



HATCH
REGENERIS

Lower Thames Crossing Economic Costs Study

Final Report

A Report by Hatch Regeneris
February 2020

Thurrock Council

Lower Thames Crossing Economic Costs Study

Final Report

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Glossary

AQMA	Air Quality Management Areas
COPD	Chronic Obstructive Pulmonary Disease
DCO	Development Consent Order
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
GVA	Gross Value Added
HGV	Heavy Goods Vehicle
HS2	High Speed Rail 2
IMD	Index of Multiple Deprivation
LSOA	Lower Super Output Area
LTC	Lower Thames Crossing
MHCLG	Ministry of Housing Communities and Local Government
NCR	National Cycle Route
NEET	A person not in employment, education or training
NPPF	National Planning Policy Framework
PEIR	Preliminary Environmental Information Report
PRoW	Public Rights of Way
RASA	Rest and Service Area
SME	Small and Medium-Sized Enterprises
SSSI	Site of Special Scientific Interest:
TAG	Transport Analysis Guidance (developed by the DfT)
WHO	World Health Organisation

1. Introduction

- 1.1 Hatch Regeneris has been commissioned by Thurrock Council to undertake an assessment of the local economic and social costs of the Lower Thames Crossing scheme (LTC Scheme hereafter).
- 1.2 The primary aim for the study is to identify the type and scale of potential economic, social and environmental costs upon the local community and area that can be expected as a result of the construction and operation of the LTC Scheme.

Overview of LTC Scheme

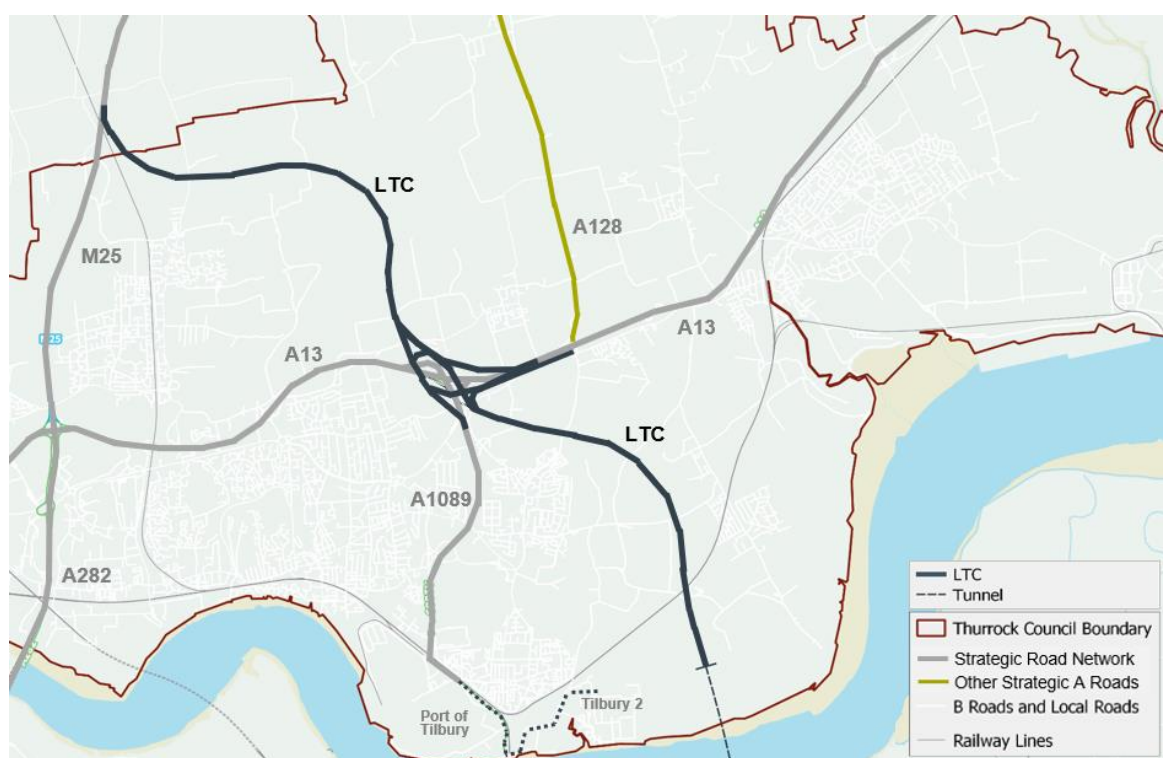
What is the LTC?

- 1.3 The proposed LTC Scheme is a nationally significant infrastructure project developed by Highways England. It consists of a tunnel crossing beneath the Thames to provide additional strategic capacity across the Thames Estuary.
- 1.4 The LTC will have:
 - approximately 23km of new roads connecting the tunnel to the existing road network
 - three lanes in both directions with a 70mph speed limit (with the exception of the southbound section from the M25 to the A13 that will be 2-lane only)
 - two 4km tunnels, one for southbound traffic, one for northbound traffic crossing beneath the river
 - a free-flow charging system
 - upgrades to existing roads (M25, A2 and A13) where the LTC meets them

LTC Configuration within Thurrock

- 1.5 Within Thurrock, whilst the alignment cuts directly across the area, the current proposals incorporate relatively limited interactions with the current road network.
- 1.6 The A13 junctions with the A1089 and A128 will be reconfigured to incorporate some additional movements to and from the LTC, but even these will be limited in scope, and will restrict some local traffic movements (discussed further in the sections below).
- 1.7 Figure 1.1 provides an overview of the general LTC Scheme alignment within the Thurrock area, including the configuration of the proposed junction with the A13.

Figure 1.1 LTC Alignment within Thurrock



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Thurrock's Position

- 1.8 Whilst it is recognised that the LTC Scheme may bring a range of strategic transport connectivity benefits to the South East of England and South Midlands, a range of limitations have been identified within the current configuration of the scheme that will negatively affect the Thurrock area.
- 1.9 As set out within their 2018 Statutory Consultation Response¹, Thurrock Council considers the current LTC Scheme does not meet several national and Highways England strategic policy tests and scheme objectives, including the delivery of economic growth and achieving sustainable local growth within the Thurrock area. Furthermore, the LTC Scheme is inconsistent with the housing and development potential for Thurrock and further engagement is required to assess the negative health and environmental impacts of the scheme, including noise, air quality and visual impact during both construction and operational phases.
- 1.10 From a direct transport perspective, the LTC provides limited additional connectivity for residents and businesses of Thurrock. The only means of accessing the LTC Scheme is through the reconfigured A13 junctions with the A1089 and A128, but even these will have constraints, e.g. restricting current access from the A128 to the A1089 southbound.
- 1.11 Throughout the construction phase there will be considerable disruption of local roads and Public Rights of Way across Thurrock. This will affect access to employment, education, health facilities and local services, as well as delay development opportunities.

¹ <https://democracy.thurrock.gov.uk/ieListDocuments.aspx?CId=134&MId=5512>

- 1.12 Once operational, the LTC Scheme will result in the permanent loss of property and valuable development land, as well as giving rise to on-going blight to surrounding properties and land.
- 1.13 All of these issues will impact upon the prosperity of residents and businesses within Thurrock, both in terms of direct financial impacts but also across a wide range of economic and social criteria.

Research Aims

- 1.14 The purpose of the research is to support on-going assessments by Thurrock Council of the cost impact of the LTC Scheme proposals upon the local area. This will feed into representations by the Council to Highways England, as part of the formal Development Consent Order (DCO) process, as well as inform wider engagement processes to raise awareness of the issues with local businesses and communities across Thurrock.
- 1.15 At this stage, the research has been restricted to assessing the LTC Scheme proposals as they have been presented by Highways England. It does not consider potential amendments to the scheme to improve the impacts upon Thurrock's economy, local communities, environment, or future growth potential.

Study Methodology

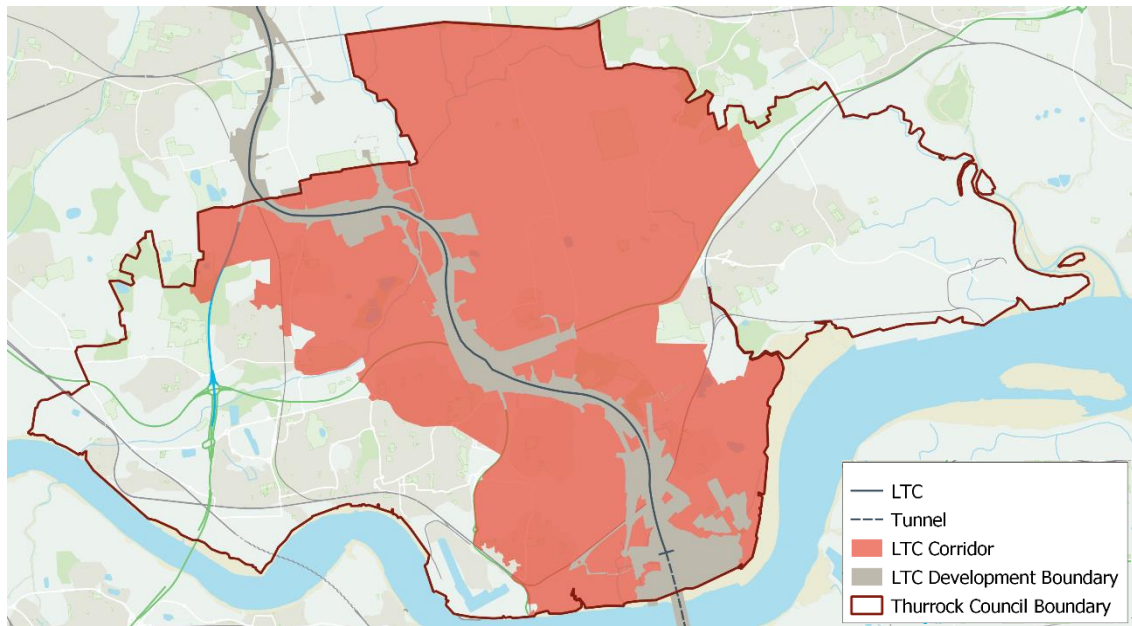
Overview

- 1.16 The study has adopted a range of quantitative and qualitative assessment methodologies, utilising a range of economic, societal, commercial and financial data. It has considered the potential economic, social and environmental costs to the Thurrock area arising from both the construction and operational phases of the LTC Scheme.
- 1.17 The construction phase has been assumed to commence in 2021, with a six-year duration. The operational phase would then commence from 2027.
- 1.18 As well as understanding the costs within the context of current economic and social activities across the borough, the assessment also focuses upon future year scenarios and how the LTC Scheme will impact over time and constrain growth potential.

Assessment Geographies

- 1.19 The economic, social and environmental characteristics of the Thurrock area, as well as the subsequent assessment of the costs of the LTC Scheme, have been considered at a range of different geographies. These have been systematically built upon from small-scale statistical geographies located directly around the proposed LTC Scheme and development area, through to borough-wide impact areas.
- 1.20 For the construction phase the geographies include:
- Within the proposed LTC Development Boundary (see Figure 1.2)
 - Within the defined LTC Corridor (see Figure 1.2): this is an area surrounding the LTC Scheme alignment made up of the smallest available statistical geographies for which economic and social data is presented (Lower Super Output Areas);
 - Within hamlets/settlements, villages, and urban areas served by local roads and Public Rights of Way that will be affected by the construction of LTC; and
 - The borough as a whole.

Figure 1.2 LTC Development Boundary and defined LTC Corridor

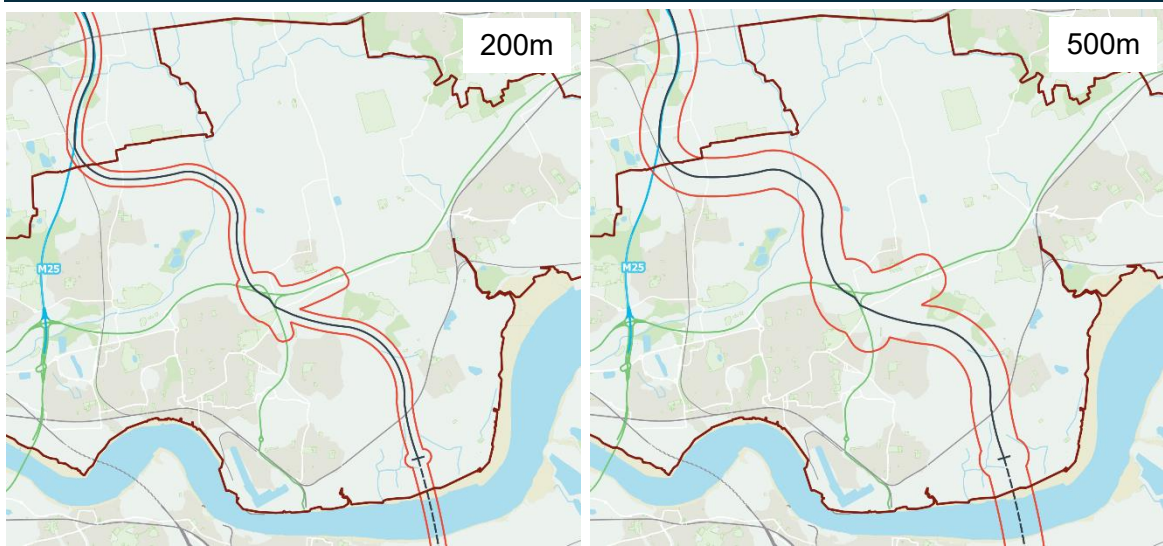


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1.21 For the operational phase the geographies include:

- Permanent land take for the LTC Scheme alignment (see Figure 1.1);
- 'Buffer zones' within 200m and 500m of the LTC alignment (see Figure 1.3);
- Within the defined LTC Corridor (see Figure 1.2); and
- The borough as a whole.

Figure 1.3 200m and 500m 'Buffer Zones' around LTC Alignment



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Methodological Approach

- 1.22 The key elements of the methodological approach are based around three phases of assessment process:
- 1) Gaining an understanding of current and projected future economic and social activity across Thurrock in a scenario without the delivery of the LTC Scheme. This includes:
 - Understanding current characteristics through reference to existing studies and available data sources
 - Forecasting future growth and development over time, through assessment of underlying trends and the Emerging Local Plan, and the definition of future year growth scenarios
 - 2) Demonstrating the direct impacts of LTC Scheme during the construction and operational phases of the scheme, utilising transport modelling outputs, in terms of:
 - Local connectivity impacts (access and journey times)
 - Physical impact (amount of land take, severance)
 - Environmental impacts (levels of emissions, blight, and effect on habitats)
 - 3) Translating these direct impacts into social and economic costs:
 - Applying HM Treasury Green Book, DfT TAG, MHCLG, DMRB guidance, as well as case study evidence, to robustly assess impacts;
 - Estimating the economic costs of increased travel times;
 - Forecasting the proportional loss in economic and social activity; and
 - Calculating environmental cost impacts.
- 1.23 This approach is considered to embody rigour throughout the assessment process, with a clear understanding of both the current and future context of Thurrock's economy and local communities; a demonstration of the direct impacts of the LTC Scheme; and then the application of robust government appraisal guidance techniques to quantify the economic, social and environmental costs.
- 1.24 Where feasible, the analysis seeks to quantify and monetise the identified costs, but for elements where there is an absence of robust mechanisms for doing so a qualitative assessment process is undertaken. In summarising overall potential impacts this applies a standardised assessment scale, outlined in Appendix D.

Study Limitations

- 1.25 It is recognised that there are a range of limitations with the extent to which the cost impacts of the LTC Scheme can be assessed at this stage. These limitations are based around two main aspects:
- 1) **Data availability from Highways England.** Whilst a range of information around the LTC Scheme has been made available, the level of detail is not always sufficient to accurately assess the likely direct and indirect cost impacts. Furthermore, there are a range of areas where further impact analysis is required from Highways England. Identified areas of data limitations include:

- GIS plans of the scheme alignment;
- Local traffic modelling outputs;
- Air quality assessment;
- Noise assessment;
- Flood risk assessment and mitigation;
- Health Impact Assessment; and
- Heritage impacts.

- 2) **Alternations to the LTC Scheme Plans.** We are aware that the LTC Scheme design and implementation plans continue to evolve. It was necessary to undertake this analysis upon a defined scheme, based upon the information available at a specific point in time.

On this basis, the assessment has been conducted based upon Thurrock Council's understanding of the proposed LTC Scheme at the end of October 2019. This definition of the LTC Scheme is set out in Chapter 2. It does not include some of the latest design changes released by highways England in January 2020.

- 1.26 It is also worth recognising that in conducting the assessment it has been necessary to assume that the baseline characteristics of Thurrock presented in Chapter 3 will remain largely unchanged. However, where it is possible to predict change, or to identify planned developments, these are considered as part of the assessment.

Research Phases

- 1.27 The core element of the research work has comprised three main phases of work, as follows:

- **Phase 1: Baseline Assessment:** To lay the basis for the assessment, the initial phase of the research involved the collation of existing information and evidence on the performance of the local economy, the characteristics of local communities and status of the environment across Thurrock. This included the forecast future social and economic evolution of the area and the potential for growth.
- **Phase 2: Assessment Framework:** The second phase of the research generated, and tested, the framework that captures the range of potential economic, social and environmental costs of the LTC Scheme within the Thurrock area. This has focused upon four key themes (described in detail in Chapter 5):
 - Business and Economy
 - Community
 - Environment
 - Growth
- **Phase 3: Cost Impact Assessment:** the final phase of the project then applied the assessment framework to quantify the magnitude of cost impacts of the LTC Scheme and set out the manner in which business and community activities will be affected.

- 1.28 The analytical processes adopted, and the subsequent outputs produced, are documented within this report, alongside an Executive Summary.

Report Structure

1.29 This report represents the main output from the study and sets out the findings from the research in the following sections:

- Section 2** **LTC Scheme:** provides a brief overview of the development of the LTC Scheme and defines the exact design iteration that has been applied within this study
- Section 3** **Area Context:** provides an overview of key economic and social characteristics of the study area
- Section 4** **Connectivity Impacts:** examines the direct impact of the LTC Scheme upon local transport provision and connectivity across Thurrock during both the construction and operational phases
- Section 5** **Impact Framework:** establishes the framework and approach for assessing the range of potential cost impacts of the LTC Scheme within the study area
- Section 6** **Business and Economy Impacts:** presents the analysis of potential cost impacts upon business operations and current and future economic performance
- Section 7** **Community Impacts:** presents the analysis of potential cost impacts upon the health, well-being and sustainability of local communities across the study area
- Section 8** **Environmental Impacts:** presents the analysis of potential cost impacts upon the local environment within the study area
- Section 9** **Growth Impact:** presents the analysis of potential cost impacts upon future growth potential within the study area
- Section 10** **Summary and Conclusions:** provides a summary of the key cost impacts and an overall conclusion on the extent of the cost impact of the LTC Scheme within study area

2. LTC Scheme

Scheme Development

Work undertaken by Highways England to date

- 2.1 Consideration of an additional strategic transport crossing of the River Thames has been a long-standing aspiration of the Department for Transport, with detailed work on-going since 2009. A preferred route was announced by the Secretary of State for Transport in 2017, identified as tunnel under the River Thames east of Grays. This was subject to statutory consultation in 2018.
- 2.2 Appendix A provides a summary of the overarching scheme development process and the evolution of the scheme specifications.

Defined Scheme and Assessment Assumptions

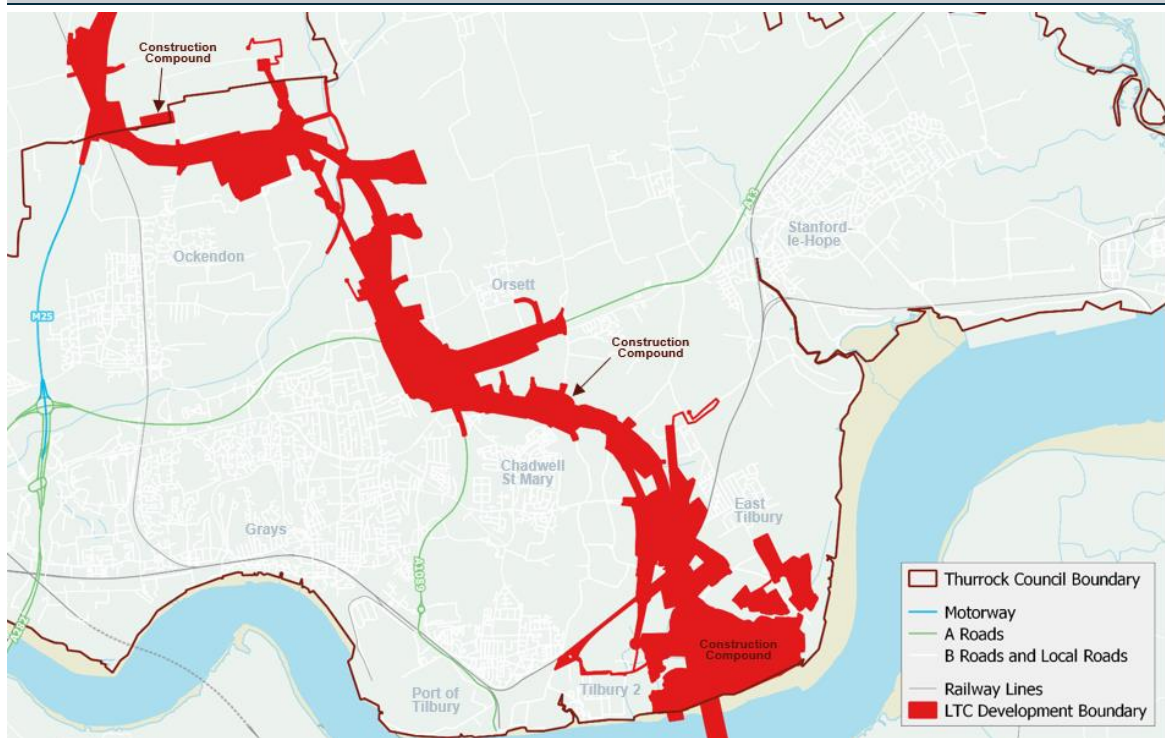
- 2.3 The analysis contained within this report is based upon Thurrock's understanding of the proposed LTC Scheme in Autumn 2019 and related to data made available by Highways England at that time. This specifically includes the following documents:
- The 2018 **Statutory Consultation Preliminary Environmental Information Report**² (PEIR), which provided some insights into the potential construction plans for the LTC, albeit these remain relatively high level at this stage
 - Lower Thames Crossing **Map Book 1: General Arrangements**, 2018, which provided detailed maps of the route and development boundary alignments
 - Lower Thames Crossing **Map Book 2: Land Use Plans**, 2018, maps on the permanent and temporary land take
 - Lower Thames Crossing: **Design, Construction and Operations** 2018, some high-level information on the development of the route, construction compounds, phasing etc
 - The Lower Thames Crossing **Project Update**, Summer 2019, high-level insights from the 2018 statutory consultation
- 2.4 The defined scheme elements that have formed the basis of the assessment of the construction and operational phases of the LTC Scheme are set out below.

Construction Plans

- 2.5 The LTC development boundary applied within the analysis is presented in Figure 2.1 and was provided by Highways England as part of the 2018 Statutory Consultation Process.
- 2.6 Whilst we are aware there have now been subsequent updates in January 2020, Highways England did not provide advanced copies to enable us to include it within the analysis.

² https://highwaysengland.citizenspace.com/ltc/consultation/supporting_documents/LTC%201%20PEIR%20Volume%20One.pdf

Figure 2.1 LTC Development Boundary (as applied within study analysis)



Source: Hatch Regeneris replication of Highways England boundary from the 2018 Statutory Consultation. Contains OS data © Crown copyright and database right 2019

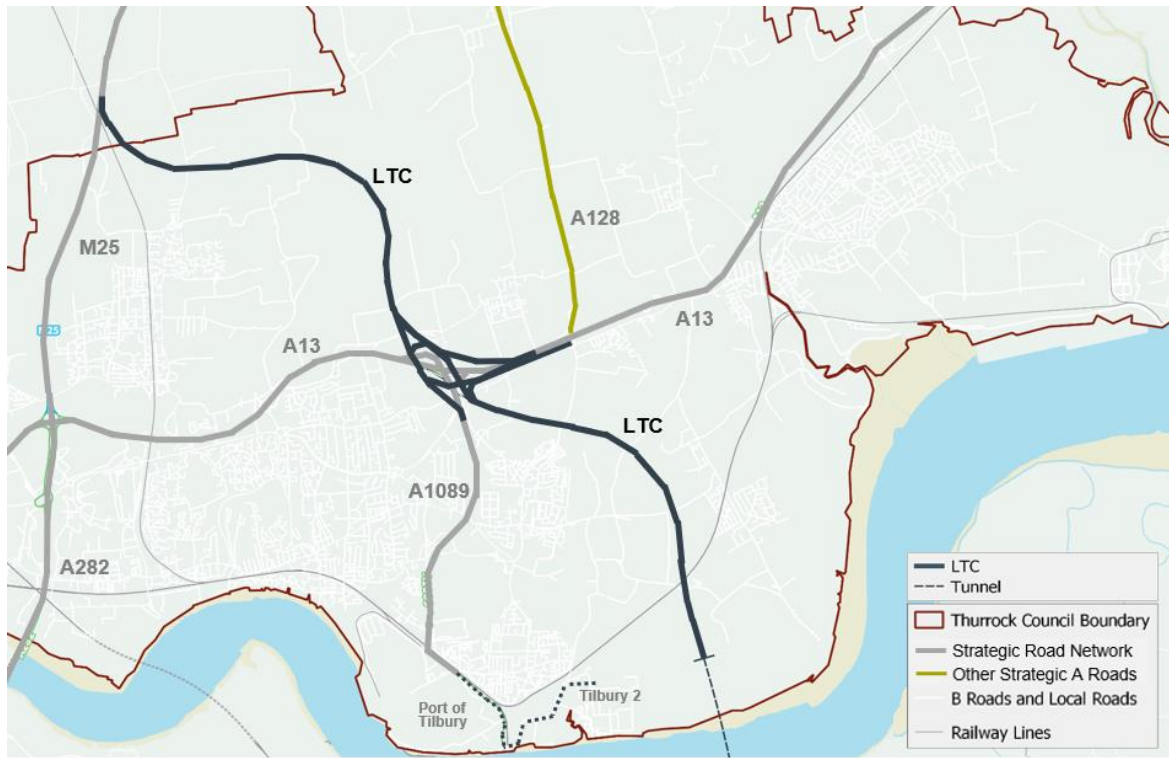
2.7 The following additional information forms the basis of the assessment of the construction phase:

- LTC Construction Phase will commence in 2021 and will be completed within a six-year period;
- There will be three construction compounds to the north of the River Thames. The main one will be located around the proposed tunnel portal location between Tilbury and East Tilbury. A second will be located off the Brentwood Road to the north east of Chadwell St Mary. The final compound is located just outside the Thurrock boundary to the north of Ockendon and in close proximity to where the LTC will join the M25 (*Source: PEIR*)
- There will be around 11,700 monthly HGV movements going to and from the three construction compounds. In addition, there are estimated to be around 1,900 construction workers located to the north of the River Thames, with around 800 of these working on the Tilbury construction compound. (*Source: PEIR*) The implications of additional traffic movements on local roads during the construction phase is examined within Section 4.
- A number of local roads within Thurrock, that currently cross the proposed LTC alignment, will be subject to disruption during the LTC construction phase. (*Source: PEIR*). The extent to which individual routes are impacted is explored within Chapter 4.
- All Public Rights of Way (PRoW) and tracks that currently cross the proposed LTC alignment will be closed during the LTC construction phase. (*Source: PEIR*) The routes affected are set out within Section 4.

Operational Configuration

- 2.8 Figure 2.2 presents the LTC scheme alignment that has formed the basis of this cost study assessment. It is based around the LTC scheme defined within Highway England's 2018 statutory consultation, with the exception that it excludes the Rest and Service Area, and associated junction, at East Tilbury that were proposed at that time.

Figure 2.2 LTC Alignment in Thurrock (as applied within study analysis)



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 2.9 The following additional information forms the basis of the assessment of the operational phase:
- The only direct interaction of the LTC Scheme with the Thurrock highway network will be at the reconfigured A13 junctions with the A1089 and the A128 (*Source: Highways England Route Plans*). The implications of this reconfiguration are examined in Section 4 but include restricted movements from the A128 to the A1089, as well as limitations in the way in which the LTC can be accessed.
 - All local roads affected during the construction phase will be reinstated via bridges or underpasses across the LTC Scheme, with some minor re-alignments. The exception will be Hornsby Lane, which will be closed to through traffic movements, but will retain access to local properties. Some other access arrangements to local properties will also be subject to minor alterations where local roads are required to change alignment to pass over the LTC scheme. (*Source: PEIR*).
 - The majority of PRow and tracks affected during the construction phase will be reinstated, via overbridges or underpasses, although a number of them will be subject to diversions (*Source: PEIR*). The implications of these changes are examined in Chapter 4.

Scheme Revisions

- 2.10 For the avoidance of doubt, the assessment does not include any subsequent revisions to the proposed LTC Scheme published in January 2020 as part of the Supplementary Consultation process.
- 2.11 This includes revisions to the proposed layout of the LTC junction with the A13; changes to the overall alignment; changes to the development boundary; and changes to the construction plans and number of construction compounds.

Scheme Variations

- 2.12 Thurrock Council has advocated for alternative access arrangements from the local Thurrock highway network to the LTC Scheme. This includes support for the Tilbury Docks Link Road, from a junction to the north of the proposed tunnel portal, as well as additional junctions around Chadwell St Mary and to the east of Ockendon to support potential future growth and development.
- 2.13 Whilst none of these proposals are included within current Highways England plans, there have been discussions between Thurrock Council and Highways England around including 'soft provision' within the design to enable junctions to be constructed at a future date.
- 2.14 For the purposes of the analysis included within this report, these potential scheme variations have not been included.

3. Study Area Context

Key Features of the Study Area

Current Transport Network in area of LTC

- Strategic Road Network focuses around M25 and A13, with A1089 spur providing access to Port of Tilbury. The A128 is also an important connector from Basildon.
- Around 16 local roads or tracks currently cross the proposed LTC alignment and provide connectivity between urban areas and local villages / hamlets.
- The bus network is focused around connections to and from Grays, with nine services crossing the area potentially affected by LTC, at five specific points.
- There is an extensive cycling and PRow network across the area with up to nine cycle routes and 20 PRow / tracks crossing the area potentially affected by LTC.

Business and Economy

- The local economy has been performing well and shown strong growth over last 5 years, but vacancy rates for industrial, office and retail remain higher than the South Essex average.
- Around 2,200 businesses (employing 12,500 workers) are located within the direct corridor around the LTC alignment.
- Across the wider Thurrock economy, the Transport and Logistics sectors are particularly specialist; however, there are aspirations to diversify and grow a number of 'opportunity sectors', including the creative industries and environment and energy sector.
- There have been investments from major organisations into Thurrock in recent years, including London Gateway DP World and the Tilbury2 port development. This recent investment has delivered a large number of jobs, although further investment could secure a higher proportion of skilled jobs in the area.

Community

- Around 57,300 residents are located within the direct corridor around the LTC alignment. Population growth has been higher than the South Essex average over the last 5 years.
- Thurrock has a slightly lower economic activity rate than the comparator areas and a higher unemployment rate. Thurrock residents are also overrepresented in lower skill level occupations, which reflects the nature of prominent industries in the area. The focus on diversification of the economy and growth in sectors such as the creative sector will provide residents with an opportunity to upskill and access new employment opportunities. Recent investment in skills and training will also support this.
- Household income and levels of deprivation vary significantly across the borough. However, a third of the Lower Super Output Areas within the direct corridor around the LTC are within the top 30% most deprived in the country.
- Some areas of Thurrock struggles with significant health and wellbeing challenges, including obesity and Chronic Obstructive Pulmonary Disease, health inequality, social isolation and inadequate service provision. The Council's Active Travel and Health and Wellbeing strategies are working to improve the situation and reduce inequality.

Environment

- The area is characterised by a mosaic of landscapes, including coastal marsh, low-lying fenland, farmland and more developed urban areas.
- There is one designated Site of Special Scientific Interest, including Hangman's Wood and the Mucking Flat Marshes as well as one Special Protection Area/Ramsar.
- There are 18 air quality management areas across Thurrock where air pollution levels are likely to fall short of national targets, although none are directly within the LTC Corridor
- Thurrock is home to 17 scheduled monuments, ranging from forts to crop marks. Seven are likely to fall within the 200m buffer of the LTC.
- There are seven Conservation Areas in Thurrock. Three of these are likely to fall within the 200m buffer of the LTC Corridor.
- Three Grade II Listed Buildings are proposed for total demolition.
- Data on open space from the Ordnance Survey shows there are a number of open space sites in Thurrock. Provision of open space is spread across the borough but tends to concentrate around built up areas and communities.
- Within the direct LTC construction development boundary, there is an allotment, Children's Play Area and areas of semi-natural green space. The LTC is also likely to pass through/nearby to cycle routes, Coalhouse Fort and golf courses.

Introduction

- 3.1 This chapter examines the current transport, economic, social, and environmental context of Thurrock and the areas directly around the proposed LTC alignment. It provides the baseline characteristics that have been used to analyse the potential impact of the LTC in Thurrock.
- 3.2 The analysis focuses upon the range of geographies set out in Chapter 1, with data presented at for small statistical areas within the LTC Corridor; as well as for key settlements, villages, towns and urban areas within Thurrock; and, finally, for the borough as a whole. Where relevant, comparisons are made with data available for South Essex and Essex.
- 3.3 To understand the characteristics of the LTC Corridor and borough as a whole, both social and economic datasets have been used focusing on the following themes:
 1. **Business** - jobs, sectors, business and enterprise.
 2. **Community** - population, health, deprivation, labour market conditions, housing access, prosperity
 3. **Environment** – air quality, wildlife sites, heritage sites, access to open space
 4. **Growth** – Thurrock's Emerging Local Plan and housing need assessments
- 3.4 In addition, current accessibility levels in Thurrock, by all modes of travel, have been assessed through analysis of the existing transport network. This has particularly focused upon connections that will either cross over the proposed LTC Alignment or will be affected by either the construction or operational phases of the scheme.
- 3.5 This data provides a baseline understanding of characteristics of Thurrock, both now and with future growth, in the absence of the LTC Scheme.

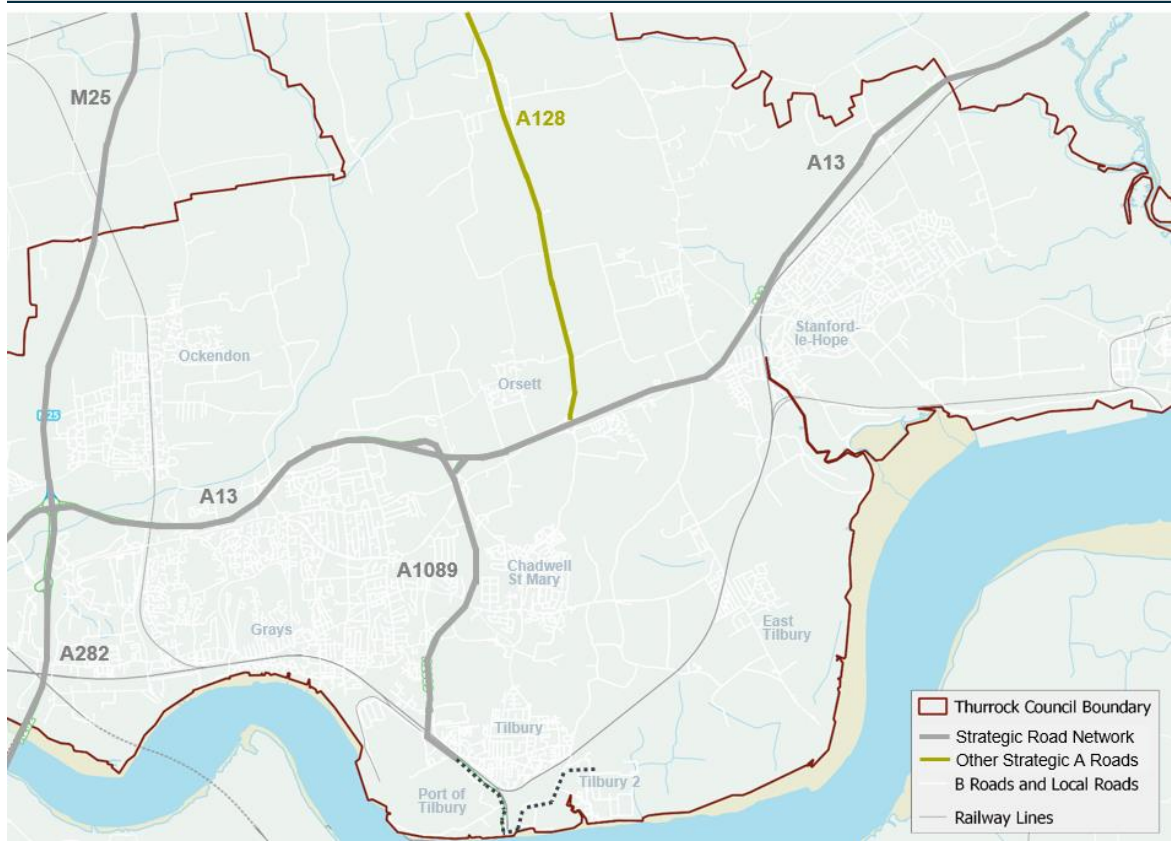
Current Transport Network

Highway Network

Strategic and Major Roads

- 3.6 The current Strategic Highway Network (managed by Highways England) across Thurrock comprises the M25, that leads into the A282 / Dartford Crossing, the A13 from the western borough boundary to the A1089, as well as the A1089 connecting to Tilbury, at the A1089 Asda roundabout and onward connection through to Port of Tilbury gate entrance and Tilbury2.
- 3.7 In addition, the A13 to the east of the A1089 represents part of the Major Road Network of the borough, along with the A128, which connects from the A13 up towards the A127 and Basildon.
- 3.8 The combined strategic and major road network is depicted in Figure 3.2 below.

Figure 3.1 Strategic and Major Road Network



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

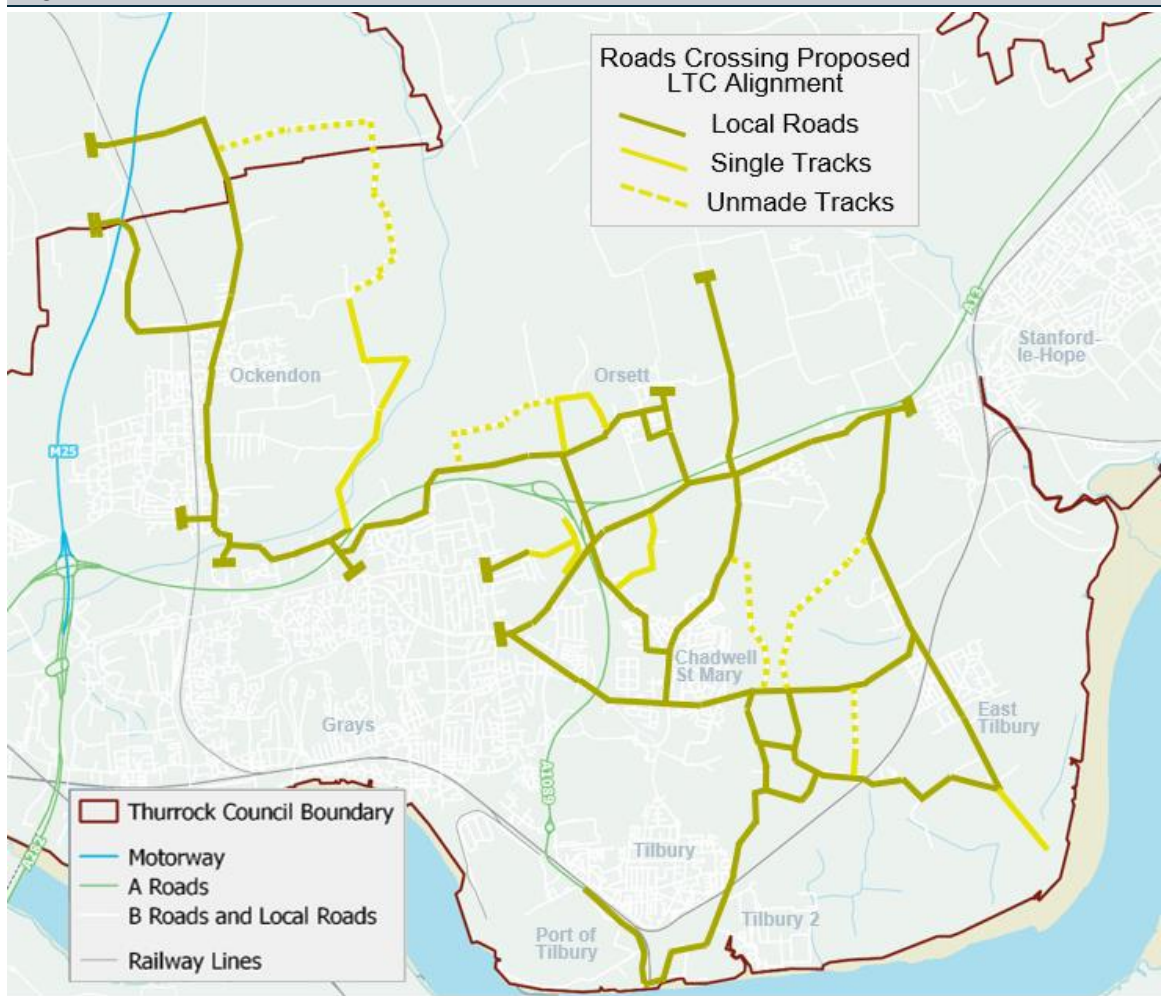
- 3.9 If constructed, the LTC Scheme will represent a significant additional element of strategic road network across the borough, partially connecting with the A13 and A1089 within the Thurrock, as well as the M25 to the northeast of the borough boundary.

Local Highway Network

- 3.10 There is an extensive network of local roads across Thurrock, providing connections to, from, and across local centres. Whilst many of them would not be directly impacted upon by the LTC Scheme, there are a number of roads that directly cross the proposed LTC alignment.

- 3.11 These consist of local connector roads, single track lanes, as well as some un-made tracks (nearly all of which are public rights of way), and they are highlighted in Figure 3.3.

Figure 3.2 Local Roads within the LTC Corridor



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 3.12 We have identified 16 local roads, or tracks, that will potentially be impacted by the LTC Scheme. These are described below (ordered from south of the borough to the north).

- **Coopers Shaw / Low Street Lane / Station Road**
A local east-west road link from West Tilbury across to East Tilbury (south), crossing the 'Tilbury Loop' rail via a level crossing to the east of Low Street. This route offers secondary access to East Tilbury over the rail level crossing to c. 2,100 homes.
- **Low Street Lane (partial track)**
A minor road providing access to properties from the southern end but no longer permitting through movements to the north for vehicular traffic.
- **Muckingford Road**
A key local east-west link between the centres of Chadwell St Mary to Linford / East Tilbury (north), connecting into East Tilbury Road to the north of East Tilbury Rail Station.
- **Hoford Road (track)**
An untarmacked lane from Muckingford Road to Buckingham Hill Road, providing access to Mill Farm and Clearserve Landfill and Recycling
- **High House Lane (track)**
An unmade lane from Muckingford Road to Brentwood Road, providing access to Mill Farm

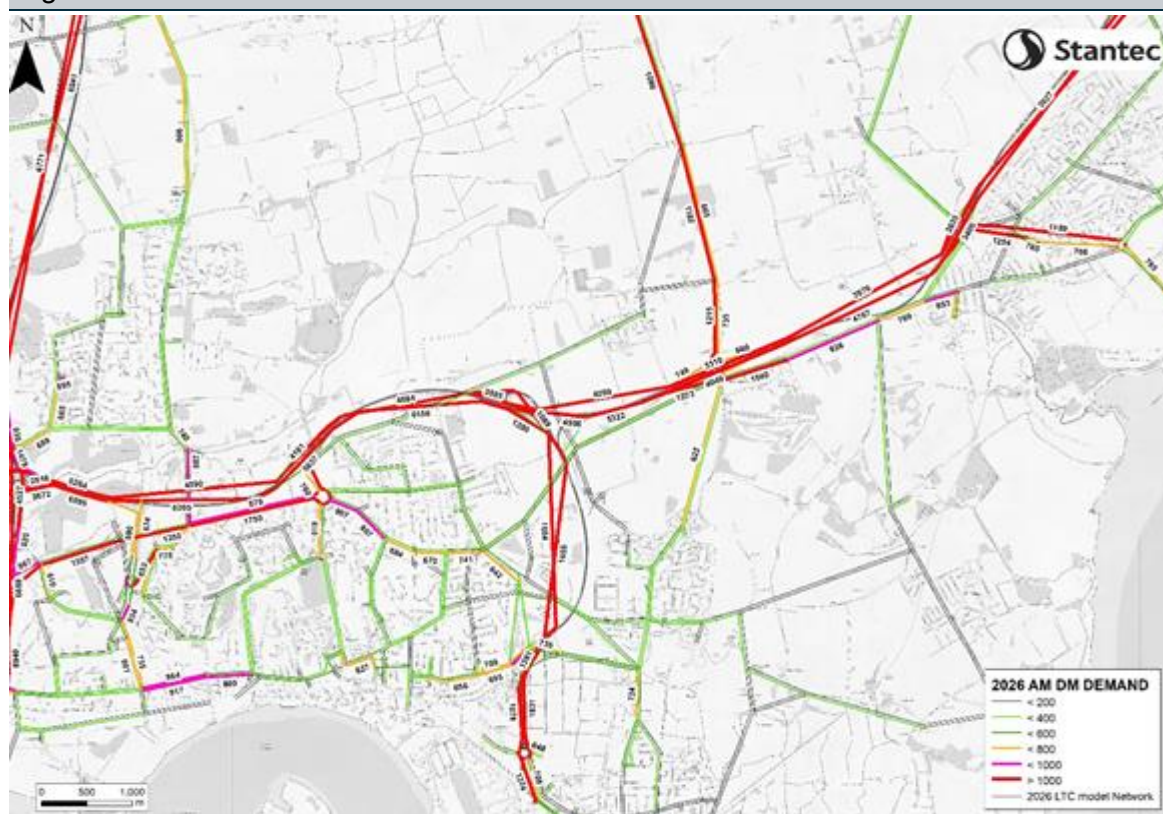
- **Brentwood Road**
A local north-south link from Chadwell St Mary to the A13 Orsett Cock roundabout, also providing access to A1013 Stanford Road and the A128 Brentwood Road. This is a vital north / south link running parallel to the A1089 from A13 to Tilbury.
- **Hornsby Lane**
Single track, tarmacked lane connecting Orsett Heath village up to Stanford Road (A1013) and providing access to Heath Place.
- **Stanford Road (A1013)**
A major local link (northeast-southwest) from A13/A128 Orsett Cock Junction, across the A1089 (but without interchange), and into Little Thurrock and on into Grays. This is a secondary east/west route parallel to the A13, linking Grays to Orsett Cock / A128.
- **Heath Road**
A local north-south link from A1013 Stanford Road down into Orsett Heath village
- **Baker Street**
A local north-south link from A1013 Stanford Road, under the A13 (with no interchange) and into Baker Street village.
- **Gammonfields Way**
A local access off the A1013 Stanford Road providing access to a traveller site
- **Long Lane (track)**
A single track, tarmacked lane connecting Gammonfields Way to Milford Road
- **Stifford Clays Road**
A local east-west link that originates from Stifford Clays and passes under the A13 (with no interchange) and turns east to head into Baker Street village.
- **Green Lane (track)**
An untarmacked east-west track from Stifford Clays Road to Fen Lane (Orsett Village)
- **Unknown (track)**
An untarmacked north-south lane from Veolia Landfill Access Road to Fen Lane (Fen Farm)
- **North Road (B186)**
A key local north-south link from A127 to South Ockendon Chafford Hundred and Lakeside Basin

- 3.13 These local routes are particularly important connectors to a number of the villages and hamlets around Thurrock, including East Tilbury, Linford, Low Street, West Tilbury, Orsett Heath, Baker Street, and Orsett. They also provide important links to the urban areas of Tilbury, Chadwell St Mary, Chafford Hundred and Ockendon.

Traffic Flows

- 3.14 High level traffic flow data on the current transport network is available via Highway England's Strategic Transport Model. The model replicates existing traffic flows across the strategic transport network and key local routes and enables forecast for future years, based upon predicted traffic growth and committed road schemes. It is known, however, not to include up-to-date data on freight movements, an important element of traffic across the Thurrock network.
- 3.15 Figure 3.4 provides an overview of the type of traffic flow data available.

Figure 3.3 2026 Forecast Traffic Flows – AM Peak Hour



Source: Stantec

- 3.16 The model provides key flow data along local routes potentially impacted by the LTC Scheme. Using data from the AM, Inter-peak, and PM peak models, we have estimated the flows on these key routes, and these are presented in Table 3.1.

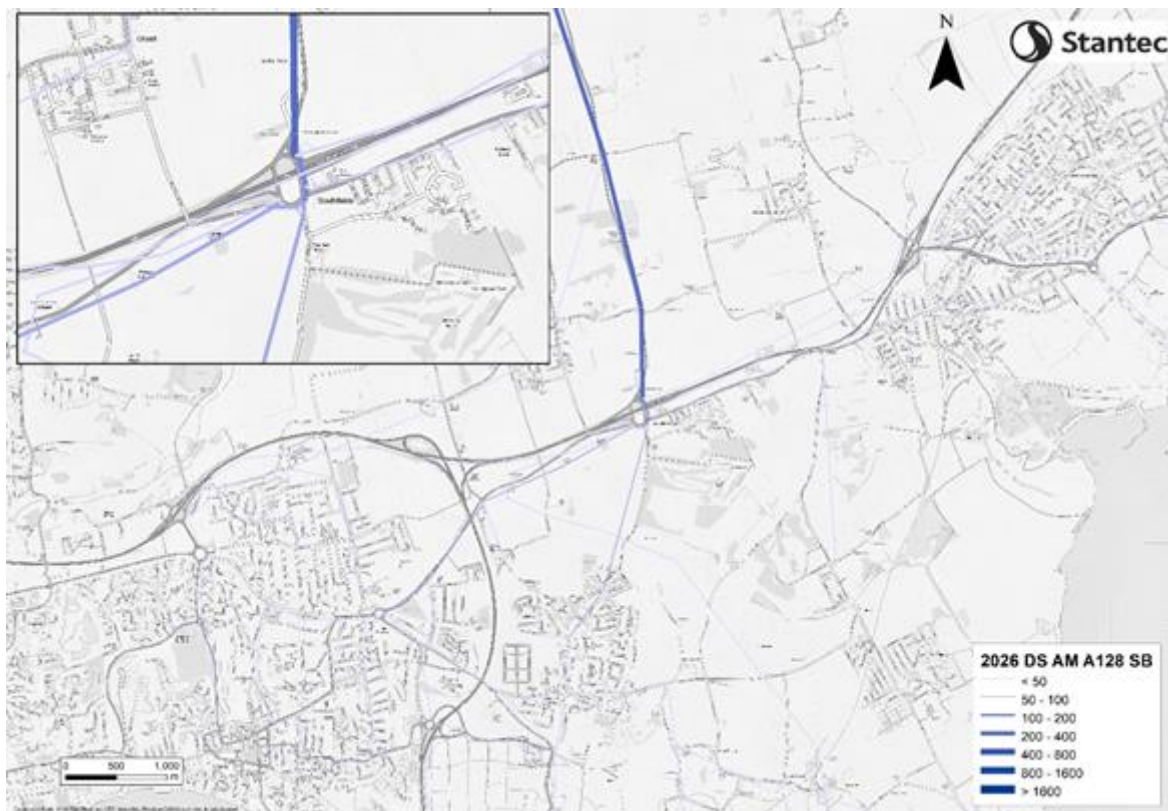
Table 3.1 Forecast Traffic Flows on key Local Routes

Route	Forecast 2026 Daily Traffic Flow
Station Road	3,350
Muckingford Road	750
Brentwood Road	9,600
Stanford Road	9,400
Baker Street	2,250
Heath Road	3,350
Stifford Clays Road	4,750
North Road	12,450

Source: Stantec

- 3.17 This indicates that many of the local routes have reasonably high levels of daily traffic flows and that any disruption to these routes would affect a considerable number of journeys and individuals.
- 3.18 Along with individual traffic flows on specific roads, the transport model is also able to determine flows along particular combinations of routes. Figure 3.5 provides outputs from the model showing the southbound flow of traffic from the A128 and what routes these vehicles continue on to.

Figure 3.4 Analysis of Southbound Traffic Flows along the A128



Source: Stantec

- 3.19 Given the proposed reconfiguration of the A13 junction, this is particularly useful information to understand the level of traffic that currently travels from the A128 to the A1089 – a movement that would be prevented under the current LTC proposals. The outputs from the transport model forecasts that around 1,100 vehicles will make this movement by 2026 and so would be directly affected by the reconfigured A13 junction.

Public Transport Network

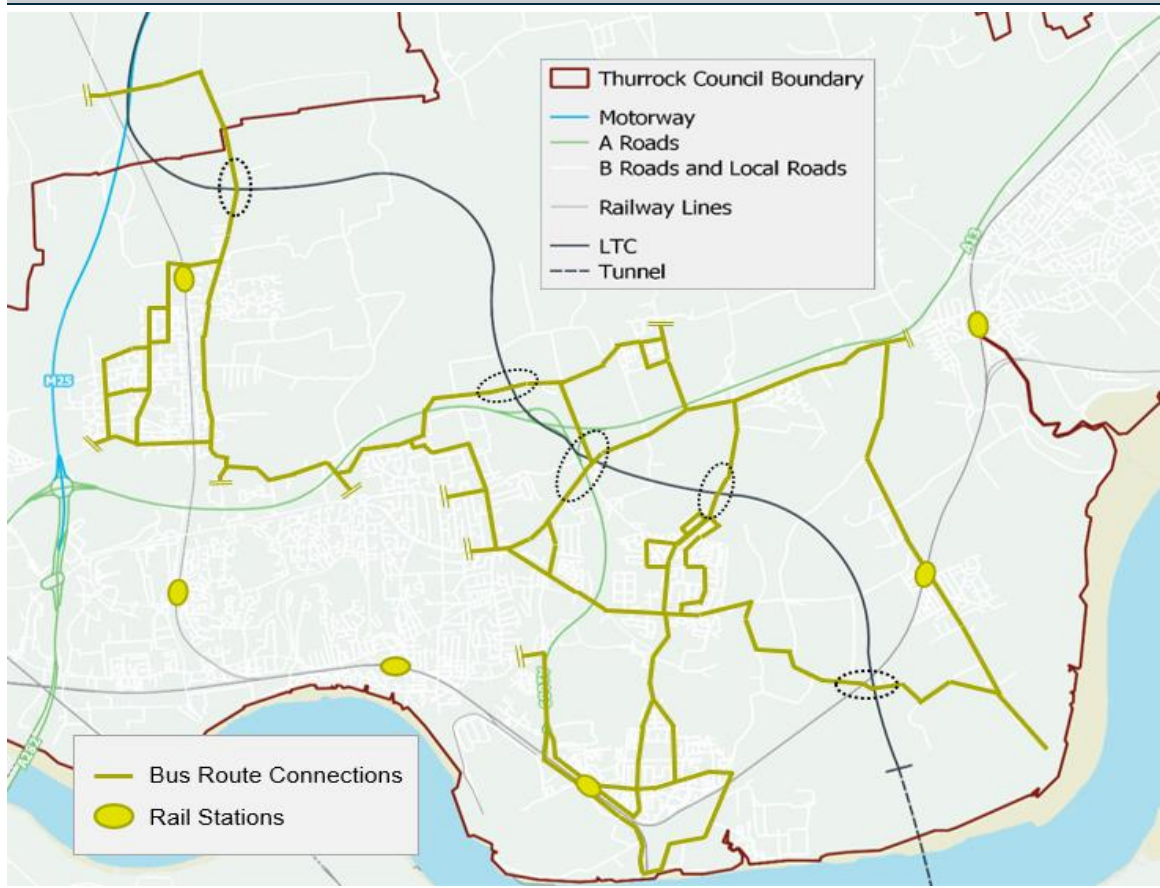
Local Rail Provision

- 3.20 Thurrock is served by two rail routes from Central London, one via Purfleet, and the other via Upminster, South Ockendon and Chafford Hundred. These provide connections to Grays Station, with the route then continuing east to Tilbury Town, East Tilbury and Stanford-le-Hope Stations. There are four peak hour train services from Stanford-le-Hope to Grays, reducing to a half hour service in the off-peak, which includes Saturdays and Sundays.
- 3.21 There are seven rail stations in Thurrock, with six within 5 kms of the proposed alignment of the LTC Scheme (see Figure 3.6). The LTC Scheme will cross over the rail line between Tilbury Town and East Tilbury Stations, to the east of Low Lane Village.

Local Bus Provision

- 3.22 Thurrock also has a network of bus provision, centred around services to and from Grays Town Centre and Lakeside. The routes that could be directly impacted by the proposed LTC Scheme are highlighted in Figure 3.6.

Figure 3.5 Public Transport Network in Thurrock potentially affected by LTC Scheme



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Nine bus routes run along five local highway routes that will be impacted upon by the LTC Scheme, including:

- Route 12:** running east from Grays, through Chadwell St Mary and the eastwards along Linford Road before turning down Turnpike Lane and Rectory Road to serve West Tilbury. It then proceeds along Church Road, Low Street Lane and Station Road, crossing the 'Tilbury Loop' rail line before joining Princess Margaret Road and serving Coalhouse Fort. It then travels back up Princess Margaret Road to serve East Tilbury, Stanford-le-Hope, and on to Basildon Town Centre.
- Route 11:** starting at either Purfleet Station or Aveley Usk Road, the service runs via Ockendon Station, Stifford Clays and Chadwell St Mary and the out along the Brentwood Road to Orsett Cock and then via Stanford Road and Rectory Road to Orsett Hospital. It then makes its way to Horndon-on-the-Hill and onto Basildon Town Centre.
- Route 100:** running north east from Grays along Southend Road the service then travels along the A1013 Stanford Road to Orsett Cock and on to Stanford-le-Hope and then Basildon Town Centre.
- Routes 200 and 201:** running east from Grays, out along the Chadwell Road and turning north along King Edward Drive, the service then travels along the A1013 Stanford Road and Baker Street to serve the village of Orsett and Baker Street. It then travels along Rectory Road back south to Orsett Cock and on to Stanford-le-Hope and then Basildon Town Centre. On Sundays only, the 201 service runs via Stifford Clays and along Stifford Clays Road across to Orsett.

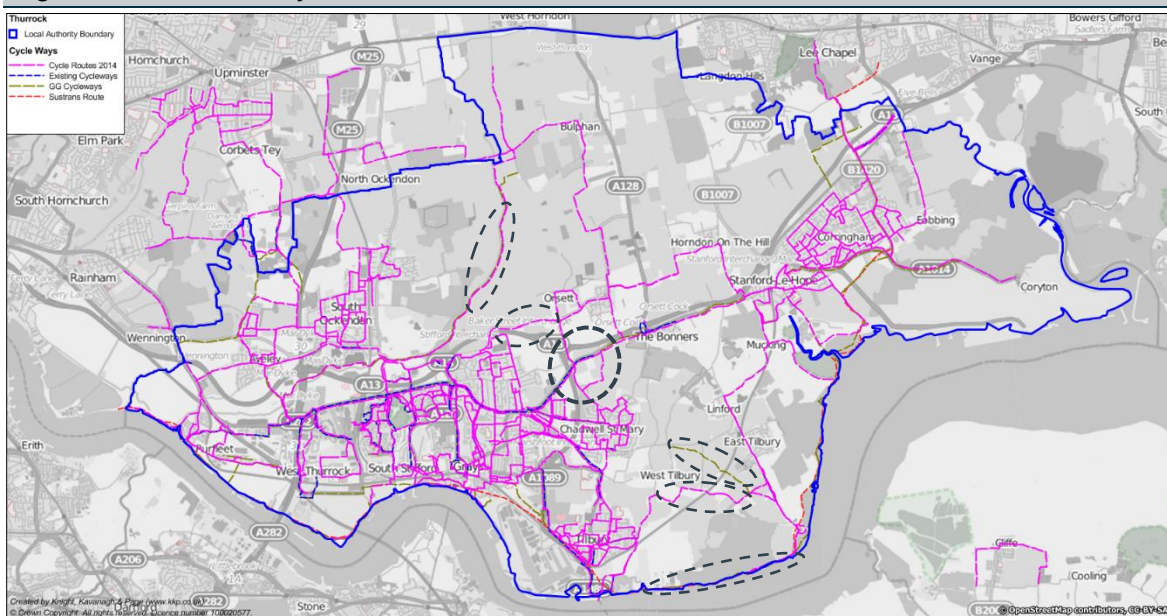
- **Route 265:** running north east from Grays along Southend Road the service then travels along the A1013 Stanford Road and then turns north up Baker Street to serve the Baker Street and Orsett, before continuing north to Bulphan and West Horndon.
- **Route 269:** running north from Grays via Stifford Clays, South Ockendon, and Ockendon Station, the service then runs north along the B186 North Road to North Ockendon and on to Brentwood Town Centre
- **Route 99:** running north from Lakeside along the eastern side of South Ockendon and then north along the B186 North Road to North Ockendon and on to Upminster
- **Route 347:** running north from Ockendon Station along the B186 North Road to North Ockendon and on to Upminster.

Active Travel Network

Cycling

- 3.23 There is a network of cycle routes of different classifications across Thurrock, as shown in Figure 3.7.

Figure 3.6 Thurrock Cycle Network



Source: Knight, Kavanagh & Page.

- 3.24 The National Cycle Network designates two routes within Thurrock.

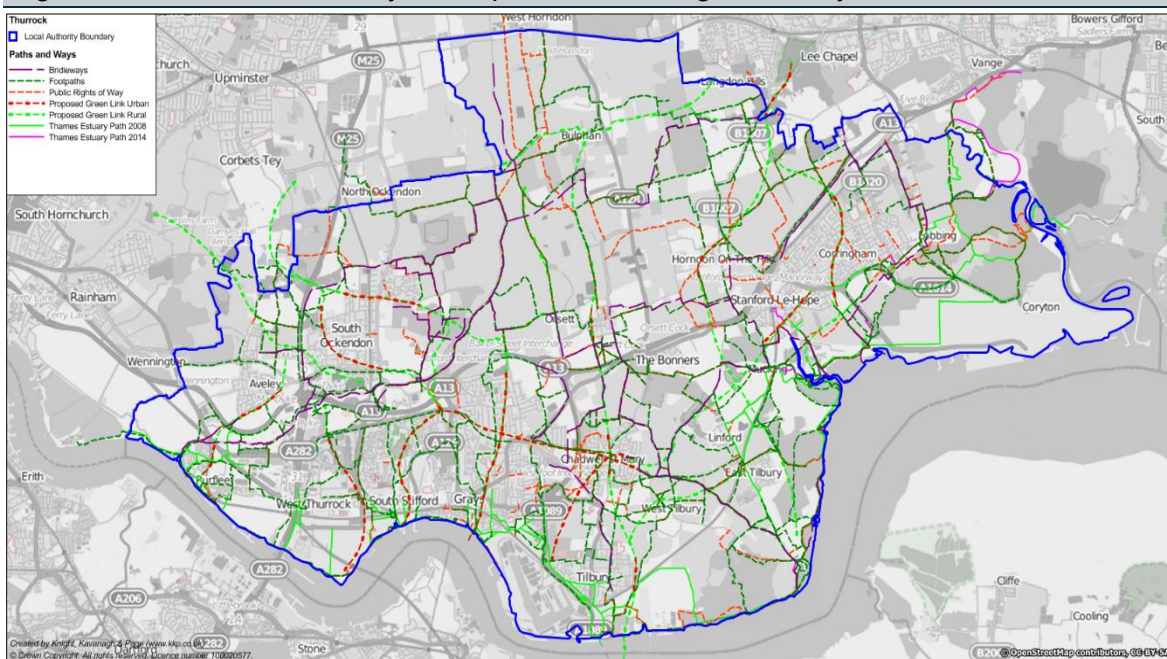
- Route 13 incorporates three separate sections across Thurrock. The first two elements follow the river, from east to the west side of Grays, and then from, effectively, Tilbury Town Rail Station all the way round to Coalhouse Fort. The gap between these sections relates to the location of the Port of Tilbury. The final section runs from the southwest of Stanford-le-Hope across the southern side of the town and then north to Basildon Town Centre.
- Route 137 spurs off Route 13 and runs from Purfleet under the A282, to the south of Mar Dyke Interchange, and follows the Mar Dyke River to North Stifford, crosses over the A13, and continues east across Chafford Hundred through to Little Thurrock. This route will not be directly impacted upon by the LTC Scheme, although cyclists may continue up the A1013 Stanford Road towards Baker Street, Orsett, or Southfields and would, therefore, be affected by the scheme.

- 3.25 The A1013 and A1306 provide a link between Route 137 and Stanford le Hope urban conurbation via an adjacent shared route.
- 3.26 Other designated cycle routes that cross the proposed LTC alignment include:
- Station Road (from Low Street to East Tilbury)
 - Coal Road - Bridleways 63 and 58 (leading from Chadwell St Mary to East Tilbury)
 - Hornsby Lane
 - Heath Road
 - Baker Street
 - Stifford Clays Road
 - Bridleway 219 (along the Mardyke Valley)
- 3.27 All of these routes will be impacted during the proposed LTC construction phase, with the bridleways closed for prolonged periods and many of the roads also subject to disruption and potential closures. This is examined further in Section 4.

Walking / PRowS

- 3.28 There is an extensive network of bridleways, footpaths and Public Rights of Way (PRow) across Thurrock, outlined in Figure 3.8.

Figure 3.7 Thurrock Bridleways, Footpaths, Public Rights of Way



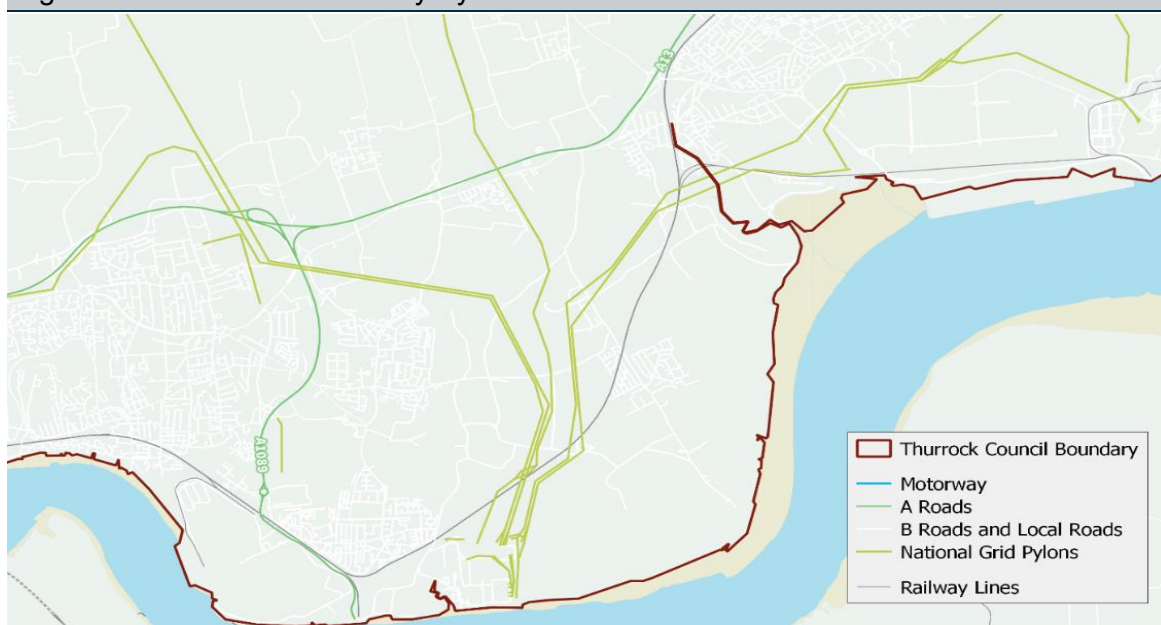
Source: Knight, Kavanagh & Page.

- 3.29 The LTC alignment will impact upon up to 20 routes, creating temporary severance during the construction phase and permanent diversions and blight once operational. This is examined further in Section 4.
- 3.30 FP14 is known locally as the Two Forts Way. It is also part of the Thames Estuary Path and is part of the proposed England Coastal Access route. This follows the Thames close to the proposed northern portal entrance. It is unclear at this time if the route would be directly affected during construction; it would however be subject to significant disturbance even if it were to remain open.

Electricity Pylons and Overhead Lines

- 3.31 Alongside the existing transport network across Thurrock, there is also an extensive corridor of electricity pylons that run from the site of the old power station at Tilbury, north towards the A13 before splitting along different routes. These pylons are in the same corridor as the LTC alignment and so add to the infrastructure that will impact upon the local environment. Figure 3.9 provides an overview of the corridor of pylons.

Figure 3.8 Network of Electricity Pylons across Thurrock



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Committed and Planned Transport Interventions

- 3.32 There is currently one committed transport scheme in development within the study area. Work is underway to widen the A13 from 2 to 3 lanes in both directions between the A128 (Orsett Cock roundabout) and the A1014 (The Manorway, Stanford-le-Hope).
- 3.33 When complete, the widened section will join with the existing 3-lane section of the A13, west of the A128, providing a continuous 3-lane road in both directions between the M25 and Stanford-le-Hope.
- 3.34 Feasibility work has also been undertaken to enhancements to the A1013 Treetops roundabout to the west of Gammon Fields.
- 3.35 Future capacity improvements are also likely to be required to the the A13/A1014 junctions, particularly in the context of the LTC scheme.



Business and Economy

- 3.36 There are currently estimated to be around 12,500 people employed in the LTC Corridor in 2,200 businesses. This means the Corridor is home to 18% of total employment in Thurrock and 34% of Thurrock's business base.
- 3.37 The Corridor's economy has been performing well and has experienced strong growth in recent years. Between 2013 and 2018 there was a 29% increase in employment, which is significantly higher than any of the comparator areas (see Figure 3.10). The business base has also grown very strongly (+43%), increasing the number of businesses by around 660.

Figure 3.9 Employment and Businesses

	Employment		Businesses	
	No. (2018)	% change 2013-18	No. (2019)	% change 2014-19
LTC Corridor	12,500	+29%	2,200	+43%
Thurrock	68,500	+13%	6,500	+42%
South Essex	303,000	+8%	32,500	+23%
Essex	611,000	+12%	65,500	+18%
England	26,841,500	+10%	2,360,800	+21%

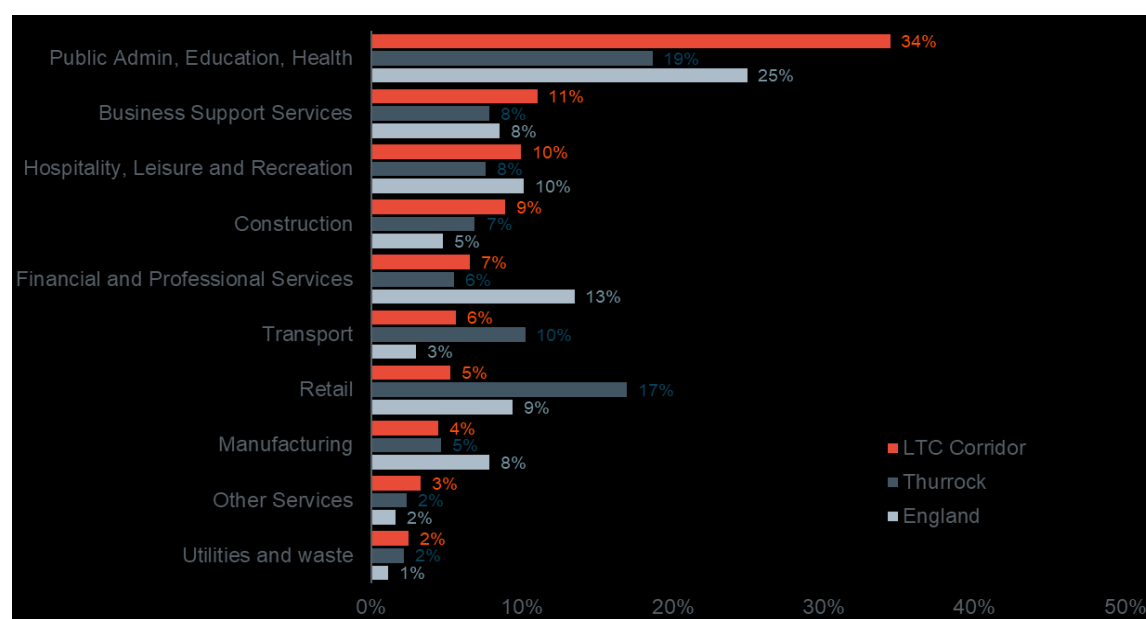
Source: BRES 2018, 2013; UK Business Count 2018, 2013

- 3.38 As highlighted in the 2015 Economic Profile of Thurrock, the strong economic links with London and transport connections to the south east of England are a key driver for this strong growth.

Sector Profile

- 3.39 As shown by Figure 3.11, employment in the Corridor is very heavily skewed towards public admin, education and health, with 34% of all jobs in the Corridor falling within these sectors compared to 19% across Thurrock's economy and 25% in England. This is likely to be a result of the presence of large public sector employers in the Corridor, including the only hospital in the borough - Orsett Hospital.
- 3.40 The reliance on sectors such as these, as well as business support services and hospitality, leisure and recreation, means the Corridor's economy is heavily service focused, with jobs tending to be lower value and often lower skilled as a result.

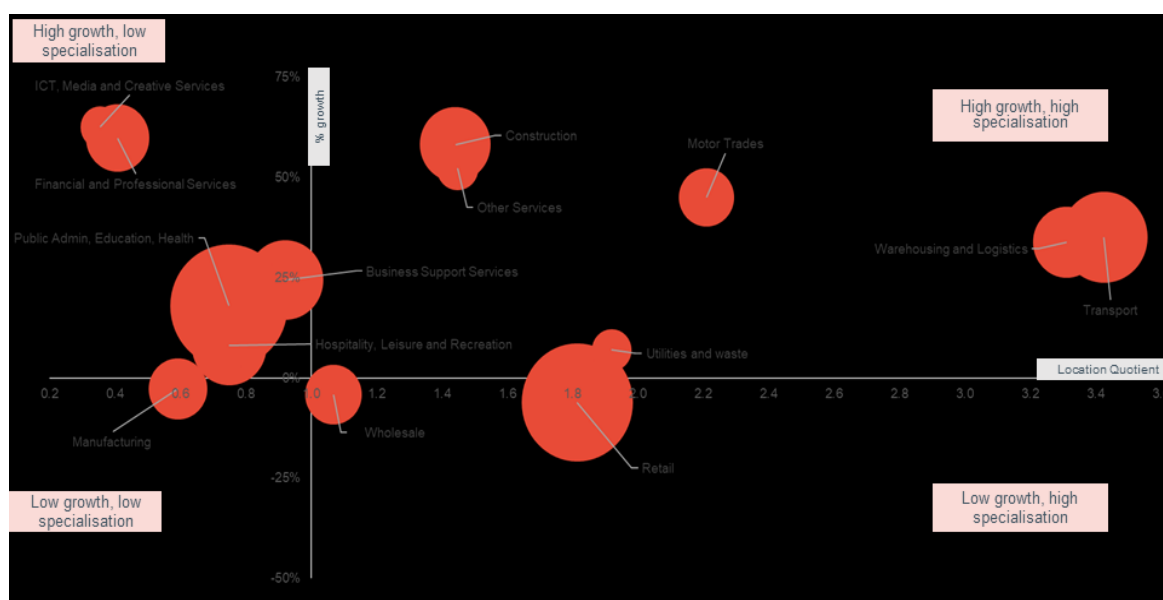
Figure 3.10 Top 10 Employment Sectors



Source: BRES 2018

- 3.41 Across the wider Thurrock economy, the Transport and Logistics sectors are prominent. Figure 3.12 shows there is a significant sector specialism in these sectors and that they've been growing in the last five years. This is likely to be due to the presence and growth of the Port of Tilbury and London Gateway ports.
- 3.42 However, given the nature of activities, these sectors tend to employ lower skilled workers and offer lower value jobs which are often lower paid and less secure.

Figure 3.11 Sector Size, Specialisation and Growth, Thurrock



Source: BRES 2018, 2012

- 3.43 Given the reliance of Thurrock's economy on a few key sectors, the aspiration for economic growth in Thurrock includes sector diversification and a growth in higher-value, knowledge

intensive employment. As a result, a number of sectors have been highlighted as 'opportunity sectors', including the creative industries, environment and energy sector and business services.

Enterprise and Investment

- 3.44 Whilst entrepreneurship is currently below the national average in Thurrock, there has been considerable growth in the business base in recent years. In particular, Thurrock has a strong SME base compared to some of the other of authorities in south Essex. As shown in Figure 3.13, employment in SME's accounted for just under half of total employment. This could be a result of the relatively large amount of venture capital investment into SME's in recent years.

Figure 3.12 Small Businesses and Enterprise						
	Thurrock	Basildon	Castle Point	Brentwood	Southend	Rochford
Number of SMEs	5,710	6,925	3,250	4,180	6,695	3,510
SME Employment	27,726 (around 43% of total employment)	38,032	13,128	19,097	31,505	16,075
Number of new businesses starting in 2016	1,528 (27% of total)	1,277 (18% of total)	567 (17% of total)	722 (17% of total)	1,316 (20% of total)	519 (15% of total)
5-year survival rate	42%	40%	41%	44%	38%	44%
Venture capital investment into SMEs	£2.5 million	-	-	£1.46 million	£0.95 million	-

Source: State of Small Business, Nesta 2016

- 3.45 In addition to SME investment, there have been a number of investments from major organisations into Thurrock in the last 1-2 years, alongside on-going expansion plans, including:
- New distribution centres including Amazon, UPS, Made.com, Lidl
 - High House and the National Opera House
 - Investment in Tilbury Port includes a CO2 terminal for Nippon gases and a new rail connected distribution terminal handling international steel distribution
 - Investment also confirmed for Tilbury2
 - Investment plans for LGDP World
- 3.46 However, these high-profile investments into Thurrock have predominantly focused on the logistics and port sectors which are already dominant in the area. As stated in the Thurrock Economic Growth Strategy, whilst this investment has delivered a high number of jobs, a significant share of these are low skill. If economic growth in Thurrock is going to fulfil the

aspiration for diversification and new types of employment, investment into the area will need to diversify.

- 3.47 Vacancy rates can give an indication of the economic performance of an area and attractiveness to investors. As shown in Figure 3.14, vacancy rates for Thurrock are slightly higher than the south Essex average, however the office vacancy rate is significantly higher at 5.5%.

Figure 3.13 Vacancy Rates for Thurrock and South Essex

	Thurrock	South Essex
Industrial	2.2%	2.0%
Office	5.5%	1.4%
Retail	2.3%	2.0%

Source: Co Star 2019

- 3.48 There is also significant local variation in town centre vacancy rates across the main town centres and retail areas in Thurrock. In particular, Tilbury and Stifford Clays have very high vacancy rates, suggesting challenges with the high street and retail sectors.

Figure 3.14 Vacancy Rates in Thurrock

Centre	% Town Centre Vacancy 2018
Grays Core	8.5
South Ockenden	10.6
Corringham	6.6
Stanford-le-Hope	10.0
Tilbury	18.3
East Tilbury	0.0
Chadwell St Mary	9.1
Little Thurrock	7.1
Stifford Clays	17.6
Chafford Hundred	0.0
Linford	0.0

Source: Thurrock Town Centre Health Check. Bold text indicates the vacancy rate is at or above the national average.

Key Local Businesses

Port of Tilbury

- 3.49 The Port of Tilbury is a key local business within Thurrock located to the west of the proposed LTC tunnel portal. It is a major employer within the area and serves markets across London and the South East, generating significant levels of transport movements to and from the site.
- 3.50 The port has multimodal transportation links by road, rail and barge. Three onsite railheads provide main line connections directly into London or on to the rest of the UK. The A1089, part of the Strategic Road Network, connects directly to the port and provides dual carriageway access to the A13 and on to the M25.

3.51 The port handles a varied set of cargoes spread across an estate in excess of 1,000 acres, with 5 million square feet of undercover warehousing and 20 acres of HGV parks. Some key services and metrics related to the port are as follows:

- An **annual throughput** of 16 million tonnes with an estimated to value around £8.7 billion
- A **key local employer**, offering substantial apprenticeship programmes and has an award-winning **Logistics Training Academy**
- The **London Container Terminal**, the fourth largest in the UK, has an annual throughput of 500,000 units and ships to 96 ports and 50 countries worldwide
- Hosts 16 **ro-ro freight services** per week from Europe, including two daily ferries from Zeebrugge for P&O, a bi-weekly service serving Scandinavia, and weekly calls from Africa and South America.
- The historic **International Cruise Terminal** is a listed building and over 100,000 passengers travel through the terminal per year
- Plays a vital role in the **automotive sector** with over 100,000 cars moving through the port each year and the UK's only import centre for Hyundai vehicles
- The port plays a vital role in the UK **grain market** through the largest combined import and export grain terminal in the UK.
- The port has two **paper terminals**, making it a leader in the import and export of paper for short sea markets.
- Handles 750,000 tonnes of **bulk aggregates** and 2 million tonnes of **recycled products**
- Acts as a **gateway for major projects**, including the London 2012 Olympic Games, Thames Tideway Tunnel, the building of Canary Wharf and Crossrail
- Offers **heavy lift services** to a range of sectors handling everything from generators, wind turbines, tunnel boring machines to modular units

Figure 3.15 Ports of Tilbury and Tilbury2



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Tilbury2

- 3.52 In February 2019, the Port of Tilbury obtained approval under a Development Consent Order (DCO) from the Secretary of State for Transport to build a new terminal adjacent to the current port in Thurrock. The proposed new port, known as Tilbury2, will be built on a 152-acre site which was part of the former Tilbury Power Station. It is envisaged that Tilbury2 will act as a satellite of the main port, comprising of a:
- Roll on/roll off ferry terminal for importing and exporting containers and trailers, with a new deep-water ro-ro river berth.
 - Construction Materials and Aggregate Terminal (CMAT) for importing, processing, manufacturing and distributing construction materials, with a new deep-water aggregate river berth
 - New nationally strategic rail and road connection into the site
- 3.53 In addition, the existing Grain Terminal is currently expanding to include a flat store with capacity for a further 15,000 tonne capacity.

London Gateway DP World

- 3.54 The London Gateway Port is owned by DP World and built on a 607 hectare site. It opened in November 2013 and cost £1.5bn to build. The port is capable of handling the largest deep-sea container ships and runs almost 3km along the Thames Estuary in the east of Thurrock. The port is highly efficient, it is highly automated and has excellent road, rail and sea links enabling the quicker, cheaper and more environmentally friendly transportation of goods.
- 3.55 Currently, the port has one berth open, but once completed it will have six deep sea berths and feature a 2,700m long container quay. It will also offer a 90 hectare logistics park for the distribution, manufacturing and high-tech sectors. Once completed, 2,000 people will be employed at the port, and a further 10,000 jobs will be created at the nearby logistics park.

Figure 3.16 Location of London Gateway Port in Thurrock



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Other Major Businesses

- **Amazon UK** – opened one of its largest warehouses at the London Distribution Park, adjacent to the Port of Tilbury. The four-storey warehouse 18.6 hectares of floorspace and is expected to create over 3,500 jobs when fully operational.
- **High House Production park** – located on a 5-hectare site, the park is focused on creative and cultural businesses and activities. The first phase of the development opened in 2010 and included the Royal Opera House's set production workshop. Since then, a number of other facilities have opened including studios, performance spaces, rehearsal venues and costume making workshops.

Community

- 3.56 The LTC Corridor is currently home to around 57,300 people, which is approximately 34% of Thurrock's total population. The population in the Corridor grew by +7.0% between 2012-2017. This is in line with the Thurrock average, but above the growth rates for the other comparator areas.

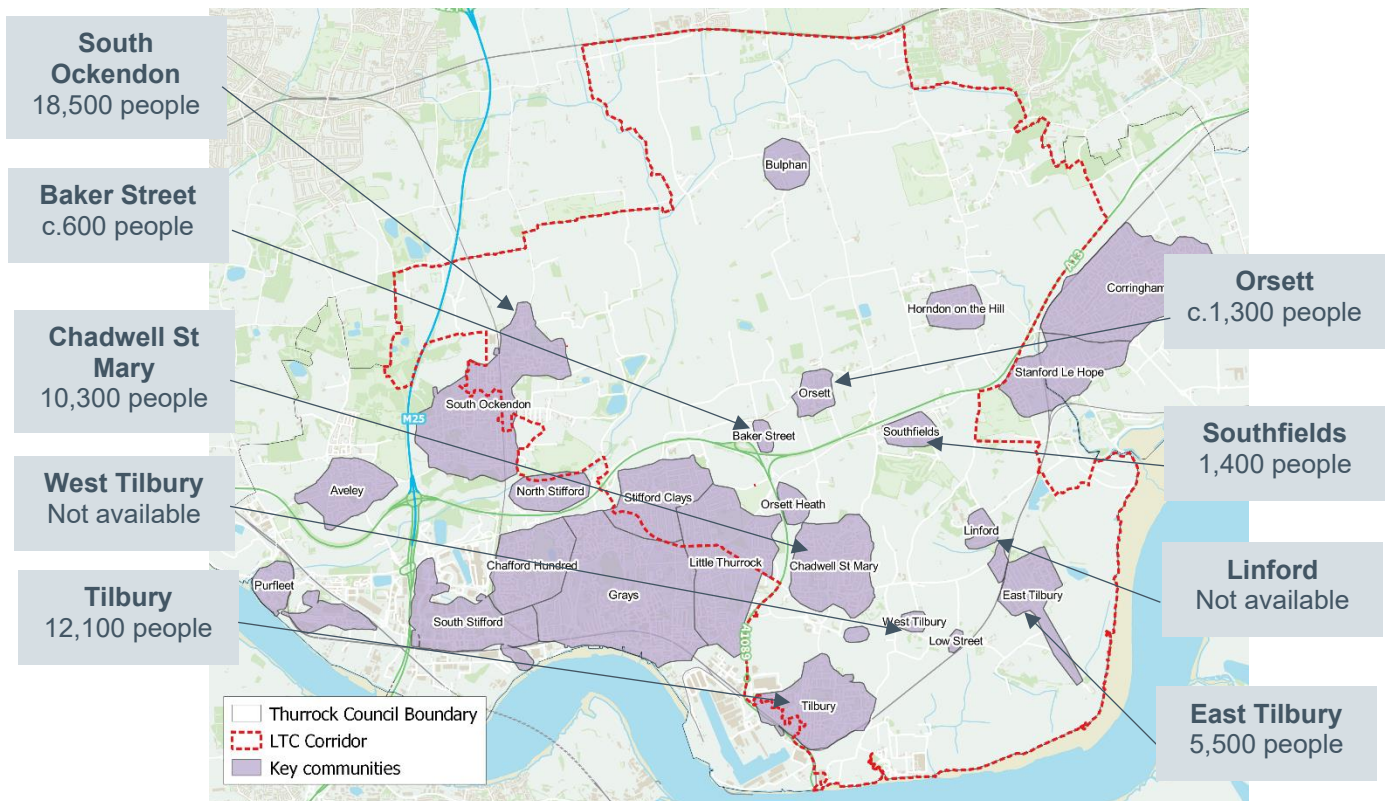
Figure 3.17 Population

	Population (2017)	% Growth 2012-2017
LTC Corridor	57,300	+7.0%
Thurrock	170,400	+6.6%
South Essex	780,300	+4.2%
Essex	1,468,200	+4.3%
England	55,619,400	+4.0%

Source: ONS 2017, 2012

- 3.57 The LTC Corridor is made up of a number of key communities. These include Tilbury, East Tilbury, West Tilbury, Linford, Chadwell St Mary, Southfields, Baker Street, and South Ockendon. The map below shows the location and the population of each community.

Figure 3.18 Key communities in Thurrock



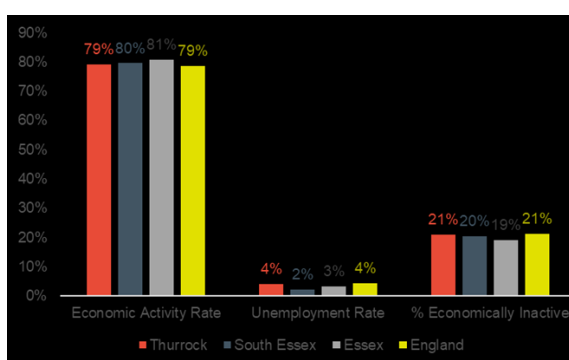
Source: Hatch Regeneris. Data from the ONS, 2017. Contains OS data © Crown copyright and database right 2019

- 3.58 There are a number of community facilities and amenities in and around these communities. Community facilities are defined as public or publicly funded resources that provide for the physical, social, cultural and/or intellectual development or welfare of the community. These include schools, care homes, village halls, leisure centres, and other community facilities. Maps created by Highways England³ show the extent and location of these within 1km of the LTC boundary.

Economic Participation and Labour Market

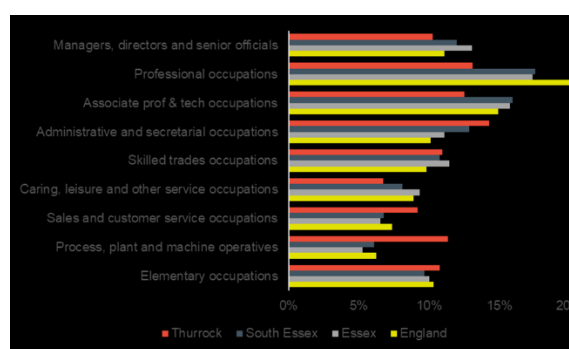
- 3.59 Figures from the Annual Population Survey give an insight on the economic participation of residents living in an area. Figures 3.19 and 3.20 show that Thurrock has a slightly lower economic activity rate than the comparator areas and a higher unemployment rate than the immediate surrounding areas. Thurrock residents are also overrepresented in lower skill level occupations.

Figure 3.19 Labour Market Participation



Source: Annual Population Survey 2018

Figure 3.20 Occupational Profile

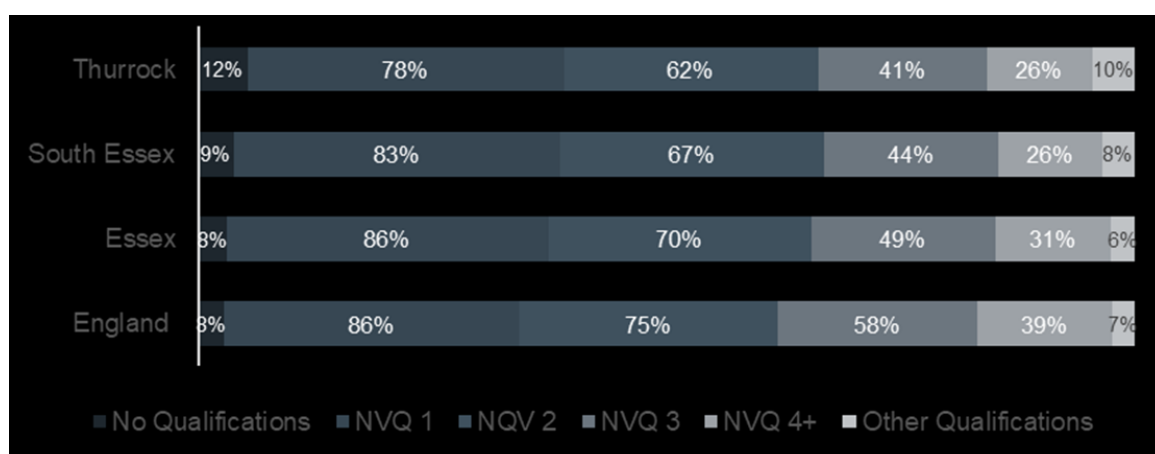


Source: Annual Population Survey 2018

- 3.60 Whilst there have been improvements in qualifications and educational attainment in recent years, Thurrock still has a higher proportion of people with no qualifications than the comparator areas (see Figure 3.21). The area also struggles with lower proportions of residents with NVQ 3+. However, in recent years the proportion of young people who are NEET ('not in education, employment or training') has improved, with Thurrock now lower than the average for the East region and England.
- 3.61 Given that there are few high skilled employment opportunities in Thurrock, there needs to be continued investment in both skills training to improve the quality of the local skills base, and to attract businesses with higher skilled employment opportunities into the area.

³ Lower Thames Crossing Preliminary Environmental Information Report: Figures (Highways England, 2018)
<https://hatchengineering.sharepoint.com/:b:/r/sites/UrbanSolutionsUK/ajobs/H360739/Input/Documents%20from%20the%20Client/LTC%20Scheme/PEIR%20Figures%20%20Chapter%2014%20People%20and%20Communities%20complete.pdf> ?csf=1&e=2xfjzG

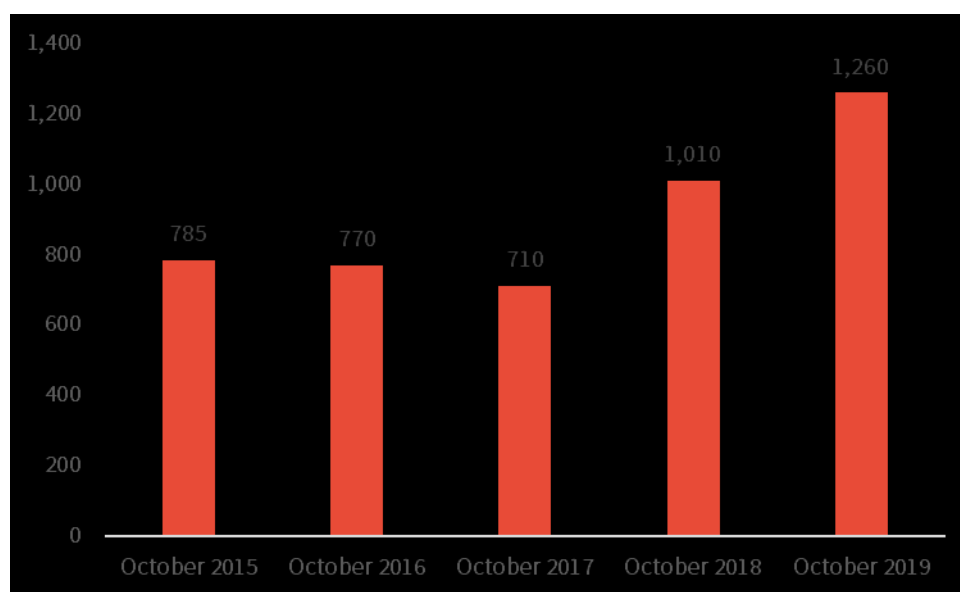
Figure 3.21 Qualifications Levels



Source: Annual Population Survey 2018

- 3.62 In addition, claimant count data suggests that in October 2019 the LTC Corridor had 1,260 claimants. This has been increasing over the last 5 years, which suggests the population in the Corridor is experiencing increasing levels of unemployment and economic inactivity.

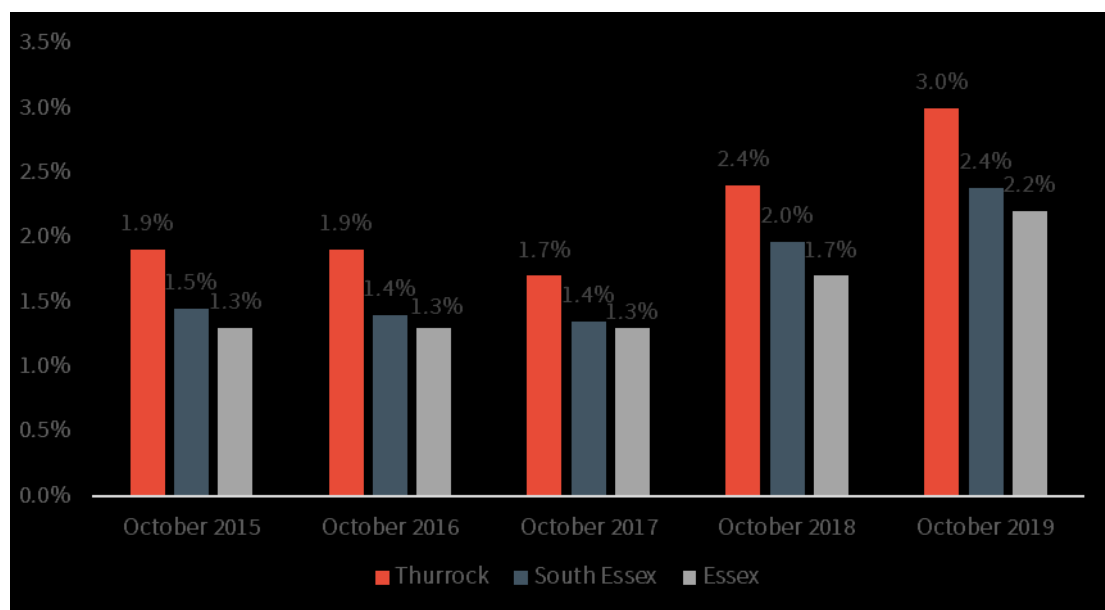
Figure 3.22 Claimant Count in the LTC Corridor, October 2015-2019



Source: Hatch Regeneris. Data from 'Claimant Count', ONS, 2015-2019

- 3.63 Claimant rates in Thurrock and the wider region have increased over the past five years, and claimant rates in Thurrock have remained consistently higher than both the South Essex and Essex average.

Figure 3.23 Claimants as a proportion of residents aged 16-24 across comparator areas, October 2015-2019

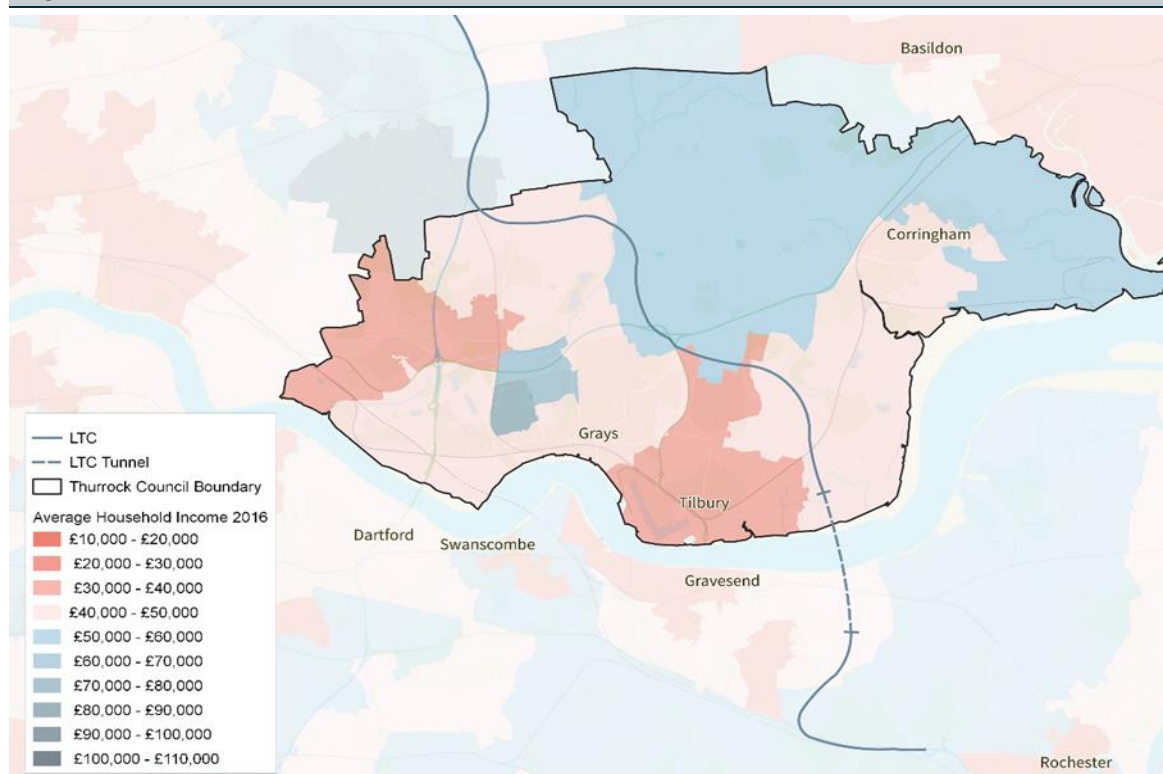


Source: Hatch Regeneris. Data from 'Claimant Count', ONS, 2015-2019

Income and Prosperity

- 3.64 In 2016, the average annual household income for Thurrock was £46,200. However, Figure 3.24 shows how this varies significantly across the borough, with pockets of very low average annual household income levels to the south of Thurrock around Tilbury.

Figure 3.24 Household Income, 2016



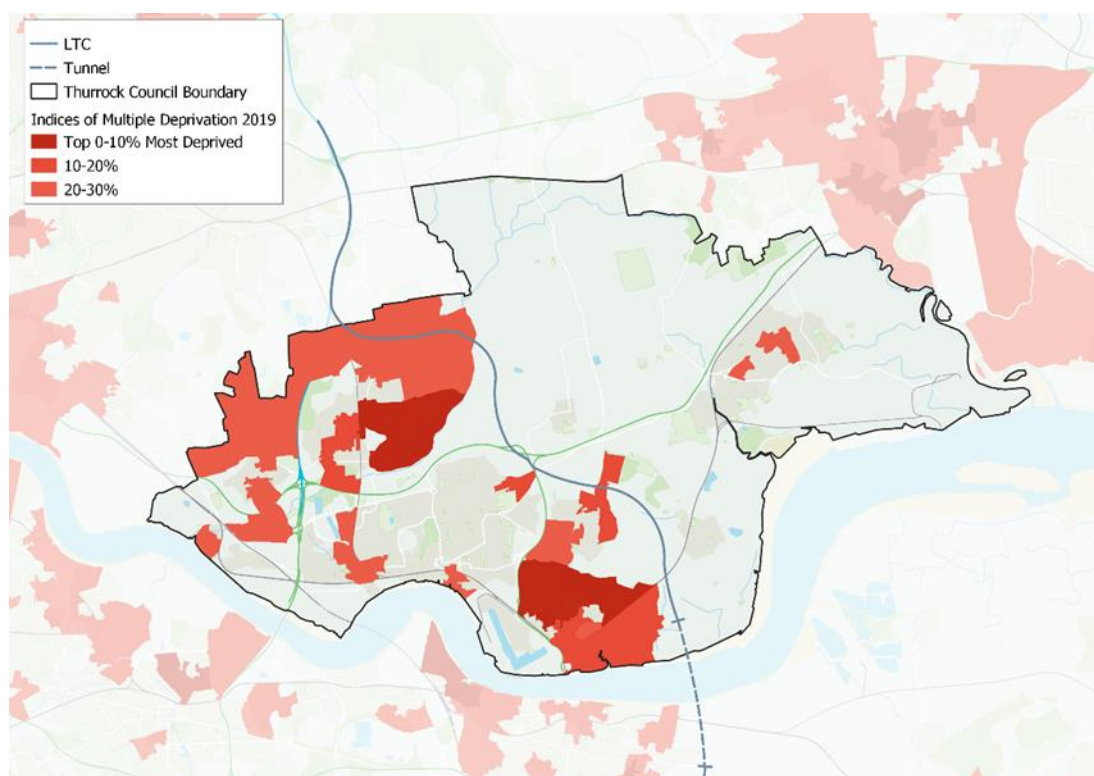
Source: Hatch Regeneris. Data from ONS 2016. Contains OS data © Crown copyright and database right 2019

3.65 Partly reflecting the pockets of low household income and poor performance in other metrics, Thurrock is also characterised with areas of high deprivation. As shown in Figure 3.25, the LTC Corridor has 35% of LSOAs in the top 30% most deprived nationally. This is compared to just 17% in Essex. Figure 3.26 shows that much of this deprivation is concentrated in the south of the borough around Tilbury and in South Ockendon.

Figure 3.25 Index of Multiple Deprivation	
	% LSOAs in the Top 30% Most Deprived 2019
LTC Corridor	35%
Thurrock	26%
South Essex	24%
Essex	17%

Source: MHCLG, 2019

Figure 3.26 Index of Multiple Deprivation - Top 30% Most Deprived LSOAs Nationally



Source: Hatch Regeneris. Data from MHCLG 2019. Contains OS data © Crown copyright and database right 2019

3.66 The Index of Multiple Deprivation comprises the following metrics: barriers to housing and services; employment; income; education, skills and training; health and disability; crime; environment.

3.67 Further interrogation of these different metrics highlights some of the specific challenges facing Thurrock. These include:

- **Employment deprivation:** an LSOA in Tilbury is in the top 900 most deprived in the country for employment
- **Skills deprivation:** 54% of LSOAs within Thurrock are within the top 30% of most deprived for Education, Training and Skills Deprivation. This is compared to 41% in South Essex and 31% in Essex. As shown in Figure 3.27, there's a strong concentration of skills deprivation in and around Tilbury, East Tilbury, Corringham and South Ockendon/the western edge of the borough.

- **Crime:** 38% of LSOAs within Thurrock are within the top 30% of most deprived for Crime Deprivation, compared to 31% South Essex and 22% Essex. Figure 3.28 suggests crime is a particular challenge in Tilbury, South Ockendon and Aveley.

Figure 3.27 Education, Skills and Training Deprivation – Top 30% Most Deprived LSOAs Nationally

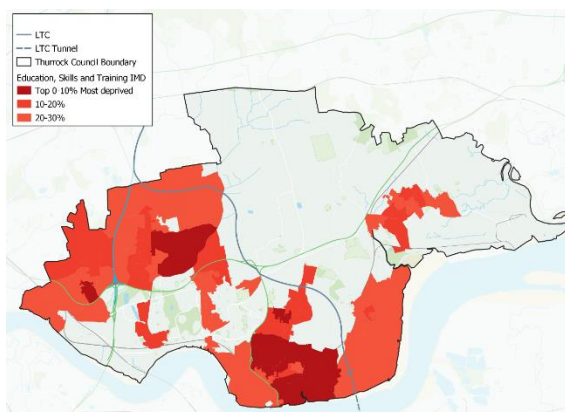
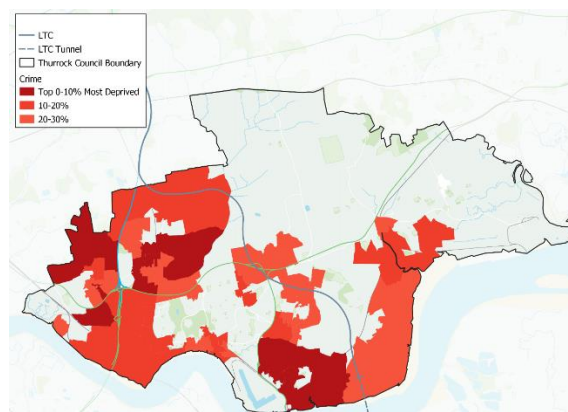


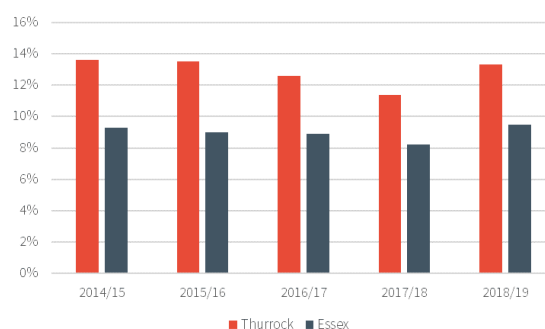
Figure 3.28 Crime Deprivation – Top 30% Most Deprived LSOAs Nationally



Source: Hatch Regeneris. Data from MHCLG 2019. Contains OS data © Crown copyright and database right 2019

- 3.68 Data on the proportion of children who qualify for Free School Meals can also give an indication of levels of poverty and deprivation.
- 3.69 For the most recent academic year 2018/19, the proportion of pupils with free school meals is 13% for Thurrock and 10% for Essex. The proportion of secondary school pupils with free school meals over the past five academic years is consistently higher within Thurrock than Essex as a whole.

Figure 3.29 Percentage of Secondary School Pupils with Free School Meals



Source: Hatch Regeneris. Data from LG Inform.

Housing and Affordability

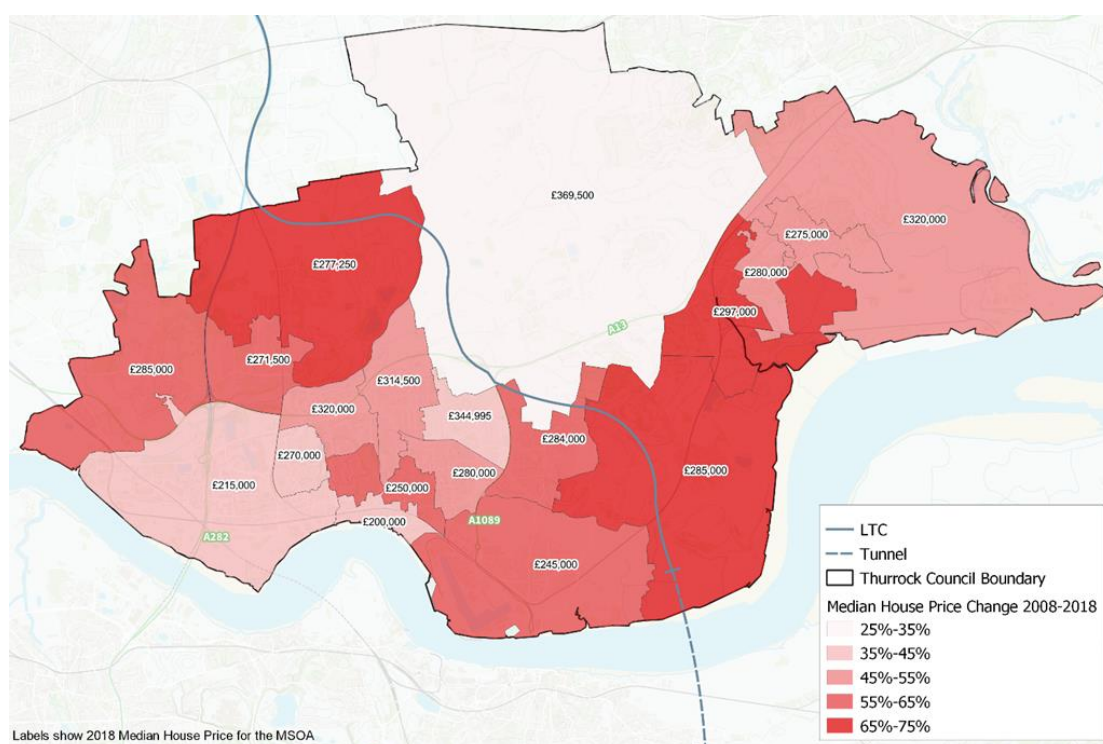
- 3.70 Across the LTC Corridor, the median house price is £302,900. This is slightly higher than the Thurrock average, however the Corridor is characterised by significant variation in prices with higher house prices found in the north of Thurrock in and around Orsett. Median house prices here are almost £100,000 higher than in the southern parts of the Corridor around Tilbury.
- 3.71 As shown in Figure 3.30, median house prices in the LTC Corridor have grown significantly over the last decade (+52%), in line with growth seen across the rest of Thurrock.
- 3.72 However, the spatial variation in median house price growth shows that the areas in the Corridor with the lowest median prices have grown the most over the last 10 years. The most significant increases of above +65% have been in and around East Tilbury.

Figure 3.30 Median House Price and Change

	Median House Price 2018	House price change 2008-2018
LTC Corridor	£302,900	+52%
Thurrock	£283,400	+51%

Source: ONS 2008, 2018

Figure 3.31 Median House Price change 2008-2018

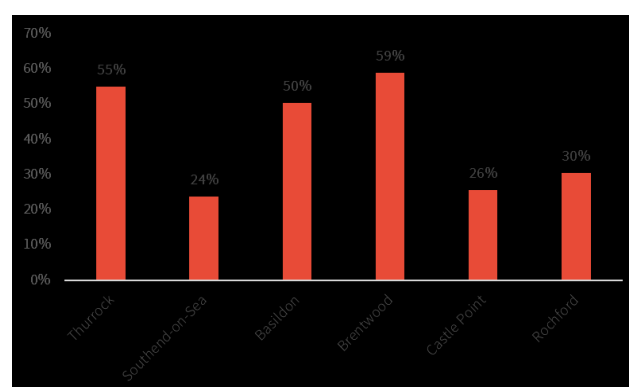


Source: Hatch Regeneris. Data from the ONS 2008, 2018. Contains OS data © Crown copyright and database right 2019

3.73 The house price affordability ratio is used to indicate the gap between resident's earnings and house prices. This gives an indication of the likelihood for residents to be able to afford to buy a house in the area in which they live. Data shows that house prices are around 9 times the annual earnings of residents in Thurrock, which is just below the South Essex average of 9.5 times.

3.74 Affordability has weakened considerably over the past 5 years (see Figure 3.32). Since 2013, house prices relative to income have increased by 55% in Thurrock, the second highest increase of the South Essex boroughs. This means residents have to find an extra 3 times their income to afford a house in 2018 compared to 2013.

Figure 3.32 Childhood Obesity Levels three-year average, 2015/16 - 17/18



Source: Hatch Regeneris. Data from National Child Measurement Programme, Public Health England.

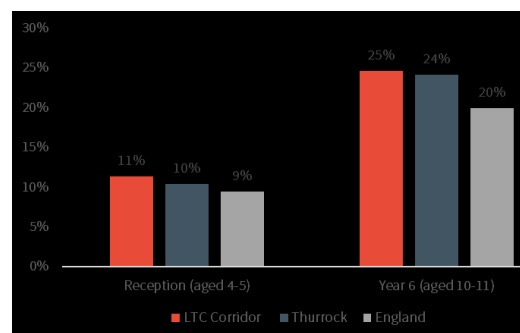
Health and Wellbeing

3.75 It is recognised that Thurrock has a range significant health and wellbeing challenges. The recent Joint Strategic Needs Assessment summarised in the Thurrock Health and Wellbeing Strategy highlights the following issues across the borough.

Obesity

- 3.76 Thurrock has high obesity levels in both children and adults. More than 7 out of 10 adults in Thurrock are either overweight or obese.
- 3.77 As shown in Figure 3.33, obesity levels in children in Thurrock at both age 4-5 years and 10-11 years are higher than the national average.
- 3.78 In addition, for the period 2015/16-2017/18, the obesity rate for children aged 4-5 years within the LTC Corridor is 11% compared to a national average of 9%. Childhood obesity rates for 10-11 years in the LTC Corridor are 25% compared to a national average of 20%.

Figure 3.33 Childhood Obesity Levels three-year average, 2015/16 - 17/18



Source: Hatch Regeneris. Data from National Child Measurement Programme, Public Health England.

Health Inequalities

- 3.79 One of the biggest health challenges facing Thurrock is the large differences in health and wellbeing between different communities. Health inequalities exist in relation to life expectancy, obesity, cardio-vascular disease etc, which is driven by factors such as deprivation, low incomes and unemployment.
- 3.80 In Thurrock 20% of children grow up in poverty and there's a 10-year difference in life expectancy between children born in Orsett and Tilbury. The Health and Wellbeing Strategy also finds that employment is one of the biggest factors shown to improve health and wellbeing in Thurrock.

Loneliness and Social Isolation

- 3.81 Social isolation is a major concern for some areas of Thurrock. For example, 39% of people experience social isolation in Tilbury, compared to a national average of 32%. This is driven by the high proportion of elderly people living alone in the area. In Ockendon, 38% of people experience social isolation.

Inadequate Service Provision

- 3.82 Thurrock struggles with too few GPs for the size of the population. Given the levels of population growth, Thurrock will need to transform its primary care services to ensure good quality and fit-for-purpose services are provided. It will also need to create a positive perception of the area, as a place to live and work, to recruit and retain GPs.
- 3.83 In addition, Thurrock has no A&E provision within the borough and instead relies on Basildon Hospital. This means that Thurrock residents are very reliant on good access to, and the continued provision of, services in Basildon.

Summary

- 3.84 The data in this section demonstrates that there are specific areas of Thurrock which struggle significantly with multi-faceted challenges. In particular, the communities living in and around Tilbury, and South Ockendon are characterised by high deprivation, low incomes and poor health outcomes.
- 3.85 The Council is responding to these challenges through a range of mechanisms, including their Active Place Strategy designed to ensure local residents have sufficient access to open space and sports facilities, and that they are encouraged to travel by active modes through appropriate infrastructure provision and promotion.

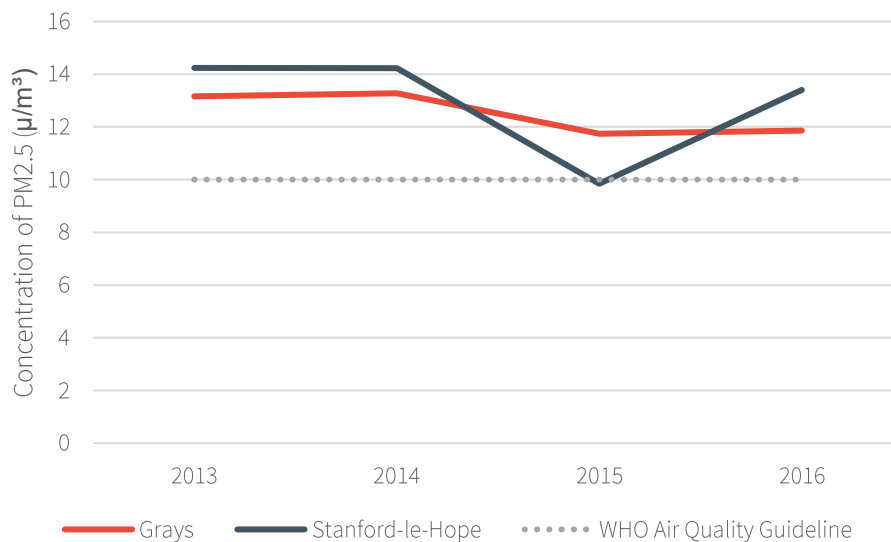
Environment

- 3.86 The LTC Corridor is characterised by a mosaic of landscapes, including coastal marsh, low-lying fenland, farmland and more developed urban areas. Landscapes of 'strategic scale' in Thurrock (as defined in the Integrated Landscape Character Assessment⁴) include the River Thames which runs along the southern edge of the borough and forms part of the wider Thames Estuary and the Thames Estuary and Marshes Special Protection Area. In addition, Thurrock is home to the Mar Dyke River Valley which runs through the north east of the borough.

Air Quality

- 3.87 There are 18 sites within Thurrock currently designated as Air Quality Management Areas (AQMAs) in which air pollution levels are likely to fall short of national targets. All 18 sites are AQMAs for Nitrogen dioxide (NO₂) pollution and of these, four are also monitored for particulate matter (PM₁₀).
- 3.88 The LAQM Annual Status Report 2018 by Thurrock Council attributes these AQMAs to traffic related pollution along busy roads. Two AQMAs within Thurrock were declared for breaching the annual mean objective for NO₂.
- 3.89 As shown in Figure 3.34, the World Health Organisation (WHO) Ambient Air Quality Database 2018 recorded PM_{2.5} and PM₁₀ measurements in Grays and Stanford-le-Hope that exceeded WHO Air Quality Guidelines for maximum annual mean levels. Whilst the EU Air Quality Standards have a higher limit for PM_{2.5} (23µ/m³), the prevalence of respiratory diseases amongst residents in Thurrock suggests a strong need to be ambitious with air quality targets.

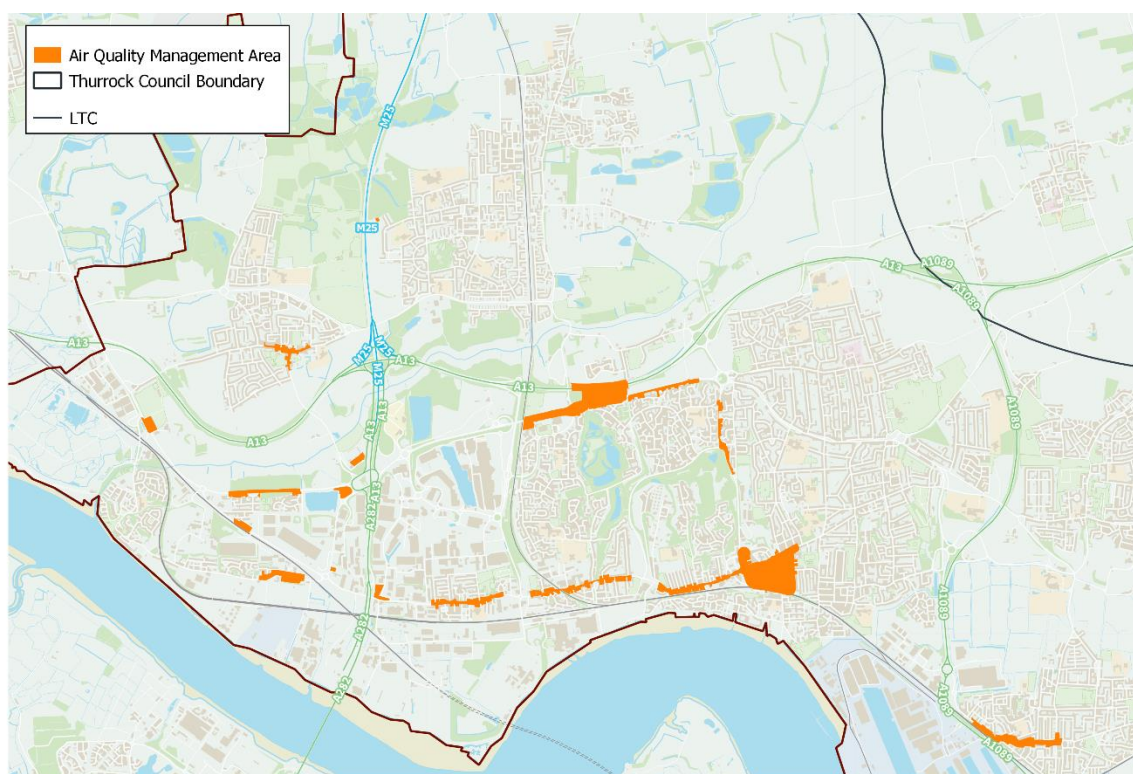
Figure 3.34 WHO Ambient Air Quality PM_{2.5}



Source: Hatch Regeneris. Data from WHO Ambient Air Quality Database 2018.

⁴ Thurrock Integrated Landscape Character Assessment, LUC 2018

Figure 3.35 Thurrock Air Quality Management Areas



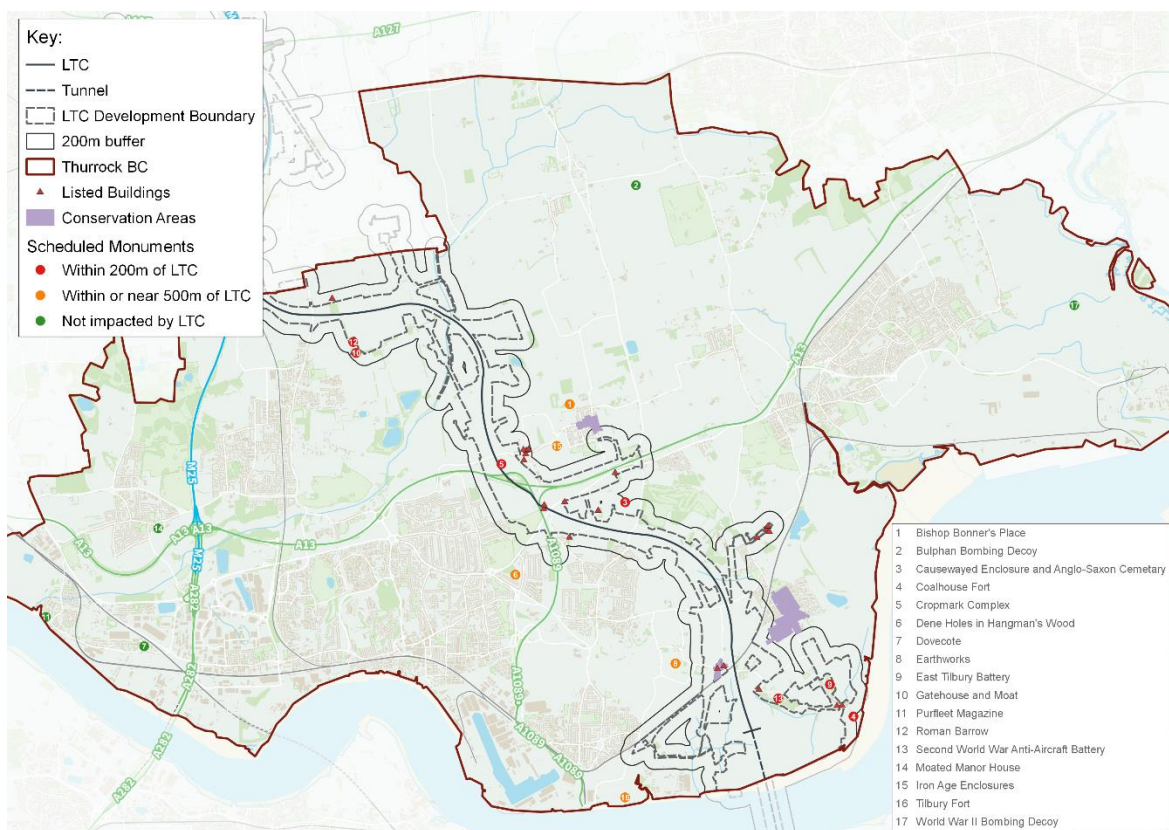
Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Heritage Assets

- 3.90 Thurrock has extensive heritage assets situated across the borough. Within 200m of the LTC route alone, the Historic Environment Record identifies 182 designated heritage sites. There are 17 scheduled monuments distributed across the borough's landscape ranging from Neolithic sites to World War II bombing decoys. All of the monuments are of national importance, either because of the type of monument or because they are a rare survival of that monument form. As stated in the Thurrock Scheduled Monuments assessment⁵, "*all significantly contribute to the understanding and enjoyment of the archaeology and history of Thurrock and provide an important and tangible link with the past*".
- 3.91 As shown in Figure 3.36, 7 out of the 17 scheduled monuments in Thurrock fall within 200m of the LT, and a number are already identified as 'at risk'. The Scheduled Monuments assessment found that at least 4 of the monuments are likely to be subject to major or detrimental impacts as a result of the LTC, and that LTC could destroy all or part of the Cropmark monument (no. 5).

⁵ Thurrock Scheduled Monuments: Assessment of Settings, 2018

Figure 3.36 Designated Heritage Assets in Thurrock

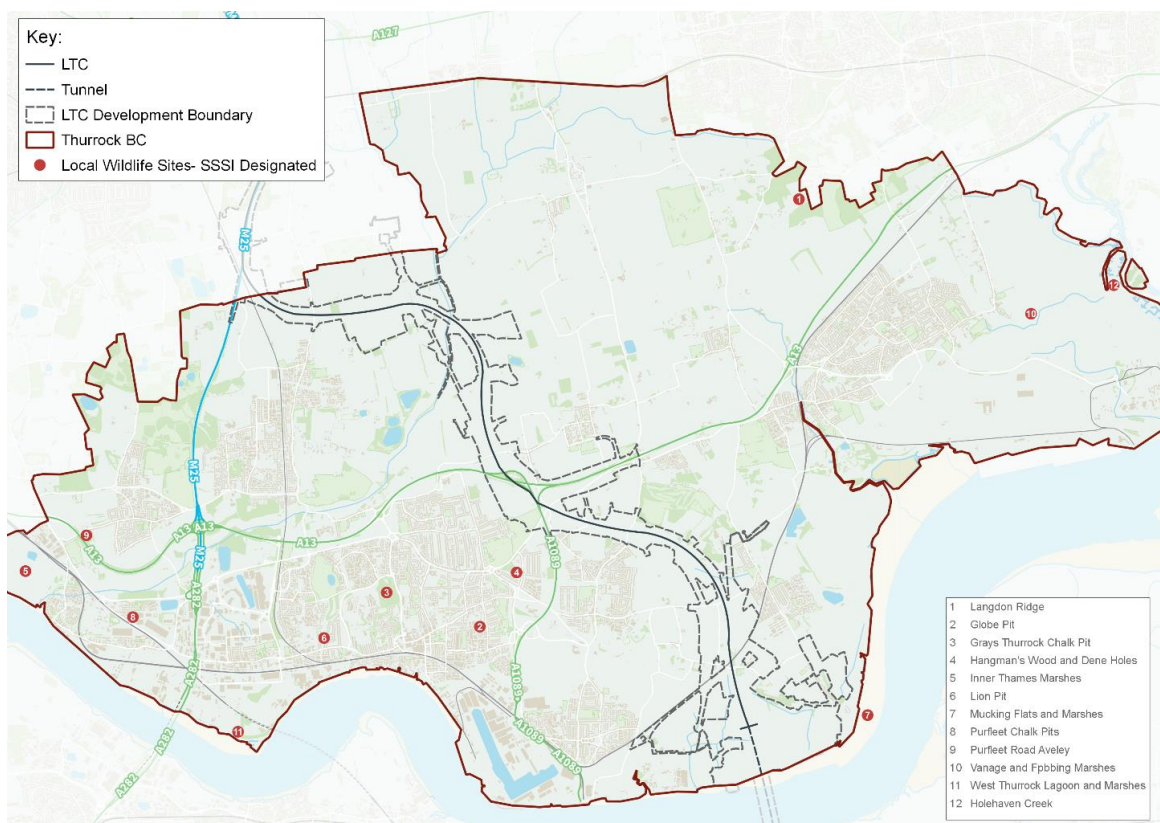


Source: Hatch Regeneris. Data from Thurrock Scheduled Monuments: Assessment of Settings Report, 2019 and Historic England 2019. Contains OS data © Crown copyright and database right 2019

Wildlife Sites

3.92 In addition to heritage assets, there are a range of sites important for wildlife across Thurrock. There are 12 sites designated as Sites of Special Scientific Interest (SSSI) (see Figure 3.33), which means they support habitat species or geological features of national importance and are considered some of the best sites for wildlife in the country. This includes sites such as Hangman's Wood and the Mucking Flat Marshes which run along the bank of the river from Mucking to Coalhouse Fort. Mucking Flats Marshes are part of the Thames Estuary and Marshes Special Protection Area/Ramsar which is of international significance due to their populations of overwintering wildfowl and waders. Surrounding sites including land near form functionally linked habitat.

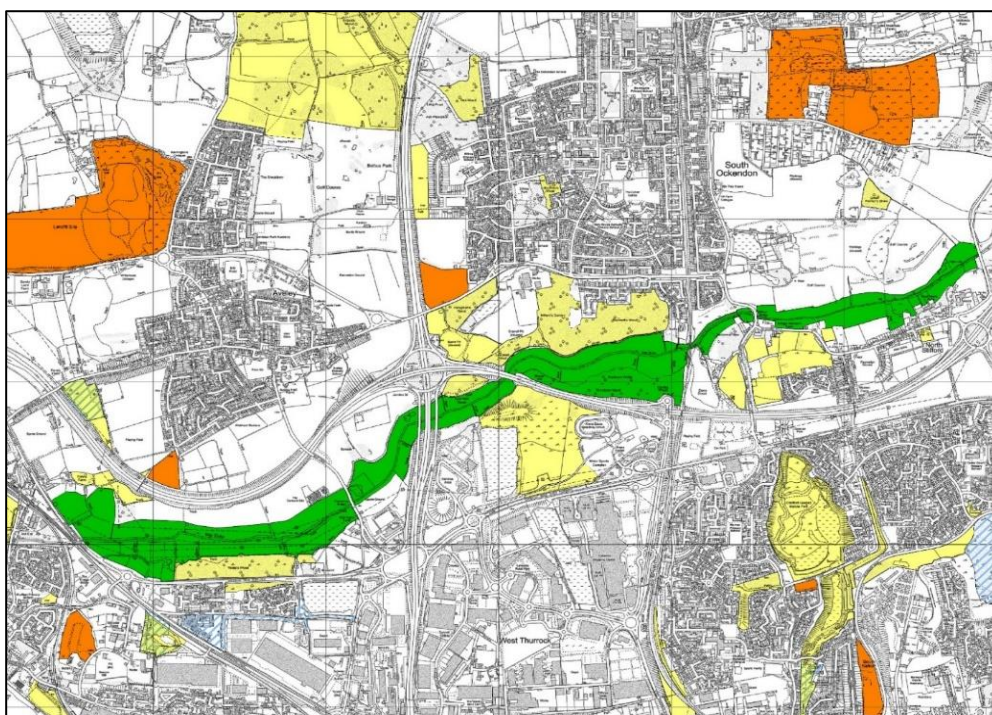
Figure 3.37 Wildlife Sites in Thurrock



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- 3.93 In addition, Thurrock supports wildlife through its network of non-statutory Local Wildlife Sites, which include woodland, green areas and open spaces. This can create 'wildlife corridors' such as the Mardyke Valley Wildlife Corridor which is an extensive river floodplain grassland system running across Thurrock (see Figure 3.34). This acts as both a wildlife corridor and a 'green wedge' separating urban developments. As a result, this, and other corridors, could be subject to severance and disturbance with the development of new homes and infrastructure. The borough also significant assemblages of rare invertebrates which are often found in undesigned sites

Figure 3.38 Mardyke Valley Wildlife Corridor

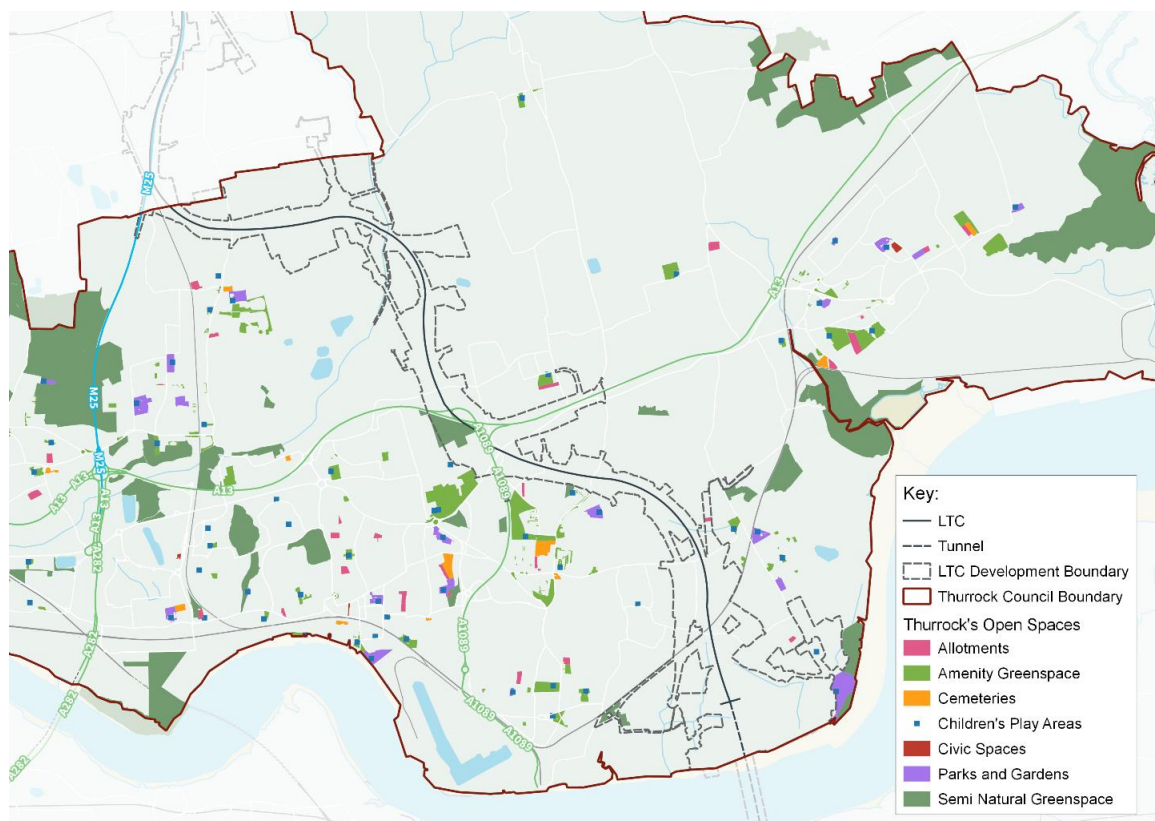


Source: Thurrock Local Wildlife Sites Review

Open Spaces

- 3.94 There are diverse mix of open space sites in Thurrock (see Figure 3.31). Provision of open space is spread across the borough but tends to concentrate around built up areas and communities.
- 3.95 Within the LTC development boundary, there is an allotment, Children's Play Area and areas of semi-natural green space. The LTC also likely to pass through/nearby to:
- National Cycle Route NCN Route 13
 - Coalhouse Fort
 - Thames Chase Community Forest
 - Orsett Golf Course
 - Stubbers Outdoors Pursuit Centre
 - Grangewaters Outdoor Pursuits Centre
 - Common land such as West Tilbury Marshes and Orsett Fen
 - Blackshots recreation ground
 - Blakshots Nature Park
 - Orsett Heath
 - The open spaces are important areas for informal recreation within a borough with high levels of adult and childhood obesity.

Figure 3.39 Open Spaces in Thurrock



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Growth

- 3.96 This section sets out the policies and factors which will influence economic growth and development in Thurrock. It establishes a future year growth scenario that can be applied within the assessment of cost impacts over time.

Local Plan Process

- 3.97 Thurrock Council is currently progressing with the preparation of a single Local Plan covering the whole of the Council's administrative area. This will replace, when adopted, all the existing development plan documents and policies, including those within:
- Thurrock Core Strategy and Policies for Management of Development Local Plan, as amended, (January 2015); and
 - Thurrock Borough Local Plan (1997)
- 3.98 The Emerging Thurrock Local Plan (TLP) will determine the amount and distribution of new development, providing a comprehensive and long-term planning framework for the period up to 2038. A single Policies Map will define geographically the development proposals and have notations to allow for the application of planning policies.
- 3.99 The emergence of the LTC proposals has created a series of challenges to the Local Plan process and disrupted progress towards the development of a draft Local Plan. The Issues and Options (Stage 2) process has been completed and was consulted upon between December 2018 – March 2019.
- 3.100 On the basis of the work completed to date, the Council has identified a comprehensive list of sites that have commenced; that have been approved or allocated within the LDF; or that have been received through a Call for Sites or identified from previous site assessments. The Council is now in the process of evaluating all of these sites in the context of statutory requirements, stakeholder and public consultation and engagement, and in co-operation with neighbouring local authorities.

Housing Need and Employment Land

- 3.101 The National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) set out a requirement for a standard method to be used to assess future local housing need in each local authority area. The standard method calculation currently identifies a need for 1,167 new homes per year in Thurrock. If this figure were to be projected over a typical 20-year plan period (2022-2041), it would result in a minimum requirement for 23,340 new homes over the plan period across the borough.
- 3.102 The PPG indicates that the local housing need calculated by the standard method should be considered a minimum starting point and it can be appropriate to plan for a higher housing need figure than the standard method calculation indicates in certain circumstances. These include where there are:
- growth strategies for the area that are likely to be deliverable;
 - strategic infrastructure improvements that are likely to drive an increase in the homes needed locally;
 - previous assessments of need (such as a recently-produced Strategic Housing Market Assessment) that are significantly greater than the outcome from the standard method.
- 3.103 All these circumstances are relevant to the calculation of local housing need in Thurrock. The previous assessment of housing need was set out in a technical document called the

'Strategic Housing Market Assessment' (SHMA) published in May 2017. This assessment identified a jobs-led need for 1,381 new homes per year in Thurrock, to be delivered between 2014 – 2037. This equates to a housing requirement of 31,763 new homes over this period. Around 2,810 homes have been delivered within the period 2014 – 2019, still leaving a requirement for a further 28,953 homes up to 2037. Extending this forward to encapsulate a typical 20-year plan period (2022-2041) would equate to a requirement for around 33,000 new homes.

- 3.104 The NPPF requires local plans to be internally consistent when planning for growth. Critically, the standard method's minimum starting point does not take account of any adjustments which will need to be made to the housing need figure to ensure the provision of new homes matches and supports the projected level of economic growth in the borough. Current evidence concludes that the housing requirement falls within the range of 1,167 - 1,381 new homes per year; however, the Council anticipates that additional technical work due to be carried out through ongoing work on the Local Plan, will support a housing requirement at the higher end of the identified range.
- 3.105 In terms of assessing housing land supply, based upon the current identified list of potential development sites, and assuming an average housing density across the area of between 35 and 40 dwellings per hectare (dph), there is an unconstrained potential to deliver over 90,000 homes within the area.
- 3.106 The reality, however, is that a significant proportion of the available land will not be suitable, or viable, for development, for a wide variety of reasons and so will not meet the NPPF's definition of sites which are deliverable and developable within the plan period. This will include issues of contaminated sites, physical viability, insufficient supporting infrastructure, and access constraints. Furthermore, large proportions of the sites are within designated Green Belt, whilst overarching statutory requirements and planning policies necessitate consideration of green space and protection of the character of settlements.
- 3.107 In addition, many sites will take a significant period of time to develop out and may extend beyond a plan period of 2022 - 2041.
- 3.108 Until a new Local Plan is adopted, there remains uncertainty in the land availability for new residential and commercial development. However, the Council's continuing work to progress the new Local Plan means that the position is becoming clearer. This is something that the Council is sharing with the scheme promoters as the part of the DCO pre-application technical engagement with Highways England.
- 3.109 In the interim, Hatch Regeneris have undertaken a theoretical exercise to develop a scenario that reflects the potential scale of available land for residential and commercial development. This has used the broad quantum of total identified sites, and applied the constraints of suitability and viability, to produce a magnitude of potential development opportunities across the Thurrock area. Through this analysis, we estimate that Thurrock has the potential to deliver between 38,100 and 43,500 homes by 2050.
- 3.110 This analysis indicates that, despite high theoretical land availability upon which to deliver housing and commercial development, the area is likely to have a range of constraints upon overall land availability. As such, the differential between the future housing target and deliverable and developable land supply is substantially narrower.

4. Transport and Connectivity Impacts

- 4.1 This chapter examines the direct impact of the LTC Scheme upon local transport provision and connectivity across Thurrock.
- 4.2 It considers these impacts within two phases:
- **Construction phase:** how temporary road and PRow closures, or reductions in operating capacity, could affect transport provision and connectivity and accessibility between localities through the course of the 6-year construction phase.
 - **Operational phase:** how permanent changes to the local transport network related to the final LTC configuration could have on-going impacts on connectivity and accessibility between localities.

Assessment Approach

- 4.3 The assessment has considered how access, movement, and travel times will change in comparison to the current, and future transport network, without the LTC Scheme. This includes the use of traffic modelling data (provided by Stantec) to assess the current and future year performance of the highway network across Thurrock in scenarios both with and without the LTC Scheme.
- 4.4 Information on the current bus, cycle and PRow networks has been taken from the baseline assessment presented within Chapter 3.
- 4.5 The assessment has utilised available information provided within the PEIR to understand how the LTC Scheme will be developed, temporary transport network impacts, and permanent changes during the operational phase.
- 4.6 Where there is currently insufficient information available from Highways England assumptions have been applied and are highlighted.

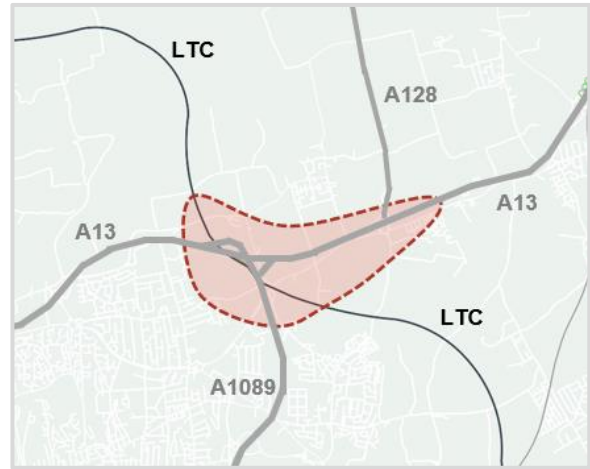
Construction Phase Connectivity Impacts

- 4.7 The construction of the LTC Scheme will require the physical closure of a number of local roads and PRow for varying lengths of time. In addition, it is likely that some of the more major routes through the area will also suffer periods of disruption and loss of capacity as part of delivering the LTC Scheme, in particular around the proposed junction with the A13/A1089.
- 4.8 Alongside the direct physical impacts, the construction of the LTC Scheme will engender significant HGV movements to and from work sites across the area, as well as additional vehicle movements associated with bringing workers to and from these sites. There will be particular impacts on routes to compounds accessed from B186 Stifford Clays Road and the A1089 Asda Roundabout.

Physical barriers created by LTC Construction

A13 Junction

- 4.9 The proposed LTC Scheme requires a major reconfiguration of the current A13 junction with the A1089, as well as the adjacent junction to the east with the A128. As well as the LTC alignment itself, a range of additional slip roads will be constructed to enable certain movements between the LTC and the A13, as well as some movements from the A1089 onto the LTC.
- 4.10 During the construction phase for the junction works, there will, therefore, be disruption to the operation of the key strategic routes of the A13, the A1089, and the A128, alongside the local roads, including the A1013 Stanford Road, the B188 Baker Street, Heath Road, Stifford Clays Road, Hornsby Lane, and Gammonfields Way / Long Lane.
- 4.11 As outlined within Section 2, the details of levels of disruption to each of these routes is not identified by Highways England. For the strategic routes, it is anticipated that any required road closures will be kept to a minimum; however, recent experience of the A13 widening project has required overnight closures, weekend, and some weekday on-line closure, causing significant disruption to the network. If a similar approach is adopted for LTC there would be significant disruption to the strategic and local highway network. The duration of lane closures and speed restrictions on these routes also remains unclear but could feasible be for an extended period of time.
- 4.12 For the purposes of our analysis, we have made the following central case assumptions:
- General speed restrictions of 50 mph from a point 1 mile west of the current A13/A1089 junction to a point 1 mile east of the current A13/A128/Brentwood Road junction.
 - General speed restrictions of 40 mph upon the connections between the A13 and A1089, with periods of lane reductions to a single lane operation, and some overnight road closures
 - Speed restriction upon all approaches to the A13/A128/Brentwood Road junction, with reductions in junction capacity
 - Temporary closures to A1013 Stanford Road, B188 Baker Street, Heath Road, and Stifford Clays Road.
 - Hornsby Lane permanently closed from the commencement of construction phase.
 - Gammonfields Way / Long Lane closed throughout the construction phase
- 4.13 In reality, recent experience of the A13 widening works has demonstrated that actual average speeds are likely to be considerably lower as a result of congestion, potentially more like 40mph on the A13 and 30mph on connections between the A13 / A1089.
- 4.14 These assumptions will be subject to revision should additional details on the construction phase of the LTC Scheme become available from Highways England.
- 4.15 The impacts of the closures to the local roads are considered further in the section below.



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 4.16 The potential speed restrictions and capacity reductions on the strategic routes will significantly impact upon all trips to, from, and within Thurrock, as well as through trips across the area. Based upon the traffic modelling outputs⁶, it is estimated that by 2026 there will be up to 115,000 two-way trips along the A13 passing through the junction with the A1089 during a typical day. A further 44,000 daily trips will travel between the A13 and the A1089. This represents the type of magnitude of trips on the strategic road network that could be affected by delays during the construction phase of the LTC project⁷.
- 4.17 On the basis of the assumed speed reductions set out above, we have estimated the following impacts:
- A reduction in speed restrictions from a maximum of 70mph to a range of 40mph to 50mph on the A13, across a 4.1-mile section of carriageway. This is estimated to equate to an average daily increase in vehicle journey times of between 2,650 to 5,000 hours, or up to 1.6 million hours per annum.
 - a reduction in average speeds from 50mph to a range of 30mph to 40mph on movements between the A13 and A1089, across a 3.3-mile section of carriageway. This is estimated to equate to an average daily increase in vehicle journey times of between 730 to 1,925 hours, or up to 620,000 hours per annum.
- 4.18 Further interrogation of the traffic model indicates that around 16% of the trips passing along the A13 through the A13 / A1089 junction have an origin or destination within Thurrock. All of the trips passing along the A1089 have an origin or destination within Thurrock. On this basis, it is estimated that around 62,000 trips with an origin or destination in Thurrock would be affected by LTC construction at the A13, accounting for an average daily increase in vehicle journey times of up to 2,750 hours, or over 875,000 hours per annum.

Temporary road closures

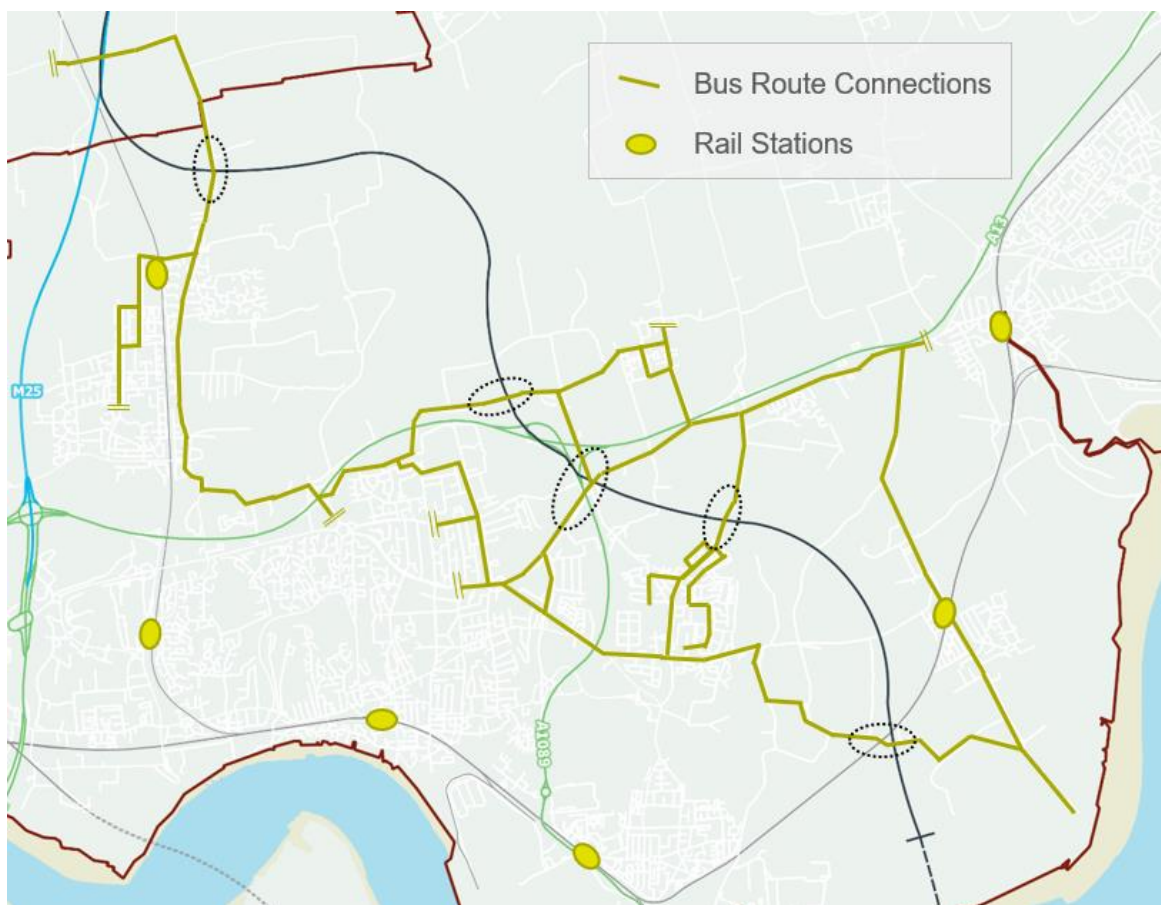
- 4.19 In addition, the four temporary local road closures that may occur around the A13 junction, highlighted in the section above, a further four local roads will be affected by the LTC Scheme:
- Station Road
 - Muckingford Road
 - Brentwood Road
 - North Road
- 4.20 Whilst it is not yet clear over what time periods these roads may be closed, it is stated within the Highways England PEIR⁸ that some links will be closed for prolonged period. This is assumed to be a period of over 6 months, potentially up to a year. The timing and management of closures will be critical in managing the overall operation of the network.
- 4.21 As well as providing for local traffic movements, some of these routes are also used by local bus services, as presented in Figure 4.1 and outlined below.

⁶ Source: Stantec 2019

⁷ It is noted that the construction phase will be from 2021 to 2026 during which period there will be growth in trips up to 2026. The average traffic volumes during the period will, therefore, be marginally lower. A factor of 0.95 has been applied to account for this difference.

⁸ Source: Lower Thames Crossing Preliminary Environmental Impact Report (Highways England 2018)

Figure 4.1 Bus Routes Impacted by Temporary road Closures



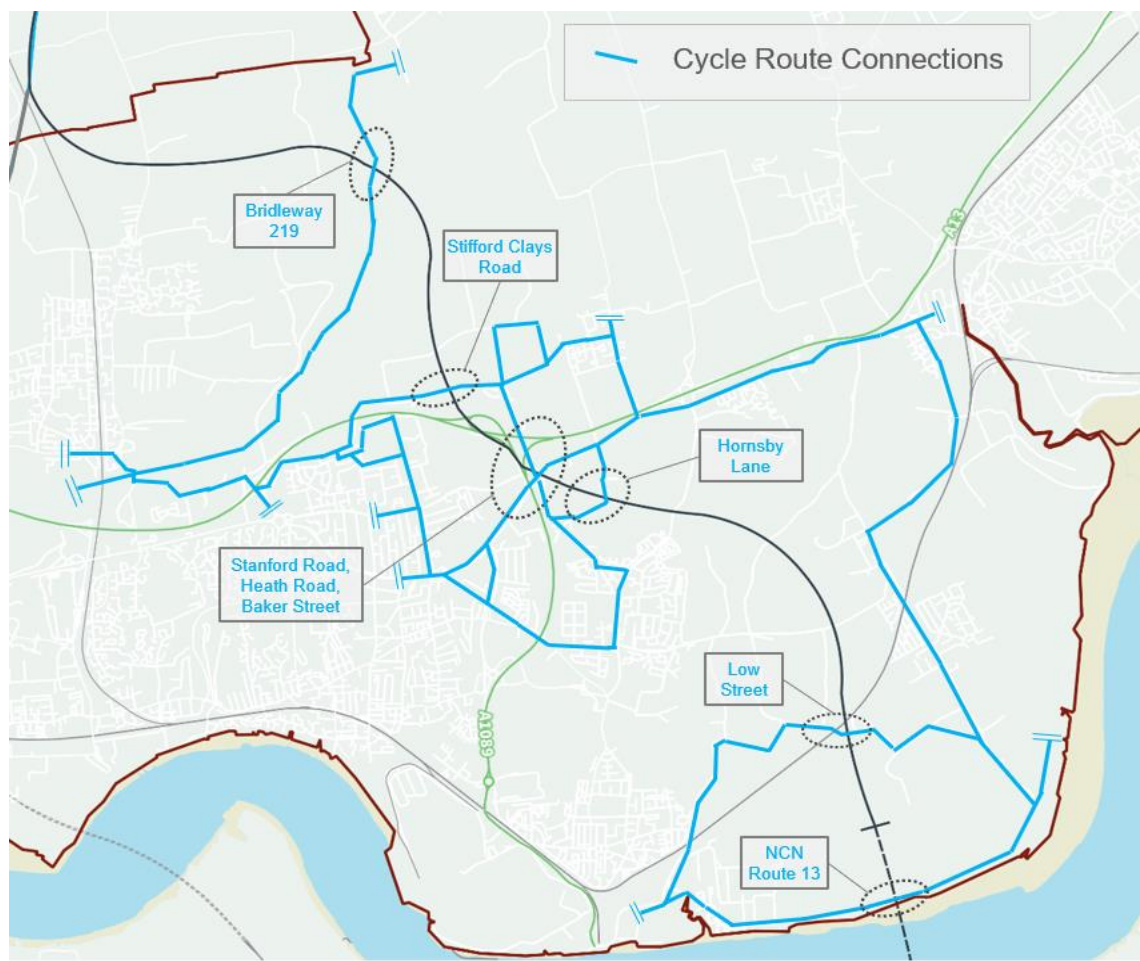
Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- **Station Road:** Route 374 (Grays to Stanford-le-Hope, via Coalhouse Fort)
- **Brentwood Road:** Route 11 (Ockendon to Horndon-on-the-Hill, via Stifford Clays, Chadwell St. Mary, Orsett Hospital)
- **Stanford Road / Baker Street:** Route 200/201 (Grays to Stanford-le-Hope, via Palmers College / South East Essex Colleges, Baker Street, and Orsett Hospital), Route: 265 (Grays to Bulphan via Baker Street and Orsett Hospital)
- **Stanford Road:** Route 100 (Grays to Stanford-le-Hope, via Orsett Cock)
- **Stifford Clays Road:** Route 201 (Sundays only. Grays to Stanford-le-Hope, via Stifford Clays and Orsett Hospital)
- **North Road:** Route 269 (Grays to Brentwood, via Thurrock Community Hospital, Stifford Clays, North Stifford, Ockendon), Route 347 (Ockendon to Upminster), Route 370 (Lakeside to Upminster, via Ockendon)

4.22 In the event of temporary road closures, all of these routes would need to be diverted and could be subject to significant diversions. A number of these routes provide connections to Orsett Hospital (the only minor injuries clinic in Thurrock), Basildon Hospital (A&E provision for the borough), and to a number of educational facilities, and so provide important public transport routes.

4.23 The following routes presented in Figure 4.2 are also highlighted as local on- and off-road shared cycle routes.

Figure 4.2 Cycle Routes Impacted by Temporary Road Closures



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 4.24 Any route closures would also affect connectivity by cycling, with diversions adding significant journey times to trips made by this mode. Even if routes are not closed, any reductions in carriageway widths through roadworks would put cyclists at increased danger along these routes and may deter trips.
- 4.25 Table 4.1 provides a summary of the estimated impact of a closure upon journey distances and travel time via the next best alternative route⁹. A forecast of the likely duration of any road closure is presented on the basis of information presented within the Highways England PEIR documentation.

⁹ This has been based upon a typical route between two centres that uses the road that will be closed and on the assumption that diversionary routes will be signposted well in advance of the road closure.

Table 4.1 Estimated implications and durations of road closures

Route	Alternative Diversionary Routes		Forecast Closure Duration
	Additional Distance (miles)	Additional Time (mins)	
Station Road	1.4	3	High
Muckingford Road	1.2	3	High
Brentwood Road	0.7	2	Medium
Stanford Road	1.4	6	Medium
Baker Street	1.3	3	Medium
Heath Road	1.4	3	Medium
Stifford Clays Road	1.7	5	Medium
North Road	1.5	4	Short

Source: Hatch Regeneris

4.26 Based upon the combination of i) role of route for general traffic, bus services, and cyclists; ii) the scale of diversionary impact; and iii) the potential duration of any closure, the overall impact on each route has been classified on a four-level scale¹⁰:

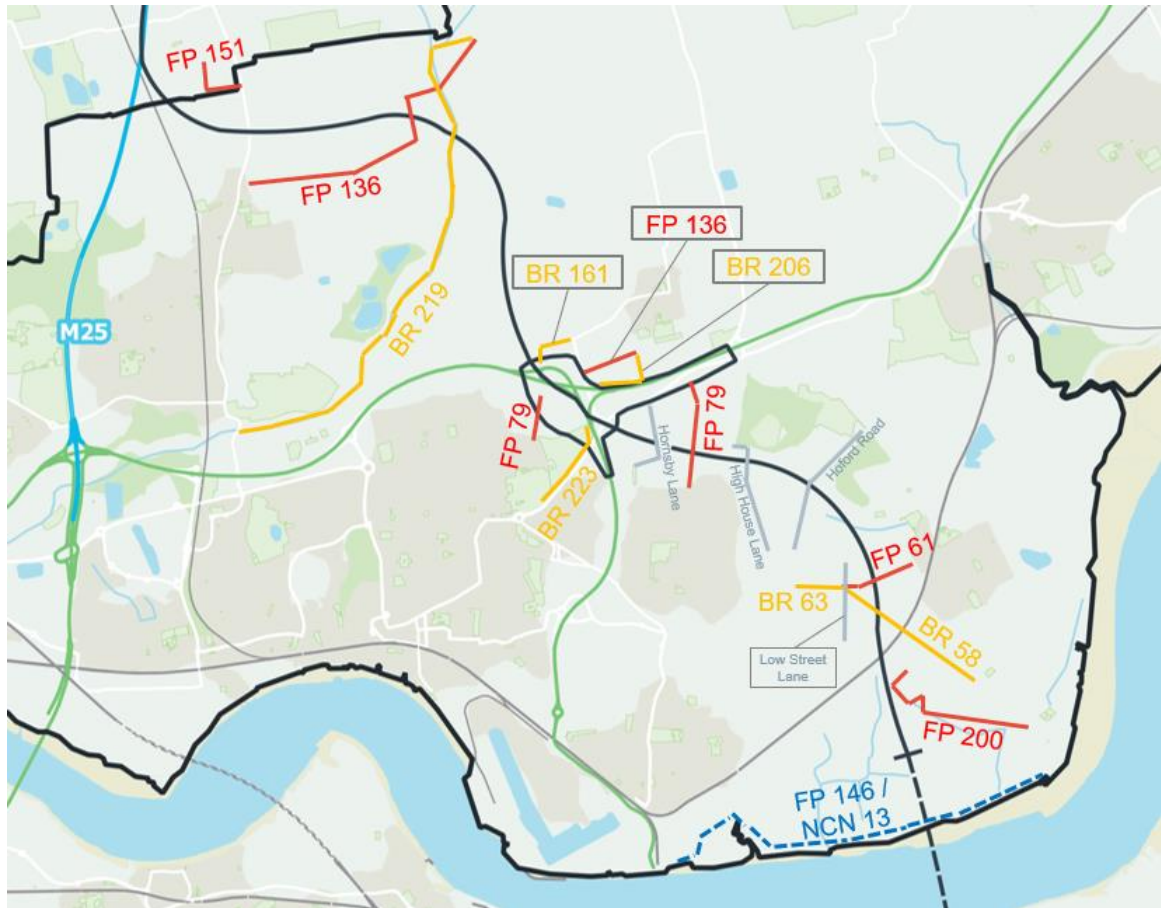
- **Station Road: Major adverse** impact either through road closure (predicted high duration) or construction-related traffic (forecast up to 14% increase in flows from construction traffic and significant HGV turning movements along the route)
- **Muckingford Road: Major adverse** impact either through road closure (predicted high duration) or construction-related traffic (forecast up to 11% increase in flows from construction traffic)
- **Brentwood Road: Moderate adverse** impact either through road closure (medium duration) or construction-related traffic (forecast up to 7% increase in flows from construction traffic)
- **Stanford Road: Moderate adverse** impact either through road closure (medium duration) or construction-related traffic (forecast up to 1% increase in flows from construction traffic)
- **Baker Street: Moderate adverse** impact through road closure (medium duration)
- **Heath Road: Moderate adverse** impact through road closure (medium duration) and loss of alternative route options through permanent closure of Hornsby Road
- **Stifford Clays Road: Moderate adverse** impact through road closure (medium duration)
- **North Road: Minor adverse** impact either through road closure (predicted short duration) or construction-related traffic (forecast up to 4% increase in flows from construction traffic)

¹⁰ Scale: **neutral** = no noticeable impact on travel; **minor adverse** impact = a relatively small effect on travel over a long duration of time (months) or a medium to high impact for a very short time period (a few days); **moderate adverse** impact = a medium effect on travel over a long duration of time (months) or a high impact over a short time period (a few weeks); **major adverse** impact = a relatively large effect on travel over a long duration of time (months)

Public Rights of Way (PRoW) closures

- 4.27 The Highways England PEIR documentation provides a list of PRoW that will be closed during the LTC construction phase. Whilst a specific time period is not stated, it is assumed it will encompass the majority of the construction phase. Figure 4.3 indicates the routes that will be impacted within Thurrock.

Figure 4.3 PRoWs and Tracks subject to temporary closure during LTC construction



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 4.28 The concurrent closure of all PRoW will create semi-permanent, east-west severance across LTC alignment during construction phase. This is particularly the case for the section of the LTC in Thurrock to the north of the A13, where there are no alternative road options for PRoW users to use to travel across the area. To the south of the A13, whilst some local roads may still provide non-motorised connections across the LTC alignment, these will be subject to closures themselves (as highlighted in the section above).
- 4.29 The construction phase will, therefore, create significant severance and disruption for PRoW users. A Countryside Agency consultation¹¹ found that 62.4% respondents use Rights of Way to walk, demonstrating the widespread value of these assets. It is understood that Highways England has some information on potential usage of these routes but this has not been made available at this time. Should this data become available then additional analysis could be undertaken to assess the scale of potential impacts.

¹¹ Source: Countryside Agency Use and Demand Study cited in the Rights of Way Improvement Plan 2007, Thurrock Council (p10) https://www.thurrock.gov.uk/sites/default/files/assets/documents/row_improvementplan_2007.pdf

Construction-related traffic

HGV movements to / from construction compounds

- 4.30 At the time of this assessment, the construction phase of the LTC Scheme was proposed to utilise three construction compound sites to the north of the River Thames. It is understood that this proposal may be subject to change, but full details were not available from Highways England at this time of this analysis. The assessment below is based upon the previously assumed three compound sites.
- 4.31 The most significant of the proposed compound sites will be in and around the proposed portal location for the tunnel leading under the River Thames (Tilbury site). This will encompass a significant area of land to the west of East Tilbury. A second proposed compound site is located off Brentwood Road, to the south of the A13 (Orsett Heath site), and the third located just outside Thurrock where the LTC will join the M25 (North Ockendon site).
- 4.32 Highways England provided indicative monthly profiles of HGV movements to each of the three compound sites. Whilst the profile of these movements is not broken down any further, e.g. by time-of-day, they provide an overarching understanding of the level of HGV vehicle trips that will be generated. At this stage it is unclear how any of the proposed temporary road closures (outlined in Section 4.19 above) could impact upon the routing of HGV traffic and so the assessment does not take this into account.
- 4.33 Overall there are estimated to be a peak of around 11,700 HGV movements per month within Thurrock. These are forecast to be distributed between the three compound sites, as set out in Table 4.2

Table 4.2 Forecast HGV Movements per Month to Compounds

Compound Site	Percentage of HGV Movements	HGV Movement per Month
North Ockendon	29.6%	3,460
Orsett Heath	37.9%	4,430
Tilbury	32.6%	3,810
Total	100.0%	11,700

Source: Hatch Regeneris. Data from Highways England PEIR.

- 4.34 By mapping out the routes to and from the compound sites, the impact this will have upon overall levels of traffic movements has been estimated. Figure 4.2 provides a representation.
- 4.35 It can be seen that there could be an increase in excess of 5% of current inter-peak traffic flows on routes leading to the main compound near Tilbury. This represents a significant increase in traffic on these routes, particularly as they will all be HGV or bus movements. Increases of between 2% and 3% are forecast around the other two compounds.

[illegible]

Workers moving to and from construction compounds

- 54

Operational Phase Connectivity Impacts

- 4.40 Post-construction phase of the LTC Scheme, the majority of the local road connections and PRow are planned to be restored, albeit not necessarily on precisely the same alignments.
- 4.41 For most of the local roads, bridges will be installed over the LTC Scheme (Muckingford Road, Brentwood Road, Stanford Road, Stifford Clays Road, North Road) but, in the case of Station Road, the LTC will pass over the local road.
- 4.42 Most of the PRow will have bridges over the LTC Scheme but some will be subject to significant diversions, described in more detail below and in Chapter 7.

Impacts upon Strategic Transport Movements

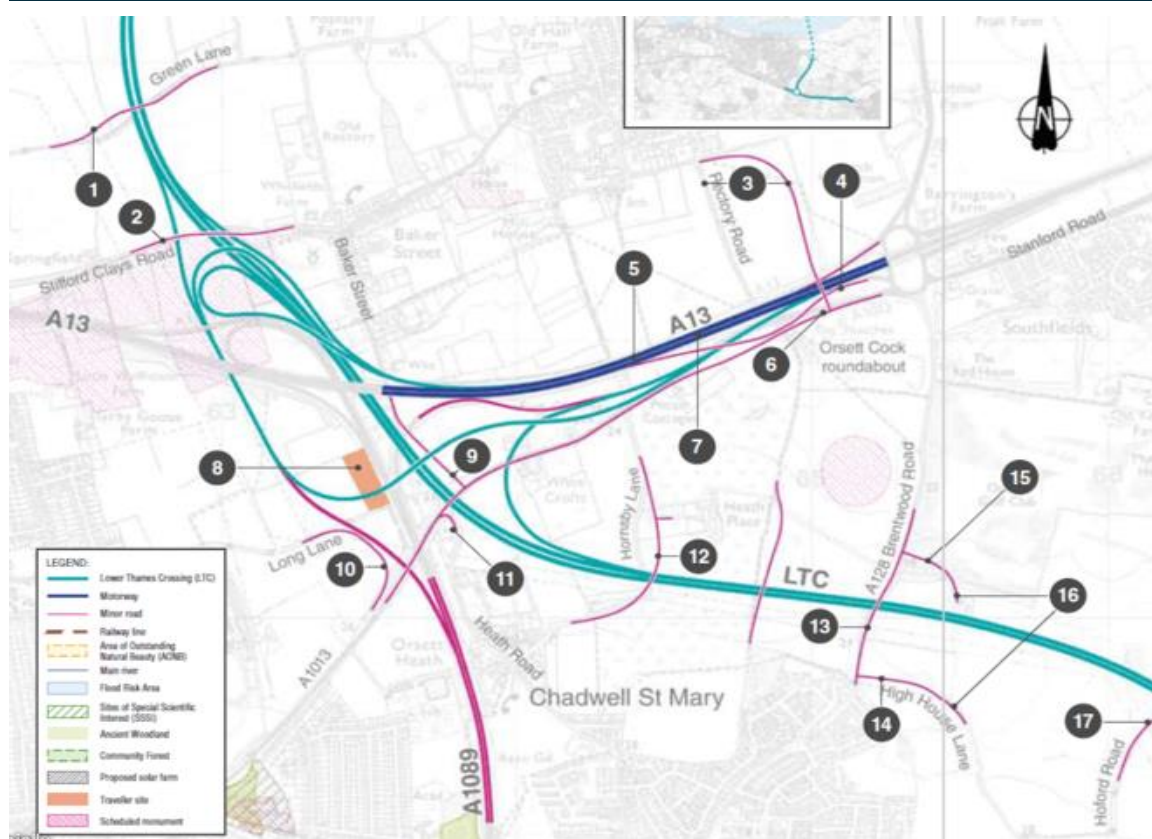
- 4.43 As a major strategic piece of infrastructure, most of the transport and connectivity impacts of the scheme have focused upon its role in supporting strategic traffic movements.
- 4.44 The LTC Scheme is designed to provide relief to the Dartford Crossing, at least in the short term. The Dartford Crossing is already operating above design capacity and is forecast to become further congested over time. The delivery of the LTC Scheme is forecast to reduce flows on the Dartford Crossing, albeit that background growth will have, effectively, consumed all spare capacity on the Dartford Crossing by 2027/28.
- 4.45 It is recognised that the Dartford Crossing is subject to frequent incidents that result in lane closures (1.8 times a day, on average¹²). These incidents have a major impact upon the operation of the M25 and linking roads, such as the A13 through Thurrock. Furthermore, when the Strategic Road Network becomes congested, driver attempt to take alternative routes via local roads across Thurrock and this creates large-scale congestion across the local road network and, particularly at peak travel times, this can cause gridlock.
- 4.46 The delivery of LTC would provide an alternative strategic crossing point across the River Thames. Based upon the Highways England traffic modelling outputs, the LTC will carry between 90,000 and 100,00 daily traffic movements across the River Thames by 2026. The section to the north of the A13 will carry between 75,000 and 80,000 daily vehicle trips.
- 4.47 The Highways England traffic modelling indicates that there will be an overall reduction in trips along the A13 on the section between the M25 and LTC of around 11%. Conversely, on the section of the A13 between A128/Brentwood Road and Stanford-le-Hope, traffic levels are forecast to increase by 19% as a result of LTC, making this section much busier for strategic and local traffic movements alike.
- 4.48 As explained earlier in this chapter, the re-design of the A13 / A1089 junction to incorporate the LTC Scheme creates a highly complex layout that incorporates the adjacent A13 / A128 / Brentwood Road junction. There are a limited range of traffic movements permitted through the proposed junction, as outlined in Table 4.3 and Figure 4.3.

¹² Source: Freedom of Information request (Essex Live)

Table 4.3 Permitted and unpermitted strategic traffic movements through A13 / LTC Junction						
	LTC Northbound	LTC Southbound	A13 Eastbound	A13 Westbound	A1089 Southbound	A128 Northbound
LTC Northbound	-	-	Yes	No	No	Yes
LTC Southbound	-	-	Yes	No	No	Yes
A13 Eastbound	No	No	-	-	Yes	Yes
A13 Westbound	Yes	Yes	-	-	Yes	Yes
A1089 Northbound	Yes	Yes	Yes	Yes	-	Yes
A128 Southbound	No	No	Yes	Yes	No	-

Source: Hatch Regeneris

Figure 4.5 Proposed A13 / LTC / A1089 / A128 junction layouts



Source: Highways England, 2018

- 4.49 This demonstrates that trips from the LTC Scheme will only be able to directly access the A13 eastbound (towards Stanford-le-Hope) and the A128 (towards Brentwood via the following junction). There are no links from the LTC to either the A13 westbound (towards the M25) or the A1089 (towards the Port of Tilbury).

- 4.50 Trips travelling westbound along the A13 (from Stanford-le-Hope) will be able to make the reverse movements back onto the LTC, but this is not the case for trips travelling south down the A128 (from Brentwood). This is due to reconfigurations to the A13 / A128 / Brentwood Road junction that do not enable access to the slip road leading to the LTC.
- 4.51 The same issue applies for trips travelling south down the A128 (from Brentwood) trying to access the A1089 (discussed further in the section below).
- 4.52 There is no access for trips travelling eastbound on the A13 (from the M25) to the LTC. All trips travelling to and from the north side of Greater London are expected to connect to the LTC at its direct junction with the M25. Trips coming out of Greater London on the A13 are expected to continue to use the Dartford Crossing to travel south into Kent. Whilst this might be a reasonable assumption in the short term, forecast background traffic growth means that post 2027/28 the levels of trips crossing the Dartford Crossing will return to current levels. In these circumstances, trips from Greater London may wish to utilise the LTC Scheme but would have restricted access to the scheme from the A13.
- 4.53 Any trips accessing the A13 from the junction with the A1012 from Chafford Hundred, Stifford Clays or Grays are also unable to access the LTC.
- 4.54 There are questions around how navigable the A13 junction with the LTC will be and whether its complexity will confuse and frustrate drivers. The route to and from the A1089 is a good example, with traffic able to access the LTC from the A1089 but not vice versa. Vehicle travelling along the LTC southbound from the M25, or northbound from the River Thames may be unaware that there is no direct access to the A1089 towards the Port of Tilbury. They may end up travelling onto the A13 and return at the next junction (A1014), causing unnecessary additional vehicle mileage and adding to congestion at junctions and an increase risk of accidents. Highways England have already indicated that upgrades to the A13/A1014 junction are likely to be required, as this is already an important junction providing access to London Gateway DP World.
- 4.55 It is still unclear as to the Highways England justification as to why an interface with the A13 / A1089 is required. Proposals limit the Council's Local Plan growth and will extend congestion points further east of junction 30. It remains the officer view that no interface with A13/A1089 should progress. However, potential future passive access points along the LTC alignment at South Ockendon / East Tilbury should be considered with direct major links to A13. This would better align with the Local Plan and would significantly enhance resilience on the network.

Impacts upon Local Transport Movements

- 4.56 As highlighted in the section above, there are a number of limitations to the strategic highway network around the junctions of the A13 with the LTC Scheme that will impact upon local transport movements.

A128 to A1089

- 4.57 The restricted movement from the A128 southbound (from Brentwood) to the A1089 (leading to the Port of Tilbury) represents a significant constraint. Whilst the A128 is not a formal part of the Strategic Highway Network, it provides an important link down from the A127 and centres such as Brentwood, Basildon and Billericay. It is estimated from the Highways England traffic modelling outputs that around 28,000 vehicles will use this route by 2026, in a scenario without LTC.
- 4.58 The introduction of the LTC, as proposed, would significantly restrict movements along this route. To access the A1089, vehicles would have to first travel eastbound to the A13 junction at Stanford-le-Hope, to the travel back westbound. This would equate to an

additional 4.2 miles and around 8 minutes, depending upon traffic levels, particularly at the A13/A1014 junction (as discussed in Section 4.54 above).

- 4.59 The Highways England traffic model indicates that around 1,100 vehicles may make this movement every day. This could equate to lost travel time of up to 55,000 hours pa, which would equate to around £650,000 lost value pa (in 2026 in 2019 prices).
- 4.60 The Highways England traffic modelling with LTC Scheme indicates that the number of trips using the A128 will fall by nearly 30%, demonstrating this route becomes considerably less attractive to use. Whilst this may have some benefits along the route, it comes at a cost to wider local connectivity.

Local Road Realignment

- 4.61 The LTC Scheme will result in the realignment of a number of local roads (to a greater or lesser degree), including A1013 Stanford Road, Station Road, Low Street Lane, Heath Road, and Baker Street. The realignments to Heath Road and Baker Street are relatively minor, to accommodate the design of the junction of the LTC with the A13. Low Street Lane is current closed to general traffic and so the realignment will only impact upon non-motorised modes of travel (discussed further below and in Section 7).
- 4.62 A13 Stanford Rd will be significantly diverted to accommodate LTC. Local requirement to improve capacity and access (for 2x school access) must be incorporated into the LTC design / delivery.
- 4.63 Station Road currently passes through the location that was proposed for the Rest and Service Area (RASA) that would have included a junction from the LTC. In order to accommodate this construction, Station Road would require a significant diversion around the northern and eastern edges of the site. This is estimated to marginally increase the route from Low Street to East Tilbury (south) but is only likely to add around 15 to 20 seconds per trip. Reference Case (without LTC) daily traffic flows in 2026 along the route are forecast to be around 4,000 vehicles per day. Bus route 374 also uses the route.
- 4.64 Whilst it is understood that this RASA is no longer part of Highways England plans, there is still the potential to provide 'soft' provision for a junction in this location. At this stage, it is unclear how this would impact upon the requirement to re-align Low Street. This will need to be considered further when revised Highways England plans become available.

Hornsby Lane

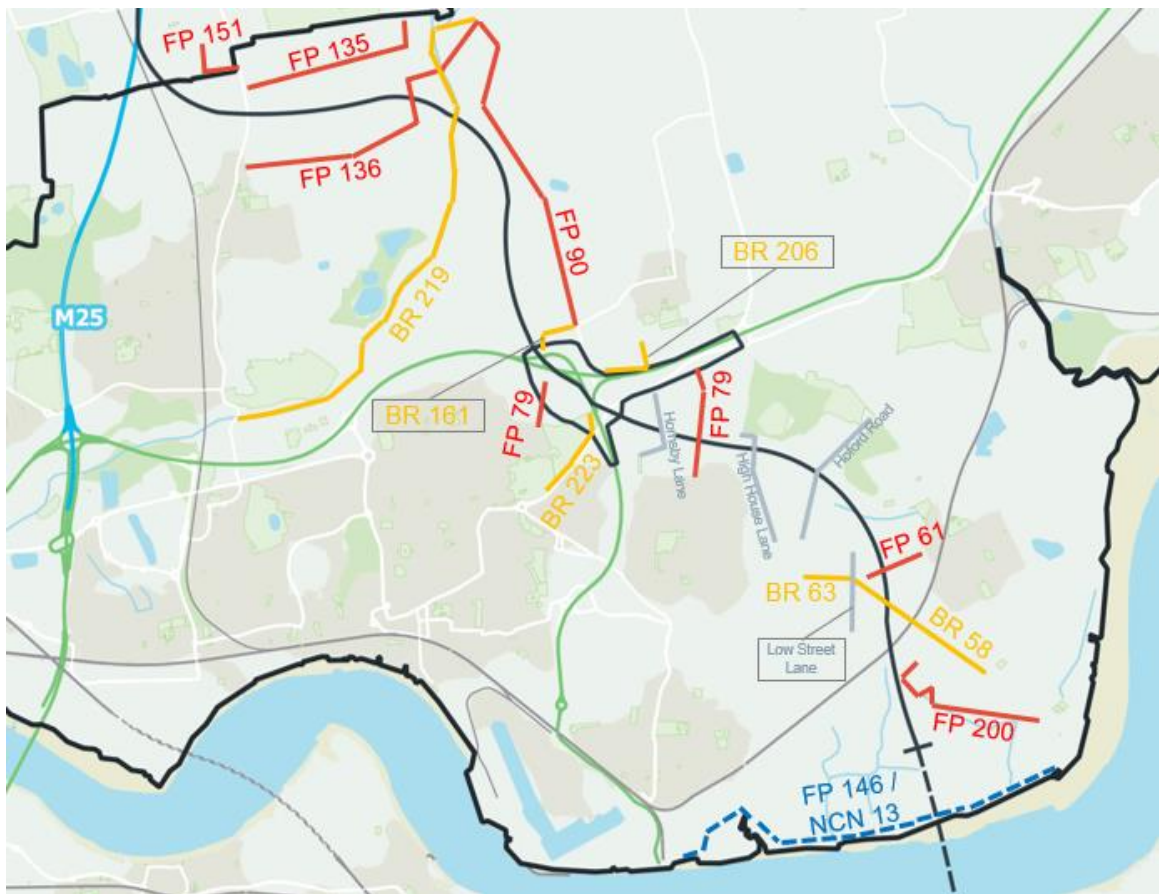
- 4.65 Alongside the realignment of local roads, one road will be permanently closed as a through route by LTC. This is Hornsby Lane. It is a single-track route that provides an alternative connection from Orsett Heath to Stanford Road and gives access to some local properties. There is no traffic flow data available for this route, but flows are likely to be minimal. The closure of the route to through traffic may have a minor adverse impact on local access to properties and residents in Orsett Heath, but it is not considered likely to generate any significant economic cost.
- 4.66 The route is also classified as a bridleway, as part of wider non-motorised connections, and it is assumed that the through route will be lost for these modes as well. This is discussed further in the following section.

Public Rights of Way (PRoW)

- 4.67 The operational phase of the LTC Scheme is not stated to entail any closures of PRoW; however, the status of Footpath 61 is currently unclear. Whilst this is a signposted route, and included within Thurrock's PRoW mapping, it would not appear to be well maintained or heavily utilised. None-the-less, there would appear to be no provision within the LTC Scheme proposals for this route to be retained and so it will be permanently severed.

- 4.68 A large number of other PRow will be subject to amendments and permanent diversions under the proposed operational phase of LTC. These are presented in Figure 4.6 and summarised underneath.

Figure 4.6 PRow and Tracks affected by LTC in Operational



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- NCN 13 / Footpath 146 (Coastal Route)
 - Retains general alignment but runs behind tunnel portal and new control buildings
- Footpath 200 (Coalhouse Fort to Station Road)
 - Diverted to join new Station Road alignment
- Bridleway 58 (Coal Road)
 - Diverted by 900m to pass under project embankment through new underpass
- Low Street Lane
 - Diversion west to retain access to Muckingford Road, adding 120m to 180m (depending on route)
- Bridleway 63 (Coal Road)
 - Retains general alignment but affected by realignment of Low Street Lane and Bridleway 58
- High House Lane (track)
 - Diversion west (along similar alignment to Footpath 78) to retain access to Brentwood Road, adding 180m to equivalent point-to-point distance

- Footpath 79 (Chadwell St Mary to Orsett)
 - Diverted about 600 m to cross project route on new overbridge, also carries realigned farm track
- Hornsby Lane (single track / bridleway)
 - Assumed it is closed as a through route (as with general traffic)
- Bridleway 223 (Gammonfields Way / Long Lane)
 - Realignment of route
- Footpath 79 (Long Lane leading to the north east into rough ground)
 - Shortened due to presence of new A1089 to LTC northbound slip road)
- Permissive Bridleway 206 (Baker Street to Mill Lane)
 - Realignment of route
- Bridleway 161 (Green Lane)
 - Realignment of route
- Footpath 90 (from Fen Lane running north towards Bulphan Fen)
 - Not directly impacted by LTC Scheme but will run alongside LTC alignment
- Bridleway 219 (alongside Mardyke)
 - Retains alignment but route under the LTC Scheme
- Footpath 136 (South Ockendon to Bulphan Fen)
 - Diverted about 650 m and raised about 9.5 m above existing level to cross project route on a new footbridge
- Footpath 135 (from North Road running east towards Bulphan fen)
 - Not directly impacted by LTC Scheme but will run alongside LTC alignment
- Footpath 151 (west from North Road - mainly located outside of Thurrock area)
 - Diversion of about 650 m and raised 3 m above ground level to cross project route to M25 link roads and to railways on new footbridge

4.69 We understand that Highways England has some usage data for PRoW that will be impacted but this has yet to be made available. The scale of the direct impact of these permanent diversions is not known, but it could be considered in due course.

4.70 Section 7 provides a further assessment of the potential impacts, in terms of community connectivity, resulting from the diversions.

Thames Crossing Closures

4.71 As highlighted earlier in this chapter, data collected on the frequency of closures of the Dartford Crossing¹³ indicates there are currently estimated to be around 1.8 closures of the Dartford Crossing per day. Whilst closures can vary significantly in duration, closures for emergency repairs are, typically, estimated to take 30 minutes. This would indicate that there is disruption on Dartford Crossing for 54 minutes of every 24-hour period (3.75% of the time).

4.72 Whilst the delivery of the LTC Scheme will provide more resilience to strategic crossing provision over the River Thames in this area, the combined LTC Scheme and Dartford Crossing are forecast to have significantly higher overall flows in the future.

¹³ Source: Freedom of Information request (Essex Live)

- 4.73 It might reasonably be anticipated that emergency repair works will be considerably lower on the LTC Scheme in early years of operation, in comparison to the Dartford Crossing. There are, however, considered to be elements of the LTC Scheme design that increase the risk of potential incidents. This includes the gradient of the incline from the tunnel portal into Thurrock, which is required to be relatively significant (in motorway terms) to be able to reach sufficient height to bridge across the Tilbury Loop Railway Line. Whilst it is recognised the incline is within relevant design standard, the design will increase the risk of incidents related to fully laden HGV traffic.
- 4.74 On the basis of the current level of closures on the Dartford Crossing, the redistribution of traffic flows, the increasing flows of traffic, and the design standards of the LTC Scheme, we have assumed the following level of closures could occur:
- Estimated 1.5 incidents per day on Dartford Crossing
 - Assumed to be an incident every 4 to 8 days on the LTC Scheme
- 4.75 On the basis of these incident rates, and an average duration of 30 minutes, the estimated probability of an incident occurring on both crossings, at some point in the same 30-minute period (not necessarily concurrently), as 4.9% on days when an incident occurs on each crossing.
- 4.76 On the basis that an incident occurs every day on the Dartford Crossing, and every 4 to 8 days on the LTC crossing, it is estimated that there could be an overlap in incidents between once every 80 to 160 days.
- 4.77 The impact of a concurrent closure of the Dartford Crossing and LTC Scheme has not been investigated by Highways England, however, given how significant an impact the closure of the Dartford Crossing alone has upon the local Thurrock road network, it is only reasonable to assume that it will be of a magnitude higher. The impact on local roads between the M25 and the A1089 is likely to be particularly severe. The impact upon business and communities is examined within Chapters 6 and 7, respectively, including the major risks it would present to accident and emergency response times across the network.

5. Impact Framework

Development of Impact Framework

- 5.1 The baseline research summarised in chapter 3 and the transport and connectivity impacts discussed in chapter 4 have supported the development of a bespoke impact framework to assess the adverse impacts of the LTC in Thurrock.
- 5.2 There is no single set of guidance relating to assessment of local economic and social impacts of major infrastructure projects. The guidance which currently exists (such as the HM Treasury Green Book and Department for Transport TAG) is highly technical and focuses predominantly on macro level transport and development (land value uplift) impacts, rather than local economic and social impacts.
- 5.3 As a result, while the framework takes into account and aligns with standard appraisal and impact assessment methodologies, it also reflects a highly tailored response to the local conditions and priorities in Thurrock.

Assumptions

- 5.4 The following overall assumptions have informed the development of the impact framework:
- The scope of this study means that the focus of the framework has been on cost impacts.
 - The framework allows for the collation of both quantitative and qualitative data. Impacts are quantified where possible, but in other places qualitative assessment of the types and magnitudes of potential impacts is necessary.
 - In quantifying impacts, a number of different types of value have been considered, recognising that a broad range of different stakeholders will be affected and that each of these will perceive value in different ways. The broad impacts types are: economic impacts (jobs and GVA), commercial impacts (land value uplift and revenue generation), community impacts (loss of housing, personal prosperity, health and wellbeing) and environmental impacts relating to physical environmental changes such as loss of habitat and noise pollution.
 - To ensure truly local assessment of impacts, the framework has been designed to allow for a bottom up and 'site by site' approach to the measurement of growth impacts. However, given sensitivities relating to some of the local development and regeneration conditions, all reporting has been at aggregated levels: LTC Development Boundary¹⁴; 50m / 200m / 500m buffers of the route; and borough level.
- 5.5 The impact framework has been designed to assess impacts during both the construction and operational phases. This occurs at a number of different impact geographies, including:
- Construction phase*
- LTC Development Boundary (shown in Figure 2.4 with Chapter 2)
 - 200m buffer around the Development Boundary

¹⁴ As set out in the Highways England 2018 Statutory Consultation

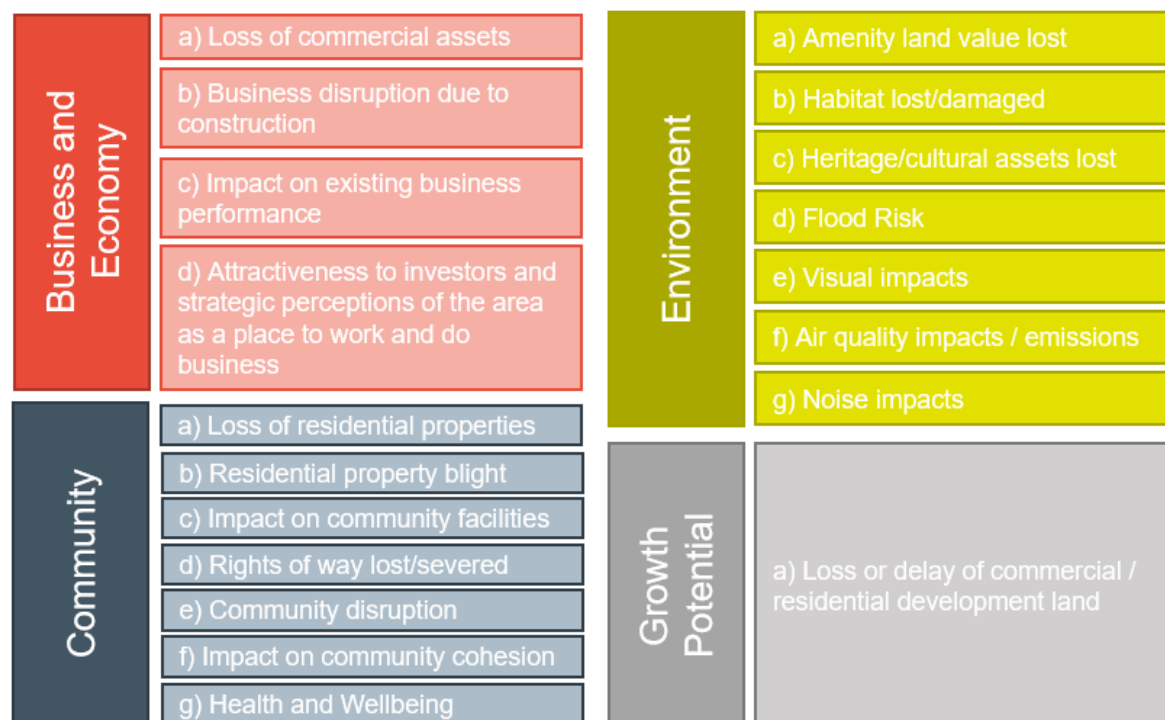
Operational phase

- The LTC alignment (shown in Figure 2.3 within Chapter 2)
- 50m, 200m and 500m buffers around the LTC alignment (shown in Figures C1, C2, and C3 within Appendix C)

Impact Themes and Sub-Themes

- 5.6 The overall impact framework has been categorised by four main themes and associated sub-themes. These are summarised in Figure 5.1 below.

Figure 5.1 Impact Framework



Source: Hatch Regeneris

- 5.7 The four themes are not independent and there is overlap in impacts amongst them. They are each meant to capture the impacts from different perspectives. For this reason, the outputs are not all additive, in a collective sense.

Business and Economy

- 5.8 The business and economy theme focuses on understanding the impact of LTC on the Thurrock economy and business base. By assessing this impact across a range of sub themes, including on existing business operations and the potential for on-going investment after the LTC has been delivered, an overall assessment can be made on the costs (monetary and otherwise) of the LTC to the economy.

Key metrics for measuring impact:

- Productive land value lost
- Turnover lost
- Jobs lost
- GVA lost
- Delay to journey times for business trips
- Investment Potential

Community

- 5.9 The impact of the LTC on the people and communities in Thurrock is multi-dimensional and requires interrogation of a number of different sub-themes in order to understand the overall impact. These sub-themes include both qualitative and quantitative assessment of impact, ranging from the cost of demolished properties to community disruption and severance.

Key metrics for measuring impact:

- Economic cost of lost housing
- Blight to the value of housing
- Impact on community facilities
- Disruption to the communities' ability to access key assets and services
- Severance and community isolation
- Journey time increases due to PRow diversions
- Health and wellbeing impacts

Environment

- 5.10 The environment theme captures the Impact of LTC on the landscape and environment in Thurrock. This includes an assessment of the potential impacts to habitat and wildlife, heritage assets, landscape blight and increased noise and air pollution.

Key metrics for measuring impact:

- Loss of amenity value of land
- Loss of habitat and impacts to wildlife
- Adverse impacts to heritage
- Increased risk of flooding
- Visual blight
- Impacts of increased noise
- Reduction in air quality / increased emissions

Growth Potential

- 5.11 The delivery of the LTC is likely to impact upon the future residential and commercial development potential in Thurrock due to the land take required. A significant sterilisation of space as a result of the LTC will have implications for the delivery of Thurrock's Emerging Local Plan and could prevent the council from achieving its housing and employment land targets.

Key metrics for measuring impact:

- Number of potential housing units lost or delayed
- Amount of potential commercial space lost or delayed
- Loss of land value for potential lost/delayed housing
- Loss of land value for potential lost/delayed commercial space
- Land value blight for residential and commercial land

6. Business and Economy Cost Impacts

Overview

- 6.1 This chapter assesses the impact of LTC on Thurrock's businesses and economy, including the loss of commercial assets, business disruption, and adverse impacts on the strategic perceptions of the area as a place to invest and do business.
- 6.2 The impacts considered within this chapter fall into two main categories:
- **Direct impacts:** as a result of demolition and / or direct loss of land
 - **Indirect impacts:** on the wider economy and businesses in the borough as a result of congestion from construction traffic and LTC operations
- 6.3 As a result, the assessment study areas for this chapter include:
- **LTC Development Boundary¹⁵:** businesses that fall within or around the LTC Development Boundary will experience *direct effects* during construction;
 - **Thurrock Borough:** businesses located in the towns and villages around the LTC route, the wider Thurrock economy and perceptions of the borough may be *indirectly* impacted during the construction and operational phases.

Impact Assessment

- 6.4 The impacts assessed under the Business and Economy costs theme are:
- a) Loss of commercial assets
 - b) Business disruption due to LTC construction
 - c) Impact on existing business performance
 - d) Attractiveness to investors and take up of space as well as strategic perceptions of the area as a place to work and do business

a) Loss of Commercial Assets

- 6.5 The delivery of LTC will require the temporary and permanent loss of commercial assets in Thurrock. Commercial assets include business premises or land used for commercial purposes, such as agriculture.

Scope and Methodology of Assessment

- 6.6 Understanding the impact of LTC on commercial assets has been guided by the scope of assessment below.

¹⁵ As set out in the Highways England 2018 Statutory Consultation

Figure 6.1 Loss of Commercial Assets – Scope of Assessment



Source: Hatch Regeneris

- 6.7 The information presented in the Highways England 2018 PEIR suggests that no businesses will be lost as a result of LTC. However, local information from Thurrock Council finds that the compulsory purchase of Springfield Farm on Stifford Clays Road will result in the closure of a small local business – Springfield Cattery. The purchase of the farm and Cattery means that commercial premises will be permanently lost as a result of LTC.
- 6.8 In addition, productive agricultural land in Thurrock will be permanently lost as a result of the construction and operation of LTC.
- 6.9 The impact of the loss of commercial assets has been calculated using a land value approach to determine the cost of land lost. To calculate this impact, the following assumptions have been used:
- Commercial land is assumed to be lost in the first year of construction of LTC (2021)
 - MHCLG appraisal guidance¹⁶ on the value of industrial or agricultural land per ha in the South East LEP region has been used to determine the value of land lost:
 - Agricultural: £22,500 per ha in 2017 prices
 - Industrial: £1,800,000 per ha in 2017 prices
 - The amount of commercial land lost due to the closure of the Cattery has been determined by calculating the area of Springfield Farm
 - The amount of agricultural land lost has been determined by looking at all the non-development land within 50m of the LTC route. This is to prevent double counting with the growth impacts captured in chapter 9.

Assessment of Impacts of the Loss of Commercial Assets

- 6.10 Around 0.3ha of commercial land will be permanently lost due to the closure of the Cattery. This equates to £546,000 lost in present value (2019 prices).
- 6.11 Analysis also shows that there could be around 152 ha of agricultural land loss due to the construction and operation of LTC. This equates to a value of £3.5m in present value (2019 prices).
- 6.12 In addition to this cost, the loss of productive agricultural land will impact upon farm productivity and the farming sector in Thurrock, with implications for the future of jobs and

¹⁶ Land Value Estimates for Policy Appraisal

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/710539/Land_Values_2017.pdf

livelihoods. Assessment by Highways England for the LTC Preliminary Environmental Impact Report found that there are 6 farms located within the LTC development boundary and a further 16 farms within 200m of the boundary (as shown within mapping¹⁷ created by Highways England).

- 6.13 Many of these farms are likely to experience direct loss of land or significant disruption (explored further below in impact 6b) as a result of the construction of the LTC. In total there are 53 farms within 1km of the LTC development boundary.

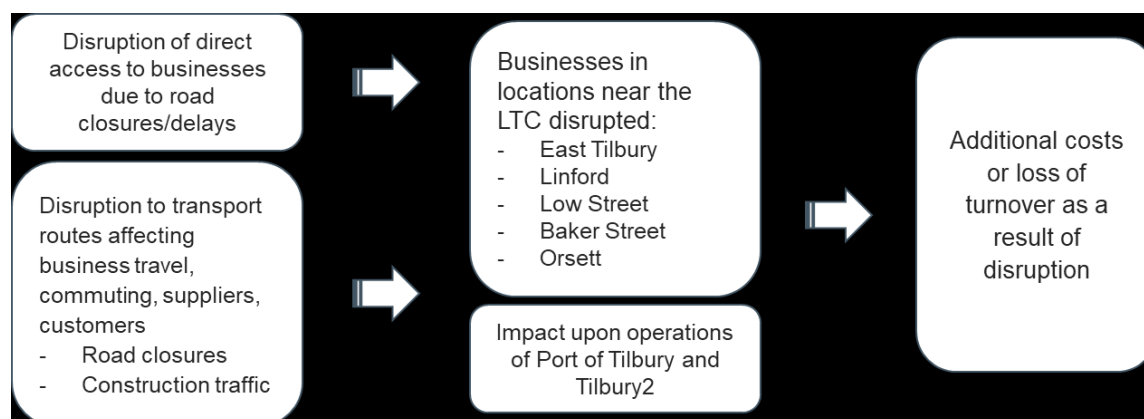
b) Business Disruption due to LTC Construction

- 6.14 A number of businesses are located in close proximity to the LTC route and main construction work sites. It is likely that these businesses will be adversely impacted due to the disruption associated with LTC construction.
- 6.15 As noted in Chapter 4, our assessment of the construction phase of the LTC Scheme is based upon information available within the PEIR, and does not take into account any recently updated proposal by Highways England in January 2020.

Scope and Methodology of Assessment

- 6.16 Businesses located in and around the towns and villages near the LTC may be subject to disruption in two ways as a result of construction:
- 1) Disruption of direct access to businesses
 - 2) Negative impacts to town centre performance as a result of disruption, and therefore reduced footfall and turnover for businesses
- 6.17 To understand this impact, the following scope of assessment has been used:

Figure 6.2 Business Disruption – Scope of Assessment



Source: Hatch Regeneris

Assumptions to underpin (1) disruption of direct access

- 6.18 The details of road closures during the LTC construction phase is discussed in Chapter 4. The limited information that is available, has been used to assess potential disruption to access to specific businesses located in close proximity to the LTC development boundary.

¹⁷ Lower Thames Crossing Preliminary Environmental Information Report: Figures (Highways England, 2018) <https://hatchengineering.sharepoint.com/:b:/r/sites/UrbanSolutionsUK/ajobs/H360739/Input/Documents%20from%20the%20Client/LTC%20Scheme/PEIR%20Figures%20%20Chapter%2014%20People%20and%20Communities%20complete.pdf?csf=1&e=2xfjzG>

Assumptions to underpin (2) negative impacts to town centre performance

- 6.19 Firstly, business turnover was determined using turnover data by sector for Thurrock from the ONS in combination with business location data from the VOA.
- 6.20 The magnitude of impact on business turnover was then determined using information on:
- the footprint of LTC construction works (see Figure 1.2);
 - proposed LTC construction movements (as set out in Chapter 4); and
 - information on existing town centre catchment areas.
- 6.21 This enabled an assessment of which areas around the LTC are most susceptible to adverse impacts on turnover, as shown in Figure 6.3 below.
- 6.22 The assessment suggests that businesses in East Tilbury, West Tilbury and Low Street are particularly at risk given their proximity to LTC construction worksites and traffic routes.
- 6.23 The impact of construction traffic on local roads is set out in Chapter 4. This highlights the highest impacts are predicted to be on Station Road and Muckingford Road, followed by Brentwood Road, Stanford Road, Baker Street, Heath Road, and Stifford Clays Road. Lower level impacts are also forecast for North Road. Using this assessment, alongside the proximity of the LTC construction boundary, as well as underlying characteristics of each area, an overall assessment of the scale of likely impact upon turnover has been generated.

Figure 6.3 Likelihood of LTC Impact

Area	Distance from LTC Development Boundary	Character	Likelihood of LTC Impact on Turnover
East Tilbury	0.5km	Village	High
Southfields	0.6km	Settlement/Hamlet	Medium
Linford	0.2km	Settlement/Hamlet	Medium
West Tilbury	0.3km	Settlement/Hamlet	High
Low Street	0.1km	Settlement/Hamlet	High
Baker Street	0.1km	Settlement/Hamlet	Low
Orsett	0.65km	Village	Low
Tilbury	2km	Small Town	Medium
Chadwell St Mary	1km	Small Town	Medium

Source: Hatch Regeneris

- 6.24 To model the sensitivity of local businesses to changes in turnover, we have examined two scenarios with different levels of impact (summarised in Figure 6.4 and described below):
- Under the small turnover impact scenario, we have modelled the possible economic impact of a 1% decline in footfall in the high impact town centres and a 0.5% decline in footfall in the lower impact town centres. A conservative medium / central case scenario of 3% is applied.
 - Under the moderate turnover impact scenario, we have modelled the impacts of 5% and 2.5% declines in footfall in the respective town centres. A conservative medium / central case scenario of 3% is applied.

Figure 6.4 Turnover Impact Scenarios

Scenario	Likelihood of Impact	Reduction in turnover
Moderate	High	-5%
	Medium / Central Case	-3%
	Low	-2.5%
Small	High	-1%
	Medium / Central Case	-0.75%
	Low	-0.5%

Source: Hatch Regeneris

Assessment of Impacts of Business Disruption

- 6.25 As stated in the scope of assessment, businesses located near to the LTC may be subject to disruption during LTC construction in two ways:

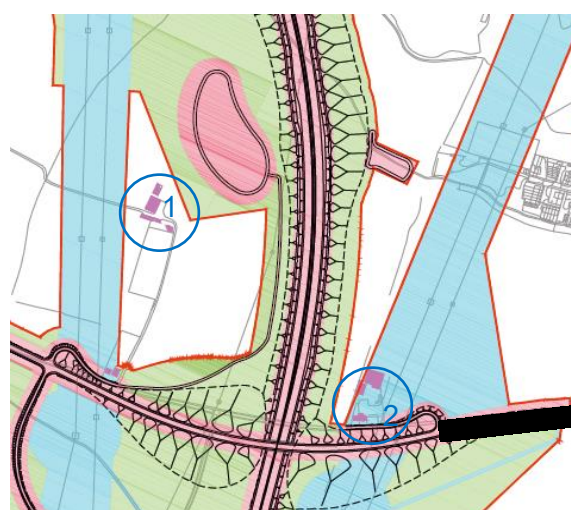
1) Disruption to direct access

- 6.26 A number of local roads will be subject to prolonged delays during LTC construction, particularly the east-west running local roads south of the A13 junction and north of the Tilbury loop railway line. This has the potential to directly disrupt businesses due to the closure or diversion of their main access route.

- 6.27 Analysis of the proposed road changes suggests that at least 6 farms and businesses in Thurrock could have their single direct route of access temporarily disrupted during construction or permanently re-routed/diverted. Disruption to 4 of those businesses is likely to be particularly heightened during the construction of bridges to divert local roads over the LTC due to their proximity to the LTC route. The re-routing of Muckingford road is a key example of this:

- Two farms (Ashlea Farm and Becksland Farm) currently have direct access routes off the Muckingford road. Both farms are located in close proximity to the LTC route. As shown in Figure 6.5, the diversion of Muckingford road over the LTC will result in new access routes to the two farms. The construction of these is likely to cause disruptions to the farm operations.

Figure 6.5 Muckingford Road Re-routing



Source: Highways England. 1: Becksland Farm, 2: Ashlea Farm

- 6.28 Other examples of businesses likely to be disrupted include:

Port of Tilbury/Tilbury 2

The closure of roads and increased congestion in the south of Thurrock are likely to result in adverse impacts to the Port of Tilbury, the largest employer in the borough. In particular, there could be moderate adverse delays to movements to and from the Port of Tilbury and Tilbury 2 via the A13/A1089 junction during construction (see section 6.30 below).

Fox Inn

- 6.29 The Fox Public House is located within 100m of the development boundary on Heath Road, between Chadwell St Mary and the A13 junction. The creation of the new A1089 slip road onto the LTC will result in significant construction work directly adjacent to the pub, as well as closure and disruption to the roads that serve it. Given the customer facing nature of the business and reliance on customers accessing it by car, it is likely that the Fox Inn could be subject to moderate adverse impacts.

A13 Junction Impacts

- 6.30 Section 4 outlines the potential construction related impacts of LTC on the operation of the current A13 / A1089 junction. Whilst specific traffic management plans are unavailable it has been assumed that some speed restrictions, lane reductions, and occasional road closures will be in place during certain points in the construction phase.
- 6.31 Based on the same approach adopted in Chapter 4 for all general traffic, it is estimated that around 20,000 business trips per day pass through the junction with an origin or destination within Thurrock.
- 6.32 The delays that will be incurred at the junction will translates into an additional 360 to 900 business hours per day, or 116,000 to 288,000 per annum, depending upon actual average journey times through the roadworks.
- 6.33 Depending upon the duration that traffic restrictions are in place around the A13 junction works takes, this level of delay translates to an estimated monetised economic cost of between £2.4 million (1 year) to £18.3 million (3 years) in present values (2019 prices) to the Thurrock business economy.
- 6.34 Nearly 65% of these impacts will be associated with business trips along the A1089 and will include all traffic heading to and from the Port of Tilbury, as well as other businesses located along this corridor, such as Amazon and Uniserve.

2) Negative impacts on town centre performance

- 6.35 The table below highlights the economic impact of business disruption. Under the small impact scenario, there could be a loss of £4m in turnover, 26 FTE jobs and £1.5m in GVA in one year and up to £8.8m over 6 years. This could increase to up to £18m turnover, 115 FTE jobs and £6.6m GVA (1 year) / £28.9m GVA (6 years), under the moderate impact scenario. Included in Figure 6.6 below is also the GVA impacted costed over 3 and 6 years.
- 6.36 These figures are intended to illustrate the sensitivity of businesses and the local economy to adverse impacts, rather than a robust assessment of impact. However, the sensitivity testing suggests there's will be a need for appropriate mitigation measures to be put in place in Thurrock to protect businesses if the LTC goes ahead.

Figure 6.6 Business Disruption Impact

Impact Measure (over x number of years)	Small Impact			Moderate Impact		
	1 year	3 years	6 years	1 year	3 years	6 years
Turnover Loss	£4.03m	-	-	£18.15m	-	-
Employment Loss (FTE)	26	-	-	115	-	-
GVA Loss from Employment	£1.5m	£4.4m	£8.8m	£6.6m	£19.6m	£38.9m

Source: Hatch Regeneris

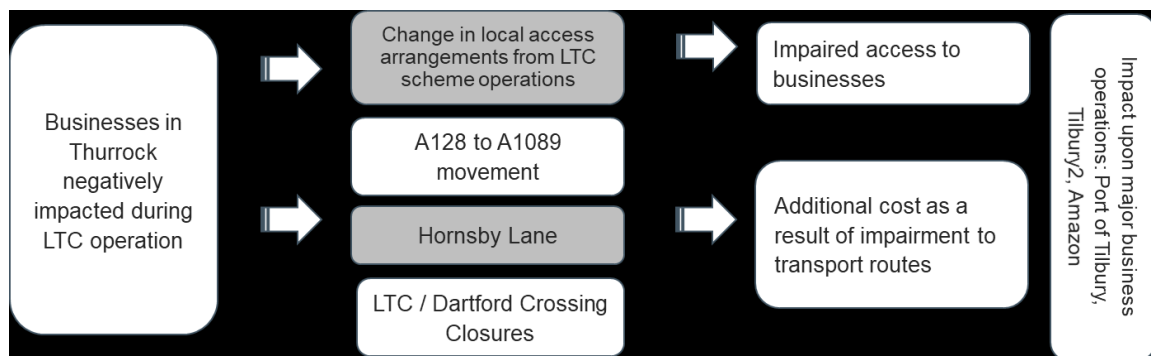
c) On-going business performance

- 6.37 Once the LTC has been delivered, there may be on-going adverse impacts to business performance as a result of physical access constraints in the area. This could result in additional travel time for business-related trips which has an economic cost.

Scope and Methodology of Assessment

- 6.38 The logic map below (Figure 6.7) details the areas included in the assessment of the impact to on-going business performance.

Figure 6.7 On-going business performance – Scope of Assessment



Source: Hatch Regeneris

- 6.39 The two main outcomes are:

- Constraint to physical access in the area as a result of the scheme
- Additional costs due to transport impacts, measured by the cost of additional travel time. Travel time impacts are assessed over a 60-year appraisal period, which is standard for UK Department for Transport assessments. Journey times are assumed to increase as a result of:
 - Re-configuration to the A13 junction resulting in a loss of direct access between the A128 and A1089 (as set out in Chapter 4).
 - Simultaneous incidents to the LTC and Dartford Crossing which would significantly increase congestion and impair transport accessibility in Thurrock. The baseline used in this assessment (as set out in Chapter 4) is an average of 1.8 closures a day on the Dartford Crossing.

Assessment of Impacts of On-going Business Disruption

- 6.40 Despite the closure of Hornsby Lane and localised disruption to roads around the LTC, there is unlikely to be any major ongoing impact for businesses as a result of these issues due to the absence of businesses within a close catchment to the LTC.
- 6.41 There will, however, be costs associated with increased travel time during LTC operation which will affect some business trips within Thurrock:
- 1) The additional travel time associated with reduced access onto the A1089 from the A128 could cost up to £14.5 million. It is estimated that 40-50% of this impact is linked to movements to and from the Port of Tilbury and Tilbury 2, costing £5.8m-

£7.25m. Given the reliance of the port, and surrounding businesses such as Amazon, on road freight and distribution, this is likely to negatively impact on business operations.

- 2) It is estimated that there could be concurrent incidents (whereby there is at least a 5-minute overlap in incidents) of the LTC and Dartford Crossing between every 80 to 160 days. Whilst average closures associated with incidents on the Dartford Crossing are around 30 minutes, the impact they can have upon traffic disruption on the M25 and approach roads can last significantly longer, in some instances well over an hour.

The impact of a concurrent incident on both the Dartford Crossing and LTC could result in widespread disruption within the local vicinity. This will include the A13 through Thurrock, as well as knock-on impacts to the local road network across Thurrock. It is envisaged that the scale of potential delays could be exponentially high with both crossing points closed.

To assess these impacts would require detailed traffic modelling of the area, which is unavailable. An indicative analysis has been undertaken to demonstrate the scale of potential impacts.

If a concurrent closure resulted in delays along key routes running parallel to the A13 (A1306, B186, A1013) and the A1089 then the traffic modelling data available indicates this could affect up to 1,200 business trips. If delays average were an average of 30 to 45 minutes per vehicle then the impact would equate to £15,000 to £23,000.

Allowing for a concurrent closure of between every 80 to 160 days, these delays are the equivalent to an economic loss of between £1.2m and £3.5m over the full appraisal period.

d) Attractiveness to Investors and Strategic Perceptions

- 6.42 It is possible that LTC construction will have an adverse impact on business investment into existing (vacant) business premises due to reduced investor confidence. The negative impacts on business performance discussed above, as well as significant flows of LTC construction traffic (and related congestion) and wider LTC construction related blight (such as noise and visual impacts), may significantly weaken perceptions of the area as a place to do business.
- 6.43 As discussed in Chapter 3, Thurrock requires significant investment in new sectors and skills training if it is going to achieve its aspiration of economic diversification. However, the addition of a major piece of infrastructure, with its associated blight and disruption, may create additional challenges in attracting investment and people to live and work in the area. As a result, adverse impacts of the LTC could result in missed opportunities to support the development of Thurrock and ensure growth across its economy. This is particularly important given the recent publication of the Thames Estuary Growth Commission report¹⁸ and the governments agenda to support economic growth in the region.

¹⁸ Thames Estuary Growth Commission 2050 Vision, 2018
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718805/2050_Vision.pdf

Attractiveness to Investors – take up of vacant space

- 6.44 Currently, parts of Thurrock have high town centre vacancy rates which is often a marker of a struggling economy. Research presented in the House of Commons High Streets and Town Centres 2030¹⁹ report finds that empty shops can cause a 'negative feedback loop', discouraging investment and re-enforcing low consumer confidence in an area.
- 6.45 Whilst it is not possible to quantify the impact of the LTC on reduced investor confidence, it is likely that the LTC could have a moderate adverse effect on the vitality of the areas surrounding the route and the inward investment in these areas.
- 6.46 As shown in Figure 6.8, Stifford Clays, Tilbury, Stanford-Le-Hope have high vacancy rates. To ensure these town centres, and others, grow and are more prosperous and resilient in the future, there needs to be an increased take up of space and better utilisation of current capacity. This requires inward investment and an ability to attract more visitors to increase demand and footfall. However, these locations are in close proximity to the LTC and will be subject to disruption, as discussed in impact 6b.
- 6.47 In particular, the disruption associated with local road closures and diversions over the 6-year LTC construction period could have a major impact on accessibility to these town centres, reducing the attractiveness of these locations as a place to do business. This could impact on investor confidence and, as a consequence, the levels of inward investment.

Figure 6.8 Vacancy Rates in Thurrock	
Centre	% Town Centre Vacancy 2018
Grays Core	8.5
South Ockenden	10.6
Corringham	6.6
Stanford-le-Hope	10.0
Tilbury	18.3
East Tilbury	0.0
Chadwell St Mary	9.1
Little Thurrock	7.1
Stifford Clays	17.6
Chafford Hundred	0.0
Linford	0.0

Source: Thurrock Town Centre Health Check. Bold text indicates the vacancy rate is at or above the national average.

- 6.48 Whilst some of the smaller centres near the LTC have very low vacancy rates (East Tilbury and Linford have 0%) and therefore may appear less vulnerable to the disruption associated with LTC, it is worth noting that these retail centres have very low numbers of units (e.g. 6 in East Tilbury). Therefore, any impact of LTC on business closures (even if small) could see vacancy rates jumping to at least 16%.

¹⁹ High Streets and Town Centres in 2030
<https://publications.parliament.uk/pa/cm201719/cmselect/cmcomloc/1010/1010.pdf>

Strategic perceptions of Thurrock

- 6.49 There is limited direct evidence to establish the extent to which current perceptions of Thurrock may constrain strategic investment within the area. This is due to a lack of business and other attitudinal surveys about Thurrock. However, a number of issues strongly characterise Thurrock, including poor infrastructure and accessibility, low paid employment and poor community wellbeing. The delivery of the LTC is likely to exacerbate these issues of perception, in turn potentially making the area a more challenging location to recruit employees and retain staff, for example. This could have additional impacts upon the overall competitiveness of the area and, in particular, may affect the ability to diversify the economy and generate jobs within higher value sectors.
- 6.50 The severance impacts to Thurrock residents (explored in Chapter 7) and business communities, created by LTC, could also add to this challenge. In the longer term, this could potentially have some impact upon property values.

Summary - Business and Economy

- 6.51 It is clear that the LTC could significantly impact upon the local economy and businesses in Thurrock, particularly in relation to disruption as a result of LTC construction and operation.
- 6.52 The overall impacts of the themes discussed above are summarised in Figure 6.9.

Figure 6.9 Summary of Key Business and Economy Impacts

Impact Area		Estimated Cost to Thurrock
a) Commercial assets / land value lost		c. £4 million
b) Business disruption during construction	Jobs loss	115 FTE
	GVA Impact	up to c. £39 million
c) On-going business performance		up to c. £18 million
d) Attractiveness to investors & strategic perceptions		<i>Minor to Moderate Adverse</i>

Source: Hatch Regeneris

7. Community Cost Impacts

Overview

- 7.1 This chapter covers the impact of LTC on communities located within Thurrock, including effects on residential properties, community facilities and public rights of way (PROW).
- 7.2 Impacts considered within this chapter fall into two main categories:
- **Direct impacts:** demolition / loss of residential properties and land; and
 - **Indirect impacts:** blight on communities (residential properties) and community facilities caused by the construction and operation of LTC, such as changes in noise, air quality and visual effects. The disruption of the LTC on the community cohesion is also considered.
- 7.3 Study areas have been established based on the following assumptions:
- **LTC Development Boundary²⁰:** residential properties / community assets that fall within the LTC Development Boundary will experience *direct effects*;
 - **200m from the LTC Development Boundary:** residential properties / community assets that fall within 200m of the LTC Development Boundary will experience potential *blight effects during the construction phase*; and
 - **450m from the LTC alignment:** residential properties / community assets that fall within 450m of the LTC alignment will experience potential *permanent blight effects during the operational phase*.

Impact Assessment

- 7.4 A number of impacts have been identified under the Community Costs theme. These are:
- a) Loss of residential properties
 - b) Residential property blight
 - c) Loss of community facilities
 - d) Public rights of way lost or severed
 - e) Community disruption due to LTC construction
 - f) On-going impact on community cohesion
 - g) Health and wellbeing

²⁰ As set out in the Highways England 2018 Statutory Consultation

a) Loss of Residential Properties

- 7.5 In order to construct the LTC, permanent land take is required. As a result, there will be a physical loss of housing, with 20 homes being demolished. All these homes are located within the LTC Development Boundary. This loss of housing has a permanent impact, spanning both the construction and operational phases of the LTC.

Scope and Methodology of Assessment

- 7.6 The impact of the loss of housing is calculated through the assessment of two costs. These are:
- 1) the loss of the value of the land on which housing is lost
 - 2) the cost of relocating the households
- 7.7 Both costs have been included in the assessment to capture both the capital and revenue cost of the loss of housing. As a result, the overall impact of the loss of residential properties is determined by combining the value of 1) and 2).
- 7.8 In order to calculate these costs, a number of assumptions have been made:
- The Highways England PEIR 2018 reports that 20 properties will be demolished to the north of the River Thames. As a full Environmental Impact Assessment has not yet been carried out, the exact location of these 20 properties is unknown. However, the report states that the majority will be lost around the A13 junction in Thurrock. Therefore, for the purposes of this assessment, it is assumed that all 20 properties are within the Thurrock boundary.
 - Given the lack of detail on construction timescales, it has been assumed that the housing will be lost in the first year of LTC construction (2021).
 - To calculate the value of land lost, the approach to calculating land value uplift in the MHCLG Appraisal Guide²¹ has been used. This uses the Thurrock residential land value of £3.42m per ha in 2017 prices and assumes a density of 35 dwellings per ha. The value was then inflated to 2021 (first year of construction) prices.
 - The cost of relocation has been calculated using the cost of re-housing households in rental accommodation over the 6-year construction period. Average monthly rental values in Thurrock have been used for this calculation.

Assessment of Impacts of the Loss of Residential Properties

- 7.9 The overall impact of the loss of residential properties to the Thurrock economy is £3.1m in present value (2019 prices). This is the combination of:
- 1) £1.97m cost of lost residential land
 - 2) £1.15m cost of relocating households

²¹ Land Value Estimates for Policy Appraisal

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/710539/Land_Value_Estimates_2017.pdf

b) Residential Property Blight

- 7.10 It is likely that residential properties in close proximity to the LTC will be affected by blight resulting from visual impacts, noise impacts and traffic impacts. Blight tends to have an adverse impact on property prices, resulting in an economic cost for local residents.

Scope and Methodology of Assessment

- 7.11 The assessment of blight considers the economic cost to properties within a 500m buffer of the LTC during the operational phase. This includes both the number of properties that will be affected and the monetary impact of reduced residential prices, as shown in Figure 7.1 below.

Figure 7.1 Residential Property Blight – Scope of Assessment



Source: Hatch Regeneris

- 7.12 The monetary impact of blight has been determined based on research from similar major infrastructure schemes. In particular, evidence of property blight impacts emerging in relation to HS1 and HS2 have been used to estimate the impact of LTC blight upon local house prices.
- 7.13 Analysis by PwC²², based upon discussions with DfT and HS2 Ltd, forecasts on-going blight from transport infrastructure ranging up to 10% within 120m and up to 6% within 500m. Further research from Hampton International²³ linking the housing market to major transport infrastructure estimated that properties outside London within 500m of the HS2 alignment fell by 4.5% in absolute terms, but 8.9% in relative terms to wider house price trends.
- 7.14 Therefore, on the basis of this wider evidence base, we have applied a 10% loss of value to properties within 200m of the LTC, whilst for properties between 200m and 500m, a 5% loss in value has been applied.
- 7.15 In addition, a number of other assumptions underpin this assessment:
- The number of properties within 200m, and 500m buffers was calculated using the 2018 VOA Stock of Properties dataset. This data is at the LSOA geography, and therefore a best-fit match between the buffer and LSOAs was used.
 - Property value has been calculated using the average house price of a semi-detached house in Thurrock in 2019; £325,250.

²² HS2 Property Bond Cost Report, PwC (2014)

²³ Linking Housing Markets: The effect of transport infrastructure on housing, Hamptons International (2014)

Assessment of Impacts of Blight to Residential Properties

- 7.16 Properties within 200m and 500m of the LTC currently have a combined property value of around £455m. Based upon the above research, this could result in a (theoretical) loss of value to residents of around £25.4m across that area (see Figure 7.2).
- 7.17 Whilst blight impacts are measured as a one-off loss in value, and therefore the potential differential impacts of the LTC construction vs operational phases cannot be captured in monetary terms, it is likely that construction will have a detrimental impact on properties close to the route. The noise, visual and air pollution associated with construction activities and construction traffic will temporarily make properties in close proximity to the boundary unattractive to the market.

Figure 7.2 Blight Impacts on Residential Property Prices

Buffer Zone	Number of Properties	Estimated Property Value	Estimated Reduction in Value	Estimated Loss of Value
200m	160	£52m	10%	£5.2m
500m	1,240	£403m	5%	£20.2m
Total	1,400	£455m	-	£25.4m

Source: Hatch Regeneris

- 7.18 In addition to the direct monetary loss of value resulting from blight to properties, it is recognised that there will be broader impacts of blight upon the 'sense of place' that result from a 6-lane motorway being constructed through the middle of the borough. Villages and hamlets surrounding the alignment will become less attractive places to live, work and visit. Whilst it is challenges to quantify this type of impact, it remains an important consideration in the context of blight.

c) Impacts on Community Facilities

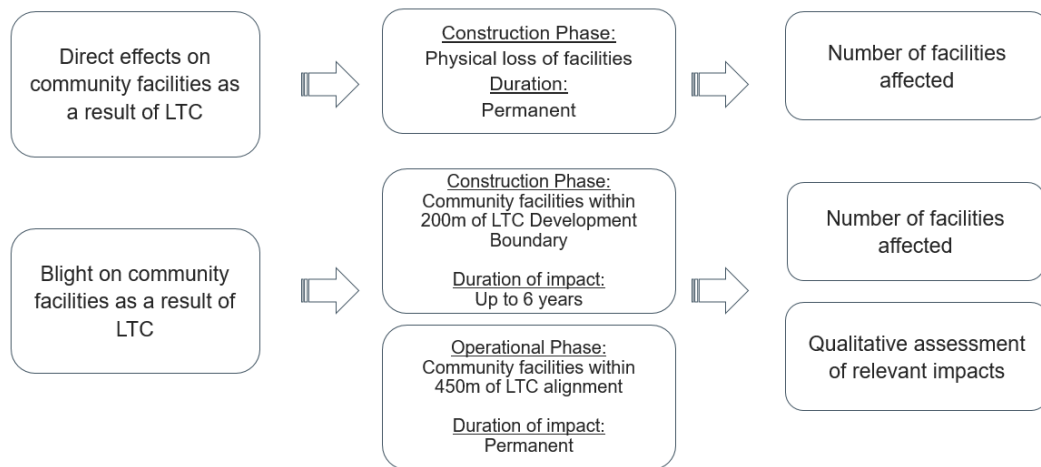
- 7.19 Within this report, community facilities are defined as public or publicly funded resources that provide for the physical, social, cultural and/or intellectual development or welfare of the community. This includes, but is not limited to, resources such as educational facilities care homes, health services, places of worship, community halls, libraries and sports and recreational facilities.
- 7.20 Due to the limited availability of alternatives within rural communities, privately owned resources which provide key community functions have also been considered as part of the assessment – for example public houses and community shops.

Scope and Methodology of Assessment

- 7.21 The assessment of impacts on community facilities will consider effects during the construction and operation of LTC. Impacts on community facilities could include:
- Demolition;
 - Temporary or permanent loss of land from community facilities;
 - Blight effects such as adverse changes in noise, air quality, accessibility, visual impacts and isolation.

The scope of the assessment is summarised in the Figure 7.3 below:

Figure 7.3 Community Facilities – Scope of Assessment



Source: Hatch Regeneris

7.22 There are no industry-wide accepted methods for assessing community effects on infrastructure projects. Determining the significance of impacts on community facilities has therefore been developed using existing guidance and methods established for other nationally significant infrastructure, e.g. HS2 and Silvertown Tunnel.

7.23 The significance of a community effect has been determined by the magnitude of the impact and the sensitivity of the community facility or users of the community facility.

Magnitude

7.24 The magnitude of an impact is its severity or scale considering the spatial extent, the number of people affected and the duration of the impact. To determine the magnitude, the characteristics of the impact will be assessed and classified as high, medium, low or negligible.

Table 7.1 Magnitude of Cost Impact

Impact magnitude	Definition
High	A very adverse cost impact that is very likely to affect large numbers of people (with the number depending on the local context and nature of the impact) and that will usually constitute a long-term impact on baseline conditions
Medium	A cost impact that is likely to affect a moderate number of people (with the number depending on the local context and nature of the impact)
Low	A cost impact that is likely to affect a small number of people and/or the base case in not affected beyond the short or medium-term duration
Negligible	A cost impact that is temporary in nature and/or is anticipated to have a slight or no effect on the well-being of people

Source: HS2 Ltd (2018): HS2 Phase 2b - Scope and Methodology Report

Sensitivity

7.25 The sensitivity of the community facility will be determined by the extent to which users of the facility have the capacity to adapt to any adverse impacts. This will relate to the importance, scarcity and size of the community facility. Sensitivity will be classified as high, medium or low.

Table 7.2 Sensitivity of effects

Impact magnitude	Definition
High	Individuals or user groups that have little or no capacity to experience the impact without incurring a significant effect
Medium	Individuals or user groups that have a limited or average capacity to experience the impact without incurring a significant effect
Low	Individuals or user groups that generally have adequate capacity to experience impacts without incurring a significant effect

Source: HS2 Ltd (2018): HS2 Phase 2b - Scope and Methodology Report

Significance of effects

- 7.26 The significance of a community effect is the product of the magnitude of the impact and the sensitivity of users of the affected community facility.
- 7.27 Significant impacts are those considered to have major adverse or moderate adverse effects. Major adverse effects occur if both the magnitude and sensitivity are high or medium. Effects are moderate adverse if the magnitude is high and the sensitivity is low (or vice versa).
- 7.28 Other effects, equating to minor adverse or negligible, are not considered to be significant.

Table 7.3 Significance of effects

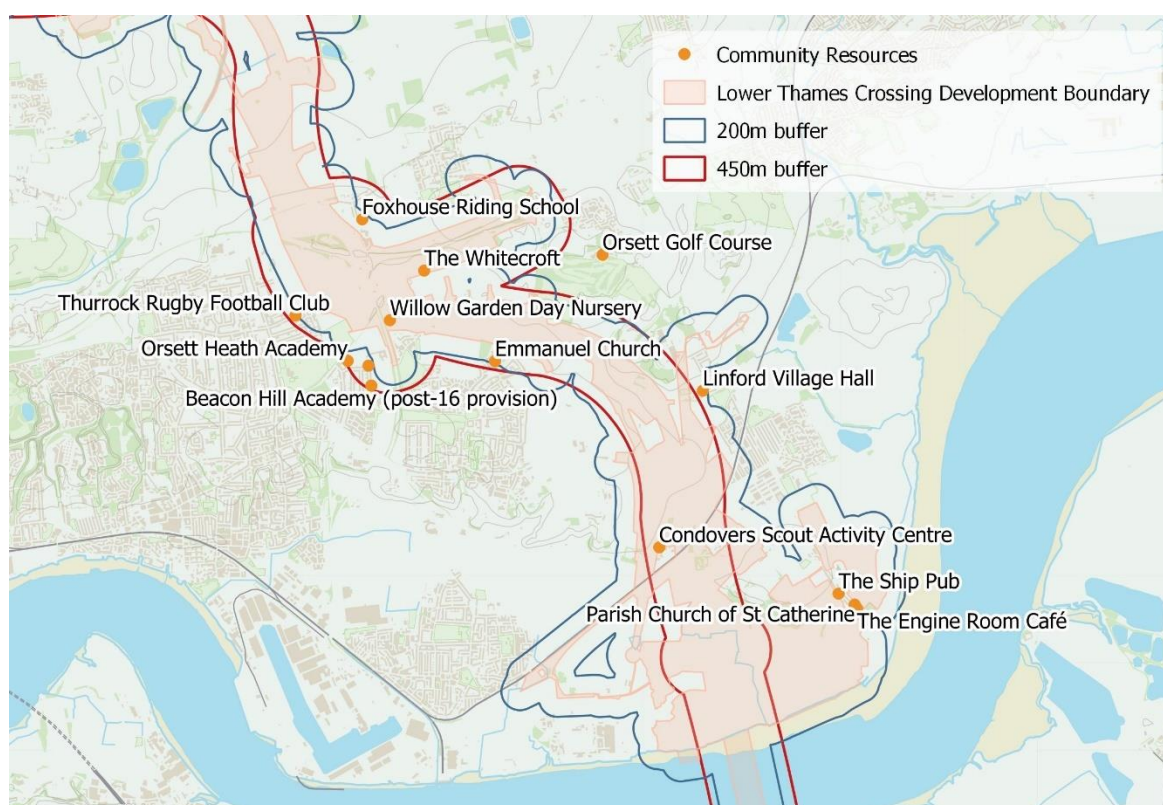
Significance		Impact magnitude			
		High	Medium	Low	Negligible
Sensitivity of users	High	Major adverse (significant)	Major adverse (significant)	Moderate adverse (significant)	Minor adverse (not significant)
	Medium	Major adverse (significant)	Moderate adverse (significant)	Minor adverse (not significant)	Negligible (not significant)
	Low	Moderate adverse (significant)	Minor adverse (not significant)	Negligible (not significant)	Negligible (not significant)

Source: HS2 Ltd (2018): HS2 Phase 2b - Scope and Methodology Report

Assessment of Impacts on Community Facilities

- 7.29 This section describes where there are forecast to be significant direct and indirect (blight) impacts of LTC Scheme on community facilities within Thurrock. The assessment of impact does not take into account any potential mitigation measures that may be introduced alongside the scheme. Appendix A - provides a full assessment of all community facilities within the study area.
- 7.30 Figure 7.4 shows the location of all community resources considered as part of this study. A total of 14 community facilities have been identified within the construction and / or operational study areas.

Figure 7.4 Map of Community Facilities



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Impact Assessment

Direct Impacts

- 7.31 Two community facilities are located within land required for the LTC Development Boundary.

Condozers Scout Activity Centre

- 7.32 Land required for the diversion of utilities spans across the entire site of the Condozers Scout Activity Centre. Located on Church Street, the Centre is a formal 3.5-acre site with accommodation, a campsite, wash facilities and facilities for a wide range of sport and game activities for children and young people.
- 7.33 The temporary requirement for land is likely to result in the loss of the Centre throughout the six-year construction period – potentially impacting the viability of the facility permanently. As there are no other scout activity centres between the River Thames and the A127, the construction of LTC is considered to have a **significant major adverse effect** on this community facility and children in the local community.

Thurrock Rugby Football Club

- 7.34 Land required for the construction of LTC and realignment of Long Lane will temporarily require land intended for the reconfiguration of the Thurrock Rugby Football Club. The Club currently has 20 teams including men's, women's, youth and children teams. To accommodate the construction of a new secondary school, Thurrock Rugby Football Club is to be reconfigured to the east of its current site. The temporary requirement for land will result in the loss of four pitches (comprising two Junior U11-U12 pitches, one Junior U9-U10 pitch and a mini pitch) for the duration of the construction phase. As the pitches lost

are purpose built for the use of children, and the nearest alternative pitches are located in Stanford-Le-Hope and South Ockendon, the loss of these facilities will result in a **significant major adverse effect**.

Blight during construction

- 7.35 During the six-year construction phase, seven community resources will experience significant adverse effects.

The Engine Room Café

- 7.36 The LTC Development Boundary, including construction compounds, will be located 170m from The Engine Room Café is located in East Tilbury. The café, located at Coalhouse Fort, is open six days a week (Tuesday to Sunday) and is anecdotally a central community facility in the village.
- 7.37 It is likely that the cafe could be heavily used by construction workers should provisions not be made within construction compounds. This could result in reduced availability and enjoyment of the café for local residents and visitors.
- 7.38 The prolonged closure of Station Road for up to six years will further limit access to the café, increasing walking distances for some users (e.g. Low Street residents) by up to 4.8km – an increase of 2.1km. The nearest alternative café is located 3.8km away at Thurrock Thameside Nature Park. As such, in the absence of mitigation, it is considered that the reduced availability and accessibility of the café could reduce the enjoyment and use of the café by local residents, resulting in a **moderate adverse effect which is significant**.

The Ship Pub

- 7.39 The LTC Development Boundary, including construction compounds, will be located in proximity to The Ship Pub in East Tilbury. The Ship is the only public house in the village of East Tilbury and is open seven days a week. The nearest alternative public house is located in Linford, 2.4km north of The Ship.
- 7.40 The proximity of the pub to the LTC Development Boundary could result in environmental changes and reduced availability of the facility for local users due to increased demand by construction workers. As such, the enjoyment of the pub by local residents could be reduced.
- 7.41 Similar to the Engine Room Café, the prolonged closure of Station Road will restrict access to the pub for up to six years, resulting in increased walking distances of up approximately 2km for some residents (increasing a pedestrian's journey time from 28 minutes to 53 minutes). As pubs are of economic, social and cultural importance in village life, it is considered that impacts could have a **moderate adverse effect which is significant**.

The Whitecroft

- 7.42 The Whitecroft is a 56-bedroom care home for older people, specialising in care for people with dementia. The Whitecroft is located on the A1013 Stanford Road, adjacent to the LTC Development Boundary. Construction of LTC will further require the closure of Stanford Road for up to six years, closing the main access route into Grays (and essential facilities within Grays, such as medical facilities) for users of the care home.
- 7.43 As dementia can heighten the effects of sensory changes, construction noise could be particularly distressing and disorientating for residents of The Whitecroft. The presence of construction workers and increase in HGV traffic, will also increase safety risks for care home residents. It is therefore considered that the construction of LTC will have a **significant major adverse effect** on the well-being of care home residents.

Willow Garden Day Nursery

- 7.44 Land required for the construction of LTC will be located 40m from the Willow Garden Day Nursery, resulting in adverse environmental changes, such as noise and air quality, for users of the nursery. Willow Garden Day Nursery provides early years education for with capacity for 36 children aged 0-5 years and is open Monday to Friday from 7am to 7pm. In addition to its proximity, the nursery has a strong focus on outdoor learning, as such adverse changes environmental factors are likely to have an adverse impact on child learning and development.
- 7.45 The increase in HGV traffic on the local road network will further increase safety risks for users accessing the nursery school. As there are no other nursery schools in Orsett Heath, as such impacts are considered to have a **significant major adverse effect** on children using the nursery.

Orsett Heath Academy

- 7.46 Land required for the construction of LTC will be located 200m from the proposed location of Orsett Heath Academy, resulting in adverse environmental changes, such as noise and air quality, for users of the school. The school, due to open in temporary accommodation from September 2020, will provide secondary education for up to 240 pupils with the permanent site providing education for up to 1,200 pupils from September 2022.
- 7.47 Adverse environmental factors, such as noise, have the potential to negatively affect learning. Additionally, the increase in HGV traffic on the local road network will further increase safety risks for children accessing the school. Due to the sensitivities of the key user group, impacts are considered to have a **significant major adverse effect**.

Treetops School (including Post-16 Provision)

- 7.48 The construction of LTC will require the prolonged closure of the A1013 Stanford Road, which is an access route to Treetops Schools for pupils living east of the A1089 Dock Approach Road. Treetops School is a specialist school with 276 children and young people (aged 3 to 19 years) who experience moderate learning difficulties, particularly in the areas of autism. Prolonged road closures and the presence of HGV traffic on local roads will alter journey times and increase the unpredictability of commuting. This can be distressing for many people with learning difficulties, particularly autism.
- 7.49 There are no alternative schools in the area. Beacon Hill Academy could act as a suitable alternative school for some pupils in the area, however the main school site is located approximately 11km away (in South Ockendon), with the post-16 provision located adjacent to Treetops School. Moreover, Beacon Hill Academy does not offer places to pupils where there is a primary diagnosis of autism. Consequently, the prolonged closure of Stanford Road is considered to have a **significant major adverse effect** on users of Treetops School.

Treetops 2

- 7.50 Treetops 2 is a new free school programmed for delivery in September 2022. This school will be located adjacent to Treetops School and will also be accessed via A1013 Stanford Road. Treetops 2 school is a specialist all-through school with 140 places for pupils between the ages of 4-16 catering for Moderate Learning Difficulties and Autistic Spectrum Condition. The prolonged closure of Stanford Road is considered to have a **significant major adverse effect** on users of Treetops 2 School.

Beacon Hill Academy (Post-16 Provision)

- 7.51 Beacon Hill Academy is a 75-place special academy for children and young people (aged 2 to 19 years) who have severe and complex learning difficulties. The construction of LTC will require the prolonged closure of the A1013 Stanford Road, which is an access route to the Post-16 Provision site.
- 7.52 For pupils living east of the A1089 Dock Approach Road, the prolonged road closure and the presence of HGV traffic on local roads will alter journey times and increase the unpredictability of commuting. This can be distressing for many people with learning difficulties. Whilst Treetops School could provide an alternative education facility for some pupils, it is located adjacent to the Beacon Hill Academy post-16 site and therefore subject to experience the same impacts. The prolonged closure of Stanford Road is therefore considered to have a **significant major adverse effect** on users of the Beacon Hill Academy post-16 provision.

Blight once operational

- 7.53 Significant adverse effects will be experienced by two community facilities during the operational phase.

The Whitecroft

- 7.54 The permanent alignment of LTC will be 190m from The Whitecroft. It is not expected that LTC will result in significant environmental effects once operational. However due to the sensitivity of residents of The Whitecroft, if unmitigated significant **moderate adverse effects** are likely to occur.

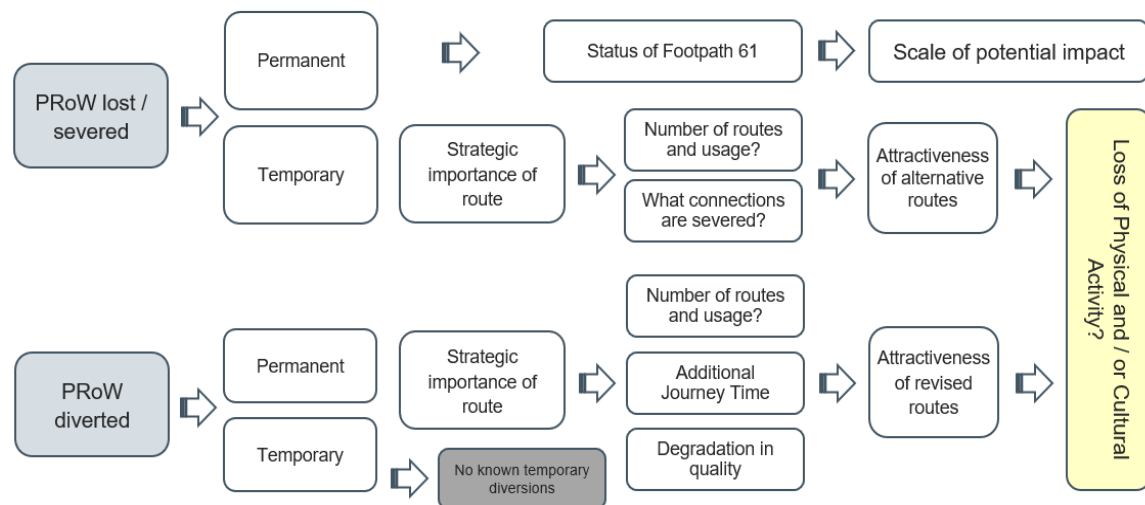
Willow Garden Day Nursery

- 7.55 The permanent alignment of LTC will be 330m from Willow Garden Day Nursery. It is not expected that LTC will result in significant environmental effects once operational. However due to the sensitivity of children and the emphasis on outdoor learning at the nursery, significant **moderate adverse effects** are likely to occur if impacts are unmitigated.

d) Impact of Rights of Way

- 7.56 Thurrock's Public Rights of Way (PRoW) network consists of 155.7 km of definitive footpaths, over 50 km cycle route and 16.6 km bridleway. As outlined within Chapter 4, definitive usage data of individual PRoWs is not currently available; however, research by the Countryside Agency indicated that over 60% of individuals use the PRoW network. Thurrock Council Active Travel Strategy (Oct 2017) highlights importance of a sufficient PRoW network in affecting the quality of life of local communities
- 7.57 Chapter 4 also outlines the range of direct impacts the construction and operation of the LTC Scheme could have upon individual PRoWs. Figure 7.5 below summarises these impacts by type and considers how the direct impacts may translate into loss of economic value and social wellbeing.

Figure 7.5 PRoW Impacts – Scope of Assessment



Source: Hatch Regeneris

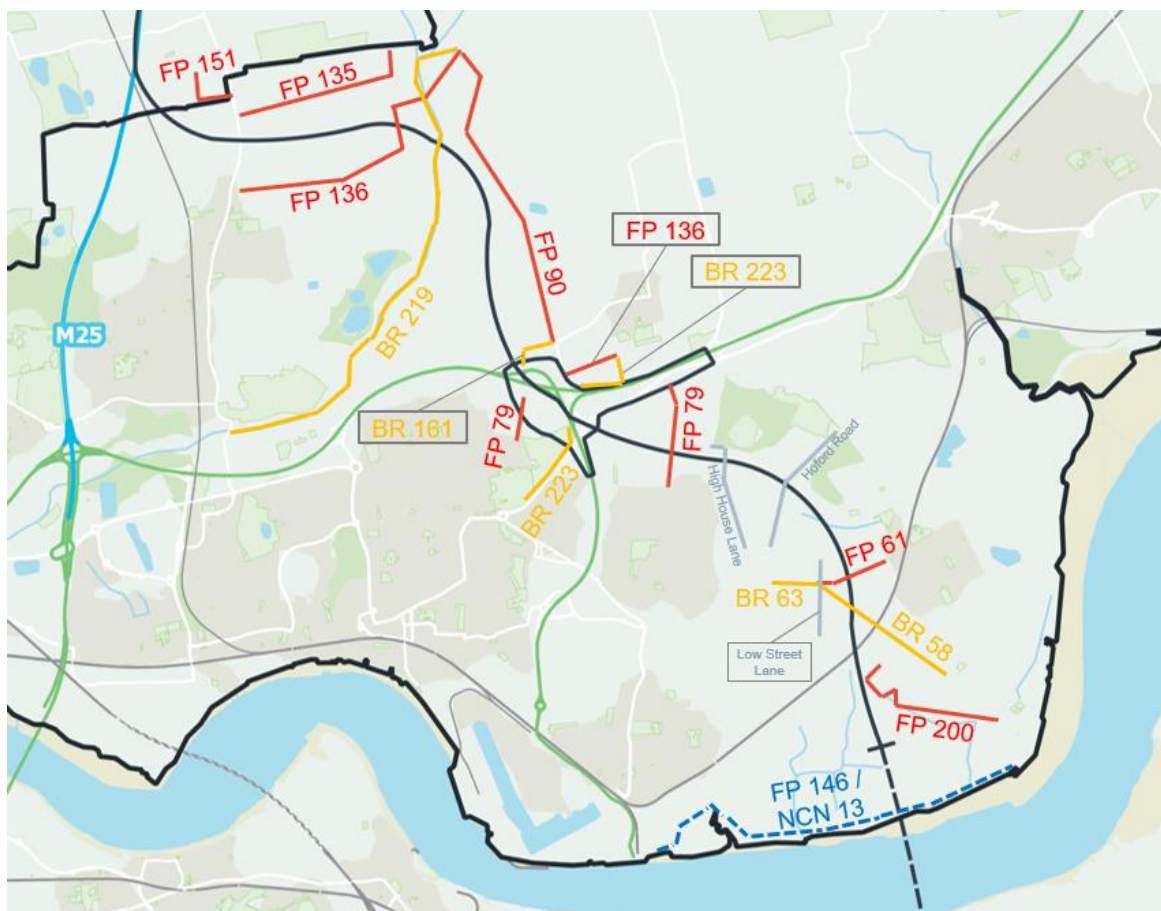
Permanent Severance

- 7.58 Whilst Highways England documentation suggests that there are no PRoW routes permanently severed, the status of Footpath 61 remains unclear. The footpath currently provides access from Bridleway 63 (part of Coal Lane connecting towards Chadwell St Mary) and Beechcroft Avenue in East Tilbury (located to the north of the Tilbury Loop Railway Line) (see figure 7.7 below). The route feasible provides a connection between East Tilbury and Chadwell St Mary. Usage data is not available, but it would appear that the route may not be particularly well-utilised.
- 7.59 Whilst it may not be heavily utilised, there would appear to be no provision within the LTC Scheme proposals for this route to be retained and so it will be permanently severed.
- 7.60 Muckingford Road is located around 275m to the north and will provide a crossing point over the LTC; however, Muckingford Road currently has no pedestrian provision and would not offer the same amenity or safety as a segregated footpath.
- 7.61 A route under the LTC will be provided as part of the diversion to Bridleway 58 (Coal Lane). This will be located approximately 450m south of the current Footpath 61 alignment. A diversion along this route would add approximately 850m onto a trip from East Tilbury and Chadwell St Mary.
- 7.62 Whilst the direct economic impact of the loss of this route is unlikely to be significant (given the anticipated low current footfall) it is likely to reinforce the physical severance created by the LTC Scheme between East Tilbury and Chadwell St Mary. There will no longer be a direct walking route between the two communities. This will discourage pedestrian trips and disadvantage those without access to other modes, such as car. This is considered further in the section (f) below on community cohesion.

Temporary Severance

- 7.63 A large number of PRoWs, cycle routes, and tracks are impacted during the LTC construction phase, a number of which could be temporarily severed whilst the scheme is built. This includes 17 routes identified within Thurrock, which are presented in Figure 7.6 and listed below:

Figure 7.6 PRoW, Cycle Routes, and Tracks Impacted by LTC

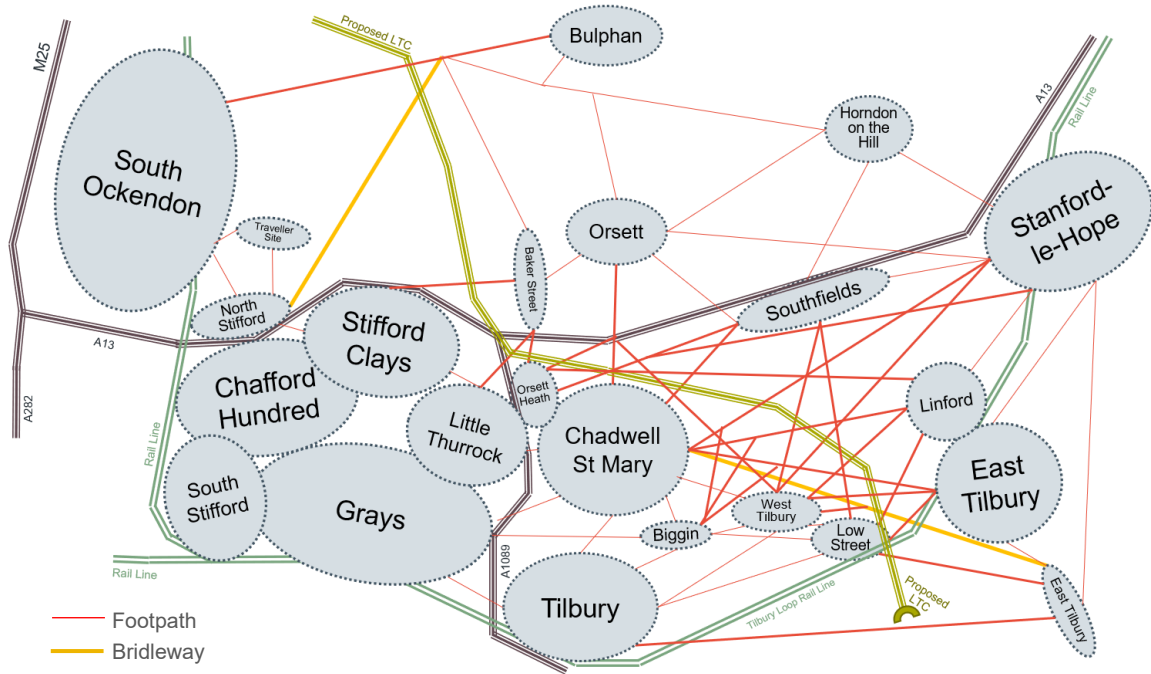


Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 1) NCN 13 / Footpath 146 (Coastal Route) – undetermined if this will remain open during the construction phase.
- 2) Footpath 200 (Coalhouse Fort to Station Road)
- 3) Bridleway 58 (Coal Road)
- 4) Low Street Lane (track)
- 5) Bridleway 63 (Coal Road)
- 6) Holford Road (track)
- 7) High House Lane (track)
- 8) Footpath 79 (Chadwell St Mary to Orsett)
- 9) Bridleway 223 (Gammonfields Way / Long Lane)
- 10) Footpath 97 (Long Lane leading to the north east into rough ground)
- 11) Permissive Bridleway 206 (Baker Street to Mill Lane)
- 12) Bridleway 161 (Green Lane)
- 13) Footpath 90 (from Fen Lane running north towards Bulphan fen)
- 14) Bridleway 219 (alongside Mardyke)
- 15) Footpath 136 (South Ockendon to Bulphan Fen)
- 16) Footpath 135 (from North Road running east towards Bulphan fen)
- 17) Footpath 151 (west from North Road - mainly located outside of Thurrock area)

- 7.64 To assess the relative importance of the PRowW an assessment has been undertaken to determine how they provide connections between the surrounding local communities. Figure 7.7 provides a graphical representation of this analysis, with local community areas presented, alongside the connections that will cross over the LTC alignment and be severed during the LTC construction phase.

Figure 7.7 PRowW, Cycle Routes, and Tracks Impacted by LTC



Source: Hatch Regeneris

It is estimated that a total of 29 different PRowW connections between local villages, towns, and urban centres across Thurrock will be affected by the construction of the LTC Scheme. Table 7.4 provides a demonstration of the number of connections for different geographic groupings of communities.

Table 7.4 Local PRowW Connections

Area	Communities	PRowW Connections Across LTC Alignment
Area 1 (North)	Baker Street, Orsett, Bulphan, Horndon on the Hill	11
Area 2 (North East)	Southfield, Stanford-le-Hope	12
Area 3 (East)	Linford, East Tilbury (North & South)	14
Area 4 (Villages)	Low Street, West Tilbury, Biggin	16
Area 5 (Tilbury)	Tilbury	11
Area 6 (Central)	Chadwell St Mary, Orsett Heath	11
Area 7 (Grays)	Grays, Little Thurrock, Stifford Clays, Chafford Hundred, South Stifford	13
Area 8 (North West)	South Ockenden, North Stifford	6

Source: Hatch Regeneris

- 7.65 This indicates that the villages of Low Street and West Tilbury, and the settlement/hamlet of Biggin, will be particularly affected by the temporary severance of PRow routes, reducing accessibility to a wide range of nearby communities across a large number of separate routes. Similarly, Linford and East Tilbury will also be significantly impacted.
- 7.66 It is not yet known how the construction of LTC may be phased and whether the closures to the PRow will be continuous throughout much of the construction phase, if the closures will be staggered to minimise the collective impact, or at what point overbridges / underpasses will be provided. Given the scale of the project, it is anticipated that severance will occur across long periods of time and that for any one PRow that is closed, there is likely to be very limited viable alternative routes.
- 7.67 The closures are therefore likely to result in a range of impacts over a prolonged period, including:
- **Reduced accessibility to facilities and services:** Some routes provide connections between nearby local communities that could be utilised to access schools, local shops, churches, and recreational facilities. Whilst the routes may not be a primary mode of access, they provide access to all, particularly those without access to a private car.
 - **Increased community isolation:** as is described further in section (g), a number of the communities located along the LTC alignment are already relatively isolated, and the loss of connections will create further severance between individuals and community-based groups. This could exasperate issues of loneliness and associated physical and mental health issues.
 - **Health and Wellbeing:** the PRow provide access to all for both physical exercise and the ability to connect with nature. There is wide-ranging literature around both the need for physical activity²⁴ (150 minutes per week significantly reduces the risk of poor health), as well as the benefits of interacting with nature and mental health²⁵. Widespread loss of PRow across the construction phase of the LTC Scheme could create damaging changes in underlying behaviours and increase the risk of health issues amongst the local population. These issues could extend beyond the construction phase where walking routes are permanently blighted and become less attractive to use, as discussed further in the section below.

Permanent Diversions and Blight

- 7.68 Whilst it is the intention to restore nearly all of the existing PRow upon completion of the LTC Scheme, a number of them will be subject to diversions and all of them will, to a greater or lesser degree, suffer blight as a result of the LTC operations.
- 7.69 There is some uncertainty around the number and extent of PRow, cycle paths, and tracks that will be diverted but the following routes have been identified as potentially being affected:

²⁴ <https://www.nhs.uk/live-well/exercise/exercise-health-benefits/>

²⁵ Example of evidence of the benefits of nature and wellbeing:

Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science*, 19(12), 1207-1212.

Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC Public Health*, 10, 456.

Cervinka, R., Röderer, K., & Hefler, E. (2012). Are nature lovers happy? On various indicators of well-being and connectedness with nature. *Journal of Health Psychology*, 17(3), 379-388.

Hartig, T. (1991). Restorative effects of natural environment experiences. *Environment and Behavior*, 23, 3.

- Footpath 200 (Coalhouse Fort to Station Road)
 - Diverted to join new Station Road alignment
- Bridleway 58 (Coal Road)
 - Diverted by 900m to pass under project embankment through new underpass
- Low Street Lane (track)
 - Diverted west to retail access to Muckingford Road
- High House Lane (track)
 - Diverted west to retain access to Brentwood Road
- Footpath 79 (Chadwell St Mary to Orsett)
 - Diverted west by 600m to cross project route on new overbridge
- Bridleway 223 (Gammonfields Way / Long Lane)
 - Diverted to west accommodate new slip road from A1089 to LTC
- Footpath 97 (Long Lane leading to the north east into rough ground)
 - Curtailed to accommodate new slip road from A1089 to LTC
- Permissive Bridleway 206 (Baker Street to Mill Lane)
 - Realigned to accommodate new slip from LTC to A13 (eastbound)
- Footpath 136 (South Ockendon to Bulphan Fen)
 - Diverted by 650m and raised by 9.5m above existing level to cross project route on new footbridge

- 7.70 The diversions will result in some additional distances added to some routes between communities and to community facilities. This may continue to discourage residents from travelling by foot to access facilities, services, or visit other communities. This may particularly be the case if the route now requires crossing the LTC, with the associated blight of noise, poor air quality and visual intrusion. Given all of these routes will have been severed potentially for a prolonged period during construction, it may be challenging to encourage residents to change back to using these routes, even once reinstated.
- 7.71 Whilst the direct economic cost of additional journey times between communities / community facilities could be measured, the absence of information on current usage levels means that an overall estimation of the total economic impact cannot be accurately assessed.
- 7.72 As a purely indicative assessment, if the three routes subject to the main diversions (58, 79, 136) were used, collectively, by between 30 and 60 pedestrians a day this could equate to a loss of economic present value of between £275,000 and £550,000 over the appraisal period.
- 7.73 There will also be negative impacts upon those individuals and groups using the PRow for recreational purposes. Whilst the additional distance attributable to diversions may not be a specific issue, the blight resulting from the LTC Scheme could be significant. This will affect routes crossing the LTC Scheme, but also those running alongside it, such as Footpaths 90 and 135. The attractiveness of these routes will all be reduced, in terms of visual outlook, as well as noise and, potentially, air quality.

Overall Impact

- 7.74 Whilst it is challenging to monetise the impact of the LTC upon PRow, the analysis has demonstrated a range of potential impacts, during both the construction phase, but also continuing during the operational phase. As such, it is concluded that the overall impact will be rated Moderate Adverse.

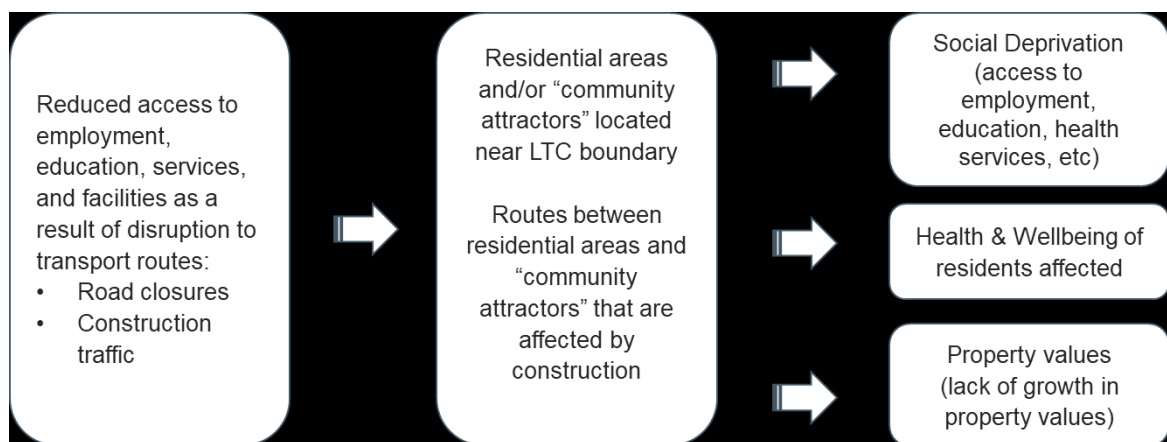
e) Community Disruption During Construction

- 7.75 The construction of the LTC is likely to disrupt the communities living around the route, particularly those living in already isolated parts of Thurrock. The ability for local residents to access employment, community facilities or services such as education and healthcare may be affected due to:
- Closure of roads to build the LTC
 - Increased congestion and traffic as a result of road closures
 - Increased traffic from construction vehicles creating additional congestion and increasing accident risks

Scope and Methodology of Assessment

- 7.76 To understand the disruption impact of the construction of the LTC on the local community, the scope of assessment set out in Figure 7.8 was used.

Figure 7.8 Community Disruption – Scope of Assessment

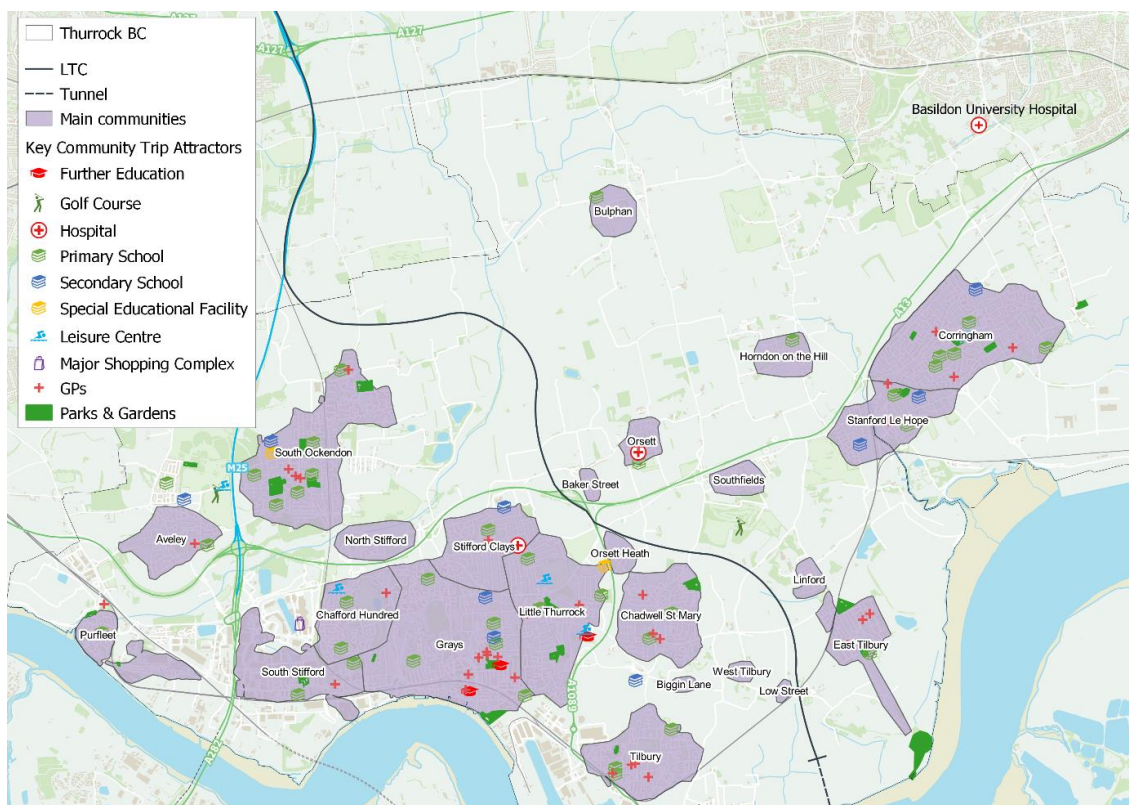


Source: Hatch Regeneris

Residential Areas and Community Attractors

- 7.77 Firstly, the key residential areas and community attractors in Thurrock were mapped to determine the current landscape of provision in the area. As shown in Figure 7.9, there's a range of services across Thurrock, however there are a number of important attractors, including the non-emergency hospital and FE colleges, which are less prevalent.
- 7.78 At the moment, Thurrock has no Accident and Emergency provision, and so the majority of residents use the A&E in Basildon Hospital (located outside of the Borough, to the North East).

Figure 7.9 Key Residential Areas and Community Attractors in Thurrock



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Magnitude of Disruption

7.79 The magnitude of disruption potentially caused by the LTC was determined using a scoring matrix. This assessed the level of current access from each residential area to the key attractors using the quickest road route. The attractors used for this assessment were:

- A&E
- Non-emergency hospital
- GPs and access to the nearest 3 GPs (included due to GP prevalence in Thurrock)
- Leisure centre
- Primary school and access to nearest 3 primary schools (included due to primary school prevalence in Thurrock)
- Secondary school and access to nearest 3 secondary schools (included due to primary school prevalence in Thurrock)
- Further/Higher education
- Specialist education facilities
- Parks, gardens and children's play areas
- Primary and Secondary retail centres

7.80 The disruption impact of the LTC on that route was then scored using a 1-4 scale (with 1 being the biggest disruption and 4 being the lowest disruption). As a result, locations with the lowest score across all the attractors were identified as being at highest risk to disruption from the LTC. The scoring criteria is shown in Figure 7.10.

Figure 7.10 Disruption Scoring Matrix

1	Single route of access disrupted
2	Route disrupted but other reasonable alternatives available, or main route has minor disruptions
2.5	Route disrupted but access to other services over the river
3	Direct access
4	Direct access within 10 minutes

Source: Hatch Regeneris

Assessment of Impacts on Community Disruption

7.81 The results of the disruption scoring exercise are shown in Figure 7.11 and show that the communities located in close proximity to the route are likely to be most disrupted. The 8 communities within the red box are considered to be the worst affected, predominantly as a result of prolonged road closures of local roads during the construction period.

7.82 Whilst these communities are predominantly small settlements or villages, and therefore have smaller populations with fewer people to disrupt, many of them already experience isolation from the rest of Thurrock and its services. This is due to their more rural location, limited access routes and limited provision of services in close proximity.

7.83 The sections below detail the analysis undertaken when determining the disruption impact of access to the different 'attractors'. A greater level of detail has been included for the A&E example as it is the attractor subject to the most disruption. It is also intended that this will give an example of how the analysis for each attractor was undertaken.

Figure 7.11 Magnitude of LTC Disruption

Community	Size of Place	Rank	Score
Grays	Significant Urban Area		
Little Thurrock	Urban Area		
Stifford Clays	Urban Area		
Aveley	Small Town		
Chafford Hundred	Urban Area		
North Stifford	Village		
South Stifford	Urban Area		
South Ockendon	Small Town		
Tilbury	Small Town		
Horndon on the Hill	Village		
Orsett Heath	Settlement/Hamlet		
Corringham	Small Town		
Biggin Lane	Settlement/Hamlet		
Chadwell St Mary	Small Town		
Stanford Le Hope	Small Town		
Purfleet	Small Town		
West Tilbury	Settlement/Hamlet		
Bulphan	Village		
Low Street	Settlement/Hamlet		
Linford	Settlement/Hamlet		
East Tilbury	Village		
Orsett	Village		
Baker Street	Settlement/Hamlet		
Southfields	Settlement/Hamlet		

Source: Hatch Regeneris

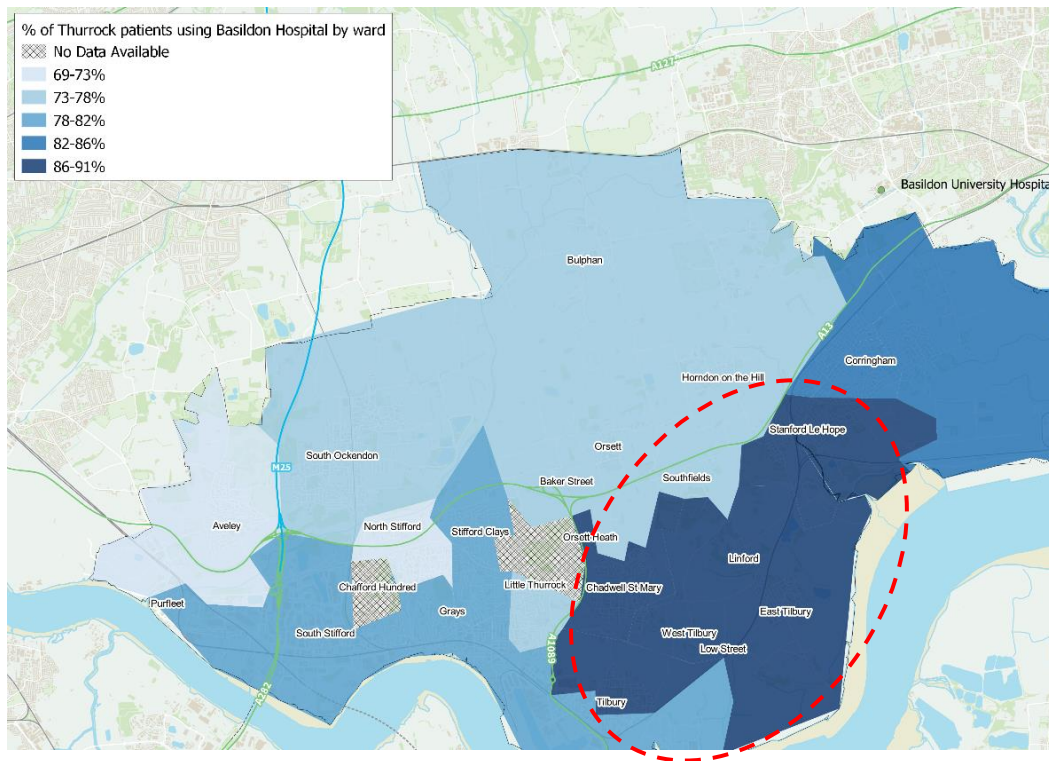
Access to A&E

7.84 Disrupting access to A&E is a significant impact of LTC construction, with consequences for community health and wellbeing in Thurrock.

7.85 Data from the NHS in 2017 shows that, at the moment, the communities in the south east of Thurrock (such as Tilbury and Chadwell St Mary) are some of the worst performing areas in the country for access to an A&E department. This is primarily due to the lack of A&E provision within Thurrock.

7.86 In addition, data from Thurrock Council on the proportion of Thurrock patients using Basildon Hospital (see Figure 7.12) shows the greatest reliance on Basildon Hospital by communities is in those worst performing areas. This suggests these communities are particularly at risk to any east-west severance caused by LTC.

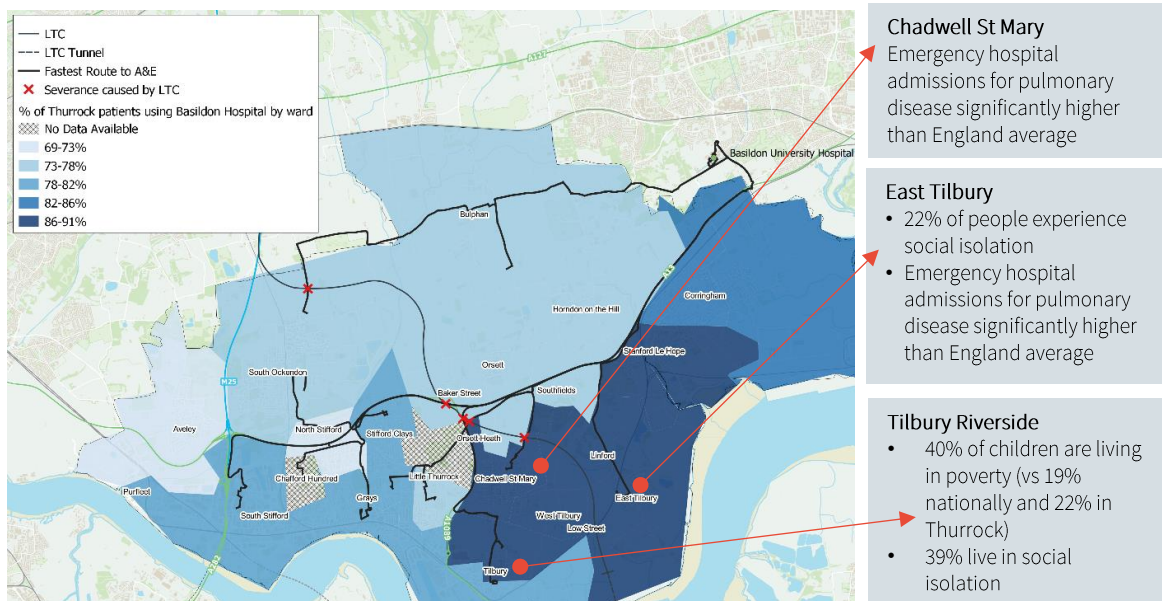
Figure 7.12 Reliance on Basildon Hospital by Thurrock Patients



Source: Hatch Regeneris. Data from Thurrock Council. Contains OS data © Crown copyright and database right 2019

- 7.87 Overlaying the fastest routes from each ward in Thurrock to Basildon A&E onto this map (see Figure 7.13 below) shows that the LTC is likely to have a major impact on the accessibility of the hospital to south-east Thurrock. Prolonged local road closures during LTC construction will be a primary cause of severance and/or increased journey times from these communities to Basildon Hospital.

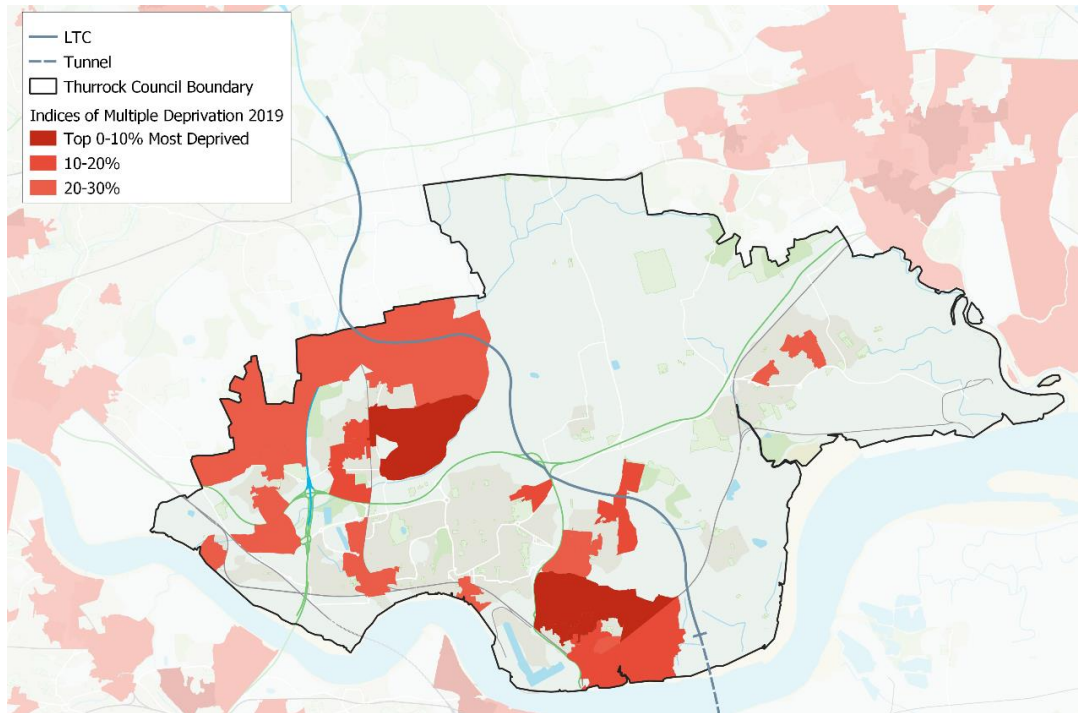
Figure 7.13 Disruption caused by LTC on routes to Basildon Hospital



Source: Hatch Regeneris. Data from Thurrock Council. Contains OS data © Crown copyright and database right 2019

- 7.88 In addition to disruption of access, there is also concern about the inequality of the negative impacts resulting from LTC. As shown in Figure 7.13, the communities most likely to suffer from disruption of access to A&E are also struggling with poor health and higher than average hospital admissions, poverty and isolation. The Index of Multiple Deprivation 2019 map (Figure 7.14) also shows how these same communities are in the top 30% most deprived in the country. Baseline data in Chapter 3 also shows that the people living in Tilbury are currently most impacted by health inequalities and social isolation.

Figure 7.14 Top 30% Most Deprived LSOAs (IMD 2019)



Source: Hatch Regeneris. Data from MHCLG 2019. Contains OS data © Crown copyright and database right 2019

Access to a non-emergency hospital

- 7.89 Thurrock currently has one non-emergency hospital, located in the village of Orsett. The location of this attractor on the other side of the A13/A1089 junction means access to the hospital is likely to be heavily impacted for many Thurrock residents who live on the western side of the borough. In fact, for all communities apart from those in the north east of Thurrock (such as Bulphan and Horndon on the Hill), the construction of the LTC will close or disrupt the main access routes to the hospital.
- 7.90 A number of communities including North Stifford, Low Street, Tilbury and Chadwell St Mary will experience the worst degree of disruption. Their fastest route to Orsett hospital will be closed for prolonged periods of time and the alternative route via the A13 will be heavily disrupted due to the A13/LTC junction creation.
- 7.91 There are outline plans to close Orsett Hospital in the future and replace it with four new integrated medical centres across Thurrock. These new centres will provide the same services as currently offered in Orsett Hospital, so there will be no net loss of provision in Thurrock as a whole. If the proposal were to go ahead, it would change the type of disruption impacts that the LTC Scheme would have on non-emergency medical care but the constraints are likely to remain.

Access to GPs

- 7.92 Thurrock has a large number of GPs, with at least one in almost every community included in our analysis. Therefore, the potential disruption in access to the nearest GP as a result of the construction of LTC is minimal.
- 7.93 However, a recent audit²⁶ of healthcare provision in Thurrock found that there was insufficient GP provision in the borough for the size of the population and its needs, and that the pressure on these resources was increasing due to the size of waiting lists. As a result, it is assumed that the ability to access just the nearest GP is most likely to be inadequate for the majority of residents. When assessing access to the nearest 3 GPs, the potential disruption impact of the LTC increases. Orsett, Baker Street and Southfields are among the communities who experience disruption in this case.

Access to Leisure Centre

- 7.94 The provision of leisure facilities in Thurrock is skewed towards the centre and west of the borough, with only one centre in Corringham to serve the communities in the east. As a result, locations such as Orsett, Baker Street and Low Street, which are in close proximity to the LTC and are likely to have access roads closed, are at risk of having their access to a leisure centre disrupted.
- 7.95 Whilst there are plans to build a new leisure facility in between Orsett Heath and Little Thurrock, this will still be difficult to access during the construction period for communities on the other side of the LTC, such as Southfields and Linford. It is also likely that the construction of this new leisure centre will be disrupted due to its close proximity to the route.

Access to Further Education

- 7.96 The provision of further education in Thurrock is predominantly centred around Grays town centre, with three FE colleges located in close proximity to one another. There is no higher education provision in Thurrock, and many people travel to Basildon or Gravesend on the over side of the River Thames to access further/higher education.
- 7.97 As a result, for a number of communities in Thurrock access to this attractor will be disrupted due to LTC. Our analysis suggests five communities could face the highest degree of disruption due to road closures. This includes Low Street, East Tilbury, Linford, Orsett, Baker Street and Southfields. As discussed in chapter three, Tilbury, East Tilbury and the surrounding areas currently have the highest levels of Education and skills deprivation in Thurrock.

Access to Specialist Educational Facility

- 7.98 Similarly, to further education, the provision of specialist education facilities in Thurrock is scarce. Whilst it is likely that people will travel further to access a specialist facility (for example outside the borough or to the south side of the river), many residents in Thurrock will be reliant on more local provision which can be easily access by car or public transport.
- 7.99 Modelling the disruption associated with LTC construction suggests that a significant number of communities could be heavily disrupted, primarily due to prolonged road closures but also due to the likely delays and congestion at the A13/A1089 junction.

²⁶ Thurrock Health and Wellbeing Strategy 2016-2021

Access to Primary Retail Centre

- 7.100 Grays Town Centre and Lakeside represent Thurrock's primary retail centres, due to their large and diverse retail offer. Whilst there are other retail centres in Thurrock, these are secondary/tertiary, and many are strongly characterised by a convenience offer serving local residents living in the immediate vicinity. As a result, it is likely that communities in Thurrock will need to access the retail centre in Grays/Lakeside. This puts a number of communities at risk of disruption during the LTC construction phase. Similarly, to the other attractors, it is the communities on the eastern side of the LTC, such as East Tilbury, Linford, Orsett and Southfields which are likely to be most impacted.

Access to the other attractors

- 7.101 The community disruption analysis also looked at potential impact to disruption for access to primary schools, secondary schools, parks and gardens, children's play areas and secondary retail centres. Whilst the overall impact across the communities is likely to be minimal due to the prevalence of these attractors across Thurrock, there may be some isolated instances of disruption as a result of the LTC.
- 7.102 For example, open spaces and parks are important community assets and play a key role in the good mental and physical health of a population. Coalhouse Fort, an attractor which has multiple functions (a well-used open space and a heritage site), will have its access disrupted during construction due to the closure of nearby roads and the close proximity of the main construction site. This could have negative impacts for residents across the borough who regularly use the fort for exercise, education and social purposes.

Direct Travel Time Costs

- 7.103 As part of the disruption caused to access and movement to local facilities across Thurrock there will be specific impacts upon journey times. Whilst it is not feasible to capture all of these impacts quantitatively, there are two elements that can be estimated in quantified terms:
- Additional journey times through diversions caused by road closures
 - Delays through the A13/A1089 junction during roadworks

Additional Journey Times through diversions

- 7.104 Section 4 outlined the local roads that will be subject to closures as a result of the construction of the LTC Scheme. An assessment of the potential additional mileage and journey time that would be incurred as a result of diversions to avoid these routes has been undertaken.
- 7.105 Using estimates of traffic flows along each road, the forecast total additional journey times and distances have been estimated. This indicates that up to 51,000 additional vehicle miles and up to 2,550 hours of travel time would be incurred across these routes for every day of closure.
- 7.106 Whilst it is unclear for what period of time each road would be closed, the estimated impact over 6 months to 1 year would be equivalent to a loss in economic value of between £5.7m and £18.3m

A13/A1089 Junction Impacts

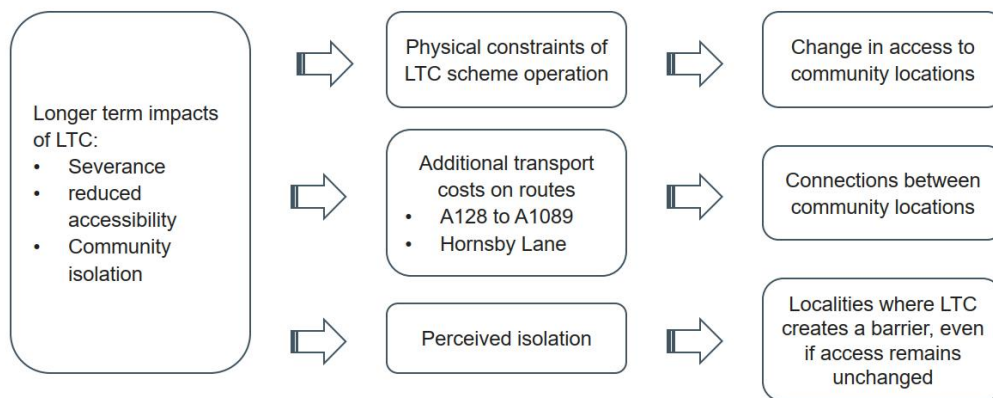
- 7.107 Section 4 outlines the potential construction related impacts of LTC on the operation of the current A13 / A1089 junction. Whilst specific traffic management plans are unavailable it has been assumed that some speed restrictions, lane reductions, and occasional road closures will be in place during certain points in the construction phase.

- 7.108 Based on the same approach adopted in Chapter 4 for all general traffic, it is estimated that around 42,000 non-business-related trips per day pass through the junction with an origin or destination within Thurrock.
- 7.109 The delays that will be incurred at the junction will translates into an additional 800 to 1,850 hours per day, or 255,000 to 587,000 per annum, depending upon actual average journey times through the roadworks.
- 7.110 Depending upon the duration that traffic restrictions are in place around the A13 junction works takes, this level of delay translates to an estimated monetised economic cost of between £2.5 million (1 year) to £18.1 million (3 years) in present values (2019 prices) to the Thurrock business economy.

f) On-going Community Cohesion

- 7.111 The delivery of LTC could result in long-term adverse impacts which have the potential to adversely affect social cohesion within Thurrock.
- 7.112 The proposed LTC alignment will bisect wards that are already severed by both road and rail infrastructure, namely the wards of East Tilbury, Orsett and Ockendon. The additional infrastructure will not only fail to improve access to and within Thurrock but will further advance community severance and isolation – ultimately affecting the vibrancy of communities and personal well-being of the local population.
- 7.113 To understand the effect of LTC on community cohesion, the following scope of the assessment was followed:

Figure 7.15 Community Cohesion – Scope of Assessment



Source: Hatch Regeneris

Current Local Perceptions

- 7.114 Local perceptions of factors that influence community cohesion are described below.
- **Social isolation:** nearly a third (31.9%) of the Thurrock population currently experiences social isolation.²⁷ This figure varies substantially when considered at ward level. Latest figures show that 22% of people in East Tilbury, 19.5% in Orsett and 38% of those in Ockendon currently experience social isolation.²⁸ As such, the

²⁷ Social isolation is based on the number of pensioners living alone

²⁸ Thurrock Borough Council (2019): EIA Scoping Report request – Public Health.

population of Thurrock, and especially in Ockendon, is particularly vulnerable to changes that could adversely affect perceptions of social isolation.

- **Community unity:** The Thurrock Residents Survey²⁹ provides insights into community unity at ward level. Using “to what extent would you agree / disagree that people in this local area pull together to improve the local area” as a proxy, 81% of East Tilbury and 72% of Orsett residents agree, which is significantly higher than the Thurrock average of 52%. Conversely, only 40% of Ockendon residents would agree with the statement, which is significantly lower than the borough average.

The findings suggest an inverse relationship between community unity and social isolation.

- **Personal well-being:** The Annual Population Survey considers personal well-being to be a product of a person’s perceptions of life satisfaction, happiness, worthwhile and anxiety.

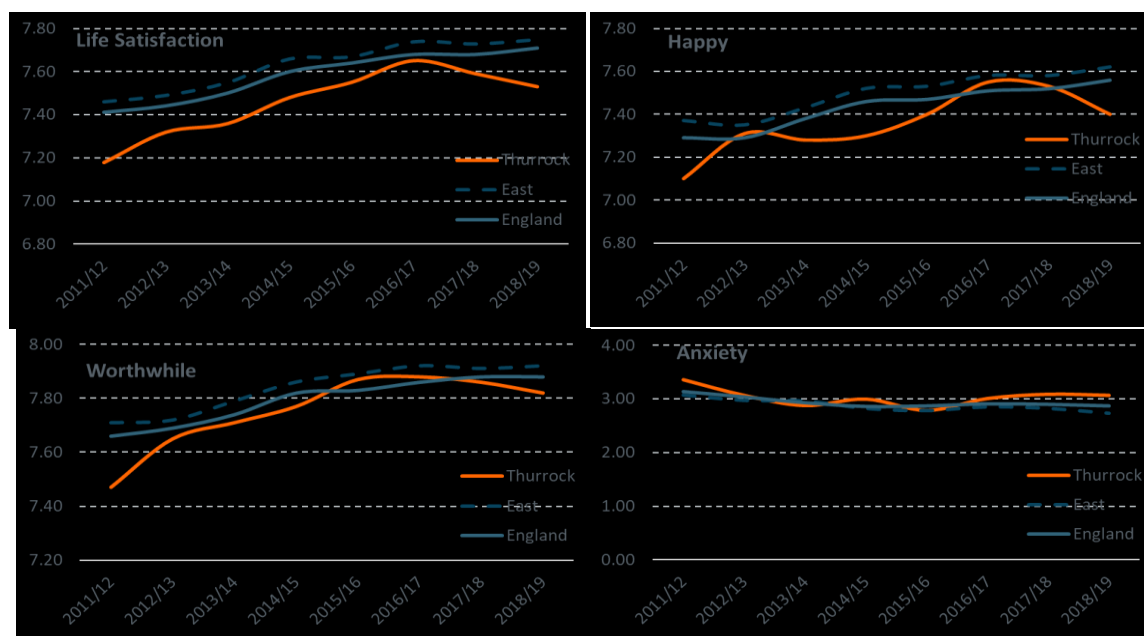
Prior to 2016, the population of Thurrock experienced a general improvement across all well-being indicators (as shown in Figure 7.17 below). Thereafter, personal well-being has been in decline, with latest figures showing that the population of Thurrock have lower personal well-being (across all indicators) compared to the regional and national average.

Figure 7.16 Personal well-being 2018/19

Life satisfaction	7.53	7.75	7.71
Happiness	7.40	7.62	7.56

Source: ONS (2019): Annual Population Survey.

Figure 7.17 Trends in personal well-being factors



Source: ONS (2019): Annual Population Survey.

²⁹ BMG Research (2016): Thurrock Residents Survey 2016.

Impact of LTC on Community Cohesion

- 7.115 With the exception of Hornsby Lane, all roads traversed by LTC will be reinstated upon completion. As such, the physical constraints of the LTC Scheme in operation are limited.
- 7.116 Hornsby Lane provides access to one residential farm and is a minor link road between Stanford Road and Orsett Heath. As access to the residential property will be maintained from the south, the impact of permanently closing Hornsby Lane will be limited to local access, therefore having a minor impact on community cohesion.

A128 to A1089 Movements

- 7.117 As set out in Chapter 4, the configuration of LTC will alter vehicular southbound movements from the A128 to the A1089 – resulting in an additional 6.8km and eight-minute journey time. Recent research identified that longer commute times are associated with higher levels of stress, reduced leisure time, and reduced job satisfaction, culminating in lower levels of life satisfaction.³⁰ Monetarily, the additional commute resulting from LTC (calculated over a standard Department for Transport 60-year appraisal period, and based on current traffic movements for commuting and leisure) is estimated to be equivalent to an economic costs of around £14.5m.

Thames Crossing Closures

- 7.118 As set out in Chapter 4, instances when both LTC and Dartford Crossing could be closed concurrently are predicted to occur once every 80 to 160 days. Whilst average closures associated with incidents on the Dartford Crossing are around 30 minutes, the impact they can have upon traffic disruption on the M25 and approach roads can last significantly longer, in some instances well over an hour.
- 7.119 The impact of a concurrent incident on both the Dartford Crossing and LTC could result in widespread disruption within the local vicinity. This will include the A13 through Thurrock, as well as knock-on impacts to the local road network across Thurrock. It is envisaged that the scale of potential delays could be exponentially high with both crossing points closed.
- 7.120 To assess these impacts would require detailed traffic modelling of the area, which is unavailable. An indicative analysis has been undertaken to demonstrate the scale of potential impacts.
- 7.121 If a concurrent closure resulted in delays along key routes running parallel to the A13 (A1306, B186, A1013) and the A1089 then the traffic modelling data available indicates this could affect up to 6,600 non-business-related trips. If delays average were an average of 30 to 45 minutes per vehicle then the impact would equate to £30,000 to £44,000.
- 7.122 Allowing for a concurrent closure of between every 80 to 160 days, these delays are the equivalent to an economic loss of between £2.2m and £6.7m over the full appraisal period.

Perceptions of Isolation

- 7.123 While it is acknowledged that LTC will not permanently sever existing routes, the additional travel times and the physical presence of the infrastructure can increase perceptions of social isolation for vulnerable residents in the community. People in rural communities, especially those without access to a car, are particularly susceptible to such changes.

³⁰ Understanding Society (2016): 'How and Why Community Influences Life Satisfaction'. Commuting and Wellbeing: Bulletin 2: Cross-sectional Analysis

- 7.124 Research shows a positive relationship between social cohesion and access to destinations / walkability³¹. Throughout the six-year construction period, prolonged road closures will separate residents from key social amenities within walking distance.
- 7.125 For example, the closure of Station Road will sever Low Street Lane and Church Road residents from East Tilbury. Taking The Ship public house as a key social amenity within East Tilbury, the closure of Station Road would increase walking distances for pedestrian residents by 2km, resulting in an additional 26 minutes' walk. Given the rural nature of the area, reducing access to already limited social infrastructures will adversely affect the vibrancy of the community, resulting in a decline in social well-being and community cohesion.
- 7.126 The construction of LTC is therefore considered to have an overall **moderate adverse effect** on community cohesion.

g) Health and Wellbeing

- 7.127 The baseline assessment identifies a range of underlying health issues across Thurrock. This inter-relates with areas of very high deprivation across a number of wards within the area.
- 7.128 A range of different potential issues have been identified, that cut across many of the other themes identified within the assessment, which could impact upon the health and wellbeing of local residents. These include:
- Health/stress impacts of loss of housing and relocation
 - Disruption in access to healthcare
 - Health impacts of increased noise/air pollution
 - Disruption and blight to Public Rights of Way (PRoW)
 - Impact on health and wellbeing of disrupted views/access to nature
 - Negative health and wellbeing impacts of increased community severance and decreased community cohesion
- 7.129 As this study has predominantly focused on the qualitative health and wellbeing costs associated with the other impact areas, it does not preclude any findings from the Health Impact Assessment which will be undertaken in due course.

Housing Loss and Relocation

- 7.130 Whilst only impacting upon a relatively limited number of properties, the impact upon residents living within these properties could, potentially, be significant. Individual circumstances will differ, but the definitive requirement to move out of family home, and all of the associated stress of relocation, could be determinantal to the physical and mental wellbeing of some individuals.
- 7.131 In addition, Thurrock Council has already received concerns from residents who live in close proximity to the proposed route about their inability to sell or re-mortgage their properties due to uncertainty about land values and the route. These concerns are centred on the stress and anxiety caused as a result.

³¹ Victoria Transport Policy Institute (2018): Community Cohesion as a Transport Planning Objective.

Disruption in Access to Healthcare

- 7.132 The analysis has indicated that access to healthcare services will be particularly affected by the delivery of the LTC Scheme, particularly during the construction phase. Whilst it is difficult to quantify the scale of potential impacts, some groups are likely to find it more challenging to access the medical care they need, including by public transport services – such as the bus routes that currently connect communities to Orsett and Basildon Hospitals.
- 7.133 There could also be a disruption to care workers and other health providers who need to travel around the borough to reach vulnerable and in-need residents. This is likely to particularly impact the locations which will have access routes impaired during the construction phase and which have high proportions of ill residents, such as Little Thurrock, East Tilbury and Chadwell St Mary.

Noise / Air Pollution

- 7.134 It is recognised that noise and air pollution have direct impacts upon both physical and mental wellbeing. High concentrations of pollutants from vehicles are well documented as causing respiratory impacts, and there is a growing evidence base of the impact of noise, as referenced within DfT TAG:

“there is growing evidence on the links between environmental noise, defined by the World Health Organisation (WHO) as ‘noise emitted from all sources except industrial workplaces’, and health outcomes. The 2011 WHO report Burden of disease from environmental noise identified environmental noise as the second largest environmental risk to public health in Western Europe.”

- 7.135 Whilst the majority of the LTC alignment is away from residential areas, there are still some localities where impacts will be felt, including around Low street, Chadwell St. Mary, Orsett Heath, Stifford Clays, and Baker Street.
- 7.136 Detailed modelling of noise and air quality impacts is not yet available from Highways England but even if the extent to which formal tolerance levels are exceeded may be low, there will still be a significant increase in background noise and pollutants from current baseline levels created by the LTC Scheme. When coupled with the high prevalence of respiratory disease in communities such as South Ockenden, Tilbury and Chadwell St Mary, it is likely there will be a negative impact upon local residents’ health and wellbeing.

Lost community Assets

- 7.137 A scout activity centre and rugby club are located within the proposed LTC development boundary. The potential loss of parts, or all, of these facilities, even on a temporary basis, could have health and wellbeing impacts. This could be in relation to the direct physical health benefits that participants derive from the clubs, but also the wider social connections.
- 7.138 Open spaces and parks are also important community assets and play a key role in the good mental and physical health of a population. A number of

Loss of PRow

- 7.139 PRowS provide access-to-all for both physical exercise and the ability to connect with nature. There is wide-ranging literature around both the need for physical activity (150 minutes per week significantly reduces the risk of poor health), as well as the benefits of interacting with nature and mental health.
- 7.140 Widespread loss of PRow across the construction phase of the LTC Scheme could create damaging changes in underlying behaviours and increase the risk health issues amongst the local population, particularly for a population which suffers from high levels of obesity

and physical inactivity. These issues could extend beyond the construction phase where walking routes are permanently blighted and become less attractive to use.

Severance and Community Cohesion

- 7.141 The LTC Scheme will create a significant additional physical barrier across the area, impacting on the ability for residents to access friends, social networks and services. Whilst most transport connections will, ultimately, be restored, there are likely to remain perceptions of increased isolation created by the scheme. There could be a range of negative health and wellbeing impacts associated with increased community severance and resultant decreased community cohesion, in terms of individuals mental wellbeing. This will have detrimental impacts for those communities near the LTC which already have high levels of social isolation, such as Tilbury, South Ockendon and East Tilbury.

Conclusions – Community

- 7.142 The LTC will have a number of impacts on Thurrock's communities. This includes the economic costs of lost housing, adverse impacts to community facilities and negative social impacts of increased severance.
- 7.143 The overall impacts of the themes discussed above are summarised in Figure 7.18.

Figure 7.18 Summary of Community Impacts	
Impact Area	Estimated Cost to Thurrock
a) Loss of residential properties	£3.1 million
b) Residential property blight	£24.5 million
c) Impact on community facilities	<i>Moderate adverse (within LTC Corridor)</i>
d) PRoW severance/disruption	<i>Moderate adverse (within LTC Corridor)</i>
e) Community disruption during construction	<i>Moderate adverse (across Thurrock) (up to £36 million direct transport impacts #1)</i>
f) On-going impact on community cohesion	<i>Moderate adverse (across Thurrock) (up to £21 million direct transport impacts #1)</i>
g) Health & Wellbeing	<i>Moderate adverse (across Thurrock) #2</i>

Source: Hatch Regeneris #1 estimated economic impact of delays to non-business-related car trips

#2 subject to findings of full Health Impact Assessment

8. Environmental Cost Impacts

Overview

- 8.1 This chapter assesses the impact of LTC on the environment in Thurrock, including the loss of land, impacts on habitat and heritage, air, noise and visual pollution, and wider climate change impacts.
- 8.2 The impacts considered within this chapter fall into two main categories:
- **Direct impacts:** as a result of loss of land / environmental assets or direct environmental pollutants from the construction and operation of the LTC Scheme
 - **Indirect impacts:** blight on the wider environment as a result of the delivery of LTC
- 8.3 As a result, the assessment study areas for this chapter include:
- **LTC Development Boundary³²:** land, habitat or heritage that falls within the LTC Development Boundary will experience *direct effects* during construction and, in some instances, permanent demolition
 - **200m from the LTC Development Boundary:** environmental resources that fall within 200m of the LTC Development Boundary will experience potential *blight effects during the construction phase*
 - **50m from the LTC alignment:** environmental resources that fall within 50m of the LTC alignment may experience *permanent blight effects during the operational phase*.
 - **200m from the LTC alignment:** environmental resources that fall within 200m of the LTC alignment may experience less significant *blight effects during the operational phase*.

Impact Assessment

- 8.4 A number of impacts have been identified under the Business and Economy costs theme. These are:
- a) Amenity value of land lost
 - b) Habitat lost or damaged
 - c) Impact on heritage
 - d) Flood risk
 - e) Visual impacts
 - f) Air quality impacts/emissions
 - g) Noise impacts

³² As set out in the Highways England 2018 Statutory Consultation

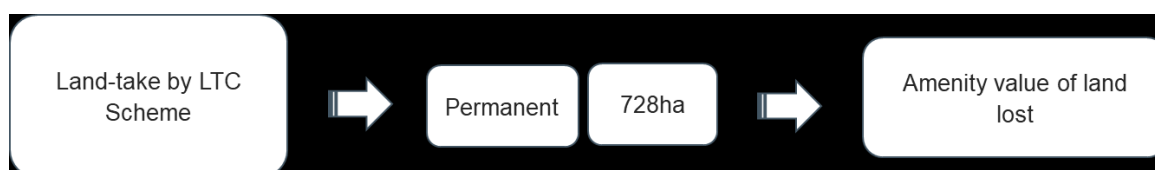
a) Amenity Value of Land Lost

- 8.5 To construct the LTC, 728 hectares³³ of land will be permanently taken. This land has an amenity value which will be lost as a result.

Scope and Methodology of Assessment

- 8.6 The scope of assessment for this impact is shown below. Only the permanent land loss has been included to evidence the absolute value loss as a result of the LTC. Amenity value of land is separate to the value of the land itself (captured elsewhere), and therefore this impact can be included in addition to the loss of agricultural (see impact 6a) and developable land (see chapter 9).

Figure 8.1 Amenity Land Lost – Scope of Assessment



Source: Hatch Regeneris

- 8.7 Calculating the amenity value of the land lost has been undertaken based on the following assumptions:
- It is assumed land is lost in the first year of construction
 - The approach taken is based on research undertaken by Eftec and Entec on amenity benefit values. This has been adopted in the DCLG Appraisal Guidance³⁴.
 - Given the location of the LTC route, the amenity value of greenbelt land (£1,797 per ha in 2016 prices) has been applied to the 728 ha. This value has been inflated to 2021 (first year of construction) and then discounted to 2019.

Assessment of Impacts of the Loss of Amenity Land

- 8.8 The economic cost of losing 728ha of amenity land is £1.35m in present value (2019 prices).

³³ Taken from the Highways England Preliminary Environmental Information Report 2018

³⁴ DCLG Appraisal Guide
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576427/161129_Appraisal_Guidance.pdf

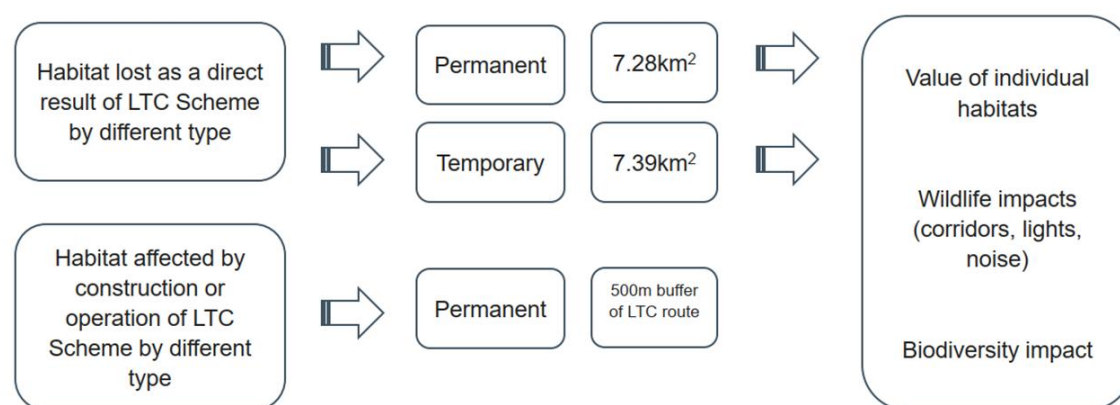
b) Habitat Loss

- 8.9 The construction of LTC will permanently require 728ha of land, with an additional 739ha required temporarily³⁵. The requirement of land will result in the loss, damage or reduced quality of wildlife habitats across the borough. While some habitats will be permanently lost or altered, those located within proximity to the LTC will be affected by environmental effects such as noise, lighting and visual disturbances – ultimately affecting the richness and/or viability of Thurrock's biodiversity.

Scope and Methodology of Assessment

- 8.10 The assessment of habitat loss considers wildlife habitats lost as a result of LTC, and further considers the effect of the Scheme on habitats located within 500m of the permanent alignment, as shown in Figure 8.2 below.

Figure 8.2 Habitat Loss – Scope of Assessment



Source: Hatch Regeneris.

Assessment of Impacts of the Loss of Habitats

- 8.11 Thurrock has a rich biodiversity, including numerous Sites of Special Scientific Interest (SSSIs), Nature Reserves, Community Forests and Local Wildlife Sites. Using DEFRA data³⁶, the locations of key habitats have been identified.

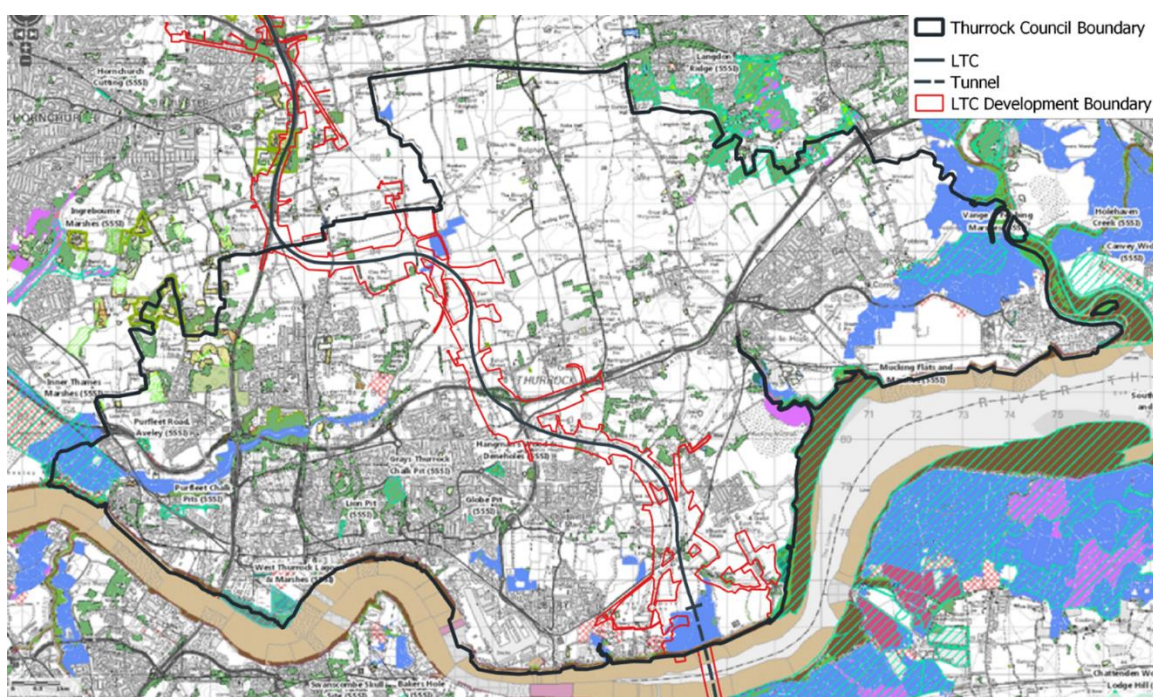
Direct effects

- 8.12 Figure 8.3 shows the location of habitats of importance in relation to the LTC Development Boundary.

³⁵ Taken from the Highways England Preliminary Environmental Information Report 2018

³⁶ DEFRA data compiles information on habitats from various sources including Priority Habitat Inventory, Intertidal Substrate Foreshore, BAP Priority Habitat and National Forest Inventory.

Figure 8.3 Location of habitat sites with LTC Development Boundary



Source: Hatch Regeneris. Data from DEFRA (2019)

- 8.13 In total, the LTC Development Boundary spans across 138ha of wildlife habitats, resulting in the loss or damage of these environments. Affected areas are listed in Table 8.1 below.

Table 8.1 Habitats within LTC Development Boundary

Data List	Habitat	Type	Affected land: Location and area (hectares (ha))
Priority Habitat Inventory	Coastal	Mudflats	<ul style="list-style-type: none"> • River Thames (22ha)
Priority Habitat Inventory	Coastal	Coastal and floodplain grazing marsh	<ul style="list-style-type: none"> • Area north of River Thames (90ha) • North east of South Ockendon (8.2ha)
Priority Habitat Inventory	Woodland	Deciduous Woodland	<ul style="list-style-type: none"> • Church Road / Station Road (4.4ha) • A13 Junction (7.1ha) • Stanford Road (0.6ha)
Priority Habitat Inventory	Other	No main habitat but additional habitat exists	<ul style="list-style-type: none"> • Condoers Scout Activity Centre (2.6ha)
National Forest Inventory	Woodland	Conifer	<ul style="list-style-type: none"> • Linford (1.1ha)
National Forest Inventory	Woodland	Broadleaved	<ul style="list-style-type: none"> • North of South Ockendon (2.6ha)
			TOTAL: 138.6ha lost

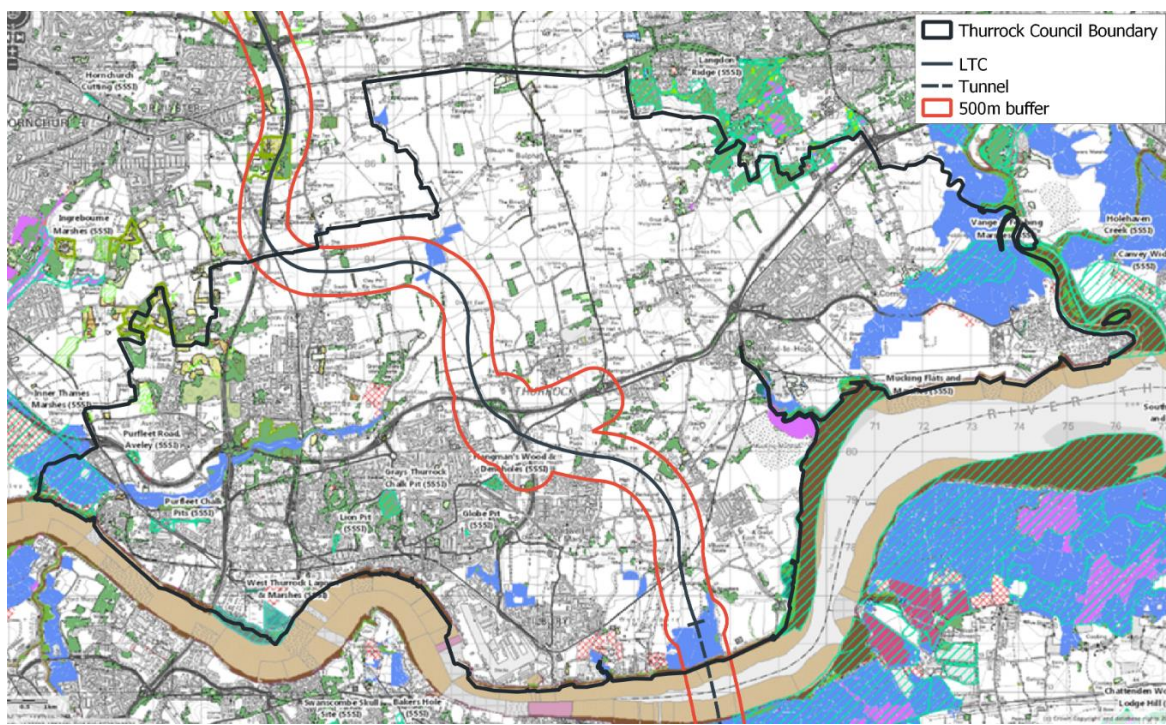
Source: DEFRA (2019) – MAGIC. Available at: <https://magic.defra.gov.uk/>

- 8.14 Associated noise and vibration associated with the construction of the LTC tunnel is likely to further affect marine biodiversity in the River Thames. Despite being temporary, the construction phase has the potential to disturb the marine environment, resulting in the loss of benthic habitats and macroinvertebrate resources. Construction activities also have the potential to deteriorate the quality of water and produce underwater noise, resulting in the possible contamination of benthic habitats and / or affecting migrating smelt.
- 8.15 While the LTC Development Boundary does not directly impact upon the Mucking Flats and Marshes, it is noted that this *Site of Special Scientific Interest (SSSI)* and *Important Plant Area* is in close proximity to the development area and therefore may experience some disturbances. The mudflats are the largest intertidal feeding area for wintering wildfowl and waders west of Canvey Island on the north bank of the Thames. The area is an important staging post for migratory species with wintering wildfowl and waders reaching both nationally and internationally numbers, and ringed plover reaching internationally important numbers.

Indirect effects

- 8.16 Once operational, environmental changes resulting from the use of the LTC has the potential to affect wildlife and habitats within the area.
- 8.17 Figure 8.4 shows wildlife habitat sites within 500m of the permanent alignment of LTC.

Figure 8.4 Habitats sites within 500m of LTC

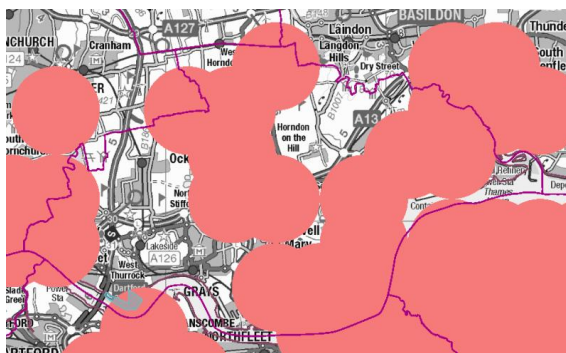


Source: Hatch Regeneris. Data from DEFRA (2019)

- 8.18 Majority of the habitat areas within the 500m buffer will have been subject to direct effects during the construction phase, resulting in the permanent loss of these sites. However, according to DEFRA data, the following wildlife habitats and species are located within 500m of LTC:
- Deciduous Woodland located to the west of Linford, to the north of Chadwell St Mary and surrounding the Orsett Golf Club;

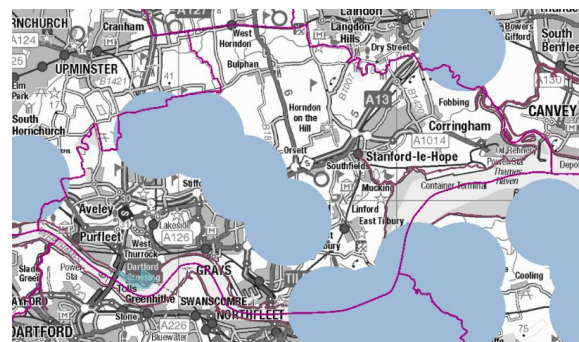
- A 3ha area of deciduous woodland is located to the west of the A1089 and is also an ancient and semi-natural woodland;
- Hangman's Wood and Denehole (SSSI): A 5.2ha woodland located 550m from the LTC alignment. The site has been identified as an important underground hibernation site for bats in Essex. Three bat species (brown long-eared bat, Natterer's bat and Daubenton's bat) have been recorded at this location;
- Species:
 - Great Crested Newt: an area to the west of East Tilbury, 500m from LTC, has previously granted a European Protected Species licence application (between 2014 and 2017). Licences allow the licence holder to take actions to safeguard European Protected Species from negative impacts associated with development and other potentially damaging activity. The license granted was for the protection of Great Crested Newt. It is unclear what the current status of this habitat and species is;
 - Farmland Birds: corn bunting, grey partridge, lapwing, tree sparrow, turtle dove, yellow wagtail, redshank and snipe are present across Thurrock and, crucially, follow the route of LTC. Figures 8.5 to 8.12 show the locations of respective habitats within Thurrock.

Figure 8.5 Corn Bunting



Source: DEFRA (2019)

Figure 8.6 Grey Partridge



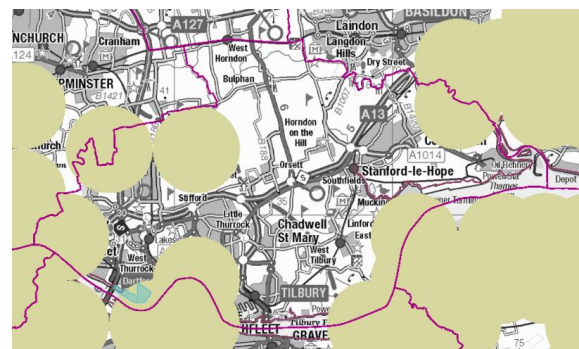
Source: DEFRA (2019)

Figure 8.7 Lapwing



Source: DEFRA (2019)

Figure 8.8 Redshank



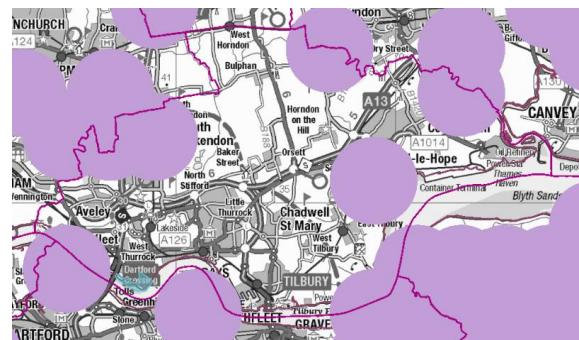
Source: DEFRA (2019)

Figure 8.9 Tree Sparrow



Source: DEFRA (2019)

Figure 8.10 Turtle Dove



Source: DEFRA (2019)

Figure 8.11 Yellow Wagtail



Source: DEFRA (2019)

Figure 8.12 Snipe



Source: DEFRA (2019)

- 8.19 Due to their proximity to the LTC and the height viaduct, the habitats and species identified above are at risk of permanent environmental disturbances, ultimately adversely affecting Thurrock's biodiversity.
- 8.20 Within the borough are many sites supporting rare invertebrates, many of which have specialist habitat requirements. These habitats include Thames Terrace Grasslands and Open Mosaic Habitat on Previously Developed Land several of which will be directly affected by the route.

c) Impact on Heritage

Scope and Methodology of Assessment

- 8.21 The National Heritage List for England has been used to establish existing heritage assets in the study area. Approximately 180 heritage assets are located within the study area, including seven Scheduled Monuments, one Conservation Area, one Grade I listed building and 21 Grade II listed structures. The full list of identified designated assets is provided in Appendix B, along with their respective assessments. The remainder are sites recorded on the Historic Environment Record.
- 8.22 The significance of effects on heritage assets has been determined by the sensitivity of the asset and magnitude of the impact on the asset or users of the asset.

Sensitivity

- 8.23 The sensitivity of impacts on heritage assets has been prescribed using the following criteria:

Table 8.2 Sensitivity of Heritage Assets	
Sensitivity of Resource	Criteria
Very High	<p>Very high importance and rarity, international scale and very limited potential for substitution:</p> <ul style="list-style-type: none"> • World Heritage Sites (including nominated sites) • Heritage assets of acknowledged international importance • Other buildings of recognised international importance • Historic landscapes or townscapes of international importance
High	<p>High importance and rarity, national scale and limited potential for substitution:</p> <ul style="list-style-type: none"> • Scheduled monuments • Heritage assets of acknowledged national importance (including non-designated assets) • Grade I and Grade II* listed buildings • Other listed buildings of acknowledged national importance • Conservation areas containing buildings of acknowledged national importance • Historic landscapes or townscapes of national importance
Medium	<p>Medium or high importance and rarity, regional scale and limited potential for substitution:</p> <ul style="list-style-type: none"> • Grade II listed buildings • Conservation areas • Heritage assets of acknowledged regional importance • Other buildings of acknowledged regional importance • Historic landscapes or townscapes of regional importance
Low	<p>Low or medium importance and rarity, local scale:</p> <ul style="list-style-type: none"> • Locally listed buildings • Other listed buildings of acknowledged local importance • Heritage assets of limited importance, but with potential to contribute to local research objectives • Historic landscapes or townscapes of local importance
Negligible	<p>Very low importance and rarity, local scale:</p> <ul style="list-style-type: none"> • Historic buildings of no architectural or historical note • Heritage assets with very little or no surviving interest

Source: DMRB (2019): LA 104 – Environmental Assessment and Monitoring; TFL (2016): Silvertown Tunnel 6.1.8 Environmental Statement, Chapter 8 - Cultural Heritage and Archaeology

Magnitude

- 8.24 The magnitude of effects on heritage assets has been prescribed using the following criteria:

Table 8.3 Magnitude of Impact on Heritage Assets

Magnitude of Impact	Criteria
Major	<ul style="list-style-type: none"> Change to most or all of the heritage asset, such that it is totally altered Comprehensive changes to the setting of an asset
Moderate	<ul style="list-style-type: none"> Changes to a large part of the heritage asset, such that it is clearly modified Changes that affect the setting of an asset that affects its character
Minor	<ul style="list-style-type: none"> Changes to a heritage asset, such that it is slightly altered Slight changes to the setting of a heritage asset
Negligible	<ul style="list-style-type: none"> Very minor changes to a heritage asset or its setting
No Change	<ul style="list-style-type: none"> No change to the heritage asset or its setting

Source: DMRB (2019): LA 104 – Environmental Assessment and Monitoring; TFL (2016): Silvertown Tunnel 6.1.8 Environmental Statement, Chapter 8 - Cultural Heritage and Archaeology

Significance of effects

- 8.1 The significance of a heritage effect is the product of the magnitude of the impact and the sensitivity of users of the affected heritage asset.
- 8.2 Significant impacts are those considered to have moderate, large or very large adverse effects. Other effects, equating to minor adverse or negligible, are not considered to be significant.

Table 8.4 Significance of Heritage Asset Impacts

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

Source: DMRB (2019): LA 104 – Environmental Assessment and Monitoring; TFL (2016): Silvertown Tunnel 6.1.8 Environmental Statement, Chapter 8 - Cultural Heritage and Archaeology

Assessment of Impacts on Heritage Assets

- 8.3 This section provides a summary of assets which are considered to be significantly affected by the delivery of LTC.

Direct Impacts

- 8.4 A large number of heritage assets are located within land required for the LTC Development Boundary. These include:
- **Crop Mark Complexes:** These include a large Scheduled Monument located to the north of the A13/A1089 junction, a second close to Baker Street with numerous non designated cropmarks recorded on the Historic Environment Record.
 - **Three listed buildings will be totally demolished including 1 and 2 Grays Corner Cottages:** a Grade II listed building currently used as two semi-detached residential properties.
 - **Thatched Cottage:** a listed Grade II residential property. **Murrells Cottages:** a listed Grade II residential property currently used as two semi-detached residential properties.
 - **Early prehistoric and palaeo-environmental deposits:** Deposits likely to contain evidence of early human occupation within Thurrock
- 8.5 These assets will be demolished and / or permanently altered, resulting in a **very large adverse effect** which constitute a significant effect.

Impact on setting

- 8.6 Construction of LTC has the potential to cause significant effects on setting of a number of Grade II listed buildings, scheduled monuments and conservation areas due to their proximity to LTC activities:
- **A number of listed buildings lie will have their setting impacted:** including Buckland: a listed Grade II residential building; Heath Place: a listed Grade II residential property.; hitecroft Farmhouse: a listed Grade II building currently used as a care home; Baker Street Windmill: a listed Grade II residential property.
 - **Scheduled monuments setting will be impacted:** These include the Orsett Causewayed enclosure, Coalhouse Fort, Coalhouse Battery
 - **Conservation Areas:** the **landscape in which the West and East Tilbury conservation areas are located in will be subject to major negative change** due to the close proximity of the construction site, LTC and road closures during construction
- 8.7 The above heritage assets are considered assets of medium to high value. Given the proximity of the these to the LTC Development Boundary and/or the permanent LTC alignment, environmental effects, such as vibration, visual impact will affect the integrity of the assets. In addition, large numbers of undesignated heritage assets, including archaeological sites, non-designated buildings, paleo-environmental deposits and historic landscape features, will be impacted by the proposed scheme.
- 8.8 As environmental mitigation strategies are currently unknown, the significance of impact effects on the heritage assets are considered to be moderate, resulting in each asset having a permanent **moderate adverse effect, which is significant**. To fully understand the potential damage the construction of LTC may have on the assets, detailed environmental assessment will be required to be submitted as part of the DCO process. Trial trenching, palaeo-environmental assessment, geophysical survey is being undertaken at present and is likely to identify further heritage assets to be added to the above.

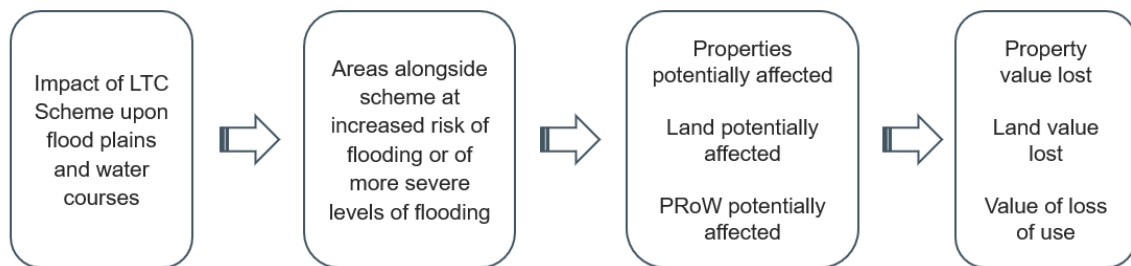
d) Flood Risk

- 8.9 As with any new highway development of this scale, there will be a significant increase in hardstanding associated with the footprint of the proposed LTC Scheme. As such, without appropriate measures being put in place there is a significant risk that flood risk could increase.

Scope and Methodology of Assessment

- 8.10 Figure 8.13 sets out the scope of the assessment proposed to assess the potential flood risks associated with the LTC Scheme.

Figure 8.13 Flood Risk – Scope of Assessment



Source: Hatch Regeneris.

- 8.11 It is understood that, with most major infrastructure schemes, major flood risks will be mitigated against; however, there can be instances where the cost of mitigation is prohibitively expensive and so there can be increased risk of flooding to some properties or land. In addition, flood mitigation work can affect specific parcels of land and so it can be important to understand whether or not this could have subsequent negative impacts for the local community.
- 8.12 The assessment has sought to establish whether or not the LTC Scheme (taking into account any mitigation measures) is likely to significantly impact upon flood risk across the Thurrock area.

Assessment of Impact on Flood Risk

- 8.13 There are on-going discussions between the Council and Highways England to ensure that flood risks are appropriately accounted for any runoff from the LTC Scheme and to ensure that there will be no increase in the runoff rates. Whilst there are potentially a few areas where the scheme could deliver slight improvements to existing flooding risk, these are currently considered incidental and there has not been any significant consideration about how the scheme could be used to tackle existing flood risk.
- 8.14 There remains limited detailed information with which to assess the overall impact and so, whilst there are currently no significant concerns from the proposals presented to date, this could be subject to change once further revised designs are presented.

Conclusion

- 8.15 On the basis of the limited information available it is concluded that there will be a negligible or minor impact upon flood risk from the LTC Scheme, but this will be subject to further review once further information is available.

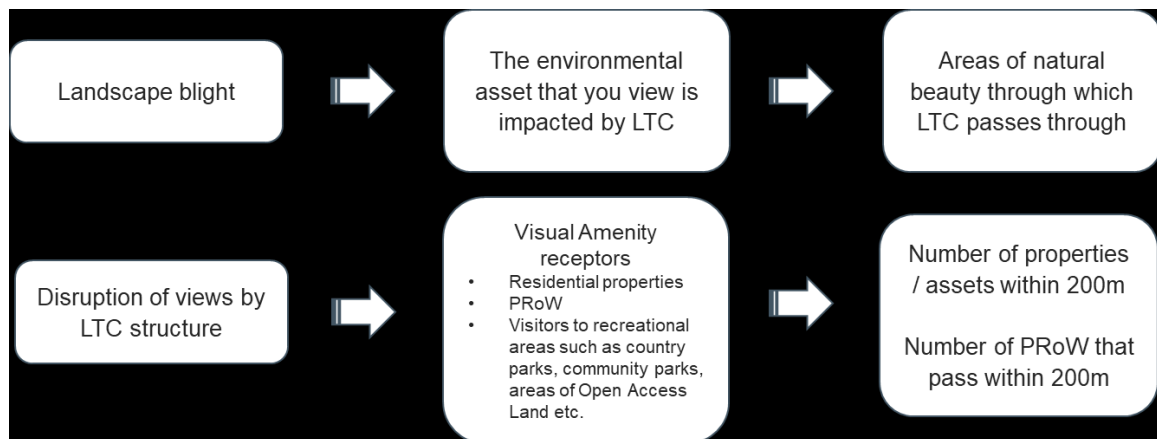
e) Visual Impacts

- 8.16 It is likely that an infrastructure project of this size will have visual impacts on the surrounding environment. This is due to the size and scale of the LTC, and the alignment of the route through greenbelt and low-lying marsh land.

Scope and Methodology of Assessment

- 8.17 Figure 8.14 below sets out the scope of assessment for understanding the visual impacts of the LTC. This includes two possible areas of impact:
- 1) The physical landscape is impacted by the LTC structure, resulting in a reduction in the quality of the environment that is viewed
 - 2) The LTC physically blocks or impairs views from visual amenity receptors. This includes residential homes, users of public rights of way and visitors to parks etc.
- 8.18 It is assumed that these visual impacts will occur throughout both the construction and operational phases.

Figure 8.14 Visual Impacts – Scope of Assessment



Source: Hatch Regeneris

Assessment of Visual Impact

- 8.19 Assessment of the impact of the LTC on the two areas set out above suggests:
- 1) The LTC is likely to have adverse impacts on a number of important visual landscapes in Thurrock. As set out in the Highways England PEIR, there are several different landscapes which will be subject to permanent changes due to the construction and operation of the LTC, these include:
 - Marshland across the borough – in particular, Tilbury marshes will be subject to major adverse change from the construction activities of the LTC tunnel portal.
 - Greenbelt land with specific heritage or biodiversity value – Orsett Fen will undergo major negative change due to the construction and operation of the LTC/A13 junction
 - Mardyke Valley – the character of low-lying Mardyke Valley will be significantly altered due to the construction and operation of a viaduct to carry the LTC over the marshland. This area of Thurrock is currently sparsely populated and relatively

undeveloped, with much of the natural landscape intact. The introduction of a major road and elevated viaduct could result in major adverse change to the area.

- 2) During construction and operation, the LTC will disrupt views for a number of visual amenity receptors:
- **Residential properties** within 200m of the LTC are likely to experience moderate to major impacts to current views. There are 160 properties that fall within this 200m boundary. Given the scale of construction, for some of these homes the disruption to views in the construction phase will be heightened. Two examples of residential properties likely to experience major impacts include:
 - Homes on Princess Margaret Road which currently have an uninterrupted view across the Thames and of the Kent Downs AONB. The LTC tunnel portal will impair these views
 - Residential properties on the eastern edge of Tilbury with an uninterrupted eastern view across the West Tilbury marshes. The tunnel portal and LTC route will disrupt these views
 - **14 Public Rights of Way** are located in close proximity to the LTC and are likely to have their views impacted. PRow at risk include:
 - Users of PRow between West and East Tilbury
 - Users of NCR 13 and Thames Riverside PRow which will be subject to moderate/minor visual change
 - The footpath network and scattered rural properties in the open, low-lying Orsett Fen. These visual amenity receptors currently have 360-degree, uninterrupted views
 - Other receptors such as visitors to Coalhouse Fort and users of the Orsett and Top Meadow golf courses are likely to experience disruption. In particular, Coalhouse Fort currently has extensive views along and across the Thames Estuary, as well as views to the west across Tilbury Marshes. Therefore, LTC construction and operation on both sides of the River Thames could impede views from the Fort.

Additional impacts of visual disturbance

Health and Wellbeing

- 8.20 Evidence³⁷ compiled by the University of Essex on behalf of the Wildlife Trust explores the impacts of natural views to health and wellbeing. It finds that natural views and access to green space can have positive impacts in areas such as mental wellbeing, encouraging physical exercise, tackling obesity and health inequality. However, as the baseline data shows, these are all challenges which are currently heightened in Thurrock, and therefore the role of natural landscapes in these communities could be particularly important.
- 8.21 The research suggests that building on green spaces could have serious implications for health and social inequalities, as a lack of green space in residential areas corresponds with poor wellbeing and reduced physical activity. This is exacerbated in poorer areas, which will impact on the deprived communities concentrated around the LTC route.

³⁷ https://www.wildlifetrusts.org/sites/default/files/2018-05/r1_literature_review_wellbeing_benefits_of_wild_places_lres_0.pdf

Light pollution from construction compounds

- 8.22 Given the 24-hour programme of construction, it is likely that lights used to light up the construction compounds will result in visual light pollution impacts at night for the surrounding areas. This could have an adverse impact on the properties, community facilities and habitats located in close proximity to the compounds. However, due to a lack of detailed information on construction activities, it is impossible to make a robust assessment of the potential magnitude of visual impact associated with light from construction activities at night at this stage.

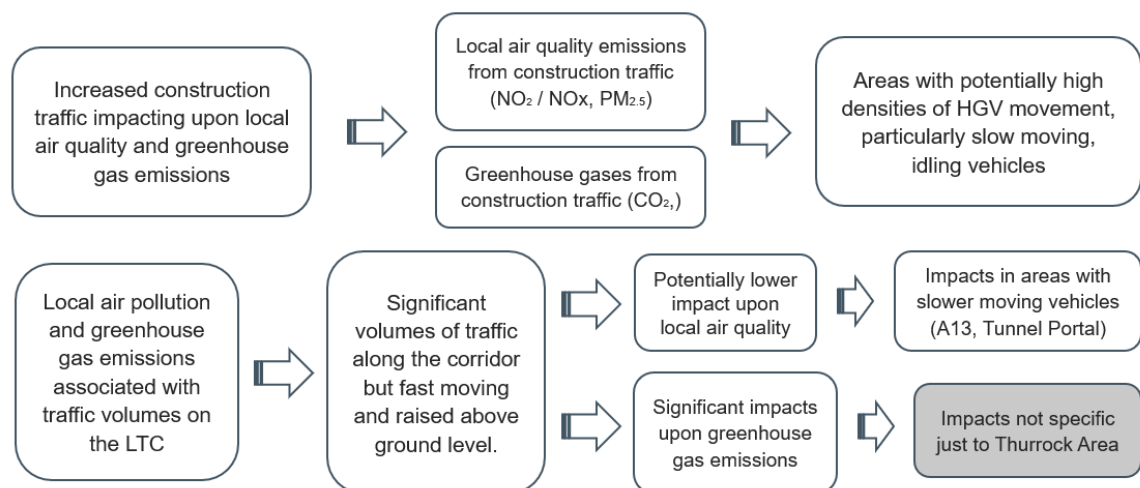
f) Air Quality/Emissions

- 8.23 The LTC will result in significant additional strategic traffic movements across Thurrock, as well as changes in local traffic movements. In addition, the construction of the scheme will require a significant increase in HGV. These changes in traffic movements could impact upon both local air quality, as well as the level of greenhouse gas emissions.

Scope and Methodology of Assessment

- 8.24 Figure 8.15 sets out the scope of the assessment proposed to assess the potential impacts of the LTC Scheme upon local air quality and greenhouse gas emissions.

Figure 8.15 Local Air Quality and Greenhouse Gas Emissions – Scope of Assessment



Source: Hatch Regeneris.

Construction Phase Air Quality / Emissions Impacts

- 8.25 Chapter 4 outlined the level of additional traffic movements associated with the construction of the LTC Scheme. Overall are estimated to be an additional 11,700 monthly HGV movements to compounds in Thurrock and between 1,800 and 2,700 monthly bus movements to bring workers to and from the construction compounds. Whilst, in themselves, these are not significant daily traffic movements, they will create clusters of additional movements in and around the compound sites themselves.
- 8.26 These clusters of movements, and idling vehicles, could contribute to local air quality issues in the areas around the two compounds locations in the heart of Thurrock: Low Street / East Tilbury, and Chadwell St Mary / Southfields.

- 8.27 The greenhouse gas emissions from the construction-related traffic will depend upon the specific vehicle mix but, whilst still notable, the overall scale of trips will not be significant in comparison to wider transport emissions across Thurrock and the resultant LTC Scheme itself.
- 8.28 There will also be a range of traffic impacts around the existing A13 junction with the A1089 during the construction of the LTC Scheme. Traffic flows are likely to be slower and there could be additional congestion, including stop-start traffic on local roads subject to disruption. Whilst there is insufficient data to quantify these impacts, they are likely to add to local air quality issues around the junction.

Operational Phase Air Quality / Emissions Impacts

- 8.29 The operational phase of the LTC will result in a significant traffic flows along the route. As detailed in Chapter 4, the Highways England traffic modelling indicates that there could be the following average daily traffic flows on different section of the LTC:
- South of the A13 = between 90,000 – 95,000
 - North of the A13 = between 75,000 – 80,000
- 8.30 These levels of traffic will generate significant emissions, in terms of nitrogen dioxide (NO₂), Nitrogen Oxide (NO_x), Particulate Matter (PM), and carbon dioxide (CO₂).

Local Air Quality

- 8.31 Assessing the levels of emissions generated and, most importantly, the local concentrations created, requires detailed air quality modelling that is not currently available.
- 8.32 Evidence recognises³⁸ that driving a constant speed is more efficient than acceleration and deceleration (unless driving at speeds above 75mph), and that emissions disperse more readily is greater at higher speeds. As such, the concentrations of emissions created along free-flowing sections of the LTC are likely to be relatively low, in comparison to similar traffic volumes on local roads. The raised height of the carriageway will further assist with dispersing pollutants.
- 8.33 Where traffic speeds reduce, and vehicles are accelerating and decelerating, the risk of higher concentrations of emissions forming is much higher. This is likely to occur around the junction with the A13, where speeds will reduce considerably for vehicles interchanging between routes, albeit the junction is designed to avoid stationary traffic. There are also likely to lower vehicle speeds, and higher acceleration, for vehicles coming out of the tunnel portal, particularly HGV given the level of incline.
- 8.34 Low traffic speeds, and stop/start traffic, will also occur in the event of incidents along the LTC. Whilst Highways England has not provided definitive forecasts of incident management, analysis undertaken within Chapter 4, applying existing data on closures from the Dartford Crossing, forecasts that an incident may occur on the LTC once every four days.
- 8.35 As well as assessing the potential concentrations of emissions created, air quality impact assessments need to consider the number of sensitive 'receptors' within defined distances of the scheme that could be affected. The estimated number of properties within 200m of the LTC alignment is 160. Beyond 200m from the scheme, the contribution of vehicle emissions to local pollution levels is not significant³⁹.

³⁸ 'Advising fuel efficient driving techniques for your fleet' (Energy Savings Trust / Department for Transport)

³⁹ TAG Unit A3 Environmental Impact Assessment

- 8.36 It can be seen that the overall number of existing properties in close proximity to the proposed LTC Scheme alignment is relatively low. There will be some properties around the LTC junction with the A13 that will be within 200m, as well as potentially some in Chadwell St Mary and Low Street.
- 8.37 Based upon the evidence of traffic volumes, speeds, and location of sensitive receptors within 200m of the alignment, the analysis concludes that the main impacts of the LTC Scheme in terms of local air quality impacts are likely to be focused around the A13 junction.

Greenhouse Gas Emissions

- 8.38 Whilst the local air quality impacts (as defined by the DfT) in the immediate vicinity of the LTC Scheme may not be high relative to the scale of the scheme, the overall level of greenhouse gas emissions associated with the scheme will be considerable.
- 8.39 It is recognised that a primary role of the LTC is to provide capacity relief to the Dartford Crossing, which is operating above capacity. A significant proportion of trips (83%) using the LTC will be existing trips that have diverted from the Dartford Crossing. The proportion of induced trips crossing the River Thames as a result of the LTC Scheme is, therefore, estimated to be around 13,250 vehicle trips per day.
- 8.40 Data on the overall average length of trip undertaken by these additional vehicles is not currently known, but if it assessed across the length of the LTC Scheme within Thurrock then this would account for an additional 32 million miles travelled per year. This is estimated to equate to around 7,500 additional tonnes of CO₂ produced within Thurrock per annum.

Overall Air Quality / Emissions Impacts

- 8.41 Without specific air quality modelling outputs, it is not possible to quantify the overall impacts of the LTC Scheme upon local air quality and greenhouse gas emissions. The disruption caused by the scheme and the volume of traffic generated will create significant impacts and so the overall conclusion is that there will be **moderate adverse** impact, subject to further analysis.

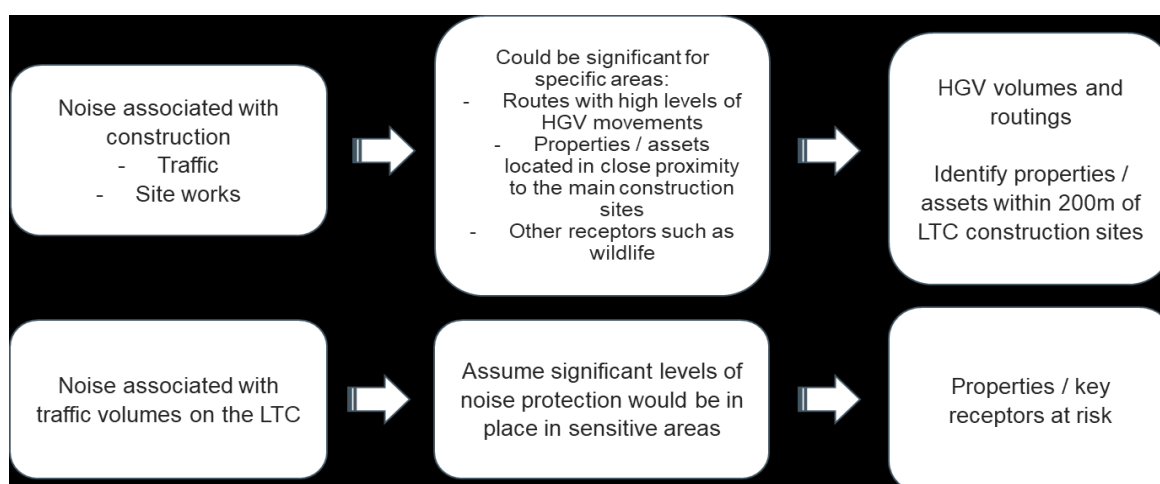
g) Noise Impacts

- 8.42 The construction and operation of the LTC will result in increases to noise levels in Thurrock. This is a result of increased levels of traffic, as well as construction activities.

Scope and Methodology of Assessment

- 8.43 The scope of assessment below (Figure 8.16) sets out the approach to measuring the noise impact of the LTC in the construction and operational phases:
- **Construction** – noise impacts from construction traffic and construction activities on the main work sites
 - **Operational** – noise from traffic on the LTC road

Figure 8.16 Noise Impact – Scope of Assessment



Source: Hatch Regeneris

8.44 The likely receptors at risk from increased noise impacts include:

- Residential properties
- Public Rights of Way
- Hospitals, schools and community facilities

Assessment of Noise Impact

8.45 Whilst strict national guidelines mean that noise from the LTC is unlikely to exceed standards set for construction and operation of major road infrastructure, there is likely to be an increase to the background noise above current levels. For the more rural locations in Thurrock, this increase, whilst still within national limits, may be a significant noise impact compared to current levels.

8.46 As a result, assessing the impact of noise will focus on this relative increase and the potential adverse effects it may have. Department for Transport WebTAG guidance⁴⁰ states that transport-related noise should be assessed in relation to its impact on annoyance, sleep disturbance and health impacts (such as stress and dementia).

Construction phase impacts

8.47 Assessment of the construction phase has determined the areas at most risk to high levels of construction traffic (see chapter 4). This finds that the communities closest to the main work sites, including East Tilbury, West Tilbury and Southfields, will have significantly increased traffic flows, mostly HGV vehicles. HGV (>3.5 tonnes) and other construction traffic emit greater levels of noise than normal cars. Given the small, local nature of the roads around these settlements, it is likely that the baseline HGV traffic level is very low. Therefore, significantly increased traffic flows for LTC construction will result in a relative increase to noise levels. This is assessed potentially having a moderate adverse impact on local properties and community assets within 300m⁴¹ of the construction boundary. This is likely to affect over 250 properties and other sensitive receptors such as Treetops, Treetops

⁴⁰ DfT WebTAG Environmental Impact Appraisal
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/825064/tag-unit-a3-environmental-impact-appraisal.pdf

⁴¹ This is the buffer used by Highways England in the PEIR, in accordance with national guidance.

2 and Orsett Heath Schools, Linford Village Hall, The Whitecroft nursing home and a number of primary schools.

- 8.48 In addition, construction activities at the work sites will generate noise in the local area. There is currently a lack of detailed information on the potential noise and vibration impacts of construction, and therefore a robust assessment of impact cannot be made. However, information on the construction process suggests that, in addition to day-time construction noise, tunnel boring will occur 24/7 and work to connect the LTC to the existing road network will occur during night-time. As a result, there are likely to be continuous day-time and night-time construction noise impacts for the 6-year construction period. The rural location of the tunnel portal means the relative uplift in noise due to tunnel boring, especially during the night, could be significant.
- 8.49 Therefore, the LTC construction phase is likely to have noise impacts which cover all three of DfT's impact areas: annoyance, sleep disturbance and health impacts.

Operational phase impacts

- 8.50 Assessing the levels of noise generated by the LTC requires detailed noise monitoring and modelling that is not currently available. However, the information that is available suggests that operational noise impacts due to traffic increases are likely to be significant for some sensitive receptors due to the relative increase from a low baseline level.
- 8.51 As stated in the PEIR, the LTC will go through an area of Thurrock which currently has 'lower road traffic noise levels', in particular areas such as Tilbury, East Tilbury, West Tilbury and Linford are likely to experience adverse impacts associated with increased background noise.
- 8.52 In addition, the WebTAG guidance acknowledges the increasing importance of measuring the impact of noise on 'quiet areas'. This refers to 'tranquil landscapes' or peaceful rural areas. Whilst assessment of this impact cannot be included in a technical appraisal of noise impacts, it is important to consider the potential changes to landscape tranquillity as a result of major transport schemes. This is likely to be particularly relevant for areas of Thurrock such as the Mardyke Valley, which is currently relatively undisturbed.

Conclusions – Environment

- 8.53 The LTC will have a number of impacts on the environment in Thurrock. This includes the economic costs of lost housing, adverse impacts to community facilities and negative social impacts of increased severance.
- 8.54 The overall impacts of the themes discussed above are summarised in Figure 8.17.

Figure 8.17 Summary of Environmental Impacts

Impact Area	Estimated Cost to Thurrock
a) Amenity Land Value lost	£1.35 million
b) Habitat lost/damaged	<i>Minor to moderate adverse impacts (within LTC Corridor)</i>
c) Heritage impact	<i>Moderate adverse [#] (within LTC Corridor)</i>
d) Flood risk	<i>Negligible to minor adverse [#] (within LTC Corridor)</i>
e) Visual impacts	<i>Moderate adverse (across Thurrock)</i>
f) Local air quality and emissions	<i>Moderate adverse [#] (within LTC Corridor)</i>
g) Increase in noise	<i>Moderate to Major adverse [#] (within LTC Corridor)</i>

Source: Hatch Regeneris

[#] not-withstanding the findings of future modelling exercise and detailed analysis

9. Impact upon Growth

Overview

- 9.1 The LTC scheme represents a major piece of physical infrastructure that will require significant land take, both to construct, but also when in permanent operation. This will have direct impacts upon land availability for development across Thurrock, as well as wider impacts upon the value of land surrounding the LTC Scheme.
- 9.2 This section examines the potential constraints that LTC will place upon residential and commercial development across Thurrock, with specific reference to:
- **Permanent** loss of development land during the construction and operational phases of LTC;
 - **Temporary** loss of development land during the construction phase of LTC; and
 - **Blight** upon other development land affecting viability or value during the operational phase of LTC.
- 9.3 A review of the current Local Planning process is set out within Chapter 3. Whilst a new Local Plan is still under development, current evidence identifies a local housing need for up to 33,000 new homes by 2041, along with aspirations for growth in commercial development. The permanent, or temporary, loss of land associated with the construction and operational phases of LTC could, potentially, impact upon the ability of Thurrock Council to meet these growth aspirations.
- 9.4 Within the Chapter 3 baseline, a scenario assessment was presented that considered potential site suitability and viability for development, at a strategic area-wide level. Whilst only representative of a theoretical assessment, the outcomes of this exercise indicated that deliverable sites may enable between 38,100 and 43,500 new homes across Thurrock by 2050.

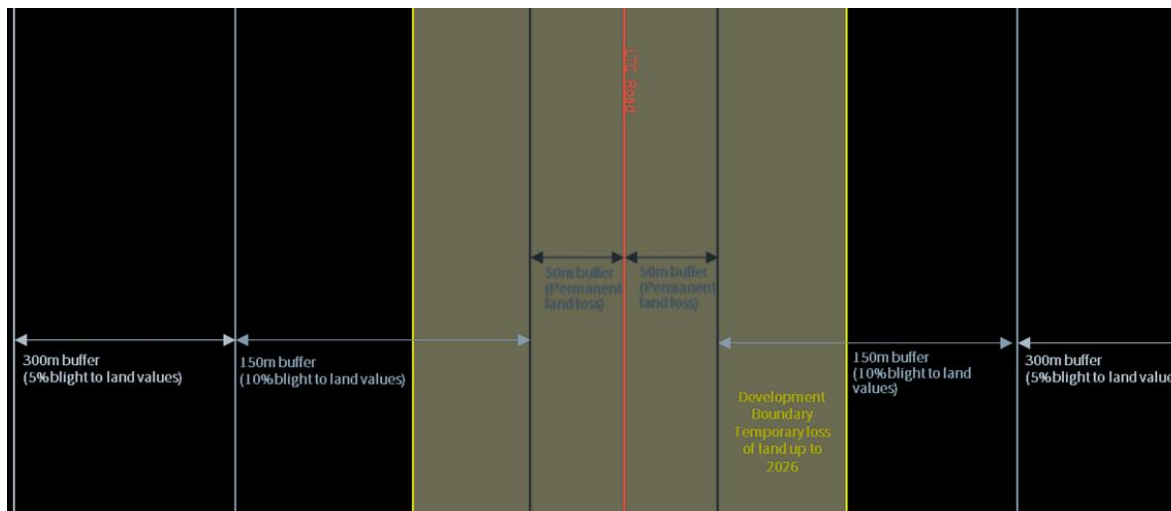
Impact Assessment

- 9.5 The growth impact assessment considers the potential development land affected by the construction and operational phases of LTC. These are defined as development land within:
- the physical boundary of the LTC structure and its surrounds that prevents any alternative development;
 - the red line boundary for LTC construction that restricts other development opportunities during the LTC construction phase (2021 to 2026); and
 - buffers extending 150m and 450m from the LTC permanent boundary
- 9.6 For each of these areas the volume of land affected has been determined and the value of that land for commercial or residential development estimated, using MHCLG estimates⁴². These estimates represent the Reference Case scenario for development values that could be achieved in the absence of the LTC Scheme.
- 9.7 Individual assessments are then undertaken to determine what land may be permanently or temporarily lost as a result of LTC, or if the viability and/or value of land could be affected by blight.

⁴² <https://www.gov.uk/government/publications/land-value-estimates-for-policy-appraisal-2017>

- 9.8 Figure 9.1 provides an overview of the different zones in which the impacts of LTC upon development land has been assessed.

Figure 9.1 Diagram of Buffer Zones applied within the analysis



Source: Hatch Regeneris

- 9.9 For land deemed permanently lost, the total value of the land is presented as an economic cost. For land deemed temporarily lost, the economic loss of value from not being able to progress any development until 2027 is estimated.
- 9.10 For land within the 150m and 450m buffers, an assessment of the impact that the close proximity of the LTC Scheme (during both construction and operational phases) could have upon underlying economic values has been undertaken. Evidence of property blight impacts emerging in relation to HS1 and HS2 have been used to estimate the impact of LTC blight upon local land values.
- 9.11 Analysis by PwC⁴³, based upon discussions with DfT and HS2 Ltd, forecasts on-going blight from transport infrastructure ranging up to 10% within 120m and up to 6% within 500m. Further research from Hampton International⁴⁴ linking the housing market to major transport infrastructure estimated that properties outside London within 500m of the HS2 alignment fell by 4.5% in absolute terms, but 8.9% in relative terms to wider house price trends.
- 9.12 On the basis of this wider evidence base, we have applied the following parameters within the assessment of impacts of LTC upon the value of development land:
- For commercial development land located in close proximity of the LTC (within 150m) a 5% loss of value has been applied, based upon the evidence base. For the commercial development land between 150m and 450m, a 2.5% loss in value has been applied.
 - For residential development land located with 150m of the LTC a 10% loss of value has been applied, whilst for land between 150m and 450m, a 5% loss in value has been applied.

⁴³ HS2 Property Bond Cost Report, PwC (2014)

⁴⁴ Linking Housing Markets: The effect of transport infrastructure on housing, Hamptons International (2014)

Commercial Development

Permanent Loss

- 9.13 The only potential development land directly impacted by the final LTC alignment is an area to the south of the Tilbury Loop rail line. There is estimated to be a maximum loss of 3 ha of potential employment land. It is understood that any development opportunities within this area will require significant upgrades to transport infrastructure provision. Alternative land options would be available to off-set this relatively small potential loss of land in this locality. The net economic value of losing this land for commercial development will therefore be negligible.
- 9.14 For completeness, we have estimated the loss in gross economic value associated with this permanent loss of commercial development land. At £5.4m, it can be seen that, even at this maximum gross level, it represents a relatively small loss of value.
- 9.15 Given the uncertainties of the medium-term viability of the site, we would conclude that the net impact of permanent loss of commercial development land for LTC is, broadly, neutral.

Temporary Loss

- 9.16 As with the permanent loss of land, the main area of potential commercial development land that could be affected by the construction of LTC is to the south of the Tilbury Loop rail line. This area is particularly affected by the main designated construction compound for the LTC tunnel portal. A further 84 ha of potential employment land will be temporarily lost within the construction red line boundary (over and above the permanent commercial land lost). As stated above, this land will require substantial transport infrastructure investment to “unlock” any development and, as such, the probability of any substantial development coming forward before 2027 may be limited.
- 9.17 For completeness, we have estimated the maximum loss in gross economic value associated with the temporary loss of commercial development land. This indicates that delaying construction on these sites could cost the economy up to £11m.
- 9.18 Given the uncertainty over whether this development could come forward in the period up to 2027, we have concluded that impact of the construction of LTC upon commercial development opportunities is likely to be relatively minimal.

Blight

- 9.19 A final assessment of the potential commercial development land within 150m and 450m of the LTC alignment has been undertaken. Whilst none of this land will be permanently or temporarily lost as a result of the LTC Scheme, the disruption caused during the construction of the scheme, and the permanent physical and environmental impacts of the scheme in its operational phase, could cause blight in these areas. This could impact upon the viability or value of development that could be brought forward.
- 9.20 There remain relatively few commercial development opportunities located within 150m and 450m of the LTC alignment. A maximum of 6 ha has been identified within 150m and 48 ha within 450m. Much of this land is, again, south of the Tilbury Loop rail line and subject to a number of constraints for development. The total economic value associated with developing this land is estimated at around £104m. Applying a loss of value of 5% for land within 150m, and 2.5% for land between 150m and 450m, would generate a maximum loss in value of £2.7m.

Residential Development

- 9.21 The LTC alignment, and associated red line construction boundary, passes through a significant area of potential development land within the heart of Thurrock. An expansive area between Chadwell St. Mary, Linford/East Tilbury, and the Tilbury Loop rail line has been identified for potential residential development. It is recognised, however, that not all of this land is likely to be brought forward within the next 20 years, due to a combination of requirement, suitability, and/or viability. It is probable that housing expansion will be focused around extensions to existing villages, towns, and urban areas.
- 9.22 The assessments of permanent and temporary residential land loss, as well as blight, have been undertaken on the basis that a reduced proportion of the total available land would be brought forward for development within the emerging Local Plan and that the land is highly likely to be required to meet the housing needs of the Thurrock area. The assessment has applied a range of average housing density rates for the whole of Thurrock of between 35 and 40 dph.

Permanent Loss

- 9.23 Figure 9.2 presents the estimated areas of designated residential development land that will be permanently lost by the construction of LTC.

Figure 9.2 Estimation of Permanent Residential Development Land Loss due to LTC



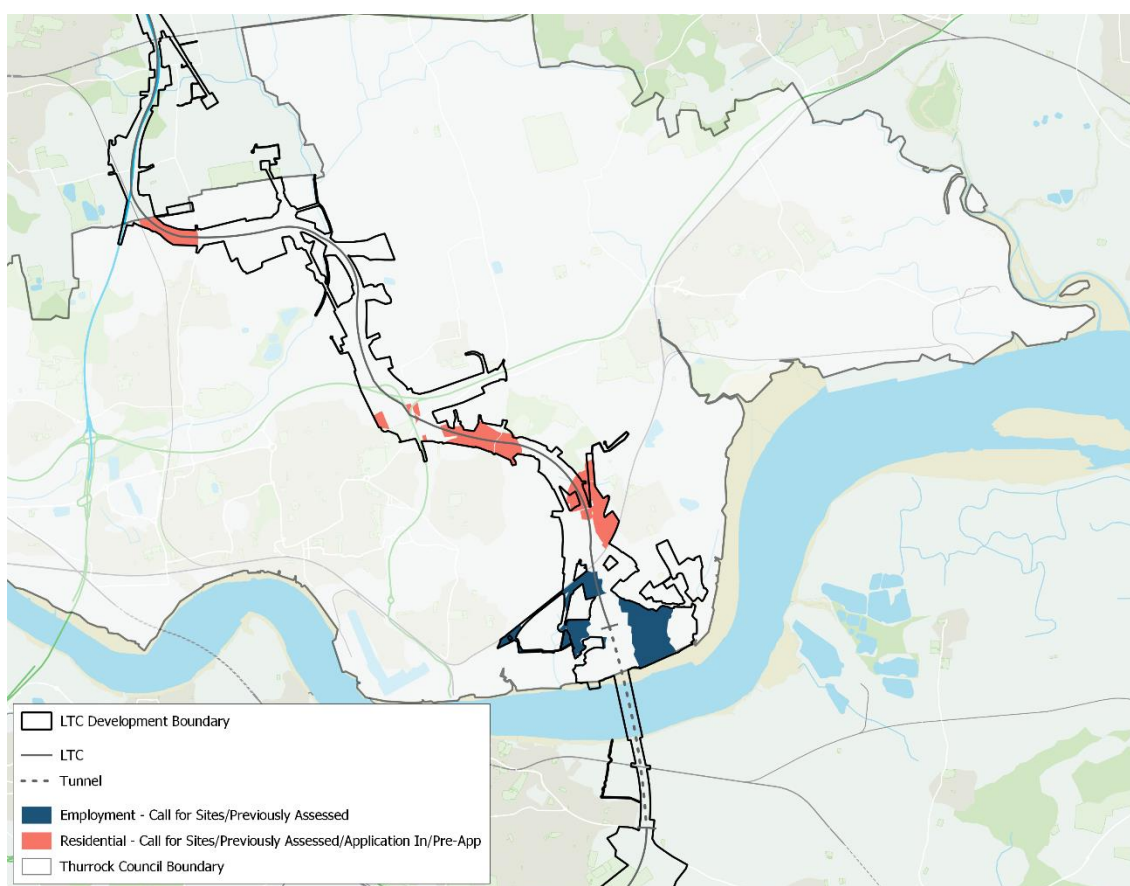
Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 9.24 We have estimated the permanent loss of homes that could be delivered on these sites, and the associated economic value. The scale of potential residential development affected is estimated to be between 735 - 840 homes, with an associated gross economic value of between £70m and £85m.

Temporary Loss

- 9.25 Figure 9.3 presents the estimated areas of residential development land that could be impacted by the construction of LTC. Excluding the area that will be permanently lost to the LTC Scheme, we have estimated the number of homes that could be temporarily delayed in construction until post-2026. The economic time value of the enforced delay in construction is then estimated.

Figure 9.3 Estimation of Temporary Residential Development Land Loss due to LTC Construction



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

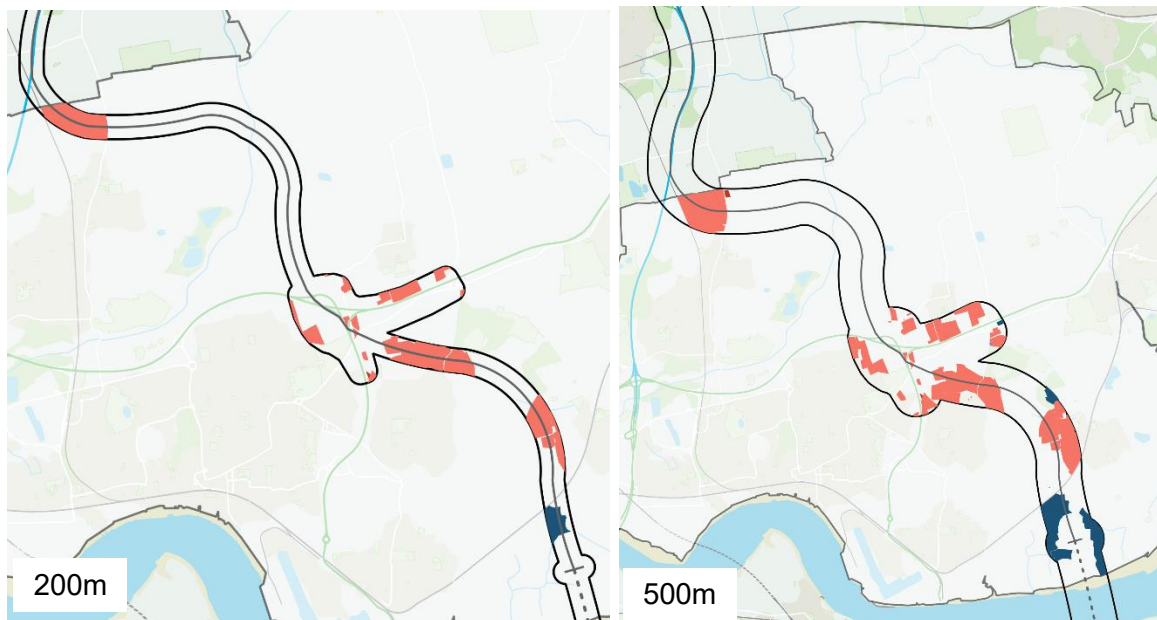
- 9.26 The scale of potential residential development affected is estimated to be between 2,330 – 2,660 homes, with an associated gross economic value of between £16m and £18.5m.

Blight

- 9.27 A further assessment of the potential residential development land within 150m and 450m of the LTC alignment has been undertaken. Whilst none of the land will be permanently, or even temporarily, lost as a result of LTC, the disruption caused through the construction of the scheme, and the permanent physical and environmental impacts of the operational scheme, could cause blight in these areas. This could impact upon the viability or value of development that could be brought forward.
- 9.28 Figure 9.4 presents the estimated areas of residential development land within 150m and 450m of the LTC alignment. There is forecast to be the potential for between 1,870 and 2,135 homes within 150m and a further 3,150 and 3,600 homes within the extended buffer to 450m.

- 9.29 The total economic value associated with this residential land is estimated at between £520m and £600m. Applying a loss of value of 10% for land within 150m, and 5% for land within 150m to 450m, would generate a loss in gross economic value of between £33m and £39m.

Figure 9.4 Estimation of Development Land Potentially Affected by LTC Blight



Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

Summary and Conclusions

- 9.30 The assessment of growth has examined a range of impacts of the LTC Scheme upon residential and commercial development. Whilst there remains uncertainty around future development proposals, it is clear that land required directly for the construction and final operation of the LTC Scheme, as well as sites immediately surrounding the proposed alignment, hold significant economic value in development terms.

Forecast Gross Economic Development Cost Impacts

- 9.31 Table 9.1 provides a summary of the maximum gross economic impacts, in terms of lost value of development land.

Table 9.1 Estimated Loss of Gross Economic Value from Development Impacts

Development Impact	Land Area	Land Impacted	Economic Cost to Thurrock
Permanent Land Lost	Total Development Area *	39 hectares	Up to £88 million *
	Number of new homes #	Up to 840 homes	
Temporary Land Lost	Total Development Area *	285 hectares	Up to £29 million *
	Number of new homes #	Up to 2,660 homes	
Development Land Blight	Total Development Area *	324 hectares	Up to £41 million *
	Number of new homes #	Up to 5,730 homes	

Source: Hatch Regeneris * commercial and residential land # delivered from residential land allocations

Forecast Net Economic Development Cost Impacts

- 9.32 It is standard economic practice to consider the 'net' economic cost impacts, alongside 'gross' impacts. In the context of this study, this should take into account the overall potential supply of development land across the borough, and whether the development land lost, or affected, by the LTC Scheme would mean there is insufficient land available to meet future development needs.
- 9.33 Given some of the uncertainties around future development it is challenging to assess the likely net impacts of the LTC upon development value. Chapter 3 established that Thurrock has a 'housing needs' assessment of 33,000 homes by 2041. Whilst Thurrock has a wide range of potential development sites, many of them will be subject to constraints that will make them not deliverable or developable.
- 9.34 Hatch Regeneris have estimated that the amount of actual developable land may allow between 38,100 and 43,500 homes to be delivered by 2050 (see Chapter 3). Whilst the profile by which this land may come forward is not specified, it is anticipated that between 5% and 20% may not come forward until after the provisional Local Plan period (post-2041). Applying an average figure of 12.5% indicates that there may only be land available for between 33,350 and 38,000 homes over a typical Local Plan period (2022 – 2041).
- 9.35 At the lower end of the forecast land available for delivering homes (sufficient to deliver 33,350 homes) it is only marginally above the designed need (33,000 homes). This implies that nearly all of the designated development land within 500m of the LTC Alignment is required to meet Thurrock's potential housing needs to 2041. Under this scenario, the residential impacts presented in Table 9.1 reflect the net economic cost of the LTC Scheme in terms of residential growth impacts.
- 9.36 The higher end of the forecast land available for delivering of homes (sufficient for delivering 38,000 homes) is 15% above the designed need (33,000 homes). This would infer that Thurrock could have an excess of land for residential development equating to the provision of 5,000 homes. Under this scenario, the homes that are forecast to be permanently and temporarily lost as a result of the LTC Scheme (equating to between 3,065 and 3,500 homes), whilst still representing a gross economic loss, would not be required to meet Thurrock's housing needs. However, some of the land within the 150m and 450m buffer zones around the LTC Alignment would still be required to meet the housing needs target (enough to deliver between 3,080 and 4,230 homes). The blight associated with these properties would still represent a net economic cost. This value is estimated to be between £17m and £23m.

Development Cost Impact Conclusions

- 9.37 In conclusion, the gross development cost impact of the LTC Scheme upon future development values is significant with a potential economic cost in excess of £150m. This value could also represent the net economic cost to the area, due to the risk that the developable land across the designated LTC Corridor is required to meet Thurrock's housing needs. Even under a more unconstrained assessment of available development land across Thurrock, much of the development land directly adjacent to the LTC alignment will be required to meet the housing needs target. The loss of value of this land as a result of blight from LTC is estimated to be in the region of £20m.

10. Summary and Conclusions

Summary

- 10.1 This section provides an overall summary of the outputs from the economic cost impact analysis.

Business and Economy Impacts

- 10.2 The LTC could significantly impact upon the local economy and businesses in Thurrock, particularly in relation to disruption as a result of LTC construction and operation.
- **Permanent loss of one commercial premises in Thurrock** - the Cattery on Springfield Farm. There will also be a **loss of 152ha of agricultural land** that could affect up to 53 farms located within 1 km of the proposed LTC route.
 - Construction-related **business disruption** may occur from restricted access to some commercial premises along the LTC route and the negative impact of reduced accessibility to town centres. Disruption around the A13 junctions with the A1089 and A128 could impact upon access to the Port of Tilbury and other businesses located off the A1089. The impact of local road closures and additional HGV construction traffic could reduce trips to local retail centres and impact upon levels of turnover.
 - **On-going business performance** could be affected by reduced accessibility from the A128 to the A1089, as well as in the event of concurrent closures of the LTC and Dartford Crossing.
 - The LTC could also have an adverse impact upon the **attractiveness of the local area to investors** by negatively affecting strategic perceptions. This could impact upon local vacancy rates.

Summary of Key Business and Economy Impacts		
Impact Area		Estimated Cost to Thurrock
a) Commercial assets / land value lost		c. £4 million
b) Business disruption during Construction	Jobs loss	115 FTE
	GVA Impact	up to c. £39 million
c) On-going business performance		up to c. £18 million
d) Attractiveness to investors & strategic perceptions		Minor to Moderate Adverse (across Thurrock)

Source: Hatch Regeneris

Community Cost Impacts

- 10.3 The LTC will have a number of impacts on Thurrock's communities. This includes the economic costs of lost housing, adverse impacts to community facilities and negative social impacts of increased severance.
- The LTC Scheme results in a direct **loss of up to 20 residential properties**, with associated land value and cost of relocation.
 - In addition, a further **1,400 residential properties are affected by blight**, with 160 of them located within 200m of the LTC Scheme, and a further 1,240 within 500m.
 - Whilst none are lost as a result of LTC, around **14 community facilities are impacted** by the construction or operational of the scheme. Land associated with two facilities is temporarily lost. A further seven community resources experience significant adverse blight during construction, and two suffer significant adverse blight during the on-going operation of the LTC Scheme.
 - There will be significant **disruption to PRowS** during the construction phase with, most routes temporarily severed, reducing access to facilities/services, increasing community isolation, and impacting health & wellbeing. There will also be some permanent diversions to routes, and many will suffer blight from the LTC Scheme.
 - The construction of the LTC scheme is likely to **disrupt the communities** living around the route through closures to local routes, increased congestion from road closures and diversions, and increased traffic from construction vehicles. Eight communities along the route will be particularly affected (*Southfields, Baker Street, Orsett, East Tilbury, Linford, Low Street, Bulphan, and West Tilbury*), whilst access to A&E will be particularly affected, followed by access to further education and special education facilities. There will also be isolated incidences of disruption in access to open spaces and important community assets in the borough, such as Coalhouse Fort which currently plays a key role in supporting the physical and mental wellbeing of residents as it is widely used for exercise, education and social interaction.
 - **On-going community** cohesion will be affected by reduced access from the A128 to the A1089, the impact of concurrent incidents on the LTC and Dartford Crossing, as well as more general perceptions of isolation created by the physical barrier of the LTC Scheme and impacts on PRowS.
 - A number of these impacts have a cumulative effect upon overall **health and wellbeing** of local residents⁴⁵. These include health/stress impacts of enforced relocation, blight, noise/air pollution, disruption to access to healthcare, loss of community assets, loss of PRow, and severance and community cohesion. There are concerns that the costs of the LTC will disproportionately negatively affect the communities who already suffer from health inequality, such as Tilbury and South Ockendon, where there are already high levels of deprivation, isolation and poor health outcomes.

⁴⁵ This assessment has predominantly focused on the qualitative health and wellbeing costs associated with the other impact areas and, therefore, does not preclude any findings from the Health Impact Assessment, to be undertaken in due course.

Summary of Community Impacts	
Impact Area	Estimated Cost to Thurrock
a) Loss of residential properties	£3.1 million
b) Residential property blight	£24.5 million
c) Impact on community facilities	<i>Moderate adverse (within LTC Corridor)</i>
d) PRoW severance/disruption	<i>Moderate adverse (within LTC Corridor)</i>
e) Community disruption during construction	<i>Moderate adverse (across Thurrock) (up to £36 million direct transport impacts #1)</i>
f) On-going impact on community cohesion	<i>Moderate adverse (across Thurrock) (up to £21 million direct transport impacts #1)</i>
g) Health & Wellbeing	<i>Moderate adverse(across Thurrock) #2</i>

Source: Hatch Regeneris

#1 estimated economic impact of delays to non-business-related car trips

#2 subject to findings from full Health Impact Assessment

Environmental Cost Impacts

10.4 The LTC will have a number of impacts on the environment in Thurrock. This includes the economic costs of lost housing, adverse impacts to community facilities and negative social impacts of increased severance.

- The LTC will result in **direct loss of amenity value** from land lost across 728ha
- There will also be **a direct loss of habitat**, along with indirect impacts on wider habitat corridors, including deciduous woodland, and potential impacts upon areas with Great Crested Newts and farmland birds.
- There are numerous **heritage assets** that will be directly impacted, including nationally protected scheduled monuments, listed buildings, as well as impacts on numerous undesignated assets. In addition, there will be impact on the setting of a range of assets such as Scheduled monuments, listed buildings and conservation areas.
- Whilst available data on the scheme impacts is relatively limited, the potential impact of the LTC Scheme upon flood risk is considered likely to be relatively neutral.
- The LTC Scheme will have a range of **visual impacts** in terms of changing the physical landscape or impairing views. Tilbury Marshes, Orsett Fen, and the Mardyke Valley will all be impacted visually. Around 160 properties are located within 200m of the LTC and may have their views impaired, whilst at least 14 PRoWs are in close proximity to the LTC Scheme and users of these routes will be negatively impacted. There are also likely to be issues associated with light pollution during the construction phase.
- The LTC will result in significant additional strategic traffic movements across Thurrock, as well as changes to local traffic. Furthermore, the construction of the scheme will generate significant HGV movements. All of these will impact upon **local air quality and greenhouse emissions**. Whilst detailed air quality modelling is unavailable, it is considered likely that there could be issues around the LTC junction with the A13, where there will be changes in vehicle speeds and there are sensitive receptors in close proximity to the junction.

- Both the construction and operation of the LTC Scheme will generate significant **noise impacts**. Over 250 properties and a range of other sensitive receptors, such as Treetops, Treetops 2 and Orsett Heath Schools, will be in close proximity to the LTC development boundary and could be significantly impacted during the construction phase. Whilst detailed noise modelling outputs are not available, there are also likely to be significant impacts during the operational phase, particularly in areas around Tilbury, East Tilbury, West Tilbury and Linford.

Summary of Environmental Impacts	
Impact Area	Estimated Cost to Thurrock
a) Amenity Land Value lost	£1.35 million
b) Habitat lost/damaged	<i>Minor to moderate adverse impacts (within LTC Corridor)</i>
c) Heritage impact	<i>Moderate adverse # (within LTC Corridor)</i>
d) Flood risk	<i>Negligible to minor adverse # (within LTC Corridor)</i>
e) Visual impacts	<i>Moderate adverse (across Thurrock)</i>
f) Local air quality and emissions	<i>Moderate adverse # (within LTC Corridor)</i>
g) Increase in noise	<i>Moderate to Major adverse # (within LTC Corridor)</i>

Source: Hatch Regeneris

subject to future modelling exercises and more detailed analysis

Growth Cost Impacts

- 10.5 The assessment of growth has examined a range of impacts of the LTC Scheme upon residential and commercial development. Whilst there remains uncertainty around future development proposals, it is clear that land required directly for the construction and final operation of the LTC Scheme, as well as sites immediately surrounding the proposed alignment, hold significant economic value in development terms.

Forecast Gross Economic Impacts

- 10.6 The table below provides a summary of the maximum gross economic impacts, in terms of lost value of development land.

Estimated Loss of Gross Economic Value from Development Impacts			
Development Impact	Land Area	Land Impacted	Economic Cost to Thurrock
Permanent Land Lost	Total Development Area *	39 hectares	Up to £88 million *
	Number of new homes #	Up to 840 homes	
Temporary Land Lost	Total Development Area *	285 hectares	Up to £29 million *
	Number of new homes #	Up to 2,660 homes	
Development Land Blight	Total Development Area *	324 hectares	Up to £41 million *
	Number of new homes #	Up to 5,730 homes	

Source: Hatch Regeneris

* commercial and residential land

delivered from residential land allocations

Forecast Net Economic Impacts

- 10.7 Given some of the uncertainties around future development it is challenging to assess the likely net impacts of the LTC upon development value. Under some potential residential development scenarios nearly all of the defined development land along the LTC alignment may be required to meet the Thurrock's future housing needs. This would imply the net economic cost of loss of residential land could equate to the gross costs set out above.
- 10.8 Under more generous land availability assumptions, the net impacts would be lower (as residential development can take place elsewhere) but it is still estimated that between 3,100 and 4,250 new homes within a 500m buffer area around the LTC Scheme will be affected by blight with an estimated economic loss of between £17m and £23m.

Conclusions

- 10.9 The construction and operation of the LTC Scheme will have significant impacts upon residents and businesses located across the Thurrock area:
- The scheme will result in **significant direct loss of land** for current agricultural and amenity uses, as well as substantial future residential and commercial development opportunities. This represents a major loss of economic value for the area, potentially equating to as much as **£96 million**.
 - The construction phase will create **significant disruption for local access and movement** between villages/hamlets and the main urban areas. This will disrupt business operations and create severance between communities. The scale of impacts will depend upon the length of disruptions, but businesses could lose up to **£39 million** in economic value and communities will see a loss in social value equating to in excess of **£36 million**. A further **£29 million** will be lost from delayed development, on the basis the project is delivered to programme.
 - Once operational, the LTC Scheme will continue to **create blight across the corridor**, affecting current and future property values and creating environmental emissions. This will affect community cohesion and local health and wellbeing. There will also be on-going impacts upon business operations and affect the attractiveness of the area for investment. Whilst not all of these impacts can be quantified, there is estimated to be a loss of economic value of over **£100m**.

Appendix A - Assessment of Community Facilities

A.1 Table A.1 provides a full assessment of community facilities considered during the study of LTC.

Table A.1 Impact of LTC on Community Facilities						
Resource	Resource Description	Phase	Impact phase and effect	Magnitude	Sensitivity	Significance
The Engine Room Café (at Coalhouse Fort), Princess Margaret Road, East Tilbury	<ul style="list-style-type: none"> A café located at Coalhouse Fort in East Tilbury, approximately 140m from the LTC Development Boundary A key community resource for residents and visitors of East Tilbury. The café is open six days a week (Tuesday to Sunday). 	Construction	<ul style="list-style-type: none"> Reduced availability of the café for existing users due to the increased demand from nearby construction workers Reduced enjoyment of the café due to changes in noise levels, air quality and construction traffic during the construction period Physical isolation due to prolonged road closures 	Medium: impacts will continue for the duration of the six-year construction period.	Medium: The nearest alternative café is at the Thurrock Thameside Nature Park (Essex Wildlife Trust Visitor Centre), 3.8km away. As such, users have limited capacity to avoid impacts. The viability of the café is unlikely to be affected.	Significant moderate adverse effect
		Operational	<ul style="list-style-type: none"> Not assessed 	N/A	N/A	N/A
Parish Church of St Catherine, Princess Margaret Road, East Tilbury	<ul style="list-style-type: none"> Located 20m the LTC Development Boundary in East Tilbury. An Anglican (Church of England) church serving the communities of East and West Tilbury and Linford. Due to isolation, the church is kept locked apart from when services are held (on Sundays). It is also open on the last Sunday of the month from Easter to October for tea and cake. Services are also held on Wednesday mornings at the St Francis Centre which is associated with the church. 	Construction	<ul style="list-style-type: none"> Physical isolation due to prolonged road closures Potential noise disturbance during service hours due to construction activities 	Medium: impacts will continue for the duration of the six-year construction period.	Low: due to the limited operating hours of the church, and the availability of an alternative place of worship within East Tilbury (i.e. the St Francis Centre).	Minor adverse effect which is not significant.
		Operational	<ul style="list-style-type: none"> No impacts identified 	N/A	N/A	N/A

The Ship Pub, Princess Margaret Road, East Tilbury	<ul style="list-style-type: none"> A public house located adjacent to the LTC Development Boundary in East Tilbury. The pub is open seven days a week between 12pm-11pm. (12pm-10.30pm on Sunday). Features include car parking and a beer garden. 	Construction	<ul style="list-style-type: none"> Reduced availability of the pub facilities for existing users due to the increased demand from nearby construction workers Reduced enjoyment of the pub due to changes in noise levels and air quality during the construction period Physical isolation due to prolonged road closures 	Medium: impacts will continue for the duration of the six-year construction period.	Medium: The nearest alternative pub is located in Linford, 2.4km away. Given its location, prolonged road closures are likely to limit the accessibility of this pub for some users, e.g. Low Street residents. The viability of the pub is unlikely to be affected.	Significant moderate adverse effect
		Operational	<ul style="list-style-type: none"> No impacts identified 	N/A	N/A	N/A
Condozers Scout Activity Centre, Church Road, West Tilbury	<ul style="list-style-type: none"> Located within the LTC Development Boundary A formal 3.5-acre site with accommodation, a campsite, wash facilities and facilities for a wide range of sports / game activities. 	Construction	<ul style="list-style-type: none"> Temporary use of land required affecting the entire site. 	High: the viability of the facility is affected.	High: children are the primary users of this facility. The tranquil location of the Centre is important for successful children's play and outdoor learning. Moreover, there are no other scout activity centres between the River Thames and the A127. However due to the transient use of this facility, sensitivity is considered to be medium	Significant major adverse effect
		Operational	<ul style="list-style-type: none"> Unknown 	N/A	N/A	N/A
The Whitecroft, Stanford Road	<ul style="list-style-type: none"> Located adjacent to the LTC Development Boundary and approximately 200m from the permanent LTC alignment. A 56-bedroom residential care home for older people and people with dementia 	Construction	<ul style="list-style-type: none"> Reduced enjoyment of the care home due to changes in noise levels, air quality and construction traffic. Physical isolation due to construction activities and the prolonged road closures of Stanford Road 	Medium: impacts will continue throughout the six-year construction period	High: older people and people with dementia are the primary users of this facility. Changes in noise levels can have adverse impacts on people with dementia.	Significant major adverse effect
		Operational	<ul style="list-style-type: none"> Reduced enjoyment of the care home due to permanent environmental changes (i.e. noise, air quality and visual impacts) 	Low: while permanent impacts are anticipated, the environmental changes are expected to be low and will affect a small group of people.	High: older people and people with dementia are the primary users of this facility. Changes in noise levels can have adverse impacts on people with dementia.	Significant moderate adverse effect

Emmanuel Church, Sleepers Farm Road, Chadwell St Mary.	<ul style="list-style-type: none"> Located approximately 235m from the LTC Development Boundary and approximately 430m from the permanent LTC alignment. One of two Church of England churches in Chadwell St Mary. Weekly Sunday services and a monthly communion service is held at the church. 	Construction	<ul style="list-style-type: none"> Reduced access to the church due to road closures and construction traffic 	Medium: impacts will continue throughout the six-year construction period; however, this will only affect a very small proportion of people (i.e. congregants that live to the north of Chadwell St Mary).	Low: the church is operational for a limited number of hours. Alternative places of worship are also available within Chadwell St Mary (i.e. St Mary's).	Minor adverse effect which is not significant .
		Operational	<ul style="list-style-type: none"> Potential noise disturbance during service hours 	Low: while permanent impacts are anticipated, the environmental changes are expected to be low and will affect a very small group of people. Operational impacts will have little or no effect on the well-being of congregants.	Low: the church is operational for a limited number of hours. Alternative places of worship are also available within Chadwell St Mary (i.e. St Mary's).	Negligible adverse effect which is not significant
Orsett Golf Course, Brentwood Road, Orsett	<ul style="list-style-type: none"> An 18-hole golf course located in Orsett. The golf course lies adjacent to the LTC Development Boundary, and 180m from the LTC alignment. Facilities include a club house with restaurant and bar, and a pro shop. 	Construction	<ul style="list-style-type: none"> Reduced access to the golf course due to road closures during construction Reduced enjoyment of the golf course due to changes in noise levels, air quality and construction traffic 	Medium: accessibility impacts are likely to affect any users accessing the golf course from the south west of the golf course throughout the six-year construction period. Environmental impacts are likely to have little effect on the well-being of users	Low: due to the transient nature of the facility's use, users of the golf course will be able to experience impacts without incurring a significant effect.	Minor adverse effect which is not significant .
		Operational	<ul style="list-style-type: none"> Permanent environmental changes 	Low: permanent environmental impacts are likely to have little or no effect on the well-being of users.	Low: due to the transient nature of the facility's use, users of the golf course will be able to experience impacts without incurring a significant effect.	Negligible adverse effect which is not significant
Willow Garden Day Nursery, 176 Heath Road, Orsett Heath	<ul style="list-style-type: none"> Located adjacent to the LTC Development Boundary and approximately 340m from the permanent LTC alignment. A nursery school providing early years education for children aged 0-5 years old. The nursery is open Monday to Friday from 7am to 7pm. Latest Ofsted report indicates that the nursery has a total of 36 places, with 68 children on roll. 	Construction	<ul style="list-style-type: none"> Reduced enjoyment and development of children due to changes in noise levels, air quality and traffic during the construction period. Physical and visual isolation due to location of LTC alignment and prolonged road closures 	Medium: impacts will continue throughout the six-year construction period	High: young children are the primary users of this facility. Changes in noise levels will have adverse impacts on successful learning, particularly as the school emphasises outdoor learning.	Significant major adverse effect
		Operational	<ul style="list-style-type: none"> Permanent environmental changes 	Low: while permanent impacts are anticipated, the environmental changes are	High: young children are the primary users of this facility. Changes in noise levels will have	Significant moderate adverse effect

				expected to be low and will affect a small group of people	adverse impacts on successful learning, particularly as the school emphasises outdoor learning.	
Foxhound Riding School	<ul style="list-style-type: none"> Located approximately 340m north of the LTC alignment. A riding school providing equestrian services and facilities, including a riding school (for riders of all abilities, aged over 5 years old) and livery yard. 	Construction	<ul style="list-style-type: none"> Impact phase: construction phase Reduced access to the riding school due to road closures during construction 	Medium: accessibility impacts are likely to affect any riders accessing the riding school from the south of the A13 due to prolonged road closures. Impacts will continue throughout the six-year construction period	Low: due to the transient nature of the facility's use, users of the riding school will be able to experience impacts without incurring a significant effect.	Minor adverse effect which is not significant .
		Operational	<ul style="list-style-type: none"> Permanent environmental changes 	Low: permanent environmental impacts are likely to have little or no effect on the well-being of users.	Low: due to the transient nature of the facility's use, users of the riding school will be able to experience impacts without incurring a significant effect.	Negligible adverse effect which is not significant
Linford Village Hall, Lower Crescent, Linford	<ul style="list-style-type: none"> Located 150m from the LTC Development Boundary. A fully accessible village hall in Linford which is available to hire by organisations of private individuals for meetings, group activities and receptions. 	Construction	<ul style="list-style-type: none"> Reduced enjoyment of facility by users due to changes in noise levels and air quality once operational 	Negligible: environmental impacts associated with the operation of LTC will have little or no effect on the well-being of village hall users.	Low: due to the transient nature of the facility's use, users of the village hall will be able to experience impacts without incurring a significant effect.	Negligible adverse effect which is not significant
		Operational	<ul style="list-style-type: none"> No impacts identified 	N/A	N/A	N/A
Orsett Heath Academy*	<ul style="list-style-type: none"> Located 200m from the LTC Development Boundary A new secondary school opening in a temporary site from September 2020 for up to 240 pupils. The permanent new site is planned to open in September 2022. The academy will provide have capacity for up to 1,200 pupils. 	Construction	<ul style="list-style-type: none"> Reduced access to the school due to the anticipated prolonged closure of the A1013 Stanford Road Adverse environmental impacts (such as noise and vibration effects) which can disturb learning. 	Medium: impacts will continue throughout the six-year construction period	High: children are the primary users of this facility. Prolonged road closures, resulting in changes in journey lengths, and increase the unpredictability of commuting times. Environmental effects may also affect children's' learning.	Significant major adverse effect
		Operational	<ul style="list-style-type: none"> Permanent environmental changes 	Negligible: permanent environmental impacts are likely to have little or no effect on the well-being of users.	High: children are the primary users of this facility.	Minor adverse effect which is not significant .
Thurrock Rugby Football Club, Long Lane, Grays	<ul style="list-style-type: none"> Located adjacent to the LTC Development Boundary 	Construction	<ul style="list-style-type: none"> Temporary land take from the Club affecting four junior rugby pitches. 	Medium: impacts will continue throughout the six-year construction period	High: children are the key users of the rugby pitches which will be temporarily lost. Due to the transient nature of the facility's use, users of the rugby	Significant major adverse effect

	<ul style="list-style-type: none">A rugby club with 20 teams including men's, women's, youth and children teams.		<ul style="list-style-type: none">Reduced access to the Club due to temporary road closuresTemporary environmental changes	club will be able to experience environmental impacts without incurring a significant effect.		
		Operational	<ul style="list-style-type: none">Permanent environmental changes	Low: permanent environmental impacts are likely to have little or no effect on the well-being of users.	Low: due to the transient nature of the facility's use, users of the Club will be able to experience impacts without incurring a significant effect.	Negligible adverse effect which is not significant
Treetops School (including planned extension and Post-16 Provision*), Buxton Road, Grays	<ul style="list-style-type: none">Located 50m form the LTC Development BoundarySpecialist school for children and young people (3-19 years old) who experience moderate learning difficulties – particularly in the areas of autism.There are 276 places available at the school.	Construction	<ul style="list-style-type: none">Reduced access to the school due to the anticipated prolonged closure of the A1013 Stanford RoadAdverse environmental impacts (such as noise and vibration effects) which can disturb learning.	Medium: impacts will continue throughout the six-year construction period	High: children with learning difficulties are the primary users of this facility. Prolonged road closures, resulting in changes in journey lengths, and increase the unpredictability of commuting times. Environmental effects may also affect children's' learning.	Significant major adverse effect
		Operational	<ul style="list-style-type: none">Permanent environmental changes	Negligible: permanent environmental impacts are likely to have little or no effect on the well-being of users.	High: children with learning difficulties are the primary users of this facility.	Minor adverse effect which is not significant .
Beacon Hill Academy (Post-16 Provision), Buxton Road, Grays	<ul style="list-style-type: none">Located 110m form the LTC Development BoundarySpecialist school for children and young people (2-19 years old) who experience severe and complex learning difficulties.There are 75 places available at the Academy (including primary, secondary and post -16 provision).	Construction	<ul style="list-style-type: none">Reduced access to the school due to the anticipated prolonged closure of the A1013 Stanford RoadAdverse environmental impacts (such as noise and vibration effects) which can disturb learning.	Medium: impacts will continue throughout the six-year construction period	High: children with learning difficulties are the primary users of this facility. Prolonged road closures, resulting in changes in journey lengths, and increase the unpredictability of commuting times. Environmental effects may also affect children's' learning.	Significant major adverse effect
		Operational	<ul style="list-style-type: none">Permanent environmental changes	Negligible: permanent environmental impacts are likely to have little or no effect on the well-being of users.	High: children with learning difficulties are the primary users of this facility.	Minor adverse effect which is not significant .

*future development

Appendix B - Designated Heritage Assets

B.1 The tables below provide a list of designated heritage assets located within 200m of the LTC Development Boundary.⁴⁶

Table B.1 Scheduled Monuments

Asset	Location	List Entry Number	Within 200m of LTC DB	Within 450m of LTC	Sensitivity	Magnitude	Significance
Crop Mark Complex*	Orsett	1002134	✓	✓	High	Major: the alignment of LTC will sever this asset, permanently altering most of this asset.	Very Large
Coalhouse Fort*	East Tilbury	1013943	✓	×	High	Minor: land surrounding this asset will be permanently required for environmental mitigation, resulting in a change in the setting of this asset	Moderate
East Tilbury Battery	East Tilbury	1013880	✓	×	High	Minor: land surrounding this asset will be permanently required for environmental mitigation, resulting in a change in the setting of this asset	Slight
Second World War Anti-Aircraft Battery	West Tilbury	1012185	✓	×	High	Minor: land surrounding this asset will be permanently required for environmental mitigation, resulting in a change in the setting of this asset	Slight
Causeway Enclosure and Anglo-Saxon Cemetery	-	1009286	✓	✓	High	Utility diversions will directly impact the site. : land to south of this asset will be permanently required for the construction of LTC, resulting in a change in the setting of this asset	Moderate
Gatehouse and Moat	South Ockendon	1002155	✓	×	High	Minor: land surrounding this asset will be permanently required for environmental mitigation, resulting in a slight change in the setting of this asset	Slight
Roman Barrow	South Ockendon	1019106	✓	×	High	Minor: land surrounding this asset will be permanently required for environmental mitigation, resulting in a slight change in the setting of this asset	Slight

Table B.2 Conservation Areas

Conservation Area	Within 200m of the LTC DB	Within 450m of the LTC	Sensitivity	Magnitude	Significance
East Tilbury*	✓	×	Medium	Minor: due to the location of the conservation area, no changes to the actual asset are anticipated as the permanent requirement of land will be used for environmental mitigation. However, there will be a major negative change to the landscape which forms the setting of the conservation area.	Slight
West Tilbury	✓	✓	Medium	Moderate: the edge of the conservation area is within the LTC development boundary. There will be a major negative change to the landscape which forms the setting of the conservation area, and access may be affected due to road closures and construction traffic.	Moderate

*Asset on the Heritage at Risk register

⁴⁶ Historic England (2019): National Heritage List for England. Available at: <https://historicengland.org.uk/listing/the-list/map-search?clearresults=True>

Table B.3 Listed Buildings							
Asset	Location	List Entry Number	Within 200m of the LTC DB	Within 450m of the LTC	Sensitivity	Magnitude	Significance
Grade I listed buildings							
Church of St Katherine	Princess Margaret Road	1337129	✓	✗	High	Minor: land surrounding this asset will be permanently required for environmental mitigation, resulting in a slight change in the setting of this asset	Slight
Grade II listed buildings							
Old Rectory	Princess Margaret Road	1111553	✓	✗	Medium	Minor: land adjacent to this asset will be permanently required for environmental mitigation, resulting in a slight change in the setting of this asset	Slight
Buckland	Station Road	1147796	✓	✓	Medium	Moderate: land adjacent to this asset will be permanently required for construction of LTC and Station Road realignment, changing the setting of the asset	Moderate
Sutton's Farmhouse	Waltons Hall Road	1111569	✓	✗	Medium	Negligible: land adjacent to this asset will be temporarily required for the diversion of utilities, resulting in a temporary change in the setting of this asset	Neutral
Waltons Hall	Waltons Hall Lane	1111568	✓	✗	Medium	Negligible: land adjacent to this asset will be temporarily required for the diversion of utilities, resulting in a temporary change in the setting of this asset	Neutral
Weatherboarded Barn (at Waltons Hall)	Waltons Hall Lane	1337098	✓	✗	Medium	Negligible: land adjacent to this asset will be temporarily required for the diversion of utilities, resulting in a temporary change in the setting of this asset	Neutral
Turners Farm	Waltons Hall Lane	1307175	✓	✗	Medium	Negligible: land adjacent to this asset will be temporarily required for the diversion of utilities, resulting in a temporary change in the setting of this asset	Neutral
Polwicks	Church Road	1111623	✓	✗	Medium	Minor: a large area of land adjacent to this asset will be temporarily required for the diversion of utilities, resulting in a temporary change in the setting of this asset	Slight
Walnut Tree Cottage	Church Road	1111624	✓	✗	Medium	Minor: a large area of land adjacent to this asset will be temporarily required for the diversion of utilities, resulting in a temporary change in the setting of this asset	Slight
Murrels Cottages	Stanford Road	1337096	✓	✗	Medium	Major: the realignment of Stanford Road will result in the demolition of this asset	Very Large
Heath Place	Hornsby Lane	1111575	✓	✓	Medium	Moderate: the permanent alignment of LTC will be located in proximity to this asset, resulting in access to the asset being temporarily affected and an indirect, but permanent, change in the setting of this asset	Moderate
Heath Cottage	Hornsby Lane	1111574	✓	✓	Medium	Negligible: land in proximity to this asset will be temporarily required for the diversion of utilities and the construction of LTC, resulting in a slight change in the setting of this asset	Neutral
Whitcroft's Farmhouse	Stanford Road	1111566	✓	✓	Medium	Moderate: the permanent alignment of LTC will be located in proximity to this asset. Construction of the Stanford Road realignment will additionally result in access to the asset being temporarily affected	Moderate
1 and 2 Grays Corner Cottages**	Baker Street	1337056	✓	✓	Medium	Major: land required for the LTC alignment will result in the demolition of this asset	Very Large

Thatched Cottage**	Baker Street	1111644	✓	✓	Medium	Major: land required for the LTC alignment will result in the demolition of this asset	Very Large
Baker Street Windmill	Stifford Clays Road	1111643	✓	✓	Medium	Moderate: the permanent alignment of LTC will be located in proximity to this asset, affecting its setting. Construction of the Stifford Clays Road realignment will additionally result in access to the asset being temporarily affected	Moderate
Mill House	Stifford Clays Road	1111642	✓	✓	Medium	Minor: land required to the west of this asset will be temporarily required for a construction compound, and permanently required for the LTC alignment, resulting in a slight change in the setting of this asset	Slight
Whitfields	Stifford Clays Road	1146709	✓	✓	Medium	Minor: land required to the west of this asset will be temporarily required for a construction compound, and permanently required for the LTC alignment, resulting in a slight change in the setting of this asset	Slight
Thatched Barn (at Whitfields)	Stifford Clays Road	1111630	✓	✓	Medium	Minor: land required to the west of this asset will be temporarily required for a construction compound, and permanently required for the LTC alignment, resulting in a slight change in the setting of this asset	Slight
The Wilderness	Fen Lane	1111631	✓	✓	Medium	Negligible: land required to the west of this asset will be temporarily required for a construction compound, and permanently required for the LTC alignment, resulting in a slight change in the setting of this asset	Neutral
Moat Bridge and Gatehouse (at South Ockendon Hall)	Hall Lane	1147701	✓	*	Medium	Negligible: land surrounding this asset will be permanently required for environmental mitigation, resulting in a slight change in the setting of this asset	Neutral
Former Gateway (at Groves Barns)	North Road	1147431	✓	✓	Medium	Minor: the permanent alignment of LTC will be located in proximity to this asset, affecting its setting.	Slight

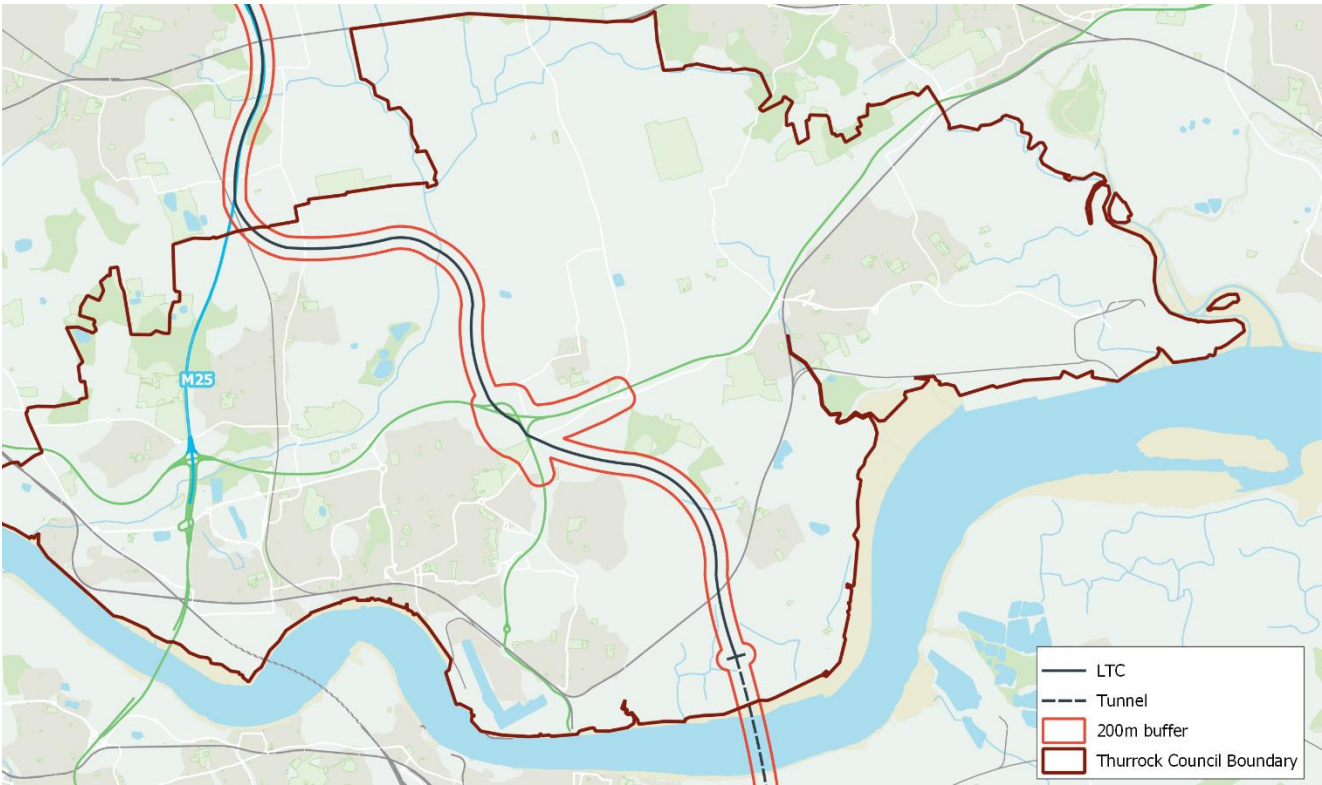
** Asset located within LTC Development Boundary

Appendix C - LTC Buffer Zones

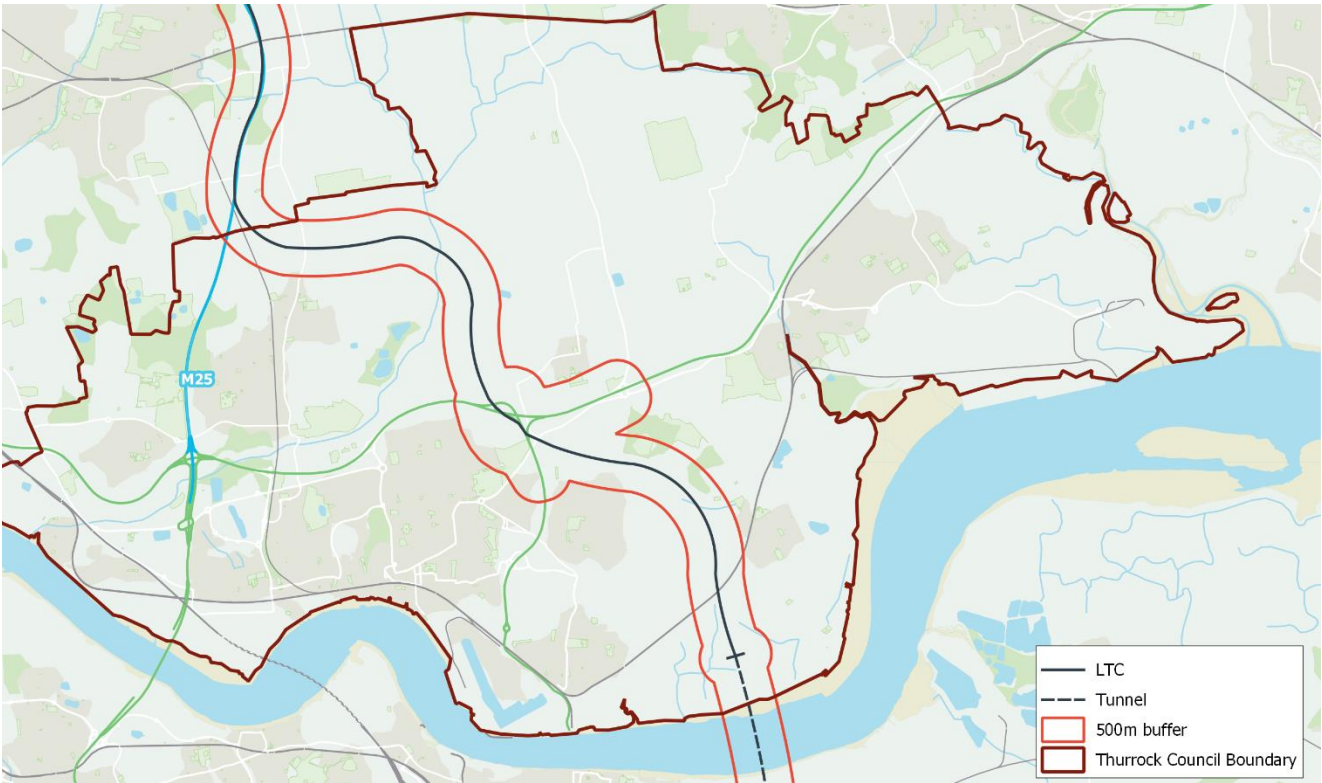
C.1 LTC Alignment with 50m Buffer



C.2 LTC Alignment with 200m Buffer



C.3 LTC Alignment with 500m



Appendix D - Qualitative Assessment Scale

Economic, social, and environmental impacts can often be quantified against thresholds defined using numerical values. Where this has not been feasible within this study, a consistent scale of adverse impacts has been applied for assessing the significance of the potential negative effects.

Major Adverse - Total loss or large-scale damage to existing character or distinctive features. Likely to result in substantial harm or loss of economic or social value.

Moderate Adverse - Partial loss or noticeable damage to existing character or distinctive features. May result in significant harm or loss of economic or social value, without appropriate remedial action.

Minor Adverse - Slight loss or damage to existing character or features and elements, with associated loss of economic or social value. The effects cannot be completely mitigated but opportunities may exist for mitigation

Negligible Adverse - Barely noticeable loss or damage to existing character or features and elements. There is a low possibility that harm or loss of economic or social value could arise.

No Change - No noticeable loss, damage or alteration to character or features. No harm or loss of economic or social value.



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