A120/A133 Link Road

EIA Scoping Report

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Contents

1 Introduction

This Environmental Impact Assessment Scoping Report has been produced by Jacobs UK Ltd on behalf of Essex Highways, for the proposed A120/A133 Link Road.

The Scoping Report has been prepared for the Local Planning Authority (LPA), Essex County Council, to inform a request for formal Scoping Opinion under the Town and Country Planning EIA Regulations 2017 (Statutory Instrument 2017 No. 571) (hereafter called 'the EIA Regulations' (see Section 1.2.4)). Please refer to Appendix A for acronyms used within this report.

The proposed A120/A133 Link Road (hereafter referred to as the 'proposed scheme') is located east of Colchester, Essex, connecting the A120 in the north to the A133 in the south. Figure 1.1 in Appendix B presents the location of the proposed scheme within its wider context.

Further details of the scheme design are provided in Section 2 of this report.

1.1 Purpose of this Report

The proposed scheme requires an Environmental Impact Assessment (EIA) under EIA Regulations, further details for which are provided in Section 1.2.4.

This Scoping Report contains an overview of the proposed scheme and of its potential impacts on the baseline environment and identifies the likely significant effects that will need to be considered as part of the EIA and documented in the Environmental Statement (ES). In accordance with EIA Regulations, the EIA will be based upon the formal scoping opinion as determined by the LPA.

Scoping is not a mandatory stage in the EIA process however it has an important role in the development of the EIA, enabling the design team to:

- Gain an understanding of the application site and identify potential sources of environmental impacts arising from the scheme and associated works
- Determine the key environmental matters as a basis for collating the appropriate baseline data and defining the impact assessment methodology
- Anticipate, and thus avoid or mitigate for, potential adverse environmental impacts
- Provide a basis for consultation with statutory authorities and other consultees
- Avoid unnecessary assessment of non-significant effects and undertake the assessment on a proportional basis
- Ensure all appropriate and necessary supporting information is submitted with the Planning Application

1.1.1 Scope and Content

This Scoping Report sets out the proposed scope and methods that will be used in undertaking the EIA and the broad structure of the ES to be produced in support of a planning application to deliver the proposed scheme.

Environmental factors have been considered in accordance with the revised Design Manual for Roads and Bridges (DMRB)[1]. This report has been prepared with reference to the guidance provided in the DMRB[2] and in accordance with EIA Regulations. The proposed scope and method for the

[1] Highways England (2019) Volume 11: Environmental Assessment, Design Manual for Roads and Bridges.
[2] Highways England (2019) LA 103 Scoping projects for environmental assessment, Design Manual for Roads and Bridges, Vol. 11, Section 1, Part 3

assessment of impacts on specific environmental factors (topics) are provided in the following chapters of this Scoping Report:

4. Air Quality
5. Cultural Heritage
6. Biodiversity
7. Landscape and Visual Effects
8. Geology and Soils
9. Material Assets and Waste
10. Noise and Vibration
11. Road Drainage and Water Environment
12. Population and Human Health
13. Climate
14. Cumulative Effects

In accordance with the Town and Country Planning (EIA) Regulations 2017, a risk assessment on potential environmental impacts from major accidents and disasters has been undertaken for the proposed scheme, with results presented in Appendix C. The assessment shows that any risks from major accidents and disasters would either be considered through other environmental factors or can be sufficiently managed through the proposed scheme design. Major accidents and disasters have therefore been scoped out of the EIA as a standalone topic.

The Environmental Statement will not contain a traffic assessment, but the development description will summarise the outputs of a separate traffic assessment to be submitted with the planning application.

The Heat and Radiation topic, required under EIA Regulations 2017, is not relevant to this scheme. The proposed scheme would not introduce any sources of radiation and although it may generate limited amounts of heat from minor elements such as lighting this would not be considered to cause significant effects to receptors. This topic has therefore been scoped out of this report and will not be assessed further within the EIA.

In addition, relevant health impacts will be assessed within the Population and Human Health and Air Quality chapters and therefore a separate Health Impact Assessment will not be provided.

1.2 Requirement for an Environmental Impact Assessment

The proposed scheme falls under Schedule 2, Item 10 (f), 'Infrastructure projects – Construction of roads (unless included in schedule 1)', of EIA Regulations as the development area exceeds one hectare and is likely to have significant environmental effects. This Scoping Report includes the following information, in accordance with EIA Regulations:

- A plan to identify the land
- A brief description of the nature and purpose of the proposed scheme, including its location and technical capacity
- An explanation of the likely significant effects of the development on the environment as set out by environmental factor
- Any additional and relevant information that has supported the development of the scope of the EIA

1.3 Local Plans and Policy

Tendring District Council Local Plan 2007[3] - The Tendring District Council Local Plan was adopted in 2007 and is now considered out of date and not in accordance with current national planning policy. Weight will, therefore, also be given to the emerging local plan which is currently in public examination. Elements of the 2007 adopted Local Plan remain in force and are used in determining planning applications, where relevant.

Tendring District Council Emerging Local Plan 2013-2033 and Beyond Publication Draft[4] The local plan (once adopted) will guide development to 2033 and beyond. As the new Local Plan progresses it will begin to have more "weight" in the planning process in deciding planning applications and guiding new development across the District, alongside other 'material considerations', including national planning policy.

Colchester Borough Council Adopted Local Plan 2001-2021[5] (Adopted December 2008 and selected policies revised July 2014) The policies in the Development Policies Development Plan Document (DPD) are a material consideration and used in the determination of planning applications.

The Publication Draft stage of the Colchester Borough Local Plan 2017-2033 (published 2017)[6]

The following county level transport policies and strategies include relevant considerations for the design of the proposed scheme and the assessment of effects on population and human health:

- Essex County Council Adopted Local Transport Plan 2011-2025
- Essex County Council Adopted Local Transport Plan - Development Management Policies 2011

The National Planning Policy Framework (NPPF)[7]: Sets out the governments planning policies for England and how these are expected to be applied. Specific policies for each of the environmental factors have been addressed within the relevant chapters.

1.4 General Assessment Assumptions and Limitations

This report is based on information available at the time of writing. The preliminary design for the proposed scheme is currently in development with construction methodologies and traffic data not yet confirmed. Outputs from the microsimulation traffic model will not be available until later for assessment. Where there are data gaps, a precautionary approach has been taken.

Each environmental factor has specific assumptions and limitations highlighted within the individual topic chapters under the 'Assessment Assumptions and Limitations' sections.

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[3] Tendring District Council (2007), Tendring District Local Plan 2007. Available at: https://www.tendringdc.gov.uk/localplan

[4] Tendring District Council (2017), Tendring District Local Plan 2013-2033 and Beyond (Publication Draft). Available at: https://www.tendringdc.gov.uk/planning/local-plans-and-policies/view-our-local-plan/local-plan-submission-documents.

[5] Colchester Borough Council. (2008). Local Development Framework: Core Strategy 2006-2021. https://www.colchester.gov.uk/info/cbc-article/?catid=adopted-local-plan&id=KA-01124.

[6] Colchester Borough Council. (2017). The Publication Draft stage of the Colchester Borough Local Plan 2017-2033. https://www.colchester.gov.uk/info/cbc-article/?catid=emerging-local-plan&id=KA-01127.

[7] Ministry of Housing, Communities and Local Government (2019), National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

1.4.1 Limitations Due to Coronavirus

On the 30 January 2020, the World Health Organisation (WHO) declared the novel coronavirus (COVID-19) outbreak a public health emergency of international concern[8]. In response to the COVID-19 outbreak, the UK Government issued nationwide restrictions and guidance on travel and social distancing[9].

Due to the unprecedented situation, alternative methods of working have been outlined where the assessment methodologies are likely to deviate from standard guidelines as a result of the outbreak. This includes surveys that have not been able to continue and where the Government restrictions have resulted in a non-representative environment for measuring baseline data. These methods have been presented to ECC Planning Officer Tom McCarthy on 22nd April 2020, in advance of this report.

All references to the outbreak or the resulting changes to methodology have been made clear throughout this report by being presented in red text.

1.4.2 Assumptions regarding Tendring Colchester Borders Garden Community

The proposed layout and phasing of the proposed Tendring Colchester Borders Garden Community is not yet known, and this is unlikely to change prior to the submission of the planning application for the Link Road. Although it is anticipated that the Colchester Local Plan Part 1 document will be subject to consultation on further modifications during later summer/early Autumn 2020, the first initial indication of likely layout and phasing is not expected until the publication of a draft Development Plan Document (and masterplan) in Spring 2021, with adoption currently scheduled for the first half of 2023.

Consequently, for the purposes of establishing a future baseline of committed development within the study area of the ES:

- During the proposed construction period of the Link Road, it is assumed there will be no completed development on the Garden Community. The baseline will therefore comprise only extant planning permissions at August 2020
- For the operational assessment (at Years 1 and 15 of operation for Air Quality, Noise and Landscape and Visual assessments) there will be insufficient information to assess the impacts on sensitive receptors (i.e. residential properties, schools etc). Consequently, an assessment of the increase in noise levels and potential visual impacts within defined study areas will be undertaken but it will not be possible to assign significance to impacts upon future baseline receptors

In addition, given the timeframe for the adoption of the DPD, and the policy requirement in the Proposed Modifications to the Part 1 Plan (that the planning consent for route 1 of the Rapid Transit Scheme should be secured prior to planning approval being granted for development forming part of the Tendring Colchester Borders Garden Community) it is not anticipated that there will be any major development taking place for the Garden Community prior to March 2024 and therefore no inter-project cumulative effects (see Chapter 14).

[8] World Health Organisation (2020) Coronavirus disease (COVID-19) Pandemic [online] Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 (Accessed 01/04/2020)
[9] UK Government (2020) Coronavirus (COVID-19): what you need to do [online] Available at: www.gov.uk/coronavirus (Accessed 01/04/2020)

2 The Proposed Scheme

2.1 Need for the Scheme

Plans for a proposed Tendring Colchester Borders Garden Community comprise up to 9,000 new homes and associated infrastructure and employment to the immediate east of Colchester. For this scale of development to be realised, it will be necessary to provide new integrated transport infrastructure, including, a new link road between the A120 and the A133, as well as a Rapid Transit System (RTS) and associated 'Park and Choose' sites (for interchange between transport modes). As well as providing an essential part of the future Garden Community growth strategy, the proposed scheme also aims to improve connectivity locally, ease congestion within the wider Colchester area and future-proof the capacity of both the A133 and A120.

This Scoping Report is for the purpose of the A120/A133 Link Road only for which the scheme objectives are:

- To develop an integrated Link Road and RTS that could accommodate additional traffic from the proposed Garden Community development and help relieve congestion issues on the local road network as well as providing a reliable journey time
- To develop a link road that could serve the new Community and the businesses within the development
- To effectively integrate the road into the emerging masterplan being developed, such that it meets the needs of the residential and business development proposed and contributes the strategic objectives of the Garden Community
- To minimise adverse environmental impact
- To provide safe access routes for Walkers, Cyclists and Horse Riders (WCH)
- To manage the design and planning so as to facilitate completion of the infrastructure construction by March 2024

2.2 Project Background and Alternatives Considered

In March 2019, Essex County Council applied for Housing Infrastructure Funding (HIF) to deliver the A120/A133 Link Road and RTS operational for spring 2024. In August 2019, HIF funding was awarded for the project.

Nine potential route options were developed through the Stage 1 design process, eight of which were taken forward to the Stage 2 design process to be developed further: Options 1A, 1B, 1C, 1D, 2A, 2B, 2C and 3. An Environmental Options Appraisal[10] was completed for these eight options in November 2019. Four of these, Options 1A, 1C, 1D and 3, were taken forward to a public consultation which launched on 04 November 2019 and closed on 16 December 2019. The consultation indicated that the public showed a preference for Options 1C and 1D as these exhibited the least impact to residents, communities and woodland[11].

In response to the findings of the public consultation and subsequent analysis, a new route (a variant of the existing Option 1C), referred to as 'Option 1C Variant' was developed further and considered within the Environmental Options Appraisal Report as an addendum[12]. This route has since been

[10] Jacobs (2019) A120/A133 Link Road Environmental Options Appraisal
[11] Jacobs (2020) A120/A133 Link Road and Rapid Transit System – Consultation Report
[12] Jacobs (2020) A120/A133 Link Road Environmental Options Appraisal Addendum

formally announced as the preferred route for the A120/A133 Link Road by Essex County Council and is referred to throughout this report as the 'proposed scheme'.

2.3 Proposed Scheme Description

2.3.1 Scheme Description

The proposed scheme falls between National Grid Reference points TM 04437 24494 and TM 05664 26650 (see Appendix B Figure 2.1) and comprises the following design elements:

- 50mph design speed dual two-lane carriageway
- An at grade (level of current road) junction connecting the proposed link road to the A133
- Two potential intermediate roundabout locations giving access between Allen's Farm and the Garden Community development, and Tye Road (NW) and the Garden Community development
- An underpass for future proposed RTS and a diverted public right of way (PRoW)
- One grade separated dumbbell junction (two roundabouts linked by a single bridge) connecting the Link Road to the A120
- New access road to Colchester Waste Transfer Station (WTS) north west of the proposed A120 junction
- New two-way access to an existing petrol station west of the proposed A120 junction

The proposed scheme will be a new dual carriageway between the A120 trunk road and A133 to the east of Colchester. As part of the proposed scheme there is to be a new grade-separated dumbbell type junction on the A120, with new accesses to an existing petrol station and Colchester WTS (operated by Veolia Environmental Services).

The new slip roads on and off the A120, with the exception of the westbound on-slip, vary between 360 m and 400 m with gradients of up to 4 %. The westbound on-slip is 935 m, generally running parallel to the A120 westbound carriageway and providing a separate two-way access to the existing petrol station. The A120 junction is to be grade separated, with 5.3 m headroom to the existing carriageway resulting in a level difference of 9.3 m and 10.6 m above the existing ground either side.

The chainage for the Link Road commences at the northern end upon exiting the A120 grade separated junction. (At this stage of the design, each section of the proposed scheme has its own chainage. As the design develops, one chainage for the entire route will be provided). At this location Here the road is on a 9.6 m embankment and this level is only slowly reduced over the first 250 m to allow it to pass over an underpass which will give a grade separated and delay free crossing of the Link Road to both the RTS and for users of a diverted PRoW. From this point the road falls at a maximum gradient of 2.5 % to the first of two intermediate roundabouts, which is referred to as Allen's Farm roundabout. The total length of this link is 618 m with 1020 m and 720 m radii curves.

Between the Allen's Farm and Tye Road roundabouts, the road level is a maximum of 2.4 m above existing ground level and it utilises a left- and right-hand curve both with 510 m radii. The total length of this link is 703 m.

From Tye Road roundabout to the A133 the road level is a maximum of 3.0 m above existing ground level and it also utilises a left- and right-hand curve of 510 m radius prior to a straight into the A133 roundabout. It enters a shallow cut to the north of the A133. The total length of this link is 932 m.

The total length of the proposed scheme Link Road is 2380 m.

The Link Road is to be designed as a dual two-lane all-purpose road. The two lanes in each direction was initially proposed in the HIF bid and verified as necessary in subsequent traffic modelling. The slip roads have been checked to CD 122[13]. Traffic flows are expected to be between 1,100 and 1,400 vehicles per carriageway in the peak direction at peak times by 2033.

The junctions with the A120 and the A133 are both roundabouts, with a minimum of two lanes to match the provision at the two intermediate junctions along the Link Road.

All of the embankments are to be 1:3 slope except those facing in towards the A120 at its new junction. Planting and toe drainage are to be utilised.

In certain locations, a nominal 2m wide linear hedge is to bound the road but generally a 6-10m wide planting strip will be used, wider than this towards the A120 where the embankments are higher. It is anticipated that other mitigation planting will be required.

Surface water drainage is proposed to be concrete V channels on the links of the Link Road and Combined Kerb Drainage System at the roundabouts. There are to be carrier drains out-falling into eight attenuation ponds, discharging into watercourses and ditches, at a greenfield runoff rate. The earthworks drainage is to be a mix of filter drains and swales.

There is to be a shared footway/cycleway along much of the western side of the road, generally separated from the carriageway by the embankment and planting screen, and it will merge with a PRoW diversion towards the northern end of the scheme.

Street lighting is to be provided at each roundabout and at 160 m stopping sight distance (SSD) in advance. The links in between are not expected to be lit. It is an aspiration to use solar studs to illuminate the cycleway as there is not planned to be illumination of this facility. There will be road signs throughout the scheme, illuminated where required by regulation.

There will be UK Power Networks and BT Openreach diversions across the site. South of the A120 the route crosses an Affinity Water water main. Diversionary works may be required. However diversionary works to this main are expected close to the petrol station on the route of the westbound on-slip.

2.3.2 Construction Programme and Methods

The Stage 2 construction programme for this option was 89 weeks but it is expected this could be slightly longer due to compaction and settlement of the extra volume of fill material required for the embankment at the northern end of the proposed scheme. Construction is expected to be from Spring 2022 to early Spring 2024.

Construction methods and plant will be typical for a road construction project of this size with large excavators, bulldozers, blades and dumper trucks. Cranes will be required most notably for lifting bridge deck beams into place. It has not yet been determined if any sheet piling will be required and its associated rig. Special measures are required for all construction within 15 m of the 132 kV overhead power lines. Consideration has not yet been given to construction of the potential borrow pits which will also require the above large machinery.

Materials required for the scheme are likely to be a mix of cohesive and granular which is typical for a road construction project of this size. At this stage it is not possible to provide a cut fill balance, but a large quantity of fill material will be required. Four borrow pits are proposed as part of the scheme, but until ground investigation (GI) is carried out it is not known if these will be sufficient to provide all the fill material requirements or if some will need to be imported.

[13] Highways England (2020) Geometric design of grade separated junctions, CD 122 Rev 1, Design Manual for Roads and Bridges

One main site compound location has been provisionally chosen, on the northern side of the proposed scheme, directly south of Strawberry Grove but the other side of the overhead power lines. It is then proposed there are two smaller sites, sub-compounds, primarily for storing materials: one to the northeast of the main compound on the other side of the A120; and one near the proposed A133 roundabout. The haul routes are proposed to utilise the road corridors thereby construction traffic will access the site by exiting the A120 via existing access points at the petrol station and WTS to avoid them using other junctions nearby and passing through surrounding villages on unclassified roads or the A133. This will require approval from Highways England.

The total permanent construction footprint is estimated to be approximately 555,416 m^2 in area.

2.4 Proposed Scheme Design

The environmental scoping assessments within this report have been undertaken based on the design available at the time of writing as described in Section 2.3 above. This design is considered to represent approximately 90 % horizontal and 90 % vertical, a proposed Red Line Boundary (RLB) and 70 % fix on other measures within the RLB. There will be further design developments prior to the final design intended for planning submission and utilised for the purposes of the EIA. The likely changes from the design detailed in Section 2.3 include the following:

- General lowering of the vertical alignment where possible
- Lengthening of petrol station spur access road
- Updated layout of current SSD non-compliant eastbound diverge and slip road
- Possible removal of junction arrangement at start of WTS access and provide direct arm off roundabout – subject to adequate clearance to overhead power lines
- Confirmation of cross sections
- Preliminary design of structures
- Possible widening of footway/cycleway to 5 m
- Provision of 1x Toucan and 1x Pegasus crossing and connection of these to existing and proposed WCH network
- Incorporation of bunding and visual/noise screening at locations currently undefined

Unknown changes could arise from the following:

- Topographical survey
- Ground Investigation (GI)
- Updated traffic model
- Road Safety Audit
- Mineral resource assessment
- Discussions with North Essex Garden Communities, Highways England and landowners

Following on from the project's Preliminary Design Value Engineering session the following changes could be introduced:

- Removal of 1 m hardstrips from carriageway cross section
- Alteration to WTS access road
- Splitting of RTS and PRoW underpass, placing the RTS underpass close to the A120 southern dumb-bell roundabout and the PRoW underpass between current position and Allen's Farm

- Removal of Allen's Farm roundabout and just having left in, left out on the southbound carriageway
- Reduction in width from 5 m to approximately 3 m of edge of road corridor maintenance strip
- Possible use of swales for attenuation rather than the current pond provision

In all cases above it is considered more likely that the Red Line would be reduced rather than increased by any of these potential changes.

3 Site and Surrounding Area

3.1 Proposed Scheme Location

The scheme is located east of Colchester, Essex, between the existing A120 to the north and A133 to the south. The footprint of the scheme comprises mostly agricultural fields with Colchester's urban area approximately 1.7 km to the west and Elmstead Market village along the A133, approximately 1 km east of the proposed scheme.

3.2 Site Description

The predominant land use across the proposed scheme and surrounding area is arable farmland with an Agricultural Land Classification (ALC) of Grade 1 'excellent quality agricultural land',[14] with large fields and field boundaries defined by hedgerows. There are a small number of residences and local businesses scattered within the wider study area. Figure 3.1 in Appendix B provides an overview of environmental constraints relevant to the proposed scheme.

Notable locations around the proposed scheme include:

- Ardleigh South Services and an existing WTS managed by Veolia Environmental Services, located along the A120 near Bromley Road (TM 04988 26854)
- Strawberry Grove woodland located just south of the existing A120 (TM 05216 26513)
- Elmstead village located south of the A120, St Anne and St Lawrence Parish Church (Grade I listed building) and Elmstead Hall are located here (TM 06394 26038)
- Allen's Farm, which comprises a working farm and several small businesses, located west of former sand and gravel pit (now a lake) (TM 05272 25952)

Major roads in the area include the A120 to the north, which connects towns east and west of this area as well as providing links to the A12, a major freight route through Essex and Suffolk, and the A133 in the south, the main commuter route from Clacton-on-Sea into Colchester. The A120 is also a key link in international travel for the wider Essex area, offering connectivity to the Port of Harwich and London Stansted Airport.

3.3 Designations and Key Features

3.3.1 Statutory and Non-Statutory Designated Sites

The footprint of the proposed scheme does not lie within any of the following; Air Quality Management Area (AQMA), Area of Outstanding Natural Beauty (AONB), Site of Special Scientific Interest (SSSI), Ramsar site, Special Area of Conservation (SAC) or Special Protection Area (SPA).

The closest statutorily designated site is Wivenhoe Gravel Pit SSSI approximately 1 km to the east of the proposed scheme. Colne Estuary Ramsar Site and SPA, and Essex Estuaries SAC are located over 4 km from the proposed scheme.

There are no internationally designated sites within 2 km of the proposed scheme.

There are 18 non-statutory Local Wildlife Sites (LWS) located within 2 km of the proposed scheme. These sites are designated as LWS for biodiversity value at county level and are known to support a

[14] Natural England (2019) Provisional Agricultural Land Classification (ALC) [online] Available at: https://data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc (Accessed 31/03/2020)

wide variety of protected species and species and/or habitats of conservation importance. LWS closest to the proposed scheme are:

- Pyecats Corner Verges located 400 m to the west
- Wall's Wood located 500 m to the west

There is one Local Nature Reserve (LNR) located within 2 km of the proposed scheme. Salary Brook LNR is located on the eastern outskirts of Colchester. This site comprises conservation grassland meadows, three fishing ponds and areas of wetland which have a known population of water voles.

There are two areas of Lowland Mixed Deciduous Woodland that are considered likely to be Ancient Woodland, Strawberry Grove and Broom Grove, located near the proposed slip roads connecting the scheme to the A120.

Sensitive sites are discussed in more detail in Chapter 6 - Biodiversity.

3.3.2 Air Quality Management Areas

The proposed scheme is not within an AQMA. There are three AQMAs declared within the administrative boundary of Colchester Borough Council, designated for exceedances of nitrogen dioxide (NO_2). Two of these are in Colchester Town Centre approximately 4.5 km west of the proposed scheme. The proposed scheme has the potential to affect traffic conditions in central Colchester and therefore may affect annual mean NO_2 concentrations in these two AQMAs. The other AQMA is located approximately 10 km west of the proposed scheme and is considered less likely to be affected by changes in traffic conditions resulting from the proposed scheme.

3.3.3 Heritage Assets

There are 15 listed buildings within 1 km of the proposed scheme, only one of which lies within 300 m for which the setting of the heritage asset could be affected. There is one Registered Park and Garden, Wivenhoe Park, within 1 km of the proposed scheme. There are no scheduled monuments within 1 km.

Cultural heritage assets are discussed in more detail in Chapter 5.

3.3.4 Landscape

The landscape is generally characterised by arable farmland comprising large fields and field boundaries defined by hedgerows. The landscape surrounding the proposed scheme is generally flat. There are open views locally across agricultural fields however landscape features such as hedgerows, tree belts and woodlands restrict the distance of such views.

Landscape is discussed in more detail in Chapter 7.

3.3.5 Geology and Soils

The superficial deposits consist of combinations of clay, silt and sand. The underlying bedrock geology is the London Clay Formation (of the Thames Group). The proposed scheme does not lie within a Groundwater Source Protection Zone (SPZ).

Geology is discussed further in Chapter 8.

3.3.6 Rivers and Water Environment

The main surface water body in the vicinity of the proposed scheme is the Sixpenny Brook which has several tributaries running through the study area. The southern part of the proposed scheme crosses one of these tributaries.

The water environment is discussed in more detail in Chapter 11.

3.3.7 Public Rights of Way and Protected Lanes

The scheme itself crosses PRoW ID 162_21 near Allen's Farm and a section of the Essex Cycle Network along the A133 (see Appendix B Figure 3.1). There are also several existing and proposed protected lanes (and extensions to) in the area as identified by Tendring District Council. Of particular relevance is Turnip Lodge Lane, a protected lane which ties into the proposed scheme just south of the Wivenhoe Road roundabout. These are discussed in more detail in Chapter 7 and 12.

4 Air Quality

4.1 Introduction

Both the construction and operation of the proposed scheme have the potential to impact on local air quality.

During construction, there is the potential, primarily, for construction related dust effects. There will also be construction vehicle emissions but, as the duration of construction is less than two years, an assessment of construction vehicle emissions has been scoped out in line with DMRB LA 105 Air Quality[15].

Once the proposed scheme is in operation, as well as introducing a new source of road traffic emissions, the proposed scheme will result in changes to road traffic flows on the local road network, thereby altering emissions from vehicle traffic off-site. Both changes have the potential to affect air quality at nearby sensitive receptors.

The purpose of this chapter is to outline the proposed scope of work and assessment methodology for the consideration of potential air quality effects associated with the proposed scheme.

4.2 Baseline Conditions

4.2.1 Study Area

4.2.1.1 Construction Dust

The study area for the construction dust assessment will be defined based on guidance within Institute of Air Quality Management (IAQM) Construction Dust guidance[16]. As such, all sensitive receptors within 350 m of the boundary of the site or 50 m from the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), will be considered.

4.2.1.2 Operation

The study area for road traffic related emissions will be defined based on DMRB LA 105 Air Quality[15]. The extent of the air quality study area, also referred to as the Affected Road Network (ARN), will be defined by identifying any road links likely to experience any of the following changes between the Do-Something traffic (with the proposed scheme) compared to the Do-Minimum traffic (without the proposed scheme) in the opening year:

- Annual average daily traffic (AADT) >=1,000 or
- Heavy duty vehicle (HDV) AADT >=200 or
- A change in speed band or
- A change in carriageway alignment by >=5 m

It should be noted that the term ‘speed band’ referred to above refers to a range of categories for which outputs from traffic models can be grouped into to describe their emissions. This process (which is defined in DMRB LA 105 Air Quality[15]) and associated emission factors (available upon request from Highways England) are, however, only relevant to Highways England schemes. As such,

[15] Highways England et al. (2019). Design Manual for Roads and Bridges, Sustainability and Environmental Appraisal, LA 105 Air Quality.
[16] Institute of Air Quality Management (2016) Guidance on the Assessment of Dust from Demolition and Construction (v1.1). Available at: https://iaqm.co.uk/text/guidance/construction-dust-2014.

the following criteria, taken from previous Highways England air quality guidance (HA 207/07[17]), will be used to identify road links where changes in vehicle speeds have the potential to result in air quality effects, rather than changes in 'speed band':

- Daily average speeds change by 10 km/hour or more or
- Peak hour speed change by 20 km/hour or more

It has not been possible to define the ARN at this stage, as traffic forecasts are not yet available. For the purposes of this Scoping Report, therefore, baseline data and constraints have been assessed in the locality of the proposed scheme over an area determined by professional judgement. The baseline data collated, and constraints identified will subsequently be reviewed and updated where necessary when traffic data are available, and the study area is confirmed.

4.2.2 Baseline Data Sources

The proposed scheme is located in the area administered by Tendring District Council but borders the area administered by Colchester Borough Council to the west. Baseline conditions in the air quality study area have been established with reference to a number of sources, as detailed in Table 4-1.

Table 4-1 - Key baseline air quality information sources

Data Source	Reference	Information Obtained
Colchester Borough Council	2019 Air Quality Annual Status Report (ASR)[18]	Local Air Quality Management (LAQM) information and air quality monitoring data
Tendring District Council	Tendring 2018 Air Quality Data (provided via email)	Air quality monitoring data
Department of the Environment Food and Rural Affairs (Defra)	List of Local Authorities with AQMAs[19]	Details of AQMAs
	Background maps (for a 2017 reference year)[20]	Mapped background pollutant concentrations
	2019 NO_2 projections data (for a 2017 reference year)[21]	Mapped Pollution Climate Mapping (PCM) model outputs

4.2.3 Local Air Quality Management (LAQM)

Tendring District Council and Colchester Borough Council undertake reviews and assessments of air quality within the respective administrative areas, as required by the LAQM regime (see Section 4.3.1).

[17] Highways Agency (2007), Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA 207/07 Air Quality.
[18] Colchester Borough Council (2019), 2019 Air Quality Annual Status Report (ASR). Available at: https://cbccrmdata.blob.core.windows.net/noteattachment/Colchester_Borough_Council%202019_ASR.pdf
[19] https://uk-air.defra.gov.uk/aqma/list
[20] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017
[21] https://uk-air.defra.gov.uk/library/no2ten/2019-no2-pm-projections-from-2017-data

4.2.3.1 Tendring District Council

Tendring District Council undertake monitoring at a single continuous monitoring station, as well as a network of 14 passive NO_2 diffusion tubes; none of these, however, are in close proximity to the proposed scheme (as shown in Appendix B Figure 4.1), with the nearest being 6.5 km east of the proposed scheme.

No AQMAs are currently declared within the administrative boundary of Tendring District Council[19].

4.2.3.2 Colchester Borough Council

As part of their LAQM duties, Colchester Borough Council undertake monitoring at a single continuous monitoring station, as well as a network of 62 passive NO_2 diffusion tubes; none of which are in close proximity to the proposed scheme (as shown in Appendix B Figure 4.1), with the nearest being 2.2 km west of the proposed scheme.

There are currently three AQMAs declared within the administrative boundary of Colchester Borough Council[18] due to exceedances of the annual mean NO_2 Air Quality Objective (AQO), as described in Table 4-2 (a fourth AQMA (Area 3) was revoked in 2018).

Two of these AQMAs are located in central Colchester (Area 1 and Area 2) approximately 4.5 km west of the proposed scheme. It is considered that the proposed scheme has the potential to affect traffic conditions in central Colchester and therefore affect annual mean NO_2 concentrations in these AQMAs.

The Area 4 AQMA, which is located adjacent to the A12 to the west of Colchester, approximately 10 km west of the proposed scheme, is considered less likely to be affected by changes in traffic conditions as a result of the proposed scheme. The potential for any of these AQMAs to be affected by the proposed scheme will be confirmed once traffic data are available and the air quality study area defined (see Section 4.2.1.2).

Table 4-2 – AQMAs declared by Colchester Borough Council

Name	Description	Pollutant/Air Quality Strategy Objective	Approximate Distance/Direction from Proposed Scheme
Area 1	Central Corridors - High St Colchester, Head St, North Hill, Queen St, St Botolphs St, St Botolphs Circus, Osbourne St, Magdelen St, Military Rd, Mersey Rd, Brook St, East St and St Johns Street.	NO_2 Annual Mean	4.5km west
Area 2	East Street and the adjoining lower end of Ipswich Road	NO_2 Annual Mean	4.5km west
Area 4	Lucy Lane North, Stanway	NO_2 Annual Mean	10km west

Measured annual mean NO_2 concentrations in recent years within Colchester Borough Council's Area 1 and Area 2 AQMAs are summarised below in Table 4-3. These results indicate that the annual mean NO_2 AQO (40 µg/m^3) has been exceeded at multiple locations within the Area 1 AQMA and at a single location in the Area 2 AQMA in recent years.

Table 4-3 – Measured NO_2 concentrations in Area 1 and Area 2 AQMAs

AQMA	Site ID	Site Name	Measured Annual Mean NO2 Concentration (µg/m3)				
			2014	2015	2016	2017	2018
Area 1	CBC Auto 1	Brook Street	28.0	28.6	27.4	29.1	25.8
Area 1	CBC3	Mersea Road, 21	63.9	52.6	60.0	48.2	54.5
Area 1	CBC21	Head Street	47.8	46.8	51.1	45.0	48.7
Area 1	CBC43	Magdalen Street	37.0	33.3	33.6	31.9	32.8
Area 1	CBC45	Brook Street, 28/30	51.0	43.7	43.5	45.7	50.5
Area 1	CBC48	33 St Botolphs Street	44.6	34.2	40.7	35.4	42.5
Area 1	CBC49	High Street - Brighthouse	37.7	36.0	39.2	40.5	38.8
Area 1	CBC54	Mersea Road, 10	31.1	43.0	47.0	42.2	47.1
Area 1	CBC62	Mersea Road, 9	45.5	38.8	42.6	39.2	42.9
Area 1	CBC63	Mersea Road, 12	48.9	43.2	47.4	43.9	48.6
Area 1	CBC66	Brook Street RAB	28.5	25.8	25.0	26.5	25.7
Area 1	CBC68	Brook Street 60	24.7	23.6	22.2	22.2	23.2
Area 1	CBC69	Brook Street 23	47.3	45.6	44.3	48.6	46.9
Area 1	CBC71	Osborne Street, 6	52.6	50.2	50.9	43.3	51.6
Area 1	CBC103	Brook St 74	29.8	26.1	24.9	26.8	27.8
Area 1	CBC104	Military Rd 37	29.6	26.4	28.9	27.9	29.0
Area 1	CBC106	Mersea Rd 30	39.2	33.2	38.7	35.6	36.4
Area 1	CBC107	North Hill 49	31.0	28.8	31.0	30.5	30.9
Area 1	CBC109	North Hill, Strada	32.6	31.1	33.0	31.2	33.3
Area 1	CBC111	St John's Street, Lemon Tree	41.0	40.9	42.3	42.8	42.3
Area 1	CBC112	High St George Hotel	30.3	30.7	31.8	32.5	32.3
Area 1	CBC117	High Street 71	43.8	39.4	44.4	41.1	39.8
Area 1	CBC124	58 East Hill	-	-	-	39.8	39.8
Area 2	CBC72	Ipswich Road, Old Coach House	33.6	31.9	34.6	32.1	34.7
Area 2	CBC101	Ipswich Rd 50	37.7	35.8	36.0	36.5	34.9
Area 2	CBC102	East St 72	41.7	41.4	42.9	38.4	41.2
Note: Exceedances of annual mean NO_2 AQO shown in bold type.							

4.2.4 Site Specific Diffusion Tube Monitoring

In the absence of local authority monitoring in the vicinity of the proposed scheme and to supplement the monitoring performed by the local authorities across the wider area, a six-month diffusion tube monitoring survey was proposed to be undertaken between 8th January 2020 and 1st July 2020. This monitoring was to be undertaken both at locations in close proximity to the proposed scheme and roads likely to be affected by changes in traffic conditions as a result of the proposed scheme. The locations of these diffusion tubes are shown in Appendix B Figure 4.1.

This survey was, however, halted in March 2020 in line with Government restrictions imposed on travel and social distancing as a result of COVID-19, the implications of which are discussed in Section 4.8.2.

The diffusion tube data collected from early survey progress will be annualised and bias-adjusted in line with Defra LAQM.TG(16) and used both to further characterise baseline conditions and to inform model verification going forwards.

Where appropriate and safe to do so, surveys may be able to proceed at a later date.

4.2.5 Particulate Matter (PM_{10} and $PM_{2.5}$)

Neither Tendring District Council or Colchester Borough Council undertake monitoring for particulate matter (PM_{10} or $PM_{2.5}$) in their administrative areas. It would not be expected, however, that there would be any exceedances of the PM_{10} or $PM_{2.5}$ AQO's as these are not generally exceeded in England (outside of London).

For example, the results of a baseline emissions modelling study undertaken on behalf of Colchester Borough Council (reported in Colchester Borough Council's 2019 Air Quality ASR[18]) suggests that the average $PM_{2.5}$ concentration across the urban area of Colchester is between 16-18 µg/m^3 and, therefore, below the AQO for $PM_{2.5}$ (25 µg/m^3).

4.2.6 Mapped Background Pollutant Concentrations

Table 4-4 presents the range of modelled background pollutant concentrations[20] across Tendring District Council and Colchester Borough Council for 2019 (based on a 2017 reference year), which indicates that background concentrations were well within the relevant AQO for each pollutant considered except for nitrogen oxides (NOx), which has the potential to exceed the AQO (30 µg/m^3) for the protection of vegetation and ecosystems at some locations.

Table 4-4 - Mapped 2019 background pollutant concentrations (µg/m^3) across the study area

Pollutant	Air Quality Objective (µg/m^3)	Annual Mean Pollutant Concentration (µg/m^3) Range	
		Tendring District Council	Colchester Borough Council
NOx	30	31.7 - 9.7	31.0 - 10.0
NO_2	40	20.4 - 7.4	21.3 - 7.6
PM_{10}	40	18.1 - 12.4	19.9 - 12.7
$PM_{2.5}$	25	11.0 - 8.4	12.4 - 8.6
NOTE: Exceedances of AQOs shown in bold type.			

4.2.7 Pollution Climate Mapping (PCM)

The PCM model is run by Ricardo-AEA on behalf of Defra and is designed to fulfil part of the UK's European Union (EU) Directive (2008/50/EC)[22] requirements to report on the concentrations of pollutants in the atmosphere. Modelled PCM concentrations are provided by Defra[21] for a 2017 base year and projected to future years for representative roads throughout the UK. As shown in Appendix B Figure 4.2, the main arterial roads within central Colchester (namely the A1124, A1232, A133, A134 and A137) are included in the Defra Compliance Risk Road Network. None of these roads are, however, projected to exceed the relevant EU Limit Value in 2019 (with the maximum projected 2019 roadside NO_2 concentration being 33 µg/m^3).

4.2.8 Receiving Environment Sensitivity

The baseline conditions described above have been used to define the 'receiving environment sensitivity' with reference to the criteria proposed within DMRB LA 105 Air Quality[15] (Table 2.11b).

Whilst traffic data are not yet available, given that there is the potential for a large number of receptors (human and/or ecological) within 50 m of roads triggering the traffic change criteria (i.e. the ARN) and that AQMAs within Colchester have the potential to be within the proposed scheme's study area, the sensitivity of the receiving environment for this assessment has been classified as 'high', on a precautionary basis.

4.3 Legislation and Policy

4.3.1 Legislation

Key legislation relevant to the protection of air quality is summarised below. Whilst the United Kingdom is still within the EU exit transition period the requirements of EU environmental directives will still apply, and it is understood that post exit these requirements will be transposed into UK legislation. Therefore, references to EU directives requirements in the text below will remain relevant.

Environment Protection Act 1990[23] Part III: includes statutory nuisance provisions for dust and odour.

Environment Act 1995, Part IV[24]: Introduced a system of LAQM in the UK, which requires local authorities to review and assess air quality within their boundaries regularly and systematically against AQOs and make plans to meet AQOs where these are exceeded.

The Air Quality (England) Regulations 2000[25] and Air Quality (England) Amendment 2002 Regulations[26]: Set national AQOs for local authorities in England. AQOs exist for a variety of pollutants including NOx, NO_2, PM_{10} and $PM_{2.5}$. These have been established for both the protection of human health and the protection of vegetation and ecosystems (see Table 4-5 for AQOs relevant to this assessment).

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[22] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. Available at: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008L0050.
[23] Environmental Protection Act 1990. Available at: http://www.legislation.gov.uk/ukpga/1990/43/contents.
[24] Environment Act 1995. Available at: http://www.legislation.gov.uk/ukpga/1995/25/contents.
[25] The Air Quality (England) Regulations 2000. Available at: http://www.legislation.gov.uk/uksi/2000/928/contents/made
[26] The Air Quality (England) Amendment Regulations 2002. Available at: http://www.legislation.gov.uk/uksi/2002/3043/contents/made

Ambient Air Quality Directive (2008/50/EC)[22] and Directive 2004/107/EC[27]: Set limits for concentrations of pollutants in outdoor air.

The Air Quality Standards (England) Regulations 2010[28]: Transpose the requirements of Directives 2008/50/EC and 2004/107/EC on ambient air quality into English law.

Table 4-5 - Relevant national AQOs

Pollutant	Threshold Concentration (µg/m3)	Averaging Period
NO_2 (for human health)	40	Annual Mean
	200	1-hour mean, not to be exceeded more than 18 times per year (equivalent to the 99.79th percentile of hourly means)
PM_{10} (for human health)	40	Annual Mean
	50	24-hour mean, not to be exceeded more than 35 times per year (equivalent to the 90.4th percentile of 24-hour means)
$PM_{2.5}$ (for human health)	25	Annual Mean
NOx (for vegetation and ecosystems)	30	Annual Mean

4.3.2 Planning Policy

The proposed scheme will be situated entirely within the planning authority area of Tendring District Council however the air quality study area is likely to extend into the area administered by Colchester Borough Council. The relevant national and local plans and policies (and how these relate to the air quality assessment) are summarised below.

The NPPF[29]: Sets out the governments planning policies for England and how these are expected to be applied. Paragraph 181 of NPPF references air quality.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007[30]: Provides an overview of the UK Government and devolved administrations' ambient (outdoor) air quality policy.

[27] Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. Available at: https://eur-lex.europa.eu/eli/dir/2004/107/oj

[28] The Air Quality Standards Regulations 2010. Available at: http://www.legislation.gov.uk/uksi/2010/1001/contents/made

[29] Ministry of Housing, Communities and Local Government (2019), National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf.

[30] Defra (2007), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf.

Clean Air Strategy[31]: Outlines actions to tackle emissions from a range of pollutant sources.

4.4 Value of Environmental Receptors

The exact spatial extent of the air quality study area and sensitive receptors with the potential to be affected by the proposed scheme cannot be determined until traffic data for the Do-Minimum and Do-Something scenarios are available. The following sections detail the process that will be followed to identify sensitive receptors. For the purposes of this Scoping Report, and in the absence of specific guidance, all sensitive receptors will be considered to be of equal (high) value.

4.4.1 Human Health Receptors

Representative human health receptor locations will be included in the assessment. In accordance with DMRB LA 105 Air Quality[15], sensitive receptors will be selected within 200 m of the ARN and include residential properties, schools and hospitals for assessment against annual mean air quality thresholds. Similarly, sensitive receptors will be identified to inform the construction dust assessment in accordance with IAQM Construction Dust guidance[16]. Building usage will be determined from Ordnance Survey records.

4.4.2 Compliance Risk Assessment

In accordance with DMRB LA 105 Air Quality[15], a compliance risk assessment will only be undertaken on the roads identified in the PCM model which are within the ARN.

The assessment will identify areas with qualifying features on the PCM road network that meet Defra's interpretation of the Air Quality Directive[22] (i.e. qualifying features include locations of public access (e.g. footpaths) and sensitive receptors (e.g. residential properties, schools etc) within 15 m of the running lane/kerbside, but not within 25 m of a junction).

Sensitive receptors will be chosen adjacent to PCM links, within 15 m of the ARN and include residential properties, schools, hospitals, and locations of public access for inclusion in the compliance risk assessment for the assessment of annual mean Limit Values. Receptors at 4 m from the roadside and 2 m in height will also be modelled to allow comparison with PCM model outputs.

4.4.3 Designated Habitats

Internationally, nationally and locally designated sites of ecological conservation importance within 200 m of the ARN will be included in the air quality assessment.

Designated habitats, as defined within DMRB LA 105 Air Quality[15], include Ramsar sites, SPAs, SACs, SSSIs, LNRs, LWSs, Nature Improvement Areas, ancient woodland and veteran trees (see Chapter 6 – Biodiversity for further details of designated sites in the study area).

For each designated habitat which is sensitive to nitrogen deposition, transect receptor points at 10 m intervals will be modelled, starting from the nearest point of the designated habitat to the ARN, up to a maximum distance of 200 m.

The locations of designated sites in relation to the proposed scheme are shown in Appendix B Figure 4.3.

[31] Defra (2019), Clean Air Strategy 2019. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf.

4.5 Potential Impacts

The proposed scheme has the potential to impact on air quality through dust soiling (during construction) and emissions of NO_X and PM_{10} (during both construction and operation). The effect of the proposed scheme on Greenhouse Gas (GHG) emissions will be considered in Chapter 13 - Climate.

4.5.1 Construction Phase

4.5.1.1 Construction Dust

During construction there is the potential for dust emissions from construction plant, activities, material handling and vehicle movements. Dust arising from construction activities generally has a particle size greater than the PM_{10} fraction, however, construction activities may also contribute to local PM_{10} concentrations. Consequently, unmitigated dust impacts can harm human health and ecology and affect amenity. Construction dust is therefore scoped into the assessment for the construction phase.

4.5.1.2 Construction Plant

The operation of site equipment, vehicles and machinery during the construction phase would result in emissions to the atmosphere from exhaust gases. However, such emissions are unlikely to be significant, particularly in comparison to levels of similar emissions from vehicle movements on the surrounding road network. Impacts would also be managed through standard mitigation (e.g. no idling engines). Emissions of NO_X and PM_{10} from construction plant is therefore scoped out of further assessment.

4.5.1.3 Construction Traffic

DMRB LA 105 Air Quality[15] states that the impact of construction activities on vehicle movements should be assessed where construction activities are programmed to last for more than two years, but that if construction activities are less than two years, it is unlikely they would constitute a significant air quality effect. As such, construction traffic impacts are scoped out of further assessment.

4.5.2 Operational Phase

Once in operation, the proposed scheme would result in changes to road traffic flows, composition and/or speed on the local road network, thereby altering overall emissions from vehicle traffic. Furthermore, the proposed scheme would introduce a new road link that would pass closer to some receptors and could therefore result in adverse air quality impacts at those locations. Emissions of NO_X and PM_{10} during the operational phase are therefore scoped into the assessment.

4.6 Design, Mitigation and Enhancement Measures

4.6.1 Construction

Based on the outcomes of the proposed construction dust assessment, mitigation measures will be proposed commensurate to the level of risk identified, in accordance with guidance published by the IAQM[32] and include, as a minimum:

[32] Institute of Air Quality Management (2016), Guidance on the assessment of dust from demolition and construction. Available at: http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf.

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary
- Display the head or regional office contact information
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken
- Make the complaints log available to the local authority when asked
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
- Carry out regular site inspections, record inspection results, and make an inspection log available to the local authority when asked
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Avoid site runoff of water or mud.
- Ensure all vehicles switch off engines when stationary - no idling vehicles
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Avoid bonfires and burning of waste materials.

4.6.2 Operation

Operational mitigation may be required if the assessment predicts there to be likely significant effects at nearby sensitive receptors. No operational phase mitigation measures are proposed at this stage however, if required could include changes to the junction designs or speed limit of the road in in an attempt to make the route ‘less attractive’ to through traffic, thereby potentially reducing the redistribution of road traffic on other roads.

4.7 Description of Likely Significant Effects

4.7.1 Construction

IAQM guidance[32] states that for construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation and that experience shows that this is normally possible. Following mitigation, therefore, construction phase effects are considered unlikely to be significant.

However, where for example, dust emissions occur under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. IAQM guidance[32] indicates, however, that the likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation the effects will be 'not significant'.

4.7.2 Operation

Further assessment is required in order to identify whether the operation of the proposed scheme has the potential to have a significant effect on air quality. Whilst AQOs are considered unlikely to be exceeded in the vicinity of the proposed scheme, changes in road traffic movements as a result of the proposed scheme could potentially affect air quality in AQMAs within Colchester.

4.8 Proposed Assessment Methodology

4.8.1 Guidance

Key guidance for the air quality assessment are summarised below.

DMRB, Sustainability & Environment Appraisal, LA 105 Air Quality[15]: Provides advice on the assessment of the impact of road traffic on air quality, particularly that from new/altered roads.

LAQM Technical Guidance TG16[33]: Designed to guide local authorities through the LAQM process and includes detailed technical guidance on air quality screening, modelling and assessment. It also provides guidance on where AQOs apply.

IAQM Construction Dust guidance[16]: Provides guidance on how to undertake a construction dust risk impact assessment based on the dust emission magnitude from demolition, earthwork, construction and trackout, as well as the sensitivity of the surrounding area to dust soiling effect and health impact.

4.8.2 Surveys and COVID 19

As discussed in Section 4.2.4, the planned six-month air quality survey was halted in March 2020 due to COVID-19, with only two months of data having been collected. The survey was halted due to concerns regarding the health and safety of our employees, the fact that the laboratory which would have analysed the collected samples was closed for an unknown duration due to COVID-19 restrictions and the fact that the data collected during the 'lock down' period would in any case not have been representative of typical air quality conditions (e.g. due to substantially reduced traffic flows).

Baseline data are used to validate the outputs of air quality models for a base year, giving additional confidence in model outputs for future years. Guidance issued by Defra. indicates that a minimum of

[33] Defra (2018), Local Air Quality Management Technical Guidance (TG16). Available at: https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf.

three months (and ideally six months) of data should be collected, in order to provide a reasonable estimate of annual mean concentrations. The use of the baseline survey data collected to-date (i.e. only two months of data) could therefore increase the uncertainty in the modelling results. However, as exceedances of AQOs in the vicinity of the proposed scheme and neighbouring roads are considered unlikely, and a conservative approach will be employed when estimating future year NO_2 concentrations (see Section 4.8.4), this greater level of uncertainty is considered unlikely to have a material effect on the validity of the outputs of the proposed air quality assessment.

Should the ARN extend into Colchester, however, where annual mean NO_2 concentrations potentially exceed the relevant AQO, then the air quality modelling undertaken in this area would be validated against monitoring data collected by Colchester Borough Council in 2018, rather than the results of the site-specific survey. This would provide greater certainty in the model outputs, proportionate to the scale of potential air quality risks.

The approach set out above is considered proportionate to the baseline air quality conditions identified in the study area, however, it is proposed that, if possible, the baseline survey will be completed later this calendar year in order to provide additional supporting information on baseline conditions.

4.8.3 Construction Dust

A preliminary desk study suggests that there are a small number of human and ecological receptors within 350 m of the proposed scheme and 50 m of roads likely to be used by construction traffic. Therefore, in line with the IAQM Construction Dust guidance[16], a qualitative dust risk assessment for the construction phase will be carried out. The construction phase dust assessment will:

- Assess and assign a risk category to the construction site based on the scale and nature of the works as well the sensitivity of the area to dust impacts
- Determine site specific mitigation based on the level of risk that has been assigned
- Determine significant construction phase effects

4.8.4 Operation

Highways England set out the nationally recognised approach to the assessment of road schemes for air quality in the DMRB. Air quality effects associated with the proposed scheme will therefore follow the general guidance described in DMRB LA 105 Air Quality[15].

As the project risk potential (as defined in Table 2.11a of DMRB LA 105 Air Quality[15]) is considered to be 'high', and the receiving environment sensitivity 'high' (see Section 4.2.8), a detailed operational phase assessment is proposed in accordance with the criteria in Figure 2.10 of DMRB LA 105 Air Quality[15].

A screening assessment (i.e. an assessment of changes in traffic conditions in the opening year (2026) due to the proposed scheme) will be used to define the roads to be modelled as per DMRB LA 105 Air Quality[15] (see Section 4.2.1.2). NOx and PM_{10} emissions will be calculated for the base year (2019) and opening year (2026) Do-Minimum and Do-Something scenarios using the most current version of Defra's Emission Factor Toolkit[34] (rather than speed band emission factors which are only applicable to Highways England schemes).

The road contribution to ambient concentrations at specific sensitive receptors will be calculated for NOx and PM_{10} using the Atmospheric Dispersion Modelling System-Roads dispersion model (version 5.0). Background (i.e. non-modelled) contributions will be taken from Defra background maps[20] and

[34] https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html.

the latest version of Defra's NOx to NO_2 calculator[35] used to estimate total NO_2 concentrations. Modelled annual mean NO_2 concentrations would then be verified against measured concentrations in the air quality study area, and model outputs adjusted as necessary, in accordance with the methodology set out within Defra LAQM.TG(16) guidance[27].

In order to address uncertainty in predicted future roadside NO_2 concentrations, Highways England's latest gap analysis methodology[15] and tool will be used to provide a more conservative estimate of future year NO_2 concentrations.

DMRB LA 105 Air Quality[15] states that it should only be necessary to model PM_{10} for the base year to demonstrate that there is no impact on achievement of the PM_{10} air quality thresholds as a result of the project. However, where the air quality modelling indicates exceedances of the PM_{10} air quality thresholds in the base year, then PM_{10} should be included in the air quality model in the Do-Minimum and Do-Something scenarios. This approach will be followed in this assessment.

DMRB LA 105 Air Quality[15] also states that there should be no need to model $PM_{2.5}$ as the UK currently meets its legal requirements for the achievement of the $PM_{2.5}$ air quality thresholds. The modelling of PM_{10} can be used to demonstrate that the project does not impact on the $PM_{2.5}$ air quality threshold. Modelling is therefore not proposed for the proposed scheme for $PM_{2.5}$.

Rates of nitrogen deposition within designated ecological sites will be calculated from modelled annual mean road NO_2 concentrations using the conversion factors given in DMRB LA 105 Air Quality[15] and site specific background nitrogen deposition rates obtained from the air pollution information system[36]. Nitrogen deposition rates and changes in rates of nitrogen deposition will then be compared to site relevant critical loads for each site, identified by an ecologist.

The overall judgement of significant effects on local air quality will be based on guidance as set out in DMRB LA 105 Air Quality[15]. Human receptors will be assessed against the annual mean objective values of 40 µg/m^3 for NO_2 and PM_{10}. Ecological receptors will be assessed in line with DMRB LA 105 Air Quality[15], with the significance of any resulting impacts assessed by an ecologist.

Criteria contained within DMRB LA 105 Air Quality[15] will be used to support the determination of impact significance, which will be based on professional judgement, and will be reported.

A cumulative assessment scenario will also be modelled to consider the potential combined impact of the proposed scheme and the proposed Garden Community on air pollutant concentrations in the air quality study area defined for the proposed scheme. As such, modelling will be undertaken using traffic data for the design year (2041) of the proposed scheme, including traffic expected to be generated by the Garden Community. As vehicle emission factors and background concentrations are currently only available up to 2030, this will likely provide a worst-case assessment of future year air pollutant concentrations, however.

4.8.5 Assessment Assumptions and Limitations

The assumptions and limitations associated with the air quality assessment for the proposed scheme will be included in the environmental assessment with a description of the potential influence on the model outcomes.

It should be noted that air quality modelling, like all modelling, is inherently uncertain, but, it is the most reliable, reasonable and robust tool available to determine whether a proposed scheme has the potential to have a significant air quality effect and/or affect the UK's reported ability to comply with the Air Quality Directive[22] in the shortest timescales possible.

[35] https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc.
[36] www.apis.ac.uk

In order to help manage uncertainty in air quality modelling, the modelled concentrations in the base year will be verified against air quality monitoring data in accordance with Defra guidance, with the verification adjustment factors applied to the modelled concentrations in the base year and Do-Minimum and Do-Something scenarios in the opening year. The magnitude of this uncertainty is likely to be increased, but not unreasonably so, due to the short period over which site-specific data were able to be collected (as discussed in Section 4.8.2).

Uncertainty in future air quality is one of the key assumptions in air quality modelling and the approach for addressing uncertainty in predicted future roadside NOx and NO_2 trends set out in DMRB LA 105 Air Quality[15] will be followed.

5 Cultural Heritage

5.1 Introduction

This chapter presents an initial baseline of cultural heritage assets, comprising both designated and non-designated archaeological remains, historic buildings and historic landscapes, and a preliminary assessment of the potential of the proposed scheme to impact upon the cultural heritage resource. The three subtopics of cultural heritage assets are defined as follows:

- Archaeological remains: the material remains of human activity from the earliest periods of human evolution to the present. These could be buried traces of human activities, sites or features visible above ground, or moveable artefacts
- Historic buildings: architectural, designed or other structures with significant historical value. These could include structures that have no aesthetic appeal or structures not usually thought of as buildings, such as milestones or bridges. If present, conservation areas are considered within the historic building subtopic
- Historic landscapes: the current landscape, whose character is the consequence of the action and interaction of natural and/or human factors. Historic Landscape Types (HLTs) have been identified through the methodology produced by East of England Regional Historic Landscape Characterisation project which sought to identify and record the historic character of the current landscape. For consistency of approach non-designated protected lanes and designated historic landscapes, which includes registered parks and gardens, are included as individual HLTs

The preliminary value of cultural heritage assets has been assessed in line with guidance provided in DMRB LA 106: Cultural Heritage Assessment[37], LA 104: Environmental Assessment and Monitoring[38] and using professional judgement. The magnitude of impact, i.e. the level of change that a cultural heritage asset may experience as a result of the proposed scheme, has also been assessed using guidance provided in LA 106 and LA 104.

The DMRB states that the aim of scoping is to "document the initial baseline studies undertaken" and to "make a recommendation on the scope of further assessment"[39]. An understanding of the need to undertake cultural heritage assessment is obtained through addressing the following questions:

"1) Is any designated or other cultural heritage resource in the footprint of the scheme or outside that footprint but still potentially physically affected by it?

2) Is the setting of any designated or other cultural heritage resource in the footprint of the scheme within the zone of visual influence or potentially affected by noise?

3) Is there new land take associated with the project?

4) Could potential archaeological remains be concealed?"[40]

[37] Highways England et al. (2020) LA 106 Cultural Heritage Assessment Rev. 1, Design Manual for Roads and Bridges.
[38] Highways England et al. (2019) LA 104 Environmental Assessment and Monitoring, Design Manual for Roads and Bridges.
[39] Highways England et al. (2020) LA 106 Cultural Heritage Assessment Rev. 1, Design Manual for Roads and Bridges.
[40] Highways England et al. (2020) LA 106 Cultural Heritage Assessment Rev. 1, Design Manual for Roads and Bridges.

Further assessment will be recommended when the response to one or more of the scoping assessment questions is 'yes'[41].

5.2 Baseline Conditions

5.2.1 Study Area

Guidance from LA 106 indicates that a study area for new roads "shall include the footprint of the scheme plus any land outside that footprint which includes any heritage assets which could be physically affected" and that should include "the settings of any designated or other cultural heritage resource in the footprint of the scheme or within the zone of visual influence or potentially affected by noise"[42].

For the purposes of this Scoping Report, and in line with the guidance provided by LA 106 and professional judgement, two study areas were used to develop the initial baseline, as follows:

- A 300 m study area extending in all directions from the RLB of the proposed scheme was used to identify designated and non-designated assets that may be physically affected by the proposed scheme or have impacts on their immediate settings. This study area is also used to characterise the potential for unknown archaeological remains within the footprint of the proposed scheme which would also have the potential to be physically affected. This study area is considered appropriate to assess the potential for physical impacts on cultural heritage assets
- A 1 km study area extending in all directions from the RLB of the proposed scheme was used to assess the potential for impacts on the settings of designated assets. This study area was mainly limited to higher value cultural heritage assets as they are likely to be more sensitive to the potential impacts of the proposed scheme. Although they are non-designated, protected lanes will also be considered within the 1 km study area as changes in traffic flow would have the potential to affect these assets beyond the 300 m study area. This study area is considered appropriate at this stage to capture the likely zone of visual influence of the proposed scheme and the potential for impacts on these designated and non-designated heritage assets

The Zone of Theoretical Visibility (ZTV) presented in Appendix B Figure 7.4 is based upon a bare earth model and is indicative of a theoretical maximum extent to which the proposed scheme may be visible; however, it does not take into consideration vegetation or structures which may provide shielding and has therefore not been used to inform the current study area. Further assessment will consider any refinements to the ZTV, if available, as well as information gained from representative viewpoint data, site inspections, and desk-based research to ensure the full extent of potential impacts on the setting of cultural heritage assets are assessed.

[41] Highways England et al. (2020) LA 106 Cultural Heritage Assessment Rev. 1, Design Manual for Roads and Bridges.
[42] Highways England et al. (2020) LA 106 Cultural Heritage Assessment Rev. 1, Design Manual for Roads and Bridges.

5.2.2 Information Sources

Baseline data was collected from Historic England's National Heritage List for England for information on designated cultural heritage assets. Sources available online have been consulted to gain an overview of non-designated assets and HLTs within the 300 m study area, comprising:

- The Essex Historic Environment Record, accessed through the Heritage Gateway[43]
- Aerial imagery[44]
- The Tendring District Protected Lanes Assessment[45]
- The Essex Historic Landscape Characterisation (HLC)[46] Project

5.2.3 Baseline

A summary of cultural heritage assets within the initial baseline is provided below:

- 16 listed buildings within 1km, one of which is within 300 m of the proposed scheme
    - One Grade I listed building within the 1 km study area
    - One Grade II listed building within the 300 m study area and a further twelve Grade II listed buildings within the 1 km study area
    - Two Grade II* listed building within the 1 km study area
- One designated HLT, the Grade II listed Wivenhoe Park Registered Park and Garden lies within the 1 km study area
- Non-designated HLT within the 300 m study area are predominantly rural enclosures with some woodland and built up areas[47]. There is only one protected lane HLT within the 300 m and 1 km study areas (Turnip Lodge Lane) and it is crossed by the footprint of the proposed scheme[48]
- No scheduled monuments are present within the 1 km study area. The nearest scheduled monument comprises 'Crop mark site S of Ardleigh' which is situated over 1.3 km to the north of the proposed scheme and will not be affected
- The Essex Historic Environment Record[49] indicates that non-designated archaeological remains are recorded within the footprint of the proposed scheme and that there is a high potential for unknown archaeological remains to be present throughout the 300 m study area

All designated cultural heritage assets and non-designated protected lanes within the vicinity of the proposed scheme are shown in Appendix B Figure 5.1.

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[43] Heritage Gateway (https://www.heritagegateway.org.uk/) [accessed 23.03.20]
[44] Google Earth [accessed 23.03.20]
[45] Essex County Council (2016) Tendring District Protected Lanes Assessment.
[46] Dyson-Bruce & Bennett (2013) Essex Historic Landscape Characterisation Project (HLC) (https://archaeologydataservice.ac.uk/archives/view/essex_hlc_2013/index.cfm) [accessed 22.03.20]
[47] Dyson-Bruce & Bennett (2013) Essex Historic Landscape Characterisation Project (HLC) (https://archaeologydataservice.ac.uk/archives/view/essex_hlc_2013/index.cfm) [accessed 22.03.20]
[48] Essex County Council (2016) Tendring District Protected Lanes Assessment.
[49] Essex Historic Environment Record accessed through the Heritage Gateway (https://www.heritagegateway.org.uk/) [accessed 23.03.20]

5.3 Legislation and Policy

5.3.1 Legislation

The primary relevant legislation designed for the protection of cultural heritage assets comprise:

- The Planning (Listed Buildings and Conservation Areas) Act 1990 – which provides specific protection for buildings and areas of special architectural or historic interest
- The Ancient Monuments and Archaeological Areas Act 1979 – which provides specific protection for scheduled monuments
- Further legislation which may be relevant to the cultural heritage within this project includes:
- The Hedgerow Regulations 1997 – which defines what constitutes an important hedgerow and makes provision for the protection of important hedgerows in England and Wales
- Burial Act 1857 – Section 25 of the Burial Act states that it is a criminal offence to remove human remains from any place of burial without a Home Office license
- Treasure Act 1996 – the Treasure Act defines what constitutes 'treasure' and states that any finds of treasure and objects found in association with 'treasure' must be reported to the local coroner

5.3.2 Planning Policy

The primary relevant planning policy designed for the protection of cultural heritage assets are set out below.

The key cultural heritage policies from Tendring District Council Local Plan are outlined below:

- Policy EN1 – Landscape Character, which seeks to protect and, where possible, enhance landscape and local character within the district, including the conservation of historic landscape, listed parks and garden, ancient woodlands and the traditional character of protected lanes
- Policy EN29 – Archaeology, which outlines how development will not be permitted where it is considered to adversely affect nationally important sites and the protections in place for sites of local importance
- Policy EN23 – Development within the Proximity of a Listed Building, which states that 'proposals for development that would adversely affect the setting of a Listed Building, including group value and long-distance views will not be permitted'

The emerging local plan has set out a number of policies aimed at achieving its strategic objective to "conserve and enhance Tendring District's historic environment, including: heritage; respecting historic buildings and their settings; heritage assets; landscapes; links; and views"[4].

The key cultural heritage policies in relation to the proposed scheme are outlined below:

- Policy PPL 3: The Rural Landscape, which seeks to protect the character and appearance of rural landscape including traditional buildings and settlement setting, protected lanes, and registered parks and gardens
- Policy PPL 7: Archaeology, which sets out the protections in place for archaeological remains
- Policy PPL 9: Listed Buildings, which seeks to protect listed buildings and their settings

National Planning Policy Framework (NPPF) policies on the conservation of the historic environment are set out in Chapter 16 of the NPPF[50]. It outlines that the significance of any heritage assets affected, including any contribution made by their setting, should be understood in order to assess the potential impact of the proposed development.

The NPPF defines significance of heritage assets as "the value of a heritage asset for this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting"[51].

5.4 Value of Environmental Receptors

A preliminary assessment of the value of cultural heritage assets within the baseline study area has been undertaken using professional judgement and guidance within LA 104 using a scale of unknown, negligible, low, medium, high and very high (as in LA 104 Table 3.2N)[52]. The NPPF[53] and Historic England's The Setting of Heritage Assets[54] have also been considered when assessing value. Values are subject to change upon receipt of further information. A summary of the values of cultural heritage assets is presented in Table 5-1.

Table 5-1 - Summary of the values of cultural heritage assets

Receptor		Receptor Value (Sensitivity)
Non-designated Archaeological Remains		Potential for Negligible to High
Designated Archaeological Remains		High
Non-designated Historic Buildings		Not applicable
Designated Historic Buildings		High
Non-designated HLTs	Standard HLT	Potential for Negligible to Medium
	Protected Lane (Turnip Lodge Lane)	Medium
Designated HLTs (Registered Park and Garden)		High

All listed buildings within the 1 km and 300 m study areas are of importance on a national scale with limited potential for substitution and have been assessed to be of high value. Currently, no non-designated historic buildings have been identified within the 300 m study area.

Non-designated archaeological remains within the study area have the potential to range in value from negligible to high. A review of the Essex Historic Environment Record[55] indicates that there are a number of cropmark sites noted within the 300 m study area that have the potential for in situ archaeological remains such as pits, trackways, ring ditches, and enclosures. Although no scheduled

[50] Ministry of Housing, Communities & Local Government (2019) National Planning Policy Framework.
[51] Ministry of Housing, Communities & Local Government (2019) National Planning Policy Framework, Annex 2: Glossary
[52] Highways England (2019) Table 3.2N in Environmental Assessment and Monitoring, Design Manual for Roads and Bridges.
[53] Ministry of Housing, Communities & Local Government (2019) National Planning Policy Framework.
[54] Historic England (2017) The Setting of Heritage Assets. Historic Environment Good Practice Advice in Planning: 3 (2nd Edition).
[55] Essex Historic Environment Record accessed through the Heritage Gateway (https://www.heritagegateway.org.uk/) [accessed 23.03.20].

monuments lie within the 1 km study area, the presence of a scheduled cropmark site ('Crop mark site S of Ardleigh'), situated just over 1.3 km to the north of the proposed scheme, indicates the potential for other high value cropmark sites to be located in the vicinity.

The single designated HLT within the study area, the Grade II Wivenhoe Park Registered Park and Garden, is of importance on a national scale with limited potential for substitution and has been assessed to be of high value.

The non-designated HLT within this area are predominantly rural enclosures with some woodland and built up areas[56]. The HLT predominantly date to between the 19th to 21st centuries, though some earlier pre-18th century field enclosures may still be present. These non-designated HLTs range in value from negligible to medium as they have up to regional scale importance. The single protected lane (Turnip Lodge Lane) within the study area is considered to have regional importance with limited potential for substitution and has been assessed to be of medium value.

5.5 Potential Impacts

5.5.1 Construction Phase

Potential impacts to cultural heritage assets during construction can be divided into physical impacts and impacts to setting. Potential physical impacts on heritage assets which may occur during construction of the proposed scheme comprise:

- Partial or complete removal of archaeological remains or historic landscape elements (such as hedgerows and sections of protected lanes) within the footprint of the proposed scheme through groundworks associated with construction. This would include works such as widening of existing highway boundary or the creation of new offline sections in addition to any service trenches and drainage features, topsoil stripping for compounds, the excavation of attenuation ponds and landscaping features
- Damage to archaeological remains within the footprint of the proposed scheme through their compression during construction, through the movement of machinery or within site compound or spoil storage areas
- Damage to archaeological remains through changes to groundwater levels caused by engineering activities associated with the project

Potential impacts to the setting of cultural heritage assets which may occur during construction comprise:

- The physical removal of, damage to, or severance of associated archaeological remains which form the setting of a heritage asset
- The alteration to the setting of archaeological remains, historic buildings, or HLTs through the removal of vegetation or associated above-ground elements during construction
- Temporary noise and visual intrusion on the setting of archaeological remains, historic buildings, or HLTs during construction activities such as groundworks, placement of site compounds and from increased construction traffic

In line with the scoping assessment questions presented in LA 106 Section 3.2[38], an initial assessment of potential impacts indicates that:

- No physical impacts are predicted on any listed buildings

[56] Dyson-Bruce & Bennett (2013) Essex Historic Landscape Characterisation Project (HLC) (https://archaeologydataservice.ac.uk/archives/view/essex_hlc_2013/index.cfm) [accessed 22.03.20].

- There is the potential for construction activities to have a temporary impact on the setting of historic buildings and HLT within the baseline through elements such as increased noise, dust, and/or visual intrusion
- There is a high potential for archaeological remains to be present within the footprint of the proposed scheme that may be physically affected by the proposed new land take
- There are HLT located within the footprint of the proposed scheme that may be physically affected by the proposed new land take; this includes the Protected Lane HLT (Turnip Lodge Lane) which is partially within the footprint of the proposed scheme

5.5.2 Operational Phase

Potential impacts to cultural heritage assets during operation can be divided into physical impacts and impacts to setting. Potential physical impacts on heritage assets which may occur during operation of the proposed scheme comprise:

- Removal of, or damage to, archaeological remains during maintenance works
- Damage to archaeological remains, historic buildings, or HLT through pollutants
- Damage to archaeological remains or historic buildings through changes in groundwater levels

Potential impacts to the setting of cultural heritage assets which may occur during operation comprise:

- Visual intrusion on the setting of historic buildings and HLT where new infrastructure is present in key views towards, through and across and asset
- Changes to the baseline setting due to the introduction of traffic movement, noise and light caused by the proposed scheme
- Severance of identifiable interrelationships due to the new length of road causing physical divisions between previously related cultural heritage assets

In line with the scoping assessment questions presented in LA 106 Section 3.2[38], an initial assessment of potential impacts indicates that:

- There is limited potential for significant physical impacts to historic buildings, archaeological remains, and HLT during operation
- The setting of all historic buildings and HLTs within the baseline have the potential for noise or visual intrusion during operation, dependent on the existing and proposed shielding from the natural topography, vegetation and the vertical alignment of the proposed scheme design. The one Grade II listed building situated within the 300 m study area, and any HLT within the 300m study area, will have the highest potential for noise and/or visual intrusion during operation of the proposed scheme
- While archaeological remains have the potential for impacts to setting, the initial assessment of the archaeological remains within the study area is that their value is primarily derived from their physical remains and any intrusion on their setting during operation would be limited to no impact based on our current understanding of these cultural heritage assets

5.6 Design, Mitigation and Enhancement Measures

It is proposed that Aerial Investigation and Mapping (AIM) (and targeted geophysical survey if required) followed by a programme of archaeological trial trenching is undertaken within the proposed scheme footprint to establish the nature, extent and survival of known and unknown subsurface archaeological remains. A geoarchaeological and palaeoenvironmental assessment of the GI records is also proposed which would inform the need for further evaluation in conjunction with the archaeological trial trenching. The results of these investigations would be used to inform a suitable programme of archaeological mitigation. The scope of archaeological trial trenching and subsequent mitigation measures will be devised in consultation with Essex Place Services. Examples of potential mitigation measures would be:

- To preserve high value archaeological remains in-situ through changes in design
- To undertake a targeted archaeological excavation or strip map and sample prior to construction
- To incorporate an archaeological watching brief during construction

If considered appropriate following further assessment, there is the potential for mitigation of any effects on HLTs through historic landscape recording. See Section 5.8 for the proposed assessment methodology.

Maintaining and incorporating appropriate best practice measures and mitigation through design in the form of screening (for example using cuttings, bunds and vegetation) would reduce any potential effects on the setting of historic buildings and HLTs.

5.7 Description of Likely Significant Effects

The preliminary impact assessment has identified the following potential likely significant effects on cultural heritage assets:

- There is the potential for significant effects through the damage or destruction of archaeological remains during construction
- There is the potential for significant effects through impacts on the setting of historic buildings during construction and operation
- There is the potential for significant effects on HLTs, including a protected lane, through the removal of key historic landscape elements during construction and through impacts on the setting of HLTs during construction and operation

5.8 Proposed Assessment Methodology

All sub-topics within cultural heritage have been scoped in for further assessment as potential effects on archaeological remains, historic buildings, and historic landscapes have been identified. All further assessment of the value of cultural heritage assets, the potential impacts on cultural heritage assets, and the significance of those effects will be undertaken in accordance with the relevant sections of DMRB[39,38] and in consideration of guidance such as the NPPF[57] and The Setting of Heritage Assets[58].

[57] Ministry of Housing, Communities & Local Government (2019) National Planning Policy Framework.
[58] Historic England (2017) The Setting of Heritage Assets. Historic Environment Good Practice Advice in Planning: 3 (2nd Edition).

In the first instance, further assessment will comprise a desk-based study which aims to provide a more complete understanding of cultural heritage assets within the baseline, their values, and their setting. This desk-based study will utilise the sources used in the creation of the initial baseline presented in Section 5.2, as well as data formally obtained from the Essex Historic Environment Record. Where it is considered appropriate, the desk-based study may also include information obtained from walkover survey, a site inspection survey, a review of published and unpublished reports, aerial photographs, LiDAR, geological assessment, and cartographic information in order to establish a more complete baseline.

The study areas used in further assessment may be amended in consideration of a more refined ZTV, if available, to ensure the full extent of potential impacts on the setting of cultural heritage assets are assessed.

It is also recommended that AIM (and targeted geophysical survey if required) and a specialists geoarchaeological/palaeoenvironmental assessment of the GI records followed by a programme of archaeological trial trenching is undertaken within the proposed scheme footprint to establish the nature, extent and survival of known and unknown subsurface archaeological remains. The extent and location of archaeological trial trenching will be informed by all of the non-intrusive evaluation measures including the results of the desk-based survey, the AIM, and the archaeological assessment of GIs. The scope of trial trenching will be agreed in consultation with the archaeological advisor from Essex Place Services prior to the start of works.

The assessment of potential impacts on cultural heritage assets that will be undertaken for the cultural heritage chapter of the ES will be informed by:

- The desk-based study
- Any supplementary walkover survey, site inspection, archival research, etc. undertaken subsequent to the desk-based study
- The results of the AIM (and geophysical survey if carried out)
- The results of the geoarchaeological and palaeoenvironmental assessment of GIs, if available (if not available during the ES assessment, information provided by the results of this assessment will be taken into account for the subsequent development of an agreed evaluation and mitigation strategy)
- The results of a trial trench evaluation, if available (if not available during the ES assessment, information provided by the results of a trial trench evaluation will be taken into account for the subsequent development of an agreed mitigation strategy)
- Relevant viewpoints as documented by Landscape and Visual Effects specialists
- Noise and Vibration assessments as provided by specialists in these fields
- Ground water assessments as provided by specialists in this field

Government restrictions on travel and social distancing as a result of COVID-19 outbreak, has prevented survey work such as geophysical survey, site walkovers, and archive visits from taking place. As such, the primary focus has been on undertaking desk-based evaluation.

If the COVID-19 situation changes and Government restrictions are relaxed, there may be opportunities to carry out walk-over and targeted geophysical surveys where considered appropriate to do so, and to progress with all other field-based activities.

5.8.1 Assessment Assumptions and Limitations

This scoping assessment has undertaken a preliminary evaluation of value and potential for impacts commensurate for this stage of work. The assessed value and potential for impact on cultural heritage assets may change following further desk-based study and through fieldwork activities such as walkover surveys, site inspections, AIM and trial trench evaluation.

Changes to the design of the proposed scheme and the introduction of construction elements beyond the footprint of the proposed scheme (such as additional construction compounds, borrow pits etc.) have the potential to change both the cultural heritage baseline and the assessment of potential impacts.

Only a bare earth model ZTV has been available during the production of this chapter; the extent of the study areas may change should a more refined ZTV become available and/or if potential impacts to setting beyond 1 km are identified.

Data from the Essex Historic Environment Record has not been acquired at the time of writing and has only been viewed online through Heritage Gateway; data will be formally obtained for further assessment.

No site visits have been undertaken for the production of this Scoping Report.

6 Biodiversity

6.1 Introduction

This section considers the potential impacts of the scheme on ecological receptors, which are considered to be those species and habitats protected by legislation or those otherwise recognised to be of significance in the maintenance of biodiversity within the geographic area.

This assessment has been informed by a desk study to identify baseline conditions, a UK Habitat Classification walkover survey and the early stages of ongoing surveys of protected or otherwise notable species. See Appendix B Figure 6.1 for ecological survey results.

The assessment has been carried out in line with DMRB, Sustainability & Environment, LA 108 Biodiversity[59] with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland[60].

6.2 Baseline Conditions

6.2.1 Study Area

Unless otherwise noted, a buffer of 250 m has been used around the construction RLB.

The desk study included requesting existing biological records from Essex Field Club and from the Essex Wildlife Trust Records Centre. For the Essex Field Club search a wide search area was used taking in all of the early route options, although predominantly those within a kilometre of the proposed scheme have been used in relation to this scoping assessment. The Essex Wildlife Trust species records search was for 1 km from the proposed scheme.

In addition, Magic Map was used to obtain information about statutory designated sites, and Tendring District Council's and Colchester Borough Council's websites were used to identify LWS data.

6.2.2 Designated Sites

The study area primarily consists of a farmed landscape dominated by arable and horticultural cultivation and divided by field boundaries that tend to feature a high frequency of mature trees and little shrub cover.

There are no statutory or non-statutory designated nature conservation sites within the likely construction area.

Nevertheless, the study area falls within the Impact Risk Zones of the following SSSIs:

- Bullock Wood SSSI; 2.4 km to the west; designated for its uncommon woodland community types
- Upper Colne Marshes SSSI; 2 km to the southwest; designated for its coastal habitats and the plant species that they support, as well as the presence of invertebrates and breeding

[59] Highways England (2019). LA 108 Biodiversity (formerly Volume 11, Section 3, Part 4 Ecology and Nature Conservation and IAN 130/10), Revision 0, Design Manual for Roads and Bridges, Volume 11, Section 3, Part 4, Sustainability & Environment Appraisal.
[60] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

birds of interest, including Redshank Tringa totanus, Lapwing Vanellus vanellus and Shelduck Tadorna tadorna

- Colne Estuary SSSI; 3.5 km to the south; designated for its internationally important over-wintering populations of Black-tailed Godwit Limosa limosa and Dark-bellied Brent Goose Branta bernicla and nationally important over-wintering populations of Redshank, Dunlin Calidris alpina, Sanderling Calidris alba, Ringed Plover Charadrius hiaticula and Grey Plover Pluvialis squatarola, together with nationally important breeding numbers of Little Tern Sternula albifrons

Following the guidance on Impact Risk Zones available on the Magic Map Application, road construction is not included within the requirements to carry out consultation with Natural England for any of these SSSIs given their distance from the construction area.

The Colne Estuary SSSI is the basis for the following sites designated to protect habitats and species included within the annexes of the Habitats Directive:

- Colne Estuary (Mid-Essex Coast Phase 2) SPA; Features of Interest: non-breeding populations of Dark-bellied Brent Goose, Hen Harrier Circus cyaneus and Redshank; non-breeding assemblage of water birds; breeding populations of Little Tern, Pochard Aythya ferina and Ringed Plover
- Colne Estuary (Mid-Essex Coast Phase 2) Ramsar site; Principal features: winter assemblage of waterfowl; internationally important winter numbers of Dark-bellied Brent Goose and Redshank; nationally important winter numbers of Cormorant Phalacrocorax carbo , Mallard Anas platyrhynchos, Shelduck, Long-tailed Duck Clangula hyemalis, Ringed Plover, Grey Plover, Sanderling , Dunlin, Black-tailed Godwit and Curlew Numenius arquata
- Essex Estuaries SAC; qualifying features are intertidal or marine habitats of no relevance to the study area

The Ardleigh Gravel Pit SSSI is approximately 1.2 km to the north of the construction area and Wivenhoe Gravel Pit SSSI is approximately 1 km to the south, but both have very small Impact Risk Zones, neither of which is affected by the proposals.

The Roman River SSSI is 3.6 km to the southwest, beyond the River Colne, and its Impact Risk Zone does not extend as far as the study area.

There are 18 LWS, within a 2 km buffer, across Colchester and Tendring Districts as detailed in Table 6-1 below.

Table 6-1 – Local wildlife sites

Site Code and name	Distance and direction from Red Line Boundary	Summary description
Co140 University Marshes	1.7 km to the southwest	Relict grazing marsh and reed-dominated ditches
Co143 Welsh Wood	1.9 km to the west	Ancient oak and lime woodland with rich ground flora
Co146 Salary Brook	1.1 km to the west	River valley corridor with unimproved grassland and fen communities, scrub and secondary woodland. Dormice are present

Co148 Wivenhoe Park	650 m to the west	Old parkland with veteran trees, acid grassland and old woodland
Co150 Home Wood	800 m to the west	Ancient dry oak woodland
Co152 Thousand Acres	990 m to the west	Largely ancient Sweet Chestnut Castanea sativa coppice woodland with Pedunculate Oak and Ash Castanea sativa
Co161 Wivenhoe Cross	1.1 km to the south	A complex mosaic of scrub, woodland, open mosiac and grassland habitats
Te3 Ardleigh Reservoir Grassland	1.7 km to the northwest	Acidic neutral grassland with developing scrub
Te4 Churn Wood Meadow	1.6 km to the west	Marshy acidic grassland
Te5 Churn Wood	1 km to the west	Large ancient woodland
Te6 Wall's Wood	500 m to the west	Ancient streamside woodland adjoined by more recent woodland blocks
Te7 Chapel Lane Verge	800 m to the west	Roadside wood bank supporting Common Polypody Polypodium vulgare; also a Special Roadside Verge (SRV)
Te8 Pyecats Corner Verges	400 m to the west	Road verge acid grassland supporting Betony Stachys officinalis and Hawkweed Hieracium sabaudum; also a SRV
Te9 Manor House Meadow	1.8 km to the north	Dry acid grassland
Te10 Springhead Corner Meadow	1.7 km to the north	Dry acid grassland
Te15 Palegate Wood	1.6 km to the southeast	Ancient Sweet Chestnut coppice woodland
Te20 Money Wood	1 km to the east	A fragment of ancient Sweet Chestnut coppice woodland
Te27 Mill Wood	1.9 km to the east	Ancient dry oak woodland.

There is a cluster of LWS associated with Salary Brook and its eastern valley slope, forming a corridor to the west of the study area that includes the Salary Brook LNR, managed by Colchester Borough Council. Connections between that cluster and the study area are poor, being restricted to a few of the better hedgerows crossing the intervening arable landscape and the corridor of the A120.

Although sharing characteristics of the study area, especially the dry, acid soils in woodland and grassland, few of the other LWS have any direct connection to the study area. The exceptions are Te8 Pyecats Corner verges, which is part of the same network of lanes and field boundaries crossed by the proposed scheme, and Te6 Wall's Wood, which adjoins the verges of the A120 to the north and south.

6.2.3 Habitats

The study area includes two areas of Lowland Mixed Deciduous Woodland that are considered likely to be Ancient Woodland: Strawberry Grove and Broom Grove. Both are below the two-hectare threshold for inclusion in the Ancient Woodland Inventory. They share a similar vegetation community, consisting of Pedunculate Oak standards with coppiced Hornbeam Carpinus betulus and Hazel Corylus avellana and an understorey containing Hawthorn Crataegus monogyna and Holly Ilex aquifolium. The ground flora is not species-rich, as is typical of woodlands on acid soils, but both support locally abundant Bluebell Hyacinthoides non-scripta and Three-nerved Sandwort Moehringia trinervia.

There are five areas identified as Priority Habitat on Magic Map, all Lowland Mixed Deciduous Woodland, two of them being Strawberry and Broom Groves, discussed above. The other three are small areas of recently planted woodlands, none of which was identified as Priority Habitat during habitat survey work. None has good woodland structure, and each includes a number of species that would not be considered native locally.

The field boundaries within the study area include a significant number of large Pedunculate Oak trees, some of which may be considered veteran, and therefore 'Irreplaceable', as defined in the NPPF. Some of these field boundaries may also match the description of the Hedgerows Priority Habitat.

Road verges in the study area support acid grassland communities, with recent records of species such as Betony, Pignut Conopodium majus, Hawkweed, Harebell Campanula rotundifolia and Devil's-bit Scabious Succisa pratensis. The first two of these species have been found on verges in the study area during survey visits. Grassland of this type would constitute Lowland Dry Acid Grassland Priority Habitat.

The Nationally Scarce Lesser Calamint has been found on one verge just to the north of the A120, in a location that is likely to be previously unrecorded. Other species present in the more diverse sections of verge grassland include Common Knapweed Centaurea nigra, Perforate St John's-wort Hypericum perforatum and Wild Carrot Daucus carota.

The Essex Field Club data search included records within the study area of several notable arable weeds: Small Toadflax Chaenorhinum minus, Mousetail Arisarum proboscideuim and Rough Poppy Papaver hybridum, all of which are on the Essex Red Data List. Surveys of field margins throughout the study area were carried out during the summer of 2019, with a focus on the presence of arable weeds. In general, there was little diversity, with many field margins lacking any recognised arable weed species. No notable (Nationally Rare, Nationally Scarce, or Essex Red Data List) arable weeds were recorded.

Much of the study area is dominated by land under intensive cultivation for arable or horticulture and so supports little biodiversity. The survey area also includes a small area of Bramble Rubus fruticosus scrub and several small areas of improved grassland in field corners, as well as larger grass leys. There are also a number of residential properties and collections of farm buildings, including a larger complex of agricultural and industrial buildings at Allen's Farm that features a power generating bio-digester.

6.2.4 Great Crested Newts

Great crested newts Triturus cristatus are protected by the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981. It is a criminal offence to kill, harm, capture, possess or sell them (alive or dead), disturb them, take or destroy their eggs, or destroy any of their breeding or resting places.

There were no records of great crested newt within the data search provided by Essex Field Club. The landscape is generally unsuitable for great crested newts because the sands and gravel soils of the area mean that there are few natural ponds present, combined with the dominance of cultivated land making the majority of habitat unsuitable.

All ponds within 500 m of the construction area, that are considered to be ecologically linked to habitats likely to be affected by the proposed scheme, have been subjected to Habitat Suitability Index assessments. Those ponds that are considered to be suitable were sampled for environmental DNA analysis. Samples from two ponds and a ditch were sent for analysis and all were negative for the presence of great crested newts. A further pond was dry at the time of the survey. One pond on the limit of the 500 m buffer to the southeast of the scheme has been scoped out as the likelihood of any adverse impact is very low.

It is concluded that this species is likely absent from the study area and so will not be impacted by the proposals.

Full details of all great crested newt surveys will be provided within a report appended to the ES.

6.2.5 Bats

All bat species are protected by the Conservation of Habitats and Species Regulations 2017 and by the Wildlife and Countryside Act 1981. It is a criminal offence to kill, harm, capture, possess or sell them (alive or dead), disturb them, or destroy any of their breeding or resting places.

The Essex Field Club data search returned only a single record of common pipistrelle Pipistrellus pipistrellus from within the study area, although there were also records for noctule Nyctalus noctula, Leisler's bat Nyctalus leisleri, serotine Eptesicus serotinus, soprano pipistrelle Pipistrellus pygmaeus, Daubenton's bat Myotis daubentonii, Natterer's bat Myotis nattereri and brown long-eared bat Plecotus auritus from a wider area of up to 3 km.

The Essex Wildlife Trust data search includes records of Daubenton's Bat, soprano pipistrelle and common pipistrelle from Elmstead Church, 420 m to the east of the proposed construction area. It isn't clear whether or not these records relate to roosting activity.

From previous survey work completed to support a housing development (but not yet submitted to the records centres), there are also known to be Barbastelle bats Barbastella barbastellus along Salary Brook to the west of the study area (pers. obs.).

The habitat within the survey area is considered to contain elements of 'Moderate' suitability as commuting and foraging habitat, as defined in Bat Surveys for Professional Ecologists[61], although a significant proportion by area is of 'Low' suitability. Mature trees are present in some field boundaries. No buildings or other structures will be affected by the works.

Static detectors were deployed, and activity transects were carried out from August to October 2019, while emergence surveys on trees with 'Moderate' roost potential[63] were carried out in August and September following Preliminary Ground Level Roost Assessments. These surveys covered a broader study area based upon early route options, before the current proposed scheme was finalised.

No roosts were identified during these surveys. The following species have been recorded to date, with a number of contacts from static detector surveys given as a measure of relative frequency:

- Soprano pipistrelle, by far the most frequently recorded with 3687 contacts

[61] Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

- Common pipistrelle, 2046 contacts throughout
- Myotis spp., 325 contacts, mostly in August and October
- Barbastelle, 249 contacts across all four months
- Noctule, 26 contacts
- Serotine, 15 contacts
- Brown long-eared, four contacts
- Nathusius' pipistrelle Pipistrellus nathusii, two contacts

Full details of all bat surveys will be provided within a report appended to the ES.

6.2.6 Dormouse

Hazel dormouse Muscardinus avellanarius is protected under the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981. It is a criminal offence for anyone to deliberately disturb, capture, injure or kill them. It is also an offence to damage or destroy their breeding or resting places, to disturb or obstruct access to any place used by them for shelter.

The Essex Field Club data search included records of dormice: on the northern edge of the A120 about 750 m northwest; along Salary Brook approximately 1.5 km to the west; and 2.5 km south-east of the study area.

The habitat within the study area was assessed for its suitability for dormice in the summer of 2019 and nesting tubes were placed in those field boundaries and habitat features considered to be suitable in September 2019. These were checked in October and November 2019 and remain in place for the 2020 survey season.

Checks in October and November revealed the presence of dormice in the hedge along the southern edge of the A120 either side of Strawberry Grove, and in the hedge to the east of Blossomwood Farm (outside of the 250 m buffer).

Full details of dormouse surveys will be provided within a report appended to the ES.

6.2.7 Water Vole

Water voles Arvicola amphibius are legally protected under the Wildlife and Countryside Act 1981, meaning that it is an offence, amongst other things: to intentionally kill, injure or take water voles; to intentionally or recklessly damage, destroy or obstruct access to places used by Water Voles for shelter or protection (i.e. their burrows); or to intentionally or recklessly disturb Water Voles while occupying a place of shelter or protection.

The Essex Wildlife Trust Records Centre data search results include a record of Water Vole on Sixpenny Brook to the south of the A133, approximately 650 m southeast of the construction area. Sixpenny Brook is connected to the construction area.

Walkover surveys indicate that the habitat within the study area is sub-optimal, with few watercourses holding water through the summer and most being subject to pollution and heavy shading.

6.2.8 Breeding Birds

There are no records of species of nature conservation significance within the Essex Field Club data search results, which is likely, in part, to reflect a lack of previous survey effort.

A partial breeding bird survey was carried out in spring 2019, consisting of three survey visits during April and May, but with access only along roads and PRoW. Although not comprehensive, this survey

indicated a low level of breeding bird activity in the study area, even considering the generally poor habitat present.

The results of this survey indicate that the species of nature conservation significance that could be breeding within the study area include Shelduck, Stock Dove Columba oenas, Skylark Alauda arvensis, Song Thrush Turdus philomelos, House Sparrow Passer domesticus, Linnet Linaria cannabina and Yellowhammer Emberiza citrinella. Only low numbers of these species were recorded.

Full details of breeding bird surveys will be provided within a report appended to the ES.

6.2.9 Wintering Birds

Wintering bird surveys have been completed, over the 250 m buffer, monthly between November 2019 and February 2020, with a focus on species associated with the nearby Colne Estuary SPA to determine whether or not the habitats present in the study area constitute functionally linked land. The surveys resulted in the following observations of species with nature conservation significance:

- Skylark was only recorded in February, but in five locations with up to four birds at each. Their behaviour was more suggestive of the establishment of territories than with over-wintering. The area does not appear to support a significant winter population of this Red List species
- A flock of up to 350 Starling Sturnus vulgaris was seen in January and February, this is a Red List species, but only for breeding, whereas the majority of winter flocks are derived from Scandinavian birds
- A flock of 20 Linnet was present near Allen's Farm in December, with two flyovers at Turnip Lodge Lane in February. While these may be part of a local breeding population, such numbers on a single occasion does not indicate any significance of the area as a wintering habitat for this Red List species
- In November, 10 House Sparrow were recorded, associated with a game feeding station, with two at Allen's Farm in February. These are likely to be part of a local breeding population of this Red List species, but such numbers are not considered significant in more than an immediately local context
- Small numbers (a maximum of three) of Yellowhammer were recorded in November and February. These are most likely to be from the local breeding population, but this does not constitute a significant winter population of this Red List species
- A single Corn Bunting Emberiza calandra was recorded near Allen's Farm in December, with five present in January. Similarly, while these birds might breed locally, this is not evidence of the study area being of significance in maintaining local populations of this Red List species
- Stock Dove, flocks of up to 30 were recorded on each survey
- The Red List Song Thrush and Amber List Meadow Pipit Anthus pratensis were also recorded during the surveys in small numbers, but those present during the winter are less likely to be components of local breeding populations, and their numbers were not significant

In February, during the badger walkover survey, a group of 11 Golden Plover Pluvialis apricaria were seen flying low over the northeast corner of the survey area, but with no evidence of them using habitat within the survey area. Although not included on either the Red or Amber List for the UK, this was the only species recorded on site that is associated with the nearby Colne Estuary SPA, where it forms part of the over-wintering assemblage.

In summary, the study area does not appear to be of more than local significance for over-wintering birds and there is no significant link to nearby designated coastal sites. Full details of survey results will be provided within a report appended to the ES.

6.2.10 Reptiles

All of the species of reptile native to Essex are partially protected by the Wildlife and Countryside Act 1981 such that it is an offence to intentionally kill or injure them.

There are no existing records of reptiles within the study area within the Essex Field Club data search results, although this is likely to reflect a lack of survey effort in an area unaffected by development and largely under private ownership, with no obvious blocks of accessible, suitable habitat.

There is a general lack of habitat suitable for reptiles within the area to be affected by the proposals, this being limited to grassy road verges and some field margins.

Data Protection Act

Data Protection Act

6.2.12 Other Priority Species

Brown hares Lepus europaeus have been recorded over most of the study area between the A120 and A133 during the course of other surveys.

The Essex Field Club included a single record for Western polecat Mustela putorius, just over 800 m to the west of the study area. The status of this species in Essex is less than certain, with the vast majority of recent records coming from road traffic casualties, as this one almost certainly did. Given the intensive game-rearing taking place across the study area, it is unlikely that there is a resident population of this predator.

There are no existing records of otter Lutra lutra within the study area and the habitat present is considered to be of marginal suitability. Sixpenny Brook is a small stream within the study area, although it could in theory be used as a means of dispersal.

6.2.13 Invertebrates

Within the Essex Field Club data search there are no records of invertebrates of conservation significance within the study area, which is likely to reflect a lack of survey effort, in part at least.

The habitats within the survey area have been assessed for their potential value to significant invertebrate assemblages by an ecologist with experience of invertebrate survey.

The combination of habitats present and the predominance of arable land in particular, do not suggest that the study area is of significance to invertebrates in a landscape context. There is an absence of habitat features that indicate the likelihood of significant invertebrate assemblages, such as stable open mosaics, diverse herbaceous vegetation, flower rich communities, wetland features, varied topographies and significant exposures of mineral soils.

However, there is an unusual concentration of mature oak trees in the field boundaries, which could support species associated with dead wood habitats, including stag beetle Lucanus cervus, which is locally common in the area around Colchester. There are no existing records of stag beetle in the data search results, but their presence is considered likely.

6.2.14 Invasive Species

No invasive species have been recorded during any of the survey visits carried out to date.

6.3 Legislation and Policy

Whilst the United Kingdom is still within the EU exit transition period the requirements of EU environmental directives will still apply and it is understood that post exit these requirements will be transposed into United Kingdom legislation. Therefore, references to EU directives requirements in the text below will remain relevant.

The following legislation and policy is considered relevant to ecological aspects of the scheme:

- Local Plan Policy QL11 - Environmental Impacts and Compatibility of Uses: states that development will only be permitted where it will not lead to loss or damage to areas of ecological value and that “Where appropriate, compensatory and/or mitigation measures will be required to resolve or limit environmental impacts”
- Local Plan Policy EN6 – Biodiversity: states that “Development proposals will not be granted planning permission unless the existing local biodiversity and geodiversity is protected and enhanced.”
- The Conservation of Habitats and Species Regulations 2017: Protection for sites with international designations (Habitats sites) and protection for European Protected Species
- The Wildlife and Countryside Act 1981 (as amended): Protection for SSSIs; protection for species listed in Schedules 1, 5 and 8 and for all nesting birds; required measures in relation to invasive non-native species on Schedule 9
- Natural Environment and Rural Communities Act 2006: Identification of habitats and species of Principal Importance for the conservation of biodiversity in the Section 41 list
- [redacted]
- The NPPF: sets out how planning policies and decisions should enhance the natural environment, minimise impacts on biodiversity and provide net gain for biodiversity; introduces the impact hierarchy of avoid, mitigate, compensate; introduces the idea of irreplaceable habitats, whose loss or deterioration should not be permitted; and states the

need for certainty of impacts in ecological information submitted in support of planning applications

6.4 Value of Environmental Receptors

Ecological receptors within the study area that are likely to be affected by the proposals will be assigned a value based upon the geographic frames of reference set out in DMRB LA 108[62] and CIEEM's Guidelines for Ecological Impact Assessment in Britain and Ireland[63], amended to be relevant to local circumstances and the scale of the scheme:

- International and European
- National
- Regional
- County
- Local

The following table sets out the likely value of ecological receptors, as far as can be gauged with the information currently available. For sites and habitats, value is determined by the policy and legislation background of their designation. For species, value is determined in light of the status of the habitat or species, but also the level at which an adverse effect would impact their favourable conservation status.

Table 6-2 – Value of ecological receptors

Ecological Receptor	Value	Justification
Colne Estuary SPA and Ramsar Essex Estuaries SAC	International	These sites are designated in accordance with the requirements of European Directives and associated legislation
Bullock Wood SSSI Upper Colne Marshes SSSI Colne Estuary SSSI	National	SSSIs are designated under UK legislation as they are considered the sites that best represent the habitats and species present in the UK
Ancient Woodland and Veteran Trees	National	Ancient Woodland and Veteran Trees are both identified as irreplaceable in the NPPF and so are afforded National value
Priority Habitats: Lowland Mixed Deciduous Woodland Lowland Dry Acid Grassland Hedgerows	National	The S41 list identifies habitats of Principal Importance for the Conservation of Biodiversity at the national (England) level
Local Wildlife Sites (LWS): Te6 Walls Wood Te8 Pyecats Corner	County	LWS are, by definition, sites of County importance. These are the only two LWS in the area that are ecologically connected to the red line boundary

[62] Highways England (2019). LA 108 Biodiversity (formerly Volume 11, Section 3, Part 4 Ecology and Nature Conservation and IAN 130/10), Revision 0, Design Manual for Roads and Bridges, Volume 11, Section 3, Part 4, Sustainability & Environment Appraisal.
[63] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

Ecological Receptor	Value	Justification
Lesser Calamint	Regional	This is a Nationally Scarce species and this population forms part of its core national range, which covers south Suffolk and Essex. If affected, there could be an impact at a regional level.
Great Crested Newts	None	Likely absence has been established.
Bats	Local to Regional	No roosts have been identified so far and survey results suggest that only relatively common species are present at a significant level of activity, and so roosts of high conservation significance are unlikely. The study area may be of importance for bats moving through the landscape, and the value of individual species will vary depending on their conservation status and local abundance. The value of scarcer species such as Barbastelle may be regional, while that of commoner species such as Soprano Pipistrelle may only be Local.
Dormouse	Regional	Dormouse is protected under European legislation and have Priority status. Any population should be considered of value at a Regional level, because of their low density populations and the importance of connectivity between populations.
Water Vole	Local	The study area is unlikely to be of high significance for the maintenance of Water Vole populations in the local area because of the unsuitability of habitat.
Breeding bird assemblage	Local	The habitats present and initial survey results suggest that the breeding bird assemblage is relatively impoverished and so any value is likely to only be at the Local level. The discovery of notable populations of birds of conservation concern could raise this value.
Wintering bird assemblage	None	Surveys did not identify any significant populations of birds in the study are over the winter period.
Reptiles	Local	Habitat suitability is such that any reptiles present will be at low densities and so will make minimal contribution to the status of local populations. The presence of less common species could increase their value in the study area.
Data [redacted]	Data [redacted]	Data Protection Act [redacted]
Other Priority Species: Brown Hare	Local	Although a Priority Species, Brown Hare remains common in areas of suitable habitat such as this throughout Essex and so the population in the

Ecological Receptor	Value	Justification
		study area is not considered to be of any more than Local value.
Invertebrates	Local	Given the habitats present and their management, the study area is unlikely to be making a significant contribution to invertebrate populations at more than a Local level. The presence of Stag Beetles, which is assumed, is considered in light of a known population hotspot around Colchester, of which the study area forms a minor part.
Invasive Species	None	No such species have been identified at present

6.5 Potential Impacts

6.5.1 Construction Phase

Activities during construction that could generate ecological impacts are:

- Vegetation clearance, including hedge and tree removal (habitat loss and degradation)
- Habitat isolation and fragmentation (physical barriers)
- Ground disturbance, including soil stripping, excavation and landscaping (habitat loss and degradation)
- Hydrological changes, including impacts to existing watercourses
- Noise and visual disturbance
- Dust generation (smothering)
- Pollution (air and surface water)
- Installation of temporary artificial lighting, including for night work (disturbance)
- Establishment of compounds, including storage and set-down areas (habitat loss or degradation)
- Establishment of haul roads and access routes (habitat loss and degradation)
- Habitat restoration and creation

6.5.2 Operational Phase

Activities during operation that could generate ecological impacts are:

- Habitat fragmentation by the presence of an ecological barrier
- Hydrological impacts, including discharge of surface water
- Animal death by road traffic accidents
- Noise and visual disturbance
- Pollution (air and surface water)
- Installation of permanent artificial lighting

6.6 Design, Mitigation and Enhancement Measures

6.6.1 Design

The current design has been proposed to reduce the loss of woodland habitat at Strawberry Grove, in recognition of its Ancient Woodland status. The land take adjacent to the existing A120 has been minimised by the introduction of a retaining wall rather than a sloped embankment. The route of the road has been selected to minimise impacts on semi-natural habitats, within the constraints imposed by the road's function and safety and its intersection with the A120, a high speed road.

6.6.2 Mitigation

Full details of mitigation and compensation measures will be provided within the ES, to be informed by full survey results when available. An outline of the mitigation anticipated to be incorporated into scheme design, or applied during construction, include:

- A method statement for the protection of bats during tree removal associated with construction, including working under licence and the provision of replacement roosts
- Measures to reduce the effect of interruption of bat commuting routes through the landscape during and after construction, such as hop-overs and artificial hedges
- A method statement for the protection of Dormice under licence during habitat removal
- Planting or natural regeneration of scrub and woodland habitat to the west and east of Strawberry Grove to provide a habitat extension and buffer, with a focus on suitability for Dormouse
- Planting of shrubs and trees along new road verges, creating linear connectivity, with a focus on suitability for Dormice and commuting bats
- Minimised removal of veteran trees, with compensatory veteranisation of suitable trees in the surrounding landscape, where possible
- Minimised removal of 'Important' or Priority Habitat hedgerows
- Retention of dead wood from tree removal, to be incorporated into landscaping
- Wildlife fencing to prevent animal deaths on the completed road

Full details of all mitigation measures and method statements will be included within the ES.

6.6.3 Enhancement

The Defra Metric (2.0 or subsequent version) will be used to measure the ecological value of the RLB area for biodiversity and ensure that a minimum of 10% Biodiversity Net Gain is provided by the landscape and ecological design of the finished road.

The elements of enhancement to be incorporated into design include:

- Planting of trees and shrubs in excess of the habitat area required to compensate for that to be lost and to improve habitat connectivity along the new road alignment and with adjoining habitats
- Incorporation of ecological design into new balancing ponds and their surroundings to create or facilitate locally relevant habitats, including acid grassland
- Creation of areas of low nutrient status substrate to encourage the development of acid grassland and to provide habitat for invertebrates

Full details of enhancement measures will be provided in the ES.

6.7 Description of Likely Significant Effects

From the information available at the present time, with further ecological surveys yet to complete and no consideration of the mitigation or compensation measures proposed, the following are anticipated to represent the likely significant ecological effects resulting from the proposed scheme:

- Loss of Ancient Woodland (Priority) habitat; the proposed scheme will necessitate the loss of a narrow strip of Strawberry Grove along its northern edge to accommodate a new slip road to the service station to the west
- Loss of veteran trees; tree removal will be required along the new road alignment, although it is not yet known how many of these, if any, are veterans
- Loss of hedgerow (Priority) habitat; hedge removal will be required along the new road alignment, but it is not known how much of this, if any, will affect hedgerows that are either Priority Habitat and/or Important under the Hedgerow Regulations
- Loss of dormouse habitat; hedges and scrub on the southern edge of the existing A120 will need to be removed to accommodate elements of the road scheme
- Loss of bat roosts in trees; if there are any bat roosts identified within trees that are required to be removed, these will be lost

6.8 Proposed Assessment Methodology

6.8.1 Impact Assessment Methodology

The methodology for impact assessment will follow DMRB LA 108[64], with reference to CIEEM guidance[65].

The results from field surveys will be used to determine the presence or likely absence of ecological receptors, to assess the value of the populations of those receptors that are present and to confirm those whose value is considered to be 'County' or above. This will be the threshold of value for impact assessment, considered to be relevant to the scale of development.

Each ecological receptor, the population of which is considered to be of 'County' or higher value, or that is protected by legislation or policy, will then be assessed against the potential impacts of the proposed scheme, to determine the character and significance of the impacts that they will face.

Impact character will make reference to the duration, reversibility, extent, magnitude, frequency and duration of the effect, and whether it is considered positive or negative.

The level of each impact will be given a category against the following scale: Major, Moderate, Minor, Negligible (DMRB LA 108, Table 3.11[6]) and this level will then be compared to the value of the receptor using the matrix in Table 3.13 of DMRB LA 108[66] to give a significance of impact as follows:

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[64] Highways England (2019). LA 108 Biodiversity (formerly Volume 11, Section 3, Part 4 Ecology and Nature Conservation and IAN 130/10), Revision 0, Design Manual for Roads and Bridges, Volume 11, Section 3, Part 4, Sustainability & Environment Appraisal.

[65] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

[66] Highways England (2019). LA 108 Biodiversity (formerly Volume 11, Section 3, Part 4 Ecology and Nature Conservation and IAN 130/10), Revision 0, Design Manual for Roads and Bridges, Volume 11, Section 3, Part 4, Sustainability & Environment Appraisal.

Very Large, Large, Moderate, Slight or Negligible. Those impacts with significance of Moderate, Large or Very Large will be those that are material to the decision making process.

The results of this categorisation will then be used to influence the final design of the scheme and the mitigation measures developed for those impacts that cannot be avoided. Any residual significant effects will then be identified, if any, and proposals drawn up for their compensation. All mitigation and compensation measures will be fully detailed within the ES and incorporated into planning documents to ensure their achievement prior to and during construction.

Proposals to monitor the efficacy of mitigation and compensation measures will be prepared, with a mechanism for remedial measures where objectives are not being met.

6.8.2 Scoped Out

The following ecological receptors have been scoped out of the EIA through the results of the early survey work, either as a result of the lack of suitable habitat, or through evidence of likely absence at a significant population level:

- Designated sites; none of the features of interest identified is considered to be ecologically connected to the study area
- Great Crested Newts; no likely breeding ponds within 500 m of the proposed scheme, as determined by survey results
- White-clawed Crayfish Austropotamobius pallipes; no suitable habitat and the species is known to be absent from this catchment
- Over-wintering birds; no significant populations of species of nature conservation significance (in relation to the Birds of Conservation Concern lists) identified during survey work

6.8.3 Habitats

An arboricultural survey is being carried out during 2020, including the identification of all trees considered to be veterans.

All hedgerows within the study area will have been subject to a Hedgerow Regulations assessment during the spring of 2020. This will be used to identify any hedgerows of raised significance within the terms of the Regulations as a proxy for their ecological significance, which in turn will inform the need for mitigation and compensation, and the form it should take. Breaches in hedgerows considered to be important will be minimised in number and extent, wherever possible.

The character of the two LWS with some ecological connection to the study area, Te6 Walls Wood and Te8 Pyecats Corner, will be considered in the design of habitat creation and enhancement measures.

6.8.4 Species

6.8.4.1 Bats

Static detector, emergence and activity transect surveys will continue between April and August 2020 in order to identify roosts and determine the most important foraging areas and commuting routes within the study area. Survey locations and transect routes have been revised to reflect the proposed route option and survey effort has been determined with reference to Bat Conservation

Trust's Bat Surveys for Professional Ecologists[67], on the basis of 'Moderate' habitat suitability for bats.

Activity transect surveys will be carried out monthly between April and July, with two transects covering the study area.

A total of ten locations will be sampled with static detectors between April and August, locations chosen to represent the commuting routes crossed by the road that are most likely to be significant, or that are close to areas of better foraging habitat.

All trees within a 20 m buffer of the construction area, will be subject to a Preliminary Ground Level Roost Assessment to identify Potential Roost Features (PRF), in line with the guidelines set out in Collins (2016)[69]. PRF Inspection Survey (by tree climbing) or at least two emergence surveys between May and August will be carried out for all trees assessed as having 'Moderate' roosting potential, as defined in Collins (2016)[69].

6.8.4.2 Dormouse

Nesting tubes were checked and refurbished in March 2020, with some adjustment in locations to reflect the proposed route option. Monthly checks will continue from April 2020 to determine the extent of the species' presence across the survey area. The results of the survey will be used to assess the impact of the proposals on the local population of dormouse and to inform appropriate mitigation or compensation measures.

6.8.4.3 Water Voles

Surveys of all streams, ditches and water bodies supporting suitable habitat will be carried out in April and July, in line with the methodology set out in the Water Vole Conservation Handbook[68]. The results of this survey will determine the presence or likely absence of Water Voles from the study area and the need for any precautionary measures or mitigation.

6.8.4.4 Breeding Birds

A five-visit breeding bird survey will be carried out between April and June 2020 using a territory mapping methodology in line with the British Trust for Ornithology's Common Bird Census[69]. Analysis of territories will be restricted to those species included within the Birds of Conservation Concern Red List and any other species with legal protection, although a record will be kept of all species recorded and of those confirmed as breeding or considered likely to be doing so.

The results of the survey will be used to assess the significance of the breeding bird assemblage in the wider context, consider the habitat features of most significance to the assemblage, determine the likely impacts of the proposed scheme on that assemblage and influence the mitigation provided by the landscape design for the proposed scheme.

6.8.4.5 Reptiles

Artificial cover objects will be used within suitable habitats that will be physically affected by the proposals to determine the presence or likely absence of reptile species. Seven such locations have been identified along the road's route, comprising two grassy field corners, two grassy field margins

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[67] Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.
[68] Dean, M., Strachan, R., Gow, D., and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London.
[69] Gilbert, G., Gibbons, D.W., and Evans, J. (1998). Bird Monitoring Methods, a manual of techniques for key UK species. RSPB, Sandy.

and three sections of road verge. At least seven visits will be made under suitable weather conditions to check for the presence of reptiles.

The results of the survey will be used to assess the significance of any impact on any local populations of reptiles and to inform the risk avoidance and mitigation measures necessary prior to and during construction.

Data Protection Act [redacted]

6.8.5 Other Priority Species

Brown Hare presence will be recorded during other survey work, especially the breeding bird survey, in order to assess the scale of the population present. Options to maintain habitat connectivity and limit the impact of the mortality from road traffic accidents will be considered.

During water vole surveys, a search will also be made for evidence of any otter activity to confirm the presence or likely absence of this species.

6.8.5.1 Invertebrates

No further survey work is proposed. The presence of stag beetles will be assumed and used as a proxy for the assemblage of invertebrates associated with veteran trees and dead wood. Options for mitigation will be considered and incorporated into landscaping plans.

6.8.6 Invasive Species

The presence of any invasive species noted during other survey work will be recorded and a method statement will be prepared to maintain surveillance for such species and to deal with any that may appear prior to or during construction.

6.8.7 Assessment Assumptions and Limitations

At the time of writing, movement and activity of the general public is restricted by the outbreak of COVID-19. At present, this is not likely to provide any significant constraint to the completion of the surveys detailed above due to the availability of local resources and the refinement of Risk Assessments, although there is still potential for tighter controls to be introduced. As far as is possible, survey schedules and methodologies will remain as specified above, but any limitations placed upon progress will be documented. Any delay to the programme of the scheme will be reflected within the survey schedule to ensure the currency of survey results at the EIA stage.

7 Landscape and Visual Effects

7.1 Introduction

This chapter provides a summary of the landscape and visual baseline conditions; legal and policy context; value of likely landscape and visual receptors; an outline of potential landscape and visual effects; as well as the proposed scope and methodology for the Landscape and Visual Impact Assessment (LVIA) for the ES for the proposed scheme.

LVIA is defined in the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)[70], as a tool to identify and assess the significance of change resulting from a proposed development. LVIA addresses two separate but related issues, namely:

- Effects on the landscape as a resource
- Effects on people's views and visual amenity

For simplicity, the term 'landscape' has been used throughout the LVIA to describe areas of landscape and townscape, in line with the DMRB LA 107 Landscape and visual effects[71] (hereafter referred to as 'LA 107') which states that the "LVIA process does not differentiate between 'landscape' and 'townscape', as it is applicable to any landscape - urban, rural or a combination of both...". Therefore, the assessment methodology for impacts on landscape and townscape does not differ.

This scoping chapter has been produced in accordance with the latest available guidance in GLVIA3[70] and LA 107[71], the latter of which states that the "scoping assessment shall identify potential significant effects" by answering a series of questions relating to landscape and visual effects. It replaces the guidance in the DMRB Volume 11, Section 3, Part 5 Landscape Effects[72] and Interim Advice Note (IAN) 135/10 Landscape and Visual Effects Assessment[73], which have been withdrawn.

7.2 Baseline Conditions

7.2.1 Study Area

The study area for the scoping stage is the full sheet extent illustrated on the scoping Figures 7.1 to 7.4 in Appendix B of this Scoping Report, which incorporates a buffer of 2 km from the proposed scheme. (The study area for the proposed ES, is set out in Section 7.8.)

Site visits were carried out by two chartered landscape architects on 17 July 2019 and 6 March 2020. The objectives of the site visits were to become familiarised with the study area and to inform the scope of the LVIA.

A working draft of ZTV mapping for the proposed scheme is illustrated on Figure 7.4 in Appendix B, within the study area. This has also been used to inform the scope of the LVIA. It should, however, be noted that the ZTV is based upon a bare earth ground model and therefore only takes account of the visual screening provided by the existing topography. The ZTV does not take account of surface features, such as buildings and vegetation, which could also provide screening. Potential refinements

[70] Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment. Third Edition. Oxon: Routledge.
[71] Highways England et al. (2020). LA 107 Landscape and visual effects, Rev. 2, Design Manual for Roads and Bridges.
[72] Highways Agency (1993). Landscape Effects, Design Manual for Roads and Bridges Volume 11, Section 3, Part 5.
[73] Highways Agency (2010). Interim Advice Note 135/10 Landscape and Visual Effects Assessment.

of the proposed scheme design may result in changes to the vertical or horizontal alignment, and therefore the ZTV.

7.2.2 Information Sources

The following sources of baseline information have informed the scoping assessment:

- Google Maps aerial photography and Google Maps 'Street View'
- Ancient Tree Inventory (Woodland Trust (2020)[74]
- Ancient Woodland Inventory[75]
- Colchester Landscape Character Assessment[76]
- Colchester Local Plan 2001 – 2021[77]
- England's Light Pollution and Dark Skies[78]
- Environment Agency 2m Composite LiDAR delivered Digital Terrain Model
- Essex Landscape Character Assessment[79]
- National Character Area (NCA) profile: 111: Northern Thames Basin[80]
- Ordnance Survey Explorer mapping
- Ordnance Survey Terrain 5 mapping
- Tendring District Local Plan 2007[81]
- Tendring District Local Plan 2013-2033 and Beyond Publication Draft[82]
- Tendring Landscape Character Assessment[83]
- The Publication Draft stage of the Colchester Borough Local Plan 2017 – 2023[84]
- Townscape Character Assessments, Colchester, Tiptree, West Mersea & Wivenhoe[85]
- Tranquillity Map: England. National map with 2001 district boundaries[86]

[74] Woodland Trust (2020). Ancient Tree Inventory. [Online] Available at: https://ati.woodlandtrust.org.uk/tree-search/?v=1648817&ml=map&z=15&nwLat=51.84434157074092&nwLng=0.46267663305825213&seLat=51.82638862265718&seLng=0.5347744113785646 [Accessed: 28 January 2020].
[75] Natural England, 2019. Ancient Woodland Inventory.
[76] Chris Blandford Associates (2005). Colchester Landscape Character Assessment.
[77] Colchester Borough Council (adopted December 2008 and selected policies revised July 2014). Colchester Local Plan 2001 – 2021.
[78] Campaign to Protect Rural England (2019). England's Light Pollution and Dark Skies. Available online at: https://www.nightblight.cpre.org.uk/maps/
[79] Chris Blandford Associates (2003). Essex Landscape Character Assessment.
[80] Natural England, 2013. National Character Area profile: 111: Northern Thames Basin.
[81] Tendring District Council (December 2007). Tendring District Local Plan 2007.
[82] Tendring District Council (2017). Tendring District Local Plan 2013-2033 and Beyond Publication Draft[82].
[83] Land Use Consultants (2001). Tendring Landscape Character Assessment.
[84] Colchester Borough Council (2017). The Publication Draft stage of the Colchester Borough Local Plan 2017 – 2023.
[85] Chris Blandford Associates (2006). Townscape Character Assessments, Colchester, Tiptree, West Mersea & Wivenhoe.
[86] Campaign to Protect Rural England (2007). Tranquillity Map: England. National map with 2001 district boundaries.

7.2.3 Landscape Designations

The landscape designations within the study area are illustrated on Figure 7.2 in Appendix B of this Scoping Report.

Within the study area, there are 17 ancient woodland blocks identified on the Ancient Woodland Inventory[75], including the following ancient woodlands located within 1 km of the proposed scheme:

- Home Wood, approximately 800 m to the west of the proposed scheme at the closest point
- Wood near Thousand Acres, approximately 1 km to the west of the proposed scheme at the closest point
- Churn Wood, approximately 1 km to the west of the proposed scheme at the closest point
- Walls Wood, which is bisected by the A120, located approximately 500 m to the north-west of the proposed scheme at the closest point

It is likely that there are other ancient woodlands within the study area, that are not recorded on the Inventory due to being less than 2 ha in size. Strawberry Grove located partially within the proposed scheme to the south of the A120, and Broom Grove, located in close proximity to the proposed scheme to the north of the A120, are considered likely to be ancient woodland. For further information regarding this, refer to Chapter 6 - Biodiversity.

In addition, within the study area there are a number of veteran trees and ancient trees identified on the Woodland Trust Ancient Tree Inventory[74] (checked on the 26 February 2020), including a large number located at The University of Essex and Wivenhoe Park Registered Park and Garden approximately 700 m to the south-west of the proposed scheme at the closest point. Other veteran trees and ancient trees on the Inventory within the study area are located more than 2 km from the proposed scheme. There may be other potential veteran and ancient trees within the study area that are not recorded on the Inventory. Proposed arboricultural and ecological surveys will confirm the presence of any such trees in close proximity to the proposed scheme to inform the assessment for the ES.

The current dataset for Tree Preservation Orders (TPOs) within the study area has not been received at the time of preparing this report. The locations of TPOs illustrated on Figure 7.2 in Appendix B are based upon TPO data from 2014/15. This dataset indicates a number of TPOs within the study area, including at Wivenhoe Park Registered Park and Garden to the south-west (approximately 700 m at the closest point), along Bromley Road to the west (approximately 200 m at the closest point) and within Green Island Gardens to the north (approximately 450 m at the closest point). The locations of TPOs will be reviewed once more up to date data is received.

Locally, the adopted Tendring District Local Plan 2007[81] identifies a number of open spaces (Policy COM7 and COM7a) and a proposed open space associated with Elmstead Market (Policy COM8a), including three open spaces on the northern fringe of the village, approximately 1 km from the proposed scheme at the closest point. These include the playing fields for Elmstead Primary School, Elmstead Grasshoppers Cricket Club and an adjacent open space at the rear of Holly Way. It is noted that the emerging local plan (Tendring District Local Plan 2013-2033 and Beyond Publication Draft[82]) identifies 'safeguarded local greenspace' (Policy HP4) in place of the current open space allocations.

The Proposals Map for the adopted Colchester Local Plan 2001 – 2021[77] identifies a number of private and public open spaces (Policy PR1) on or near the eastern fringe of Colchester, as well as football pitches and other open space on the northern fringe of Wivenhoe, approximately 750 m south of the proposed scheme at the closest point. Other open spaces are located more than 1 km from the proposed scheme. It is noted that the emerging local plan (The Publication Draft stage of the Colchester Borough Local Plan 2017 – 2023[84]) only identifies public open space (Policy DM17).

Cultural heritage designations are set out in detail within Chapter 5 - Cultural Heritage. However, as the landscape setting of heritage features is relevant to the landscape assessment, a brief summary is provided in this section and the designations are illustrated on Figure 7.2 in Appendix B. The Grade II listed Wivenhoe Park Registered Park and Garden is located south of the A133, approximately 700 m south-west of the proposed scheme at its closest point. There are also several listed buildings scattered throughout the study area, as well as a scheduled monument more than 1.3 km to the north of the proposed scheme, and, conservation areas within Ardleigh and Colchester more than 2 km from the proposed scheme.

Tendring District Council has identified protected lanes in their adopted local plan (Policy EN1), as non-designated heritage assets. A number of protected lanes are located within the study area, with further protected lanes and extensions proposed in the emerging local plan. Within 1 km, there is one protected lane; Turnip Lodge Lane, which ties into the proposed scheme just south of the proposed roundabout to tie into Wivenhoe Road.

7.2.4 Landscape Character

At the national scale, Natural England has divided England into 159 character areas, based on a combination of landscape, biodiversity, geodiversity and cultural and economic activity. The study area falls within NCA 111: Northern Thames Basin, which is described as a "diverse landscape", including the "open landscape and predominantly arable area of the Essex heathlands, with areas of urbanisation mixed in throughout." Colchester is described as the "principal settlement" and "…the walled Roman capital and England's oldest town, dating from 49 AD." It is noted that "the least tranquil areas are associated with urban centres such as … Colchester…". "Important A roads providing wide physical links include the … A120…" A summary of the relevant key characteristics for NCA 111 is set out in Appendix D.

For NCA 111, it is suggested that "Although housing, other construction and agriculture are significant for the area it is important that these are developed in a sustainable way so that predicted changes in climate and the effects on the area's character are considered and sense of place and history are preserved."

The Statements of Environmental Opportunity (SEO) for NCA 111 includes SEO 4, to "Manage and expand the significant areas of broadleaf woodland and wood pasture, and increase tree cover within urban areas, for the green infrastructure links and important habitats that they provide, for the sense of tranquillity they bring, their ability to screen urban influences…."

At a regional scale, landscape character assessment is provided within the Essex Landscape Character Assessment. A number of broad Landscape Character Types (LCTs) have been identified as part of this assessment; that is distinct landscape types that "…share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetics attributes" (such as 'pattern, scale, tranquillity, wildness'[87])"[88]. The LCTs are then further subdivided into constituent Landscape Character Areas (LCAs). A summary of the relevant key characteristics of the LCTs and LCAs within the study area is set out in Table D-1 of Appendix D, which also includes the published sensitivity to major transportation developments and improvements, stated in the Essex Landscape Character Assessment, for all LCAs, as well as further description of LCA E3 Tendring Plain which would be directly impacted by the proposed scheme. The LCAs are illustrated on Figure 7.3 in Appendix B.

[87] Highways England et al. (2020). LA 107 Landscape and visual effects, Rev. 2, Design Manual for Roads and Bridges.
[88] Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment. Third Edition. Oxon: Routledge.

At a local scale, the landscape of the study area is described in the Tendring Landscape Character Assessment[83] and Colchester Landscape Character Assessment[76]. The majority of the study area falls within the LCA 7A Bromley Heaths of the Tendring Landscape Character Assessment. Extracts of the relevant key characteristics of the LCAs within the study area that could be directly or indirectly affected are set out in in Table D-2 of Appendix D, as well as relevant published guidance for LCA 7A Bromley Heaths which would be directly affected. The LCAs are illustrated on Figure 7.3 in Appendix B.

The principal urban areas identified in the Colchester Landscape Character Assessment[76] are further subdivided into many smaller townscape character areas in the Townscape Character Assessments, Colchester, Tiptree, West Mersea & Wivenhoe[84]. Due to the distance of the proposed scheme from both Wivenhoe (approximately 900 m at its nearest point to the proposed scheme) and Colchester (approximately 1.5 km at its nearest point to the proposed scheme), the detailed townscape character set out for these urban areas is not considered to be of relevance to the assessment of landscape effects for the proposed scheme.

7.2.5 Tranquillity

The Campaign to Protect Rural England (CPRE) has undertaken a study of tranquillity in England and has mapped and published the results (2007). CPRE highlight new roads as one of the greatest threats to remaining levels of tranquillity. The Tranquillity Map for England[86] identifies tranquillity zones based on sources of noise and visual intrusion and the zones over which intrusion may be felt. Colchester is indicated to be one of the least tranquil areas, with the rural parts of the study area indicated as moderately tranquil.

7.2.6 Night Skies

The CPRE mapping of England's light pollution and dark skies[78] illustrates the influence of light pollution on the night skies within the study area. The western part of the study area is affected by higher levels of night time light pollution, associated with the urban area of Colchester and nearby villages, as well as the main roads including the A120 and A133. The night time lighting levels within the urban area of Colchester are considered as brighter skies, with some of the brightest skies located centrally within the urban area. Lighting levels within the settlements of Wivenhoe, Elmstead Market, Great Bromley and Ardleigh are also considered to be brighter, while there is a localised area of very bright skies on the eastern fringe of the study area at Frating. The night skies of the rural parts of the study area are generally less affected by light pollution, although there are no skies located within the study area that are identified as being in the darkest category. It should also be noted that the mapping of England's light pollution and dark skies[78] is based upon satellite data of sky-glow during the year 2015 and will therefore not necessarily reflect the current situation. It is also evident from the mapping that headlights on parts of the A120 and A133 are not recorded.

7.2.7 Visibility and Potential Visual Receptors

The landscape within the study area is generally flat and open plateau, with the exception of the river valleys associated with the Salary Brook and the River Colne, and very subtle undulations for other brooks, such as the Sixpenny Brook. While there are open views locally across agricultural fields, hedgerows, tree belts and woodlands restrict the distance of such views. As such, the range of available views are generally local or middle-distance.

The existing A120 and A133 corridors are reasonably well screened by vegetation belts, although the tops of passing vehicles, including high-sided vehicles, are visible from adjacent PRoW and properties, with the exception of sections where the A120 is located in cutting.

Views from Crockleford Heath are restricted by mature vegetation and generally contained locally. From the surrounding settlements in Elmstead Market and Wivenhoe, views are generally restricted

by buildings and/or mature vegetation, while views from the eastern edge of Colchester are restricted by topography, buildings and mature vegetation. However, there are occasional views from the edges of the settlements to the surrounding farmland.

Potential visual receptors within the study area include the following:

- Users of a number of PRoW within the surrounding landscape, including the Camuplodunum long distance path
- Cyclists on Essex Cycle Network and National Cycle Network Route (NCNR) 51
- Residents at scattered residential properties within the rural landscape
- Residents at Crockleford Heath
- Residents on the eastern edge of Colchester, to the west of the proposed scheme
- Residents on the northern edge of Wivenhoe, to the south of the proposed scheme
- Residents on the western and northern edge of Elmstead Market, to the east of the proposed scheme
- Residents at Great Bromley and Balls Green to the east of the proposed scheme
- Residents on the southern edge of Ardleigh, to the north of the proposed scheme
- Users of open space allocations on fringes of Colchester, Wivenhoe, Elmstead Market and Ardleigh
- Visitors to St Anne & St Lawrence's Church
- Visitors to Wivenhoe Park Registered Park and Garden, and University of Essex, to the south-west of the proposed scheme
- Workers at businesses within the rural landscape, such as businesses at Allen's Farm, Balls Farm (small business park), the Waste Depot north of the A120, the Ardleigh South Services south of the A120, the vehicle repair business north of Bromley Road, agricultural engineering business on Springvalley Lane and Spring Valley Nursery
- Travellers on the local road network, including the A120 and A131

7.3 Legislation and Policy

The key European and national legislation that provides context to the landscape and visual scoping assessment includes:

- The European Landscape Convention[89]: Promotes "the protection, management and planning of the landscapes…"
- The NPPF[90]: Sets broad overarching objectives of relevance, in particular relating to conserving and enhancing the 'natural, built and historic environment, including landscapes and green infrastructure'
- Action for Roads - A network for the 21st Century[91]: Sets out reforms for highways management in England, including how to maximise green gains and protect the

[89] Council of Europe (2000). European Landscape Convention and reference documents.
[90] Ministry of Housing, Communities and Local Government (2019). National Planning Policy Framework.
[91] Department for Transport (2013). Action for Roads - A network for the 21st Century.

environment. Integrating roads into the landscape and mitigating visual impacts associated with roads is encouraged

A review of local plan policies has identified the following planning policy issues to be of relevance to landscape and visual. Policies relating specifically to cultural heritage assets are included in Chapter 5 – Cultural Heritage, of this report, while policy related to biodiversity is listed within Chapter 6 – Biodiversity, of this report.

- Tendring District Local Plan 2007 (Adopted 2007)
- Tendring District Local Plan 2013-2033 and Beyond Publication Draft
- Colchester Local Plan 2001 – 2021 (Adopted December 2008 and selected policies revised July 2014)
- The Publication Draft stage of the Colchester Borough Local Plan 2017 – 2023[BI1]

Tendring District Local Plan 2007 (Adopted 2007)

- Policy QL7 Rural Regeneration: Covers the protection and enhancement of landscape character.
- Policy QL9 Design of New Development: Encourages good design of development, including maintaining or enhancing local character, incorporating existing landscape features and, respecting and enhancing views, skylines, etc.
- Policy QL11 Environmental Impacts and Compatibility of Uses: Sets out environmental criteria for new development, including criteria relating to landscape and visual amenity.
- Policy COM21 Light Pollution: Sets out requirements for lighting schemes of new development to minimise light pollution.
- Policy EN1 Landscape Character: Sets out further detail regarding the protection and enhancement of local landscape character, including conserving landscape features such as skylines and views, landscape setting of settlements and vernacular buildings, vegetation, protected lanes and registered parks and gardens.

Tendring District Local Plan 2013-2033 and Beyond Publication Draft

- Policy HP 3 Green Infrastructure: Sets out requirements for development to protect and enhance green infrastructure.
- Policy PL 3 The Rural Landscape: Sets out requirements for the protection of the rural landscape and its character, including protection of landscape features, such as skylines and views, vegetation, protected lanes and, registered parks and gardens. Development should have regard to both national and local landscape character assessments. Also requires development to minimise light pollution.

Colchester Local Plan 2001 – 2021 (Adopted December 2008 and selected policies revised July 2014)

- Policy ENV1 – Environment, of the Core Strategy (Adopted December 2008 and selected policies revised July 2014): Sets out policy for conservation and enhancement of the countryside, including requirements for the design of new development, including protecting, conserving or enhancing landscape character, and providing mitigation or compensation.
- Development Policy DP1: Design and Amenity: Requires development to be designed to a high standard, including respecting and enhancing local character, protecting public and residential amenity, and respecting and enhancing the landscape.

- Development Policy DP21: Nature Conservation and Protected Lanes: Includes protection of protected lanes of historic and/or landscape value in the context of development.

The Publication Draft stage of the Colchester Borough Local Plan 2017 – 2023

- Policy ENV1: Environment: Sets out policy for conservation and enhancement of the countryside, including landscape features that contribute to landscape character, such as ancient woodland, important hedgerows and veteran trees.
- Policy ENV3: Green Infrastructure: Sets out policy for protecting and enhancing green infrastructure, including requirement for mitigation.
- Policy DM15: Design and Amenity: Requires development to be designed to a high standard, including respecting and enhancing local character, protecting public and residential amenity, and responding appropriately to directly affected views.

7.4 Value of Environmental Receptors

Landscape and visual sensitivity is established by assessing the value attached to a receptor and its susceptibility to the particular form of change likely to result from the individual development. The determination of sensitivity of landscape and visual receptors has been broadly based on the methodology set out within LA 107, as summarised in Tables 7-1 and 7-2.

7.4.1 Value of Landscape Receptors

Table 7-1 - Sensitivity (susceptibility and value) of landscape receptors (based on LA 107)

Landscape sensitivity (susceptibility and value) of receptor/resource	Typical description from LA 107	Examples of potential receptors within the study area
Very High	Landscapes of very high international/national importance and rarity or value with no or very limited ability to accommodate change without substantial loss/gain (i.e. national parks, internationally acclaimed landscapes - UNESCO World Heritage Sites).	None.
High	Landscapes of high national importance containing distinctive features/elements with limited ability to accommodate change without incurring substantial loss/gain (i.e. designated areas, areas of strong sense of place - registered parks and gardens, country parks).	None.
Medium	Landscapes of local or regional recognition of importance able to accommodate some change (i.e. features worthy of conservation,	LCA 6B Ardleigh, LCA 6C Alresford Valley System, LCA 7A Bromley Heaths, LCA A6 Ardleigh River Valley, LCA B7 Langham Farmland

Landscape sensitivity (susceptibility and value) of receptor/resource	Typical description from LA 107	Examples of potential receptors within the study area
	some sense of place or value through use/perception).	Plateau and LCA B8 Wivenhoe Farmland Plateau. Medium sensitivity of these LCAs reflects that there is no regional or local recognition of these landscapes, with the exception of localised ancient woodlands, trees with TPOs, ancient and veteran trees and localised heritage assets, whilst there is limited ability to accommodate change and the nature of these landscapes are generally undeveloped.
Low	Local landscape areas or receptors of low to medium importance with ability to accommodate change (i.e. non-designated or designated areas of local recognition or areas of little sense of place).	LCA B3 Southern Colchester Farmland Plateau, LCA D3 Colne Drained Estuarine Marsh, LCA G3 Wivenhoe Urban Landscape and LCA G4 Colchester Urban Landscape. Low sensitivity of these LCAs reflect that there is no local recognition of these landscapes, with the exception of a localised heritage asset, whilst the landscapes have some ability to accommodate change due to either existing fragmentation, influence of existing development or urban context.
Negligible	Landscapes of very low importance and rarity able to accommodate change.	None.

7.4.2 Value of Visual Receptors

Table 7-2 - Sensitivity (susceptibility and value) of visual receptors (based on LA 107)

Visual sensitivity (susceptibility and value) of receptor/resource	Typical description from LA 107	Examples of potential receptors within the study area
Very High	1) Static views from and of major tourist attractions 2) Views from and of very important national/international landscapes,	None

Visual sensitivity (susceptibility and value) of receptor/resource	Typical description from LA 107	Examples of potential receptors within the study area
	cultural/historical sites (e.g. National Parks, UNESCO World Heritage sites) 3) Receptors engaged in specific activities for enjoyment of dark skies	
High	1) Views by users of nationally important PRoW/recreational trails (e.g. national trails, long distance footpaths) 2) Views by users of public open spaces for enjoyment of the countryside (e.g. country parks) 3) Static views from dense residential areas, longer transient views from designated public open space, recreational areas 4) Views from and of rare designated landscapes of national importance	Views by users of PRoWs, including the Camuplodunum long distance path, residents of dense residential areas and scattered rural properties, visitors to St Anne & St Lawrence's Church and, Wivenhoe Park Registered Park and Garden, are considered to have high sensitivity. This reflects their high susceptibility to the nature of the proposed scheme, even if the value of their views would range from medium to high.
Medium	1) Static views from less populated residential areas, schools and other institutional buildings and their outdoor areas 2) Views by outdoor workers 3) Transient views from local/regional areas such as public open space, scenic roads, railways or waterways, users of local/regional designated tourist routes of moderate importance 4) Views from and of landscapes of regional importance	Transient views by cyclists on National Cycle Network Route 51 and Essex Cycle Network; views of outdoor workers at Spring Valley Nursery; views of users of outdoor areas and locally identified open space allocations associated with schools and other institutional buildings, such as school playing fields and playgrounds, including outdoor areas at the University of Essex and playing fields at Elmstead Primary School; and views of residential students at University of Essex, are considered to have medium sensitivity. This reflects their medium susceptibility to the nature of the proposed scheme, and that the value of their views would range from low to high.
Low	1) Views by users of main roads or passengers on public transport on main arterial routes 2) Views by indoor workers 3) Views by users of recreational/formal sports facilities	Transient views by travelers on the A120, A133 and minor roads; views by workers at indoor businesses within the rural landscape, such as businesses at Balls Farm (small business park), the vehicle repair business north of Bromley Road and

Visual sensitivity (susceptibility and value) of receptor/resource	Typical description from LA 107	Examples of potential receptors within the study area
	where the landscape is secondary to enjoyment of the sport 4) Views by users of local public open spaces of limited importance with limited variety or distinctiveness	the agricultural engineering business on Springvalley Lane; views by workers at Allen's Farm (including a power station and quarry workings), the Waste Depot north of the A120, the Ardleigh South Services south of the A120; and views by users of locally identified open space allocations such as sports facilities, including Elmstead Grasshoppers Cricket Club and football pitches on the northern fringe of Wivenhoe, are considered to have low sensitivity. This reflects their low susceptibility to the nature of the proposed road scheme and their low to medium value of views.
Negligible	1) Quick transient views such as from fast moving vehicles 2) Views from industrial area, land awaiting re-development 3) Views from landscapes of no importance with no variety or distinctiveness	None.

7.5 Potential Impacts

The proposed scheme is a major highway scheme. While it is not likely to affect designated landscapes, it may directly affect one woodland which is considered likely to be ancient woodland (Strawberry Grove), even though it is not listed on the Ancient Woodland Inventory[75]. It would also be likely to directly affect a small section of Turnip Lodge Lane Protected Lane (a non-designated heritage asset), which contributes to local landscape character. The proposed scheme is likely to affect the distinctiveness of LCAs and LCTs locally, including the key characteristics of national, regional and local LCAs, as well as the condition and quality of the landscape locally.

The proposed scheme is also considered likely to have an adverse effect on the views by sensitive visual receptors and visual amenity locally within 1 km.

7.5.1 Construction Phase

The potential landscape and visual impacts during construction are likely to be associated with:

- Construction of the new offline link road, including construction of new roundabouts and the A120 junction with an overbridge across the A120; retaining walls; embankments; attenuation ponds and maintenance tracks, involving construction plant and tall crane movements, as well as large-scale earth movements and temporary soil storage

- Removal of vegetation to facilitate construction of the link road
- Removal of vegetation to facilitate construction of the A120 junction, which would make the presence of existing traffic on the A120 more noticeable during construction
- Construction plant and haul vehicles, with deliveries of materials, traveling along haul routes and transport routes
- Temporary traffic management measures would result in temporary signage and congested traffic flow on roads locally
- Lighting of construction works that have to be undertaken during the hours of darkness would result in presence of lighting equipment during the day and light spill during the night
- Creation of construction compounds, including stockpiles, would result in views of temporary site offices, parking areas for plant and construction staff, and material mounds

The design and construction methodology is not sufficiently developed to provide details regarding the exact locations of different types of temporary working areas, such as construction compounds, haul routes, attenuation ponds or the extent and nature of vegetation clearance. Therefore, assumptions for this scoping assessment are based on knowledge of similar schemes.

During the construction period, there would potentially be short term adverse effects on the landscape character locally, including perceptual and aesthetic aspects. Whilst the construction activities associated with the proposed scheme would detract from the rural character of the open farmland, the earthworks for the proposed scheme would not be dissimilar to the quarry activities in the vicinity of Allen's Farm.

A number of visual receptors would also potentially experience adverse visual effects in the short term, such as users of the many PRoW in the vicinity of the proposed scheme; user of cycle routes; residents in surrounding scattered residential properties or on the fringes of settlements; users of public open spaces; visitors to St Anne & St Lawrence's Church, and, Wivenhoe Park Registered Park and Garden; residential students at tower blocks at the University of Essex; workers within the rural landscape and users of the local road network.

7.5.2 Operational Phase

The potential landscape and visual impacts during operation are likely to be associated with:

- New offline link road, including new roundabouts and the A120 junction with an overbridge across the A120; retaining walls; embankments; attenuation ponds and maintenance tracks
- Presence of traffic and infrastructure on the link road, such as signage, associated with the link road and A120 junction
- Removal of vegetation currently providing established screening of traffic and infrastructure on the A120, which would make the presence of existing traffic on the A120 more noticeable
- Lighting columns and light spill associated with new roundabouts and the A120 junction
- Potential lighting associated with proposed routes for walkers, cyclists and horses

During operation, there would potentially be adverse effects on the landscape character locally, including perceptual and aesthetic aspects.

A number of visual receptors would also potentially experience adverse visual effects during operation, such as users of the many PRoW in the vicinity of the proposed scheme; user of cycle routes; residents in surrounding scattered residential properties or on the fringes of settlements; users of public open spaces; visitors to St Anne & St Lawrence's Church, and, Wivenhoe Park Registered Park and Garden; residential students at tower blocks at the University of Essex; workers

within the rural landscape and users of the local road network. Views of highways infrastructure and traffic on the offline link road would change the generally rural nature of views. The link road would be particularly noticeable in the vicinity of the A120 junction, where the road would be on high embankments.

7.6 Design, Mitigation and Enhancement Measures

Landscape objectives would be defined to inform the continued development of the proposed scheme design, to integrate the road into the local context and avoid the need for additional mitigation where possible, in line with LD 117 Landscape design[92] (hereafter referred to as 'LD 117'). The Garden Community will be considered when developing these objectives, although it is assumed this would be constructed after the proposed scheme and that the garden community proposals would include environmental mitigation as required, including any additional mitigation required to screen views towards the proposed scheme from potential future visual receptors.

7.6.1 Construction Phase

Potential landscape and visual mitigation during construction could include:

- Topsoil and subsoil to be stripped from temporary works areas such as sites proposed for construction compounds and areas allocated for the stockpiling of materials. Where practicable, stripped soil to be stored in bunds around the perimeter of the temporary works and construction areas to provide temporary screening
- In the vicinity of large construction compounds and around proposed structures near residential properties, consideration could be given to modifying site security fencing to provide an additional temporary screening function
- As much of the existing vegetation within the proposed scheme boundary, and within temporary works areas, to be retained as far as practicable. Particular attention would be given to the retention of mature vegetation including specimen trees and woodlands, including consideration of the use of localised retaining walls rather than embankments to limit impact on potential ancient woodland or veteran trees
- All trees, shrubs and hedges to be retained would be protected throughout the construction period in accordance with BS5837: 2012 Trees in Relation to Design, Demolition and Construction – Recommendations
- Where necessary to remove trees or hedgerows within temporary works areas, such as construction compounds, haul routes and regrading areas, these would be replanted on completion of construction and the areas would be restored and returned to their original uses wherever practicable and appropriate
- Temporary lighting required for safety and security during construction to be kept to a minimum and have sharp cut-off properties to reduce light spill as far as practicable. Night time working to be kept to a minimum

7.6.2 Operational Phase

A preliminary environmental mitigation design would be developed in conjunction with assessment for the ES, reflecting current landscape guidelines and landscape design guidance, including LD 117[92].

[92] Highways England, Transport for Scotland, Welsh Government and Department for Infrastructure (2020). LD 117 Landscape design.

The intention would be to integrate the proposed scheme and other environmental mitigation measures appropriately into the surrounding landscape and reduce adverse effects on landscape and visual receptors. A holistic approach would be taken to the development of the environmental mitigation design, including the integration of landscape mitigation with mitigation required for other factors, such as habitat connectivity for biodiversity.

Potential landscape and visual mitigation during operation could include:

- Earthwork design to integrate the proposed scheme into the wider landscape and reduce the visual impact, considering slackening of embankment slopes if appropriate
- Careful consideration of the design of the A120 overbridge, links to side roads and diverted PRoW to help integrate these into the wider landscape
- Careful consideration of landscape treatment in vicinity of minor roads to be stopped up
- Sensitive design of attenuation ponds, to integrate ponds into the landscape and reduce visual intrusion
- Sensitive location of main road signs to limit visual intrusion
- Planting, including native hedgerows, hedgerows with trees, shrubs and trees. Consideration of the species, pattern and distribution of proposed hedgerows, shrubs and trees along the proposed scheme to reflect the distinctive local character of vegetation of the landscape and provide screening
- Consideration of balance between screening the proposed link road and providing a stimulating visual experience for travellers
- Areas of species rich grassland, including naturally regenerated grassland, at locations where conditions are suitable for their establishment, to provide seasonal interest
- Rounding of crests and toes of embankments to improve integration with the surrounding landform, where space and materials are available
- Integration of roadside barriers, fences and retaining walls within the landscape
- Use of hedgerows on the highway boundary, including hedgerows with trees, where appropriate, to link into existing field boundaries, provide screening and to integration with the local landscape pattern
- Off-site planting by agreement with adjacent landowners could potentially be offered to supplement the on-site proposals and provide additional landscape integration, screening and enhancement. However, in principle on-site mitigation close to the proposed link road is considered most effective, as this is likely to provide mitigation for a larger number of receptors. Furthermore, off-site mitigation cannot be relied upon for essential mitigation to reduce potential significant adverse effects, as the management of such mitigation would not be within the control of Essex Highways
- Sensitive lighting design, where lighting is required for safety, such as the use of modern dimmable light emitting diodes (LEDs) with cut-off properties, together with dynamic systems of operation to provide the minimum amount of light required at different times

7.7 Description of Likely Significant Effects

7.7.1 Construction Phase

Mitigation during construction would not be likely to alter the level of effect for most landscape and visual receptors due to the major construction works proposed within relatively open farmland. It

would generally not be practicable to screen views of construction and the activities would generally be at odds with the rural character of the landscape. As such, there would likely be temporary significant adverse landscape and visual effects during construction.

Significant adverse effects would potentially be experienced by the LCA 7A Bromley Heaths, which would be directly impacted by the construction of the proposed offline link road within the rural landscape. Adverse effects on other LCAs which would be indirectly affected by construction activities would be less likely to be significant.

For visual receptors located within 1 km of the proposed scheme, adverse effects could potentially be significant, unless there is existing intervening vegetation that provides screening. The visual receptors that would be likely to experience significant visual effects, would potentially include views from a number of PRoW, views by cyclists on the Essex Cycle Network and views by residents in scattered properties within the rural landscape. A range of viewpoints would be likely to be affected and the representative viewpoints proposed to be included in the LVIA, to represent the receptor groups likely to experience significant visual effects, are listed in Table 7-3.

For visual receptors with longer distance views, potential effects are not considered likely to be significant due to the screening effect of existing vegetation within the wider landscape and the relatively flat landscape, which means there are no elevated vantage points with longer distance views from the surrounding landscape, with the exception of the tower blocks at the University of Essex. Furthermore, any views of tops of taller cranes in association with construction of the A120 junction would likely form a small element of the overall view and either be barely perceptible within the overall view and/or not alter the overall balance of features in the view.

7.7.2 Operational Phase

Planting mitigation would not take immediate effect during operation, and effects on some landscape and visual receptors would be likely to be significant adverse initially despite mitigation.

Significant adverse effects would potentially be experienced by the LCA 7A Bromley Heaths, which would be directly impacted by the offline proposed link road which would introduce major highway infrastructure within the rural landscape and, lead to severance of existing landscape features and the landscape pattern. Adverse effects on other LCAs which would be indirectly affected by the link road would be less likely to be significant.

As per the construction phase, for visual receptors located within 1 km of the proposed scheme it is considered likely that effects could potentially be significant, unless there is existing intervening vegetation that provides screening. A range of viewpoints would be likely to be affected, particularly where the proposed scheme would change the nature of the view from open countryside to highway infrastructure.

For visual receptors with longer distance views, potential effects are not considered likely to be significant due to the screening effect of existing vegetation within the wider landscape and the relatively flat landscape, which means there are no elevated vantage points with longer distance views from the surrounding landscape, with the exception of the tower blocks at the University of Essex.

In the longer term, planting would establish and help to soften earthworks, roundabouts and the A120 junction and overbridge, as well as providing screening of traffic and infrastructure. This would likely reduce the significance of effect for several visual receptors. However, some residual landscape and visual effects may remain adverse and significant in the longer term, during operation, despite mitigation. The rural character of the landscape would, for instance, be permanently affected by the offline link road. Visual effects on highly sensitive receptors may also remain significant where views would be close range and elements of the proposed scheme would be difficult to screen effectively, such as the A120 overbridge.

It is considered unlikely that the following visual receptors would experience significant visual effects during construction or operation, including all visual receptors located more than 1 km from the proposed scheme. These receptors are therefore scoped out of the proposed LVIA:

- Walkers on the Camuplodunum long distance path, due to intervening vegetation which would be likely to generally screen views. Any potential views would likely be filtered or glimpsed above such vegetation
- Cyclists on NCNR 51, due to the distance of almost 1.5 km or more and intervening vegetation which would be likely to generally screen views. Any potential long-distance views would likely be filtered or glimpsed above such vegetation
- Residents at Crockleford Heath, due to intervening vegetation which generally contain views locally. As such, any potential views would likely be filtered or glimpsed
- Residents on the eastern edge of Colchester, due to the lack of theoretical visibility of the proposed scheme from much of the eastern edge due to intervening landform (as illustrated by the ZTV on Figure 7.4 in Appendix B), and the distance of more than 2 km for residents with theoretical visibility (based on bare earth ZTV modelling), and intervening vegetation which would likely screen views
- Residents on the northern edge of Wivenhoe, western and northern edge of Elmstead Market, and at Great Bromley, Balls Green and Ardleigh; due to the distance of almost 1 km or more, and intervening vegetation and/or landform which would generally screen views. Any potential views would be filtered or glimpsed above the intervening vegetation
- Users of open space allocations on fringes of Colchester, Elmstead Market and Ardleigh, due to the distance of more than 1 km and intervening vegetation and/or buildings which would generally screen views. Any potential long-distance views would likely be filtered or glimpsed above such vegetation
- Users of open space allocations on the northern fringe of Wivenhoe, due to intervening vegetation which generally screens and filters views
- Visitors to St Anne & St Lawrence's Church, due to intervening vegetation which generally contain views locally. Furthermore, any restricted views north-west towards the proposed A120 junction location are affected by a number of existing detracting features, including rubbish, the existing A120 footbridge and a pylon
- Visitors to Wivenhoe Park Registered Park and Garden, due to intervening vegetation along the western boundary of the park (in addition to many mature trees within the park itself) which screens views. Any filtered glimpses through vegetation from the eastern edge of the park would be seen in the context of traffic at close range on the B1028 and A133
- Users of outdoor areas at the University of Essex, who's views would be screened by intervening landform and vegetation and residential students at the tower blocks at the University of Essex. Vegetation within Wivenhoe Park Registered Park and Garden provides significant screening of views from the lower stories of these tower blocks. While there may be wide reaching views from the upper stories of the tower blocks, such views would already be affected by the presence of main roads, including the A133, and it is not considered likely that the proposed link road would alter the overall balance of features and elements that comprise such existing wide views.
- Workers within the rural landscape due to intervening vegetation or their low sensitivity
- Travellers on the local road network, including the A120 and A131; due to their low sensitivity

7.8 Proposed Assessment Methodology

7.8.1 Proposed Scope of Assessment

As set out above in Section 7.7, significant adverse landscape and visual effects are considered likely and, in line with the requirements of paragraphs 3.9, 3.10, 3.29 and 3.30 of LA 107[71], it is concluded that further assessment of landscape and visual effects is required.

The proposed assessment will be proportionate, focusing on significant adverse effects. As the scoping study has concluded that significant landscape and visual effects are only expected within approximately 1 km of the proposed scheme, the proposed study area will reflect this. Effects on receptors that are not considered likely to be significant will be summarised concisely but will not be set out in detail.

It is proposed to base the assessment of landscape effects on the Tendring and Colchester LCAs within 1 km of the proposed scheme, as identified on Figure 7.3 in Appendix B. The effect on the constituent landscape features and elements of the LCAs, such as trees (including veteran, ancient and TPO trees), woods, hedgerows, hedgerow trees, landform, field patterns and heritage assets, will be considered as part of the effects on landscape character and not as individual receptors. In line with the NPPF, assessment of effects on ancient woodland, veteran trees and LWS in their own right, as well as effects on habitat connectivity, will be included in Chapter 6 – Biodiversity (including effects on ecologically important hedgerows), while assessment of effects on heritage assets in their own right will be set out in Chapter 5 - Cultural Heritage (including effects on historically important hedgerows).

It is proposed to base the assessment of visual effects on a selection of representative viewpoints, representing different visual receptor groups within the study area. These are presented in Table 7-3 and illustrated on Figure 7.4 in Appendix B, and, have been informed by the working draft ZTV and site visits.

Table 7-3 - Representative viewpoints

Representative Viewpoint	Justification
1	Representative of views towards proposed junction with A120 from residential properties along Bromley Road (including grade II listed buildings)
2	Representative of views towards proposed junction with A120 from PRoW and nearby residential properties along Bromley Road
3	Representative of views towards proposed junction with A120 from PRoW and nearby residents at Morants
4	Representative of views towards proposed junction with A120 from PRoW north of A120
5	Representative of views towards proposed junction with A120 from PRoW south of A120 and nearby residential properties, including Elmstead Hall (grade II* listed building)
6	Representative of views towards proposed junction with A120 from PRoW east of Allen's Farm
7	Representative of views towards proposed roundabout near Allen's Farm and road from PRoW north-west of Allen's Farm

Representative Viewpoint	Justification
8	Representative of views towards proposed road and roundabout near Allen's Farm from PRoW and nearby residential property at Whitehouse Farm
9	Representative of views towards proposed road from PRoW and nearby residential property at Allen's Farm (grade II listed buildings)
10	Representative of views towards proposed road from residential properties at Mount Pleasant
11	Representative of views towards proposed road from residential properties at Turnip Lodge Cottages and Turnip Lodge Protected Lane
12	Representative of views towards proposed road and roundabout with Wivenhoe Road from residential properties and business premises at Balls Farm
13	Representative of views towards proposed road from PRoW west of Elmstead Market
14	Representative of views towards proposed roundabout with A133 from Essex Cycle Network route and residential properties along Colchester Road
15	Representative of views towards proposed roundabout with A133 from PRoW south of A133

7.8.2 Proposed Assessment Methodology

LA 107 sets out the "requirements for assessing and reporting the landscape and visual effects of highway projects"[71]. The development of LA 107 has been influenced by GLVIA3[70], which is therefore also relevant to the proposed methodology. The methodology will also accord with requirements of LA 104 Environmental assessment and monitoring[93] (hereafter referred to as 'LA 104').

Baseline photography will be in accordance with the Landscape Institutes Visual Representation of Development Proposals Technical Guidance Note 06/19[94].

The landscape and visual baseline have been outlined within this chapter. This will be reviewed and expanded upon as required within the proposed assessment. The ZTV mapping on Figure 7.4 in Appendix B will be refined to inform the proposed assessment in accordance with LA 107[71], to take account of any potential refinements of the proposed scheme design. The value and sensitivity of landscape and visual receptors will be verified in accordance with Tables 7-1 and 7-2 respectively.

As defined in LA 107[71] and in accordance with GLVIA3[70], the magnitude of effects "combines judgements about size and scale of effect, extent of area it occurs over, whether reversible or irreversible and whether short or long term in duration". The assessment will take proposed mitigation into account. The criteria set out in Tables 3.24 and 3.43 of LA 107[71], will be used for determining the magnitude of landscape and visual effects respectively.

The assessment of magnitude of landscape and visual effects will consider impacts at the following timeframes, in accordance with LA 107[71]:

[93] Highways England, Transport for Scotland, Welsh Government and Department for Infrastructure (2019). LA 104 Environmental assessment and monitoring.
[94] Landscape Institute (2019). Visual Representation of Development Proposals Technical Guidance Note 06/19.

- Construction Phase: Considers construction activities, temporary works and construction traffic during the construction period. Assessments for each landscape and visual receptor during the construction period will be made at a time during construction when impacts are likely to be most significant for the individual receptor
- Operation Year 1: Considers impacts on a winter's day during year 1 following completion of all construction, when planted mitigation would not yet have taken effect. Both the completed project and the traffic using it would be considered
- Operation Year 15: Considers the impacts on a summer's day in the fifteenth year after opening, when planted mitigation would have taken effect. Both the completed project and the traffic using it would be considered

Day and night time changes for landscape and visual receptors will be considered against the baseline situation, that is the situation if the proposed scheme was not to proceed. However, it is not considered that assessment of effects on the night skies in their own right is required due to the surrounding landscape context. This is because there are no dark skies within the study area and, there are no international dark sky reserves or AONBs within the study area.
The significance of effects will be determined by combining judgements on the sensitivity of landscape and visual receptors, with the magnitude of landscape and visual effects. The descriptions of significance categories for the proposed assessment will be as set out in Table 3.7 of LA 104[93]. The matrix in Table 7-4, which is based on Table 3.8.1 of LA104[93], but includes minor amendments suggested in LA 107[71], will be used to assist professional judgement, when determining the significance of landscape and visual effects. An overall statement of landscape and visual significance will be included in accordance with LA 107[71].

Table 7-4 - Significance matrix (based on Table 3.8.1 of LA104 with minor amendments suggested in LA 107)

	Magnitude of effect (degree of change)					
		No change	Negligible	Minor	Moderate	Major
Landscape/Visual sensitivity (susceptibility and value)	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Cumulative landscape and visual effects would also be assessed in accordance with the above methodology.

7.8.3 Arboricultural Survey and Impact Assessment

An arboricultural impact assessment will be appended to the ES. This will be informed by an arboricultural survey, which will be carried out in accordance with the requirements of BS5837: 2012

Trees in Relation to Design, Demolitions and Construction – Recommendations, covering the RLB and a buffer of 15 m, and will include a tree constraints plan. The arboricultural survey and the arboricultural impact assessment will be used to inform the LVIA.

7.8.4 Possible variation to the proposed LVIA methodology due to COVID-19

Due to the effects of COVID-19 and the associated Government restrictions on travel and social distancing, it is recognised that it may not be possible to undertake fieldwork. The Landscape Institute currently recommend "avoiding site visits and fieldwork if alternative working methods can be undertaken. Members should also look to negotiate with clients to delay site visits if possible."[95]

This could have impact on the proposed LVIA. It may not be possible to collect representative viewpoint photography and undertake assessment in the field, for any viewpoints that have not already been visited. As a result, some viewpoint photography may not be fully compliant with the methodology and there would be no viewpoint photography available for some viewpoints. In this event, the visual impact assessment would be informed by use of desktop tools such as Google Street View and the Google Earth Viewshed tool, and two Chartered Landscape Architects would undertake such desktop visual impact assessment.

In the event that further fieldwork is not possible, worst case assumptions would be made and it is possible that effects may be stated as significant when they in reality may not be so.

Where COVID-19 travel restrictions are eased and the health risk reduced sufficiently, fieldwork may be undertaken to collect summer photography for the full set of representative viewpoints and professional judgement would be used to inform assessment based on winter conditions.

7.8.5 Assessment Assumptions and Limitations

Access to receptors and viewpoints to be assessed (if possible, under the COVID-19 restrictions) will be restricted to publicly accessible areas. Descriptions of baseline views and the assessment of changes to views from private and/or inaccessible viewpoints, including upper storey views from properties, will be made using the professional judgement of Chartered Landscape Architects based on an assessment from a nearby representative viewpoint e.g. adjoining PRoW or roadside pavement or verge.

Visual effects tend to diminish with distance. Where a receptor, such as the user of a PRoW, could view the proposed scheme from a range of distances, the assessment of visual effects likely to be experienced will generally be based on the worst-case situation. In most cases, subject to other factors such as the presence of screening elements, this is likely to be when the receptor is at the nearest point to the proposed scheme.

The visual assessment will be based upon visual receptors present at the time of assessment fieldwork, as well as those at proposed developments with detailed planning permission. Impacts on visual receptors subject to planning permission (such as development allocations in the local plan, including the proposed Tendring and Colchester Border Garden Community, or where only outline permission has been granted, will not been assessed. This is because such developments are not all guaranteed to be built, the layout and/or number of receptors are not firm, and they do not have existing views that would be affected.

It is recognised that future development, such as the proposed Garden Community, may lead to significant changes to the baseline environment and the development would likely screen views in some locations. However, as there is insufficient information regarding the proposed Garden Community development, it will not be considered in the baseline for the assessment.

[95] Landscape Institute (20 April 2020). LI COVID-19 Update for Members [Email].

Impacts on views from the proposed road will not be assessed in the landscape chapter, as there is no baseline view for comparison.

The screening or filtering effect of existing vegetation outside the proposed scheme boundary will be taken into account within the assessment in its current condition. Growth or other changes to this vegetation would potentially affect impacts caused by the proposed scheme, but the management and retention of such vegetation is outside the control of Essex Highways.

8 Geology and Soils

8.1 Introduction

This chapter sets out the scope of the proposed assessment of potential effects which may be realised during the construction and operational phases of the proposed scheme on the baseline geology and soil environment. The potential effects will be assessed by assigning the value (sensitivity) and the potential magnitude of impact (change) to the identified receptors. This chapter considers:

- Effects on bedrock geology and superficial deposits, including geological designations and sensitive/valuable non-designated features
- Effects on soil resources
- Effects from contamination on human health, surface water and groundwater

This chapter highlights potentially significant effects to the receptors and the methods to be applied to further assess them. Issues with potentially significant effects will be scoped into further stages of assessment in accordance with guidance document LA 109 Geology and Soils[96].

Ground conditions are based on site-specific data and information obtained from the British Geological Society (BGS), Enviro Insight and Geo Insight reports, dated May 2019, from Groundsure Ltd.

The data gathered on baseline ground conditions is sourced from the Jacobs 2019 Stage 2 Desktop Study[97] report. A scheme walkover was undertaken in June 2019 as part of the desktop study.

The next phases following on from the desk study will include:

- Ground Investigation (GI): an intrusive GI, including a period of environmental monitoring, will be designed and undertaken to assess existing ground conditions along the route of the proposed scheme. The GI will be dual purpose and will provide ground contamination data and geotechnical parameters
- Risk Assessment: the data gathered from the GI and monitoring will be analysed and the conceptual site model and preliminary risk assessment presented in the desk study will be updated. Potential risks to the environment and human health during the construction and operational phases of the scheme will be assessed and recommendations for further action provided. Recommendations will be incorporated into the project design

COVID-19 and the restrictions imposed by the UK government will delay the intrusive GI start date and follow-on fieldwork. As a result, this will also delay the interpretation of chemical data to undertake the risk assessment. See Section 8.9 for further details. If it is not possible to undertake any surveys, the Environmental Statement would be produced using the baseline information provided in this Environmental Scoping Report and will contain conservative assumptions and mitigation measures based on the assumption of the presence of contamination.

8.2 Study Area

For the purposes of the assessment, the study area is defined as the footprint of all the permanent and temporary works plus all immediately adjacent land (defined as a surrounding 'buffer') extending to 250m in all directions based on the proposed scheme design (see Chapter 2 The

[96] Highways England et al. (2019). LA 109 Geology and Soils, Design Manual for Roads and Bridges.
[97] Jacobs. (2019). A120/A133 Link Road Stage 2 Desktop Study B355363A Rev A.

Proposed Scheme). See Appendix B Figure 8.1 for the geoenvironmental constraints within the study area.

8.3 Baseline Conditions

8.3.1 Baseline Data Sources

The following sources of information have been used to obtain the baseline information discussed in this chapter:

- BGS. (2019). Geo Index Map. Retrieved from British Geological Survey: http://mapapps2.bgs.ac.uk/geoindex/home.html
- BGS Map Records. (2010). Geological Survey of Great Britain: Bedrock and Superficial Edition, Colchester and Brightlingsea - Sheet 224 and 242 (2010). Retrieved 2019, from British Geological Survey: Map Records: http://www.largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001849
- Geology of Britain Viewer. (accessed June 2019). British Geological Survey. Retrieved from http://mapapps.bgs.ac.uk/geologyofbritain/home.html
- Groundsure Ltd. (May 2019). Enviro Insight and Geo Insight Reports. Allen Farm.
- Jacobs. (2019). A120/A133 Link Road. Stage 2 Desktop Study B355363A Rev A[97].
- Natural England. (2019). Provisional ALC. Retrieved from Provisional Agricultural Land Classification (ALC): https://data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc
- Zetica Ltd. (2019). Unexploded Ordnance (UXO) Pre-Desk Study Risk Assessment[98]

8.3.2 Geology

The BGS Viewer (Geology of Britain Viewer, 2019) indicates that the superficial deposits comprise Coversands consisting of combinations of clay, silt and sand. The BGS lexicon describes the sand as periglacial aeolian deposits of fine to very fine-grained sand, usually horizontally bedded. The paper map version (BGS Map Records, 2010) instead uses the term Coverloam for this stratum and describes this as variable pebbly sandy clay, locally silty with a sandy upper part. The Coversands/Coverloam is underlain by the Kesgrave Catchment Subgroup, comprising bodies of cross-bedded and massive, moderately sorted sand and gravel. The underlying bedrock geology is the London Clay Formation (of the Thames Group) comprising poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay.

8.3.3 Soils and Agriculture

The system grading the quality of soil is set out within ALC for England and Wales[99], which defines six grades of soils:

- Grade 1 (excellent quality)
- Grade 2 (very good quality)
- Subgrade 3a (good quality)

[98] Zetica Ltd. (2019). Unexploded Ordnance (UXO) Pre-Desk Study Assessment.
[99] Natural England, (1988), Agricultural Land Classification of England and Wales, Revised Guidelines and Criteria for Grading the Quality of Agricultural Land.

- Subgrade 3b (moderate quality)
- Grade 4 (poor quality)
- Grade 5 (very poor quality)

Grades 1 to Subgrade 3a are determined as Best and Most Versatile (BMV) land. BMV agricultural land is the most flexible land in terms of the range of crops that can be grown, the level and consistency of yield and the cost of obtaining the yield and offers the best prospect for both food and non-food crop production.

Only limited post-1988 (detailed) ALC data is available for the study area. The only area which has been classified is located approximately 500 m south-east of the link road where Grades 2 to 3b (very good quality to moderate quality) have been mapped.

However, pre-1988 ALC data is available for the study area which provides provisional data at much reduced detail. This shows the proposed scheme predominantly crossing Grade 1 (excellent quality) agricultural land with some areas crossing Grade 2 (very good quality) to the south-east and north-west of the scheme.

8.3.4 Hydrogeology

The Coversands are classified by the Environment Agency as a Secondary B Aquifer. This designation describes predominantly lower permeability layers, which may store significant amounts of water due to localised fractures such as fissures, thin permeable horizons and weathering.

The Kesgrave Catchment Subgroup are classified as Secondary A Aquifers. These are permeable layers capable of supporting water supplies at a local rather than a strategic scale, and in some cases forming an important source of base flow to rivers. The Kesgrave Catchment Subgroup are anticipated to underlie the majority of the scheme area.

The London Clay Formation is classified as Unproductive Strata. These are layers with low permeability that have negligible significance for water supply or river base flow.

The Groundsure report identified 53 groundwater abstraction licence locations within 1 km of the study area. Details of active groundwater abstractions can be found in Chapter 11 - Road Drainage and the Water Environment.

The study area falls within a groundwater SPZ 3. This is likely to be associated with abstractions from the Chalk Principal aquifer to the north of the Scheme. Within the study area groundwater in the Chalk is protected from possible downward migration of contamination by the overlying low permeability London Clay Formation. SPZs are intended to protect public drinking water supply boreholes from pollution.

8.3.5 Hydrology

The main surface water body in the study area is the Sixpenny Brook, which has several tributaries, running through the study area. The southern part of the proposed scheme crosses one of the tributaries. Under the Water Framework Directive (WFD), taken from the Jacobs Stage 2 Desktop Study report[997], Sixpenny Brook has an ecological classification of 'bad' and a chemical classification of 'good'/'does not require assessment', the overall classification is 'bad'. The WFD status categories are high, good, moderate, poor and bad.

There are no surface water abstraction licences within 250 m of the proposed scheme.

There is a large lake associated with Allens Farm, that is reportedly a former sand and gravel extraction pit, located approximately 400 m east of the scheme.

8.3.6 Environmentally Sensitive Sites

There are no designated environmentally sensitive land uses in or within 250 m of the proposed scheme. However, although not designated, there is a wooded area called Strawberry Grove (woods) situated adjacent to the south-western slip road which connects to the A120. This may comprise Ancient Woodland (see Chapter 6 – Biodiversity)

8.3.7 Waste Management and Landfill Sites

Colchester Transfer Station (Veolia Environmental Services) is situated in the north-western corner of the scheme. It has an 'active' discharge consent for the 'release of sewage and trade combined effluent' into groundwater. The WTS is a licenced waste site and comprises a building for the transfer/bulking of municipal waste, along with a number of facilities for maintaining waste collection vehicles. This includes an electricity substation, a package sewage treatment system, and a weighbridge. The licence for waste transfer allows for commercial and industrial waste, with one licence including asbestos containing waste.

There are no current or historical landfills located within 250 m of the proposed scheme.

8.3.8 Study Area History

From the earliest available historical maps (1875), the proposed scheme and the immediate surrounding area have predominantly comprised agricultural land and a small number of farms plus limited residential and small-scale road infrastructure. On the 1982 map the A120 and associated cuttings and embankments are present at the northern end of the study area. The 2002 map indicates the location of current WTS and fuelling station. Also, on the 2002 map a large sand and gravel pit associated with Allens Farm is present. On current aerial imagery this is shown as a deep-water lake.

8.3.9 Current Land Uses

Most of the current land use within the proposed scheme is arable agricultural land. There are small residential areas throughout the study area, however, these tend to be in the form of a few clustered houses and farms. Allens Farm is situated adjacent to the scheme to the east and is linked to the scheme via a connecting road from a roundabout. A petrol station and a WTS are located in the north-west corner of the site. Strawberry Grove (woods) is also situated adjacent to the proposed south-western slip road connecting to the A120.

8.3.10 Potentially Contaminative Land Uses

The WTS, petrol station and associated fuel delivery infrastructure are the principal land uses of concern in relation to potential contamination.

Other areas/land uses of potential concern are:

- The existing road alignments which the proposed scheme will tie into plus the A120 embankments
- Allens Farm – farm buildings, vehicle repair works, metal welding works, electrical substation and areas of made ground
- Active Farm - Blossomwood Farm (adjacent to the south)

8.3.11 Other Environmental Data

A Zetica UXO Pre-Desk Study Assessment[98] (contained within the 2019 Jacobs desk study[97]) was obtained for the proposed scheme.

The survey concluded that no available records have been found to indicate that the immediate site area was directly affected by WWII bombing. However, a Heavy Anti-Aircraft (HAA) battery was located on Crockleford Heath, on the site. HAA batteries typically had associated accommodation facilities and ammunition stores located nearby (and potentially disposal) which may represent a source of potential UXO hazard. In addition, there were several strategic targets located within the vicinity of the site, including a World War II bombing decoy 2 km east of the site, military camps and barracks, transport infrastructure, Royal Air Force airfields and radar stations and Anti-Aircraft anti-invasion defences within 5 km of the site.

Therefore, it is recommended that a detailed desk study is undertaken prior to the commencement of works, including ahead of intrusive GI.

8.4 Legislation and Policy

The assessment of the potential effects on geology and soil characteristics, including land quality, of the proposed scheme will consider the following legislation and planning policies:

- Part IIA of the Environmental Protection Act 1990[100]
- Environmental Permitting (England and Wales) Regulations 2016[101]
- Wildlife and Countryside Act 1981, as amended[102]
- NPPF[103]
- National Policy Statement (NPS National Networks (Department for Transport, 2014)[104]
- WFD (Council Directive 2000/60/EC); implemented in England by The Water Environment (WFD) (England and Wales) Regulations 2017[105]
- Land Contamination and Planning: Advice Note, Colchester Council (2013)[106]
- Statutory Contaminated Land Strategy, Tendring District Council (2005)[107]
- Land Affected By Contamination (Technical Guidance for Applicants and Developers), Essex Contaminated Land Consortium (3rd Edition, 2014)[108]

8.5 Value of Environmental Receptors

The value (sensitivity) assigned to the receptors below is set out in accordance with the criteria provided in Table 3.11 of guidance document LA 109 Geology and Soils[96].

8.5.1 Geologically Important Sites

There are no geologically important sites within 250 m of the proposed scheme.

[100] Department for Environmental Food and Rural Affairs (2012). Environmental Protection Act 1990: Part 2A.
[101] Department for Environmental Food and Rural Affairs (2016). Environmental Permitting regulations.
[102] European Commission (1981) Wildlife and Countryside Act.
[103] Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework (NPPF).
[104] Department for Transport (2014) National Policy Statement.
[105] European Commission (2017) Water Framework Directive (England and Wales) Regulations.
[106] Colchester Council (2013). Land Contamination and Planning: Advice Note
[107] Tendering District Council (2005). Statutory Contaminated Land Strategy.
[108] Essex Contaminated Land Consortium (2014). Land Affected by Contamination: Technical Guidance for Applicants and Developers, 3rd Edition.

8.5.2 Soil Resources

Available information suggests that the proposed scheme predominantly crosses Grade 1 agricultural land with sections crossing Grade 2 in the north-west and south-east. As Grade 1 soils are indicated to be more widespread, the value for this receptor has been assigned as 'very high'.

8.5.3 Human Health

There is limited residential development in proximity to the proposed scheme. There are small scale residential areas throughout the study area however this tends to be in the form of a few clustered houses and farms. Residential properties have a 'very high' sensitivity; however, they are located over 100 m from the proposed scheme.

The proposed scheme passes through a proposed Garden Community development. This would be designated a 'very high' sensitivity. An updated risk assessment may be needed once the position of the proposed Garden Community is confirmed.

The proposed scheme passes through a WTS and a fuel station. A connecting road from a roundabout joins the scheme to Allens Farm. All the locations mentioned are active commercial sites. These are considered to be of 'medium' sensitivity.

Construction workers and ground workers during the operational phase will have 'high' sensitivity due to likely contact with soils. During the operational phase future site user of the network are likely to have 'low' sensitivity as no or very limited contact with soils is expected due to the presence of hardstanding and removal of potential contamination during construction.

There is no GI soil chemical data for the proposed scheme so the potential hazard from chemical contaminants in soils is currently unknown.

8.5.4 Groundwater/Surface Water

8.5.4.1 Groundwater

The superficial deposits, consisting of the Coversands and Kesgrave Catchment Subgroup, are considered to be of 'medium' value. Shallow groundwater could be adversely impacted by construction activities and earthworks.

The bedrock formation of the London Clay Formation is considered to be of 'low' value.

These sensitivities are based upon the aquifer designations and other information which has been presented in Section 8.3.4.

8.5.4.2 Surface Water

The main surface water body in the study area of the scheme is the Sixpenny Brook, which has several tributaries, running through the scheme. This surface watercourse is considered to be of 'medium' value.

Further consideration of risks to Controlled Water receptors are considered in Chapter 11, Section 11.7.

8.5.5 Summary of Environmental Value

The value of environmental receptors has been summarised in below.

Table 8-1 - Receptor assessment summary

Receptor		Receptor Value (Sensitivity)
Geologically Important Sites		Not Applicable
Soil Resources		Very High
Human Health (Current Land Users)	Residential	Very High
	Commercial	Medium
Human Health (Future Site Users)	Residential (Garden Community)	Very High
	Construction workers	High
	Network users	Low
Groundwater	Secondary A & B Aquifers	Medium
	Unproductive Strata	Low
Surface Water		Medium

8.6 Potential Impacts

8.6.1 Construction Phase

8.6.1.1 Geologically Important Sites

There are no geologically important sites within close proximity to the proposed scheme so there will be no impact or change.

8.6.1.2 Soil Resources

The majority of the proposed scheme passes through arable farmland with Grade 1 and Grade 2 soils. These soils are likely to pose a constraint to development as it will not be possible to avoid disturbing them during the construction phase. This is likely to have a 'moderate' impact or change.

Impacts may include temporary loss of access to soils from temporary land-take areas, such as those for site compounds, and damage to soils during the construction stage including physical damage and contamination such as from spillages and fuel leaks.

8.6.1.3 Human Health

Made ground/infill materials and natural soils may be potentially contaminated by activities from the WTS, Allens Farm, and the petrol station and associated fuel delivery infrastructure. Disturbance of potentially contaminated soils may cause mobilisation of contaminants along new or existing surface or sub-surface pollution pathways. These could create new pathways to construction workers and residents around the proposed scheme.

There is also the potential for ground gases to migrate through sub-surface pathways or be released from excavated areas, which may impact human health or impact infrastructure by presenting an explosive/asphyxiant risk in confined spaces. However, the preliminary risk assessment in the desk study concluded there may be a 'moderate' to 'moderate/low' risk to construction workers and a 'low' risk to nearby residents and site users.

No GI soil chemical data was available at the time of writing this report, however the impact on human health is considered likely to be 'minor' based on information available from the desk study.

There is a short-term risk to the health of construction workers exposed to potentially harmful contaminants close to the existing WTS and petrol station and Allens farm.

Risks during construction are typically dealt by applying mitigation/good working practice set out in a construction environmental management and/or health and safety plan (or similar). Assuming appropriate good working practices are undertaken during construction, the predicted significance of effects is likely to be 'negligible'.

8.6.1.4 Groundwater/Surface Water

Disturbance of potentially contaminated soils may cause mobilisation of contaminants along new or existing surface or sub-surface pollution pathways. This may lead to the chemical quality of surface waters and groundwater being impacted through runoff, infiltration and sub-surface migration. Additionally, construction activities have the potential to impact controlled waters from, for example, releases of silt, concrete, oils and fuels. This is likely to have a 'minor adverse' impact or change on both groundwater and surface water.

There are a number of surface water features both on, and in close proximity to, the proposed scheme which could be at an increased risk of contamination from stockpile runoff or infilled material. This will appropriately be managed during the design and construction phases, see Section 8.7 below.

Further considerations of risks to Controlled Waters are considered in Chapter 11, Section 11.7.

Risks during construction are typically dealt by applying mitigation set out in a Construction Environmental Management Plan (CEMP). Assuming appropriate good working practices are undertaken during construction, the predicted significance of effects is likely to be 'negligible'.

8.6.2 Operational Phase

8.6.2.1 Geologically Important Sites

There are no geologically important sites within close proximity of the proposed scheme so there will be 'no impact' or change.

8.6.2.2 Soil Resources

It is unlikely that the loss of agricultural soils resulting from the construction of the proposed scheme could be fully mitigated within the proposed scheme boundary and there will likely be some residual effects on soils.

Soil quality may be degraded or there may be a permanent loss of soils in some areas during the operational phase, although there would be opportunity to use site-won soils for site restoration works. This is likely to have a 'minor' impact or change.

During operation of the road there would likely be low loading of petroleum hydrocarbons, metals and suspended solids from the new road surfaces. Furthermore, there would be potential for spillages of minor volumes of hydrocarbons. This is likely to have a 'minor' impact.

8.6.2.3 Human Health

It is understood that on completion of the construction phase, the proposed scheme would comprise mainly hardstanding. Operational maintenance staff involved in below ground works would be new receptors. Previous contamination within the proposed scheme area would have been removed during construction, reducing the potential for contact with contaminated soil. Furthermore, implementing appropriate task risk assessments and method statements will reduce exposure. This is likely to have a 'negligible' impact or change.

8.6.2.4 Groundwater/Surface Water

During operation of the road, there is the potential for pollution incidents as a result of fuel or chemical leaks or spills, and any contamination from such events has the potential to pose a risk to environmental receptors. This is likely to have a 'negligible' impact on both surface water and groundwater.

Further considerations of risks to Controlled Water receptors are considered in Chapter 11, Section 11.7.

8.6.3 Summary of Magnitude of Impact

The expected magnitude of impact on environmental receptors has been summarised below in line with Table 3.12 of LA 109[96] and Table 3.71 of LA 113[109].

Some impacts mentioned in Sections 8.6.1 and 8.6.2 above can be scoped out of further assessment due to the limited impact anticipated during the scheme construction and operation. These have been highlighted in grey in Table 8-2 below.

Risks during construction are typically dealt by applying mitigation/good working practice set out in a CEMP and/or health and safety plan (or similar). Assuming appropriate good working practices are undertaken during construction, the predicted significance of effects is likely to be 'minor' and 'negligible' for all receptors with the exception of soil resources.

Table 8-2 - Magnitude of impact

Receptor		Magnitude of Impact (change)			
		Baseline Scenario	Construction Phase	Construction Phase with Good Practice	Operational Phase
Geologically Important Sites		No Change	No Change	No Change	No Change
Soil Resources		No Change	Moderate	Minor	Minor
Human Health		No Change	Minor	Negligible	Negligible
Groundwater	Secondary A & B Aquifers	No Change	Minor Adverse*	Negligible*	Negligible*
	Unproductive Strata	No Change	No Change*	No Change*	No Change*
Surface Water		No Change	Minor Adverse*	Negligible*	Negligible*
*These relate to the affect contamination may have on groundwater/surface water. Please refer to Chapter 11 - Road Drainage and the Water Environment for further detail on magnitude of impact on groundwater/surface water from other aspects.					

[109] Highways England (2019) DMRB LA 113 – Road Drainage and the Water Environment.

8.7 Design, Mitigation and Enhancement Measures

8.7.1 Design and mitigation measures

The following mitigation measures will be put in place for the receptors that have been identified as being potentially impacted by the proposed scheme or sources which could potentially impact the scheme.

Mitigation measures will include both embedded mitigation and additional mitigation measures.

Embedded mitigation will include design measures which may include the use of:

- Construction Environmental Management Plan (CEMP) which is to include a pollution control and contingency plan
- Code of Construction Practice
- Materials Management Plan (MMP) for reuse of materials under the CL:AIRE Code of Practice[110]
- Soil Management Plan, following guidance within Ministry of Agriculture, Fisheries and Food Good Practice Guide for Handling Soils[111] and Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[112]
- GI
- Local Contamination Risk Assessments

Additional mitigation measures may also be developed to address specific identified impacts. At this stage, the requirement for specific mitigation measures in respect of soils and geology cannot be meaningfully identified, particularly in relation to impacts from ground contamination. Measures could include, for example, remedial treatment (in-situ and/or ex-situ) and working methods incorporated to mitigate against gas build up in voids.

8.7.2 Enhancement Principles

The waste hierarchy principle will be used at every stage of the project, as appropriate and proportionate, to identify enhancement opportunities in respect to the reuse of soils and materials on site.

It is anticipated that in order to promote sustainable reuse of soil and other geological arisings within the proposed scheme, a Site Waste Management Plan (SWMP) and an MMP would be prepared, which would detail the proposed use of the arisings. It is anticipated that this would follow the protocols within the CL:AIRE Definition of Waste guidance[110]109 to ensure that excavated materials are reused appropriately and sustainably. Consultation with the Environment Agency would be undertaken to prepare a Position Statement regarding the suitability of reuse of material to ensure that an understanding is secured prior to works commencing.

8.8 Description of Likely Significant Effects

At this stage, it is not practicable to meaningfully describe the likely nature of any significant or residual effects in respect to geology and soils, particularly in relation to impacts from ground

[110] CL:AIRE (2011) The Definition of Waste: Development Industry Code of Practice.
[111] Ministry of Agriculture, Fisheries and Food (2000). Good Practice Guide for Handling Soils.
[112] Department for Environment, Food and Rural Affairs (2009), Construction Code or Practice for the Sustainable Use of Soils on Construction Sites.

contamination. However, it is anticipated that, with mitigation measures of the type discussed above, the residual effects are unlikely to be significant.

It is unlikely that the loss of agricultural soils resulting from the construction of the proposed scheme could be fully mitigated within the proposed scheme boundaries and there will likely be some residual effects on soils.

8.9 Proposed Assessment Methodology

COVID-19 and the restrictions imposed by the UK government will delay the intrusive ground investigate start date and follow-on fieldwork. As a result, without soil and groundwater chemical data, the potential impacts to identified receptors from land contamination cannot be fully assessed. If this is realised, the ES would be produced using the baseline information provided in this Scoping Report and will contain conservative assumptions and mitigation measures based on the assumption of the presence of contamination. It may be necessary to include further investigation and assessment as a planning condition. The LPA would be consulted to agree on this approach. The Government restrictions associated with COVID-19 will be continually reviewed and surveys undertaken when/if possible and safe to do so.

The assessment of the potential effects on geology and soil characteristics, including land quality, of the proposed scheme will consider the following legislation and planning policies:

- DMRB LA 103 – Scoping Projects for Environmental Assessment (Highways England, 2019)[113]
- DMRB LA 104 – Environmental Assessment and Monitoring (Highways England, 2019)[114]
- DMRB LA 109 – Geology and Soils (Highways England, 2019)[96]
- DMRB LA 113 – Road drainage and the Water Environment (Highways England, 2019)[109]

A significance matrix – as presented as Table 3.8.1 of LA 104[114] will be used to evaluate the significance of effect based upon the value of each receptor and the magnitude of impact.

A desk study has been completed for the proposed scheme and it is proposed that information gained from an intrusive site investigation and period of environmental monitoring (depending on Government restrictions associated with COVID-19) will be used in the assessment for soils and geology. Data will be gathered on the chemical quality of soil and groundwater which will be used to provide detail for further stages of assessment.

A land contamination risk assessment would be undertaken in accordance with the Contaminated Land Report 11 (CLR11)[115]. CLR11 sets out the procedure for the investigation and assessment of potentially contaminated land. It should be noted that this guidance will be updated in 2020; the updated online guidance is entitled Land Contamination Risk Management[116]. The overall investigation and assessment procedures in the updated guidance with effectively remain the same.

Environmental impacts on geology and soils will be expressed in terms of the significance of effect, both positive and negative. Impacts are defined as the changes resulting from an action and effects are defined as the consequences of impacts. The significance of the effect of an impact is derived through consideration of the baseline sensitivity of a receptor (sometimes referred to as its value) and the magnitude of the potential impact.

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[113] Highways England (2019) DMRB LA 103 – Scoping Projects for Environmental Assessment.
[114] Highways England (2019) DMRB LA 104 – Environmental Assessment and Monitoring.
[115] Contaminated Land Report 11 (CLR11) (2001) Model Procedures for the Management of Contaminated Land 2004 (Environment Agency and Defra, 2004).
[116] Land Contamination Risk Management https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks

The revised DMRB guidance for geology and soils, will be used in the assessment. This will include an amended Table 3.11 (significance/environmental value) and Table 3.12 (magnitude of impact) and will be produced based on the contaminated land assessment in line with CLR11[115]. The approach to deriving impact significance from receptor value and magnitude of effects shall be in accordance with LA 104[114] Environmental assessment and monitoring.

8.9.1 Assessment Assumptions and Limitations

The methodology above makes the following assumptions:

- The assessment will largely be dependent of the quality of information obtained from third party sources

The following limitations have been encountered:

- Only partial information was available for the ALC, a soil survey may be needed to clarify the potential loss of agricultural farmland. However, the requirement for, and extent of, any survey should be confirmed with the LPA as part of the scoping opinion
- There is no GI data for the proposed scheme so potential impacts to current land users, groundwater and surface water cannot be fully assessed at this stage

9 Material Assets and Waste

9.1 Introduction

This chapter presents the Material Assets and Waste environmental scoping assessment undertaken for the proposed scheme. It assembles baseline data and design information that is readily available to indicate the likely significant environmental effects of constructing the proposed scheme. Operational impacts and effects have been scoped out of this assessment for reasons identified in Section 9.5.2.

The chapter includes a scoping level assessment of the potential environmental effects related to the use and consumption of material assets and the production and management of waste that can reasonably be anticipated as a result of the construction of the proposed scheme. It also identifies initial mitigation measures and environmental enhancements with a view to 'designing out' any adverse effects where possible.

The outcomes of the scoping assessment will be used to reach a reasoned conclusion on the likely significant effects of constructing the proposed scheme on the environment, and provide justification, supported by evidence, for scoping the material assets and waste EIA environmental factor area (or either of its elements) in or out of further EIA; specify the methodology to be used, and any data collection and survey requirements for those elements scoped in.

9.2 Baseline Conditions

9.2.1 Study Area

This scoping assessment has been prepared with reference to the Highways England (2019) 'LA 110 Material Assets and Waste'[117] Environmental Assessment standard which is the published standard for assessing the impacts associated with this environmental factor, and which replaces IAN 153/11[118] in England.
The scoping assessment for Material Assets and Waste considers the following elements:

- The consumption of 'material assets' [Article 3.1 (d) of the EIA directive[119]] – this includes materials and products from primary, secondary, recycled and renewable sources
- The production and management of 'waste' [Annex IV of the EIA Directive] – this includes surplus materials which can become waste during the construction of the proposed scheme, as well as other substances which the holder discards or intends or is required to discard

In accordance with LA 110, the assessment of material assets and waste has utilised two geographically different study areas to examine the use of primary, secondary and recycled construction materials; and the generation and management of waste:

[117] Highways England et al. (2019). LA 110 Material assets and waste, Design Manual for Roads and Bridges.
[118] Highways Agency (2011). Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resources [http://bailey.persona-pi.com/Public-Inquiries/A465-English/13%20-%20Materials/13.2.2%20-%20IAN%20153-11.pdf].
[119] The European Parliament (2011) Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011L0092].

1. The first study area – based on the construction footprint/boundary of the proposed scheme (as denoted by Appendix B Figure 3.1). Within these areas, construction materials will be consumed, and waste will be generated
2. The second study area – based on the likely provenance of construction materials required to construct the main elements of the proposed scheme, and waste infrastructure that is likely to be suitable to accept arisings and/or waste generated by the proposed scheme. These include:
    a. The East of England Regional Aggregates Working Party area which is likely to be the primary source of primary, secondary and recycled aggregates used to construct the proposed scheme
    b. The Former East of England Planning Region which is likely to be where the waste management infrastructure used to manage the majority of waste generated by the proposed scheme is located

Professional judgement (a balance of the proximity principle and value for money principle) has been applied in deriving the second study area.

9.2.2 Information Sources

A desk-based assessment has been undertaken in order to establish the current and likely future conditions for material assets and waste in the absence of the proposed scheme. Baseline data has been collected from numerous sources at national, regional and sub-regional levels, including: the availability of primary, secondary and recycled aggregate materials; the presence of mineral safeguarding sites and/or peat resources; the construction, demolition and excavation of waste arisings, as well as information on regional waste management capacity, including remaining landfill void space and annual throughputs of waste transfer, waste treatment, metal recycling and waste incineration facilities.

9.2.3 Baseline

9.2.3.1 Material Assets

For the purposes of this assessment, material assets are considered to be the physical resources in the environment required for the construction of the proposed scheme, which may be of human or natural origin.

Primary aggregates have been chosen to act as a proxy indicator of both material assets and natural resources given that large quantities of aggregates are typically required for road projects.

Regional and Sub-regional Primary Aggregates

The principal materials used in road construction are primary aggregates, including sand, gravel and crushed rock. Primary aggregates are aggregates produced from naturally occurring mineral deposits and used for the first time, as defined by the BGS (2019) 'Mineral Planning Factsheet Construction Aggregates'[120].

The materials required for the construction of the proposed scheme would include aggregates (e.g. soil, clay, sand, gravel and crushed rock) and aggregate-containing products (e.g. asphalt and concrete). Many of these materials would originate off site, purchased as primary construction products, and it is likely that some would arise onsite such as excavated soils, crushed concrete or

[120] British Geological Survey (2019). Mineral Planning Factsheet Construction Aggregates [https://www.bgs.ac.uk/downloads/start.cfm?id=1355].

recycled road planings, or recycled materials brought in from off site, possibly from other projects or industries.

The NPPF requires Mineral Planning Authorities to maintain a minimum landbank of ten years for crushed rock and a minimum landbank of seven years for sand and gravel. This is used to determine whether there is a shortage or surplus of supply in a given minerals planning area. The East of England Aggregate Working Party (EEAWP) Annual Monitoring Report 2018 Data[121] provides sales and reserves data from January to December 2018. This data is summarised in Table -1.

Table 9-1 - Land-won aggregate sales, reserves and landbanks in the east of England, 2016

Mineral	Sales 2018 (Mt)	Reserves 2018 (Mt)	Landbank based on ten-year average
Sand and gravel	12.37	121.1	11.4 years
Crushed rock	0.22	4.3	12.1 years

From Table 9-1 the East of England demonstrates landbanks in excess of the required thresholds as at the end of 2018. The Essex County Council (2019) 'Greater Essex Local Aggregate Assessment 2019 (Covering the Calendar Year 2018)'[122] also assessed the balance between the demand for and supply of aggregates, at the sub-regional level. The report concludes that:

- Greater Essex had permitted reserves of 29.98 Mt sand and gravel as of 31 December 2018. The apportionment landbank stood at 6.74 years at the end of 2018, whilst the ten-year sales average landbank results in 9.30 years
- Greater Essex is served by the Thames and East Coast dredging regions. The combined reserve within these dredging regions is 11.5 Mtpa, which is expected to be sufficient to provide for the Thames region for 34 years and the East of England region for 15 years

Regional and Sub-regional Secondary and Recycled Aggregates

Secondary aggregates are typically by-products of industrial and other processes. These can be subdivided into manufactured and natural aggregates, depending on their source and can include materials such as pulverised fuel ash, ground granulated blast furnace slag, furnace bottom ash, incinerator bottom ash, recycled glass etc. Whereas recycled aggregates are typically derived from reprocessing materials previously used in construction, such as road planings, railway ballast, crushed concrete or masonry from construction and demolition (C&D) activities. Both secondary and recycled aggregates offer appropriate engineering specifications to allow them to replace primary aggregates.

The EEAWP Annual Monitoring Report 2018[121] confirms that data on secondary and recycled aggregate production and use in the East of England is variable and incomplete. Notwithstanding, reference to the Environment Agency's (2019) 'Waste Data Interrogator'[123] confirms 13.8 Mt of inert

[121] East of England Aggregates Working Party (2019). Annual Monitoring Report 2018 Data [https://www.centralbedfordshire.gov.uk/downloads/file/55/2018_annual_monitoring_report_east_of_england_aggregates_working_party].
[122] Essex County Council (2019). Greater Essex Local Aggregates Assessment 2019 (Covering the Calendar Year 2018) [https://assets.ctfassets.net/knkzaf64jx5x/3sJ71RK5Oq15wPpfIcBJgk/f97edc796864f3627cb0513203246709/GE_LAA_2019_FINAL.pdf]. Greater Essex includes Essex, Thurrock & Southend-on-Sea.
[123] Environment Agency (2019). Waste Data Interrogator [https://data.gov.uk/dataset/312ace0a-ff0a-4f6f-a7ea-f757164cc488/waste-data-interrogator-2018].

C&D waste was received at waste management facilities in the East of England in 2018. This figure includes both wastes generated within the region and wastes imported from outside the region.

Approximately 6.1 Mt of this was received at waste management facilities in Essex. Defra (2019) 'Statistical data set ENV23 - UK statistics on waste'[124] reports that approximately 92% of 'Mineral Waste from C&D' activities are currently subject to waste recovery in England. These data would therefore indicate there is likely to be a good supply of recycled aggregates available within the study area. No data is available for secondary aggregates.

The Greater Essex Local Aggregates Assessment[122] reports that there were 37 operational aggregate recycling facilities in Greater Essex in March 2019 with a combined operational capacity of 3.2 Mtpa. Some of these sites are transient in nature, so there will be a reduction in recycling capacity as temporary permissions expire unless further permissions are granted.

Mineral Safeguarding Sites

The NPPF requires that LPAs define Mineral Safeguarding Areas (MSAs) and adopt appropriate policies in order that known locations of specific minerals resources are not needlessly sterilised by non-mineral development and define Mineral Consultation Areas (MCAs) based on these MSAs.

The Essex County Council 'Minerals Local Plan 2014'[125] confirms that MSAs are designated in Essex for mineral deposits of sand and gravel, silica sand, chalk, brickearth and brick clay considered to be of national and local importance, as defined on the Policies Map. Whereas, MCAs are designated within and up to an area of 250 m from each safeguarded permitted minerals development and proposed and reserve site allocation as shown on the Policies Map.

Reference to the Essex County Council 'Minerals Policies Map'[126] confirms that the proposed scheme is located entirely within an MSA for sand and gravel. The 'Policies Map 1 West Tendring'[127] and 'Polices Map Key'[128] of Tendring District Council Tendring District Local Plan 2013 - 2033 and Beyond Publication Draft also identifies an additional small 'Safeguarding Area for Sand and Gravel' within the study area. This area is located to the east of the proposed scheme extents at Allens Farm and is consistent with the spatial location and broad extent of a previously worked sand and gravel pit which is now a flooded reservoir. However, given its distance from the proposed scheme extents (>250 m), this area is unlikely to be sterilised by the proposed works.

The Essex Minerals Policy Map[126] also confirms that that those elements of the proposed scheme located north-west of the proposed A120 roundabout gyratory are located inside a MCA for 'Existing Sites (Extraction)' and 'Preferred Mineral Sites (Extraction)' associated with the existing 'Martells Quarry site' and preferred 'Site B1 Slough Farm'. The quarry is also designated as an 'Allocated Mineral Extract Site' in the West Tendring Polices Map.

Martell's Quarry accommodates a number of operations related to the extraction, processing and sale of silica sand as well as the sale and onward distribution of recycled aggregates. If approved,

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[124] Department for Environment, Food and Rural Affairs (Defra) (2019). Statistical data set ENV23 - UK statistics on waste [https://www.gov.uk/government/statistical-data-sets/env23-uk-waste-data-and-management].
[125] Essex County Council (2014). Minerals Local Plan [https://www.essex.gov.uk/minerals-waste-planning-policy/minerals-local-plan].
[126] Essex County Council (n.d.). Minerals Local Plan Minerals Policies Map [https://images.ctfassets.net/knkzaf64jx5x/3kRWyM7PIyxdi1ccSCRb3Z/8b8c8d6e33e65d4673e5bdf376b185aa/policies-map.jpg].
[127] Tendring District Local Plan 2013 - 2033 and Beyond Publication Draft Policies Map 1 West Tendring [https://www.tendringdc.gov.uk/sites/default/files/documents/planning/Planning_Policy/SDTDC_009%20Policies%20Map%201%20West%20Tendring.pdf].
[128] Tendring District Local Plan 2013 - 2033 and Beyond Publication Draft Policies Map Key [https://www.tendringdc.gov.uk/sites/default/files/documents/planning/Planning_Policy/SDTDC_012%20Policies%20Map%20Key.pdf].

Slough Farm would be a 10 year 11.66 ha extension to the existing Martells Quarry for the proposed extraction of 0.86 Mt of mineral resources (maximum annual output of 45,000 tpa), of which 54 % is silica sand (0.46 Mt) and 46 % is sand and gravel (0.39 Mt). This site would make use of the existing access onto Slough Lane and access to the road network would be by way of continued use of the private track access to the A120, via the lorry park.

Peat Resources

Reference to the Minerals Local Plan confirms that there are no sites recorded for peat extraction within the study area, and the BGS 'Minerals Information Online Tool'[129] confirms that there are no superficial peat deposits within 250 m of the proposed scheme extents.

9.2.3.2 Waste Management

Construction and Demolition Waste Generation

The majority of waste generated by the construction of the proposed scheme would be C&D waste.

Defra (2019) 'Statistical data set ENV23 - UK statistics on waste'[124] provides an update on the generation and management of UK waste, including the contributions made by various sectors. This confirms that the construction sector generated a total of 120.3 Mt of C&D waste in 2016, and that 92% of waste was recovered.

As stated above approximately 13.8 Mt of inert C&D waste was received at waste management facilities in the East of England in 2018. Approximately 6.1 Mt of this waste was received at waste management facilities in Essex.

Baseline Waste Treatment, Recycling and Recovery Capacity

The availability of waste management infrastructure, to accept waste likely to be generated during construction, has been considered through a review of the Environment Agency (2019) 'Waste Management in East of England: Data Tables 2018'[130].

Whilst annual capacity data is published by the Environment Agency for both landfill and incineration facilities at the national, regional and sub-regional level, no annual capacity data is published by the Environment Agency for waste transfer, treatment or metal recycling sites. Only annual permitted throughput is published for these facilities.

The total annual permitted throughput or capacity reported by Environment Agency (2019)[130] for the East of England and Essex respectively are detailed in Table 9-2 below.

Table 9-2 - Total permitted throughput or capacity of waste management sites in the study area, 2018

Site type	East of England region (000s tonnes)	Essex sub-region (000s tonnes)
Transfer (annual throughput)		
Hazardous waste transfer stations (WTSs)	1,049	316
Household, industrial, commercial WTSs	2,990	926
Non-biodegradable WTSs	498	452
Treatment and metal recycling (annual throughput)		

[129]British Geological Survey (n.d.). Minerals Information Online [https://www.bgs.ac.uk/mineralsuk/maps/maps.html].

[130] Environment Agency (2019). Waste Management in the East of England: Data Tables [https://data.gov.uk/dataset/312ace0a-ff0a-4f6f-a7ea-f757164cc488/waste-data-interrogator-2018].

Site type	East of England region (000s tonnes)	Essex sub-region (000s tonnes)
Material recovery	1,302	657
Physical treatment	4,396	1,187
Physico-chemical treatment	964	149
Chemical treatment	1,078	-
Composting	906	114
Biological treatment	2,175	783
Metal recycling	2,272	1,417
Incineration (annual capacity)		
Co-incineration of hazardous waste	-	-
Co-incineration of non-hazardous waste	-	-
Hazardous waste incineration	-	-
Municipal and/or industrial & commercial incineration	269	-
Biomass/waste wood incineration	770	490
Total	**18,669**	**6,491**

It can be assumed that, based on the above, there will be opportunities for waste arisings during the construction of the proposed scheme to be recycled or recovered as appropriate, if they cannot be reused on-site.

The Essex County Council 'Minerals and Waste Development Framework Authority Monitoring Report 2016 to 2017'[131] reports that as, of 31 March 2017, there were 329 waste management facilities (including waste transfer facilities) in Greater Essex and confirms that there was a significant amount of waste management capacity within the plan area at the time of publication.

In addition to the capacity available to the plan area as a whole, the Authority Monitoring Report 2016 to 2017[131] confirms that there is a good spatial distribution of waste management facilities in Greater Essex, with the majority of the facilities correlating with the urban areas, where the majority of waste is produced.

The 'Authority Monitoring Report 2017 to 2018'[132] confirms there were an additional 17 applications granted in Greater Essex during this monitoring period for: transfer facilities, inert waste recovery facilities, materials/energy recovery facilities and disposal (landfill) facilities.

Baseline Inert, Non-hazardous and Hazardous Landfill Capacity

For wastes which cannot be reused, recycled or otherwise recovered, disposal to landfill would be required. Environment Agency (2019) details total remaining landfill capacity in the East of England and Essex in 2018 and is presented in Table 9-3.

[131] Essex County Council (2017). Minerals and Waste Development Framework Authority Monitoring Report 2016 to 2017 [https://www.essex.gov.uk/minerals-waste-planning-policy/authority-monitoring-report].
[132] Essex County Council (2018). Minerals and Waste Development Framework Authority Monitoring Report 2017 to 2018 [https://assets.ctfassets.net/knkzaf64jx5x/238RLlgKDGTr8EwwQvB1n5/b2a1c96fc85aff4af3e96461bde1822a/Authority_Monitoring_Report_2017-18.pdf].

Table 9-3 - Total landfill capacity available in the study area, 2018

Site Type	East of England region (000s cubic metres)	Essex sub-region (000s cubic metres)
Hazardous merchant landfill	-	-
Hazardous restricted landfill	-	-
Non-hazardous landfill with stable non-reactive hazardous wastes cell	5,711	-
Non-hazardous landfill	25,092	11,852
Non-hazardous restricted	-	-
Inert landfill	20,342	3,191
Total	51,145	15,043

Future Baseline Waste Treatment, Recycling and Recovery Capacity

Waste treatment, recycling and recovery facilities are typically characterised by large annual throughputs; consequently, large step changes in capacity (as single facilities are commissioned) have an exaggerated impact on the historical trend. Waste treatment, recycling and recovery infrastructure capacity cannot therefore be realistically projected forward to the construction phase of the proposed scheme.

Waste treatment, recycling and recovery infrastructure responds to market demands, and historical trends show that infrastructure is added or removed, not least to cope with changes in waste generation. The future waste treatment and recovery infrastructure capacity for use in the assessment will, therefore, be based on the most recent available Environment Agency annual capacity/input data. This suggests that there is likely to be adequate opportunity for wastes arising during the construction of the proposed scheme to be recycled or otherwise recovered via appropriate means.

The available waste treatment and recovery infrastructure is considered to be a beneficiary of incoming feedstock through driving the management of waste up the waste hierarchy. These facilities are therefore not considered to be sensitive receptors, in the same way as landfill sites, given that they have the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal.

Professional experience has shown that waste markets are flexible and adapt to changing markets within a region. It is expected that whilst the actual waste facilities available may change over the course of constructing the proposed scheme, the overall capacity is likely to remain similar as the market responds.

Future Forecast Baseline Inert, Non-hazardous and Hazardous Landfill Capacity

Projected future landfill capacity has been estimated in Table 9-4 and illustrated in Error! Reference source not found.-2 based on the average annual percentage change in remaining combined (total) inert, non-inert and restricted user landfill capacity for the years for which consistent data is available from the Environment Agency (2005 to 2018)[133].

[133] Landfill site classifications were changed in 2005. The categories therefore include: Inert (inert landfill only); Non-Inert (non-hazardous landfill sites, non-hazardous landfill sites with a SNRHW Cell and merchant hazardous landfill sites); and Restricted User (non-hazardous and hazardous restricted landfill sites).

The predicted changes in landfill capacity are derived from the existing Environment Agency time-based data (remaining landfill capacity at the end of each calendar year). These data have been projected forward to 2024 (target opening year), using the 'Exponential Smoothing (ETS AAA) algorithm' in Microsoft Excel[134], in order to provide an estimate of the remaining landfill capacity that may be available during the construction phase (expected between 2022 and 2024).

Table 9-4 - Forecast future baseline landfill capacity in the study area, 2019 to 2022

Timeline	East of England (000s cubic metres)	Essex (000s cubic metres)
2022	46,755	14,138
2023	45,629	13,876
2024	44,503	13,615

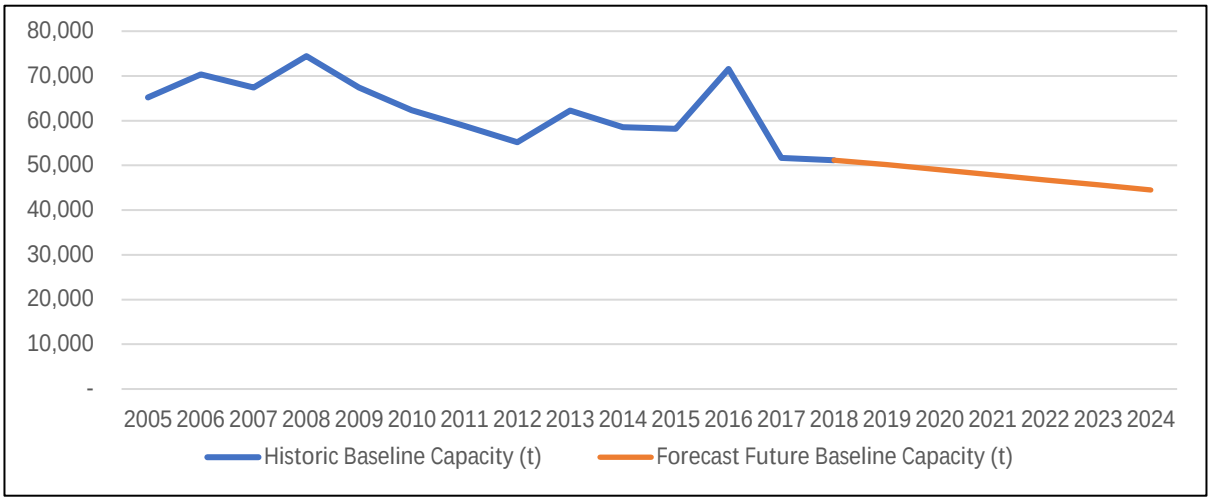

Figure 9-2 - Forecast future landfill capacity in the study area (2019 to 2024)

Although there is a generally a reducing trend for landfill disposal in England, the forecast future baseline landfill capacity suggests that there is likely to be adequate landfill capacity available in the East of England and Essex respectively (~46,755,000 m^3 and 14,138,000 m^3) in 2022 to support the construction of the proposed scheme. This means that any waste that is destined for landfill would most likely find available regional capacity in the study area. It is also of note that even where wastes are accepted at landfill some may, subject to their properties, be used within landfill cover or other engineering uses rather than subject to and accounted as disposal.

Notwithstanding, it is envisaged that the vast majority of the waste arising during the construction of the proposed scheme will be re-used, recycled or otherwise recovered in accordance with legislative and policy requirements identified in Section 9.3. This will specifically be required in order to demonstrate the proposed scheme's contribution to ensuring that at least 70 % of non-hazardous C&D waste is subject to material recovery in accordance with the Waste Framework Directive, whilst aiming for 90 % where possible to support landfill target of reducing landfill to a maximum of 10 %

[134] The ETS-AAA algorithm is explained in greater detail at: https://support.office.com/en-gb/article/create-a-forecast-in-excel-for-windows-22c500da-6da7-45e5-bfdc-60a7062329fd#bkmk_calculation.

of all waste by 2035, as set out within the Defra (2018) 'Resources and Waste Strategy for England'[135].

9.3 Legislation and Policy

The use and consumption of material assets and the production and management of waste are subject to a complex framework of legislative and policy instruments at the European[136], national and local level.

The key legislative and policy instruments influencing the construction of the proposed scheme and the consideration of the environmental assessment of material assets and waste are identified below and summarised in Appendix E.

This framework is intended to preserve material assets by promoting resource efficiency, safeguarding mineral resources, minimising waste and moving towards a circular economy. This framework also recognises the need to take action early in a project lifecycle, encouraging resource efficient design and increasing waste recovery rates in construction.

9.3.1 National and European Legislation:

- The EU Circular Economy Package, 2018
- Revised EU Waste Framework Directive (2008/98/EC)
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste
- The Environmental Protection Act 1990
- The Environmental Permitting (England and Wales) Regulations 2016 (as amended)
- The Waste (England and Wales) Regulations 2011 (as amended)
- The Landfill (England and Wales) Regulations 2002 (as amended)
- The Hazardous Waste (England and Wales) Regulations 2005 (as amended)

9.3.2 National Policy:

- Department for International Development 2017 Agenda 2030
- HM Government 2018 A Green Future – Our 25 Year Plan to Improve the Environment
- HM Government 2017 Policy Paper Clean Growth Strategy
- Defra 2018 Resources and Waste Strategy for England
- Defra 2013 Waste Management Plan for England
- NPPF 2019
- National Planning Policy for Waste 2014

[135] This stretch target is considered achievable given that the available Defra statistics confirm that approximately 92% of all non-hazardous C&D waste is currently being diverted from landfill in England.
[136] Whilst the United Kingdom is still within the European Union exit transition period the requirements of EU environmental directives will still apply, and it is understood that post exit these requirements will be transposed into United Kingdom legislation. Therefore, references to European Union directives requirements will remain relevant.

9.3.3 Local Policy:

- The Essex Minerals Local Plan 2014
- The Essex and Southend-on-Sea Waste Local Plan 2017

9.4 Value of Environmental Receptors

The baseline environment comprises receptors which have been defined geographically based on the likely impacts and effects, associated with the use and consumption of material assets and the production and management of waste, as set out in LA 110[117].

These receptors, and an indication of their sensitivity, are set out in Table 9-5 however, it should be noted that the LA 110[117] simplified significance framework precludes the need to assign a sensitivity rating to the identified receptors for the purposes of assessment.

Notwithstanding, the baseline conditions reported in Section 9.2 have been used in Section 9.7 as an intrinsic guide to informing and determining which significance effect categories should be applied to the proposed scheme in accordance with the simplified assessment framework criteria provided in LA 110[117].

Table 9-5 - Receptors that are relevant to material assets and waste

Receptor	Summary of baseline conditions
Primary, secondary and recycled aggregate resources	There is likely to be a good supply of both primary and recycled aggregates within the study area to construct the proposed scheme. Although, there is currently limited information on the availability of secondary aggregates.
Mineral safeguarding sites and peat resources	There are substantial parts of the proposed scheme that lie within a designated MSA/MCA for sand and gravel resources and associated processing infrastructure. These mineral resources and processing facilities are of national and local importance. No peat resources have been identified in the study area.
Waste management infrastructure	There is likely to be adequate waste management capacity within the study area to accommodate the majority of wastes arising from the construction of the proposed scheme, and there are unlikely to be any specific constraints with regards to managing inert, non-hazardous or hazardous waste streams.

9.5 Potential Impacts

9.5.1 Construction Phase

Constructing the proposed scheme would require the use of material assets and hence may result in potential impacts on the environment through the depletion of non-renewable natural resources; and compliance/non-compliance with relevant policies and plans.

Conversely, constructing the proposed scheme would also result in surplus materials and waste, leading to potential impacts on the available waste management infrastructure (i.e. through the permanent use of landfill void space and/or the short-term use of waste recycling and recovery capacity), and compliance/non-compliance with relevant policies and plans. The majority of wastes are likely to comprise inert or non-hazardous wastes. However, there will also be smaller quantities

of hazardous waste (e.g. paints and solvents, admixtures, spill absorbent materials, waste lubricants, oil filters, waste electrical and electronic equipment and batteries).

The proposed scheme will require structural works (including earthworks and concrete and steel structures) as well as imported aggregates and asphalt for new road construction. The proposed scheme includes constructing across previously undeveloped land, within areas designated as an MCA/MSA for sand and gravel resources, and an MCA for strategic aggregate recycling sites. The proposed scheme may, therefore, result in potential sterilisation impacts on safeguarded mineral resources.

9.5.2 Operational Phase

Operational impacts have not been assessed in the scoping assessment as it has been assumed that no significant maintenance activities would occur during the first years of operational activities (target opening year 2024), and thus no significant materials consumption or waste generation is likely to be realised. LA 110 requires that the environmental assessment for material assets and waste should only report on the opening year.

9.6 Design, Mitigation and Enhancement Measures

Measures will be implemented to minimise the impacts associated with both the consumption of material assets and the generation and management of waste during the construction of the proposed scheme.

The design of the proposed scheme has not been sufficiently developed to allow mitigation measures to be defined in detail. This section therefore identifies established and reliable embedded and standard mitigation measures considering relevant legislation, policy and best practice.

9.6.1 Safeguarding Mineral Resources, Mineral Reserves and Processing Facilities

Pre-application discussions with Essex County Council's Planning Officer have confirmed that a Minerals Resource Assessment (MRA) will need to be prepared for the proposed scheme given that it is located within an MSA for sand and gravel and MCA covering the Martells Quarry site, and that the scale of the development is greater than 5 ha in size.

Depending on the findings of this assessment an economic viability assessment would then be required to identify potential options for prior extraction including inter alia: the amount that could be extracted, nearby operators that could extract and process the material, or opportunities for on-site use. These assessments will be undertaken outwith the EIA to support the planning application.

9.6.2 Applying Designing for Resource Efficient Construction Principles (DfRE)

The Designer and appointed Contractor shall aim to design and construct the proposed scheme to be resource efficient and to minimise the consumption of materials and the generation of waste throughout the lifecycle of the proposed scheme.

All opportunities to DfRE are covered by five key principles as detailed in para 3.18.1 of LA 110[117]: "(1) design for reuse and recovery (2) design for materials optimisation (3) design for off-site construction (4) design for the future (5) design for waste efficient procurement."

These DfRE principles shall be implemented by applying the three-step process described below:

1. Identify opportunities for alternative design solutions which improve resource efficiency, and prioritise those which will have the greatest impact and be easiest to implement
2. Investigate the prioritised solutions further to fully ascertain their viability, and quantify the potential benefits

3. Implement the agreed solutions, ensuring that they are agreed with Essex County Council and recorded by way of a SWMP

9.6.3 Responsibly Sourcing Construction Materials and Products

The appointed Contractor shall produce a Responsible Sourcing Plan, which shall set out the principles for procurement and specification of materials to prevent waste and maximise the responsible sourcing of construction materials and products with proven sustainability credentials. The plan shall specify the:

- Use of key material elements responsibly sourced from suppliers with industry recognised responsible sourcing certification for that material (e.g. certification to BRE BES 6001[137], or membership of a sector specific scheme that complies to BSI BS 8902138)
- Use of timber and wood-derived products that are sustainably sourced from independently verifiable legal and sustainable sources or from a licensed Forest Law Enforcement Governance and Trade partner[139]
- Use of alternatives to primary materials, where available and permitted by the Specification for Highway Works. This could include materials that already exist on site or can be sourced from other projects/suppliers; and specifically ensuring that any aggregates imported to site comprise re-used, secondary or recycled content at levels in line with the 'National and regional guidelines for aggregates provision in England 2005-2020'[140] target of 31 % for the East of England
- Minimal use of hazardous materials that have the potential to harm human health or the environment; and that might cause problems for future reuse, recycling and recovery

9.6.4 Implementing a Site Waste Management Plan

A SWMP shall be prepared and implemented so that each potential waste stream is evaluated against the waste hierarchy and to plan, implement, monitor and review waste minimisation and management throughout the construction programme to support compliance with duty of care requirements.

The SWMP is a live document, updated at varying points within the project cycle, used to facilitate waste prevention at the design stage and reuse, recycling and other recovery opportunities during construction.

A Design Stage SWMP shall be prepared. It will identify the person(s) responsible for the SWMP, set the reporting metrics for the proposed scheme, identify scheme targets, provide an outline estimate of the likely types of waste and quantities that will be generated during the construction of proposed scheme and record any actions taken to prevent waste during the detailed design stage.

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[137] BRE (2014). BES 6001 – The Framework Standard for Responsible Sourcing [https://www.bregroup.com/services/standards/responsible-sourcing/].
[138] BSI (2009). BS 8902:2009 Responsible sourcing sector certification schemes for construction products. Specification [https://shop.bsigroup.com/ProductDetail/?pid=000000000030191223].
[139] European Union (n.d.). Forest Law Enforcement Governance and Trade [http://www.euflegt.efi.int/what-is-flegt].
[140] Ministry of Housing, Communities & Local Government (2009). National and Regional Guidelines for Aggregates Provision in England 2005 to 2020 [https://www.gov.uk/government/publications/national-and-regional-guidelines-for-aggregates-provision-in-england-2005-to-2020].

Once the Design Stage SWMP has been finalised, it shall be passed to the appointed Contractor who will be responsible for discharging the remaining requirements of the SWMP process during construction, including:

- Forecasting residual waste arisings
- Identifying and recording waste management and recovery actions
- Specifying waste carriers
- Identifying the sites that the waste will be taken to
- Updating the plan to record waste movements
- Where relevant, drawing on any lessons learnt, identifying any further action

The SWMP shall contain the following targets applicable to the proposed scheme; that at least 70 % (by weight) of non-hazardous C&D waste shall be subjected to material recovery in accordance with the Waste Framework Directive, whilst aiming for 90 % where possible to support the target of reducing landfill to a maximum of 10% of all waste by 2035, as required by the Defra (2018) 'Resources and Waste Strategy for England'.

The SWMP shall also set out how all construction phase materials will be managed, and shall reference any specific MMPs developed under relevant statutory and industry regulated codes of practice

9.6.5 Obtaining All Relevant Consents and Licenses

The appointed Contractor shall be responsible for obtaining and validating, where required, all necessary registrations; environmental permits for waste, mobile plant deployments or waste exemptions in relation to the management of waste during construction.

The appointed Contractor shall similarly be responsible for preparing any documentation required by relevant statutory and industry regulated codes of practice (e.g. CL:AIRE 'Definition of Waste Code of Practice'[110] and/or Environment Agency 'End of Waste Criteria for the Production of Aggregates from Inert Waste').

9.7 Description of Likely Significant Effects

The construction of the proposed scheme is likely to have an adverse effect with regards to Material Assets and Waste, when compared to a Do-Nothing scenario.

LA 110[117] provides scoping questions to be answered in order to gain an understanding of the need to undertake further assessment for the Material Assets and Waste environmental factor. These are set out in Table 9-6 below with corresponding answers as applied to the proposed scheme

This is also supported by the application of professional judgement to the LA 110[117] significance descriptors and criteria provided in Table 9-7 and Table 9-78 respectively (i.e. the LA 110 simplified assessment framework). These criteria have been used in determining which elements of the material assets and waste environmental factor have the potential to result in likely significant environmental effects warranting further EIA.

Table 9-6 - Scoping level assessment matrix

Element	Scoping question	Corresponding assessment Criteria	Scoping response/likelihood of meeting significance criteria
Material Assets	(1) Is the project likely to recover/reuse little on site material thereby requiring materials to be imported to site?	(1) Project achieves less than 70 % overall material recovery/recycling (by weight) of non-hazardous C&D waste to substitute use of primary materials.	Yes/unlikely, whilst it is currently unknown what percentage of C&D waste will be used to substitute the use of primary, the nature of the proposed scheme mean that it will inevitably require primary materials to be imported. Nevertheless, it is assumed that the proposed scheme would achieve an overall material recovery/recycling rate of ≥70 % (by weight) of non-hazardous C&D materials to substitute the use of primary materials either on or off site given that Defra (2019)[141] statistics confirms that the construction industry in England is currently achieving a recovery rate of in excess of 92 % for non-hazardous C&D waste.
	(2) Is the project likely to use little/no recycled/secondary materials thereby requiring the majority of materials used on the project to comprise primary materials?	(2) Aggregates imported to site comprise re-used/recycled/content below the relevant regional percentage target of 31 %.	No/unlikely, some degree of re-used/recycled content is anticipated in constructing the proposed scheme given that this is standard practice in construction, and Waste and Resources Action Programme (WRAP)[142] (2009) 'Construction Procurement Guidance'[143] suggests that infrastructure projects typically exceed 10 % even without explicitly trying to increase recycled content, and that the recycled content as a percentage of the total material cost for an infrastructure project was found to be in the region of 8-36 % using standard practice products, with this rising to 25-49 % when applying cost-neutral good practice. The Mineral Products Association (2018) 'Profile of the UK Mineral Products Industry 2018 Edition' also confirms that in 2017 the share of recycled and secondary aggregate materials as a proportion of total GB aggregates sales was 30 %. These data further support the assumption that recycled aggregate content in constructing

[141] Defra (2019), UK Statistics on Waste - Statistical Notice (March 2020) [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/874265/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_rev_v0.5.pdf].

[142] Waste and Resources Action Programme (which operates as WRAP).

[143] WRAP (2009), Construction procurement guidance: Delivering higher recycled content in construction projects [http://www.wrap.org.uk/sites/files/wrap/Delivering%20higher%20recycled%20content%20in%20construction%20projects.pdf].

Element	Scoping question	Corresponding assessment Criteria	Scoping response/likelihood of meeting significance criteria
			the proposed scheme is unlikely to be less than the 31 % regional target.
	(3) Is the project likely to sterilise mineral sites or peat resources?	(3) Project sterilises ≥1 mineral safeguarding site and/or peat resources.	Yes/unlikely, the proposed scheme includes constructing across previously undeveloped land within an extensive MSA for sand and gravel, and smaller MCA associated with the existing Martells Quarry site. The proposed scheme may therefore result in the partial sterilisation of those safeguarded sand and gravel resources present within the study area, should prior extraction not be viable. Any sterilisation will be minimised through the adherence to local planning policy, including preparation of an MRA and, potentially, an economic viability assessment. Nevertheless, any potential permanent sterilisation is considered to be negligible by area (~42.6 ha[144]) in the context of the MSA in which the scheme is located. Should prior extraction not be viable, then this would represent the marginal loss of the safeguarded resource given its widespread distribution in the country and is therefore likely to represent a minimal overall percentage loss. This is unlikely to constitute a significant effect, according to the definition provided in LA 110[145]. Furthermore, given the distance of the proposed scheme from the minerals workings at Martell Quarry, no sterilisation of this site is likely to occur. If anything, the proposed scheme is likely to increase the viability of the proposed extension of the Martell Quarry site by improving the performance of the A120 junction to

[144] This is an estimate of the total permanent footprint of the proposed scheme to indicate how much of the safeguarded sand and gravel resource could be sterilised should prior extraction not be viable. This figure excludes the following areas: borrow pits, existing highway areas, and existing areas that have already been built on (e.g. petrol station, waste transfer station and adjacent premises etc).

[145] Reference to the newly published IEMA guide to: Materials and Waste in Environmental Impact Assessment [https://www.iema.net/policy/ce/materials-and-waste-in-eia/] also suggests that a likely significant effect would typically only be realised in instances where one or more allocated mineral sites are substantially sterilised (in their entirety) by the development rendering it inaccessible for future use. IEMA notes that whether a mineral site is substantially sterilised should be justified using professional judgement, based on the scale and nature of the allocated mineral site being assessed.

Element	Scoping question	Corresponding assessment Criteria	Scoping response/likelihood of meeting significance criteria
			accommodate lorry movements from the extension.
Waste	(4) Would the project generate large quantities of waste relative to regional landfill capacity?	(1) Project leads to a greater than 1 % reduction or alteration in regional landfill capacity.	No/unlikely, whilst the precise quantities of waste generated by the proposed scheme is currently unknown, the scheme has the potential to generate comparatively small quantities of waste in the context of the available waste management infrastructure (~13,000 m^3)[146], and therefore a >1 % reduction or alteration in regional or sub-regional landfill capacity is unlikely to occur given that the proposed scheme would need to dispose of >467,550 m^3 or >141,380 m^3 of C&D waste to landfill respectively in 2022; or >456,290 m^3 or >138,760 m^3 of C&D waste to landfill respectively in 2023 for this to be realised. Based on professional judgement, and the expected rate of recovery, this is considered unlikely.
	(5) Will the project have an effect on the ability of waste infrastructure within the region to continue to accommodate waste from other sources?	(2) Greater than 1 % of project waste requiring disposal outside of the region.	No/unlikely, given the anticipated types and quantities of waste, and the expected rate of recovery, the receiving waste infrastructure is likely to have sufficient capacity to accommodate waste from the proposed scheme. It is unlikely that >1 % of project waste would require disposal outside of the south-east.

LA 110[117] sets out how effects associated with material assets and waste should be assessed. The descriptors of effect provided in Table 9-7 have been used to assess the likely environmental effects of constructing the proposed scheme on material assets and waste. Professional judgement has been used to determine which significant effect category the proposed scheme is likely to fall within.

Table 9-7 - Significance category descriptions for material assets and waste (LA 110)

Significance category	Description
Very large	Material assets 1) No criteria: use criteria for large categories Waste 1) >1 % reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project or

[146] Estimated based on the Key Performance Indicator (KPI) for median waste removal from sites in 2018 of 18.4 m^3 per £100k project value published in the Glenigan et al (2019) UK Industry Performance Report 2018: Construction Key Performance Indicators (KPIs) Annual Report [https://www.glenigan.com/wp content/uploads/2018/11/UK_Industry_Performance_Report_2018_4456.pdf].

	2) Construction of new (permanent) waste infrastructure is required to accommodate waste from a project
Large	Material assets 1. Project achieves <70 % overall material recovery/recycling (by weight) of non-hazardous Construction and Demolition (C&D) Waste to substitute use of primary materials 2. Aggregates required to be imported to site comprise <1 % re-used/recycled content and/or[147] 3. Project sterilises ≥1 mineral safeguarding site and/or peat resource[148] Waste 1. >1 % reduction in the regional capacity of landfill as a result of accommodating waste from a project and >50 % of project waste for disposal outside of the region
Moderate	Material assets: 1. Project achieves less than 70 % overall material recovery/recycling (by weight) of non-hazardous C&D Waste to substitute use of primary materials and 2. Aggregates required to be imported to site comprise re-used/recycled content below the relevant regional percentage target, which for the East of England is 31 % Waste: 1. >1 % reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project and 1-50 % of project waste for disposal outside of the region
Slight	Material assets: 1. Project achieves 70-99 % overall material recovery/recycling (by weight) of non-hazardous C&D Waste to substitute use of primary materials; and 2. Aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target, which for the East of England is 31 %. Waste: 1. ≤1 % reduction or alteration in the regional capacity of landfill and Waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region

The potential for likely significant effects on material assets and waste has been determined in accordance with the criteria set out in Table 9-8, which are aligned to the category descriptions

[147] The online published version of LA 110 includes ";AND" instead of ";AND/OR". This has been changed in this assessment to correct an editorial error in the original guidance that was confirmed in an email from Wilson, S., Stuart.Wilson@highwaysengland.co.uk, 2020. SMP LA 110 Material Assets and Waste. [E-mail] Message to P Tomlinson (Paul.Tomlinson@jacobs.com). Sent 09 January 2020 15:42.

[148] Sterilisation is defined by LA 110 to mean "substantially constrain/prevent existing and potential future use and extraction of materials". In the absence of any further guidance, this has been interpreted to mean that a project would need to intersect with (sterilises) the whole of a mineral safeguarding site and/or or existing or potential peat extraction site or intersect with a significant part of a safeguarded minerals site/existing or potential peat extraction site (>50 % by area).

provided in Error! Reference source not found., which confirms that effects of moderate significance or above are considered significant. Consequently, this simplified assessment framework precludes the need to derive the significance of effect based on a combination of the value of a resource (or receptor) and the magnitude of impact.

Table 9-8 - Significance criteria for material assets and waste (LA 110)

Significance category	Description
Significant (one or more criteria met)	Material assets: 1. Category description met for moderate or large effect Waste: 1. Category description met for moderate, large or very large effect
Not significant	Material assets: 1. Category description met for neutral or slight effect Waste: 1. Category description met for neutral or slight effect

The construction of the proposed scheme therefore has the potential to realise the following effects after the application of those mitigation measures detailed in Section 9.6.

9.7.1 Material Assets:

- The proposed scheme is likely to achieve an overall material recovery rate of between 70-99 % of non-hazardous C&D waste (Slight adverse effect)
- The aggregates required to be imported are likely to comprise re-used/recycled content in line with the relevant regional percentage target (Slight adverse effect)

9.7.2 Waste:

- Constructing the proposed scheme is likely to result in a ≤1 % reduction or alteration in the regional landfill capacity (Slight adverse effect)
- The regional waste management infrastructure is likely to have sufficient capacity to accommodate waste from the proposed scheme (Slight adverse effect)

Based on the above, it is considered unlikely that the construction of the proposed scheme would result in any significant effects on materials assets and waste.

9.8 Proposed Assessment Methodology

It is the conclusion of this scoping assessment that the scoping level of assessment is sufficient to understand the impacts and effects of constructing the proposed scheme and that further EIA is unlikely to be required. As such, it is recommended that material assets and waste be scoped out of any further assessment on the basis that no likely significant effects are anticipated.

Where insignificant effects have been identified these will be managed by ensuring that the design and construction of the proposed scheme responds to the regulatory and policy framework, as reported in Section 9.3 and the mitigation measures identified in Section 9.6.

These measures shall be secured through contractual responsibilities between Essex County Council and its design and construction contractors, and implemented, measured and monitored during construction using a variety of methods including, but not limited to:

- Planning conditions
- Contract documents
- CEMP
- MRA
- Responsible Sourcing Plan; and materials procurement register
- SWMP

9.8.1 Assessment Assumptions and Limitations

The scoping assessment on material assets and waste receptors is predominantly based on a review of the baseline information available at the time of assessment.

Whilst the baseline data source used in this assessment represent the most recently available information, conditions may have changed since publication.

Although checks are made by stakeholders for anomalies or errors in their data prior to publication, it cannot be guaranteed that these data are error free, or whether any commercial decisions taken by site operators that may have affected them. Furthermore, changes to the permitted minerals and waste management capacity during the construction of the proposed scheme is difficult to predict.

Waste management facilities are typically characterised by large annual throughput capacities; consequently, large step changes in capacity (as single facilities are commissioned and decommissioned) can have an exaggerated impact on the historical trend. Baseline waste infrastructure capacity cannot therefore be projected forward to the date of construction with any accuracy. Notwithstanding, professional experience shows that waste infrastructure responds to market demands, and historical trends show that infrastructure is added or removed to cope with changes in waste generation.

There is little information available at this stage regarding the precise material requirements and waste quantities associated with constructing the proposed scheme; and therefore, there is also limited precise information available at this stage regarding.

For material assets:

- Information on materials that contain secondary/recycled content
- Information on any known sustainability credentials of materials to be used
- The type and volume of materials that will be recovered from off-site sources
- Details of on-site storage and stockpiling arrangements

For waste management:

- The amount of waste that will be recovered and diverted from landfill either on or off site
- Types and quantities of waste arising from the proposed scheme requiring disposal to landfill
- Details of on-site storage and segregation arrangement for waste

Notwithstanding, the above limitations are not untypical of scoping level assessments, and the information presented in this chapter is considered to be an appropriate level of detail in line with

the scoping assessment methodology (questions) outlined in LA 110. Furthermore, the scoping assessment has been supported by the following additional information:

- Defra Waste Statistics
- Glenigan, CITB, BIS and Constructing Excellence UK Construction KPIs
- WRAP Construction Procurement Guidance
- WRAP Resource Efficiency Benchmarks for Construction Projects

While the use of materials and the production of waste can affect the full range of environmental media and assessment topics (notably air quality, geology and soils, water environment, noise and traffic and climate), their effect on the wider environment has been considered as part of the other technical chapters in this Scoping Report.

LA 110[117] requires that the environmental assessment shall report on the construction phase and first year of operational activities (target opening year 2024). Operational impacts have not been assessed in the scoping level assessment as it has been assumed that no significant maintenance activities would occur during the opening year, and thus no significant materials consumption or waste generation is likely to occur.

10 Noise and Vibration

10.1 Introduction

Both the construction and operation of the proposed scheme have the potential to impact the local noise climate. An assessment of potential noise and vibration impacts, for both the construction and operational phases, will be carried out for the proposed scheme in line with guidance contained within the DMRB, Volume 11, Section 3, Part 7 – Noise and Vibration LA 111 Rev-1 (DMRB LA 111)[149], and BS 5228: 2009 + A1: 2014 – Part 1: Noise (BS 5228-1)[150] and BS 5228: 2009 + A1: 2014 - Part 2: Vibration (BS 5228-2)[151].

The purpose of this chapter is to outline the proposed scope of work and assessment methodology for the consideration of potential noise and vibration effects associated with the proposed scheme.

10.2 Baseline Conditions

10.2.1 Study Area

An operational study area for this project will be defined using guidance from DMRB LA 111[149] as follows:

i. The area within 600 m of new road links or road links physically changed or bypassed by the project

ii. The area within 50 m of other road links with potential to experience a short-term Basic Noise Level (BNL) change of more than 1.0 dB(A) as a result of the project

The study area defined by (i) above will be modelled using CadnaA© noise modelling software[152]. This study area will include a 600 m area around the proposed scheme, and around any identified bypassed routes.

The additional study area defined by (ii) above will be assessed using BNL calculations, in accordance with DMRB LA 111[149].

10.2.2 Baseline Environment

The baseline noise environment is likely to be dominated by road traffic noise from the A120 and A133. There are currently approximately 300 buildings within an indicative 600 m boundary from the proposed scheme, which are largely rural, including farms, small holdings, villages and businesses.

Baseline noise surveys would usually be undertaken for an EIA in accordance with Calculation of Road Traffic Noise (CRTN)[153] and DMRB LA 111[149]. The noise surveys would predominantly assist in defining the existing noise environment for those receptors currently some distance away from sources of road traffic noise, where the noise climate is not dominated by road traffic noise. They

[149] Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7 – Noise and Vibration LA 111 Revision – 1, 2020.
[150] British Standard 5228: 2009 + A1: 2014 – Code of practice for noise and vibration control on construction and open sites - Part 1: Noise, 2014.
[151] British Standard 5228: 2009 + A1: 2014 – Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration, 2014.
[152] CadnaA Noise Modelling Software version 2020 MR 1, Datakustik GmbH, 2020.
[153] Department of Transport and Welsh Office Calculation of Road Traffic Noise, 1988.

would also be used to define baseline noise levels for the construction noise assessment and for comparison against the noise model.

Baseline noise surveys would involve both unattended long-term (5-7 days) noise monitoring at some locations, supplemented by attended short-term measurements (three consecutive hours, in accordance with the Shortened Measurement Procedure within CRTN[153], at other locations. The exact locations of the baseline noise monitoring would be dependent upon gaining approval from residents to take measurements. Noise measurements would be carried out at properties in close proximity to the proposed scheme and other areas where the greatest noise changes may be expected.

Due to COVID-19 it is unlikely that baseline noise surveys can be included in the scope for this project, as travel restrictions imposed by the government impact upon the ability to travel for surveys, and because the current noise environment is unlikely to be representative of normal acoustic conditions due to reduced road, rail and aircraft traffic. Therefore, an alternative methodology to baseline noise assessment has been proposed (see Section 10.8).

10.2.3 Noise Important Areas

Defra has undertaken noise mapping exercises, the latest of which (Round 3 mapping) was published in late 2019[154]. Defra have produced a list of noise Important Areas (IAs), identified as areas requiring action to reduce noise levels. The noise IAs identified within 1 km of the proposed scheme are listed below (see also Appendix B Figure 10.1) and will be included within the assessment of potential noise and vibration effects:

- ID 4782, located on the A120 Westbound carriageway north of Bromley Road, responsibility of Highways England
- ID 4781, located on the A120 Eastbound carriageway at the junction with Bromley Road, responsibility of Highways England

10.3 Legislation and Policy

The following legislation, policy and guidance will be taken into account during the preparation of the environmental noise assessment:

- The NPPF[155] – sets out the Government's planning policies for England and how these are expected to be applied
- Noise Policy Statement for England[156] – the aim of this policy is to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development
- Planning Practice Guidance: Noise[157] – sets out how planning can manage potential noise impacts in new development
- Land Compensation Act 1973[158]
- Control of Pollution Act (CoPA) 1974[159]

[154] https://www.gov.uk/government/publications/strategic-noise-mapping-2019.
[155] Ministry of Housing, Communities and Local Government – National Planning Policy Framework, 2019.
[156] Department for Environment, Food and Rural Affairs – Noise Policy Statement for England, 2010.
[157] Ministry of Housing, Communities and Local Government – Planning Practice Guidance – Noise, 2019.
[158] Land Compensation Act, 1973.
[159] Control of Pollution Act, 1974.

- Environmental Protection Act 1990[160]
- DMRB LA 111[149]
- CRTN[153]
- WHO, Night Noise Guidelines for Europe (WHO NNG) 2009[161]

10.4 Value of Environmental Receptors

Receptors sensitive to noise and vibration effects include dwellings, hospitals, schools, community facilities, designated areas and PRoW located within 600 m of the scheme and any bypassed routes. For the purposes of the noise assessment, there is no difference in the value between these receptors and their sensitivity to noise impacts.

10.5 Potential Impacts

10.5.1 Construction Phase

During construction, there is the potential for adverse noise and vibration impacts at sensitive receptors in the vicinity of the proposed scheme. Additionally, there is the potential for increased noise on the local road network associated with additional construction road traffic. This would be dependent upon the type of construction works undertaken/vehicles used, the proximity to nearby receptors, the duration of the works and their timing. Construction impacts would be temporary in nature.

10.5.2 Operational Phase

The proposed scheme introduces a new road and therefore a new noise source to a largely rural area. This new road could also lead to some redistribution of traffic elsewhere on the local road network. As such, there is the potential for receptors located close to the proposed scheme to experience adverse noise impacts, whilst in addition, both adverse and beneficial impacts could occur on the wider road network as a result of traffic redistribution.

10.6 Design, Mitigation and Enhancement Measures

10.6.1 Construction

Potentially significant construction noise effects are likely to be predicted. As such, a number of mitigation measures will be considered such as:

- The contractor would engage with Tendring District Council at the earliest convenience during the construction works planning stage. It would also be expected that a formal Section 61 (under CoPA[159]) agreement for prior consent for work on construction sites is entered into with Tendring District Council
- Use of best practicable means during construction works under Section 72 of CoPA and follow good practice under BS 5228-1[150] and BS 5228-2[151]
- Switch off plant, equipment and vehicles when they are not in use for long periods of time
- Establish agreed site working hours for “normal” construction activities

[160] Environmental Protection Act, 1990.
[161] World Health Organisation Europe – Night Noise Guidelines for Europe, 2009.

- Establish agreed criteria for undertaking significantly noisy or vibration-causing operations near to sensitive locations
- Programme works such that the requirement for working outside of normal working hours is minimised and noisy works are undertaken during the daytime where possible
- Limitation of high noise level durations in the vicinity of sensitive receptors
- Ensure that all staff and operatives are briefed on the requirement to minimise noise from site activities
- Advance communication of the works to local environmental health departments and to affected properties
- Use temporary noise screens or partial enclosures around particularly noisy activities used in proximity to sensitive receptors
- Use silenced compressors, generators and fans
- Maintain plant regularly

10.6.2 Operation

Potential measures are likely to include, but would not be limited to:

- Re-use of site won material as noise mitigation embankments, where practicable
- Erection of noise barriers between the noise source (road) and receptors (dwellings etc.)
- Use of Low Noise Road Surfacing in areas where vehicle speeds are in excess of 75 kph

Further analysis of the efficacy of mitigation measures for the proposed scheme would be carried out for the EIA.

It should be noted that noise mitigation measures will only be considered where predicted impacts are considered to be as a result of the proposed scheme, and not where impacts are considered to be as a result of traffic volume increases as a result of the Garden Community development.

10.7 Description of Likely Significant Effects

The construction of the proposed scheme has the potential to result in adverse effects of noise and vibration on a number of sensitive receptors along the proposed scheme. Due to the close proximity of existing properties to the proposed scheme, the impacts have the potential to be significant. Sensitive receptors that have the greatest potential for significant adverse construction effects are as follows:

- Properties on A133 Clacton Road, between Slough Lane and Tye Road, including Brick and Tile Cottage, Park Farm, Blossomwood Cottages, Blossomwood Farm
- Properties on the A120 between Church Road and Bromley Road, including wheatsheaf House and White House
- Turnip Lodge, Mount Pleasant, Ball's Farm and Allen's Farm which lie in close proximity to the proposed scheme between the A120 and A133

The proposed scheme would introduce a new noise source to a predominantly rural area. It is therefore likely that several receptors within the study area would experience increased noise levels that have the potential to be significant, even with mitigation. Mitigation could include noise barriers or earth bunding, though any measures would need to be integrated into the design sustainably and so as not to result in other undesirable impacts (e.g. a visual impact).

Receptors that are likely to experience significant adverse operational noise increases include, though are not exclusive to, the following:

- Turnip Lodge, Mount Pleasant, Ball's Farm, Allen's Farm and Whitehouse Farm which lie in close proximity to the proposed scheme between the A120 and A133
- Brick and tile Cottages, Park Farm, Blossomwood Cottages, and Blossomwood Farm on the A133 Clacton Road
- Elmstead Hall on Church road to the East of the proposed scheme
- Collierswood Farm, Park Cottages, San Lorenzo, White House and Wheatsheaf House on Bromley Road north of the A120

10.8 Proposed Assessment Methodology

For each sub-topic, a summary of the proposed assessment methodology is provided below. All assessment stages will be carried out according to DMRB LA 111[149] and other relevant UK legislation, where possible, however amendments to the standard methodologies are proposed due to the current outbreak of COVID 19 and the associated Government restrictions. This is discussed below.

10.8.1 Effects of COVID-19

The coronavirus pandemic has resulted in the following issues for baseline noise assessments:

- UK Government have imposed a "lockdown" such that all non-essential travel is prohibited
- Restrictions on: access to monitoring locations (e.g. residents garden areas), travel mode (e.g. reduced train service), access to welfare facilities and essential services (e.g. breakdown assistance) and additional health and safety precautions
- The lockdown and closure of most non-essential businesses/services has resulted in atypical noise environments for most of the UK, due to the reduction in travel around the UK by car, aircraft and railway traffic. This is likely to render any baseline noise measurements irrelevant

For these reasons, it is considered likely that baseline noise surveys should not be undertaken for this EIA. It is instead proposed that the baseline assessment is defined using a mixture of the following sources, where appropriate:

- Existing noise survey data from similar nearby sites where applicable, obtained from Essex County Council planning portal
- Predicted Do-Minimum opening year noise levels from the traffic noise model
- Open source Defra noise mapping

It is considered that the above approach is suitable and proportionate given the restrictions in place due to the COVID-19 pandemic and is line with recommendations from the Institute of Acoustics and the Association of Noise Consultants[162]. However, this will be reviewed as Government restrictions are revised.

[162] https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2020/03/Joint-Guidance-On-the-Impact-of-Covid.IOA-ANC-V3.pdf.

10.8.2 Construction Phase – Noise and Vibration

The accuracy of the impact assessment for potential construction noise and vibration will depend upon the construction information available from the design team. Where information is unavailable, we will identify a preliminary construction programme and the likely plant and equipment that might be used for the worst-case phases of construction which would be assessed using BS 5228-1[150]. Similarly, if sufficient information is available, we will carry out predictions of ground-bone vibration levels for any percussive/vibratory piling or vibratory compaction works, using the prediction methodology within BS 5228-2[151] for any sensitive receptors in close proximity to such works.

DMRB LA 111[149] states that the Lowest Observable Adverse Effect Level (LOAEL) and Significant Observable Adverse Effect Level (SOAEL) shall be established and reported within the environmental assessment for all noise sensitive receptors within the construction activity study area. The LOAEL shall be established from measured (where available) or predicted (from the operational Do-Minimum model) baseline noise levels. DMRB LA 111[149] refers to the BS 5228-1[150] ABC Method for determining the SOAEL. The construction noise assessment will therefore consider the predicted construction noise levels arising from construction works and compare them against the LOAEL and SOAEL criteria.

Following the alternative methodology proposed as a result of COVID-19, there may be missing baseline data for some receptors; particularly in more rural settings where there is no existing data. For these receptors, we would assume the baseline noise level is low and therefore the BS 5228-1[150]/DMRB LA 111[149] lower threshold limits for construction noise would apply.

Where construction information is not sufficiently available, we propose to carry out a qualitative assessment based on available information, good practice guidance and our experience of other road schemes.

10.8.2.1 Construction Noise and Vibration

The calculation of construction noise levels will follow the methodology in BS 5228-1[150] and include the following noise sources where appropriate:

- Construction plant in use on the project
- Construction compounds
- Traffic on haul roads not part of the public highway

In addition to this, construction traffic BNL calculations will be undertaken for roads within the construction traffic study area.

DMRB LA 111[149] gives the following tables to determine the magnitude of impact of construction noise and construction traffic noise.

Table 10-1 - Construction noise level magnitude of impact

Magnitude of Impact	Construction noise Level
Major	Above or equal to SOAEL +5 dB
Moderate	Above or equal to SOAEL and below SOAEL +5dB
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Table 10-2 - Construction traffic noise level magnitude of impact

Magnitude of Impact	Increase in BNL of closest public road used for construction traffic (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights
- A total number of days exceeding 40 in any 6 consecutive months

BS 5228-2[151] contains guidance on vibration levels in structures from construction works. It provides a prediction methodology for mechanised construction activities, such as compaction and piling. The standard also presents guidance for the control of vibration from construction. For building structure response, BS 5228-2[151] reproduces the advice given in BS 7385-2: 1993 – Evaluation and measurement for vibration in buildings - Part 2: guide to damage levels from ground borne vibration[163]. The response of a building to ground borne vibration is affected by the type of foundations, underlying ground conditions, the building construction and its state of repair.

The construction vibration assessment would consider the predicted construction vibration levels arising from construction works and compare them against LOAEL and SOAEL criteria provided in Table 10-3 below, reproduced from DMRB LA 111[149]. If necessary, the potential impact on structures would also be considered.

Table 10-3 - Effect levels for vibration on humans

Effect level	Peak Particle Velocity, mm/s
SOAEL	1.0
LOAEL	0.3

[163] British Standard 7385-2: 1993 – Evaluation and measurement for vibration in buildings: guide to damage levels from ground borne vibration

If the predicted vibration level at a sensitive receptor is above the SOAEL, then there is the potential for a significant effect to occur and mitigation would be proposed. However, the duration of the works and the character of the impact would also be considered.

10.8.3 Operational Phase – Noise

The assessment of operational road traffic noise for the proposed scheme will follow the assessment methodology outlined in DMRB LA 111[149], using data provided from the traffic model. Noise levels will be calculated at all residential dwellings and other sensitive receptors (for example schools, hospitals, religious buildings and outdoor spaces) within the defined study area.

The assessment of the proposed scheme will predict noise levels at dwellings and other noise sensitive receptors, with the following scenarios being modelled:

- Do-Minimum scenario in the baseline year (2026), assuming that the proposed scheme nor the Garden Community are constructed
- Do-Minimum scenario in the future assessment year (2041), assuming that the proposed scheme nor the Garden Community are constructed
- Do-Something scenario in the baseline year (2026), assuming that the proposed scheme is constructed, but the Garden Community is not constructed
- Do-Something scenario in the future assessment year (2041), assuming that the proposed scheme is constructed, but the Garden Community is not constructed

In addition to the above, a fifth scenario will also be modelled, in order to estimate the impact that the additional road traffic accessing the Garden Community could have on existing noise sensitive receptors:

- Do-Something scenario in the future assessment year (2041), assuming that the proposed scheme and the Garden Community are constructed

This scenario will allow the impacts of traffic reassignment due to the proposed scheme to be disaggregated from traffic generated by the Garden Community such that the development with the greatest effects can be identified and any necessary mitigation applied accordingly by their respective developers. For direct comparison all assessment scenarios will utilise the same study area, as set out in Section 10.2.1 above.

The assessment will consider noise level changes at dwellings and other noise sensitive receptors, with the following scenarios being considered:

- Do-Minimum scenario in the baseline year (2026) against Do-Something scenario in the baseline year (2026), known as the short-term assessment
- Do-Minimum scenario in the baseline year (2026) against Do-Minimum scenario in the future assessment year (2041), known as the long-term Do-Minimum assessment
- Do-Minimum scenario in the baseline year (2026) against Do-Something scenario in the future assessment year (2041), known as the long-term assessment – note that this comparison will be performed for the Do-Something 2041 scenarios with the proposed scheme in place, both with and without the Garden Community in place

DMRB LA 111[149] defines the future year as "the year between opening year and the 15th year of operation". For this assessment the future year will be the 15th year of operation.

The predicted noise levels determined from the noise modelling exercise will be assessed using the criteria set out in the following sections to determine the potential for significant environmental effects.

10.8.3.1 Magnitude of Impact

Section 3 of DMRB LA 111[149] provides guidance on the magnitude of impacts for road traffic noise changes. Magnitude of impact is considered for both the short-term and long-term.

The classification of magnitude of noise impact is set out in Table 10-4 and Table 10-5 below.

Table 10-4 - Classification of magnitude of noise impacts in the short-term

Noise Change (dB)	Magnitude of Impact
0	No change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
5+	Major

Table 10-5 - Classification of magnitude of noise impacts in the long-term

Noise Change (dB)	Magnitude of Impact
0	No change
0.1 – 2.9	Negligible
3.0 – 4.9	Minor
5.0 – 9.9	Moderate
10+	Major

Calculations will be performed for all noise sensitive receptors contained within the study area and presented for the short-term, long-term, daytime and night-time periods based on the example tables 3.55a and 3.55b in DMRB LA 111[149].

10.8.3.2 Significance of Effects

DMRB LA 111[149] states that the LOAEL and SOAEL shall be set for all noise sensitive receptors within the study area, for time periods when they are in use. LOAEL and SOAEL to be considered in this assessment are defined in Table 10-6 below, which is reproduced from Table 3.49.1 of DMRB LA 111[149]. These LOAEL and SOAEL are considered to apply to both dwellings and other noise sensitive receptors for the purpose of this assessment.

Table 10-6 - Operational noise LOAEL and SOAEL for all receptors

Time Period	LOAEL	SOAEL
Day (06:00 – 24:00)	55 dB $L_{A10,18hr}$ (façade)	68 dB $L_{A10,18hr}$ (façade)
Night (23:00-07:00)*	40 dB $L_{night,outside}$ (free-field)	55 dB $L_{night,outside}$ (free-field)
*Note that DMRB LA 111 states the night-time period is 00:00 – 06:00, however, consultation with Highways England has confirmed this period should read "(23:00 – 07:00)".		

DMRB LA 111[149] states that the initial assessment of likely significant effects on noise sensitive buildings shall be determined using Table 10-7 below, which is reproduced from Table 3.58 of DMRB LA 111[149].

Table 10-7 - Initial assessment of noise significance

Significance	Short term magnitude of change
Significant	Major
Significant	Moderate
Not significant	Minor
Not significant	Negligible

DMRB LA 111[149] then requires that other factors are considered for noise sensitive receptors, or groups of noise sensitive receptors, to determine the final significance of effect. The factors to be considered on a case by case basis are:

- Noise level change relative to minor/moderate boundary
- Differing magnitude of impact in the long-term and/or future year, compared to the short-term
- Absolute noise level with reference to LOAEL and SOAEL
- Location of noise sensitive parts of a receptor, e.g. location of sensitive room windows or garden areas
- Acoustic context e.g. does the proposed scheme change the acoustic character of the area
- Likely perception of change by residents, e.g. changes to landscape or receptor setting

10.8.4 Operational Phase – Vibration

DMRB LA 111[149] states the following in relation to operational vibration assessment:

"Operational vibration is scoped out of the assessment methodology as a maintained road surface will be free of irregularities as part of the project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects"

As a new surface would be installed as part of the proposed scheme, the above is considered to apply and therefore, no operational vibration assessment will be carried out.

10.8.5 Assessment Assumptions and Limitations

10.8.5.1 Baseline Noise Assessment

Current travel restrictions in the UK mean that baseline noise surveys have not been undertaken for the proposed scheme as previously described. Instead, a proportionate approach, making use of any available surveys/desktop data, would be followed in order to define the baseline noise environment. Whilst this deviates from what is considered normal best practice, it is considered a proportionate and suitable alternative during the COVID-19 pandemic. Additionally, it not considered likely that a lack of noise survey information would influence the outcomes of the significance of effect assessment.

10.8.5.2 Construction Phasing Working Hours

Tendring District Council provides guidance on general working times for construction sites. These working hours are repeated below:

- Monday to Fridays: 8am to 6pm
- Saturdays: 8am to 1pm
- Sundays and Public/Bank Holidays: No works of any kind permitted
- No vehicle connected with the works to arrive on site before 7.30am or leave after 7pm (except in the case of emergency)

11 Road Drainage and the Water Environment

11.1 Introduction

The Road Drainage and the Water Environment chapter covers the surface water and groundwater environment, comprising the following elements:

- Hydromorphology (surface waters)
- WFD compliance
- Water Quality (surface water and groundwater routine runoff and spillage)
- Groundwater (levels and flows, groundwater dependent terrestrial ecosystems)
- Flood risk

The scoping assessment is based on the guidance set out within Section 3.2.1 of the DMRB LA 113: Road drainage and the water environment[164], and Section 2.2 of the DMRB LA 103: Principles and purpose of scoping[165].

The Road Drainage and the Water Environment environmental factor has close links with the Biodiversity and Geology and Soils topic areas. For this scoping assessment the potential impacts to groundwater from existing contaminated land is considered in the Geology and Soils chapter.

11.2 Baseline Conditions

11.2.1 Study Area

The study area has been defined as a 500 m buffer around the RLB of the proposed scheme in order to identify the fluvial geomorphology, groundwater and surface water quality receptors (see Appendix B Figure 11.1). For the assessment and identification of flood risk receptors the buffer area are extended to 1km (see Appendix B Figure 11.1). However, in certain circumstances, the study area may extend beyond the buffers identified in order to fully assess impacts.

11.2.2 Sources

The following sources of information have informed the scoping assessment:

- Aerial imagery
- A120/A133 Link Road. Stage 2 Desktop Study B355363A Rev A (Jacobs, 2019)
- British Geological Survey Geo Index Map (British Geological Survey, 2020)
- Contemporary Ordnance Survey maps
- Cranfield Soil and Agrifood Institute Soilscapes (Cranfield Soil and Agrifood Institute, 2020)
- Defra Magic Map Application (Defra, 2020)

[164] Highways England (2019a). Design Manual for Roads and Bridges: LA 113 Road Drainage and the Water Environment. [Online] Available at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3.htm [Accessed 31/03/2020].
[165] Highways England (2019b). Design Manual for Roads and Bridges: LA 103 Scoping projects for environmental assessment. [Online] Available at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3.htm [Accessed 31/03/2020].

- Environment Agency Guidance for Flood Risk Assessments: climate change allowances (Environment Agency, 2020b)
- Lidar Composite DTM 2017-1m (Environment Agency, 2020f)
- Environment Agency Catchment Data Explorer (Environment Agency, 2020c)
- Environment Agency Flood Map for Planning (Environment Agency, 2020a)
- Environment Agency Historic Flood Map (Environment Agency 2020e)
- Environment Agency Long term flood risk information mapping (Environment Agency, 2019b)
- Environment Agency Main River Map (Environment Agency, 2020d)
- Environment Agency's Risk of Flooding from Surface Water (RoFSW) mapping (Environment Agency, 2020g)
- Essex County Council Section 19 Flood Investigation Reports
- Groundsure Ltd Enviro Insight (Groundsure Ltd, 2019a) – contains information on pollution incidents, licensed abstractions, discharge consents, flooding and aquifer designations
- Groundsure Geo Insight Reports (Groundsure Ltd, 2019b) – contains information on geology and hydrogeology)
- Highways England Data Management System (HADDMS)
- Mid-Essex Strategic Flood Risk Assessment (SFRA) (Scott Wilson, 2007)
- National River Flow Archive (NRFA, 2020)
- Tendring District Council SFRA Addendum (Essex County Council Flood Services, 2017)

11.2.2.1 Consultation

Consultation was undertaken with the Environment Agency and Essex County Council as the Lead Local Flood Authority (LLFA) on the 25 of June 2019. The proposed scheme was introduced, and the consultees discussed their planning requirements for the assessment of minor watercourse crossings, proposed drainage (infiltration feasibility and storage requirements), water quality, hydrogeology and biodiversity. These informed the ES scope.

11.2.3 Water Environment Features

Surface water environment features within the study area are shown in Appendix B Figure 11.2.

There are 11 watercourses and a further two surface water features within the 500 m study area, described in Section 11.2.6. According to the Environment Agency's Statutory Main River Map there is only one Main River within the study area: Sixpenny Brook. The Sixpenny Brook is classified as an ordinary (minor) watercourse to the north of the existing A133. The remaining ten are classified as ordinary watercourses. The ordinary watercourses within the study area include tributaries of the Sixpenny Brook, Bromley Brook, minor road drains and land drains. The remaining two water features include a small artificial lake located to the south-east of Allen's Farm (NGR: TM 0551 2558) and a small pond located to the north of the scheme (NGR: TM 0693 2617).

In addition to the above there is a tributary of the Main River, Salary Brook that is within the 1 km study area.

The proposed scheme footprint traverses six of the identified ordinary watercourses this includes a tributary of the Bromley Brook to the north-east, a tributary of Sixpenny Brook to the south and four land/road drains.

11.2.4 Existing Surface Water Drainage Assets

A review of HADDMS[166] has been undertaken to identify the presence of existing drainage assets within the study area. The existing assets on the A120 mainly include gravity drains that discharges to existing highways network.

However, the location of drainage assets on the A133 is unconfirmed at this stage. It is assumed that the location of these would be identified with the development of the drainage design. Possible changes to the existing drainage assets resulting from the proposed scheme may need to be considered in the next stage of the assessment (ES stage).

11.2.5 Hydromorphology

The study area (Appendix B Figure 11.2) lies predominantly within the headwaters of the Sixpenny Brook catchment, but also crosses into the headwaters of the Tenpenny Brook catchment. One statutory designated Main River and ten ordinary watercourses are located within the 500 m study area[167]. Five ordinary watercourses: an unnamed tributary to Sixpenny Brook, an unnamed tributary of Bromley Brook, and three other unnamed watercourses are crossed by the scheme. The baseline characteristics of these watercourses are presented below from north to south, with the Main River Sixpenny Brook outlined first, followed by ordinary watercourses.

11.2.5.1 Sixpenny Brook

The source of Sixpenny Brook is located immediately south of Tye Road (TM 05011 25209) from where it flows south between arable fields under to a confluence with Tenpenny Brook (approximately 6.7 km downstream) (Appendix B Figure 11.2). The watercourse has a catchment area of approximately 9.5 km^2 [168]. Information from a gauging station downstream of the study area (NGR: TM 0545 2138[169]) states the catchment is predominantly arable agriculture (76 %) with small areas of grassland (10 %), woodland (5 %) and urban development (4 %).

Analysis of aerial imagery shows that the Sixpenny Brook has a straight planform and flows between arable fields. Downstream of Wivenhoe Road, the Sixpenny Brook is sinuous. The riparian vegetation broadly consists of hedgerow or grasses with regularly spaced trees. Aerial imagery shows no significant geomorphic features along the course of the brook.

The channel is crossed by a number of roads. It also appears to have a sluice gate preventing tidal ingress. Historical mapping[170] indicates limited significant change to the channel since 1874.

11.2.5.2 Unnamed Tributary of Bromley Brook 1 and 2

The source of the Unnamed Tributary of Bromley Brook 1 is north of the A120, between two arable fields (TM 0514 2675) from where it flows along a straight planform north-east for approximately

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[166] Highways England Data Management System (HADDMS) [Online] Available at: http://www.haddms.com/ [Accessed 31/03/20].
[167] Environment Agency (2020). Available at: https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386.
[168] UK Centre for Ecology and Hydrology. Available at: https://fehweb.ceh.ac.uk/.
[169] National River Flow Archive (2020). Available at: https://nrfa.ceh.ac.uk/data/search.
[170] Scottish National Library (2020). Available at: https://maps.nls.uk/geo/explore/#zoom=5&lat=56.00000&lon=-4.00000&layers=1&b=1.

1.1km to a confluence with Bromley Brook (Appendix B Figure 11.2). The watercourse has a catchment area of approximately 1.95 km^2 [168]. Unnamed Tributary of Bromley Brook 2 is approximately 500 m long and flows from Elmstead Hall (TM 06488 26032) east under the A120 to a confluence with Bromley Brook (Appendix B Figure 11.2). Land use in both catchments consists of arable fields, a number of small woodlands and woodland plantations, and industrial and residential properties. The riparian zones are vegetated by grasses and regularly spaced trees.

Analysis of aerial imagery shows no geomorphic features. The unnamed tributary of Bromley Brook 1 is culverted twice. Unnamed Tributary of Bromley Brook 2 is culverted once.

11.2.5.3 Unnamed Tributary of Sixpenny Brook

The source of the Unnamed Tributary of Sixpenny Brook is located south of Turnip Lodge Road (TM 0445 2515), from where it flows in a straight trapezoidal channel south-eastwards for approximately 600m to its confluence with Sixpenny Brook (Appendix B Figure 11.2). The watercourse from source to confluence, has a catchment area of approximately 1.1 km^2 [168] which predominantly consists of arable land.

Analysis of aerial imagery shows no geomorphic features. The riparian zone is vegetated by hedgerows and grasses with isolated trees with a 5 m buffer from arable land along both banks. The watercourse is culverted once under an access track. No notable changes to the channel have been identified since 1876170.

11.2.5.4 Other Watercourses

Seven other small unnamed watercourses have also been identified within the study area which are depicted on Figure 11.2 in Appendix B. These are:

- Unnamed Watercourse 1 (TM 0494 2461) approximately 160 m long drain flowing to Sixpenny Brook
- Unnamed Watercourse 2 (TM 0389 2441) approximately 600 m flowing west to artificial lakes
- Unnamed Watercourse 3 (TM 0480 2436) approximately 480 m long drain flowing to Sixpenny Brook
- Unnamed Watercourse 4 (TM 0506 2429) approximately 110 m long drain flowing to Unnamed Watercourse 3
- Unnamed Watercourse 5 (TM 0520 2602) approximately 350 m long field drain
- Unnamed Road Drains (TM 0539 2593) approximately 160 m and 140 m
- Tye Road Drain (TM 0513 2583) approximately 630 m long flowing to Sixpenny Brook

All unnamed watercourses appear to be straight drainage channels that flow between arable fields with limited riparian vegetation typically consisting of grasses or shrubs and occasional trees. Only short sections of Unnamed Watercourse 1 and two and Tye Road drain are vegetated by deciduous trees. Analysis of aerial imagery shows Unnamed Watercourse 2 flows west to a series of small artificial lakes. No geomorphic features are evident in other watercourses.

11.2.5.5 Other surface water receptors

One small artificial lake is located south-east of Allens Farm (Appendix B Figure 11.2). A small pond is located to the north of the scheme on the edge of a woodland. Due to the distance from the scheme and there being no interaction with scheme components, these have been scoped out.

11.2.6 Water Framework Directive

The scheme passes through the catchments of two fluvial WFD water bodies and one WFD groundwater body (Appendix B Figure 11.3). These are:

- Sixpenny Brook surface water body (GB105037034200)
- Tenpenny Brook surface water body (GB105037041310)
- Essex Gravels groundwater body (GB40503G000400)

A more detailed baseline assessment is provided in the preliminary WFD compliance assessment which is presented in Appendix F.

11.2.7 Surface Water Quality

One water quality monitoring point is present along Sixpenny Brook 3.4 km downstream of the A133 (Sixpenny Br. At Keelers Tye – NGR: TM 0556 2310)[171].The Nitrate Vulnerable Zone (NVZ) for Surface Water number 436 - Salary Brook NVZ lies partially within the study area.

A gauging station in the same location also records flow rates and a Base Flow Index. Flow rate for the Q95 is recorded at 0.003 m^3/s. Base Flow Index is recorded as 0.63.

The chemical quality of the Essex Gravels WFD Groundwater Body (GB40503G000400is currently (2016) classified as poor[172] Due to diffuse source pollution from poor livestock and nutrient management. The proposed scheme also lies within a NVZ for groundwater (Groundwater 78 - Sandlings and Chelmsford).

11.2.8 Discharge Consents, Water Abstractions and Pollution Incidents

There is one active licensed discharge consent to groundwater within the study area[173,174], detailed in Table 11-1.

Table 11-1 - Active licensed discharge consents to groundwater

Permit No.	NGR	Address	Effluent type	Receiving water
EPRFB3093WR	604908, 226877	Colchester Transfer Station, A120, Ardleigh, Colchester, Essex, CO7 7SL	Sewage & Trade Combined - Unspecified	Groundwater

The study area falls within a SPZ 3 likely to be associated with abstractions from the Chalk Principal aquifer to the north of the Proposed Scheme. Within the study area, groundwater in the Chalk is confined by the overlying low permeability London Clay Formation, which will afford considerable protection to groundwater in the Chalk aquifer. SPZs in the vicinity of the Proposed Scheme are shown on Figure 11.4 in Appendix B.

There are three active licensed groundwater abstractions within the study area, as shown on Figure 11.5 in Appendix B. Details are presented in Table 11-2.

[171] Environment Agency (2020). Available at: https://environment.data.gov.uk/water-quality/view/sampling-point/AN-TG305.
[172] Environment Agency (2019). Catchment Data Explorer. [Online] Available at: https://environment.data.gov.uk/catchment-planning/. [Accessed: 31/03/2020].
[173] Groundsure Ltd. (2019a). Enviro Insight – Allens Farm.
[174] Groundsure Ltd. (2019b). Geo Insight Reports – Allens Farm.

Table 11-2 - Active licensed groundwater abstractions

Licence No.	NGR	Distance and direction from Proposed Scheme*	Name	Aquifer**	Use	Max Daily Volume (m^3)
8/37/25/*G/0284	605600, 226500	Crossed by the Proposed Scheme	Jetwells at Collierswood Farm, Ardleigh	Superficial gravel	Spray Irrigation – Direct	682
8/37/25/*G/0289	605200, 225600	190m east	14 Wellpoints – Allens Farm	Superficial gravel	Spray Irrigation – Direct	474
8/37/25/*G/0224	606300, 226150	200m south-east	Elmstead Hall, Elmstead	Superficial gravel	Spray Irrigation – Direct	909
* This is the likely aquifer the borehole abstracts from based on review of BGS borehole scans. However, Environment Agency records will be needed to confirm this. ** The grid references for the groundwater abstractions are to the nearest 100m, as such distances are approximate and exact locations would need to be confirmed via site visits at the next stage of assessment						

Up-to-date records of licensed groundwater abstractions within the study area will be obtained from the Environment Agency for the next stage of assessment.

Records of unlicensed private groundwater abstractions (abstractions of less than 20 m^3/day) within the study area will be obtained from Tendring District Council for the next stage of assessment.

There are no Environment Agency recorded pollution incidents within the study area[173].

11.2.9 Groundwater

11.2.9.1 Baseline information sources

No project-specific intrusive GI have been carried out to date. GI is planned to inform the next stage of assessment.

11.2.9.2 Geology and aquifer designation

A brief description of the geology underlying the study area is given below, largely based on a review of several historical borehole records carried out as part of the Stage 2 Desk Study[175].

The majority of the study area is underlain by superficial deposits of coversands[176], of sandy silty clay. This is a Secondary B aquifer, which is an aquifer of predominantly lower permeability layers that may store and yield limited amounts of groundwater[177].

Underlying the coversands throughout the study area is the Kesgrave Catchment Subgroup of slightly silty sands and gravels. Where coversands are absent, the Kesgrave Catchment Subgroup outcrops at the surface[176]. The Kesgrave Catchment Subgroup is a Secondary A aquifer, which is an

[175] Jacobs (2019). A120/A133 Link Road. Stage 2 Desktop Study B355363A Rev A.
[176] British Geological Survey. (2020). GeoIndex. [Online] Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html. [Accessed: 31/03/2020].
[177] Defra (2020). Magic Map Application. [Online] Available at: https://magic.defra.gov.uk/MagicMap.aspx. [Accessed: 31/03/2020].

aquifer of permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers[177].

Bedrock the London Clay Formation (of the Thames Group), generally comprising firm to stiff silty clay[176]. This has been designated as Unproductive strata, which are rock layers with low permeability that have negligible significance for water supply or river base flow[177].

Underlying the London Clay Formation is the Lambeth Group and Thanet Sand Formation, Undifferentiated, generally comprising clays, sands and silts, designated as a Secondary A aquifer.

Underlying the Lambeth Group and Thanet Sand Formation, Undifferentiated, is the White Chalk Subgroup, generally comprising chalk with flints. This is designated as a Principal aquifer, which is an aquifer of highly permeable layers that usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

11.2.9.3 Soil type

Soils within the study area are slightly acid loamy and clayey soils with impeded drainage[178].

11.2.9.4 Groundwater levels

Several borehole records are available via BGS GeoIndex[176]. 26 borehole records were reviewed as part of the Stage 2 Desk Study[179]. The desk study states that groundwater was recorded within the sand and gravel of the Kesgrave Catchment Subgroup, typically at a depth around 2 metres below ground level (mbgl) to 4 mbgl. Water ingress into all exploratory holes was recorded as being medium or fast once a water strike occurred.

There was increased variability in groundwater levels recorded around the intersection of the existing A120 and Springvalley Lane (just outside the current study area).

There are three Environment Agency groundwater level observation boreholes in the vicinity. Available groundwater level data will be obtained for the next stage of assessment.

11.2.9.5 Springs

Four “issues” have been identified in the south and east of the study area, as shown on Figure 11.5 in Appendix B. The closest is 50 m east of the proposed scheme in the east and the other three are 300-450 m away in the south of the study area. These are potentially groundwater fed springs. There could also be additional springs within the study area that are not marked on Ordnance Survey mapping.

11.2.9.6 Interaction with Surface Water Features

Watercourses within the study area may receive baseflow from groundwater within the superficial aquifers.

In the east of the study area, 295 m east of the Proposed Scheme, is a body of open water. BGS mapping[176] indicates this area to be worked ground – void and so it is likely that this is a flooded former gravel pit. This feature is likely to be in hydraulic continuity with groundwater in the superficial aquifers.

[178] Cranfield Soil and Agrifood Institute (2020). Soilscapes. [Online] Available at: http://www.landis.org.uk/soilscapes/. [Accessed: 31/03/2020].
[179] Jacobs (2019). A120/A133 Link Road. Stage 2 Desktop Study B355363A Rev A.

During a walkover survey carried out in June 2019 for the Stage 2 Desk Study[175], it was noted that water appeared to be being drained into the body of open water from an adjacent active quarry via a pipe.

11.2.9.7 Potential Groundwater Dependent Terrestrial Ecosystems

The probable flooded gravel pit could potentially be classified as a groundwater dependent terrestrial ecosystem (GWDTE).

No other sites likely to be classified as GWDTE have been identified.

11.2.10 Flood Risk

The proposed scheme runs through agricultural land. The study area includes several farmhouses (e.g. Allens Farm, Ball's Farm) that may be affected by the proposed scheme.

11.2.10.1 Fluvial Flood Risk

The Environment Agency's Flood Map for Planning[180] indicates that there are areas designated as Flood Zone 3: greater than 1 % (1 in 100) Annual Exceedance Probability (AEP) and Flood Zone 2: between 0.1 % (1 in 1000) and 1 % (1 in 100) AEP within the 1 km study area (see Appendix B Figure 11.6).

There are areas of Flood Zones 2 and 3 associated with the Bromley Brook, located in the north-east of the study area, approximately 500 m from the proposed scheme. There is an additional area of Flood Zone 2 and 3 associated with the Sixpenny Brook located approximately 900 m to the south-east.

There are several other unnamed ordinary watercourses that form tributaries of the Bromley Brook, Sixpenny Brook and Salary Brook (a Main River) and other small land drains within the study area. The fluvial flood risk associated with ordinary watercourses is not always captured in the Environment Agency's Flood Map for Planning[180]. Therefore, the Environment Agency's RoFSW mapping[181] has been assessed in order to augment the assessment of baseline risk associated with the ordinary watercourses within the study area. The flood risk associated with these watercourses has been detailed in the Surface Water Flood Risk section (see Section 11.2.10.3).

At the time of writing this report, no information or maps were available on the functional floodplain or future fluvial flood extent as a result of climate change. Further investigation will be required to determine the fluvial flood risk to and from the scheme for the lifetime of the scheme. Therefore, fluvial flooding has been scoped in for further assessment.

11.2.10.2 Tidal Flood Risk

According to Mid-Essex SFRA[182] the tidal flood sources in the Mid-Essex region are associated with the North Sea and the estuary system, which includes the River Colne. The Sixpenny Brook, Salary

[180] Environment Agency Flood Map for Planning (Environment Agency, 2020a) [Online] Available at: https://flood-map-for-planning.service.gov.uk/confirm-location?easting=599091.672&northing=226405.12&placeOrPostcode=colchester [Accessed 31/03/2020].
[181] Environment Agency Long term flood risk information mapping (Environment Agency, 2019b) [Online] Available at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map [Accessed 31/03/2020].
[182] Mid-Essex Strategic Flood Risk Assessment (Scott Wilson, 2007) [Online] Available at: https://www.colchester.gov.uk/info/cbc-article/?catid=emerging-local-plan&id=KA-02202 [Accessed 31/03/2020].

Brook and Tenpenny Brook are tributaries of the River Colne. However, the SFRA details that none of these watercourses are considered as a major tributary that is influenced by tidal flooding.

A further review of the predicted impacts of climate change on sea level rise has been taken into consideration. Environment Agency Guidance for Flood Risk Assessments[183] details that the relative sea level rise for Anglian river basin would be 1.2 to 1.6 m by 2125. According to LIDAR information[184], the proposed scheme lies approximately 33m Above Ordnance Datum. The confluences of the River Colne and Salary Brook with the identified tributaries is approximately 20 - 25 m lower than the study area.

As such, the study area lies outside of an area that would be influenced by tidal flooding. Thus, tidal flood risk is scoped out of further assessment.

11.2.10.3 Surface water flood risk

According to Environment Agency's RoFSW mapping[185] the study area is predominantly within an area at very low risk: less than 0.1 (1 in 1000) AEP of surface water flooding, as shown in Appendix B Figure 11.7. There are, however, areas of predicted ponding which interact with the proposed scheme footprint defined by a medium risk of flooding: between 0.1 % (1 in 1000) and 1 % (1 in 100) AEP to low: less than 1 % (1 in 100) AEP. There is one overland surface water flow path of low flood risk within the study area, that flows south-east into the Sixpenny Brook.

There are areas of high risk of surface water flooding: greater than 3.3 % (1 in 30) AEP) in the north-east and south-east of the study area, predominantly located within the Flood Zone 3 extents of the Bromley Brook and Sixpenny Brook floodplains (assessed in Fluvial Flood Risk section).

The RoFSW mapping[185] identifies areas of high to medium surface water flood risk associated with the ordinary watercourses identified in Section 1. Therefore, surface water flood risk has been scoped in for further assessment.

11.2.10.4 Groundwater Flood Risk

The Tendring District Council SFRA[186] includes a map of Areas Susceptible to Groundwater Flooding. The map displays a susceptibility rating on a 1 km grid. The majority of the study area falls within 1km grid squares assigned <25 % susceptibility to groundwater flooding. The northeast part of the study area falls within grid squares assigned >=25 % <50 % susceptibility to groundwater flooding. The far southeast part of the study area falls within grid squares assigned >=50 % <75 % susceptibility to groundwater flooding. The areas with greater susceptibility to groundwater flooding coincide approximately with areas where superficial cover sands are absent and the sands and gravels of the Kesgrave Catchment Subgroup outcrop at the surface.

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[183] Environment Agency Guidance for Flood Risk Assessments: climate change allowances (Environment Agency, 2020b) [Online] Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances [Accessed 30/04/2020].

[184] Lidar Composite DTM 2017-1m (Environment Agency, 2020f) [Online] Available at: https://data.gov.uk/dataset/6a117171-5c59-4c7d-8e8b-8e7aefe8ee2e/lidar-composite-dtm-2017-1m [Accessed 30/04/2020].

[185] Environment Agency's Risk of Flooding from Surface Water mapping (Environment Agency, 2020g)[Online] Available at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map [Accessed 31/03/2020].

[186] Tendring District Council Strategic Flood Risk Assessment (Essex County Council, 2017) [Online] Available at: https://www.tendringdc.gov.uk/sites/default/files/DistrictSFRA.pdf [Accessed 31/03/2020].

The Groundsure report[187] indicates that there are areas in the vicinity of the study area that are susceptible to superficial deposits flooding. There is potential in these areas for groundwater flooding to occur at the surface.

The Tendring District Council SFRA[186] states that groundwater flooding is not considered as high risk across the district. In addition, at consultation, the Environment Agency stated that there were no known issues related to groundwater in the area and that there has historically been a lack of flooding.

Given that there are areas within the vicinity of the proposed scheme that are susceptible to groundwater flooding, groundwater flood risk has been scoped in for further assessment.

11.2.10.5 Flood Risk from Reservoir Failure

The Environment Agency's Long-term flood risk information mapping provides an indication of the areas at risk of flooding due to reservoir failure. This information is limited to those reservoirs that fall under the Reservoirs Act, 1975.

This suggests that there are no areas of risk within the study area and it has therefore been scoped out of the assessment.

11.2.10.6 Other Sources of Flood Risk

The proposed scheme lies within a rural area with a limited existing sewer network. Tendring District Council SFRA's Sewer Flooding Map[188] provides detail of sewer flooding incidents based on the DG5 data supplied by Anglian Water, up until February 2009. This indicates that the study area is located within the postal code area that has 18 recorded sewer flooding related events. However, these events have not been georeferenced to specific locations. A review of the Mid-Essex SFRA does not identify any records of sewer flooding within the study area. The risk is therefore considered to be low and sewer flooding is scoped out of further assessment.

The Environment Agency's Flood Map for Planning[189] indicates that there are no areas benefiting from flood defences, nor are there any flood defences, within the study area. Consequently, the risk of flooding from flood defence failure is considered low and scoped out of further assessment.

Baseline mapping identifies that there is an artificial lake within the study area near Allen's Farm, see Appendix B Figure 11.2. The lake appears to be retained by an earth embankment, which if breached could pose a risk of flooding to the proposed scheme. At the time of writing there was no information available on the lake. Therefore, the risk of flooding from artificial water retaining infrastructure is scoped into the assessment

There are no canals within the study area. Thus, the risk of flooding from canals is scoped out of further assessment.

[187] Groundsure Ltd. (2019a). Enviro Insight – Allens Farm.
[188] Tendring District Council Strategic Flood Risk Assessment (Essex County Council, 2017) [Online] Available at: https://www.tendringdc.gov.uk/sites/default/files/DistrictSFRA.pdf [Accessed 31/03/2020].
[189] Environment Agency Long term flood risk information mapping (Environment Agency, 2019b) [Online] Available at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map [Accessed 31/03/2020].

11.2.10.7 Historical Flood Events

The Environment Agency's Historic Flood Map[190] identifies the maximum recorded extent of flooding from rivers and groundwater. There are no recorded historic flood events within the study area.

The HADDMS's[191] records show that there were two historical flood records along the A120, in the north-east and north-west of the study area, dated in 2014 and 2016. It was recorded that for one of the events, flooding occurred due to water overflowing from the adjacent fields. The other flood event was assumed to be a result of blocked gullies. In both flood events the gullies had to be cleared in order to relieve the flow.

11.2.10.8 Factors Influencing the Future Baseline

Baseline conditions for flood risk and geomorphology could change over the anticipated lifetime of the proposed scheme as a consequence of climate change, land use changes and measures to improve watercourses in line with WFD objectives. It is likely that flood events will increase in frequency and magnitude in the study area.

Continued implementation of the WFD in the Tenpenny Brook and Sixpenny Brook WFD water body catchments could potentially result in improvements in the water quality and geomorphology of the watercourses identified in the baseline.

11.3 Legislation and Policy

The following legislation provides context for the assessments made in this chapter:

- WFD (2000): European Directive setting out requirements for the protection of surface and groundwaters throughout Europe. Enacted in English law by The WFD (England and Wales) Regulations 2017 (SI 407/2017)
- Floods Directive (2007): European Directive for the assessment and management of flood risks, reinforcing the rights of the public to access this information and contribute to the planning process
- Reservoir Act (1975): Provides provision against the escape of water from large reservoirs, lakes and lochs that have been artificially created or enlarged
- Water Resources Act (1991): Consolidation of previous legislation including water resource management, water quality standards and empowering the Environment Agency to regulate and manage works affecting designated Main Rivers and create Byelaws
- Land Drainage Act (1991, further updated in 1994): Empowering Drainage Authorities to regulate works to ordinary watercourses (non-main rivers)
- Environment Act (1995): Creating a number of new agencies (including the Environment Agency) and setting new standards for environmental management
- Water Act (2003, further updated in 2014): Extending the provisions of the Water Resources Act (1991) and the Environment Act (1995) for abstractions and discharges, water conservation and pollution control

[190] Environment Agency Historic Flood Map (Environment Agency 2020) [Online] Available at: https://data.gov.uk/dataset/76292bec-7d8b-43e8-9c98-02734fd89c81/historic-flood-map [Accessed 31/03/2020].
[191] Highways England Data Management System (HADDMS) [Online] Available at: http://www.haddms.com/ [Accessed 31/03/2020].

- Climate Change Act (2008): Sets out targets and duties for the mitigation and adaption to climate change
- Flood Risk Regulations (2009): Sets out the duties regarding preliminary flood risk assessments, flood hazard maps and flood risk maps and management plans and the duty of cooperation between the Environment Agency and the LLFA
- Flood and Water Management Act (2010): Designating Lead Local Flood Authorities and empowering them to identify and manage flood risks from surface water runoff, groundwater and ordinary watercourses
- The Water Environment (WFD) (England and Wales) Regulations (2017): Sets out requirements for the protection of surface and groundwaters in England and Wales
- The Groundwater (WFD) (England) Direction (2014, further updated in 2016): Aims to prevent the entry into groundwater of "hazardous substances" and the pollution of groundwater by "non-hazardous pollutants"
- The Environmental Permitting (England and Wales) Regulations (2016): Provides regulation and licensing requirements for the regulation of water discharges to controlled waters
- Water Supply (Water Quality) (Amendment) Regulations (2016): The regulations set out standards (based on EU Directives) for the quality of water intended for domestic purposes or for use in food production
- Private Water Supplies (England) Regulations (2016): Covers private water supplies. Confers a duty on local authorities to monitor private water supplies
- NPPF and accompanying Planning Practice Guidance, (MHCLG, 2019a and 2019b): sets tests to protect people and property from flooding. Where these tests are not met new development should not be allowed. The main steps are designed to ensure that: if there are better sites in terms of flood risk; a proposed scheme cannot be made safe; or the development adversely impacts water quality, it should not be permitted

Tendring District Local Plan 2007 (Adopted 2007)

- Policy QL3 Minimising and Managing Flood Risk: Covers the council's approach to managing flood risk in all stages of the planning process
- Policy QL7 Rural Regeneration: Covers the protection and enhancement of biodiversity
- Policy QL9 Design of New Development: Encourages good design of development, including incorporating existing water features
- Policy QL11 Environmental Impacts and Compatibility of Uses: Sets out environmental criteria for new development, including criteria relating to water environment with specific reference to water courses and groundwater
- Policy QL1 Planning Obligations: Sets out the council's obligations to grant planning permissions this may include environmental improvements and flood mitigation
- Policy COM19 Contaminated Land: Sets out requirements for work to be undertaken in contaminated land
- Policy COM23 General Pollution: Sets out requirements for development to minimise pollution including the release of pollutants to surface water of groundwater
- Policy COM33 Flood Protection: Sets out requirements for development to minimise tidal flooding

- Policy EN6 Biodiversity: Sets out requirements for development to protect or enhance local biodiversity and geodiversity

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- The following policies have been detailed within the draft document however there is no detailed information:
- Policy PPL1 Development and Flood Risk
- Policy PPL4 Biodiversity and Geodiversity
- Policy PPL5 Water Conservation, Drainage and Sewerage

11.4 Value of Environmental Receptors

The value (sensitivity) of environmental receptors has been determined based on DMRB LA 113[164] (Table 3.70). This chapter also assesses hydromorphology which is not included in the DMRB LA 113[164] (Table 3.70). The specific value criteria for the hydromorphology receptors has been presented in Table 11-3.

Table 11-3 - Fluvial geomorphology specific value criteria

Value (sensitivity)	Typical examples
Very high	Hydromorphology: A watercourse that appears to be in complete natural equilibrium and exhibits a natural range of morphological features. There is a diverse range of fluvial processes present, free from any modification or anthropogenic influence. Morphological features and processes would be highly sensitive to change as a result of temporary or permanent works.
High	Hydromorphology: A watercourse that appears to be in natural equilibrium and exhibits a natural range of morphological features. There is a diverse range of fluvial processes present, with very limited signs of modification or other anthropogenic influences. Morphological features and processes would be sensitive to change as a result temporary or permanent works.
Medium	Hydromorphology: A watercourse showing signs of modification, recovering to a natural equilibrium, and exhibiting a limited range of morphological features (such as pools and riffles). The watercourse is one with a limited range of fluvial processes and is affected by modification or other anthropogenic influences. Morphological features and processes could be sensitive to change as a result temporary or permanent works.
Low	Hydromorphology: A highly modified watercourse that exhibits no morphological diversity and has a uniform channel, showing no evidence of active fluvial processes. Has likely been significantly affected by anthropogenic factors which may include modification of flow regime, resulting in a dry channel during prolonged dry periods. Morphological features and processes would be unlikely to be sensitive to temporary or permanent works. Includes heavily modified Main Rivers and drainage channels.

Table 11-4 summarises the initial assessment of the value of receptors within the study area. The flood risk receptors are defined by the vulnerability of developments as defined in NPPF, Paragraph

066 (Table 2 Flood risk vulnerability classification). Surface Water Quality receptor value is defined in DMRB LA113[164], Table 3.70. It has been assumed that the Sixpenny Brook has a Q95 of >0.001 m^3s and all ordinary watercourses (as small drains) have a Q95 of <0.001 m^3s.

Table 11-4 - Value of receptors for road drainage and the water environment

Value (sensitivity)	Road Drainage and the Water Environment element	Receptors within the study area
Very high	Flood Risk	The A133 and A120 (receptors) are essential infrastructure.
	Hydromorphology	None identified
	Surface Water Quality	None identified
	Groundwater	White Chalk Subgroup Principal aquifer (at depth)
High	Flood Risk	Residential areas such as Elmstead Market and several farmhouses (e.g. Allens Farm, Ball's Farm)
	Hydromorphology	None identified
	Surface Water Quality	Sixpenny Brook
	Groundwater	Kesgrave Catchment Subgroup Secondary A aquifer Lambeth Group and Thanet Sands Formation, Undifferentiated Secondary A aquifer Licensed non-potable groundwater abstractions Unlicensed potable groundwater abstractions (presence and locations currently unknown) Issues marked on Ordnance Survey mapping with potential to be springs Open water in east of study area may have ecological value and be dependent on groundwater Listed buildings
Medium	Flood Risk	Agricultural buildings (e.g. Turnip Lodge Cottages, Friars Hall Cottages).
	Hydromorphology	Sixpenny Brook
	Surface Water Quality	Unnamed Tributary of Sixpenny Brook, Unnamed Tributary of Bromley Brook 1
	Groundwater	Coversands Secondary B aquifer Private non-potable groundwater abstractions (presence and locations currently unknown) Watercourses receiving baseflow from Secondary aquifers

Value (sensitivity)	Road Drainage and the Water Environment element	Receptors within the study area
		SPZ 3 Residential properties
Low	Flood Risk	None
	Hydromorphology	All unnamed Tributaries of Bromley Brook and Sixpenny Brook, Unnamed watercourse 1, 2, 3, 4, and 5, Unnamed Road Drain, Tye Road Drain
	Surface Water Quality	Unnamed Tributary of Bromley Brook 2, Unnamed watercourse 1, 2, 3, 4 and 5, Unnamed Road Drain, Tye Road Drain
	Groundwater	London Clay Formation Unproductive strata Unoccupied buildings

11.5 Potential Impacts

11.5.1 Construction Phase

11.5.1.1 Flood risk

The construction of the Proposed Scheme could lead to:

- Temporary works and alterations within or adjacent ordinary watercourses (e.g. tributaries of Sixpenny and Bromley Brook) may affect the frequency, depth, extent and duration of fluvial flooding. Temporary earthworks and general site activities taking place in floodplains has the potential to create a loss of floodplain storage. Alterations to culverts and other structures conveying water could also result in a temporary loss of capacity. This has the potential to increase flood risk to receptors further downstream (and potentially upstream)
- Temporary drainage has the potential to increase the volume and rate of surface water runoff to a receiving watercourse, increasing of fluvial flood risk. Also, the potential transfer of sediment into the watercourse may affect the flood mechanisms
- The temporary increase in impermeable surfaces from haul routes and construction compounds could result in increased runoff volumes and velocities. This could lead to an increase in the risk of flooding downstream
- Surface water flow paths could be altered due to construction activities or haul roads blocking existing, or creating new, flow paths. Potential alterations to culverts or drainage systems could result in a temporary loss of capacity and potential blockage with construction debris, resulting in overflowing drains
- Provision of cuttings, including the excavation of materials and construction of below ground structures, could provide a route of egress for groundwater. This could result in an increased risk of groundwater flood risk
- Temporary drainage could increase both the rate and volume of surface water runoff to a receiving watercourse and has the potential to transfer sediment (potentially affecting flooding mechanisms)

11.5.1.2 Hydromorphology

The construction of the Proposed Scheme could lead to:

- Increased fine sediment delivery causing channels to silt up or bury coarse substrate
- Removal of riparian vegetation and modification/damage to the channel banks, impacting on bank stability
- Disturbance of channel bed and bank material and structure during in-channel working

11.5.1.3 Water quality

The construction of the Proposed Scheme could lead to:

- Spillage and leakage of chemicals, such as oils and petrochemicals, could make contact with watercourses, groundwater and/or drainage networks adversely impacting water quality
- Mobilisation of sediment to surface waters impacting water quality and aquatic ecosystems. Increases in run-off through soil compaction and increases in impermeable area can also occur. Works directly within watercourses also poses a risk of mobilising sediment within the watercourse
- Altered overland flow paths could connect areas of contamination or pollution with watercourses or groundwater

11.5.1.4 Groundwater

The construction of the Proposed Scheme could lead to:

- Excavation of underground structures has the potential to disturb shallow groundwater flow paths, which may increase the risk of groundwater flooding up-gradient
- Potential impacts to groundwater quality due to physical disturbance of aquifer materials leading to increased turbidity
- Spillage and leakage of polluting materials such as petroleum, oils and cement to ground could result in contamination
- Potential changes to groundwater quantity as a result of dewatering or changes to land cover, which could impact on local abstractions and habitats that rely on groundwater
- Potential impacts to listed and other buildings and infrastructure due to subsidence induced by dewatering
- Physical disruption to/destruction of groundwater resources such as abstraction points

11.5.2 Operational Phase

11.5.2.1 Flood Risk

The operation of the proposed scheme could lead to:

- Roads are designed to drain freely and avoid the build-up of standing water on the carriageway. However, the permanent increase of impermeable area could result in increased runoff greater the impermeable area the greater the attenuation required
- The proposed scheme involves the addition of seven proposed culverts under ordinary watercourses. The addition of new (or modification of existing) culverts, the interception of overland flows, and the realignment of watercourses, could potentially disrupt local flow routes increasing flood risk

- The construction of below ground features may affect groundwater flows resulting in permanent alteration of the groundwater table, including flow patterns and baseflow to rivers. This could result in an increase in groundwater flood risk

11.5.2.2 Hydromorphology

The operation of the proposed scheme could lead to:

- Lateral and longitudinal connectivity could be reduced and become fragmented by the construction of culverts
- Loss of natural bank material and riparian zone at the culverts and any outfall headwalls
- Loss of potential geomorphic features, bed forms and natural substrate at the culverts
- Potential for altered flow processes and patterns of erosion and deposition downstream of the culverts and any outfalls
- Increased volumes of run-off and fine sediment delivery from discharge of road run-off via outfalls could result in alterations to in-channel flow processes and patterns of erosion and deposition

11.5.2.3 Surface Water quality

During operation pollution from road drainage can arise from a variety of sources including:

- Fuel and other oil deposits on the road due to leakage
- Hydrocarbons from exhausts
- Lead, copper, zinc and cadmium deposits from exhausts and brake and tyre wear
- Synthetic rubber deposits from tyre wear
- Chemicals used in windscreen washes such as detergents or de-icer
- De-icing agents such as salt, but also potentially including trace amounts of impurities such as cyanide, metals and clays

Contaminants deposited on the road surface are quickly washed off during rainfall, entering the highway drainage system and potentially having an adverse effect on the receiving watercourses and their ecology.

For WFD classified waterbodies, the Environmental Quality Standard of the receiving waters must be met and discharges from roads must not lead to a deterioration in the classification status of the receiving water body as determined in the relevant River Basin Management Plan.

During operation, there is also a risk that polluting materials may be accidentally spilt onto the road surface as a result of a road accident.

11.5.2.4 Groundwater

The operation of the proposed scheme could lead to:

- Below-ground structures have the potential to disrupt groundwater flows, potentially resulting in increased groundwater flood risk upstream and/or decreased flow downstream
- Routine road runoff and accidental spills have the potential to pollute groundwater bodies via infiltration from filter drains and attenuation ponds

11.6 Design, Mitigation and Enhancement Measures

11.6.1 Construction phase

In accordance with DMRB LA120 an Outline Environmental Management Plan (OEMP) should be prepared to mitigate short term impacts. Development and implementation of a CEMP should be undertaken before and during construction to reduce adverse impacts on the environment from construction. The CEMP is a live document which should be updated constantly, as additional information or alterations arise. The CEMP should be prepared in alignment with industry best practice measures to limit the risk of pollution and long-term damage to water receptors, for example Guidance for Pollution Prevention 5[192]. An Environmental Clerk of Works should attend site to ensure that the contractors are following the CEMP.

With regard to the water environment the CEMP would include the following information:

- Measures to limit increases to flood risk, and deterioration of water quality and geomorphology
- Where possible, avoidance of areas with a high risk of flooding
- Drainage and sediment management to control the quantity and quality of runoff
- Surface water management plan or pollution/spillage management and response plans
- Appropriate storage, handling and use of substances hazardous to the water environment
- Monitoring of groundwater quality and quantity to confirm baseline conditions, the likelihood of impacts and if mitigation measures are effective
- Physical protection or relocation of existing groundwater abstractions and other groundwater resources that may be impacted

11.6.2 Operational phase

11.6.2.1 Flood Risk

During the operational phase, several actions and considerations can be taken to manage increased flood risk. Such measures may include, but are not limited to:

- A robust surface water drainage strategy should be designed to ensure discharge from the proposed scheme does not increase flood risk elsewhere up to and including the 1 % (1 in 100) AEP rainfall event, with the appropriate allowances for climate change
- The proposed surface water drainage should discharge in accordance with the drainage hierarchy set out in the Guidance for Pollution Prevention[192] and the Non-Statutory Technical Standards for Sustainable Drainage Systems (SuDS) to achieve greenfield runoff rates and ensure that surface water is managed as close to its source as possible
- Incorporation of SuDS features where possible in the design process. SuDS should be used to attenuate discharge and treat contaminants and fine sediments, reducing pollution
- Where possible, the provision of crossings or culverts be implemented to maintain existing overland flow paths. Where not possible, drainage or suitable attenuation areas should be sought

[192] NRW, NIEA and SEPA. (2018). Guidance for Pollution Prevention 5: Works and maintenance in or near water.

- Provision of a proposed surface water drainage maintenance plan

11.6.2.2 Hydromorphology

All outfalls and culverts should be designed to specifications set out in the Construction Industry Research and Information Association (CIRIA) C768 – Culvert, screen and outfall manual.

To reduce the potential for erosion of the channel bed and banks downstream of outfalls, reduce the delivery of additional fine sediment to receiving watercourses, and minimise changes to flow dynamics, SuDS should be utilised.

11.6.2.3 Surface Water Quality

SuDS to attenuate discharges and treat contaminants should be put in place.

A drainage treatment schedule and Highways England Risk Assessment Tool (HEWRAT) assessment would be prepared in order to guide SuDS design and demonstrate that there would be no detriment to water quality caused by the operation of the proposed scheme.

11.6.2.4 Groundwater

Measures may include the design of permanent structures in line with best practice and CIRIA guidance (such as C591, C592) including the use of soft-engineering techniques where practicable.

Should proposed drainage include discharge to ground, such as via filter drains, then an assessment of the potential contamination risk to groundwater will be carried out in line with DMRB guidance.

Detailed analysis of required measures to address specific and long-term water environment impacts will be identified at the next stage of the project.

11.7 Development of Likely Significant Effects

Table 11-5 identifies the likely effect of the proposed scheme, with those that are likely to be significant taken forward for further assessment. Criteria for determining likely significant effects and the proposed assessment methodologies are discussed in Section 11.8

Table 11-5 - Description of likely significant effects

Scheme component	Road Drainage and the Water Environment element	Receptors	Scoped In/Out	Justification
Construction	Flood Risk	Properties and associated road infrastructure	Scoped in	Potential increases in flood risk from the temporary addition of impermeable area, interception of overland flow paths, blocking of drainage systems, temporary dewatering activities, and the interception of the groundwater table by cutting activities.
	Hydromorphology	Watercourses in proximity to construction compounds or receiving discharge from surface water run-off from compounds	Scoped out	Adherence to good practice principles and CIRIA guidance, including a CEMP, would sufficiently mitigate impacts.
	Groundwater*	Groundwater within superficial aquifers and secondary receptors such as abstractions, springs and groundwater dependent surface water features	Scoped out	Potential for spillage and/or leakage of polluting materials to ground and/or surface water causing contamination of groundwater sufficiently mitigated by adherence to good practice principles and CIRIA guidance, including a CEMP.
			Scoped in	Disturbance of superficial aquifer materials leading to increased turbidity Impacts to groundwater levels and flows in the superficial aquifers due to dewatering.
	Surface Water Quality	Surface waters in proximity to construction activities and construction compounds or that surface run-off is discharged to	Scoped out	Potential delivery of pollutants from run-off, spillage and leakage of polluting material would be mitigated by adherence to good practice and CIRIA guidelines and through implementation of a CEMP.

Scheme component	Road Drainage and the Water Environment element	Receptors	Scoped In/Out	Justification
Construction Haul roads	Flood Risk	Properties and existing road infrastructure within the study area.	Scoped in	Potential increases in flood risk as a consequence of the temporary addition of impermeable area, the interception of overland flow paths, the blocking of drainage systems, temporary dewatering activities, and the interception of the groundwater table by cutting activities.
	Hydromorphology	Sixpenny Brook	Scoped in	Potential delivery of fine sediment from run-off from haul roads would be mitigated by adherence to good practice and CIRIA guidelines and through implementation of a CEMP. Potential for altered flow regime and processes, changes to substrate, connectivity, riparian vegetation and channel dimensions at haul road crossings
		All Low value watercourses receiving discharge of surface water run-off or crossed by haul roads	Scoped in	Magnitude of impact is not anticipated to be great enough to trigger a significant effect following adherence to good practice and CIRIA guidelines.
	Groundwater*	Groundwater within superficial aquifers and secondary receptors such as abstractions, springs and groundwater dependent surface water features	Scoped out	Potential for spillage and/or leakage of polluting materials to ground and/or surface water causing contamination sufficiently mitigated by adherence to good practice principles and CIRIA guidance, including a CEMP. Impacts to groundwater levels and flows are unlikely.
	Surface Water Quality	Surface waters in proximity to haul roads or that surface run-off is discharged to	Scoped out	Potential delivery of pollutants from runoff, spillage and leakage of polluting material would be mitigated by adherence to good practice and CIRIA guidelines and through implementation of a CEMP.
Highway structures (including highways drainage structures, maintenance roads, culverts and outfalls) operations	Flood Risk	The existing A120 and A133, new road, various farmhouses and residences.	Scoped in	Potential increase in flood risk from the interception/alteration of overland flows.
	Hydromorphology	Sixpenny Brook	Scoped in	Potential for altered flow regime and processes, changes to substrate, connectivity, riparian vegetation and channel dimensions

Scheme component	Road Drainage and the Water Environment element	Receptors	Scoped In/Out	Justification
		All Low value watercourses crossed or requiring outfalls	Scoped out	Magnitude of impact is not anticipated to be great enough to trigger a significant effect following adherence to good practice and CIRIA guidelines.
	Groundwater*	Groundwater within superficial aquifers and secondary receptors such as abstractions, springs and groundwater dependent surface water features	Scoped in	Any below-ground structures may disrupt groundwater flows and levels, impacting secondary receptors. The Proposed Scheme passes close to or through a licensed groundwater abstraction at Collierswood Farm
	Surface Water Quality	Watercourses impacted by highway structures	Scoped out	No impacts upon water quality from highway structures. Impacts relating to the discharge of road runoff associated with outfalls is assessed below.
Cuttings/excavations and below-ground structures during construction and operation	Flood Risk	Various farmhouses (e.g. Allen's Farm) and associated roads	Scoped in	Potential increases in flood risk from prolonged interception of the groundwater table by below-ground structures (i.e. cuttings).
	Hydromorphology	All watercourses	Scoped out	There are no cuttings or excavations across watercourses. Excavations in proximity to watercourses are minor and the magnitude of impact is not anticipated to be great enough to trigger a significant effect.
	Groundwater*	Groundwater within the superficial aquifers and secondary receptors such as abstractions, springs and groundwater dependent surface water features	Scoped in	Dewatering may be required, although design fix A does not include any significant cuttings. Below ground structures may alter groundwater flow paths.
		Listed buildings and other buildings, structures and infrastructure	Scoped out	Based on design fix A, the extent of dewatering is likely to be limited and impacts due to subsidence are unlikely.
	Surface Water Quality	Surface waters in proximity to cuttings/excavations	Scoped out	Limited excavations and cuttings are not anticipated to result in water quality impacts. Potential for connection of contaminated groundwater to surface water anticipated to be managed by adherence to good practice and CIRIA guidance, including implementation of a CEMP.

Scheme component	Road Drainage and the Water Environment element	Receptors	Scoped In/Out	Justification
Road run-off and accidental spillages during operation	Flood Risk	Properties, existing road infrastructure and surrounding land areas.	Scoped in	Potential for the introduction of new impermeable surfaces to increase flood.
	Hydromorphology	Sixpenny Brook	Scoped in	Potential for altered flow regime and processes, changes to substrate, connectivity, riparian vegetation and channel dimensions
		All low value watercourses receiving discharge from surface water run-off	Scoped out	Magnitude of impact is not anticipated to be great enough to trigger a significant effect following adherence to good practice and CIRIA guidelines.
	Groundwater*	Groundwater within superficial aquifers via infiltration from road drainage system. Secondary receptors such as abstractions, springs and groundwater dependent surface water features	Scoped in	The current drainage design allows for infiltration to ground. The contamination risk to groundwater in the superficial aquifers should therefore be assessed.
	Surface Water Quality	All watercourses receiving runoff from the proposed scheme (to be identified through the drainage design at the next stage).	Scoped in	As no drainage design has been made available to inform the scoping assessment, significant impacts cannot be ruled out. It is likely that significant effects could be mitigated through the implementation of SuDS.
* For groundwater, due to the depth to the bedrock Secondary and Principal aquifers (Lambeth Group and Thanet Sand Formation, Undifferentiated and White Chalk Subgroup) and the overlying low permeability London Clay Formation, impacts to these aquifers are scoped out.				

11.8 Proposed Assessment Methodology

11.8.1 Assessment

This section demonstrates how the magnitude of effects for the sensitive receptors, as detailed in Section 11.4 would be determined during assessment for the ES. Magnitude of effects area determined based on DMRB LA 104 guidance. Discipline specific criteria developed using LA 113[164] guidance and professional judgement has been presented in Appendix G.

11.8.1.1 Assessment Criteria

Taking into account the value of the receptor and the magnitude of the potential impact, the significance of the impact can be defined. The analysis is based on the value criteria included in DMRB LA 113[164] (Table 3.70) and Table 11-3 and magnitude criteria including Appendix G.

Considering the value of the receptor and the potential magnitude of impact, the significance of the effect is then determined based on the combination of the two using the matrix in DMRB LA 104 – Table 3.8. Potential effects could be either beneficial or adverse.

For the purposes of the EIA regulations effects described as having a Moderate effect or above are considered to be significant.

11.8.1.2 Key Guidance Documents

The key guidance documents considered in this assessment include:

- Planning Inspectorate Advice Note 18: The WFD: Advice note from the Planning Inspectorate detailing the WFD process and information required at each stage of the WFD assessment process
- Guidance for Pollution Prevention: Non-regulatory guidance (in England) covering management of potential pollutants
- The Environment Agency's Approach to Groundwater Protection (February 2018 Version 1.2) sets out the Environment Agency position statements which provide information on the Environment Agency's approach to managing and protecting groundwater
- CIRIA C591 – Infrastructure cuttings – condition appraisal and remedial treatment: Guidance addressing technical issues in design, repair and maintenance of infrastructure cuttings
- CIRIA C592 – Infrastructure embankments – condition appraisal and remedial treatment (second edition): Guidance addressing technical issues in design, repair and maintenance of infrastructure embankments

11.8.2 Environment Statement Methods

The methodologies which would be followed are presented in Table 11-6.

Table 11-6 - Road drainage and the water environment assessment methods for ES

Potential impact	Mechanism	Level of assessment (simple/detailed)
Flood risk (to project)	Alignment, location, drainage design	Flood Risk Assessment, including hydrological assessment.
Flood risk (resulting from project)	Drainage design, impoundment, runoff rate, blockage, barrier	

Potential impact	Mechanism	Level of assessment (simple/detailed)
Hydromorphology	Alteration of processes e.g. Flow rate, scour	Site specific simple assessment
	Alteration of features e.g. construction in, or alteration of, bed and banks	
Water quality (groundwater)	Routine runoff	HEWRAT - pass or fail at simple assessment. LA113 detailed assessment if necessary.
	Spillage	HEWRAT Spillage Risk Assessment - no detailed assessment method available, pass or fail at simple assessment
Groundwater level and flow	Altered drainage regime, physical barrier, dewatering	Conceptual model development – LA113 Appendix A assessment.
Groundwater dependent terrestrial ecosystems (GWDTE)	Altered drainage regime, physical barrier, dewatering	If GWDTEs are identified, then a GWDTE assessment shall follow Appendix B of LA113.
	Routine runoff	
	Spillage	
Water quality (surface water)	Routine runoff	HEWRAT – LA113 routine runoff and surface water quality pass or fail at simple assessment.
	Spillage	HEWRAT Spillage Risk Assessment – LA113 spillage and water quality assessment pass or fail at simple assessment.
Construction phase impacts	Spillage, sediment release, scour, blockage and others	Follow guidance in CIRIA Report C648
Cumulative impacts	Above mechanisms in combination	Follow requirements in LA 104 Environmental assessment and monitoring.
Contravention of WFD	Above mechanisms in isolation or combination	Detailed WFD Assessment in line with PINS Guidance Note 18 (See Preliminary WFD compliance assessment for methodology, Appendix F)

11.8.3 Effects of Covid-19

COVID-19 may restrict the ability to carry out site walkovers or GI and, in this case, if surveys are not possible the assessment will be solely based on desk study

If surveys are not undertaken, the presence and/or status of potential springs, potential GWDTE and groundwater abstractions will be uncertain

If a GI is delayed then details of the local geology and groundwater levels, and how the levels vary over time, may not be available for the ES.

All available desk study resources and liaison with relevant stakeholders will be used to reduce uncertainty as far as possible but a conservative approach will be taken to provide a realistic worst case assessment.

The resulting assessment may be overconservative, and allowance should be made for site surveys at a later stage.

11.8.4 Assessment Assumptions and Limitations

The assessment of potential effects is based on the design detailed in Chapter 2 - The Proposed Scheme. At the time of writing, details regarding the proposed design of drainage and mitigation measures were not available to inform this Scoping Report.

It is assumed that information requested from the Environment Agency and Local Authority will be made available for inclusion in the assessment at the next stage.

The scoping assessment assumes that all mitigation suggested is followed. Should this not be the case there is the potential for significant impacts.

For the scoping assessment fluvial flood risk has been determined according to the Environment Agency Flood Map for Planning[180]. Whilst this provides the flood risk associated predominantly with Main Rivers, it does not necessarily capture the fluvial flood risk associated with ordinary watercourses or the predicted influence as a result of climate change. The Environment Agency RoFSW mapping[185] has therefore been used to assess fluvial flood risk associated with smaller watercourses. This is considered to be a reasonable representation of the risk; however, further investigation may be required at later stages as the project progresses. The assessment approach should be agreed in advance with the LLFA.

No site work, including GI, has yet been conducted and this scoping assessment is based on desk-based information only. Due to the COVID-19 outbreak, site work may not be undertaken prior to the impact assessment. If this is the case the baseline will be based upon available information from a desk study. However, this is not anticipated to result in a significant change to the assessment.

Drainage data, pollution incident data, and information on discharge consents and abstraction licenses used for this scoping assessment was obtained in 2019. The latest information, where available, will be obtained at the next stage of assessment.

The assessment will depend largely on third party information and will, therefore, be reliant on the accuracy and completeness of these data. Where appropriate, third-party data will be supplemented by site walkovers and GI depending on COVID-19 restrictions Again, if surveys are not possible the assessment will be solely based on desk study.

Based on the design of the proposed scheme and the site's setting, assessments will be largely qualitative with the magnitude of impacts assessed using professional judgement and experience of other projects. A HEWRAT assessment will be required to determine the risk of impact to water quality.

12 Population and Human Health

12.1 Introduction

This chapter provides a summary of the population and human health baseline conditions; legal and policy context; value of receptors (where receptors include the resources which support a population); an outline of potential population and human effects; as well as the proposed scope and methodology for the population and human health assessment for the ES for the proposed scheme.

Health is defined as a "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948)[193]. Highway projects can affect human health in a variety of direct and indirect ways. Figure 12-1 provides an illustration of some of the pathways through which a highway scheme, and its associated traffic, can affect physical and mental health.

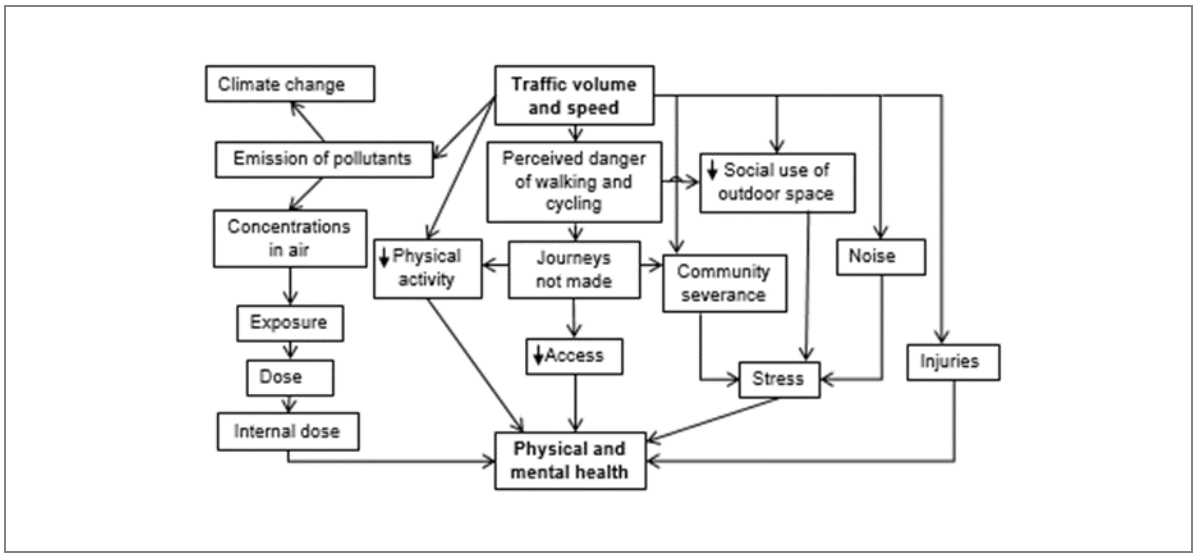

Figure 12-1 - Links between traffic volume and speed on health (adapted from West Midlands Health Observatory, 2006)

For the purposes of this Scoping Report, human health is considered at a community level, rather than an individual level. This is because individuals each have their own genetic, social, lifestyle and household circumstances that would influence their individual health, but which cannot be known or accounted for in an assessment of this type due to confidentiality of clinical data. Instead, the scope of this assessment relies upon health data at community (ward) and population scales and seeks to identify how the proposed scheme could affect determinants of health. Determinants of health are the broad socioeconomic, cultural and environmental circumstances that influence human health. These include factors such as air quality, noise levels, access to employment, community assets (recreational facilities, education, healthcare, social support networks) and community land, and lifestyle choices (e.g. diet and physical activity). The concept of determinants of health is illustrated by Dahlgren and Whitehead's model[194] (Figure 12-2).

[193] World Health Organization (WHO). (7 April 1948). Constitution, https://www.who.int/about/who-we-are/constitution.

[194] Dahlgren G & Whitehead M. (1991). Policies and strategies to promote social equity in health: Background document to WHO – Strategy paper for Europe. Institute for Futures Studies.

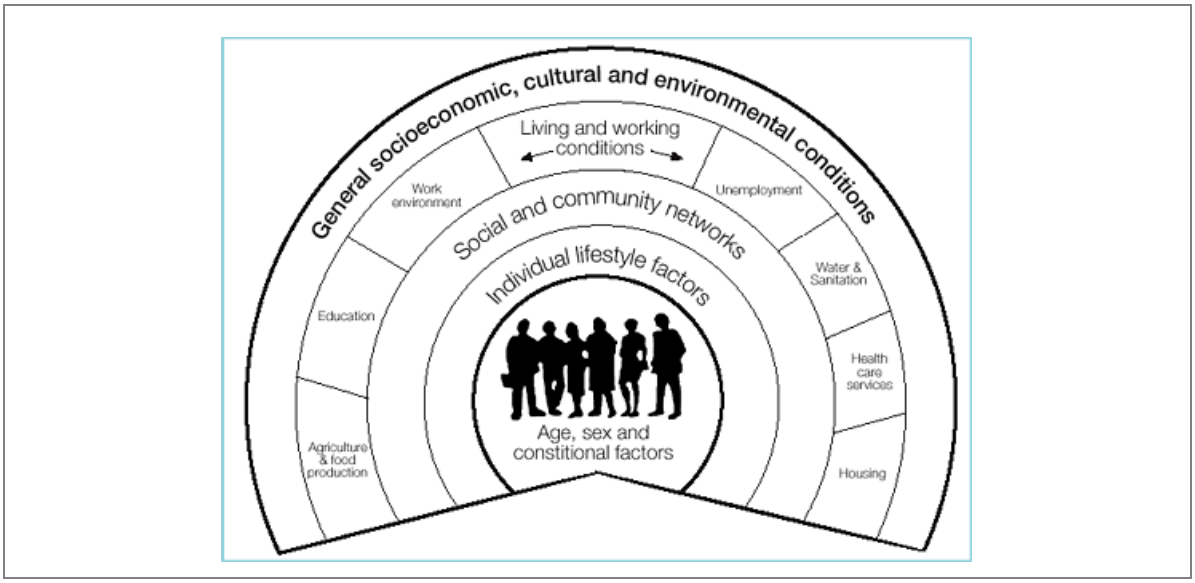

Figure 12-2 - Determinants of health model (Dahlgren and Whitehead 1991)

The proposed scope and methodology of assessment has been informed by the DMRB guidance; LA 112 Population and human health[195]. The guidance advises the following elements should be reported on:

- Land-use and accessibility including; a) private property and housing; b) community land and assets; c) development land and businesses; d) agricultural land holdings; and e) walkers, cyclists and horse-riders
- Human health including; a) health profiles of affected communities; b) health determinants (e.g. noise or air pollution); and c) likely health outcomes

12.2 Baseline Conditions

12.2.1 Study Area

Two study areas are proposed, a 'detailed' study area to capture the potential direct effects on land use, and a 'wider' study area, to capture the communities whose health could be directly or indirectly affected by the proposed scheme. The two study areas are shown on Figure 12.3 in Appendix B and described below.

12.2.1.1 Detailed Study Area

The detailed study area is most applicable for land-use and accessibility and will comprise the footprint of the proposed scheme (including construction compounds and temporary land take), plus a 500 m buffer. As set out in DMRB LA 112[195] this is deemed sufficient to encompass the likely effects on land-use and the routes (e.g. PRoW) that could be affected.

12.2.1.2 Wider Study Area

At this stage, the wider study area includes the two wards that coincide with the footprint of the proposed scheme: 1) Thorrington, Frating, Elmstead and Great Bromley ward (within which the majority of the scheme falls including the entire new link road section) and 2) Ardleigh and Little

[195] Highways England et al. (2020). LA 112 Population and human health, Rev. 1, Design Manual for Roads and Bridges

Bromley ward (for which only the western connections to the A12 and services fall within). It also includes key communities and facilities outside these wards where relevant. Ward boundaries have been revised in Tendring[196] and since data is not currently available to reflect the recently revised ward areas, the data presented within Section 12.2.4 is based on previous ward boundaries.
At this stage traffic modelling data is not available to inform where traffic conditions will change on the local road network. Information on traffic patterns, air quality and noise impacts will become known through the EIA process. The wider study area will be revised as it becomes clearer which communities would be most affected by these changes.

12.2.2 Information Sources

The preliminary understanding of the baseline conditions has been developed through a desk-based review of project information from previous stages of the proposed scheme, publicly available information, council and Public Health England websites and Ordnance Survey 1:25,000 mapping. GIS datasets have been obtained from Essex County Council. The key websites consulted were accessed between 10 March and 15 April 2020 (further websites within footnotes) and are as follows:

Data and statistics about Tendring, Colchester and land use:

- https://www.tendringdc.gov.uk/localplan
- https://www.colchester.gov.uk/info/cbc-article/?catid=adopted-local-plan&id=KA-01124
- https://www.colchester.gov.uk/info/cbc-article/?catid=emerging-local-plan&id=KA-01127
- https://www.colchester.gov.uk/info/cbc-article/?catid=colchester-statistics&id=KA-01631
- https://www.essexhighways.org/Transport-and-Roads/tell-us/Getting-Around/Public-Rights-of-Way/PRoW-Interactive-Map.aspx

Data and statistics about health:

- https://fingertips.phe.org.uk/
- https://data.essex.gov.uk/topic/health
- https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/articles/generalhealthinenglandandwales/2013-01-30

A site familiarisation visit could not be undertaken due to travel restrictions associated with the COVID-19 pandemic. Consultation with the Director of Public Health has also not been undertaken at the time of preparing this scope to allow priority to be given to managing the COVID-19 public health emergency. It is proposed that opinion from the Director of Public Health will be sought soon and prior to completion of the ES.

12.2.3 Baseline – Land Use and Accessibility

12.2.3.1 Settlements, Private Property and Housing

Appendix B Figure 12.3 shows key settlements, housing and transport links in the area. The main settlement is Colchester, a major town offering lots of facilities[197], and with an estimated population

[196] Tendring District Council. (2020). Boundary Reviews. https://www.tendringdc.gov.uk/council/elections-voting/boundary-reviews.
[197] Visit Colchester Visitor Information Centre. (2020). Visit Colchester. https://www.visitcolchester.com/.

of 192,500 in 2018 (a significant increase from the 2011 census figure of 173,100[198]). The A120 and A133 provide important road links across this part of Essex. Hythe (Colchester) and Wivenhoe railway stations – with direct links into London Liverpool Street – are both located approximately 3 km away from the proposed scheme.

Residential areas in the wider study area include communities in the east of Colchester (Highwoods, Greenstead and Hythe with Colchester's urban extent approximately 2 km west of the proposed scheme), the town of Wivenhoe (approximately 1 km south of the proposed scheme), and the surrounding villages of Ardleigh, Elmstead Market, Burnt Heath, Bromley Cross, Great Bromley, Frating Green, and Frating. Crockleford Heath, part of Ardleigh although spatially separated, is approximately 600 m west of the proposed scheme and Elmstead Market (which abuts the A133) is located approximately 950 m east of the proposed scheme. The University of Essex Colchester Campus[199] (within Wivenhoe Park and approximately 1 km south-east from the proposed scheme) houses 15,000 students and Colchester Garrison within the town centre has capacity for 4,000 military personnel.

The village of Elmstead is approximately 1 km east of the proposed new link road however, due to proposed new connections to the A120, parts of the village also fall within 500 m of the proposed scheme therefore this community is considered to be a key receptor. Also, within the detailed study area, there are several scattered farmsteads, cottages and other residential properties, predominately along Allen's Road, Tye Road and Bromley Road.

12.2.3.2 Communities and Community Facilities

Appendix B Figure 12.3 shows key communities and community facilities in the area. Residents living within the district of Tendring but close to the edge of Colchester are likely to go into Colchester town centre to access the majority of services (e.g. shops, healthcare, leisure). Within the detailed study area and considered to be key receptors, Elmstead Hall and Elmstead Parish Church (St Anne & St Lawrence's Church) are located within Elmstead, and Blossomwood Care Home is located off the A133. The proposed Garden Community is likely to include new community facilities however the nature and layout of proposals for the garden community is not currently confirmed so the effect on future baseline local journey patterns is unknown.

There is strong evidence that access to green and outdoor spaces has significant health benefits. It is associated with increased levels of physical activity as well as promoting stress relief and improving the mental wellbeing (Ward Thompson et al. 2008)[200]. Key landscape features are identified in Chapter 7 - Landscape and Visual Effects. There are open space allocations on the fringes of Colchester, Wivenhoe, Elmstead Market, Ardleigh and Great Bromley. East of Colchester's urban boundary, approximately 1 km west of the proposed scheme, Salary Brook LNR and a number of woodlands, including Churn Wood provide green spaces with public access. Grade II listed Wivenhoe Park Registered Park and Garden is located approximately 750 m south-west of the proposed scheme.

[198] Colchester Borough Council (2020) Key Statistics for Colchester. https://www.colchester.gov.uk/info/cbc-article/?catid=colchester-statistics&id=KA-01631.
[199] University of Essex. (2020). Colchester Campus. https://www.essex.ac.uk/life/colchester-campus.
[200] Thompson, C. W., Aspinall, P., & Montarzino, A. (2008). The Childhood Factor: Adult Visits to Green Places and the Significance of Childhood Experience. Environment and Behavior, 40(1), 111–143. https://doi.org/10.1177/0013916507300119.

Within the detailed study area, a lake just east of Allen's Farm (bounded by an informal path) provides a local recreational resource. The proposed Garden Community is likely to include significant areas of open space.

12.2.3.3 Development Land, Business and Agricultural Farm Holdings

Appendix B Figure 12.3 shows key development land, businesses and farms in the area. Land use within the detailed study area is predominantly agricultural, dominated by arable fields and interspersed with small areas of pasture, residential dwellings, farmsteads and commercial premises.

In the wider study area, Colchester is the largest employment centre in North Essex (with 50,000 people commuting into and out of the borough daily[201]) and there is significant proposed business growth. More than half the people leaving Tendring commute into Colchester. The University of Essex is a major employer in the area.

In the detailed study area, a WTS and Ardleigh South Services are located north and south of the A120 respectively. There are a number of businesses located in and around Allen's Farm on Allen's Lane (including Allen's Farm Partners, VisionTech Automotive, Vinyl Hunter Essex, BC Designs and a small power station). There is a small business park at Balls Farm on Tye Road (including nearby Pheasant Suites and Balls Farm farmstays), and a number of businesses off the A133 including Blossomwood Farm, Blossomwood Care Home (within Blossomwood Cottages) and Park Farm (hosting various creative services).

12.2.3.4 Walkers, Cyclists and Horse-Riders

There is substantial policy supporting the promotion of walking and cycling (i.e. 'active travel') and both national, regional[202] and local level. Notable policies and strategies are contained within:

Essex Transport Strategy:

The Local Transport Plan for Essex (2011)

Tendring Cycling Action Plan (TCAP) (2018)[203]

Colchester Cycling Action Plan (CCAP) (2018)[204]

At a regional level, there is a particular emphasis on providing sustainable access and travel choice for Essex residents. Colchester, which was designated as a Cycling Town in 2008, is specifically identified in Policy 14 (Cycling) of the Essex Transport Strategy as a "main urban area where cycling facilities will continue to be improved". No proposals within the detailed survey area have been identified in the TCAP. The CCAP identifies multiple opportunities within the wider study area, particularly in and around Colchester town centre and railway stations.

Appendix B Figure 12.3 illustrates all PRoW relevant to the proposed scheme.

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[201] Essex Highways. (2019). A120/A133 Link Road and Rapid Transit System Public Consultation Document. www.essex.gov.uk/link-road-and-rapid-transit.

[202] Essex Highways. (2020). Cycling Strategy. https://www.essexhighways.org/getting-around/cycling/cycle-strategy.aspx.

[203] Essex Highways. (2018). Tendring Cycling Action Plan. https://www.essexhighways.org/uploads/files/Getting%20Around/Cycling/Tendring-District-Cycling-Action-Plan.pdf.

[204] Essex Highways (2018). Colchester Cycling Action Plan. https://www.essexhighways.org/uploads/files/Getting%20Around/Cycling/Colchester-Borough-CAP.pdf.

The network of lanes available within the detailed study area may currently be used for recreational use, and in addition, for commuting to Colchester. Within the wider study area, NCNR 51[205] passes the southern part of Elmstead Market and provides a link to Wivenhoe however this does not provide a direct link for cycle commuters to Colchester and so any cyclists commuting through the detailed study area are likely to use the A133 or Tye Road instead.

There are no bridleways within the detailed survey area however there is a horse riding stable, Crockleford Stud, on Bromley Road in Crockleford Heath approximately 1 km from the proposed scheme and so equestrian activity is expected around this location.

Protected Lanes are non-designated heritage assets that still bear the character and features of their historical use linking settlements. Tendring District's Turnip Lodge Lane Protected Lane is located within the detailed study area and runs from Slough Lane in an easterly direction for approximately 900 m where it intersects with Wivenhoe Road and Tye Road[206].

Within the detailed survey area, a restricted byway runs in a south-easterly direction to Allen's Farm where it splits into two; a footpath links up with Allen's Lane to the south and the second continues east to Elmstead. At Elmstead this forks; one section linking up with Church Road, whilst the footpath continues north crossing the A120 over a bridge. Another footpath within the detailed study area links up with Tye Road. The proposed Garden Community is likely to be served by PRoW.

12.2.4 Baseline – Human Health

12.2.4.1 Socio-economic Profile

The preliminary baseline has considered the socio-economic profile of the populations in each ward compared to the average for England. The key data are presented in Table H-1 in Appendix H[207,208]. The Thorrington, Frating, Elmstead and Great Bromley ward has a larger proportion of older residents (65+ years) than the Ardleigh and Little Bromley ward and the average for England as a whole. Both wards have a slightly lower proportion of children compared to the average for England.

There is a widely recognised link between a person's health and wealth. In a release by the Office for National Statistics, in England, there is a continuing difference in life expectancy between those of low income backgrounds compared with those with high income backgrounds. Males born between 2016 and 2018 to wealthier families are reported to live up to 9.5 years longer than their counterparts from lower income families. Similarly, females born to wealthier families within the same timeframe are reported to live 7.5 years longer than their lower income counterparts[209]. Females living in the most deprived areas of England saw a fall in life expectancy at birth in 2016 to 2018 compared with 2013 to 2015, the only group to do so. In 2010, a report was created to

[205] Sustrans. (2020). Route 51. https://www.sustrans.org.uk/find-a-route-on-the-national-cycle-network/route-51/ and Ordnance Survey. (2020). https://osmaps.ordnancesurvey.co.uk/51.88447,0.99018,13.
[206] Tendring District Council (2007). Tendring District Local Plan 2007 (Adopted 2007). https://www.tendringdc.gov.uk/localplan.
[207] Public Health England. (2020). Thorrington, Frating, Elmstead and Great Bromley Ward 2018: https://www.localhealth.org.uk/#bbox=590087,239647,34373,33107&c=indicator&selcodgeo=E05004259&view=map15.
[208] Public Health England. (2020). Ardleigh and Little Bromley Ward 2018: https://www.localhealth.org.uk/#bbox=590087,239647,34373,33107&c=indicator&selcodgeo=E05004228&view=map15.
[209] Office for National Statistics. (2020). Health state life expectancies by national deprivation deciles, England: 2016 to 2018. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthinequalities/bulletins/healthstatelifeexpectanciesbyindexofmultipledeprivationimd/2016to2018.

highlight the links between inequality and health, whereby many lower income families are a lot more likely to have worse health and living conditions compared to their wealthier counterparts (The Marmot Review, 2010)[210]. A 10-year assessment of the Marmot Review shows that the gap between health inequality is widening and life expectancy stalling (Institute of Health Equality, undated[211]). The scoping process has therefore considered the socio-economic profile of the area as a key determinant of health. In both wards, levels of income deprivation are significantly better compared to the average for England. In the Ardleigh and Little Bromley ward the life expectancy at birth for males is significantly better than the England average, unusually male life expectancy is higher than for females within the ward.

12.2.4.2 Health Profile

The preliminary baseline has considered the health of the populations in each ward compared to the average for England. The key data are presented in Table H-1 in Appendix H[212,213,214,215]. Data relating to Chronic Obstructive Pulmonary Disease (COPD), emergency admissions and deaths from respiratory disease have been obtained to identify if there are communities that would have a higher proportion of people sensitive to air pollution than average. Data on premature deaths from circulatory disease have been collected because circulatory disease (notably stroke and coronary heart disease) is the leading cause of premature death in the UK. Risk factors for circulatory disease include low levels of physical activity and therefore can be linked to transport development projects whereby the availability and access to facilities may affect the levels of walking and cycling.

The health of communities within the study area is generally comparable to the average for England, however the Thorrington, Frating, Elmstead and Great Bromley ward shows significantly more of the population have a long-term illness or disability compared to the average for England, which is likely linked to the generally older population. Levels of emergency hospital admissions for COPD are lower in both wards compared to the average for England.

As mentioned in Section 12.2.1, the wider study area will likely be revised as it becomes clearer which communities would be most affected by a change in predicted conditions from differing local road network use, including in and around Colchester, and additional ward level data is likely to need to be incorporated. If ward level data subsequently shows a community with higher than average deaths from respiratory disease and premature deaths from circulatory disease this may indicate a community with higher than average numbers of people susceptible to air pollution. Interventions that encourage more physical activity may also be more acutely beneficial in these communities.

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[210] Marmot M. (2010). Fair Society, Healthy Lives: The Marmot Review, Strategic Review of Health Inequalities in England post-2010. http://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-full-report-pdf.pdf.

[211] Institute of Health Equity. (2019). Home - Institute of Health Equity. http://www.instituteofhealthequity.org/home.

[212] Public Health England. (2020). Thorrington, Frating, Elmstead and Great Bromley Ward 2018: https://www.localhealth.org.uk/#bbox=590087,239647,34373,33107&c=indicator&selcodgeo=E05004259&view=map15.

[213] Public Health England. (2020). Ardleigh and Little Bromley Ward 2018: https://www.localhealth.org.uk/#bbox=590087,239647,34373,33107&c=indicator&selcodgeo=E05004228&view=map15.

[214] Office for National Statistics. (2020). Thorrington, Frating, Elmstead and Great Bromley Ward (as of 2011): https://www.nomisweb.co.uk/reports/localarea?compare=E05004259.

[215] Office for National Statistics. (2020). Ardleigh and Little Bromley Ward (as of 2011): https://www.nomisweb.co.uk/reports/localarea?compare=E05004228.

12.2.4.3 Environmental Determinants of Health

There are currently limited communities, businesses and other receptors around the proposed scheme. The proposed Garden Community development to the west and business use to the east would result in substantial additional receptors.

Exposure to pollution can have lasting damaging effects on human health, most relevant of which to highway projects are air pollution and noise.

There are three AQMAs within Colchester Borough Council's jurisdiction declared for exceedances of annual mean NO_2 AQOs. Two of these AQMAs are located approximately 4.5 km west of the proposed scheme but with the potential to be affected due to changing traffic conditions in central Colchester. Further details of air quality issues are provided in Chapter 4 - Air Quality.

The baseline noise environment is likely to be dominated by road traffic noise from the A120 and A133. There are currently approximately 300 buildings within an indicative 600 m from the proposed scheme, which are largely rural, including farms, small holdings, villages and businesses. There are two noise IAs identified within 1 km of the proposed scheme. Further information on the noise environment is set out in Chapter 10 - Noise and Vibration.

Chapter 8 - Geology and Soils considers the potential for other sources of pollution to be present, for example, from historic or current land uses. Most of the current land use of the proposed scheme is arable agricultural land. The WTS and Ardleigh South Services (located either side of the A120) are considered to be key potentially contaminative land uses, with other uses of potential concern including existing road alignments and proposed scheme embankments, Allen's Farm (housing for example vehicle repair works and metal welding works) and Blossomwood Farm (an active farm located off the A130).

Residents within rural settlements are more likely to travel by car. Reliance on the car as a key mode of transport has resulted in increased sedentary lifestyles. There is potential for improvements to the built environment surrounding the proposed scheme to build more physical activity into people's lives, in particular through the proposed Garden Community and associated infrastructure and for example cycling to be considered as a potential mode of travel to work (to Colchester and Hythe and Wivenhoe railway stations).

12.2.4.4 Road Safety

Collision data during 2014-2019 was reviewed for the wider study area in the Ringway Jacobs Walking, Cycling and Horse-Riding Assessment Report[216] (Ringway Jacobs, 2019). Of the 252 collisions noted, 30 involved cyclists, 14 involved pedestrians and none involved equestrians. No collisions involving pedestrians, cyclists or horse-riders occurred on the A120 or A133 or in between within this five year period. Collision data should be interpreted carefully when linking with health effects. For example, there is often a mismatch between police collision data and hospital admission data, suggesting that some injuries are under-reported in police data. Furthermore, lack of collisions involving pedestrians and cyclists may not necessarily imply safer conditions. Instead, the data may indicate unsafe conditions such that people are deterred from making pedestrian or cycling journeys. Further review of available data, together with consultation with the Director of Public

[216] Essex Highways. (2019). Ringway Jacobs Walking, Cycling and Horse-Riding Initial Assessment Report B355363A-LNK-HGN-SW-RP-001 CNEB-JAC-ENM-P1_000-RP-ZS-0001.

Health, if possible, will assist with building a fuller understanding of road safety in the wider study area and its links to physical activity and health.

12.3 Legislation and Policy

The Equality Act 2010[217] states that transport must be accessible to all, regardless of any disability. This means people with disabilities should be able to move around freely between modes of transport, for example using inclusive cycle infrastructure to support their journey.

The NPPF (2019)[218] includes policies which promote good design, sustainable transport options and access to the environment and open space and are relevant for the design of the proposed scheme:

- Paragraph 91 (Promoting healthy and safe communities)
- 98 (Open space and recreation)
- 102 (Promoting sustainable transport)
- 110 (Considering development proposals)
- 124, 127 and 130 (Achieving well-designed places)
- 172 (Conserving and enhancing the natural environment)

The UK Government's Cycling and Walking Investment Strategy **(2017)**[219] highlights that at a national level, there is a long-term vision for cycling to become the normal mode of choice for short journeys or a part of a longer journey.

The local development plan and emerging local development plan for both Tendring Borough Council and Colchester Borough Council are also relevant for the design of the proposed scheme and the assessment of effects on population and human health.

Legislation and policy relating to air quality, landscape, geology, noise and water can be found within Sections 4.3, 7.3, 8.3, 10.3, and 11.3).

12.4 Value of Environmental Receptors

For this assessment, receptors include the resources which support a population, for example community facilities, recreational space or private properties, and the people and communities themselves present in the study area. The guidance on sensitivity criteria in LA 112[220] has been used, along with professional judgement, to assign values to the receptors present in the baseline. Receptor sensitivity is set out in Table 12-1, along with rationale behind assigning the values.

[217] UK Legislation. Equality Act 2010. http://www.legislation.gov.uk/ukpga/2010/15/contents.
[218] UK Government. (2019). National Planning Policy Framework. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf.
[219] Department of Transport. (2017). Cycling and Walking Investment Strategy. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/603527/cycling-walking-investment-strategy.pdf.
[220] Highways England et al. (2020). LA 112 Population and human health, Rev. 1, Design Manual for Roads and Bridges.

Table 12-1 - Value of receptors

Receptor	Preliminary Understanding of Value/Sensitivity	Rationale
Communities – Elmstead and residents of properties throughout the detailed study area	Medium – High	Ward data indicates significantly more of the population in the Thorrington, Frating, Elmstead and Great Bromley ward have a long-term illness or disability compared to the average for England. As a result, the population in this ward would likely have increased susceptibility to health effects from air pollution, noise and other transport related health determinants. These receptors are the closest residents to the proposed scheme and would be the most likely to experience direct effects from construction and operation of the proposed scheme.
Communities – Blossomwood Care Home (located off the A133)	Medium – High	Individuals within care homes are classed as vulnerable due to age, health or mobility factors. As a result, this community would likely have increased susceptibility to health effects from air pollution, noise and other transport related health determinants. Although these receptors are close to the existing A133 they would also be likely to experience direct effects from construction and operation of the proposed scheme (proximity to tie in with the A133 and the link road itself).
Community facility – Elmstead Parish Church (St Anne & St Lawrence's Church) within Elmstead	Medium – High	This community facility is likely to be used at least weekly, potentially daily, and is the only church within Elmstead. Users of the church would be likely to experience direct effects from construction and operation of the proposed scheme, for example from air pollution, noise and other transport related health determinants and also as a result of a change in access.
Community facility – Elmstead Hall within Elmstead	Medium – High	This community facility is likely to be used at least weekly, potentially daily. Users of the hall would be likely to experience direct effects from construction and operation of the proposed scheme, for example from air pollution, noise and other transport related health determinants and also as a result of a change in access.
Agricultural land holdings	Low – Medium	It is currently uncertain how sensitive land holdings would be to changes in access caused by the proposed scheme. However, since land is largely arable, it is deemed likely that there less sensitivity compared to sites where it is necessary to move livestock on a regular basis.

Receptor	Preliminary Understanding of Value/Sensitivity	Rationale
Open space (areas of woodland)	Medium – High	There are limited patches of woodland within the detailed study area, none are identified in the emerging Local Plan as open space, and there are no formal PRoW to Broom Grove and Strawberry Grove. There is a lake near Allen's Farm bounded by an informal path. In the wider study area open space on the fringes of settlements is likely to be valuable for outdoor recreation, important for local wellbeing and physical exercise. Due to urban expansion, the value of these green spaces becomes increasingly important.
Turnip Lodge Lane Protected Lane	Medium – High	This lane may be used for cyclists commuting to Colchester, depending on destination, due to the A133 being a barrier to cycling. It is likely to be used by WCH on a recreational basis. These groups have high sensitivity to changes in traffic conditions, however, the affected section is relatively short. Changes in traffic conditions may alter use of this lane by WCH with implications for local accessibility and health.
Local PRoW network	Medium – High	There are limited formal PRoW within the detailed survey area including no bridleways. The network of lanes is likely to be used for recreation by local communities. Existing PRoW 21 Elmstead would need to be diverted (a double underpass is currently proposed). Users of the local PRoW network have high sensitivity to changes in traffic conditions. They would be likely to experience direct effects from construction and operation of the proposed scheme.

12.5 Potential Impacts

12.5.1 Construction Phase

During construction the key potential impacts may include:

- Temporary and permanent loss of private land to the footprint of the proposed scheme
- Temporary disruption of access to community facilities, businesses, farm holdings, open space and countryside from the footprint of the proposed scheme and construction traffic routes
- Temporary severance of, or diversions of a Protected Lane and PRoWs to allow for construction activities, including site compounds, earthworks and haul routes
- Impacts (for example temporary congestion) on the local road network from construction traffic
- Temporary loss of amenity (due to noise, disruption and visual intrusion) of the PRoW network, open space and countryside

- Impacts (for example water pollution from the mobilisation of potential contaminants near the fuelling station and WTS) from construction plant and activities affecting nearby properties
- Temporary impacts of dust, noise and air pollution from construction plant and activities affecting nearby properties

12.5.2 Operational Phase

During operation the key potential impacts may include:

- Severance of farm holdings
- Changes in traffic on the wider road network as traffic is diverted to the proposed scheme with potential consequent changes in exposure to air pollution and noise
- Impacts on open/green space and tranquillity from the introduction of new highway infrastructure, traffic and associated traffic noise
- Impacts on length and amenity of journeys for WCH as PRoW and lanes are diverted and crossing points are introduced
- Increase in opportunities to walk, cycle or horse ride due to the introduction of new pedestrian/cycle links, as well as potentially reduced traffic on some roads

12.6 Design, Mitigation and Enhancement Measures

12.6.1 Design

The type and quality of surfacing, crossing and access points for PRoWs and other routes used by pedestrians, walkers and horse riders will be considered within the design of the scheme and should be suitable for the intended use and context (i.e. whether rural or urban, or whether there is likely cyclist, wheelchair or horse rider use). Key design considerations include GG 142 Walking, cycling and horse-riding assessment and review (WCHAR) guidance[221], the Equality Act 2010[222], and Essex County Council's plans and strategies set out above in Section 12.3. Signposting will be incorporated to inform people of any new or diverted PRoW.

12.6.2 Construction Mitigation

Good practice construction measures to reduce dust, noise, visual intrusion and traffic disruption would limit nuisance to local residents, businesses, road users and users of the PRoW network and would also reduce the risk of pollution incidents. Details of good practice measures for dust, visual intrusion and noise are set out in Chapters 4, 7, and 10 respectively. An OEMP and subsequent CEMP would set out construction mitigation measures and guide their implementation.

Effective communication of construction proposals to local stakeholders, including clear signage of any required diversions or closures of PRoWs or local roads, would mitigate nuisance and allow people to plan alternative routes or activities. This would limit the likelihood of adverse effects on stress and wellbeing.

Night-time construction work would be avoided as far as practicable. On occasions where night-time working is required, early and effective communication with local residents would reduce the

[221] Highways England et al. (2019). GG 142 Walking, cycling and horse-riding assessment and review (WCHAR) guidance, Design Manual for Roads and Bridges.
[222] UK Legislation. Equality Act 2010. http://www.legislation.gov.uk/ukpga/2010/15/contents.

likelihood of associated health effects (i.e. from sleep disturbance) by allowing people to make alternative plans where possible.

12.6.3 Operational Mitigation

Most potential operational effects would be mitigated through good design (see Section 12.6.1). However, further mitigation may be required where likely significant air quality effects are identified at nearby receptors (refer to Chapter 4 - Air Quality) or where road safety issues are identified (for example at junctions). Measures could include speed restrictions, optimisation of traffic signals or traffic calming. It should be noted that these may be in locations on the wider road network, should traffic patterns be predicted to alter significantly at locations used by vulnerable groups.

12.7 Description of Likely Significant Effects

Key population and health effects are set out below.

12.7.1 Land Use and Accessibility

Effects on private property and housing: It is not envisaged that any buildings would be lost to the scheme. There is potential for minor impacts to access during construction, however, these would be temporary and for a limited number of properties. Therefore, this is not considered to be a likely significant effect for the purposes of EIA and has been scoped out for further assessment.

Effects on community land and assets: No community land has been identified that would be directly physically affected. There is potential for minor impacts to access during construction, however, these would be temporary and limited in terms of the likely populations affected. Therefore, this is not considered to be a likely significant effect for the purposes of EIA and has been scoped out for further assessment.

Effects on development land and businesses: The proposed scheme has been identified and designed to facilitate proposals for growth within Colchester and, as such, is part of the strategic development and economic proposals for the area. It is therefore considered unlikely that there would be any unintended consequences from the proposals. Therefore, this is not considered to be a likely significant effect for the purposes of EIA and has been scoped out for further assessment.

Effects on agricultural land holdings: The proposed scheme would occupy agricultural land and therefore has the potential to sever land holdings. Further information on the number and type of land holdings is required before any conclusions on likely significance in relation to wider community and population effects can be drawn. It is therefore proposed to assess this issue further.

Effects on walking, cycling and horse riders: The proposed scheme would result in some changes to the provision, convenience and amenity of the PRoW network (albeit limited) and a Protected Lane, during both construction and operation. There are also potential effects on safety, depending on the final design and levels of use. It is therefore proposed to consider these effects further.

12.7.2 Human Health

Effects on human health associated with physical activity levels: Physical inactivity directly contributes to one in six deaths in the UK, the same number as smoking. People who have a physically active lifestyle have a 20-35 % lower risk of cardiovascular disease, coronary heart disease and stroke compared to those who have a sedentary lifestyle. Regular physical activity is also associated with a reduced risk of diabetes, obesity, osteoporosis and colon/breast cancer and with improved mental health. As identified in Section 12.5, the proposed scheme would directly and indirectly impact on routes used by walkers, cyclists and horse-riders, which may result in behavioural change. It is proposed to assess how the provision, convenience and amenity of routes is likely to change and the potential size of population that could benefit or be disadvantaged.

Effects on human health associated with access to green space and countryside: The proposed scheme would be implemented in a rural area which although has limited formal PRoW does have a network of lanes and other paths. There is therefore a potential loss of recreational amenity and access during construction and operation, with potential effects on health and wellbeing of local residents. It is therefore proposed to assess which communities would potentially be most affected and whether mitigation could be provided.

Effects on human health associated with air pollution: Across the UK 40,000 deaths per year are attributed to exposure to outdoor air pollution, and therefore this is a significant public health issue. Air pollution is linked to cancer, asthma, stroke, heart disease, diabetes, obesity and changes linked to dementia. The proposed scheme would likely alter traffic patterns affecting communities in and around Colchester. Impacts may be beneficial or adverse, with potential for beneficial or adverse effects on human health. It is proposed to assess the likely populations affected by increases or decreases in air pollution concentrations. This assessment will be informed by the results of the air quality assessment scoped in Chapter 4 - Air Quality.

Effects on human health associated with noise: Environmental noise is becoming increasingly associated with a number of health effects including increased blood pressure and increased risk of cardiovascular disease. Noise during the night can cause sleep disturbance which itself can have significant health implications. There is also a link between increased noise pollution and educational failures. Due to the low population density surrounding the area of the proposed scheme is it unlikely that many people would be affected by noise. However, the area is currently quite rural so those residents present may experience a high magnitude of change with implications for quality of life. This assessment will be informed by the results of the noise and vibration assessment scoped in Chapter 10 - Noise and Vibration.

Effects on health inequalities: Health inequalities is a key concern for public health. It is proposed to keep this under review throughout the EIA as more is understood of the effects on traffic patterns, communities affected, and the nature of associated health effects are identified.

12.8 Proposed Assessment Methodology

12.8.1 Effects of COVID-19

Other discipline assessments namely air quality, landscape, and noise, feed into the Population and Health assessment. Assessment methods (particularly regarding baseline surveys) for these environmental factors have been revised to account for restrictions and abnormal conditions associated with COVID-19, potentially with less confidence in model outputs or needing to consider a worst-case scenario. Alternative methods are set out in the relevant chapters. However, accounting for professional judgement, the risk of an incorrect Population and Health assessment conclusion is considered to be minimal as the results of the above assessments are likely to reflect realistic worst-case conditions.

As mentioned in Section 12.2.2, due to the current circumstances relating to COVID-19, it has not been appropriate to engage with Essex's Director of Public Health and team at this time. Therefore, a limitation and risk for the scope of the Population and Health assessment is that the baseline does not currently include specific local insight nor has the content and approach been discussed and agreed. It is anticipated that consultation with the relevant health consultees can be still be undertaken during the EIA process.

12.8.2 Method for Assessing Effects on Population and Human Health

The assessment will follow DMRB LA 112[195] Population and human health guidance. The baseline understanding will be developed further to focus on the key population and health receptors at risk

from the impacts of the proposed scheme. This will use information being developed for the proposed scheme such as the predicted changes in traffic volumes and speeds on the ARN, the results of the noise and air quality modelling and the visual impact assessments. The wider study area will be revised as it becomes clearer which communities would be most affected by these changes and additional ward level data is likely to need to be incorporated.

Consultation will be undertaken with the Director of Public Health to obtain further evidence and to aid with the understanding of key health issues in the local area.

For the assessment on land-use and accessibility (population) quantification of impacts will be presented where feasible, for example the type, location and number of farm holdings that could be affected by the proposed scheme. The assessment will not draw conclusions on the viability of any individual businesses, including farm businesses, that may be affected by changes in land or access from the proposed scheme. Such matters would relate to the relevant margins that support the businesses and any impacts on business viability would be require direct negotiation between the interested parties and their representatives.

For the two scoped in land and accessibility subtopics (effects on agricultural land holdings and effects on walking, cycling and horse riders) the significance of any potential effects will be determined based on DMRB LA 112[195]

For the assessment of effects on human health, it will not be possible to quantify the impacts due to the nature of the data and techniques available. Estimates of the populations within affected communities will be provided to enable a judgement as to whether more people would be adversely or beneficially affected by the proposals.

The assessment will consider health effects and data relating to population level studies, rather than health data and effects relating to individuals. Although the assessment will refer to research that demonstrates evidence of association between changes in health determinants and effects on health, this should not be interpreted as causation. It is not possible to draw conclusions on cause and effect relationships for human health using aggregated population level data.

The conclusions of other topics will be used to help identify any changes to health determinants. A change to a single health determinant can affect the health status of communities depending on their characteristics and sensitivity to change. An evidence base for the assessment will be provided as an appendix to the ES, setting out the studies which support evidence for associations.

The assessment will not conclude the significance of any potential health effects. The assessment presented will comprise a qualitative description of the health effects associated with changes in determinants of health caused by the proposed scheme and would conclude as to whether the associated health outcomes are positive, neutral, negative or uncertain.

12.8.3 Assessment Assumptions and Limitations

Ward level data has been used to provide a preliminary understanding of income deprivation and potential health inequalities. It should be noted that although no significant concerns relating to the presence of deprived communities have yet been identified, it is possible that there are pockets of deprivation or health inequalities that could be identified at a different geographical scale, for example, if using Lower Super Output Area data.

Ward boundaries have been revised in Tendring and the ward level data reviewed for the baseline is based on the previous ward boundaries.

Information is not available regarding communities likely to experience a change in conditions as a consequence of differing local road network use, including in and around Colchester, as these are yet to be identified via traffic modelling.

Due to no consultation with Essex's Director of Public Health and team to date, no specific local insight has been captured and incorporated within the current baseline.

13 Climate

13.1 Introduction

The proposed scheme could have an impact on climate change and also be impacted by climate change, during both its construction and operation. During the construction phase, GHGs are expected to be emitted through the supply chain of materials (e.g. carbon embodied in the materials used to construct the proposed scheme and their transport), from the transport of waste, from the transport of workers to and from the construction areas and fuel/energy used during the construction works. Once in operation, the proposed scheme has the potential to alter GHG emissions resulting from the use of the regional road network, as traffic flows on the surrounding road network are likely to change, and through the consumption of maintenance materials and associated works (e.g. energy for lighting, carbon embodied in replacement materials, fuel use for maintenance activities etc). These changes in GHG emissions can have an effect on climate change by contributing to the intensification of global warming. Furthermore, increased GHG emissions could affect the UK's ability to meet legally binding carbon reduction targets.

The proposed scheme could also potentially be impacted by climate change, both during the construction and operation phase, as a result of changes in typical and extreme weather conditions resulting in increased vulnerability of the scheme (e.g. to flooding).

The purpose of this chapter is to outline the legislative and policy context for climate, in addition to the proposed scope and methodology for the consideration of climate impacts associated with the proposed scheme.

13.2 Baseline Conditions

13.2.1 Study Area

In line with the DMRB LA 114 Climate guidance[223] (paragraphs 3.8, 3.9 and 3.25), different study areas are required to be defined for each aspect of a climate assessment. As such, the following study areas have been defined:

- Carbon emissions resulting from construction and operational maintenance - the study area comprises the East of England region (from where the majority of the materials are likely to be sourced) and the footprint of the permanent works (where maintenance will be undertaken)
- Carbon emissions resulting from operational road users - the study area comprises the road network as defined in the Traffic Reliability Area (TRA)[224]
- The proposed scheme's vulnerability to climate change - the study area comprises the construction footprint (including compounds and temporary land take). The construction footprint has yet to be finalised, however it is anticipated that it will comprise of, as a minimum, the footprint of the permanent works (see Appendix B Figure 1.1) plus a buffer of at least 5 m, together with the construction compounds/materials storage areas.

[223] Highways England et al. (2019). LA 114 Climate, Design Manual for Roads and Bridges.
[224] Defined as the area covered by the traffic model, that the competent expert for traffic has identified as reliable for inclusion in an environmental assessment.

13.2.2 Greenhouse Gas Emissions

13.2.2.1 Regional and Borough Level

The Proposed Scheme is located entirely within the jurisdiction of Essex County Council and governed under Tendring District Council. Table 13-1 shows carbon dioxide (CO_2) emissions by source for Essex County, extracted from the 2017 UK GHG Emissions Inventory[225], with data for the East of England region and Tendring District Council also provided for context.

CO_2 emissions for Essex County in 2017 totalled 7,204 kt, representing approximately 2 % of total CO_2 emissions for the UK.

Road transport CO_2 emissions are estimated to comprise a significant proportion of the total CO_2 emissions within Essex County (49 %), with A-roads estimated to generate approximately 20 % of the total CO_2 emissions in Essex.

In total, road transport emissions from Essex County contribute 2.9 % of total road transport CO_2 emissions in the UK.

Table 13-1 - Regional, county and borough CO_2 emissions estimates by source (2017)

Data Source	2017 CO_2 emissions (kt)		
	East of England	Essex County	Tendring District Council
Industry and Commercial Electricity	3,919	733	58
Industry and Commercial Gas	2,757	408	43
Large Industrial Installations	525	34	-
Industrial and Commercial Other Fuels	1,830	335	26
Agriculture	356	64	6
Industry and Commercial Total	9,387	1,575	133
Domestic Electricity	2,763	673	69
Domestic Gas	5,403	1,360	138
Domestic 'Other Fuels'	872	150	14
Domestic Total	9,039	2,183	221
Road Transport (A roads)	6,760	1,474	96
Road Transport (Motorways)	2,794	822	-
Road Transport (Minor roads)	4,524	1,234	144
Diesel Railways	161	15	0
Transport Other	293	49	1
Transport Total	14,532	3,593	242

[225] Department for Business, Energy & Industrial Strategy (2019). UK local authority and regional carbon dioxide emissions national statistics: 2005-2017. [Online] Available at https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2017.

Data Source	2017 CO_2 emissions (kt)		
	East of England	Essex County	Tendring District Council
Land Use, Land-Use Change, and Forestry Net Emissions	-221	148	-15
Total	32,737	7,204	581

13.2.2.2 Do-Minimum Scenarios

At the time of writing, no quantitative information on GHG emissions associated with the combustion of fuel by road vehicles travelling within the study area for the Do-Minimum scenario (i.e. representing the baseline GHG emissions over the assumed 60 year life span of the proposed scheme, as required by the DMRB LA 114 Climate guidance[223]) is available. These estimates will be produced for the road network within the TRA and presented within the ES. GHG emissions for the Do-Minimum scenario will be subtracted from the GHG emissions calculated for the respective Do-Something scenario to determine the net change in GHG emissions associated with the proposed scheme.

As the proposed scheme predominantly comprises new road sections and junctions to link the A120 and A133, there is no requirement to obtain information regarding GHG emissions arising from the maintenance of any existing sections of the road network.

13.2.3 Vulnerability

13.2.3.1 Current and Projected Climate

Those current and projected climate variables for the East of England region of most relevance to the proposed scheme vulnerability are presented in Table 13-2. The current climate data were obtained from the HadUK-Grid regional observations dataset v1.0.1.0 for the "climate normal" period of 1981-2010. The projected climate data for the East of England region were obtained from the UK Climate Projections 2018 (UKCP18) based on a 25km grid spatial resolution (1981-2010 baseline)[226], under the high emissions scenario Representative Concentration Pathway (RCP) 8.5[227] and for 50 % probability of occurrence. The East of England climate projections are presented for the periods 2020 – 2049, 2050 – 2079 and 2079 – 2099, covering the life cycle of the project.

The wind gust data shown in Table 13-3 were obtained from the UKCP18 2.2 km grid climate projections (1981-2000 baseline), under the high emissions scenario RCP8.5 for a range of 12 model projections. The projections are presented for the available periods, i.e. 2021-2039 and 2061-2079, covering the majority of the life cycle of the project.

Based on the UKCP18 data for the East of England region for the period up to 2099, maximum summer and minimum winter daily temperatures are predicted to increase by up to 5.2 °C and 3.1 °C, respectively; whereas mean daily rainfall is predicted to increase by up to 19.1 % during winter and decrease by up to 34.5 % during summer (see Table 13-2). Also, the annual average

[226] https://ukclimateprojections-ui.metoffice.gov.uk/products.

[227] The RCPs (Representative Concentration Pathways) are scenarios of future concentrations of greenhouse gases and other forcings. The UKCP18 probabilistic projections use four of the RCPs – 2.6, 4.5, 6.0 and 8.5 – named after the amount of "radiative forcing" they cause by the end of the century (which is the change in energy that, on balance, warms the Earth as a result of a stronger greenhouse effect).

maximum wind speed gust is predicted to reduce by between -0.2 m/s and -0.6 m/s by 2079 (see Table 13-3).

Overall, the climate in the region of the Proposed Scheme is projected to experience wetter and warmer winters and drier and warmer summers, whereas the maximum yearly average wind speed gusts are projected to be less intense.

Table 13-2 - Current climate and future climate projections for the east of England region

Climate Variable	Observations (°C – temperature, mm - rainfall)	Projected Anomaly (°C – temperature, % - precipitation)		
		2020 – 2049	2050 – 2079	2070 – 2099
Temperature				
Summer daily maximum temperature (°C)	21.3	1.5	3.4	5.2
Winter daily minimum temperature (°C)	1.4	0.9	2.1	3.1
Mean annual daily temperature (°C)	10.2	1.1	2.4	3.6
Precipitation				
Summer mean daily rainfall (mm)	160	-11.6%	-25.3%	-34.5%
Winter mean daily rainfall (mm)	146	4.8%	11.9%	19.1%

Table 13-3 - Future wind speed gust projections for the east of England region

Annual Average Maximum Wind Speed Gust (m/s)	Projected Anomaly (m/s)	
	2021 – 2039	2061 – 2079
Highest change	-0.5	-0.6
Lowest change	-0.1	-0.2

13.2.3.2 Flood Risk and Historical Weather-Related Events

As detailed in Section 11.2.10 of Chapter 11- Road Drainage and the Water Environment, based on the Environment Agency's Flood Map for Planning[180], the footprint of the proposed scheme is within Flood Zone 1: an area with less than 0.1 % (1 in 1,000) AEP of flooding from river or sea. Similarly, the Environment Agency's RoFSW mapping indicates that the proposed scheme is predominantly within an area at very low risk: less than 0.1 % (1 in 1,000) AEP of surface water flooding. However, there are overland flow paths of high: greater than 3.3 % (1 in 30) AEP to low: less than 1 % (1 in 100) AEP surface water flood risk that intersect the proposed scheme. This is predominantly associated with ordinary (minor) watercourses. The proposed scheme is considered to be within an area of low to medium groundwater susceptibility, although further investigation is required. The

scheme area is not in an area at risk of tidal flooding, and the risk of flooding from other flood sources (e.g. reservoirs and canals etc) is also considered to be low.

At this stage, there are no known major historical weather events specific to the location of the proposed scheme.

13.2.4 Potential Receptors

In line with the DMRB LA 114 Climate guidance[223], the proposed scheme's receptors will include the following:

With regard to GHG emissions:

- UK carbon budgets (as a proxy for the global climate)

With regard to the proposed scheme's vulnerability:

- Receptors associated with the construction process (including the workforce, plant and machinery)
- The assets and their operation, maintenance and refurbishment (e.g. road pavement surface, structures, earthworks and drainage, technology assets, soft estate etc.)
- End-users (e.g. members of the public or commercial operators using the road etc.)

13.3 Legislation and Policy

13.3.1 International Level

The Intergovernmental Panel on Climate Change states that:

"Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks." [228].

Furthermore, GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit[229].

In 1997, the Kyoto Protocol to the United Nations Framework Convention on Climate Change was adopted as a means to provide legally binding limits on carbon emissions for 37 countries, including the UK. The Protocol committed to the reduction of carbon emissions by an average of 5 % below 1990 levels between 2008 and 2012; and by at least 18 % below 1990 levels between 2013 and 2020.

In December 2015, the global Paris Agreement was adopted. The Paris Agreement was ratified and entered into force in November 2016. The central aim is to strengthen the global response to climate change by limiting global temperature increases, through setting a target of net zero global carbon emissions in the second half of this century.

[228] Intergovernmental Panel on Climate Change (2014). Climate Change 2014. Synthesis Report. Summary for Policymakers (pg. 8)
[229] Institute of Environmental Management & Assessment (2017). Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance.

13.3.2 National Legislation and Policy

Under the Kyoto Protocol's second commitment period (2013 – 2020), the EU set a target to reduce GHG emissions by 20 % relative to the 1990 levels. In 2014, the EU agreed to reduce carbon emissions by at least 40 % by 2030 compared to 1990 levels. This commitment was reaffirmed in the EU's Nationally Determined Contribution submitted as part of the Paris Agreement. While the UK will be leaving the EU, it is expected that the UK will continue to abide by the commitments it made while a member.

13.3.2.1 The Climate Change Act 2008

The Climate Change Act 2008 established a framework for the UK to achieve its long-term goals of reducing GHG emissions by at least 80 % by 2050 relative to 1990 levels. An interim target of a 34 % reduction from 1990 levels by 2020 was also set. To ensure that regular progress is made, the Climate Change Act 2008 established a system of carbon budgets.

The first three carbon budgets in the UK were announced in April 2009, covering the periods 2008–2012, 2013–2017 and 2018–2022. The budgets require emissions reductions of 23 %, 29 % and 35 % respectively, below 1990 levels. In June 2011, the fourth carbon budget was announced, amounting to an emission cut of 51 % on 1990 levels over the years 2023-2027 and the fifth amounting to an emission reduction of 57 % on 1990 levels over the years 2028-2032.

On 27 June 2019 the Climate Change Act 2008 (2050 Target Amendment) Order 2019 came into force, which amended the Climate Change Act 2008 by introducing a target for at least a 100 % reduction of GHG emissions (compared to 1990 levels) in the UK by 2050. This is otherwise known as a "net zero" target because some emissions can remain if they are offset by removal from the atmosphere and/or by trading in carbon units.

If met, this target would effectively mean that the UK will end its contribution to global GHG emissions by 2050. Before this amendment, the UK had a long-term emissions reduction target of reducing GHG emissions by 80 % by 2050, compared to 1990 levels.

13.3.2.2 National Adaptation Programme

The Climate Change Risk Assessment[230] is a five-yearly assessment of all major risks and opportunities from climate change within the UK. The most recent assessment (published in 2017) identified the main risks associated with climate change in the UK, of which the following are relevant to this scheme:

- Flooding risks to communities, businesses and infrastructure
- Risks to health, well-being and productivity from higher temperatures
- Risks of water deficits in public water supply, and for agriculture, energy generation and industry, with impacts on freshwater ecology

The National Adaptation Programme is the UK Government's strategy to address the main risks and opportunities identified in the risk assessment. The programme focuses on raising awareness of the need for climate change adaptation, increasing resilience to current climate extremes, taking timely action for long-lead time measures and addressing major evidence gaps.

13.3.2.3 National Planning Policy Framework

The NPPF was published in February 2019 and states in paragraph 8 (c) that:

[230] HM Government (2017). UK Climate Change Risk Assessment.

"Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives): to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

There are national and local policies for the management, mitigation and adaptation to climate change.

The NPPF prioritises addressing climate change impacts in the planning and decision-making process for major transport infrastructure projects and provides guidance on climate change allowances to be used in flood risk assessment. The Framework identifies how new developments must make allowances for climate change impacts to ensure no increased risk is placed on people and property.

13.3.2.4 Tendring District Local Plan 2007 (Adopted)

Although there are no policies within the current Local Plan[231] which directly refer to climate change, the policy of most relevance to climate change is Policy QL3 Minimising and Managing Flood Risk. The supporting text to this policy refers to the expectation that climate change will increase the risk of flooding and that flood risk assessments "… must show that the development will remain safe throughout its lifetime (taking climate change into account), will not increase flood risk elsewhere, and will, where possible reduce the probability and consequences of flooding elsewhere".

13.3.2.5 Tendring District Local Plan 2013 – 2033 and Beyond (Publication Draft) (2017)

The emerging Local Plan's[232] strategic objectives for infrastructure provision are set out in Objective 4. This includes the following reference to climate change;

"To ensure that flood defence infrastructure is considered so that future developments take into consideration the impacts of climate change".

The emerging Local Plan's strategic objective for Water and Climate Change is set out in Objective 9, which states:

"To reduce the risk of flooding (all types) by securing the appropriate location and design of new development (including SuDs), having regard to the likely impact of climate change".

Part B (Practical Requirements) of Policy SPL3 Sustainable Led Design sets out criteria that new development must meet, including:

"the applicant/developer can demonstrate how the proposal will minimise the production of greenhouse gases and impact on climate change as per the current regulations and policies in this plan; …. The development has considered climate change adaptation measures and technology from the outset including reduction of emissions, renewable and low carbon, passive design, and through green infrastructure techniques where appropriate".

Policy HP3 Green Infrastructure requires that green infrastructure should be used as a way of adapting to, and mitigating the effects of, climate change, through the management and enhancement of existing spaces and habitats and the creation of new spaces and habitats, helping to provide shade during higher temperatures, flood mitigation and benefits to biodiversity, along with increased access.

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[231] Tendring District Council (2007). Tendring District Local Plan 2007 Adopted, December 2007.
[232] Tendring District Council (2017). Tendring District Local Plan 2013-2033 and Beyond Publication Draft, June 2017.

13.3.2.6 Adapting to Climate Change: Action Plan

Essex County Council published its Adapting to Climate Change: Action Plan in May 2011[233]. The plan identifies the types of climatic events that Essex is expected to face in the future and assesses the relative risk levels of different events occurring. It also identifies measures that can be taken to adapt to future climate change and to build resilience to these types of events. These include activities such as updating Highways Maintenance Strategies and implementing a Winter Maintenance Plan.

13.3.2.7 Tendring District Council Climate Emergency

A 'Climate Emergency' was declared by Tendring District Council in August 2019, which amongst other commitments, requires the Council to prepare an action plan with the aim of making its activities net-zero carbon by 2030, and that it will act as a community leader to encourage the rest of Tendring to join its mission.

13.4 Value of Environmental Receptors

The receptors relevant to climate are outlined in Section 13.2.4. In the absence of specific guidance on the valuation of environmental receptors with regard to climate change impacts, all receptors will be considered as of equal value for the climate assessment.

13.5 Potential Impacts

13.5.1 Construction Phase

13.5.1.1 GHG emissions

GHGs emissions would be generated during the construction phase as a result of the following activities:

- Embodied GHG emissions associated with the required raw materials
- Transport of materials and wastes to and from the construction site
- Transport of construction workers to and from the construction site
- Operation of construction plant and on-site activities
- GHG emissions mobilised by vegetation or soil losses

13.5.1.2 Vulnerability

As identified in Section 13.2.3, changes in climate variables anticipated during the life span of the proposed scheme (assumed to include the construction phase and extending 60 years after opening, in line with DMRB LA 114 guidance[223]) include increased temperatures (especially during summer), reduced precipitation during summer, increased precipitation during winter and reduced wind gust speeds. Table 13-4 identifies potential climate related impacts on receptors, including temporary works, as a result of these changes.

[233] Essex County Council (2011). Adapting to Climate Change: Action Plan.

Table 13-4 - Potential impacts resulting from climate effects during construction

Climate Effect	Receptor	Potential Impacts
Increased temperatures, including prolonged periods of hot weather	Construction workforce	Health risks to construction workers associated with increased potential for dust generation and dispersal; and Health risks to construction workers associated with higher working temperatures, such as dehydration and sunstroke.
Increased precipitation, including intense periods of rainfall	Construction workforce	Increased risk of flooding of temporary works areas, including construction compounds
	Geotechnics	Risks to slope stability associated with changes in pore pressure; and Risk of scour and erosion of earthworks.
	Soft estate	Increased risk of contamination of waterbodies due to flooding of construction areas/compounds or through runoff.
	Scheme operator	Increased risk of disruption to supply of materials and goods required to support construction activities; and Increased risk of delay to construction programme, and associated costs incurred.

13.5.2 Operational Phase

13.5.2.1 GHG Emissions

GHG emissions during the operational phase would be associated with:

- Maintenance of the road infrastructure through combustion of fuel and use of electricity and materials required to support activities such as the repair and replacement of lighting and structures (including fencing) and highway resurfacing
- Combustion of fuel by motorised vehicles using the road infrastructure: the proposed scheme has the potential to alter traffic volumes, composition and flows on the local road network, which could act to alter the magnitude of the contribution of road transport to GHG emissions within the local and regional area
- Ongoing changes in the emission/sequestration balance within the scheme footprint associated with changes in land uses e.g. through changes in the spatial extents and/or management of carbon sinks such as woodland

These emissions have the potential to impact the global climate and the UK's ability to meet legally binding carbon budgets.

13.5.2.2 Vulnerability

Table 13-5 sets out how the anticipated changes in temperature and precipitation identified in Section 13.2.3 may affect receptors including infrastructure elements (e.g. structures, earthworks, drainage, road surfacing, lighting and signage, soft estate), road users including pedestrians and cyclists, scheme operators and maintenance workers.

Table 13-5 - Potential impacts resulting from climate effects during operation

Climate effect	Receptor	Potential impacts
Increased precipitation, particularly in winter	Geotechnics	Risks to stability of earthworks Increased scour and erosion of earthworks Risks to slope stability associated with changes in water levels/pore pressure
	Pavements	Stress on road surfaces (i.e. difficulties with maintaining required texture depth)
	Soft estate	Risks to long term viability of landscape planting
	Structures	Risk of scour to foundations
	End users	Disruption of access to highway infrastructure
	Scheme operator	Increased costs associated with increased maintenance/renewal requirements
	Maintenance workforce	Challenges for maintenance regime
Increased average and peak temperatures	Pavements	Stress on road surfaces (i.e. difficulties with maintaining required texture depth)
	Structures	Stress on structures as a result of thermal loads applied to superstructure
	End users	Disruption to accessing the highway infrastructure
	Scheme operator	Increased costs associated with increased maintenance requirements
	Maintenance workforce	Challenges for maintenance regime

13.6 Design, Mitigation and Enhancement Measures

13.6.1 GHG emissions

Opportunities to reduce the magnitude of GHG emissions associated with construction activities include:

- Minimisation of the use of resources and use of renewables or with recycled or secondary content to reduce the amount of carbon embodied in the construction materials
- Minimisation of import and export of fill and materials
- Using more efficient construction plant and delivery and/or those powered by electricity or alternative/lower carbon fuels

Opportunities to reduce the magnitude of GHG emissions associated with the maintenance, repair and refurbishment of the proposed scheme include:

- Designing, specifying and constructing the scheme with a view to maximising the operational lifespan of surfaces and structures and minimising the need for maintenance and refurbishment
- Designing, specifying and constructing the scheme with a view to maximising the potential for reuse and recycling of materials/elements at the end-of-life stage

- Making adequate provision to support up and coming new clean vehicle technologies where appropriate
- Specifying high efficiency mechanical and electrical equipment such as LED lighting and signal gantries
- Maintaining, refurbishing and repairing equipment using current best practice techniques

13.6.2 Vulnerability

Up-to-date design and construction standards, along with good engineering practice, are expected to be applied to the design and construction of the proposed scheme. The use of the embedded adaptation measures is expected to secure the resilience of the proposed scheme for its whole lifecycle.

Specific measures identified as relevant to the construction stage include:

- Ensuring that site compound drainage has sufficient capacity to withstand extreme precipitation events
- Additional inspections of material stockpiles and structures during and following extreme weather events (e.g. floods, heatwaves, storms) to ensure stability
- Provision of appropriate Personal Protective Equipment (e.g. sun cream) and facilities (e.g. cool rooms and shade) during high temperature periods
- Allowing sufficient time within the construction programme to accommodate minimisation of risks to construction workers, plant and other elements of the scheme associated with periods of high temperature and/or prolonged periods of heavy precipitation

The design should take account of the following measures which would help reduce the vulnerability of the proposed scheme to climate effects during operation:

- Ensuring the proposed scheme design (in particular the drainage system) complies with Environment Agency and Local Lead Flood Authority guidance regarding peak rainfall
- Minimisation of permanent structures within channels or within the flood plain and provision of flood compensation storage
- Slope stabilisation measures
- Design and specification of pavement construction, expansion joints and other elements which are resilient to anticipated increases in peak summer temperatures and increased UV exposure
- Designing and specifying pavement construction, drainage systems, embankments and other elements with a view to anticipated changes in precipitation characteristics as well as increased variability of ground conditions (wetting and drying)
- Specify regular inspection of drainage infrastructure, materials and structures to identify any deterioration and additional inspections after extreme weather conditions

13.7 Description of Likely Significant Effects

13.7.1 GHG Emissions

In accordance with DMRB LA 114 guidance[223], the potential impacts on climate associated with GHG emissions during the construction of the proposed scheme, as identified in Section 13.5.1, are scoped in for further assessment. This is because as a new road scheme, the increase in GHG

emissions would be greater than 1 % of existing maintenance activities on any sections of the A120 or A133 which the proposed scheme connects to).

The proposed scheme design is not currently sufficiently developed to facilitate a quantitative assessment of GHG emissions associated with maintenance activities or a land usage emission/sequestration balance during operation. In addition, no quantitative assessment of GHG emissions associated with combustion of fuels by motorised users has yet been undertaken. GHG emissions associated with operational road users are, however, likely to comprise the majority of emissions associated with the operation of the proposed scheme, and the DMRB LA 114 guidance[223] identifies that further assessment should be undertaken where traffic modelling indicates that one or more of the following criteria are met on any road:

- Change of more than 10 % in AADT flow
- Change of more than 10 % in HDVs
- Change in daily average speed of more than 20 km/hour

As a new road, the proposed scheme would exceed these criteria and would also likely cause changes on the wider road network which exceed these criteria. On this basis, the potential impact on climate arising from GHG emissions associated with combustion of fuel by vehicles using the new road infrastructure during operation is scoped in for further assessment.

Assessment of the potential impacts on climate associated with (i) maintenance of the Proposed Scheme and (ii) changes in carbon emissions/sequestration associated with land use changes are also scoped in for further assessment in accordance with the DMRB LA 114 guidance[223].

13.7.2 Vulnerability

The following trends in climate variables identified from the UKCP18 projections datasets (see Section 13.2.3) as presented in Table 13-4 and Table 13-5 could potentially impact on receptors:

- Increased temperatures (especially during summer)
- Reduced precipitation during summer
- Increased precipitation during winter

At this stage, there is limited information available regarding the proposed scheme design or intended construction processes and methodologies. Therefore, all the potential impacts identified in Table 13-4 and Table 13-5 are considered potentially significant and are scoped in for further assessment.

13.8 Proposed Assessment Methodology

13.8.1 Climate Assessment Methodology

13.8.1.1 GHG Emissions

For the assessment of the potential impacts of the Proposed Scheme on climate change, and in line with the DMRB LA 114 Climate guidance[223], the following will be estimated:

- Embodied and construction phase carbon using the Highways England Carbon Tool v.2.2
- GHG emissions resulting from land use change imposed by the proposed scheme (only where there is likely to be a substantial change) based on information within the National Atmospheric Emissions Inventory

- Operation phase GHG emissions over the assumed 60 year life span of the proposed scheme (for the Do-Minimum and Do-Something scenarios) based on the road network covered by the TRA using an industry recognised carbon calculation tool (such as EFT or TAG Databook). As a minimum, the traffic flow data for the opening year (the first full calendar year of opening is anticipated to be 2025) and design year (i.e. 15 years after opening) scenarios will be used to inform this assessment
- Maintenance related GHG emissions for the proposed scheme based on Highways England Carbon Tool v.2.2

In line with the DMRB LA 114 Climate guidance[223], an assessment of GHG emissions against UK government carbon budgets will be undertaken. As the operational phase of the proposed scheme will extend over multiple carbon budget periods, the project's GHG emissions will be reported against each relevant carbon budget for each project stage. An assessment will then be made as to whether increases in GHG emissions as a result of the proposed scheme will have a material impact on the ability of the UK Government to meet its carbon reduction targets (and would therefore potentially be significant).

13.8.1.2 Vulnerability

For the assessment of the proposed scheme's vulnerability to climate impacts, the following will be included, in line with the DMRB LA 114 Climate guidance[223]:

- Detailed receptor identification for the construction and operation phase, in liaison with the Design Team
- Survey of historical events as a result of weather patterns and extreme weather events (e.g. landslides, floods etc) informed by the Essex Local Climate Impact Profile
- Analysis of current and projected baseline climate conditions utilising appropriate UKCP18 datasets in order to identify any likely significant climate changes and likely project exposure to these changes
- Identification of adaptation measures for any significant impacts, in liaison with the Design Team and informed by the Adapting to Climate Change Action Plan[233]

Where the climate change impact on project receptors is considered to be potentially significant, a risk assessment will be undertaken, in line with DMRB LA 114 Climate guidance[223].

The risk assessment will assess the likelihood and consequence of the impact occurring to each receptor, leading to evaluation of the significance of the effect. The assessment of significance will be carried out in accordance with the following steps:

- The identification of hazards and benefits
- Assessment of likelihood and consequences
- Evaluation of significance

Once the climate change impacts have been identified, a qualitative risk assessment of those impacts on the operational phase will be undertaken with reference to the indicative framework set out in Table 3.39a (likelihood categories) and Table 3.39b (measure of consequence) of the DMRB LA 114 Climate guidance[223].

The likelihood and consequence of each impact will then be combined in the form of a matrix to subsequently identify the significance of each impact as per Table 3.31 (significance matrix) of the DMRB LA 114 Climate guidance[223].

For the construction phase, a qualitative description of disruption risk will be reported.

13.8.2 Assessment Assumptions and Limitations

The following assumptions and limitations have been identified with respect to the assessment of climate impacts:

- There are inherent uncertainties in the UKCP18 climate projections, however, use of data for the high emissions scenario is likely to provide a more conservative assessment of potential climatic changes
- The study area for the operational climate assessment will be limited to the TRA and, therefore, may exclude some effects which occur outside this area (in which there is less confidence in the traffic model predictions)
- A proportionate approach to estimate the change in GHG emissions due to the changes in land use and forestry caused by the proposed scheme will be undertaken in line with DMRB LA 114[223]

14 Cumulative Effects

14.1 Introduction

This chapter provides a summary of the methodology for assessing the cumulative effects for the ES.

Cumulative effects are defined in DMRB LA 103[2] as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project."

A cumulative impact can arise as the result of:

- Intra-development effects - the combined impact of a number of different environmental factors, that have specific impacts from a single project on a single receptor/resource, and/or
- Inter-development effects - the combined impact of a number of different projects (in combination with the EIA project) on a single receptor/resource

Cumulative effects can occur during both construction and operational phases of the proposed scheme.

14.2 Baseline Conditions

The baseline conditions for each environmental factor are provided in their respective chapter (Chapters 4-13) under 'Baseline Conditions' section. Please see Contents page for associated page numbers.

14.2.1 Study Area

The study area for the assessment of intra-development effects is identified within the relevant environmental factor chapters of this report (Chapters 4 -13).

The study area, also termed the spatial Zones of Influence (ZOI), for the identification of potential inter-development effects covers an area extending approximately 2 km from the proposed scheme. This is considered adequate considering the length of the proposed scheme.

14.3 Legislation and Policy

The assessment of cumulative effects is required in line with Town and Country Planning (EIA) Regulations 2017[234] and guidance within DMRB Volume 11, LA 104 Environmental assessment and monitoring[235]. The need to consider cumulative effects in planning and decision making also is set out in the planning policy in particular the NPPF[236]. Paragraph 109 which states that:

"Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

[234] Town and County Planning (EIA Regulations) 2017
[235] Highways England (2019). LA 104: Environmental Assessment and Monitoring. Design Manual for Roads and Bridges. Vol. 11. Section 2. Part 4.
[236] Ministry of Housing, Communities & Local Government. (2019). National Planning Policy Framework.

14.4 Proposed Assessment Methodology

The assessment of cumulative effects will consider both intra-development and inter-development effects.

14.4.1 Intra-development Cumulative Effects

Cumulative effects would be presented for receptors which could be affected by more than one environmental factor. Where a receptor has been identified as only experiencing one residual significant effect there is no potential for intra-development effects to occur.

Intra-development cumulative effects would therefore only be identified where more than one environmental factor has identified a residual significant effect on an individual or group of receptors. Intra-development effects will be reported within the Cumulative Effects chapter and will draw upon impacts identified within individual environmental factor chapters. A checklist matrix approach will be used to demonstrate links/receptors and where it will be covered within the EIA.

14.4.2 Inter-development Cumulative Effects

The inter-development cumulative effects assessment will assess the effects of other identified developments within the ZOI.

The assessment methodology has been developed taking into consideration the guidance within the Planning Inspectorate's Advice Note 17[237] on the assessment of cumulative effects (hereafter, referred to as the PINS guidance) and the DMRB LA 104 guidance[235] on cumulative effects.

There will be a four-stage approach to the assessment of inter-development cumulative effects:

- Stage 1 – Establish a long list of 'other existing development and/or approved development within the Zone of Influence
- Stage 2 – Establish a short list of projects which have the potential to result in cumulative impacts
- Stage 3 – Information gathering
- Stage 4 – Assessment

Stage 1: Establish a long list of other existing development and/or approved development within the Zone of Influence

A review of other developments likely to result in significant cumulative effects will be undertaken for other projects located within 2 km around the proposed scheme. A committed development log has been produced to identify the long list of developments and is provided in Appendix I.

The committed development log has listed planning applications that are likely to be constructed or have not yet been commenced but have a valid planning permission. Proposed developments that are subject to planning applications have also been considered. Site allocations from adopted and emerging local plans have also been listed.

The committed development log has been based on a 2 km buffer over a 6-year period (June 2014-present) and focusses on the following:

- Anything over 1 dwelling for housing

[237] The Planning Inspectorate (2019) Cumulative Effects Assessment Version 2. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf.

- Non-residential – major development - anything on a site over 1 ha/floorspace of 1000sqm +
- Mineral and waste sites of 1 ha+

The committed development log identifies the following developments:

- Planning applications and permissions for which EIA is a requirement
- Allocations and safeguarded areas for future developments in DPDs and Neighbourhood Development Plans with a clear identified programme for delivery

In regards to the proposed Garden Community, given the timeframe for the adoption of the DPD, and the policy requirement in the Proposed Modifications to the Part 1 Plan (that the planning consent for route 1 of the Rapid Transit Scheme should be secured prior to planning approval being granted for development forming part of the Tendring Colchester Borders Garden Community) it is not anticipated that there will be any major (EIA) development taking place for the Garden Community prior to March 2024 and therefore no inter-project cumulative effects.

Stage 2: Establish a short list of projects which have the potential to result in cumulative impacts

At Stage 2, any developments of a nature or scale without the potential to result in cumulative impacts will be excluded, following discussion with the local planning authorities and consideration of each environmental factor's likely ZOI. The justification for including or excluding developments will be provided in a matrix.

Stage 3: Information Gathering

Detailed information will be gathered on the developments shortlisted at Stage 2. This will inform the Stage 4 assessment, and will include the following:

- Proposed design and location information
- Proposed programme of construction, operation and decommissioning
- Environmental assessments that set out baseline data and effects arising from the 'other existing development and/or approved development.'

Stage 4: Assessment

The assessment will identify the cumulative effects of the proposed scheme with the 'other existing development and/or approved development' as identified in Stages 1-3. This will be determined through a matrix which will include:

- A brief description of the development
- An assessment of the cumulative effect with the proposed scheme
- Proposed mitigation applicable to the proposed scheme
- The likely residual cumulative effect

The criteria for determining the significance of cumulative effects will be based on the DMRB LA 104 guidance[235].

14.4.3 Assessment Assumptions and Limitations

The traffic model used to inform the air quality and noise and vibration assessments for the proposed scheme takes into account projected traffic growth from other planned development in the surrounding area of the proposed scheme. Therefore, the cumulative effects of development in terms of these traffic related environmental factors will be inherently included as part of the assessment of the proposed scheme.

15 Summary and Conclusions

15.1 Summary

This section of the report summarises the proposed scope of the EIA. The EIA will be undertaken in accordance with EIA Regulations and other guidance. The ES will include the following as set out in Schedule 4, Part II of the EIA Regulations:

- A description of the proposed scheme
- A description of the reasonable alternatives and the main reasons for selecting the chosen option, including a comparison of environmental effects
- A description of the relevant aspects of the current state of the environment (baseline condition) and an outline of the likely evolution without implementation of the proposed scheme
- A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape
- A description of the likely significant effects of the development on the environment resulting from:
    - The construction and operation of the proposed scheme
    - Use of natural resources
    - Emission of pollutants
    - Risks to human health, cultural heritage, or the environment
    - The cumulation of effects with other existing and/or approved projects
    - The impact of the proposed scheme on climate and the vulnerability of the proposed scheme to climate change
    - The technologies and substances used
- A description of the forecasting methods or evidence used to identify and assess the significant effects on the environment
- A description of the measures to avoid, prevent, reduce or offset any identified significant adverse effects on the environment and, where appropriate, proposed monitoring arrangements
- A non-technical summary of the above

15.2 Environmental Factors Scoped into the Environmental Assessment

Table 15-1 – Summary of environmental factors and receptors/elements scoped 'in' to the EIA and further assessment required

Environmental Factor	Receptor/element	Further assessment required
Air Quality	Construction dust to human health and receptors.	Construction dust assessment.
	Emissions from vehicles to human health and ecological receptors.	Screening and detailed operational phase assessment including quantitative analysis and air quality modelling of predicted traffic flows.
Cultural Heritage	Physical impact to historic buildings, archaeological remains, and Historic Landscape Types (HLTs) during construction and operation	Desk-based assessment, Aerial Investigation and Mapping (AIM followed by a programme of archaeological trial trenching evaluation.
	Impacts on the setting of all historic buildings and HLTs during construction and operation	
Biodiversity	Loss of habitats including Ancient Woodland, veteran trees and hedgerow (Priority) habitats Emissions from vehicles to ecological receptors (see Air Quality above).	Further assessment and consultation with the key stakeholders (i.e. Natural England and the Environment Agency). Arboricultural survey. Hedgerow Regulations assessment. Habitats Regulations Assessment Stage 1: Screening. Biodiversity Net Gain
	Ecological species including bats, dormice, water vole, breeding birds, reptiles, badgers, brown hare and invertebrates.	Protected/notable species surveys
	Invasive species	Invasive species survey
Landscape and Visual	Landscape Character Areas Landscape features Potential visual receptors including residents, users of open spaces and public rights of way; travellers on local roads; and visitors to local registered parks and gardens.	Further assessment in accordance with LA 107. Including: Zone of Theoretical Visibility mapping; Landscape and Visual Impact Assessment (winter and summer) and consultation with Landscape Officer.

Environmental Factor	Receptor/element	Further assessment required
Geology and Soils	Human health	Land Contamination Risk Assessment Contaminated land assessment and inclusion of Ground Investigation findings.
	Disturbance to agricultural soils (Grade 1 and 2)	
	Disturbance of potentially contaminated soils	
Noise and Vibration	Airborne noise from operational and construction phases.	Operational road traffic noise assessment through quantitative analysis and noise modelling of predicted traffic flows. Construction noise and vibration assessment.
	Ground-borne vibration from construction phase only.	
Road Drainage and Water Environment	Flood risk to properties and infrastructure during construction and operation	Flood Risk Assessment, including hydrological assessment
	Groundwater during construction and operation. Surface water quality of watercourses during operation.	Highways England Water Risk Assessment Tool (HEWRAT) simple assessment. LA 113 Detailed assessment if necessary. HEWRAT Spillage Risk Assessment. Conceptual model development – LA 113 Appendix A assessment. Groundwater Dependent Terrestrial Ecosystems (GWDTE) assessment following Appendix B of LA 113 where necessary.
	Hydromorphology of Sixpenny Brook and other local watercourses during construction and operation	Site specific simple assessment
	Water Framework Directive (WFD)	Detailed WFD Assessment and Preliminary WFD compliance assessment.
Population and Human Health	Agricultural land holdings	Analysis of land take Analysis of traffic modelling results, visual impact assessment, air quality assessment, noise and vibration assessment, construction methodology, transport management plan, severance and health data.
	Walkers, cyclists and horse-riders	
	Human health, including effects associated with air pollution, access to green space and countryside; physical activity levels and noise.	
	Health inequalities.	
Climate	Effects of the scheme on climate change (carbon emissions) and risks to the scheme from climate change	Embodied and construction phase carbon using the Highways England

Environmental Factor	Receptor/element	Further assessment required
		Carbon Tool v.2.2 (Highways England 2019b. Greenhouse Gas (GHG) emissions Assessment of the proposed scheme's vulnerability to climate impacts Risk assessment in line with LA 114 Climate DMRB guidance

15.3 Conclusions

This EIA Scoping Report has established the environmental baseline of the site and the surrounding area against which the potential impacts of the scheme have been considered. The likely significant effects of the scheme have been identified, which have highlighted the key environmental factors requiring further assessment within the ES. The proposed methodology for the assessment of each of the environmental factors has been outlined.

This EIA Scoping Report has been prepared to document the scoping process and demonstrate the intended approach to the environmental assessment process and preparation of the ES. The report provides the basis for consultation with relevant statutory and non-statutory consultees and other interested parties and any feedback or recommendations are welcomed at the earliest opportunity to enable sufficient consideration in the environmental assessment process, identify any further issues of concern requiring assessment, influence the design of the scheme and to help identify appropriate mitigation.

Further consultation will also be undertaken with environmental stakeholders including the Environment Agency, Natural England, Historic England and local authorities to collect additional baseline information, discuss the results of the assessment and establish proposed mitigation.

Appendices

Appendix A: Acronyms

AADT	Annual Average Daily Traffic
AEP	Annual Exceedance Probability
AIM	Aerial Investigation and Mapping
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
AQO	Air Quality Objective
ARN	Affected Road Network
ASR	Annual Status Report
BGS	British Geological Society
BMV	Best and Most Versatile
BNL	Basic Noise Level
BRE	Building Research Establishment
C&D	Construction and Demolition
CCAP	Colchester Cycling Action Plan
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CLR	Contaminated Land Report
CO_2	Carbon Dioxide
CoPA	Control of Pollution Act 1974
COPD	Chronic Obstructive Pulmonary Disease
CPRE	Campaign to Protect Rural England
CRTN	Calculation of Road Traffic Noise
Defra	Department of the Environment Food and Rural Affairs
DfRE	Designing for Resource Efficient Construction Principles
DMRB	Design Manual for Roads and Bridges
DPD	Development Plan Document
EC	European Commission
EEAWP	East of England Aggregate Working Party
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
GHG	Greenhouse Gas
GI	Ground Investigation
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Addition
GWDTE	Groundwater dependent terrestrial ecosystems
HAA	Heavy Anti-Aircraft
HDV	Heavy Duty Vehicle
HEWRAT	Highways England Risk Assessment Tool
HIF	Housing Infrastructure Fund
HLC	Historic Landscape Characterisation
HLT	Historic Landscape Types

IA	Important Areas
IAN	Interim Advice Note
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LCA	Landscape Character Areas
LCT	Landscape Character Types
LED	light emitting diodes
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LOAEL	Lowest Observable Adverse Effect Level
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
mbgl	Metres Below Ground Level
MCA	Mineral Consultation Area
MMP	Materials Management Plan
MRA	Minerals Resource Assessment
MSA	Mineral Safeguarding Area
NCA	National Character Area
NCNR	National Cycle Network Route
NGR	National Grid Reference
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NPPF	National Planning Policy Framework
NRFA	National River Flow Archive
NVZ	Nitrate Vulnerable Zone
OEMP	Outline Environmental Management Plan
PCM	Pollution Climate Mapping
PM	Particulate Matter
PRF	Potential Roost Features
PRoW	Public Rights of Way
RCP	Representative Concentration Pathway
RLB	Red Line Boundary
RoFSW	Risk of Flooding from Surface Water
RTS	Rapid Transit System
SAC	Special Area of Conservation
SEO	Statements of Environmental Opportunity
SFRA	Strategic Flood Risk Assessment
SOAEL	Significant Observable Adverse Effect Level
SPA	Special Protection Areas
SPZ	Source Protection Zone
SRV	Special Roadside Verge
SSD	Stopping Sight Distance
SSSI	Site of Special Scientific Interest

SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TCAP	Tendring Cycling Action Plan
TPO	Tree Preservation Order
TRA	Traffic Reliability Area
UXO	Unexploded Ordnance
WCH	Walkers, Cyclists and Horse Riders
WCHAR	Walking, cycling and horse-riding assessment and review
WFD	Water Framework Directive
WHO	World Health Organisation
WRAP	Waste and Resources Action Programme
WTS	Waste Transfer Station
ZOI	Zones of Influence
ZTV	Zone of Theoretical Visibility

Appendix B: Figures

This appendix includes the following figures:

- Figure 1.1 - Location Plan
- Figure 2.1 - The Preferred Route
- Figure 3.1 - Environmental Constraints (Sheets 1 and 2)
- Figure 4.1 - Air Quality Monitoring Locations and Air Quality Management Areas
- Figure 4.2 - Pollution Climate Mapping Model Outputs (2019)
- Figure 4.3 - Sensitive Ecological Sites
- Figure 5.1 - Key Cultural Heritage Constraints
- Figure 6.1 - Ecology Survey Results
- Figure 7.1 - Landscape Context
- Figure 7.2 - Landscape Planning Constraints
- Figure 7.3 - Published Landscape Character Areas
- Figure 7.4 - Zone of Theoretical Visibility and Proposed Representative Viewpoints
- Figure 8.1 - Geoenvironmental Constraints
- Figure 9.1 - Minerals Policy Map
- Figure 9-2 - Forecast future landfill capacity in the study area (2019 to 2024) Embedded Page 94
- Figure 10.1 - Noise Important Areas
- Figure 11.1 - Study Area
- Figure 11.2 - Surface Water Environment
- Figure 11.3 - WFD Water Body Outlines Tenpenny Brook, Sixpenny Book
- Figure 11.4 - Groundwater Abstractions and Discharges
- Figure 11.5 - Aquifers
- Figure 11.6 - Fluvial Flood Risk
- Figure 11.7 - Surface Water Flood Risk
- Figure 12-1 - Links between traffic volume and speed on health (adapted from West Midlands Health Observatory, 2006) Embedded Page 144
- Figure 12-2 - Determinants of health model (Dahlgren and Whitehead 1991) Embedded Page 145
- Figure 12.3 - Population and Human Health Context and Baseline

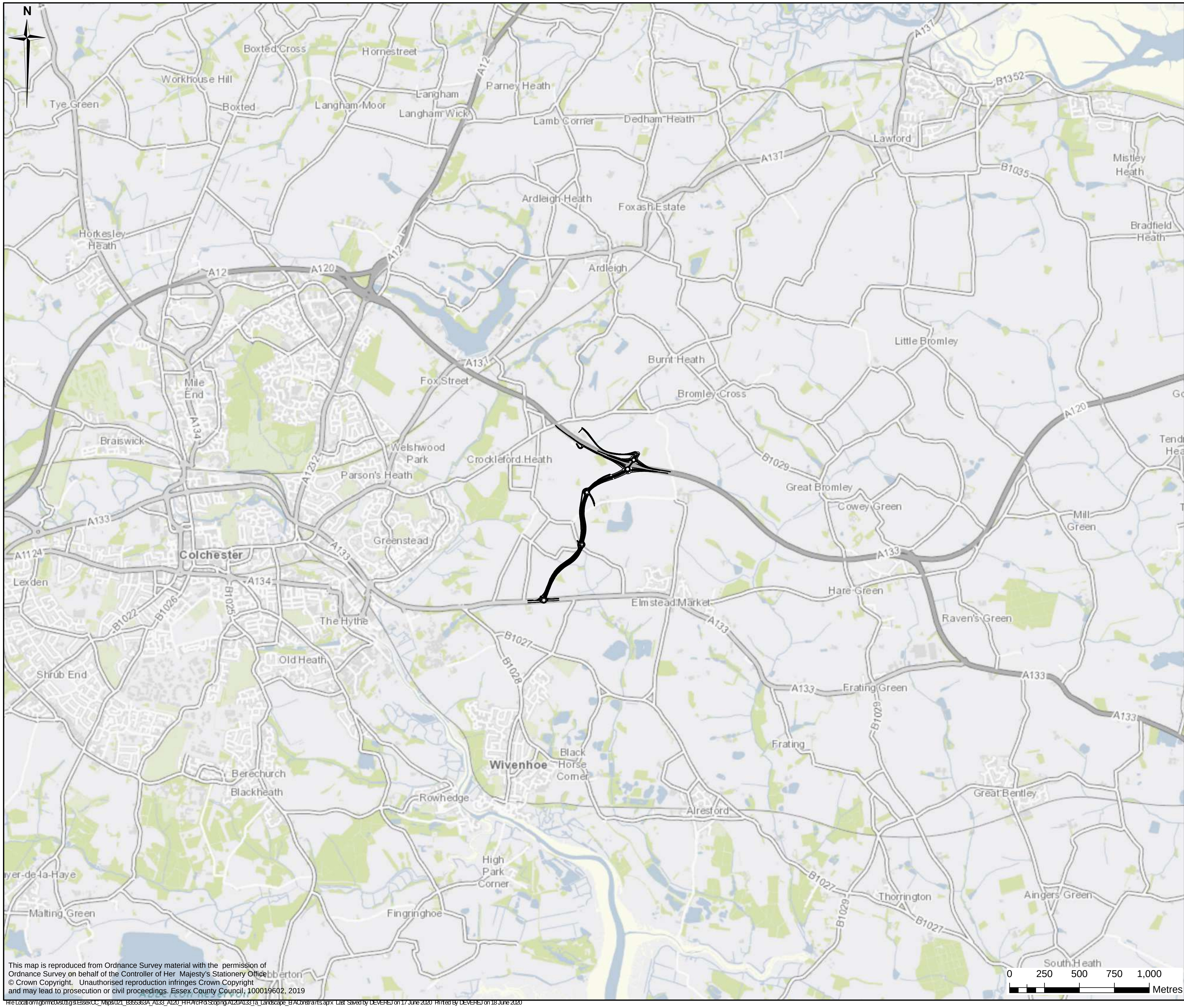

FIGURE 1.1

Legend

— Preferred route

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

EIA SCOPING REPORT

FIGURE TITLE

LOCATION PLAN

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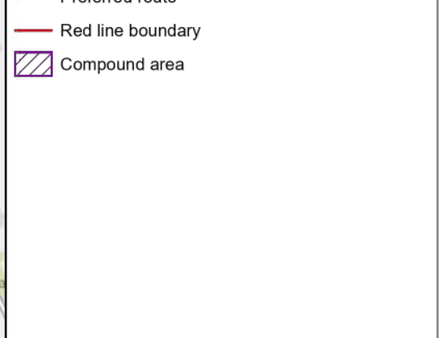
FIGURE 2.1

Legend

- Preferred route
- Red line boundary
- Compound area



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EIA SCOPING REPORT

FIGURE TITLE

THE PREFERRED ROUTE

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FIGURE 3.1

Legend

- Preferred route
- 500m buffer from preferred route
- 2km buffer from preferred route
- Public Right of Way
- Protected lane
- Essex Cycle Network
- National Cycle Network Route (NCNR)
- Main River
- Grade I Listed Building
- Grade II* Listed Building
- Grade II Listed Building
- Local Wildlife Sites
- Site of Special Scientific Interest (SSSI)
- Ancient Woodlands
- Deciduous woodland
- Local Narure Reserves (LNR)
- Tree Preservation Order (TPO)
- Registered Park and Garden
- Scheduled Monuments
- Compound area
- Surface water
- High risk of surface water flooding
- Flood Risk Zone 2
- Flood Risk Zone 3

SCHEME TITLE

A120/A133 LINK ROAD

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EIA SCOPING REPORT

FIGURE TITLE

ENVIRONMENTAL CONSTRAINTS
Sheet 1 of 2

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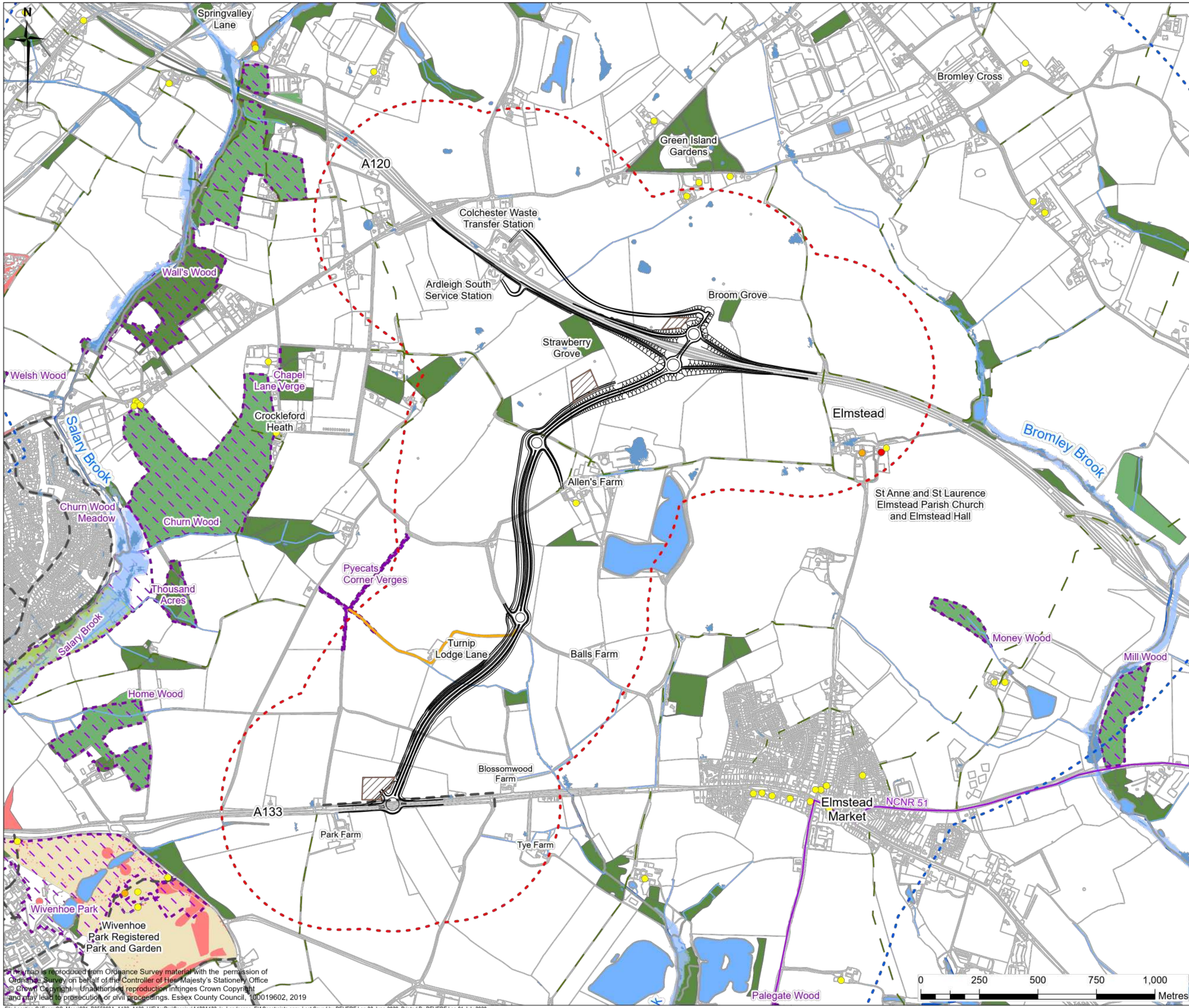

FIGURE 3.1

Legend

- Preferred route
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- High risk of surface water flooding
- Flood Risk Zone 2
- Flood Risk Zone 3

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

EIA SCOPING REPORT

FIGURE TITLE

ENVIRONMENTAL CONSTRAINTS
Sheet 2 of 2

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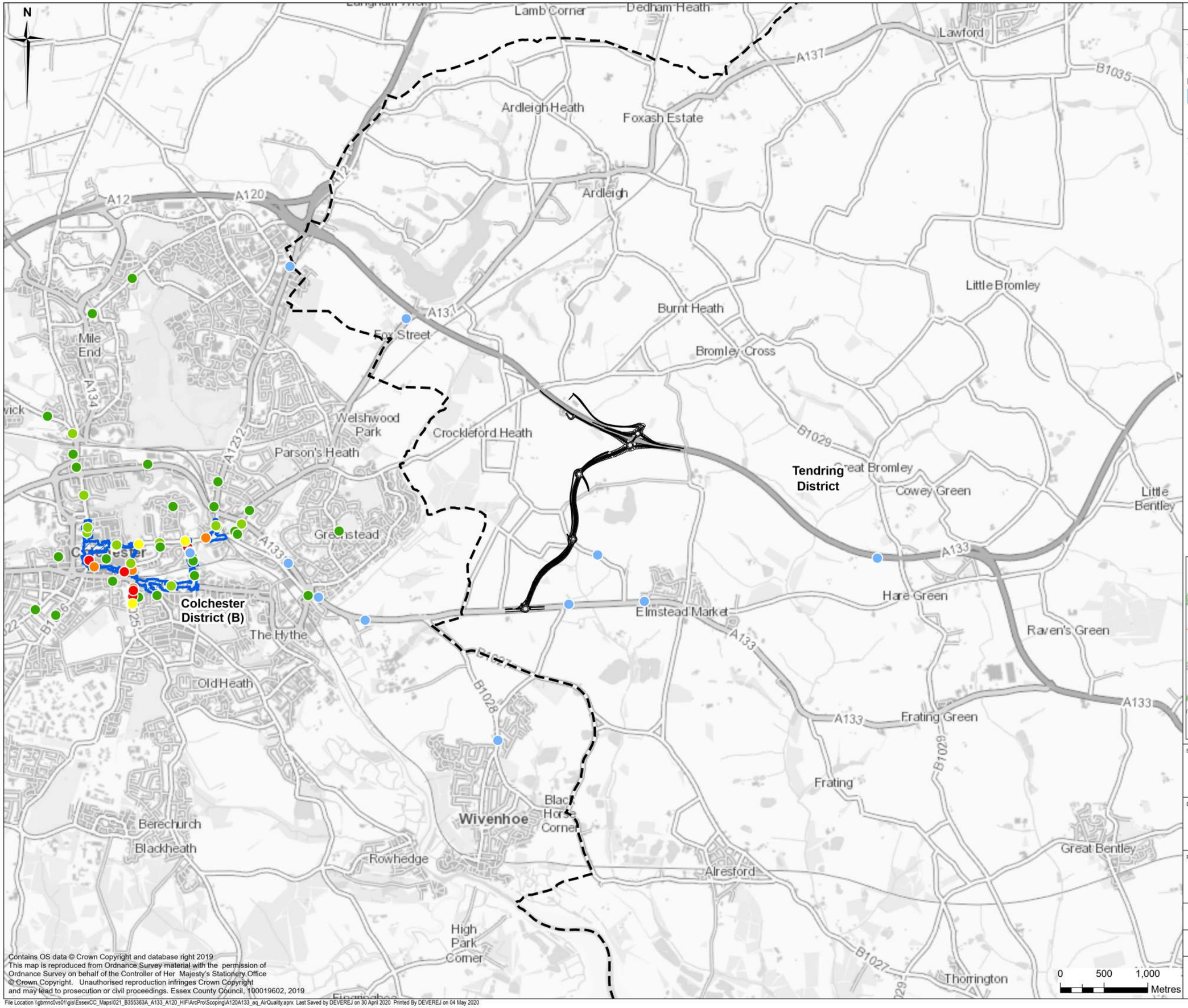

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FIGURE 4.1

Legend

- Preferred route
- Local Authority Boundaries
- Air Quality Management Areas
- Site Specific Monitoring Locations

Local Authority Monitoring Results

2018 Annual Mean NO_2 ($\mu g/m^3$)

- <= 30.0
- 30.1 - 36.0
- 36.1 - 40.0
- 40.1 - 44.0
- > 44.0

SCHEME TITLE

A120/A133 LINK ROAD

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EIA SCOPING REPORT

FIGURE TITLE

AIR QUALITY MONITORING LOCATIONS AND AIR QAULITY MANAGEMENT AREAS

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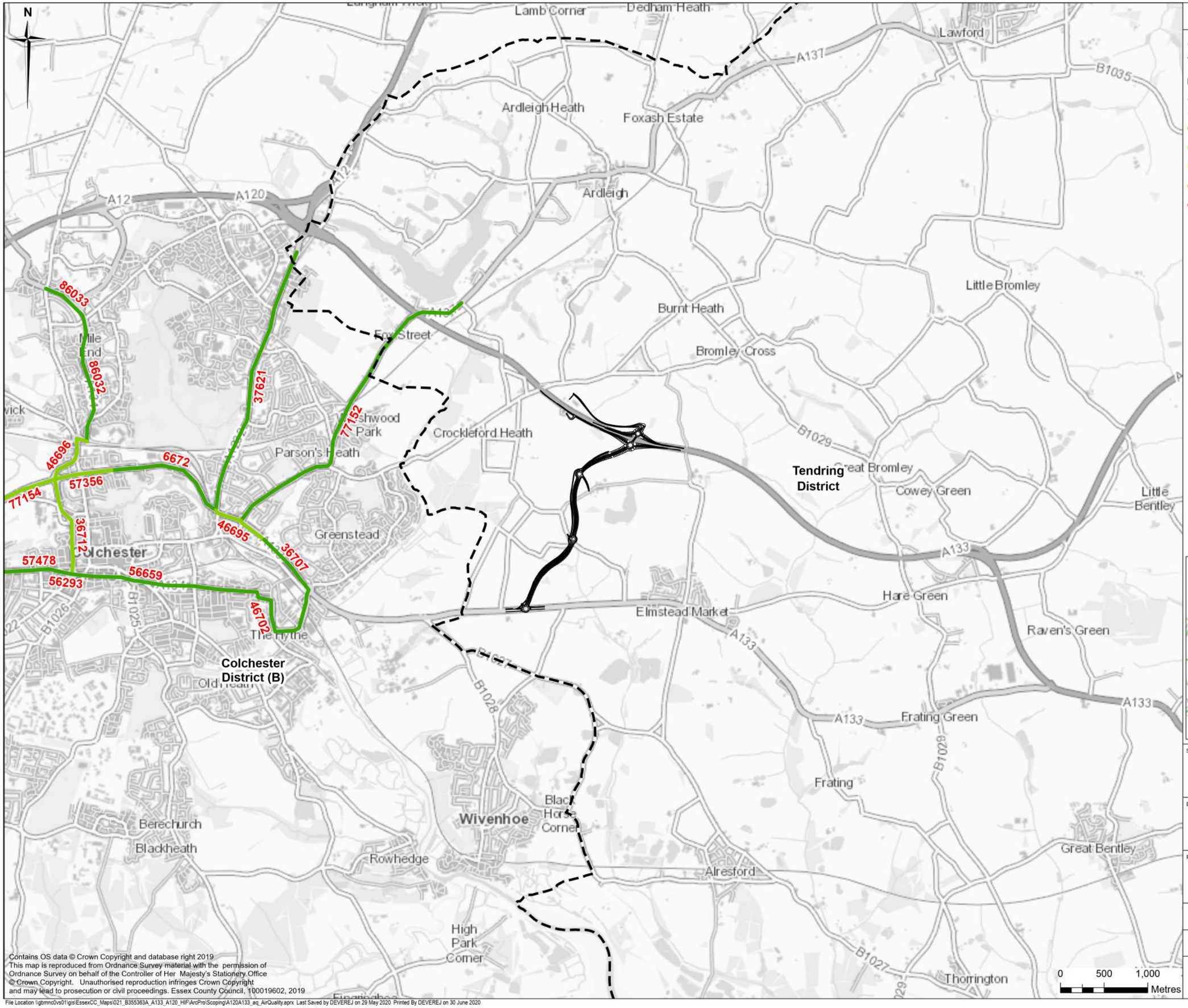

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FIGURE 4.2

Legend

- Preferred route
- Local Authority Boundaries

PCM Model Outputs

2019 Annual Mean NO_2 ($\mu g/m^3$)

- <= 30.0
- 30.1 - 36.0
- 36.1 - 40.0
- 40.1 - 44.0
- > 44.0

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

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FIGURE TITLE

POLLUTION CLIMATE MAPPING MODEL OUTPUTS (2019)

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N

Lamb Corner
Dedham Heath
Lawford
A137
B1035
Ardleigh Heath
Foxash Estate
A12
A120
Ardleigh
A137
Little Bromley
Burnt Heath
Fox Street
Mile End
A134
Bromley Cross
Welshwood Park
Parson's Heath
A1232
B1029
Great Bromley
Tendring District
Cowey Green
Little Bentley
Colchester District (B)
Greenstead
Colchester
A134
B1026
B1025
A133
Hare Green
Elmstead Market
The Hythe
A133
Raven's Green
Old Heath
B1028
A133
Frating Green
B1029
Frating
Black Horse Corner
Wivenhoe
Berechurch
Blackheath
Rowhedge
Great Bentley
Alresford
High Park Corner
B1027
Thorrington
0 500 1,000 Metres

File Location \\gbmnc0vs01\gis\EssexCC_Maps\021_B355363A_A133_A120_HIF\ArcPro\Scoping\A120A133_aq_AirQuality.aprx Last Saved by DEVEREJ on 29 May 2020 Printed By DEVEREJ on 30 June 2020

FIGURE 4.3

Legend
- Preferred route
- Local Authority Boundaries

Sensitive Ecosystems
- Nature Improvement Area
- Ramsar Site
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- Ancient Woodland
- Local Wildlife Site
- Local Nature Reserve

SCHEME TITLE

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DOCUMENT TITLE

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FIGURE TITLE

SENSITIVE ECOLOGICAL SITES

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N

Springvalley Lane
Burnt Heath
Bromley Cross
A120
Green Island Gardens
Colchester Waste Transfer Station
Broom Grove
Ardleigh South Service Station
Strawberry Grove
Greenstead Estate
Crockleford Heath
Great Bromley
Allen's Farm
St Anne and St Laurence, Elmstead Parish Church and Elmstead Hall
Turnip Lodge Lane
Balls Farm
Hare Green
A133
Elmstead Market
Balls Green
Wivenhoe Park Registered Park and Garden
University of Essex
The Beth Chatto Gardens
Frating Green

0 250 500 750 1,000 Metres

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FIGURE 5.1

Legend

- Preferred route
- 300m buffer from preferred route
- 1km buffer from preferred route
- Protected Lane
- Public Right of Way
- Grade I Listed Building
- Grade II* Listed Building
- Grade II Listed Building
- Registered Park and Garden
- Scheduled Monument

SCHEME TITLE

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DOCUMENT TITLE

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FIGURE TITLE

KEY CULTURAL HERITAGE CONSTRAINTS

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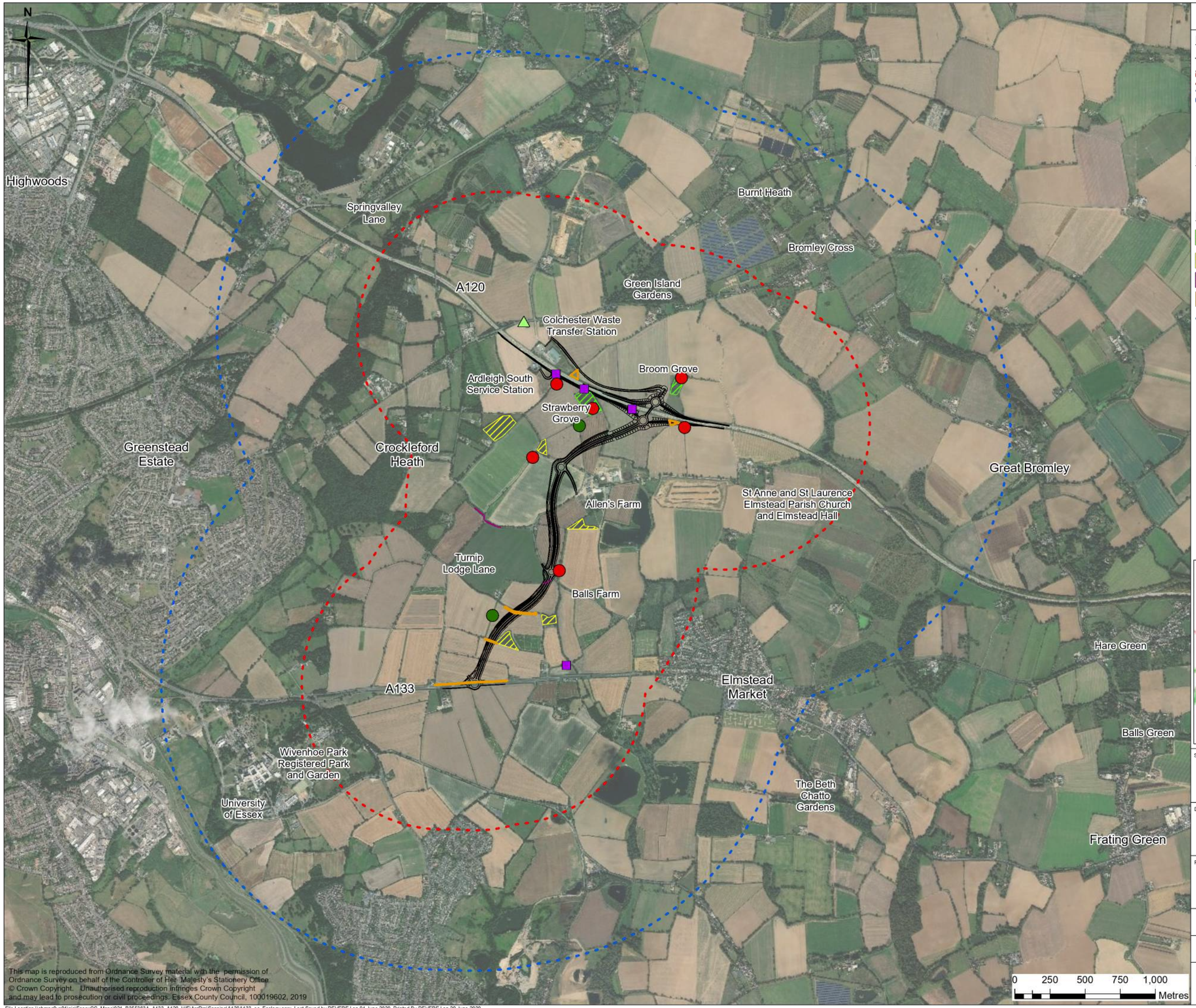

FIGURE 6.1

Legend

- Preferred route
- 1km buffer from preferred route
- 2km buffer from preferred route
- Plant species
- Dormouse Locations

Badger Activity Survey

- Active
- Disused

Habitats

- Lowland Mixed Deciduous Woodland
- Non Priority Woodland
- Dry Acid Grassland
- Reptile Survey Areas
- Watercourse

SCHEME TITLE

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ECOLOGY SURVEY RESULTS

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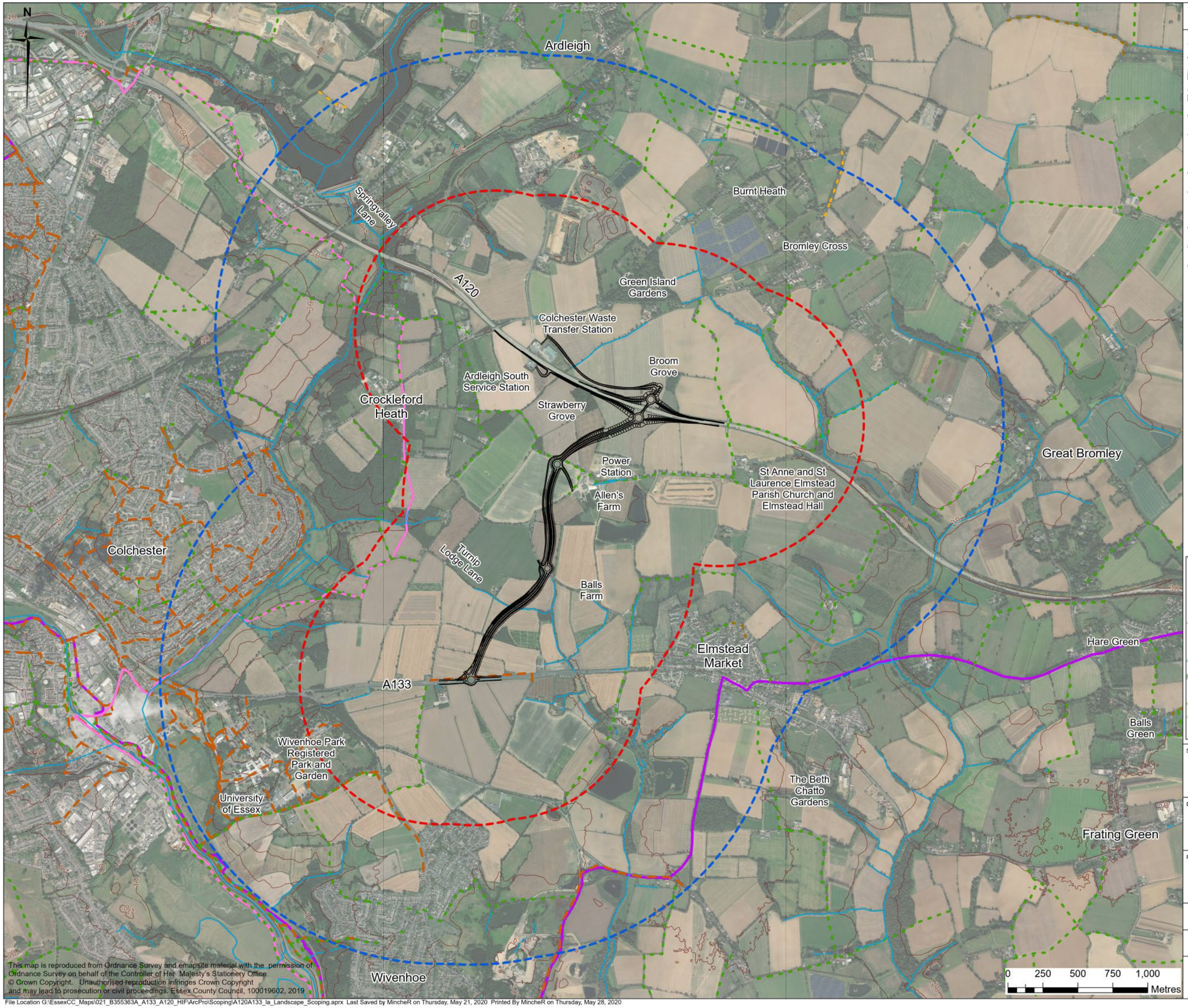

FIGURE 7.1

Legend

- Preferred route
- 1km buffer from preferred route
- 2km buffer from preferred route
- Contours at 10m intervals
- Watercourse
- National Cycle Network Route 51
- Essex Cycle Network
- Campolodunum Long Distance Path

Public Rights of Way

- Footpath
- Bridleway
- Byway/restricted byway

SCHEME TITLE

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FIGURE TITLE

LANDSCAPE CONTEXT

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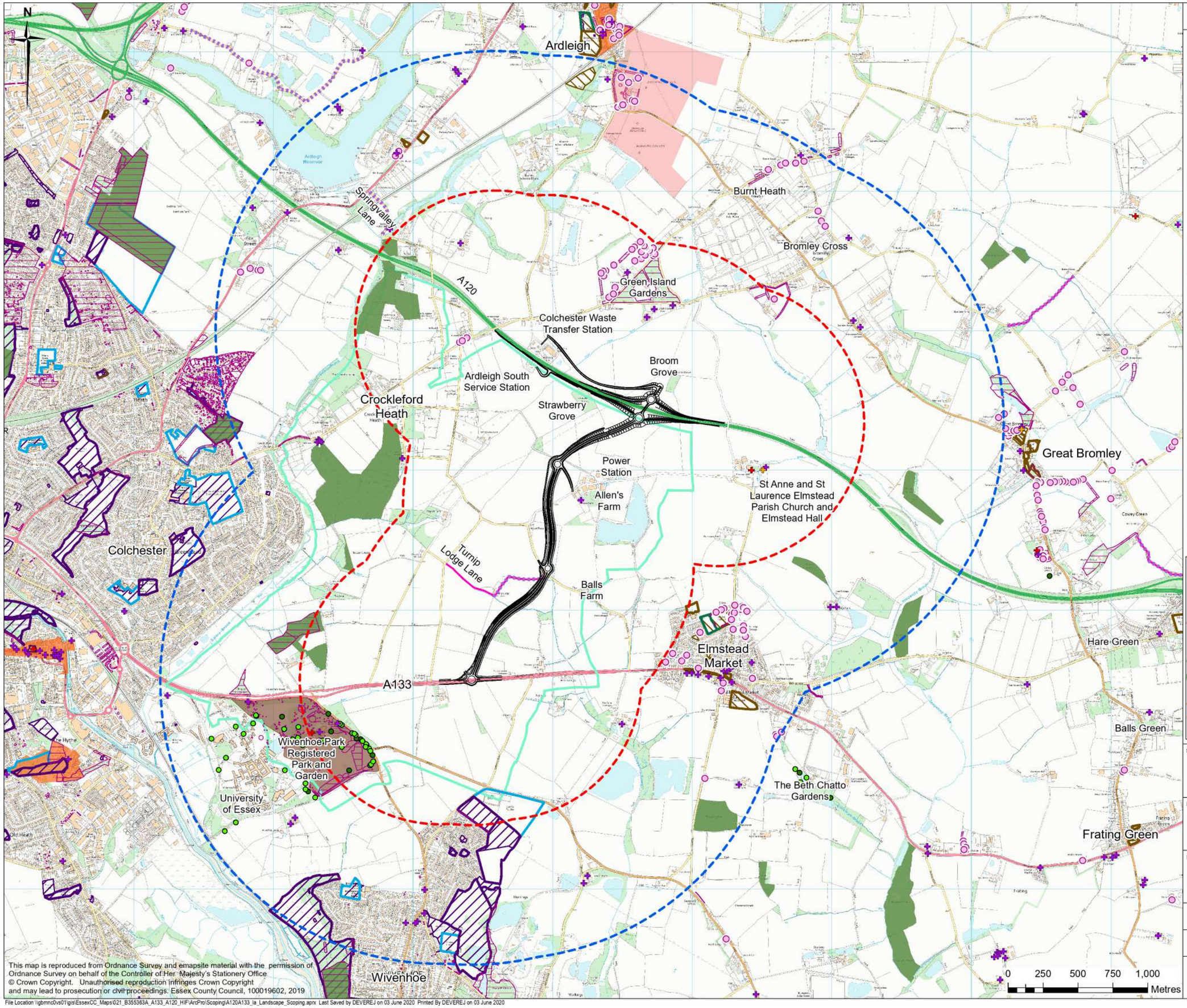
FIGURE 7.2



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Legend

- Preferred route
- 1km buffer from preferred route
- 2km buffer from preferred route
- Ancient woodland
- Ancient tree
- Veteran tree
- Tree Preservation Order - indvidual trees (2014/2015)
- Tree Preservation Order – individual tree and tree group (2014/2015 data)
- Listed Building Grade I
- Listed Building Grade II*
- Listed Building Grade II
- Scheduled monument
- Registered historic park and garden
- Conservation area

Tendring District Council Adopted Local Plan Policies (adopted 2007)

- Protected lane
- Proposed new recreational open space
- Protection of existing recreational open space

Tendring District Council Emerging Local Plan Policies (2017)

- Protected lane
- Safeguarded local green space

Colchester Borough Council Adopted Local Plan Policies (adopted 2008 and revised 2014)

- Open space
- Private open space

Colchester Borough Council Emerging Local Plan Policies (2017)

- Public open space
- Tendring Colchester Borders Garden Community

SCHEME TITLE

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FIGURE TITLE

LANDSCAPE PLANNING CONSTRAINTS

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FIGURE 7.3

Legend

- Preferred route
- 1km buffer from preferred route
- 2km buffer from preferred route

Essex landscape character areas and types (LCA and LCT)

- LCA E2 South Colchester Farmlands (LCT E London Clay)
- LCA E3 Tendering Plain (LCT E London Clay)
- LCA G4 Colcester and Environs (LCT G Urban)

Tendring LCAs and LCTs

- LCA 6B Ardleigh (LCT 6 Clay Valleys)
- LCA 6C Alresford Valley System (LCT 6 Clay Valleys)
- LCA 7A Bromley Heaths (LCT 7 Heathland Plateaux)

Colchester LCAs and LCTs

- LCA A6 Ardleigh River Valley (LCT A River Valley)
- LCA B3 Southern Colchester Farmland Plateau (LCT B Farmland Plateau)
- LCA B7 Langham Farmland Plateau (LCT B Farmland Plateau)
- LCA B8 Wivenhoe Farmland Plateau (LCT B Farmland Plateau)
- LCA D3 Colne Drained Estuarine Marsh (LCT D Drained Estuarine Marsh)
- LCA G3 Wivenhoe Urban Landscape (LCT G Principal Urban Areas)
- LCA G4 Colchester Urban Landscape (LCT G Principal Urban Areas)

Note:
Study area falls within National Character Area 111: Northern Thames Basin.

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

EIA SCOPING REPORT

FIGURE TITLE

PUBLISHED LANDSCAPE CHARACTER AREAS

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0 250 500 750 1,000 Metres

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1. Zone of theoretical visibility (ZTV) is generated using computer program ArcGIS 10.7 and is based on a combined ground model comprising Ordnance Survey Terrain 5 and Environment Agency 2m Composite LiDAR delivered Digital Terrain Model (DTM).
2. The ZTV is based upon bare earth ground model and therefore only takes account of the visual screening provided by existing topography. The ZTV does not take account of surface features, such as buildings and vegetation, which could also provide screening.
3. The ZTV has been modelled with a viewing height of 1.7m.
4. The ZTV results have been calculated within the extent of this figure. The limit of the ZTV shown on this figure is a working draft and provides an indication only of the theoretical maximum extent to which the proposals may be visible from within this area.
5. Elevations used for target points for the ZTV to represent high-sided vehicles (HGVs) and lighting columns along the preferred route are indicative only. Target points 4.5m above the level of the proposed carriageway have been used to represent the height of HGVs. In addition, target points 15m above the level of the proposed carriageway have been used to represent the height of lighting columns where applicable.
6. Potential refinements of the preferred route design may result in changes to the vertical or horizontal alignment, and therefore the ZTV.

FIGURE 7.4

Legend

- Preferred route
- 1km buffer from preferred route
- 2km buffer from preferred route
- Proposed indicative representative viewpoint position and direction
- Theoretical visibility of high-sided vehicles and lighting column target points
- Theoretical visibility of lighting columns target points only
- No theoretical visibility
- Contours at 10m intervals
- National Cycle Network Route 51
- Essex Cycle Network
- Campolodunum Long Distance Path

Public Rights of Way

- Footpath
- Bridleway
- Byway/restricted byway

Tendring District Council Adopted Local Plan Policies (adopted 2007)

- Proposed new recreational open space
- Protection of existing recreational open space

Tendring District Council Emerging Local Plan Policies (2017)

- Safeguarded local green spaces

Colchester Borough Council Adopted Local Plan Policies (adopted 2008 and revised 2014)

- Open space
- Private open space

Colchester Borough Council Emerging Local Plan Policies (2017)

- Public open space
- Tendring Colchester Borders Garden Community

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

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FIGURE TITLE

ZONE OF THEORETICAL VISIBILITY AND PROPOSED REPRESENTATIVE VIEWPOINTS

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JUN20	CW	LD	HM	PK

SCALE AT A3 1:25,000 | DO NOT SCALE

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0 250 500 750 1,000 Metres

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FIGURE 8.1

Legend

- Preferred route
- 1km buffer from preferred route
- 2km buffer from preferred route
- Surface Water Abstraction License
- Current Industrial Sites
- Registered Waste Transfer Sites
- Consented Discharges
- National Incidents and Records of Pollution
- Records of Part A1 and IPPCs Authorised Activities
- Air Pollution Consent Permits
- Historical Landfill Sites
- Active Landfill Sites
- Historical Potentiallly Infilled Land
- Historical Tanks
- Sites of Special Scientific Interest
- Surface Water Line Features
- Flood Zone 2
- Flood Zone 2
- Current Industrial Land Use
- Current farms & Nurseries
- Historical farms & Nurseries
- Lake
- Potentially Infilled Land
- Woodland

Groundwater abstractions

- Agricultural - Active
- Agricultural - Historical
- Other - Active
- Other - Historical

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

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FIGURE TITLE

GEOENVIRONMENTAL CONSTRAINTS

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MAY20	RM	PH	RL	PK

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FIGURE 9.1

Legend

- Preferred route
- 500m buffer from preferred route
- 1km buffer from preferred route
- Mineral Planning Application Areas

Note
Awaiting data for county and district level mineral areas

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

EIA SCOPING REPORT

FIGURE TITLE

MINERALS POLICY MAP

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0 250 500 750 1,000 Metres

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FIGURE 10.1

Legend

- Preferred route
- 600m buffer from preferred route
- Noise Important Areas

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DOCUMENT TITLE

PRE SCOPING CONSULTATION
EIA SCOPING REPORT

FIGURE TITLE

NOISE IMPORTANT AREAS

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SCALE AT A3 1:25,000 | DO NOT SCALE

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0 250 500 750 1,000 Metres

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FIGURE 11.1

Legend

- Preferred route
- 500m buffer around the scheme for geomorphology, surface water quality and groundwater
- 1km buffer around scheme for flood risk

SCHEME TITLE

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DOCUMENT TITLE

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FIGURE TITLE

STUDY AREA

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MAY20	RM	GK	CH	PK

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0 250 500 750 1,000 Metres

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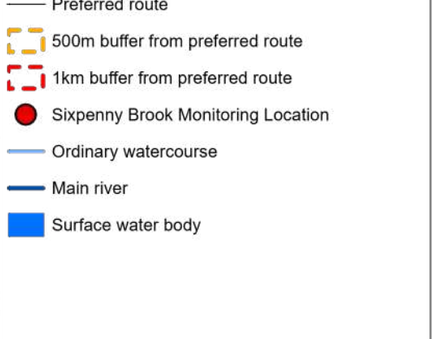
FIGURE 11.2

Legend

- Preferred route
- 500m buffer from preferred route
- 1km buffer from preferred route
- Sixpenny Brook Monitoring Location
- Ordinary watercourse
- Main river
- Surface water body



SCHEME TITLE

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DOCUMENT TITLE

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FIGURE TITLE

SURFACE WATER ENVIRONMENT

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FIGURE 11.3

Legend

- Preferred route
- 500m buffer from preferred route
- 1km buffer from preferred route
- WFD Waterbody catchments
- WFD river water body

Salary Brook

Salary Brook

Tenpenny Brook

Sixpenny Brook

Sixpenny Brook

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

EIA SCOPING REPORT

FIGURE TITLE

WFD WATER BODY OUTLINES TENPENNY BROOK, SIXPENNY BROOK

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FIGURE 11.4

Legend

- Preferred route
- 500m buffer from preferred route
- 1km buffer from preferred route
- Active Licensed Groundwater Abstractions
- Groundwater Discharge Consents

Source Protection Zones

- Zone III - Total Catchment

SCHEME TITLE

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FIGURE TITLE

GROUNDWATER ABSTRACTIONS AND DISCHARGES

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FIGURE 11.5

Legend

- Preferred route
- 500m buffer from preferred route
- 1km buffer from preferred route
- Pontential springs

Superficial Aquifers

- Secondary A
- Secondary B

Bedrock Aquifers

- Unproductive

Note: Scheme design has changed since data was purchased

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FIGURE TITLE

AQUIFERS

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FIGURE 11.6

Legend

- Preferred route
- 500m buffer from preferred route
- 1km buffer from preferred route
- Flood Zone 2 (Between 1% and 0.1% AEP)
- Flood Zone 3 (Greater than 1% AEP)
- Surface water body
- Ordinary watercourse
- Main river

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

EIA SCOPING REPORT

FIGURE TITLE

FLUVIAL FLOOD RISK

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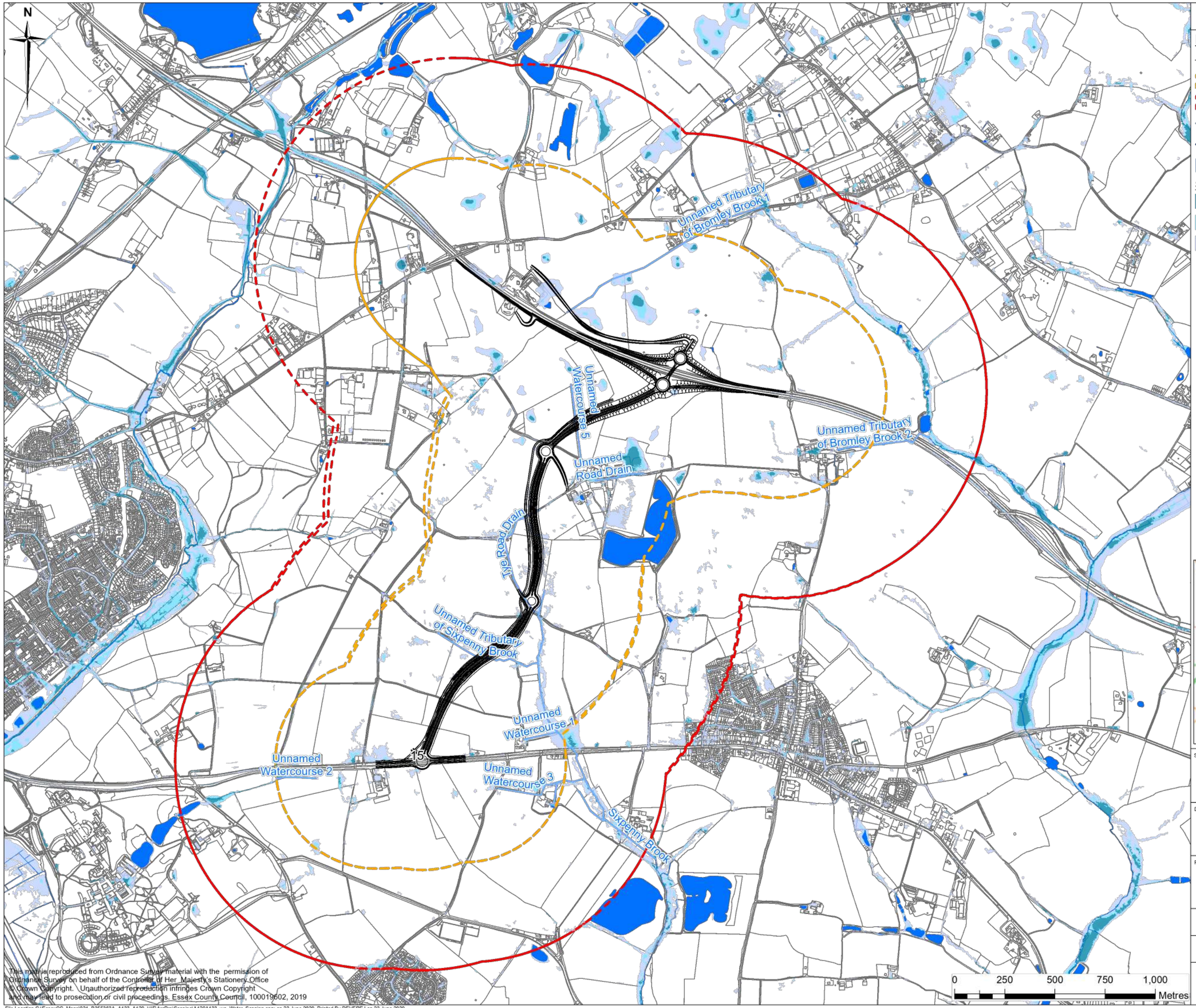

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FIGURE 11.7

Legend

- Preferred route
- 500m buffer from preferred route
- 1km buffer from preferred route
- Ordinary watercourse
- Main river
- Surface water body

Surface Water Flood Risk

- High Risk (Greater than 3.3% AEP)
- Medium Risk (Between 1% and 3.3% AEP)
- Low Risk (Between 0.1% and 1% AEP)

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

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FIGURE TITLE

SURFACE WATER FLOOD RISK

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FIGURE 12.3

Legend

- Preferred route
- 500m buffer from preferred route
- Potential Park and Choose Site
- Builtup areas
- National Cycle Network Route (NCNR)
- Protected lane
- Registered Park and Garden
- Local Nature Reserves
- Tendring Colchester Borders Garden Community
- Ward boundary

Public Rights of Way

- Footpath
- Bridleway
- Byway/restricted byway

Note: Ward boundaries as of time of 2011 census and health data. Note that ward boundaries have since been changed in 2017

SCHEME TITLE

A120/A133 LINK ROAD

DOCUMENT TITLE

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FIGURE TITLE

POPULATION AND HUMAN HEALTH CONTEXT AND BASELINE

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Appendix C: Major Accidents and Disasters

Introduction

A disaster is defined as a sudden, catastrophic event that can result in serious damage to human welfare or the environment. A disaster can result in major disruption to society or communities and can result in economic and environmental losses. Disasters can be caused by both natural processes and by human actions.

The EIA Directive requires that risks due to major accidents and disasters are considered within the environmental assessment. The following provides a risk assessment of the major accidents and disasters that could potentially affect the proposed scheme.

Methodology

An initial screening of potential risks due to major accidents and disasters that could apply to the proposed scheme was undertaken using guidance given by the International Federation of Red Cross and Red Crescent Societies website[238] and National Risk Register (NRR) of Civil Emergencies[239], which considers the proposed scheme's location and intended land use. For example, as the proposed scheme will be used as a transport route, the risk of a major transport accident applies. The results from the initial screening are presented in Table C-1.

Potential risks identified in the screening exercise were taken forward for more detailed consideration, with results being presented in Table C-2. The detailed risk assessment considered the probability of an event occurring, as well as the consequence and effect should such an event occur. Probabilities of event occurrence were obtained from the NRR, which considers the local context of the proposed scheme and climate change, relating to increased risk from flooding and risk to health from high temperatures. These factors were used to determine if an event presented a significant risk (i.e. potential to cause loss of life or long lasting and/or permanent environmental damage and would require a response beyond existing response measures), and therefore would be scoped in for further assessment. If information available was not sufficient for a detailed assessment, then the risk (or 'event') was scoped in for further assessment.

Conclusion

The risk assessment in Table C-2 shows that any risks from major accidents and disasters would either be considered through other environmental factors (e.g. climate effects are reported within the Climate Change chapter) or can be sufficiently managed through the proposed scheme design (i.e. mitigation embedded into the design, where required). Major accidents and disasters have therefore not been scoped into the EIA as a standalone topic.

As per Table C-2, two risk events will be taken forward for further consideration; 'mass movements/ground hazards' will be further reviewed within the ES Geology and Soils Chapter, and 'inland floods' will be further reviewed within the ES Road Drainage and Water Environment Chapter.

[238] International Federation of Red Cross and Red Crescent Societies (2020). Types of disasters: Definition of hazard. [Online]. Available at: http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/definition-of-hazard/. [Accessed: 30 January 2020]

[239] Cabinet Office (2017). National Risk Register of Civil Emergencies - 2017 edition. [Online]. Available at: https://www.gov.uk/government/publications/national-risk-register-of-civil-emergencies-2017-edition. [Accessed: 30 January 2020].

Table C-1 - Major accidents and disasters screening matrix

Accident/disaster	Location risk	Land use risk	Further consideration required
Biological hazards: epidemics	×	×	×
Biological hazards: animal and insect infestation	×	×	×
Earthquakes	×	×	×
Mass movements/ground hazards*	✓	×	✓
Tsunamis	×	×	×
Volcanic eruptions	×	×	×
Drought	×	×	×
Heatwaves*	✓	×	✓
Wildfires	×	×	×
Inland floods*	✓	×	✓
Coastal floods	×	×	×
Tropical storms	×	×	×
Storms and gales*	✓	×	✓
Industrial accidents	×	×	×
Transport accidents*	✓	✓	✓
Famine	×	×	×
Displaced populations	×	×	×
Terrorist attacks	×	×	×
Cyber attacks	×	×	×
Public disorder	×	×	×
Critical infrastructure failure*	×	✓	✓
Heavy snowfall/low temperatures*	✓	×	✓
Armed conflict/complex emergency	×	×	×
*Taken forward for more detailed consideration in Table C-2.			

Table C-2 - Major accidents and disasters risk assessment

Event	Likelihood	Consequence	Further considerations	Residual effects (after mitigation)	Scoped In/Out	Refer to
Mass movements/ ground hazards	There is insufficient information at this time to assess the likelihood and consequence of this event. A review of the Ground Investigation Report (GIR) once complete will need to be undertaken to inform the risk assessment of this event.				Scoped In	ES Geology and Soils Chapter
Heatwaves	The NRR probability of a heatwave occurring in the next five years is between 1 in 20 and 1 in 2. Summer temperatures are predicted to increase in the UK due to climate change, potentially increasing the likelihood of this event occurring.	Hot weather increases the risk of tarmac melting and technology overheating. This could result in unsafe driving conditions, potentially leading to accidents. Hot temperatures could also result in increased driver stress, increasing the likelihood of an accident occurring.	The UK Met Office has a system in place for providing warnings of extreme weather, which reduces the risk of drivers driving in extreme weather. There is a minor risk of high temperatures damaging the road surface and technology; however, the likelihood of this resulting in a catastrophic event is considered unlikely. Heatwaves are therefore not being considered further.	Negligible	Scoped Out	N/A

Event	Likelihood	Consequence	Further considerations	Residual effects (after mitigation)	Scoped In/Out	Refer to
Inland floods (surface water and fluvial flooding)	The NRR probability of a surface water flooding event occurring in the next five years is between 1 in 200 and 1 in 20. Locally there are areas around the proposed scheme at high risk from fluvial and groundwater flooding. Winters are predicted to get wetter in the UK due to climate change, potentially increasing the likelihood of this event occurring.		Further assessment is required through the flood risk assessment, drainage design and HEWRAT assessment (see Chapter 11).		Scoped In	ES Road Drainage and Water Environment Chapter
Storms and gales	The NRR probability of a storm/gale occurring in the next five years is between 1 in 20 and 1 in 2. There is uncertainty regarding the impact of climate change on wind speeds; however, there has been an increased occurrence of severe windstorms in the last decade which has been attributed to climate change.	High wind speeds can fell trees and man-made structures. This can result in property damage, disruption to the transport network, disruption to critical infrastructure, and casualties/fatalities. Large scale events have the potential to impact at a regional or even national scale.	High wind speeds have caused historic disruption to transport networks in the East England, and there is potential for future events to impact the proposed scheme which will be designed in accordance with best practice. Therefore, no additional consideration is needed.	Negligible	Scoped Out	N/A

Event	Likelihood	Consequence	Further considerations	Residual effects (after mitigation)	Scoped In/Out	Refer to
Transport accidents	The NRR probability of a major transport accident occurring in the next five years is between 1 in 2000 and 1 in 200. This probability could increase (e.g. due to future stress on the network) or decrease (e.g. through advances in technology) beyond five years.	Major accidents can result in fatalities, casualties, and damage to infrastructure, causing disruption to the network. There can also be impacts on local communities if they are not equipped to deal with a large-scale event in their area. Environmental damage could occur if a crash resulted in discharge of contaminants (e.g. if an oil tanker crashed).	Although accidents are likely to take place on the road network, it is extremely unlikely these would occur at a scale that would be considered a national or regional disaster. Traffic accidents would be managed through existing local emergency service procedures and would unlikely need a coordinated government response. Traffic accidents have therefore not been considered further in the EIA but will be included within the TA in terms of safety.	Negligible	Scoped Out	N/A

Event	Likelihood	Consequence	Further considerations	Residual effects (after mitigation)	Scoped In/Out	Refer to
Critical infrastructure failure (electricity failure)	The NRR probability of a widespread electricity failure occurring in the next five years is between 1 in 200 and 1 in 20. Although this has never occurred in the UK before, the risk could increase due to the increased risk of severe weather.	The proposed scheme will be a strategic local route that may rely on powered technology. A critical electricity failure could disrupt this technology, resulting in potential casualties/fatalities due to road accidents.	The Department for Business, Energy & Industrial Strategy works closely with industry and government to provide contingency planning in the event of a widespread electricity shutdown occurring. Existing measures are in place to manage such events, and it has therefore not been considered further.	Negligible	Scoped Out	N/A

Event	Likelihood	Consequence	Further considerations	Residual effects (after mitigation)	Scoped In/Out	Refer to
Heavy snowfall / low temperatures	The NRR probability of heavy snowfall occurring in the next five years is between 1 in 20 and 1 in 2. Winters are predicted to get milder in the UK due to climate change, potentially reducing the likelihood of such events.	Heavy snowfall can result in serious disruption to the transport network, resulting in road closures and increasing the risk of vehicle accidents. This has the potential to result in casualties and fatalities. Environmental damage could occur if a crash resulted in discharge of contaminants (e.g. if an oil tanker crashed).	The UK Met Office has a system in place for providing warnings of extreme weather. Essex Highways operate gritting lorries and manage operations for removing snow. These existing mitigation measures reduce the risk of accidents occurring. Although a residual risk remains for an accident to occur, the chance of one resulting in catastrophic damage to human health or the environment is considered unlikely. As such snow storms have not been considered further.	Negligible	Scoped Out	N/A

Appendix D: Published Landscape Character

National Landscape Character

Key characteristics of National Character Area 111: Northern Thames Basin, of relevant to the landscape within the proposed scheme scoping study area include:

- "The landform is varied with a wide plateau divided by river valleys. ...extensive tracts of flat land are found in the south.
- Characteristic of the area is a layer of thick clay producing heavy, acidic soils, resulting in retention of considerable areas of ancient woodland...
- A diverse landscape with a series of broad valleys containing the major rivers ... [including the] Colne ... and several reservoirs are dotted throughout the area.
- The pattern of woodlands is varied across the area and includes considerable ancient semi-natural woodland. ... parts of Essex [are heavily wooded], while other areas within Essex are more open in character. Significant areas of wood pasture and pollarded veteran trees are also present.
- The field pattern is very varied across the basin reflecting historical activity. Informal patterns of 18th-century or earlier enclosure reflect medieval colonisation of the heaths...
- Mixed farming, with arable land... Grasslands are characteristic of the river valleys throughout. Horticulture and market gardening are found on the light, sandy soils of former heaths in Essex, particularly around Colchester, along with orchards, meadow pasture and leys following numerous narrow rivers and streams.
- The diverse range of semi-natural habitats include ancient woodland ... and floodplain grazing marsh ...
- Rich archaeology including sites related to Roman occupation, with the Roman capital at Colchester ...
- The medieval pattern of small villages and dispersed farming settlement remains central to the character of parts of ... Essex. Market towns have expanded over time as have the London suburbs and commuter settlements, with the creation of new settlements ...
- Brick-built dwellings are characteristic from the late 17th century onwards. Prior to this dwellings and farm buildings tended to be timber built with weatherboarding..."[240]

[240] Natural England, 2013. National Character Area profile: 111: Northern Thames Basin.

Regional Landscape Character

Table D-1 – Published regional landscape character

Landscape Character Type/Area	Relevant Key Characteristics and Sensitivity to Major Transportation Developments/Improvements[241]
London Clay Landscapes LCT (E)	Key Characteristics: • "Mainly gently undulating or flat landform. • Heavy clay soils and lighter sandy/loamy soils where sand and gravel deposits overly clay. • Regular and straight hedged field boundaries the result of both ancient planned landscapes, and late enclosure of former heathlands. • Pasture and arable farmland. • Mostly enclosed nature of the landscape."
LCA E2 South Colchester Farmlands (potentially indirectly affected)	Key Characteristics: • "Mix of small regular pasture and large arable fields…" Sensitivity to Major Transportation Developments/Improvements: Moderate ("May be capable of being absorbed. Developments to be considered on their individual merit").
LCA E3 Tendring Plain (potentially directly affected)	Key Characteristics: • "Large flat farmland plateau, dissected by occasional small narrow valleys. • Arable land use dominates, but with some pasture and orchards. • Straight and regular field patterns with mainly low trimmed hedgerows. • Widely dispersed blocks of woodland/small copses… • Former heathland character near Colchester." The LCA is described as "a low, relatively flat plateau with extensive arable land use … Typically the fields are large and regular. Apart from a few localised clusters of woodlands/copses they are very widely dispersed. As a result[,] the area has a generally open character and there are frequent wide views in which the small settlements, scattered hedgerow trees [and] occasional lines of poplars punctuate the low horizons. Small river/stream valleys cutting through the broad plateau have a contrasting enclosed character and more intimate scale. Pylons, high masts and major roads visually interrupt the landscape in parts."

[241] Chris Blandford Associates (2003). Essex Landscape Character Assessment.

Landscape Character Type/Area	Relevant Key Characteristics and Sensitivity to Major Transportation Developments/Improvements[241]
	Sensitivity to Major Transportation Developments/Improvements: Moderate ("May be capable of being absorbed. Developments to be considered on their individual merit").
Urban Landscapes LCT (G)	Key Characteristics: • "Very large areas of 20th century residential and commercial developments, usually surrounding a historic core, and/or enveloping former villages. • Visual dominance of an urban skyline. • Integral open spaces important for informal/formal recreation and/or wildlife, and which act as green lungs. • Influence of water, with river valley …, often with an associated gently undulating landform."
LCA G4 Colchester and Environs (potentially indirectly affected)	Key Characteristics: • "Historic town core with a strong grid pattern on a low hill above the River Colne. • Residential and commercial development wraps over valley sides or slightly elevated flatter land. • Uninterrupted valley floor of the Colne forms a ribbon of green space running through the centre of the urban area. • Large blocks of woodlands and open spaces on some valley sides. • Variable size regular … fields [enclosed by hedgerows] in the fringing farmland." Sensitivity to Major Transportation Developments/Improvements: Moderate ("May be capable of being absorbed. Developments to be considered on their individual merits.")

Local Landscape Character

Table D-2 – Published local landscape character

Landscape Character Type/Area	Relevant Key Characteristics, Guidelines and Sensitivity to Change[242]
Tendring Landscape Character Assessment	
LCT 6 Clay Valleys	Key Characteristics: Not Stated.
LCA 6B Ardleigh (potentially indirectly affected)	Key Characteristics: • "Steep sided rural wooded valley system on the eastern outskirts of Colchester. • Ancient deciduous woodland clings to valley sides and alder and willow dominate streamlines. • Leafy lanes drop steeply down the valley sides and cross streams on stone brides, e.g. Spring Valley Lane. • The A120 and railway line, in contrast, cut across the valley on embankments, fragmenting the valley both visually and physically. • Spring Valley Mill is the only remaining example of a water mill in Tendring. • Ardleigh Reservoir floods the two northernmost arms of the valley system."
LCA 6C Alresford Valley System (potentially indirectly affected)	Key Characteristics: • "A series of distinct river valleys, steep sided in places, containing Sixpenny [and] Tenpenny… Brooks … • An intimate, wooded character which contrasts with the adjacent expansive large scale open arable landscapes of the Heathland Plateaux. • Extensive areas of deciduous woodland… • Historic lands drop steeply down the valley side and cross the brooks at historic crossing points. • Sparse settlements consisting of scattered cottages and isolated farms."
LCT 7 Heathland Plateau	Key Characteristics: Not Stated.
LCA 7A Bromley Heaths (potentially directly affected)	Key Characteristics: • "Exposed and windswept plateau corresponding to the highest part of the district, with deep loamy soils.

[242] Chris Blandford Associates (2005). Colchester Landscape Character Assessment.
Land Use Consultants (2001). Tendring Landscape Character Assessment.

Landscape Character Type/Area	Relevant Key Characteristics, Guidelines and Sensitivity to Change[242]
	• Extensive arable landscape of large productive fields divided by low, gappy hedgerows where oaks stand out as silhouettes against the skyline. • Apple orchards around Ardleigh [and] Elmstead... are sheltered by belts of poplar... • Areas of former heath have been converted to smallholdings or appear as areas of regenerated woodland. • Low density, rural settlement pattern of scattered farms and halls, hamlets, villages and small market towns. • A network of narrow lanes connects the scattered farms and villages ... • Dominating skyscape." Guidance: • "The large scale open landscape means that particular care must be taken in siting and design. Any new development, even of single farm buildings has the potential to be highly visible over long distances. • Plateau edges form highly visible skylines and are particularly sensitive to built development. • Maintain the historic dispersed settlement pattern of hamlets, scattered farmsteads and distinctive villages. Further incremental linear development along roads would disrupt this pattern... • The isolated halls and churches located separately from their village are a special historic feature. The rural setting of these buildings should be conserved... • The church towers frequently form prominent landmark features within this open landscape and views to these features should be conserved. • Care should be taken in the siting of ... vertical elements - isolated elements may act as landmark features but several can lead to a cluttered skyline..."
Colchester Landscape Character Assessment	
LCT A River Valley	Key Characteristics: • "V-shaped valley landform which dissects Boulder Clay/Chalky Till plateau; • Main river valley served by several tributaries; • Flat or gently undulating valley floor; • Intimate character in places; • Wooded character in places."

Landscape Character Type/Area	Relevant Key Characteristics, Guidelines and Sensitivity to Change[242]
LCA A6 Ardleigh River Valley (potentially indirectly affected)	Key Characteristics: • "Lower reaches of a small narrow river valley encompassing the Salary Brook and steep valley sides; • Wooded western valley slopes (patches of ancient deciduous woodland); • Small regular fields on the valley sides in proximity to Salary Brook, becoming larger adjacent to the south; • Connects to the large Ardleigh reservoir and remainder of the character area outside the borough boundary to the north."
LCT B Farmland Plateau	**Key Characteristics:** • "Elevated gently rolling Boulder Clay/Chalky Till plateau landscape; • Network of narrow winding lanes and minor roads; • Medium to large-scale enclosed predominantly arable fields; • Long distance views across valleys from certain locations; • Well wooded in places (with several areas of semi-natural and ancient woodland), interspersed with orchards."
LCA B3 Southern Colchester Farmland Plateau (potentially indirectly affected)	Key Characteristics: • "An area of sloping farmland plateau (with a mixture of small, medium and large predominantly arable fields) bordered by Colchester settlement fringes to the north and the wooded Roman River Valley to the south; • Influence of the military (East Donyland military training area & Middlewick Rifle Ranges) – disturbs tranquillity whilst firing practice is taking place; • ...Character area provides physical and visual separation between Colchester urban area and the Roman River Valley; • Fragmented and sometimes chaotic landscape structure with numerous unrelated land uses."
LCA B7 Langham Farmland Plateau (potentially indirectly affected)	Key Characteristics: • "Large-scale arable fields ... now cover the large expanse of [the disused Langham] airfield;..."
LCA B8 Wivenhoe Farmland Plateau (potentially indirectly affected)	Key Characteristics: • "Small, irregular patches of woodland; • Plateau, predominantly arable farmland consisting of medium to large arable irregular fields with gappy field boundaries;

Landscape Character Type/Area	Relevant Key Characteristics, Guidelines and Sensitivity to Change[242]
	• Well-connected network of lanes and footpaths traversing the area; • Distinctive Wivenhoe Park and Lodge adjacent to the University of Essex site."
LCT D Drained Estuarine Marsh	Key Characteristics: "Areas of flat, artificially drained former salt marsh currently grassland and cultivated fields; Visible sea walls separate drained former marshland and current saltmarsh/mudflats; Lack of large areas of trees or woodland; Network of visible drainage ditches."
LCA D3 Colne Drained Estuarine Marsh (potentially indirectly affected)	Key Characteristics: "Corridor of rough grassland and grazing marsh lines the River Colne; Scattered patches of low-lying scrub; Network of drainage ditches in places; Visual influence of main railway line which runs through parts of the area."
LCT G Principal Urban Areas	No key characteristics listed, as excluded from the Colchester Landscape Character Assessment (Chris Blandford Associates, 2005).
LCA G3 Wivenhoe Urban Landscape	
LCA G4 Colchester Urban Landscape	

Appendix E: Material Assets and Waste Legislation and Policy

European and National Legislation

The EU Circular Economy Package, 2018

The Circular Economy Package[243] outlines the European Commission's proposals to help stimulate the EU economy to move from a linear to a stronger and more circular model where resources are used in a more sustainable way. It also includes revised targets for waste reduction to establish an ambitious and credible long-term path for waste management and recycling in the EU. The targets are accompanied by measures to help address different situations across Member States. Key elements, of relevance to this assessment, include:

- Recycling 75 % of packaging waste by 2030
- Binding landfill target to reduce landfill to maximum of 10% of all waste by 2035
- Ban on landfilling of separately collected waste
- Measures to promote re-use and stimulate industrial symbiosis – specifically turning one industry's by-product into another's raw material

Revised EU Waste Framework Directive (2008/98/EC)

The Waste Framework Directive[244] establishes a legal framework for treating waste in the EU. This is designed to protect the environment and human health by emphasising the importance of waste management, recovery and recycling techniques to reduce pressure on resources and improve their use. Those elements of relevance to this assessment include:

- Establishes a waste hierarchy: prevention, re-use, recycling, recovery for other purposes such as energy and disposal
- Producers or holders of waste must treat it themselves or have it handled by an officially recognised operator. They require a permit and are inspected periodically
- Establishes special conditions that apply to hazardous waste, waste oils and bio-waste
- Introduces recycling and recovery targets to be achieved by 2020 for C&D waste (70 %)

Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

The Landfill Directive[245] aims to prevent, or reduce as much as possible, any negative impact from landfilling on surface water, groundwater, soil, air or human health. It does so by introducing stringent technical requirements. Those requirements of relevance to this assessment include:

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[243] European Commission (2018). Circular Economy Package [https://ec.europa.eu/environment/circular-economy/].
[244] European Parliament (2008). Directive 2008/98/EC on waste and repealing certain Directives (Waste Framework Directive) [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098].
[245] Council of the European Union (1999). Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31999L0031].

- Landfill sites are divided into three categories: for hazardous waste, non-hazardous waste and inert waste (waste must only be disposed of at the correct category of landfill)
- Landfill facilities may not accept used tyres or waste which is liquid, flammable, explosive or corrosive
- Only waste that has been treated may be landfilled

The Environmental Protection Act 1990

The Environmental Protection Act 1990[246] requires that waste must be assessed and classified before it is collected and disposed of or recovered. This identifies whether the waste is hazardous or not, and which controls apply to the movement of the waste to prevent harm to people and the environment.

The Environmental Permitting (England and Wales) Regulations 2016 (as amended)

The Environmental Permitting Regulations[247] require that operators of regulated waste installations, mobile plant or waste operations to obtain an environmental permit for certain activities involving the storage, treatment, use or disposal of waste.

The Waste (England and Wales) Regulations 2011 (as amended)

The Waste Regulations[248] require that an establishment or undertaking which imports, produces, collects, transports, recovers or disposes of waste must take all such measures as are reasonable in the circumstances to apply the waste hierarchy of prevention, preparing for re-use, recycling, other recovery and disposal when transferring waste. Establishments or undertakings can depart from the above priority order so as to achieve the best overall environmental outcome.

Waste Transfer Notes and Consignment Notes require waste producers to confirm that they have fulfilled their duty to apply the waste hierarchy.

The Landfill (England and Wales) Regulations 2002 (as amended)

The Landfill Regulations[249] prohibit certain kinds of waste being disposed of at landfill, for example liquid waste, certain hazardous wastes and tyres. The Regulations classifies landfills according to whether they can accept hazardous, non-hazardous or inert wastes and mandates that wastes can only be accepted at a landfill if they meet the waste acceptance criteria for that class of landfill.

The Regulations require that all waste be treated before it is disposed of at landfill with the exceptions of inert waste for which treatment is not technically feasible and waste other than inert waste where treatment would not reduce its quantity or the hazards that it poses to human health or the environment.

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[246] HMSO (1990). Environmental Protection Act 1990 [http://www.legislation.gov.uk/ukpga/1990/43/contents].
[247] The Stationery Office Limited (2016). The Environmental Permitting (England and Wales) Regulations 2016 [http://www.legislation.gov.uk/uksi/2016/1154/contents/made].
[248] The Stationery Office Limited (2011). The Waste (England and Wales) Regulations 2011 [http://www.legislation.gov.uk/uksi/2011/988/contents/made].
[249] The Stationery Office Limited (2002). The Landfill (England and Wales) Regulations 2002 [http://www.legislation.gov.uk/uksi/2002/1559/contents/made].

The Hazardous Waste (England and Wales) Regulations 2005 (as amended)

The Hazardous Waste Regulations[250] set out the regime for the control and tracking of the movement of hazardous waste. The Regulations ban the mixing of hazardous wastes with non-hazardous waste and imposes a duty to separate different categories of hazardous waste where technically feasible.

The Regulations require producers, holders, carriers, consignors and consignees to complete documents whenever hazardous waste is removed from premises and to keep records respectively for a minimum of three years.

National Policy

Department for International Development 2017 Agenda 2030

The policy paper[251] sets out the UK Government's approach to delivering the 17 Global Goals for Sustainable Development, at home and around the world. These include, amongst others, the goal of reducing waste in the UK, and ensuring the sustainable management and efficient use of the UK's natural resources (Goal 12 Responsible Consumption and Production).

HM Government 2018 A Green Future - Our 25 Year Plan to Improve the Environment

This Plan[252] sets out the Government's goals for improving the environment, within a generation, and leaving it in a better state than we found it. Key goals and targets include maximising the value and benefits from resources, doubling resource productivity by 2050; working towards the ambition of zero avoidable waste by 2050 and meeting all existing waste targets.

Defra 2018 Resources and Waste Strategy for England

The Resources and Waste Strategy[253] sets out the plan to preserve material resources by minimising waste, promoting resource efficiency and moving towards a circular economy in England.

Defra 2013 Waste Management Plan for England

The Waste Management Plan for England[254] sets out the obligations for England which have been transposed from the revised EU Waste Framework Directive (2008/98/EC). These obligations include: ensuring that by 2020 at least 70 % by weight of construction and demolition waste is subjected to material recovery.

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[250] The Stationery Office Limited (2005). The Hazardous Waste (England and Wales)Regulations 2005 [http://www.legislation.gov.uk/uksi/2005/894/contents/made].
[251] Department for International Development (2017). Agenda 2030: Delivering the Global Goals [https://www.gov.uk/government/publications/agenda-2030-delivering-the-global-goals].
[252] HM Government (2018). 25 Year Environment Plan A Green Future: Our 25 Year Plan to Improve the Environment https://www.gov.uk/government/publications/25-year-environment-plan].
[253] Defra (2018). Resources and Waste Strategy for England [https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england].
[254] Defra (2013). Waste Management Plan for England [https://www.gov.uk/government/publications/waste-management-plan-for-england].

National Planning Policy Framework 2019

Whilst the NPPF does not contain specific materials or waste management policies, the framework does include references to both the prudent use of natural resources and waste management in Chapters 3 and 17 respectively. Those references of relevance to this assessment include: achieving the environmental objective of sustainable development through using natural resources prudently and minimising waste; and facilitating the safeguarding and sustainable use of minerals.

National Planning Policy for Waste 2014

The National Planning Policy for Waste[255] requires LPAs to ensure that the:

- Likely impact of proposed, non-waste related development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities
- Handling of waste arising from the construction and operation of development maximises reuse/recovery opportunities and minimises off-site disposal

Local Policy

Tendring District Council Local Plan 2007

The Tendring Local Plan[256] forms one part of the Development Plan for the area The Development Plan for the Tendring District currently consists of the following documents:

- The Tendring District Local Plan 2007 (adopted December 2007)
- The Essex Minerals Local Plan Second Review, First Deposit Draft (November 2003)
- The Essex and Southend-on-Sea Waste Local Plan (Adopted September 2001)

Until Tendring formally adopts a new Local Plan, the planning policy situation is complex. Elements of the 2007 adopted Local Plan will remain in force and will be used in determining planning applications, where relevant. However, as the new Local Plan progresses it will begin to have more "weight" in the planning process.

Policy elements of relevance to this assessment include:

- Policy EN7 - Safeguarding Mineral Supplies: “Development that would sterilise or prejudice the extraction of supplies within the Preferred Areas for Mineral Extraction identified in the Essex Minerals Local Plan will not be permitted”
- Policy T10 – Environmental Impact of New Transport Infrastructure: “Subject to economic considerations the adverse environmental impact of all new road and other transport infrastructure schemes will be minimised as far as possible by inter alia: using suitable recycled materials for construction and maintenance to reduce the demand for new areas of

[255] Ministry of Housing, Communities & Local Government (2014).National Planning Policy for Waste [https://www.gov.uk/government/publications/national-planning-policy-for-waste].
[256] Tendring District Council (2007). Tendring District Council Local Plan [https://www.tendringdc.gov.uk/localplan].

mineral extraction and using modes other than road haulage to transport materials to and from the construction site"

Tendring District Council Local Plan 2013-2033 and Beyond Publication Draft 2017

The Tendring District Local Plan 2013-2033 and Beyond Publication Draft[257] is the next step in preparing an emerging Local Plan for Tendring.

Policy elements of relevance to this assessment include:

- Policy SPL 3 Sustainable Design: "New development (including changes of use) must meet practical requirements. The following relevant criteria must be met:
    - Provision is made for waste storage, separation and recycling facilities
    - All new development should have regard to the most up to date adopted Essex Mineral Local Plan"

The Essex Minerals Local Plan 2014

The Essex Minerals Local Plan provides planning policies for minerals development in Essex until 2029. The plan includes ways to reduce reliance on primary mineral resources including the use of recycled aggregates.

The Plan includes the Minerals Core Strategy, which sets out the long-term direction for minerals development and a plan to deliver this; development management policies for minerals planning; strategic site allocations and safeguarding for mineral extraction; and a Policies Map, showing site locations.

Policies of relevance to this assessment include:

- Policy S4 - Reducing the use of mineral resources: "All development proposals shall ensure that mineral waste is minimised and that minerals on development/redevelopment sites are re-used and recycled. This is to ensure both a reduction in the need for primary minerals and the amount of construction, demolition, and excavation wastes going to landfill. This will be supported by joint working with strategic partners to ensure:
    - The application of national and local standards for sustainable design and construction in proposed development
    - The application of procurement policies which promote sustainable design and construction in proposed development
    - The maximum possible recovery of minerals from construction, demolition and excavation wastes produced at development or redevelopment sites. This will be promoted by on-site re-use/recycling, or if not environmentally acceptable to do so, through re-use/recycling at other nearby aggregate recycling facilities in proximity to the site"
- Policy S8 - Safeguarding mineral resources and mineral reserves: "By applying MSAs and/or MCAs, the Mineral Planning Authority will safeguard mineral resources of national and local importance from surface development that would sterilise a significant economic resource

[257] Tendring District Council (2017). The Tendring District Local Plan 2013-2033 and Beyond Publication Draft [https://www.tendringdc.gov.uk/localplan].

or prejudice the effective working of a Permitted Mineral Reserve, Preferred or Reserve Site allocation within the Minerals Local Plan. The MPA shall be consulted, and its views taken into account, on proposed developments within MSAs and MCAs except for the excluded development identified in Appendix 5 of the Minerals Local Plan. Non-mineral proposals that exceed these thresholds shall be supported by a minerals resource assessment to establish the existence or otherwise of a mineral resource of economic importance. If, in the opinion of the LPA, surface development should be permitted, consideration shall be given to the prior extraction of existing minerals"

- Policy S9 - Safeguarding mineral transhipment sites and secondary processing facilities: "Mineral facilities of strategic importance and shall be safeguarded from development which would compromise their continued operation. The LPA shall consult the Mineral Planning Authority for its views and take them into account on proposals for development within the MCA of those safeguarded sites, as identified on the Policies Map, before making planning decisions on such proposals"

The Essex and Southend-on-Sea Waste Local Plan 2017

The Essex and Southend-on-Sea Waste Local Plan[258] sets out how Essex and Southend-on-Sea aim to manage waste. It seeks to deal with waste more sustainably, encouraging recycling and reducing reliance on landfill. No policies of direct relevance to this assessment have been identified.

[258] Essex County Council and Southend-on-Sea Borough Council (2017). Essex & Southend Waste Local Plan [https://www.essex.gov.uk/minerals-waste-planning-policy/waste-local-plan].

Appendix F: Preliminary Water Framework Directive Compliance Assessment

A120-A133 Link Road

Preliminary Water Framework Directive Compliance Assessment

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Contents

1. Introduction

1.1 Purpose of the report

This appendix provides a scoping assessment of the potential effects of the A120-A133 (hereafter referred to as the proposed scheme) on the Water Framework Directive (WFD) status and objectives of nearby WFD water bodies, during both the construction and operational phases. The purpose of the report is to provide an overview of the results of the initial screening and scoping stages of the WFD Assessment, in line with The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

1.2 Assessment background

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 transposed into English and Welsh legislation the European Union's Water Framework Directive (2000/60/EC). The Directive has the overarching objective of requiring all water bodies in the Union to attain Good or High Status/Potential. The overall Status/Potential comprises a series of biological, physico-chemical and hydromorphological 'quality elements', which should not be allowed to deteriorate in the event of modifications being made to the WFD water body. The Environment Agency is the competent authority in England for delivering WFD targets.

'Good Status' refers to WFD water bodies whose quality elements show only a slight deviation from a natural/near natural condition. 'Good Potential' refers to WFD water bodies that are designated as Artificial or Heavily Modified Water Bodies (A/HMWB), recognising that they have either been artificially created or substantially modified in character by human activity to fulfil important socio-economic benefits (e.g. flood defence or navigation). In A/HWMBs, Good Potential objectives are set out to allow for the maximum quality of the aquatic ecosystem to be achieved without significantly impacting the socio-economic functions of the water body (UKTAG, 2008).

The WFD outlines the following objectives in Article 4(1)(a) for the protection of surface and groundwater bodies:

- Prevent deterioration in the status of WFD water bodies;
- Aim to achieve Good Status and good surface water chemical status in WFD water bodies by 2021 or 2027 (depending on feasibility);
- For WFD water bodies designated as artificial or heavily modified, aim to achieve Good Potential by 2021 or 2027 (depending on feasibility);
- Comply with objectives and standards for protected areas where relevant; and,
- Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.

A WFD water body is defined not only as the main river shown on Environment Agency plans, but also encompasses all other watercourses (including connected drains) contributing towards the overall WFD condition of the main water body. The extent of each WFD water body is highlighted by a defined catchment boundary.

Where a scheme is considered likely to cause deterioration, or where it could contribute to failure of the WFD water body to meet Good Status/Potential, then an Article 4.7 assessment would be required. Article 4.7 is an exemption to the WFD legislation where new modifications prevent a WFD water body (or bodies) from achieving Good or cause a deterioration in status.

1.3 Study Area

The proposed scheme is located to the east of Colchester, England. For the purposes of this WFD assessment a study area has been assigned, extending 500m out from the proposed scheme components. The study area

allows for the assessment of the water features within close proximity to the proposed scheme, as well as encompassing the potential for changes to the upstream/downstream watercourses and upgradient/downgradient groundwater bodies. Within this study area there are two Environment Agency Main Rivers and four ordinary watercourses.

2. Methodology

2.1 Data sources

A desk-based study has been carried out to inform this assessment, reviewing existing information for the proposed scheme and study area to develop a baseline. The following are the key data sources used:

- Environment Agency Catchment Data Explorer (Environment Agency, 2018);
- Contemporary OS maps and designated areas (Natural England, 2020);
- Geology maps (BGS 2020)
- Historical maps (National Library of Scotland, 2020); and,
- Hydrological information (CEH, 2020; FEH 2020).

2.2 WFD assessment methodology

The following assessment draws on key guidance provided by the Design Manual Roads and Bridges LA113 (Road Drainage and Water Environment), Environment Agency (including the Clearing the Waters for all Guidance (Environment Agency 2017), UKTAG (UK Technical Advisory Group) (UKTAG 2008) and The Planning Inspectorate (PINS) Advice Note 18 (PINS, 2017).

The following outlines the proposed sequence for undertaking the WFD assessment to determine compliance of the proposed scheme against WFD objectives and legislation. It is formed of three key stages of which this preliminary WFD assessment undertakes the first two:

Stage 1: WFD Screening

The screening stage identifies the extent the proposed scheme likely to affect the WFD water bodies and justifies the exclusion of receptors and scheme components. This stage includes:

- Outlining the proposed scheme;
- Identifying the relevant River Basin Management Plans and WFD water bodies; and,
- Identifying whether any WFD water bodies or proposed scheme components can be screened out and why.

Stage 2: WFD Scoping

The scoping stage identifies the potential risks of the proposed scheme activities impacting the WFD water bodies screened in for assessment. This stage includes:

- An initial assessment to identify the risks from the proposed scheme and what aspects require a detailed assessment; and,
- Identifying which WFD quality elements are scoped in for each WFD water body.

Stage 3: WFD Impact Assessment

The WFD impact assessment is a detailed assessment of the WFD water bodies and activities carried forward from the WFD screening and scoping stages. This includes the:

- Identification of baseline conditions of the WFD quality elements for surface and groundwater bodies;
- Description of the proposed scheme;
- Identification of potential impacts from the proposed scheme on quality elements;
- Review of actions to deliver WFD specific mitigation measures; and,
- Assessment of the proposed scheme against WFD status objectives, other related (EU Directive) legislation and overall compliance (including identification of required mitigation and/or enhancements).

3. Stage 1: WFD screening

3.1 Relevant WFD water bodies

An initial exercise has been completed to identify the WFD water bodies potentially impacted by the proposed scheme within the study area, both directly and indirectly, and determine whether the identified water bodies should be screened in for assessment. Table 3.1Error! Reference source not found. provides a summary of the WFD Screening.

Four WFD water bodies were identified, which cover those within the 500m study area as well as the connecting upstream and downstream WFD water bodies. Of these, two surface WFD water bodies and one groundwater WFD water body have been screened in.

A figure is presented in Chapter 11, Road Drainage and Water Environment, (Figure 11.3) showing the location of the WFD water bodies and study area in relation to the proposed scheme.

Table 3.1: Screening assessment for identified WFD water bodies (green shading indicates those WFD water bodies screen in, with orange representing those screened out)

RBMP	WFD water body	ID	Hydromorphological designation	Status/ Potential (2016)	Screened in?	Reasoning
Fluvial						
Anglian	Tenpenny Brook	GB105037041310	Heavily Modified	Moderate	In	Proposed scheme components would directly impact WFD water body
Anglian	Sixpenny Brook	GB105037034200	Heavily Modified	Bad	In	Proposed scheme components would directly impact WFD water body
Transitional						
Anglian	Colne	GB520503713800	Heavily Modified	Moderate	Out	This WFD water body lies 9.9km downstream of the Tenpenny Brook and 6.6km downstream of Sixpenny Brook WFD water bodies and is not directly impacted by the proposed scheme components. No impacts are anticipated from the proposed scheme and therefore screened out
Groundwater						
Anglian	Essex Gravels	GB40503G000400	N/A	Poor	In	Potential impacts upon groundwater due to excavations and structures

As noted above all the WFD water bodies identified in Table 3.2 are currently failing to achieve Good Status/Potential. A list of the Reasons for Not Achieving Good (RNAGS) for each screened in WFD water body are outlined in Table 3.2Error! Reference source not found.

Table 3.2: RNAGS for scoped in water bodies

WFD water body	Activity	Category	Quality Element
Tenpenny Brook	Barriers – ecological discontinuity	Local and government	Fish

WFD water body	Activity	Category	Quality Element
	Flood protection - structures	Local and government	Fish
	Sewage discharge (continuous)	Water industry	Phosphate
Sixpenny Brook	Groundwater	Agriculture and rural land management	Hydrological regime
	Transport Drainage	Urban and transport	Phosphate
	Poor soil management	Agriculture and rural land management	Phosphate
	Private sewage treatment	Urban and transport	Phosphate
	Poor livestock management	Agriculture and rural land management	Phosphate
	Land use – arable	Agriculture and rural land management	Fish
	Poor soil management	Agriculture and rural land management	Fish
	Surface water abstraction	Agriculture and rural land management	Hydrological regime
	Poor soil management	Agriculture and rural land management	Invertebrates
Essex Gravels	Poor Livestock Management	Agriculture and rural land management	General Chemical Test
			Chemical Drinking Water Protected Area
	Poor Nutrient Management		General Chemical Test
			Chemical Drinking Water Protected Area

3.2 Proposed scheme components

3.2.1 Overview

The proposed scheme consists of a new section of road that links the A120 and A133 east of Colchester. The new section of road includes two new culverts and new outfalls discharging road run-off to nearby watercourses.

3.2.2 Screening of components

Table 3.3 provides an overview of the proposed scheme components and indicates whether each has been screened in or out for further assessment based on the potential for impacts to occur on the WFD water bodies within the study area (outlined in Section Error! Reference source not found.). Proposed scheme components t hat have been screened have been colour coded green. Proposed scheme components that have been screened out have been colour coded orange.

Table 3.3: Screening of proposed scheme components (green shading indicates those components screen in, with orange representing those screened out)

Phase	Component	Surface - screened in or out?	Groundwater - screened in or out?
Construction	Construction of highway structures (including, the highway, culverts, outfalls, maintenance tracks)	In – Potential for direct effects that could alter the WFD water body; timeframe would need to be considered depending on the programme of works	Out – Construction of new components would not result in significant or long-term impacts at the WFD water body scale.
	Excavations (for below ground structures and cuttings, including dewatering operations)	In – Potential for direct effects if requires excavation of a watercourse	In– Potential for direct effects that could alter the WFD water body
	Accidental spillage of contaminants and pollutants, and drainage of surface water from compounds and construction areas	Out – Accidental spillages would occur as single isolated events; and, it is anticipated that good practice mitigation implemented during construction would minimise this risk. Consequently, spillages would not be	In – Potential for contaminated material to permeate into groundwater where it could have a high residence time. This would result in potential long-term impacts and therefore requires assessment.

Phase	Component	Surface - screened in or out?	Groundwater - screened in or out?
		anticipated to result in long-term impacts required to be assessed as part of the WFD.	
	Haul Roads	In – Potential for direct effects that could alter the WFD water body; timeframe would need to be considered depending on the programme of works	Out – Haul roads would not result in impacts upon groundwater. Impacts relating to accidental spillage of pollutants or contaminants is assessed above.
Operation	Operation of highway structures (including, the highway, culverts, outfalls, maintenance tracks)	In – Potential for direct effects that could alter the WFD water body	Out – Structures that could impact upon groundwater would be below ground which is considered below.
	Discharge of road run-off	In – Potential for direct effects that could alter the WFD water body	In – Potential for direct effects that could alter the WFD water body
	Cuttings/excavations and below ground structures	Out – as there are no cuttings or excavations across watercourses. There are not anticipated to be impacts upon surface water quality elements.	In – Potential for direct effects that could alter the WFD water body

3.3 WFD quality elements

Table 3.4 and 3.5 outline the specific elements that form each WFD quality element for fluvial and groundwater WFD water bodies as assessed in the Anglian River Basin Management Plan. A screening exercise has been undertaken to determine which WFD quality elements outlined for the WFD water bodies require further assessment against the potential impacts of the proposed scheme.

For the survey water quality elements (outlined in Table 3.4), chemical quality has been screened out as these elements are identified as “not required to be assessed” in both the Sixpenny Brook and Tenpenny Brook WFD water bodies according to the Environment Agency Catchment Data Explorer (Environment Agency, 2020).

Table 3.4: Specific quality elements requiring assessment for surface water bodies. Scoped out quality elements are struck through.

Surface water quality elements			Chemical quality elements		
Biological	Physico-chemical	Hydromorphological	Priority Substances	Priority Hazardous Substances	Other Pollutants
▪ Fish ▪ Macro-invertebrates ▪ Macrophytes and phytobenthos	▪ Ammonia ▪ Dissolved oxygen ▪ pH ▪ Phosphate ▪ Temperature	▪ Quantity and dynamics of water flow ▪ River depth and width variation ▪ River continuity ▪ Connection to groundwater ▪ Structure and substrate of the river bed ▪ Structure of the riparian zone	~~▪ Lead and its compounds~~ ~~▪ Nickel and its compounds~~	~~▪ No sub-quality elements~~	~~▪ Cadmium and its compounds~~ ~~▪ Di(2-ethylhexyl) phthalate~~ ~~▪ Nonylphenol~~ ~~▪ Tributylin Compounds~~

For the groundwater quality elements (outlined in Table 3.5) saline intrusion, Groundwater Dependant Terrestrial Ecosystems (GWDTEs) and Drinking Water Protected Areas (DWPA) have been screened out of the

assessment. This is due to the site being distant from saline water bodies, meaning a low risk of intrusion, and no GWDTEs or DWPAs being located within the study area.

Table 3.5: Specific quality elements requiring assessment for groundwater bodies, scoped out quality elements are struck through

Groundwater quality elements	
Quantitative	Chemical (qualitative)
▪ Water balance ▪ Dependent surface water status ▪ ~~GWDTEs~~ ▪ ~~Saline Intrusion~~	▪ Dependent surface water status ▪ ~~Saline intrusion~~ ▪ Chemical status ▪ ~~GWDTEs~~ ▪ ~~DWPAs~~

4. Stage 2: WFD scoping

4.1 WFD water body baseline summary

4.1.1 Tenpenny Brook WFD water body

The Tenpenny Brook WFD water body lies to the north and east of the proposed scheme. Two watercourses have been identified within the study area that form part of the Tenpenny Brook WFD water body. This includes Unnamed Tributary of Bromley Brook 1, which is directly crossed by the proposed scheme, and Unnamed Tributary of Bromley Brook 2. Table 4.1 provides an overview of the overall WFD water body quality elements.

Table 4.1: WFD water body quality elements (based on Cycle 2 (2016) data; Environment Agency 2020)

Tenpenny Brook – GB105037041310			
Overall status	Moderate	Hydromorphological designation	Heavily Modified Water Body
Reasons for not achieving good	Physical modification, point source pollution		
Area	30.1km^2	Length	1.5km
Biological status	Poor	Physico-chemical status	Moderate
Hydromorphological status	Supports Good	Mitigation measures assessment	Good
Specific pollutants	Not recorded	Chemical status	Good

Unnamed tributary of Bromley Brook 1

The Unnamed Tributary of Bromley Brook 1 has its source north of the A120, between two arable fields (TM 05136 26748), from where it flows north east for approximately 1.1km between fields to a confluence with Bromley Brook. The watercourse has a catchment area of approximately 1.95km^2. Land use consists of arable fields, a number of small woodlands and plantations, and industrial and residential properties.

Analysis of aerial imagery shows the Unnamed Tributary of Bromley Brook 1 has a straight planform and is likely to have narrow trapezoidal channel with no obvious geomorphological features. The riparian zone is vegetated by grasses and regularly spaced trees for approximately 600m from its source, after which it passes to the rear of agricultural outbuildings along a hedgerow. The channel is culverted twice along the rear of the outbuildings before being culverted under Bromley Road and another property to the north of Bromley Road. The watercourse does not appear on historical maps.

Unnamed tributary of Bromley Brook 2

Unnamed Tributary of Bromley Brook 2 is approximately 500m long and flows from Elmstead Hall (TM 06488 26032) east under the A120 to a confluence with Bromley Brook. The watercourse flows along a row of deciduous trees between arable fields from its source to the A120 culvert and through a deciduous woodland downstream of the A120 to the confluence. The watercourse has been realigned and culverted under the A120 between 1914 and the present day.

4.1.2 Sixpenny Brook WFD water body

Three watercourses within the WFD water body are crossed, the Unnamed Tributary of Sixpenny Brook, Tye Road Drain and Unnamed Watercourse 5. Five other watercourses, including Sixpenny Brook (the WFD watercourse) lie within the water body and within the 500m study area of the scheme. Table 4.2 provides an overview of the WFD water body quality elements.

Table 4.2: WFD water body quality elements (based on Cycle 2 (2016) data; Environment Agency 2020)

Sixpenny Brook – GB105037041310			
Overall status	Bad	Hydromorphological designation	Heavily Modified Water Body
Reasons for not achieving good	Physical modification, point source pollution, diffuse pollution, flow (surface water abstraction)		
Area	11km^2	Length	7.6km
Biological status	Bad	Physico-chemical status	Moderate
Hydromorphological status	Supports Good	Mitigation measures assessment	Good
Specific pollutants	Not recorded	Chemical status	Good

Sixpenny Brook

The source of Sixpenny Brook is located immediately south of Tye Road (TM 05011 25209) from where it flows south between arable fields, under the A133, the B1027 and Wivenhoe Road to a confluence with Tenpenny Brook (approximately 6.7km downstream). The watercourse has a catchment area of approximately 9.5km^2. Information from a local gauging station (37027 - Sixpenny Brook at Ship House Bridge – NGR: TM 05450 21381) (obtained from the National River Flow Archive, 2020) states the catchment is predominantly arable agriculture (76%) with small areas of pasture/grassland (10%), woodland (5%) and urban development (4%).

Analysis of aerial imagery shows that the Sixpenny Brook has a straight, modified planform and acts as a boundary between arable fields from its source down to Wivenhoe Road. Downstream of Wivenhoe Road, the Sixpenny Brook develops some sinuosity before being obscured by a deciduous woodland east of Ford Lane. The riparian vegetation varies, but broadly consists of hedgerow or grasses with regularly spaced trees from its source to the B1027. Downstream of the B1027, vegetation consists either of fragmented, narrow tree cover or woodland. Where woodlands are present the root structure of the trees increases bank stability by binding the bank material together. Aerial imagery shows no significant geomorphological features along the course of the brook.

The channel is crossed at a number of locations, including at the A120. Immediately upstream of the confluence with Tenpenny Brook the Sixpenny Brook appears to have a sluice gate preventing tidal ingress.

Historical mapping shows limited change to the channel since 1874. Between 1936 and 1959 the Sixpenny Brook was realigned approximately 30m to the east of the Keelars Lane - Alresford Road junction, for a length of approximately 500m. This realignment was undertaken immediately upstream of Villa Pond (outside of the study area) which was partially removed between 1874 and 1897 giving way for a sinuous channel.

Unnamed tributary of Sixpenny Brook

The source of the Unnamed Tributary of Sixpenny Brook is located on the south side of Turnip Lodge Road (TM 04454 25151), from where it flows for approximately 600m to the south-east to a confluence with Sixpenny Brook. The watercourse has a catchment area of approximately 1.1km^2 which is occupied almost entirely by arable land, with the exception of two small woodland copses, several unnamed roads and one residential property.

Analysis of aerial imagery shows the Unnamed Tributary of Sixpenny Brook has a narrow trapezoidal channel that has a low sinuosity planform with no observable geomorphological features. The riparian zone is vegetated by hedgerow for approximately 140m from its source. Downstream of the hedgerow the tributary then flows between two arable fields where the riparian zone is vegetated by regularly spaced trees and grasses. Approximately 120m upstream of the confluence with Sixpenny Brook the watercourse is culverted by an access track and then flows along the northern boundary of a deciduous woodland to the confluence with Sixpenny Brook. No notable changes to the channel of Unnamed Tributary of Sixpenny Brook have been identified since 1876.

Unnamed watercourse 1

Unnamed watercourse 1 is an approximately 160m straight field drain that forms a boundary between two arable fields. The drain starts immediately to the east of Blossomwood Farm (TM 04939 24607) and flows east to its confluence with Sixpenny Brook. Along the south bank the drain is lined by a hedgerow and a private access track. To the north, the drain is immediately adjacent to arable crops. It is likely to have a trapezoidal channel vegetated by grasses with no geomorphological features evident from aerial imagery. The watercourse is not present on historical maps.

Unnamed watercourse 2

Unnamed watercourse 2 lies outside of any WFD surface water bodies and has consequently not been included in this assessment. The watercourse is assessed within the Road Drainage and Water Environment Chapter of the Environmental Statement (Chapter 11).

Unnamed watercourse 3 and 4

Unnamed watercourse 3 and 4 are two small drains that pass through Tye Farm to the south east of the proposed scheme. Unnamed watercourse 3 begins at Elmstead Road (TM 04796 24364) and flows 480m east through Tye Farm to a confluence with Sixpenny Brook. Unnamed watercourse 4 begin in Tye Farm (TM 05064 24286) and flows approximately 110m north to a confluence with Unnamed watercourse 3. The watercourse is not present on historical maps.

Tye road drain

Tye road drain is a roadside drainage ditch that flows from close to Allens Farm (TM 05132 25830) along an unnamed road to the east and down Tye Road to a confluence with Sixpenny Brook. The left bank of the channel is vegetated by deciduous trees. The watercourse is not present on historical maps.

Unnamed watercourse 5

A straight drainage channel between two arable fields running from a road adjacent to Allens Farm (TM 05195 26019) to a field boundary (TM 05156 26367) has been identified to be crossed by the scheme. The watercourse does not appear to be hydrologically connected to any watercourses. The watercourse is not present on historical maps.

Unnamed road drain

A road drain is present on OS Mapping either side of an unnamed road that runs through Allens Farm (TM 05391 25925). The watercourse is not visible on aerial imagery and does not appear to be hydrologically connected to any watercourses. The watercourse is not present on historical maps.

4.1.3 Essex Gravels groundwater WFD water body

A detailed baseline assessment of the groundwater environment within the study area is provided in Chapter 11 (Road Drainage and the Water Environment) of the Scoping Report. Table 4.3 provides an overview of the WFD status of the Essex Gravels groundwater body.

The majority of the study area is underlain by superficial deposits of coversands, generally comprising sandy silty clay. The coversands have been designated by the Environment Agency as a Secondary B aquifer which has limited capability to store or yield groundwater. Underlying the coversands throughout the study area is the Kesgrave Catchment Subgroup, generally comprising slightly silty sands and gravels. BGS mapping indicates that where coversands are absent, the Kesgrave Catchment Subgroup outcrops at the surface. The Kesgrave Catchment Subgroup has been designated by the Environment Agency as a Secondary A aquifer which is capable of supporting water supplies at a local scale and may form an important source of baseflow to rivers.

Bedrock underlying the study area is the London Clay Formation (of the Thames Group), generally comprising firm to stiff silty clay. The London Clay Formation within the study area has been designated by the Environment Agency as Unproductive strata. Underlying the London Clay Formation is the Lambeth Group and Thanet Sand Formation, Undifferentiated, generally comprising clays, sands and silts. The Environment Agency has designated this formation as a Secondary A aquifer.

Table 4.3: WFD water body quality elements (based on Cycle 2 (2016) data; Environment Agency 2020)

Essex Gravels - GB40503G000400	
Overall status	Poor
Area	127.5km^2
Quantitative status	
Quantitative saline intrusion	Good
Quantitative water balance	Good
Quantitative GWDTEs test	Good
Quantitative dependent surface water body status	Good
Chemical (qualitative)	
Chemical DWPA	Poor
General chemical test	Poor
Chemical GWDTEs test	Good
Chemical dependent surface water body status	Good
Chemical saline intrusion	Good

4.2 Scoping impact assessment

4.2.1 Scheme components

Error! Reference source not found. and Table 4.5: Scoping of proposed scheme components (operation) for detailed assessment. ** signifies groundwater quality elements.Table 4.5 provides an overview of the potential impacts that could occur on the quality elements of the screened in WFD water bodies as a consequence of the screened in construction and operation components (respectively) of proposed scheme.

The tables provide an overview as to whether the components have been scoped in for Stage 3: WFD Impact Assessment in a subsequent Detailed WFD Assessment as part of the ongoing Environmental Impact Assessment. Where a scoping assessment is not required as the components were screened out, this is indicated by “N/A”.

Table 4.4: Scoping of proposed scheme components (construction) for detailed assessment (note: ** signifies groundwater quality elements; green shading indicates those components screen in, with orange representing those screened out)

Proposed scheme component	Quality elements	Potential impacts	Scoped in or out?		
			Sixpenny Brook	Tenpenny Brook	Essex Gravels
Construction of highway structures	Biological	Localised loss in habitat and delivery of fine sediment	In	In	-
	Physico-chemical	Introduction of pollutants, either from spills or mobilisation of pollutant bound sediments during construction (short term; localised)	Out	Out	-
	Hydromorphological	Localised disturbance of bed and banks Delivery of fine sediment, smothering bed substrate	In	In	-
	**Quantitative	Screened out (see Section 3.2.2)	-	-	N/A
	**Chemical (GW)	Screened out (see Section 3.2.2)	-	-	N/A
Excavations (for below ground structures and cuttings)	Biological	None anticipated – assuming no watercourses lie within the excavation footprint	Out	Out	-
	Physico-chemical	Discharge of contaminants arising from dewatering	In	In	-
	Hydromorphological	None anticipated – assuming no watercourses lie within the excavation footprint	Out	Out	-
	**Quantitative	Disruption to groundwater flow paths and volumes	-	-	In
	**Chemical (GW)	Altered flow paths connecting contaminated land/groundwater	-	-	In
Accidental spillage of	Biological	Screened out (see Section 3.2.2)	N/A	N/A	-
	Physico-chemical	Screened out (see Section 3.2.2)	N/A	N/A	-

Proposed scheme component	Quality elements	Potential impacts	Scoped in or out?		
			Sixpenny Brook	Tenpenny Brook	Essex Gravels
pollutants and contaminants	Hydromorphological	Screened out (see Section 3.2.2)	N/A	N/A	-
	**Quantitative	None anticipated	-	-	Out
	**Chemical (GW)	Contamination and pollution of groundwater	-	-	In
Haul Roads	Biological	Localised loss of habitat and disturbance of invertebrate, fish and macrophyte populations where crossing watercourses	In	In	-
	Physico-chemical	Altered water quality due to run-off containing fine sediment and pollutants	In	In	-
	Hydromorphological	Localised changes to flow processes, channel geometry and connectivity where crossing watercourses	In	In	-
	**Quantitative	Screened out (see Section 3.2.2)	-	-	N/A
	**Chemical (GW)	Screened out (see Section 3.2.2)	-	-	N/A

Table 4.5: Scoping of proposed scheme components (operation) for detailed assessment. ** signifies groundwater quality elements.

Proposed scheme component	Quality elements	Potential impacts	Scoped in or out?		
			Sixpenny Brook	Tenpenny Brook	Essex Gravels
Operation of highway structures	Biological	Localised loss of habitat and disturbance of invertebrate, fish and macrophyte populations	Out	Out	-
	Physico-chemical	Localised reduction in temperature (shading)	Out	Out	-
	Hydromorphological	Localised changes to flow processes, channel geometry and connectivity caused by structures	In	In	-
	**Quantitative	Screened out (see Section 3.2.2)	-	-	N/A

Proposed scheme component	Quality elements	Potential impacts	Scoped in or out?		
			Sixpenny Brook	Tenpenny Brook	Essex Gravels
	**Chemical (GW)	Screened out (see Section 3.2.2)	-	-	N/A
Discharge of road run-off	Biological	Indirect impact due to water quality reducing aquatic habitat quality and harming aquatic species (fish, invertebrates and macrophytes)	In	In	-
	Physico-chemical	Introduction of pollutants arising from road run-off into the watercourses	In	In	-
	Hydromorphological	Release/mobilisation of fine sediments into watercourses Delivery of additional flow/modification of local hydrology.	In	In	-
	**Quantitative	None	-	-	Out
	**Chemical (GW)	Contamination from routine road-runoff, spillages and leakages	-	-	In
Cuttings/excavations and below ground structures	Biological	Screened out (see Section 3.2.2)	N/A	N/A	-
	Physico-chemical	Screened out (see Section 3.2.2)	N/A	N/A	-
	Hydromorphological	Screened out (see Section 3.2.2)	N/A	N/A	-
	**Quantitative	Alterations of flow path ways and reductions in volumes	-	-	In
	**Chemical (GW)	Altered flow paths connecting to contaminated land/groundwater	-	-	In

4.2.2 Specific WFD mitigation measures

At this stage of the assessment, no information was obtained on the specific mitigation measures assigned to the WFD water bodies within the study area. This would require assessment as part of a Detailed WFD Assessment undertaken as part of the ongoing Environmental Impact Assessment.

An initial review of the RNAGs presented in Section 3.1 (Table 3.2) suggests that the proposed scheme components would be unlikely to prevent any measures that could be put in place to address the pressures.

4.2.3 Other EU Directives

Article 4.9 of the WFD specifies that where an area requires special protection under another EC Directive, or where water is used for the abstraction of drinking water, then these areas should be identified as 'protected areas'. Such areas have their own objectives and standards. Where WFD water body boundaries overlap with protected areas, the most stringent objective applies, that is the requirements of one particular EC Directive should not undermine the requirement of another.

The European Union (EU) legislation Directives which identify 'protected areas', and the specific designations, shown to be of relevance to the scoped in WFD water bodies are outlined below:

- Tenpenny Brook and Sixpenny brook WFD water bodies:
  - Nitrates Directive
  - Conservation of Wild Birds Directive
- Essex Gravels WFD water body:
  - Nitrates Directive
  - Drinking Water Protected Area

At this stage of the assessment, it is considered unlikely that the proposed scheme would lead to any detriment in these protected areas or the relevant legislative requirements. However, it is recommended that these are taken forward for further assessment in a Detailed WFD Assessment.

5. Conclusion and recommendations

This Preliminary WFD Assessment has undertaken Stage 1 (screening) and Stage 2 (scoping) of the WFD methodology, to determine whether a Detailed WFD Assessment is required for the proposed scheme as part of the ongoing Environmental Impact Assessment.

Stage 1 (screening) identified a total of four WFD water bodies within the study area (including those upstream and downstream), three surface water and one groundwater. Of these, two of the WFD surface water bodies and one WFD groundwater body were screened in for further assessment (namely the Tenpenny Brook and Sixpenny Brook and the Essex Gravels).

As part of the Stage 1 assessment, the WFD quality elements were also considered. As part of this process all the surface water WFD quality elements were screened in except for the Chemical Status quality elements. For the groundwater WFD quality elements, four were screened in; as there are no GWDTE or DWPAs within the vicinity of the proposed scheme these were screened out. There is also a low risk of saline intrusion, so this to has been screened out.

Stage 2 (scoping) then considered the potential for impacts as a result of the proposed scheme components on the WFD water bodies and quality elements screened in for assessment. Table 5.1 and Table 5.2 summarise the findings of the scoping assessment for surface water and groundwater WFD water bodies respectively. An initial scoping assessment was also made for the potential impacts on specific assigned WFD mitigation measures and other EU Directives. It was concluded that further assessment would be required of both these elements in a Detailed WFD Assessment.

Table 5.1: Summary of WFD scoping for surface water WFD water bodies (note: ✓ signifies scoped in, × signifies scoped out)

WFD water body	Proposed scheme components	Quality elements		
		Biological	Physico-chemical	Hydromorphological
Tenpenny Brook	Construction of highway structures	✓	×	✓
	Excavations	×	✓	×
	Haul Roads	✓	✓	✓
	Operation of highway structures	×	×	✓
	Discharge of road run-off	✓	✓	✓
Sixpenny Brook	Construction of highway structures	✓	×	✓
	Excavations	×	✓	×
	Haul Roads	✓	✓	✓
	Operation of highway structures	×	×	✓
	Discharge of road run-off	✓	✓	✓

Table 5.2: Summary of WFD scoping for WFD groundwater bodies (note: ✓ signifies scoped in, × signifies scoped out)

WFD water body	Proposed scheme components	Quantitative elements	Chemical elements
Essex Gravels	Excavations	✓	✓
	Accidental spillages	×	✓
	Discharge of road run-off	×	✓
	Cuttings, excavations and below ground structures	✓	✓

Overall, the scoping assessment concluded that a Detailed WFD Assessment would be required (i.e. a Stage 3: Impact Assessment) for the proposed scheme. This would assess those components identified in Table 5.1 and Table 5.2, as well as the specific WFD mitigation measures and other EU Directives. The Detailed WFD Assessment would provide an overall statement of the compliance of the proposed scheme with the WFD legislation,

It is recommended that the Detailed WFD Assessment is undertaken in parallel with the Environment Statement for the Environmental Impact Assessment. In support of this, an initial review of potential mitigation measures has been undertaken to support the ongoing development of the Proposed Scheme. These are outlined in Appendix A.

6. References

British Geological Society (BGS) (2020) Geology of Britain Mapper. Available online at: http://mapapps.bgs.ac.uk/geologyofbritain3d/

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UK Technical Advisory Group (2008) guidance on the Classification of Ecological Potential for Heavily Modified Water Bodies and Artificial Water Bodies. Available online at: https://www.wfduk.org/sites/default/files/Media/Classification%20of%20ecological%20potential%20for%20HMWBs%20and%20AWBs_Final_310308TAG%20guidance.pdf

Appendix A. Proposed Mitigation Measures for Ongoing Compliance

A.1 Construction

The following mitigation measures should be considered to reduce potential impacts associated with the construction of the proposed scheme:

- Preparation of a Construction Environmental Management Plan (CEMP) (or similar);
- All works to be carried out in accordance with relevant pollution prevention guidelines and industry good practice;
- Reinstatement of the channel cross-section and vegetated riparian corridor following haul road crossings and any other modifications;
- Limit the extent of riparian vegetation removal to minimise habitat loss and maintain bank stability. Reinstated removed vegetation as soon as possible with species of similar type and age;
- Avoid compaction of bed substrate by working from the banks not the bed; and,
- Replace any removed or disturbed bed material with appropriately sized and compacted sediment.

A.2 Operation

The following mitigation measures should be considered to reduce potential impacts associated with the operation of the Proposed Scheme:

- All outfalls and culverts should be designed to specifications set out in the CIRIA C768 – Culvert, screen and outfall manual.
  - For culverts this includes, but is not limited to, the following considerations:
    - The culvert alignment should be perpendicular to the alignment of the highway, reducing the length of the culvert and need for realignment of the channel or bends within the culvert.
    - Appropriate erosion protection at the inlet and outlet of culverts, for example by providing wingwalls
    - The culvert must span the width of the watercourse and be designed to ensure that velocities do not decrease or increase in the culvert. Ideally the cross-sectional area of the channel should be replicated. Maintaining flow velocities will reduce the potential for erosion at the outlet and deposition within the culvert, maintaining sediment connectivity. If present in the watercourse, a low flow channel through the culvert should be provided.
    - Embedding the invert of the culvert a minimum of 300mm or a quarter of the height of the culvert below the natural channel bed level in order to encourage the natural build-up of sediment within the culvert. This maintains the morphological connectivity of the channel and allows natural bedforms to develop.
    - The culvert gradient should follow the natural gradient of the channel, maintaining the 300mm embedment along the length of the culvert. This would contribute to the maintenance of the channel velocity through the culvert mitigating for any potential erosion or deposition within the culvert.
  - For outfalls this includes, but is not limited to, the following considerations:
    - The outfall should be set back from the channel banks with appropriate scour protection along the banks upstream and downstream, that is tied into the bank profile to prevent erosion, and at the headwall;
    - The outfall should be directed to discharge flows in the downstream direction of flow of the receiving watercourse; and,

    - Discharge should be attenuated and discharged at greenfield run-off rates via a Sustainable Drainage System.
- To reduce impacts upon water quality, namely those relating to the discharge of contaminated road run-off and pollution from spillage or road maintenance, appropriate sustainable drainage systems to attenuate discharge and treat soluble and sediment bound contaminants should be put in place prior to discharge or run-off to receiving watercourses.
- To mitigate for operation impacts upon groundwater, avoidance of areas at high risk of groundwater flooding, use of sustainable drainage systems and design of permanent structures in-line with best practice and CIRIA guidance should be undertaken, i.e. CIRIA C583 (Engineering in the Lambeth Group), C591 (Infrastructure cuttings condition appraisal and remedial treatment) and C592 (Infrastructure embankments condition appraisal and remedial treatment).

Appendix G: Road Drainage and the Water Environment Assessment Criteria

Table G-1 Road drainage and the water environment specific magnitude criteria adapted from DMRB LA 113 Table 3.71 (Highways England, 2019a)

Major adverse	Flood risk: Loss of flood storage areas. Results in loss of receptor and or quality and integrity of the receptor and/or increase in peak flood level (1 % (1 in 100) AEP) >100 mm. Hydromorphology: Loss or extensive damage to habitat due to extensive modification of natural channel planform, and/or sediment and flow processes. Replacement of a large extent of the natural bed and/or banks with artificial material. Surface water and groundwater quality: Loss/improvement of special characteristics of a water resource. Change in pollution/treatment of potable source. Any pollution inside Zone 1 or a groundwater protection zone of special interest. Failure of both soluble and sediment bound pollutants in HEWRAT and compliance failure with EQS values. Calculated risk of pollution from a spillage >2 % annually (Method D). Potential high risk of pollution to groundwater from routine runoff with a risk score >250 (Method C, Annex 1). Groundwater: Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. Loss or significant damage to major structures through subsidence or similar effects.
Moderate adverse	Flood risk: Results in an effect on integrity of receptor, or loss of part of receptor and/or increase in peak flood level (1 % (1 in 100) AEP) of greater than 50 mm but under 100 mm. Hydromorphology: Moderate deterioration from baseline conditions, with partial loss or damage to habitat due to modifications and/or changes to natural fluvial forms and processes. Replacement of the natural bed and/or banks with artificial material. Surface water and groundwater quality: Partial loss or change to an aquifer/groundwater supported designated wetlands. Pollution of a receiving water body, but insufficient to change the environmental status/classification, including water quality classification. Failure of both soluble and sediment bound pollutants in HEWRAT but compliance with EQS values. Calculated risk of pollution from a spillage 1-2 % annually (Method D). Potential medium risk of pollution to groundwater from routine runoff with a risk score 150-250 (Method C, Annex 1). Groundwater: Partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial/industrial/agricultural supplies. Partial loss of the integrity of GWDTE. Damage to major structures through subsidence or similar effects or loss of minor structures.

Minor adverse	Flood risk: Results in some measurable change in receptor quality or vulnerability and/or increase in peak flood level (1 % (1 in 100) AEP) greater than 10 mm but under 50 mm. Hydromorphology: Slight deterioration from baseline conditions, with partial loss/damage to habitat due to modifications and/or changes to natural fluvial forms and processes. Surface water and groundwater quality: Potential low risk of some pollution to a water body, insufficient to cause loss in quality, fishery productivity or biodiversity. Failure of either soluble and sediment bound pollutants in HEWRAT. Calculated risk of pollution from a spillage 0.5-1 % annually (Method D). Potential low risk of pollution to groundwater from routine runoff with a risk score <150 (Method C, Annex 1). Groundwater: Minor effects on an aquifer, GWDTEs, abstractions and structures.
Negligible	The proposed options may adversely affect the integrity of the water environment, although this is not considered measurable. Flood risk: Results in an effect on receptor, but of insufficient magnitude to affect the use or integrity and/or negligible change in peak flood level (1 % (1 in 100) AEP) <+/- 10 mm. Fluvial Geomorphology: Very slight change from surface water baseline conditions, approximating to a 'no change' situation. Surface water and groundwater quality: No risk identified in HEWRAT. Calculated risk of pollution from a spillage <0.5 % annually. No measurable impact on an aquifer. Groundwater: No measurable impact upon an aquifer and/or groundwater receptors.
Minor beneficial	Flood risk: Results in some beneficial effect on receptor or a reduced risk of negative effect occurring and/or reduction in peak flood level (1 % (1 in 100) AEP) greater than 10 mm but under 50 mm. Hydromorphology: Slight improvement of baseline conditions through partial improvement/gain in riparian or in-channel habitat. Slight diversification of flow processes and/or sediment processes. Surface water and groundwater quality: No beneficial impacts Groundwater: Reduction of groundwater hazards to existing structures. Reductions in waterlogging and groundwater flooding.

Moderate beneficial	Flood risk: Results in moderate improvement of receptor quality and/or reduction in peak flood level (1 % (1 in 100) AEP) greater than 50 mm but under 100 mm. Hydromorphology: Moderate improvement from baseline conditions, with partial creation of both in-channel and riparian habitat. Removal of existing superfluous structure or artificial channel bed/bank. Moderate diversification of flow processes and/or sediment processes. Surface water and groundwater quality: No beneficial impacts Groundwater: Improvement in water body catchment abstraction management strategy (or equivalent) classification. Support to significant improvements in damaged GWDTE.
Major beneficial	Flood risk: Results in major improvement of receptor quality and/or reduction in peak flood level (1 % (1 in 100) AEP) >100 mm. Hydromorphology: Extensive enhancement in-channel habitat and/or riparian habitat, as well as diversification of flow and sediment processes. Removal of an existing superfluous structure or artificial channel bed/bank. Extensive diversification of flow processes and/or sediment processes. Surface water and groundwater quality: No beneficial impacts Groundwater: Recharge of an aquifer.

Appendix H: Socio-economic and Health Ward Data

Table H-1 - Key socio-economic data by ward compared to England average

Indicator	Units	Thorrington, Frating, Elmstead and Great Bromley ward	Ardleigh and Little Bromley ward	England average
Population (2011 census)	Number	4770	2514	N/A
Population 85+ years	Number (percent)	189 (4.0 %)	53 (2.1 %)	(2.4 %)
Population 65+ years	Number (percent)	1273 (26.7 %)	522 (20.8 %)	(18 %)
Population 0-15 years	Number (percent)	770 (16.1 %)	412 (16.4 %)	(19.1 %)
Life expectancy at birth for males (2013-2017)	Years	78.7	85.6 - significantly better than England average	79.5
Life expectancy at birth for females (2013-2017)	Years	83.3	84.2	83.1
Income deprivation (DCLG, 2015) [1]	Percent [1]	7.8 % - significantly better than England average	6.8 % - significantly better than England average	14.6 %
Long term unemployed (DCLG, 2017/2018)	Rate per 1,000 working population [2]	0.5 - significantly better than England average	Zero claimants - significantly better than England average	3.6
Child poverty (DCLG, 2015)	Percent [3]	7.1 % - significantly better than England average	8.3 % - significantly better than England average	19.9 %

Table notes:
[1] Percentage living in income deprived households reliant on means tested benefit, Income domain score from the Indices of Deprivation 2015
[2] Average claimants of Jobseeker's Allowance who have been claiming for more than 12 months, expressed as rate per 1,000 working population (aged 16-64) [Source: Indices of Deprivation, 2015]
[3] Percentage of all 0-15 year olds living in income deprived families. [Source: Indices of Deprivation, 2015]

Table H-2 - Key health data by ward compared to England average

Indicator	Units	Thorrington, Frating, Elmstead and Great Bromley ward	Ardleigh and Little Bromley ward	England average
General health (census 2011)	Percent of population self-reporting in census	Very good 44.5 %; Good 35.3 %; Fair 14.6 %; Bad 4.2 %; Very bad 1.4 %	Very good 48.7 %; Good 33.9 %; Fair 13.8 %; Bad 3.2 %; Very bad 0.4 %	Very good 47 %; Good 34 %; Fair 13 %; Bad 4 %; Very bad 1 %
Limiting long term illness or disability (census 2011)	Percent of population self-reporting in census	926 (19.8 %) - significantly worse than average	408 (17.7 %)	17.6 %
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) (5-year period 2013/14 – 2017-2018)	Number and (Standardised Admissions Ratio (SAR)%) [1]	45 (62.8 % SAR) - significantly better than average	20 (59.2 % SAR) - significantly better than average	100 % SAR
Deaths from respiratory disease (5-year period 2013 – 2017)	Number and (Standardised Mortality Ratio (SMR)) [2]	42 (95.5 % SMR)	8 (56.1 % SMR)	(100 % SMR)
Premature deaths (under 75) from circulatory disease	Number and (Standardised Mortality Ratio (SMR)) [2]	21 (107.6 % SMR)	8 (82.9 % SMR)	(100 % SMR)

Table notes:

[1] The Standardised Admissions Ratio (SAR) is a health measure that allows a comparison of hospital admissions data between areas, whilst accounting for differences in population structures (i.e. age profile) between those areas. It is calculated by using admissions data from a standard population to estimate the number of admissions expected in the study population. The estimate is then compared with the actual (observed) number of admissions and multiplied by 100 to yield the SAR. If the observed admissions are the same as the expected admissions, the SAR will be 100. A SAR greater than 100 indicates that admissions are higher than would be expected for the age structure in the study population. A SAR less than 100 indicates that it is lower than expected.

[2] The Standardised Mortality Ratio (SMR) is a health measure that allows a comparison of mortality data between areas while accounting for differences in population structures (i.e. age profile) between those areas. It is calculated from mortality data using the same approach as for the SAR.

Appendix I: Committed Development Log

The committed development schedule has listed planning applications that are likely to be constructed or have not yet been commenced but have a valid planning permission. Proposed developments that are subject to a planning applications have also been considered. Site allocations from adopted and emerging local plans have also been listed. The committed development log has been based on the following methodology over a 6 year period (June 2014-present):

- 2 km buffer (taking this from the greatest environmental assessment extent of landscape)

The search focussed on:

- Anything over 1 dwelling for housing
- Non-residential – major development - anything on a site over 1 ha/floorspace of 1000 sqm +
- Mineral and waste sites of 1 ha+

Parameters

Use type and scale	Major Planning Applications and Permissions dating from June 2014-present	Data source
Housing: 1 or more houses (includes hotels, care houses, residential use and student accomodations)	Major Town and Country Planning Act (1990) (TCPA) applications and permission type: - Full - Outline - Change of use - Reserved Matters applications - Regulation 3 - Hybrid Applications - Appeals - Applications refused in the last 6 months (timescale for going to appeal) Major TCPA applications and permissions status: • Planning permissions yet to be implemented; • Planning permissions under construction; • Submitted planning applications yet to be determined; • Pending or approved appeals.	Local Planning Authority • Online application register • Information request
Non-Residential: Buildings with 1,000sqm or more or Developments with 1ha or greater Includes: - Employment - Offices (includes business parks, employment sites other than industrial and retail) - Employment -Industrial (includes storage and distribution centres, chemical treatment, industrial activity, any B2 and B8 uses) - Employment -Retail (includes shopping centre, shops, restaurants, retail warehouses) - Mixed use (includes a combination of residential and any of the following uses: sport/recreation, cemetery, hotel, offices, commercial, healthcare, industrial, education, traveller sites, industrial, environmental and retail) - Community - Sports/Recreation (includes cinema, leisure centres, community centres, swimming centres, churches, golf courses, private horse or dog training) - Community - Cemeteries (includes burial grounds, churchyards and cemeteries) - Community - Educational (includes schools, universities, colleges and nurseries) - Community - Healthcare (includes hospitals, surgeries and clinics) - Community - Travellers sites (includes camping, caravans, gypsy/travellers sites) - Environmental (includes ponds, embankments, ecological mitigation measures, earthworks) - Agriculture (activities relating to farming and grazing)	Major TCPA applications and permission type: - Full - Outline - Change of use - Reserved Matters applications - Regulation 3 - Hybrid Applications - Appeals - Applications refused in the last 6 months (timescle for going to appeal) Major TCPA applications and permissions status: • Planning permissions yet to be implemented; • Planning permissions under construction; • Submitted planning applications yet to be determined; and • Pending or approved appeals.	Local Planning Authority • Online application register • Information request
Minerals and Waste: sites of 1ha or more	Major TCPA applications and permission type: - Full - Outline - Change of use - Appeals - Reserved Matters applications - Regulation 3 - Hybrid Applications - Appeals Major TCPA applications and permissions status: • Planning permissions yet to be implemented; • Planning permissions under construction; • Submitted planning applications yet to be determined; and • Pending or approved appeals.	County Council • Online application register • Information request
Infrastructure: sites of 1ha or more Includes: - Transport - Water - Communications - Energy	**TCPA Applications** Major TCPA applications and permission type: - Full - Outline - Change of use - Reserved Matters applications - Regulation 3 - Hybrid Applications - Appeals - Applications refused in the last 6 months (timescle for going to appeal) Major TCPA applications and permissions status: • Planning permissions yet to be implemented; • Planning permissions under construction; • Submitted planning applications yet to be determined; and • Pending or approved appeals.	County Council • Online application register • Information request

	Nationally Significant Infrastructure Projects (NSIP) Major applications and permission type: - Development Consent Orders (DCO) DCO status: • Projects listed in the Planning Inspectorates (PINS) Programme of Projects	Planning Inspectorate • PINS website - Register of applications: https://infrastructure.planninginspectorate.gov.uk/projects/register-of-applications/
	Transport and Works Act 1992 (TWA) Major applications and permission type: - Transport and Works Act 1992 (TWA) TWA status: • Projects listed in the Gov.uk website - TWA screening, applications, inspector's reports, decisions and related documents.	Transport and Works Act: • Gov.uk website - Register of applications and decisions: https://www.gov.uk/government/collections/twa-inspector-reports-and-decision-letters#2018-twa-decisions-and-applications
	High Speed Rail (London - West Midlands) Act 2017 Major applications and permission type: - High Speed Rail (London - West Midlands) Act 2017 HS2 status: • Projects listed in the Gov.uk website - TWA screening, applications, inspector's reports, decisions and related documents.	High Speed Rail (London - West Midlands) Act 2017: • Gov.uk website - Register of applications and decisions: https://www.gov.uk/government/collections/twa-inspector-reports-and-decision-letters#2018-twa-decisions-and-applications

Major Applications

Local Planning Authority	Ward	Parish	Application Reference	Application Type	Development Type	Applicant	Site Address	Site Area	Description	No. of Housing Units	Application Status	Validation/Decision Date	Development status	Application Weblink	Other comments	Easting	Northing	Site location plan ref
Tendering District Council	N/A	Ardleigh CP	14/01528/AGRIC	Prior Notification	Agricultural	J.S Blyth & Sons Ltd	Wick Farm Wick Lane Ardleigh Colchester Essex CO7 7RE	1.8 ha	Construction of agricultural irrigation reservoir.	0	Application Approved	10/11/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NDHRLJSQB0G400		603283	229545	TDC_Plan01
Tendering District Council	N/A	Ardleigh CP	14/01589/FUL	Full	Agricultural	T W Salmon & Co	TW Salmon & Co Slough Lane Ardleigh Colchester Essex CO7 7RX	6,878 sqm	Demolition of 3no. 5.5m diameter outdoor grain storage bins and associated fan room, demolition of indoor nest of galvanised grain bins with associated handling equipment steel frame and cladding and demolition of part of red brick out building. Erection of Bulk Agricultural Grain Store with 1m link extension to existing GP Building/Agricultural Workshop. Solar PV to the southern elevation	0	Application Approved	01/12/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NDY5LIAQB0G500		604910	227478	TDC_Plan02
Tendering District Council	N/A	Ardleigh CP	14/01340/FUL	Full	Housing - Residential	Mr Matthew Clarke	Hillhouse Farm Lodge Lane Ardleigh Colchester Essex CO7 7RD	6 ha	Change of use from agricultural outbuilding to ancillary annexe use, with associated alterations to the fenestration and internal layout to that approved under 00/02106/FUL		Application Approved	02/12/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=NC1DSTQB0G400				TDC_Plan03
Tendering District Council	N/A	Ardleigh CP	14/01259/FUL	Full	Housing - Residential	Mr Mark Burt	Morrowood Cottage Morrow Lane Ardleigh Colchester Essex CO7 7NG	0.3 ha	Replacement Dwelling	1	Application Approved	28/10/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NBDTWBQB0G400		606591	228479	TDC_Plan04
Tendering District Council	N/A	Ardleigh CP	14/01222/FUL	Full	Housing - Residential	Mr Matthew Clarke	Hillhouse Farm Lodge Lane Ardleigh Colchester Essex CO7 7RD		Change of use from agricultural outbuilding to ancillary residential use with associated alteration	1	Application Approved	22/10/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NB7UY6QB0G400				TDC_Plan03
Tendering District Council	N/A	Ardleigh CP	14/01054/FUL	Full	Housing - Residential	Mr Matthew Clarke	Hillhouse Farm Lodge Lane Ardleigh Colchester Essex CO7 7RD		Change of use from agricultural outbuilding to related domestic dwelling use with associated alterations and refurbishment	1	Application Approved	31/10/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=N97J5WQB0GS00				TDC_Plan03
Tendering District Council	N/A	Ardleigh CP	14/00910/FUL	Full	Agricultural	J.S Blyth & Sons Ltd	Wick Farm Wick Lane Ardleigh Colchester Essex CO7 7RE		Relocation of existing agricultural reservoir to enable implementation of mineral extraction on adjoining site	0	Application Withdrawn	01/12/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=N7Z8C3QB0GS00		603283	229545	TDC_Plan01
Tendering District Council	N/A	Ardleigh CP	15/00136/DETAIL	Reserved Matters	Housing - Residential	Landex Ltd	Notcutts Garden Centre Station Road Ardleigh Colchester Essex CO7 7RT	0.78 ha	Reserved matters application following outline approval 13/00036/OUT to include the final site layout and house design. The application includes the assigned Arboricultural Report together with ecological management plan as required	18 units	Application Approved	13/05/2015		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=NJ709WQB0GI00&activeTab=summary		605426	229016	TDC_Plan05
Tendering District Council	N/A	Ardleigh CP	15/00175/FUL	Full	Housing - Residential	Mr Matthew Clarke	Hillhouse Farm Lodge Lane Ardleigh Colchester Essex CO7 7RD		Demolition of an agricultural outbuilding and erection of a replacement building with related change to ancillary domestic use (change to previously approved development 14/01222/FUL		Application Approved	18/03/2015		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NJIA3QB0G400				TDC_Plan03
Tendering District Council	N/A	Ardleigh CP	16/01814/COUNOT	Change of use	Housing - Residential	Mr and Mrs Cresswell	Barn B The Landbase Frating Road Ardleigh Colchester Essex CO7 7SU		Change of use of existing agriculture building to 2 no. self contained single private dwellings.	2 dwellings	Application Approved	21/12/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OGBWQIQB0KO00				TDC_Plan07
Tendering District Council	N/A	Ardleigh CP	16/01003/DETAIL	Reserved Matters	Housing - Residential	Mr Rob Reid	Land to The Side of Fairfield Colchester Road Ardleigh Essex CO7 7PB		Proposed single detached bungalow with new access to Colchester Road (reserved matters application following approval of 14/01783/OUT).	1 dwelling	Application Approved	24/08/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=O9JHRBQB0JH00				TDC_plan10
Tendering District Council	N/A	Ardleigh CP	16/01608/FUL	Full	Housing - Residential	Hillside Cottage, John de Bois Hill	Hillside Cottage John De Bois Hill Ardleigh Colchester Essex CO7 7PH	1,088 sqm	Proposed new dwelling including workshop.	1 dwelling	Application Approved	28/11/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OEKYOFQB0JH00				TDC_plan11
Tendering District Council	N/A	Ardleigh CP	16/01300/FUL	Full	Housing - Residential	Mrs Sparrows	Land adjacent 1 Tilsit Place Colchester Road Ardleigh Essex	427 sqm	Construction of a detached dwelling.	1 dwelling	Application Approved	28/11/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OC850NQB0G500		604713	229363	TDC_plan12
Tendering District Council	N/A	Ardleigh CP	16/00857/FUL	Full	Housing - Residential	Mr Dean Pearce	Land at John De Bois Hill Ardleigh Essex CO7 7PH	0.76 ha	Erection of 2 No. detached dwellings and ancillary out-buildings, improvements (shared) to highway access. (2 No. self build dwellings	2 dwellings	Application Approved	25/07/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=O87B4MQB0JH00				TDC_plan15
Tendering District Council	N/A	Ardleigh CP	16/00846/FUL	Full	Housing - Residential	DF Homes Ltd	Wood View Cottage Bromley Road Ardleigh Colchester Essex CO7 7SE	560 sqm	Proposed construction of two detached dwellings and associated parking.	2 dwellings	Application Approved	21/07/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=O85GYSQB0EL00		603374	226284	TDC_plan16
Tendering District Council	N/A	Ardleigh CP	16/00751/FUL	Full	Housing - Residential	Mr E Hilham	Land adjacent Valley Springs Fox Street Ardleigh Essex CO7 7PP	0.0380 ha	Proposed 3 bedroom detached house and single detached garage	1 dwelling	Application Approved	11/07/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=O79PD5QB0GS00				TDC_plan17
Tendering District Council	N/A	Ardleigh CP	16/00649/FUL	Full	Housing - Residential	Mr Mark Read	Mayo House Crown Lane South Ardleigh Colchester Essex CO7 7PL		Demolition of existing dwelling, garage and other outbuildings. Construction of a new dwelling, garage and indoor swimming pool	1 dwelling	Application Approved	29/06/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=O68Z2TQB0JH00				TDC_plan18
Tendering District Council	N/A	Ardleigh CP	16/00362/FUL	Full	Housing - Residential	Mr D Webster	Hull Farm Barn Spring Valley Lane Ardleigh Colchester Essex CO7 7SA	0.25 ha	Barn conversion into residential use including retention of small extension and construction of 1 other small extension and a detached garage	1 dwelling	Application Approved	11/05/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=O3TFCYQB0JH00		604172	227106	TDC_plan19
Tendering District Council	N/A	Ardleigh CP	16/01461/OUT	Outline	Housing - Residential	Mr Roger Jones	Holly House Chapel Lane Ardleigh Colchester Essex CO7 7BJ	505.00 sqm	Construction of a one bedroom detached bungalow.	1 dwelling	Application Approved	07/11/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=ODJW79QB0EL00		603919	226274	TDC_plan20
Tendering District Council	N/A	Ardleigh CP	16/00972/OUT	Outline	Housing - Residential	Mr Russell Smith	Land adjacent Maryland Cottage Turnpike Close Ardleigh Essex CO7 7QW	2,200 sqm	Proposed two no. 3 bedroom detached dwellings.	2 dwellings	Appeal Allowed	09/0/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=O9FQ5VQB0EL00				TDC_plan21
Tendering District Council	N/A	Ardleigh CP	16/00537/OUT	Outline	Housing - Residential	Ms A Sparrow	Land adjacent 1 Tilsit Place Colchester Road Ardleigh Essex	500.11 sqm	Outline application for the erection of a single detached dwelling	1 dwelling	Application Approved	03/06/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OSIX4DQB01U00		604702	229351	TDC_plan22
Tendering District Council	N/A	Ardleigh CP	16/00523/OUT	Outline	Housing - Residential	Mr and Mrs Brownell	Land opposite The Old Mission Bromley Road Ardleigh Essex CO7 7SE	0.20 ha	Erection of two detached dwellings.	2 dwellings	Application Approved	18/08/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OSIJHYQB0EL00		603279	226254	TDC_plan23
Tendering District Council	N/A	Ardleigh CP	17/01426/DETAIL	Reserved Matters	Housing - Residential	Belvedere Developments	Land opposite The Old Mission Bromley Road Ardleigh Essex CO7 7SE		Erection of four detached dwellings and associated garaging and parking	4 dwellings	Application Approved	24/10/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OVBLE9QB0EL00		603279	226254	TDC_plan24
Tendering District Council	N/A	Ardleigh CP	17/00742/FUL	Full	Employment	Endeavor Automotive	Haddocks Hyundai Fox Street Ardleigh Essex CO7 7PP	6,688 sqm	Proposed erection of an extension to the showroom, and the erection of a valet building following the demolition of existing valet/showroom building	0	Application Approved	19/07/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OPMYYZQB0JH00		603076	227873	TDC_plan25
Tendering District Council	N/A	Ardleigh CP	17/00494/FUL	Full	Housing - Residential	Lynmore Developments	Land adjacent Holly House Chapel Lane Ardleigh Essex CO7 7BJ		Erection of a bungalow and associated parking facilities.	1 dwelling	Application Approved	17/05/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=ONGTQZQB0KO00				TDC_plan26
Tendering District Council	N/A	Ardleigh CP	17/00457/FUL	Full	Housing - Residential	Mr Alex Northcott	The Paddocks Chapel Lane Ardleigh Essex CO7 7BJ	930 sqm	Erection of dwelling house	1 dwelling	Appeal Allowed	05/05/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=ON46PRQB0KO00		603888	226390	TDC_plan27
Tendering District Council	N/A	Ardleigh CP	17/00081/FUL	Full	Housing - Residential	DF Homes Ltd	37 Wood View Cottage Bromley Road Ardleigh Colchester Essex CO7 7SE	560 sqm	Construction of two detached dwellings and associated parking as amendment to 16/00846/FUL.	2 dwellings	Application Approved	10/03/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OK0V28QB0KO00		603374	226284	TDC_plan28
Tendering District Council	N/A	Ardleigh CP	17/00271/OUT	Outline	Housing - Residential	Mr and Mrs Brownell	Land opposite The Old Mission Bromley Road Ardleigh Essex CO7 7SE		Erection of four detached dwellings an associated garaging and parking.	4 dwellings	Application Approved	19/04/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=OLQ7AXQB0JH00&activeTab=summary		603279	226254	TDC_plan29
Tendering District Council	N/A	Ardleigh CP	17/00056/OUT	Outline	Housing - Residential	Mr C Clarke	Land at Nobbys Place Crockleford Hill Bromley Road Ardleigh Colchester Essex CO4 3JG	0.20 ha	Outline application for the erection of two detached dwellings and associated garaging and parking	2 dwellings	Application Approved	08/03/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OJOFG4QB01U00		603079	226241	TDC_plan30

Tendering District Council	N/A	Ardleigh CP	18/01105/FUL	Full	Housing - Residential	Mr and Mrs N Moorcroft	Land adjacent to Willowell Spring Valley Lane Ardleigh Colchester Essex CO7 7SD	0.16 ha	Proposed single residential dwelling, cart lodge, landscaping & access.	1 dwelling	Appeal Allowed	17/08/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PBEHEIQB0LD00		604176	226995	TDC_plan31
Tendering District Council	N/A	Ardleigh CP	18/01575/OUT	Outline	Housing - Residential	Mr and Mrs Mckellar	Chantrys Fox Street Ardleigh Colchester Essex CO7 7PS	0.1 ha	Outline application for one self build dwelling.	1 dwelling	Application Approved	28/11/2018		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PFCYBTQB0M600				TDC_plan32
Tendering District Council	N/A	Ardleigh CP	18/00714/COUNOT	Prior Approval	Housing - Residential	A Lochore and Sons	Holly Lodge Colchester Road Great Bromley Colchester Essex CO7 7TN		Proposed conversion of two barns into two dwellings	2 dwellings	Prior approval not required	19/06/2018		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PB5HCTQB0LD00				TDC_plan33
Tendering District Council	N/A	Ardleigh CP	18/00055/FUL	Full	Housing - Residential	Toad Hall Free Range Eggs Ltd	Land East of Hall Road Great Bromley Essex CO7 7TR	0.02	Erection of an agricultural dwelling to replace temporary mobile home approved under 16/00874/FUL	1 dwelling	Application Approved	28/02/2018		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=P2C7TZQB0LD00				TDC_plan34
Tendering District Council	N/A	Ardleigh CP	17/00068/AGRIC	Prior Approval	Agricultural	Toad Hall Free Range Eggs Ltd	Toad Hall Free Range Eggs Land East of Hall Road Great Bromley Essex CO7 7TR	10 ha	Proposed agricultural storage building.	0	Prior approval not required	08/02/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OJX7TLQB0KO00				TDC_plan35
Tendering District Council	N/A	Ardleigh CP	17/01706/FUL	Full	Housing - Residential	Mr and Mrs Richmond	Land adjacent Grange Hall Hall Road Great Bromley Colchester Essex CO7 7TS	0.19 ha	Erection of detached four bedroom dwelling with single storey double garage	1 dwelling	Application Approved	30/11/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=OXEMEEQB0KO00		608155	226313	TDC_plan36
Tendering District Council	N/A	Ardleigh CP	16/00749/COUNOT	Prior Approval	Housing - Residential	Mr R Moss	Primrose Farm Hall Road Great Bromley Colchester Essex CO7 7TR		Change of use of agricultural storage barn to 2 dwellings.	2 dwellings	Prior approval not required	07/11/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=ODG7WOQB0K100				TDC_plan37
Tendering District Council	N/A	Ardleigh CP	16/00399/DETAIL	Reserved Matters	Housing - Residential	LK Development Ltd	The Cross Inn Ardleigh Road Great Bromley Colchester Essex CO7 7TL		Residential development of 2 no. detached dwellings (reserved matters application following approval of 14/00792/OUT).	2 dwellings	Application Approved	29/06/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=O42YL9QB0EL00		606839	227456	TDC_plan38
Tendering District Council	N/A	Ardleigh CP	16/00217/FUL	Full	Housing - Residential	Beech Hill Properties	Land adjacent The Cross Inn PH Ardleigh Road Great Bromley Essex CO7 7TL	00.10 ha	Erection of two dwellings (revisions to scheme approved under planning permission 15/01502/FUL).	2 dwellings	Application Approved	07/04/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=O2N79HQB01U00&activeTab=summary		606686	227672	TDC_plan39
Tendering District Council	N/A	Ardleigh CP	15/00403/COUNOT	Prior Approval	Housing - Residential	Mrs Allam	Blue Gates Farm Carringtons Road Great Bromley Colchester Essex CO7 7UZ		Change of use of agricultural building to residential use (C3)	1 dwelling	Prior approval not required	06//05/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=NLGOWHOB01U00				TDC_plan40
Tendering District Council	N/A	Ardleigh CP	15/00358/FUL	Full	Housing - Residential	Mr and Mrs Volf	Land adjacent Morants Lodge Colchester Road Great Bromley Essex	00.28 ha	Proposed development of one detached house and garage	1 dwelling	Application Approved	02/06/2015		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NL24Y6QB0IO00		606708	227347	TDC_plan41
Tendering District Council	N/A	Ardleigh CP	14/01636/FUL	Full	Housing - Residential	Mr and Mrs Volf	Land adjacent Morants Lodge Colchester Road Great Bromley Essex	00.28 ha	Proposed development of two detached houses including the demolition of outbuildings	2 dwellings	Application Approved	18/12/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NEIFTEQB0G400		606708	227347	TDC_plan42
Tendering District Council	N/A	Ardleigh CP	14/00973/FUL	Full	Housing - Residential	Dakas Homes Ltd	Land Adj The Cross Inn Colchester Road Great Bromley Essex CO7 7TN	0.12 ha	Erection of a detached dwelling house with a detached garage & an associated new vehicular access	1 dwelling	Application Approved	05/09/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=N8JTQ1YQB0GS00				TDC_plan43
Tendering District Council	N/A	Ardleigh CP	14/00792/OUT	Outline	Housing - Residential	Mr and Mrs J Mann	The Cross Inn Ardleigh Road Great Bromley Essex	1625 sqm	Residential development.	4 dwellings	Application Approved	22/12/2014		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=N7061JQB0GS00		606839	227456	TDC_plan44
Tendering District Council	N/A	Elmstead Market	18/02117/DETAIL	Reserved Matters	Housing - Residential	Mr M Simpson	Avonleigh Clacton Road Elmstead Colchester Essex CO7 7DA		Reserved matters application following Outline application 17/00027/OUT - providing details of Access, Layout, Appearance and Landscape	5 dwellings	Application Approved	07/05/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PKBXWGQB0M600				TDC_plan46
Tendering District Council	N/A	Elmstead Market	18/01863/DETAIL	Reserved Matters	Housing - Residential	Go Homes Ltd	Charity Field Land South of Colchester Road Elmstead Essex CO7 7ET	6.24 ha	Erection of up to 50 dwellings and a new community building, provision of dual-purpose car park, new village allotments and public open space. (Reserved Matters including Appearance, Layout and Scale)	50 dwellings	Application Approved	14/02/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PHTZHUQB0EL00		606038	224387	TDC_plan47
Tendering District Council	N/A	Elmstead Market	18/01810/DETAIL	Reserved Matters	Housing - Residential	South East Developments Limited	Agricultural Field to The North of Meadow Close Elmstead Essex CO7 7HR	1.03 ha	Reserved matters application following outline approval (planning approval 16/01015/OUT) for the erection of twenty dwellings with associated access and pedestrian crossing on Colchester Road	20 dwellings	Application Approved	10/05/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PHEOL7QB0EL00		605773	224709	TDC_plan48
Tendering District Council	N/A	Elmstead Market	18/00431/DETAIL	Reserved Matters	Housing - Residential		Charity Field Land South of Colchester Road Elmstead Essex CO7 7ET	6.24 ha	Reserved matters application following planning approval 14/01728/OUT - Provision of vehicular & pedestrian access from School Road to the application site in accordance with the Highway Authorityrs requirements.	50 dwellings	Application Approved			https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=P5U6ORQB0LD00		606038	224387	TDC_plan47
Tendering District Council	N/A	Elmstead Market	14/01728/OUT	Outline	Housing - Residential	Edward Gittins & Associates	Charity Field Land South of Colchester Road Elmstead Essex CO7 7ET	6.24 ha	Erection of up to 50 dwellings and a new community building, provision of dual-purpose car park, new village allotments and public open space.	50 dwellings	Appeal Allowed	05//01/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=NF6IVCEQB0G400		606038	224387	TDC_plan47
Tendering District Council	N/A	Elmstead Market	17/00927/DETAIL	Reserved Matters	Housing - Residential	Hills Residential Ltd	Land to The East of Tye Road Elmstead Colchester Essex CO7 7BB	2.38 ha	Reserved matters application for construction of new access to serve housing development approved under 16/00219/OUT.	32 dwellings	Application Approved	12/03/2018		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=OR2W1J9QB0IH00&activeTab=summary				TDC_plan49
Tendering District Council	N/A	Elmstead Market	16/00219/OUT	Outline	Housing - Residential	Hills Residential Ltd	Land to The East of Tye Road Elmstead Colchester Essex CO7 7BB	2.38 ha	Outline planning application for residential development of up to 32 dwellings, land for a community facility and associated parking and infrastructure	32 dwellings	Appeal Allowed	27/07/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=O2NEHIQB01U00&activeTab=summary		605695	224730	TDC_plan50
Tendering District Council	N/A	Elmstead Market	17/01965/FUL	Full	Housing - Residential	Mr and Mrs Warren	Sunnydene Chapel Lane Elmstead Colchester Essex CO7 7AG	613 sqm	One bungalow with associated parking and amenity area.	1 dwelling	Application Approved	26/01/2018		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=OZEJZEQB0LD00&activeTab=summary		606367	224535	TDC_plan51
Tendering District Council	N/A	Elmstead Market	17/01821/FUL	Full	Housing - Residential	Mr Paul Wynne	Land adjacent Havenbrook Clacton Road Elmstead Essex CO7 7DB	1,500 sqm	Erection of detached dwelling and garaging.	1 dwelling	Application Approved	08/12/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OYA28ZQB0LD00		606726	224278	TDC_plan52
Tendering District Council	N/A	Elmstead Market	17/01484/FUL	Full	Housing - Residential	Mr S Bartholomew	Elmstead Delivery Office Clacton Road Elmstead Colchester Essex CO7 7AB	0.04 ha	Proposed erection of 2 no. two storey semi-detached dwellings.	2 dwellings	Application Approved	07/11/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=OVV3ABQB0EL00		606283	224475	TDC_plan53
Tendering District Council	N/A	Elmstead Market	17/01271/FUL	Full	Renewables	Full Circle Energy Limited	Allens Farm Tye Road Elmstead Colchester Essex CO7 7B	2.0 ha	Erection of a second bio-gas plant comprising anaerobic digester, cogeneration unit, grid entry unit and digestate store to replace previous approval 15/01679/FUL	0	Application Approved	20/12/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OU03NZQB0EL00		605247	225151	TDC_plan54
Tendering District Council	N/A	Elmstead Market	17/01260/FUL	Full	Housing - Residential	Mr G Barnes	Land adjacent to Finch Lane Bromley Road Elmstead Essex CO7 7BX	0.1 ha	Detached dwelling and garage.	1 dwelling	Application Approved	10/01/2018		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OTY7PVQB0KO00				TDC_plan55
Tendering District Council	N/A	Elmstead Market	17/00961/FUL	Full	Housing - Residential	Mr Sayeed Parker	Havenbrook Clacton Road Elmstead Essex CO7 7DB	2,565 sqm	Proposed 6 No. detached bungalows	6 dwellings	Application Approved	23/08/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=ORFU44Q8B0EL00		606688	224296	TDC_plan56
Tendering District Council	N/A	Elmstead Market	16/01704/FUL	Full	Housing - Residential	Mr S Bartholomew	Elmstead Delivery Office Clacton Road Elmstead Colchester Essex CO7 7AB	0.04 ha	Residential development consisting of a new two storey dwelling on the site of former listed building now demolished as a result of fire damage.	1 dwelling	Application Approved	12/01/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=OFC8SIQB0K100&activeTab=summary		606283	224475	TDC_plan57
Tendering District Council	N/A	Elmstead Market	16/01449/FUL	Full	Housing - Residential	Mr and Mrs Dunt	Matapos Colchester Road Elmstead Colchester Essex CO7 7EG	760 sqm	Proposed Dwelling	1 dwelling	Appeal Allowed	03/05/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=O2OIZE2QB0EL00		605855	224598	TDC_plan58
Tendering District Council	N/A	Elmstead Market	16/00390/FUL	Full	Housing - Residential	Mr Rawlings	Land Adj Bromley Road Elmstead Colchester Essex CO7 7BX	0.05 sqm	Erection of cottage style dwelling with associated parking facilities.	1 dwelling	Application Approved	23/05/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=O42V0FQB0EL00				TDC_plan59
Tendering District Council	N/A	Elmstead Market	15/01679/FUL	Full	Renewables	Full Circle Energy Limited	Allens Farm Tye Road Elmstead Colchester Essex CO7 7BB	0.70 ha	Revised application for erection of second combined heat and power bio-gas plant comprising anaerobic digester, digester dome, CHP engines, substation, operations area and new digestate store to replace planning permission 15/00607/FUL to be revoked in favour of this application.	0	Application Approved	05/01/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NX8Y91QB01U00		605247	225151	TDC_plan54

Tendering District Council	N/A	Elmstead Market	15/01670/FUL	Full	Renewables	Full Circle Energy Limited	Allens Farm Tye Road Elmstead Colchester Essex CO7 7BB	480 ha	Revised application for erection of agricultural building to be used in connection with recently constructed anaerobic digester. | Allens Farm Tye Road Elmstead Colchester Essex CO7 7BB	0	Application Approved	05/01/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NX6ZAFQB0EL00		605204	225786	TDC_plan60
Tendering District Council	N/A	Elmstead Market	15/00711/FUL	Full	Renewables	Full Circle Energy Limited	Allens Farm Tye Road Elmstead Colchester Essex CO7 7BB		Erection of agricultural building to be used in connection with recently constructed anaerobic digester	0	Application Approved	18/06/2015		https://idox.tendringdc.gov.uk/online-applications/simpleSearchResults.do?action=firstPage		605204	225786	TDC_plan61
Tendering District Council	N/A	Elmstead Market	15/00679/FUL	Full	Housing - Residential	Square Sail	Land adjacent to Public Car Park Clacton Road Elmstead Essex CO7 7DA	0.24 ha	Development of 6.no dwellings and construction of two vehicular accesses.	6 dwellings	Appeal Allowed	27/072016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=NNVUGFQB0GI00		606473	224322	TDC_plan62
Tendering District Council	N/A	Elmstead Market	15/00607/FUL	Full	Renewables	Full Circle Energy Limited	Allens Farm Tye Road Elmstead Colchester Essex CO7 7BB	0.4 ha	Erection of second combined heat and power bio-gas plant comprising anaerobic digester, additional co generation unit and substation.	0	Application Approved	15/06/2015		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=NN9BHLQB0GS00&activeTab=summary		605247	225151	TDC_plan63
Tendering District Council	N/A	Elmstead Market	14/01736/FUL	Full	Housing - Residential	Crown Homes East Anglia Ltd	Dianthus Bromley Road Elmstead Colchester Essex CO7 7BX	0.23 ha	Erection of 3 no. detached bungalows with associated garages & parking facilities	3 dwellings	Application Approved	10/02/2015		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=NF8H1RQB0GD00&activeTab=summary				TDC_plan64
Tendering District Council	N/A	Elmstead Market	18/00950/OUT	outline	Housing - Residential	Hills Residential Ltd	Land to The East of Tye Road Elmstead Colchester Essex CO7 7BB	0.90 ha	Outline planning application for residential development of up to 18 dwellings and associated open space, car parking and infrastructure.	18 dwellings	Appeal dismissed	04/07/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=P6M2FCQB0KO00&activeTab=summary		605649	224764	TDC_plan65
Tendering District Council	N/A	Elmstead Market	17/01306/OUT	outline	Housing - Residential	Mr and Mrs Godden	Bromley Road Elmstead Essex CO7 7BX	0.53 ha	Residential development of up to 9 dwellings	9 dwellings	Application Approved	22/11/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=OUBMGOQB0KO00&activeTab=summary				TDC_plan66
Tendering District Council	N/A	Elmstead Market	17/00785/OUT	outline	Housing - Residential	Lanswood Limited	Lanswood Park Broomfield Road Elmstead Essex CO7 7FD	6,200 sqm	Hybrid submission for outline permission for the provision of proposed buildings 7, 8, & 9. Variation of approved planning application 08/01426/FUL to provide two smaller footprint and smaller scale office buildings identified as 5 & 6 as replacement for original single building	0	Split Decision	09/10/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=OPU7IVQB0KO00		607094	223955	TDC_plan67
Tendering District Council	N/A	Elmstead Market	17/00027/OUT	outline	Housing - Residential	A Eversted, J Walkers, R Napthine	Avonleigh House Clacton Road Elmstead Colchester Essex CO7 7DA	0.24 ha	Proposed 5 dwellings	5 dwellings	Application Approved	17/03/2017		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=OJIGCVQB0K100		606611	224326	TDC_plan68
Tendering District Council	N/A	Elmstead Market	16/01797/OUT	outline	Housing - Residential	Hills Residential	Land adjacent Market Field School School Road Elmstead Essex CO7 7ET	4.37 ha	Outline application for the erection of 62 dwellings, associated garaging, parking and infrastructure.	62 dwellings	Appeal Allowed	05/02/2018		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=OGA41GQB0JH00		606379	224243	TDC_plan69
Tendering District Council	N/A	Elmstead Market	16/01690/OUT	outline	Housing - Residential	Mr N Napthine	Forres Clacton Road Elmstead Colchester Essex CO7 7DD	0.89 ha	Proposed erection of up to 9 no. dwellings and associated out-buildings with access onto Clacton road (A133	9 dwellings	Application Approved	16/12/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=OFAI2HQB0K100				TDC_plan70
Tendering District Council	N/A	Elmstead Market	15/00675/OUT	outline	Housing - Residential	Go Homes	Land off Clacton Road Elmstead Essex	1.99 ha	Residential development of up to 32 dwellings (incorporating 25% affordable housing) with associated open space and infrastructure	32 dwellings	Appeal Allowed	17/02/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=NNVSFQQB0GI00&activeTab=summary		606790	224349	TDC_plan71
Tendering District Council	N/A	Elmstead Market	15/00417/OUT	Outline	Housing - Residential	Mr M Willis	Barnfield Lodge Clacton Road Elmstead Colchester Essex CO7 7DB	0.19 ha	Erection of two detached dwellings served by existing vehicular access.	2 dwellings	Application Approved	12/06/2015		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=NLO465QB0G400&activeTab=summary		606642	224262	TDC_plan72
Tendering District Council	N/A	Elmstead Market	14/01292/OUT	Outline	Mixed use	Knight Developments Ltd	Land to The West of Church Road Elmstead Market Essex CO7 7AR	3.2 ha	Outline planning application (all matters reserved) for residential development, a community hall, green infrastructure open space including land for a sports field and allotments together with new vehicular and pedestrian accesses, parking, servicing, landscaping and utilities infrastructure	20 dwellings	Application Approved	12/12/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=NBOKP9QB0GD00		604504	226009	TDC_plan73
Tendering District Council	N/A	Elmstead Market	14/01238/OUT	Outline	Housing - Residential	Wivenhoe Park Estate	Agricultural Field to The North of Meadow Close Elmstead Essex CO7 7HR	1.03 ha	Outline application for the erection of twenty dwellings with associated access and pedestrian crossing on Colchester Road.	20 dwellings	Application Approved	18/04/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=NB954VQB0GS00&activeTab=summary		605773	224709	TDC_plan74
Tendering District Council	N/A	Elmstead Market	19/00933/OUT	Outline	Housing - Residential	Mr A Massink	Land to the north of Bromley Road Elmstead, Essex CO7 7BX	7.8 ha	Erection of up to 45 affordable residential units	45 units	Application Pending	24/06/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PTP7ZNQB0KP00		606749	224582	TDC_plan75
~~Colchester Borough Council~~	~~Wivenhoe~~	~~Colchester~~	~~182926~~	~~Full~~	~~Commercial - office~~	~~Mr Gary Stapleton~~	~~Land to rear of, Oaklene, Keelars Lane, Wivenhoe Colchester CO7 9LA~~	~~1,540 sqm~~	~~Proposed detached office building and yard for business use~~	~~0~~	~~Application refused~~	~~23/01/2019~~		~~https://www.colchester.gov.uk/wampd/?id=182926~~				CDC_plan01
Colchester Borough Council	Greenstead	Colchester	182848	Full	Housing - Residential	Mr Stones	33 Salary Close, Colchester CO4 3HL		Proposed Detached Annex for use of main dwelling only	1 dwelling	Application approved	16/01/2019		https://www.colchester.gov.uk/wampd/?id=182848		602534	226071	CDC_plan02
Colchester Borough Council	Wivenhoe	Colchester	181516	Full	Educational	University of Essex	North Teaching Centre 2, University Of Essex, Wivenhoe Park, Colchester CO4 3SQ	7,000 sqm	Erection of 3 storey building to provide teaching and lecture rooms.	0	Application approved	13/11/2018		https://www.colchester.gov.uk/planning-app-details/?id=decdaef6-af82-e911-a988-000d3a9dfd39#ValidationSummaryEntityForm View		602775	224015	CDC_plan03
Colchester Borough Council	Wivenhoe	Colchester	190876	Full	Housing - Residential	Arbora Homes Ltd	Land adj, 1 Valfreda Way, Wivenhoe Colchester CO7 9PJ	377.27 sqm	The construction of two semi-detached dwellings on vacant garden land.	2 dwellings	Application Approved	26/06/2019		https://www.colchester.gov.uk/wampd/?id=190876		603790	222500	CDC_plan04
Colchester Borough Council	Greenstead	Colchester	145980	Full	Housing - Residential	Mr Stephen Brown	2 Leam Close, Colchester CO4 3TE	0.1 ha	3 Bedroom Attached Dwelling (side extension to donor dwelling at No 2 Leam Close, Colchester, Essex), together with associated alterations to existing donor dwelling to provide re-configured accommodation/front entrance door at ground floor level	1 dwelling	Application Approved			https://www.colchester.gov.uk/wampd/?id=145980		602599	225126	CDC_plan05
Colchester Borough Council	St John's	Colchester	152484	Full	Housing - Residential	Robinson & Hall LLP	Shaws Farm, Parsons Heath, Colchester CO4 3ER	0.5 ha	Proposed demolition of existing dwelling and the erection of replacement dwelling and associated works.	1 dwelling	Application approved	05/01/2016		https://www.colchester.gov.uk/wampd/?id=152484		602993	226984	CDC_plan06
Colchester Borough Council	St Andrews	Colchester	143740	Outline	Housing - Residential	Clive Richard Hopkins and Richard Ernest Barker	Hammonds, Land to North of, Elmstead Road/East of Swan Close, Colchester	0.7 ha	Outline application for the erection of 18 residential units and engineering operations to raise ground levels on part of site	18 units	Application approved	08/12/2014		https://www.colchester.gov.uk/wampd/?id=143740		602114	224484	CDC_plan07
Colchester Borough Council	St Andrews	Colchester	152613	Full	Housing - Student Accommodation	University of Essex	Meadows Phase II, Knowledge Gateway, Boundary Road, Colchester Essex CO4 3SQ	1.6 ha	Erection of two 7 storey buildings to provide 643 student residences with associated access, bin stores, cycle stores and electricity sub station; with hard and soft landscaping and vehicle access/servicing from Capon Road.	643 student residences	Application Approved	0707/2016		https://www.colchester.gov.uk/wampd/?id=152613				CDC_plan08

Colchester Borough Council	Wivenhoe	Colchester	152219	Full	Educational	University of Essex Knowledge Gateway Limited	Knowledge Gateway Site, University Of Essex, Wivenhoe Park, Colchester CO4 3SQ	1.2 ha	Erection of three storey Innovation Centre with plaza to front and temporary car park to rear; with ancillary substation, cycle stores and hard and soft landscaping all as shown on application drawings.	0	Application Approved	16/12/2015		https://www.colchester.gov.uk/wampd/?id=152219		602570	224186	CDC_plan09
Colchester Borough Council	Wivenhoe	Colchester	150895	Full	Educational	University of Essex	University Of Essex, Wivenhoe Park, Colchester CO4 3SQ	2,211 sqm	Installation of a new three storey temporary modular teaching facility, consisting of twenty seminar rooms, toilets & breakout space.	0	Application Approved	04/08/2015		https://www.colchester.gov.uk/wampd/?id=150895		602927	223898	CDC_plan10
Colchester Borough Council	Wivenhoe	Colchester	152068	Full	Educational	University of Essex	University Of Essex, Wivenhoe Park, Colchester CO4 3SQ	3,108 sqm	New five storey academic and teaching building.	0	Application Approved	07/01/2016		https://www.colchester.gov.uk/wampd/?id=152068		602927	223898	CDC_plan11
Colchester Borough Council	Wivenhoe	Colchester	152814	Full	Educational	University of Essex	University Of Essex, Wivenhoe Park, Colchester CO4 3SQ	1.1 ha	Erection of sports centre extension to include a 3 No. basketball court sports hall (capable of conversion to 1800 spectator seating), facilities for sports therapy and human performances, classrooms, rehabilitation area, social space and bar, post-graduate study facilities and staff offices.	0	Application Approved	01/07/2016		https://www.colchester.gov.uk/wampd/?id=152814		602927	223898	CDC_plan12
Colchester Borough Council	Wivenhoe	Colchester	191529	Outline	Mixed use	D G Rose Ltd	Flag Inn, Colchester Road, Wivenhoe Colchester CO7 9HS	0.11 nha	Outline application for the demolition of an existing public house and the erection of 3 storey building comprising of 2 commercial (office) units on the ground floor with 8no. one bedroom flats above	8 dwellings	Withdrawn	13/08/2019		https://www.colchester.gov.uk/planning-app-details/?id=0004a964-9b92-e911-a97e-000d3ab42be8#ValidationSummaryEntityFormView		604102	223185	CDC_plan17
Colchester Borough Council	Wivenhoe	Colchester	182138	Full	Housing - Residential	Mr Nick Perks	36 The Cross, Wivenhoe Colchester CO7 9QL	210 sqm	Erect a single bedroom house with home office with provision for parking. Resubmission of 180943	1 dwelling	Application Approved	06/11/2018		https://www.colchester.gov.uk/wampd/?id=182138		604040	222807	CDC_plan18
Colchester Borough Council	Wivenhoe	Colchester	170958	Full	Housing - Residential	The Kemble Family Settlement	15-16 Nelson Close, Wivenhoe Colchester CO7 9FN	0.07 ha	Demolition of redundant commercial building and erection of one pair of semi-detached two-storey houses, car parking and landscaping.	2 dwellings	Application Approved	31/05/2017		https://www.colchester.gov.uk/wampd/?id=170958		604102	222704	CDC_plan19
Colchester Borough Council	Wivenhoe	Colchester	171201	Prior Notification	Housing - Residential	The Kemble Family Settlement	10-14 Nelson Close Wivenhoe Essex C07 9FN		Prior approval for the change of an office to 3 dwellings	3 dwelling	Prior approval approved	16/06/2017		https://www.colchester.gov.uk/wampd/?id=171201				CDC_plan20
Colchester Borough Council	Wivenhoe	Colchester	161635	Full	Educational	University of Essex Knowledge Gateway Limited	Knowledge Gateway Site, University Of Essex, Wivenhoe Park, Colchester CO4 3SQ		Erection of three storey Innovation Centre with plaza to front and temporary car park to rear; with ancillary substation, cycle stores and hard and soft landscaping all as shown on application drawing	0	Application Approved	13/02/2017						CDC_plan21
Colchester Borough Council	Wivenhoe	Colchester	172360	Full	Housing - Residential	Mr T Sallows	71 The Avenue, Wivenhoe Colchester CO7 9PP	0.1 ha	Partial demolition of existing doctors surgery/health centre, alterations to & conversion of remaining part to a dwelling & erectionof a new detached bungalow. Associated parking facilities to be provided for both dwellings.	1 dwelling	Application Approved	02/11/2017		https://www.colchester.gov.uk/wampd/?id=172360				CDC_plan22
Colchester Borough Council	Greenstead	Colchester	181309	Full	Housing - Student Accommodation	Osborne	Land to North of Elmstead Road/East of Swan Close, Colchester CO4 3BL	0.75 ha	Development consisting of 135 bed space Student Accommodation within five terraces of Town Houses and a Studio Block, complete with Car and Cycle Parking and Bin Store	135 bed space, 5 dwellings	Application Approved	21/03//2019		https://www.colchester.gov.uk/wampd/?id=181309		602114	224484	CDC_plan23
Colchester Borough Council	Greenstead	Colchester	181907	Full	Housing - Student Accommodation	Beyond the Box Beta Ltd	Avon Way House, Avon Way, Colchester CO4 3TZ	1.2 ha	Erection of 5 new accommodation blocks to provide for an additional 152 student bedrooms, a shared student communal lounge with staff offices and associated facilities, demolition of bungalow, with associated parking, landscaping, and boundary treatment	152 student bedrooms	Application Approved	16/01/2019		https://www.colchester.gov.uk/planning-app-details/?id=facfae6-af82-e911-a988-000d3ab9df39#ValidationSummaryEntityFormView		602559	224964	CDC_plan24
Colchester Borough Council	St Anne's and St John's	Colchester	181565	Reserved Matters	Housing - Residential	Mr Martin Lee	Land Between 42 And 58, Parsons Heath, Colchester CO4 3HY	0.26 ha	Application for approval of reserved matters for erection of 4no. dwellings following outline approval of 170735.	4 dwellings	Application Approved	22/11/2018		https://www.colchester.gov.uk/wampd/?id=181565		602311	226724	CDC_plan25
Colchester Borough Council	St Anne's and St John's	Colchester	170735	Outline	Housing - Residential	Mr Martin Lee	Land Between 42 And 58, Parsons Heath, Colchester CO4 3HY	0.26 ha	Outline application for the erection of four detached houses, garages and associated parking.	4 dwellings	Application Approved	17/03/2017		https://www.colchester.gov.uk/planning-app-details/?id=499d4dda-af82-e911-a988-000d3ab9df39#ValidationSummaryEntityFormView		602311	226724	CDC_plan25
Colchester Borough Council	St Anne's and St John's	Colchester	191625	Outline	Housing - Residential	Mrs Clinch	Land adjacent, Heathcote Farm, Fox Street, Ardleigh Colchester CO7 7PS	0.1 ha	Outline application for two dwellings, all matters reserved	2 dwellings	Application refused	06/09/2019		https://www.colchester.gov.uk/planning-app-details/?id=a6cb5089-1494-e911-a973-000d3ab42b30#ValidationSummaryEntityFormView				CDC_plan26
Colchester Borough Council	Wivenhoe	Colchester	192090	Full	Housing - Residential	The Universty of Essex and Ulving	Western Knowledge Gateway Site, Land adjacent to Capon and Annan Roads Colchester CO4 3SQ	2.6 ha	The construction of five buildings to provide 1204 new student bedrooms arranged as cluster flats and 58 studios, with social and administrative facilities, associated hard and soft landscaping, cycleparking, bin stores and vehicle access and turning.	1196 student bedrooms 58 studios	Application Pending	13/08/2019		https://www.colchester.gov.uk/planning-app-details/?id=e2fc087d-84be-e911-a976-000d3ab42b30#ValidationSummaryEntityFormView		602927	223898	CDC_plan27
Colchester Borough Council	Greenstead	Colchester	191246	Full	Housing - Residential	Miss Jennifer Ruffell	33 Britten Close Colchester CO4 3UN	145 sqm	Erection of two storey, two bed house dwelling	1 dwelling	Application Approved	27/07/2019		https://www.colchester.gov.uk/planning-app-details/?id=46ddaef6-af82-e911-a988-000d3ab9df39#ValidationSummaryEntityFormView		602126	224590	CDC_plan28
Colchester Borough Council	Wivenhoe	Colchester	191618	Full	Infrastructure	University of Essex Knowledge Gateway Limited	University Of Essex, Wivenhoe Park, Colchester CO4 3SQ	4581 sqm	Retrospective application: Overflow car park with 170 spaces, associated fencing, vehicle barrier and pedestrian gate.	0	Application Approved	09/08/2019		https://www.colchester.gov.uk/planning-app-details/?id=e3a2a31-6397-e911-a97c-000d3ab42ba4#ValidationSummaryEntityFormView		602431	602431	CDC_plan29
Colchester Borough Council	Wivenhoe	Colchester	192457	Full	Housing - Residential	University of Essex Knowledge Gateway Limited	Land adj to Clingoe Hill, Nesfield Road & to the East of, Boundary Road, Colchester CO4 3SQ	1.04 ha	Wivenhoe Park, Colchester CO4 3SQ	0	Application Pending	02/10/2019		https://www.colchester.gov.uk/planning-app-details/?id=bd61ff14-1dec-e911-a812-000d3ab29c25#ValidationSummaryEntityFormView		602508	224314	CDC_plan30
Colchester Borough Council	Wivenhoe	Colchester	192733	Full	Housing - Residential	Colchester Borough Council	Garage site between Scarfe Way and Woodcock Close	0.08 ha	Redevelopment of a garage site located in Scarfe Way, Colchester to create additional affordable housing	6	Application Approved	10/01/2019		https://www.colchester.gov.uk/planning-app-details/?id=965d6696-9601-ea11-a811-000d3ab29c25#ValidationSummaryEntityFormView		602362	224744	CDC_plan31
Colchester Borough Council	Wivenhoe	Colchester	192777	Full	Housing - Residential	Colchester Borough Council	Garage site between Scarfe Way and Woodcock Close	0.07 ha	Redevelopment of garage site to create 6no. 2 bedroom flats to provide additional affordable housing	6	Application Approved	10/01/2020		https://dtlcs.colchester.gov.uk/Publisher/mvc/listDocuments?identifier=DC&ref=192777		602519	224880	CDC_plan32

Colchester Borough Council	Greenstead	Colchester	192954	Full	Commercial	Mr Friend	Treetops, 115A Bromley Road, Colchester CO4 3JG	1334 sqm	Change of use of land and modification and conversion of the existing building from B1 (a) office to Holiday let to accommodate a 2-bed withassociated amenity space and parking at Treetops, 115a Bromley Road, Colchester CO4 3JG.		Application Pending	02/12/2019		https://www.colchester.gov.uk/planning-app-details/?id=b57b70e4-4d18-ea11-a811-000d3ab29b50#ValidationSummaryEntityFormView		602975	226217	CDC_plan33
Tendering District Coucnil	N/A	Great Bromley	19/01481/FUL	Full	Agricultural	A Lochore and Sons	Holly Lodge Colchester Road Great Bromley Colchester Essex CO7 7TN	192 ha	Proposed agricultural storage building		Application Approved	27/11/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PYSGBBQB0KP00		606253	227297	CDC_plan34
Tendering District Coucnil	N/A	Elmstead Market	19/01474/FUL	Full	Commercial	Decorative Events	Elmstead Lodge Farm Bromley Road Elmstead Colchester Essex CO7 7BZ	1260 sqm	Proposed barn conversion - change of use to Use Class D2 Assembly and Leisure (wedding venue and other community uses) and associated physical alterations.		Application Pending	30/12/2019		https://idox.tendringdc.gov.uk/online-applications/files/602795AB8A95CDFBD6A18398E2D0AF32/pdf/19_01474_FUL-APPLICATION_FORM-1208536.pdf		607030	225017	CDC_plan35
Tendering District Coucnil	N/A	Ardleigh CP	19/01349/FUL	Full	Housing - Residential	Mr and Mrs Moorecroft	Land adjacent Willowell Bromley Road Ardleigh Essex CO7 7SG	0.36 ha	Erection of two detached properties with garaging, parking, turning facilities and landscaping. Accessed from Bromley Road	2	Appeal lodged	07/01/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PXM4Q3QB0EL00				TDC_plan76
Tendering District Coucnil	N/A	Ardleigh CP	19/01148/OUT	Outline	Housing - Residential	Wambugh Ltd	Land to The North of Mount View Fox Street Ardleigh Essex CO7 7PS	1.2 ha	Outline planning application with all matters reserved for the construction of 9 no. custom build/self build dwellings, access road and pavement.	9	Appeal lodged	28/01/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PVLWOGQB0EL00		602800	227720	TDC_plan77
Tendering District Coucnil	N/A	Ardleigh CP	19/01176/FUL	Full	Housing - Residential	Mr Michael Woods	Land adjacent Whinstones Crown Lane North Ardleigh Essex CO7 7RA	0.9 ha	Proposed dwelling, part re-grading of existing lake edges, 2no. solar arrays, associated works including new landscape planting and area of hardstanding.	1	Appeal lodged	21/01/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PVYV5EQB0EL00		602893	228933	TDC_plan78
Tendering District Coucnil	N/A	Ardleigh CP	19/01271/OUT	Outline	Housing - Residential	Mr and Mrs Grant	Land at Crockleford Stud Bromley Road Ardleigh Colchester Essex CO7 7SF	0.2 ha	Proposed 3 dwellings (outline application with all matters reserved).	3	Application refused	17/10/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=PWZOSOQB0KP00&activeTab=summary				TDC_plan79
Tendering District Coucnil	N/A	Ardleigh CP	19/01377/FUL	Full	Housing - Residential	S Wright	Land adjacent to Hammonds Farm Bromley Road Ardleigh Colchester Essex CO7 7SG	0.37 ha	Erection of two detached properties with garaging, parking and turning facilities, and landscaping access from Bromley Road	2	Appeal lodged	07/01/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?previousCaseType=Application&keyVal=P0UW8EQB0KO00&previousCaseNumber=19%2F01377%2FFUL&activeTab=summary&previousKeyVal=PXRWDGQB0EL00				TDC_plan80
Colchester Borough Council					Housing - Residential		The Beehive Public House Bromley Road Colchester CO4 3JG											TDC_plan81
Tendering District Coucnil	N/A	Ardleigh CP	18/01840/OUT	Outline	Housing - Residential													TDC_plan82
Tendering District Coucnil	N/A	Ardleigh CP	19/01491/COUNOT	Prior Approval	Housing - Residential	J.O & M.P Bland & Sons	Barns at Moze Hall Fox Street Ardleigh Colchester Essex CO7 7PP		Proposed conversion of agricultural buildings into two dwellings.	2	Prior approval not required	26/11/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PZ1RO6QB0KP00				TDC_plan83
Tendering District Coucnil	N/A	Ardleigh CP	19/01481/FUL	Full	Agricultural	A Lochore and Sons	Holly Lodge Colchester Road Great Bromley Colchester Essex CO7 7TN	192 ha	Proposed agricultural storage building.		Application Approved	27/11/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PYSGBBQB0KP00				TDC_plan84
Tendering District Coucnil	N/A	Elmstead Market	19/01211/DETAIL	Detailed Application	Housing - Residential	Heron Developments	Land at Forres Clacton Road Elmstead Colchester Essex CO7 7DD		Construction of 8 new dwellings with associated development and landscaping (approval of reserved matters Layout, Scale, Appearance and Landscaping following approval of 16/01690/OUT - Access already approved under 16/01690/OUT)	8	Application Approved	12/11/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PW8FKXQB0KP00		607045	223994	TDC_plan85
Tendering District Coucnil	N/A	Elmstead Market	14/01728/OUT	Reserved Matters	Housing - Residential	Go Homes Ltd	Charity Field Land South of Colchester Road Elmstead Essex CO7 7ET		Reserved matters application following planning approval 14/01728/OUT- Erection of up to 50 dwellings and a new community building, provision of dual-purpose car park, new village allotments and public open space	50	Application Approved	11/11/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PPQYE3QB0LD00		606038	224387	TDC_plan86
Tendering District Coucnil	N/A	Ardleigh CP	19/01629/FUL	Full	Housing - Residential	Stewart	Hope Cottage Crown Lane South Ardleigh Colchester Essex CO7 7PL	893 sqm	Demolition of existing dwelling and replacement with the construction of 4 no. 2 bedroom bungalows, associated accesses, parking and garden areas.	4	Application Pending	28/10/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=Q03D56QB07M00		603147	227981	TDC_plan87
Tendering District Coucnil	N/A	Ardleigh CP	19/01740/OUT	Outline	Housing - Residential	Wambugh Ltd	Land to The North of Mount View Fox Street Ardleigh Essex CO7 7PS	1.29 ha	Outline planning application with all matters reserved for the construction of 9 no. custom build/self build dwellings, access road and pavement.	9	Application Pending	14/11/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=Q0YVZQQB0KP00&activeTab=summary		602800	227720	TDC_plan88
Tendering District Coucnil	N/A	Ardleigh CP	19/01835/FUL	Full	Housing - Residential	Mr and Mrs Percival	Hollydene Spring Valley Lane Ardleigh Colchester Essex CO7 7SB	1680 sqm	Replacement dwelling and demolition of existing, extension to residential curtilage.	1	Application Approved	11/02/2010		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=Q1XYSCQB0KP00&activeTab=summary		603993	227584	TDC_plan89
Tendering District Coucnil	N/A	Elmstead Market	19/01179/DETAIL	Reserved Matters	Housing - Residential	Hills Residential Construction Limited	Land to The East of Tye Road Elmstead Colchester Essex CO7 7BB	2.38 ha	Reserved matters application for the variation of the site layout as approved in 18/01307/DETAIL	32	Application Approved	06/12/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PVYX4IQB0EL00		605646	224751	TDC_plan90
Tendering District Coucnil	N/A	Elmstead Market	18/01307/DETAIL	Reserved Matters	Housing - Residential	Hills Residential Construction Limited	Land to The East of Tye Road Elmstead Colchester Essex CO7 7BB	2.38 ha	Reserved matters application for 32 dwellings, land for a community facility and associated parking and infrastructure.	32	Application Approved					605646	224751	TDC_plan90
Tendering District Coucnil	N/A	Elmstead Market	16/00219/OUT	Outline	Housing - Residential	Hills Residential Construction Limited	Land to The East of Tye Road Elmstead Colchester Essex CO7 7BB	2.38 ha	Outline planning application for residential development of up to 32 dwellings, land for a community facility and associated parking and infrastructure.	32	Appeal Allowed	27/07/2016		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=O2NEHJQB01U00&activeTab=summary		605646	224751	TDC_plan90
Tendering District Coucnil	N/A	Great Bromley	17/00927/DETAIL	Reserved Matters	Housing - Residential						Application Approved			https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?keyVal=OR2WU9QB0JH00&activeTab=summary				
Tendering District Coucnil	N/A	Elmstead Market	19/00544/FUL	Full	Industrial	Full Circle Energy Limited	Allens Farm Tye Road Elmstead Colchester Essex CO7 7BB	0.27 ha	Erection of two buildings to be occupied under a B8 Storage and Distribution use.		Application Approved	04/07/2019		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PPFKZCQB0EL00		605248	225891	TDC_plan91
Tendering District Coucnil	N/A	Ardleigh CP	19/01939/OUT	Outline	Commercial	SRC Aggregates and Hills Building Group	Land at Crown Quarry Old Ipswich Road Ardleigh Essex CO7 7QR	2.76ha	Proposed small business park development of B1, B2 and B8 storage. The construction of a new internal access from the existing access road, relocation of the existing temporary quarry office to a new building together with associated car / cycle parking.		Application Pending	15/01/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=Q2TCNIQB0KP00		602527	229760	TDC_plan92
Tendering District Coucnil	N/A	Ardleigh CP	19/01742/COUNOT	Prior Notification	Residential	Ashbee	Newbridge Farm Fox Street Ardleigh Colchester Essex CO7 7PN		Proposed conversion of agricultural buildings into 3 one bed dwellings.	3	Prior approval not required	10/01/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=Q10ALHQB0KP00				TDC_plan93
Tendering District Coucnil	N/A	Elmstead Market	19/00808/FUL	Full	Residential	Friendly Homes Ltd	Land adjacent Finch Lane Bromley Road Elmstead Essex CO7 7BX	0.1ha	Erection of detached dwelling with garage	1	Application Approved	30/05/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PSD76WQB0EL00				TDC_plan94

Tendering District Council	N/A	Elmstead Market	20/00281/FUL	Full	Agricultural	Allen's farm partnership	Allens Farm Tye Road Elmstead Colchester Essex CO7 7BB	0.5ha	Proposed bulk onion store		Application Pending	30/03/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=Q6F0R1QB0KP00				TDC_plan95
Tendering District Council	N/A	Elmstead Market	20/00425/LBC	Listed Building Consent	Leisure	Decorative events	Elmstead Lodge Farm Bromley Road Elmstead Colchester Essex CO7 7BZ		Proposed alterations and conversion Grade II listed barn - change of use to Use Class D2 Assembly and Leisure (wedding venue and other community uses) and associated physical alterations		Application Pending	23/03/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=Q8065RQB0KP00		607030	225017	TDC_plan96
Tendering District Council	N/A	Elmstead Market	18/01884/FUL	Full	Residential	Newell Homes	Land to The West of Church Road Elmstead Essex CO7 7AW	3.24ha	Erection of 41 no. residential dwellings, open space, allotments, parking, access and landscaping. | Land to The West of Church Road Elmstead Essex CO7 7AW	41	Application Approved	28/05/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=PI32WQQB0EL00		606306	224802	TDC_plan97
Tendering District Council	N/A	Ardleigh CP	20/00158/OUT	Outline	Residential		Land to South West of Ardleigh Bowls Club Colchester Road Ardleigh Essex CO7 7PQ	0.29ha	Proposed erection of 3 No. Self Build single storey dwellings, ancillary outbuildings and change of use of land (considering access)	3	Application refused	13/05/2020		https://idox.tendringdc.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=Q59YXCQB0KP00				TDC_plan98
Colchester Borough Council	Wivenhoe	N/A	192090	Full	Residential	The Univeristy of Essex and Uliving	Western Knowledge Gateway Site; Land Adj Capon &, Annan Road, Colchester Colchester CO4 3ZH	2.6ha	The construction of five buildings to provide 1204 new student bedrooms arranged as cluster flats and 58 studios, with social and administrative facilities, associated hard and soft landscaping, cycleparking, bin stores and vehicle access and turning		Application approved	15/05/2020		https://www.colchester.gov.uk/planning-app-details/?id=e2fc087d-84be-e911-a976-000d3ab42b3b#ValidationSummaryEntityFormView		602927	223898	CDC_plan36

Minerals and Waste Essex County Council

Local Planning Authority	Development Plan Document	Allocation Policy Reference	Allocation Type	Description (site location and brief description)	No. dwellings/site area/floorspace	Adoption Date	Site Name	Easting	Northing	Site location plan	Comments
Tendring District Coucnil	Tendring Local Plan 2007	Policy RA1 - Martells Pit	Employment	On land allocated for employment use at Martells Pit, no new premises will be occupied until the internal road system has been extended satisfactorily in highway terms, to cope with the new development		2007	Martells Pit				Proposals Map
Tendring District Coucnil	Tendring Local Plan 2007	Policy ER2 - Principle Businesses and Industrial Areas	Employment	Proposals for employment development will be directed towards the principal business and industrial areas and allocated sites set out in Policies QL5 (b) and ER1. Within these areas, Class B1 (a) uses will not be permitted.		2007					Proposals Map
Tendring District Coucnil	Tendring Local Plan 2007	Policy EN1	Environment	Protected Lanes		2007					Proposals Map
Colchester Borough Coucnil	Colchester Site Allocations DPD 2010	University Research Park (The knowledge gateway)	Employment	Development expected to support development of the University of Essex as a key centre for Research and Development. Future uses to be closely connected with the University and to provide some Business Incubation Units.	11.80 ha	2010					
Colchester Borough Coucnil	Colchester Site Allocations DPD 2010	Policy SA H1 Housing Allocations	Housing			2010	Former Cedrics coach depot, The Avenue, Wivenhoe				Site is also mentioned in the Wivenhoe Neighbourhod Plan
Colchester Borough Coucnil	Colchester Core Strategy (Revised 2014)	Policy CE3 - Employment Zones	Employment	Employment Zones will accommodate business developments that are not suited to Mixed Use Centres, including industry and warehousing (see Table CE1b). Strategic Employment Zones (SEZ) are identified at North Colchester, Stanway and the University of Essex, which provide ample capacity to accommodate projected business growth during the plan period. The Borough Council will seek to focus business development at these Strategic Employment Zones, and will improve the supporting transport infrastructure. The Council will seek to deliver approximately 45,100sqm (gross) of industry and warehousing floor space, primarily within the North Colchester and Stanway Strategic Employment Zones. The Council will also support the delivery of existing office commitments in all the Strategic Employment Zones, however further office development will be directed towards the Town Centre in accordance with the sequential approach set out in policy CE2a. The Council will encourage the provision of incubator units and grow-on space to support the development of small and medium enterprises. Local Employment Zones will be defined in the Site Allocations DPD based on existing and proposed concentrations of rural and local employment in order to support and promote rural enterprise and local employment. Retail developments will not normally be supported in Employment Zones, except for small scale developments that provide for the needs of the local workforce or are ancillary to an industrial use.		2014					Page 44 and 50 of Core Strategy
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 22	Employment	Development proposals for office and/or light industrial use (use class B1) on a two hectare site off Keelars Lane (as defined in Figure 30) will be supported.	2 ha	2019	Land off Keelars Lane				Page 77 of Wivenhoe Neighbourhood Plan
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 28	Housing	An area of 1.35 hectares lying behind Croquet Gardens shown in Figure 32 is allocated for a minimum of 25 residential dwellings and for a residential care home	1.35 ha 25 dwellings	2019	Land off Croquet Gardens				Figure 32, page 89 of Wivenhoe Neighbourhood Plan
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 29	Housing	Land behind Broadfields totalling 4.06 hectares is allocated for a minimum of 120 dwellings	4.06 ha 120 dwellings	2019	Land behind Broadfields				Figure 35, page 94 of Wivenhoe Neighbourhood Plam

Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 30	Housing	The land shown in Figure 36 totalling 0.93 hectares is allocated for a minimum of 25 dwellings subject to the following conditions: (i) each dwelling to be of a maximum of two bedrooms suited primarily for single people or as 'starter' homes for young couples; and (ii) 20% of these dwellings should be affordable housing or that percentage relevant under national or Borough policies at the time the planning application is submitted subject to viability; and (iii) land of a minimum of 1.5 hectares in size and as shown on Figure 37 for use as a proposed new cemetery and car park be gifted to Wivenhoe Town Council. Subject to viability, it is expected this site will be provided with car parking for 12 cars, be suitably fenced on all sides, incorporate a suitable footway through it and provide a cold water supply to a stand-pipe before it is gifted to the Town Council; and (iv) a hydrological or other necessary surveys demonstrate that ground conditions are suitable for the cemetery and will not have an unacceptable impact on local drainage; and (v) appropriate landscaping to be implemented on the north west boundary of the residential part of the site in order to ensure that development is well screened by trees and not easily visible to people travelling on Colchester Road; and (vi) it can be demonstrated that development will not have a detrimental impact on wildlife, as evidenced through an appropriate wildlife survey; and (vii) appropriate pedestrian and vehicle access into the residential part of the site from Elmstead Road is provided; and (viii) contributions towards open spaces, sports, recreational facilities and community facilities will be required in line with current policy at the time any application for planning permission is made.	0.93 ha	2019	Land at Elmstead Road				Figure 36, page 97 of Wivenhoe Neighbourhood Plam
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 31	Housing	The land behind the Fire Station shown in Figure 39 totalling 3.56 hectares of which 2.7 hectares is allocated for a minimum of 80 dwellings subject to the following conditions: (i) the gift of 0.15 hectare of land to build a minimum of 5 dwellings suitable for people aged over 60 in need of housing, currently or recently living or working in Wivenhoe or having close family connections to people living or working in Wivenhoe to a suitable housing charity; and (ii) a minimum of 20 dwellings suitable for occupation by older people including the frail elderly and active retirees and preferably built to the Lifetime Homes Standard should be provided; and (iii) a minimum of 15 dwellings of smaller units suitable for older people, single people or young couples should be provided; and (iv) the number of dwellings with four or more bedrooms should not exceed 15 and could also incorporate an office for home working or annexe to accommodate a relative; and (v) at least 50% of all dwellings should be constructed to the Lifetime Homes Standard; and (vi) 20% of dwellings should be affordable housing or that percentage relevant under national or Borough policies at the time the planning application is submitted subject to viability; and (vii) land for allotments is provided on a field of approximately 1.5 hectares close by Broomgrove Schools together with a suitable access. Subject to viability this site should be provided with a mains water supply; and (viii) contributions towards open spaces, sports, recreational facilities and community facilities will be required in line with current policy at the time any application for planning permission is made; and (ix) appropriate landscaping is provided on the northern boundary of the site in order to ensure that development is well screened; and Proposals to include some self-build plots will be supported. An additional 0.86 hectares of land, adjacent to the site allocated for housing, is proposed as a potential site for a care home. This area is as shown on Figure 40.	3.56 ha	2019	Land behind Fire Station, Colchester Road				Figure 38, page 100 of Wivenhoe Neighbourhood Plan
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 30	Housing	The land shown in Figure 36 totalling 0.93 hectares is allocated for a minimum of 25 dwellings subject to the following conditions: (i) each dwelling to be of a maximum of two bedrooms suited primarily for single people or as 'starter' homes for young couples; and (ii) 20% of these dwellings should be affordable housing or that percentage relevant under national or Borough policies at the time the planning application is submitted subject to viability; and (iii) land of a minimum of 1.5 hectares in size and as shown on Figure 37 for use as a proposed new cemetery and car park be gifted to Wivenhoe Town Council. Subject to viability, it is expected this site will be provided with car parking for 12 cars, be suitably fenced on all sides, incorporate a suitable footway through it and provide a cold water supply to a stand-pipe before it is gifted to the Town Council; and (iv) a hydrological or other necessary surveys demonstrate that ground conditions are suitable for the cemetery and will not have an unacceptable impact on local drainage; and (v) appropriate landscaping to be implemented on the north west boundary of the residential part of the site in order to ensure that development is well screened by trees and not easily visible to people travelling on Colchester Road; and (vi) it can be demonstrated that development will not have a detrimental impact on wildlife, as evidenced through an appropriate wildlife survey; and (vii) appropriate pedestrian and vehicle access into the residential part of the site from Elmstead Road is provided; and (viii) contributions towards open spaces, sports, recreational facilities and community facilities will be required in line with current policy at the time any application for planning permission is made.	1.5 ha	2019	Land at Elmstead Road				Figure 37, page 98 of Wivenhoe neighbouhood Plan
Essex County Council	Minerals local plan	A20 Sunnymead, Alresford	Minerals	Extension to existing Wivenhoe quarry	65 ha		Sunneymead, Alresford				Appendix 1 of Local Plan
Essex County Council	Minerals local plan	B1 Slough Farm	Minerals	Extension to existing Martells Quarry	11.66 ha		Slough Farm				Appendix 1 of Local Plan
Essex County Council	Minerals local plan	Wivenhoe Quarry Coated Stone Plant	Minerals	Safeguarded subject to planning permission (ref: ESS/42/12/TEN). Safeguarded status will be withdrawn on expiry of the permission on 31 December 2015 unless a new application is granted for continuation of the temporary activity.	2.1 ha		Wivenhoe Quarry				Appendix 4 of Local Plan

Local Plan Allocations - Adopted

Local Planning Authority	Development Plan Document	Allocation Policy Reference	Allocation Type	Description (site location and brief description)	No. dwellings/site area/floorspace	Adoption Date	Site Name	Easting	Northing	Site location plan	Comments
Tendring District Coucnil	Tendring Local Plan 2007	Policy RA1 - Martells Pit	Employment	On land allocated for employment use at Martells Pit, no new premises will be occupied until the internal road system has been extended satisfactorily in highway terms, to cope with the new development		2007	Martells Pit				Proposals Map
Tendring District Coucnil	Tendring Local Plan 2007	Policy ER2 - Principle Businesses and Industrial Areas	Employment	Proposals for employment development will be directed towards the principal business and industrial areas and allocated sites set out in Policies QL5 (b) and ER1. Within these areas, Class B1 (a) uses will not be permitted.		2007					Proposals Map
Tendring District Coucnil	Tendring Local Plan 2007	Policy EN1	Environment	Protected Lanes		2007					Proposals Map
Colchester Borough Coucnil	Colchester Site Allocations DPD 2010	University Research Park (The knowledge gateway)	Employment	Development expected to support development of the University of Essex as a key centre for Research and Development. Future uses to be closely connected with the University and to provide some Business Incubation Units.	11.80 ha	2010					
Colchester Borough Coucnil	Colchester Site Allocations DPD 2010	Policy SA H1 Housing Allocations	Housing			2010	Former Cedrics coach depot, The Avenue, Wivenhoe				Site is also mentioned in the Wivenhoe Neighbourhod Plan
Colchester Borough Coucnil	Colchester Core Strategy (Revised 2014)	Policy CE3 - Employment Zones	Employment	Employment Zones will accommodate business developments that are not suited to Mixed Use Centres, including industry and warehousing (see Table CE1b). Strategic Employment Zones (SEZ) are identified at North Colchester, Stanway and the University of Essex, which provide ample capacity to accommodate projected business growth during the plan period. The Borough Council will seek to focus business development at these Strategic Employment Zones, and will improve the supporting transport infrastructure. The Council will seek to deliver approximately 45,100sqm (gross) of industry and warehousing floor space, primarily within the North Colchester and Stanway Strategic Employment Zones. The Council will also support the delivery of existing office commitments in all the Strategic Employment Zones, however further office development will be directed towards the Town Centre in accordance with the sequential approach set out in policy CE2a. The Council will encourage the provision of incubator units and grow-on space to support the development of small and medium enterprises. Local Employment Zones will be defined in the Site Allocations DPD based on existing and proposed concentrations of rural and local employment in order to support and promote rural enterprise and local employment. Retail developments will not normally be supported in Employment Zones, except for small scale developments that provide for the needs of the local workforce or are ancillary to an industrial use.		2014					Page 44 and 50 of Core Strategy
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 22	Employment	Development proposals for office and/or light industrial use (use class B1) on a two hectare site off Keelars Lane (as defined in Figure 30) will be supported.	2 ha	2019	Land off Keelars Lane				Page 77 of Wivenhoe Neighbourhood Plan
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 28	Housing	An area of 1.35 hectares lying behind Croquet Gardens shown in Figure 32 is allocated for a minimum of 25 residential dwellings and for a residential care home	1.35 ha 25 dwellings	2019	Land off Croquet Gardens				Figure 32, page 89 of Wivenhoe Neighbourhood Plan
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 29	Housing	Land behind Broadfields totalling 4.06 hectares is allocated for a minimum of 120 dwellings	4.06 ha 120 dwellings	2019	Land behind Broadfields				Figure 35, page 94 of Wivenhoe Neighbourhood Plam

Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 30	Housing	The land shown in Figure 36 totalling 0.93 hectares is allocated for a minimum of 25 dwellings subject to the following conditions: (i) each dwelling to be of a maximum of two bedrooms suited primarily for single people or as 'starter' homes for young couples; and (ii) 20% of these dwellings should be affordable housing or that percentage relevant under national or Borough policies at the time the planning application is submitted subject to viability; and (iii) land of a minimum of 1.5 hectares in size and as shown on Figure 37 for use as a proposed new cemetery and car park be gifted to Wivenhoe Town Council. Subject to viability, it is expected this site will be provided with car parking for 12 cars, be suitably fenced on all sides, incorporate a suitable footway through it and provide a cold water supply to a stand-pipe before it is gifted to the Town Council; and (iv) a hydrological or other necessary surveys demonstrate that ground conditions are suitable for the cemetery and will not have an unacceptable impact on local drainage; and (v) appropriate landscaping to be implemented on the north west boundary of the residential part of the site in order to ensure that development is well screened by trees and not easily visible to people travelling on Colchester Road; and (vi) it can be demonstrated that development will not have a detrimental impact on wildlife, as evidenced through an appropriate wildlife survey; and (vii) appropriate pedestrian and vehicle access into the residential part of the site from Elmstead Road is provided; and (viii) contributions towards open spaces, sports, recreational facilities and community facilities will be required in line with current policy at the time any application for planning permission is made.	0.93 ha	2019	Land at Elmstead Road				Figure 36, page 97 of Wivenhoe Neighbourhood Plam
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 31	Housing	The land behind the Fire Station shown in Figure 39 totalling 3.56 hectares of which 2.7 hectares is allocated for a minimum of 80 dwellings subject to the following conditions: (i) the gift of 0.15 hectare of land to build a minimum of 5 dwellings suitable for people aged over 60 in need of housing, currently or recently living or working in Wivenhoe or having close family connections to people living or working in Wivenhoe to a suitable housing charity; and (ii) a minimum of 20 dwellings suitable for occupation by older people including the frail elderly and active retirees and preferably built to the Lifetime Homes Standard should be provided; and (iii) a minimum of 15 dwellings of smaller units suitable for older people, single people or young couples should be provided; and (iv) the number of dwellings with four or more bedrooms should not exceed 15 and could also incorporate an office for home working or annexe to accommodate a relative; and (v) at least 50% of all dwellings should be constructed to the Lifetime Homes Standard; and (vi) 20% of dwellings should be affordable housing or that percentage relevant under national or Borough policies at the time the planning application is submitted subject to viability; and (vii) land for allotments is provided on a field of approximately 1.5 hectares close by Broomgrove Schools together with a suitable access. Subject to viability this site should be provided with a mains water supply; and (viii) contributions towards open spaces, sports, recreational facilities and community facilities will be required in line with current policy at the time any application for planning permission is made; and (ix) appropriate landscaping is provided on the northern boundary of the site in order to ensure that development is well screened; and Proposals to include some self-build plots will be supported. An additional 0.86 hectares of land, adjacent to the site allocated for housing, is proposed as a potential site for a care home. This area is as shown on Figure 40.	3.56 ha	2019	Land behind Fire Station, Colchester Road				Figure 38, page 100 of Wivenhoe Neighbourhood Plan
Colchester Borough Coucnil	Wivenhoe Neighbourhood Plan 2019 - 2033	Policy WIV 30	Housing	The land shown in Figure 36 totalling 0.93 hectares is allocated for a minimum of 25 dwellings subject to the following conditions: (i) each dwelling to be of a maximum of two bedrooms suited primarily for single people or as 'starter' homes for young couples; and (ii) 20% of these dwellings should be affordable housing or that percentage relevant under national or Borough policies at the time the planning application is submitted subject to viability; and (iii) land of a minimum of 1.5 hectares in size and as shown on Figure 37 for use as a proposed new cemetery and car park be gifted to Wivenhoe Town Council. Subject to viability, it is expected this site will be provided with car parking for 12 cars, be suitably fenced on all sides, incorporate a suitable footway through it and provide a cold water supply to a stand-pipe before it is gifted to the Town Council; and (iv) a hydrological or other necessary surveys demonstrate that ground conditions are suitable for the cemetery and will not have an unacceptable impact on local drainage; and (v) appropriate landscaping to be implemented on the north west boundary of the residential part of the site in order to ensure that development is well screened by trees and not easily visible to people travelling on Colchester Road; and (vi) it can be demonstrated that development will not have a detrimental impact on wildlife, as evidenced through an appropriate wildlife survey; and (vii) appropriate pedestrian and vehicle access into the residential part of the site from Elmstead Road is provided; and (viii) contributions towards open spaces, sports, recreational facilities and community facilities will be required in line with current policy at the time any application for planning permission is made.	1.5 ha	2019	Land at Elmstead Road				Figure 37, page 98 of Wivenhoe neighbouhood Plan
Essex County Council	Minerals local plan	A20 Sunnymead, Alresford	Minerals	Extension to existing Wivenhoe quarry	65 ha		Sunneymead, Alresford				Appendix 1 of Local Plan
Essex County Council	Minerals local plan	B1 Slough Farm	Minerals	Extension to existing Martells Quarry	11.66 ha		Slough Farm				Appendix 1 of Local Plan
Essex County Council	Minerals local plan	Wivenhoe Quarry Coated Stone Plant	Minerals	Safeguarded subject to planning permission (ref: ESS/42/12/TEN). Safeguarded status will be withdrawn on expiry of the permission on 31 December 2015 unless a new application is granted for continuation of the temporary activity.	2.1 ha		Wivenhoe Quarry				Appendix 4 of Local Plan

Local Plan Allocations - Emerging

Local Planning Authority	Development Plan Document	Allocation Policy Reference	Allocation Type	Description (site location and brief description)	No. dwellings/site area/floorspace	Adopted / Emerging	Adoption Date	Site Name	Easting	Northing	Site location plan	Comments
Tendring District Council	Tendring DC Publication Draft Local Plan October 2017	Policy PP 7 - Employment Allocations	Employment	Lanswood Park, Elmstead Market	1.2 ha	Emerging		Lanswood Park, Elmstead Market				Page 217 of the emerging local plan
Tendring District Council	Tendring DC Publication Draft Local Plan October 2017	Policy PP 7 - Employment Allocations	Employment	Tendring/Colchester Borders Garden Community	6 ha	Emerging		Tendring/Colchester Borders Garden Community				Proposals Map
Tendring District Council /Colchester Borough Council	Tendring DC Publication Draft Local Plan October 2017	Policy SP7/SP8	Housing	Tendring/Colchester Borders Garden Community	2,500 homes over plan period 7,000-9,000 homes overall total	Emerging		Tendring/Colchester Borders Garden Community				Proposals Map
Colchester Borough Council	Publication draft stage of the Colchester Borough Local Plan 2017-2033	Policy SG3	Employment	Knowledge Gateway	7ha	Emerging		Knowledge Gateway				Proposals Map
	Publication draft stage of the Colchester Borough Local Plan 2017-2033		Minerlas	Safeguarded area for sand and gravel		Emerging						Proposals Map
	Publication draft stage of the Colchester Borough Local Plan 2017-2033	Policy PPL 3	Environment	Protected Lane		Emerging						Proposals Map
Colchester Borough Council	Publication draft stage of the Colchester Borough Local Plan 2017-2033	Policy SG3	Employment	Tendring/Colchester Borders Garden Community	2.8 ha	Emerging		Tendring/Colchester Borders Garden Community				Page 76 of the emerging local plan
Colchester Borough Council	Publication draft stage of the Colchester Borough Local Plan 2017-2033	Policy EC1	Employment	Knowledge Gateway and Univeristy of Essex Strategic Economic Area		Emerging		Knowledge Gateway and Univeristy of Essex Strategic Economic Area				**Emering Policy Map - East Colchester** **Policies EC1-4** Knowledge Gateway - Blue horizontal Line Universty uses - Blue vertical line