed that the Testos Junction Improvement Pond 1 would be used for attenuation, but

should the ongoing design of this Testos scheme pond preclude this, a new pond would be required. Flows would be attenuated to greenfield rates.

- 2.5.2 The A1290 to the west of the junction would drain away to existing highway drainage. Existing geocellular storage at the junction would need to be replaced and re-sized appropriately.
- 2.5.3 The realigned Downhill Lane East and Washington Road Link would drain to an existing tributary of the Don. There is an existing outfall at this location which would be re-used if possible pending further survey work. Options for the layout of the junction in the vicinity of Downhill Lane East and Washington Road Link are currently being finalised. An assessment of the increase to paved areas will then be made and attenuation provided accordingly.
- 2.5.4 The drainage infrastructure proposed at this stage is standard; i.e. a mixture of concrete surface water channels, kerb and gully and combined kerb drainage units for edge of carriageway surface water collection. Carrier drains, a few filter drains and possibly an open ditch at the toe of embankments would be used to convey the water to the outfall. Attenuation and flow control are proposed at all outfalls, with the possible exception of Downhill Lane East where there may be no net increase in paved area. Sub-surface drainage would be provided in the form of narrow filter or fin drains.
- 2.5.5 The north of the scheme lies within the River Don floodplains, but there are no known flooding issues associated with the existing road drainage. It has been a scheme design objective to avoid any impact on the Don Culvert under the existing A19 and slip roads.

2.6 Non-Motorised User Facilities

- 2.6.1 Non-motorised user (NMU) connectivity will be maintained and, where feasible, enhancements would be provided. NMU objectives have been set out with the aim of improving conditions for NMUs as part of the proposed works. These objectives are as outlined below:
- Ensure the new junction at least replicates all existing connectivity for pedestrians, cyclists and equestrians across the A19 and between Bridleway B46, Downhill Lane, Washington Road, the A1290 and Follingsby Lane either side of the A19.
 - Ensure that facilities are provided to a standard that enable cyclists and equestrians to cross the A19 safely without dismounting or the need for advisory 'cyclists dismount' signs.
 - Introduce measures to improve cyclist convenience and safety at Downhill Lane junction.
 - Improve the safety of the southern tie-in of bridleway B46 into Downhill Lane junction, eliminating the current 'shortcutting' along the slip roads and across the A19.
 - Address the markings and layout of signals at Downhill Lane junction and ensure the new design is more compatible/ convenient to all NMU user needs.
 - Ensure the International Advanced Manufacturing Park development is considered carefully within Downhill Lane Junction Improvement scheme and that it does not deteriorate NMU facilities.
 - Ensure accessibility and safety of all new and replaced provision for vulnerable users.

2.7 Construction Proposals

- 2.7.1 Subject to development consent being granted, construction work would start in Autumn 2019 and be complete by Spring 2021. There would be the potential to work at the weekends as well as nights throughout the whole works programme, which could help bring forward the estimated completion date. Prior to any construction work commencing, there would be a mobilisation period, including traffic management installation and site enabling works. Traffic management would typically comprise lane closures, lane narrowing and speed restrictions for the duration of the works, with supporting temporary CCTV cameras. However, the contractor is required to keep two lanes of traffic open in each direction throughout the contract, except during occasional night closures for installing bridge beams etc.
- 2.7.2 Construction of the Downhill Lane junction improvements would take place largely in parallel with construction works for the A19/A184 Testos Junction Improvement scheme which is planned to start on site in December 2018/ January 2019 and be complete around the same time as the Downhill Lane scheme. It is expected that the two schemes would open simultaneously.
- 2.7.3 The Contractor would produce and manage a Construction Environmental Management Plan (CEMP) in advance of the start of construction. An outline CEMP would be produced to accompany the application for a DCO. The CEMP would identify relevant environmental aspects and management/working procedures to avoid environmental incidents on site or degradation of environmental features as a result of the works, together with response plans if incidents were to occur. It is anticipated that the CEMP would incorporate a Site Waste Management Plan, a Materials Management Plan and a Soils Management Plan, or that these would be prepared as separate documents. The plans would be subject to review and approval by Highways England. Implementation and adherence to these plans would all be subject to regular audit.

Materials Import

- 2.7.4 It is expected that fill material would need to be imported to the site. The estimated bulk earthworks cut volume would be 9,619 m³ compared to a fill volume of 103,146 m³. These values have been derived from the options stage design and are subject to change as the design progresses.

2.8 Maintenance Proposals

- 2.8.1 Operational maintenance of the A19 would experience relatively few changes as compared to the current situation. Existing maintenance activities include inspection and repair of barriers and signage, drain inspection and clearance, road repairs and road verge/ vegetation maintenance (amongst other activities). For Highways England and parties acting on their behalf, future maintenance activities would include these same tasks, plus the addition of inspection and maintenance of the new bridge and the balancing pond, including any oil interceptors. Due to the high number of NMUs using the cycle paths, the design would seek to keep these clear of vegetation as part of the future maintenance programme.

3 PLANNING POLICY

3.1 Introduction

3.1.1 This section provides the relevant planning policy context for the proposed scheme. This includes a review of national and local level planning policy and guidance documents.

3.2 National Planning Policy

3.2.1 Strategic roads have their own policy framework, with relevant policy objectives set out in the National Policy Statement (NPS) for National Networks. The NPS is framed in the context of wider Government policies on environment, safety, technology, sustainable transport and accessibility.

3.2.2 The Government's vision, as set out in the NPS for National Networks, is to:

Deliver national networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system.

3.3 Tyne and Wear Joint Local Transport Plan (LTP3)

3.3.1 The Keep Tyne and Wear Moving: LTP3: The Third Local Transport Plan for Tyne and Wear³ was published in March 2011. It was prepared jointly by five local authorities, Gateshead, Newcastle, North Tyneside, South Tyneside and Sunderland.

3.3.2 The draft strategy comprises three elements:

- Strategy 2011-2021;
- Delivery Plan 2011-2014; and
- Consultation Summary Report.

3.3.3 One of the five overarching objectives outlined in the strategy is relevant to the scheme, as it is to support the economic development, regeneration and competitiveness of Tyne and Wear, improving the efficiency, reliability and integration of transport networks across all modes.

3.3.4 Other policies relevant to the scheme are:

- Policy 2: We will work to improve road safety;
- Policy 8: We will keep our transport networks in good condition; and
- Policy 43: We will pursue major scheme investment to improve our transport networks.

3.4 Local Planning Policy

3.4.1 The South Tyneside Local Plan, finalised in 2012, comprises:

- Core Strategy (adopted July 2007)⁴;
- Development Management Policies (adopted December 2011)⁵;
- Area Action Plans for specific defined areas; and

³ Tyne and Wear Integrated Transport Authority (2011). *Keep Tyne and Wear Moving: LTP3: The Third Local Transport Plan for Tyne and Wear*. Available from: <http://www.tyneandwearltp.gov.uk/wp-content/uploads/2011/04/TW-LTP3-Strategy-Mar-2011-for-upload.pdf>

⁴ South Tyneside Council (2007). *South Tyneside Local Development Framework: Core Strategy*. Available from: <http://www.southtyneside.info/CHttpHandler.ashx?id=2468&p=0>

⁵ South Tyneside Council (2011). *South Tyneside Local Development Framework: Development Management Policies*. Available from: <http://www.southtyneside.info/CHttpHandler.ashx?id=13672&p=0>

- Site-specific Allocations (adopted April 2012)⁶.

- 3.4.2 There are no adopted Area Action Plans relevant to the vicinity of Downhill Lane junction. However, the key driver for the improvement of the junction is the proposed development of an International Advanced Manufacturing Park (IAMP) on adjacent land to the north-west and south-west, jointly by South Tyneside Council and Sunderland City Council. The Councils consulted on an Area Action Plan for the IAMP in 2015, and on the removal of the affected land from the green belt in 2015-2016. Following several stages of consultation and amendment, the current version of the Area Action Plan was submitted to the Secretary of State and Planning Inspectorate for examination in February 2017 for independent examination. The examination hearing sessions are expected to take place in early April 2017.
- 3.4.3 The key relevant objective of the Core Strategy (2007) is to ensure good accessibility for all to jobs, goods and services in the borough.
- 3.4.4 The key relevant policies of the Core Strategy to achieve this objective are ST1C: promoting opportunities along the A19 economic growth corridor and A1: Improving accessibility. Policy A1B states that priority will be given to improving accessibility, particularly by encouraging and promoting public transport improvements, both within the borough and between the borough and the A19 Economic Growth Corridor. The supporting text for this policy emphasises this by stating that the A19 between South East Northumberland and Doxford Park, Sunderland is a key corridor for economic growth. It also states that the proposed Second Tyne Tunnel (since completed) and improvements at the A19/A184 Testos roundabout reflect this corridor's importance.

3.5 South Tyneside Infrastructure Delivery Plan

- 3.5.1 South Tyneside Council's Infrastructure Delivery Plan (2012)⁷ is an assessment of South Tyneside's existing infrastructure, plans for new or upgraded infrastructure and potential future infrastructure needs in the borough. It describes the A19 trunk road as a prime 'economic artery' within South Tyneside, and as a major facilitator of economic growth in the borough and the North East of England.

⁶ South Tyneside Council (2012). *South Tyneside Local Development Framework: Site-Specific Allocations*. Available from: <http://www.southtyneside.info/chtphandler.ashx?id=14710&p=0>

⁷ South Tyneside Council (2012). *South Tyneside Infrastructure Delivery Plan*. Available from: <http://www.southtyneside.info/chtphandler.ashx?id=10376&p=0>

4 CONSULTATION

4.1 Introduction

DCO Consultation Requirements

4.1.1 The Downhill Lane Junction Improvement scheme is being delivered under the Planning Act 2008. The Act requires Highways England to submit an application for a DCO to the Planning Inspectorate, who will examine the application and provide advice and a report to the Secretary of State, who will determine the application.

4.1.2 The DCO application has a number of statutory requirements regarding consultation. These requirements stipulate that certain stakeholder groups and the community must be consulted and engaged with as part of the pre-application process, as set out in Sections 42 and 47 of the Planning Act 2008. Further requirements relate to specific documents that must be produced, including a Statement of Community Consultation (SoCC) and a Consultation Report.

4.2 Consultation To-Date

Consultation with Statutory Bodies

4.2.1 To date, statutory bodies have been contacted primarily for data-collection purposes. The relevant statutory bodies for the Downhill Lane Junction Improvement scheme are as follows:

- South Tyneside Council;
- The Environment Agency;
- The Countryside Agency;
- Natural England; and
- English Heritage.

Non-Statutory Key Stakeholders

4.2.2 **Non-motorised users** – a consultation meeting was held on 14 December 2016. It was attended by representatives of the Tyne and Wear Local Access Forum and user groups including the British Horse Society, Cycling UK, Sustrans, South Tyneside Council, Sunderland Council, Gateshead Council and the urban traffic manager for Tyne and Wear. The meeting addressed potential effects on the right-of-way network, and identified the facilities that these groups would like to see incorporated into the design. The IAMP project coordinator was in attendance and an update was provided on relevant aspects of the IAMP project and its potential interactions with the Downhill Lane junction improvement.

Public Consultation

4.2.3 Public exhibitions were held at Bunny Hill Centre in Sunderland on 2nd December 2016, and on the following day at the Quadrus Centre in Boldon Business Park. The public were able to find out about the proposed improvements to the A19 Downhill Lane junction and were invited to provide comments.

4.2.4 The comments received will be taken into account as the scheme develops.

4.3 On-going Consultation

4.3.1 This Scoping Report will be submitted to the Planning Inspectorate, which will consult on it under the Infrastructure Planning (Environmental Impact Assessment)

- Regulations. Views from consultees will be considered and used to inform the Scoping Opinion to be issued by the Planning Inspectorate.
- 4.3.2 Under Section 42 of the Planning Act Highways England will conduct its own Section 42 consultation with statutory environmental bodies (Natural England, the Environment Agency and English Heritage), the relevant planning authorities (South Tyneside Council, Sunderland City Council and Newcastle-Upon-Tyne City Council), landowners and other key consultees. Information and views from these consultees will inform the environmental assessment study.
- 4.3.3 Section 42 consultation will be undertaken through a combination of correspondence, telephone calls and meetings. Some of this consultation is likely to be iterative (i.e. we may speak to an individual consultee several times as the scheme develops).
- 4.3.4 The local community and wider public will be consulted on the proposed scheme via a consultation programme, which will include making available the Preliminary Environmental Information, in accordance with Section 47 of the Planning Act 2008.
- 4.3.5 The Section 47 consultation programme will be publicised in the SoCC in local newspapers and will also be available at: <http://www.highways.gov.uk/roads/road-projects>. The Section 47 consultation has not yet been planned in detail, but methods of consultation are likely to include (without necessarily being limited to):
- exchanges of correspondence, meetings and workshops with local community groups and businesses;
 - exchanges of correspondence, meetings and workshops with local groups representing walkers, cyclists and horse riders;
 - publication of leaflets, reports and other information made available in the local area and online; and
 - public exhibitions at which members of the community can interact directly with members of the project team.
- 4.3.6 Feedback obtained from consultation with third parties and the local community will be recorded and included in a Consultation Report that will be submitted as part of the DCO application.

5 SCOPE OF THE ASSESSMENT

5.1 Introduction

5.1.1 The objectives of the Environmental Impact Assessment are to provide information, advice and reports to:

- facilitate the consideration of environmental effects and opportunities in the development of the design of the highway improvements;
- enable the minimisation of environmental effects through design, and the identification of environmental mitigation measures where required;
- seek the opportunity to provide environmental improvements where possible;
- provide information about environmental effects for the public consultation; and
- ensure that decision-making about the scheme is based on sound environmental information and takes environmental effects into account.

5.1.2 This EIA Scoping Report sets out the proposed scope of coverage, approaches and methodologies to be applied to the EIA and ES production as a whole, and to each individual environmental topic.

5.1.3 The development and design of major highway projects is governed by guidance set out in the 15 volumes of the DMRB. Volume 11 of DMRB, originally published in 1993, provides guidance on EIA that is specifically applicable to highway projects. Volume 10 of DMRB⁸ covers environmental mitigation.

5.1.4 The proposed scope, approach and method of assessment for each topic are outlined in the topic-specific chapters 6-14.

5.1.5 Certain environmental topics are not DMRB topics in their own right. Climate change mitigation (emissions) is addressed in the 'Air Quality' assessment, climate change adaptation in terms of flood risk is addressed under 'Road Drainage and the Water Environment', sustainability issues are addressed under 'Materials' and aspects of human health are addressed in Air Quality, Noise and Vibration, and People and Communities. It is not proposed to conduct the optional process of health impact assessment alongside this EIA.

Previous Planning Inspectorate Scoping Opinion

5.1.6 As outlined in Chapter 2, there will be a close interaction between the Downhill Lane junction improvement and the Testos junction improvement both during construction (as they would be constructed in parallel and open together), and during operation (as traffic to and from the north wishing to use Downhill Lane junction would have to use the link roads parallel to the A19, constructed as part of the Testos scheme, pass around the roundabout at Testos junction and join or leave the A19 north of Testos junction).

5.1.7 It is therefore felt that there would be a significant benefit in carrying out the EIA for Downhill Lane in as consistent a manner as possible with the EIA for Testos junction, which is in its closing stages. That approach would facilitate recognition and assessment of cumulative effects between the two schemes. A Scoping Opinion for that EIA was obtained from the Planning Inspectorate in 2014, and this Scoping Report draws heavily on the recommendations made in that Scoping Opinion.

⁸ Highways Agency (2001). *Design Manual for Roads and Bridges: Volume 10, Environmental Design and Management*. Available from: <http://www.dft.gov.uk/ha/standards/DMRB/vol10/index.htm>

5.2 Overview of the Environment

- 5.2.1 Figure 1.2 provides an overview of key environmental baseline features and context for the scheme.
- 5.2.2 The scheme is located at the interface between countryside and the urban areas of South Tyneside, at the boundary with Sunderland. Most of the land required to build the scheme is farmland, mainly in arable use. However, there are adjacent residential areas, particularly at Town End Farm to the south-east. Two farms (West House Farm and Make-Me-Rich Farm) lie close to the A19 to the west. The Nissan car manufacturing plant lies to the south, west of the A19.
- 5.2.3 The River Don passes beneath the A19 in a long culvert just north of Downhill Lane junction, flowing from west to east. Most of the corridor of the River Don is designated as a Local Wildlife Site (LWS). Make-Me-Rich Meadow LWS lies adjacent to the River Don and to Downhill Lane junction to the east, while East Hylton Bridge LWS lies adjacent to the River Don west of the Downhill Lane junction. The River Wear is approximately 3 km to the south of Downhill Lane junction.
- 5.2.4 There are small blocks of woodland in the surrounding area. Most of the surrounding landscape comprises a pattern of rectilinear fields divided by hedgerows. To the east/south-east, the ground rises to the Boldon Hills.
- 5.2.5 Scots House, an historic Grade II* Listed Building, lies approximately 1.8 km to the north-west of Downhill Lane junction, adjacent to the A184. Scots House sits in landscaped grounds, surrounded by mature trees. Several subsidiary buildings in the Scots House complex are Grade II Listed Buildings. Another group of Grade II Listed Buildings around Downhill House lies some 750-840 m north-east of Downhill Lane junction, adjacent to Downhill Lane.
- 5.2.6 Downhill Lane either side of the A19, continued further west by Follingsby Lane, forms part of a popular recreational cycling and horse-riding route (the Great North Forest Trail; GNFT), also used locally for dog-walking. Although the funding and local authority partnership promoting the Great North Forest itself have lapsed, the policies remain in place, and the GNFT remains (in this area, as shown by survey evidence) a well-used, popular route. In addition, a bridleway (Bridleway B46) runs southwards from the West Boldon area to meet Downhill Lane at Downhill Lane junction. Surveys show this to be very well used. In general, the junction remains busy with non-motorised traffic throughout the year, particularly with cycle commuters crossing the junction to reach the Nissan plant.
- 5.2.7 Chapters 6 to 14 of this report are set out by environmental topic, and describe the main environmental information available for the study area and descriptions of the likely environmental effects and mitigation measures envisaged for the proposed scheme.

5.3 Approach to Assessment

Levels of EIA Reporting

5.3.1 DMRB guidance on EIA⁹ sets out three 'levels' of EIA assessment and reporting: 'scoping', 'simple' and 'detailed'. These levels are not intended to be sequential (i.e. applied one after another in order), but 'consequential', in that the level to be applied at any stage of environmental reporting is determined on a topic-by-topic basis according to the following factors:

- The results of any previous assessment work (especially the Scoping Report);
- The likely scale or significance of impact (not the scale of development);
- The nature of the decision-making process to which the report relates; and
- The degree of uncertainty about the potential impact of the scheme.

5.3.2 Guidance published in DMRB or in Highways England Interim Advice Notes (IANs) for most topics defines topic-specific requirements for each level of assessment and reporting. The levels of assessment to be applied to the various topics in this scoping report are given in each of the specialist topic chapters 6 to 14.

Study Area

5.3.3 Study areas have been defined individually for each environmental topic, taking account of guidance published in DMRB, the geographic scope of the potential impacts relevant to that topic or of the information required to assess those impacts. The study areas are described within each relevant chapter of this report.

Existing, Baseline and Future Conditions and the 'Do Minimum' Scenario

5.3.4 In order to identify the effects of the proposed scheme on the environment, it is important to understand the environment that would be affected by the proposed works (the 'baseline conditions'). Understanding the baseline allows the measurement of changes that would be caused by the junction improvements.

5.3.5 The 'baseline' for the measurement of environmental effects is not the situation as it exists now, but the situation as it would exist immediately before the implementation of the scheme. This means that the identification of baseline conditions will take into account potential changes likely to occur before implementation of the scheme, that are entirely independent of the proposed scheme. Identification of the baseline therefore requires first the identification of the existing situation and then the prediction of how it is likely to change between now and implementation of the scheme.

5.3.6 For some topics, impacts are predicted both for the baseline (opening) year and for a 'future year' (for example 15 years after opening, or the worst year in the first 15 years of operation). It should be noted that in some cases, the worst year in the first 15 years after opening can in fact be the opening year, in which case no separate future year prediction is made. This is usually the case for air quality, for instance.

5.3.7 In most cases, impact prediction for the future year compares the predicted situation in that year with the situation that would occur in that year if the scheme had not been built, but taking into account any other, independent changes that can be predicted, such as predicted growth in traffic, or known future changes in law, regulations or policy. This hypothetical situation is known as the 'do-minimum' scenario. Where relevant, the future year is defined separately for each topic.

⁹ Highways Agency (2008). *HA 201/08: General Principles and Guidance of Environmental Impact Assessment*. <http://www.dft.gov.uk/ha/standards/dmr/vol11/section2/ha20108.pdf>

Data Gathering and Consultation

- 5.3.8 For each topic, data has been gathered from a number of sources and has informed design development so far.
- 5.3.9 Additional or updated information from the same sources and from new sources will be gathered during the current phase of work. The data gathering work to be carried out is defined in each specialist chapter. However, in most cases the work can be broken down into four elements:
- Consultation of third-party organisations to obtain factual information;
 - Consultation of third-party organisations (including statutory Consultation Bodies) for comment on the scope of work required, on the prediction and assessment of impacts and in relation to mitigation requirements;
 - Desk-based surveys; and
 - Field surveys to be carried out for the EIA or for other aspects of the scheme.

Identifying Potential Effects – Direct, Indirect and Cumulative

- 5.3.10 The EIA considers both direct and indirect effects. Indirect effects in this context can be *“those that alter the character, behaviour or functioning of the affected environment because of the knock-on impacts over a wider area or timescale”*, or *“the effects related to pressure as a result of project-induced change”*¹⁰.
- 5.3.11 Cumulative effects can occur:
- as a result of changes caused by other reasonably foreseeable developments acting cumulatively with the similar effects of the proposed development (‘inter-project cumulative effects’); or
 - from the combined effect of several different impacts of the proposed development, acting together on a single receptor, so that the combined effect is more significant than the sum of the individual effects (‘intra-project cumulative effects’).
- 5.3.12 In this EIA, it is intended that intra-project cumulative effects will be dealt with within the specialist topic chapters. Inter-project cumulative effects will be addressed separately, and the methodology for addressing these is set out in more detail in Chapter 15 of this Scoping Report.

¹⁰ Extracts from DMRB, Volume 11 Section 2 Part 5 (HA 205/08), paragraph 1.50 i. and ii.

Significance of Effects

- 5.3.13 The significance of environmental effects can be defined by reference to two key factors:
- The ‘value’ or ‘sensitivity’ of the receptor¹¹; and
 - The ‘magnitude’ or ‘scale’ of the impact.
- 5.3.14 DMRB specifies both a typical generic set of terminology and criteria¹² and topic-specific terminology and criteria for some topics¹³, covering the description of both the sensitivity and magnitude. However, DMRB does not necessarily use the same scales, terminology or criteria, or indeed the same overall approach, for all topics. For several topics whose guidance was published in the 1990s there are no published criteria, while some recently introduced topics have no published topic-specific guidance.
- 5.3.15 All assessments of impact are based on the professional judgement of the relevant environmental specialist, supported by the application of published topic-specific guidance found in DMRB where this is available. As a minimum, all impacts, for all topics, can be defined through the following four pairs of opposites:
- Adverse or beneficial (i.e. they are undesirable effects, or they represent an improvement over the existing situation);
 - Short-term or long-term (i.e. they are felt for less than 15 years, or they will still be felt 15 years after construction and beyond);
 - Construction or operational (i.e. caused by the construction of the scheme, or by the operation of the scheme after opening); and
 - Significant or insignificant.
- 5.3.16 However, for topics that benefit from detailed guidance in DMRB, more detailed techniques can be applied to support and further refine the assessment of effect. For those topics whose impacts are most easily definable in absolute numbers, this is done through calculations or computer modelling and the definition of numerical values for the environmental change (e.g. the increase or reduction in the concentration of an air pollutant, or the increase or reduction in noise levels).
- 5.3.17 For topics where the environmental effects are less amenable to numerical measurement, professional judgement can be applied to determine the significance of impact on a graduated scale. This is done by grading both the value/sensitivity of the receptor and the magnitude of impact on separate graduated scales and then applying a matrix, with the sensitivity of the affected receptor on one axis and the magnitude of the impact on the other axis. A typical matrix for this purpose is given in DMRB, and is presented below as Table 5.1, showing typical terminology for sensitivity of receptor, magnitude of impact and significance of impact.
- 5.3.18 Some topics use this matrix unmodified, together with their own tables of criteria for defining value/sensitivity and magnitude of impact; some other topics use modified versions of the matrix; others use a combination of matrix and calculations. The impact assessment that will be used for each topic is set-out in each of the relevant topic chapters (6-15).

¹¹ The ‘receptor’ is the existing environmental feature that would be affected by an impact – for instance, the population of a protected species, or a specific archaeological site, or the occupants of a residential property.

¹² Highways Agency (2008). DMRB Volume 11, Section 2, Part 5 (HA205/08): Assessment and Management of Environmental Effects. Available from: <http://www.dft.gov.uk/ha/standards/dmrb/vol11/section2.htm>

¹³ In relevant parts of DMRB Volume 11, Section 3.

Table 5.1: Typical Matrix for Assessment of Significant Effects

Value/ Sensitivity	Magnitude				
	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Large or Very Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Slight or Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Mitigation, Enhancements and Residual Effects

- 5.3.19 Where there would be adverse environmental effects, mitigation measures are required. The purpose of any mitigation measure is to eliminate the effect or, where this is not possible, to reduce its significance
- 5.3.20 The first option in mitigating any effect is to seek design measures that would enable the effect to be avoided, or at least reduced. Effects can be avoided or reduced, for instance, through changes to the horizontal or vertical alignment of the scheme, junction strategy or other aspects of the scheme layout; or through changes in the methods and/or materials to be used in construction.
- 5.3.21 Where avoidance of an effect through design measures is not possible, or is only partly effective, further mitigation measures are required. Such measures fall into three broad categories:
- Measures that do not remove an effect but make it less significant. A typical example is planting trees to screen views of a road where it is visually intrusive.
 - Like-for-like replacement of a feature that would be lost, for instance creating a new pond designed to provide habitat similar to that in a pond that is on the scheme alignment and cannot be avoided.
 - Provision of a beneficial effect that is related to the adverse effect, but is not a like-for-like replacement of the feature to be lost. A typical example would be an archaeological excavation, which provides detailed archaeological records of the archaeological remains to offset the loss of the remains themselves.
- 5.3.22 In some cases, it may be necessary to apply a combination of two or more of these approaches. Where appropriate, statutory Consultation Bodies will be consulted before determining the measures or combinations of measures to be used in mitigation.

Construction Environmental Management Plan

- 5.3.23 All of the mitigation measures above are designed principally to address effects whose occurrence, timing and location can be predicted in advance and are intrinsic to the design of the scheme. However, there are also potential effects that would occur as a result of the actual process of construction and from accidental occurrences during construction, which may or may not occur, and whose timing and location cannot be accurately predicted. Examples would include accidental spillages of fuels, oils or other chemicals, or the generation of nuisance dust drifting off the construction site.
- 5.3.24 The likelihood of occurrence and the severity of any such incidents can be reduced through good construction site management practices. The contractor would ensure that such good practices are applied through the application of a detailed CEMP. A CEMP is prepared and implemented for a specific project in line with an Environmental Commitments Register. It evolves throughout the life of the project, developing information and a level of detail appropriate to the particular stage of scheme development. The CEMP would:
- identify relevant environmental commitments made in the ES and measures put in place to enable their achievement;
 - identify 'environmental aspects' – that is, features of the local environment that may be particularly vulnerable to impacts as a result of construction activity, and construction activities that could give rise to accidental damage to the environment or accidental nuisance to local residence;
 - set out good practice site management measures to minimise the routine effects of construction on the environment;
 - set out control measures to reduce the likelihood of accidental occurrences that could lead to environmental damage; and
 - set out action plans to respond to any such occurrences that do arise, to minimise the damage caused.
- 5.3.25 In the environmental topic chapters of this Scoping Report, potential impacts are identified that fall into the category of construction-period impacts. In general the mitigation measure specified for such impacts is by reference to the CEMP.

Residual Effects

- 5.3.26 Effects that would still occur after the mitigation measures are taken into account are referred to as 'residual' effects. This Scoping Report outlines some of the likely relevant effects before mitigation, but assessment of their significance after the application of mitigation measures will be undertaken at the detailed assessment stage.

Dealing with Uncertainty

- 5.3.27 EIA is an iterative process, and scheme proposals may include somewhat uncertain aspects, such as specific locations or types of mitigation which will achieve a certain objective. At the time that the EIA is submitted, it is proposed that no aspects of design would vary so much as to represent effectively different schemes. The EIA would ensure it addresses the potential for a range of impacts resulting from any undecided parameters.
- 5.3.28 The Rochdale Envelope principle would be applied in accordance with the Planning Inspectorate's Advice Note 9¹⁴. Every attempt will be made to narrow the range of options, and the ES will explain clearly any elements of the scheme which are yet to

¹⁴ Infrastructure Planning Commission (2011). *Using the 'Rochdale Envelope'*. Available from: <http://infrastructure.independent.gov.uk/wp-content/uploads/2011/02/Advice-note-9.-Rochdale-envelope-web.pdf>

be finalised, with justification. Where flexibility is sought in the scheme design, the maximum potential adverse impacts of the scheme will be assessed. The ES will confirm maximum and other dimensions of the proposed scheme, and that any changes to the development within such parameters would not result in significant impacts not previously identified and assessed.

5.4 Structure of the Environmental Statement

5.4.1 Table 5.2 overleaf presents an indicative structure for the Environmental Statement (ES) for the A19 Downhill Lane Junction Improvement scheme. While this represents the currently envisaged structure of the ES, it should be recognised that the final structure may vary as a result of decisions made or needs recognised in the course of implementing the work.

5.4.2 Within this table, it should be noted that ‘accommodation works’ are any measures required in order to accommodate adjoining land owners relative to the impacts of the scheme. Minor works may include such measures as fencing, gates and preserving land owner access during construction.

Table 5.2: Indicative Structure of the Environmental Statement

Chapter	Potential Sections
Non-Technical Summary	
Volume 1: Main Text	
1. Introduction	A19 Downhill Lane Junction Improvement Legal basis for the ES General principles of EIA Purpose of the ES Scope and content of the ES Consideration of the requirement for Habitats Regulation Assessment Availability of the ES How to make comments/ the next steps in the process Other regulatory regimes

Chapter	Potential Sections
2. The Scheme	The applicant and the design team Background to the scheme Scheme objectives The site and its surroundings Scheme description Landscaping and environmental design Temporary and permanent land-take Changes to traffic flows Drainage design Non-motorised user facilities Diversions of utilities Accommodation works Materials Maintenance proposals Design uncertainties Other schemes
3. Consideration of Alternatives	Development of alternatives Development of the preferred option
4. Consultation	Origin of the scheme and strategic alternatives Timeline of consultation Consultation on options Development of the preferred option Consultation with third parties on EIA matters Consultation with the community – ‘Section 47’ Statutory consultation Environmental data requests
5. Approach to the Assessment	Legislation and guidance on EIA The Design Manual for Roads and Bridges Study Area Existing, Baseline and Future Conditions and the ‘Do Minimum’ Scenario Data Gathering Identifying Potential Impacts Significance of Impacts Mitigation, Enhancement and Residual Impacts
6. Air Quality	Common structure for all specialist topics: Executive summary Introduction Legislative and policy background to the topic Assessment method Baseline conditions Description of potential impacts (without
7. Cultural Heritage	
8. Landscape and Visual Effects	
9. Ecology and Nature Conservation	
10. Geology and Soils	
11. Materials	
12. Noise and Vibration	

Chapter	Potential Sections
13. People and Communities	mitigation)
14. Road Drainage and the Water Environment	Mitigation measures Monitoring and maintenance – if applicable Significance of residual effects (with mitigation)
15. Cumulative Effects	Executive Summary Introduction Scoping the cumulative effects assessment Gathering information on the schemes in the short list Assessment method Baseline Conditions Identification of impacts Mitigation Assessment of impact
16. Glossary of Acronyms and Technical Terms	
Environmental Masterplan (contained in Volume 1)	
Volume 2: Figures	
<p>Volume 3: Appendices, provisionally including:</p> <ul style="list-style-type: none"> · Appendix 1.1 - Scoping issue log · Appendix 1.2 - Schedule of environmental mitigation · Appendix 1.3 - Environmental action plan · Appendix 1.4 - Other regulatory regimes · Appendix 6.1 – Air quality dispersion model setup · Appendix 6.2 – Air quality model verification and adjustment · Appendix 6.3 – Air quality model receptor results · Appendix 6.4 – Air quality TAG assessment <ul style="list-style-type: none"> ○ Appendix 6.4a – Local air quality ○ Appendix 6.4b – Regional air quality, including greenhouse gases · Appendix 7.1 – Cultural heritage – assessment methodology · Appendix 7.2 – Cultural heritage gazetteer · Appendix 8.1 – Landscape and visual impact assessment – methods · Appendix 8.2 – Landscape – baseline information sources · Appendix 8.3 – Landscape character assessment · Appendix 8.4 – Landscape and visual impact tables · Appendix 9.1 – Relevant wildlife legislation, Section 41 and Durham BAP · Appendix 9.3 – Ecology and nature conservation: evaluation and impact assessment methodology · Appendix 9.4 – Ecology and nature conservation: characterisation of impact tables · Appendix 9.5 – Ecological baseline survey reports · Appendix 12.1 – Acoustic context and definitions · Appendix 12.2 – Noise and vibration: legislative and policy background · Appendix 12.3 – Noise and vibration: assessment approach · Appendix 12.4 – Baseline noise monitoring data · Appendix 12.5 – Noise and vibration: construction information 	

Chapter	Potential Sections
	<ul style="list-style-type: none">· Appendix 12.6 – Noise modelling data· Appendix 13.1 – NMU context report· Appendix 13.2 – NMU survey results· Appendix 13.3 – Driver stress calculations· Appendix 13.4 – Traffic data for driver stress calculations· Appendix 14.1 – Routine run-off and spillage risk calculations· Appendix 14.2 – Flood risk assessment· Appendix 14.3 – Water Framework Directive assessment· Appendix 14.4 – Traffic data for routine run-off and spillage risk calculations· Appendix 15.1 – Cumulative effects: long-list of developments· Appendix 15.2 – Cumulative effects: consultation letter template

6 AIR QUALITY

6.1 Introduction

6.1.1 This topic comprises localised effects on air quality arising from construction activities, in particular the generation of nuisance dust, in addition to three sub-topics which address the principal types of operational impact caused by road traffic at different geographic scales:

- local air quality, which is concerned principally with emissions of pollutants that are of concern in relation to human health and ecosystems, at a local level;
- regional air quality, which is concerned with emissions of pollutants that can disperse over longer distances, affecting both human health and ecosystems; and
- climate change, which is concerned with the emissions of greenhouse gases that can contribute to changes in the climate at a global level.

6.1.2 Construction and operational study areas for local and regional air quality will be defined using traffic flow forecasts from the traffic model, in order to enable identification of relevant 'affected roads'. The study area for local air quality assessment will comprise all land within 200 m of these 'affected roads', which for this purpose are those that meet any of the following criteria:

- the alignment would move by more than 5 m;
- daily traffic flows would change by 1,000 annual average daily traffic (AADT)¹⁵ or more;
- heavy duty vehicle (HDV) flows would change by 200 AADT or more;
- daily average speed would change by 10 km/hour or more; and
- peak hour speed would change by 20 km/hour or more.

6.1.3 For construction, the study area will also include any potentially sensitive receptors within 200 m of the construction site, such as residential properties, schools, hospitals or designated ecological receptors.

6.1.4 The study area for regional air quality assessment takes into account all roads meeting the following criteria:

- a change of more than 10% in AADT;
- a change of more than 10% in the number of HDVs; and
- a change in daily average speed of more than 20 km/hour.

6.1.5 Carbon emissions and their potential impact on climate change are included in the regional air quality assessment.

6.2 Existing and Baseline Knowledge

6.2.1 Table 6.1 below presents annualised mean data from 2013-based background maps for air quality produced by Defra¹⁶, for 1 km grid squares close to the junction improvements. The data shown is an estimated projection for the base year, opening and design assessment years. Table 6.1 also shows the health-based Air Quality Objective for nitrogen dioxide (NO₂), which is set by the government's Air Quality Regulations and defined by concentrations below which health effects are unlikely to be experienced even by the most sensitive members of the population.

¹⁵ AADT: a measure of the volume of traffic of a given highway or road, as a daily average.

¹⁶ Defra (2017). *2013 Based Background Maps for NO_x, NO₂, PM₁₀ and PM_{2.5}*. Available from: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013>

Table 6.1: Annual Mean Nitrogen Dioxide Concentrations ($\mu\text{g}/\text{m}^3$)

1 km Grid Square Reference	2012*	2021	2036**	Air Quality Objective
433500, 559500	15.6	11	9.6	40 $\mu\text{g}/\text{m}^3$
434500, 559500	20.1	13.9	12	
433500, 560500	17.5	11.8	10.1	
434500, 560500	16.4	11.4	9.8	

Note: *Background concentration has been factored using data calculated from 2013 – 2017

**Background concentrations are only available up to and including 2030. For years beyond this data, 2030 values have been used.

6.2.2 Table 6.1 shows that concentrations of NO_2 were and are expected to be well below the relevant air quality objective.

6.2.3 A search has been conducted for ecologically designated sites at European or national level within 2 km of the proposed scheme. No such internationally or nationally designated ecologically sensitive sites were identified. Although Hylton Castle Cutting Site of Special Scientific Interest is located just within 2 km of the proposed scheme, this site is designated for its geological interest (exposed fossil beds in limestone) rather than its ecological interest.

6.3 Relevant Guidance on Air Quality

6.3.1 The air quality assessment is to be undertaken in accordance with the guidance outlined in the DMRB (Volume 11, Section 3, Part 1, HA207/07¹⁷), Interim Advice Note (IAN) 174/13 (Impact Significance), IAN 175/13 (Compliance Risk), IAN 170/12 v3 (NO_x and NO_2 Projections for DMRB users) and Defra's Local Air Quality Management Technical Guidance (LAQM TG(16))¹⁸.

6.4 Legislation and Planning Policy Related to Air Quality

6.4.1 The air quality assessment will focus on NO_2 and fine particulate matter (PM_{10}). Predicted concentrations will be compared against health-based thresholds or Air Quality Objectives (AQO). These are set by the Air Quality Regulations and defined by concentrations below which health effects are unlikely to be experienced even by the most sensitive members of the population.

6.4.2 During the assessment, the following planning policy will be reviewed as relates to air quality:

- National Planning Policy Framework (2012);
- National Networks National Planning Statement (2014);
- Tyne and Wear Joint Local Transport Plan (LTP3);
- South Tyneside Local Plan: Core Strategy (2007);
- South Tyneside Local Plan: Development Management Policies (2011);
- South Tyneside Local Plan: Site-Specific Allocations (2012); and
- City of Sunderland Unitary Development Plan: Saved Policies (2007).

6.5 Data Gathering and Survey

6.5.1 Data gathering requirements are as follows:

¹⁷ Highways Agency (2007). *DMRB Volume 11, Section 3, HA 207/07: Air Quality*. Available from: <http://www.dft.gov.uk/ha/standards/dmr/vol11/section3/ha20707.pdf>

¹⁸ Defra (2016). *Local Air Quality Management Technical Guidance LAQM.TG(16)*. Available from: <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf>

- baseline traffic data;
- production of a revised traffic model for the 'without scheme'/ 'do minimum' scenario, including total vehicle flow and heavy duty vehicle flow;
- review representative air quality monitoring data;
- review all receptors in the study area; and
- confirm/ identify the 'worst case' receptor selection.

6.5.2 Note that traffic data gathering and modelling is being undertaken separately from the EIA by Arup. The majority of this work is complete. Arup will provide traffic flow forecasts to the EIA team as appropriate, covering the relevant scenarios, for use in air quality modelling.

6.6 Modelling and Calculations

6.6.1 The local air quality situation is to be predicted using an air quality dispersion model. The traffic characteristics on each road for each scenario would be used to calculate the emissions from the road network, and the model will then predict how these pollutants disperse to produce pollutant concentrations at receptor locations. The model predictions are to be adjusted to take account of the difference between the predicted concentrations and measurements of real concentrations made near the road, and to define the uncertainty associated with the model predictions. This process is known as model verification.

6.6.2 In July 2011, Defra published a report¹⁹ examining the long-term air quality trends in NO_x and NO₂ concentrations. This identified that ambient air quality concentrations are not decreasing into the future as is predicted using the current best practice methods of assessment (defined in the LAQM TG(16), which was issued before the 2011 report). To address this, Highways England has developed the Gap Analysis methodology to adjust model predictions to better reflect measured long-term trends of NO_x and NO₂.

6.6.3 The assessment will identify changes in air quality at individual residential properties chosen for analysis. In addition, a Transport Analysis Guidance (TAG) appraisal will be carried out. The local air quality TAG appraisal creates an overall 'score' for the scheme, which is calculated on the basis of the number of residential properties within 200 m of affected roads and the overall sum of the changes in pollutant concentrations at these properties. The TAG appraisal also calculates the overall emissions of NO_x and CO₂.

6.7 Proposed Assessment Method

6.7.1 In accordance with HA 207/07, the proposed level of assessment for local air quality will begin as a 'simple' assessment (see Section 0) using up-to-date traffic forecast data. The assessment will progress to a 'detailed' assessment should significant effects on environmental resources or receptors be likely.

6.7.2 The overall objectives of this assessment are to estimate the impact of the scheme on local and regional air quality, in addition to estimating changes in greenhouse gas emissions.

6.7.3 Traffic data will be used to consider air quality effects in five scenarios:

- Baseline scenario (i.e. existing conditions);
- Opening Year – Do Minimum (DM) (i.e. without the scheme in place);

¹⁹ Defra (2011). *Trends in NO_x and NO₂ emissions and ambient measurements in the UK*. Available from: http://uk-air.defra.gov.uk/assets/documents/reports/cat05/1108251149_110718_AQ0724_Final_report.pdf

- Opening Year – Do Something (DS) (i.e. with the scheme in place);
- Design Year (15 years after opening) – DM; and
- Design Year (15 years after opening) – DS.

- 6.7.4 The local air quality study area for operational impacts will cover receptors within 200 m of roads that are expected to be affected by the scheme, as defined in paragraphs 6.1.2. The study area for construction impacts such as nuisance dust will be determined based on up-to-date traffic flow forecast data, according to the criteria set out in paragraph 6.1.2.
- 6.7.5 Changes in greenhouse gas emissions have an impact at a regional, national and international scale. The methodology for defining the study area for assessing changes in emissions resulting from the scheme is defined in paragraph 6.1.2.
- 6.7.6 Atmospheric pollution can affect habitats which are sensitive to nitrogen or acid deposition. DMRB therefore mandates a specific assessment of air quality effects on nature conservation sites designated at International or European level. However, there are no habitat sites designated at these levels within 2 km of the affected road network and no assessment is required.
- 6.7.7 The model results are to be used to assess whether there would be any significant local air quality effects as a result of the scheme.
- 6.7.8 Highways England's approach to air quality assessment and significance identifies and assesses sensitive receptors near roads where air quality might be affected. Areas where national AQOs might be expected to be exceeded are also considered, which includes Air Quality Management Areas (AQMAs). The model results are used to identify those receptors which are in exceedance of AQOs in either the DM or DS scenario. These are the only receptors which are considered in the judgement of significance. The change in predicted concentration is then calculated as the difference between DS and DM model results at these receptors.
- 6.7.9 The assessment of significance is to follow Highways England's guidance IAN 174/13²⁰. The significance categories and guideline property numbers are summarised in Table 6.2.

Table 6.2: Guideline to Number of Properties Constituting a Significant Effect

Magnitude of Change in NO ₂	Number of Receptors with:	
	Worsening of AQO already above objective or creation of a new exceedance	Improvement of an AQO already above objective or the removal of an existing exceedance
Large (>4 µg/m ³)	1 to 10 receptors	1 to 10 receptors
Medium (>2 to 4 µg/m ³)	10 to 30 receptors	10 to 30 receptors
Small (>0.4 to 2 µg/m ³)	30 to 60 receptors	30 to 60 receptors

- 6.7.10 Where the results reside between the lower and upper guideline bands for any of the magnitude criteria then scheme effects could be significant and a judgement is required taking into account the results for all six categories. This judgement will be based on the technical knowledge and experience of the air quality professional.

²⁰ Highways Agency (2013). *Interim Advice Note 174/13: Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07)*. Available from: <http://www.dft.gov.uk/ha/standards/ians/pdfs/ian174.pdf>

- 6.7.11 Scheme effects are more likely to be significant where:
- There are no/ few receptors with any improvements;
 - PM₁₀ annual averages are also affected by small, medium or large deteriorations; and
 - Short-term exceedances may be caused or worsened by the scheme for either NO₂ or PM₁₀.
- 6.7.12 Scheme effects are more likely to be not significant where:
- There are receptors with small, medium or large improvements;
 - PM₁₀ annual averages are not affected by small, medium or large deteriorations; and
 - Short-term exceedances are not caused or worsened by the scheme for either NO₂ or PM₁₀.
- 6.7.13 The significance of the change is greater the higher above the air quality thresholds the changes are predicted to occur. Where it is predicted that the short-term NO₂ and/ or PM₁₀ thresholds are exceeded, then more significance should be attributed to these effects.
- 6.7.14 The EU Directive on Ambient Air Quality sets Limit Values for a range of pollutants. The purpose of the Directive is to protect human health, and the environment as a whole. Defra reports annually, on behalf of the UK government, on the status of air quality to the European Commission. Highways England's compliance risk assessment test (IAN 175/13²¹) has been developed to enable decision makers to judge a scheme's likelihood of non-compliance with the EU Directive. The compliance risk assessment test also informs the air quality significance test.
- 6.7.15 A regional assessment will be completed following the guidance in HA207/07; this will include assessment of CO₂. The proposed level of assessment for regional air quality is a 'simple' assessment, given the potential for only small regional emissions relative to the national emissions. The calculated CO₂ mass emissions are used as part of the TAG process to monetise the impacts of greenhouse gas emissions as a result of the scheme.

6.8 Mitigation Options

- 6.8.1 There are several standard and best practice mitigation measures that could be implemented during construction to help mitigate potential adverse effects upon air quality during construction. Various mitigation measures will be recommended within the ES following the assessment. Typical examples include:
- dampening down site access roads as necessary using a water bowser to reduce airborne dust, to be monitored on a daily basis during hot, dry weather;
 - locating internal haulage routes away from sensitive receptors where possible and dampening down the routes where necessary;
 - re-vegetating or temporarily sealing completed earthworks as soon as is practicable; and
 - sheeting vehicles carrying spoil, fill or earthworks material leaving the site to prevent loss of materials off-site.
- 6.8.2 Mitigation measures during operation are to be considered in response to the predicted impacts of the assessment.

²¹ Highways Agency (2013). *Interim Advice Note 175/13: Compliance Risk Analysis Tool Ver 1.0*. Available from: <http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian175.pdf>

7 CULTURAL HERITAGE

7.1 Introduction

7.1.1 The Cultural Heritage assessment is undertaken in accordance with the guidance provided in Volume 11, Section 3, Part 2 of the Design Manual for Roads and Bridges (HA208/07). HA208/07 specifies that the assessment of impacts upon cultural heritage considers three sub-topics:

- **archaeological remains** – the material remains of human activity from the earliest periods of human evolution to the present, which may be buried traces of human activities, sites visible above ground, or moveable artefacts;
- **historic buildings** – architectural or designed or other structures with a significant ‘historical value’, which may include structures that have no aesthetic appeal or structures not usually thought of as buildings’, such as milestones or bridges; and
- **historic landscape** – the current landscape, whose character is the result of the action and interaction of natural and/or human factors, and includes evidence of past human activities, which is a significant part of the historic landscape, and may derive both from archaeological remains and historic buildings within it.

7.1.2 In accordance with the guidance provided in paragraph 5.4 of HA/207, a study area of 300 m from the footprint of the scheme will be used for this assessment.

7.2 Existing and Baseline Knowledge

7.2.1 Existing and baseline knowledge has been obtained from the following sources:

- the National Heritage List for information on statutorily designated heritage assets (Scheduled Monuments, Listed Buildings, Registered Battlefields, and sites included on the Register of Historic Parks and Gardens);
- Tyne and Wear Historic Environment Record (HER) for information on undesignated heritage assets and Historic Landscape Characterisation;
- previous unpublished heritage reports prepared for this scheme and Testos Junction Improvement scheme; and
- a walkover survey, conducted in December 2014.

Cultural Heritage Assets

7.2.2 Based on the data gathered from the sources identified above, a total of 19 cultural heritage assets have been identified, consisting of 11 archaeological remains, 1 historic building and seven historic landscape types. Their locations are shown on Figures 7.1 and 7.2, and further information is provided in Table 7.1 and Table 7.2.

7.2.3 Eight assets are within the footprint of the proposed scheme (six archaeological sites; two historic landscape types):

- 46 Engine House (Site of),
- 47 West Boldon Dam (Site of),
- 49 Downhill Lane Level Crossing (Site of),
- 58 Stanhope and Tyne Railway (Site of),
- 70 Ridge and Furrow 8,
- 72 Narrow Ridge and Furrow,
- HLT1 20th Century Enclosure, and

- HLT5 Modern Communications.

7.2.4 There are no World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields or Conservation Areas within the study area.

Table 7.1: Cultural Heritage Assets Identified within the Study Area

Asset No.	Asset name	HER/ Other reference	Sub-topic	Value
43	Make-Me-rich Farm	N/A	Historic Buildings	Low
44	Stone (Site of)	N/A	Archaeological remains	Negligible
46	Engine House	2,302	Archaeological remains	Negligible
47	West Boldon Dam	2,301	Archaeological remains	Negligible
49	Downhill Level Crossing	N/A	Archaeological remains	Negligible
58	Stanhope and Tyne Railway	1376130; 2290	Archaeological remains	Negligible
63	Ridge and Furrow 4	11731; 2007/27	Archaeological remains	Negligible
70	Ridge and Furrow 8	11731; 2007/27	Archaeological remains	Negligible
72	Narrow Ridge and Furrow	1403245	Archaeological remains	Negligible
73	Ridge and Furrow 9	11731	Archaeological remains	Negligible
74	Usworth, Sunderland Aerodrome (RAF Usworth)	1824	Archaeological remains	Negligible
75	Usworth RAF, Searchlight Battery TT237	5534	Archaeological remains	Negligible
HLT1	20th century enclosure	N/A	Historic Landscape	Negligible
HLT3	Settlement	N/A	Historic Landscape	Low
HLT5	Modern Communications	N/A	Historic Landscape	Negligible
HLT9	20th century plantation	N/A	Historic Landscape	Negligible
HLT10	Public services	N/A	Historic Landscape	Negligible
HLT11	Recreation	N/A	Historic Landscape	Negligible
HLT12	Industrial	N/A	Historic Landscape	Negligible

Table 7.2: Summary of the value of Cultural Heritage Assets Identified within the Study Area

Asset value	Number of Assets
High	0
Medium	0
Low	2
Negligible	17
Unknown	0

Archaeological Remains

- 7.2.5 Archaeological remains within the study area predominantly date from the post-medieval period (AD1540 - AD1900) and comprise agricultural and transport-related features.
- 7.2.6 Four areas of ridge and furrow have been identified within the study area, resulting from agricultural practise in the post-medieval period. These assets are generally in poor condition or have been destroyed by modern development.
- 7.2.7 Development of the railway in the 19th century is represented by four assets, including the Stanhope and Tyne Railway (Asset 58) which was established in the 1830s to enable the movement of coal and lime to the coast.
- 7.2.8 Two cultural heritage assets dating to after AD1900 are present within the study area. Sunderland Aerodrome originated during the First World War, and became RAF Usworth during the Second World War. This site has been redeveloped as an industrial site. Related to the presence of the airfield is the former site of an RAF searchlight battery, the location of which has been redeveloped with housing.

Potential for Unknown Archaeological Remains

- 7.2.9 As the land around Downhill Lane junction remains undeveloped, it is possible that previously unknown archaeological remains are present.

Historic Buildings

- 7.2.10 Within the study area, one historic building is present. Make-Me-Rich Farm (Asset 43) comprises a farmhouse of post-medieval date constructed on a T-plan.

Historic Landscape

- 7.2.11 Within the study area, seven historic landscape types have been identified. These areas are summarised in Table 7.3 below and illustrated in Figure 7.2.

Table 7.3: Historic Landscape Character Areas

Unit No.	Unit Name	Description
HLT1	20th century enclosure	Large fields of 20 th century date, generally resulting from widespread alteration or reorganisation of post-medieval enclosure. Evidence of earlier ridge and furrow field systems survive in areas as earthworks, cropmarks, and geophysical survey anomalies.

Unit No.	Unit Name	Description
HLT3	Settlement	Mostly comprised of blocks of early 20th century terraced housing or later semi-detached housing associated with the town of Downhill. It also includes the farmstead at Make-Me-Rich Farm.
HLT5	Modern Communications	Large modern roads (dual carriageways, greater than 20 m wide), and including embankments and service areas. In the study area this type comprises the A19.
HLT9	20th century plantation	Areas of modern plantation associated with the A19 which were probably created as part of visual screening when the road was constructed.

7.3 Relevant Guidance on Cultural Heritage

7.3.1 The assessment will be carried out in line with DMRB guidance (Volume 11, Section 3, Part 2 HA 208/07, Cultural Heritage²²). This guidance defines slightly different methods of assessment for each of the Cultural Heritage sub-topics, and these are described further below.

7.3.2 The cultural heritage inputs to the ES will be prepared in line with the Chartered Institute for Archaeology's Code of Conduct (2014)²³ and Standard and Guidance for Historic Environment Desk-Based Assessment (2014).

7.4 Legislation and Planning Policy Related to Cultural Heritage

7.4.1 The following legislation, regulations or guidelines are applicable to the cultural heritage assessment of the proposed scheme:

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas) Act 1990; and
- Historic Buildings and Ancient Monuments Act, 1953 (as amended).

7.4.2 During the assessment, the following planning policy will be reviewed as relates to cultural heritage:

- National Planning Policy Framework (2012);
- National Networks National Planning Statement (2014);
- South Tyneside Local Plan: Core Strategy (2007);
- South Tyneside Local Plan: Development Management Policies (2011);
- South Tyneside Local Plan: Site-Specific Allocations (2012); and
- Sunderland Unitary Development Plan (UDP) Adopted Alteration No.2 (2007).

7.5 Data Gathering and Survey

7.5.1 In order to check that all data and baseline information gathered to date is still accurate, the following actions will be undertaken:

- review comments previously received from consultees to ensure that all have been addressed;

²² Highways Agency (2007). *DMRB Volume 11, Section 3, Part 2 HA 208/07, Cultural Heritage*. Available from: <http://www.dft.gov.uk/ha/standards/dmr/vol11/section3/ha20807.pdf>

²³ Institute for Archaeologists (2014). *Code of Conduct*. Available from: <http://www.archaeologists.net/sites/default/files/CodesofConduct.pdf>

- identify all relevant policies and plans and assess whether the proposed junction improvement would help or hinder their objectives;
- consult the Tyne and Wear Historic Environment Record to determine whether any new information has been added since the previous desk-based assessment;
- geophysical survey suitable areas of the proposed scheme footprint;
- if any new information is identified, incorporate it into the assessment; and
- consult with Historic England and the Tyne and Wear Archaeologist in relation to the design, predicted impacts and mitigation proposals.

7.6 Proposed Assessment Method

7.6.1 It is proposed that a 'simple assessment' as defined in HA208/07 will be undertaken (see Section 0). In accordance with the DMRB, the results of simple assessment will be used to review the potential need for detailed assessment through an iterative process.

7.6.2 DMRB specifies that the study area for assessing impacts on archaeological remains should extend for at least 200 m in all directions from the proposed scheme. This approach will also be adopted for the historic buildings and historic landscape sub-topic. The study area will be extended if the potential for impacts on the setting of designated heritage assets outside this area is identified.

7.6.3 Assessment of magnitude and significance of impact will be undertaken based on the guidance provided by HA 208/07. Assessment of the setting of heritage assets, its contribution to historic legibility and capacity for change will be undertaken based on the guidance contained in Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (Historic England 2015).

7.7 Mitigation Options

7.7.1 Potential mitigation measures include:

- detailed design of development proposals to avoid or reduce impacts on heritage assets;
- installation of physical protection measures, or temporary removal of assets and for reinstatement following the completion of construction works;
- the use of noise fencing or maintenance of access routes to a historic building to maintain its viability;
- archaeological investigation, including detailed excavation, strip map and sample; and recording during construction;
- historic building recording; and
- landscaping and planting to reduce the visual impact of the scheme.

8 LANDSCAPE AND VISUAL EFFECTS

8.1 Introduction

- 8.1.1 The landscape takes its character from a combination of elements, including topography, watercourses, land use and pattern, vegetation, public open space and cultural heritage influences. Landscapes vary considerably in character and quality, and they are a key component of the distinctiveness of any local area or region. The concept of 'townscape' applies the same principles to an urban context, with greater emphasis on the built environment. The assessment of effects on landscape and townscape therefore addresses changes in any of these components.
- 8.1.2 To a large extent, human beings experience the landscape and townscape visually. The quality of views available in any given area can contribute to the quality of life. Visual Impact Assessment therefore assesses potential changes in the key components and character of existing views. It takes into account the extent to which the scheme would be visible from surrounding houses, farms, public rights of way (PRoWs), public open spaces and offices.
- 8.1.3 For the purposes of this scoping study, the study area was defined as a 1 km offset from the proposed scheme. The scoping study area encompasses the landscape and visual receptors most likely to be affected by the proposed scheme.

8.2 Existing and Baseline Knowledge

- 8.2.1 Existing landscape and visual elements within the scoping study area are summarised below. Landscape elements referred to in the text are illustrated in Figure 8.1, while landscape character areas are shown in Figure 8.2.

Landscape Elements

- 8.2.2 In terms of topography, the distant southern horizon is defined by Penshaw Hill, which is 136 m high above ordnance datum (AOD) and Carr Hill which is approximately 100 m AOD, both of which are some 5 km to the south. The western horizon is defined by higher ground in Gateshead which is 150 m AOD, and between 6 and 8 km to the west. West Boldon (60 m AOD) and the Boldon Hills (90 m AOD) form areas of higher ground to the eastern horizon.
- 8.2.3 The topography of the scoping study area to the west of the A19 is mainly flat, with rolling fields and localised valleys created by sunken streams such as the River Don. Substantially modified landforms in the scoping study area include the embankments, bridges and cuttings of the A19. Other locally common landform features include restored former open-cast mines to the west and east.
- 8.2.4 The main watercourses through the scoping study area are the River Don and its smaller tributaries. The watercourses follow sinuous but generally north-south courses within noticeable local valleys in generally flat, low-lying land. There are also several disused local land drains amongst the fields.
- 8.2.5 Open water within the scoping study area can be found at Boldon Lake and in parts of Mount Pleasant Marsh, which are both designated as Local Wildlife Sites²⁴. The open water areas are located to the south of Boldon Business Park and also comprise marshland and deciduous woodland.
- 8.2.6 The local landscape pattern comprises a corridor of predominantly arable agricultural land aligned east-west, linked to a similar corridor aligned north-south. These corridors are protected by designation as green belt, in order to maintain the

²⁴ South Tyneside Council. 2012. *South Tyneside Local Development Framework: Site-Specific Allocations*. [Online]. [Accessed: 24 January 2017]. Available from: <https://www.southtyneside.gov.uk/article/36015/Local-Development-Framework>

separation between the surrounding urban areas of Tyneside to the north, Wearside to the southeast and Washington to the southwest (3 km). The urban areas are linked by trunk roads, such as the A19, and minor roads, which subdivide the rural corridors. Isolated farms and other properties are scattered within the rural corridors (West House Farm, Scots House, Make-Me-Rich Farm and Elliscrope Farm).

- 8.2.7 Combined with some pasture, arable fields are separated by gappy, moderately maintained hedgerows with some semi-mature trees. There are several small-to-medium-sized deciduous woodland areas, particularly near farmsteads, town edges and along the river/stream banks. Tree Preservation Orders (TPOs) are present to the north at Mount Pleasant Marsh, Scots House and West Boldon and to the south-east of Downhill Lane junction near Hylton Castle.
- 8.2.8 Boldon Downhill Area of High Landscape Value or Landscape Significance is located on the west facing slopes of the Boldon Hills. The east-west green belt corridor is also designated as a Wildlife Corridor, and is linked to other designated Wildlife Corridors running north-south, for example along the River Don.
- 8.2.9 Commercial land in the scoping study area largely comprises of Boldon Business Park to the north-east of Testos junction and the large Nissan plant to the south-west of Downhill Lane junction. There is a network of PRowS within the rural landscape, fragmented by existing highways, but with some intact links into the urban fringe areas to the east.
- 8.2.10 Cultural heritage elements and characteristics that influence the landscape within the scoping study area include Listed Buildings (e.g. Scots House and within the East and West Boldon Conservation Areas), the disused Stanhope and Tyne railway, the Penshaw Monument, and the 18th/ 19th century 'enclosure' period field system, which is superimposed on an earlier agricultural system with medieval origins.

Landscape Character

- 8.2.11 At a regional scale, the scoping study area is covered by the eastern part of National Character Area 14 (Tyne and Wear Lowlands)²⁵, and the northernmost tip of Area 15 (Magnesian Limestone Escarpment)²⁶. At a local authority level, the scoping study area is covered by the following character areas within the South Tyneside Landscape Character Study²⁷:
- Character Area 24 (Urban): The Boldons;
 - Character Area 31 (Urban Fringe): Boldon Fell; and
 - Character Area 32 (Urban Fringe): Boldon Downhill.
- 8.2.12 The scoping study area is also covered by the following character areas within the City of Sunderland Landscape Character Assessment²⁸:
- Character Area 2a (Coalfield Lowland Terraces): Usworth Lowland; and
 - Character 9f (Urban Limestone Plateau): Hylton Castle, Downhill and Castleton.
- 8.2.13 For the purposes of this scoping study, smaller-scale local landscape character units (LCUs) have been identified using the published landscape character assessments

²⁵ Natural England. 2013. National Character Area Profile 14: Tyne and Wear Lowlands. [Online]. [Accessed: 16 January 2017]. Available from: <http://publications.naturalengland.org.uk/publication/4683608954503168>

²⁶ Natural England. 2013. National Character Area Profile 15: Durham Magnesian Limestone Plateau. [Online]. [Accessed: 16 January 2017]. Available from: <http://publications.naturalengland.org.uk/publication/8308038>

²⁷ LUC on behalf of South Tyneside Council. 2012. South Tyneside Landscape Character Study Part I: Landscape Character Assessment. [Online]. [Accessed: 16 January 2017]. Available from: <https://www.southtyneside.gov.uk/article/36020/Supporting-Documentation-and-Evidence-Base-Studies>

²⁸ LUC on behalf of Sunderland City Council. 2015. City of Sunderland Landscape Character Assessment. [Online]. [Accessed: 16 January 2017]. Available from: <http://www.sunderland.gov.uk/index.aspx?articleid=3301>

as a guide, along with information gained through desk study work and site surveys. The LCUs are listed below along with a brief description and are shown on Figure 8.2:

- LCU1 Western Lowland Agricultural Land: Mainly flat arable farmland with gappy hedgerows and occasional wooded clumps.
- LCU2 Vegetated Corridor: Busy commuter road between Newcastle and Sunderland with extensive tree belts and hedgerow planting.
- LCU3 Boldon Business Park Complex: Busy retail and office park of large warehouses and smaller office units with boundary planting to the edges.
- LCU4 Boldon Ecological Wetlands: Flat and low-lying areas of marshland, woodland and open water.
- LCU5 River Don Scrubby Farmland: Gently sloping arable farmland with intermittent vegetation clumps crossed by the River Don.
- LCU6 West Boldon Elevated Urban Centre: Elevated residential area with recreational and community facilities based around a medieval layout and centre around St. Nicholas Church.
- LCU7 Downhill Elevated Farmland: Undulating, open arable farmland with gappy hedgerows and occasional properties and farmsteads.
- LCU8 Town End Farm Residential Edge: Mixed modern semi-detached and terraced housing of red brick, render and tile roofing along cul-de-sacs and main spine roads.
- LCU9 Usworth Lowland: Gently rolling to flat arable fields with undulating landform along river valleys, influenced by nearby residential and industrial development.
- LCU10 Nissan Plant: Large scale industrial buildings amongst open car park areas with mature boundary planting.

Existing Views and Visual Receptors

- 8.2.14 Within the scoping study area, views from the north are largely contained by woodland along the A19, at Boldon Business Park and at Mount Pleasant Marsh. Large commercial buildings in Boldon Business Park also screen views from some residential areas. Views from the east are more elevated and open, although beyond 1 km views become restricted by topography at the Boldon Hills.
- 8.2.15 Views from the south are contained by vegetation along the A19 and by buildings in Town End Farm and at the Nissan Plant. Views from the west are more open but the flat topography in this area results in views being filtered by intervening hedgerow and scrub vegetation.
- 8.2.16 Potential visual receptors of the proposed scheme include residents at houses and farmsteads scattered within the surrounding agricultural fields such as Make-Me-Rich Farm and Hylton Bridge Farm, users of PRoWs such as Bridleway B46 to the east and the Great North Forest Trail and workers at the Nissan Plant. There are also likely to be views from Town End Farm and the North-east Aircraft Museum.
- 8.2.17 Elements within the landscape that detract from visual amenity include the electricity substation within Mount Pleasant Marsh and the pylon network that extends out from it in all directions. The A19 itself and the large Nissan Plant are also visual detractors.
- 8.2.18 Night-time views from much of the surrounding area are dominated by light pollution independent of the highway. However, vehicle headlights between Downhill Lane junction and Testos junction are prominent in existing west-facing night-time views from the high ground in Downhill/ Town End Farm, where they are backed by dark areas of countryside.

8.3 Relevant Guidance on Landscape and Visual Effects

- 8.3.1 The assessment will be carried out in line with the DMRB as updated by Interim Advice Note (IAN) 135/10²⁹ as well as Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3)³⁰.

8.4 Legislation and Planning Policy Related to Landscape and Visual Effects

- 8.4.1 There are Acts of Parliament and Regulations protecting the green belt, trees, hedgerows and Listed Buildings which are of relevance to the study area:

- Green belt: Town and Country Planning Act (1947);
- Protected trees: Town and Country Planning (Tree Preservation) (England) Regulations (2012);
- Important Hedgerows: Environment Act 1995 and Hedgerow Regulations 1997; and
- Listed Buildings and Conservation Areas: Town and Country Planning Act 1990 and Town and Country Planning (Listed Buildings and Conservation Areas) Act 1990. The setting of Listed Buildings is considered in Section 7.

- 8.4.2 As there are no National Parks, Areas of Outstanding Natural Beauty, Registered Parks or Gardens, Scheduled Monuments or internationally/nationally designated nature conservation sites in the vicinity of the scheme, associated legislation is not relevant.

- 8.4.3 During the assessment, the following planning policy documents will be reviewed as relates to landscape:

- National Planning Policy Framework (2012);
- South Tyneside Local Development Framework (LDF): Core Strategy (2007);
- South Tyneside LDF: Development Management Policies (2011);
- South Tyneside LDF: Site-Specific Allocations (2012);
- Sunderland Unitary Development Plan (UDP) Adopted Alteration No. 2 (2007);
- South Tyneside Landscape Character Study (2012); and
- City of Sunderland Landscape Character Assessment (2015).

8.5 Data Gathering and Survey

- 8.5.1 The following is a list of data to be gathered to update the existing baseline information:

- check Multi-Agency Geographic Information for the Countryside (MAGIC), the South Tyneside LDF and Sunderland UDP for accurate, updated information on landscape designations and planning policy;
- obtain the definitive footpath map for the area;
- study more recent aerial photos and carry out a site visit to assess any changes in vegetation cover and land use;
- use Ordnance Survey (OS) data and site survey work to check the locations of visual receptors;

²⁹ Highways England (formerly Agency). 2010. Interim Advice Note 135/10 Landscape and Visual Effects Assessment (IAN 135/10). [Online]. [Accessed: 16 January 2017]. Available from: <http://www.standardsforhighways.co.uk/ians/pdfs/ian135.pdf>

³⁰ Landscape Institute and Institute of Environmental Management and Assessment. 2013. Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3). Abingdon: Routledge.

- consult with planning authorities to determine if there are any supplementary planning guidance notes of relevance to the scheme;
- contact the local planning authority to confirm TPO and Important Hedgerow information; and
- consult with local landscape officers to confirm the study area extent, approach to the assessment and the locations of sensitive landscape and visual receptors.

8.6 Proposed Assessment Method

- 8.6.1 It is proposed that a ‘detailed’ level of assessment will be conducted as part of the EIA and will cover both landscape and visual effects. This is because the scheme would result in the loss of vegetation and the construction of an additional bridge structure, creating the potential for significant landscape and visual effects.
- 8.6.2 The assessment will build on the baseline information acquired to inform this scoping study and will assess the potential landscape and visual effects of the proposed scheme on individual receptors. The proposed methodology for this assessment is summarised below and will be carried out by experienced landscape architects.
- 8.6.3 Computer modelling and site survey work will be undertaken to confirm the Zone of Theoretical Visibility (ZTV), which will form the basis of the study area for the assessment. The assessment of landscape effects will take account of landscape designations, the quality of landscape elements, the character of the landscape, the historical and cultural associations in the study area, the susceptibility of the landscape to change, and the overall change likely to occur in the landscape.
- 8.6.4 The assessment of visual effects will identify potential visual receptors, which will be informed by the ZTV and site survey work. Receptors will include people in their homes, users of PRowS and other areas of public open space, people at work, and people travelling along roads or railways. The value of views will be considered along with a receptor’s susceptibility to change, and the overall change in the view taken into account. The nature of views in the study area will be represented by photos from key viewpoints and photomontages prepared to illustrate the change in views from certain locations. Photos would also be taken to show seasonal variation in leaf cover, for example between summer and winter. Photomontages will be created in line with best practice guidelines suitable for illustrative purposes only. Night-time visual effects will also be considered in the assessment.
- 8.6.5 The assessment of sensitivity, magnitude of impact and significance of effect will be informed by specific criteria within IAN 135/10 as listed below in Table 8.1 and Table 8.2. A matrix approach will be used to assess significance effect, whilst also using professional judgement. The matrix is presented in Table 8.3.

Table 8.1: Landscape and Visual Sensitivity Criteria

Sensitivity	Landscape Criteria	Visual Criteria
High	<p>Landscapes which by nature of their character would be unable to accommodate change of the type proposed. Typically these would be:</p> <ul style="list-style-type: none"> · Of high quality with distinctive elements and features making a positive contribution to character and sense of place. · Likely to be designated, but the aspects which underpin such value may also be 	<p>Residential properties with views towards the proposals from ground floor and first floor windows.</p> <p>PRowS or other recreational trails (e.g. National Trails, footpaths, bridleways.) with open views of the scheme proposals.</p> <p>Users of recreational facilities where the purpose of that recreation is enjoyment of the countryside (e.g. Country Parks,</p>

Sensitivity	Landscape Criteria	Visual Criteria
	<p>present outside designated areas, especially at the local scale.</p> <ul style="list-style-type: none"> · Areas of special recognised value through use, perception or historic and cultural associations. · Likely to contain features and elements that are rare and could not be replaced. 	<p>National Trust, other access land). Highly valued views (e.g. from heritage assets, views featured in art and literature).</p>
Moderate	<p>Landscapes which by nature of their character would be able to partly accommodate change of the type proposed. Typically these would be:</p> <ul style="list-style-type: none"> · Comprised of commonplace elements and features creating generally unremarkable character but with some sense of place. · Locally designated, or their value may be expressed through non-statutory local publications. · Containing some features of value through use, perception or historic and cultural associations. · Likely to contain some features and elements that could not be replaced. 	<p>Residential properties with limited views due to partial obstruction towards the proposed scheme. Public Rights of Way or other recreational trails (e.g. National Trails, footpaths, bridleways etc.) with restricted views of the scheme proposals. Outdoor workers. Users of lower speed passenger railways. Users of scenic roads, railways or waterways or users of designated tourist routes. Schools and other institutional buildings, and their outdoor areas.</p>
Low	<p>Landscapes which by nature of their character would be able to accommodate change of the type proposed. Typically these would be:</p> <ul style="list-style-type: none"> · Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place. · Containing few, if any, features of value through use, perception or historic and cultural associations. · Likely to contain few, if any, features and elements that could not be readily replaced. 	<p>Indoor workers. Users of main roads (e.g. trunk roads) or passengers in public transport on main arterial routes. Users of higher speed passenger or freight railways. Users of recreational facilities where the purpose of the recreation is not related to the view (e.g. sports facilities).</p>

Table 8.2: Magnitude of Impact Criteria

Magnitude	Landscape Criteria	Visual Criteria
Major	<p>Total loss or large scale damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic conspicuous features and elements.</p> <p>Large scale improvement of character by the restoration of features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.</p>	<p>The scheme, or a part of it, would become the dominant feature or focal point of the view.</p>
Moderate	<p>Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.</p> <p>Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic features.</p>	<p>The scheme, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor.</p>
Minor	<p>Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.</p> <p>Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.</p>	<p>The scheme, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.</p>
Negligible	<p>Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.</p> <p>Barely noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.</p>	<p>Only a very small part of the scheme would be discernible, or it is at such a distance that it would form a barely noticeable feature or element of the view.</p>
No Change	<p>No noticeable loss, damage or alteration to character or features or elements.</p>	<p>No part of the scheme, or work or activity associated with it, is discernible.</p>

Table 8.3: Significance of Effect Categories for Landscape and Visual Effects

Landscape/ Visual Sensitivity	Magnitude				
	No change	Negligible	Minor	Moderate	Major
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Moderate	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate

8.7 Mitigation Options

8.7.1 Potential mitigation measures to reduce the impact of the proposed scheme include:

- retaining and protecting vegetation during construction in accordance with best practice;
- reinstating areas used for temporary works, such as construction compounds, to a condition suitable for its original use;
- planting replacement hedgerows and trees where removal could not be avoided and to provide screening of views and integration with local landscape character;
- providing a variety of grassland areas to increase local biodiversity;
- keeping lighting to a minimum to minimise light pollution in west-facing views;
- designing structures and materials to be in keeping with local landscape character; and
- maintaining seeding and planting by controlling weed growth, establishment cuts, replacing dead trees and ensuring adequate space for healthy tree growth.

9 ECOLOGY AND NATURE CONSERVATION

9.1 Introduction

- 9.1.1 Ecology is the scientific study of living organisms and their relationships with each other and their environment. Nature conservation is concerned with maintaining a viable population of the country's characteristic fauna, flora and wildlife communities. Impacts on nature conservation are broadly split into two categories: habitats and species.
- 9.1.2 The construction and operation of highways can affect both site-specific receptors (locations or areas that provide habitats for wildlife or rare flora) and mobile receptors (populations of wildlife, especially species that are rare, declining or endangered).
- 9.1.3 The study area will vary for different aspects of the assessment, as follows:
- Statutory and non-statutory designated sites and records of protected species: 2 km from the centre-line of the scheme, with reference to DMRB guidance on assessing the effects on sites protected at a European level (Volume 11, Section 4, Part 1 and IAN 141/11³¹) and Planning Inspectorate Guidance on Habitat Regulation Assessment (Advice note ten, Version 5, August 2013)³²;
 - Extended Phase 1 habitat survey: 500 m to either side of the proposed improvements, in accordance with guidance contained in the JNCC (Joint Nature Conservation Committee) Handbook for Phase 1 Habitat Survey³³ (JNCC, 2010); and
 - Protected species and specific habitats: survey areas will be defined in accordance with standard survey methods for each species.
- 9.1.4 The understanding of the ecology and nature conservation baseline expressed in this report has been derived from ecological surveys and a desk-based study collated in 2016.
- 9.1.5 This was supplemented by ecology baseline information available from surveys undertaken between 2014 and 2016 in relation to the proposed International Advanced Manufacturing Park (IAMP) development.
- 9.1.6 The following organisations/local wildlife groups have been contacted in 2016 to obtain any desk based records that informed the scope of the ecology surveys:
- Environmental Records Information Centre North East;
 - Durham Bat Group;
 - Durham County Badger Group;
 - Durham Bird Club; and
 - North East Reptile and Amphibian Group.

9.2 Existing and Baseline Knowledge

- 9.2.1 There are two statutory designated sites within 2 km of the scheme. These are:

³¹ Highways Agency (2011). *Interim Advice Note 141/11: Assessment of Implications (of Highways and/or Roads Projects) on European Sites (Including Appropriate Assessment) and the Planning Act 2008*. Available from: <http://www.dft.gov.uk/ha/standards/ians/pdfs/ian141.pdf>

³² The Planning Inspectorate (2013). *Guidance on Habitat Regulation Assessment, Advice Note 10*. Available from: <http://infrastructure.planningportal.gov.uk/wp-content/uploads/2012/10/Advice-note-10-HRA.pdf>

³³ Joint Nature Conservation Committee (JNCC) (2010). *Handbook for Phase 1 Habitat Survey*. Available from: <http://jncc.defra.gov.uk/page-2468>

- Hyton Castle Cutting Site of Special Scientific Interest (SSSI). This site is designated for its geological interest rather than its ecological value, and is not therefore considered further in this chapter.
- Hyton Dene Local Nature Reserve (LNR).

9.2.2 There are a total of 18 LWS located in the study area that span two local authorities (South Tyneside and Sunderland). Table 9.1 below provides the details of these sites. They are also illustrated in Figure 1.2, the Environmental Features Map.

Table 9.1: Locally Designated Sites

Site Name	Description	Approximate Distance from Proposed Scheme
Make-me-rich Meadow	The site is made up of an area of species-rich, damp, unimproved grassland together with a section of the River Don between the A19 and the A184. The meadow was formerly grazed, but has not been intensively managed for some years. In the absence of grazing, large areas have become dominated by tall stands of meadowsweet, great willowherb and tufted hairgrass.	24 m
Elliscope Farm East/ Hylton Bridge	The site consists of two small woodlands and the linking section of the River Don, leading east from Hylton Bridge Farm. Elliscope Farm East is a linear, mature broadleaf plantation dominated by sycamore, with ash and elder. Hylton Bridge is a small mature broadleaf plantation with a varied canopy of sycamore, ash and beech.	42 m
River Don west Boldon	This is a linear site and covers the banks of the River Don as it flows through West Boldon between North Road and New Road. The Don here has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood.	1356 m
Downhill Old Quarry	Downhill is a Magnesian limestone 'outlier' which forms a prominent domed hill overlooking the low lying, open land north of the Nissan car plant. The former quarry base and paddock has a range of species-rich grassland types grading from Magnesian limestone grassland communities through to more neutral grasslands.	384 m
River Don East House	The site consists of a section of the River Don between East House Farm and Hylton Bridge Farm. In this stretch the Don has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood.	610 m
Downhill Meadows	The site incorporates large areas of calcareous grassland with areas of tree planting, rank neutral grassland and small amounts of scattered scrub.	508 m
River Don North Road	The site consists of a section of the River Don between North Road and Newcastle Road. In this stretch the Don has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood.	884 m

Site Name	Description	Approximate Distance from Proposed Scheme
Boldon Lake	The site comprises a man-made lake (the largest body of open water in the borough) adjacent to the Quadrus building in West Boldon, together with species-rich damp grassland alongside. The lake was created in 1986 and has developed substantial areas of marginal vegetation including large stands of reedmace and common reed, and an area dominated by hard rush.	918 m
Tilesheds	A varied site with a wooded area, wetlands and an area of open Magnesian Limestone grassland. Covers part of the same area as Hylton Dene LNR.	1000 m
Hylton Castle Grassland	Hillside displays Magnesian Limestone grassland and scrub adjacent geological exposures of Ford Formation (reef facias) at Hylton Castle Cutting SSSI.	1163 m
Turner's Hill	Turner's Hill is an area of grassland on a small circular hillock within Boldon Golf Course, south east of Boldon Cemetery.	1367 m
Hylton Plantation	A mixed plantation dominated by coniferous trees with scattered broad-leaved trees. Trees and scrub provide shelter for a thriving woodland bird community.	1528 m
Strother House Farm	The site is situated to the north of Strother House Farm. It comprises an area of marshy ground approximately 0.3ha in extent, bounded by a ditch to the south and east.	1560 m
Peepy Plantation	A mature plantation with interesting woodland flora and fauna is also notable for invertebrate assemblage and woodland birds.	1605 m
Calf Close burn	Calf Close Burn is a linear site following the course of a small burn as it flows north across agricultural land towards the Fellgate Estate. The stream sides have abundant great hairy willowherb and there is a stand of common reed extending into the burn's channel.	1620 m
Black Plantation	Black Plantation is a small, rectangular, area of mature even-aged, broadleaved plantation woodland lying to the south of West Boldon. The canopy is dominated by sycamore, whilst other trees present include wych elm, beech, ash and hybrid poplar. The ground flora has no ancient woodland indicators, being dominated by plants such as bramble, stinging nettle, false oat-grass and umbellifers. A diverse bird life includes jays and breeding great spotted woodpecker, whilst barn owl have been recorded using the wider area.	1758 m
Barons Quay Wood	Mixed deciduous woodland and hawthorn scrub are of particular botanical interest, with extensive areas of rough grassland of high nature conservation value. An important and integral part of the salt marsh complex along the River Wear,	1863 m

9.2.3 Previous consultation with South Tyneside and Sunderland Councils led to all of the LWSs being assessed as being of Medium value (Regional importance) for nature

conservation. This will be reviewed as part of the ongoing environmental assessment work for the scheme.

- 9.2.4 The habitat types listed in Table 9.2 below are those identified in the survey area during the Extended Phase 1 Habitat Survey undertaken in 2016. The table identifies any particularly sensitive habitats or species that are protected under specific legislation, or are listed as species or habitats of principal importance under the Section 41 List of the Natural Environment Research Council (NERC), or the Durham Biodiversity Action Plan (BAP)³⁴, which covers South Tyneside.

Table 9.2: Habitats Identified in the Study Area in 2016

Habitat type	Section 41 Habitats of Principal Importance	LBAP priority habitat
Species-Poor Semi-improved Grassland		
Running Water (River Don)	ü	ü
Broad-leaved Semi-natural Woodland (Elliscope Farm Copse LWS)	ü	ü
Broadleaved Plantation Woodland		ü
Broadleaved Scattered Tree		
Mixed Plantation Woodland		
Marshy Grassland		
Species Poor Hedgerows		ü
Native Species-rich Hedgerow	ü	ü
Scattered Scrub		
Dense Continuous Scrub		ü
Improved Grassland/Arable		
Amenity Grassland		
Tall Ruderal		
Inland Cliff		ü

- 9.2.5 The results of surveys carried out in 2016 showed that the majority of the hedgerows surveyed in the study area were dominated by hawthorn/ blackthorn and were species-poor.
- 9.2.6 There were three sections of hedgerow in the south west of the survey area that were native species-rich hedges; these hedges will not be impacted by the scheme.
- 9.2.7 Table 9.3 below provides a summary of the protected species surveys undertaken in the survey area in 2016 to inform ongoing environmental assessment work.

Table 9.3: Protected Species Baseline Summary

Receptor	Baseline Summary
Otter	Otter surveys in 2016 found no evidence of otter within any of the areas surveyed, these included: <ul style="list-style-type: none"> · River Don upstream and downstream of the A19;

³⁴ Durham Biodiversity Partnership (2006). *Durham Biodiversity Action Plan*. Available from: <http://www.durhambiodiversity.org.uk/biodiversity-action-plan/>

Receptor	Baseline Summary
	<ul style="list-style-type: none"> Mount Pleasant Marsh LWS; and Boldon lake LWS. <p>Otter surveys in previous years have identified Otter activity concentrated on the River Don, both upstream and downstream of the A19, which is likely to be a commuting corridor for otters between suitable habitat on the River Tyne in the north and the River Wear to the south.</p>
Barn Owl	Surveys undertaken in 2016 within 500 m of the proposals identified evidence of barn owl within two building groups. Both sites were considered to contain regular roosts and are classified potential breeding sites.
Great Crested Newt (GCN)	GCN environmental DNA (eDNA) sampling was undertaken in April 2016 on ponds within 500 m of the proposals. The results of the sampling identified no GCN.
Water Vole	Water vole presence was recorded on the River Don downstream of the A19 and upstream of the A19 at Make-Me-Rich Farm.
Bats	<p>The result of surveys in 2016 showed that in general the habitat quality and bat activity within the survey area were low. The 500 m surrounding the proposals was of local value to edge habitat species and of less than local value to open and cluttered habitat species.</p> <p>No roosts were found within the survey area and few bats were observed crossing the road.</p>
Badger	Badger setts were recorded over 1 km away from the proposals (identified from a desk-based study). No evidence of badger activity within 500 m of the proposals was identified during surveys undertaken in 2016. It was concluded that badgers would not be affected by the scheme.
Breeding Birds	<p>Breeding bird surveys undertaken by Jacobs in 2014 identified the following species of conservation interest in the survey area:</p> <ul style="list-style-type: none"> 2 species listed under Schedule 1 (Part 1) of the WCA (as amended) – barn owl and kingfisher; 13 “Species of Principal Importance”, Section 41, NERC Act 2006; 8 species on the Red List of Birds of Conservation Concern 4 2015335; and 11 species on the Amber List of the Birds of Conservation Concern 4 2015.
Wintering Birds	<p>Wintering bird surveys in the survey area identified a total of 45 bird species comprising:</p> <ul style="list-style-type: none"> 2 species listed on Schedule 1 (Part 1) of the Wildlife and Countryside Act 1981 (WCA) (as amended); 11 species listed under Section 41 of the Natural Environment and Rural Communities Act 2006; 8 species on the Red List of Birds of Conservation Concern 4 2015; 2 species on the Amber List of the Birds of Conservation Concern 4 2015; 8 Durham Biodiversity Action Plan Species; and

³⁵ Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708-746

Receptor	Baseline Summary
	<ul style="list-style-type: none"> 22 common undesignated species.
White-Clawed Crayfish	White-clawed crayfish were not identified in the study area, although the habitat looked suitable.
Brown Hare	Brown hares were recorded in arable fields east and west of the A19, and likely to be using all suitable habitats in the study area.
Invasive Species	No invasive species were recorded within the survey area for Downhill Lane junction.

9.2.8 Surveys for red squirrels were not undertaken as both the nature and the structure of the habitat in the study area is unsuitable for this species. Reptile surveys were not carried out because most species are dependent on a structured mixture of rough grassland and scrub, whereas the habitat around Downhill Lane junction comprises mainly arable, pasture and plantation woodland.

9.2.9 A number of other species, including hedgehogs, polecat, deer and aquatic invertebrates (etc.) were not surveyed as their presence was not identified through either desk-based research or consultation, and even if they were present, they would be unaffected by the proposed scheme.

9.3 Relevant Guidance on Ecology and Nature Conservation

9.3.1 The assessment will follow the most recent guidance provided in DMRB for the Simple Assessment of ecology and nature conservation topics on proposed road schemes. This guidance is provided in:

- DMRB Volume 11, Section 2, Part 5 (HA 205/08) Assessment and Management of Environmental Effects;
- DMRB Volume 11, Section 3, Part 4 *Ecology and Nature Conservation*;
- DMRB Volume 11, Section 4, Part 1 (HA 44/09) Assessment of Implications (of Highways and/or Roads Projects) on European Sites (Including Appropriate Assessment);
- IAN 125/09 Supplementary Guidance for Users of DMRB Volume 11 Environmental Assessment; and
- IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment.

9.3.2 Assessment of Implications on European Sites (AIES) is a separate process to the EIA which is directed by guidance given in IAN 141/11 Assessment of Implications (of Highways and/or Roads Projects) on European Sites. Consideration will be given to whether such an assessment will be required, but it is considered unlikely, due to the significant distance of the proposed scheme from any Natura 2000 site and the lack of a pathway for any effect.

9.3.3 The Environmental Impact Assessment will also draw upon the latest Chartered Institute for Ecology and Environmental Management (CIEEM) guidelines on the process of ecological impact assessment, entitled *Guidelines for Ecological Impact Assessment in Britain and Ireland* (CIEEM, 2016)³⁶, in conjunction with the DMRB

³⁶ Institute for Ecology and Environmental Management (CIEEM) (2016). *Guidelines for Ecological Impact Assessment in Britain and Ireland*. http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/EcIA_Guidelines/TGSEcIA-EcIA_Guidelines-Terrestrial_Freshwater_Coastal.pdf

guidance. The criteria used in the assessment are based on the most recent and available HA guidance provided in IAN 130/10³⁷.

- 9.3.4 All ecological field surveys will follow published guidance and accepted methodologies, which will be referenced in survey reports.

9.4 Planning Policy Related to Ecology and Nature Conservation

- 9.4.1 During the assessment, the following planning policy will be reviewed as relates to ecology and nature conservation:

- National Planning Policy Framework (2012);
- South Tyneside Local Plan: Core Strategy (2007);
- South Tyneside Local Plan: Development Management Policies (2011);
- South Tyneside Local Plan: Site-Specific Allocations (2012);
- Sunderland Unitary Development Plan (UDP) Adopted Alteration No.2 (2007); and
- England Biodiversity Strategy.

9.5 Data Gathering and Survey

- 9.5.1 The ecology surveys conducted in 2014-2016 are considered to provide sufficient data to be able to assess the potential ecological impacts of the proposed scheme. No further detailed surveys are anticipated at this stage to inform the assessment; however, a validation walkover survey would be undertaken to confirm existing surveys are sufficient in scope.

- 9.5.2 The following data gathering and survey tasks have been undertaken in 2016 as part of the ongoing environmental assessment work for the scheme:

- Review all relevant policies and plans and assess whether the proposed junction improvement would help or hinder their objectives.
- Communication with South Tyneside Council, Natural England and local wildlife groups regarding the scope of ecology surveys.
- Data searches for protected habitats and records of protected species, using the following data sources:
 - MAGIC;
 - Northumbria Coal Measures Natural Area Profile;
 - Durham Biodiversity Action Plan (BAP);
 - JNCC website; and
 - NERC Section 41 list.
- Update/ re-validate the Phase 1 habitat survey.
- New species surveys (2014-2016):
 - Amphibian Survey (eDNA sampling completed April 2014): survey of ponds within a 500 m buffer of the scheme in line with the standard method detailed in Natural England standing advice (<https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects>);
 - Breeding Bird Survey: completed April, May and June 2014 to cover the nesting period when most bird species are preparing their nests or nesting, including favourable conditions for observation such as less dense vegetation than there would be later in summer;

³⁷ Highways Agency (2010). *Interim Advice Note 130/10: Ecology and Nature Conservation: Criteria for Impact Assessment*. Available from: <http://www.dft.gov.uk/ha/standards/ians/pdfs/ian130.pdf>

- Bat Tree Roost Inspection: inspection of trees within 50 m of the scheme (ground-based assessments and tree climbing where necessary) in winter 2016;
- Bat Activity Survey: habitats/ commuting routes up to 500 m from the scheme, spring/summer 2016;
- Badger Survey: completed September/ October 2016;
- Barn Owl Activity: summer 2016;
- Water Vole and Otter Survey: spring and autumn 2016; and
- Wintering Bird Surveys: winter 2014.

9.6 Proposed Assessment Method

- 9.6.1 It is proposed that in accordance with the DMRB (Volume 11, Section 2, Part 1), a 'simple' assessment (see Section 0) of the significance of impacts of the proposed scheme upon the ecological resources will be undertaken, which reflects the scale of the scheme. However, the assessment will include following ecological features within the study area:
- Make-Me-Rich Meadow LWS (approximately 24 m from the scheme footprint);
 - the presence of three Section 41 Habitats of Principal Importance and seven LBAP priority habitats;
 - the low-level presence of the protected and notable species otter, water vole and species group bats; and
 - the presence of a breeding bird assemblage that included two species listed on Schedule 1 (Part 1) of the WCA (as amended) and additional Birds of Conservation Concern red and amber list species.
- 9.6.2 In order to characterise and assess the impacts of the scheme, IAN130/10 will be used as the current best approach, building on existing advice as set out in DMRB Volume 11, Section 3, Part 4.
- 9.6.3 This guidance steps away from the assignment of magnitude of impact categories, as described in Section 0. Accordingly, the latest approach for ecological assessments should consider 'Characterisation of Ecological Impacts', in order to encourage consideration of all the characters of an ecological impact, rather than relying on magnitude of impact alone.
- 9.6.4 Characterisation of Ecological Impacts is a process that starts with the 'Evaluation of Ecological Resources', which identifies the most valuable resources that may be impacted by the proposed scheme.
- 9.6.5 The value given to an ecological receptor takes into account any statutory or non-statutory designations, the intrinsic value of the receptor and whether it supports legally protected or notable species. Consideration will be given to the value of the species or habitat and its conservation status at a geographic level taking population size, life cycle, rarity and/ or distribution into account. Each ecological resource will be assessed as being valuable, or potentially valuable, within a geographic frame of reference as set out in the resource valuation guidance in IAN 130/10 *Ecology and Nature Conservation: Criteria for Impact Assessment*. Table 9.4 sets out examples of resource valuation based on geographical level (adapted from IAN 130/10)
- 9.6.6 The resource valuation will be further informed by CIEEM's *Guidelines for Ecological Impact Assessment in Britain and Ireland*.

Table 9.4: Factors for Assessing the Value of Ecological Resources

Level of Value	Examples
International or European	<p>Natura 2000 sites including: Sites of Community Importance (SCIs); Special Protection Areas (SPAs); potential SPAs (pSPAs); Special Areas of Conservation (SACs); candidate or possible SACs (cSACs or pSACs); and Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Resident, or regularly occurring, populations of species which may be considered at an International or European level where:</p> <ul style="list-style-type: none"> · the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or · the population forms a critical part of a wider population at this scale; or · the species is at a critical phase of its life cycle at this scale.
UK or National	<p>Designated sites including: SSSIs; Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNRs). Areas which meet the published selection criteria (e.g. JNCC (1998)) for those sites listed above but which are not themselves designated as such. Areas of key/ priority habitats identified in the UKBAP, including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity. Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:</p> <ul style="list-style-type: none"> · the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or · the population forms a critical part of a wider population at this scale; or · the species is at a critical phase of its life cycle at this scale.
Regional	<p>Areas of key/ priority habitats identified in the Regional BAP (where available); areas of key/priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats (for example, South West Nature Map); and areas of key/priority habitat listed within the Highways Agency Biodiversity Action Plan (HABAP). Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within the HABAP where:</p> <ul style="list-style-type: none"> · the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or · the population forms a critical part of a wider population; or · the species is at a critical phase of its life cycle.
County or Unitary Authority Area	<p>Designated sites including: LWSs or LNRs designated in the county or unitary authority area context. Areas which meet the published selection criteria for those sites listed</p>

Level of Value	Examples
	<p>above but which are not themselves designated as such.</p> <p>Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent).</p> <p>Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:</p> <ul style="list-style-type: none"> the loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area; or the population forms a critical part of a wider population; or the species is at a critical phase of its life cycle.
Local	<p>Designated sites including: LNRs designated in the local context.</p> <p>Trees that are protected by TPOs.</p> <p>Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.</p>

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

9.6.8 Characterisation of Ecological Impacts upon each receptor requires the determination of a range of parameters as shown in Table 9.5 (reproduced from IAN 130/10) to inform the determination of impact significance. These criteria take account of both direct loss of habitat and ecological resources through land take, and also perceived indirect impacts such as pollution and habitat fragmentation.

Table 9.5: Characterisation of Impact for Ecology and Nature Conservation

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

- 9.6.9 Having characterised impacts, proposals for mitigation, compensation and enhancement will be considered, with the aim of avoiding or reducing the significance of impacts. Subsequent to the mitigation proposals, the overall residual significance of impacts on each receptor will be assessed.
- 9.6.10 Using the receptor value ascertained from Table 9.4, and the characterisation impact table of Table 9.5, it is possible to assign an 'overall significance category'. Table 9.6 below illustrates the approach taken to relating significant impacts at different levels of value, and reproduced from IAN 130/10.

Table 9.6: Significance of Effects for Ecology and Nature Conservation

Significance Category	Typical Descriptors of Effect (Nature Conservation)
Very Large	An impact on one or more receptor(s) of International, European, UK or National Value. Note: only adverse effects are normally assigned this level of significance. They should be considered to represent key factors in the decision-making process.
Large	An impact on one or more receptor(s) of Regional Value. Note: these effects are considered to be very important considerations and are likely to be material in the decision-making process).
Moderate	An impact on one or more receptor(s) of County or Unitary Authority Area Value. Note: these effects may be important, but are not likely to be key decision-making factors.
Slight	An impact on one or more receptor(s) of Local Value. Note: these effects are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the scheme.
Neutral	No significant impacts on key nature conservation receptors. Note: absence of effects, or those that are beneath levels of perception.

9.7 Mitigation Options

9.7.1 Potential mitigation measures include:

- maintaining key habitat and wildlife dispersal corridors across the scheme corridor as far as is practicable, using bridges, culverts and structural planting (in conjunction with appropriate fencing and sensitive lighting to maximise effectiveness) within the design;
- creation of new and replacement habitat;
- for works near invasive species, for example Japanese Knotweed (*Fallopia Japonica*), follow Environment Agency best practice guidelines;
- accounting for ecological receptors as surveys and survey analysis develops; adjust landscape, visual, noise and drainage mitigation where practicable to broaden habitat opportunities and biodiversity without compromising other mitigation provision; and
- identifying areas beyond the proposed scheme boundary where lasting benefits might be achieved through additional land take and/or working with partners.

10 GEOLOGY AND SOILS

10.1 Introduction

- 10.1.1 Geology and soils are key factors in determining the environmental character and quality of any given location or area. The rocks beneath the ground's surface have a major influence on the landform; i.e. the topography and others geographical features of an area. The physical and chemical properties of the rocks and the overlying soils influence the type and variety of vegetation that will grow, agricultural quality, drainage/flood risk and water storage capacity.
- 10.1.2 This topic considers the geological and hydrogeological (i.e. links between geology and ground and surface water) characteristics of the proposed route and the immediately adjacent area. It addresses geology, hydrogeology, soils and soil quality, including agricultural land, mineral resources, contaminated land/ potential contamination and designated geological sites. These issues will be considered in light of impacts to the resources themselves (as relevant), and also potential risks to the health of construction workers and future site users.
- 10.1.3 The scope related to surface water is considered within Chapter 14 – Road Drainage and the Water Environment.
- 10.1.4 For the purposes of the assessment, the area of potential impact can be defined as the footprint of all the permanent and temporary works; and the study area covers this area plus all immediately adjacent land (defined as a surrounding 'buffer' extending to 200 m in all directions).

10.2 Existing and Baseline Knowledge

- 10.2.1 The site is underlain by a sequence of glacial deposits comprising Pelaw Clay, Tyne and Wear Complex (mainly laminated clay) and Durham Lower Boulder Clay. Alluvial deposits are present at the locally, associated with the River Don watercourse. These are likely to comprise clay, silt sand and gravel materials. These superficial deposits overlie a sequence of siltstones, mudstones, sandstones and coals of the Middle and Upper Coal Measures.
- 10.2.2 There are no nationally designated geological or geomorphological sites in the study area. A Site of Special Scientific Interest designated for its geological value (exposed fossil beds in limestone) is located approximately 2 km to the south-east, at Hylton Castle Cutting. However, there is no 'pathway' by which this site could be affected by the development of the junction improvement.
- 10.2.3 The bedrock underlying the site and the superficial alluvial deposits are designated by the Environment Agency as Secondary A Aquifers. This means that these deposits are capable of supporting water supplies at a local scale or form a source of base flow to rivers. The superficial glacial deposits, due to their low permeability are noted as unproductive strata and have negligible significance for water supply.
- 10.2.4 The surface soils underlying the south-east quadrant of Downhill Lane junction are reported to be of high leaching potential (i.e. having little ability to retain pollutants within the soil structure due to either being shallow or coarse grained). Soils under the remainder of the scheme are classified as low leaching potential and pollutants are unlikely to penetrate the soil layer either because water movement is largely horizontal or because the soils have the ability to attenuate diffuse pollutants (i.e. the pollutants will be retained within the soil structure and not pass into the underlying aquifer).
- 10.2.5 Available records suggest the agricultural soils comprise Grade 3b at best, which is outside of the 'best and most versatile' land category.

- 10.2.6 The site is believed to be underlain by mine workings in four seams at between 360 m and 540 m depth. The last recorded date of working of these seams is 1979, and consequent ground movement should have ceased. There are no recorded mine entries within 50 m of the study area.
- 10.2.7 The following potential sources of contamination have been identified in the vicinity of the site:
- existing site uses: A19, Nissan Manufacturing Plant and electricity sub-station to the east of the A19;
 - burnt shale potentially incorporated into the existing highway earthworks, which is likely to contain high sulphates and sulphides;
 - colliery and mine workings to the north of the site;
 - licenced waste facilities at Nissan Manufacturing Plant/ historic land fill site east of the route at Downhill Quarry; and
 - a former mineral railway line crossed by the A19 north of Downhill Lane junction.
- 10.2.8 The 2007 ground investigation³⁸ included a number of holes on the north facing sliproads at Downhill Lane junction. These generally encountered Made Ground associated with the road construction overlying natural deposits. No evidence of burnt shale was encountered. Exploratory holes did not reveal visual or other evidence of contamination.
- 10.2.9 Enquiries made to the state veterinary services indicated that there are no animal burial sites within the vicinity of the scheme.

10.3 Relevant Guidance on Geology and Soils

- 10.3.1 The assessment will be carried out in line with DMRB guidance (Volume 11, Section 3, Part 11 Geology and Soils). This guidance defines the scope of the topic but does not provide formal guidance on the assessment of impacts.

10.4 Legislation and Planning Policy Related to Geology and Soils

- 10.4.1 The following legislation will be considered:
- Environmental Protection Act (1990,) as amended; and
 - Mines and Quarries Act (1954), as amended.
- 10.4.2 During the assessment, the following planning policy documents will be reviewed as relates to geology and soils:
- National Planning Policy Framework (2012);
 - South Tyneside Local Plan Core Strategy (2007);
 - South Tyneside Local Plan: Development Management Policies (2011);
 - South Tyneside Local Plan: Site-Specific Allocations (2012); and
 - Sunderland Unitary Development Plan (UDP) Adopted Alteration No.2 (2007).

10.5 Data Gathering and Survey

- 10.5.1 The following data sources will be reviewed during the preparation of the ES:
- 'Envirocheck' Report (Landmark Information Group, 2014);
 - geological maps and memoirs;

³⁸ Costain (2007). *A19 (T) Testos Junction Improvement Boldon Ground Investigation Final Factual Report*.

- ground investigation reports;
- pedological maps;
- hydrogeological maps;
- mining reports;
- site walkovers; and
- consultations with public bodies (e.g. local council, state veterinary service, the Environment Agency).

10.6 Proposed Assessment Method

10.6.1 Part 11 of the DMRB Volume 11, Section 3 precedes HA 201/08, *General Principles and Guidance of Environmental Impact Assessment*, and therefore does not specify how to set the level of EIA assessment for 'Geology and Soils'. Using general descriptions from HA 201/08, the proposed level of assessment is a 'simple' assessment (see Section 0). This is because there is no requirement for further detailed field surveys or modelling, and there is low potential for significant effects under this topic.

10.6.2 The assessment will include:

- assessing the impact of the proposed scheme on the baseline conditions; and
- identifying mitigation measures required to reduce/eliminate potentially negative impacts.

10.6.3 Each potential impact will be assessed using professional judgement and while it will be possible to distinguish between significant and insignificant impacts, different levels of significance will not be assessed. Impacts will be assessed in terms of whether they are:

- adverse or beneficial (i.e. they are undesirable effects, or they represent an improvement over the existing situation);
- short-term or long-term (i.e. they are felt for less than 15 years, or they will still be felt 15 years after construction and beyond);
- construction or operational (i.e. caused by the construction of the scheme, or by the operation of the scheme after opening); and
- significant or insignificant.

10.6.4 The assessment will include the consideration of the following factors:

- presence of any nationally or locally designated geological sites;
- the nature of any contamination present, and how easily and to what extent those contaminants could be mobilised;
- the proximity of any areas of contaminated land within the site to receptors such as local residents, flora, fauna and water bodies;
- underlying aquifers; and
- mineral resources and potential to sterilise these deposits.

10.7 Mitigation Options

10.7.1 Potential mitigation measures for effects on geology and soils during construction include:

- putting protective measures in place to deal with contaminated materials, should such material be encountered;

- good construction practice and proper disposal of contaminated arisings to minimise creation of pollution pathways;
- protective measures to prevent linkages between contaminants and ground and surface water;
- handling topsoil in a manner to retain its potential for plant growth, including careful stripping, handling and placement; and
- defining access routes to prevent overrun of topsoil where possible.

10.7.2 Potential mitigation measures for effects on geology and soils during operation include:

- designing measures such that they use appropriate materials and construction methods to avoid impacts on hydrogeology;
- protective measures to prevent linkages between contaminants and ground and surface water; and
- seeding topsoil with grass to minimise risk of erosion.

11 MATERIALS

11.1 Introduction

Material Resources

- 11.1.1 Material resources include both primary raw materials, such as aggregates and minerals, and secondary manufactured products.
- 11.1.2 Road schemes require significant quantities of both primary raw materials and secondary manufactured products. Many material resources originate off-site and some arise on-site, such as excavated soils or recycled road planings (old road surface materials removed from redundant carriageways or areas to be re-surfaced).
- 11.1.3 The production, sourcing, transport, handling, storage and use of these materials, as well as the disposal of any surplus, have the potential to affect the environment adversely. At the same time, the beneficial re-use of materials arising on site in construction prevents these materials from becoming waste that would require transport off-site for disposal elsewhere, and also prevents the need for the use of finite resources obtained from elsewhere.

Generation and Management of Waste

- 11.1.4 In considering material resources use and waste management, it is important to define when, under current legislation and understanding, a material is considered to be a waste. The Waste Framework Directive (European Directive 2006/12/EC, as amended by Directive 2008/98/EC) defines waste as any substance or object that the holder discards or is required to discard.
- 11.1.5 Once a material has become waste, it remains waste until it has been fully recovered and no longer poses a potential threat to the environment or to human health, at which point it is no longer subject to the controls and other measures required by the Directive.
- 11.1.6 Information used in this scoping report has been gained from published information such as the Model of Waste Arisings and Waste Management Capacity for the North East of England Planning Authorities report (2012), in addition to the Sub-regional Tyne and Wear Waste Management Partnership- Joint Municipal Waste Management Strategy (2007) and review (2012). The results of further research and survey, which were not available prior to the preparation of this report, will be reported in the forthcoming ES for the proposed scheme.
- 11.1.7 The management/ use of surplus materials and waste would be undertaken in accordance with the waste hierarchy, outlined in the Waste (England and Wales) regulations 2011.
- 11.1.8 The study area for this topic is limited to the boundaries of the construction site, within which materials would be used and wastes would be generated and managed.
- 11.1.9 The construction site is deemed to include the full footprint of the proposed scheme, together with any land that would be used temporarily during construction. Such temporary land includes site compounds, temporary storage areas for soils and other materials, haul-roads, and potentially land for temporary construction site drainage.

11.2 Existing and Baseline Knowledge

- 11.2.1 As discussed in Section 2.4, the Downhill Lane junction scheme has a fill material import requirement of about 94,000 m³. The A19/A1058 Coast Road Junction Improvement scheme to the north of Downhill Lane junction has an estimated bulk earthworks surplus of approximately 130,000 m³. The material from the Coast Road scheme is thought to be largely suitable for re-use at Downhill Lane junction scheme

and may also be sourced for the concurrent and neighbouring Testos junction scheme.

- 11.2.2 Based on current programmes, there is the potential for the Downhill Lane junction scheme (and concurrent neighbouring Testos scheme) to utilise some of the Coast Road surplus material. The schemes are only approximately 8 km apart, making bulk material transport between the sites a feasible proposition.
- 11.2.3 This proposal presents a sustainable alternative to both disposal of the Coast Road material, and other import options for the Downhill Lane Junction Improvement scheme, should it prove feasible. Other import sources for the proposed scheme are not confirmed at this stage, but the three known closest alternative options are further than 10 km away.
- 11.2.4 Identification of the baseline conditions for waste material disposal have been considered, where possible, according to conditions likely to be present at the commencement of construction (programmed for 2019) and up until the scheme is operational (programmed for 2021).

Local Landfill Capacity - South Tyneside Waste Planning Authority

Non-Hazardous

- 11.2.5 In 2012 Total Non-hazardous Residual Waste produced in South Tyneside was estimated at 84,000 tonnes. As there is currently no local landfill or treatment capacity in South Tyneside, this represents an apparent shortfall of landfill capacity within the local area.
- 11.2.6 Figures for the Tyne and Wear Sub-region show that there is sufficient landfill and treatment capacity in adjoining waste planning authority areas to deal with the forecasted commercial and industrial waste arisings.

Hazardous

- 11.2.7 According to figures from the Environment Agency's Hazardous Waste interrogator for 2010, South Tyneside Waste Planning Authority's Total Arisings are some 4,000 tonnes per annum. This is not expected to change significantly over a forecast period running to 2030.
- 11.2.8 Although there is no local hazardous landfill capacity in South Tyneside, there is considerable capacity in nationally significant sites in the Tees Valley Sub-region.

Sub- Regional Landfill Capacity - Tyne and Wear Waste Management Partnership

Non-Hazardous

- 11.2.9 The most recent available Defra statistics (2014) indicate landfill capacity to be in region of 6.8 million tonnes for non-hazardous wastes and 2.3 million tonnes for inert wastes. The same statistics show annual waste deposits to be in the order of 960,000 tonnes per annum of non-inert (non-hazardous) wastes and 430,000 tonnes per annum of inert wastes. These figures indicating that there is likely to be landfill capacity for the duration of the project delivery.

Regional Landfill Capacity - North East of England

Non-Hazardous

- 11.2.10 A detailed 2012 study by Urban Mines estimated landfill capacity in North East England to be equivalent to 1.8 million tonnes in 2011 per annum, decreasing to 0.24 million tonnes per annum by 2030. The study concluded a potential shortfall of landfill capacity equivalent to 49,000 tonnes per annum by 2018, increasing to 312,000 by 2021.

- 11.2.11 However, a more recent study undertaken to update the 2012 Urban Mines study (2016 New Waste Management Capacity permitted in the North East) indicates additional landfill capacity has been permitted within the North East area of approximately 3.7 million m³ since the 2012 Urban Mines study, indicating that the anticipated shortfall is unlikely to occur.

Hazardous

- 11.2.12 North East England has considerable capacity for the treatment and disposal of hazardous wastes, and imports such wastes from various parts of the UK.
- 11.2.13 The detailed Urban Mines study concluded a regional hazardous landfill capacity of some 770,000 tonnes annually (2010). The 2016 update to the Urban Mines study indicates that a minimum of 59,500 tonnes of additional hazardous waste capacity has been approved within the North East Region. Indicating sufficient capacity to cope with any hazardous waste that may arise through the Downhill Lane Junction Improvement scheme.

Treatment Capacity

- 11.2.14 The 2012 Urban Mines study concludes there is significant material recycling facility capacity in North East England, and the 2012 update to the study indicates since the study was completed approximately 800,000 tonnes of inert and Construction Demolition and Excavation Waste treatment capacity has been added. This indicates significant potential opportunity for the treatment of waste arising prior to disposal of residual wastes.

11.3 Relevant Guidance on Materials

- 11.3.1 The assessment of materials follows the interim guidance on the scope of the 'Materials' topic and the approaches/ methodologies to be applied as set out in IAN 153/11 (Highways Agency et al, 2011)³⁹ supplemented by the more recent draft (unpublished) DMRB Volume 11, Section 3, Part 6, Materials guidance (HD 212/14)⁴⁰.
- 11.3.2 The management/ use of surplus materials and waste would be undertaken in accordance with the waste hierarchy, outlined in the Waste (England and Wales) regulations 2011.

11.4 Legislation and Planning Policy Related to Materials

- 11.4.1 The following legislation, regulations or guidelines are applicable to the assessment of the proposed scheme:
- Waste Framework Directive, 2008;
 - Waste Management Plan for England, 2013;
 - Government Review of Waste Policy in England, 2011;
 - Waste (England and Wales) Regulations, 2011;
 - National Policy Statement for National Networks (NPS), 2015;
 - Waste (England and Wales) Regulations 2011;
 - National Planning Policy for Waste, 2014 (supersedes the Waste Strategy for England, 2007);
 - National Policy Statement for National Networks 2014 (Department for Transport, December 2014) (Ref 12.14);
 - Highways Agency Strategic Plan, 2010 – 2015

³⁹ Highways Agency et al. (2011). Interim Advice Note (IAN) 153/11 Guidance on the Environmental Assessment of Material Resources

⁴⁰ Highways Agency 2014 - Draft DMRB Volume 11, Section 3, Part 6, Materials guidance (HD 212/14)

- Highways Agency Environment Strategy, 2010 – 2015;
- Highways Agency Sustainable Development Plan, 2012 – 2015;
- Highways Agency Procurement Strategy, 2009; and
- Environmental Permitting (England and Wales) Regulations 2013.

11.4.2 During the assessment, the following planning policy documents will be reviewed as relates to materials:

- National Planning Policy Framework (2012);
- South Tyneside Local Plan: Core Strategy (2007);
- South Tyneside Local Plan: Development Management Policies (2011); and
- South Tyneside Local Plan: Site-Specific Allocations (2012).

11.5 Data Gathering and Survey

11.5.1 Existing and baseline conditions relating to materials and waste have been obtained through desk-based research of a number of sources. These include;

- New Waste Management Capacity permitted in the North East since the Urban Mines (2016);
- Model of Waste Arisings and Waste Management Capacity For the North East of England Waste Planning Authorities (July 2012), a report produced for Newcastle City Council;
- South Tyne and Wear Waste Management Partnership: Joint Municipal Waste Management Strategy 2007;
- South Tyne and Wear Waste Management Partnership: Joint Municipal Waste Management Strategy 2007 review (2012); and
- South Tyne and Wear Waste Management Partnership: Identification and Assessment of Potential Support Waste Management Sites (2010).

11.6 Proposed Assessment Method

11.6.1 It is proposed to undertake a 'detailed' assessment as defined in HD 212/14. This is because in-depth study will be applied in order to influence design, while taking account of potential environmental effects identified under other EIA topic areas.

11.6.2 The detailed assessment of the use and consumption of materials should utilise and build on the information and data gathered at the simple assessment levels. To quantify the magnitude of change associated with the scheme's material requirements the embodied carbon emissions associated with specific materials or construction products will be calculated. This provides a mechanism to normalise the magnitude of the use and consumption of materials to permit the comparison of different materials as well as quantifying the magnitude of change. It will also identify whether the effects which have been identified are beneficial or adverse, direct or indirect, short-term or long-term and permanent or temporary.

11.6.3 The detailed assessment of waste will collate additional information to forecast as accurately as possible the quantities and types of waste which are likely to be produced by the scheme. The potential environmental effects associated with waste relate primarily to the waste management methods identified and the effects that forecast waste arisings will have on the available waste management infrastructure. In this way, the assessment reflects both the relative quantities of waste produced and the position within the waste hierarchy of the chosen waste management methods. The value/sensitivity of the receptor is defined as the available waste management infrastructure within an appropriate radius of the scheme.

11.6.4 Operational effects in terms of resource use and waste generation will not be assessed as the impacts are likely to be insignificant in the context of construction of the proposed scheme.

11.7 Mitigation Options

11.7.1 Measures will be implemented to mitigate the potential impacts of both the use of materials and the generation of waste in relation to the proposed scheme. This would also seek to consider the transport of materials and waste to and from site. There is significant synergy between materials re-use and the avoidance of the generation of waste. Therefore, there is a substantial overlap between the mitigation measures for materials and waste.

11.7.2 The importance of careful management of materials to promote re-use and reduce waste has been widely recognised by the construction industry. Both legislation and voluntary best practice mechanisms have been developed and implemented. These provide measurable and accountable processes that form the basis for mitigating environmental impacts associated with materials and waste.

11.7.3 Site Waste Management Plans (SWMPs) are prepared prior to a construction project commencing in order that waste is considered throughout the project. SWMPs identify the type of waste expected to be produced during the project, estimate the quantity of waste that will be produced and identify the planned waste management action proposed for each type of waste.

11.7.4 Although SWMPs are no longer a statutory requirement in England, the size and value of the proposed scheme means that the potential exists for significant impacts in relation to material use and waste generation. The implementation of a SWMP encourages the effective management of materials and ensures that waste is considered at all stages of a project, from detailed design through to completion.

11.7.5 The main aims of a SWMP are to:

- improve resource efficiency and reduce the amount of waste produced on construction sites;
- promote reuse, recycling and recovery of waste rather than disposal; and
- reduce fly-tipping by keeping a full audit trail of waste removed from the site.

11.7.6 The best opportunities for improving materials resource efficiency in construction projects occur during the design stage. Measures to design out waste include:

- the re-use and recovery of materials on site;
- designing the layout to use the existing topography;
- balancing cut/ fill quantities;
- screening arisings for use as recycled aggregates;
- importing materials with high recycled content;
- designing for off-site construction of elements if practical (e.g. manholes, bridge components etc.); and
- designing for deconstruction and flexibility to make sure structures can be maintained, refurbished or extended if required.

11.7.7 Additional measures that can be taken to reduce waste during construction include:

- segregating all arisings on site;
- identifying re-useable materials on site for use on site;
- storage or resale; and

- removing recyclable and recoverable materials from site to be processed by a licensed facility.

12 NOISE AND VIBRATION

12.1 Introduction

12.1.1 Noise in its widest sense can be defined as unwanted sound. Such sound can be associated with industrial, domestic and transportation sources. Vibration comprises oscillatory waves that propagate from a source through either the ground or the air to adjacent areas.

12.1.2 Sound consists of vibrations transmitted to the ear as rapid variations in air pressure. The more rapid the fluctuation the higher the frequency of the sound. However, the sensitivity of the human ear varies with frequency. Therefore, most everyday noise is measured in decibels (dB(A)), with the (A) indicating that the measured level has been modified to allow for this phenomenon.

12.1.3 To measure noise, a logarithmic decibel scale is used. Using the scale, a change in noise level of 10 dB(A) represents a halving or doubling in perceived loudness. Table 12.1 gives examples of typical sound levels.

Table 12.1: Typical Sound Levels Found in the Environment

Sound Level	Location
0dB(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 1 m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of pain

12.1.4 Under normal circumstances, the biggest contributor to noise from road traffic comes from the interaction between the vehicle tyres and the road.

12.1.5 The study area comprises:

- A 1 km buffer around the proposed junction Improvements;
- A 600 m buffer around any 'affected roads' that lie within 1 km of Downhill Lane junction; and
- A 50 m buffer around any 'affected roads' that lie beyond 1 km of Downhill Lane junction.

12.1.6 An 'affected road' is defined as one where there is a possibility of a change of 1 dB $L_{A10,18hr}$ in the short-term or, 3 dB $L_{A10,18hr}$ in the long-term. In general, this is defined by reference to traffic flow forecasts, where there is a prediction that there may be an increase in traffic flows of 25% or more or a reduction of 20% or more. This may be modified where there is a change in the composition of the traffic, such as the proportion of HGVs, or a change in the average speed of traffic.

12.2 Existing and Baseline Knowledge

- 12.2.1 Road traffic noise emanating from the A19 dominates the existing noise environment for many sensitive premises within the study area. Other arterial roads in the area such as the A1290 would also be the primary noise source for receptors in their local vicinity. Road traffic noise is particularly dominant for those receptors in closest proximity to the existing busy roads, whereas many of the properties in the overall calculation area will be shielded from traffic noise by barriers formed by multiple other properties.
- 12.2.2 Indicatively, those receptors located on the western edge of the Town End Farm housing estate are currently exposed to noise levels in the region of 70 dB $L_{A10,18h}$. Such properties are exposed to road traffic noise from the A19 and Washington Road. Other receptor groups in the area of the scheme include those adjacent to the A1290, e.g. The Chalet, which would currently be exposed to noise levels of approximately 60 dB $L_{A10,18h}$ and Make-Me-Rich Farm with existing noise levels in the region of 64 dB $L_{A10,18h}$, derived mainly from the A19.
- 12.2.3 If no changes are made to the existing road infrastructure, these noise levels would gradually increase with time, due to expected growth in the volume of traffic.

Measurement of existing noise levels

- 12.2.4 Noise monitoring undertaken at Make-Me-Rich Farm during the period of November 20th - 4th December 2014. The monitored data is summarised in Table 12.2 which presents a summary of the daytime (06:00 to 00:00) and the night-time (23:00 to 07:00) monitoring respectively. The monitoring results below are the average values of the measurements taken across the day and night-time periods.

Table 12.2: Summary of Baseline Noise Monitoring at Make-Me-Rich Farm

Time Period	Average Measured Noise Level (dB)		
	$L_{Aeq,T}$	$L_{A90,T}$	$L_{A10,T}$
Day-time (06:00 – 00:00)	63	60	64
Night-time (23:00 – 07:00)	56	48	58

12.3 Relevant Guidance on Noise and Vibration

- 12.3.1 The assessment will follow the most recent guidance provided in DMRB for the assessment of noise and vibration on proposed road schemes. This guidance is provided in DMRB Volume 11, Section 3, Part 7 (HD 213/11 – Revision 1) *Noise and Vibration*.

12.4 Legislation and Planning Policy Related to Noise and Vibration

- 12.4.1 During the assessment, the following planning policy will be reviewed because it relates to noise and vibration:
- National Planning Policy Framework (NPPF) 2012
 - National Planning Practice Guidance;
 - Noise Policy Statement for England (NPSE) 2010;
 - Noise Action Plan 2010;
 - Land Compensation Act 1973;
 - The Noise Insulation Regulations 1975 (as amended 1988);

- The Highways Noise Payments and Movable Homes (England) Regulations 2000;
- Control of Pollution Act 1974;
- Environmental Protection Act 1990;
- The Environmental Noise (England) Regulations 2006.
- South Tyneside Local Plan: Core Strategy (2007);
- South Tyneside Local Plan: Development Management Policies (2011);
- South Tyneside Local Plan: Site-Specific Allocations (2012); and
- Sunderland Unitary Development Plan (UDP) Adopted Alteration No.2 (2007).

12.5 Data Gathering and Survey

12.5.1 The following scope of works is recommended in order to obtain the baseline data for the proposed assessment:

- identify all relevant policies and plans and assess whether the proposed junction improvement would help to meet or hinder their objectives;
- undertake further baseline noise measurements (typically at sensitive receptors, such as to the western periphery of Town End Farm Housing Estate and at properties to the south west);
- undertake noise level predictions for all relevant receptors in accordance with the most recent DMRB guidance using up-to-date traffic forecast data;
- undertake noise level predictions at night where traffic forecast data indicates significant noise changes are likely;
- evaluate any potential impacts arising from traffic induced vibration;
- should significant changes in noise or vibration be likely, a report in the form of a 'detailed' assessment as defined in DMRB will be prepared; and
- should significant changes in noise or vibration be unlikely, a report in the form of a 'simple' assessment as defined in DMRB will be prepared.

12.6 Proposed Assessment Method

12.6.1 The assessment will follow the methodologies contained within HD 213/11 – Revision 1. The proposed level of assessment (see Section 0) for noise and vibration will be determined as a result of initial noise or vibration level predictions. For operational noise and vibration effects, the need for a 'detailed' assessment in accordance with guidance contained within HD 213/11 – Revision 1 will be considered once traffic flow information from a traffic model becomes available.

Assessment of Potential Construction Effects

12.6.2 Disruption caused during the construction phase of the scheme has the potential to affect residents and other sensitive receptors adjacent to the scheme. HD 213/11 – Revision 1 advises on the use of BS 5228: 2009 (Parts 1 and 2) to assess and control noise and vibration from construction activities.

12.6.3 CadnaA is a software program for calculating construction site noise using the methodology set out in BS 5228. Construction plant, activities and programme will be incorporated to predict "representative worst case" noise levels at nearby residential premises. The assessment will also take into account the possibility of night time construction working. CadnaA will be used in the assessment to calculate noise levels from the construction activities associated with the proposed scheme.

- 12.6.4 Predictions of vibration will be undertaken in accordance with the guidance contained within BS 5228. This will apply to works associated with piling and ground compaction.

Assessment of Potential Operational Effects

Noise Assessment

- 12.6.5 The assessment of noise levels at noise-sensitive receptors will follow the methodology from HD 213/11 – Revision 1. Noise impacts will be assessed according to any permanent short and long-term changes in the noise that would result from the scheme. This includes presenting day-time noise level changes in the short and long-term, night-time noise level change in the long-term, and noise nuisance change.
- 12.6.6 Noise levels will be calculated at all residential dwellings and other noise-sensitive receptors within 600 m of the scheme and ‘affected routes’ (within 1 km of the scheme) on the existing road network.
- 12.6.7 Noise level predictions will be undertaken using the CadnaA noise modelling package, which incorporates the methodology contained in the Calculation of Road Traffic Noise 1988 (CRTN). CRTN is a technical memorandum produced by the Department of Transport and Welsh Office providing the definitive method of predicting road traffic noise in the United Kingdom. Noise level predictions will take account of the following variables:
- typical weekday volumes of traffic during the eighteen hour period from 6 am to midnight (18-hour AAWT flows) – day-time assessment;
 - typical weekday volumes of traffic during the eight hour period from 11 pm to 7 am – night-time assessment;
 - percentage of Heavy Vehicles (vehicles of un-laden weight >3.5 tonnes);
 - traffic speeds;
 - road gradient;
 - local topography;
 - nature of the ground cover between the road and the receptor;
 - shielding effects of any intervening structures, including allowances for limited angles of view from the road and any reflection effects from relevant surfaces; and
 - road surfacing type.
- 12.6.8 Where necessary, a qualitative assessment will be undertaken for receptors that exist beyond 600 m from an affected route.
- 12.6.9 For affected routes within the study area that are beyond 1 km from the improvement works, an assessment will be undertaken by obtaining the Basic Noise Level (BNL) of these affected routes. The BNL is a measure of source noise at a reference distance of 10 m from the nearside carriageway edge.
- 12.6.10 The assessment will consider noise level changes at dwellings and other sensitive receptors according to their baseline façade noise levels (a reception point 1 m in front of the building facade).
- 12.6.11 An assessment of night-time noise levels will be undertaken in accordance with HD 213/11 – Revision 1. Consideration will be given to those receptors that are predicted to experience a noise level change in the long-term and which are exposed to a night-time noise level ($L_{\text{night, outside}}$) of 55 dB or greater in any scenario. Where feasible, Method 2 within TRL report ‘*Converting the UK traffic noise index $L_{A10, 18h}$ to EU noise*

indices for noise mapping will be used to determine the night-time noise levels ($L_{\text{night, outside}}$).

- 12.6.12 For a 'simple' assessment, the following comparisons will be made:
- Do-Minimum scenario in the baseline year (2021) against Do-Something scenario in the baseline year (2021); and
 - Do-Minimum condition in baseline year (2021) against Do-Something in the future assessment year (2036).
- 12.6.13 If a 'detailed' assessment is required, an additional comparison would be made, which is:
- Do-Minimum scenario in baseline year (2021) against Do-Minimum in the future assessment year (2036).
- 12.6.14 For daytime noise levels at dwellings and other noise sensitive properties, façade noise levels will be predicted whereas night-time noise levels will be free-field (façade location but without any reflection effects).
- 12.6.15 Further baseline noise measurements will be undertaken as part of the assessment. The location of the noise monitoring will be agreed with South Tyneside Council. Such measurements will, where appropriate, be undertaken to define the baseline condition for receptor façades. In addition, noise measurements would be used for the purposes of validating the calculated baseline noise levels.

Noise Nuisance

- 12.6.16 If a 'detailed' assessment is required, a noise nuisance assessment shall be undertaken. Noise nuisance⁴¹ predictions will be based on the highest nuisance levels expected during the first 15 years after opening for the Do-Minimum and Do-Something scenario and compared to the nuisance levels of the Do-Minimum baseline year (2021). In accordance with the predictive technique presented in HD 213/11 – Revision 1, an assessment of noise nuisance for all properties situated within the calculation area will be undertaken.

Ground-Borne Vibration

- 12.6.17 A qualitative assessment will be undertaken to determine the likelihood of perceptible traffic induced ground-borne vibration.

Vibration Nuisance

- 12.6.18 Where properties are within 40 m of the carriageway, HD 213/11 – Revision 1 recommends that, for a given level of noise exposure, the percentage of those 'bothered' by airborne vibration is 10% lower than the corresponding figure for noise nuisance. Where noise levels are below 58 dB $L_{A10,18h}$, it should be assumed that residents would not be 'bothered' by airborne vibration. Consideration will be given to changes in airborne vibration nuisance at all dwellings within 40 m of roads where noise level predictions have been undertaken. For receptors that are screened or are located beyond 40 m of the road, vibration nuisance levels cannot be predicted with accuracy using the HD 213/11 – Revision 1 method.

Assessment of the Significance of Effects

Construction Noise

- 12.6.19 BS 5228-1: 2009 (Method 2 – the '5 dB(A) Change' Method) provides a methodology for the prediction of significance of noise effects on residential properties and other sensitive receptors during typical construction works, based upon noise change and

⁴¹ Note that the term 'nuisance' as used in HA213/11 and in this report does not have the same meaning as it does in some statutory documents.

existing measured ambient noise levels. Noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB for the daytime period, 55 dB for the evening period and 45 dB from the night-time period ($L_{Aeq, period}$) from construction noise alone. This applies for a duration of one month or more, unless works for a shorter duration are likely to result in a significant effect. The evaluation criteria are generally applicable for residential housing, hotels and hostels, buildings in religious use, schools and health or community facilities.

Construction Vibration

- 12.6.20 Vibration is a low frequency disturbance producing physical movement in buildings or to their occupants. Ground-borne vibration is usually measured in terms of peak particle velocity, or PPV, which is measured in terms of movement in mm/s. BS 5228-2: 2009 provides a prediction methodology for mechanised construction works, such as compaction and tunnelling works, and piling works. The Standard also presents guidance on control of vibration from construction works.
- 12.6.21 BS 5228-2: 2009 provides guidance on the human response to vibration, reproduced from BS 6472-1⁴². The Standard provides guidance for predicting human response to vibration in buildings. For construction works, the guidance contained in Table 12.3 is provided.

Table 12.3: Guidance on the Human Response to Vibration Levels from BS 5228-2: 2009

Vibration Level (PPV)	Effect
0.14 mm/s	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration
0.3 mm/s	Vibration might just be perceptible in residential environments
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents
10.0 mm/s	Vibration is likely to be intolerable for any more than very brief exposure to this level

- 12.6.22 From Table 12.3 it is observed that at a vibration level of 1.0 mm/s peak particle velocity (PPV) *"It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents."* At a PPV of 10 mm/s the standard advises *"Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments."* Accordingly, if the exposure to construction is for a "brief period" then a PPV of 10 mm/s would be considered to represent the threshold of a significant effect, whereas for prolonged exposure a PPV of 1.0 mm/s would represent the threshold
- 12.6.23 For building structure response, BS 5228-2: 2009 reproduces the advice given in BS 7385-2⁴³, which gives guidance on vibration levels which could potentially result in building damage. The response of a building to ground-borne vibration is affected by

⁴² British Standards Institution (2008). *BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings — Part 1: Vibration sources other than blasting.*

⁴³ British Standards Institution (1993). *BS 7385-2:1993 Evaluation and measurement for vibration in buildings — Part 2: Guide to damage levels from groundborne vibration.*

the type of foundation, underlying ground conditions, the building construction and the state of repair of the building. Table 12.4 reproduces the guidance detailed in BS 5228-2:2009 on building classification and guide values for cosmetic building damage.

Table 12.4: Guidance on the Effects of Vibration Levels on Building Structures from BS 5228-2: 2009

Type of Building	PPV in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and Above
Reinforced or framed structures	50 mm/s	50 mm/s
Industrial and heavy commercial buildings		
Un-reinforced or light framed structures	50 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Residential or light commercial buildings		

Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 12.4, with major damage at values greater than four times the values in the table. BS 7385-2: 1993 also notes that the probability of cosmetic damage tends towards zero at 12.5 mm/s peak component particle velocity.

Operational noise

- 12.6.24 Section 3 of DMRB HD 213/11 provides guidance on the magnitude of traffic noise impacts on human receptors. Magnitudes of impact are considered for both the short-term and long-term. A change in road traffic noise of 1 dB in the short-term, for example when a scheme is opened, is the smallest that is considered perceptible. In the long-term, a 3 dB change is considered perceptible. The classifications of the short- and long-term noise impacts provided by DMRB HD 213/11 are detailed in Table 12.5 and Table 12.6, respectively.

Table 12.5: Classification of Magnitude of Noise Impacts in the Short-Term

Noise Change $L_{A10,18h}$ (dB)	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5+	Major

Table 12.6: Classification of Magnitude of Noise Impacts in the Long-Term

Noise Change $L_{A10,18h}$ (dB)	Magnitude of Impact
0	No Change
0.1 – 2.9	Negligible
3 – 4.9	Minor
5 – 9.9	Moderate
10+	Major

- 12.6.25 For the assessment of night-time noise impacts, DMRB HD 213/11 advises that, until further research is available, only impacts in the long-term scenario shall be considered. Therefore, only the classification in Table 12.6 is used for determining

night-time noise impacts. In addition, DMRB HD 213/11 advises only those sensitive receptors predicted to be subject to a noise level exceeding 55 dB $L_{\text{night, outside}}$ should be considered.

- 12.6.26 In terms of the significance of effects for the operational noise assessment, the noise levels detailed in Table 12.7 are to be considered as the Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) in this assessment. These have been defined based on the guidance provided in the NPSE and PPG.

Table 12.7: LOAEL and SOAEL Noise Levels

Observed Effect Level	Value for Daytime	Value for Night-time
LOAEL	55 dB $L_{A10,18h}$ (façade) 50 dB $L_{Aeq,16h}$ (free-field)	40 dB $L_{\text{night, outside}}$ (free-field)
SOAEL	68 dB $L_{A10,18h}$ (façade) 63 dB $L_{Aeq,16h}$ (free-field)	55 dB $L_{\text{night, outside}}$ (free-field)

- 16.28 A predicted noise level which exceeds the SOAEL does in itself not result in a significant effect for any given sensitive receptor. The noise level change when compared with the 'Do Minimum' 2021 noise level also requires consideration.
- 16.29 Where the predicted noise level is above the SOAEL, it is considered that any perceptible noise increase in the short or long-term has the potential to cause a significant adverse effect. Conversely, a perceptible noise decrease, where the absolute noise level is above the SOAEL, is considered to be a potentially significant benefit.
- 12.6.27 It is considered that a potentially significant adverse effect has occurred where:
- the predicted 'Do Something' noise level is more than or equal to the SOAEL, and
 - there is an increase in noise level (compared to the 'Do Minimum' 2021 scenario) of 1 dB or more in either the short-term or long-term.
- 12.6.28 Conversely, it is considered that a potentially significant beneficial effect has occurred where:
- the 'Do Minimum' 2021 noise level is above or equal to the SOAEL, and
 - there is a perceptible decrease in noise level of either 1 dB or more the short-term or 3 dB or more in the long-term.
- 12.6.29 It is worth noting that DMRB HD 213/11 advises that changes in noise levels of less than 3 dB (A) are not considered perceptible in the long-term.
- 12.6.30 For predicted noise levels which are less than the SOAEL, it is considered that a potentially significant adverse effect has occurred where:
- the predicted 'Do Something' noise level is above or equal to the LOAEL, and
 - there is an increase in noise level (compared to the 'Do Minimum' 2021 scenario) of at least 3 dB in the short-term or 5 dB in the long-term.
- 12.6.31 Conversely, it is considered that a potentially significant beneficial effect has occurred where:
- the 'Do Minimum' 2021 noise level is above or equal to the LOAEL, and
 - there is a decrease in noise level of either 3 dB or more the short-term or 5 dB or more in the long-term.

- 12.6.32 The above aligns with unpublished advice provided by Highways England in determining potential significant adverse effects.
- 12.6.33 In addition to the above, consideration has been given to the 'Important Areas' within the study area. As the highway authority should look to reduce noise levels in these 'Important Areas' (where feasible), any predicted increase in noise within these areas of greater than 1 dB is highlighted as significant.

Operational vibration

- 12.6.34 In line with HD 213/11, should the level of vibration at a receptor be predicted to rise above a level of 0.3 mm/s, or an existing level above 0.3 mm/s be predicted to increase, then this should be classed as an adverse impact from vibration.

12.7 Mitigation Options

Construction

- 12.7.1 Potential mitigation measures that could be employed on during construction works to ensure that noise and vibration levels are attenuated as far as possible include:
- the use of 'best practicable means' during all construction activities;
 - switching off plant and equipment when it is not in use for longer periods of time;
 - establish agreement with the local authority on appropriate controls for undertaking significantly noisy works or vibration-causing operations close to receptors;
 - programming works so that the requirement for working outside normal working hours is minimised (taking into account the highway authority's statutory duties under the Traffic Management Act 2004);
 - use of low noise emission plant where possible;
 - the use of temporary noise screens around particularly noisy activities; and
 - regular plant maintenance.

Operation

- 12.7.2 Potential mitigation measures to prevent adverse noise and vibration impacts during operation include environmental bunds and barriers; quieter road surfacing; and noise insulation.

13 PEOPLE AND COMMUNITIES

13.1 Introduction

13.1.1 This chapter was developed with reference to the following parts of DMRB Vol 11 Section 3: Part 6 Land Use; Part 8 Pedestrians, Cyclists, Equestrians & Community Effects and Part 9 Vehicle Travellers. DMRB Interim Advice Note 125/15 sets out the requirement to combine the current DMRB Vol 11 Section 3 parts 6, 8 and 9 into one chapter titled People and Communities.

13.1.2 On this basis, the chapter is structured according to the following eight subheadings: Land Use, Physical Assets, Non-Motorised Users, Community Severance, Community Amenity, Public Transport Users, Vehicle Travellers, and Economy and Employment.

- For land use, the assessment considers the effects on agricultural farm units; community land and facilitates; and development land.
- For physical assets, the assessment considers the effects on private built assets in proximity to the scheme, including residential, commercial, and industrial property and farm businesses.
- For Non-Motorised Users, the assessment considers the effects on pedestrians, cyclists, equestrians, and their journey amenity.
- For community severance, the assessment considers the increase or reduction of journey lengths, which may deter or encourage people from using community facilities, based on the change in AADT figures generated by traffic modelling.
- For community amenity, the assessment considers the ability of people to enjoy their surroundings and the indirect effects on the wellbeing of local stakeholder groups.
- For public transport users, the assessment considers the effects on bus routes and the potential for changes to bus journey times.
- For vehicle travellers, the assessment considers the effects on the view from the road and changes to the level of stress experienced by drivers.
- For economy and employment, the assessment considers the effects on employment levels and general economic stimulation.

13.2 Existing and Baseline Knowledge

Land use

Agricultural Land

13.2.1 Some smaller permanent pasture fields around Downhill Lane junction are understood to be utilised for horse grazing. Other small fields north of Downhill Lane junction and east of the A1290 may not be under active agricultural management at the current time.

13.2.2 The agricultural land in the study area is mainly managed for arable crop production, including ley grass in the rotation. The crops grown comprise combinable crops of winter sown cereals (mainly wheat) and oilseed rape in rotation. There is some limited grassland for grazing and hay/silage making, associated with a beef cattle-rearing enterprise on one of the farms. Other mainly permanent grassland areas are utilised for horse grazing or currently not used.

13.2.3 For information on farm businesses, refer to the section below on private property.

Community Land and Facilities

13.2.4 Community land and facilities in the study area include:

- land adjacent to the River Don, approximately 1 km to the north-east of the scheme, is designated as public open space; and
- land used as playing fields to the east of the A1290 and to the north of Washington Road, covering approximately 1.8 hectares.

Development Land

13.2.5 The South Tyneside Local Plan and South Tyneside Site-Specific Allocations identify a number of development sites in the study area, which will be considered in the EIA. These include the IAMP which would be developed close to Downhill Lane junction.

Physical Assets

Private Property: Residential

13.2.6 One residential property is located close to the west side of the existing A19: Make-Me-Rich Farm House. The farm house is located on a smallholding approximately 75 m from the existing highway boundary north of Downhill Lane junction.

13.2.7 There are a number of residential properties to the south of Downhill Lane junction. The nearest are at Town End Farm, which is a dense residential area approximately 350 m to the south-east of the junction, and over 80 m east of the A19 highway boundary. The Chalet and Usworth cottages are located over 800 m to the south-west of Downhill Lane junction.

13.2.8 The Chalet is a private property located approximately 50 m west of the A1290 and north of Washington Road, just north of the Nissan car factory. Usworth cottages are located adjacent to the Chalet and consist of five individual properties.

Private Property: Commercial

13.2.9 There are four active commercial properties in close proximity to the scheme. Located to the south of Downhill Lane junction is the North-East Aircraft Museum, the Three Horse Shoes pub, the Gateshead College Skills Academy and the Air Training Corps (ATC) centre.

13.2.10 The North-East Aircraft Museum is a volunteer-run aviation museum and is located between the A1290 and the A19, to the north of Washington Road. It occupies an area of approximately 1.4 hectares.

13.2.11 The Three Horse Shoes pub is a host for community events and is located to the south of the A1290, to the north of Washington road.

13.2.12 The Gateshead College Skills Academy is a department of Gateshead College which focuses on sustainable manufacturing and innovation. It is located to the east of the A1290 and to the south of Washington road, and lies approximately 150 m from the proposed scheme. It covers an area of approximately 0.8 hectares.

13.2.13 The ATC centre used to form part of the site of the historic RAF Usworth (subsequently Sunderland Airport), which was operational from 1916 to 1984. It is located adjacent to the North-east Aircraft Museum, approximately 160 m east of the A1290 and to the north of Washington Road.

Private Property: Industrial

13.2.14 The Nissan plant, although it lies just outside the study area in Washington North, is the largest employer in the region and a major stakeholder in the scheme. In addition to cars, it manufactures batteries and other components. Around 80% of its production is made for export; a new production line has recently opened for manufacture of a new model; and it is understood that there are further plans for

expansion. Past NMU surveys showed that large numbers of Nissan employees commute to and from the plant from West Boldon/Boldon Colliery, Fellgate and Hedworth, using the rights of way, cycle paths and roads in or near the study area (in particular, Bridleway B46, the 'Don Valley Footpath'), passing through Downhill Lane junction.

- 13.2.15 On the land adjacent to and north of the Nissan plant, South Tyneside and Sunderland Councils are jointly preparing an application for a DCO for the IAMP development. If this were to proceed, it would comprise a large industrial park for high-tech manufacturing. The proposed park would be in the region of 160 hectares, providing over 5,200 jobs on completion. The park would provide modern manufacturing premises close to existing employers and would build on the region's advanced manufacturing heritage. The IAMP site is directly adjacent to Downhill Lane junction to the south, west and north-west. IAMP infrastructure proposals include upgrading the A1290 to dual carriageway, and this would tie-in directly to the Downhill Lane Junction Improvement scheme.

Private Property: Farm Businesses

- 13.2.16 Farm structure in the study area comprises a mix of owner-occupied, tenanted and licensed landholdings, sometimes farmed together with land elsewhere.
- 13.2.17 At least one owner-occupied unit is farmed by use of a local agricultural contractor and another licenses land for arable cropping and hay-making.
- 13.2.18 Most farms use the local road network, comprising the A19, A184, A1290 and Downhill Lane, for access to and from farmsteads and fields. Two farms have field access gateways directly off the A19 between the junctions.
- 13.2.19 Two farms in the study area have agreements under Natural England's Entry Level Stewardship (ELS) Scheme that encourages environmentally sensitive management of land.

Non-Motorised Users

- 13.2.20 Downhill Lane junction is a significant crossing over the A19 for equestrians, recreational walkers and in particular for both commuting and recreational cyclists. There are various footpaths, bridleways and cycle routes in the study area. Surveys of NMU traffic have been carried out on at five locations surrounding the junction during both the winter and summer periods in 2016, and a consultation meeting has been held with the Tyne and Wear Local Access Forum and user groups in December 2016 to identify their aspirations and concerns relating to the junction.

Community Severance

- 13.2.21 The key community in the study area is Town End Farm in Sunderland. The built-up area of this community is mainly located in the south east of Downhill Lane junction, while the areas closest to the scheme are predominantly open countryside within the green belt. However, there is also significant non-motorised commuter traffic from the Boldons (East and West Boldon and Boldon Colliery) to the Nissan Plant, and this area is located to the north, and east of the A19.

Community Amenity

- 13.2.22 Within the local study area, a number of general stakeholder groups are present:
- residents in the local communities;
 - residents of farmhouses in close proximity to the scheme;
 - farmers and others working on the agricultural land of the area;
 - commuters, including those using the public right of way and road network to access employment;

- local road users who use the roads for access more generally; and
- community groups, such as social and education groups within the local area.

Public Transport Users

- 13.2.23 A number of buses operate within the area of Downhill Lane junction providing routes to Gateshead and Newcastle to the west and Middlesbrough and Sunderland to the south-east.

Vehicle Travellers

- 13.2.24 The A19 is a strategic north-south route running from Doncaster to north of Newcastle via York and linking the Tyne and Wear conurbation with Teesside. However, locally it is also used for commuting traffic; Downhill Lane junction is busiest at Nissan shift-change times, when there are often long queues at the junction, sometimes tailing back onto the A19 carriageway.

Economy and Employment

- 13.2.25 This sub-topic focuses on the wider region surrounding the proposed scheme, represented by the local authority areas of South Tyneside, Sunderland and Gateshead.

South Tyneside

- 13.2.26 As of the 2011 census, there were 148,127 people in South Tyneside. The unemployment rate was 6.6%, which was greater than that the average for the North-east region (5.4%) or England as a whole (4.4%).

- 13.2.27 Labour market statistics for 2014 show that South Tyneside had 44,400 employee jobs, of which 29,100 were full-time and 15,400 were part-time. Approximately 2,000 (4.6%) of these were in the construction industry, with services at 37,400 (84.1%); within the services sector, public administration, education and health in particular was at 15,400 (34.7%), being the largest employer.

- 13.2.28 South Tyneside is relatively deprived, ranking 31st out of 326 local authorities in the Index of Multiple Deprivation 2015.

Gateshead

- 13.2.29 As of the 2011 census, there were 200,214 people in Gateshead. The unemployment rate was 5.0%, slightly below the average for the North-east (5.4%), but above the England average (4.4%).

- 13.2.30 According to labour market statistics for 2014, Gateshead has 92,700 employee jobs, of which 62,300 are full-time and 30,300 are part-time. Approximately 4,200 (4.6%) of these are in the construction industry, with services at 75,100 (81.1%); within the services sector, public administration, education and health in particular was at 24,400 (26.3%), being the largest employer.

- 13.2.31 Gateshead is relatively deprived, ranking 80th out of 326 local authorities in the Index of Multiple Deprivation 2015.

Additional Tyneside Data

- 13.2.32 Some data is unavailable at local authority level. At the NUTS3 level, Tyneside as a whole (i.e. the combined areas of Newcastle upon Tyne, Gateshead, South Tyneside, and North Tyneside) had a Gross Value Added (GVA) per head of £20,693 in 2014, a growth of 11.9% since 2010. This is greater than the GVA per head for the North-east region (£18,216) but less than the average for the UK as a whole (£24,616).

Sunderland

- 13.2.33 As of the 2011 census, there were 275,506 people in Sunderland. The unemployment rate was 5.8%, slightly greater than the average for the North-east (5.4%) and England as a whole (4.4%).
- 13.2.34 According to labour market statistics for 2014, Sunderland has 117,300 employee jobs, of which 80,600 were full-time and 36,700 were part-time. Approximately 4,300 (3.7%) of these were in the construction industry, with services at 89,500 (76.3%); within the services industry, public administration, education and health in particular was at 36,100 (30.7%), being the largest employer. In Sunderland, 19,800 (16.8%) were involved in manufacturing compared to a national average of 8.5%.
- 13.2.35 Sunderland had a GVA per head of £19,693 in 2014, a growth of 13.9% since 2010. This is greater than the GVA per head for the North-east (£18,216) but less than the average for the UK as a whole (£24,616).
- 13.2.36 Sunderland is relatively deprived, ranking 38th out of 326 local authorities in the Index of Multiple Deprivation 2015.

13.3 Relevant Guidance on People and Communities

- 13.3.1 This chapter was developed with reference to the following parts of DMRB Vol 11 Section 3: Part 6 Land Use; Part 8 Pedestrians, Cyclists, Equestrians & Community Effects and Part 9 Vehicle Travellers. DMRB Interim Advice Note 125/15 sets out the requirement to combine the current DMRB Vol 11 Section 3 parts 6, 8 and 9 into one chapter titled People & Communities.

13.4 Planning Policy Relevant to People and Communities

- 13.4.1 During the assessment, the following planning policy will be reviewed because it relates to People and Communities:

National Planning Policy

- 13.4.2 The National Policy Statement for National Networks (NPS-NN 2015) sets out the Government's vision and policy in relation to nationally significant infrastructure projects on the strategic road and rail networks.

Local Planning Policy – South Tyneside Council

- 13.4.3 New development in the South Tyneside Council area is assessed against the spatial strategy, policies and proposals set out in the Local Development Framework. It comprises a Core Strategy, Development Management Policies, several Area Action Plans and Site-Specific Allocations document. Policies relevant to this chapter are:
- Policy ST1 – ‘Spatial Strategy for South Tyneside’;
 - Policy A1 – ‘Improving Accessibility’;
 - Policy E1 – ‘Delivering Economic Growth and Prosperity’;
 - Policy SC6 – ‘Providing for Recreational Open Space, Sport and Leisure’;
 - Policy DM1 – ‘Management of Development’;
 - Policy SA2 – ‘Improving Physical Accessibility and Transport Infrastructure’; and
 - Policy SA7 – ‘Green Infrastructure and Recreational Opportunities’.

Local Planning Policy – Sunderland City Council

- 13.4.4 The scheme is within two plan areas. The southern portion lies within the area of the Sunderland Unitary Development Plan (UDP) Adopted Alteration No.2 (2007). The

UDP seeks to ensure that 'the City's residents have access to an appropriate range of community, health and education services in order to provide for their needs'.

13.4.5 The key saved policies, referring to those that are to be maintained in future plans, in the UDP in relation to people and communities are:

- CF13: Loss of Community Buildings;
- L10: Countryside Recreation;
- B19: User Friendly Environment; and
- CN8: Rural Economy and Agriculture.

13.5 Data Gathering and Survey

13.5.1 Information used for this topic to date has been obtained from a wide variety of sources including:

- GIS layers compiled during the course of the scheme, including several previous phases of the scheme, based on data gathering for several topics.
- Cartographic sources.
- Online data sources, other desk-based research and consultation with third parties.
- Traffic flow data (average AM/PM peak hourly flow per lane in vehicles/hour and AM/PM peak average speed in km/hour at points throughout the local network), obtained from the traffic model used for the scheme.
- Previous scheme reports, including the NMU Context Reports produced for the scheme in 2006 and 2014 (incorporating the results of NMU traffic surveys) and previous environmental assessment reports. Each of these reports themselves drew on multiple sources of information and consultation.
- websites of South Tyneside Council, Sunderland City Council and Nexus (Tyne and Wear Passenger Transport Executive).
- Consultation with local authorities and interest groups.
- NMU traffic flow information from Gateshead Council Traffic Flows Report.
- Ordnance Survey.
- MAGIC online maps.
- Sustrans online map.
- Walks and Rides website.
- South Tyneside Council website.
- Sunderland City Council website.

13.5.2 Further data will be obtained through:

- site visits;
- interviews with farmers;
- consultation responses;
- an investigation of the potential agricultural effects of the proposed scheme improvements by a specialist consultant; and
- information sourced from the Additionality Guide and the Office for National Statistics (ONS), in particular using the Census 2011, local and regional statistics 2014 and the Index of Multiple Deprivation 2015.

13.6 Proposed Assessment Method

- 13.6.1 An assessment of the significance of effect normally requires the identification of the sensitivity of the receptor and the magnitude of the impact, and for some DMRB topics these are determined according to specified methods and criteria. However, the available published guidance for most sub-topics of this chapter does not include methodologies or criteria to enable the identification of sensitivity or magnitude, nor therefore the assessment of significance using a matrix.
- 13.6.2 In consequence, the assessment of the significance of effect is based on professional judgement and experience, taking account of the specialist's judgement of the relationship between the sensitivity of the receptor and scale of impact. Impacts are assessed as being 'significant' or 'insignificant', and further qualified as 'adverse' or 'beneficial'; otherwise there is 'no impact'.
- 13.6.3 A defined method is provided in DMRB Volume 11, Section 3, Part 9 ('Vehicle Travellers') for grading drivers' stress on a scale of Low, Moderate or High. This is based on data taken from the traffic model, including:
- Average AM/PM peak hourly flow per lane, in flow units per hour; and
 - Average AM/PM peak journey speed in km/hour.

13.7 Mitigation Options

- 13.7.1 Possible mitigation measures include the following:
- measures to address noise, air quality and landscape impacts would be identified in the relevant topic assessments;
 - accommodation works to enable continued access to agricultural land;
 - provision of facilities for non-motorised users as part of the scheme design; and
 - highway design to be to modern standards to reduce driver stress.

14 ROAD DRAINAGE AND THE WATER ENVIRONMENT

14.1 Introduction

- 14.1.1 This topic covers the hydrology (including water quantity and flood risk) and water quality of surface waters and groundwater, taking account of the construction and operational impacts of the scheme.
- 14.1.2 If required a separate assessment will be completed in response to Water Framework Directive (WFD) legislation. This assessment would be appended to the ES, with the main findings summarised within the road drainage and the water environment chapter.
- 14.1.3 The study area for this topic is based on the features and attributes of the water environment in the surrounding area that have the potential to be affected by the proposed scheme. It has not been defined as a measured zone around the scheme location.

14.2 Existing and Baseline Knowledge

- 14.2.1 Figure 1.2 illustrates the indicative environmental constraints for the wider study area, including the key water environment features.

River Don

- 14.2.2 The River Don rises east of Wrekenton and flows in a generally easterly direction, mainly through farmland until it meets the A19 at Downhill Lane junction. At Downhill Lane, the River Don passes beneath the A19 in a culvert approximately 160 m long. The river then follows a sinuous, but generally northerly course, between fields for around 1 km and then through a predominantly urban area, to discharge into the tidal River Tyne at Jarrow.
- 14.2.3 The Environment Agency classifies the River Don as a heavily modified water body (i.e. its shape or form has been significantly altered by people over time). The River Don is classified as being of 'poor' ecological potential from its source to its confluence with the River Tyne. The WFD 'chemical' status has been classified as 'good.'
- 14.2.4 The River Don, to the north of Downhill Lane junction, was designated as a cyprinid water under the repealed Freshwater Fish Directive (FFD). This stretch of the River Don is now a protected area under the WFD. The River Don is not classified as a salmonid water under the repealed FFD through the scheme or surrounding area.
- 14.2.5 The Environment Agency records available in January 2017 show four historic pollution incidents involving the River Don between its source and Jarrow. All the incidents, which occurred in 2016, 2007 (two spillage events) and 2002, involved the spillage of sewerage into the River Don.

River Wear

- 14.2.6 The River Wear is a main river that flows in an easterly direction towards the coast at Sunderland. In the area of the proposed scheme, the River Wear is estuarine. River Wear has 'moderate' ecological and 'good' chemical status, as classified by the Environment Agency under the WFD.
- 14.2.7 There are no water abstractions from the River Wear downstream of the A19 crossing. Information regarding the dilution and removal of waste products was not available at the time of the assessment, but the river is approximately 60 miles long and drains a catchment including the city of Durham and the town of Chester-le-Street, and so is likely to receive multiple discharges.

- 14.2.8 Washington and Harraton Angling Club fish in the stretch of the River Wear upstream of Hylton Bridge⁴⁴. The Weardale Way long-distance footpath follows the whole length of the river⁴⁵.

Local Wildlife Sites

- 14.2.9 Two LWSs are located adjacent to Downhill Lane junction. Elliscope Farm East Hylton Bridge LWS is located to the west of Downhill Lane junction. The site consists of two small woodlands and the linking section of the River Don, leading east from Hylton Bridge Farm. It has been designated as a LWS, in part, because it forms part of a section of the River Don which has particular habitat features that are beneficial to wildlife. It also provides occupied breeding habitat for water vole and was used by otter.
- 14.2.10 Make-Me-Rich Meadow is located to the east of Downhill Lane junction. The LWS includes species-rich, damp, unimproved grassland and a section of the River Don itself. The LWS has also been designated, in part, because it forms part of a section of the River Don which has particular habitat features that are beneficial to wildlife. It also provides occupied breeding habitat for water vole and was used by otter.
- 14.2.11 There is a Secondary A aquifer in the bedrock beneath the project area. There is no aquifer in the superficial deposits. A total catchment (Zone 3) groundwater source protection zone is located approximately 625 m north-east of the most eastern extent of the scheme. The groundwater vulnerability beneath the site is classified as low to the west of Downhill Lane junction and high to the east of the junction.
- 14.2.12 The Environment Agency's on-line flood maps indicate that there is a narrow floodplain either side of the River Don both upstream and downstream of the point where it is crossed by the A19.
- 14.2.13 In terms of highway drainage, run-off from the A19 in the vicinity of Downhill Lane junction and from the slip roads of the junction itself drains to the River Don via an outfall to the north-east of Downhill Lane junction. Run-off from Downhill Lane to the east of the junction and Washington Road discharge to an unnamed tributary of the River Don, located approximately 225 m to the east of the A19. Records show that highway run-off for the A1290, west of Downhill Lane junction, discharges to the south of the scheme. It is assumed that highway run-off from this road discharges into the River Wear.

14.3 Relevant Guidance on Road Drainage and the Water Environment

- 14.3.1 The assessment will be carried out in accordance with the guidance contained in DMRB (HD45/09). This will include the use of the Highways Agency Water Risk Assessment Tool (HAWRAT) as one of the indicators of the likely impacts associated with routine runoff.
- 14.3.2 A WFD assessment will be carried out, in order to assess whether the scheme would have any impact on the ecological status of any water bodies classified under the WFD. A report on this assessment will be attached as an appendix to the ES and its findings will be taken into account in Chapter 14 of the ES.
- 14.3.3 A flood risk assessment (FRA) will be carried out in line with the NPPF, Technical Guidance to the NPPF and Environment Agency's Flood Risk Assessment Guidance Note 1 and 3. It will look at changes in peak runoff from the site before and after the proposed development, and include consideration of climate change. The FRA report

⁴⁴ Washington & Harraton Angling Club (unknown) *Club's Waters* [online]. Accessed on 20th January 2017. Available at: <https://sites.google.com/site/washingtonharratonanglingclub/club-s-waters>

⁴⁵ The Long Distance Walkers Association *Weardale Way* [online]. Accessed on 20th January 2017. Available at: https://www.ldwa.org.uk/ldp/members/show_path.php?path_name=Weardale+Way

will be attached as an appendix to the ES and its findings will be taken into account in Chapter 14 of the ES.

14.4 Legislation and Planning Policy Related to Road Drainage and the Water Environment

14.4.1 In the UK, the legislation for the protection of the water environment has developed over several decades, leading to a complex collection of Acts and Regulations. Key items within the overall suite of legislation are listed below:

- European Water Framework Directive 2000/60/EC;
- The Flood and Water Management Act 2010 (Commencement No. 7) Order 2012;
- Water Act 2003;
- Water Industry Act 1991 and 1999;
- Environment Act 1995;
- Land Drainage Act 1991 and 1994;
- Water Resources Act 1991;
- Environmental Protection Act 1990;
- The Water Supply (Water Quality) Regulations 1989, 2000, 2001 and 2010;
- The Groundwater Regulations 2009;
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;
- Control of Pollution (Oil Storage) Regulations 2001;
- Surface Water (Dangerous Substances) (Classification) Regulations 1989 (amended 1992, 1997 and 1998);
- Environmental Permitting (England and Wales) Regulations 2010 (amended 2016)

14.4.2 During the assessment, the following planning policy documents will be reviewed as relates to Drainage and the Water Environment:

- National Planning Policy Framework (2012);
- South Tyneside Local Plan: Core Strategy (2007);
- South Tyneside Local Plan: Development Management Policies (2011);
- South Tyneside Local Plan: Site-Specific Allocations (2012);
- Draft Core Strategy and Development Management Policies (2013); and
- Sunderland Unitary Development Plan (UDP) Adopted Alteration No.2 (2007).

14.5 Data Gathering and Survey

14.5.1 The following scope of work is proposed:

- assess all relevant policies and plans for whether the proposed junction improvement would help or hinder their objectives;
- consider the revised baseline as summarised in Section 14.2, research detail as appropriate using the following sources:
 - Ordnance Survey mapping;
 - Environment Agency website;
 - Landmark Envirocheck Report;
 - MAGIC;
 - Defra's archive website for freshwater fisheries designations; and
 - National River Flow Archive data on the website of the Centre for Ecology and Hydrology (CEH);

14.5.2 Site surveys will be planned if necessary to verify any baseline information.

14.5.3 The WFD assessment will be based also on the above information, plus WFD water body and status information provided in the River Basin Management Plan for the Northumbria River Basin District (Environment Agency, 2009). Historic maps, geological maps and aerial photographs of watercourses are also likely to be used.

14.5.4 The FRA will be informed by the following information:

- Environment Agency flood zone mapping;
- Environment Agency flood risk standing advice;
- South Tyneside Strategic Flood Risk Assessment, February 2011; and
- South Tyneside Preliminary Flood Risk Assessment, June 2011.

14.6 Modelling and Calculations

14.6.1 Calculations are used in order to predict the risk of potential impacts on potentially sensitive water receptors. These will be carried out in accordance with the guidance contained in DMRB (HD45/09), with use of the HAWRAT.

14.6.2 HAWRAT is a spreadsheet tool which calculates whether the scheme would 'pass' or 'fail' in terms of water quality in the receiving watercourses. HAWRAT was developed in recognition of the objectives of the Water Framework Directive for water bodies to achieve 'good ecological status'. The HAWRAT assessment is therefore based not on a change in water quality relative to the existing baseline, but rather on the physical characteristics of each watercourse, as those characteristics affect the dilution and dispersion of highway runoff.

14.6.3 Method D of the DMRB guidance will be used to calculate spillage risk and the associated probability of a serious pollution incident.

14.6.4 The FRA will be carried out in line with the NPPF. A model will be developed in consultation with South Tyneside Council and in line with Environment Agency guidance, which will look at changes in peak runoff from the site before and after the proposed development, and will include consideration of climate change.

14.7 Proposed Assessment Method

14.7.1 In accordance with HD 45/09, the proposed level of assessment for road drainage and the water environment will be a 'simple' assessment (see Section 0). There will be no detailed field surveys or water quality monitoring.

14.7.2 The tables listed below are taken directly from HD 45/09 and will be used in the assessment. The significance of an impact is a function of the ‘importance’ of an attribute of the water environment and the magnitude of a predicted impact. The significance of impacts will be determined only for residual impacts following mitigation.

Table 14.1: Valuation of Water Environment Attributes

Importance	Criteria	Typical Examples
Very high	Attribute has a high quality and rarity on a regional or national scale	Surface water: EC designated salmonid/ cyprinid fishery WFD class ‘high’ Site protected/ designated under EU or UK habitat legislation (SAC, SPA, SSSI, MPZ, Ramsar site, salmonid water) Species protected by EU legislation
		Groundwater: Principal aquifer providing a regionally important resource or supporting site protected under EU and UK habitat legislation Source Protection Zone (SPZ) 1
		Flood risk: Floodplain or defence protecting more than 100 residential properties from flooding
High	Attribute has a high quality and rarity on a local scale	Surface water: WFD class ‘good’ Major cyprinid fishery Species protected under EU or UK habitat legislation
		Groundwater: Principal aquifer providing locally important resource or supporting river ecosystem SPZ 2
		Flood risk: Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding
Medium	Attribute has a medium quality and rarity on a local scale	Surface water: WFD class ‘moderate’
		Groundwater: Aquifer providing water for agricultural or industrial use with limited connection to surface water SPZ 3
		Flood risk: Floodplain or defence protecting 10 or fewer industrial properties from flooding
Low	Attribute has a low quality and rarity on a	Surface water: WFD class ‘poor’

Importance	Criteria	Typical Examples
	local scale	Groundwater: Unproductive strata
		Flood risk: Floodplain with limited constraints and a low probability of flooding of residential and industrial properties

14.7.3 The process for identifying the magnitude of an impact includes consideration of the results of the HAWRAT assessment, as described under ‘Modelling and Calculations’ above.

Table 14.2: Estimation of the Magnitude of Impact on Water Environment Attributes

Importance	Criteria	Typical Examples
Major adverse	Results in loss of attribute and/or quality and integrity of the attribute	Surface water: Failure of both soluble and sediment-bound pollutants in HAWRAT (Method A, Annex I) and compliance failure with EQS values (Method B) Calculated risk of pollution from a spillage >2% annually (spillage risk assessment, Method D, Annex I) Loss or extensive change to a fishery Loss or extensive change to a designated nature conservation site
		Groundwater: Loss of, or extensive change to, an aquifer Potential high risk of pollution to groundwater from routine runoff – risk score >250 (groundwater assessment, Method C, Annex I) Calculated risk of pollution from spillages >2% annually (spillage risk assessment, Method D, Annex I) Loss of, or extensive change to, groundwater supported designated wetlands
		Flood risk: Increase in peak flood level (1% annual probability) >100 mm (hydrological assessment of design floods and hydraulic assessment, Methods E And F, Annex I)
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute	Surface water: Failure of both soluble and sediment-bound pollutants in HAWRAT (Method A, Annex I) but compliance with EQS values (Method B) Calculated risk of pollution from spillages >1% annually and <2% annually Partial loss in productivity of a fishery

Importance	Criteria	Typical Examples
		<p>Groundwater: Partial loss or change to an aquifer Potential medium risk of pollution to groundwater from routine runoff – risk score 150-250 Calculated risk of pollution from spillages >1% annually and <2% annually Partial loss of the integrity of groundwater supported designated wetlands</p> <p>Flood risk: Increase in peak flood level (1% annual probability) >50 mm</p>
Minor adverse	Results in some measurable change in attributes quality or vulnerability	<p>Surface water: Failure of either soluble or sediment-bound pollutants in HAWRAT Calculated risk of pollution from spillages >0.5% annually and <1% annually</p> <p>Groundwater: Potential low risk of pollution to groundwater from routine runoff – risk score <150 calculated risk of pollution from spillages >0.5% annually and <1% annually minor effects on groundwater supported wetlands</p> <p>Flood risk: Increase in peak flood level (1% annual probability) >10 mm</p>
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	<p>The proposed scheme is unlikely to affect the integrity of the water environment</p> <p>Surface water: No risk identified by HAWRAT (pass both soluble and sediment-bound pollutants) Risk of pollution from spillages <0.5%</p> <p>Groundwater: No measurable impact upon an aquifer and risk of pollution from spillages <0.5%</p> <p>Flood risk: Negligible change in peak flood level (1% annual probability) <+/- 10 mm</p>
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	<p>Surface water: HAWRAT assessment of either soluble or sediment-bound pollutants becomes pass from an existing site where the baseline was a 'fail' condition Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is <1% annually)</p> <p>Groundwater: Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk <1% annually)</p> <p>Flood risk:</p>

Importance	Criteria	Typical Examples
		Reduction in peak flood level (1% annual probability) >10 mm
Moderate beneficial	Results in moderate improvement of attribute quality	Surface water: HAWRAT assessment of both soluble and sediment-bound pollutants becomes a pass from an existing site where the baseline was a 'fail' condition Calculated reduction in existing spillage by 50% or more (when existing spillage risk >1% annually)
		Groundwater: Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is >1% annually)
		Flood risk: Reduction in peak flood level (1% annual probability) >50 mm
Major beneficial	Results in major improvement of attribute quality	Surface water: Removal of existing polluting discharge, or removing the likelihood of polluting discharges occurring to a watercourse
		Groundwater: Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring Recharge of an aquifer
		Flood risk: Reduction in peak flood level (1% annual probability) >100 mm

14.7.4 The method of assessing the significance of effects on the water environment varies from the generic matrix produced in Section 0, and will be conducted as per Table 14.3 below.

Table 14.3: Estimating the Significance of Potential Effects on Water Environment Attributes

Importance of Attribute	Magnitude			
	Negligible	Minor	Moderate	Major
Very High	Neutral	Moderate or Large	Large or Very Large	Very Large
High	Neutral	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Slight	Moderate	Large
Low	Neutral	Neutral	Slight	Slight or Moderate

14.8 Mitigation Options

14.8.1 Construction mitigation can include:

- best practice set out in Environment Agency's Pollution Prevention Guidelines;

- a bespoke Construction Environmental Management Plan for the scheme;
- programming site drainage (including balancing ponds) early in the construction sequence, to ensure that any run-off from the site can be intercepted and controlled;
- oil, fuel and chemical storage tanks for use during construction kept as far away from the key water environment receptors as possible;
- bunding and/or storage facilities with impervious walls and floors installed around oil, fuel and chemical tanks at least 110% of the volume of the protected tank;
- appropriate and legislatively compliant disposal of waste oils;
- use of water-based drilling fluids, using inert bentonite clay as a lubricant;
- modifying the direction of any drilling works to locate drilling plant and entry pits away from receiving waters;
- containment of used drilling muds in sealed containers and disposed of at a suitably licensed waste management facility;
- minimising areas of exposed surface in the vicinity of watercourses;
- use of wheel wash facilities to minimise the spread of silt;
- minimising the gradient of exposed surfaces where possible to help reduce run-off; and
- mixing of concrete in a designated area away from any potential receiving waters.

14.8.2 It is likely that the drainage design will include the use of a balancing pond to attenuate the rate of surface water run-off to a rate that would be agreed with the Environment Agency. The balancing pond would be of appropriate capacity to ensure no net increase in flood risk.

14.8.3 A secondary effect of the balancing pond would be to retain and, to a certain extent, to treat sediment and pollutants associated with the sediment fraction of drainage run-off. In particular, balancing ponds are particularly effective at allowing metals present as contaminants in the run-off water to settle out before the water is released into the environment. Other forms of water storage can achieve similar benefits, and may be considered as part of the assessment and design development.

14.8.4 It is likely that shut-off valves would also be provided, enabling any fuel or chemical spillages to be contained within the drainage system.

15 CUMULATIVE EFFECTS

15.1 Introduction

15.1.1 Despite the presence of various guidance documents covering EIAs, there is no widely accepted definition of 'cumulative impact assessment' at present. At its simplest, cumulative effects occur :

- as a result of changes caused by other reasonably foreseeable developments acting cumulatively with the similar effects of the proposed development ('inter-project cumulative effects'); or
- from the combined effect of several different impacts of the proposed development, acting together on a single receptor, so that the combined effect is more significant than the sum of the individual effects ('intra-project cumulative effects').

15.1.2 Cumulative effects can therefore come from multiple projects (inter-project) or from within the same project (intra-project). In order for two impacts to have a cumulative effect, the impacts will need to have a temporal relationship (i.e. arise at broadly the same time) and a spatial relationship (i.e. occur in broadly the same geographic area).

15.1.3 As cumulative effects arise from two or more impacts acting together, an impact that may not have a significant effect on its own may combine with another to have a significant cumulative effect.

15.1.4 This chapter has been prepared with reference to the Planning Inspectorate's 'Advice Note 17: Cumulative Effects Assessment'⁴⁶, and guidance on cumulative effects contained in DMRB Volume 11⁴⁷.

15.2 Scope of the Topic

Intra-Project Cumulative Effects

15.2.1 Intra-project cumulative effects address the ways in which a single receptor, group of receptors or receptor type is affected in more than one different way by the scheme under consideration, including inter-relationships between different environmental topics.

15.2.2 It is considered most appropriate that cumulative effects of this type are addressed within the relevant specialist topic chapter, together with all other impacts on the same class of environmental receptor. This is consistent with the advice given in the Planning Inspectorate's Advice Note 17, paragraph 2.5.

15.2.3 This chapter therefore focuses primarily on inter-project cumulative effects.

Inter-Project Cumulative Effects

15.2.4 Inter-project cumulative effects require a separate scoping procedure and assessment method. It is therefore necessary to address them separately from other impacts and this will be done in a separate chapter at the end of the ES.

⁴⁶ The Planning Inspectorate 2015 'Cumulative Effects Assessment', Advice Note 17.

<https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf>

⁴⁷ DMRB Volume 11, Section 2, Part 5, 'Assessment and management of environmental effects', Chapter 1 paragraphs 1.53-1.60 and Chapter 2 paragraphs 2.13-2.16.

<http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/ha20508.pdf>

Traffic Related Effects


- 15.2.5 Several environmental topics will base all or part of their impact assessment on information about the quantity of traffic on the road network in the wider area surrounding the A19 Downhill Lane Improvement, its distribution, speed and movement. This information is derived from a computer-based traffic model.
- 15.2.6 Topics that base their impact assessment primarily or entirely on traffic-based modelling or calculations are:
- Air quality; and
 - Noise and vibration.
- 15.2.7 Other topics that base part of their assessment on traffic-based calculations include:
- road drainage and the water environment (calculations of risk to water quality from run-off, calculations of accidental spillage risk); and
 - people and communities (calculations of driver stress).
- 15.2.8 The traffic model has built into it, in accordance with standard guidelines, assumptions about traffic growth over time, taking into account proposed developments and infrastructure projects in the surrounding region. This means that inter-project cumulative effects are already built into these assessments and will not need to be covered again in the cumulative effects chapter.

15.3 Scoping the Cumulative Impact Assessment

- 15.3.1 This chapter considers the inter-project cumulative environmental effects of the A19 Downhill lane Junction Improvement.
- 15.3.2 Guidance on the identification of other projects that should be taken into account in the consideration of cumulative effects is available in DMRB⁴⁸ and from PINS Advice Note 17 (Table 3), which is reproduced here as Table 15.1, with some expansion to take more account of projects going through consenting regimes other than the National Infrastructure Planning system.
- 15.3.3 Where other past projects are already complete or are expected to be completed before construction of the proposed NSIP, and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment. The ES should clearly distinguish between projects forming part of the baseline and those in the cumulative impact assessment.
- 15.3.4 The cumulative effects assessment will therefore focus primarily on interaction between the A19 Downhill Lane Improvement and other developments whose construction will not have commenced, or will not be complete, before construction of the NSIP. Relevant other developments will be identified by a staged process.

⁴⁸ Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5 (HA205/08), paragraphs 1.54 and 1.58

**Table 15.1: ‘Other development’ for inclusion in Cumulative Impact Assessment
(Planning Inspectorate Advice Note 17 Table 3)**

Tier 1	Projects under construction.	Decreasing level of detail likely to be available 
	Permitted applications whether under PA2008 or other regimes, but not yet implemented.	
	Submitted applications whether under the PA2008 or other regimes, but not yet determined.	
Tier 2	Projects on the Planning Inspectorate’s Programme of Projects where a Scoping Report has been submitted. Potential applications under other regimes where the competent authority has issued a statutory EIA Scoping Opinion and a Scoping Report or Environmental Report is available.	
	Tier 3	
Potential applications under other regimes where the competent authority has not issued a statutory EIA Scoping Opinion and there is no Environmental Report or Scoping Report available.		
Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption), recognising that much information on any relevant proposals will be limited.		
Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward (e.g. highway schemes to which the Secretary of State has made a commitment in the Roads Investment Strategy).		

Developing a ‘Long-List of Potentially Relevant Other Developments

15.3.5 A ‘long list’ of potentially relevant other developments will be developed. The long list will be built up in line with the criteria set out in Table 15.1, and also taking into account the following additional factors:

- Any transport infrastructure or other development on the ‘traffic uncertainty log’⁴⁹ that was deemed sufficiently certain to be included in the ‘core scenario’ for traffic modelling will be included in the long list.
- Applications under other regimes will be limited to ‘major applications’ within the relevant local authorities (South Tyneside, North Tyneside, Sunderland and Gateshead) as defined in the Town and Country Planning (Development Management Procedure) (England) Order 2010 (TCPO). ‘Major applications’ include:
 - Employment proposals of 1000 m² or more;
 - Residential proposals with 10 or more houses or, where the number of houses is not known, a site area of 0.5 hectares or more;
 - Minerals or waste sites with an area of 1 hectare or more; and
 - Transport infrastructure proposals with an area of 1 hectare or more.
- Any other relevant developments identified through consultation with developers and stakeholders.

⁴⁹ The traffic uncertainty log is a similar ‘long list’ process used by traffic modellers to identify other planned developments that may influence the quantity, speed or distribution of traffic.

15.3.6 So all developments were considered, relevant stakeholders will be consulted. A provisional consultee list is given below:

- South Tyneside Council;
- Sunderland City Council;
- North Tyneside Council;
- Gateshead Council;
- Sunderland City Council Highways Department;
- South Tyneside Council Highways Department;
- Nexus (formerly Tyne and Wear Passenger Transport Executive);
- North-East Combined Authority (formerly Tyne and Wear Integrated Transport Authority);
- Northern Powergrid (Northeast) Limited;
- National Grid Electricity Transmission Plc; and
- National Grid Plc.

15.3.7 In addition, the local authorities, Natural England and the Environment Agency will be invited to comment on the cumulative effects methodology.

Sifting the Long List to Identify a ‘Short List’ of Other Developments for Assessment

15.3.8 It is likely that a proportion of the other developments in the long list are not suitable for inclusion in the cumulative effects assessment, because:

- There is too much uncertainty about the project going ahead, and therefore of its impacts occurring, to justify its inclusion in the assessment; or
- There is too little information available about the project, and in particular its environmental effects, to allow an assessment.

15.3.9 Therefore, the long list will be filtered down to a ‘short list’ of other developments that may act cumulatively with the Downhill Lane scheme and that can be included in the assessment. The factors to be taken into account in filtering down the long list to form the short list include:

- how certain it is that each development will go ahead;
- the availability of environmental information regarding the developments;
- potential temporal overlap between any of the effects of the proposed scheme and the effects of other developments; and
- potential spatial overlap between any of the effects of the proposed scheme and the effects of the other developments.

15.3.10 Consideration of whether there is sufficient certainty of a project going ahead would be based on the ‘tiers’ identified in Table 15.1, as follows:

- Any Tier 1 and Tier 2 project will be deemed to have sufficient certainty to be taken into the short list, providing other criteria are met (see paragraph 15.3.10).
- For Tier 3 projects, there may be a great deal of variation in the level of confidence that a project will go ahead. Some individual projects may have public commitments with a defined timescale and identified funding, while others remain policy or commercial aspirations. These projects will be considered on a case-by-case basis to determine whether there is sufficient confidence to carry them forward into the short list, taking other criteria into account (see paragraph 15.3.10).

- 15.3.11 Cumulative impact assessment cannot be undertaken unless there is sufficient information about the other developments included. As a minimum, this must include an environmental Scoping Report or other environmental report that enables:
- identification of the environmental zone of influence of the other project, overall and on a topic-by-topic basis; and
 - identification of the time period over which the impacts of the other project could occur.
- 15.3.12 Any projects that have sufficient confidence that they will proceed, and can provide sufficient environmental information will be included in the shortlist.

15.4 Gathering Information on the Projects in the Short List

- 15.4.1 The following categories of information will be sought for each of the developments included on the short list of developments for assessment, to inform the cumulative effects assessment:
- the location and extent of the other development;
 - information on the design of the other development;
 - the proposed programme for obtaining consent (if relevant), construction, operation and decommissioning;
 - environmental assessment information that will allow the identification of:
 - the environmental baseline;
 - the environmental effects of the development;
 - the environmental zone of influence of the development as a whole and on a topic by topic basis; and
 - the timescale on which effects would occur, overall and on a topic by topic basis.
- 15.4.2 It is recognised that the extent to which this information is available, and the level of detail of the information, is likely to vary between developments, even where the minimum requirement for inclusion in the short list has been met.
- 15.4.3 The starting point for data gathering will be the websites of the relevant competent authorities (i.e. the local authorities and the Planning Inspectorate). Where required, this may be supplemented by direct liaison with the competent authorities and consultation with other stakeholders and statutory bodies. In some cases, information may be available from the developers themselves, either from their websites or directly.

15.5 Assessment Method

Identification of Potential Impacts

- 15.5.1 The primary method for the identification of potential impacts will be through the plotting of zones of influence on a topic-by-topic basis.
- 15.5.2 Where the geographic zone of influence of another development overlaps with the overall zone of environmental influence of the Downhill Lane Junction Improvement scheme, a check will be carried out for the presence of receptors relevant to that topic within the area of overlap. If such a receptor is present, and there is also an overlap between the time periods in which the impacts would occur, then there is the potential for a cumulative effect.
- 15.5.3 The likely occurrence of a cumulative effect will be confirmed in the first instance through the examination of the environmental reports for both schemes, to determine whether the receptor is identified in both as being affected. This will be supplemented

by professional judgement to determine the likelihood of any additional effect in the context of the cumulative effects assessment.

The Nature of Potential Cumulative Effects

15.5.4 In identifying cumulative effects, consideration will be given to the various different ways in which cumulative effects can occur. In particular:

- Cumulative effects can be ‘additive’, e.g. one source of pollution can add to another source of pollution to create a higher concentration of pollutant than would otherwise occur, or an area of habitat could suffer loss of land from one development and then further loss of land from another development.
- Cumulative effects can also be ‘synergistic’, where for instance a habitat may be affected by loss of land from one development and pollution or noise from another, resulting in a combined significant impact.
- It is important to recognise whether either or both of the impacts giving rise to the cumulative effect are temporary or permanent, and if temporary over what timescale.
- What is the geographic extent of the cumulative effect relative to both the extent of the receptor and the extent of the individual effects.
- If the effect is intermittent, what is its frequency.
- What is the value/sensitivity of the receptor and how susceptible is the effect to being successfully mitigated.

15.5.5 Any cumulative impacts that are identified are further defined as 'construction' or 'operational' effects, 'short-term' or 'long-term' (based on whether they would still be felt 15 or more years after construction) and 'beneficial' or 'adverse'. DMRB sets out a specific methodology for the assessment of the significance of cumulative effects (see Table 15.2).

Table 15.2: Determining the Significance of Cumulative Effects

Significance	Effect
Severe	Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.
Major	Effects that may become a key decision-making issue.
Moderate	Effects that are unlikely to become issues on whether the scheme design should be selected, but where future work may be necessary to improve on current performance.
Minor	Minor effects that are locally significant.
Not significant	Effects that are beyond the current forecasting ability or are within the ability of the resource to adapt to such change.

15.6 Baseline Conditions

15.6.1 This section identifies assumptions about other development and highway projects and considers their relevance to the assessment of cumulative effects. It is based on information gathered in 2015, with limited updates at this stage. This information will be updated prior to confirmation of the long list of developments and filtering to decide on the short list.

Non-Highway Developments

- 15.6.2 Traffic flows are a key factor influencing the environmental effects of the A19 Downhill Lane Junction Improvement scheme in conjunction with other projects. Other projects within the region that may affect traffic flows through Testos junction have been identified for the traffic model through the development of a 'traffic uncertainty log'.
- 15.6.3 The traffic model considers large-scale developments in the wider surrounding region, in terms of the volumes that they are expected to generate and any expected change in the pattern of traffic on the highway network. The region within which developments have been identified for inclusion in the traffic model is extensive.
- 15.6.4 The traffic uncertainty log considers a total of 842 development proposals and ranks them by both certainty of occurrence and scale. Those ranked 'near certain' or 'more than likely' to occur and meeting criteria on scale were included in the traffic model 'core scenario', which is used for modelling environmental impacts. Of the 842 overall proposals in the uncertainty log, a total of 46 met these criteria (14 employment proposals; 6 office proposals; 2 retail proposals; 23 housing proposal; and one mixed proposal).
- 15.6.5 The following major non-highways developments have been considered as particularly relevant within the filtering process.

International Advanced Manufacturing Plant (IAMP)

- 15.6.6 An International Advanced Manufacturing Plant (IAMP) is proposed immediately south and west of Downhill Lane junction. The IAMP is a joint venture between Sunderland and South Tyneside Council. The aim of the IAMP would be to develop an employment site for advanced manufacturing that would attract both national and international business investment and job creation. The site is predicted to generate £295 million of private sector investment and 5,200 new jobs by 2026/ 27.
- 15.6.7 The IAMP site would be developed on an area that is currently in the Green Belt. Sunderland and South Tyneside Councils have been consulting the local community on changes to their local plans required to remove the relevant area from the Green Belt.
- 15.6.8 The IAMP project is being pursued as a commercial Nationally Significant Infrastructure Project, and the Secretary of State gave a direction authorising it to be considered for consent under the Planning Act 2008 on 15th September 2015. An application for development consent is expected during the second quarter of 2017.
- 15.6.9 Environmental information for the IAMP site is available from an EIA Scoping Report published on the Planning Inspectorate website, and from ecological survey reports that have been shared with Highways England.

Wearpoint 55

- 15.6.10 Wearpoint 55 is a proposed industrial/commercial development adjacent to the A19, located between the Nissan plant and Downhill Lane junction. An application for planning consent, with an ES, has been submitted to Sunderland City Council.
- 15.6.11 Wearpoint 55 and IAMP cannot both proceed without modification as the entirety of Wearpoint 55 would occupy some of the same land proposed for IAMP.

Nissan Manufacturing Site

- 15.6.12 Nissan Manufacturing Plant is located 1.25 km south of Downhill Lane junction. Nissan have confirmed an intention to expand their operations. No detailed information, including environmental information, has been identified at this stage.

Enterprise Zones

15.6.13 North East Local Enterprise Partnership has designated ten Enterprise Zone sites for businesses within the offshore, renewables and automotive sectors. The Enterprise Zones provide a space for businesses to grow and develop. Three Enterprise zones have been designated in the vicinity of the proposed scheme:

- Site 1 (approximately 23.5 ha in size) is situated immediately north of the A1232 between Hylton Grange interchange and Barmston junction and is partly developed.
- Site 2 (approximately 6.5 ha in size) is adjacent to the A19 north of Hylton Grange Interchange. It is currently the subject of a planning application.
- Site 3 (approximately 13 ha in size) is located immediately east of Glover Industrial estate⁵⁰ and has yet to be brought forward for consent.

15.6.14 All of the sites are located south of the Nissan manufacturing plant and are over 2 km south of the proposed junction improvement. These sites would be primarily for automotive, low carbon vehicles, advanced manufacturing and advanced engineering sectors. No environmental information was available for the proposed enterprise zones.

Relevant Highway Developments

15.6.15 Highway developments within the surrounding area of the A19/ A184 Testos Junction Improvement scheme that could influence the traffic flows in this area have been identified. The relevant highway developments are shown in Table 15.3 (reproduced from Table 10 in the Traffic Forecast Report).

Table 15.3: Relevant Highway Developments in the Vicinity of the Proposals

Highway Authority	Scheme Name/ Type
Highways England	A19/ A184 Testos Junction Improvement
	Moor Farm
	A19/ A1058 Coast Road Junction Improvement
	Howdon Interchange (A19)
	Killingworth Interchange
Sunderland	A19/ A690
	A19/ A1231
	Cherry Blossom Way/ A1290 Signals
	St Marys Way Realignment
North Tyneside	Whitehouse Farm – Buffer Area

⁵⁰ North East Local Enterprise, <http://nelep.co.uk/enterprise-zone/low-carbon-vehicle-corridor/>

Highway Authority	Scheme Name/ Type
	High Flatworth Roundabout
	Four Lane Ends - Buffer Area
	Scaffold Hill, West Shiremoor Amendments
	A192 West Park Highway Mitigations
	A1058/ Norham Road
	Billy Mill Roundabout, Local Enterprise Partnership (LEP) Bid

15.7 Assessment of Cumulative Effects

Table 15.4 presents a preliminary assessment of potential inter-development cumulative effects that would be verified in the ES.

Table 15.4: Summary of Potential Cumulative Effects Arising from the Scheme

Development	Cumulative Effect	Significance
International Advanced Manufacturing plant	Visual impacts	Not significant
	Ecological impacts	Not significant
Nissan Manufacturing	Visual impacts	Not significant
	Ecological impacts	Not significant
Enterprise Zones	-	None
Housing Developments	-	None
Downhill Lane Junction Improvement Scheme	Non-motorised users	Minor adverse
	Visual impacts	Minor adverse
	Water environment	Minor adverse
	Ecological impacts	Minor adverse
A19/ A1058 Coast Road Junction Improvement	-	None

Development	Cumulative Effect	Significance
Technology Improvement Schemes	Landscape	Not significant
New Wear Bridge	-	None
Lindisfarne Corridor Improvements	Water environment	Not assessed
	Ecological impacts	Not assessed
The Arches Roundabout	-	None

16 NEXT STEPS

16.1 Scoping Consultation

16.1.1 This Scoping Report will be submitted to the Planning Inspectorate, which will then consult bodies under The Infrastructure Planning (Environmental Impact Assessment) Regulations to receive input that will be used to inform its Scoping Opinion.

16.2 Other Consultation

16.2.1 Highways England will continue to undertake consultation with statutory environmental bodies (Natural England the Environment Agency and English Heritage), the relevant planning authorities (South Tyneside Council, Sunderland City Council and Newcastle-Upon-Tyne City Council), land owners and other key consultees.

16.2.2 The local community and wider public will also be consulted on the proposed scheme via a programme of consultation that will be described in the SoCC. The SoCC will be publicised in local newspapers and will also be available at <http://www.highways.gov.uk/roads/road-projects>.

16.2.3 Feedback from the consultation will be recorded and included in a Consultation Report that will be submitted as part of the DCO application. Information and views from these consultees will also be used to inform the environmental assessment study.

16.2.4 Highways England is required to seek authorisation to construct the proposed scheme through an application to the Secretary of State through the Planning Inspectorate (as the responsible agency) for a DCO. The ES will be submitted with the DCO application. As part of the determination process undertaken by the Planning Inspectorate on behalf of the Secretary of State, the public will have further opportunity to comment on the application. Details of how the process works can be found on the National Infrastructure Planning website⁵¹.

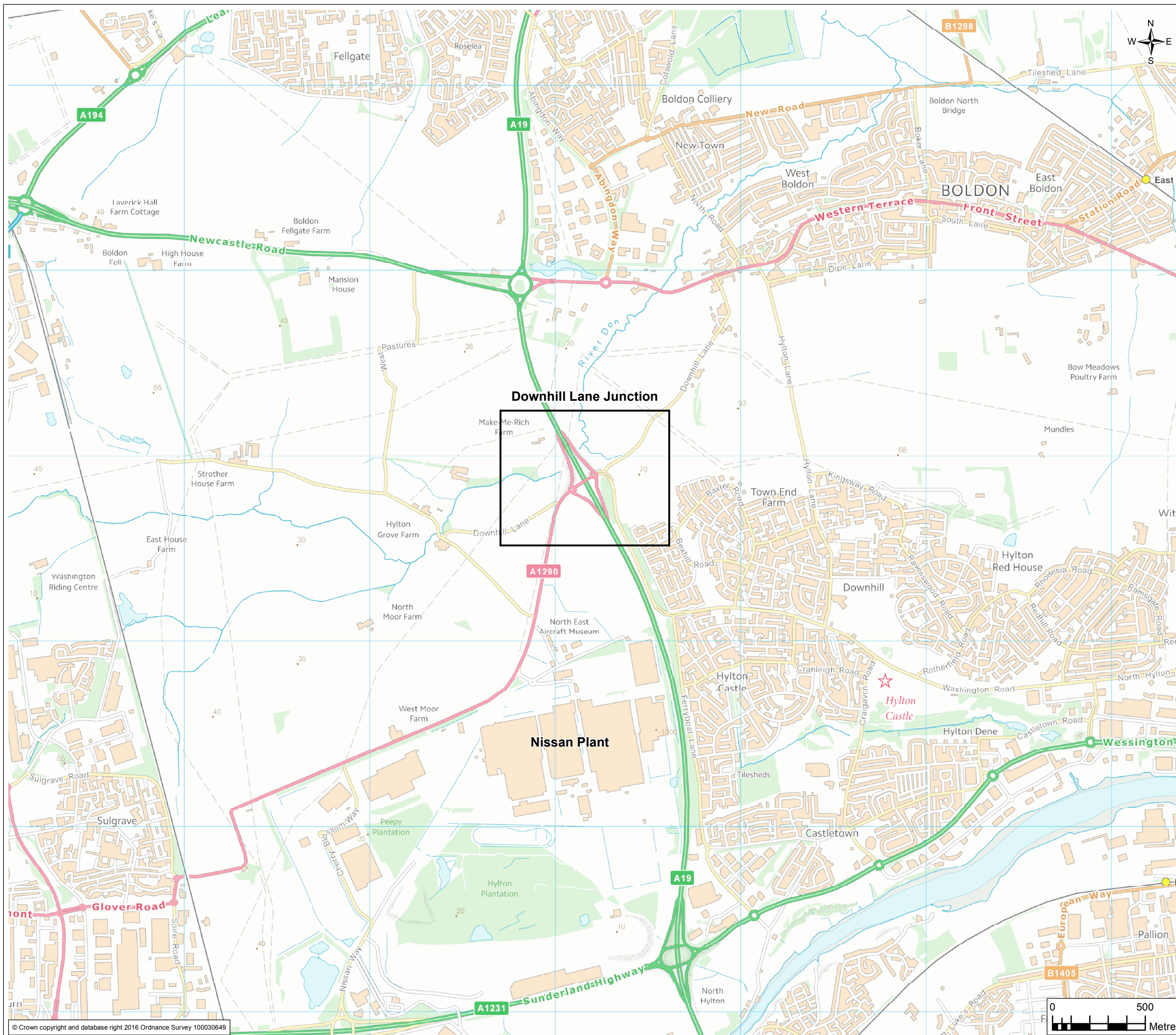
⁵¹ The Planning Inspectorate (2012). *National Infrastructure Planning*. Available at: <http://infrastructure.planningportal.gov.uk/>

APPENDIX A: GLOSSARY

AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
AD	<i>Anno Domini</i>
AEIS	Assessment of Implications on European Sites
AOD	Above Ordnance Datum
AQMA	Air Quality Management Area
AQO	Air Quality Objective
ATC	Air Training Corp
BAP	Biodiversity Action Plan
BNL	Basic Noise Level
BS	British Standard
CCTV	Closed-Circuit Television
CEH	Centre for Ecology and Hydrology
CEMP	Construction Environmental Management Plan
CO ₂	Carbon dioxide
CRTN	Calculation of Road Traffic Noise
dB	Decibel
DCO	Development Consent Order
DM	Do Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do Something
ECI	Early Contractor Involvement
eDNA	Environmental Deoxyribonucleic Acid
EIA	Environmental Impact Assessment
ELS	Entry Level Stewardship
ES	Environmental Statement
EQS	Environmental Quality Standards
EU	European Union
FFD	Freshwater Fish Directive (repealed)
FRA	Flood Risk Assessment
GCN	Great Crested Newt
GIS	Geographic Information System
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GNFT	Great North Forest Trail
GVA	Gross Value Added
HABAP	Highways Agency Biodiversity Action Plan
HAWRAT	Highways Agency Water Risk Assessment Tool
HER	Historic Environment Records
HDV	Heavy Delivery Vehicle/ Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
IAMP	International Advanced Manufacturing Plant
IAN	Interim Advice Note
CIEEM	Chartered Institute of Ecology and Environmental Management
JNCC	Joint Nature Conservation Committee

LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LCU	Landscape Character Unit
LDF	Local Development Framework
LEP	Local Enterprise Partnership
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LTP3	Keep Tyne and Wear Moving: The Third Local Transport Plan for Tyne and Wear
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
MCZ	Marine Conservation Zone
MPA	Marine Protected Area
NERC	Natural Environment Research Council
NMU	Non-Motorised User
NNR	National Nature Reserve
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Project
OS	Ordnance Survey
ONS	Office for National Statistics
PINS	The Planning Inspectorate
PM ₁₀	Particulate Matter with a diameter of 10 micrometres or less
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRoW	Public Right of Way
RAF	Royal Air Force
SAC	Special Area of Conservation
SCI	Sites of Community Importance
SOAEL	Significant Observed Adverse Effect Level
SoCC	Statement of Community Consultation
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TAG	Transport Appraisal Guidance
TCPO	Town and Country Planning (Development Management Procedure) (England) Order 2010
TPO	Tree Preservation Order
UDP	Unitary Development Plan
UKBAP	UK Biodiversity Action Plan
WCA	Wildlife and Countryside Act 1981
WFD	Water Framework Directive
ZTV	Zone of Theoretical Visibility

FIGURE 1.1



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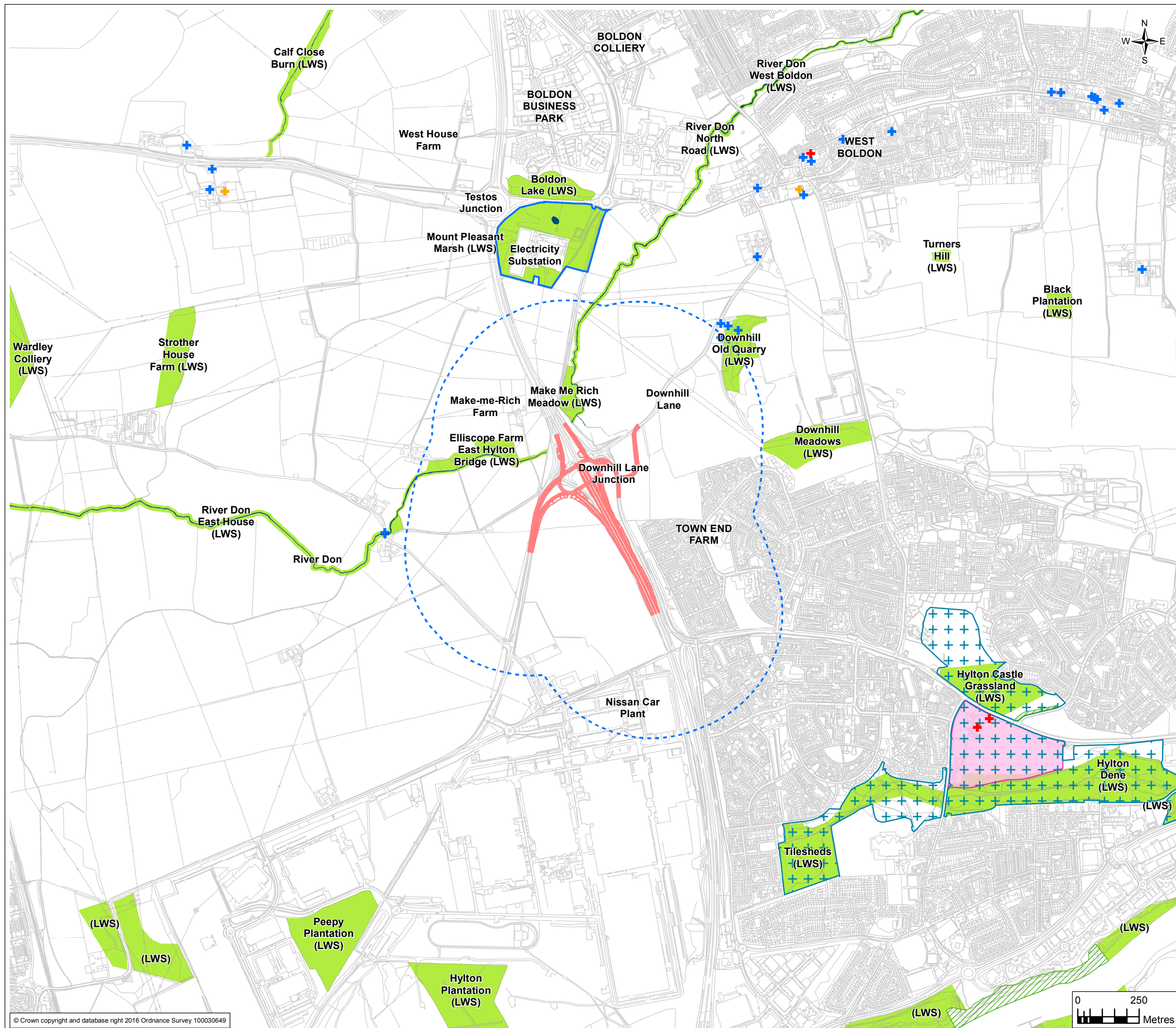
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FIGURE 1.2



- Legend**
- Preliminary Design
 - 500m Study Area
 - + Grade I Listed Building
 - + Grade II* Listed Building
 - + Grade II Listed Building
 - River Don / Other waterbodies
 - Site of Special Scientific Interest
 - Local Nature Reserve
 - Scheduled Monument
 - Local Wildlife Site
 - West Boldon Environmental Education Centre (WBEEC)

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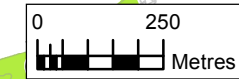
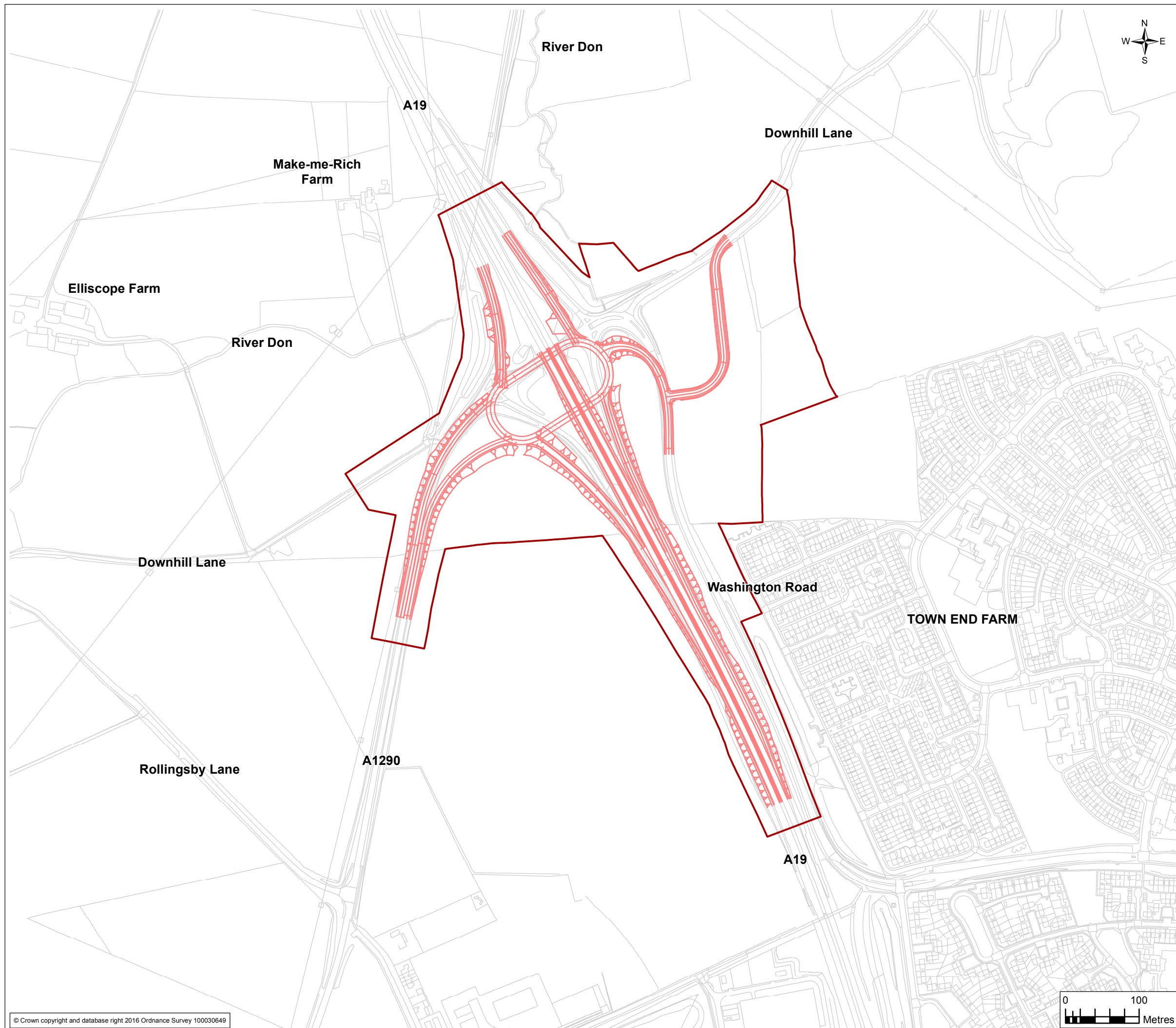


FIGURE 2.1

Legend

- Red Line Development Boundary
- Preliminary Design



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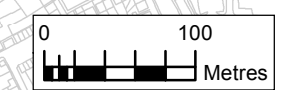
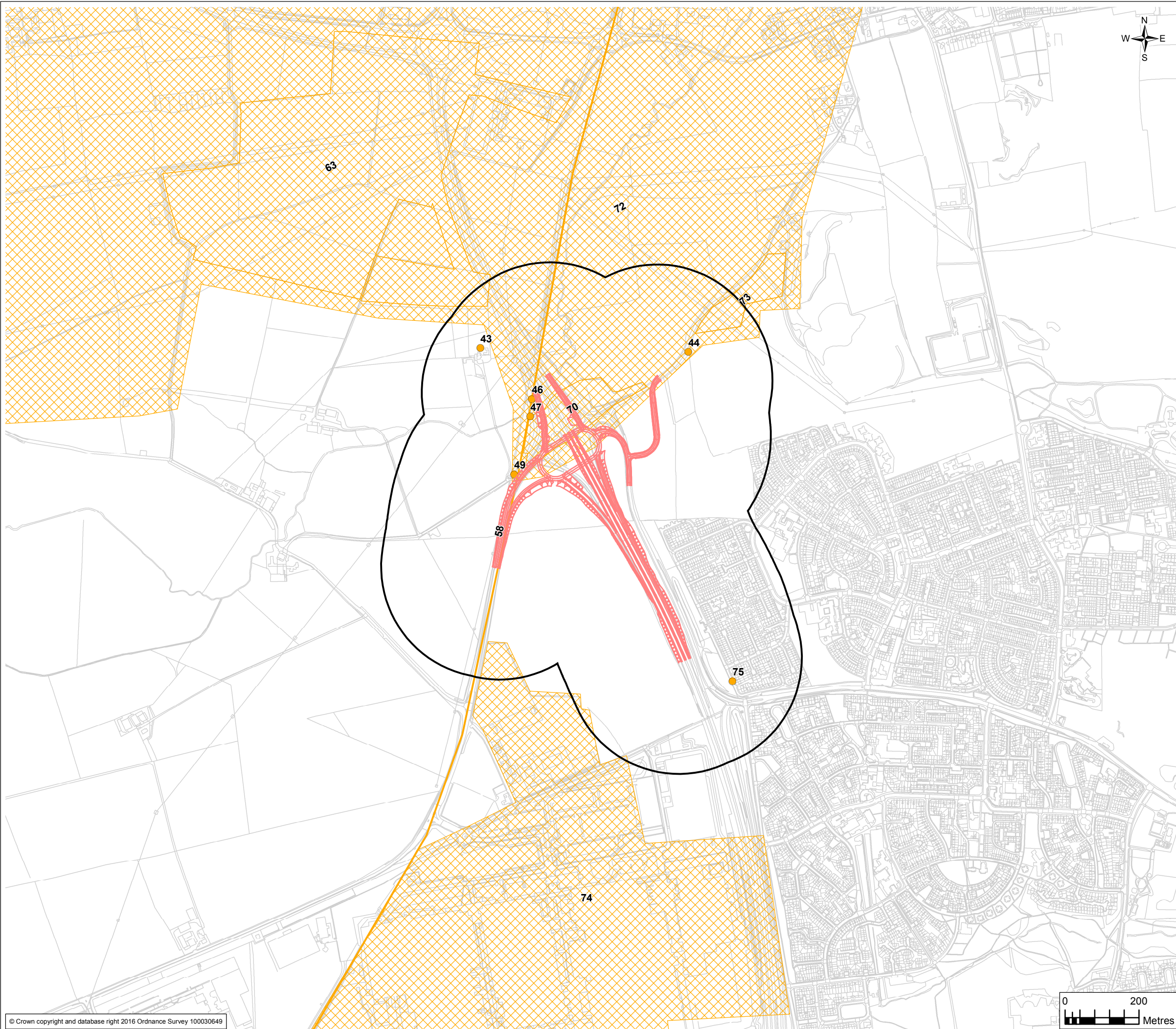


FIGURE 7.1

Legend

- Preliminary Design
- 300m Study Area
- — Non-designated Assets



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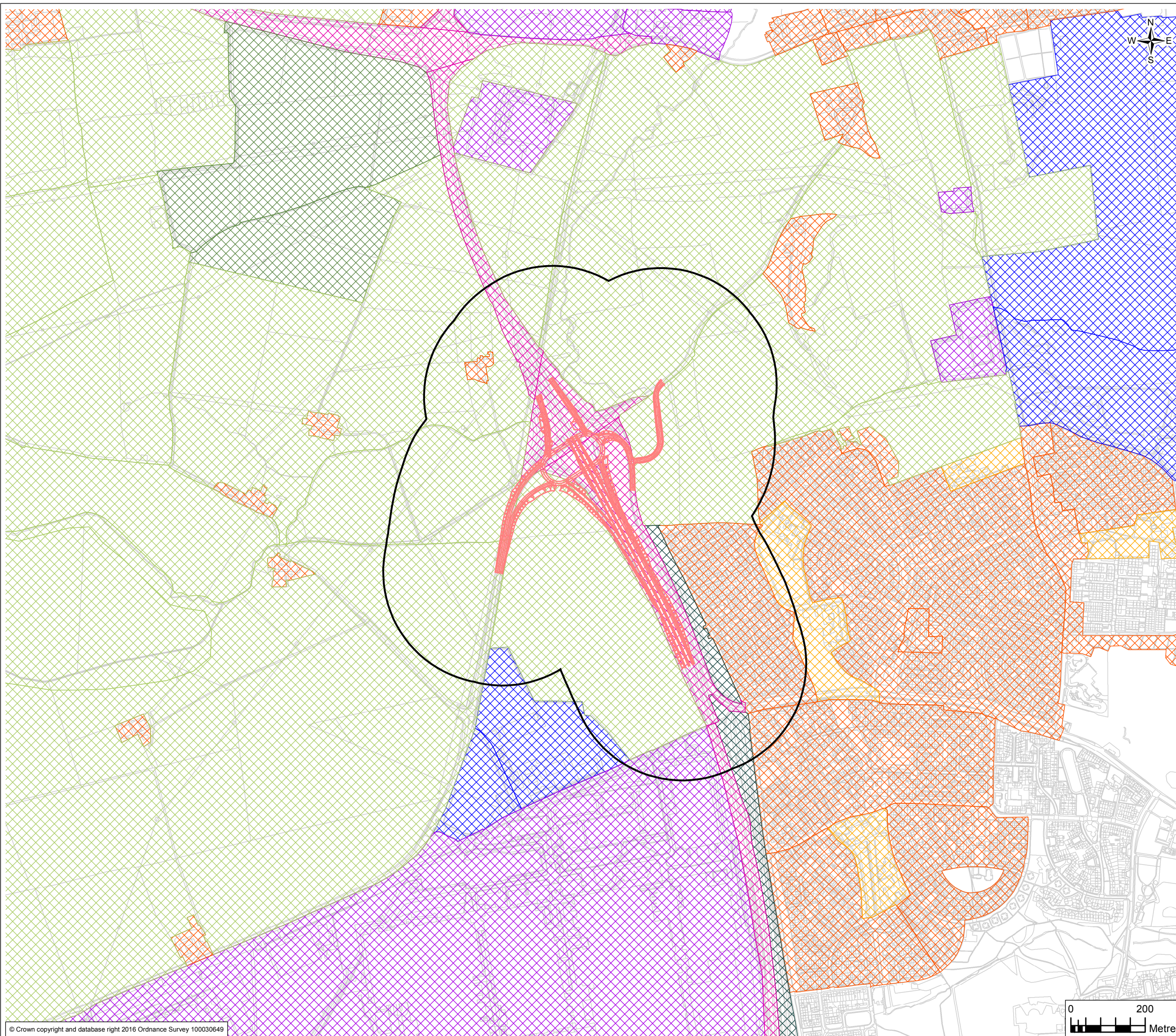
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Drawing Title **ARCHAEOLOGICAL REMAINS AND HISTORIC BUILDINGS**

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FIGURE 7.2



Legend

- Preliminary Design
- 300m Study Area
- Historic Landscape Types**
- HLT1 - 20th Century Enclosure
- HLT2 - Post-Medieval Surveyed Enclosure
- HLT3 - Settlement
- HLT4 - Modern Wetland
- HLT5 - Modern Communications
- HLT6 - Modern Industrial or Commercial
- HLT7 - Modern Schools
- HLT8 - Recreation
- HLT9 - 20th Century Plantation

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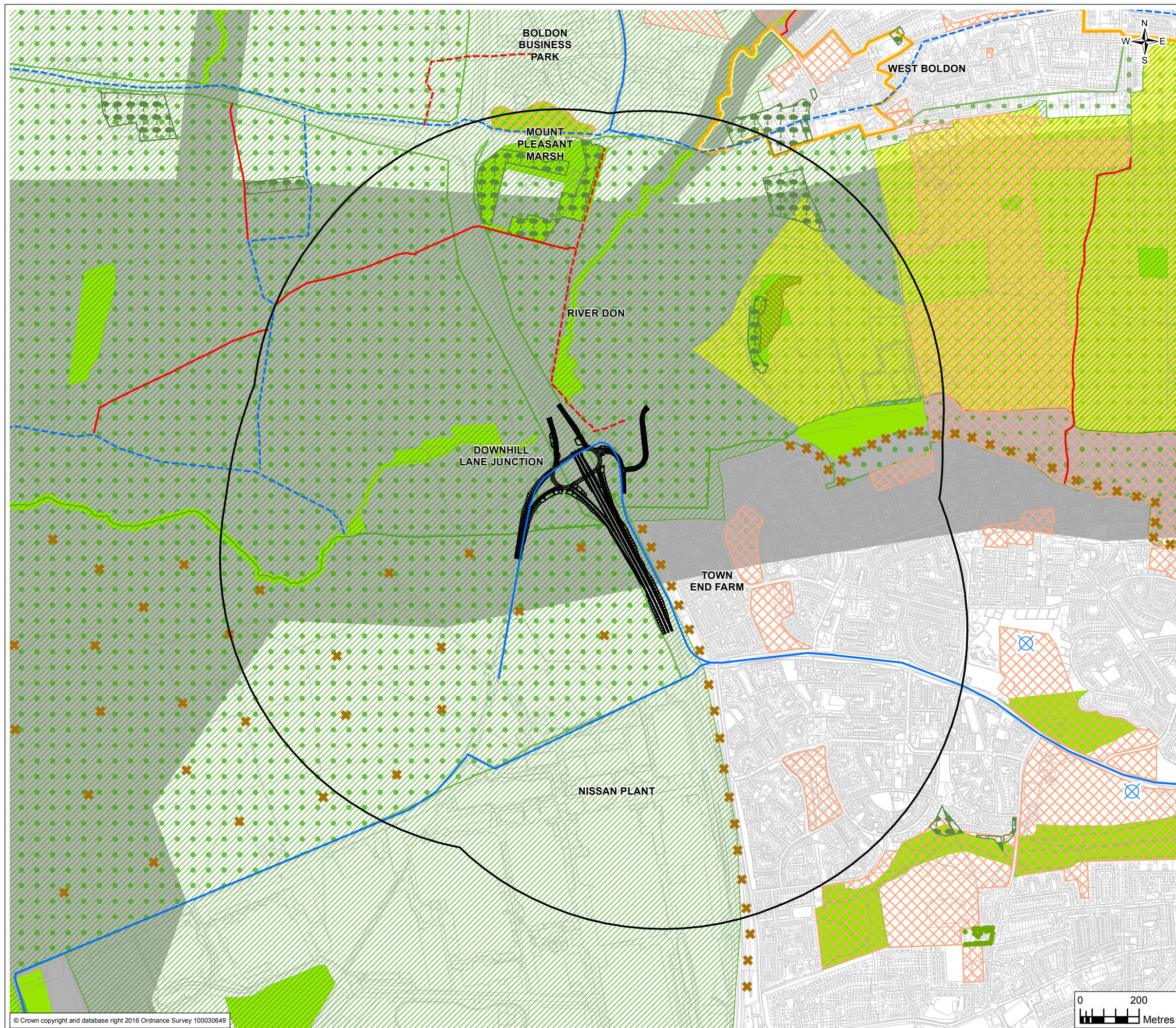
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FIGURE 8.1



- Legend**
- Preliminary Design
 - 1km Study Area
 - 10m Contours
 - Footpath
 - - - Bridleway
 - Existing Cycleway
 - - - Proposed Cycleway
 - Tree Preservation Order
 - Conservation Area (EA1, DM6, SPDs 10-20)
 - Area of High Landscape Value or Landscape Significance (EA1, DM7/8)
 - ▨ Great North Forest (CN15, EA1, DM7/8, SA4/7/10/11)
 - ▨ Green Belt (CN2/3/4/5, EA1, DM5/7/8, SA4/7/10/11)
 - Tree Preservation Order
 - ▨ Recreational Open Space - Culture, Leisure, Education (L1/2/3/4/5/6/7/8/9, B3, SC6, SA2/4/6/7/8/9/11)
 - ⊗ Important Panoramic Views (CN13/14)
 - Local Wildlife Site (LWS) or Candidate Local Wildlife Site (cLWS) (CN21, EA1/3, DM7/8)
 - Wildlife Corridor (CN23, EA3, DM7)
 - ▨ Local Geodiversity Site (LGS) (EA1/3, DM7/8)
 - ✕ Trees / Woodland (CN16, B1)

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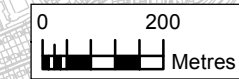
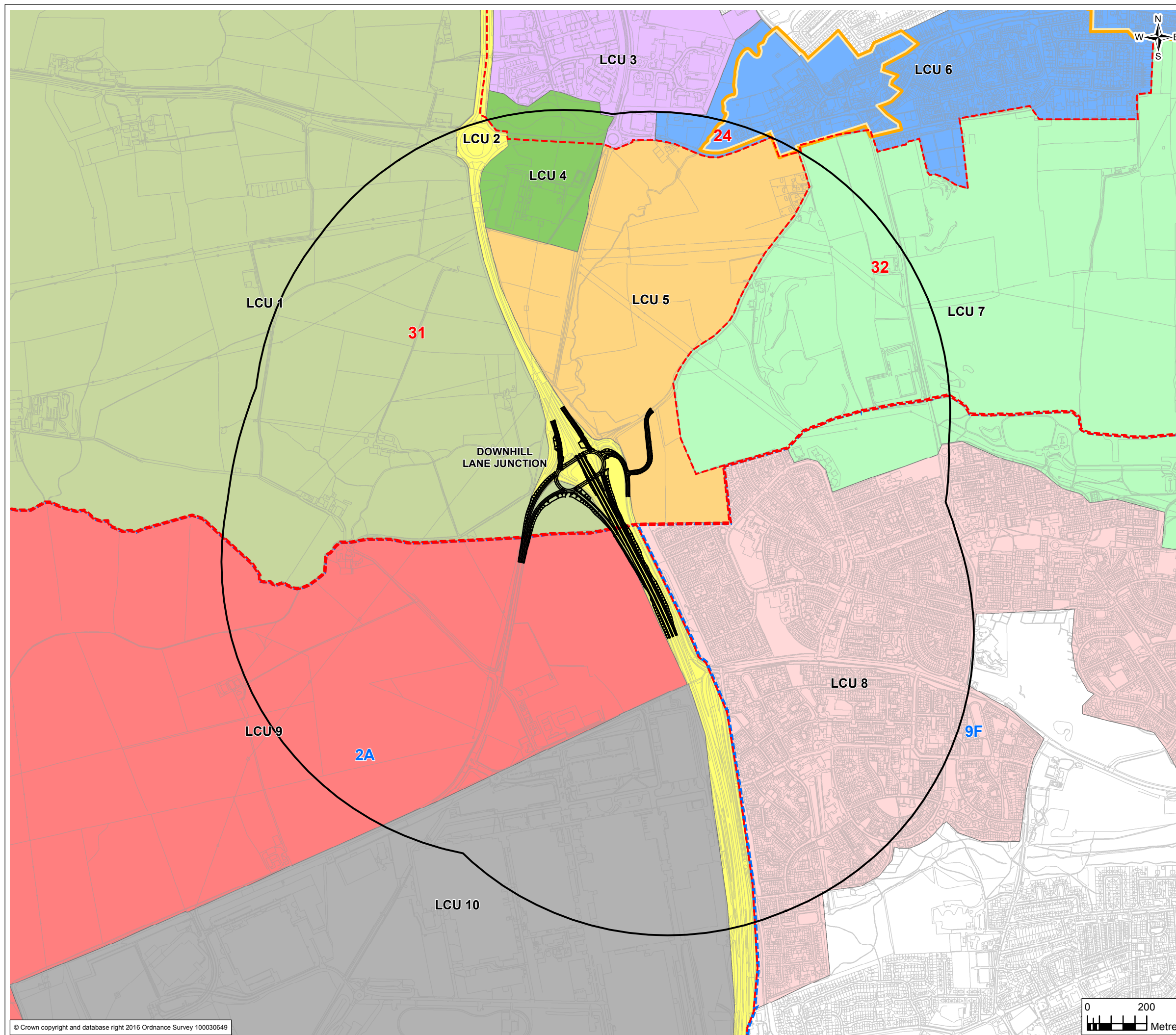


FIGURE 8.2



Legend

- Preliminary Design
 - 1km Study Area
 - Conservation
- South Tyneside Landscape Character Study - Part I
Landscape Character Assessment March 2012
- 24 (Urban) The Boldons
 - 31 (Urban Fringe) Boldon Fell
 - 32 (Urban Fringe) Boldon Downhill
- City of Sunderland Landscape Character Assessment
- 2A Coalfield Lowland Terraces - Usworth Lowland
 - 9F Urban Limestone Plateau - Hylton Castle, Downhill + Castleton
- Local Character Units (Landscape)
- LCU 1 - Western Lowland Agricultural
 - LCU 2 - A19 Vegetated
 - LCU 4 - Boldon Ecological Wetlands
 - LCU 5 - River Don Scrubby Farmland
 - LCU 7 - Downhill Elevated Farmland
 - LCU 9 - Usworth Lowland
- Local Character Units (Urban)
- LCU 3 - Boldon Business Park Complex
 - LCU 6 - West Boldon Elevated Urban Centre
 - LCU 8 - Town End Farm Residential Edge
 - LCU 10 - Nissan Plant

0	APR 17	Initial Issue	IM	SW	DJ	GW
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd



Client

Project
 DOWNHILL LANE JUNCTION

Drawing Title
 LANDSCAPE CHARACTER UNITS

Drawing Status

Scale @ A3	1:12,500	DO NOT SCALE
Jacobs No.	B0140301	
Client No.		
Drawing No.	B0140301_DLJ_SR_0802	

This drawing is not to be used in whole in or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.