A47 North Tuddenham to Easton Dualling

Scheme Number: TR010038

Volume 6
6.4 Environmental Statement Non-Technical Summary

APFP Regulation 5(2)(a)

Planning Act 2008

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

March 2021

Infrastructure Planning

Planning Act 2008

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

The A47 North Tuddenham to Easton Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT NON-TECHNICAL SUMMARY

Regulation Number:	5(2)(a)
Planning Inspectorate Scheme Reference	TR010038
Application Document Reference	TR010038/APP/6.4
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Author:	A47 North Tuddenham to Easton Dualling Project Team, Highways England

Version	Date	Status of Version
Rev 0	March 2021	Application Issue

A47 North Tuddenham to Easton

Environmental Statement: Non-Technical Summary

Contents

Introduction

Highways England is proposing to upgrade approximately 7.9km of single carriageway on the A47 between North Tuddenham and Easton to a dual carriageway. The A47 North Tuddenham to Easton dualling project is referred to as the 'Proposed Scheme'.

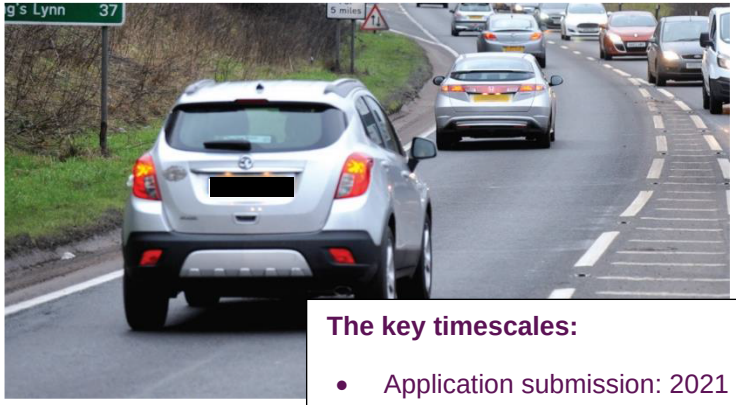
The section of single carriageway proposed for upgrade acts as a bottleneck, resulting in congestion and leading to longer and unreliable journey times. This will include associated works to enable the Proposed Scheme to connect into the strategic road network.

Highways England aim to address these issues by constructing a high-quality dual carriageway link which is intended to improve the traffic flow, reduce journey times on the route and increase the route safety and resilience. The Proposed Scheme is also intended to support economic growth by making journeys safer and more reliable.

The Proposed Scheme is defined as a 'Nationally Significant Infrastructure Project' under the Planning Act 2008, which requires Highways England to obtain permission before construction and operation can commence. This permission is called a Development Consent Order (DCO). The DCO application will be examined by the Planning Inspectorate which will report its findings to the Secretary of State for Transport to aid decision making.

Environmental information has been collected to identify the potential impacts of the Proposed Scheme and develop measures to avoid or reduce adverse impacts - a process known as environmental impact assessment (EIA).

An Environmental Statement (ES) has been prepared to accompany the DCO Application. This sets out a description of the Proposed Scheme and the reasonable alternatives considered in the development of the design, the environmental setting, potential impacts and the likely significant effects of the Proposed Scheme on local communities and the environment, and the measures proposed to mitigate these effects. This document provides a summary of the ES in non-technical language.



The key timescales:

- Application submission: 2021
- Start of construction work: 2023
- Open for traffic: 2024

The Applicant

Highways England is charged with modernising and maintaining England's strategic road network, as well as running the network and keeping traffic moving. Highways England is the Applicant, and the Strategic Highways Company as defined in the Infrastructure Act 2015.

The Proposed Scheme

The Proposed Scheme is located between the villages of North Tuddenham and Easton approximately 10km to the west of Norwich and forms part of the main arterial highway route, highway route connecting Norwich and Great Yarmouth to King's Lynn and then on to Peterborough, Leicester and the Midlands.

The A47 from North Tuddenham to Easton currently has a single lane of traffic travelling in each direction with several connecting roads.

The route currently experiences delays and high levels of slow moving traffic during peak hours. The situation is predicted to get worse with further development planned in the area.

The **Proposed Scheme** includes:

- 9km of new dual carriageway, running to the south of the existing A47 at Hockering and north of the existing A47 at Honingham.
- two new junctions where the A47 passes over the local roads: one where Berrys Lane meets Wood Lane (Wood Lane junction) and one where Blind Lane meets Taverham Road (Norwich Road junction)
- removal of the existing roundabout at Easton to create a free-flowing road
- building four bridges for the A47 to pass over or under: the new Mattishall Lane Link Road, the proposed Wood Lane junction, the River Tud and the proposed Norwich Road junction
- Sandy Lane connecting to the A47 via a new side road providing access to Wood Lane junction
- two new lay-bys on the A47 between Fox Lane and the proposed Wood Lane junction, and police observation points
- closure to through traffic of: Church Lane (East Tuddenham), Berrys Lane, Blind Lane and Church Lane (Easton), north the of A47
- widening of the junction of Rotten Row and Church Lane (East Tuddenham)
- converting sections of the existing A47 for local needs, such as
  - converting to a Class B road north of Honingham, with a new cycle track between and the new Dereham Road link road and Honingham roundabout
  - reducing to a single lane in front of St Andrews church, Honingham, with inclusion of passing places, parking places, turning area and security gate
- alterations to existing public rights of way and provision of new segregated routes for walkers and cyclists, including:
  - a new route for walkers and cyclists linking Honingham with St Andrew's Church below the A47 via the proposed Honingham Church underpass
  - a new route for walkers and cyclists linking Easton with Lower Easton over the A47 via the proposed Easton footbridge
- new drainage systems, including:
  - new outfalls to the River Tud
  - dry culverts to maintain overland flow paths
  - new attenuation basins, with pollution control devices, to control discharges to local watercourses
- compounds, material storage areas and temporary vehicle parking located within the scheme boundary when construction is taking place
- diverting or installing new utilities infrastructure, such as a high pressure gas pipeline, electricity cables, water pipelines and electronic communications cables
- environmental measures embedded into the Proposed Scheme design to reduce

the environmental effects and deliver wider benefits, such as noise barriers, low noise road surfaces, permanent mammal crossings and new wetland habitats

Alternatives considered

To resolve the transport problem between North Tuddenham and Easton, fourteen potential options were originally developed.

These options were assessed to identify their performance against safety, environmental, engineering, transportation and economic criteria so that they could be compared and a preference selected.

Four of the fourteen options were taken forward for more detailed assessment and non-statutory public consultation (2017):

- Option 1: offline dualling to the north of the existing A47.
- Option 2: online dualling of the existing A47.
- Option 3: offline dualling to the south of the existing A47 for the western part of the route
- Option 4: offline dualling to the south of the existing A47.

As set out in the Preferred Route Announcement (August 2017), an amended version of Option 2 was the preferred option. It solves the traffic and safety problems and it also has the least impact on the environment. Key concerns raised by the public regarding Option 2 have influenced a realignment which means it can be built with less impact during construction and the existing road can remain open for local traffic movements, pedestrians, cyclists and equestrians.

The chosen option deviates locally from the existing A47 which would provide the following benefits:

- Reduce the impact at the western end on Oak Farm, minimising the impact on the existing properties at Mattishall Lane. This minimises, where possible, the impact on properties close to the existing A47 at Hockering.
- Retention of sections of the existing A47 for local access, walking and cycling.

View 03 - 02 - Junction 01 - Wood Lane

View 05 - 04 - St Andrews Church

Environment Impact Assessment (EIA)

EIA is a process that identifies the likely significant environmental effects (both adverse and beneficial) of a proposed development. Environmental effects are assessed through understanding of the potential impacts and the sensitivity of the receptors for a given scheme. The process ensures that the importance of effects is properly considered and that the opportunity for reducing any adverse effects are taken into account as part of the design development process.

The approach to the EIA involves; information gathering to establish the baseline and environmental setting, considering the potential impacts of the Proposed Scheme, consultation, developing measures to prevent or reduce adverse impacts, and identifying the residual significant effects.

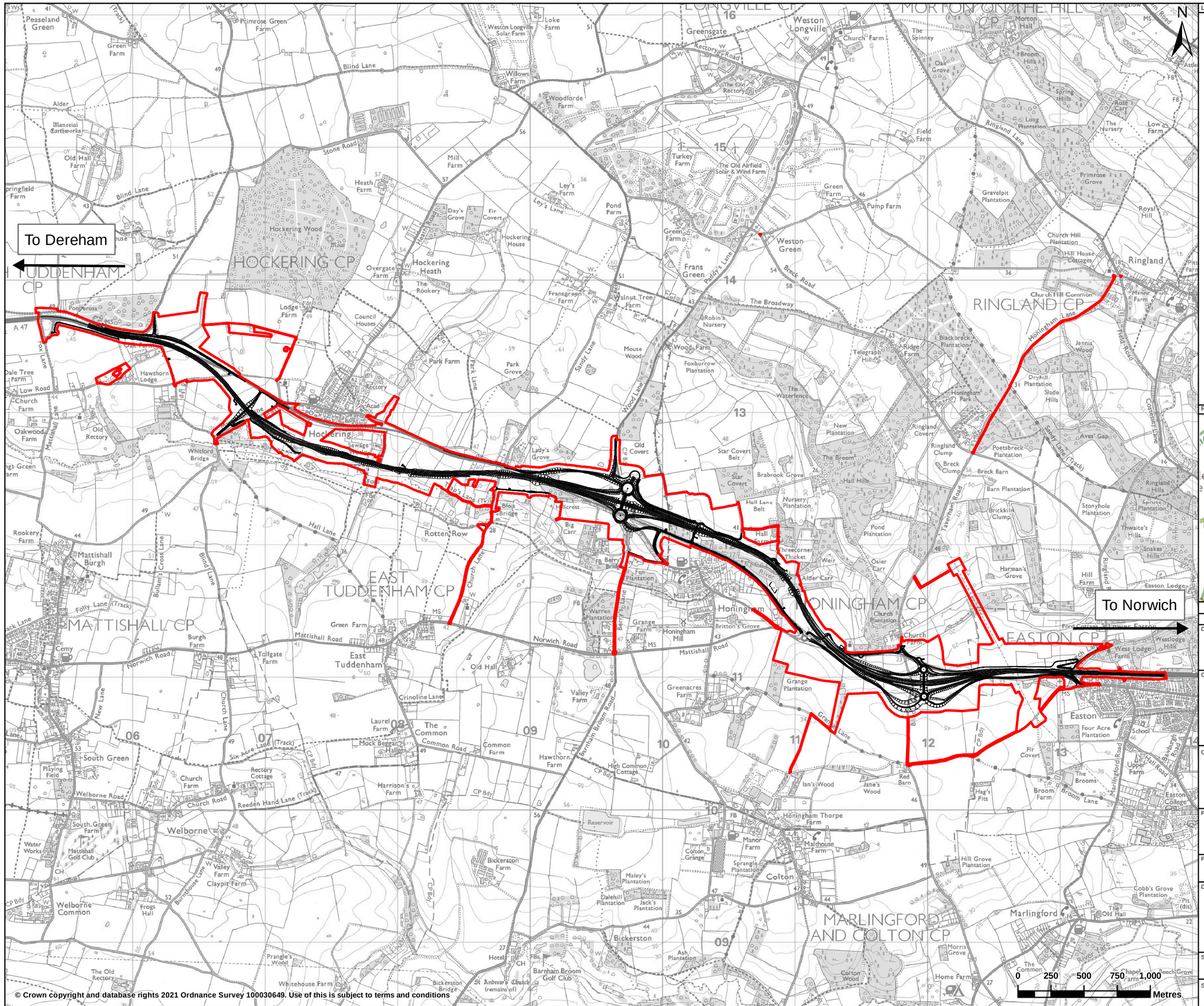
The findings inform the design process and are communicated to competent authorities, statutory authorities and other interested parties.

The EIA is undertaken in accordance with up to date legislation and guidance and within a spatial and temporal scope described in the assessment.

The findings of the EIA are reported in the Environmental Statement (ES). This document is a summary of the ES in non-technical language. The ES and this non-technical summary are submitted with the DCO application.

Each environmental topic chapter of the ES reports the effects on the local environment and sensitive receptors such as designated sites, community facilities, people living, working and relaxing in the vicinity of the Proposed Scheme and local environment management areas such as air quality management areas (AQMA), noise important areas (NIA) and water.

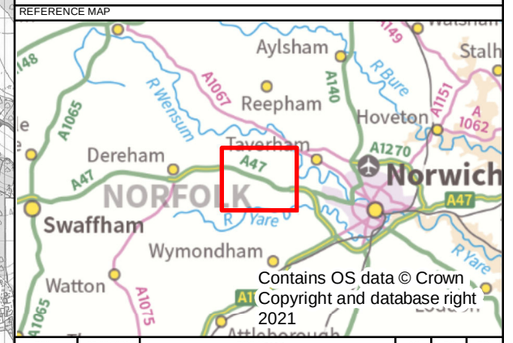
The EIA process considers impacts and their resultant effects during the construction and operation of the Proposed Scheme. The construction phase assessment addresses both the temporary activities involved in building the Proposed Scheme and the subsequent permanent presence of the Proposed Scheme once constructed. The operational assessment considers the situation when the Proposed Scheme is being used by traffic.



LEGEND

- DCO boundary
- Proposed scheme layout

REFERENCE MAP



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REV	DATE	REVISION NOTE	ORG	CHK'D	APP'D
P02	05/03/2021	DCO Update	AC	EC	EC

DESIGNER: SWECO

CONTRACTOR: GallifordTry

CLIENT: highways england

PROJECT TITLE: A47 NORTH TUDDENHAM TO EASTON

PROJECT STAGE: PCF STAGE 3

DRAWING TITLE: ES NTS FIGURE 1 – SITE LOCATION
TR010038/APP/6.4

SUITABILITY: FOR INFORMATION

SHEET SIZE	SCALE	STATUS
A3	1:27,500	S2

DRAWING NUMBER: HE551489-GTY-EGN-000-DR-LX-30009

Air Quality

Road traffic emissions at selected sensitive human and ecological receptors have been assessed by modelling the change in air quality pollutant concentrations. The model has been compared against local air quality monitoring data and has been used to predict the air quality impacts caused by changes in traffic flows and road alignments as a result of the Proposed Scheme.

During construction, it was concluded the impact of construction dust would be highly unlikely to trigger a significant air quality effect. As construction activities are programmed to last less than two years and potential effects will be mitigated and managed through best practice, it is unlikely there would be a significant effect on air quality or affect the UK's ability to comply with the Air Quality Directive.

During operation, the Proposed Scheme is expected to cause both adverse and beneficial effects in emission concentrations at sensitive human and ecological receptors. The receptors which are predicted to experience an adverse effect are largely due to the increase in traffic flows from the Proposed Scheme once open. Receptors are predicted to experience a beneficial effect is due to a diversion of traffic flows away from receptor locations. The assessment has concluded there would be no significant adverse effects on these receptors from the operation of the Proposed Scheme.

With no significant effects predicted, no mitigation is required.

Cultural Heritage

Cultural heritage includes archaeology, historic buildings / structures and historic landscapes including parks and gardens. Geophysical and archaeological trenching surveys were used to inform the assessment.

The Proposed Scheme will have both beneficial and adverse effects on cultural heritage. Potential adverse effects have been reduced or eliminated with a combination of sensitive design and targeted mitigation. Where adverse effects could not be avoided, a programme of archaeological recording and publishing is proposed to mitigate the impact.

Residual adverse effects on setting have been identified as a result of construction and operation activities on the following heritage assets:

- St Peter's Church (NHLE 1305921 Grade I Listed Building) - Moderate
- St Andrew's Church (NHLE 1170701 Grade II* Listed Building) - Large
- Church Farm House (NHLE 1051542 Grade II Listed Building) – Slight
- Berry Hall (NHLE 1396730 Grade II Listed Building) - Slight

Beneficial effects have been identified for the setting of the Grade I listed St Michael's Parish Church in Hockering and three other Grade II listed buildings near the existing A47 in Hockering by moving traffic further away and maintaining an appropriate density of planted screening along the new carriageway.

Other significant beneficial effects have been identified in the planned conservation of two mileposts along the route of the existing A47, which Highways England will also propose for listing by Historic England.

Landscape

The Landscape and visual effects assessment is a review of the existing environment, which identifies the potential impact of the Proposed Scheme on the surrounding landscape and views.

During construction there would be a loss of existing trees and hedgerows and a change to the existing agricultural land use. People's views would also be affected, including views of earthworks, construction vehicles and work associated with the installation of overbridges.

During the initial stages of operation, the Proposed Scheme carriageway, overbridge structures, junction lighting and general movement of vehicles along the highway would be visible. Once tree and hedgerow planting is established, approximately 15 years after opening, the Proposed Scheme would successfully integrate into the existing landscape and visual context with limited adverse landscape and visual effects. Four visual individual receptors would experience residual adverse significant effects.

The assessment concludes that the Proposed Scheme would not result in an overall significant residual effect on landscape and visual amenity.

Biodiversity

There are valuable habitats and species of nature conservation importance that could be adversely affected by the Proposed Scheme. Avoidance of impacting trees and hedgerows was a key consideration throughout the design stage, however, there still remains some areas of these habitats that will need to be lost.

The assessment considers all relevant designated ecological receptors within the agreed study area and the results of the ecological surveys have identified mitigation measures to safeguard the conservation status of wildlife populations through both the construction and operational phases.

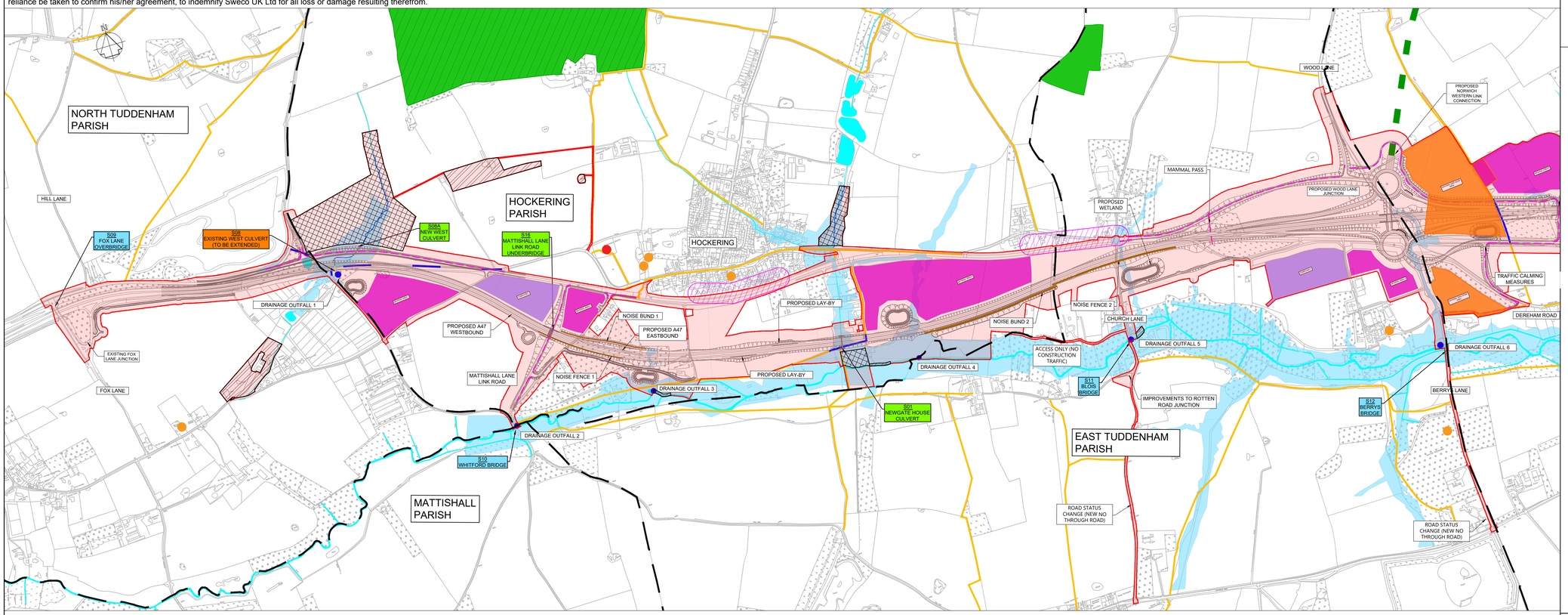
This assessment considers the following ecological receptors:

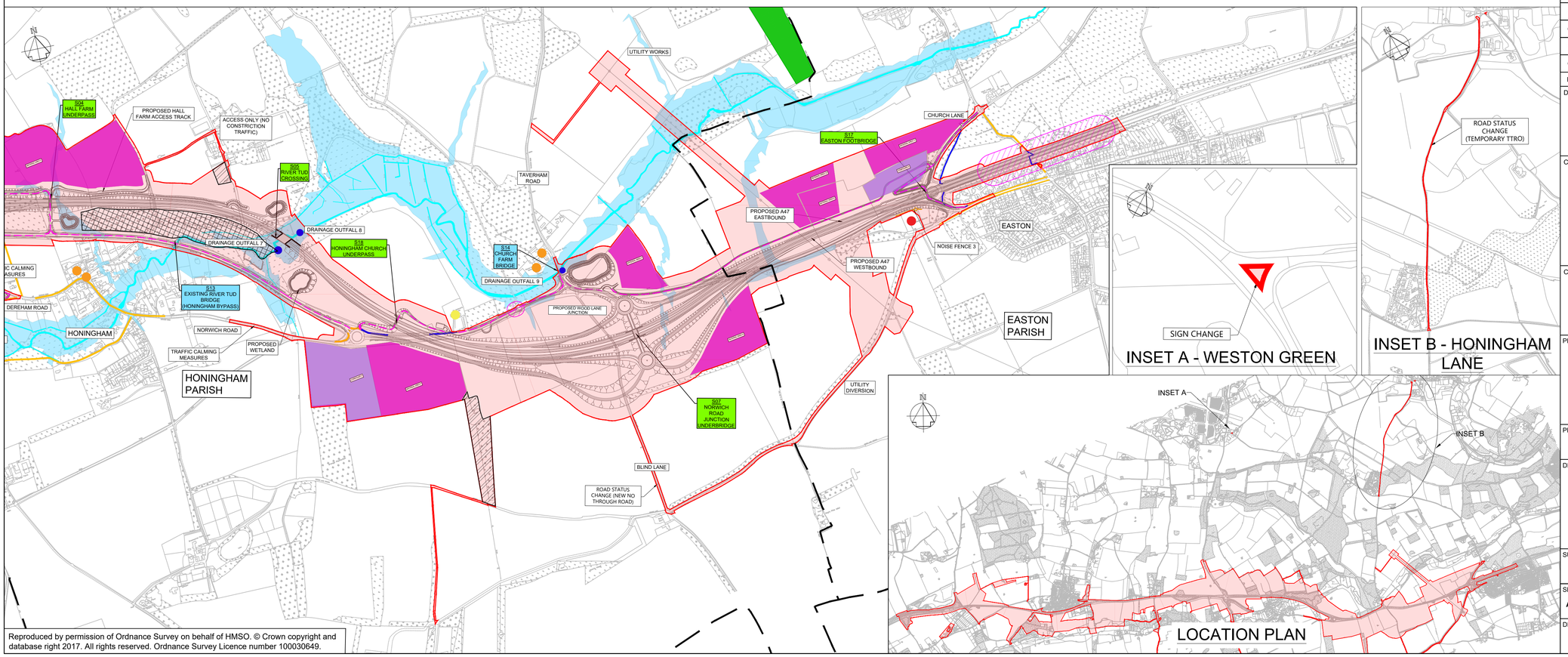
- River Wensum SAC
- Paston Great Barn SAC
- River Wensum, Hockering Wood and Rosie Curston's Meadow SSSI
- County Wildlife Sites (CWS)
- Priority habitats including ancient woodland
- Protected species and species of principal importance (notable), including; fungi, badger, bats, breeding birds, migratory birds, wintering birds, barn owl, terrestrial and aquatic invertebrates (including white-clawed crayfish), great crested newt, otter, water vole, reptiles and their habitats.

The potential impacts (unmitigated) of the proposed works include the loss of nesting, roosting, resting, commuting and foraging habitat for a range of protected and notable species.

Mitigation measures will be implemented during the construction and operational stages to reduce the effects of the proposed scheme on individuals and populations of protected and notable species. Control, management and planting measures are detailed in the Chapter (Section 8.9 Design interventions and mitigation) (**TR010038/APP/6.1**) and the Environmental Management Plan (**TR010038/APP/7.4**).

Following implementation of best practice and site-specific mitigation measures during construction and operation, as detailed in this chapter for the ES, there would be residual significant effects on barn owls, this significant effect would be until agreements are in place with landowners to place suitable nest boxes, and bats. Following mitigation there will be a moderate adverse residual effect on hedgerows, deciduous woodland, and grazing marsh as a result of the long maturity period for planting; though grasslands and ponds will have a slight beneficial effect. All other biodiversity resources are not considered to be significant.





NOTES

1. DO NOT SCALE FROM THIS DRAWING
2. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE

LEGEND

- DCO BOUNDARY
- RIVER TUD / WATERCOURSES
- SXX — EXISTING STRUCTURE (NO CHANGE)
- SXX — EXISTING STRUCTURE (MODIFIED)
- SXX — NEW STRUCTURE
- WCH - EXISTING PROVISION
- WCH - EXISTING ROUTE SEVERED / REMOVED
- NEW WALKER AND CYCLIST ROUTE
- NOISE BARRIER
- ENVIRONMENTAL MITIGATION AREA
- ECOLOGICAL MITIGATION AREAS
- GRADE I - LISTED BUILDING
- GRADE II - LISTED BUILDING
- GRADE II* - LISTED BUILDING
- ANCIENT WOODLAND
- SSSI - HOCKERING WOOD
- NOISE ACTION PLANNING IMPORTANT AREAS
- ENVIRONMENT AGENCY FLOOD ZONE 2 & 3
- PARISH COUNCIL BOUNDARY
- PROPOSED DRAINAGE OUTFALL LOCATIONS
- MATERIAL STORAGE / PROCESSING
- CONSTRUCTION COMPOUND
- CONSTRUCTION WORKS AREA

REV	DATE	REVISION NOTE	ORG	CHK'D	APP'D
P01	01/12/20	FINAL ISSUE	JWa	MR	MR
P02	02/12/20	FINAL ISSUE	JWa	MR	MR
P03	11/03/21	DCO SUBMISSION	RO	MR	MR
C01	11/03/21	DCO SUBMISSION	RO	MR	MR
P04	15/03/21	DCO SUBMISSION	ACus	MR	MR
C02	15/03/21	DCO SUBMISSION	ACus	MR	MR

DESIGNER
SWECO

CONTRACTOR
GallifordTry

CLIENT
highways england

PROJECT TITLE
A47 NORTH TUDDENHAM TO EASTON DUALLING

PROJECT STAGE
PCF STAGE 3

DRAWING TITLE
ES NTS FIGURE 2 - PROPOSED WORKS
TR010038/APP/6.4

SUITABILITY
AUTHORISED AS STAGE 3 COMPLETED

SHEET SIZE	SCALE	STATUS	REVISION
A1	N/A	A3	C02

DRAWING NUMBER
HE551489-GTY-LSI-000-DR-CH-30003

Geology and soils

No designated geological sites are located in the study area.

The land surrounding the Proposed Scheme is mainly agricultural fields with small residential areas dispersed along the existing A47. The geological sequence underlying the Proposed Scheme is sands, gravels and clays with occasional peat over chalk bedrock.

The agricultural land within the footprint of the Proposed Scheme contains Grade 2 agricultural land (very good quality), Grade 3a agricultural land (good quality), Grade 3b agricultural land (moderate quality) and Grade 4 (poor quality) agricultural land. Grade 2 and Grade 3a agricultural land are considered to be Best and Most Versatile agricultural land.

The Proposed Scheme has been identified to result in the permanent land take and temporary land take of Grade 2, Grade 3a, Grade 3b and Grade 4 agricultural land. The design of the Proposed Scheme has sought to minimise the areas of land take and a Soil Management Plan will be developed to help preserve land quality and restore areas of temporary land take. The long-term residual effects on agricultural soils would therefore be limited to the area of agricultural land permanently lost. The permanent land take of Grade 2 is considered to be of large adverse significant effect, Grade 3a agricultural land is considered to be of very large adverse significance of effect, while the permanent land take of Grade 3b agricultural land is considered to be of moderate adverse significance of effect.

Potential sources of historical contamination in the vicinity including fill materials used in construction of the existing A47 have been identified. Only minor evidence of contamination from historical activities were recorded during the site investigation and no special remedial activities are recommended for the Proposed Scheme.

Based on the confirmed ground conditions there is limited potential of construction activities mobilising contaminants within the underlying soils or introducing contaminants which may potentially harm human health or environmental receptors such as the River Tud. Risks identified can be mitigated by measures set out in the Environmental Management Plan (**TR010038/APP/7.4**).

Therefore there are slight adverse potential impacts from the Proposed Scheme during construction are predicted. These impacts, however, are not considered significant and are of short duration.

The operational phase of the Proposed Scheme results in a reduced potential for harm as the underlying soils are no longer exposed or disturbed effectively breaking potential pathways to receptors and presents no further impacts to agricultural soils.

Material assets and waste

The potential impacts of the Proposed Scheme from the use of material resources and generation of waste are assessed against the baseline information on material assets (materials availability) and waste

(landfill capacity) generated by the relevant authorities, based on predicted regional demand projections (including consideration for other significant projects within the east of England region).

Significant environmental effects from the use of material assets and generation of waste during the first year of operational activities (opening year) are not predicted due to limited material use and waste generation from infrequent maintenance activities.

Design, mitigation and enhancement measures will be implemented during construction and controlled through the Environmental Management Plan. Overall, the recycled content of the materials used are predicted to be in excess of the regional target of 31% and over 70% of the waste generated will be re-used or recycled in line with the Government's target for the recovery of construction waste. Additionally, the Proposed Scheme is not likely to result in a 1% reduction or alteration in the regions landfill capacity. The residual effects will not be significant.

Noise and vibration

Noise sensitive receptors, such as residential homes, near to the Proposed Scheme have been identified. Receptors that are close to the existing A47 are already exposed to relatively high noise levels due to road traffic.

Noise modelling has been undertaken for all sensitive receptors within each study area. As part of the assessment, a baseline noise survey was undertaken. The findings of the survey have been used to verify the results of the road traffic noise model that is used to assess the operational effects of the Proposed Scheme.

A construction noise assessment has been undertaken and concludes that with the application of best practical means of noise control and temporary barriers, significant effects due to construction noise are unlikely at the vast majority of receptors within the study area. A significant adverse temporary effect is predicted at Acorn Barn due to construction noise from the adjacent drainage basin works. Furthermore, there are a large number of receptors that could experience significant effects due to noise from night-time or weekend works. The Principal Contractor shall carry out detailed construction noise assessments once further details of the construction methods and durations are defined.

An assessment of potential construction vibration impacts has been undertaken. Mitigation in the form of best practice construction methods and vibration monitoring are required for compaction works within 30m of any sensitive receptor. It is also necessary for the Principal Contractor to carry out further detailed construction vibration assessments in relation to vibration from piling close to Acorn Barn and Oak Tree Barn. Vibration due to construction is not expected to result in any significant effects subject to monitoring and effective implementation of this mitigation.

A construction traffic assessment has been undertaken. It is concluded that, providing the anticipated vehicle movements use only the existing A47, proposed roads or Berrys Lane, potential significant effects are

unlikely. Consideration has been given to the traffic diversion routes during road closures required to undertake the construction works. It is concluded that, provided diversion routes are varied, and utilise trunk roads where possible, potential significant effects are unlikely. The outline Traffic Management Plan (**TR010038/APP/7.5**) shall detail the proposed diversion routes and the route selections shall take account of these conclusions.

At the operational stage there will be a number of significant residual traffic noise effects, both adverse and beneficial, amongst the 1,877 noise sensitive receptors considered.

Significant beneficial noise effects are predicted at:

- Noise Important Area 5200;
- Three receptors in Hockering (outside of Noise Important Area 5200);
- Two receptors on Ringland Road;
- One receptor on Park Lane, Hockering;
- Two receptors on The Broadway; and
- Three PRoWs near Hockering.

A majority of these are due to the expected change in road user behaviour (traffic re-routing) brought about by the Proposed Scheme.

Significant adverse noise effects are predicted at:

- Eighty-three receptors in Lyng or on Lyng Road (north of the A47);
- Two receptors on Church Lane;
- Six receptors on Mattishall Lane;
- Hall Farm and Hall Farm Cottages;
- St Andrew's Church, Honingham;
- Hockering Nursery and Newgate, Gypsy Lane in Hockering; and
- Two PRoWs in Hockering, one PRoW in East Tuddenham FP9, one PRoW in Honingham and three PRoWs in Lyng.

Significant adverse effects at 91 of the above receptors are due to traffic re-routing at locations where mitigation is not practical. Significant adverse effects at the remaining 15 receptors are due to the following:

- More road users choosing to access the improved A47 between North Tuddenham and Easton;
- significant effects remaining at some locations despite mitigation being included (i.e. due to the large increase in road traffic noise associated with the introduction of a high-speed dual carriageway into a rural area).
- Some noise barriers are not provided for receptors far from the Proposed Scheme where the marginal benefits provided by a noise barrier does not affect the outcome of the assessment. Further mitigation is not proportionate or would result in adverse landscape and visual impacts.

With regard to Noise Important Areas, a significant beneficial effect is predicted at NIA 5200. The remaining NIA (5201, 5202 and 6287) are not predicted to experience any significant effects (beneficial or adverse) due to the Proposed Scheme.

This chapter also presents an assessment of the cumulative effects of the Proposed Scheme in combination with the proposed Norwich Western Link (NWL). The assessment is summarised in Chapter 15 (Cumulative effects assessment) (**TR010038/APP/6.1**).

Population and human health

The main communities located by the Proposed Scheme include Hockering, Honingham and Easton. There are scattered properties along the length of the Proposed Scheme.

The area surrounding the Proposed Scheme is predominantly arable with some scattered areas of woodland used by the community. Paths are predominately located between the communities of Hockering and Honingham.

During construction, access along the local road network for local residents and businesses across the study area may be disrupted whilst traffic management measures are in place. This may result in longer journey times and a degree of temporary severance between communities, businesses and their facilities.

Construction activities are predicted to result in some adverse amenity effects for human health, specifically in terms of noise, dust and visual intrusion. The Principal Contractor will be required to put in place mitigation measures to minimise these effects. Some adverse temporary effects are likely to still occur to the health of local residents during the construction of the Proposed Scheme.

Permanent effects which occur during construction would result in changes in severance for private property and housing, community land, community assets, development land and businesses in the communities of Great Witchingham, Upper Wensum, Mattishall and Easton. Access to some private properties and businesses may change as a result of the Proposed Scheme. Change to access for properties along Church Lane, Rotten Row, Ringland Road, Dog Lane and Hillcrest, which would result in a moderate adverse effect, which is considered to be significant.

During construction, the Proposed Scheme will require permanent land take from a field adjacent to St Peter's Church. As the land is consecrated, this will result in a significant adverse effect. A **large** significance effect is reported as a worst case assessment on this area of land.

Users of three footpaths, namely, Hockering FP7, Honingham RB1 and Ringland Lane / Dog Lane crossing, are anticipated to experience significant residual adverse effects as a result of path closures and journey length increases. A new combined footway/cycleway will be provided along a section of the Proposed Scheme and safe crossings are being provided to the east of Honingham roundabout and in the location of the existing Easton roundabout. This would improve connectivity between Hockering and Easton for pedestrians and cyclists. A new crossing of the Proposed Scheme would be facilitated by the Mattishall Lane Link Road underbridge.

During construction, agricultural holdings within the DCO boundary would experience disruption to farming operations. In some cases, access to farm yards and fields will be severed. New access arrangements have been designed where possible; however, this will result in longer journey times to a

main trunk road. In many cases it will also require the removal of mature trees and hedgerows.

Permanent land take of agricultural land is required. The range of disruption will impact the wider agricultural holdings in different ways, which could lead to increased costs or a reduction in turnover. This may impact on farm profitability and therefore, potentially viability. Three agricultural holdings would result in permanent significant adverse effects.

Road drainage and the water environment

A review of the baseline information identified key surface water receptors to be The River Tud, ordinary water courses and ponds local to the Proposed Scheme. The River Wensum has been identified as a potential receptor as it is located immediately downstream of the River Tud. The key groundwater receptors include Secondary superficial aquifers and the Chalk principal aquifer.

Potential impacts to the surface water environment include:

- flooding of nearby and downstream receptors due to increases in areas of hard standing, overloading of the drainage system, diversion of flood flow pathways and new watercourse crossings (River Tud Crossing, Newgate House Culvert (Hockering), West Culvert Extension and New West Culvert (Oak Farm))
- impacts on surface water quality and aquatic environments from increased pollutants in routine runoff and from accidental spillages
- loss or degradation of natural channel due to additional culverting on tributaries of the River Tud resulting in impacts on the watercourse morphology and habitat
- impacts on surface water quality and aquatic environment (sensitive chalk stream habitat) due construction in or near to watercourses including proposed outfalls, the River Tud Crossing and the new culverts
- loss of seven ponds

Potential impacts to the groundwater environment include:

- Subsurface structures acting as a barrier to groundwater flow, creating groundwater mounding and a reduction of flow to secondary receptors including the River Tud and groundwater dependant terrestrial ecosystems
- Temporary groundwater control within the saturated aquifers, impacting indirect receptors including abstractions, the River Tud and groundwater dependent terrestrial ecosystems

- Water quality impacts due to works within the saturated aquifer and discharges to the River Tud during construction
- Water quality impacts due to infiltration to ground via filter drains included within the drainage design.

The Proposed Scheme shall discharge primarily to the River Tud and its tributaries via outfalls. Runoff shall be attenuated to a 1 in 100 year event (including an allowance for climate change) using oversized pipes and vegetated detention basins, filter drains (infiltrating to ground) and wetlands. The drainage has been designed to attenuate to greenfield runoff rates for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of 'dry culverts' or cross-drains designed to 1 in 100-year plus 65% climate change allowance.

Fluvial flood risk impacts associated with the River Tud Crossing are minimised by design including the provision of flood compensatory storage due to the loss of floodplain storage as a result of the bridge abutments. There are no adverse flood risk impacts associated with the Newgate House Culvert (Hockering tributary). Both the River Tud Crossing and Newgate House Culvert are designed for a 1 in 100-year plus 65% climate change allowance peak flood level with at least 600mm freeboard. At the Oak Farm tributary, the throttling of flood flows by the existing A47 culvert is maintained by the West Culvert Extension and the New West Culvert with no risk to flood-sensitive receptors.

The Proposed Scheme design incorporates treatment of road drainage prior to discharging to 12 outfalls. Treatment measures include swales, filter drains and detention basins or wetlands. Where these measures are not required as mitigation, they will be included subject to further assessment following supplementary ground investigations. Enhancement measures include vegetated detention basins which are vegetated or wetlands to provide further water quality and biodiversity improvements including removal of nitrate and phosphate.

The loss or degradation of channel morphology and riparian habitat as a result of additional culverting on the Oak Farm and Hockering tributaries. Newgate House Culvert (Hockering) culvert to be designed with a natural sediment bed, and mammal ledge to allow passage during flood flows. Habitat restoration upstream of existing A47 on Oak Farm and Hockering tributary (Environmental Masterplan (**TR010038/APP/6.8**) would mitigate against the impacts of additional culverting.

Ponds must be replaced one for one. Approximate locations are shown on Environmental Masterplan (**TR010038/APP/6.8**).

The design of the foundation piles and ground improvement works have been selected to minimise disruption to groundwater and specifically avoid the requirement of dewatering potentially significant volumes next to the River Tud.

The Proposed Scheme is not expected to give rise to significant adverse residual effects during the construction or operational phases with the adoption of mitigation discussed in section 13.9. The Proposed Scheme will comply with local, regional and national policies. There is no significant impact on the Water Framework Directive status of the affected water bodies.

The outcome of this assessment is based on the mitigation measures described in this chapter which shall be secured through measures embedded in the design and the implementation of the Environmental Management Plan.

Climate

This assessment has considered the Proposed Scheme's effect on climate, (i.e. increases in carbon emissions) as well as the vulnerability of the Proposed Scheme to climate change (i.e. resilience to projected change in climate).

An assessment using the Highways England Carbon Tool (v2.3) has been carried out as part of the development of the Proposed Scheme. This has allowed for the consideration of carbon in the design process, resulting in the development of a carbon baseline from which further reductions may be made.

The construction, operation and use of the Proposed Scheme is predicted to increase carbon emissions by approximately 596,790 tCO_2e over the appraisal period of 60 years (up to 2085).

As per DMRB LA 114, Proposed Scheme carbon emissions have been compared with the Government's published UK carbon budgets. These budgets currently account for UK emissions to 2032, representing 26% of the Proposed Scheme appraisal period. The remaining increase in emissions anticipated during the appraisal period from 2032 to 2085 have no carbon budget for comparison. Therefore, a definitive assessment of materiality for the complete appraisal period is currently not possible.

Guidance on gauging the significance of carbon emissions in Environmental Impact Assessment (EIA) is evolving. DMRB LA 114 (2019) states that assessments on climate should report significant effects where increases in emissions will have a material impact on the ability of Government to meet its carbon reduction targets.

In accordance with DMRB LA 114, this has not precluded efforts to minimise carbon throughout the design and construction of the Proposed Scheme. Additional measures have been adopted as part of the design of the Proposed Scheme to reduce carbon emissions, e.g. a 1km bund has been removed from the design which results in reduced earthworks carbon emissions and areas of the Proposed Scheme have been identified where the surface course of pavement need only be replaced compared with full replacement of all layers. The recent UK government announcement on ending the sales of new petrol and diesel vehicles by 2030 will further reduce the Proposed Scheme's end user carbon emissions.

The vulnerability of the Proposed Scheme assets to projected changes in climate during operation has been assessed, and the Proposed Scheme and its surrounding environment have been deemed resilient to the current projections provided by the Met

Office. Therefore, no significant effects as a result of climate change are anticipated; however this should be reviewed when updated projections become available.

Cumulative Effects Assessment

The cumulative effects assessment considers effects from:

- a single project (the Proposed Scheme), which considers numerous different effects impacting a single receptor
- different projects, in combination with the Proposed Scheme

Single project effects

As a result of the residual effects of the Proposed Scheme, as a single project there is potential significant cumulative effects for some receptors at Low Road, Mattishall Lane, Hill View, Sandy Lane, Church Lane and Rotten Row. There is also potential for significant cumulative effects to occur at St Andrew's Church, Oak Farm and Hall Farm.

The assessment also predicted beneficial effects for receptors such as traffic moving further away from receptors and the provision of a new combined footway/cycleways along the de-trunked A47 providing better connections.

A combination of proposed mitigation in the preceding chapters, best standard practice construction approaches and community liaison would likely help to mitigate the cumulative impact of the effects from the Proposed Scheme.

Different project effects

The different project assessment of noise and vibration with the NWL project has identified additional (beneficial and adverse) significant effects.

The residual different project effects during the construction and operational phases of the Proposed Scheme with of all of the other developments are not anticipated to contribute beyond that of the effects identified in the preceding environmental chapters.

Consultation

Highways England undertook non-statutory public consultation between 13 March to 21 April 2017. A variety of methods of engagement were used to gain feedback from stakeholders. A brochure and questionnaire were used to inform people of the scheme proposals, provide a map of constraints around the local area and provide contact details for Highways England. The consultation was also advertised on the Highways England website and a press notice was also issued on the 15 March 2017. Invites were also given to local MPs, local councillors and other key stakeholders to attend a preview of the exhibition.

Statutory consultation was held from 26 February 2020 to 8 April 2020. The statutory consultation period was extended for a further 22 days until 30 April 2020 as a result of the impact and restrictions imposed in response to the COVID-19 pandemic. The consultation period was more than the 28 days prescribed by Section 45(2) of the Planning Act 2008 due to the COVID-19

pandemic. The purpose of the consultation was to provide an opportunity to comment on the updated plans for the project ahead of Highways England submitting an application to the Planning Inspectorate for a Development Consent Order (DCO).

Consultation report 2017: https://highwaysengland.citizenspace.com/he/a47-north-tuddenham-to-easton-dualling/results/a47-tuddenham-cons-report_final_080817.pdf

A consultation report on the 2020 statutory consultation has been submitted as part of the DCO application (**TR010038/APP/5.1**).

How to find out more

To find out where and when the events are being held, visit our website or contact us by phone or email.

Visit our website at: https://highwaysengland.co.uk/our-work/east/a47-north-tuddenham-to-easton-improvement/

Here you can find background information on the Proposed Scheme plus information on the current consultation, including:

- our statement of Community Consultation
- the consultation brochure and feedback form
- the Proposed Scheme, including the DCO boundary that will form part of our DCO application
- a Preliminary Environmental Information Report, as well as this accompanying Non-Technical Summary

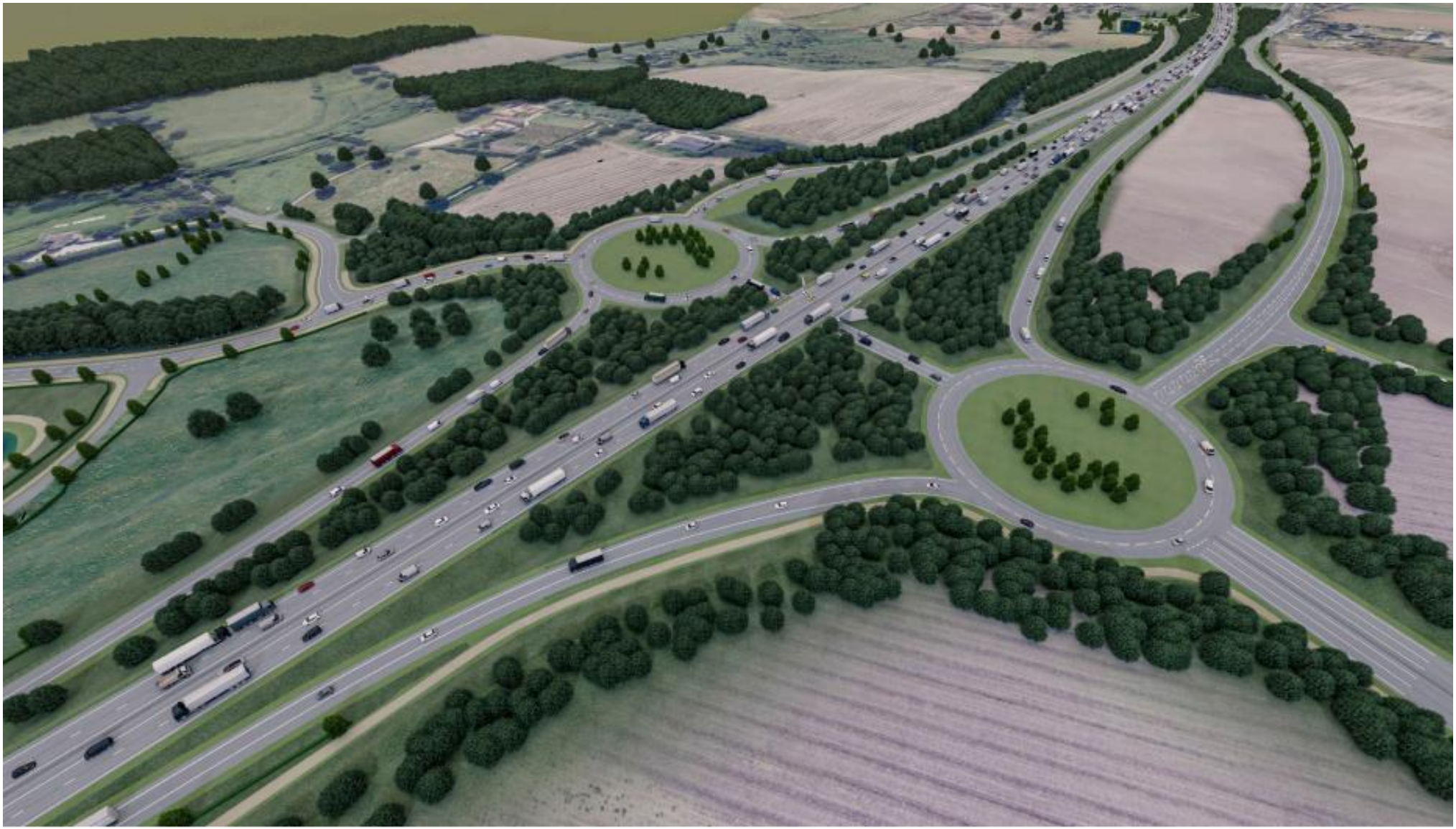
Email us: a47northtuddenhamtoeastonris@highwaysengland.co.uk

Phone us: 0300 123 5000

Next steps

Following submission of the Application for Development Consent, the Planning Inspectorate will consider, on behalf of the Secretary of State for Transport, whether the Application should be accepted for examination. If accepted, the documents accompanying the Application will be publicly available on the Planning Inspectorate's website.

Interested parties will be able to make relevant representations about the Proposed Scheme and its potential impacts. Representations received by the Planning Inspectorate will be considered as part of the examination into the Application.



A47 North Tuddenham to Easton

Environmental Statement - Non-Technical Summary

TR010038/APP/6.4