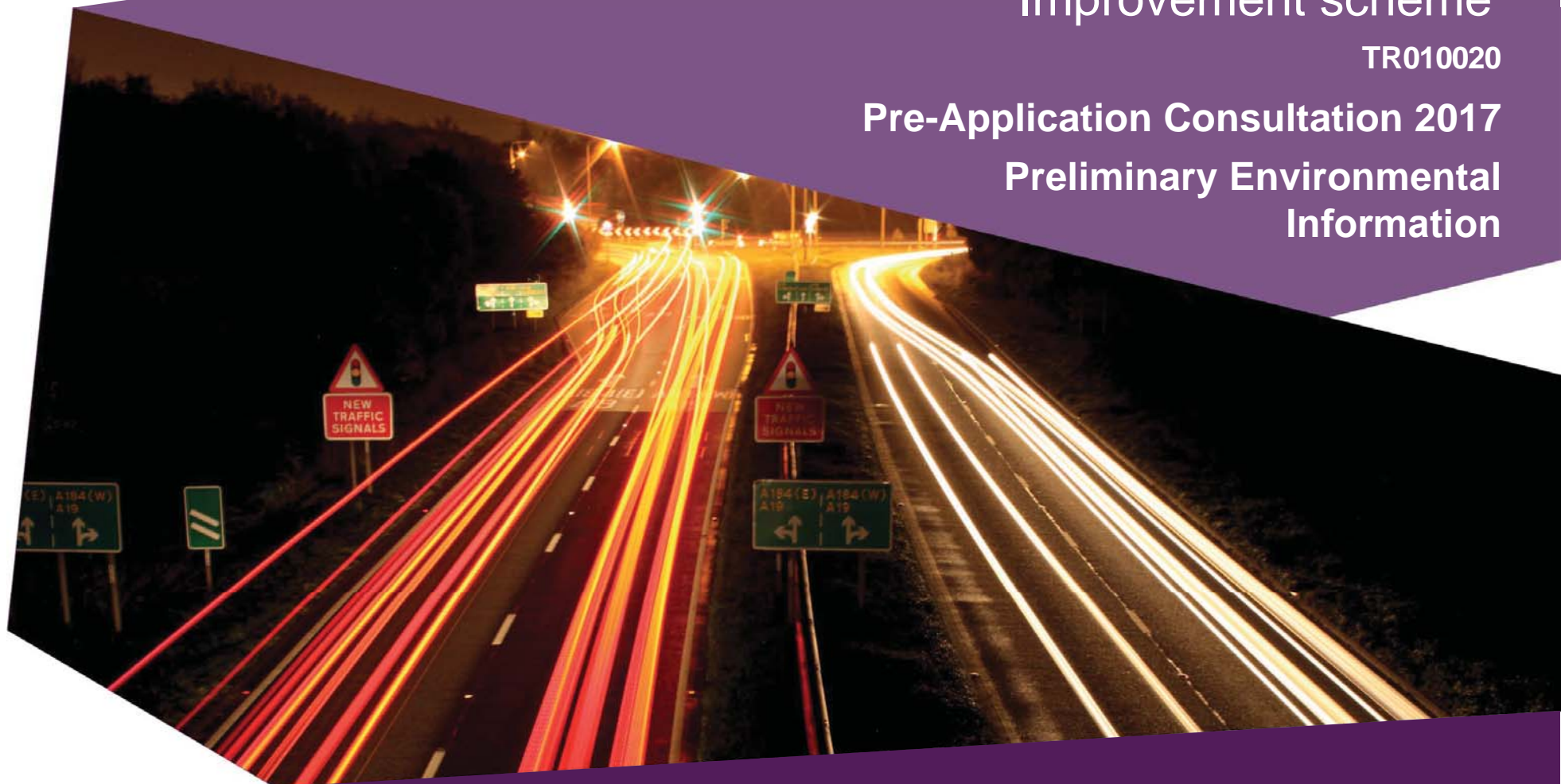


A19/A184 Testos junction Improvement scheme

TR010020

Pre-Application Consultation 2017
Preliminary Environmental
Information



A19/A184 Testos junction Improvement Preliminary Environmental Information

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PREFACE

Highways England is responsible for the maintenance and improvement of the trunk road and motorway network in England. Highways England's key objectives are to achieve safe roads and reliable journeys for informed travellers.

Highways England has appointed Costain as the Designer for the A19 Testos junction Improvement. Costain has appointed Jacobs as their Design Partner.

The roles of the Designer and Design Partner include preparation of the preliminary design of the proposed scheme, carrying out the environmental impact assessment (EIA) and preparation of the application to the Secretary of State through the Planning Inspectorate (as responsible agency) for a Development Consent Order (DCO). The Secretary of State for Transport will make the final decision on whether or not a DCO is granted for the scheme.

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1 INTRODUCTION

1.1 The preliminary environmental information

1.1.1 This report sets out the preliminary results of Highways England's investigations into the potential environmental effects of a proposed improvement to the junction of the A19 and A184 at Testos roundabout, near West Boldon in South Tyneside.

1.2 Environmental impact assessment

1.2.1 Environmental Impact Assessment (EIA) is a statutory process required for the proposed scheme¹. It is a systematic process to identify, predict and evaluate the environmental effects of a proposed project. Its primary purpose is to provide environmental information to those who will make the decision as to whether a project should go ahead. However, during the process of preparing this information the EIA will also have an important influence on the design of the proposed scheme, since it enables early identification of potential environmental impacts and, where possible, their avoidance through sensitive design. In addition it identifies enhancement opportunities that can be incorporated into the design, where appropriate.

1.2.2 This scheme is classified as a 'Nationally Significant Infrastructure Project' (NSIP). EIA for NSIPs is reported in two stages, as follows:

- a "preliminary environmental information" (PEI) report is prepared, to inform consultation of the public about the proposed scheme; and
- following consultation with the public, an Environmental Statement (ES) is prepared to accompany the application for a Development Consent Order (DCO).

1.2.3 The ES contains the detailed information to inform consideration by decision makers.

1.2.4 This report is the first stage of reporting, the PEI.

1.3 Purpose of this report

1.3.1 This PEI sets out the main environmental information available for the study area, a preliminary indication of the likely environmental effects and potential mitigation measures envisaged for the proposed scheme.

1.3.2 The PEI is intended to give members of the public and stakeholders an understanding of the key issues, and enable them to prepare well-informed responses to consultation on the scheme.

1.3.3 It should be noted that at this stage, the information provided is **preliminary**. It is based on a design in which Highways England have confidence, but which is not completely finalised. Some minor changes may yet occur before an application for consent is made. The EIA is still in progress, in parallel with ongoing finalisation of the design. This ongoing work will confirm the scale and significance of predicted environmental effects arising from the proposed scheme design, and the mitigation proposed to address those effects, where appropriate

¹ In accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the EIA Regulations) and the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended).

and achievable. The final ES, which will accompany an application for a Development Consent Order (DCO), is expected to be complete in summer 2017.

1.3.4 The main body of this report has been prepared for a non-technical audience. It is supported by appendices which contain technical detail about the proposed scope of the EIA, where this has been considered necessary.

1.3.5 This report is organised into a number of chapters which set out the main environmental topics being considered in the EIA. Since the proposed scheme is a highway project, the design and assessment is guided by the Department for Transport's Design Manual for Roads and Bridges (DMRB)², and supplemented by Interim Advice Notes (IANs). Guidance on EIA in volume 11 of the DMRB and relevant IANs sets out the main environmental topic areas considered as part of a highway scheme EIA, which are:

- air quality;
- cultural heritage;
- landscape and visual amenity;
- ecology and nature conservation;
- geology and soils;
- materials;
- noise and vibration;
- effects on all travellers;

- communities and private assets; and
- road drainage and the water environment.

1.3.6 Each environmental topic section (Chapters 5-16) in this report describes the local environment, the likely effects that the scheme would have on that environmental aspect, as well as the types of mitigation that are under consideration to seek to minimise any effects of the proposed scheme.

1.3.7 In addition to supporting the consultation of the local community and general public, this PEI report will be used to consult a range of stakeholders, including:

- local land owners and land interests;
- local businesses;
- external statutory bodies, such as Natural England; English Heritage and the Environment Agency;
- relevant local planning authorities (for the Testos scheme this is South Tyneside Council, Sunderland City Council, and Gateshead Council);
- neighbouring local authorities (this includes Newcastle City Council and North Tyneside Council); and
- non-statutory key stakeholders.

1.3.8 The scope of the EIA will be agreed through consultation with external statutory bodies and local planning authorities.

² The Highways England et al. (1993). Design Manual for Roads and Bridges.

2 SCHEME DESCRIPTION

2.1 Location of the scheme

- 2.1.1 The location of Testos junction is illustrated in Figure 2.1. It is located in South Tyneside, approximately 4 km south of the Tyne Tunnel entrance at Jarrow. It lies in a narrow belt of countryside separating the urban areas of South Tyneside and Sunderland.
- 2.1.2 The next junction is 1 km to the south at Downhill Lane. There is a separate project for the improvement of Downhill Lane junction, to be delivered in parallel with the A19 Testos junction Improvement and expected to open at about the same time. This project will be subject to its own, separate DCO application.
- 2.1.3 Residential areas lie close by, at Fellgate and Hedworth to the north-west, and Boldon Colliery to the north-east. A business park lies adjacent to the scheme 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.
- 2.1.4 All the adjacent land to the west of the scheme is agricultural. To the east, in addition to the business park, there are two nature conservation / community sites, an electricity sub-station and agricultural land.

2.2 Background to the project

- 2.2.1 Testos junction is the last remaining major at-grade junction on the strategic route via the A168 and A19 between the A1 at Dishforth in North Yorkshire and the Tyne Tunnel in South Tyneside. The A19 also provides links between the conurbations of Tyneside, Wearside

and Teesside, and together with the A184 forms part of an eastern route around the Tyneside conurbation.

- 2.2.2 Heavy congestion frequently occurs at Testos junction, leading to increased driver stress and inhibiting economic growth in the area. The proposed scheme would involve replacing the existing at-grade roundabout with a new grade-separated³ junction.
- 2.2.3 The proposed junction improvement at Testos junction is one of a package of highway improvements that were recommended by the 'Tyneside Area Multi-Modal Study' (TAMMS), involving a strategic reassessment of the region's transport needs completed in 2002. The objectives of the study were to identify ways to:
 - reduce congestion on the A1 in Tyneside;
 - reduce congestion on the A19 approaches to the Tyne Tunnel;
 - improve safety on the A19 in Tyneside; and
 - achieve these aims without causing unacceptable problems on other transport networks in the area.
- 2.2.4 TAMMS considered existing and future transportation problems in Tyneside up to 2031, based on traffic growth projections. Strategies that were considered were based either on investment in highway improvements or in public transport and road user charging. The outcome of the study was a suite of recommendations for highway improvements, including construction of a second Tyne

³ 'Grade-separated': as opposed to 'at-grade', this refers to a junction where one road has been elevated or lowered to a different level from the other, such that the main flow of traffic is separated.

Tunnel and improvements on the A1 and at specific junctions on the A19, including Testos junction.

- 2.2.5 The second Tyne Tunnel has since been built and opened, whilst some other elements of the strategy have also been either built or are at various stages of development.

2.3 Scheme history

- 2.3.1 Following the recommendation from TAMMS that Testos junction should be improved, the Highways Agency (now Highways England) prepared an initial study of options for improving the junction in 2004. Between 2006 and 2007 more detailed design work and environmental studies were carried out for an online improvement option. In 2008-9, further consideration of alternative designs for the scheme was undertaken⁴, leading to a Public Consultation in March 2009. This considered both an 'on-line' option (following the line of the existing A19) and two 'off-line' options (to the west of the existing A19).
- 2.3.2 As a result of the impacts of the 2008 global financial crisis and subsequent recession, and before a preferred route announcement was made, the Government's spending review of 2010 led to the postponement of a number of highways schemes, including the A19 Testos junction Improvement.
- 2.3.3 The Government announced £36 billion of planned investment into infrastructure for 2014-2015⁵, providing

funding for a number of new and previously postponed highways schemes including Testos junction.

- 2.3.4 The Preferred Route for the improvement was announced by the Secretary of State on 3rd June 2014, following a process of validating the outcome of the 2009 Public Consultation undertaken by the Highways Agency.
- 2.3.5 After announcement of the Preferred Route, some minor refinement of the design was undertaken and options were developed for non-motorised user facilities, leading to additional public consultation in October 2014.
- 2.3.6 As part of its first Roads Investment Strategy published in December 2014, the Government committed to delivering the Testos scheme in the period 2015-20, as well as improvements to Downhill Lane Junction. The application for a DCO for Testos junction was subsequently deferred while the potential impacts or benefits of a single joint DCO for the two junctions were explored.
- 2.3.7 This PEI accompanies a further round of consultation following the decision to proceed with two separate DCO applications for the two separate junction improvement projects. The aim of this consultation is to ensure any new stakeholders have the opportunity to express their views, in particular any new land/property owners or residents that have moved into the area since 2014.

2.4 Proposed A19 junction design

- 2.4.1 An outline of the proposed scheme is provided in Figure 2.2, and the description given throughout this chapter is

⁴ See the 'Options Identification Stage: Comparative Environmental Assessment' report (CEAR), Jacobs, 2009

⁵ Press release from the Prime Minister's Office and the Treasury, 22 April 2014

<https://www.gov.uk/government/news/pm-and-chancellor-welcome-36-billion-infrastructure-projects>

based primarily on the design as it had been developed up to 2009. Further design development is in progress and may result in some changes, but is at too early a stage to be reflected in this report.

- 2.4.2 The A19 carriageway would be raised to a height of 7.5 m above ground level on approach ramps from the north and south to pass above the roundabout. It is assumed that it would cross the roundabout via two separate bridges over the north and south sides of the roundabout, with an embankment in the middle. However, there is an alternative, whereby it would cross the whole roundabout on a single three-span flyover.
- 2.4.3 Traffic on the A19 would flow freely above the roundabout, while traffic using the A184 would still travel around the roundabout. There would be slip roads to take traffic onto and off the A19.
- 2.4.4 The proximity of Testos to another grade-separated junction at Downhill Lane (1 km to the south) means that the slip roads of two conventional grade-separated junctions cannot be safely accommodated. The existing northbound on-slip road and southbound off-slip road at Downhill Lane junction would therefore be closed. Traffic to and from the north at Downhill Lane would be linked to the A19 at Testos junction, via new connector roads running parallel to the A19 on either side.
- 2.4.5 At Downhill Lane, the capacity of the junction is limited by its single bridge and lack of a fully circulatory system. During 2015-16, Highways England has investigated options for the improvement of Downhill Lane junction. A public consultation on the selection of a single emerging preferred option ('Option A') was held in December 2016.

Option A is designed to minimise land-take and environmental impacts and to have the optimum tie-in with the proposed Testos junction improvements.

- 2.4.6 The Testos junction improvements are intended to improve journey time reliability and the quality of the traveller's experience, principally through reducing congestion. The proposed improvements would further improve safety at the junction, reducing the frequency of collisions.
 - 2.4.7 Although the proposed scheme is an on-line improvement (i.e. the route of the A19 would not be changed), the nature of the proposals mean that the scheme cannot be built within the existing highway boundary. Some new land would therefore be acquired to build the scheme. Most of this land would be to the west of the existing road, with smaller quantities of land required to the east.
 - 2.4.8 The A19/A184 Testos Junction Improvement scheme approximately 2 km long. The proposed works (illustrated in Figure 2.2) would be within the new Highways England operational boundary, except the temporary construction areas, which would include site compounds, access roads, storage areas and land required for utility diversions.
 - 2.4.9 A summary of the proposed activities is presented below.
- [Structures](#)
- 2.4.10 A new embankment will be required to carry the A19 across the junction at a height 7.5 m above existing ground level. Two new bridges would be required where

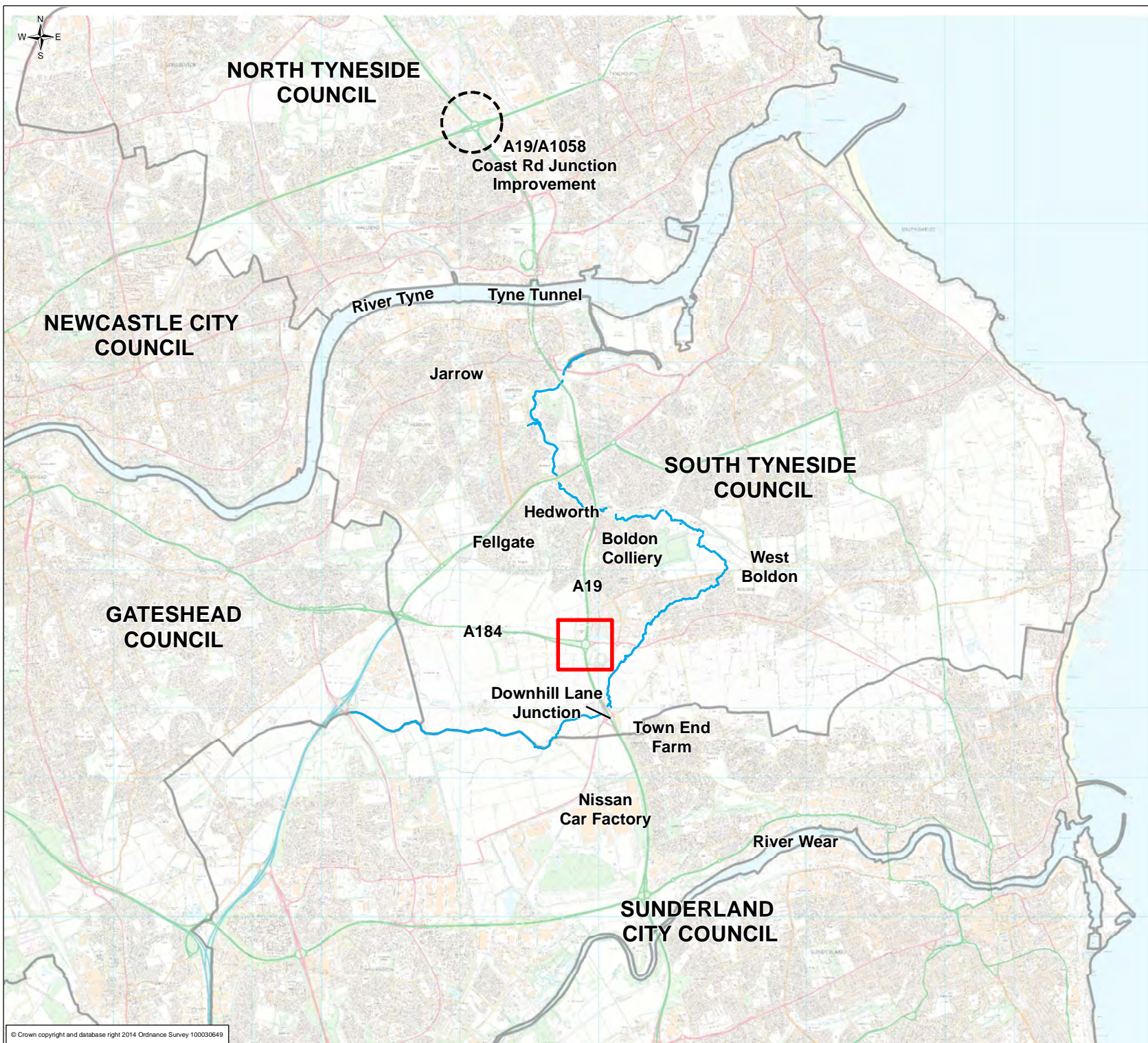
the embankment crosses the circulatory carriageway of the roundabout.

- 2.4.11 Alternatively, the A19 could be carried over the roundabout on a new three-span flyover, eliminating the need for an embankment.
- 2.4.12 There are also likely to be requirements for sign gantries, one south of Downhill Lane Junction and one between Downhill Lane Junction and Testos Junction.

Drainage strategy

- 2.4.13 The existing highway drainage is piped, and drains into the River Don in three places.
- 2.4.14 The drainage design includes two ponds ('balancing ponds') whose purpose is to capture rainwater draining off the highway and ensure that the rate at which it enters the river does not cause a risk of flooding. The balancing ponds would also retain, and to a certain extent treat, sediment and pollutants associated with it. This means that the water discharged into the River Don would be cleaner than it is at present.
- 2.4.15 Other forms of water storage (e.g. water tanks) can achieve similar benefits, and may be considered as part of scheme development.
- 2.4.16 One balancing pond is located east of the A19, immediately north of Downhill Lane junction, and another west of the A19 to the north of Testos junction. The southern balancing pond would have a new drainage point into the River Don, replacing an existing connection. The northern pond would outfall back into existing highway drainage, and eventually into the River

Don through an existing connection 2 km to the north of Testos junction. The status of the third existing outfall is currently being reassessed.



Legend

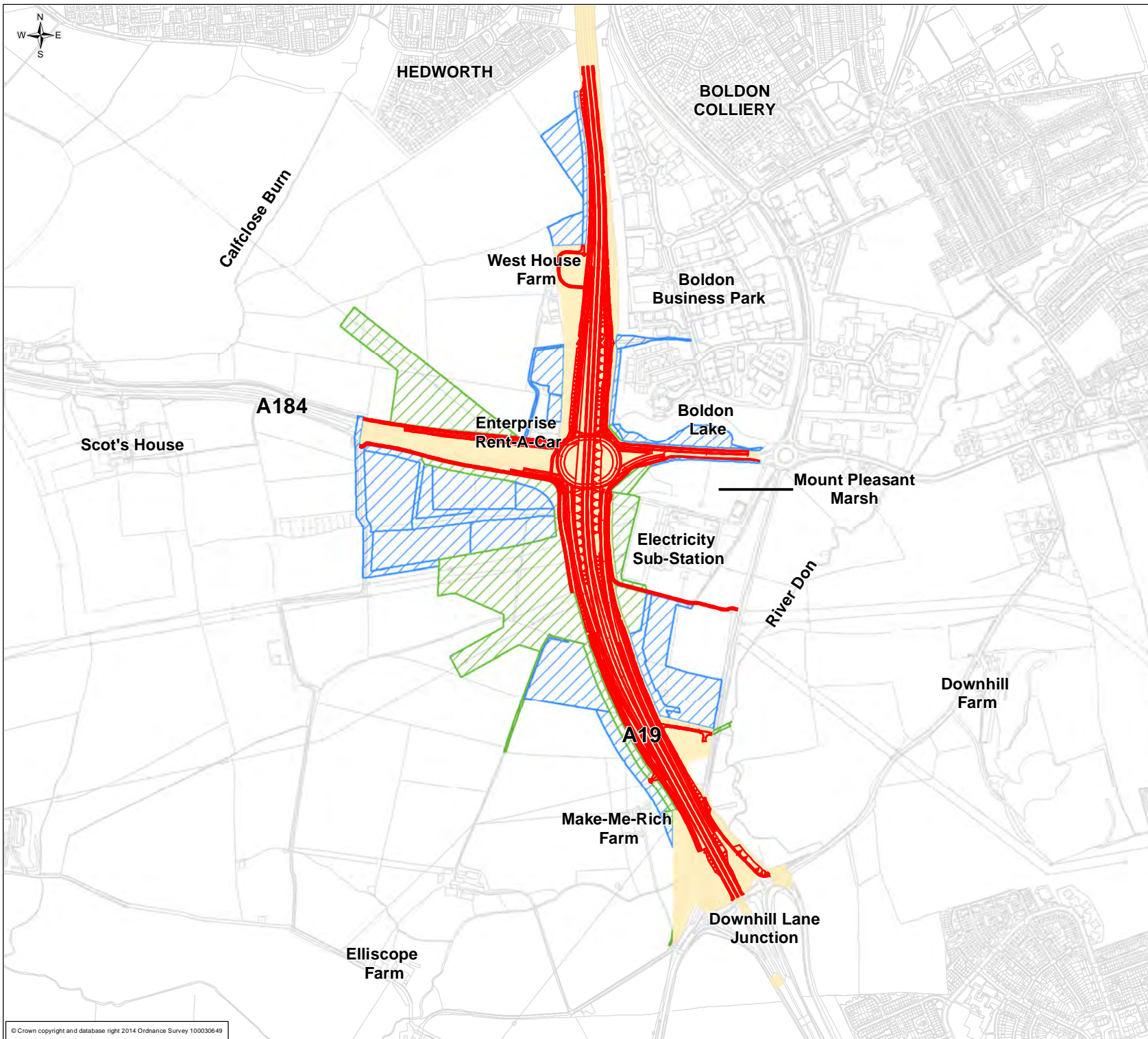
- A19 Testos Junction
- Local Authority Boundary
- River Don



Drawing Title

FIGURE 2.1
LOCATION OF TESTOS JUNCTION

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Legend

- Proposed Junction Improvement
- Permanent Landtake
- Temporary Landtake
- Temporary Landtake w/ Rights

Drawing Title

FIGURE 2.2
OUTLINE PROPOSED SCHEME

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Lighting and other infrastructure

- 2.4.17 Existing highway lighting is restricted to the immediate area of Testos junction itself, along the A184 east of the junction, and Downhill Lane junction.
- 2.4.18 It is assumed at this stage that the improved junction would only need to be partially lit. Testos roundabout itself would be lit, as well as a short distance on the roundabout exits and the immediate approaches to the roundabout. The length of road that would be lit on the approaches to the roundabout would be based on the predicted queue lengths. This will include rows of lighting columns likely to be approximately 12 m high, to be positioned at existing ground level and at intervals of approximately 35 m.
- 2.4.19 There may also be changes to road signs and other information systems and other roadside infrastructure, potentially including the provision of sign gantries.

Bridleways, footpaths and cycle paths

- 2.4.20 The junction improvement would require removal of an existing agricultural accommodation bridge carrying a bridleway over the A19 north of Testos junction (Bridleway B28), and the stopping up of an existing at-grade footpath crossing of the A19 south of Testos junction (footpath B27).
- 2.4.21 The proposed improvements to the network of rights of way around the junction are as follows:
 - Provide a new signalised crossing for pedestrians and cyclists across the A184 west of Testos junction.

- Provide an upgraded signalised pedestrian/cyclist crossing of the new on and off slip roads and passing beneath the A19 flyover north of Testos junction.
- Provide a shared-use pedestrian and cycle path from the upgraded crossing north of Testos junction eastwards along the north side of the A184, adjacent to Boldon Lake, to meet the existing cycle path on the north side of the A184 east of Testos junction which currently terminates west of Abingdon Way.
- Provide new signalised crossings of the A19 on and off slip roads on the south of Testos roundabout for pedestrians, cyclists and equestrians, segregated between cyclists and equestrians. The crossings would be linked by a shared use track passing underneath the A19 flyover and segregated from traffic on the roundabout by a 'tried and tested' visual/acoustic screen designed to protect equestrians.
- Provide a new bridleway link from West Pastures Lane (west of Testos junction) to the existing bridleway B46 to the east of the junction by crossing the roundabout, including by:
 - using the new signalised shared use crossing at the south side of the roundabout along the A184;
 - creating a new segment of bridleway on the western edge of Mount Pleasant Marsh (running north-south); and
 - upgrading the section of existing footpath B27 east of the A19 to bridleway, which then links to bridleway B46.

- Divert footpath B27 north to Testos junction on the west side of the A19, where it would have connections with:
 - the new bridleway link to West Pastures Lane;
 - the new shared-use crossing on the south side of Testos roundabout, and via that to bridleway B46;
 - the new signalised crossing of the A184 west of Testos roundabout.
- Provide a new footway on the south side of the A184 east of Testos junction, from the new shared-use crossing of the A19 eastwards around the north side of Mount Pleasant Marsh to the Abingdon Way roundabout.
- At the south end of bridleway B46, provide a new ramp for cyclists parallel to but outside the A19 southbound off-slip linking the bridleway to Downhill Lane junction.
- Widen and upgrade a section of the existing footway to a new cycleway / footway along the north side of the A184 from opposite West Pastures Lane to Testos junction.

2.5 Construction proposals

2.5.1 The construction works would be undertaken as a rolling programme of activity over a period of approximately 32 months. Subject to Development Consent being granted, construction work could start in 2018/19 and complete in 2021. If certain major utility diversion works can be carried out early, in 2017/18 (see 2.5.5 – 2.5.10) then this would reduce the duration of the main construction works.

2.5.2 Prior to any construction work commencing, there would be a mobilisation period including traffic management installation and site enabling works. Traffic management would include lane narrowing and speed restrictions on the A19 for the duration of the works, along with some temporary lane and carriageway closures. The work will be phased in order to keep two lanes of traffic flowing in both directions on the A19 at peak times.

2.5.3 The Contractor would produce and manage a Construction Environmental Management Plan (CEMP). This will outline the control measures to be adopted to minimise the impact of the works on the local environment and communities during construction.

Diversion of statutory services

2.5.4 Statutory services that may require diversion include a gas main, a water main and telecommunications equipment, all located underground and running through Testos junction along the A184 and A19. It is intended that these would be diverted within the new highway boundary.

2.5.5 Overhead electrical power lines belonging to Northern Powergrid running westwards from a large sub-station in Mount Pleasant Marsh, crossing the A19, would also require diversion into new underground ducts. Three rows of pylons/overhead lines would be affected. A fourth set of power lines already cross the A19 underground, transferring to an overhead route just to the west of the highway. This underground route would need to be extended to the west, and its first pylon west of the A19 would be relocated.

2.5.6 The works to divert the overhead cables comprise four key elements:

- civil engineering works to provide a new underground route;
- construction of three new pylons and two new smaller cable supporting structures west of the A19 and installation of new underground cables.;
- connection of the new cables to the electricity distribution network; and
- removal of the redundant overhead cables and of six redundant pylons, including three within Mount Pleasant Marsh.

2.5.7 Conventional construction methods would involve placing the new cables in an open cut trench. After connection of the new cables to the electricity distribution network, the redundant overhead cables would be disconnected and lowered to the ground.

2.5.8 The diversion of cables on the most direct route using conventional methods would involve extensive clearance of trees in Mount Pleasant Marsh local wildlife site and disruption of the operations of West Boldon Environmental Education Centre (WBEEC).

2.5.9 However, it is intended to reduce the impact of the overhead line diversion works through adoption of alternative construction methods such as directional drilling, and the re-routing of the new underground cable ducts. Initial consultation has taken place with WBEEC to find ways to minimise and mitigate disruption to their operations.

2.5.10 Highways England is currently pursuing an opportunity to carry out some or all of the overhead line diversion works before the main construction work starts. This will help

to minimise the duration of the main construction work and the disruption to road users.

Materials import

2.5.11 Highways England has identified a potential material re-use opportunity with the A19/A1058 Coast Road Junction Improvement scheme. The Coast Road project is expected to produce a surplus of excavated material which could be used in the construction of the new embankments at the Testos scheme.

2.5.12 The schemes are only approximately 8 km apart, making bulk material transport between the sites a feasible proposition.

2.5.13 This proposal could offer a sustainable means of disposing of the Coast Road excavated material, and sourcing the material required for Testos. Other import sources for Testos are not confirmed, but the three known closest alternative options are further than 10 km away.

2.5.14 As there is a time difference between the Coast Road construction works, which has already started, and access to the Testos site, a suitable temporary area or areas will need to be identified for material storage.

2.6 Changes in traffic

2.6.1 Testos junction is currently a busy interchange for local traffic travelling to Boldon Business Park and the surrounding towns, as well as longer-distance traffic passing through on the main A19 and A184 trunk roads.

2.6.2 Traffic assessment indicates that most of the traffic using the junction is:

- Traffic continuing along the A19 in both directions, across Testos junction (over 50% of the traffic);
- Traffic travelling between the A184 west and the A19 south in both directions; and
- Through traffic on the A184 in both directions.

2.6.3 With the junction improvements in place, congestion on the roundabout would be significantly reduced, as more than half the traffic would pass overhead⁶.

2.7 Maintenance proposals

2.7.1 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 and periodic resurfacing (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 bridges and balancing bonds and any other new features of the drainage system.

2.7.2 Northern Powergrid would retain a permanent access corridor for the maintenance of their buried services. Tree planting within the access corridor would not be possible, although seeding and some scattered scrub planting would be possible.

⁶ 2-way Annual Average Daily Traffic (AADT), assuming high growth and prior opening of the new Tyne Tunnel, which has since occurred.

3 SCHEME ALTERNATIVES

3.1 Design options examined

3.1.1 Options for improvement of the Testos junction were first considered in 2004. Four options for improvement were examined, as follows:

Option 1 – A19 north-south grade separation – on-line;

Option 2 – A184 east-west grade separation;

Option 3 – A19 north-south grade separation – off-line;

Option 4 – A184 west to A19 south grade separation.

3.1.2 These are illustrated in Figure 3.1 on the following page.

3.1.3 Options 2 and 4 were discounted early, because they would not meet the objectives of the scheme as set by TAMMS, and for reasons of 'buildability' and environmental impact. Options 1 ('the on-line scheme') and 3 ('the off-line scheme') were assessed in more detail.

3.1.4 Highways England subsequently rejected the off-line option, mainly on grounds of affordability, as the estimated cost would be higher than the budget available to fund construction.

3.1.5 In 2006-7 a single on-line improvement option was taken forward for development to 'preliminary design' level. This work included a detailed Environmental Impact Assessment for the on-line option. However, alternative options were then given more detailed consideration in 2008-9, to provide a robust test of the option selection process that led to the choice of the on-line option and determine whether that choice should be reconsidered.

3.1.6 Three options were considered in a new Comparative Environmental Appraisal Report and were presented at a

Public Consultation in 2009. These options were as follows:

Option A - on-line grade-separation of the existing junction, carrying the A19 over the roundabout via two bridges and approach embankments, with the roundabout in the same location as at present but extended to the west;

Option B – off-line grade separation, with the roundabout relocated approximately 300 m further west, but otherwise very similar to option A; and

Option C – off-line grade separation, with the roundabout relocated approximately 300 m further west, with the A19 at-grade and passing beneath a raised roundabout.

3.1.7 These are illustrated in Figure 3.2.

3.1.8 For all options, all A184 traffic would pass around the roundabout, while the A19 would be linked to the roundabout via slip roads.

3.1.9 For Options A and B, the A184, roundabout and A19 slip roads would remain at-grade, while part of the A19 main carriageway would be raised on approach embankments to cross the roundabout on two bridges.

3.1.10 For Option C, the A19 would have remained at-grade, while the roundabout would be raised on embankments, crossing the A19 via two bridges. The A184 and the A19 slip roads would have been raised on embankments to reach the roundabout. The roundabout would be larger than the existing one to provide sufficient room for the slip road connections. All roundabout options would still have been signalised, but through-traffic on the A19 would bypass both the roundabout and the signals.

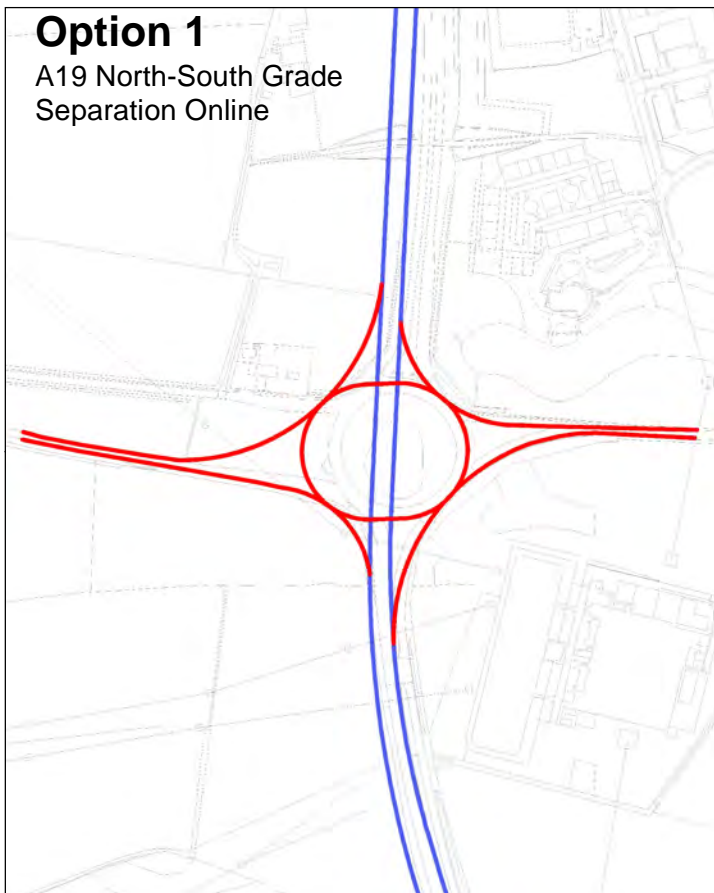
3.1.11 In relation to a wide range of environmental issues (including air quality, noise, the water environment, non-motorised users and communities), any differences

between the options in the significance of either adverse or beneficial effects would have been marginal.

- 3.1.12 In relation to the effects on West Boldon Environmental Education Centre, Mount Pleasant Marsh and possibly the Great North Forest, the off-line options offered either slightly lower environmental impacts or the potential opportunity for greater benefits than the on-line option. However, these differences were small in scale.
- 3.1.13 Similar small-scale differences arose in favour of the on-line option in relation to vehicle travellers. However, more significant differences between the options arose in relation to Green Belt policy, the landscape, visual impacts, cultural heritage and land use, where the off-line options would have all caused greater adverse impacts than the on-line option. These environmental disadvantages of the off-line options outweighed their environmental advantages, when compared to the on-line option.
- 3.1.14 Overall, the balance of environmental impacts and benefits favoured the on-line option. This on-line option forms the basis of the current proposal.

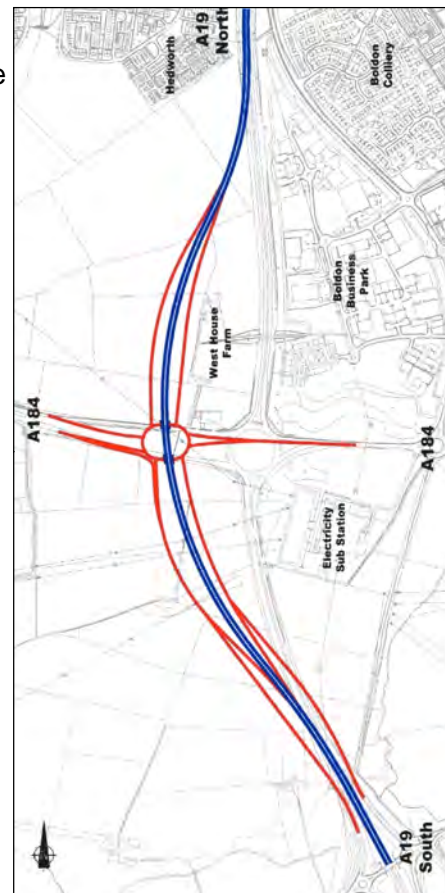
Option 1

A19 North-South Grade Separation Online



Option 3

A19 North-South Grade Separation Offline



Option 2

A184 East-West Grade Separation



Option 4

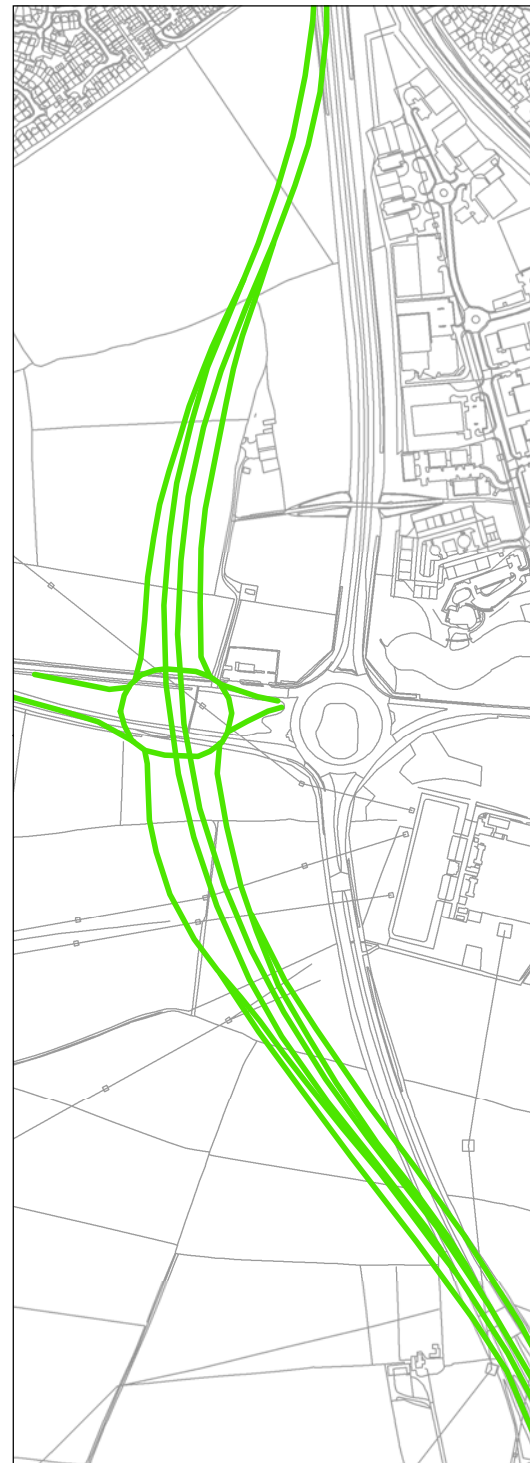
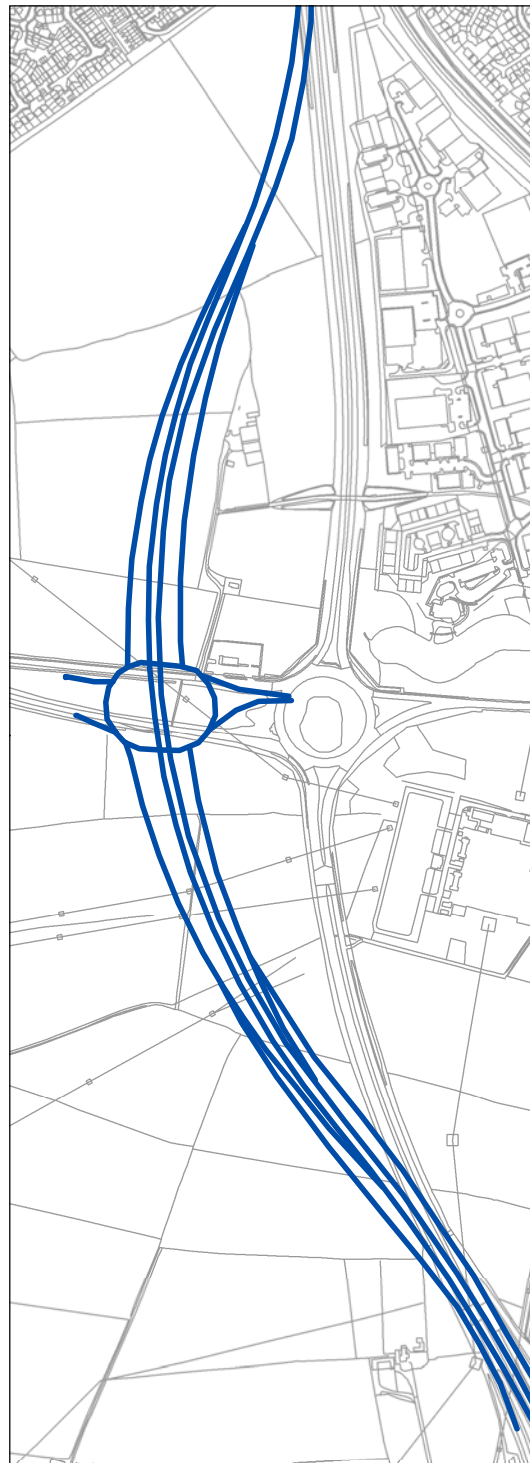
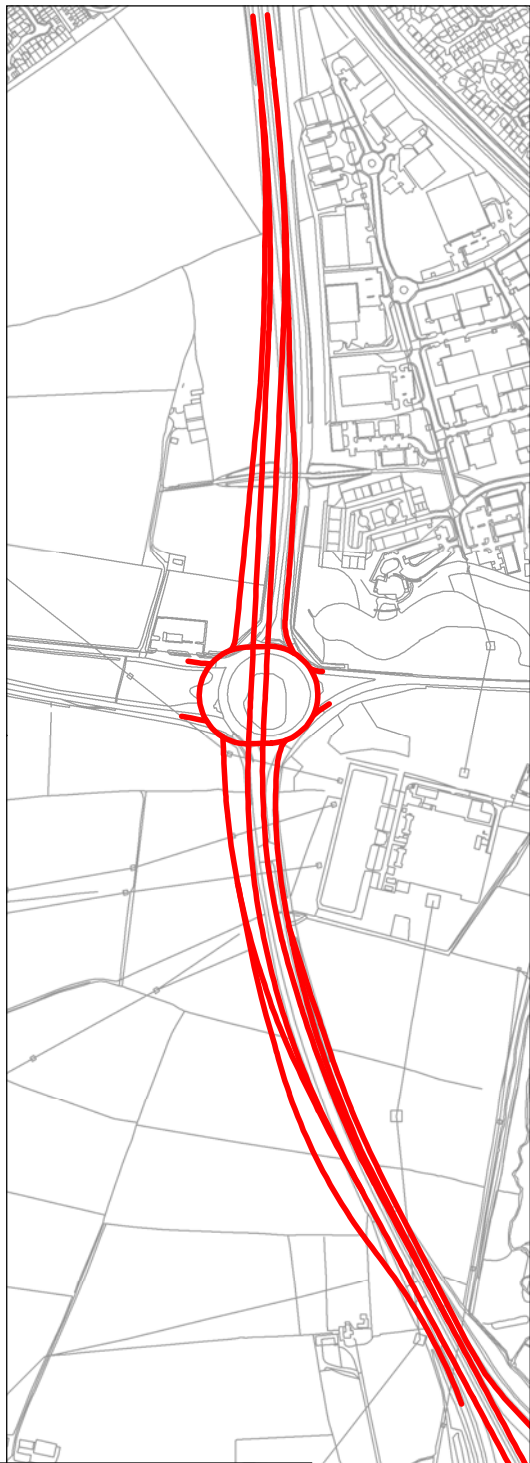
A184 West-A19 South Grade Separation

Drawing Title

FIGURE 3.1
HIGH-LEVEL SCHEME
OPTIONS (2004)

JACOBS
1 City Walk, Leeds, LS11 9DX, UK
Tel: +44(0)113 242 6771 Fax: +44(0)113 389 1389
www.jacobs.com

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Legend

- Option A
- Option B
- Option C

Drawing Title

FIGURE 3.2
DETAILED SCHEME
OPTIONS (2009)

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Tel: +44(0)113 242 6771 Fax: +44(0)113 389 1389
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4 CONSULTATION

4.1 Introduction

DCO consultation requirements

- 4.1.1 The A19 Testos junction Improvement scheme is being delivered under the Planning Act 2008. The Act requires the Highways England to submit an application for a Development Consent Order (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 (i.e. decide whether to grant consent for the project to go ahead).
- 4.1.2 The DCO application has a number of statutory requirements regarding consultation. The key items are:
- Local authorities, land interests and other specified third parties must be consulted under Section 42 of the Planning Act;
 - The local community must be consulted under Section 47 of the Planning Act;
 - The community consultation arrangements must be publicised in the form of a Statement of Community Consultation (SoCC); and
 - A Consultation Report must be prepared and included as part of the application for a DCO.
- 4.1.3 This PEI is required to inform the consultation of the community under Section 47 of the Planning Act. It may also be used to inform consultation of third parties under Section 42.

4.2 Previous consultations (2004 – 2014)

- 4.2.1 Much of the consultation undertaken as part of the A19 Testos junction Improvement scheme has been in relation to specific environmental topics, although in some instances an individual was approached in relation to several different aspects of the environment.

Consultation with statutory bodies

- 4.2.2 As a matter of good practice, the following statutory organisations were consulted during the previous phases of scheme development:
- South Tyneside Council;
 - The Environment Agency;
 - The Countryside Agency;
 - English Nature (since combined with the Countryside Agency and parts of Defra to form 'Natural England');
 - Natural England (following the merger of the Countryside Agency and English Nature), and;
 - English Heritage.
- 4.2.3 Each statutory body was consulted in 2004, during the initial options appraisal, following reduction of the options to two (on-line and off-line grade separation; see Section 3.1).
- 4.2.4 Only English Nature expressed a preference for a specific option at this stage of consultation. They considered that the off-line option would be 'less acceptable' than an on-line scheme.

Selective stakeholder consultation

4.2.5 Following the Stage 1 Scheme Appraisal Report process and the selection of the on-line option for further development, a selective stakeholder consultation was carried out by letter in March and April 2005. Consultation letters were issued to the following:

- statutory consultation bodies;
- other institutional stakeholders, including national and local organisations with environmental and transport-related interests;
- local elected representatives;
- business interests in the local area; and
- all land owners potentially affected.

4.2.6 A total of 208 letters were issued to organisations and individuals, outlining the on-line scheme. Thirty-four replies were received within the deadline. Twenty-seven of these responses were from organisations. Twelve replies were in support of the proposals, while 22 acknowledged receipt of the consultation letter but had no comment to make. None of the responses expressed any objection to the scheme.

Consultation at scoping report stage and during the environmental impact assessment (2006-7)

4.2.7 Each statutory consultation body was approached in June 2006, to invite their opinion on the scope of work required as part of the EIA, as well as to obtain baseline data. Their views were taken into account in preparing a Scoping Report, which they were then invited to

comment on upon its completion. In addition, a draft Environmental Statement was prepared and circulated for comment to statutory environmental bodies. Comments were received and taken into account, but the Environmental Statement was not completed before the scheme returned to consideration of options.

4.2.8 These formal consultation processes were supplemented through the course of the EIA work by more informal exchanges of views and information by telephone and e-mail, and in some cases through face-to-face meetings.

South Tyneside Council

4.2.9 Ongoing consultation with South Tyneside Council included telephone calls, exchanges of letters and e-mails relating to specific environmental topics and meetings with officers of the Council relating to environmental issues or to aspects of scheme design.

Non-statutory key stakeholders

4.2.10 During 2006 and 2007, 33 non-statutory consultees were approached. Some organisations were approached only once, by letter, with a request for comment or for information. In some cases, however, there has been a more extensive exchange of correspondence by letter, e-mail and telephone.

4.2.11 In addition, consultation meetings were held with organisations, or groups of organisations, whose interests may be affected. Meetings were held to address potential effects on:

- **non-motorised users** – a site meeting and walkover survey was attended by the British Horse Society,

Cyclists Touring Club, Ramblers Association, the Countryside Officer of South Tyneside Council, and Tyne and Wear Access Forum. 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. Two subsequent meetings were held to review and discuss the proposals as they were developed;

- **agricultural land** – all affected agricultural landowners and land occupiers (except one who did not wish to be consulted) were interviewed by an agricultural specialist at an early stage in the EIA. Selected landowners and occupiers were interviewed again prior to preparation of the Comparative Environmental Appraisal Report in 2009, and update interviews were held in 2014-5; and
- **community facilities** – three meetings were held with the manager of West Boldon Environmental Education Centre, located within Mount Pleasant Marsh Local Wildlife Site, in 2007-9. The meetings were also attended by the Countryside and/or Public Rights of Way Officers of South Tyneside Council. Two meetings were attended by representatives of National Grid, who own the site. Additional meetings were held in 2014-15.

Public consultation in 2009

- 4.2.12 As outlined in paragraphs 3.1.6-3.1.14, three alternative options were presented at a public consultation in 2009, including one online and two offline options. The current proposal is based on the online option presented in 2009, which emerged at that time as both the technically

preferred option and the option most supported by the public.

Statutory consultation under the Planning Act 2008

- 4.2.13 Following the Preferred Route Announcement in 2014, a statutory consultation was undertaken on the details of the scheme, based around the option that had emerged from previous consultation in 2009.
- 4.2.14 In 2014, the community were consulted under Section 47 of the Planning Act 2008, while relevant local authorities, land interests and other consultees required in accordance with the regulations were consulted under Section 42 of the Act. Methods of consultation included:
- 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;
 - public exhibitions at which members of the community can interact directly with members of the project team.
- 4.2.15 While the highway proposals put forward were relatively fixed, the key issues to be determined by the consultation in 2014 included options for non-motorised user facilities around Testos junction.

4.3 Further statutory consultation, 2017

- 4.3.1 This document is written to inform a new consultation process planned for early 2017. There has been very little change in the proposed scheme since the previous consultation carried out in 2014. The purpose of this new consultation is primarily to 'refresh' the 2014 consultation, taking account of the lapse of time between that consultation and the proposed application for a Development Consent Order in summer 2017. The aim is to ensure that any new members of the community, or new business or land interests, who have moved into the area since 2014 are able to express their views.
- 4.3.2 The consultation will be carried out primarily through the publication and distribution of information, correspondence and through face-to-face meetings where required.
- 4.3.3 In addition to these statutory consultation processes, informal non-statutory consultation/engagement with statutory bodies, other environmental bodies, local stakeholders and others with information or interests relevant to the EIA will continue throughout the period of working on the EIA.

4.4 Downhill Lane junction

- 4.4.1 The improvement of Downhill Lane junction became part of the Department for Transport's Road Investment Strategy (RIS) in 2014. Some limited information about this project was made available at the 2014 consultation on the A19/A184 Testos junction Improvement, which preceded the publication of the RIS in December 2014.

- 4.4.2 Since late 2015, Highways England has developed 30 potential options for the improvement of Downhill Lane junction and filtered these down to 5 options, from which a single preferred option ('Option A') has been provisionally identified. A separate non-statutory consultation on the selection of this option as the Preferred Route for the improvement of Downhill Lane junction was held between November 2016 and January 2017.
- 4.4.3 Assuming the confirmation of Option A as the Preferred Route for the Downhill Lane Junction Improvement, it is intended to develop the design of the option further during 2017 and hold a statutory consultation during the second half of the year, leading to an application for a Development Consent Order in early 2018.

5 OVERVIEW OF THE ENVIRONMENT

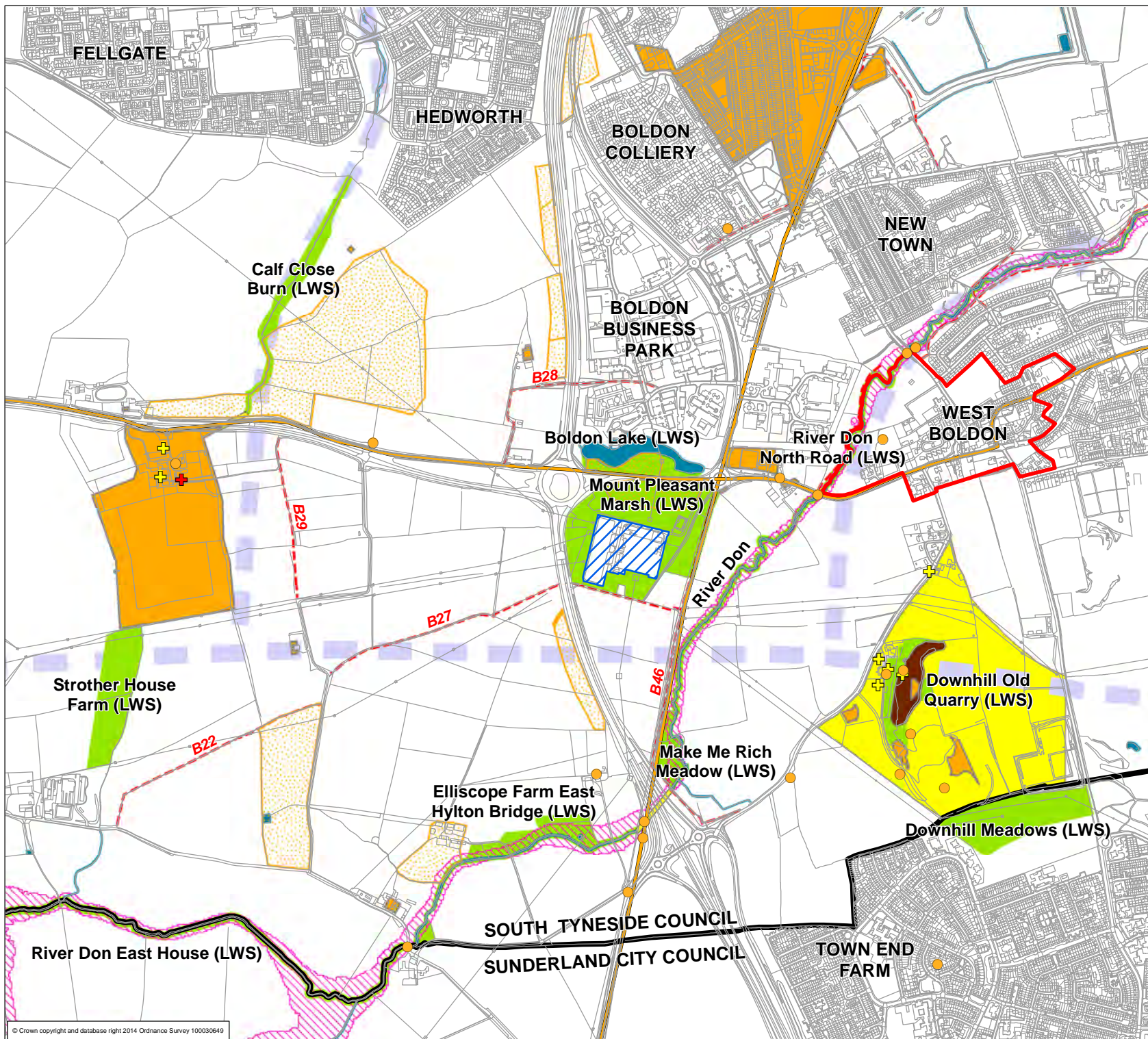
5.1 Introduction

- 5.1.1 Figure 5.1 on the following page provides an overview of the environmental baseline and context for the scheme.
- 5.1.2 The scheme sits at the interface between countryside and the urban areas of South Tyneside. Most of the land required to build the scheme is farmland, mainly in arable use. However, residential areas lie close by, particularly at Hedworth to the northwest and Boldon Colliery to the northeast, while a business park lies adjacent to the scheme to the east. Two farms (West House Farm and Make-Me-Rich Farm) lie close to the A19 to the west, along with the site of an Enterprise Rent-A-Car.
- 5.1.3 Two Local Wildlife Sites (LWS), Boldon Lake and Mount Pleasant Marsh, lie immediately adjacent to the existing junction. Mount Pleasant Marsh hosts the West Boldon Environmental Education Centre. Several other LWSs lie close by. The River Don passes beneath the A19 in a long culvert near the south end of the proposed improvement scheme.
- 5.1.4 Mount Pleasant Marsh is wooded, and there are other small blocks of woodland in the surrounding area. The highway cutting slopes north of Testos junction are also planted with trees. Most of the surrounding landscape comprises a pattern of rectilinear fields divided by hedgerows. To the east/southeast, the ground rises to the Boldon Hills.
- 5.1.5 Scots House, an historic Grade II* Listed Building, lies about 1 km west of Testos junction, next to the A184. Scots House sits in landscaped grounds, surrounded by

mature trees. Several subsidiary buildings in the Scot's House complex are Grade II Listed Buildings.

- 5.1.6 There is a network of Public Rights of Way in the surrounding area, although it suffers from fragmentation and severance, partly due to the presence of the A19.
- 5.1.7 Two rights of way cross the A19 within the scheme area. One is a crossing at ground level which is considered dangerous and largely impassable. The second is a bridleway, crossing the A19 via a former agricultural accommodation bridge north of Testos junction.
- 5.1.8 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 the likely environmental effects and mitigation measures envisaged for the proposed scheme.
- 5.1.9 Each of the chapters on environmental topics follows a structure approximately as follows:
- An introduction which explains the topic itself and its study area;
 - a summary of existing and baseline knowledge;
 - potential impacts during construction of the scheme;
 - potential mitigation of construction impacts;
 - potential impacts during operation of the scheme;
 - potential mitigation of operational impacts.
- 5.1.10 The drainage design (e.g. the location and number of balancing ponds) and attenuation requirement will be revisited as part of the EIA and scheme development.

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Legend

- Local Authority Boundary
 - - - Public Right of Way
 - Wildlife Corridor (indicative)
 - Local Wildlife Site (LWS) or Candidate Local Wildlife Site (cLWS)
 - Local Geological Site
 - Electricity Sub-Station
 - Surface Water Feature
 - Extent of Potential River Flooding (Zones 2 & 3)
 - Area of High Landscape Value
 - Grade II* Listed Building
 - Grade II Listed Building
 - Conservation Area
- ### Cultural Heritage Assets
- Agricultural / Earthwork Features
 - Other Features

Drawing Title

FIGURE 5.1
ENVIRONMENTAL CONTEXT

6 AIR QUALITY

6.1 Introduction

6.1.1 Air quality is a significant environmental issue, because poor air quality can affect human health and quality of life; it can affect the natural environment; and it can have economic impacts. The dominant long-term source of air pollution in the UK is exhaust emissions from road traffic.

6.1.2 This topic comprises both localised impacts 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. This is included in the regional air quality assessment and expressed in terms of carbon dioxide emissions.

6.1.3 The information about the air quality environment on which this chapter is based has been derived from EIA work previously published in the A19 Testos and Downhill Lane junctions Improvement Environmental Assessment report (2016). This is a joint assessment

covering the effects of both the Testos and Downhill Lane junction schemes. This is for the following reasons:

- This is the most recent and up-to-date air quality assessment available for the scheme;
- The most recent traffic data prior to preparation of this chapter was a combined forecast for both schemes.

6.1.4 The operational study area for local quality has been defined from the traffic model, in order to enable identification of relevant 'affected roads'.

6.1.5 The study area for local air quality assessment comprises all land within 200 m of 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 or more on an average day;
- heavy duty vehicle (HDV) flows would change by 200 or more on an average day;
- daily average speed would change by 10 km/hour or more; and
- peak hour speed would change by 20 km/hour or more.

6.1.6 The relevant area was identified as covering the A19 from just north of the River Wear to just north of Lindisfarne junction (approximately 5.7km), plus some sections of the A1290, A1231, A194, A195, sections of Downhill Lane, Washington Road and parts of other minor side roads close to the A19.

- 6.1.7 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 The existing environment surrounding the junction is predominantly rural. The air quality assessment identified a total of 24 receptors that are either close to the affected roads, or representative of the maximum impacts of the route option. This assessment will be reviewed as part of the next phase of EIA work, and updated as appropriate.
- 6.2.2 Pollutant concentrations from traffic disperse rapidly away from a road, returning to background concentrations within 200 m. Receptor locations were therefore chosen where people susceptible to air pollution may be present within 200 m of an 'affected road' forming part of the defined study area. These properties were chosen because they would be the worst affected properties, and an assessment based on them therefore represents a 'worst case scenario'.
- 6.2.3 The Air Quality Regulations set Air Quality Objectives (AQO) for various pollutants; these are health-based, and represent the concentrations of each pollutant below which health effects are unlikely to be experienced by even the most sensitive members of the population.
- 6.2.4 The pollutant of most concern in relation to the air quality effects of traffic is nitrogen dioxide (NO₂). The AQO for NO₂ is 40 µg/m³ (milligrams per cubic metre of air). Data obtained from Defra shows that background annual mean concentrations of NO₂ in the 11 kilometre-squares surrounding Testos junction vary from 16 µg/m³ to 20.8 µg/m³ in 2014, and have been declining since at least

2012. This is suggestive of good air quality and an improving situation.

- 6.2.5 The assessment drew on data from roadside monitoring NO₂ concentration by Highways England across 18 locations.

6.3 Potential impacts during construction

- 6.3.1 During construction, the use of site equipment, vehicles and machinery would result in emission of exhaust gases to the atmosphere. However such emissions are unlikely to be significant, particularly when compared to levels of similar emissions from vehicles using the local road network. Emissions from such construction vehicles and plant can be minimised by using equipment which meets current emission control standards, operating well-maintained vehicles and effective planning to reduce the number of trips required.
- 6.3.2 From an air quality perspective, the construction-related activities most likely to have the greatest impact include:
- fugitive dust emissions from a variety of construction activities, including re- profiling of cuttings and embankments;
 - off-site disposal of excavated material during construction; and
 - HGV haulage of material to and from the construction site.
- 6.3.3 Without mitigation, properties in the vicinity of the scheme could experience 'nuisance' as a result of construction dust emissions. However, following the

implementation of best practice dust control measures, no statutory dust nuisance⁷ would be expected.

Potential mitigation for construction impacts

- 6.3.4 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. 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.
- 6.3.5 In addition to these practices, the establishment of a public relations service would be encouraged to manage public dust complaints. The environmental health department of South Tyneside Council would be notified for verification purposes.

6.4 Potential impacts during operation

- 6.4.1 Any operational effects from the proposed scheme would derive from changes in pollutant concentrations as a

result of changes in the traffic using the roads in the local area.

- 6.4.2 Changes to the pollutant concentrations would be dependent on a number of variables, including:
- changes in road alignment;
 - changes in vehicle numbers;
 - changes in vehicle speed;
 - increased or reduced traffic congestion; and
 - changes in the composition of the traffic, for instance the proportion of heavy duty vehicles.

Local air quality assessment

- 6.4.3 The 2016 EIA work identified only marginal differences between the scheme and a 'do minimum' (i.e. 'without scheme') scenario in the opening year for both NO₂ and PM₁₀ pollutant concentrations. The largest increase in pollutant concentrations due to the proposed scheme was predicted at Make-Me-Rich Farm and Mill Lane. The significance of these changes was considered 'negligible', as concentrations of both pollutants remained below relevant Air Quality Objectives.
- 6.4.4 Neither of the Air Quality Management Areas (AQMAs) declared by South Tyneside Council were considered likely to be affected, as traffic on the local network was not predicted to increase due to the junction improvements.

Mitigation for local air quality operational effects

- 6.4.5 The EIA work in 2016 concluded that as the impacts during the operational phase are considered to be

⁷ Under Part III of the Environmental Protection Act 1990 certain matters are declared to be 'statutory nuisances'. Dust is a statutory nuisance if it is harmful to health or a nuisance.

negligible, no mitigation measures were to be proposed for the operational phase.

Regional air quality assessment/climate change

- 6.4.6 On a regional as opposed to local scale, there would be minor increases in overall emissions of oxides of nitrogen (NO_x), particulates (PM₁₀) and carbon dioxide (CO₂), compared to the do minimum scenario.

7 CULTURAL HERITAGE

7.1 Introduction

7.1.1 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 The information in this chapter is based on environmental assessment work carried out in 2015 - 2016, building on earlier phases of investigation carried out between 2006 and 2009.

7.1.3 The project team holds cultural heritage extending to 1 km either side of the centre-line of the proposed scheme. This is well above the study area required by guidance, but provides valuable context and enables effective consideration of the setting of designated sites.

For most purposes, a narrower study area of 200m, as specified by guidance, will be used in reporting.

7.2 Existing and baseline knowledge

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

- The National Heritage List (NHL) 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);
- The Multi-Agency Geographic Information for the Countryside (hereafter 'MAGIC') website for information on designated and undesignated cultural heritage sites;
- historic maps and plans held in the Tyne and Wear Archives;
- Ordnance Survey maps;
- published archaeological books and journals and unpublished reports;
- site inspections and a walkover survey, conducted in July and September 2006;
- a watching brief on geotechnical trial pits, during October 2006; and
- a geophysical survey of land to the west of the A19, during February 2007, which identified the presence of levelled ridge and furrow and field boundaries.

7.2.2 No historic landscape information was available for the study area from existing public sources. As a result, definition of historic landscape units was undertaken using the “bottom up” methodology defined in DMRB.

Cultural heritage background

7.2.3 The cultural heritage of the study area is heavily dominated by Post-Medieval features (i.e. features that originate after AD1540 and before AD1900). There are 48 sites associated with this period, comprising a wide range of settlement, domestic, industrial, agricultural and transport-related features. This reflects the rapid expansion of settlement and economic diversification in the area during and after the Industrial Revolution. The site of the Civil War ‘battle of Boldon’ is located in the southeast of the study area.

7.2.4 The study area also shows evidence of:

- Prehistoric remains (i.e. dating to before AD70, when the Romans invaded the region) – one group of flint artefacts found on Down Hill some distance to the southeast of the junction, and a ‘cist’ burial (i.e. a burial in a grave lined with stone slabs) at Nanny Cow Hill further away to the east of Testos junction;
- Roman remains (those dating to between AD70 and AD410) – a single coin found on the fringes of Sunderland some distance to the south of the junction; and
- Medieval remains (between AD1066 and AD1540) – agricultural features, mainly ‘ridge-and-furrow’ earthworks and ground evidence indicating the presence of former ridge and furrow. These represent parts of the common fields belonging to

Medieval villages in the wider surrounding area, including Boldon, all of which lie outside the study area.

7.2.5 There are no known Anglo-Saxon (AD410 to AD1066) remains in the study area. However, ‘the Boldons’ area which includes East Boldon, West Boldon and Boldon Colliery, is known to have been settled during this era, and possibly since pre-Roman times. The first written record of ‘Boldun’ is dated 1170.

7.2.6 Six cultural heritage assets dating to after AD1900 are found within the study area. Sunderland Aerodrome originated during the First World War, and became RAF Usworth during the Second World War. Several related structures lie in the study area, including aircraft obstructions, a bombing decoy and searchlight. The precise location and layout of the former West Boldon prisoner of war camp are unknown.

Cultural heritage assets

7.2.7 Based on the data gathered from the sources identified above, a total of 72 cultural heritage assets have been identified, consisting of 39 archaeological remains and 24 Historic Buildings, while the area has been characterised into nine historic landscape types. Their locations/extents and any designation are shown in Figure 5.1 and Figure 7.1.

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

7.2.9 There is one Grade II* Listed Building (Scots House) assessed to be of High Value, and seven Grade II Listed Buildings

7.2.10 West Boldon Conservation Area lies approximately 1 km to the east of the scheme, outside the cultural heritage study area. The Conservation Area is, however, within the visual envelope of the scheme and any visual impacts on it or its historic setting are addressed in Chapter 8.

7.2.11 Each of the 72 assets has been assessed for its potential sensitivity to any effects (should they occur), and placed into one of four standard sensitivity categories in line with the DMRB. The sensitivity of the 72 assets can be summarised as follows:

- one site (Scots House, a Grade II* Listed Building) is of High sensitivity;
- 11 sites are of Medium sensitivity, including 7 Grade II Listed Buildings;
- 28 sites are of Low and 30 of Negligible sensitivity; and
- 2 sites are of Unknown sensitivity.

Potential for unknown archaeological remains

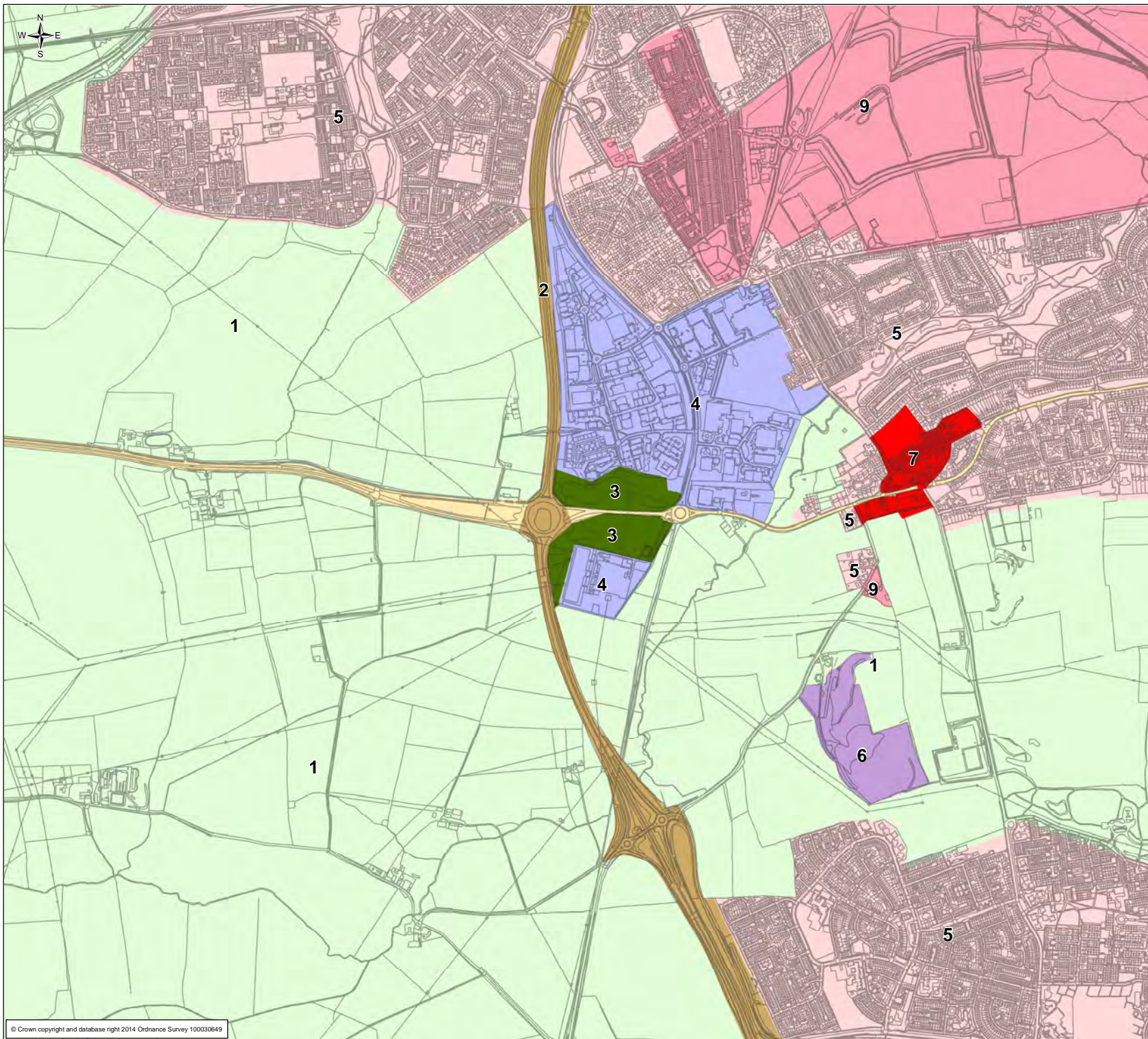
7.2.12 Based on the sources consulted above, the potential for unknown archaeological remains within the study area has been assessed to be Low.

Historic landscape

7.2.13 The historic character of the landscape in and around the study area has been assessed, and it has been divided into nine 'historic landscape character areas'. These areas are summarised in Table 7.1 below and illustrated in Figure 7.1.

Table 7.1: Historic landscape character areas

Unit No.	Unit Name	Description
1	Parliamentary Enclosure Fields	Field systems of a type characteristic of the 18th-19th century 'Parliamentary' enclosure movement.
2	A19	A19 dual carriageway constructed in the late 1960s. The road does not replace any earlier north-south routes and divides elements of the pre-existing parliamentary enclosure field system.
3	Modern Wetland	This wetland is bisected by the modern A184, and includes Boldon Lake created in the 1980s and Mount Pleasant Marshes seemingly created via the construction of the original A19 and Boldon Lake.
4	Modern Industrial	Late 20th and early 21st century light industrial and commercial development.
5	Modern Residential	Late 20th century residential development.
6	Boldon Hill Historic Rural Industries	19th and 20th century limekiln, tannery and quarries on the western face of Boldon Hill.
7	West Boldon Historic core	Largely 19th century in date, but containing several pre-19th century structures and overlooked by 13th century church.
8	A184 east and west of Testos	The line of an 18th century turnpike road within an enclosure period landscape. An OS map of 1862 shows a toll post adjacent to Scots House. The A184 follows the line of the old road. The layout of field boundaries either side of the road suggests that the turnpike predates the enclosure field system.
9	Late 19th Century Housing	Late 19th century housing, mostly terraced, built in response to economic upturn in the area, immediately following the opening of Boldon Colliery.



Legend

Historic Landscape

- 1 Parliamentary Enclosure Fields
- 2 A19
- 3 Modern Wetland
- 4 Modern Industrial And Commercial
- 5 Modern Residential
- 6 Boldon Hill Historic Rural Industries
- 7 West Boldon Historic Core
- 8 A184
- 9 19th Century Housing

Drawing Title

FIGURE 7.1
HISTORIC LANDSCAPE AREAS

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7.3 Potential impacts during construction

7.3.1 Construction of the proposed scheme has in principle the potential to affect heritage assets in the following ways:

- partial or total removal of heritage assets;
- compaction of archaeological deposits by construction traffic and structures;
- changes in groundwater levels leading to the extreme drying of previously waterlogged archaeological deposits;
- effects on the setting of heritage assets including visual and noise intrusion; and
- severance and adverse impacts on amenity as a result of construction works.

7.3.2 The first aim of the assessment is to determine the extent to which any of these effects would occur.

7.3.3 The proposed development crosses the Turnpike Road (Asset 14) where it follows the same route as the eastbound carriageway of the modern A184, and the route of the Stanhope and Tyne Railway close to its southern limit. As a result there is potential for archaeological remains associated with both assets to be removed during construction.

7.3.4 Construction may also remove archaeological remains associated with levelled ridge and furrow and trackways identified by geophysical survey.

7.3.5 Based on available information, it is considered that there is low potential for the presence of unknown

archaeological remains within the study area. However construction of the proposed scheme could result in the removal of archaeological remains that may be present.

7.3.6 No physical impacts are predicted for any of the Historic Buildings. However, the Grade II* Listed buildings Scots House and Make-Me-Rich Farm, despite being located just under 1 km from the scheme, would experience effects on their settings from construction and operation of raised elements such as junctions and signage.

7.3.7 Construction traffic and activity may temporarily interrupt distant views of West Boldon and the continuing agricultural landscape beyond the A19.

7.4 Potential mitigation for construction impacts

7.4.1 Potential mitigation measures for effects on heritage assets 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;
- archaeological investigations in advance of, or during, construction;
- historic building recording and historic landscape recording in advance of construction to provide a permanent documentary record of assets in their current form and condition; and
- dissemination of the results of all surveys in an appropriate format and supporting archive.

- 7.4.2 Based on the results of the pre-2009 EIA work, the physical impacts on archaeological remains described above are all likely to be of 'Neutral' or 'Slight' significance. At this stage, it is considered that the investigations undertaken to date, constitute sufficient recording works to mitigate the impact on these sites and no further mitigation works are proposed.

7.5 Potential impacts during operation

- 7.5.1 Operation of the Testos junction Improvement scheme has the potential to result in impacts on the setting of heritage assets. In the majority of cases, these would be long-term in nature. These impacts would commence during construction of the proposed scheme and continue during operation; however the degree of impact may vary between phases. Such impacts can include:

- changes to the surroundings of heritage assets or the general character of their setting;
- changes to access or the viability of heritage assets; and
- cumulative impacts on historic landscape elements as a result of operational maintenance through alteration of historic landscape elements.

- 7.5.2 The Grade II* Listed Scots House has views towards the proposed development, and its setting is considered to include elements of the wider surrounding landscape. The distance from the closest element of the proposed scheme to Scots House is approximately 1 km. Ground-level views will not be affected, as they are fully screened by existing trees and shrubs, and other features within the grounds. However, elevated elements of the

proposed scheme, such as junctions and signage, are likely to be visible in views from the first-floor windows, although filtered to some extent by intervening hedgerows.

- 7.5.3 The historic landscape types identified within the study area are large, fairly common and are quite robust with a high ability to accept change without loss of historic legibility. The widening of the existing highway corridor required for the scheme would take land from a small portion of the Parliamentary Enclosure Fields type.

7.6 Potential mitigation for operational impacts

- 7.6.1 Adverse impacts on the setting of heritage assets resulting from operation of the proposed scheme can be mitigated through detailed design of the proposed scheme. This may include measures such as

- consideration of the horizontal or vertical alignment of the proposed scheme to reduce its visual prominence;
- careful siting of lighting or signage; and
- the use of noise fencing or maintenance of access routes to a historic building to maintain its viability.

- 7.6.2 Further mitigation can be provided through the use of landscape mitigation measures such as bunds, planting or cladding of highways structures. These measures can help to reduce the visual prominence of the scheme and aid its integration with the surrounding landscape.

- 7.6.3 The impacts of the scheme on the setting of Scots House are considered to be of 'Slight' significance. Landscape planting is proposed to screen the road in views from

Scots House, to reduce the visual intrusion of the road for residents. It is considered that this will also mitigate the effect on cultural heritage setting.

- 7.6.4 The proposed scheme would not interrupt views of the continuing agricultural landscape beyond the A19, because views are interrupted by elements of industrial and commercial development close to the existing junction, and by existing woodland immediately east of the A19. This woodland forms an intermediate 'horizon' below the skyline ridge of West Boldon and Down Hill. When landscape planting has matured, most of the proposed elevated section would be hidden behind tree and shrub planting, restoring the woodland character of this intermediate horizon. The more distant view to West Boldon would still be available, largely unchanged.
- 7.6.5 Impacts on the historic landscape are also expected to be of neutral significance, and no further mitigation is proposed at this stage.

8 LANDSCAPE AND VISUAL EFFECTS

8.1 Introduction

- 8.1.1 Landscape and visual impact assessment are two separate but related concepts.
- 8.1.2 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 impacts on landscape and townscape therefore addresses changes in any of these components.
- 8.1.3 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 (VIA) 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, footpaths and bridleways, open spaces and offices.
- 8.1.4 The understanding of the landscape has been derived from EIA work published in the A19 Testos and Downhill junctions Improvement Environmental Assessment report (2016). Certain information has been reviewed through the Natural England website and the South Tyneside Local Development Framework.

- 8.1.5 The study area is an irregularly-shaped area, limited by the built-up areas of Fellgate, Hedworth and Boldon Colliery around 500 m to the north, by the Boldon Hills in the east (1.5 km), Downhill Lane junction and the residential area of Town End Farm to the south (1 km), and the A194 area to the west (2 km).

8.2 Existing and baseline knowledge

- 8.2.1 Existing landscape and visual elements within the study area are summarised below. Key features in proximity to the A19 are illustrated in Figure 5.1, while landscape character units are shown in Figure 8.1.
- 8.2.2 In terms of topography, the distant southern horizon is defined by Penshaw Hill, which is 136 m above sea level⁸ and Carr Hill which is approximately 100 m above sea level, both of which are some 6 km to the south. The western horizon is defined by higher ground in Gateshead which is 150 m above sea level, and between 6 and 8 km to the west. West Boldon (60 m above sea level) and the Boldon Hills (90 m above sea level) form areas of higher ground to the eastern horizon. There is an Area of High Landscape Value⁹ (AHLV) on the west facing slopes of the Boldon Hills.
- 8.2.3 The topography of the 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 and Calfclose Burn. Substantially modified landforms in the

⁸ AOD (above ordnance datum), whereby ordnance datum (OD) is an expression of average sea level.

⁹ South Tyneside Council – Site Specific Allocations Development Plan Document 2012.

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 Watercourses include the River Don and its tributary, Calfclose Burn. Both follow sinuous but generally north-south courses, within noticeable local valleys in generally flat, low-lying land. Open water can be found at Boldon Lake and in parts of Mount Pleasant Marsh, both of which are designated as Local Wildlife Sites. There are also several disused local land drains amongst the fields.
- 8.2.5 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,¹⁰ in order to maintain the 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.
- 8.2.6 Combined with some pastures, the agricultural 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.

- 8.2.7 The east-west green belt corridor is also designated by South Tyneside Council as a Wildlife Corridor, and is linked to two other designated Wildlife Corridors running north-south, in part following the River Don and Calfclose Burn valleys. Isolated farms and other properties are scattered within the rural areas (West House Farm, Scots House, Make-Me-Rich Farm and Elliscope Farm).
- 8.2.8 North of Testos junction, the east side of the A19 is flanked by Boldon Business Park. The A19 north of the existing Testos junction is enclosed by trees on both sides, with tree and shrub boundary planting separating it from Boldon Business Park.
- 8.2.9 Commercial land in the study area largely comprises of Boldon Business Park, which is to the east of the A19 and north of Testos junction. In general, the business park is separated from the A19 by tree and shrub boundary planting. There are a couple of individual commercial properties to the west of the A19 including Enterprise Rent-a-Car on the north side of the A184 and west of Testos junction, MyPetStore Kennels and Cattery further west on Follingsby Lane and a plant nursery at Red Fox Farm south of the A184 to the west. To the south of the study area is the large Nissan car manufacturing plant.
- 8.2.10 A large area north of the Nissan plant and west of the A19 is currently proposed for removal from the green belt and development as an 'International Advanced Manufacturing Park'. However, within this assessment it has been considered under its current status.
- 8.2.11 There is a network of Public Rights of Way (PRoW) within the rural landscape, fragmented by existing

¹⁰ South Tyneside Council – Site Specific Allocations Development Plan Document 2012

highways, but with some intact links into the urban fringe areas to the east.

8.2.12 Mount Pleasant Marsh comprises marshland and deciduous woodland surrounding a large electricity sub-station, southeast of Testos junction. Boldon Lake and its associated marginal vegetation lies south of the Business Park.

8.2.13 Historic elements and characteristics of the landscape include Listed Buildings such as at Scots House, West Boldon historic village with a Conservation Area and Grade I Listed Church, the disused Stanhope and Tyne railway, the Penshaw Monument and the 18th / 19th century 'enclosure' period field system throughout the study area, superimposed on an earlier agricultural system with medieval origins.

Landscape character

8.2.14 The attributes of the landscape can be used to subdivide it into different landscape character areas, and this can be done at a variety of geographic scales (e.g. national and local).

8.2.15 On a national/regional scale, Natural England publishes a series of landscape character assessments. The site lies within the eastern part of National Character Area 14 (Tyne and Wear Lowlands), which has recently been updated by Natural England, and is adjacent to the northernmost tip of Area 15 (Magnesian Limestone Escarpment).

8.2.16 At a local level, EIA work carried out for the scheme defined 11 local landscape and townscape character units. The location and extent of these units are shown in

Figure 8.1, and they are described in Table 8.1 below. Landscape quality and sensitivity scores were assigned to each unit and are presented in Table 8.1.

Table 8.1: Local landscape and townscape character units

	Unit	Description	Landscape Quality	Sensitivity
Landscape	LCU1	Western Lowland Agricultural Land	Ordinary	Moderate
	LCU3	Vegetated Corridor	Poor	Low
	LCU6	Boldon Ecological Wetlands	Good	Moderate
	LCU7	River Don Scrubby Farmland	Ordinary	Low
	LCU9	Downhill Elevated Farmland	Very Attractive	High
	LCU11	Boldon Colliery Restored Land	Ordinary-Good	Low
Townscape	LCU2	Hedworth Modern Residential Edge	Ordinary	Low
	LCU4	New Town and Boldon Colliery	Ordinary	Low
	LCU5	Boldon Business Park Complex	Ordinary	Low
	LCU8	West Boldon Conservation Area	Good	Moderate
	LCU10	Town End Farm Residential Edge	Ordinary	Low

8.2.17 Existing woodland planting largely screens views of the existing A19 from most of Boldon Business Park (except

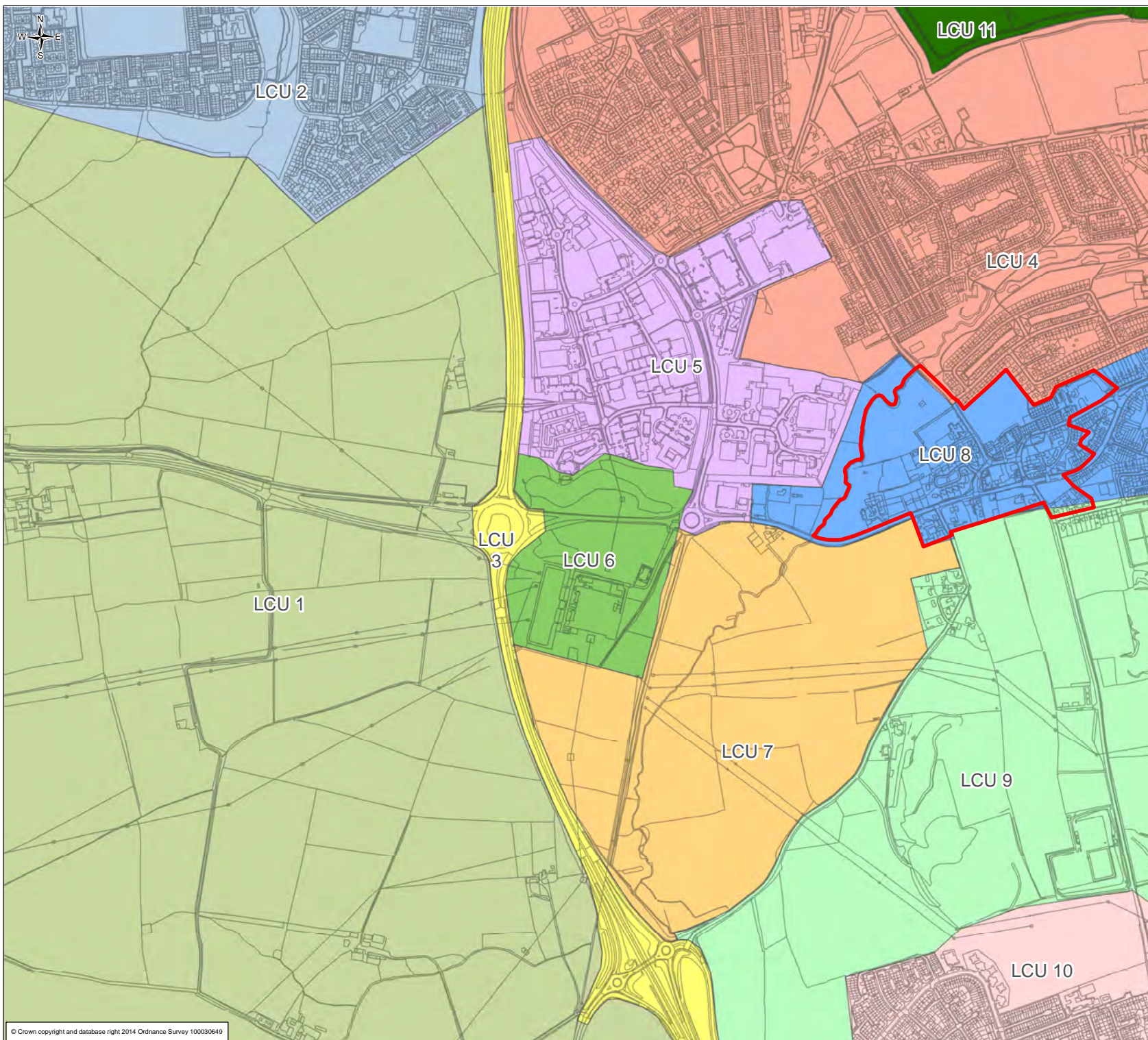
the Quadrus Centre), from Boldon Colliery, from West Boldon and from West Boldon Environmental Education Centre. Large commercial buildings in Boldon Business Park also screen views from some residential areas.

- 8.2.18 Views of the A19 from the Foxhomes estate in Hedworth are predominantly screened by an adjacent 7 m-high hedgerow, and by roadside tree and shrub planting. However, during the winter, there are glimpsed views of lorry traffic through gaps in the hedgerow. A similar 3 m-high hedge screens views from the newer Cedar Drive / Lavender Grove estate to the west of Foxhomes.
- 8.2.19 Views of the A19 from the southern boundary of Hedworth are mostly screened by adjacent remnant hedgerows, garden fences and roadside tree and shrub planting. There are glimpsed views of HGV traffic from the south-eastern edge of Fellgate mainly from upper floor windows and focused through gaps in open space boundary vegetation.
- 8.2.20 Views of the A19 from Town End Farm are predominantly screened by existing vegetation along the A19 and around the Downhill Lane junction. However, there are some properties with more open views, or some with elevated views above vegetation, for which the A19 is a noticeable feature. The topography of the Boldon Hills serves to screen views from receptors further east.
- 8.2.21 The highway between Downhill Lane junction and Testos junction, and traffic on it, are prominent in views from surrounding Public Rights of Way. However, woodland in Mount Pleasant Marsh screens views of the junction

from the east and southeast (including views from Bridleway B46, the busiest PRow in the study area).

- 8.2.22 Night-time views in 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 on Down Hill (e.g. from Downhill Farm and the far southwest of West Boldon), where they are backed by dark areas of countryside.
- 8.2.23 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.

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Legend

 Conservation Area

Landscape Character Units

Layer

- LCU 1 - Western Lowland Agricultural Land
- LCU 3 - A19 Vegetated Corridor
- LCU 6 - Boldon Ecological Wetlands
- LCU 7 - River Don Scrubby Farmland
- LCU 9 - Downhill Elevated Farmland
- LCU 11 - Boldon Colliery Restored Land

Townscape Character Units

Layer

- LCU 2 - Hedworth and Fellgate Modern Residential Edge
- LCU 4 - New Town and Boldon Colliery
- LCU 5 - Boldon Business Park Complex
- LCU 8 - West Boldon Conservation Area
- LCU 10 - Town End Farm Residential Edge

Drawing Title

FIGURE 8.1
LANDSCAPE CHARACTER UNITS

8.3 Potential impacts during construction

Landscape impacts

- 8.3.1 **Diversion of overhead power lines:** these works, if carried out by conventional construction methods, could result in the loss of woodland vegetation within Mount Pleasant Marsh Local Wildlife Site, as a result of site clearance operations. This clearance could open up views into the electricity substation from the west. Additionally, it may open up short-range views from West Boldon Environmental Education Centre towards the new road embankments.
- 8.3.2 **Other construction impacts:** Construction of the scheme is likely to have an impact on the landscape in the following ways:
- temporary loss of agricultural land in the near vicinity of the A19 to accommodate a site construction compound, haulage routes, and topsoil/subsoil storage areas;
 - permanent loss of the trees and shrubs on the existing roundabout;
 - permanent loss of established hedgerow and tree belts along both sides of the existing A19;
 - permanent loss of part of the plantation woodland on the west edge of Mount Pleasant Marsh;
 - permanent loss of agricultural land to the west of the A19 and a narrower strip to the east, to accommodate the wider road

- permanent loss of a narrow strip of agricultural land on the west edge of the existing A19 north and south of the A184, and on the east edge south of Mount Pleasant Marsh;
- loss of the existing crossing points on the A19 or Bridleway B28 and Footpath B27; and
- introduction of new raised embankments rising to 7.5 m high on the approaches to the new bridge structure or structures over the roundabout.

Visual impacts

- 8.3.3 There may be adverse visual impacts on all views focused towards the A19 and some towards the A184, where the site compound, temporary haulage routes and temporary storage bunds would increase the visibility of the construction works.
- 8.3.4 There may be greater adverse impacts upon visual receptors near the A19, as well as corresponding adverse effects upon local Landscape Character Units (LCUs), due to the proximity of construction activity and temporary structures (site compound, storage bunds and haulage routes).

8.4 Potential mitigation for construction impacts

- 8.4.1 Potential landscape and visual amenity effects during construction could be mitigated to some extent. Potential mitigation work considered to date includes:
- retain and protect existing vegetation during construction in accordance with best practice;

- where land would be used temporarily, such as for compounds, haul roads, re-grading areas, etc., then this would be returned to a condition suitable for the continuation of its original use, where possible; and
- replacement planting, where removal could not be avoided. The key planting types would include:
- Woodland and shrub planting, with a choice of species reflecting local conditions that, where possible, integrate into existing woodland areas and help to provide screening.
- Linear belts of trees and shrubs where required, where planting areas are limited or to mitigate hedgerow losses as a result of construction.

8.4.2 Some residual landscape and visual amenity effects during construction were identified as being likely to remain significant, despite mitigation. For example, this would be the case for visual amenity effects from highly sensitive receptors where views would be close at hand and impossible to screen effectively.

8.5 Potential impacts during operation

8.5.1 While it is unlikely that the AHLV on the Boldon Hills and the West Boldon Conservation Area would be directly affected by the scheme, the diversion of overhead power lines crossing the A19 to underground routes would result in the removal of three pylons within Mount Pleasant Marsh. This would result in a minor beneficial impact for longer-distance views across the countryside to the west, due to the reduced

number and altered arrangement of electricity pylons around the junction.

8.5.2 A new raised carriageway at the junction would change the landform from a flat to a locally-raised profile, with embankments up to 7.5 m high at the overbridge locations.

8.5.3 Likely effects on views include adverse change in views as a result of new earthwork features, more open views of traffic due to vegetation loss, raised traffic on the A19 over Testos junction.

8.5.4 In terms of night-time views (or in poor weather conditions), vehicle headlights, and in some cases brake lights as well, on the elevated A19 would be noticeable from certain residential properties in the vicinity. These lights would also be visible in distant views towards the junction from the west, elevated above the existing road level.

8.5.5 Highway lighting and signage (especially gantries, which would be up to 10 m tall) would be visible from many visual receptors within the study area. These would be visible during the day and night, with some receptors seeing noticeable changes in night-time views towards rural areas where the existing views consist of dark areas with no noticeable street lighting.

8.5.6 Mitigation vegetation (landscape planting) would largely eliminate potential impacts on views from the West Boldon Conservation Area. However, there may be glimpses of larger vehicles using the A19 through gaps in existing vegetation and other visual barriers.

8.6 Potential mitigation for operational impacts

8.6.1 The following mitigation measures have been considered as part of this EIA:

- Minimise loss of existing vegetation and retention wherever possible.
- Reinstatement or replacement of existing woodland blocks, hedgerows and individual trees lost during the construction phase, particularly around both junctions and along the west and east of the A19.
- Planting of native tree and shrub species in keeping with local landscape character.
- Planting of variety of grassland, including species rich grassland, within the highway estate, to increase local biodiversity.
- Design to include landscape areas that provide habitat links between existing and proposed vegetation.
- Retain views to local landmarks to help create a sense of place for drivers.
- Design of structures, walls and fences to reflect local landscape character and pattern.

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 level¹¹ and Planning Inspectorate Guidance on Habitat Regulation Assessment (2013)¹²;
 - Extended Phase 1 habitat survey: 500 m to either side of the proposed improvements, in accordance

with guidance contained in the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 Habitat Survey¹³; and

- Protected species and specific habitats: survey areas will be defined in accordance with standard survey methods for each species.
- 9.1.4 The information on the ecological environment expressed in this report has been derived from EIA work previously published in the A19 Testos and Downhill Lane junctions Improvement Environmental Assessment Report (2016) and draws on surveys undertaken in 2007 and 2014-16. Some survey work was still ongoing or not yet reported at the time of preparing this document, but will be used for the Environmental Statement.
- 9.1.5 In addition the following organisations/local wildlife groups have been contacted to update any desk based records that would inform the scope of future surveys:
- Environmental Records Information Centre North East;
 - Durham Bat Group;
 - Durham County Badger Group;
 - Durham Bird Club;
 - Durham Local RSPB group, and;
 - North East Reptile and Amphibian Group.

¹¹ Highways England. Design Manual for Roads and Bridges: Assessing the effects on sites protected at a European level (DMRB Volume 11, Section 4) and IAN 141/11.

¹² Planning Inspectorate, 2013. Guidance on Habitat Regulation Assessment (Advice note ten, Version 5).

¹³ Joint Nature Conservation Committee (JNCC) (2010). *Handbook for Phase 1 Habitat Survey*. Available from: <http://jncc.defra.gov.uk/page-2468>

9.2 Existing and baseline knowledge

9.2.1 Figure 5.1 illustrates the indicative environmental constraints for the wider study area, including the locations of designated statutory and non-statutory sites for nature conservation.

9.2.2 There are 6 statutorily protected sites within 2 km of the scheme. These are

- West Farm Meadow Site of Special Scientific Interest (SSSI);
- Hylton Castle Cutting SSSI;
- Hylton Dene Local Nature Reserve (LNR);
- Tiledshed LNR;
- Primrose Nature Reserve LNR, and;
- Station Burn, Boldon Colliery LNR.

9.2.3 All of these sites are on the fringes of the study area and assessment has determined that they would be unaffected by the scheme.

9.2.4 There are a total of 28 Local Wildlife Sites (LWS) located in the study area that spans two local authorities (South Tyneside and Sunderland). Table 9.1 below provides the details of these sites.

Table 9.1: Locally designated sites

Site Name	Description	Distance from the 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	0 m

Site Name	Description	Distance from the scheme
	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.	
Mount Pleasant Marsh	Located southeast of Testos junction, comprising open water, reedbeds, marshy grassland, scrub and woodland habitat (also hosting West Boldon Environmental Education Centre).	0 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, beech, horse chestnut, lime and crack willow.	80 m
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.	100 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.	570 m
Calfclose Burn	Calfclose 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	600 m

Site Name	Description	Distance from the scheme
	have abundant great hairy willowherb and there is a stand of common reed which extends into the channel of the burn.	
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.	730 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.	870 m
Station Burn, Boldon Colliery	The site, which is also designated as a Local Nature Reserve, is a section of the River Don valley north of Boldon Colliery. The majority of the site comprises grassland, ranging from tall neutral grassland to finer more species-rich grassland.	900 m
Hedworth Dene	The site comprises a bowl-shaped area of land bounded by the A19 and railway line. On either side of the River Don there are semi natural neutral grasslands ranging from species rich to species poor.	942 m
Inverness Road Jarrow	Inverness Road is a bowl-shaped section of the River Don Valley bounded by the A19, to the west, and the railway line to the south. Much of the site consists of grassland, dominated by tall plants such as false oat-grass, hogweed and creeping thistle. Locally, the grassland becomes much more species rich, with herbs such as meadow cranesbill and great burnet.	1000 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.	1000 m

Site Name	Description	Distance from the scheme
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.	1200 m
Boldon Colliery Former Railway Line	A length of disused railway embankment which supports unimproved neutral grassland, mature scrub, scattered trees and wet ditch communities. The site is also an important area for wintering long-eared owls.	1300 m
Newton Garths	Newton Garths includes several fields heavily grazed by horses, comprising species-rich, neutral, ridge and furrow pasture sloping down to the River Don.	1300 m
Strother House Farm	The site is situated to the north of Strother House Farm. It comprises an area of marshy ground approximately 0.3 ha in extent, bounded by a ditch to the south and east.	1400 m
Lakeside Inn Felling	The site centres on two small lakes created for angling purposes during the 1990s. Development of aquatic and marginal vegetation is controlled to provide optimum conditions for angling, but nevertheless a wide variety of species are present such as broad leaved pondweed, Canadian waterweed, curly pondweed, yellow iris and branched bur-reed	1600 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.	1600 m
Tilsheds	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.	1700 m
Wardley Colliery	This is a former colliery site mostly comprising a large raised area of colliery spoil. It is the largest	1700 m

Site Name	Description	Distance from the scheme
	'early successional "brown field" site in South Tyneside and its nature and size mean that it is considered to be the most valuable example of its type in South Tyneside.	
Hylton Castle Grassland	Hillside displays Magnesian Limestone grassland and scrub adjacent geological exposures of Ford Formation (reef facies) at Hylton Castle Cutting SSSI.	1840 m
Peepy Plantation	A mature plantation with interesting woodland flora and fauna is also notable for invertebrate assemblage and woodland birds.	1900 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.	1900 m
Monkton Pond and Wood	This is a small pond, together with woodland, adjacent to the Metro line. The pond was created in around 1998 in association with the construction of Monkton Business Park. It acts as a 'balancing pond' in the management of the surface water drainage from the business park.	1900 m
Primrose Nature Reserve	Primrose is a mosaic of wetland habitats created on flood-prone former amenity grassland along the River Don in 1991. It was subsequently designated as a Local Nature Reserve.	1900 m
Follingsby Pond/ River Don	Pond and stream habitats of particular botanical interest exhibit luxuriant flora associated with steep clay river banks and overhanging crack willow.	2000 m

Site Name	Description	Distance from the scheme
Streambank		
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.	2000 m
River Don New Road	The site consists of a section of the River Don leading north from New Road. In this stretch the Don has mostly unmodified riverbank with features such as meanders, eroding earth cliffs, riffles and pools, and dead wood.	2000 m

9.2.5 Previous consultation with South Tyneside/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 EIA.

9.2.6 The habitat types listed in Table 9.2 below are those identified in the study area during the Extended Phase 1 Habitat Survey for previous EIA work. Some particularly sensitive habitats or species are protected under specific legislation, or are listed as species or habitats of principal importance under the Section 41 List of the NERC (Natural Environment Research Council), or the Durham Local Biodiversity Action Plan (LBAP), which incorporates South Tyneside. The table identifies whether those identified are Section 41 or Durham LBAP habitats.

Table 9.2: Habitats identified in the study area

Habitat type	Section 41 Habitats of Principal Importance	LBAP priority habitat
Species poor semi-improved grassland		
Running Water (River Don),	✓	
Standing Water (Boldon Lake, Mount Pleasant Marsh)	✓	
Broad-leaved woodland (Elliscope Farm Copse LWS)	✓	
Marshy Grassland		
Species Poor Hedgerows		✓
Scattered Scrub		
Improved grassland/Arable		
Amenity grassland		
Invasive Weeds		

9.2.7 Eight sections of hedgerow surveyed in the study area were dominated by hawthorn / blackthorn and species-poor. They did not exhibit features that would qualify them as 'important' under the Hedgerow Regulations 1997.

9.2.8 Table 9.3 below provides a summary of the outcome of the protected species surveys:

Table 9.3: Protected species baseline summary

Receptor	Baseline Summary
Amphibians	No great-crested newts (GCN) recorded within 500 m of the proposed options. Other species recorded include smooth newt <i>Lissotriton vulgaris</i> , common toad <i>Bufo bufo</i> (a Species of Principal Importance) and common frog <i>Rana temporaria</i> .

Receptor	Baseline Summary
Otter	Otter field signs recorded on the River Don upstream and downstream of the A19. Field signs included a single direct otter sighting on the River Don in 2015, footprints and a suspected couch/laying up site. Otter are likely to be utilising the entire extent of the River Don within the study area. Based on current data, it appears likely that otter are traversing the A19 utilising the River Don culvert.
Water Vole	Water vole activity was concentrated on the River Don downstream of the A19, with some signs seen on Boldon Lake LWS adjacent to the scheme, and also upstream of the A19, at Make-Me-Rich Farm. No water vole field signs were recorded within wetland habitat at Boldon Lake or Mount Pleasant Marsh. Larger populations of water vole are known to be present further upstream on the River Don, as a result of surveys carried out in 2014-5 for Sunderland and South Tyneside Councils.
Bats	Bats and trees with bat roost potential in the study area included two bat roosts (identified from a desk-based study) over 800 m away from the nearest point of the scheme. Trees with bat roost potential at Elliscope Farm LWS (approx. 180 m west of the A19) were identified in 2007. A pipistrelle bat roost is known to be present at Make-Me-Rich Farm. Common pipistrelle (<i>pipistrellus pipistrellus</i>) foraging and commuting was recorded during activity surveys at: Boldon Lake LWS, Mount Pleasant Marsh LWS, the River Don corridor, Bridleway B46, roadside hedgerow west of the A19, and a hedgerow perpendicular to the A19 in the north of the study area.
Badger	Badger setts were recorded over 1 km away (identified from a desk-based study) from the proposed scheme. No evidence of badger activity within 500 m of the scheme was identified during surveys undertaken in 2007 and updates undertaken in 2010, 2014 or 2015. It was concluded that badgers would not be affected by the scheme.

Receptor	Baseline Summary
Breeding Birds	Breeding birds identified in the study area included a number of species listed on the JNCC "Red List" of birds that are of high conservation concern due to a decline in the UK by 50% or more in breeding population or breeding range over the last 25 years. These included barn owl, kingfisher, grasshopper warbler (<i>Locustella naevia</i>) breeding on the central reservation of the A184 west of Testos junction, grey partridge, song thrush, spotted flycatcher, marsh tit, willow tit, starling, house sparrow, tree sparrow, yellowhammer, reed bunting and linnet.
Barn Owl	Active barn owl nest boxes have been recorded some distance west of the existing A19, and the study area is likely to represent a relatively small proportion of the total foraging resource required to support barn owls. The barn owl boxes identified were regularly monitored during May, June and August 2016 using trail cameras to determine general activity and point counts were been undertaken in May/June 2016 to identify foraging areas. Based on fresh field signs (mainly pellets) barn owl boxes have remained consistently active throughout the monitoring period; however, breeding has not been confirmed to date.
Brown Hare	Incidental sightings, and activity transect surveys, undertaken in 2015 have indicated that brown hare are widespread across the study area.
Invasive Species	Japanese Knotweed was identified north of Testos junction, on the side slopes of the approach ramps to the existing agricultural bridge carrying Bridleway B28 over the A19 as well as on the southern verge of the A184 adjacent to Mount Pleasant Marsh. As an invasive weed, it is subject to a number of statutes which prohibit activities that may cause it to spread to other areas and that control its proper disposal under a permit system. Himalayan balsam (<i>Impatiens glandulifera</i>) was noted along the banks of the River Don east of the A19 from the A19 culvert until it leaves the study area by West Boldon. Japanese rose and Cotoneaster were recorded outside the footprint of

Receptor	Baseline Summary
	the proposals.

9.2.9 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 Testos junction comprises mainly arable, pasture and plantation woodland.

9.2.10 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 Potential impacts during construction

9.3.1 There are a number of ways in which a highways scheme can impact on ecology and nature conservation during construction. These include:

- **Habitat Loss** - is directly attributable to the change of use of the land from countryside to a highway. The offline sections of the proposed scheme to the west of the existing A19, including contractor's compounds, are where these effects are likely to be most significant as the land take is at its greatest. Areas will be lost during construction but

may be restored once construction has been completed.

- **Habitat Damage** - Habitats that extend from the construction footprint include aquatic habitats (River Don, Mount Pleasant Marsh LWS and Boldon Lake LWS) that are sensitive to pollution from fuel and chemicals spills, and from sediment run-off. While best practice construction techniques for pollution prevention and control would be used, there is always a risk that pollution could result while construction takes place. Indirect impacts may also arise on locally designated sites adjacent to the proposals where vegetation may be sensitive to elevated levels of airborne dust from the works.
- **Disturbance** - Disturbance resulting from construction can result in significant effects on sensitive species. This could lead, amongst other things, to abandonment of young, predation risk and use of critical energy reserves. It is assumed that there will already be a baseline of disturbance due to the presence of the existing A19.
- **Severance/fragmentation** - leads to isolation both within and between populations and from specific resources vital for survival. It would initially occur during the construction period through site clearance.
- **Species Mortality during Construction** - Less mobile species, or animals that are young or hibernating, are likely to be those most vulnerable to direct mortality during construction. The effects

of individual mortality erode the population, which can lead to local extinctions once the population falls beneath a critical threshold.

- **Changes in Air Quality**- Vehicle emissions and nuisance dust may increase during construction due to the presence of construction traffic. This can be particularly damaging for sites of floristic importance which support the local ecosystem. It is assumed that there will already be a baseline of effect of air quality on habitats to the due to the presence of the existing A19.

9.4 Potential mitigation for construction impacts

- 9.4.1 As discussed in Section 2.5, it is being considered that the impact of the overhead line diversion works on Mount Pleasant Marsh could be reduced by adoption of an alternative construction method. Where vegetation clearance cannot be avoided, it should be possible to re-plant the majority of the cleared area, as the cables would be protected by robust plastic pipes.
- 9.4.2 The scheme would be designed to avoid direct or indirect impacts on sites designated for nature conservation importance, protected species or valued habitats where possible; mitigation or compensation for such impacts is considered a last resort only if avoidance is not possible.
- 9.4.3 Disturbance during construction is a temporary impact that would be mitigated through the instigation of working method statements that would address potential impacts on species, or where appropriate,

Natural England licences that permit certain activities affecting protected species. This would for instance include removal of vegetation outside of bird nesting periods.

9.5 Potential impacts during operation

9.5.1 There are number of ways in which highway improvements can, in generic terms, affect ecology and nature conservation during operation. These include:

- **Habitat Loss** – As the scheme requires land-take because of the actual alignment of the proposals, there would be some permanent loss of habitat.
- **Severance/fragmentation** - The effects of this could include reduced foraging success, increased competition, genetic isolation and inbreeding, which can lead to local extinctions. In the absence of mitigation the road acts as a barrier across the landscape to a range of species. It is assumed that there will already be a baseline of severance effect due to the existing highway network, and as this is an online scheme increased severance effects will be very limited.
- **Changes in Vehicle Emissions** - in the longer term overall vehicle emissions in some areas would increase and in other areas decrease as a result of the proposed scheme. Sites that are designated for their floristic importance, and any species that depend on them, are particularly sensitive to changes in air quality. Elevated concentrations of oxides of nitrogen (NO_x) are generally considered to be the main threat to

vegetation from vehicle emissions, but normally only within close proximity to the road. An assessment of such effects is only normally required where sites of European or International importance are likely to be affected, and there are no such sites in close proximity to the road or in the air quality study area.

- **Species Mortality (vehicle collisions)** - Many animals are killed on UK roads each year and there is the potential for an increase in deaths due to the proposed scheme, before mitigation is taken into account. Most of these deaths are the result of collisions with vehicles. Animals that are at particular risk include otters, as a result of the severance of their wildlife corridors. There are some mitigation measures that can be employed to reduce the risk of collisions and these will be considered during the ongoing design of the proposed scheme. It is assumed that there will already be a baseline of effect of species mortality due to vehicle collisions given the existing highway network in the study area, and as this is an on-line scheme the potential for significant increases is limited.
- **Disturbance from Road Lighting** - Impacts from lighting are most likely to affect bat species along the alignment of the proposed scheme. The effects of road lighting are complex, but include roost disturbance and abandonment, severance and loss of foraging habitats through avoidance, and a decline in airborne invertebrate prey. Habitats where the impact of lighting can be

particularly severe include habitats along river corridors, woodland edges and hedgerows. There will only be very limited additional lighting as part of this scheme, so the likelihood of a significant impact is small.

- 9.5.2 The scheme would require a small amount of permanent land-take from Boldon Lake Local Wildlife Site, reducing the area of habitat at this locally-designated site. This is required to provide improved facilities for cyclists and pedestrians.
- 9.5.3 Some land would also be taken from the western edge of Mount Pleasant Marsh Local Wildlife Site, to accommodate part of the enlarged Testos junction and improved facilities for horse-riders, cyclists and pedestrians. The land in question is currently occupied by young plantation woodland.

9.6 Potential mitigation for operational impacts

- 9.6.1 A detailed mitigation strategy is being developed to avoid or reduce the impacts described above based on updated desk-based searches and field-based surveys undertaken in 2014. The strategy will seek to employ best-practice methods for dealing in particular with disturbance, habitat loss and habitat severance.
- 9.6.2 Mitigation measures are likely to include:
- maintaining key habitat and wildlife dispersal corridors north-south across the scheme corridor as far as is practicable, using structural planting (in conjunction with appropriate fencing and sensitive lighting to maximise effectiveness) within the design;

- maintaining river corridor habitat and wildlife dispersal along the River Don west-east near Downhill Lane junction as far as is practicable, using both culverts and structural planting, in conjunction with appropriate fencing and sensitive lighting;
- seeking opportunities to maximise habitat connectivity along both sides of the proposed scheme with new landscaping using native, locally appropriate species; aim for no net loss of valued semi-natural habitats; seek to minimise culverting of watercourses and, where unavoidable, design culverts according to current best practice design;
- seeking to increase habitats for key species that are limited by low availability of suitable habitat / connectivity e.g. bats, otter, and water vole;
- adjustments to account for evolving design, including drainage, compounds and storage areas; and
- accounting for new ecological receptors as further surveys and survey analysis develops; adjustments to landscape, visual, noise and drainage mitigation where practicable to broaden habitat opportunities and biodiversity without compromising other mitigation provision.
- In addition to the above, it is proposed that habitat improvements are undertaken at Boldon Lake LWS. The exact extent and details of these proposals will be subject to 3rd party agreement.

- Bat and bird boxes would be included in the final proposals for the preferred option, as an enhancement measure. The exact number and location of bat and bird boxes would be determined at a later stage in the schemes design. Suitable locations occur at Boldon lake LWS, Mount Pleasant Marsh LWS and Elliscope farm/Hylton Bridge LWS.

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, 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 adjacent area. It addresses geology, hydrogeology, soils and soil quality, mineral resources, contaminated land / potential contamination, and designated geological sites. As discussed in Section 7.7, 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 Information on geology and soils expressed in this report has been derived from EIA work previously published in the A19 Testos and Downhill junctions Improvement Environmental Assessment report (2016). Enquiries to external bodies, such as local councils may need to be updated as part of the current environmental work.

- 10.1.4 The study area will extend to the footprint of the scheme and immediately adjacent land.

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. 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 vicinity of the scheme.
- 10.2.3 The site is underlain by a minor aquifer, probably made up of fractured rocks which do not have a high primary permeability. Although aquifers of this type will seldom produce large quantities of water for abstraction, they can be important both for local supplies and in supplying base flow to rivers. The aquifer is overlain by low permeability glacial deposits at the surface.
- 10.2.4 The surface soils are classified as soils of low leaching potential, where 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 The site is believed to be underlain by mine workings in six seams at between 380 m and 610 m depth. The last recorded date of working of these seams is 1981, and consequent ground movement should have ceased. There are two recorded mine entries, both of

which are located approximately 150 m northeast of the existing Testos junction. Anecdotal accounts suggest that the wetlands at Mount Pleasant Marsh and Boldon Lake may have formed in hollows created by mining subsidence. Deep mining can give rise to such features within a short period during or after mining activity.

10.2.6 The following potential sources of contamination have been identified:

- The existing A19 may be a source of leaked fuels and hydrocarbons, bitumen, brake fluids, antifreeze, road salt and herbicides
- electricity sub-station to the east of the A19;
- former petrol station on the site now occupied by Enterprise-Rent-a-Car to the west of the A19 / A184 junction;
- burnt shale 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;
- former brickworks and quarries to the east, northeast and southeast; and
- a former mineral railway line crossed by the A19 north of Downhill Lane junction.

10.2.7 The ground investigation carried out during the 2007 ground investigation¹⁴ generally encountered natural

deposits, although some local surface materials gave evidence of being reworked and contained some inert man-made materials, particularly brick fragments. However, no evidence of burnt shale was encountered.

10.2.8 Exploratory holes adjacent to the former petrol station and the electricity sub-station did not reveal visual or other evidence of contamination. Concentrations of all relevant chemicals were found to be below levels which pose 'potentially unacceptable risk' (as per guidance).

10.2.9 Enquiries made to the state veterinary services indicated that there are no animal burial sites within the vicinity of the scheme.

10.2.10 No high or very high sensitivity receptors were identified on the site. In general terms, medium-sensitivity receptors include:

- Designated sites e.g. Boldon Lake, Mount Pleasant March and Make-Me-Rich Meadows;
- Agricultural land whose quality is classified as 'Grade 3b' on both sides of the A19; and
- Surface water courses.

10.3 Potential impacts during construction

10.3.1 Highway construction can affect geological and soil resources, while the nature and condition of soil and underlying rocks can be a key constraint on scheme design. Under some circumstances, construction work can also compound the environmental effects caused by previous activity, for instance by mobilising pollution left in the ground by former industrial activities.

¹⁴ Bullen Consultants (2004). A19 Testos junction Stage 1 Scheme Appraisal Report.

10.3.2 Based on the baseline environment described above, potential impacts during construction may include:

- disturbance of potentially contaminated land;
- remobilisation of residual pollutants (i.e. pollutants that are already present, but stable and inactive in their present condition);
- creation of new pollution pathways (i.e. routes by which pollutants can reach environmental receptors that are vulnerable to their effects);
- contact with unrecorded mineshafts;
- alteration of the physical and chemical characteristics of the soil and in turn the potential to increase erosion and transfer of pollutants to surface water, restrict root growth and drainage, reduce recharge of aquifers and cause surface ponding of water; and
- disturbance of groundwater flow paths.

10.4 Potential mitigation for construction impacts

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

- protective measures put 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 of topsoil in a manner to retain its potential for plant growth including careful stripping, handling and placement;
- defined access routes to prevent overrun of topsoil where possible.
- stripping, careful handling and storage of soils where necessary; and
- careful soil replacement

10.5 Potential impacts during operation

10.5.1 Operational impacts can arise due to the permanent presence of the road improvement, as well as due to maintenance and use of the road. Potential impacts can include:

- alteration of the physical and chemical characteristics of the soil which can be on-going after construction, and in turn the potential to increase erosion and transfer of pollutants to surface water, restrict root growth and drainage, reduce recharge of aquifers and cause surface ponding of water;
- the benefit of any remediation of areas of existing contamination carried out during construction (i.e. a beneficial effect in future years); and
- disturbance of groundwater flow paths.

10.6 Potential mitigation for operational impacts

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

- design measures which 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

Directive¹⁵ 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 The understanding of the material environment expressed in this report has been derived from EIA work previously carried out and from the A19 Testos and Downhill Lane junctions Improvement Environmental Assessment report (2016). Certain information has been reviewed through published sources¹⁶. However, 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 (see Chapter 2 for detailed descriptions of the proposed works).

¹⁵ European Directive 2006/12/EC, as amended by Directive 2008/98/EC

¹⁶ Such information would include 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).

- 11.1.9 The construction site is deemed to include the full footprint of the A19 junction Improvement, 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 Testos scheme needs about 85,000 m³ of general fill material to build embankments. The A19/A1058 Coast Road scheme to the north of Testos junction will create a total surplus of excavated material that exceeds this amount.
- 11.2.2 The schemes are only approximately 8 km apart, making bulk material transport between the sites a feasible proposition. As there is a time difference between the Coast Road construction works, which has already started, and access to the Testos site, a suitable temporary area or areas will need to be identified for material storage.
- 11.2.3 This proposal presents a sustainable alternative to both disposal of the Coast Road material, and other import options for Testos junction, should it prove feasible. Other import sources for Testos are not confirmed, but the three known closest alternative options are further than 10 km away. For the Coast Road scheme, delivery of material to Testos rather than disposal at an alternative location would significantly reduce the distance that the material would have to be transported.

- 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 and up until the scheme is operational.

Local landfill capacity - South Tyneside waste planning authority

Non-hazardous

- 11.2.5 There is currently no landfill or waste treatment capacity in South Tyneside for non-hazardous waste. All such waste is exported to neighbouring local planning authorities. It is anticipated that this will remain the case in the near future.

Hazardous

- 11.2.6 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

- 11.2.7 In 2014 the total waste arisings for the Tyne and Wear Sub-region was 697,000 tonnes. This compares to an existing waste disposal capacity in the same year of 740,000 tonnes, meaning there was an additional capacity of 43,000 tonnes. There is a projected falling trend in both arisings and disposal capacity.

Regional landfill capacity - North East of England

Non-hazardous

- 11.2.8 In 2011 2.3 million tonnes of residual waste was generated in North East England, 1.34 million tonnes of which was landfilled and 0.6 million tonnes used to generate energy.
- 11.2.9 Estimates of existing landfill capacity in North East England were equivalent to 1.8 million tonnes in 2011 per annum, decreasing to 0.24 million tonnes per annum by 2030.
- 11.2.10 Adopting baseline forecasts given in the *Model of Waste Arisings and Waste Management Capacity for the North East of England Waste Planning Authorities* (2012), this translates to a shortfall of capacity equivalent to 49,000 tonnes per annum by 2018, increasing to 312,000 by 2021.

Hazardous

- 11.2.11 North East England has considerable capacity for the treatment and disposal of hazardous wastes and imports such wastes from various parts of the UK.
- 11.2.12 Arisings for north east England (ignoring waste water and related treatment) are some 157,000 tonnes per annum. These arisings are not expected to change significantly over the forecast period which runs to 2030.
- 11.2.13 This compares to a regional hazardous landfill capacity of some 770,000 tonnes annually (2010) and 122,000 tonnes of treatment capacity, indicating sufficient capacity to cope with any hazardous waste that may

arise through the A19/A184 Testos Junction Improvement Scheme.

11.3 Potential impacts during construction

- 11.3.1 Construction of the proposed scheme is likely to require the production, procurement, transport and use of construction materials, including bulk materials for earthworks, concrete, steel and other structural material, pre-cast or prefabricated concrete, steel or other components, road surface material, timber used in temporary works (e.g. hoarding, shuttering) or in the permanent works (e.g. fencing), and other materials as required.
- 11.3.2 Construction work would also result in the production of construction wastes, including surplus topsoil or subsoil materials arising from the earthworks, surplus materials not used as intended, any hazardous or contaminated material found on site, vegetation and other above-ground materials produced by site clearance, and demolition wastes.
- 11.3.3 A potential material source for the scheme is the A19 / A1058 Coast Road junction Improvement which is being carried out to the north of the Testos junction at a distance of approximately 8.3 km (5.2) miles.
- 11.3.4 If material cannot be sourced from surplus excavated material produced by the Coast Road scheme, then it is likely to be imported from further afield. This will have additional environmental impacts associated with increased vehicle use and material storage. Other potential import sources for the Testos scheme are not yet confirmed, but the three known closest alternative options are all further than 10 km away.

- 11.3.5 A previously considered alternative bulk fill material was 'Pulverised Fuel Ash', which represents sustainable re-use of a waste material, but which also requires careful handling to prevent unintended environmental effects. At this stage the continued availability of this material is not yet confirmed.
- 11.3.6 Whatever the source, import of material would create additional heavy duty transport movements, including increased vehicle use, which could affect the local highway network. Similarly, if waste material cannot be reused and must be sent to a landfill further afield, this too will result in increased vehicle use and associated environmental consequences, including the depletion of landfill capacity, which is a finite resource in itself.

11.4 Potential mitigation for construction impacts

- 11.4.1 Mitigation may include designing slope angles along the scheme at the steepest angle possible (without using reinforced soil slopes) in order to minimise the quantities of imported material and the amount of land required to build the scheme.
- 11.4.2 It is recognised that there is a tension between the desire to design the scheme with the steepest possible slopes to reduce material import requirements and land-take, and the needs of other environmental disciplines. For instance, very steep slopes may limit or preclude planting and establishment of trees and shrubs or make them impracticable to maintain. Gentler slopes may therefore be required to allow the

design and implementation of ecological, landscape and visual mitigation and its ongoing maintenance.

- 11.4.3 It is understood at this stage that the scheme is likely to generate a surplus of topsoil. Where possible, this will be re-used in the environmental mitigation design.
- 11.4.4 If used, the use and storage of Pulverised Fuel Ash requires care, especially in windy or wet conditions, to prevent environmental effects. Precautions would be put in place in the Construction Environmental Management Plan to address these issues.
- 11.4.5 Although it is not a legislative requirement, a Site Waste Management Plan (SWMP) will be produced to identify additional mitigation methods for mitigating material-related impacts.

11.5 Potential impacts during operation

- 11.5.1 No significant impacts are expected in relation to materials and waste during the operation of the scheme.

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.
- 12.1.3 Sound is measured in decibels (dB). However, the sensitivity of the human ear varies with frequency. Therefore, most everyday noise is measured in decibels (dB(A)), the (A) indicating that the measured level has been modified to allow for this phenomenon.
- 12.1.4 To measure noise, the 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	Description of where found or threshold
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car

60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1 m away
110 to 130 dB(A)	Jet aircraft on take-off
140 dB(A)	Threshold of pain

- 12.1.5 The study area for the assessment of noise is primarily defined as 600 m around the proposed new or altered highways and sections of existing roads within 1 km of the proposed scheme that are predicted to be subject to a change in noise level of more than 1 decibel (dB(A)). The distance of 600 m is considered to be the distance that receptors are likely to be sensitive to traffic noise in accordance with the guidance in the DMRB. Beyond this distance, the noise levels are less discernible or are masked by other noises within the environment.
- 12.1.6 Existing roads subject to a change of 1db(A) or more will be identified from traffic forecasts that predict an increase in flow by at least 25% or decrease by 20% in the proposed scheme opening year (excluding those where the predicted traffic flow was less than 1000 vehicles per 18 hour day in both with-scheme and without-scheme scenarios). Collectively these are called “affected routes”.
- 12.1.7 The understanding of the noise environment expressed in this report has been derived from EIA work published in the A19 Testos and Downhill junctions Improvement Environmental Assessment report (2016). For this topic, this represents a joint assessment of the effects of the two schemes taken together. This is for the following reasons:

- This is the most recent and up-to-date noise and vibration assessment available for the scheme;
- The most recent traffic data prior to preparation of this chapter was a combined forecast for both schemes.

12.2 Existing and baseline knowledge

12.2.1 The numbers of residential properties present within 100 m either side of the centre-line of the proposed scheme have been estimated and divided into two distance bands. This was determined based on Ordnance Survey (OS) mapping.

12.2.2 The number of properties in proximity to the scheme was estimated as:

- 0-100m: 45
- 0 –20m: 1

12.2.3 Noise monitoring was undertaken at four locations in 2014 in order to establish the existing noise environment in the area of the proposed scheme. This is likely to be indicative of the current noise environment, but certain characteristics of the study area may have changed in more recent years, which could affect existing noise levels. Three different measures of noise were recorded; those reported below are the highest of the three, the 'worst case' scenario (this is the noise level exceeded only 10% of the time – i.e. 90% of the time it was quieter than this):

Daytime noise

- Make-me-Rich Farm: 64 dB

- Scots House: 64 dB
- West House Farm: 62 dB
- 79 Foxhomes: 66 dB

Night-time noise

- Make-me-Rich Farm: 58 dB
- Scots House: 57 dB
- West House Farm: 55 dB
- 79 Foxhomes: 60 dB

12.2.4 As a form of verification, measured noise levels were compared with expected noise levels, calculated using NoiseMap 2000©, based on available traffic flow information. The match between the measured and expected noise levels at the monitoring locations was fairly close, indicating that the measurements were likely to be reasonably representative.

12.3 Potential impacts during construction

12.3.1 Potential noise impacts from transport schemes can relate to changes in road traffic or construction activities. While noise impacts derived from road traffic during operation of the scheme would continue in the long term, any impacts associated with construction would cease at the end of the construction period.

12.3.2 Although there is no evidence that traffic-induced airborne vibration could cause even minor damage to buildings, it could be a source of annoyance to local people, causing vibrations of doors, windows and, on occasions, floors of properties close to the route. Ground-borne vibration effects could potentially be

produced during the construction phase if percussive piling or compaction techniques are used in close proximity to receptors and could be the source of annoyance to local residents.

12.3.3 Factors expected to influence noise levels perceived at nearby properties, as identified in the pre-2009 EIA work, include:

- existing noise levels;
- type and number of activities;
- type of plant;
- distance from noise sources;
- topography; and
- wind direction.

12.3.4 The EIA work identified that noise and vibration impacts would vary throughout the construction period, and would be dependent on the contractor's chosen method of working and on the timing and phasing of certain operations. Whilst there is the potential for relatively high noise levels at particular locations for short periods, the long, narrow nature of the site should ensure that the location of the main working areas changes on a regular basis. This would limit the duration of exposure of any one receptor to high levels of construction noise.

12.3.5 Vibration from construction projects is generally caused by general equipment operations and tends to be highest during soil compaction, earth-moving, piling and the use of jack-hammers. It is likely that the bridge abutments and piers will be piled. However, a

non-percussive piling technique will be used to reduce noise. The noisiest planned activities are considered to be sawing and jack-hammer work associated with cutting surface joints, and white-lining. Also, loop-cutting could also involve sawing and jack-hammer work.

12.3.6 The nearest individual residential properties to the proposed works would be Make-Me-Rich Farm and West House Farm farmhouse. However, construction works near Make-Me-Rich Farm would be limited and relatively transient. Therefore, it considered construction noise impacts to be very limited. The EIA found that larger-scale construction works would take place near West House Farm farmhouse, and the potential for noise nuisance during construction needs to be considered in light of the potential mitigation measures available (see below).

12.4 Potential mitigation for construction impacts

12.4.1 Potential mitigation measures that could be employed on site to ensure that noise 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.

12.5 Potential impacts during operation

12.5.1 Potential operational impacts include increased traffic noise. This could be caused by increased speeds, which follow from reductions in congestion. In addition, new slip and connector roads could take the traffic, and therefore noise, closer to some receptors.

12.5.2 Seventeen receptors were selected as 'sample receptors'. These are properties positioned at locations selected using professional judgement, close to the scheme or to 'affected roads'. Each is deemed to be representative of a larger group of receptors in the wider surrounding area, and was selected on the basis that it would be likely to experience the greatest impact of properties in that group. These example receptors included:

- residential properties in Hedworth;
- residential properties in Boldon Colliery;
- West House Farm;

- Mount Pleasant Marsh Local Wildlife Site (which hosts West Boldon Environmental Education Centre);
- Make-Me-Rich Farm;
- residential properties and farms on Downhill Lane and Follingsby Lane to both east and west of the A19;
- residential properties in the Town End Farm area south-east of the scheme.

12.5.3 Computer modelling of noise changes due to the scheme determined that the introduction of the scheme would result increases in noise at some sample receptors compared to the 'do nothing' scenario, in the short term (i.e. in the year of opening the scheme to traffic). However, the majority of these increases are of less than 1 dB and are therefore not perceptible to the human ear. Increases of between 1 dB and 1.6 dB in the opening year were identified for three sample receptors:

- 33 Holland Park Drive: +1.4 dB. This receptor is located to the north of the scheme and the increase is attributed to increased traffic and speed on the A19.
- Hylton Grove Farm Cottage, Follingsby Lane: +1.6 dB. This receptor is located to the west of Downhill Lane junction and the effect is more likely to be associated with that scheme than the Testos scheme. Note that modelling for this scheme does not take account of proposals associated with the IAMP to close Follingsby Lane to vehicular traffic.

- The Chalet, Washington Road: +1 dB. This is on the lower edge of perceptibility. The receptor is located to the south-west of Downhill Lane junction and the effect is more likely to be associated with that scheme.

12.5.4 In addition, four sample receptors would experience noise reductions of less than 1 dB, while two would experience no change, in the short term.

12.5.5 In the longer term, the human ear can perceive only changes in noise of 3 dB or more. An assessment of longer-term noise changes (up to 15 years after opening) identified no increases of this magnitude at any sample receptor. Most increases remained under 1 dB; three were between 1 and 2 dB; and the largest was +2.6 dB, at Hylton Grove Farm. Note the comments above about effects at this receptor. Again, there were some insignificant decreases in noise.

Wider surrounding area

12.5.6 There are three 'Noise important areas' in the study area, as follows:

- In part of Fellgate, adjacent to the A19;
- On Addison Road, adjacent to the A184 east of Testos junction;
- In part of the Hylton Castle Estate area, east of the A19 and south of Downhill Lane junction.

12.5.7 The assessment found that there would be negligible changes in noise at the Addison Road and Hylton Castle Estate areas. However, there could be a minor

(i.e. between 1 and 3 dB) noise increase in the short term in the Fellgate noise important area.

Vibration

12.5.8 All residential properties were found to be located more than 40 m from the scheme. It was therefore assumed that there will be no impact from vibration.

12.6 Potential mitigation for operational impacts

12.6.1 Potential mitigation measures to prevent adverse noise impacts during operation can include:

- environmental bunds and barriers;
- quieter road surfacing; and
- noise insulation.

12.6.2 All of the noise impacts on receptors are identified as being of 'minor' magnitude and short-term only. The majority are located along the A19 north of the scheme and are associated with speed increases due to congestion relief. Part of this area coincides with the noise important area at Fellgate. Potential mitigation measures for these impacts will be considered in preparation of the Environmental Statement.

12.6.3 The remaining Noise Important Areas would experience only negligible changes in noise. However, Highways England is committed to reducing noise levels wherever possible in Noise Important Areas. Potential opportunities to achieve improvements in these areas will be explored in preparation of the Environmental Statement. It is noted that the Addison Road area is not on the strategic road network.

13 PEOPLE AND COMMUNITIES

13.1 Introduction

- 13.1.1 This chapter covers the effects of the scheme on people and the communities that live in the vicinity of the A19 Testos junction. This includes owners and users of private property, users of community land and facilities, stakeholder groups within the local area, vehicular travel, travel by public transport, non-motorised transport (pedestrians, cyclists and horse-riders) and the local economy.
- 13.1.2 Information on the existing environment for people and communities expressed in this report has been derived from EIA work previously published in the A19 Testos and Downhill Lane junctions Improvement Environmental Assessment report (2016), and previous work focusing on Testos junction alone.

13.2 Existing and baseline knowledge

Private property

- 13.2.1 There are no residential properties directly adjacent to the A19 in this area. However, two isolated residential properties are located close to the west side of the A19 within the scheme area (West House Farm and Make-Me-Rich Farm). In addition, residential properties in the Hedworth estate and in Boldon Colliery lie close to either side of the A19 just to the north of the scheme, while the Town End Farm estate lies east of the A19 to the south-east of Downhill Lane junction.
- 13.2.2 Boldon Business Park lies to the north-east of Testos junction, separated from the A19 by a belt of trees.

Enterprise Rent a Car lies on the A184 just west of Testos junction.

- 13.2.3 National Grid own a large electricity sub-station immediately south-east of Testos junction, within wooded grounds also used by West Boldon Environmental Education Centre and designated as a Local Wildlife Site. Part of the sub-station is operated by Northern Power Grid, who own several sets of overhead power lines crossing the A19.
- 13.2.4 The Nissan car manufacturing plant lies to the south-west of Downhill Lane junction and is a significant employer in the area.

Agricultural land and businesses

- 13.2.5 Most of the land required for the scheme is farmland, mainly lying to the west of the existing A19, with some smaller areas of farmland to the east. An agricultural desk-based assessment and walkover survey suggested that all of the agricultural land in the vicinity of the proposed improvement scheme is likely to fall outside the 'best and most versatile' category.
- 13.2.6 Agricultural land use in the study area is mainly mixed arable, with some grazing livestock, including horses. Arable cropping was mainly cereals (wheat and barley) in rotation with oilseed rape. Some smaller permanent pasture fields around Downhill Lane junction are understood to be utilised for grazing, including by horses. No intensive beef cattle, dairy, pig or poultry enterprises lie within close proximity to the scheme.

13.2.7 The farming units listed below were identified in the vicinity of the proposed junction improvements. These were:

- Elliscrope Farm, Follingsby Lane, West Boldon;
- Make-Me-Rich Farm, Downhill Lane, West Boldon;
- West House Farm, Newcastle Road, West Boldon;
- Land at Downhill Lane junction;
- Glebe Farm, Newcastle Road, West Boldon;
- Wheathill Farm, Whitburn.

Community land and facilities

13.2.8 Two areas of relevant community land or land used by the community have been identified:

- Boldon Lake Local Wildlife Site – although privately owned, the site is unfenced and in part open to the public;
- West Boldon Environmental Education Centre – this is a key educational facility, hosted by National Grid within land surrounding the electricity sub-station, which is designated as Mount Pleasant Marsh Local Wildlife Site;
- In addition to the above, areas of land adjacent to the River Don, 1km north-east of the scheme, and adjacent to Calfclose Burn, 1km north-west of the scheme, are designated as public open space.

Communities

13.2.9 The key communities in the study area are:

- Fellgate and Hedworth, South Tyneside;

- Boldon Colliery, South Tyneside; and
- Town End Farm, Sunderland.

13.2.10 West Boldon lies slightly further away to the east. A traveller caravan accommodation site lies on West Pastures, a lane lying to the west of Testos junction.

Development land

13.2.11 A large area of land to the west of the A19 and north of the Nissan plant is proposed for removal from the green belt and development as an 'International Advanced Manufacturing Park'.

Non-motorised users

13.2.12 Public rights of way, cycle paths and roads in the vicinity of the proposed junction improvements are illustrated in Figure 14.1 (see Chapter 14) and described below.

13.2.13 **Footpath B27** runs eastward from a minor road known as 'West Pastures lane', crosses the A19 south of Mount Pleasant Marsh, and joins Bridleway B46.

13.2.14 Users of this footpath have to cross the A19 at-grade, via a gap in the central reservation safety fence, at a location approximately 240 m south of Testos junction. The conflict between pedestrian and high-speed vehicular traffic appears to make pedestrians reluctant to use the route, and the crossing is certainly a significant safety hazard. This problem is compounded by the lack of any warning to motorists that there is a pedestrian crossing point.

13.2.15 The surveys identified only low levels of usage of B27. Surveys in 2006 showed that despite the danger of

crossing the road and the condition of the footpath, crossings of the A19 were occasionally made. In 2014 pedestrian use of the B27 was recorded but not of anyone crossing the road.

- 13.2.16 **Bridleway B28** runs westwards from Boldon Business Park, crossing the A19 via a former agricultural accommodation bridge ('West House Farm Accommodation Bridge') and turning south to reach the A184 west of Testos junction. There are no facilities for onward travel from this point to allow horse riders or cyclists to safely cross the A184 or to continue in either direction along or parallel to the A184, or to gain access to the quieter lanes and more desirable riding routes to the south. There is provision for pedestrians in the form of a footway along the north side of the A184 between Testos junction and the next junction to the west, at White Mare Pool.
- 13.2.17 The bridleway is in fairly good condition. However, there is very little room for users (particularly horse-riders) to manoeuvre at the junction with the A184, whether they wish to cross the dual carriageway or to travel westwards along the narrow and uninviting footway. The east end of the bridleway (within Boldon Business Park) is narrow, rough and overgrown. For cyclists, it would only be passable for all-terrain bikes or dismounted.
- 13.2.18 Although only pedestrians and cyclists were seen using the route during the 2006, 2014 and 2015 surveys, there is evidence to suggest that it is regularly used by horse riders. The local representative of the British Horse Society has indicated that horse riders use the bridleway as part of a route that includes West

Pastures lane, and that they therefore have to cross the dual carriageway. Interview data suggested that most of the pedestrian/cyclist use recorded in the 2006 survey was recreational, but that most was for work purposes in 2014. It is likely that suppressed demand is due to poor crossing facilities and little room to manoeuvre at the junction with the A184.

- 13.2.19 **Bridleway B46** (the 'Don Valley Footpath') follows an old railway south from the A184 / B1298 roundabout (east of Testos junction) to the eastern boundary of the A19, with a link onto Downhill Lane. The route is in good condition and passable to all users, with the following provisos (identified through site inspection in November 2016):
- At the northern entrance, there is a 'horse stile', formed by a railway sleeper placed across the path. The gaps to either side are narrow and it is not clear whether disabled users in wheelchairs or disability scooters would be able to enter.
 - At the southern junction with Downhill Lane, there has been damage to the surface during roadworks and it has become much rougher than the rest of the bridleway.
- 13.2.20 Surveys in 2006, 2014 and 2016 showed that the bridleway is regularly used by pedestrians and cyclists for recreational purposes, and for commuting to the Nissan car plant in Sunderland. There is also some equestrian use.
- 13.2.21 Cyclists on the bridleway have been observed on several occasions taking a short-cut by climbing over the safety fence of the A19 southbound off-slip road

and using the slip road to access the A1290 and the car plant. This clearly represents a desire line, as it is straighter and more direct than following the line of the bridleway to Downhill Lane. However, it is also a significant safety risk, and at least one collision involving a vehicle and a cyclist has been recorded at the top of this slip road. Surveys in 2016 show that numbers making this short-cut are now low since Downhill Lane junction was reconfigured in 2015, but that it does still occur.

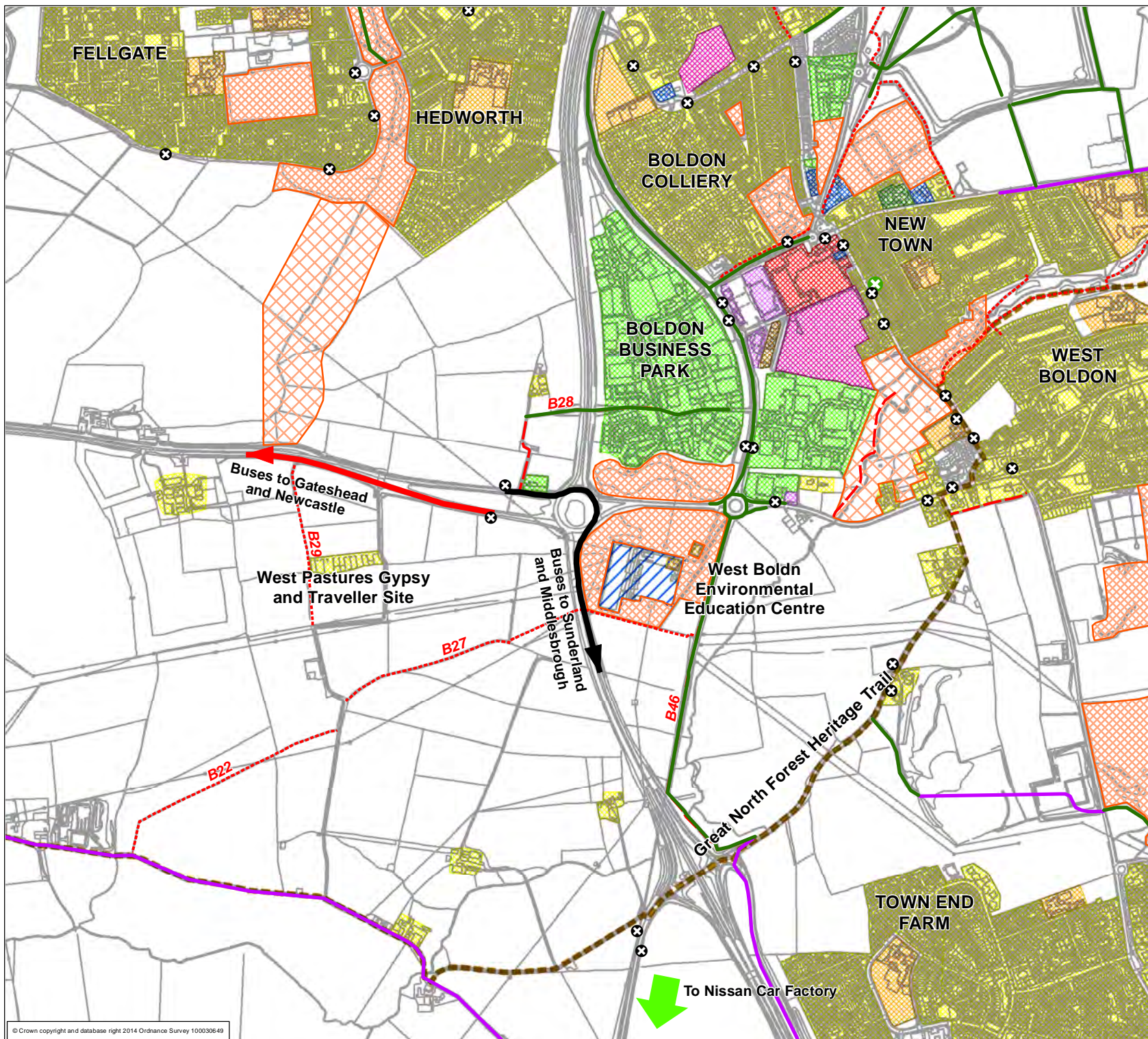
- 13.2.22 **Roadside cycle paths:** A combined off-carriageway cycle path and footpath runs for a short distance along the north side of the A184, either side of the A184 / B1298 roundabout, but not linking to Testos junction. It links with a cycle route running northwards along the B1298 (Abingdon Way).
- 13.2.23 **Roads:** The A184 runs east to west across the study area, meeting the A19 at Testos junction. To the west of Testos junction it is a trunk road and dual carriageway, while to the east it is a single-carriageway and is not a trunk road.
- 13.2.24 The cycle lane on the north side of the A184 does not continue to Testos junction. However, consultation with Sustrans in 2006 indicated that the pedestrian crossing lights on the north side of the roundabout are heavily used by cyclists using the A184 as the main east-west link between Sunderland and Gateshead.
- 13.2.25 To the west of Testos junction, there is a narrow footway alongside the north (eastbound) carriageway only, although there is a junction where Bridleway B28 meets the A184. A narrow, surfaced path crosses the

wide central reservation to provide access to and from the bus stop on the westbound carriageway, but there are no signals or signs to warn drivers of pedestrians crossing.

- 13.2.26 Surveys in 2014 showed that the footway is well-used by cyclists in both directions. Very few cyclists used the westbound carriageway, preferring to use the footway adjacent to the eastbound carriageway.
- 13.2.27 To the south of Testos junction, the A19 leads to Downhill Lane and the A1290. Downhill Lane links north-eastwards back towards Boldon, while the A1290 leads south-westwards towards Washington and the Nissan factory. Downhill Lane itself is part of a recreational route known as 'the Great North Forest Trail'. Surveys in both 2014 and 2016 showed that Downhill Lane is very popular with cyclists.
- 13.2.28 The 2016 surveys demonstrated that cyclist, pedestrian and equestrian traffic continues all year round, and that while a high proportion of it (particularly cyclists) is associated with commuting to Nissan, there is also a substantial recreational demand. Substantial numbers of users, predominantly cyclists but including both pedestrians and horse riders, do cross the A19 via the existing Downhill Lane junction.
- 13.2.29 **Bus stops:** There are bus stops on both sides of the A184 west of Testos junction. The bus stop on the eastbound carriageway is adjacent to the junction with Bridleway B28 and is on the footway. The bus stop on the westbound carriageway is in a bus layby, and accessed only via a path crossing the central reserve from the north side of the A184. The bus service

travels between Sunderland and Gateshead via the A19 and A184, turning at Testos junction.

- 13.2.30 At least one elderly individual attending the 2009 public consultation described how although they regularly travelled by bus to Sunderland, on their return they felt unable to get off at Testos because of the need to cross the A184; instead, they stayed on the bus into Gateshead and returned by bus back to Testos so as to be able to get off on the north (eastbound) side of the road and walk into West Boldon without crossing the A184.



Legend

- ⊗ Health Facility
- ⊗ Bus Stop
- Footpath
- Bridleway
- Traffic-free routes
- On-road routes
- Buses to Gateshead and Newcastle
- Buses to Sunderland and Middlesbrough
- Residential
- Employment Sites
- School, Education or Child Care
- Health Facility including Pharmacies
- Food Shop
- Leisure Facility/Restaurant or Fast Food
- Retail
- Other Community Facility
- Allotment
- Designated Open Space
- Proposed Open Space
- Electricity Sub-Station

Drawing Title

FIGURE 13.1
NON-MOTORISED USERS
AND COMMUNITY

JACOBS
1 City Walk, Leeds, LS11 9DX, UK
Tel: +44(0)113 242 6771 Fax: +44(0)113 389 1389
www.jacobs.com

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Vehicle travellers

Driver stress

- 13.2.31 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 Teeside.
- 13.2.32 Traffic surveys in 2013 estimated flows on the A19 towards Testos junction to be in excess of 25,000 for an average day. According to the 2014 traffic assessment, the major vehicle movements contributing to the traffic flows are as follows:
- Traffic continuing along the A19 in both directions, across Testos junction;
 - Traffic travelling between the A184 west and the A19 south in both directions; and
 - Through traffic on the A184 in both directions.
- 13.2.33 Heavy congestion frequently occurs at Testos junction, leading to drivers experiencing moderate to high levels of driver stress on the majority of links of the road network, particularly during peak hours. Stress levels are highest on the A184 travelling eastbound and the existing A19 travelling southbound.

Local economy and employment

- 13.2.34 As of the 2011 census¹⁷, there were 148,127 people in South Tyneside. The unemployment rate is 6.6%,

greater than that the average for the North-east region (5.4%) or England as a whole (4.4%).

- 13.2.35 Labour market statistics for 2014¹⁸ 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.
- 13.2.36 South Tyneside is relatively deprived, ranking 31st out of 326 local authorities in the Index of Multiple Deprivation 2015¹⁹.
- 13.2.37 As of the 2011 census²⁰, 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%).
- 13.2.38 According to labour market statistics for 2014²¹, 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,

¹⁷ <http://www.neighbourhood.statistics.gov.uk/dissemination/LeadAreaSearch.do?a=3&i=1&m=0&enc=1&areaSearchText=NE33+2RL&areaSearchType=13&extendedList=false&searchAreas=>

¹⁸ <https://www.nomisweb.co.uk/reports/lmp/la/1946157067/report.aspx>

¹⁹ <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015>

²⁰ <http://neighbourhood.statistics.gov.uk/dissemination/LeadDomainList.do?a=7&b=6275267&c=SR1+3SD&d=13&g=6360153&i=1x1003&m=0&r=0&s=1420566196568&enc=1&domainId=58&census=true>

²¹ <https://www.nomisweb.co.uk/reports/lmp/la/1946157068/report.aspx>

education and health in particular was at 36,100 (30.7%), being the largest employer.

- 13.2.39 In Sunderland, 19,800 (16.8%) were involved in manufacturing compared to a national average of 8.5%. Anecdotally, this high proportion of manufacturing employment may to some extent reflect the presence of the Nissan plant and its suppliers (Nissan has around 6,700 staff at its plant).
- 13.2.40 Sunderland is relatively deprived, ranking 38th out of 326 local authorities in the Index of Multiple Deprivation 2015²².

13.3 Potential impacts during construction

Impacts on private property

- 13.3.1 There would be no demolition of private property. Two farmhouses would experience some disruption during construction. Other construction effects relating to noise and air quality are addressed under the relevant topic headings.
- 13.3.2 Temporary road closures or diversions may cause some disruption to the occupants of commercial properties in the vicinity, including at Boldon Business Park.
- 13.3.3 Works to divert statutory services, including the electricity cables originating in the sub-station adjacent to Testos junction, are being coordinated with the relevant undertakers, and are not likely to significantly disrupt the operation of the relevant services.

Impacts on agricultural land and businesses

- 13.3.4 Agricultural land extending to 29.4 ha in total on seven landholdings would potentially be required for temporary uses during the construction period.
- 13.3.5 The temporary uses would be for the contractor's compound and materials storage, soil storage, haul routes and land which would be required for utility diversions.
- 13.3.6 The temporarily used areas would be out of agricultural production for some or all of the construction period, but would be progressively returned to agriculture on completion of their use and replacement of soils.
- 13.3.7 Although included in the draft Development Consent Order (DCO) boundary for acquisition, the intention would be to return these sites to the owner on completion of the restoration.

Impacts on community land and facilities

- 13.3.8 Land is to be taken to build a combined cycleway and footpath from within the southern boundary of Boldon Lake Local Wildlife Site. This could cause a loss of amenity for recreational users of the wildlife site from encroachment onto the adjacent grassland. In addition, the proximity of Boldon Lake Local Wildlife Site to the scheme construction site means that there could be some minor loss of amenity for local users during the construction period, in particular in regard to potential cumulative effects with air quality, noise and vibration and landscape impacts. Ecological effects associated with this loss of land from the local wildlife site are addressed elsewhere.

²² <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015>

- 13.3.9 The scheme would require a small-scale permanent loss of land on the western fringes of Mount Pleasant Marsh Local Wildlife Site, in an area used for teaching by West Boldon Environmental Education Centre (WBEEC).
- 13.3.10 The WBEEC's teaching areas and paths will not be directly affected by construction of the highway or bridleway. However, both the activities of power line diversion and construction will be noisy, and would disrupt the ability of the WBEEC to use these areas as they require. In addition, the works would likely occur through the spring and summer, when the WBEEC is at its busiest period.
- 13.3.11 The WBEEC also has teaching areas on the eastern side of the site, but their ability to use these areas is limited by poor security, as they are not effectively fenced, they are heavily trespassed and often vandalised.

Impacts on communities

- 13.3.12 During construction, the amenity of community members who live near or use land in proximity to the site would be affected by disruption caused by construction activities, as well as adverse impacts on noise, air quality and visual environment. These impacts would be temporary and localised, though together and without mitigation, may affect the overall amenity of a community and present stakeholder groups.
- 13.3.13 Construction activities are also likely to lead to severance, access and connectivity effects through additional traffic, road closures, diversions and general

congestion. These effects would be temporary, but together, could cause disruption at the community level. However, the relatively self-contained nature of the communities to either side of the A19 and the nature of the A19 itself as primarily a strategic through-route rather than a local community route would limit that effect.

Impacts on development land

- 13.3.14 There would be little in the way of adverse effect on land allocations as such, as nearby Boldon Business Park and the travellers' site at West Pastures are fully developed and in operation. There would be a minor infringement on land allocated as green space.

Impacts on non-motorised users

- 13.3.15 During construction, there are likely to be temporary impacts along the majority of the pedestrian, equestrian and cyclist routes in the vicinity of the proposed scheme, resulting in disruption and possible closures.
- 13.3.16 East-west travel along the A184, a popular commuting route, is likely to remain open at most times.
- 13.3.17 North-east to south-west travel via Bridleway B46 or Downhill Lane and Downhill Lane junction to the Nissan plant is likely to remain open at most times, subject to the progress of the separate project to improve that junction. However, Bridleway B46 may need to be closed for around one month to allow construction of an access ramp from the bridleway to the junction for cyclists.

13.3.18 Occupants of the permanent travellers' site at West Pastures are likely to use the verges of the A184 and Bridleway B28 to access facilities in West Boldon, Boldon Colliery and/or Fellgate and Hedworth. During the construction period, users are likely to find their access more difficult.

13.3.19 During construction, it would be necessary to temporarily close Footpath B27 at the point where it crosses the A19.

13.3.20 Bridleway B28 would be permanently closed following the demolition of the West House Farm accommodation bridge.

Impacts on vehicle travellers

13.3.21 During the construction period, the need to travel through road-works is likely to result in short-term delays and route uncertainty.

13.3.22 Without mitigation, it is likely there would be deterioration in the quality of all travellers' views and increases in driver stress levels during the construction period.

Impacts on local economy and employment

13.3.23 Construction impacts on the local authorities of the wider region relate to economic stimulus and employment impacts from spend on the scheme. The scheme will act to stimulate the local job market and increase employment both through direct jobs and indirect and induced employment. In addition, expenditure on the scheme in the local economy will act to stimulate the local market including multiplier

effects so that overall stimulus is greater than the nominal spend in the region.

13.3.24 Any economic and employment effects within the wider South Tyneside, Gateshead and Sunderland local authorities caused by disruption to commuter times are likely to be minimal in respect to this regional scale.

13.4 Potential mitigation for construction impacts

Private property

13.4.1 The effects of disruption during construction on businesses in Boldon Business Park would be minimised or avoided through measures in the Construction Environmental Management Plan. These could include restrictions on the routes to be taken by construction traffic and careful design/timing of temporary road closures or diversions.

13.4.2 The works to divert electricity power cables would be designed, managed and implemented in consultation with the operator (Northern Power Grid) and National Grid (who own the sub-station), in line with standard procedures for the diversion of statutory undertakers' equipment. This would minimise or avoid any disruption to electricity supply or the operation of the sub-station.

Agricultural Land

- 13.4.3 The loss of some Grade 3b agricultural land²³ is unavoidable.
- 13.4.4 A scheme for sustainable use of soil resources within the scheme (a 'Soil Management Plan') would be devised. This would include the restoration to agricultural use of any temporarily used agricultural land, where possible, and the sustainable use of any surplus topsoil produced by the construction process.
- 13.4.5 Maintaining access to farmed land during the works can be achieved, to enable continued farming on all holdings. However, this might involve extended journeys for some occupiers on public roads between blocks of land.

Community Land and Facilities

- 13.4.6 Any temporary loss of amenity at Boldon Lake and Mount Pleasant Marsh Local Wildlife Sites during construction would be minimised through measures in the Construction Environmental Management Plan (CEMP).
- 13.4.7 At WBEEC, it is proposed as mitigation to the temporary impacts of power line diversion and construction, that prior to any works, a 2.2m-high security fence similar to the one already used around West Boldon Lodge within the WBEEC site will be constructed around most of Mount Pleasant Marsh,

excluding only impassable areas of marshland and existing security fence.

- 13.4.8 This security fence will allow WBEEC to transfer teaching activities to the eastern part of the site during construction. Once operational, WBEEC will have a fully secured site and continue to be able to make use of these newly secured teaching areas.

Development Land

- 13.4.9 Any minor, temporary adverse impacts on development land such as that at Boldon Business Park and West Pastures Travellers' Site would be mitigated, where possible, by adhering to the Construction Environmental Management Plan and following standardised construction procedures.

Amenity and community severance, access and connectivity

- 13.4.10 During the construction phase, a Traffic Management Plan including coverage of management of site traffic would be implemented to reduce any increase in stress caused by the roadwork. This would include temporary signage which would be put in place to reduce uncertainty and frustration. During the construction phase two lanes of traffic would remain open in each direction along the A19, which would maintain traffic flow and reduce driver stress levels. The connector roads would be constructed first to allow diversion of A19 traffic to these roads rather than diverting traffic outside of the scheme area. Where full diversions may be required, it is anticipated these would take place at night-time.

²³ Grade 3b agricultural land is considered by the Department for Environment, Food and Rural Affairs system of Agricultural Land Classification as being of relatively low versatility and quality.

13.4.11 A Construction Environmental Management Plan would be implemented to address environmental impacts including impacts on air quality, noise and visual landscape; this would provide mitigation for the reduction in amenity levels caused by works during the construction phase.

Local economy and employment

13.4.12 Effects on the wider region from the construction of the scheme in terms of the local economy and employment would be expected to be positive in terms of job creation and expenditure and so do not require mitigation. No specific measures to enhance these benefits have been identified at this time.

13.5 Potential impacts during operation

Impacts on private property

13.5.1 West House Farmhouse and Make-Me-Rich Farmhouse are located within approximately 100 m of the scheme. These properties are likely to experience minimal impacts resulting from increases in traffic.

13.5.2 For West House Farmhouse in particular, the distance to the A19 would be reduced from approximately 110 m at present to approximately 45 m.

13.5.3 The potential effects of the scheme in terms of air quality and noise vibration are discussed under the relevant topic headings elsewhere in this report.

13.5.4 As the scheme would require no demolition or land-take from commercial properties, the land-use impact on commercial properties is not considered to be significant.

13.5.5 Occupiers of the Boldon Business Park and Enterprise Rent-a-Car would experience slight long-term benefits as a result of reduced congestion and improved safety at Testos roundabout.

13.5.6 There would be no demolition of buildings at the electricity sub-station and land-take would not affect its operation. The scheme does require the diversion of overhead power lines that originate at the substation to run underground, which will result in the removal of pylons.

13.5.7 Two additional sets of cables that currently cross the A19 below ground would also be affected by the loss of pylons at the point where they switch to overhead routes. The existing underground routes would need to be extended, and new pylons provided west of the new A19 boundary.

Impacts on agricultural land and businesses

13.5.8 Four farm businesses would be affected by permanent land-take for the proposed scheme, provisionally taking between 0.5% and 8% of the total land area identified of each farm, based on interim land-take calculations. The fifth farm business would only be affected by temporary land-take.

13.5.9 In addition, two other smaller holdings of agricultural land off Downhill Lane would lose all or part of their area.

13.5.10 The retention of the local road network and use of the Testos roundabout would allow continued access to land on both sides of the new road for all farms.

13.5.11 However, without mitigation, the existing access to agricultural land east and west of the A19 between Downhill Lane junction and the Testos roundabout would be lost.

13.5.12 In addition to the loss of farm access, the impacts include the effects of severing land such as creation of small, awkwardly shaped fields and cutting of land drainage systems.

Impacts on communities

13.5.13 During operation there would be a decrease in travel time between communities and thus an improvement in this regard. Although the overall quantity of traffic could increase, delay times are expected to reduce, again providing a benefit. For the communities to the north of the junction, there would be improved access to the south, while access to Boldon Business Park would be improved for those approaching from the west or south. For communities south and east of the junction, there would be improved access to retail and employment centres in Newcastle.

13.5.14 In relation to public transport, with the scheme, there is expected to be a reduced traffic flow around Testos junction, which would have positive impacts on bus services which use these routes. The addition of a crossing on the A184 to the west of Testos would provide users of the X9 and X10 with an easier and safer way to cross between the bus stop on the westbound carriageway and the footway on the eastbound carriageway. The new bridleway to the south of the A184 westbound would also increase connectivity to the bus stops. It is likely that both the

increased connectivity from the new bridleway and crossing would encourage increased use of these bus services.

Impacts on development land

13.5.15 Operational impacts on development allocations and planning applications are largely expected to be beneficial due to the improved access provided by the scheme.

Impacts on non-motorised users

13.5.16 Footpaths, cycleways, bridleways and minor roads in the vicinity of the scheme can be identified on Figure 13.1.

13.5.17 The reduction in traffic flows around the roundabout, due to the diversion of more than half the traffic onto the flyover, would reduce associated congestion and therefore improve safety for pedestrians, cyclists and horse-riders ('non-motorised users', or NMUs) using the adjacent footways and cycleways. A reduction in congestion would also improve air quality and noise levels around the junction, which would improve amenity levels for NMUs on these routes.

13.5.18 The reconnection and extension of the B27 footpath would increase connectivity between Testos roundabout and routes to the southeast and southwest. Although it would increase journey lengths and durations, the diversion to a signalised crossing at Testos south would replace the existing gap in the central reservation safety barrier and provide a safer route for pedestrians to cross the A19.

- 13.5.19 There would be no direct impact of the scheme on B29 and B22, but increased connectivity on footpath B27 may encourage increased use of these footpaths to the southwest of the junction. The upgraded B27 would allow equestrians, pedestrians and cyclists to join the B46 from the west. It is expected that this improved connectivity would increase usage of the B46.
- 13.5.20 The existing bridleway B28 would be severed through the removal of the former agricultural bridge across the A19 north. However, connectivity between routes to the east and west of the A19 would be retained and significantly improved through the new bridleway link. The alternative signalised crossing facilities would increase journey distances for users travelling to or from the northeast of Testos junction; however, the low levels of equestrian use on the existing B28 indicate a relatively small impact and the journey would be made safer by formalised crossings (rather than the existing stopping point at the pavement of the A184).
- 13.5.21 The new footway, crossing and bridleway along the south of the A184 would allow pedestrians from east of Testos to access the bus stop on the west-bound carriageway of the A184 without having to cross the A184 west of Testos. This may encourage more NMUs to use these bus stops.
- 13.5.22 Suitable segregated crossing facilities on the connector roads between the A19 slip roads to/from Testos junction and Downhill Lane junction would allow pedestrians, cyclists and horse riders to cross safely. These crossings would also ensure that demand for footpath or bridleway usage would not be suppressed due to safety concerns.

- 13.5.23 The new ramp for cyclists at the south end of the bridleway B46 would increase connectivity to Downhill Lane junction, removing the temptation for cyclists and pedestrians to use the A19 south-bound slip road. This would provide a safer, more direct route. It may also reduce the number of cyclists crossing Downhill Lane to the east of the junction in order to continue south-west towards the Nissan plant, which would reduce potential for accidents.
- 13.5.24 A new cycleway along the north side of the A184 west of Testos would provide a link to the upgraded cyclist and pedestrian crossing at the A19 north of Testos junction and the existing segregated cycleway and footway along Abingdon Way. It would segregate cyclists and pedestrians from road traffic on the A184, which would improve the safety of the route. This route is likely to see an increase in use by cyclists due to the severance of the B28.

Impacts on vehicle travellers

- 13.5.25 After completion of the junction improvements, traffic would flow much more freely than it would without improvements.
- 13.5.26 There is a complex pattern of changes in driver stress that varies from link to link on the network around Testos junction and the A19 through-route. On average, however, the scheme results in a reduction in driver stress for the full journey through the network compared to the situation if the improvements are not built.

Impacts on local economy and employment

- 13.5.27 Operational impacts on the local economy and employment in the wider region would be expected in relation to improved access between jobs and the labour market and reduced time and cost in the transport of and access to goods and services across the three local authorities of the wider study area, South Tyneside, Gateshead and Sunderland.

13.6 Potential mitigation for operational impacts

Private property

- 13.6.1 Mitigation options for Air Quality, Landscape and Noise impacts are outlined under the relevant topic headings elsewhere in this report.

Agricultural land

- 13.6.2 Agricultural land quality and farm systems in the study area depend upon effective land drainage in winter for sustainable farming operations. The detailed design of the scheme would take this into account in order to minimise the impact on agriculture through provision of outfalls for land drainage systems. Further work would be undertaken to design and install new land drains on retained or reinstated farmland by agreement as accommodation works.
- 13.6.3 Suitable replacement access points to severed fields and areas where existing access is lost would be required to ensure continued operation of farm units. Without this mitigation some farm units would experience a greater land loss than would otherwise be necessary, increasing the overall adverse effect on the farm.

- 13.6.4 The scheme design would include suitable discharge points for agricultural land drainage systems severed by the new works. This is particularly required for all land on the west side of the A19 between Downhill Lane junction in the south and Hedworth in the north.

Community land and facilities

- 13.6.5 Discussions would be sought with the management of West Boldon Environmental Education Centre and National Grid to identify potential opportunities to provide improvements to the facilities there as part of the project. Initially, this would include the fencing off of previously insecure areas to allow safe use for educational and recreational purposes.

Development land

- 13.6.6 As there would be no significant effect on any extant planning permissions or outstanding planning applications during operation, no mitigation is required.

Amenity and community severance, access and connectivity

- 13.6.7 Effects on communities would be expected to be minimal in terms of amenity after mitigation proposed in other chapters, in particular landscape and visual mitigation. As effects are primarily positive in terms of community severance, access and connectivity, further mitigation has not been identified.

NMUs - Public rights of way, cycle routes and roads

- 13.6.8 Throughout the scheme design, consideration has been given to the NMU strategy through close iterative engagement between the EIA team and the highway

designers, and mitigation has already been incorporated as part of the design. Feedback from consultation with user groups was also fed into the design. All new or altered facilities have been designed with reference to relevant Highways England guidance and the Disability Discrimination Act.

- 13.6.9 Mitigation measures through design include the creation of a bridleway link through a new bridleway along the southern side of the A184 west of Testos, a signalised crossing of the slip roads at the south side of the Testos roundabout, a new bridleway along the western edge of Mount Pleasant Marsh and the upgrading of footpath B27 to the east of Testos to a bridleway to link to the B46; a new cycleway along the north of the A184 west of Testos; an upgraded crossing of the slip roads on the north side of the Testos roundabout; a new footway along the A184 east from Testos to Abingdon Way roundabout; and a new ramp for cyclists linking the B46 to Downhill Lane junction.
- 13.6.10 With the mitigation measures and enhancements already included in the design, no further mitigation measures have been identified.

Driver Stress

- 13.6.11 As part of the scheme, road signs and traffic signals would be used to explain route changes and direct drivers with the aim of reducing uncertainty and driver stress for those drivers using the new road layout. The new section of the A19 would also be designed to a higher highway standard than the existing road, which

would help to reduce uncertainty, fear and driver stress.

Local economy and employment

- 13.6.12 Effects on the wider region from the operation of the scheme would be expected to be positive and do not require mitigation.

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 The understanding of the water environment expressed in this report has been derived from the A19 Testos and Downhill junctions Improvement Environmental Assessment Report (2016), and previous work on the Testos only scheme (including an assessment using the Highways Agency Water Environment Risk Assessment Tool (HAWRAT), Flood Risk Assessment and Water Framework Directive (WFD) assessment).
- 14.1.3 The study area for this topic extends a minimum of 1 km from the scheme, and extends as necessary to incorporate information from the 1 km distance if it is considered relevant.

14.2 Existing and baseline knowledge

- 14.2.1 Figure 5.1 in Chapter 5 illustrates the indicative environmental constraints for the wider study area, including the key water environment features.
- 14.2.2 The River Don rises north-east of Wrekenton and flows in a generally easterly direction under the A194(M) and A195 and mainly through farmland, until it meets the A19 at Downhill Lane junction, approximately 980 m south of Testos 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 River Don has been designated a Main River. 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 WFD 'ecological' status of the River Don has been classified as 'poor' by the Environment Agency. The WFD 'chemical' status has been classified as 'good.'
- 14.2.4 Calfclose Burn, a tributary of the Don whose confluence with the river is over 2 km north (and downstream) of the scheme, lies just over 900 m west of Testos junction. It flows directly northwards, into and through the residential area of Fellgate. It is a Local Wildlife Site, designated for its lowland fen habitats, a priority habitat as defined by the Durham Biodiversity Action Plan.
- 14.2.5 Boldon Lake is a small artificial lake situated directly northeast of Testos junction, designated by the local planning authority as a Local Wildlife Site. The site comprises a lake fringed by marginal vegetation, with a surrounding strip of marshy grassland. Boldon Lake has provision for anglers.
- 14.2.6 Mount Pleasant Marsh is an Local Wildlife Site located at the southeast corner of Testos junction roundabout, and comprises open water, reed-beds, marshy

grassland, scrub and plantation woodland, all surrounding a large electricity sub-station.

- 14.2.7 Make-Me-Rich Meadow is a marshy meadow also designated as a Local Wildlife Site, located near Downhill Lane junction. The meadow is located between the left bank of the River Don and Bridleway B46 (the 'Don Valley Footpath', following the former Stanhope & Tyne Railway). It is believed that the natural conditions that maintain the wetness of the meadow are due to its location within the floodplain of the River Don.
- 14.2.8 There is a Secondary A aquifer²⁴ in the bedrock beneath the project area. There is no aquifer in the superficial deposits. The site is not in a groundwater source protection zone. The groundwater vulnerability beneath the site is mainly classified as low.
- 14.2.9 The Environment Agency's on-line flood maps indicate that Testos junction does not lie within a floodplain. However, the A19 just north of the Downhill Lane junction, crosses over the River Don and its floodplain.
- 14.2.10 Drainage surveys were undertaken to determine the existing highways drainage system. The existing drainage outfalls are located:
- Northeast of Downhill Lane junction;
 - to the east of Mount Pleasant Marsh, approximately 550 m from Testos junction; and

²⁴ i.e. permeable geological layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

- 2 km north of the Testos junction.

14.2.11 A former outfall into Boldon Lake, north-east of Testos junction, is no longer in use and has been sealed shut.

14.3 Potential impacts during construction

14.3.1 Without considering any form of mitigation, the construction of highway schemes has the potential to have impacts on the water environment in the following ways:

- mobilisation of sediments, particularly during earthworks and high rainfall events;
- inadvertent discharge to surface waters or groundwater;
- disruption of groundwater or surface water flows, in particular in areas where excavations are proposed (e.g. road cuttings); and
- the risk that construction works could create new pathways for contaminants to migrate into water receptors; and
- loss of floodplain storage, either temporarily or permanently.

14.3.2 There is also the potential for pollution in surface water runoff or from on-site spills by sediment and polluting substances (e.g. oils, fuels etc.).

14.3.3 There are standard construction techniques and best practices to avoid or reduce these potential environmental impacts as summarised below.

14.4 Potential mitigation for construction impacts

- 14.4.1 During the construction process, best practice would be followed to address the potential impacts detailed above, including the Environment Agency's Pollution Prevention Guidelines. These would all be clearly documented in method statements and a bespoke Construction Environmental Management Plan.
- 14.4.2 For works in the River Don, an Environmental Permit from the Environment Agency would be required. Care would be taken to avoid damage to existing sewers within the vicinity of the works areas.
- 14.4.3 Site drainage would be programmed early in the construction sequence, to ensure that any run-off from the site can be intercepted and controlled. This would include early construction of the proposed permanent balancing ponds and the connection of the construction site drainage to the balancing ponds.
- 14.4.4 Other mitigation would include:
 - 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;

- 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.

14.5 Potential impacts during operation

- 14.5.1 Without mitigation measures incorporated into the drainage design, there is a risk of contaminated road runoff being discharged to the receiving water environment. Potential contaminants can include:
 - fuel and other oil deposits that have leaked onto the road surface;
 - hydrocarbons from exhaust deposits;
 - lead, copper, zinc and cadmium deposits from exhaust emissions and tyre wear;
 - synthetic rubber deposits from tyre wear;
 - chemicals used in windscreen washes such as detergents or de-icer;
 - de-icing agents such as salt, but also potentially including trace amounts of impurities such as cyanide, metals and clays;
 - herbicides from road-side verge maintenance; and
 - chemicals or oils that result from spillage and leakage after traffic collisions.

- 14.5.2 Without mitigation in place, highway runoff has the potential to cause adverse effects on various attributes of the receiving waters, such as water quality, water supply, dilution of waste products, recreation, value to the economy, conveyance of flow, and biodiversity. The effects depend on a number of contributory factors, such as the size of the area of paved surfaces in the highway, volume and composition of the traffic using the road and the amount of water in the water body.
- 14.5.3 The junction improvements would result in a greater area of impermeable surfaces than presently exists, leading to increased volumes of surface water run-off.

14.6 Potential mitigation for operational impacts

- 14.6.1 The proposed A19 Testos junction improvement scheme includes two balancing ponds in the drainage design to attenuate the rate of surface water run-off. They have been designed to achieve no net increase in the rate of runoff prior to discharge into the River Don, and thus no net increase in flood risk.
- 14.6.2 A secondary effect of balancing ponds would be to treat sediment and pollutants associated with highway run-off. In particular, balancing ponds are particularly effective at allowing metals which are present as contaminants in the run-off water to settle out before the water is released into the environment.
- 14.6.3 It is likely that shut-off valves would also be provided, enabling any fuel or chemical spillages to be contained within the ponds.

- 14.6.4 A Hydrodynamic Vortex Separator would also capture and contain oil and sediment in the surface water runoff before runoff is discharged.
- 14.6.5 The mitigation will be reviewed as part of the EIA. The drainage design will be developed in line with current DMRB guidance. At this stage, it is expected that attenuation ponds are likely to form an important part of the design.

14.7 Potential mitigation for operational impacts

- 14.7.1 The 2016 Environmental Assessment Report concluded that the majority of impacts during construction would be neutral. With appropriate mitigation measure in place, it is anticipated that the majority of operational impacts would be neutral or slightly beneficial.

15 CUMULATIVE EFFECTS

15.1 Introduction

- 15.1.1 Two types of cumulative effects will be assessed. The first type is where multiple impacts from the A19/A184 Testos junction Improvement would affect the same receptor, for example if a residential property was affected by noise and also changes in visual amenity. The second type is where the impacts of this project could combine with the impacts of other proposed developments and affect the same receptor(s).
- 15.1.2 The A19 Testos junction Improvement would be planned and co-ordinated in line with other road infrastructure projects within the vicinity to ensure that cumulative effects are managed. In particular, the scheme has a close inter-relationship with the adjacent A19 Downhill Lane junction Improvement. There is significant potential for cumulative environmental effects to occur as a result of the proximity of the two projects, and also for certain types of effect to be minimised through the efficient, coordinated joint delivery of the projects.
- 15.1.3 Potential and “committed” developments have been identified as part of the EIA process, in consultation with relevant stakeholders, in order to assess potential cumulative effects.
- 15.1.4 These projects include, but are not necessarily be limited to:
- An International Advanced Manufacturing Park (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. At the time of writing, the IAMP team are undertaking a consultation on a masterplan for the development site. It is intended that a Development Consent Order application for the IAMP will be submitted in early 2017. Throughout the development of the scheme, Highways England has been in constant communication with representatives from IAMP.

- The Nissan car manufacturing plant is located 1.25 km south of Downhill Lane junction. An extension is proposed to the north of the existing Nissan site and south of the IAMP site. No environmental information was available at the time of assessment.
- Highways England has submitted a DCO application for the A19 / A1058 Coast Road junction Improvement. The DCO application has been approved; construction works commenced in summer 2016 and are scheduled to be completed by March 2019.

15.2 Interactions between topics

- 15.2.1 There are several areas where the impact of the junction improvements on one environmental topic may have knock-on effects on a second topic. In addition, the provision of mitigation measures for one topic may have either adverse or beneficial effects on another topic. The majority of such interactions are

addressed within the individual specialist chapters, and only a summary of certain key aspects is presented here.

Potential cumulative effects

- 15.2.2 Adverse effects on surface water quality and flood risk in the River Don could have knock-on impacts on ecological receptors in the river corridor. However, the provision of balancing ponds to prevent increased flood-risk also provides protection that does not currently exist against pollution from both routine run-off and from spillage events. This would protect and enhance water quality, and therefore should improve existing conditions in habitats used by, for instance, otters and water voles.
- 15.2.3 The creation of new routes for Public Rights of Way increases the land required for the scheme. This has adverse effects on land use, in particular for West House Farm and for Mount Pleasant Marsh. As the latter is a designated Local Wildlife Site (LWS) and is used by West Boldon Environmental Education Centre, this also has implications for ecological receptors and for community assets.
- 15.2.4 Scots House is considered as a visual receptor in the landscape topic, because of the potential effects on residents of changes in the views available from the flats in the house. Visual amenity effects on Scots House are also considered separately in the context of heritage, in relation to the 'setting' of the Listed Building. Although both potential effects relate to the visual impact of the proposed junction improvements, the nature of the effect and the sensitivity of the

receptor differ in these two different contexts. The resulting significance of impact is therefore not the same.

Mount Pleasant Marsh / West Boldon Environmental Education Centre

- 15.2.5 The scheme would require a strip of permanent land-take along the western boundary of Mount Pleasant Marsh. This land is required to permit construction of the new slip-road leading from the roundabout to the raised A19 southbound carriageway, and the construction of a new section of bridleway through this area, linking a new signal-controlled crossing point at the roundabout to the line of footpath B27 (also to be upgraded to bridleway). This would permanently remove a small proportion of the existing plantation woodland within the LWS, with consequent effect on landscape and ecology. However, it is not considered that this loss will significantly affect the operations of West Boldon Environmental Education Centre.
- 15.2.6 Additionally increased noise is likely due to the increased proximity of the highway and the elevation of the main carriageway.
- 15.2.7 The construction of the raised carriageway requires the diversion of existing overhead power lines to new underground routes, where they cross the A19. The pylons associated with the overhead lines would be removed. Three rows of pylons originating within Mount Pleasant Marsh would be affected by the scheme.
- 15.2.8 The works to divert the overhead cables comprise four key elements:

- civil engineering works to provide a new underground route;
- construction of three new pylons and two new smaller cable supporting structures west of the A19 and installation of new underground cables in the underground route;
- connection of the new cables to the electricity distribution network; and
- removal of the redundant overhead cables and of six redundant pylons, including three within Mount Pleasant Marsh.

15.2.9 All of these works would be designed and implemented by the electricity distribution company (Northern Power Grid). All of the works would be purchased by Highways England. Highways England are seeking to implement an opportunity to complete at least the design work, and potentially the delivery of the diversions, early, to facilitate a shortening of the overall construction programme.

15.2.10 The worst case approach to construction methods would involve placing the new cables in an open cut trench. After connection of the new cables to the electricity distribution network, the redundant overhead cables would be disconnected and lowered to the ground.

15.2.11 To facilitate these works, a total of up to 8,000 m² of vegetation would be cleared, divided between three corridors, each up to 40 m wide, along each set of overhead wires. To protect the buried cables, it would probably be necessary to maintain permanent clear

corridors in which the vegetation could not be replaced. This would prevent the full replacement of lost habitat, and would open views from within West Boldon Environmental Education Centre towards the A19 and the southbound on-slip road. There would also be glimpsed views from the road towards the electricity sub-station, a significant visual detractor.

15.2.12 Additionally, safety considerations mean that access would be denied to the western part of the LWS for users of the centre for the whole duration of the works (provisionally, four weeks in winter and six weeks in summer). The area affected by clearance and by temporary denial of access is in regular use by the centre for teaching activities, all year round. It includes a bird-watching/feeding area, with recently-constructed hides, a tree nursery, willow bowers and other features.

15.2.13 Notwithstanding the above adverse effects, in the long term, the removal of three existing pylons within Mount Pleasant Marsh and the overhead lines leading westwards from them would be a beneficial effect for the users of West Boldon Environmental Education Centre.

15.3 Potential mitigation

Interactions between topics

15.3.1 Mitigation and, where relevant, enhancement measures relating to impacts discussed above are addressed in the individual specialist chapters, except in relation to Mount Pleasant Marsh / West Boldon Environmental Education Centre, which is dealt with here.

**Mount Pleasant Marsh / West Boldon
Environmental Education Centre**

- 15.3.2 All of the works would be carried out in accordance with a Specification agreed between Highways England and Northern Power Grid, designed to reduce environmental impact.
- 15.3.3 Where practicable, and subject to an agreement with Northern Power Grid, the civil engineering works east of the A19 would be carried out using trenchless construction methods. It is provisionally intended that this would comprise directional drilling, and the description given here is also provisional pending further discussions with Northern Power Grid.
- 15.3.4 The redundant cables would be removed using scaffolding towers with nets strung between them, again to reduce the amount of vegetation clearance required. Where vegetation clearance cannot be avoided, it should be possible to re-plant the majority of the cleared area, as the cables would be protected by ducts. The pylons themselves would then either be dismantled in-situ, or felled in turn towards the south, avoiding the need for extensive areas of clearance for them to fall into.
- 15.3.5 New underground cable routes would run southwards from within the substation into a field, avoiding the woodland. They would then turn westwards to pass underneath the A19 via directional drilling.
- 15.3.6 Preliminary estimates suggest that implementation of the alternative construction methods described above would reduce the area of vegetation clearance by at least half.

- 15.3.7 During the civil engineering works, the area to which access would be denied for West Boldon Environmental Education Centre's operations would be minimised. It is intended that, prior to the start of any works, the main woodland teaching areas are relocated from the western to the eastern part of the site, with appropriate improvements to the facilities in the eastern half of the site, in particular relating to security.

16 NEXT STEPS

16.1 Consultation

- 16.1.1 Highways England wishes to obtain the views of the public on the draft proposals for the scheme design as it has been developed up to January 2017, taking into account the potential environmental effects of the proposed scheme. Those views can then be taken into account in finalising the design and refining the environmental impact assessment (EIA) and Environmental Statement (ES).
- 16.1.2 Consultation at this stage follows earlier consultation of the community in 2009 in relation to highway alignment options, and in 2014 on the preferred route and NMU improvement options. The current consultation is to 'refresh' the 2014 consultation given the passage of time between that consultation and the intended submission of a DCO application in June 2017.
- 16.1.3 There will be a five-week period from 30th January 2017 for members of the public to respond to the consultation. Responses can relate to the preliminary environmental information set out in this report or to any other aspect of the proposed scheme. They can be made by completing a questionnaire by letter by e-mail or online, using any of the following addresses:

A19 Testos Project Team
Major Projects, Highways England
3 South,
Lateral,
8 City Walk,
Leeds,
LS11 9AT.

Website: www.highways.gov.uk/a19-testos-downhill-lane

Email: a19testosjunctionimp@highwaysengland.co.uk

16.2 After the consultation

- 16.2.1 After the consultation period which closes on 6 March 2017, all responses will be considered in finalising the proposed scheme design and the ES. A report will be prepared on the responses received and how they have been taken into account, including whether or not they led to changes to the proposed scheme.
- 16.2.2 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 responsible agency) for a Development Consent Order (DCO). The ES will be submitted with the DCO application in summer 2017. Once accepted by the Planning Inspectorate on behalf of the Secretary of State, the public will have further opportunity to comment on the application. Information about how the process works can be found on the National Infrastructure Planning website²⁵ and information is also provided in the A19 Testos junction Consultation Brochure.

²⁵ The Planning Inspectorate (2012). National Infrastructure Planning. Available at: <http://infrastructure.planningportal.gov.uk/>

APPENDIX A: GLOSSARY

AADT	Annual Average Daily Traffic
AHLV	Area of High Landscape Value
AOD	Above Ordnance Datum
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BAP	Biodiversity Action Plan
CCTV	Closed-Circuit Television
CEAR	Comparative Environmental Assessment report
CEMP	Construction Environmental Management Plan
dB	Decibel
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
ECI	Early Contractor Involvement
EIA	Environmental Impact Assessment
ES	Environmental Statement
HA	Highways England
HER	Historic Environment Records
HDV	Heavy Delivery Vehicle / Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
IAMP	International Advanced Manufacturing Park
IAN	Interim Advice Note
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LCU	Landscape Character Unit

LNR	Local Nature Reserve
LWS	Local Wildlife Site
NMU	Non-Motorised User
NO ₂	Nitrogen Dioxide
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OS	Ordnance Survey
PEI	Preliminary Environmental Information
PM ₁₀	Particulate Matter with a diameter of 10 micrometres or less
PRoW	Public Right of Way
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SoCC	Statement of Community Consultation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TAG	Transport Appraisal Guidance
TAMMS	Tyneside Area Multi-Modal Study
UKBAP	UK Biodiversity Action Plan
WFD	Water Framework Directive

APPENDIX B: DOWNHILL LANE JUNCTION IMPROVEMENT – OPTION 2A

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- NOTES**
- 1. DO NOT SCALE OFF THIS DRAWING.
 - 2. ALL ROAD MARKINGS AS SHOWN ARE INDICATIVE.
 - 3. NUMBER OF LANES ON DOWNHILL LANE CIRCULATORY CARRIAGEWAY WILL BE CONFIRMED IN LINE WITH DESIGN DEVELOPMENT.

0	JAN 17	For Information	BA	-	-	-
Rev	Rev./Date	Purpose of Revision	Drawn	Checked	Rev'd	Appr'd

Client



Designer

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www.jacobs.com

Contractor

COSTAIN

Project
A19 TESTOS & DOWNHILL LANE
JUNCTIONS IMPROVEMENT

Drawing title
**DOWNHILL LANE OPTION 2A
PROPOSED LAYOUT**

Drawing status
FOR INFORMATION ONLY

Scale	NTS	DO NOT SCALE
Justification	B0140300	
Client ref.		

Drawing number	Rev.
B0140300/SK/233	0

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