A46 Newark Bypass

TR010065/APP/6.4

6.4 Environmental Statement Non-Technical Summary

APFP Regulation 5(2)(a)

Planning Act 2008

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

Volume 6

April 2024

Infrastructure Planning

Planning Act 2008

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

A46 Newark Bypass

Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT

NON-TECHNICAL SUMMARY

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010065
Application Document Reference	TR010065/APP/6.4
Author:	A46 Newark Bypass Project Team, National Highways

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Rev 1	April 2024	DCO Application

Contents

1 Introduction

1.1 Background

National Highways proposes to upgrade a section of the A46 by widening the road between the Farndon and Winthorpe Roundabouts and the A1, developing a new section of dual carriageway between the western and eastern sides of the A1. The Scheme will help promote economic growth and development in Newark-on-Trent, Nottinghamshire and Leicestershire by improving safety, reducing congestion, improving customer experience and increasing resilience of the A46 and wider road network. The Scheme also aims to protect and enhance the environment and biodiversity surrounding Newark-on-Trent.

This proposal is a “Nationally Significant Infrastructure Project” under the Planning Act 2008, which means that an application will need to be made for permission to deliver the Scheme. The permission is called a Development Consent Order (DCO). Information about the Planning Act 2008 and the Planning Inspectorate can be found on the Planning Inspectorate website: National Infrastructure Planning (planninginspectorate.gov.uk).

The Scheme requires an Environmental Impact Assessment (EIA) in line with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (EIA Regulations) and an Environmental Statement has been submitted as part of the DCO application. The full Environmental Statement comprises four volumes in total, as follows:

- The Environmental Statement main text setting out the environmental assessment in chapters (Volume 6.1).
- The Environmental Statement figures, including drawings, photographs and other illustrative material (Volume 6.2).
- The Environmental Statement technical appendices (Volume 6.3).
- The Environmental Statement Non-Technical Summary (Volume 6.4) (this document).

1.2 Purpose of the document

This document provides a non-technical summary of the information presented within the Environmental Statement.

The full Environmental Statement and supporting documents can be viewed online at: A46 Newark Bypass | National Infrastructure Planning (planninginspectorate.gov.uk).

2 The Scheme

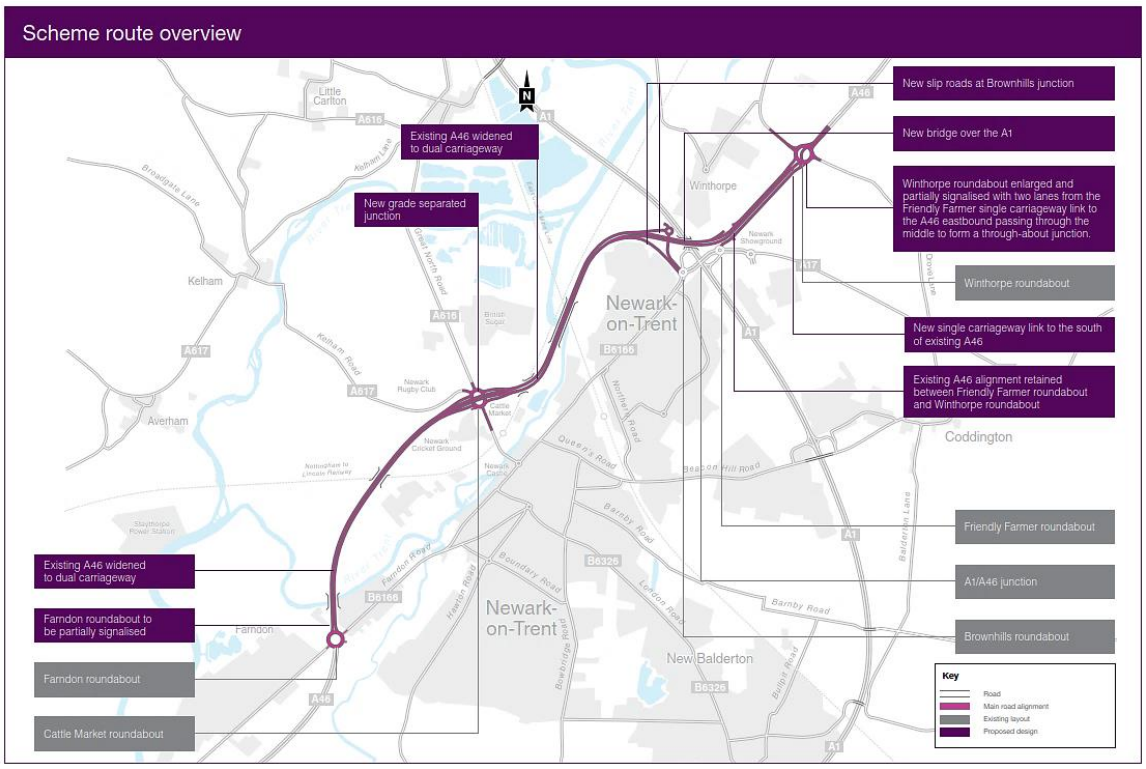
2.1 Scheme location

The section of the A46 that would be upgraded is approximately 6.5 kilometres in length. The Scheme comprises on-line widening for the majority of its length between Farndon Roundabout and the A1. A new section of off-line dual carriageway is proposed between the western and eastern sides of the A1 before the new dual carriageway ties into the existing A46 to the west of Winthorpe Roundabout. The widening works include earthwork widening along the existing embankments, and new structures where the route crosses the Nottingham to Lincoln and East Coast Main Line railway lines, River Trent, Brownhills link and the A1.

The Scheme would be situated within the county boundary of Nottinghamshire County Council, and Newark & Sherwood District Council.

Figure 1 below shows the location of the Scheme.

Figure 1 Scheme location



Source: National Highways, 2023

2.2 Environmental context

Appendix A of this Non-Technical Summary presents a drawing showing the environmental constraints that have been considered in the EIA for the Scheme. This drawing is also shown as Figure 2.2 within Volume 6.2 of the Environmental Statement.

Notable statutory and non-statutory environmental designations and additional environmental constraints are as follows:

- Devon Park Pastures Local Nature Reserve (LNR) (approximately 450 metres east of Order Limits) and Farndon Ponds LNR (approximately 512 metres west of Order Limits).
- 40 locally designated non-statutory ecological sites (24 of which are Local Wildlife Sites (LWS) and two of which are LNRs).
- The River Trent and four other main rivers (two of which are crossed by the existing A46).
- The Humber Estuary Ramsar and Special Area of Conservation (SAC), 53 kilometres directly from the Order Limits.
- The Scheme is located across areas within Flood Zone 2 and Flood Zone 3.
- Noise Important Areas (NIAs) within the vicinity of the Scheme including IDs 7832 (North Muskham, Vicarage Lane), 7834 (Langford, A46), 7838 (Newark-on-Trent, A1), 7839 (Newark-on-Trent, A46), 7840 (Newark-on-Trent, A46), 7842 (Newark-on-Trent, A1), 7843 (Balderton, A1), 7846 (Farndon, A46), 8220 (Newark-on-Trent, A46/A1), 11255 (Hockerton) and 11256 (Kelham).
- Designated heritage assets including scheduled monuments (a Civil War sconce 650m north-west of Devon Bridge, Civil War redoubts 680m north-west of Dairy Farm, 550m south-east of Valley Farm and 580 ENE of the Sugar Refinery, and a Moated site, 750m north-west of Dairy Farm) are within 1 kilometre of the Scheme.
- Numerous listed buildings and structures, including Smeaton's Arches, which lie within the Order Limits of the Scheme, and Newark Castle and Newark and Winthorpe conservation areas, which lie within 1 kilometre of the Scheme.
- Winthorpe Conservation Area, Newark Conservation Area and Kelham Conservation Area are within the Order Limits. Averham Conservation Area is located immediately adjacent to the Order Limits. Farndon Conservation Area is located 1 kilometre west of the Order Limits.
- Newark Castle Gardens Grade II Listed Registered Park and Garden is located approximately 100 metres south of the Order Limits.
- Non-designated heritage assets including from the English Civil War period and the likely potential for buried archaeological Palaeolithic remains of national or even international importance at Farndon.
- Grade 2, 3a, 3b and 4 Agricultural Land Classification (ALC) (very good to poor), as identified following the ALC surveys conducted in 2023.

- The Trent and Belvoir Vales National Character Area.
- Nine veteran and 10 notable trees have been identified within, or directly adjacent to, the Order Limits (of which one veteran and nine notable trees are located at Kelham).
- Extensive areas of Tree Protection Orders (TPOs), with four group TPOs within the Order Limits (TPOs 56, 116, 152 and 153) and three of which are in partial conflict with the Order Limits (TPOs 116, 152 and 153).
- Existing communities in the vicinity of the Scheme that are sensitive to environmental change include Newark-on-Trent to the south west of the Scheme accessed from the A46 via Farndon Road; Great North Road, and Lincoln Road; the village of Winthorpe, located to the north east of the Scheme accessed via the A1133; and the village of Kelham, located to the west of the Scheme, accessed via the A617.

2.3 Need for the Scheme

The A46 forms part of the strategic Trans-Midlands Trade Corridor between the M5 in the south-west and the Humber Ports in the north-east. The improvements to the A46 corridor are detailed within the Department for Transport's second Road Investment Strategy (RIS2) as a mechanism for underpinning the wider economic transformation of the country. RIS2 makes a commitment to create a continuous dual carriageway from Lincoln to Warwick.

The stretch of A46 between the Farndon Junction, to the west of Newark-on-Trent and the A1 to the east of Newark-on-Trent, is the last remaining stretch of single carriageway between the M1 and A1 and consequently queuing traffic is a regular occurrence, often impacting journey time reliability.

2.4 Scheme objectives

The Scheme's objectives are listed as follows:

Safety

- Improve safety through Scheme design to reduce collisions for all users of the Scheme.

Congestion

- Improve journey time and journey time reliability along the A46 and its junctions between Farndon and Winthorpe, including all approaches and A1 slip roads.

Connectivity

- Accommodate economic growth in Newark-on-Trent and the wider area by improving its strategic and local connectivity.

Environment

- Deliver better environmental outcomes by achieving a net gain in biodiversity and improve noise levels at Noise Important Areas along the A46 between Farndon and Winthorpe junctions.

Customer

- Build an inclusive Scheme which improves facilities for cyclists, walkers and other vulnerable users where existing routes are affected.

2.5 Description of the Scheme

The Scheme design has been an iterative process, undertaken as part of an integrated team to form a well-developed design made up of permanent and environmental elements.

Permanent Works

Key elements of the Scheme are shown in the Location Plan in Figure 1 of this document. The Scheme includes the following permanent works:

- The provision of a dual carriageway for a distance of 6.5 kilometres (approximately 4 miles) to provide two traffic lanes in both directions. This consists of the following key highways elements:
  - Partial signalisation of Farndon Roundabout at the southern extents of the Scheme
  - Widening of the existing A46 for a length of 4.5 kilometres
  - A new grade separated junction at Cattle Market Roundabout
  - A new off-line dual carriageway section to bypass the existing Brownhills and Friendly Farmer Roundabouts for a length of 1.3 kilometres
  - A new grade separated link between Brownhills Roundabout and a new roundabout that is situated to the north of the proposed dual carriageway. These are linked to the new dual carriageway via a new northbound off-slip and southbound on-slip
  - Retention of the existing dual carriageway between Winthorpe Roundabout and the A1 for a length of 0.8 kilometres
  - An upgraded through-about with partial signal controls at Winthorpe Roundabout

    - A two-way parallel link road from Friendly Farmer to Winthorpe Roundabout situated to the south of the existing dual carriageway
    - Tie in with local roads at Farndon, Cattle Market and Winthorpe Junctions
- New bridge structures over the Nottingham to Lincoln and East Coast Main Line railway lines, River Trent and the A1
- New culverts and extensions of existing culverts
- A parking lay-by near Brownhills Junction
- Improvements/amendments to walking and cycling routes
- Floodplain compensation at the following three floodplain compensation areas (FCAs):
    - Kelham and Averham FCA
    - Farndon West FCA
    - Farndon East FCA
- Three potential borrow pit areas to support the creation of embankments required for the Scheme:
    - Farndon West
    - Farndon East
    - Brownhills Junction
- The provision of drainage systems including attenuation ponds to drain proposed carriageways and adjacent land
- The provision of road lighting
- The provision of road markings and new traffic signs
- The provision of new road restraint systems
- Earthworks to establish the road foundation (including cuttings and embankments) and provide visual screening and noise attenuation
- Environmental mitigation including landscape planting, noise attenuation and areas identified for ecological mitigation
- Boundary treatments such as boundary fencing, hedgerow planting and trees
- Perimeter drainage ditches
- Technology installations
- Diversionary and protection works to public utilities including telephone, fibre-optics, electricity, gas, water supply and sewers
- Associated accommodation works and maintenance access tracks

For a detailed description of all elements of the Scheme, refer to Chapter 2 The Scheme of Volume 6.1 of the full Environmental Statement. The General Arrangement drawings in Volume 2.5 present the Scheme design in further detail.

Environmental design

The environmental design for the Scheme has been produced to ensure that the new road would fit in with the existing and retained landscape pattern, and to reduce adverse effects from the construction of the new A46. The environmental design ensures that field and hedgerow networks would be

replaced or reformed to provide habitat networks for wildlife, along with native woodland planting which would be provided along the new A46. This would fill in gaps in the existing vegetation, provide wildlife connections and would also screen the road from sensitive viewpoints.

The Environmental Masterplan can be found in Figure 2.3 of Volume 6.2 of the full Environmental Statement.

Construction

The Scheme's main construction works would commence in August 2025, with works being completed and the Scheme being open for traffic in November 2028.

Table 1 below shows the indicative key dates and construction programme. These dates are based on an anticipated DCO decision in June 2025.

Table 1 Indicative construction programme

Key construction programme element	Start date	Completion date
Anticipated DCO decision date	**June 2025**	
Advanced works	October 2023	April 2024
Pre-commencement works	June 2025	August 2026
Main construction works	August 2025	June 2028
Section 1 Farndon Roundabout to Nottingham to Lincoln railway line	August 2025	May 2028
Section 2 Nottingham to Lincoln railway line to East Coast Main Line (ECML)	August 2025	June 2028
Section 3 ECML to A1	August 2025	May 2028
Section 4 A1 to Winthorpe Roundabout	August 2025	June 2028
Section 5 Modifications to existing carriageway	June 2028	November 2028
Section 6 Kelham floodplain compensation area	September 2025	June 2025
Scheme open for traffic	**November 2028**	

Construction work would take place between 07.00 and 18.00 on weekdays and from 07.00 to 13.00 on Saturdays, with no working on Sundays and Public Holidays. There may be exceptions to these hours to accommodate elements such as abnormal load deliveries and tie-in works where bridges and junctions would be connected to the new A46, throughout the duration of the construction works. An Outline Construction Traffic Management Plan has been produced for the Scheme (Volume 7.7). This would be developed into a full Traffic Management Plan (TMP) before construction begins and would be implemented during the construction phase of the Scheme to ensure there is a safe environment for those travelling along the route, and for those delivering the construction works.

Further details of how the Scheme would be built are contained within Chapter 2 The Scheme of Volume 6.1 of the full Environmental Statement.

2.6 Future baseline

The potential changes to the existing environmental baseline (which is how things look today before construction works commence) due to natural changes have been considered in the EIA over both a 15 and 60-year period. This is termed the future baseline and assumes that the Scheme is not constructed, and instead, the existing A46 is maintained in its current state.

Future changes to the baseline without the Scheme could result from both natural events and human activities. This could include development (homes and businesses), changes to greenhouse gas emissions (such as from changes in traffic flows) and climate change (resulting in increased flood risk and severe weather). These changes could impact on population and human health, material assets, cultural heritage and the landscape, land, soil, water, air and climate and biodiversity.

Within the next 15 years, no substantial baseline changes are anticipated for air quality, biodiversity, noise and vibration and climate topics. For other environmental factors, fluctuations to the environmental baseline are anticipated within the 15-year period. These potential changes may arise as a result of other potential new developments separate to the Scheme and could include:

- alterations to localised and long-distance views
- pollution events for soils and water
- increased flood risk as a result of new developments
- depletion of primary materials from residential and commercial buildings
- increased opportunities of employment (this would be a positive change)

Within the next 60-years, both positive and negative changes to the environmental baseline are anticipated on all topics. Positive changes include improvements to air quality due to a likely increase in the number of electric cars and improvements to biodiversity as a result of laws and regulation potentially offsetting negative development-related impacts. However, negative changes are likely to include a range of impacts as a result of other potential new developments separate to the Scheme coming forward; including impacts and interruptions to views, impacts on the wider landscape from the introduction of new buildings, increased risk of flooding and negative impacts on biodiversity due to a reduction in habitats for wildlife to make space for new buildings. In addition, the increased levels of greenhouse gas emissions due to increased

development and vehicle movements will have an impact on climate, which may result in increased frequency of extreme weather events.

A more detailed description of these changes is provided within Chapter 2 The Scheme of Volume 6.1 of the full Environmental Statement.

3 Alternatives

3.1 Consideration of alternatives

In developing the design solution for the Scheme, National Highways has worked closely with local authorities, environmental bodies and other stakeholders, such as landowners, business owners, tenants and people with other land interests located within or around the Scheme area, to better understand local concerns and consider how to reduce environmental effects through carefully considered design.

Although an Alternative Modes Assessment was carried out by the Applicant in 2021, it found that the existing public transport network does not generally offer comparable alternatives to cars for most movements. A review of the largest public transport flows indicated that there was no obvious non-highways intervention that could cater for any substantial proportion of these flows.

Five potential route options, named Corridors A to E, were originally identified with a broad range of possibilities considered, including online solutions, and northern and southern offline solutions, as shown in the drawings in Figures 2 and 3 overleaf. These five options were put through an option sifting process to compare and evaluate them against a number of criteria including economics, environment, management, financial and commercial criteria.

Figure 2 Corridors A, B and C

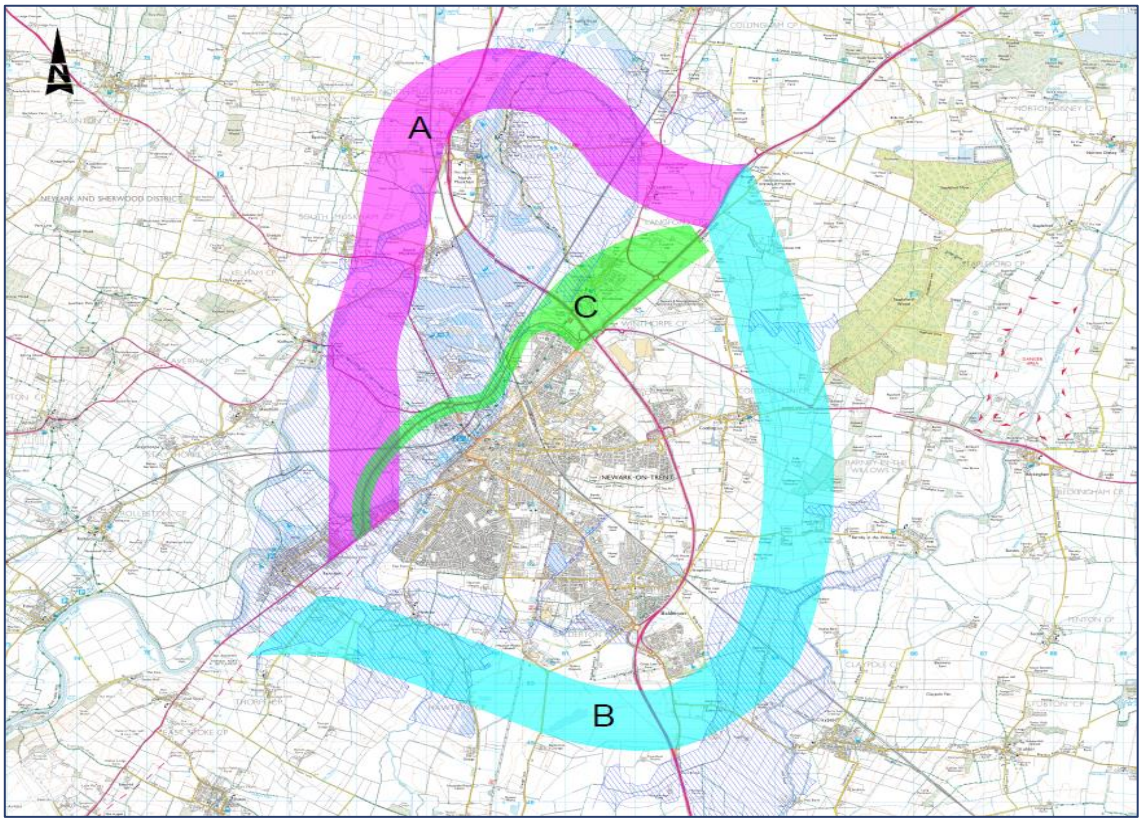
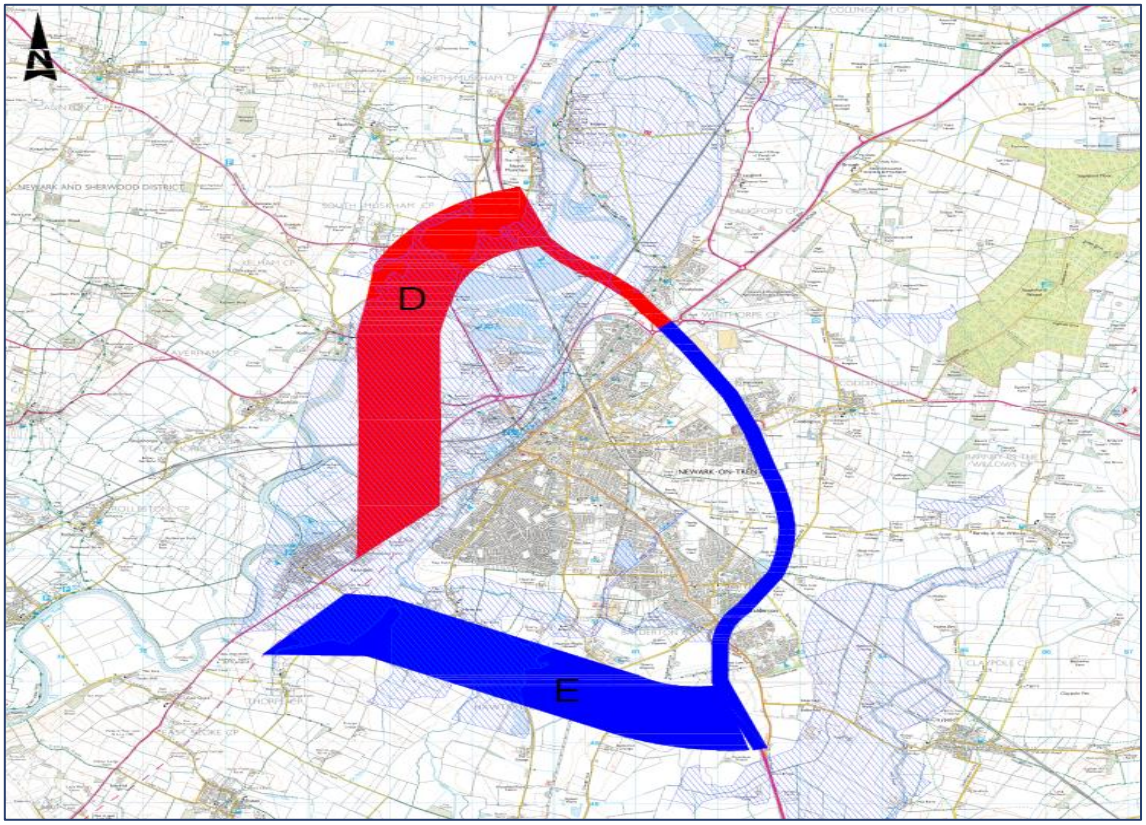


Figure 3 Corridors D and E



On completion of the sifting process, Corridor C was taken forward due to it being the best performing corridor in terms of user benefits, providing the greatest reduction in journey times, delays and incidents, and improvements in reliability. Additionally, Corridor C performed better in environmental terms in achieving potential improvements in terms of carbon, noise and the local water environment.

Four options, named Options A to D, within Corridor C were then shortlisted for further assessment. These options were subject to further technical appraisal including an environmental appraisal, which concluded that two options should be taken forward:

- Option B: Route Option 1B with all at grade junctions except the A1/A46 Junction which would be grade separated.
- Option D: Followed the existing A46 mainline from Farndon Roundabout to the north of the existing Trent River Viaduct at Nether Lock. The route then diverged away from the existing mainline, crossing over the A1 via a new structure. The route ran parallel to the northbound carriageway of the existing A46, to the south of Winthorpe, before tying-in to the existing Winthorpe Roundabout. Farndon Roundabout and Winthorpe Roundabout remained at-grade, with Cattle Market junction and the A1/A46 Junction being grade separated.

The principal reasons for the decision to proceed with Option B and Option D, were as follows:

- The least number of structures and volumes of earthworks, hence the lowest Scheme costs.
- Less land take, including excellent to good quality agricultural land which is able to best deliver food and non-food crops, resulting in a smaller volume of additional floodplain compensation storage required outside of the flood risk areas.
- Less likely to have significant adverse environmental effects with mitigation as there would be less habitat fragmentation, impact fewer heritage assets and a smaller impact on affected listed structures along the A616, and have the least likely significant adverse effects predicted for noise.
- Less likely to have significant adverse effects on landscape, townscape and visual receptors, water, mineral resources, waste generation, and materials asset use. This is due to the extent of land take, new sections of road and additional grade separated junctions, area of permeability and increased construction within the floodplain (which would require compensation).

The two options (renamed to Options 1 and 2) were taken forward to options public consultation which was held for eight weeks from December 2020 to February 2021.

A total of 852 respondents, out of 1,584 responses, gave feedback on concerns about issues in relation to the Scheme during the options consultation. The most cited concerns included amendments and improvements to the proposed options covering such comments as:

- Need to grade separate all junctions
- Need to resolve issues caused by roundabouts
- Prefer a hybrid of the two options presented
- Consideration of Newark-on-Trent Flat Crossing (rail)
- Scheme options not addressing safety concerns at the A1/A46 Junction
- Noise pollution as a result of the Scheme and associated noise mitigation
- Negative impact on local residents, including visual and setting impacts of residential properties, risk of flooding and water drainage capacity and associated mitigation
- Environmental/ecological impact and the associated mitigation required
- Air pollution and carbon emissions
- Safety and access for cyclists and pedestrians
- Negative impact of, and disruption during, construction

The two options were then subject to further environmental, economic and technical assessments in 2022. The results of these assessments, along with the outcomes of the options consultation, helped to identify the preferred route (Option 2 Modified) which was announced in February 2022.

Following the preferred route announcement, further design developments were adopted due to regular engagement with relevant stakeholders, such as Think Again Group at Winthorpe, to share information and inform the development and assessment of the Scheme design. This included identifying alternative approaches to lower costs, reduce inefficiencies and increase functionality.

A statutory public consultation which presented the proposed design for the Scheme was held between 26 October to 12 December 2022 to gather feedback from interested parties and statutory stakeholders. More than 730 people attended across the consultation events and a total of 553 people responded to the consultation by completing a questionnaire or submitting written feedback.

Following the close of the statutory consultation, National Highways undertook a targeted non-statutory consultation as a result of updates to the Scheme design in six areas. This targeted non-statutory consultation was held to allow an opportunity for consultation bodies and persons with land interests and community stakeholders to give their view on the proposed design changes as a result of the statutory consultation.

Further details of the consultations can be found in the Consultation Report for the Scheme (Volume 5.1).

The Scheme has evolved as a result of the consultation feedback received, as well as ongoing consultation with statutory consultees (including Statutory Environmental Bodies) and local landowners. This is to ensure that a 'good design' is developed to meet the requirements of the National Policy Statement for National Networks. The main changes made to the design include the following:

- Access tracks, swales and a retaining wall have been modified to retain more land and reduce unnecessary vegetation clearance.
- Earthworks have been updated along the route to reduce the amount of flood compensation required.
- The drainage design has been updated including pond locations, pond sizes and the location of drainage ditches.
- The northern side of Farndon Roundabout has been widened to improve traffic flows.
- To provide safety for users, accommodation works access has been added to Tolney Lane and access has been modified to the kennels at Brownhills, Esso interchange and Newark Showground.
- The size of Farndon East and West Borrow Pits, Farndon East and West FCAs and Kelham and Averham FCA have decreased in size to reflect flood modelling and avoid impacting on priority habitat areas.
- To improve flows around the roundabouts, the A617 arm of Cattle Market Roundabout has been reduced from three lanes to two lanes and the free flow link at Friendly Farmer Roundabout has been amended to show three lanes.
- Walking, cycling and horse-riding routes have been improved along the length of the route.
- The layout of Winthorpe Roundabout has been modified to optimise flows through the roundabout.
- Access to Langford Hall has been modified to limit vegetation loss.
- Temporary construction works design developments have been modified including amendments to numerous construction accesses and a temporary bridleway to reduce vegetation clearance and impacts to priority habitat.
- Alternatives have also been considered during the development of the FCA design. Consideration was given for 29 possible FCA sites early on in the design. Following a screening process and discussion with key stakeholders, including landowners, the Kelham & Averham and Farndon East and West FCA locations were chosen to be the most suitable sites.

Further details are provided within Chapter 3 Assessment of Alternatives contained in Volume 6.1 of the full Environmental Statement.

4 EIA process and methodology

4.1 Introduction

The Scheme is of a scope and scale to require an EIA, in line with the EIA Regulations. The Environmental Statement for the Scheme provides the information that the Applicant is required to provide as part of the EIA process about the identification and assessment of the likely significant environmental effects arising from the DCO application. Necessary consultation, publication and notification has been undertaken for the Scheme as required under the EIA Regulations. The Environmental Statement is made up of 17 different chapters along with supporting appendices and figures.

The Environmental Statement consider the effects of the Scheme during its construction and operation, to enable an informed decision to be made on whether to grant the DCO. This includes consideration of effects due to temporary activities associated with the Scheme for the construction phase and effects resulting from the Scheme once it has been built during the operation phase.

The Environmental Statement has followed Design Manual for Roads and Bridges (DMRB) guidance, which is the relevant standard to be used for motorway and all-purpose trunk roads in the United Kingdom.

4.2 Method used in the environmental assessment

For each Environmental Statement assessment, data and information was gathered to establish the existing baseline conditions as they are now. This included undertaking desk top studies using publicly available data where possible, obtaining data from bodies as appropriate and completing certain surveys for ecology and archaeology for example. Consultation with different bodies and organisations was also undertaken as part of this. This information was needed to be able to fully understand the potential impacts of the Scheme, to develop measures to avoid, prevent or reduce adverse impacts and then assess the likely significant effects of the Scheme on people and the environment.

The Environmental Statement has been prepared in line with EIA Regulations and has therefore considered the following factors and topics in Table 2 below.

Table 2 - Environmental factors and respective DMRB environmental topics

Factors contained within Regulation 5 (2) of the EIA Regulations	DMRB Topic
a) Population and human health	Air quality Noise and vibration Population and human health Road drainage and the water environment
b) Biodiversity	Biodiversity
c) Land, soil, water, air and climate	Air quality Geology and soils Road drainage and the water environment Climate
d) Material assets, cultural heritage, and the landscape	Cultural heritage Landscape and visual effects Material assets and waste
e) The interaction between the factors referred to in sub-paragraphs (a) to (d).	Combined and cumulative effects

An assessment of major accidents and disasters is also required by the EIA Regulations, and this can be found in Appendix 4.2 of the Environmental Statement in Volume 6.3. This identified that no significant adverse effects would likely occur from major accidents or disasters.

In line with Regulation 14 of the EIA Regulations, the Environmental Statement includes:

- a description of the proposed development comprising information on the site, design, size and other relevant features of the development
- a description of the likely significant effects of the proposed development on the environment
- a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment
- a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment
- a non-technical summary of the information referred to in the points above
- any additional information specified in Schedule 4 of the EIA Regulations relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected

The Environmental Statement also:

- Is based on the most recent scoping opinion adopted (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion)
- includes the information reasonably required for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment
- takes into account the results of any relevant UK environmental assessment, which is reasonably available to the applicant with a view to avoiding duplication of assessment
- has been prepared by competent experts and is accompanied by a statement from the applicant outlining the relevant expertise or qualifications of such experts

The following sections (5-15) summarise the assessment of likely significant environmental effects of the scheme for each environmental topic, as reported in the Environmental Statement, with consideration of the mitigation measures needed. The First Iteration Environmental Management Plan in Volume 6.5 details all the mitigation and management measures required for the Scheme, and the Environmental Masterplan in Volume 6.2 identifies the location of permanent environmental mitigation required for the Scheme.

5 Air quality

Information on existing air quality has been gathered from Newark & Sherwood District Council, surveys undertaken as part of the Scheme development and information from Defra. There are no current or historical air quality management areas within Newark & Sherwood. This demonstrates that the local authority has not identified any areas where pollutant concentrations are above air quality thresholds.

5.1 Method of assessment

During the construction phase there would potentially be dust generating activities, such as earth moving and demolition. A qualitative assessment of potential construction dust effects has been undertaken, it considers activities that will generate dust, and identifying sensitive receptors, such as people's homes within 200 metres of the construction site boundary. A distance of 200m has been used as this is the distance within which dust effects are greatest as beyond this distance they are minimal. Approximately 2,100 sensitive human health receptors (for example residential properties) and 20 designated ecological sites (including local wildlife sites and veteran trees) have been identified within 200 metres of the construction boundary for the Scheme.

Traffic management measures to control traffic on the A46 and some surrounding roads during construction also have the potential to affect air quality. This is because the traffic management measures will include temporary road closures and diversions, and speed limit reductions. The impact of the traffic management measures on sensitive receptors has been considered qualitatively on the basis that they will only occur for a temporary period.

For the operational phase, the changes on air quality have been assessed by computer-based dispersion modelling. This modelling has taken account of the changes in road layout and the predicted changes in traffic flows that the Scheme will cause. The modelling has predicted changes in pollutant concentrations at sensitive human health receptors, such as people's homes, and designated ecological sites. The assessment has considered the receptors which are likely to have the greatest changes in pollutant concentrations or experience the highest concentrations as a result of the Scheme.

5.2 Construction

As mentioned above, the Scheme could affect local air quality during construction as a result of construction traffic and from dust arising from construction activities.

Construction activities would be carried out in accordance with best practicable means, this will reduce emissions from the engines of construction equipment and dust generated by moving soil, which may impact upon air quality. Mitigation measures which will be implemented through the First Iteration Environmental Management Plan (Volume 6.5 of the Environmental Statement) and will include actions such as:

- minimising the height of stockpiles,
- locating stockpiles out of the wind (or cover, seed or fence),
- maintaining a low-speed limit on site,
- damping down surfaces in dry conditions, and
- switching off all vehicle engines and plant motors when not in use.

With measures such as these in place, no significant effects from dust are likely to occur during construction.

Due to the temporary nature of the construction traffic management measures, and that they include reducing the speed of traffic on the A46, which will smooth the flow of traffic, there are not expected to be significant air quality effects at nearby receptors.

5.3 Operation

During operation the Scheme is predicted to increase traffic flows and reduce congestion on the A46, particularly between Farndon Roundabout and Brownhills Roundabout. It is also predicted to decrease traffic on the A46 between Brownhills Roundabout and Friendly Farmer Roundabout, and in Newark town centre.

The predicted change in traffic-related pollutants at these sensitive human health receptors and designated ecological sites are not predicted to be significant. This is because the Scheme does not create new exceedances of the air quality standards applicable to the Scheme, or affect plants and therefore the animals they support at any of the designated sites that will experience changes in pollutant concentrations. As no significant air quality effects have been identified in operation, no mitigation is required.

5.4 Summary

- With mitigation in place, no significant air quality effects are likely during construction.
- No significant air quality effects are likely during operation.

Further details are provided within Chapter 5 (Air Quality) of Volume 6.1 of the full Environmental Statement.

6 Cultural heritage

A diverse range of heritage features have been identified in the study area, including 15 Scheduled Monuments within 1 kilometre of the Scheme, archaeological remains, listed buildings, historic buildings and landscapes, five conservation areas and a registered park and garden.

6.1 Method of assessment

The cultural heritage assessment draws upon information gained from desk-based sources, a search of archaeological records from the Nottinghamshire Historic Environment Record database, site inspections, and archaeological field surveys that have included both non-intrusive and intrusive surveys.

6.2 Construction

The Scheme is in an area of high historic and cultural value due to the diverse range of heritage and archaeological features in the area. As a result, archaeological remains would experience direct physical impact associated with groundworks. Additionally, the setting of several historic buildings, including listed buildings, would suffer from noise and visual intrusion during construction.

The First Iteration Environmental Management Plan in Volume 6.5 includes measures to ensure that key features are protected during works. This includes the requirement for temporary fencing and hoardings as well as buffer zones around built heritage assets. Monitoring of any archaeological excavations would also be undertaken by a qualified Archaeological Clerk of Works (ACoW) to ensure the preservation of archaeological remains. Additionally, assets which have the potential to be impacted structurally by vibration would be monitored to determine if any structural impacts arise and mitigation through remedial repairs is required.

After mitigation, residual significant adverse effects for the following built heritage assets would remain as a result of changes to their setting, including visual or noise intrusions, or from the potential for direct impact as a result of vibration or ground settlement during construction: Farndon Windmill, two sections of the Causeway Arches, Winthorpe Conservation Area, Langford Hall, a concrete footbridge across the River Trent, Lowwood, and the Church of All Saints at Winthorpe.

Residual significant adverse effects have also been identified upon a variety of known archaeological remains. These will be subject to archaeological excavation and recording as part of a planned programme of archaeological works aimed at recording and advancing the understanding of heritage assets that will be lost wholly or partially as a result of the Scheme.

Where possible design measures have taken into account cultural heritage assets identified through the assessment to date and the construction plan has been adjusted to preserve these assets and their setting where possible.

6.3 Operation

Mitigation has been included into the Scheme design to reduce operational noise and vibration and visual impacts upon heritage assets, and with this mitigation in place, there would be no significant effects on archaeology assets or historic landscape during operation of the Scheme. Such mitigation, for example, includes new and replacement planting as part of the landscape design to reflect the character of the area and screen heritage assets.

6.4 Summary

- Significant effects are likely with mitigation on Farndon Windmill, two sections of the Causeway Arches, Winthorpe Conservation Area, Langford Hall, a concrete footbridge across the River Trent, Lowwood, and the Church of All Saints at Winthorpe during construction.
- Significant effects are also likely upon a variety of known archaeological remains during construction which will either be wholly or partially lost.
- With mitigation, no significant effects upon other cultural heritage assets are likely are likely in operation.

Further details are provided within Chapter 6 (Cultural Heritage) of Volume 6.1 of the full Environmental Statement.

7 Landscape and visual effects

The existing A46, currently single carriageway, is generally elevated on embankment due to the low-lying floodplain of the River Trent. This floodplain is located to the west of the A46 for much of the affected length, along with a section at the southern end on the eastern side of the A46. Within the surrounding landscape to the north of the A46, farmland dominates, interspersed with small-scale settlements. To the south of the road, the town of Newark-on-Trent forms a notable urban settlement. Winthope, Newark, Averham, Kelham and Farndon Conservation Areas are within the Scheme study area. The Landscape Character Areas of Trent Washlands, Winthorpe Village and Farmlands, East Nottinghamshire Sandlands, Newark, South Nottinghamshire Farmlands, Farndon Village and Mid-Nottinghamshire Farmlands are within the Scheme study area.

7.1 Method of assessment

A Landscape and Visualisation Impact Assessment has been conducted for construction and operation, considering effects to the Landscape Character Areas noted above, visual receptors (views from houses and Public Rights of Ways), elevated viewpoints and the surrounding landscape up to 2 kilometres from the Scheme alignment.

7.2 Construction

During construction, vehicles, material stockpiling, heavy plant and machinery would change the view from residential buildings, Public Rights of Way, and road users impact the Landscape Character Areas.

To mitigate this, we have carefully considered the way that temporary construction buildings are blended into the local environment, doing what we can to keep lighting to a minimum and using motion detector lighting to make sure lights are not on when they are not needed. Material stores would be kept to a minimum height and material would be delivered to site as required. These measures are all detailed within the First Iteration Environmental Management Plan in Volume 6.5.

After this mitigation there would be a significant but temporary impact upon the Landscape Character Areas of Winthorpe Village and Farmlands and Trent Washlands. Fifteen visual receptors (including views from Public Rights of Way, elevated viewpoints, residential, heritage and commercial receptors), would also

experience significant effects during construction due to changes in views and presence of construction material.

7.3 Operation

Planting of new trees, hedgerows and shrubs would connect the road with the rural landscape. Implementation of native tree and shrub planting along the A46, restoration of hedgerow boundaries and construction of screening bunds (earth mounds) would reduce the visibility of traffic and infrastructure on the road. There would be a five-year aftercare period following completion of the works to ensure the successful establishment of planting.

In the first year of operation, the Landscape Character Areas of Winthorpe Village and Farmlands and Trent Washlands would experience significant effects. This is due to the sense of space being adversely affected by construction. All other Landscape Character Areas would experience non-significant effects with the majority experiencing no effects. After the establishment of mitigation planting (15 years) significant effects would only be expected in Winthorpe Village and Farmlands Landscape Character Area.

Once the Scheme is open to traffic, seven visual receptors (views and houses) would experience significant adverse effects due to a reduction of vegetation opening up views of traffic 1 year after opening. After considering the establishment of mitigation planting 15 years after opening, two visual receptors (No.24 being residential properties at Sandhills Park and No.40 users of the Trent Valley Way and national cycle network route 64 on Winthorpe Road) are predicted to experience significant effects.

7.4 Summary

- During construction, significant effects are likely upon the Landscape Character Areas of Winthorpe Village and Farmlands and Trent Washlands and 15 visual receptors.
- After the first year of operation, significant effects are likely upon the Landscape Character Areas of Winthorpe Village and Farmlands and Trent Washlands and seven visual receptors (houses and views).
- After 15 years of operation, significant effects are likely upon the Landscape Character Area of Winthorpe Village and Farmlands and two visual receptors (No.24 being residential properties at Sandhills Park and No.40 users of the Trent Valley Way and national cycle network route 64 on Winthorpe Road).

Further details are provided within Chapter 7 (Landscape and Visual Effects) of Volume 6.1 of the full Environmental Statement.

8 Biodiversity

The natural environment around the Scheme comprises arable land, a variety of grasslands, hedgerows, woodland, ponds and watercourses. Extensive field surveys of these habitats found wildlife, including protected and notable species, such as bats, numerous bird species, reptiles, otter, water voles and invertebrates (aquatic and terrestrial), all of which are protected by law.

8.1 Method of assessment

Ecological receptors (including designated sites, protected species and habitats) were assessed up to 2 kilometres of the Scheme and assessed for construction and operation impacts, although consideration was given for any qualifying features of designated sites beyond this boundary which could interact with the Scheme (for example bats or fish). Field surveys have taken place over several seasons. These have enabled an understanding of the populations within the area in which the Scheme could potentially impact on ecological features. Desk based studies have also been carried out. A biodiversity net gain (BNG) assessment was also undertaken to identify opportunities for BNG and enhancement of biodiversity resources.

The Habitats Regulations protect designated features of European sites in England and Wales, particularly vulnerable plants, animals and their associated habitats. To establish whether the Scheme complies with these regulations, a Habitats Regulations Assessment (HRA) must be undertaken. As presented in Volume 6.6 of the full Environmental Statement, a HRA was undertaken due to the Scheme's proximity to the Humber Estuary SAC and Ramsar and the potential risk to the water quality or habitat of this designation. The HRA found that with appropriate mitigation, such as detailed control of artificial lighting during night-time bridge works, no adverse impacts are anticipated upon the integrity of the Humber Estuary SAC/Ramsar as a result of the Scheme. Such mitigation measures would also ensure compliance with the Habitats Regulations. Further details are provided within the Habitats Regulations Assessment, of Volume 6.6 of the full Environmental Statement.

8.2 Construction

Designated sites

To facilitate the works, habitat within Great North Road Grasslands LWS, Dairy Farm Railway Strip, Newark LWS, Newark (Beet Factory) Dismantled Railway LWS and Old Trent Dyke LWS would be permanently affected during construction due to habitat loss. The effect on Great North Road Grasslands LWS would be significant while the effect on Dairy Farm Railway Strip, Newark LWS, Newark (Beet Factory) Dismantled Railway LWS and Old Trent Dyke LWS would not be significant. Further significant effects have been minimised or mitigated against through embedded mitigation and avoiding the loss of designated sites as much as possible through design developments.

Habitats

The Scheme would require some land take from woodland, scrub, grassland and hedgerows to enable construction activities including site compounds, material storage, access and temporary construction traffic routes.

Habitats of principal importance, including lowland meadows, lowland mixed deciduous woodland and coastal and floodplain grazing marsh, would also suffer some land loss.

The root protection area of three veteran trees would be directly impacted by the construction of a maintenance track and earthworks. Tree protection measures including the supervision of an arboriculturist to install temporary barriers and matting to sufficiently distribute the load of heavy construction plant that cannot be excluded from the root protection area are secured within the First Iteration Environmental Management Plan. As a result, the effect on veteran trees would not be significant.

Significant effects on habitats have been further minimised or mitigated against through a compensation strategy, incorporating embedded mitigation, adopting habitat-focused and species-focused measures and avoiding high value habitat loss as much as possible through design developments.

Protected and notable species

Bats, badgers, numerous species of birds including barn owls, fish, otters, reptiles and water voles would be subject to fragmentation and or disturbance of foraging and commuting routes due to vegetation clearance, and temporary lighting and noise disturbance. However, these effects would not be significant.

Invertebrates (aquatic and terrestrial) and reptiles would suffer from loss of terrestrial habitat due to vegetation clearance, although this would not be significant. No other species would be subject to any adverse effects during construction.

Specific control measures would be implemented to ensure no significant effects on individual protected species, where necessary following methods agreed with Natural England through mitigation licences. Furthermore, species mitigation measures will be delivered to prevent killing and injury, and where relevant, disturbance to protected species. This would include the employment of an Ecological Clerk of Works to provide advice and monitor works including undertaking a pre-works search before vegetation clearance or brash removal to check for notable species, for example, before any phased clearance.

8.3 Operation

Designated sites

Habitat within Coneygre Wood LWS, Newark Dismantled Railway LWS, Flintham Park LWS, Kelham Road Grassland LWS, Kelham Road Grassland II LWS, Newark Grassland LWS, South Scaffold Lane, Collingham LWS, Spring Wood, Kelham LWS, Valley Farm Grassland LWS, Dairy Farm Railway Strip, Newark LWS and Newark (Beet Factory) Dismantled LWS is anticipated to be impacted due to increases in airborne pollutants during operation. However, the effect would not be significant.

Compensation is provided through BNG to introduce habitat creation and ensure that the total or partial loss of sites. This compensation package is bespoke and tailored to reducing the loss of the Scheme-specific habitats as possible. This is to make sure a like-for-like habitat is created and is provided as close to the source as possible, maintaining the continuity and integrity of the site connectivity.

Habitats

The Scheme design has sought to avoid and minimise habitat loss in the long term and habitat enhancement measures would be provided to ensure that the land taken is replaced with land of better quality for wildlife wherever possible. This has included designing structural features around key habitats to avoid loss; for example, by positioning the drainage ponds to maximise preservation of mature trees and hedgerows. Nesting bird boxes and bat boxes would also be installed.

Much of the mitigation for the operational phase is included in the environmental design for the Scheme. More detail can be found in the Environmental Masterplan, which can be found in Figure 2.3 of Volume 6.2 of the full Environmental Statement. This includes new planting for wildlife to provide new and improved habitat. The habitat strategy is based on the principles of more gain than loss in habitats of biodiversity value, which are of benefit to a wide range of protected species. There would be a five-year aftercare period following completion of the works to ensure the successful establishment of planting. Certain habitats would also need maintaining, managing and monitoring for up to 30-years post construction.

During operation there is the potential for pollution incidents and changes in airborne pollutants to affect adjacent habitat, however, this would not be significant. Habitats are not likely to be significantly affected during operation due to the provision of replacement land and mitigation in the Scheme design.

The BNG assessment has identified that the Scheme would achieve a positive biodiversity net gain, taking account of different habitat losses and habitats that would be retained and planting that would be provided as part of the landscape design (which is presented in Figure 2.3 Environmental Masterplan of Volume 6.2 of the Environmental Statement) along with the 30-year implementation period for ensuring habitat establishes as expected. The BNG assessment excludes the loss and compensation for an area of lowland meadow, a habitat of very high distinctiveness, for which a bespoke compensation agreement is being sought with Natural England. The predicted scores are as follows:

- 4.01% net gain in habitat units
- 10.38% net gain in hedgerow units
- 36.93% net gain in river units

The BNG assessment has determined that the Scheme would achieve a net gain in habitat units, with the exception of the areas of impact and compensation for lowland meadow. A net gain for hedgerows and rivers would also be achieved. Further details on this assessment can be found in Appendix 8.14 (Biodiversity Net Gain Technical Report) in Volume 6.3 of the Environmental Statement.

Protected and notable species

Barn owls would potentially suffer noise disturbance and the road would act as a barrier to movements, in particular the introduction of the new flyover, however any long-term effects on these species and other protected species will not be significant in operation.

Additionally, a planting plan would provide mitigation for badgers as they follow linear features, which is detailed in the Environmental Masterplan. This discourages badgers from crossing the widened carriageway and encourage them towards existing safe underpasses, reducing the effect on badgers.

8.4 Summary

- Significant effects are predicted upon Great North Road Grasslands LWS during construction. With mitigation, no other significant effects upon biodiversity are predicted during construction.
- With mitigation, no significant effects upon biodiversity are likely during operation.

Further details are provided within Chapter 8 (Biodiversity) of Volume 6.1 of the full Environmental Statement.

9 Geology and soils

There are no designated local geological sites within 500 metres of the Scheme boundary. There are no sensitive groundwater areas within the Scheme boundary. However, grade 2 and 3a best and most versatile (BMV) agricultural land is present within the Order Limits. Furthermore, the Scheme would cross or pass close to sites that may be contaminated with hazardous substances, such as fuels, chemicals and waste by historical activities and/or be sources of waste.

9.1 Method of assessment

The method of assessment included a Ground Investigation, amongst other survey types. The methodology involved assessing the sensitivity of the geology and soils (including underground water and contaminated land) located in the vicinity of the Scheme that have the potential to be affected by the construction of it. An Agricultural Land Classification (ALC) survey was also undertaken in support of the geology and soils assessment to establish soil quality and the potential effect of the Scheme on agricultural land.

9.2 Construction

To reduce the impacts upon geology, soils and contaminated land during construction, all works would be carried out in accordance with the First Iteration Environmental Management Plan.

The Scheme will result in the temporary and permanent loss of the best and most versatile land, including:

- Temporary loss of ALC land:
  - Grade 2 – 5.5 hectares
  - Grade 3a – 3.5 hectares
  - Grade 3b – 13.2 hectares
  - Grade 4 – 0.5 hectares
- Permanent loss of ALC land:
  - Grade 2 – Less than 1 hectare
  - Grade 3a – 14.7 hectares
  - Grade 3b – 66.5 hectares
  - Grade 4 – 6 hectares

Construction activities with the potential to result in adverse effects on geology and soils include excavation works, earthworks and general construction works. Without mitigation these activities may lead to the permanent removal or

worsening of agricultural soils, potential risks to human health and the potential for the contamination of soils, groundwater and surface water because of accidental spills and leaks relating to construction plant and fuels/oils.

A Soils Management Plan and Materials Management Plan would also be prepared outlining mitigation measures including the storage, handling and disposal of contaminated soils, building upon the outline versions of these documents which are part of the First Iteration Environmental Management Plan (Volume 6.5). Such measures would include the protection of the soil structure and quality using best practice procedures, minimisation of waste generation, dust suppression, protection of controlled waters, prevention of contamination through use of suitable personal protective equipment and industry best practice guidelines. A Contaminated Land Risk Assessment has been produced which has enabled the selection of additional mitigation measures required to ensure the protection of human health and environmental receptors during construction. These mitigation measures have been incorporated into the First Iteration Environmental Management Plan.

9.3 Operation

No impacts are identified for geology and soils for the operation of the Scheme since all the effects would occur whilst it is being built. Therefore, once operational, the Scheme is not expected to result in any significant adverse effects on geology or soils.

9.4 Summary

- Significant effects due to the temporary loss of grade 2 ALC land and the permanent loss of grade 3a and 3b ALC land are likely.
- No significant effects upon geology and soils are likely during operation.

Further details are provided within Chapter 9 (Geology and Soils) of Volume 6.1 of the full Environmental Statement.

10 Material assets and waste

The construction of the Scheme would require large amounts of materials and would generate waste that would need to be recycled or disposed of. The treatment and/or disposal of these materials would typically cause environmental impacts, such as increasing landfill waste in Nottinghamshire from its 2021 capacity of 8,925,284m^3 and increasing emissions associated with the transport required for disposal.

10.1 Method of assessment

The material assets and waste assessment involved reviewing and assessing the material resource usage and generation of waste associated with construction of the Scheme.

10.2 Construction

Mitigation measures to reduce the impacts associated with the construction of the Scheme include reusing all suitable excavated materials. Opportunities for reduction, reuse and recycling have been considered where possible, such as the consideration of local materials suppliers and using materials with a high recycled content. An Outline Site Waste Management Plan and Outline Materials Management Plan have been produced as part of the First Iteration Environmental Management Plan in Volume 6.5 to detail how waste would be reduced, reused and disposed of and these will be developed into full management plans as part of the Second Iteration Environmental Management Plan.

During construction, earthworks preparation and the demolition of existing structures have the potential for impacts associated with the transportation of materials and the unnecessary introduction of primary aggregates (new materials) and exportation of excess waste materials. In addition, the construction would require a large amount of materials, however, with mitigation measures, effects on materials and waste during construction are not anticipated to be significant.

10.3 Operation

Although operation would give rise to some material resource usage and generation of waste, this would be minimal, and any effects would not be significant.

10.4 Summary

- With mitigation, no significant effects upon material assets and waste are likely during construction.
- No significant effects upon material assets and waste are likely during operation.

Further details are provided within Chapter 10 (Material Assets and Waste) of Volume 6.1 of the full Environmental Statement.

11 Noise and vibration

Construction and operation of the Scheme has the potential to result in changes in noise and vibration at sensitive receptors, such as residential properties, recreational and commercial facilities.

11.1 Method of assessment

A noise and vibration assessment has been undertaken to establish significant temporary and permanent effects (noise and vibration increases) associated with the construction of the Scheme. The study area is 300 metres from the Scheme boundary for general construction activities that could generate noise, 100 metres from any construction activities that could generate vibration and 25 metres from the kerb line of any diversion routes. The study area for the operation assessment considers impacts within 600 metres of new road links physically changed or bypassed by the Scheme and beyond this considers the area within 50 metres of road links where the Scheme could increase the basic noise level above 1 decibel. Part of the assessment process is to identify measures to eliminate significant adverse effects. Prior to the assessment, noise monitoring was undertaken across the area.

11.2 Construction

Normal workings hours would be 07:00 to 18:00 on weekdays, 07:00 to 13:00 on Saturdays, avoiding work being undertaken during Sundays and Bank Holidays (although there would be exceptions for certain essential activities outside of these working hours). Any work outside of the core hours and the exceptions to these core working hours listed in Chapter 2 (The Scheme) of the ES and the First Iteration Environmental Management Plan would be agreed with the relevant local planning authority prior to carrying out certain operations. In addition, any Section 61 of the Control of Pollution Act 1974 consents will be obtained where required. As far as reasonably practical, noise and vibration will be reduced during construction. Measures incorporated into the design and environmental management requirements of the Scheme (which are detailed in the First Iteration Environmental Management Plan in Volume 6.5) include screening of noisy machinery, and appropriate location of noisy plant items, and site maintenance, as well as monitoring of noise levels during construction.

Construction activities which would generate noise and vibration include:

- Pre-commencement works including construction compound establishment, temporary fencing, archaeological works, temporary bridge over the River Trent, site clearance works, and demolition
- Moving of earth to include stripping of soils, building bunds and creating cuttings and embankments
- Drainage works
- Roadworks, including road pavement construction
- Construction of new structures, including the grade separated junction at Cattle Market Roundabout and Brownhills Junction
- Construction of works compound and compound operation
- Temporary construction traffic routes
- Site compound works

Potentially significant effects would be avoided if construction works do not extend to a period of 10 or more days of working in any 15 consecutive days or take place for a total number of days exceeding 40 in any 6 consecutive months. Mitigation measures outlined in the First Iteration Environmental Management Plan would be implemented, including temporary acoustic barriers as well as the application of best practicable means for noise and vibration control, such as the selection of the most appropriate method and plant, adequate maintenance of plant, optimum siting of stationary plant, and education of the workforce.

11.3 Operation

An operational noise assessment has been undertaken which considered short-term and long-term changes in noise level with and without the Scheme. This assessment resulted in the need for six noise barriers, two parapets and three earth bunds to be provided along the Scheme to mitigate operational noise. Locations of noise barriers and earth bunds are identified in Figure 2.3 Environmental Masterplan, contained within Volume 6.2. New road surfacing would be a thin low noise surface.

There are several NIAs found to be located in the vicinity of the Scheme. Dwellings at NIAs would be subject to negligible or Minor Beneficial impacts in the short-term as a result of the Scheme and therefore no residual significant adverse effects are anticipated.

11.4 Summary

- With mitigation, no significant effects are likely due to noise and vibration during construction.

- With mitigation, no significant effects are likely due to noise during operation.

Further details are provided within Chapter 11 (Noise and Vibration) of Volume 6.1 of the full Environmental Statement.

12 Population and human health

The assessment of effects on population and human health identifies impacts associated with population, employment, residential properties, businesses, community facilities, open spaces and recreational areas, and human health outcomes.

12.1 Method of assessment

The assessment of effects on population and human health comes from a mixture of desk-based assessment (reviewing online information) and site visits using appropriate guidance and professional judgement of qualified professionals. The primary study area for this assessment is 500 metres from the Scheme boundary and is designed to capture most potential population and human health effects during construction and operation. This study area is extended to the area covered by the local authority of Newark & Sherwood District Council for consideration of human health impacts, including potential effects on economic activity. This is important as one of the objectives of the Scheme is to support economic growth aspirations by providing a more reliable road network.

12.2 Construction

The construction of the Scheme is likely to have an overall adverse impact on agricultural land holdings and walker, cyclist and horse-rider (WCH) provision as a result of both permanent and temporary land take and reduced access during construction. Compensation will be provided to land and business owners if considered due under the Compensation Code.

During construction of the Scheme, there would be loss, severance and fragmentation of agricultural holdings which would result in significant effects for 10 agricultural holdings. Two Public Rights of Way (Newark BW2 and Newark FP48#1) would be temporarily stopped up and diverted during construction by the Scheme. The Scheme has been designed to reduce land take and severance as far as practicable. Mitigation measures during construction would include temporary diversions to limit the impacts on pedestrians, cyclists and equestrians, and maintain agricultural access.

During the construction period the traffic management required to construct the Scheme, including the construction of temporary junction alignments and tie-ins and the presence of construction traffic, could lead to additional delays that

would increase driver stress and severance. Traffic management and construction activity could also lead to changes in views from the road. A Traffic Management Plan (Volume 7.7) would be implemented which would define measures to be used by the construction contractor to reduce the impacts from construction traffic, including measures to appropriately manage vehicle movements and minimise heavy goods movements at busy times.

Up-to-date construction and community liaison information would be provided to the community. These communication approaches would help drivers and local residents to plan their journeys and take account of potential disruption due to Scheme construction.

12.3 Operation

The operation of the Scheme is expected to have a beneficial impact on access to private property and housing; development land and businesses; community land and assets; green space, recreation and physical activity; and for walkers, cyclists and horse riders due to the reduced congestion and improved journey times that the Scheme will deliver.

Although users of the National Cycle Network 64 and Trent Valley Way along Winthorpe Road would experience significant effects as a result of a permanent diversion created by the new Brownhills junction layout, the Scheme design would include the permanent creation of new diversions of cycleways, footways and Public Rights of Way to maintain connectivity of the local network.

12.4 Summary

- During construction there would be significant effects upon 10 agricultural land holdings and two WCH receptors with mitigation in place.
- A significant effect is predicted upon one WCH receptor in operation.

Further details are provided within Chapter 12 (Population and Human Health) of Volume 6.1 of the full Environmental Statement.

13 Road Drainage and the Water Environment

Construction and operation of the Scheme have the potential to give rise to impacts on surface waters, groundwater and flood risk. The identification and assessment of the potential impact of the Scheme on road drainage and the water environment has been undertaken with the benefit of a Highways England Water Risk Tool assessment, a Water Framework Directive Compliance Assessment, a Flood Risk Assessment and a Drainage Strategy Report and Surface Water Monitoring Report.

13.1 Method of assessment

The assessment of effects on road drainage and the water environment comes from a mixture of desk-based assessment (reviewing online information), water quality monitoring surveys and hydraulic modelling. Several assessments and supporting documents have enabled the prediction of potential effects and the identification of appropriate mitigation measures. A Water Framework Directive Regulations (WFDR) Compliance Assessment has considered environmental objectives for designated waterbodies and whether the Scheme might cause deterioration or prevent the improvement in the overall status of these waterbodies. A Flood Risk Assessment has assessed the flood risk impact of the Scheme, using hydraulic modelling and established flood mitigation and compensation measures. A Highways England Water Risk Assessment Tool has been used to understand the potential for pollution of routine runoff expected to be discharged into receiving watercourses. A Drainage Strategy Report and Surface Water Monitoring Report details the drainage design and mitigation measures, as well as the water quality monitoring, which will occur as part of the Scheme.

The study area for surface water and groundwater assessments is 1 kilometre from the Scheme boundary. This has been determined based on professional judgement as pollutants are expected to disperse and to have been diluted beyond a 1 kilometre radius. Consideration was given to the extension of this study area but as no sensitive features (protected areas) were identified that are capable of being affected by contaminants transported downstream of the Scheme via surface waterbodies or ground waterbodies, the study area was not extended.

The study area for the Flood Risk Assessment is the floodplain of the River Trent between Fiskerton upstream of the Scheme and North Muskham downstream of the Scheme.

13.2 Construction

It is anticipated that the Scheme would not result in any likely significant adverse effects to road drainage and the water environment receptors during construction.

Without mitigation, proposed construction activities could impact upon surface water quality and flows, as well as impact upon groundwater quality and flows. Impacts upon surface water and groundwater could result from accidental spillages or sediment containing runoff causing pollution and risk of contamination to surface water and groundwater, localised disruption to groundwater levels and increases in flood risk.

The First Iteration Environmental Management Plan in Volume 6.5 includes measures to mitigate potential adverse impacts on surface watercourses during construction. Measures are set out to tackle emergency spillages and appropriate procedures for managing storage areas and material stockpiles. Potential impacts on groundwater would also be mitigated through adherence to the First Iteration Environmental Management Plan.

Mitigation measures have been embedded in the Scheme design and within the First Iteration Environmental Management Plan.

13.3 Operation

It is anticipated that the Scheme would not result in any likely significant adverse effects to road drainage and the water environment receptors during operation.

The Scheme has been designed to minimise the risk of it flooding or causing flooding elsewhere by incorporating current design standards and future climate change allowances to improve its resilience, and through the use of measures to control and manage surface water runoff.

The overall water management strategy for the Scheme is to attenuate and treat highway runoff using wet ponds, filter drains, swales, new highway ditches and Sustainable Drainage Systems (SuDS) where applicable.

In addition, three new Floodplain Compensation Areas (FCAs) would be constructed to replace land removed from the floodplain as part of the construction of the Scheme. These FCAs aim to mitigate the increase in flood risk from river flooding which would otherwise arise as a result of the Scheme. To ensure provision of flood compensation areas the Applicant will be acquiring

the necessary land and will ensure the maintenance of the FCAs for the operational life of the Scheme.

The Slough Dyke (The Fleet) would be realigned with similar cross-sectional dimensions and riparian habitat as currently in place with the addition of buried scour protection. This would not be anticipated to change the flow dynamics or riparian habitat of the watercourse, however it would have the potential to be considered minor beneficial due to the increase in length and sinuosity of the watercourse.

13.4 Summary

- With mitigation, no significant effects upon road drainage and the water environment are likely during construction.
- With mitigation, no significant effects upon road drainage and the water environment are likely during operation.

Further details are provided within Chapter 13 (Road Drainage and the Water Environment) of Volume 6.1 of the full Environmental Statement.

Once mitigation measures are implemented, these would also ensure compliance with the Water Environment (Water Framework Directive) Regulations 2017. Further details are provided within the Appendix 13.1 (Water Framework Directive Compliance Assessment) of Volume 6.3 of the full Environmental Statement.

14 Climate

It is now established that, as a result of rising concentrations of Carbon Dioxide (CO2) and other greenhouse gases (GHG) in the atmosphere, a degree of climate change is inevitable and is expected to have significant implications for infrastructure assets in the future, particularly those with long operational lifetimes. Therefore, a climate assessment has been undertaken for the Scheme.

14.1 Method for assessment

For the climate assessment, the Scheme's effect on the climate (looking at changes to GHG emissions) and the Scheme's vulnerability to climate (such as how the new road will react to extreme weather events) have been assessed.

14.2 Construction

The Scheme has sought to reduce GHG emissions as far as practicable to contribute to the UK's net reduction in GHG emissions and maximise the potential for reducing GHG emissions. Embodied carbon associated with the use of materials is a reasonable contributor to the carbon footprint of the Scheme, where typical road construction materials like steel, concrete and bitumen have high embodied carbon content depending on their specifications. Assessing the level of GHG emissions associated with the Scheme has been key in assisting and focusing the reduction effort. The assessment of construction emissions shows a 44% reduction in Scheme emissions compared to the baseline assessment.

Plant equipment and vehicles to be used on the Scheme would be selected based on their relative environmental performance taken from a technical specification. Construction works would be carried out in accordance with the best practicable means to reduce fumes or emissions. Mitigation measures would also ensure that the construction of the Scheme allows for adaptation to changes in climate.

A number of potential impacts of climate change on the Scheme during construction were identified. However, due to the implementation of identified mitigation and the limited changes in climate over the three year construction period, no significant effects are likely for the Scheme associated with vulnerability to climate.

The Scheme's effect on climate from GHG contributions would not have any material impact on the ability of the UK Government to meet its legally binding carbon reduction targets and would not be significant during construction.

14.3 Operation

Operational emissions calculated for the entire assessment period include the vehicle use emissions, plus the annual GHG emissions associated with maintenance, operational energy use and land use change emissions. For the purposes of identifying to what extent the Scheme may impact the Government's ability to meet its carbon budgets, a comparison has been made between the UK carbon budget assessment findings and those identified within the calculation of lifecycle emissions. The assessment has identified that the GHG emissions impact of the Scheme would not be significant as it would not have any material impact on the UK Government meeting its legally binding carbon reduction targets.

During operation, there is the potential for the road and surrounding area to be adversely affected by changes in climate. However, these are not likely to be significant. The Scheme design includes allowances for the effects of climate change in terms of drainage and grass features to increase resilience to flooding, and the use of structures to reduce the risk of failure caused by increases in temperature. With implementation of the mitigation measures it has been concluded that no significant effects would occur to the Scheme in respect of climate change.

14.4 Summary

- No significant effects upon climate are likely during construction.
- No significant effects upon the Scheme due to climate vulnerability are likely during construction.
- No significant effects upon climate are likely during operation.
- No significant effects upon the Scheme due to climate vulnerability are likely during operation.

Further details are provided within Chapter 14 (Climate) of Volume 6.1 of the full Environmental Statement.

15 Combined and cumulative effects

Combined and Cumulative effects look at both the total combination of all environmental topics assessed, as well as the cumulation of effects from nearby developments. These are assessed separately and discussed below.

15.1 Method of assessment – Combined effects

The assessment methodology considers the combined effects of the Scheme on residential receptors which involves the identification of interactions between air quality, visual effects, noise and vibration topics.

Construction

The Scheme would have a significant adverse combined effect during construction for 3 different receptors. This is after consideration of the combined effects at different receptors associated with air quality, visual effects, noise and vibration. Whilst some significant adverse effects have been identified, no additional mitigation above those identified in the First Iteration Environmental Management Plan (in Volume 6.5) are needed given the short-term temporary nature of these combined effects.

Operation

No significant adverse combined effects have been identified at the receptors considered in the assessment during operation.

15.2 Method of assessment – Cumulative effects

When proposed developments have an overlapping zone of influence for environmental effects there is the potential for a cumulation of impacts. For cumulative effects, changes likely to be caused by other developments together with the Scheme are identified. Initially a long list of developments was compiled using the Scheme traffic uncertainty log and the Planning Inspectorate's 'Programme of Projects'. This was then reduced to a short list for developments that had the potential to coincide with the construction and operational phases of the Scheme. These developments included:

- NAP2A - Land south of Newark (10/01586/OUTM and 14/01978/OUTM) (housing development)
- NUA/E/3 - Telford Drive (business development)

- NUA/Ho/4 - 18/02279/OUTM, 22/00426/S73 - Lincoln Road (Yorke Dr and Lincoln Rd Playing Field) (business development)
- NUA/MU/1 – Land North of the A17, Newark (business development)
- NUA/E/2 - Stephenson Way (business development)
- 21/02408/FULM BGO Ark PropCo Limited (business development)
- NUA/MU/3 - NSK Factory Northern Road Newark (Retail) (and residual site NUA/MU/3) (business development)

Construction

We have looked at the cumulative effect of the developments above alongside the Scheme to see if there will be any significant cumulative effect during construction. The assessment has found that there are likely significant cumulative effects on:

- The setting of a listed building due to the construction of the Scheme and the housing development.
- The landscape character of Winthorpe and the surrounding farmlands due to the Scheme and business developments.
- Views due to presence of construction material for visual receptors overlooking the Scheme and multiple business developments.
- The loss of agricultural land due to the construction of the Scheme and the housing development as well as business developments.

These significant effects are due to the possible but unlikely overlap of unavoidable construction activities between the above developments and the Scheme. This effect would only occur in the unlikely worst-case scenario that the construction activities coincided and would reduce to a non-significant effect by operation. The mitigation included in the First Iteration Environmental Management Plan is considered adequate to manage and mitigate for these potential adverse effects.

Operation

During operation, the assessment has found that there are likely significant cumulative effects on:

- The landscape character of Winthorpe and the surrounding farmlands due to the Scheme and business developments.
- Views may change for visual receptors overlooking the Scheme and business developments.

These significant effects are due to the temporary operational effects which will reduce to not significant during operation. These effects are mitigated due to planting and landscape design which will reduce the effects to non-significant levels once the planting has matured.

15.3 Summary

- The Scheme would have a temporary significant adverse combined effect during construction for 3 different receptors.
- No significant combined effects are likely in operation.
- As a worst case the Scheme would result in significant effects for heritage, landscape and population and human health receptors with NAP2A, NUA/E/3, NUA/Ho/4, NUA/MU/1, NUA/E/2, NUA/MU/3 and 21/02408/FULM developments during construction.
- As a worst case the scheme would result in significant effects for landscape receptors with NUA/E/3, NUA/Ho/4, NUA/MU/1, NUA/E/2, NUA/MU/3 and 21/02408/FULM developments during operation. These effects would reduce to not significant over time due to planting maturing.

Further details are provided within Chapter 15 (Combined and Cumulative Effects) of Volume 6.1 of the full Environmental Statement.

16 Next steps

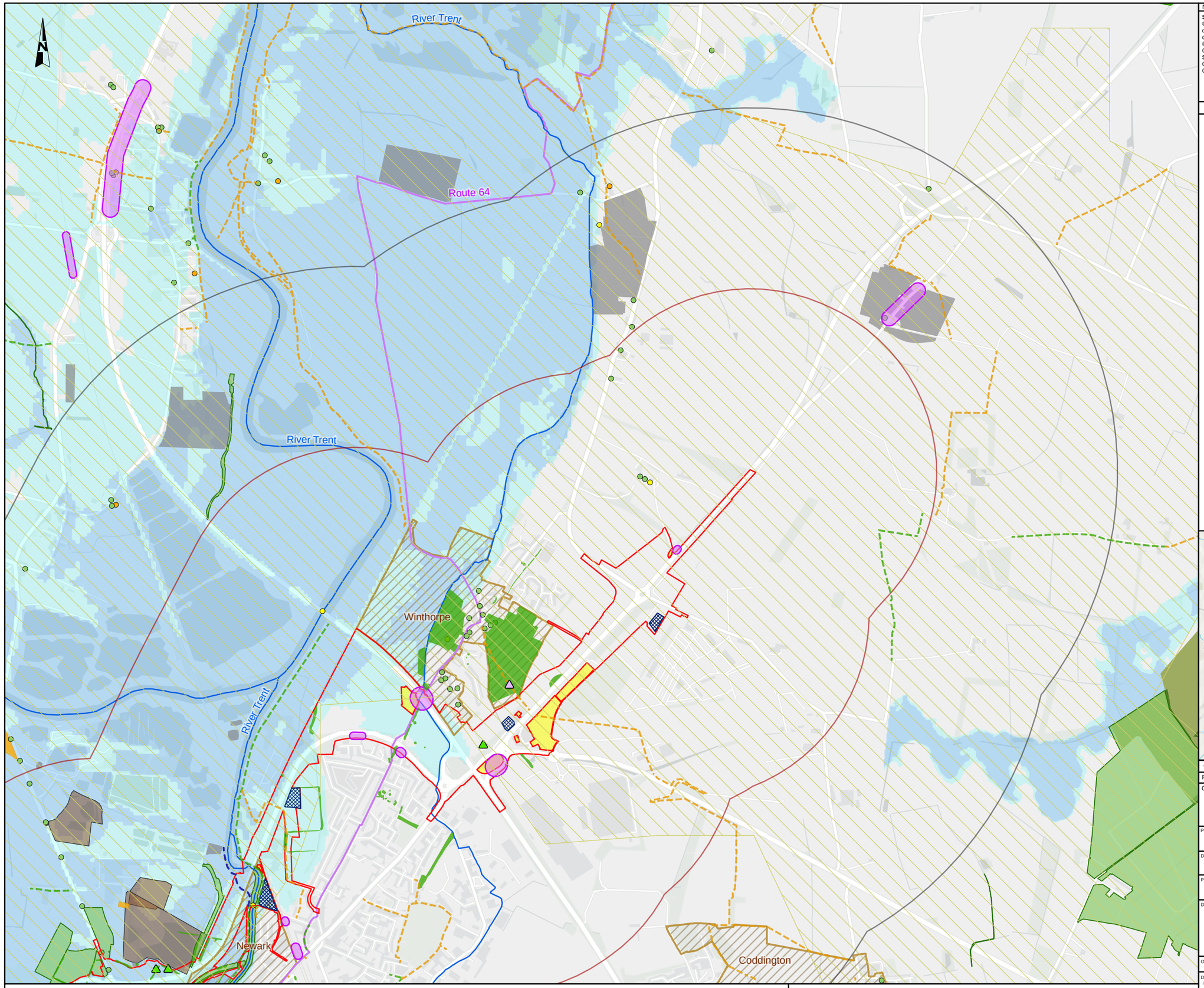
We have submitted the Environmental Statement to the Planning Inspectorate as part of our application for a DCO. The Planning Inspectorate will next consider whether the application should be accepted for examination.

The Planning Inspectorate will upload documents to its website (A46 Newark Bypass | National Infrastructure Planning (planninginspectorate.gov.uk)) and will contact local authorities for confirmation of the adequacy of the pre-application consultation. If satisfactory responses are received and all the necessary documents have been provided, the Planning Inspectorate will accept the application and the pre-examination stage will begin. Registered interested parties can send written comments to the Planning Inspectorate and can ask to speak at a public hearing. The examination will last a maximum of 6 months.

The Examining Authority will then have 3 months to consider its recommendation. This recommendation and a supporting report will then be passed to the Secretary of State for Transport, who will have 3 months to decide whether to grant a Development Consent Order.

Finally, when the Secretary of State's decision is published, there will be a 6-week High Court challenge period. If there are no High Court challenges, the decision will be final and we would have the legal power to proceed with the Scheme.

Appendix A: Environmental constraints plan



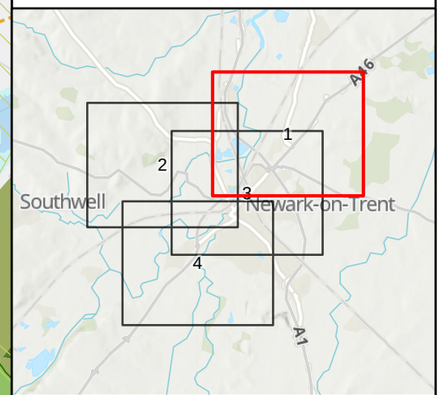
NOTES

Source

Service Layer Credits

KEY TO SYMBOLS

- Order Limits
- Satellite Compound
- Land not included within the Order Limits
- Order Limits 1km buffer
- Order Limits 2km buffer
- Grade I Listed Building
- Grade II* Listed Building
- Grade II Listed Building
- Ancient and semi-natural woodland
- Ancient replanted woodland
- Scheduled Monument
- Conservation Area
- Flood Zone 2
- Flood Zone 3
- Main River
- Tree Preservation Order
- Veteran Tree
- Notable Tree
- Noise Important Area
- Historic Landfill Site
- Authorised Landfill Site
- Local Wildlife Site
- Mineral Safeguarding Area- Alluvial Sand and Gravel
- National Cycle Network
- Permissive path
- Public Right of Way - Bridleway
- Public Right of Way - Footpath



REV.	DATE	AMENDMENT DETAILS	ORIG	CHK'D	APP'D
C01	08/12/2023	DCO APPLICATION	BH	SB	HF

CLIENT: national highways

PURPOSE OF ISSUE: DCO APPLICATION

DEVELOPMENT CONSENT ORDER NUMBER: TR010065

PROJECT TITLE: A46 NEWARK BYPASS

DRAWING TITLE:
Figure 2.2
Environmental Constraints Plan
Sheet: 1 of 4

ORIGINAL SIZE: A3 | SCALE: 1:20,000

DRAWING NUMBER
HE PIN | ORIGINATOR | VOLUME | LOCATION | TYPE | ROLE | NUMBER
HE551478 | SKAG | EGN | CONWI_CONW | DR | LE | 00006

PROJECT REF NO.: HE551478

REVISION: C01

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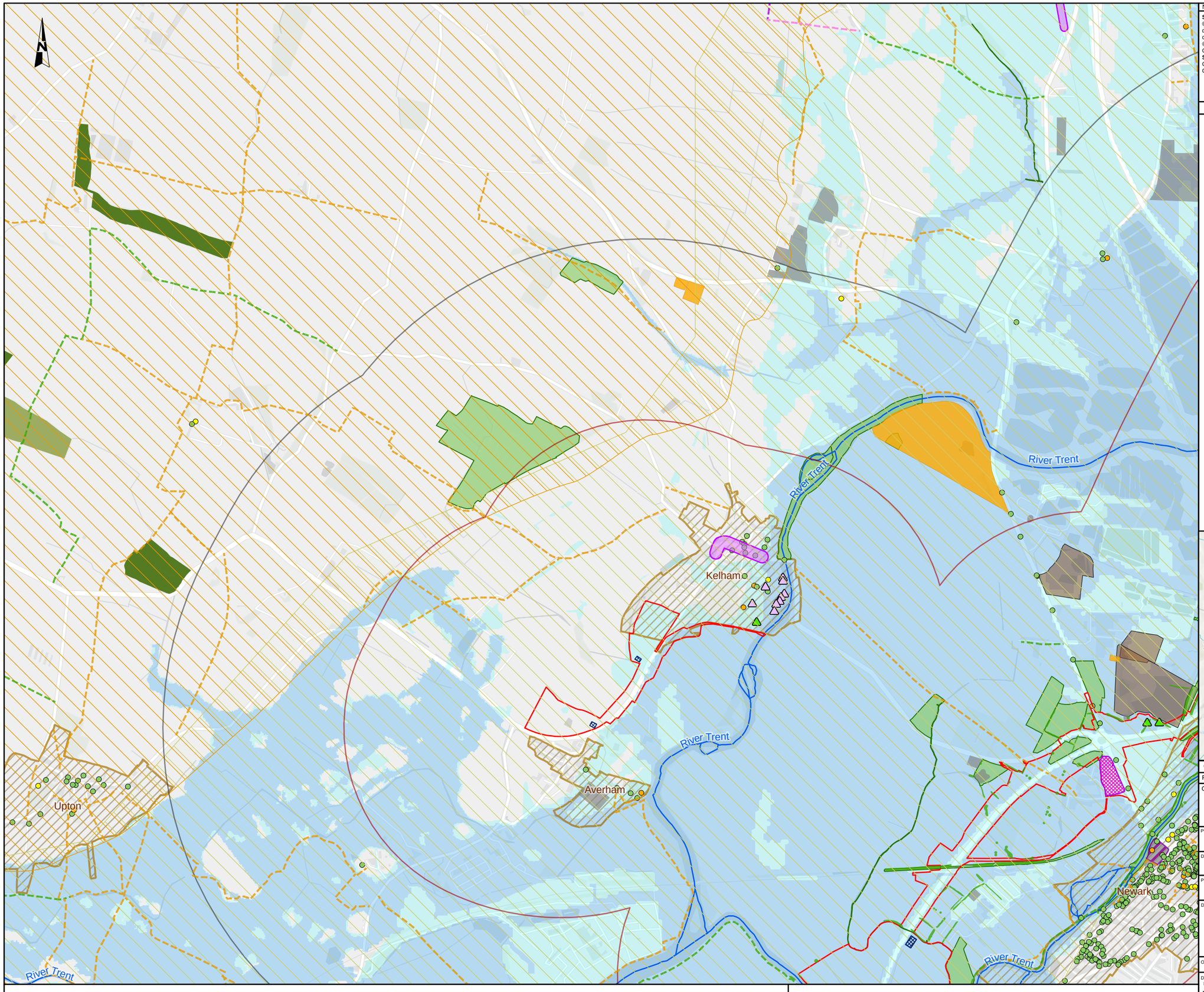

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KEY TO SYMBOLS

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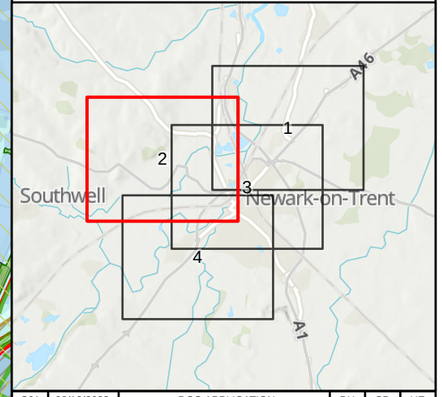
- Registered Park and Garden
- Flood Zone 2
- Flood Zone 3
- Main River
- Tree Preservation Order
- Veteran Tree
- Noise Important Area
- Historic Landfill Site
- Authorised Landfill Site
- Local Wildlife Site
- Mineral Safeguarding Area- Alluvial Sand and Gravel
- Mineral Safeguarding Area- Clay
- Public Right of Way - Byway open to all traffic
- Public Right of Way - Bridleway
- Public Right of Way - Footpath
- Public Right of Way - Restricted byway



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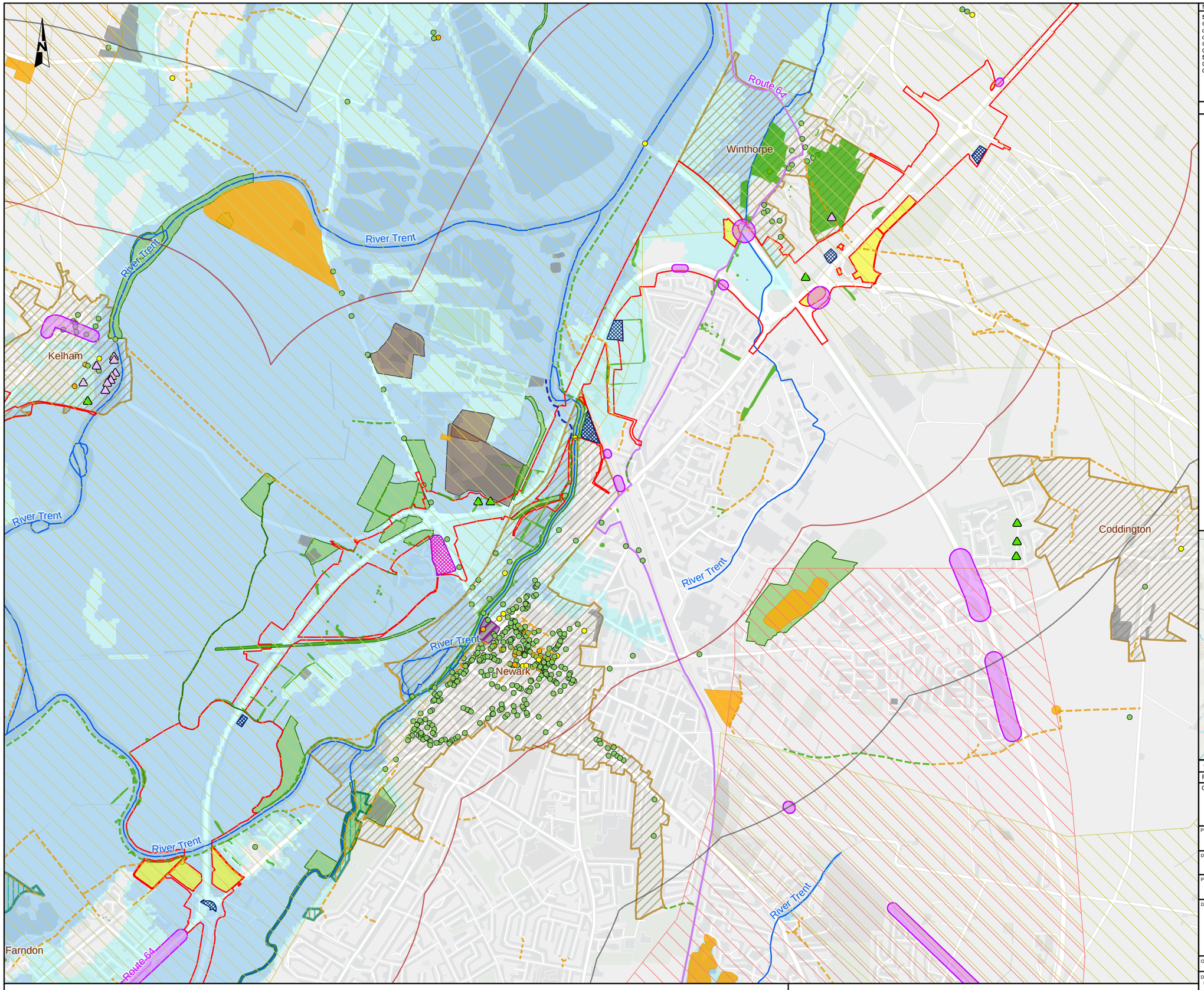
PROJECT REF NO.
HE551478

REVISION
C01

0 500 1,000 Metres



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Service Layer Credits

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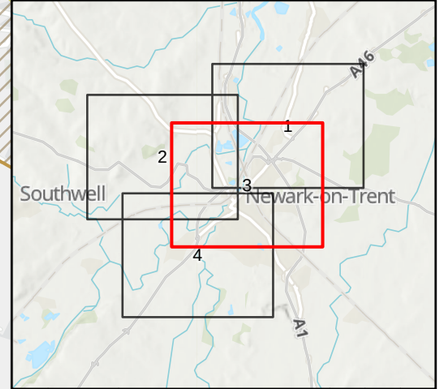

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SCALE: 1:20,000

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HE PIN	ORIGINATOR	VOLUME	LOCATION	TYPE	ROLE	NUMBER
HE551478	SKAG	EGN	CONWI_CONW	DR	LE	00008

PROJECT REF NO.: HE551478

REVISION: C01

0 500 1,000 Metres

Averham
River Trent
Newark
Route 64
Farndon
East Stoke

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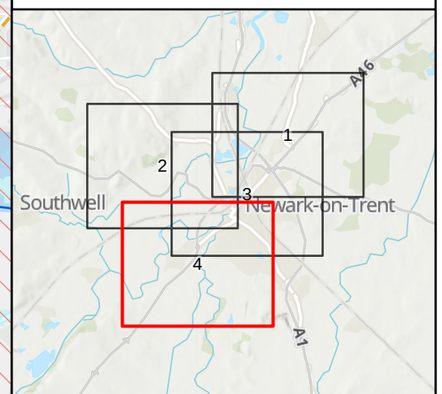

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REVISION
C01

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