



Lower Thames Crossing

Review of Supplementary Consultation Documents

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On behalf of **Thurrock Council**



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Executive Summary

Introduction

1. Highways England is applying for a Development Consent Order (DCO) to construct and operate the Lower Thames Crossing (LTC) which is approximately 14.5 miles (23 km) of new motorway connecting the existing road network from the A2/M2, south-east of Gravesend, to the M25, to the north of North Ockendon. The scheme incorporates two 2.5 mile (4 km) tunnels under the River Thames and associated modifications to the M25, A2 and A13.
2. The scheme is classified as a Nationally Significant Infrastructure Project (NSIP) therefore consent will be sought via a Development Consent Order (DCO) under the Planning Act 2008 (PA 2008) and the Planning Inspectorate (PINS) will consider the application on behalf of the Secretary of State for Transport. Highways England's programme is to submit to the DCO application in Summer 2020.
3. At the end of 2018, Highways England presented its 'Statutory Consultation Scheme' for the proposed LTC. The scheme has evolved in the last year and now a series of design changes has been published which is the subject of a Supplementary Consultation exercise, running from 29 January until 25 March 2020.
4. This report has been prepared for Thurrock Council to provide a review of the material presented as part of the Supplementary Consultation exercise. Its purpose is to identify areas of concern, potentially significant issues and suggest areas of further work required by HE, in order to assist the Council in preparing its response to the consultation exercise.
5. Overall, the Council has been actively engaging with Highways England however, based upon the consultation material available, the information presented by Highways England is deficient of the detail required for stakeholders to provide an informed response to the proposed design changes. Each design change is complex and gives rise to a number of subsequent revisions to the design and structure of the scheme, creating a cascade effect. In addition, progress on the environmental and health impact assessment work, and related engagement, has been slow such that the potential effects of the scheme, and the effectiveness of mitigation proposals cannot be properly determined at this late stage in the programme.

Supplementary Consultation Scheme

6. The design changes proposed in the Supplementary Consultation Scheme comprise:
 - Increase in length of tunnels, now 2.6 miles (4.3 km) and corresponding decrease in length of new road, now approx. 14.3 miles (23 km);
 - Changes to the M2/A2 junction and local link roads;
 - Relocating the southern tunnel entrance approximately 350 metres to the south;
 - Removal of the Rest and Services Area (RaSA);
 - Removal of the previously proposed junction at Tilbury;
 - Relocating the route between Tilbury and the A13 junction approximately 60 metres north-east;
 - Changes to a number of slip roads at the junction between the LTC, A13, A1089 and A1013;
 - Removal of one southbound running lane between the M25 and A13 junction;

- Changes to the structures over the Mardyke River, Golden Bridge Sewer and the Orsett Fen Sewer;
 - Changes to the southbound link from the M25 to the LTC; and
 - Changes to the layout of junction 29 of the M25.
7. In addition, as part of the Supplementary Consultation exercise, Highways England has reported its progress in relation to:
- Funding – the project is now being developed as a fully publicly-funded scheme rather than as a privately financed initiative;
 - Charging at Dartford and LTC – it is proposed that the charging regime will be the same for both the Dartford Crossing and the LTC; and
 - Local Residents Discount Scheme (LRDS) – Highways England intends to apply a LRDS to residents of Thurrock and Gravesham for the LTC. The intention is that this will be on a similar basis to that which applies to the Dartford Crossing.
8. Highways England’s Supplementary Consultation materials also includes the following material:
- i. Environmental Impacts Update;
 - ii. Traffic Modelling Update; and
 - iii. Utilities Update.

Review process

9. The review which has been undertaken seeks to identify and assess potential issues arising from the construction and operation of Highways England’s Supplementary Consultation Scheme which are likely to be of concern to the Council as a ‘host authority’. The review considers only the design changes north of the river.

Review findings and the Council’s position

10. The exercise has been used to re-cap the Council’s principal areas of concern relating to the LTC scheme, which are:
- **National and Strategic Policy** - the proposed LTC does not meet several of the national and Highways England’s strategic policy tests and scheme objectives;
 - **National Planning Practice** - the assessments presented by Highways England to date do not give adequate consideration to the NPPF;
 - **Emerging Local Plan and its interface with the proposed LTC** – the proposed LTC does not make provision for, and is inconsistent with, the housing and development potential for Thurrock and the aspirations for the Borough and for the wider South Essex area as set out in Thurrock’s emerging Local Plan and South Essex Joint Strategic Plan;
 - **Design Quality** – the need for the LTC scheme, if approved, to provide good quality design;
 - **Effects on Thurrock’s communities and environment** – the proposed LTC would give rise to adverse effects during the construction and operation of the scheme which would significantly affect Thurrock’s communities and environment;

- **Effects on Thurrock's economy** – the scheme would have significant economic costs on residents and businesses in the Borough, principally due to direct loss of land, disruption to access and movement in the Borough and the creation of blight across the LTC corridor;
- **Effects on Thurrock's operations** – potential effects from the construction and operation of the LTC scheme on the Council's day to day operations;
- **Creating a lasting legacy** – the importance of ensuring a lasting beneficial legacy - covering community infrastructure, environment, health and wellbeing and skills;
- **Configuration of the proposed LTC** – concerns relating to the configuration of the proposed LTC, for example at the interchange between the LTC and A13, in the reduction in number of lanes southbound from the M25, and more generally in relation to facilitating future local growth;
- **DCO process, technical engagement and LTC application programme** - the Council has raised concerns with Highways England and the Planning Inspectorate in the past, and is now raising this point again, in relation to the limited amount of meaningful technical engagement which has taken place to date, the adequacy of consultation and relating to DCO Requirements. This remains a considerable concern to the Council.

Technical assessments

11. The following areas require further assessment work and engagement with the Council:

- **Environmental Impact Assessment** – significant information gaps and the potential for under reporting potential impacts. Further increases to the Application Boundary made since EIA Scoping Opinion (2017) which are likely to give rise to new or altered likely significant environmental effects. A further scoping exercise should be undertaken;
- **Health Impact Assessment** – Highways England has confirmed that this will be provided in the form of the Health and Equalities Impact Assessment (HEqIA) however, no detail has been provided in order to consider the potential effects of the scheme and any associated mitigation and it is understood that that no detailed information will be provided by Highways England until the DCO application is submitted;
- **Assessment of cumulative effects and interaction of effects** – potential prolonged adverse effects on the communities and environment of Thurrock from major construction projects in the Borough;
- **CoCP/CEMP** – a strong reliance placed by Highways England on these documents although no detail seen by the Council as yet;
- **Traffic modelling** – does not include the results of any option testing and has insufficient detail to understand the impacts of the Supplementary Consultation Scheme on the local road networks as well as residents, businesses, open countryside and designated environmental areas in the Borough;
- **Utilities** – concerns relating to the extent of land take proposed for the utility works and the direct impact on residential premises. The land take shown for utilities works should be rationalised to the minimum possible area required to complete them.

Locations

12. The high level and generic nature of the commentary provided by Highways England means it is difficult to understand the true impacts of the design changes or to make specific recommendations regarding the mitigation measures which ought to be sought. The following locations, for example, are areas where further work is considered to be required:
 - Alternative design options for the treatment of the crossing through the Mardyke Valley should be considered to reduce potential adverse environmental effects;
 - Alternative design options for the treatment of the viaduct over the Tilbury Loop Line should be considered to reduce potential adverse environmental effects; and
 - Configuration of the interchange between the proposed LTC and A13.
13. In relation to Public Rights of Way (PRoWs), the Guide to Supplementary Consultation identifies many affected PRoWs but no detail is given as to what will be provided by way of mitigation or the measures that are “improving and upgrading” facilities for walking cycling or horse riding. There is an opportunity to provide a link from the Thames Chase Forest Centre through to Coalhouse Fort with only minor amendments to the proposed routes.

Recommendations

14. Recommendations relating to the Supplementary Consultation Scheme are presented in this report and relate to:
 - Design Quality (Ch 4)
 - Review of Environmental Impacts (Ch 5)
 - Review of Traffic Modelling Update (Ch 6)
 - Proposed Route Changes (Ch 7)
 - Review of Walking, Cycling and Horse-riding Network (Ch 8)
 - Review of Utilities Update (Ch 9)
 - Constructing and Operating the Proposed LTC (Ch 10)
15. The intention is that these should be collated, agreed with the Council and used as a checklist to ensure that the Council's concerns are addressed as the LTC design and assessment work progresses.

Engaging with the Council

16. The Council's concerns about the limited amount of meaningful technical engagement are well documented in this report. The nature of the DCO process is to encourage close and meaningful engagement with the promoter as the design proceeds and the Council would wish to ensure that this can be achieved in the time available up to submission of the DCO application. Therefore, in addition to the technical engagement which is recommended in this report - in relation to, for example, the scheme design and configuration, the on-going technical assessment work (ie. EIA, HEqIA) and traffic modelling - the Council would wish to see further discussion with Highways England in relation to some of other aspects of the proposal which would have a direct bearing on the Council and its communities should consent for the scheme be granted. These aspects would comprise, but are not limited to:

- Addressing the aspirations set out in the emerging Local Plan and delivering sustainable local growth;
- Mitigation for the likely economic costs to the Borough (see report in Appendix C);
- Delivering a lasting legacy and securing local benefits; and
- Agreeing relevant draft DCO Requirements and s106 draft Heads of Terms.

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Acronyms and Abbreviations

ASELA	The Association of South Essex Local Authorities
AQMA	Air Quality Management Area
CE/IAG	Careers Education and Information Advice and Guidance
CEMP	Construction Environmental Management Plan
CoCP	Code of Construction Practice
CTMP	Construction Travel Management Plan
DCLG	Department for Communities and Local Government (the predecessor department to MHCLG)
DCO	Development Consent Order
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
ES	Environmental Statement
FRA	Flood Risk Assessment
HEqIA	Health and Equalities Impact Assessment
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
JSP	Joint Strategic Plan
LOAEL	Lowest observed adverse effect level (noise criterion)
LPA	Local Planning Authority
LRDS	Local Residents' Discount Scheme
LTAM	Lower Thames Area Model
LTC	Lower Thames Crossing
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
MHCLG	Ministry of Housing, Communities and Local Government
NIC	National Infrastructure Commission
NNNPS	National Networks National Policy Statement
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
PA 2008	Planning Act 2008 (as amended)
PCU	Passenger Car Unit
PCUs/hr	Passenger Car Units per hour
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PRoW	Public Right of Way
PSSR	Preliminary Source Study Report
RaSA	Rest and Services Area
SHMA	Strategic Housing Market Assessment
SOAEL	Significant observed adverse effect level (noise criterion)
SRN	Strategic Road Network
TBM	Tunnel Boring Machine
UKCP	UK Climate Projections
WFD	Water Framework Directive
WHO	World Health Organisation

1 Introduction

1.1 Overview

- 1.1.1 Highways England is applying for a Development Consent Order (DCO) to construct and operate the Lower Thames Crossing (LTC) which is approximately 14.5 miles (23 km) of new motorway connecting the existing road network from the A2/M2, south-east of Gravesend, to the M25, to the north of North Ockendon. The scheme incorporates two 2.5 mile (4 km) tunnels under the River Thames and associated modifications to the M25, A2 and A13.
- 1.1.2 As this scheme is classified as a Nationally Significant Infrastructure Project (NSIP), consent will be sought under the Planning Act 2008 (PA 2008). This means that the Planning Inspectorate (PINS) will consider the application on behalf of the Secretary of State for Transport and make a recommendation as to whether the scheme should be granted consent.
- 1.1.3 At the end of 2018, Highways England presented its 'Statutory Consultation Scheme' for the proposed LTC. The scheme has evolved in the last year and now a series of design changes has been published which is the subject of a Supplementary Consultation exercise, running from 29 January until 25 March 2020.
- 1.1.4 This document has been prepared by Stantec for Thurrock Council ('the Council') to provide a review of the material which forms part of Highways England's Supplementary Consultation. The purpose of this document is to highlight potentially significant issues arising from the proposed LTC, as now presented, so as to assist the Council in preparing its response to the Supplementary Consultation exercise.
- 1.1.5 For clarity, the latest iteration of the proposed LTC scheme, as presented in the Supplementary Consultation material, is referred to in this document as the 'Supplementary Consultation Scheme'.

1.2 Responding to Highways England's consultation exercises

- 1.2.1 Under the PA 2008, Highways England has a duty to consult, among others, local authorities and the local community about the emerging proposals in the period prior to the submission of the DCO application (the pre-application process). Highways England also has a duty under section 29 of the PA 2008 to take account of the responses to consultation as it develops the scheme, before submitting the DCO application.
- 1.2.2 As this document is based on an assessment of the Supplementary Consultation Scheme, the comments and recommendations presented in this report are subject to change as the scheme design evolves. Further, this document does not supersede any of the comments submitted by the Council to Highways England as part of its Statutory Consultation exercise, or subsequent correspondence between the Council and Highways England, and it should be read in conjunction with these documents.
- 1.2.3 It is anticipated that the Council will submit further representations should a DCO application is accepted by PINS, on behalf of the Secretary of State.

1.3 Document structure

- 1.3.1 This document is structured as follows:

Part 1 – The Proposed LTC and the Council's Concerns

- Chapter 2 – The Supplementary Consultation Scheme;

- Chapter 3 – Principal Areas of Concern – the Council’s Position;
- Chapter 4 – Design Quality;

Part 2 – Review of Supplementary Consultation Scheme

- Chapter 5 – Review of Environmental Impacts Update;
- Chapter 6 – Review of Traffic Modelling Update;
- Chapter 7 – Proposed Route Changes;
- Chapter 8 – Review of Walking, Cycling and Horse-riding Network;
- Chapter 9 – Review of Utilities Update;
- Chapter 10 – Constructing and Operating the proposed LTC;

Part 3 – Summary and Recommendations

- Chapter 11 – Recommendations and Next Steps;

Appendices

- Appendix A – Thurrock Council’s Response to Highways England’s Statutory Consultation (2018);
- Appendix B – Proposed Scheme Design Changes;
- Appendix C – Economic Costs Study (Hatch Report);
- Appendix D – Review of Environmental Impacts Update – Design Changes 8 – 19;
- Appendix E – Review of Walking, Cycling and Horse-riding Network;
- Appendix F – The Strategic Importance of Thurrock and the South Essex Region.

Part 1 – The Proposed LTC and the Council’s Concerns

2 The Supplementary Consultation Scheme

2.1 Introduction

2.1.1 This chapter describes the proposed LTC, the Council's response, and the design changes now proposed by Highways England in its Supplementary Consultation Scheme.

2.2 Statutory Consultation Scheme – 2018

2.2.1 Non-statutory consultation relating to the proposed LTC route options was undertaken by Highways England between 2013 and 2016. Following the announcement of the Preferred Route in 2017, Highways England undertook further design and assessment work and, at the end of 2018, presented its 'Statutory Consultation Scheme' which comprised:

- iv. approximately 14.5 miles (23 km) of new motorway connecting to the existing road network from the A2/M2 to the M25;
- v. two 2.5 mile (4 km) tunnels under the River Thames, one southbound and one northbound;
- vi. three lanes in both directions with a maximum speed limit of 70 mph;
- vii. modifications to the M25, A2 and A13, where the Lower Thames Crossing connects to the road network;
- viii. a new Rest and Services Area (RaSA) at the Tilbury Junction (East Tilbury);
- ix. new structures and changes to existing structures (including bridges, buildings, tunnel entrances, viaducts, and utilities such as electricity pylons) along the length of the new road; and
- x. a free-flow charging system, where drivers pay remotely, similar to that at the Dartford Crossing.

2.2.2 The underlined text indicates those features where changes are now proposed as part of the Supplementary Consultation Scheme and are described in Section 2.4 below.

2.3 The Council's response to Highways England's Statutory Consultation

2.3.1 The Council's response to Highways England's Statutory Consultation exercise is available at the following link (see Item 85) and presented in Appendix A of this report: <https://democracy.thurrock.gov.uk/ieListDocuments.aspx?CId=134&Mid=5512>.

2.3.2 Since the end of the Statutory Consultation exercise, the Council has undertaken a number of non-statutory engagement activities with Highways England which are referred to in the report. This report does not supersede any of the comments or issues submitted by the Council to Highways England as part of its Statutory Consultation exercise, or subsequent correspondence between the Council and Highways England, and it should be read in conjunction with these documents.

2.4 The Supplementary Consultation Scheme – January 2020

2.4.1 Elements of the proposed LTC have evolved since Highways England's Statutory Consultation and a series of design changes has been published which are the subject of the Supplementary Consultation exercise. As described in the LTC Guide to Supplementary Consultation, the design changes proposed in the Supplementary Consultation Scheme comprise:

- Increase in length of tunnels, now 2.6 miles (4.3 km) and corresponding decrease in length of new road, now approx. 14.3 miles (23 km);
- Changes to the M2/A2 junction and local link roads;
- Relocating the southern tunnel entrance approximately 350 metres to the south;
- Removal of the Rest and Service Area (RaSA);
- Removal of the previously proposed junction at Tilbury;
- Relocating the route between Tilbury and the A13 junction approximately 60 metres north-east;
- Changes to a number of slip roads at the junction between the LTC, A13, A1089 and A1013;
- Removal of one lane southbound between the M25 and A13 junction;
- Changes to the structures over the Mardyke River, Golden Bridge Sewer and the Orsett Fen Sewer;
- Changes to the southbound link from the M25 to the LTC; and
- Changes to the layout of junction 29 of the M25.

2.4.2 These are described in detail in Appendix B.

2.4.3 To accompany these design changes the following information is included in Highways England's Supplementary Consultation materials:

- Environmental Impacts Update;
- Traffic Modelling Update; and
- Utilities Update.

2.4.4 In addition, as part of the Supplementary Consultation exercise, Highways England has reported its progress in relation to:

- Funding – the project is now being developed as a fully publicly-funded scheme rather than as a privately financed initiative;
- Charging at Dartford and LTC – it is proposed that the charging regime will be the same for both the Dartford Crossing and the LTC; and
- Local Residents Discount Scheme (LRDS) – Highways England intends to apply a LRDS to residents of Thurrock and Gravesham for the LTC. The intention is that this will be on a similar basis to that which applies to the Dartford Crossing.

2.5 LTC programme

2.5.1 The Supplementary Consultation materials provide an indicative programme for the next phases in the delivery of the proposed LTC, as set out in Table 2.1 below.

Table 2.1: Indicative programme for the delivery of the proposed LTC

Stage	Indicative programme
Development Consent Order application submitted	Summer 2020
Examination	End 2020/Early 2021
Consent (if granted)	Late 2021
Construction phase	Early 2022
Opening year	2027-2028

2.6 Reviewing the Supplementary Consultation Scheme

Overview

- 2.6.1 The review which has been undertaken seeks to identify and assess likely actual or potential issues arising from the construction and operation of Highways England's Supplementary Consultation Scheme, as presented in the consultation materials, which are likely to be of concern to the Council as a 'host authority'. The review has been prepared by an experienced consultant team supplemented by comments from Council officers, as appropriate.
- 2.6.2 This review considers only the design changes north of the river, identified as numbers 8-19 within the Environmental Impacts Update.
- 2.6.3 The review of the Supplementary Consultation materials seeks to assess the proposed LTC in the following areas:
- Prevailing national and strategic policy – the performance of the Supplementary Consultation Scheme against national and strategic policies;
 - Design quality and changes – the general design quality of the scheme and the performance of specific design changes of the Supplementary Consultation Scheme tested against provision in the emerging Local Plan and wider aspirations for growth in Thurrock and the South Essex Region;
 - Health and environmental effects as reported in the Environmental Impacts Update;
 - Highways England's proposals and assumptions made for utilities diversions;
 - Highways England's proposals and assumptions made for traffic modelling;
 - Issues relating to the construction and operation of the LTC; and
 - DCO process and adequacy of consultation.
- 2.6.4 The review has also been informed by the Council's response to Highways England's Statutory Consultation see Appendix A.

Review documents

- 2.6.5 The material which comprises Highways England's Supplementary Consultation is available to be viewed and downloaded at the following link during the consultation period: <https://highwaysengland.citizenspace.com/ltc/consultation-2020/>

2.6.6 Table 2.2 sets out the material which has been reviewed as part of this exercise.

Table 2.2: Supplementary Consultation Material

Highways England's Supplementary Consultation Material	Material included in review exercise
Guide to Supplementary Consultation	✓
Environmental Impacts Update	✓
Utilities Update	✓
Traffic Modelling Update	✓
Map Book 1: General Arrangement	✓
Map Book 2: Land Use Plans	✓
Map Book 3: Engineering Plans	✓
Land Use Plans for Land and Property	✓
Land Use Maps (Book of Six)	✓
Supplementary Consultation Response Form	✓
Easy Read Guide to Supplementary Consultation	✓
Supplementary Consultation Leaflet	✓
Non-Statutory Consultation Notice	✓
Supplementary Consultation A3 Poster	✓
Supplementary Consultation A4 Poster	✓
Highways England: Your Property and Blight	✓
Highways England: Your Property and Compulsory Purchase	✓
Highways England: Your Property and Discretionary Purchase	✓

Review findings

2.6.7 The following chapter sets out the Council's principal areas of concern in relation to the proposed LTC, Chapter 4 discusses scheme design and quality and Chapters 5 – 10 and Appendices D, E and F set out the detailed findings of the review of the Supplementary Consultation Scheme. Recommendations are presented in Chapter 11.

3 Principal Areas of Concern – the Council’s Position

3.1 Introduction

3.1.1 This chapter reiterates the Council’s concerns with regards to the proposed LTC scheme. The design changes presented in the Supplementary Consultation Scheme do not materially alter the Council’s position in respect of the scheme. Also set out in this chapter is an up to date position on Thurrock’s emerging Local Plan which will provide the development context for the LTC should the scheme proceed.

3.2 Overview

3.2.1 The LTC scheme will give rise to significant effects upon Thurrock, in many respects the effects will be adverse and substantial. A discussion of these was set out in the Council’s response to Highways England’s Statutory Consultation at the end of 2018 (see Appendix A) and have been the subject of engagement with Highways England over the past year. Whilst it is not intended to repeat these exhaustively here, for completeness and to provide context, this section summarises the areas of principal concern for the Council, which remain unresolved and are relevant to the proposed LTC scheme (notwithstanding the currently proposed changes).

3.2.2 The principal areas of Council concern relate to:

1. **National and strategic policy** – the proposed LTC does not meet several of the national and Highways England’s strategic policy tests and scheme objectives, particularly relating to option testing, the delivery of or facilitation of economic growth and achieving sustainable local growth. The policy context and the ‘tests’ against which the proposed LTC scheme has been considered were presented by the Council in its response to the Statutory Consultation Scheme (see Appendix A);
2. **National Planning Policy Framework** - the assessments presented by Highways England to date do not give adequate consideration to the National Planning Policy Framework (NPPF) and the presumption of sustainable development for communities, specifically, it falls short of demonstrating that the likely benefits are not significantly outweighed by adverse impacts (see Appendix F);
3. **Emerging Local Plan and its interface with the proposed LTC** – the proposed LTC does not make provision for, and is inconsistent with, the housing and development potential for Thurrock and the aspirations for the Borough and for the wider South Essex area as set out in Thurrock’s emerging Local Plan and South Essex Joint Strategic Plan. Specifically, there are design elements which require modification and/or further consideration by Highways England in order to contribute to meeting the Government’s and LTC’s policy and scheme objectives (see Section 3.3 and Appendix F);
4. **Design Quality** – the Council is expecting that the proposed LTC, if approved, will be an exemplar of design quality, embedding the National Infrastructure Commission’s design principles (February 2020) in the scheme design. It is noted however that through the early part of 2019, Highways England dedicated several design workshops to its proposals, seeking to provide, for example, a longer, higher and better designed Mardyke viaduct. However, without any further discussion, the scheme has reverted back to a broadly similar design as presented at Statutory Consultation in spite of the fact that all parties recognised that there was a better alternative. A detailed justification for this design change, rather than the alternative now presented, has not been provided in the Supplementary Consultation documents (see Chapter 4);

5. **Effects on Thurrock's communities and environment** – the proposed LTC would give rise to adverse effects during the construction and operation of the scheme which would significantly affect Thurrock's communities and environment, in particular in relation to effects on air quality, noise, health, severance and on Thurrock's natural and historic environment, including scheduled monuments, listed buildings, historic landscapes and extensive archaeological deposits (see Chapter 5 and Appendix D);
6. **Effects on Thurrock's economy** – the strategic importance of Thurrock and to the regional economy was set out in the Council's response to the Statutory Consultation exercise (Appendix A). Since that time, the Council has commissioned a separate study to consider the economic costs to the Borough which are likely to arise as a consequence of the proposed LTC. That study has found that the scheme will have significant economic costs on residents and businesses in the Borough, principally due to direct loss of land, disruption to access and movement in the Borough and the creation of blight across the LTC corridor (see Appendix C);
7. **Effects on the Council's operations** – the potential effects of the construction and operation of the LTC scheme on the Council's day to day operations (waste collection, traffic management, etc.), particularly in relation to additional costs incurred by the Council, have been raised in the past although, as yet, it is understood that no mitigation has been presented by Highways England (see Chapter 10);
8. **Creating a lasting legacy** – the Council recognises that it is possible that the need for the scheme may be accepted by the Examining Authority and consent granted. In order to protect the Borough's interests, the Council is keen to secure measures which serve to mitigate and to compensate for the proposed LTC's adverse effects to the extent that it is possible to do so. At present, there are a limited number of positive contributions made in the Supplementary Consultation documents, however the important issue of ensuring a lasting beneficial legacy - covering community infrastructure, environment, health and wellbeing and skills - appears to have been overlooked in the consultation documents. Should the scheme be granted consent, the Council would wish to see tangible, deliverable proposals which create a lasting legacy in the Borough (see Chapter 5);
9. **Traffic modelling** - the traffic modelling update presented as part of the Supplementary Consultation materials does not include the results of any option testing and has insufficient detail to understand the impacts of the Supplementary Consultation Scheme on the local road networks as well as residents, businesses, open countryside and designated environmental areas in the Borough (see Chapter 6);
10. **Configuration of the proposed LTC** – there are a number of locations where there are concerns relating to the configuration of the proposed LTC, for example at the interchange between the LTC and A13, in the reduction in number of lanes southbound from the M25, and more generally in relation to facilitating future local growth. It is considered that further collaborative work is needed to ensure that the configuration of the proposed LTC delivers on Highway's England's strategic policy and scheme objectives which include economic growth and driving prosperity, improving accessibility, limiting and reversing environment impacts and innovation and future proofing (see Chapter 5, Chapter 7 and Appendix D);
11. **Technical assessments** – the following comments are provided in relation to the on-going technical assessments which are being carried out by Highways England:
 - a. **Environmental Impact Assessment** – the Supplementary Consultation materials rely on the Preliminary Environmental Information Report (PEIR) in which there are significant information gaps and the potential for under reporting potential impacts, such that the effects of the scheme, during both the construction and operational phases, have not been and cannot be properly considered. A review of the PEIR, was presented by the Council in its response to the Statutory Consultation Scheme (see Appendix A). It is also considered that the changes to the Application Boundary and the scheme made since the

(EIA) Scoping Opinion was issued in 2017 are likely to give rise to new or altered likely significant environmental effects. It is considered that the Supplementary Consultation Scheme should undergo a further scoping exercise to ensure that all potential likely significant environmental effects are identified and that any Scoping Opinion will reflect the scheme for which consent is being sought;

- b. Health Impact Assessment – a full and comprehensive Health Impact Assessment (HIA) has been requested by the Council and the Director of Public Health. Highways England has confirmed that this will be provided in the form of the Health and Equalities Impact Assessment (HEqIA) however, no detail has been provided in order to consider the potential effects of the scheme and any associated mitigation and it is understood that that no detailed information will be provided by Highways England until the DCO application is submitted. Further meaningful engagement is required, particularly in relation to any proposed mitigation, compensation and legacy benefits;
- c. Assessment of cumulative effects and interaction of effects – the Supplementary Consultation documents do not include an assessment of potential cumulative effects. The Council has yet to see and agree a list of potential cumulative schemes with Highways England. This is of concern considering the existing and proposed large construction projects in the Borough and the potential these would have for prolonged adverse effects on the communities and environment of Thurrock. Examples include the construction of Tilbury 2, DP World, the proposed Thurrock Flexible Generation Plant in the south of the Borough and incorporating elements of the emerging Local Plan;
- d. Code of Construction Practice/Construction Environmental Management Plan - the Supplementary Consultation material places a strong reliance on developing a Code of Construction Practice (CoCP) and Construction Environmental Management Plan (CEMP) in order to control potential environmental impacts during construction. No discussion has taken place about designing out the potential construction impacts from the outset which would help to assure consultees that adverse environmental impacts were not only being mitigated, but avoided entirely, where possible. To date, the Council has received (and commented upon) only a 'skeleton draft' of this critical document, issued 2 Dec 2019. Of particular concern to the Council is the likely effects on Thurrock's communities arising from the extended construction working hours now proposed by Highways England.

12. **DCO process, technical engagement and LTC application programme** - the Council has raised concerns with Highways England and the Planning Inspectorate in the past relating to the limited amount of meaningful technical engagement which has taken place to date, the adequacy of consultation and detail in relation to the discharge of DCO Requirements (see Section 3.4 and Appendix A). The detailed level of technical engagement now proposed by Highways England in the lead up to a DCO application in summer 2020 is considered to be unrealistic in order to carry out meaningful engagement and to incorporate any feedback into the scheme design, assessment work and the drafting of the DCO. This remains a considerable concern to the Council (see Chapter 11).

3.2.3 The Council's position on other relevant related matters is provided below.

3.3 Emerging Local Plan

3.3.1 As Thurrock's Local Plan will provide the development context for the proposed LTC, should the scheme proceed, and for Highways England's assessment of potential cumulative effects, this section provides an update on the Local Plan development work which has taken place since Highways England's Statutory Consultation exercise at the end of 2018.

- 3.3.2 In its response to Highways England's Statutory Consultation, the Council highlighted the challenges presented by the proposed LTC in relation to the development of the new Local Plan. The parties have since participated in a workshop, in January 2019 and had numerous exchanges including meetings and letters to discuss the matters which we do not intend to repeat in this review.
- 3.3.3 In response to the correspondence in 2019, a summary of the legal advice on the Local Plan issue, sought by Highways England, was issued by Highways England to the Council on 11 November 2019. The Council notes that the summary document itself does not constitute legal advice and, as Highways England is aware, the Council has sought its own legal advice on the matter.
- 3.3.4 The Council has also engaged with Ministry of Housing, Communities and Local Government (MHCLG), the Planning Inspectorate and Homes England to discuss the challenges of preparing its Local Plan at this time in the face of the uncertainty of the potential impacts of the proposed LTC on the plan making process.
- 3.3.5 Following discussion with the bodies mentioned above, the Council is minded to proceed with a preferred option which is to prepare a full Regulation 18 and 19 Local Plan which meets the totality of the Borough's future development needs over the full plan period. In adopting this approach the Council will need to assume that the alignment of the LTC will not change significantly over the next 2/3 years; that the LTC scheme is granted Development Consent; and that the proposed LTC will accommodate Thurrock's strategic growth aspirations along the LTC corridor.
- 3.3.6 In order to manage the risks associated with the LTC, the Council will prepare the Local Plan in such a way that it would be possible to quickly extract out of the emerging spatial strategy, a 'partial plan', which meets the development need of the Borough over a shorter timescale without necessitating the abandonment of the overall spatial strategy (a 'Plan within a Plan' approach). In order to achieve this the Council will be reliant upon frequent and transparent updates from Highways England (pre and post consent) on matters such as construction and operation programme for the various phases of the scheme.

3.4 LTC application programme and technical engagement

- 3.4.1 A detailed review of the potential environmental effects which are likely to arise in constructing and operating the proposed LTC is provided in this document. It should be noted however that the Council has raised concerns with Highways England and the Planning Inspectorate regarding the limited amount of meaningful technical engagement which has taken place on the scheme to date. In particular, commencing the level of technical engagement now suggested by Highways England presents the Council with numerous challenges which would have been otherwise avoided by undertaking meaningful engagement and better planning earlier in the pre-application process.
- 3.4.2 The timing of the engagement means that the Council will be under the pressures of a compressed programme, that is to say that, by withholding information which could have been reviewed and agreed upon earlier in the pre-application process, Highways England has compressed the time in which the Council can review the information and meaningfully inform the scheme design and pre-application process prior to the submission of the DCO Application.
- 3.4.3 This remains a considerable concern to the Council as it limits the time in which suitable and appropriate measures to mitigate and to compensate the adverse effects of the scheme can be explored and agreed with Highways England.

4 Design Quality

4.1 Overview

4.1.1 This chapter provides an overview of the Council's position in relation to the design quality which the Council would expect of a major infrastructure scheme such as the proposed LTC. It also includes a review of the quality of the proposed design changes presented in Highways England's Supplementary Consultation.

4.2 Design principles for national infrastructure

4.2.1 The National Infrastructure Commission (NIC) has established an expert design group to 'champion' good design for infrastructure. The group has published design principles¹ to guide "...the planning and delivery of major projects..." which, it proposes, should guide and be applied to all economic infrastructure, including transport schemes. It is understood that member(s) of the LTC design team have been closely involved in this expert design group.

4.2.2 The 4 design principles proposed by the NIC cover the following areas:

- *'Climate - mitigate greenhouse gas emissions and adapt to climate change;*
- *People - reflect what society wants and share benefits widely;*
- *Places - provide a sense of identity and improve our environment; and*
- *Value - achieve multiple benefits and solve problems well'.*

4.2.3 Whilst these principles were published after the start of the Supplementary Consultation exercise, it is expected that they are being embedded within the evolving scheme design. It is anticipated that the performance of the proposed LTC against these design principles will be reported by Highways England as part of the technical engagement exercise and at the time of the DCO application in the Design and Access Statement.

4.3 Design quality – Supplementary Consultation Scheme

4.3.1 The information in the Supplementary Consultation documents is not clearly communicated and lacks comparative perspective for many of the design changes between the Statutory Consultation Scheme and the Supplementary Consultation Scheme. Furthermore, the arrangement of maps presented within Map Book 1: General Arrangements, Map Book 2: Land Use Plans and Map Book 3: Engineering Plans is confusing and difficult to decipher. The consultation material could have been much clearer to enable more meaningful responses.

4.3.2 The scope of the project in the Supplementary Consultation document does not mention any of the works beyond the Application Boundary to mitigate impacts on climate change, the natural and urban environment, and quality of life for residents. If the scheme is to be a positive infrastructure project, it needs to be an investment in the area it blights the most and must enhance those areas which suffer the most in terms of deprivation. As the LTC will sterilise significant swathes of land directly, and indirectly, it needs to recognise the reduced ability for the Council to improve those areas, such as Tilbury, with resident-led regeneration. These wider scale projects need to be defined and governed by the councils who's land they are in and who understand local needs and thus best value.

4.3.3 There is no mention of the progress of and existence of the 'Design Narrative' document which the Council has previously provided comment on. The Council raised concerns The Council is

¹ <https://www.nic.org.uk/wp-content/uploads/NIC-Design-Principles-Final.pdf>

expecting that the proposed LTC, if approved, will be an exemplar of design quality, embedding the NIC's design principles (February 2020) in the scheme design (see Section 4.2). It is noted however that through the early part of 2019, Highways England dedicated several design workshops to a 'design narrative' for its proposals, seeking to provide, for example, a longer, higher and better designed Mardyke viaduct. However, the scheme has reverted back to a broadly similar design as presented at Statutory Consultation in spite of the fact that all parties recognised that there was a better alternative. There is no mention of the progress or existence of the design narrative document and this raises concern over the potential design quality for this nationally significant infrastructure project.

4.3.4 There is a lack of information regarding the design quality presented in the Supplementary Consultation required for stakeholders to provide an informed response to the proposed design changes. As the design continues to evolve, the Council expect to see further engagement, namely on the following:

- As yet no detailed design of the Tilbury viaduct structure, including acoustic fencing, lighting and gantries has been provided. Map Book 3: Engineering Plans only provides an indicative elevation out of context with the surrounding landscape features. Although Tilbury viaduct is proposed to be lower at Supplementary Consultation, however, there will still be visual impacts which design quality will be fundamental to the mitigation of.
- The Mardyke Crossing – throughout the early part of 2019 Highways England dedicated several design workshops to their proposals to provide a longer, higher and better designed viaduct that would remove the need for significant embankments within the valley which they believed would reduce the landscape and visual impacts of the scheme. Without any further discussion however, the scheme has reverted back to a broadly similar design as proposed at Statutory Consultation despite Highways England's design team recognising that there was a better alternative. Thorough justification for this design change rather than the alternative discussed has not been provided in the Supplementary Consultation documents.
- While the Supplementary Consultation material suggests that a balance has been struck between the solutions of a viaduct or embankment, both still offer significant adverse impacts on the landscape in terms of visual amenity and character as a result of substantial land modification, with all of its associated risks. It is not apparent that options to form a tunnel for all or part of the route have been considered in order to eliminate these environmental impacts.
- There is a significant buffer zone around the LTC and junction works that effectively sterilises land for housing and other noise-sensitive development. The levels of noise will need to be mitigated by design and construction above and beyond the average housing cost. This makes house building in this area less viable and meeting housing need more difficult. The existing residents will suffer from the noise created by the road and mitigation measures need to be made to improve their acoustic environment. Barriers are unlikely to mitigate the noise alone and other more sympathetic landscape features should be considered.
- There are many instances where landscape features and engineered topographies have been designed to solely serve engineering requirements. A design led approach will enhance these engineering features with ecology and visual amenity through a more sensitive placement of elements, such as balancing ponds, and a deviation from the standard engineering detail to serve multiple uses.
- To design and construct for the increase in noxious emissions also impacts the viability and deliverability of new development due to a more complex ventilation specification; as well as impacting the health of the residents living close to and visiting areas where the LTC cuts through.

4.4 Recommendations

4.4.1 The following provides a summary of recommendations relating to design quality:

- It is expected that the proposed LTC will incorporate the NIC's recently published design principles and the performance of the scheme against these principles will be reported by HE as part of the technical engagement exercise and at the time of DCO application in the Design and Access Statement.
- There remains no available evidence that an options appraisal has been carried out to inform the configuration of the scheme (junction locations, junction types, restricted movements, Public Right of Way (PRoW) crossing locations, scheme height, alternative modes, etc). This should be made available to consultees.
- Alternative design options for the treatment of the crossing through the Mardyke Valley should be considered to reduce potential adverse environmental effects.
- Alternative design options for the treatment of the viaduct over the Tilbury Loop Line should be considered to reduce potential adverse environmental effects.
- Further technical and design engagement is required with the Council prior to submission of the DCO application.
- The Design Narrative document should be updated for issue and discussion with the Council prior to submission.

Part 2 - Review of Supplementary Consultation Scheme

5 Review of Environmental Impacts Update

5.1 Overview

5.1.1 This chapter sets out the findings of the review of Highways England's Environmental Impacts Update. The review findings are presented as general comments (Section 5.4) moving to the specifics (Section 5.5). Appendix B sets out a summary of the proposed design changes and Appendix D provides the detailed review and comments relating to the potential environmental impacts of each design change, as presented in the Supplementary Consultation material. The comments are summarised in Table 5.2 at the end of this chapter.

5.2 Review documents

5.2.1 The following Supplementary Consultation documents were specifically reviewed as part of this exercise:

- Environmental Impacts Update;
- Guide to Supplementary Consultation;
- Map Book 1: General Arrangements;
- Map Book 2: Land Use Plan; and
- Map Book 3: Engineering Plans.

5.2.2 The review was also informed by the Council's response on the Statutory Consultation Scheme referred to in Section 2.3 and included in Appendix A.

5.3 Review approach

Principal steps

5.3.1 The following steps below have framed the review of the environmental information presented in the Environmental Impacts Update design changes tables:

- Step 1 – Review of the design change as presented (and how this has changed since Statutory Consultation);
- Step 2 – Consider potential environmental effects of the Supplementary Consultation design changes and proposed mitigation; and
- Step 3 - Describe any further information which would be expected prior to Highways England concluding their assessment, including expected final (mitigated) design.

Red-Amber-Green rating

5.3.2 A Red-Amber-Green (RAG) rating has been used to classify the potential environmental effects of the proposed design changes. The RAG rating is as follows:

- **Red** = needs addressing immediately/requires amendment prior to DCO submission
- **Amber** = further work with Thurrock Council required prior to DCO submission
- **Green** = satisfactory

5.4 Comments on Highways England's approach to EIA and HEqIA

EIA scope

- 5.4.1 In its response to Highways England's Statutory Consultation (see Appendix A, Chapter 8 of the report), the Council raised its concerns about the changes to the Application Boundary which took place from the time of the EIA scoping exercise to the Statutory Consultation Scheme, equating to an increase in development area of approx. 68%. The Application Boundary has changed again, to accommodate the design changes presented in the Supplementary Consultation, and the application area now approximates to double that which was considered by the Secretary of State in the Scoping Opinion.
- 5.4.2 Whilst an Environmental Impacts Update is included in the Supplementary Consultation material which "...sets out our [Highways England's] current understanding of how these changes affect the preliminary environmental information that was presented in our 2018 PEIR", it is not clear if the scope of each topic assessment has been revisited and updated, as necessary, and no evidence is presented in support of this.
- 5.4.3 It is acknowledged that there is a need to retain flexibility in designing major infrastructure schemes, however the significant increase in application area, compounded by the material changes to the LTC scheme which have taken place since scoping, lead to the conclusion that Highways England's October 2017 EIA Scoping Report was submitted prematurely and a new Scoping Opinion should be sought based on the most recent LTC proposals, to ensure adequacy of the Environmental Statement. As noted in Paragraph 4.9 of PINS Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, states that "...Applicants should consider carefully the best time to request a scoping opinion. In order to gain the most benefit, Applicants should consider requesting the opinion once there is sufficient certainty about the design of the Proposed Development and the main design elements likely to have a significant environmental effect".

Baseline conditions

- 5.4.4 The PEIR reported on baseline conditions and set out a likely 'future baseline' scenario for the purpose of the assessments. A year has passed since the time of the Statutory Consultation, and a significant amount of time has elapsed since the EIA work began, there is no mention in the Supplementary Consultation documents about the baseline conditions and any changes since the time of the PEIR (for example, the PEIR refers to the 2015 Thames River Basin Management Plan which was updated in 2018). The Council would expect that the assessments are based on suitably up to date baseline information.

Cumulative effects

- 5.4.5 Under Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) "*the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development*" and under Schedule 4(5) "*the description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, **cumulative**, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.*"
- 5.4.6 Any cumulative effects assessment should be undertaken in accordance with Advice Note 17: Cumulative effects assessment relevant to Nationally Significant Infrastructure Projects (Planning Inspectorate, version 2, August 2019) (AN17). AN17 identifies 3 'tiers' of development types which may need to be considered: in addition to 'permitted developments' and 'submitted but not yet determined applications', AN17 cites projects where a scoping report has been submitted and projects where a scoping report has not been submitted but is on the Planning Inspectorate's Programme of Projects.

- 5.4.7 AN17 states that *“an assessment should be provided for all Tier 1 and Tier 2 ‘other existing development and/or approved development’, where possible. For ‘other existing development and/or approved development’ falling into Tier 3, the applicant should aim to undertake an assessment where possible, although this may be qualitative and at a very high level. The assessment should be carried out with reasonable effort and should be clearly documented...”*.
- 5.4.8 It is therefore noted that the EIA should consider ‘Tier 2’ and ‘Tier 3’ development schemes i.e. schemes which do not yet have consent and are not fully ‘committed’ developments, including the emerging Local Plan as it moves closer to adoption, as well as committed developments such as Tilbury 2.
- 5.4.9 It is considered that Tier 3 developments have not yet been adequately considered by Highways England in the assessment to inform the EIA. This would include potential Tier 3 developments, as defined in AN17, in the emerging Local Plan (see Appendix F for detailed discussion of potential sites).
- 5.4.10 Table 5.1 provides a list of developments in Thurrock which Highways England should consider in its assessment of cumulative effects. This list should not be considered as exhaustive, and the Council should be consulted upon Highways England’s approach and list of developments to be considered within its assessment of cumulative effects.

Table 5.1: Developments in Thurrock requiring consideration as part of the cumulative effects assessment

Site	Planning Permission/Consent Status
Aveley Football Ground, Mill Road, Aveley	Commenced
Springfield, Mill Road, Aveley	Commenced
Petrol Station, Daneholes Roundabout' Stanford Road, Grays	Prior Approval
Pumping Station site Manor Way, Grays	Full Permission
Bannatynes Health Spa, Howard Road, Chafford Hundred, Grays, RM16 6YJ	Full Permission
Rayvac Electrics, East Thurrock Road, Grays	Full Permission
HSBC Bank, 53 High Street, Grays	Full Permission
Land adjacent to A13/ A1014, Stanford-le-Hope	Outline Permission
Land at St Margarets Ave & Fairview Avenue, Stanford-Le-Hope. SS17 0DW	Full Permission
Land Adjacent 1 The Green, Stanford Le Hope	Full Permission
Station North Site, Tilbury	Full Permission
Tilbury Market, Calcutta Road, Tilbury	Full Permission
Rourke's Drift Guest House, 197 Dock Road, Tilbury, RM18 7BT	Outline Permission
Chapharm Ltd, 2 - 3 Civic Square, Tilbury	Full Permission
Purfleet Centre	Outline Permission
Balgownie Farm, Lower Dunton Road, Bulphan	Full Permission
London Gateway	Commenced
Tilbury2 (Port of Tilbury)	DCO Consent Granted
Thurrock Flexible Generation Plant	DCO application submitted – 28 Feb 2020

HEqIA

- 5.4.11 A full and comprehensive HIA has been requested by the Council and the Director of Public Health. Highways England has confirmed that this will be provided in the form of a combined HEqIA. It is understood that no detailed information will be provided by Highways England until the DCO application is submitted. This approach would not allow the Council to properly consider and respond to the potential effects of the scheme on health and equalities. This approach is contrary to Highways England's strategic business plan which seeks to take '*...a more responsive and coherent approach to planning*' and '*...give stakeholders more of a say in how we develop the network*', and to the LTC scheme objectives which seek to minimise adverse effects on health and the environment.
- 5.4.12 Further meaningful and timely engagement is therefore required, particularly in relation to any proposed mitigation, compensation and legacy benefits.

Technical engagement

- 5.4.13 Substantial further technical engagement is required across all environmental topics prior to the submission of the DCO application to address the concerns set out above. This ought to include but should not be limited to:
- Further engagement on the scope, assessment outcomes and recommendations of the HEqIA, considering the potential to mitigate for significant adverse health impacts;
 - Further engagement is required regarding the scope and approach being taken for construction traffic modelling, subsequent air quality, noise and health effects arising from construction traffic will need to be discussed and appropriate mitigation agreed before the DCO application is made;
 - Highways England states that operational air quality modelling is ongoing, and that impacts are "difficult to predict" in absence of such modelling. This means that no informed view of operational air quality effects can be determined as part of this consultation exercise. Further engagement is required on this important topic;
 - The final list of Landscape and Visual Impact Assessment (LVIA) representative viewpoints and photomontages should be shared and agreed with the Council;
 - Highways England should engage more proactively with the Council to reduce potential effects on the Council-owned Coalhouse Fort, a nationally important heritage asset and popular tourist attraction / leisure asset, and to realise opportunities to improve and enhance the asset for the benefit of cultural heritage and community health and wellbeing. The future of Coalhouse Fort is uncertain at present following the charity which managed the heritage asset folding in February 2020. The construction phase may impact upon the number of potential viable users of the heritage asset going forward;
 - Highways England has identified potential habitat replacement sites, and Land Use Plans (Map Book 2) shows large swathes of land marked as 'environmental mitigation'. Further detail needs to be provided on the proposals for these areas, and how they have been determined as suitable sustainable mitigation areas, as well as potential subsequent impacts to other environmental features. The balance being struck by Highways England between environmental mitigation, and the relevant tests of Section 122 of the PA 2008 is unclear;
 - Ongoing ground investigations will inform a hydrogeological risk assessment, the outcomes and recommendations of that assessment should be shared and agreed with the Council such that appropriate mitigation measures can be developed;

- The PEIR states that “*settlement and land instability issues will be assessed as part of the design process and mitigation incorporated into the design to reduce the risk of significant settlement*” it is unclear how these issues have been factored into the decisions made on design changes. A robust approach to the assessment of alternatives will need to be clearly documented in the Environmental Statement (ES) as sufficient justification for the design changes made has not been presented;
- Further engagement is required to agree the detail of measures to handle, store and transport materials and waste, which will be secured in the COCP and CEMP; and
- It appears that carbon modelling to understand the projects contributions to climate change and human health impacts is ongoing. The scope and details of that modelling and any subsequent assessment should be shared with the Council.

Biodiversity Net Gain

5.4.14 In March 2019 the Government announced that, through the new Environment Bill, Biodiversity Net Gain would be made mandatory for all new developments. Whilst the Bill has not yet been passed by Government, the requirement for Biodiversity Net Gain has also been set out in the NPPF and numerous other policies. Whilst it is mentioned in the PEIR in relation to policies which require it, no further mention of net gain is made in either the PEIR or the Environmental Impacts Update. Biodiversity Net Gain would need to be considered from the very beginning of the design process and it is currently unclear how Highways England is ensuring net gain policy requirements are met.

5.5 Supplementary Consultation Scheme – general observations

Level of detail presented by Highways England

- 5.5.1 In general, the environmental information presented by Highways England lacks the detail required for stakeholders to provide an informed response to the proposed design changes. In most cases the Environmental Impacts Update cross refers to the PEIR which was published as part of Highways England’s Statutory Consultation exercise. The comments made by the Council at that time (see Appendix A) regarding the significant information gaps and potential under reporting of potential impacts therefore remain valid.
- 5.5.2 Each design change is complex and, as set out in the Guide to Supplementary Consultation, gives rise to a number of subsequent revisions to the design and structure of the scheme. The expected effects and “what we are doing and why” presented in the Environmental Impacts Update are not specific to receptors, or at times to the effects anticipated to change. The high level and generic nature of the commentary means it is difficult to understand the true impacts of the design changes or to make specific recommendations regarding mitigation measures which ought to be sought.
- 5.5.3 Throughout the Environmental Impacts Update there are references to changes in environmental effects as a result of the modifications. As yet the results of surveys have not been published and therefore it is not possible to properly consider how the conclusions are reached.

Marine works

- 5.5.4 An update to the environmental assessment for marine works is presented in Section 4 of the Environmental Impacts Update based on the proposed change to the Application Boundary and water discharge. The change includes:

“Minor changes to the development boundary to allow flexibility for the location where water will be discharged into the Thames. This would be excess groundwater removed from the construction or operation. The jetty location remains as per Statutory Consultation.”

- 5.5.5 There is a lack of detail presented on this design change i.e. the location. The Environmental Impacts Update is high level and lacking in sufficient detail to understand any potential impacts to the marine environment and nearby Thames Estuary & Marshes Special Protection Area/Ramsar (the area fronting the portal will need to be assessed to determine if it can be considered as functionally linked habitat). For this reason, no detailed review and comment on the environmental update for Marine Works is provided.
- 5.5.6 As correctly stated within the Marine Works section, “*Appropriate approvals would [need to] be obtained from the Port of London Authority and Marine Maritime Organisation*”.

People and communities

- 5.5.7 Changes to the anticipated effects detailed in the Supplementary Consultation Environmental Impacts Update cover Highways England’s People and Communities chapter of the ES, however most comments relate to land take and public amenities. No detailed comment is made to any changes to the effects on those traffic and transport matters addressed in the People and Communities PEIR chapter. Whilst a review of Chapter 5 (Walkers, cyclists and horse riders) has been undertaken and reported in Chapter 8 and Appendix E of this document, the implications and impacts for people and communities in EIA terms are not made clear by Highways England.

Construction compounds

- 5.5.8 The new location for compounds and the utilities programme has the potential for serious impacts on two further scheduled monuments (Orsett Causewayed Enclosure and the Baker Street Springfield Style enclosure) both nationally significant as well as a non-designated location of a Roman cemetery. Further consideration will be needed on the impact of these changes on the heritage assets and their settings.

Planting strategy

- 5.5.9 In several of the images in the Guide to Supplementary Consultation there is significantly less tree planting shown in the supplementary consultation images compared to that used in statutory consultation. While it is accepted that tree planting is not appropriate in all locations there needs to be a clear rationale informing the landscape mitigation measures that are to be adopted. There are also several references to false cuttings and other landscape mitigation being removed due to 'engineering constraints'. No indication is given as to what alternative mitigation measures will be provided.

5.6 Opportunities, benefits and legacy

- 5.6.1 The Council recognises it is possible that the need for the scheme may be accepted by the Examining Authority and consent granted. In order to protect the Borough’s interests, the Council is keen to secure measures which serve to mitigate and to compensate for the potential adverse effects of the proposed LTC to the extent that it is possible to do so. Assurances over these measures will not remove but should seek to minimise the substantial adverse effects which are likely to arise in the Borough as well as providing a positive and long-lasting legacy.
- 5.6.2 Although much of the environmental assessment is focused on seeking to avoid or minimise adverse effects, it should not be forgotten that opportunities to secure or maximise beneficial effects should be thoroughly considered. At present, there are a limited number of positive contributions made in the Supplementary Consultation documents, for example the introduction of an additional 3 green bridges and such improvements are welcomed by the Council. However, the important issue of ensuring lasting beneficial legacy infrastructure appears to have been overlooked in the consultation documents.
- 5.6.3 In relation to a training and skills legacy, no skills need analysis or programme of proactive activity has been presented. If the scheme is to be used as a way of giving skills to local people

and the skills to access the jobs created, then the work should have started already. If LTC are committed to local employment and benefitting local people, they need to be in schools now mentoring young people / adding to the Careers Education and Information Advice and Guidance (CE/IAG) offer. They should also be working with the training providers already to fund / support people through the training process.

- 5.6.4 The lack of detailed justification and information presented on each design change makes it difficult to determine how legacy benefits have been considered in the iterative design process. Should the scheme be granted, the Council would wish to see tangible, deliverable proposals which create a lasting legacy in the Borough.

5.7 Detailed review findings

- 5.7.1 Appendix D provides the detailed review and comments relating to the potential environmental impacts of each design change as presented in the Supplementary Consultation material. This information is summarised in Table 5.2 below.

Table 5.2: Summary and key points of the review of the Environmental Impacts Update

Design Change	Summary and Key Points
Removal of Tilbury Junction, the rest and service area and maintenance depot - Design Change 8	<p>While removal of the RaSa is supported, the removal of the junction places pressure upon the Council to identify, fund and maintain any link road provision that will facilitate growth and access in Tilbury. The removal of Tilbury Junction is an impediment to economic development in the Tilbury area. There is no consideration of the negative impact for Tilbury and the Docks, identified as a growth sector for employment and business. A link road could have improved access to Tilbury Port and provided an alternative route away from residential areas. Also, there should be a potential to create a route through to East Tilbury and Coalhouse Fort.</p> <p>Further specific assessment and mitigation is required for the following:</p> <ul style="list-style-type: none"> • Views from West Tilbury and East Tilbury Conservation Areas, Coal Fort East Tilbury Battery or Tilbury Fort Scheduled Monuments. • Design of balancing ponds and their integrated use for wildlife, landscape and other uses with amenity value rather than the standard 'deep ditch' balancing pond detail. • Impact to Low Street Local Wildlife Site (LWS), concerns regarding reduction in mitigation.
Tilbury viaduct length reduced - Design Change 9	<p>As yet no detailed design of the Tilbury viaduct structure, including acoustic fencing, lighting and gantries has been provided. Map Book 3: Engineering Plans only provides an indicative elevation out of context with the surrounding landscape features). Although Tilbury viaduct is proposed to be lower at Supplementary Consultation, however, there will still be visual impacts in terms of the design quality. It is unclear how the design change would lessen the temporary adverse construction impacts on local communities, such as East Tilbury and West Tilbury.</p> <p>Further specific assessment and mitigation is required for the following:</p> <ul style="list-style-type: none"> • Views from West Tilbury and East Tilbury Conservation Areas, Coalhouse Fort, East Tilbury Battery or Tilbury Fort Scheduled Monuments
Muckingford Road realignment and green bridge - Design Change 10	<p>The area surrounding Muckingford Road is considered to be tranquil. The LTC route has moved slightly closer to the properties on the north side of Muckingford Road, whereby their access is affected but the properties are retained. Construction work is likely to be closer to noise sensitive receptors, however, no specific construction mitigation is provided. Information is cross referred to in the PEIR, however Figure 13.2 in Volume 3 of the PEIR is a low-resolution map and it is not clear if noise monitoring has been undertaken in this area. Alternative design should be explored to lower the LTC to preserve the tranquil nature of the area.</p> <p>Further specific assessment and mitigation is required for the following:</p> <ul style="list-style-type: none"> • Design to mitigate the major negative landscape change and a moderate to major negative change in terms of views. • Further information required on receptor sites for translocation of protected species. <p>While the green bridge would represent some form of mitigation in terms of severance for people and communities and walking/cycling active connections, it is dependent on how the green bridge is designed, planted and maintained to encourage public use.</p>
LTC route realignment near Chadwell	<p>Potential impacts to the Linford community should be properly assessed due to the route moving 60 metres closer to Linford. The Environmental Impacts Update states that this design change may increase the temporary adverse construction effects experienced by residents of Linford.</p>

Design Change	Summary and Key Points
St. Mary and Linford – Design Change 11	<p>Furthermore, it is not clear how this conclusion has been reached and which receptors are affected (e.g. community open space, community severance, economy, health).</p> <p>The Supplementary Consultation documents do not refer to the effect on Rainbow Shaw LWS which is ancient woodland. Highways England has acknowledged that the realignment will result in the permanent loss of part of this site although the extent of this loss of the priority habitat is yet to be provided. This loss will require additional woodland creation of an appropriate scale and quality to compensate for this habitat loss.</p> <p>The Environmental Impacts Update does not explicitly confirm whether there are any new direct or indirect effects on the nearby Scheduled Monument (Neolithic Causewayed Enclosure and Anglo-Saxon cemetery) considering that the footprint of the LTC appears to be closer.</p>
A13/A1089 junction changes - Design Change 12	<p>Significant changes have occurred to the junction of the A13, A1089 and LTC. Further buildings are subject to demolition as part of the proposed design changes and there are likely to be further receptors included within scope which have not been identified in the Environmental Impacts Update.</p> <p>There is a significant amount of land take proposed within this area which includes the loss of woodland and likely impacts to Blackshots Nature Area LWS, which is yet to be surveyed.</p> <p>The proposed design is confusing and the junction would continue to result in the encroachment of road infrastructure, including structures, embankments, signs, gantries and street lighting into the local landscape as a result of the intertwined string of new link roads connecting the A13 with the LTC. This will include the direct impact and permanent loss to Orsett Cropmark Complex. Specific mitigation is yet to be understood.</p> <p>The assessment makes no reference to the impact of the relocation of the traveller site.</p>
Rectory Road Realignment - Design Change 13	<p>The long-term closure of Rectory Road and planned works to other access points into Orsett could reduce the ability to deliver housing growth in Orsett in the first 5 years of the Local Plan due to the reduction in local highway capacity and resilience during the construction phase of the LTC. Furthermore, the long-term closure of Rectory Road will cause significant disruption for the residents of Orsett and could limit access to hospitals. Baker Street is also scheduled for a long-term closure and there are works planned for Stifford Clays Road, therefore, the timing of the LTC works will need to be carefully considered to reduce the impact on the residents of Orsett.</p> <p>It is unclear if Old Rectory Road will be closed during the construction of LTC, Highways England should demonstrate the implications for air quality on the Orsett Cock junction as this closure will encourage more traffic to temporarily use the junction via Baker Street to access Orsett.</p> <p>Further specific assessment and mitigation is required for the following:</p> <ul style="list-style-type: none"> • Consideration of long-term noise monitoring on Baker Street. • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets at Murrells Cottage to be impacted and to inform the mitigation requirements.

Design Change	Summary and Key Points
	<ul style="list-style-type: none"> Assessment to determine if there are any new direct/indirect effects on the nearby LWS (Blackshots Nature Area, Orsett Camp Quarry and Mucking Heath/Orsett Golf Course).
Hornsby Lane Closure - Design Change 14	<p>As part of this design change, residential properties, local businesses and community facilities in Orsett Heath would no longer be accessible via Hornsby Lane. No detail has been provided in the Environmental Impacts Update on alternative means of access for those affected. Further engagement with local residents and ward councillors to discuss the implications of this change is required. Highways England should also be mindful of potential impacts from fly tipping to residential properties, local businesses and community facilities and consider opportunities to reinstate or improve access, including pedestrian links to the bridleway from Hornsby Lane.</p>
M25 to A13 southbound lane removal - Design Change 15	<p>As part of this design change, further woodland planting is proposed along the southbound lane of the M25, this is likely to be a positive change to noise conditions in the area, e.g. St Mary Magdalene and North Ockendon Conservation Areas. However, green landscaping has been removed from the Supplementary Consultation Scheme when compared to the Statutory Consultation Scheme along the M25, exposing the residential properties on the north side of Ockendon Road. The noise and visual conditions at these properties are unlikely to change from the existing baseline, however, there is a missed opportunity to provide an improvement to these properties. It is understood that noise surveys are yet to be undertaken along this section of the route.</p>
Routing through the Mardyke – Design Change 16	<p>Through the early part of 2019, Highways England held several design workshops on its proposals to provide a longer, higher and better designed viaduct that would remove the need for significant embankments within the valley. Highways England suggested that this would reduce the landscape and visual impacts of the scheme at this location. However, without any further engagement, Highways England has reverted back to a design similar to what was presented at Statutory Consultation despite recognising that there was a better design alternative.</p> <p>A shortened viaduct subsequently means a longer embankment which not only increases the volume of flood compensation but obstructs views through a viaduct. It is concerning that no landscape mitigation measures have been shown that could mitigate the structure within an expansive, flat open landscape. As such, thorough justification for this design change is required.</p> <p>Further specific assessment and mitigation is required for the following:</p> <ul style="list-style-type: none"> Further detail regarding surface water run-off into Mardyke River and its tributaries should be provided as there is potential elevated levels of hydrocarbons. Surface water run-off should not be able to flow directly into the Mardyke River without some form of filtering e.g. through reedbeds. Such features could be of landscape and ecological benefits if designed appropriately. Full assessment of the impacts on the bridleway and isolated residential properties as a result of this design change is required. Appropriate heritage impact assessments including impacts from mitigation measures should be completed for Grove Farm.
The height of the LTC and North Road - Design Change 17	<p>The Environmental Impacts Update states that the design change would be a slight improvement to residential amenity for local communities of North and South Ockendon as a result of the reduction in height of the route at this location. However, no evidence has been presented to determine how this conclusion has been reached.</p> <p>The Environmental Impacts Update fails to properly assess potential changes to the effects on setting/significance of nearby scheduled monuments and Grade II listed buildings. It is recommended that the contribution of that North Road makes to the setting of the listed buildings, scheduled monuments and Conservation Areas is included in the EIA.</p>

Design Change	Summary and Key Points
Thames Chase Forest Centre - New Bridge – Design Change 18	<p>While a new bridge would potentially improve east to west connections in the Thames Chase Forest and promote non-motorised use, the benefits for the local community are not fully justified in the Environmental Impacts Update nor is there any detail on the design of the new bridge or PRoW.</p> <p>It should be noted that Highways England refers in the Environmental Impacts Update to the ‘Thames Chase Community Forest’ which is incorrect. The reference ought to be in this instance to the ‘Thames Chase Community Forest Centre’.</p> <p>Further specific assessment and mitigation is required for the following:</p> <ul style="list-style-type: none"> • An assessment of the effects on habitats and species as a result of further habitat loss from the construction of the proposed new route needs to be undertaken. • Design of the new bridge should consider species movement.
M25 junction 29 changes - Design Change 19	<p>Highways England has yet to share its latest traffic model with the Council (due in February 2020) and therefore it has not been possible to analyse the potential effects of the amended layout on traffic flowing into and through the Borough and onto the local road network.</p>

6 Review of Traffic Modelling Update

6.1 Overview

6.1.1 Highways England has updated the traffic model known as the Lower Thames Area Model (LTAM) since statutory consultation to include:

- Changes to the forecast years to 2027, 2032, 2042 and 2051 from the Statutory Consultation forecast years of 2026, 2031, 2041 and 2051. This reflects the 'opening year' becoming 2027 and the 'design year' 2042;
- The assumptions around Heavy Goods Vehicles (HGVs) growth and movements have been updated to include the recent Department for Transport (DfT) Road Traffic Forecasts;
- The model has been updated to reflect the following design changes:
 - i. Removal of the RaSA
 - ii. The road between Tilbury and the A13 has been moved up to 60 metres to the east
 - iii. An amended design and operation for the junction and connections between LTC and the A13 and A1089
 - iv. The southbound connection between the M25 and the A13 has been changed to two lanes (with lane drop at the merge points) compared to the three lanes of the Statutory Consultation Scheme
 - v. Amended bridge design over the Mardyke River
 - vi. Amended junction design between LTC and the M25 retaining the Ockendon Road bridge
 - vii. Alterations to M25 junction 29.
- Changes to the size and location of proposed housing and other developments in the area; and
- An update to the list of road schemes that are likely to be built on the network regardless of the LTC.

6.2 Review of the traffic modelling update

6.2.1 The results reported in Traffic Modelling Update within the Supplementary Consultation material are insufficient to understand in any detail the effects of the proposals on the local highway network and the changes the revised alignment has on local impacts. It is stated that "*further detail and results will be contained within the Traffic Forecasting Report which will be produced in support of our DCO*", but this has not been made available for this supplementary consultation and so a reasoned response cannot be made to this consultation.

6.2.2 It had been confirmed that a fixed matrix cordon model from the wider LTAM (as previously provided from the Statutory Consultation model) will be issued to the Council by the end of February. At the time of preparing this report, the cordon model has not yet been provided and does not provide Stantec and the Council with sufficient time to respond within the timescales of this supplementary consultation. It is recommended that the Council indicates to Highways England that it wishes to comment on the updated modelling, when this has been issued by Highways England.

6.2.3 The AM peak period modelled by Highways England is defined as 07:00 to 08:00hrs, the PM peak period is defined as 17:00 to 18:00hrs. The interpeak period is defined as a “*typical hour in the middle of the day*”. The AM peak does not align with the local network peak hour of 08:00-09:00hrs.

High level impacts with and without the LTC

6.2.4 Tables 4.1 and 4.2 in the Traffic Modelling Update show traffic flow changes as a result of the changes to the model. These are described in PCUs/hr (Passenger Car Units per hour).

6.2.5 The modelled assessments which consider the ‘without the LTC’ scenarios for the comparison between the Statutory Consultation and Supplementary Consultation models show:

- Increases in the base year (2016) two-way hourly flows on the Dartford Crossing in both the peak periods and the interpeak period;
- Slight increases in the opening year and design year two-way hourly flows using the Dartford Crossing in the peak periods and the interpeak period; and
- The percentage of vehicles which are HGVs remain similar in the peak periods and interpeak period in the base, opening and design years over the Dartford Crossing.

6.2.6 The modelled assessments which consider the ‘with the LTC’ scenarios for the comparison between the Statutory Consultation and Supplementary Consultation models show:

- In the AM Peak period, there is an increase in PCUs/hr in the opening year and design year using the Dartford Crossing and a very slight decrease in PCUs/hr using the using the LTC. There is also an increase in the proportion of HGVs using the Dartford Crossing and decrease in proportion of HGVs using the LTC;
- In the interpeak period (opening year and design year), there is an increase in PCUs/hr using both the Dartford Crossing and LTC. There is an increase in the proportion of HGVs using the Dartford Crossing and a decrease in the proportion of HGVs using the LTC; and
- In the PM peak period (design year and the opening year), there is an increase in PCUs/hr using the Dartford Crossing and LTC. There are similar proportions of HGVs using the Dartford Crossing and a decrease in HGVs using the LTC in the design year and the opening year.

Impacts within Thurrock

6.2.7 Figures 4.1 to 4.3 in the Traffic Modelling Update show broad ranges of flow changes between the Statutory Consultation model and the Supplementary Consultation model.

6.2.8 The following changes have been identified within the AM Peak period:

- Most minor roads in Thurrock show a change of between -249 to +250 PCUs/hr*.
- There is an increase of +251 to +500 PCUs/hr along the A1089 southbound and A13 Eastbound;
- There is an increase of +251 to +500 PCUs/hr on the M25 southbound and northbound from M25 Junction 30 (Mar Dyke Interchange); and
- There is an increase of +751 to +1000 PCUs/hr on the M25 between Junction 29 of the M25 and M25 Junction 30 (Mar Dyke Interchange).

6.2.9 The following changes have been identified in the interpeak period:

- Most minor roads within the Borough show a change of between -249 to +250 PCUs*, with the exception of London Road, Grays and a couple of other minor roads in the proximity of Lancaster Roundabout of between -499 to -250 PCUs;
- There is an increase of between +501 to +1000 PCUs/hr southbound A1089 from the junction of the A13/A1089 and northbound along the LTC (it is difficult to confirm the actual change as the key is too similar);
- There are increases of between +251 to +500 PCUs/hr eastbound along the A13 between Mar Dyke Interchange and the junction of the A13/A1089; and
- There are increases of between +501 to +1000 PCUs/hr** A13 eastbound from Stanford-le-Hope and Fobbing.

6.2.10 The following changes have been identified in the PM Peak Period:

- Most minor roads within Thurrock show a change of between -249 to +250 PCUs/hr*;
- There is an increase of +251 to +500 PCUs/hr along the A1089 southbound;
- There is an increase of between +501 to +1000 PCUs/hr** westbound between the junction of the A13/A1089 and the M25;
- There is a decrease of between -499 to -250 PCUs/hr along the A13 eastbound between the M25 and A1012/A13 roundabout;
- There is a decrease of between -499 to -250 PCUs/hr southbound along the LTC from the A13/A1089 junction
- There is an increase of +1001 to +1500 PCUs/hr northbound along the LTC.

* A range of -249 to +250 PCUs/hr is a significant range when considering local roads within a one-hour peak period, therefore more detail on the exact changes is requested.

** It is difficult to tell which change category these ranges are in as they are similarly shaded lines within the Highways England documents.

6.3 Potential effects

6.3.1 This section sets out Stantec's opinion of the potential effects which could concern the Council. This is derived from the combined understanding formed from its review of:

- the Thurrock fixed matrix cordon model output from the wider previous Statutory Consultation LTAM;
- the limited detail provided within the Traffic Modelling Update; and
- the on-going supplementary testing being undertaken using the Thurrock fixed matrix cordon model from the Statutory Consultation LTAM.

6.3.2 Stantec reserves the right to make additional representations when the updated fixed matrix cordon model is issued by Highways England. The updated model could resolve some concerns or raise new issues.

Morning peak hour

- 6.3.3 The AM model is 07:00-08:00hrs, which is the peak hour on the strategic network, but the local network AM peak hour is 08:00-09:00hrs. Stantec has concerns that the impact on the local network is underestimated.

Local road validation

- 6.3.4 Validation is the comparison of modelled and observed data to check that the model reasonably accurately reflects the current performance of the network. Good validation is when the theoretical model accurately reflects observed operations.
- 6.3.5 The Statutory Consultation fixed matrix cordon model (and therefore LTAM) validates well on the strategic road network, but there is very limited data to check the validation on the local roads.
- 6.3.6 There are concerns that the effects on the local road network may differ in practice from that modelled. The concern is that the LTAM may underestimate impacts of the LTC and as a result no mitigation is proposed by Highways England.
- 6.3.7 Highways England should review the calibration and validation and consider the reliability of the evidence on impacts and the need for mitigation on the local network.

Local road impacts

- 6.3.8 The results reported in the Traffic Modelling Update are insufficient to understand in any detail the effects of the proposals on the local highway network.
- 6.3.9 The ranges used (e.g. a range of -249 to +250 PCUs/hr, +251 to +500 PCUs/hr, etc.) are too broad when considering the significance of impacts on local roads within a one-hour peak period. The change in traffic flow could represent a significant increase in vehicle movements in one direction in a single hour. The percentage change in traffic flow could be significant and have a severe impact on severance and delay. There has been no evidence that this has been assessed as part of the EIA. Highways England should set out why these impacts are not included as a chapter specifically related to Transport within the ES.
- 6.3.10 It had been confirmed by Highways England that an updated fixed matrix cordon model (as previously provided from the Statutory Consultation model) will be issued to the Council in February. This has not currently been issued and will not provide the Council with sufficient time to respond within the timescales of this Supplementary Consultation. It is recommended that the Council should request the right to comment when a review has been undertaken.

Growth assumptions

- 6.3.11 The Council is in the process of preparing a new Local Plan. The first Local Plan 'issues and options' consultation (stage 1) took place in 2016 and covered broad policy themes. The 'issues and options' (stage 2) consultation ran from 12 December 2018 until 8 March 2019.
- 6.3.12 The emerging Local Plan will be significantly influenced should consent for the LTC be granted, and has created a level of uncertainty in the Local Plan development.
- 6.3.13 Broad details on the magnitude of potential emerging Local Plan developments and an indication of growth areas have been provided to Highways England, but this does not appear to have influenced the growth assumptions in the LTAM forecast years.
- 6.3.14 Highways England has now advised that any analysis on the LTAM would require considerable work and would require clarity and firm proposals before commencing; and, that the work can only be run on one scenario given the time taken and complexity.

- 6.3.15 Highways England recommended that testing is carried out in the Statutory Consultation fixed matrix cordon model first to refine any test and to identify any likely network improvements and mitigation to reduce the risk of the test carried out by Highways England being unsuccessful. This is being progressed and will be issued to Highways England during March 2020 as part of ongoing engagement outside of the Supplementary Consultation process.
- 6.3.16 Thurrock is identified by Government as an area for substantial growth. A primary aim of the LTC, as stated in the Guide to Supplementary Consultation document at page 7, is "*to support sustainable local development and regional growth...*". On that basis Highways England should recognise the likelihood for growth in Thurrock and fully assess that impact and design the LTC and associated connections accordingly.

Induced traffic

- 6.3.17 The scheme results in significant levels of induced traffic, bringing severance, impact on pedestrian and cyclist delay and amenity, fear and intimidation, accidents and safety and as well as pollution, dust and dirt.
- 6.3.18 These aspects do not appear to have been fully assessed for both the construction and operation stages of the project and, indeed, Highways England states in the Environmental Impacts Update at page 64 that the impacts have not been assessed and mitigation is to be developed.
- 6.3.19 The Traffic Modelling Update shows some significant increases on A13 (east of the LTC), A1013 and through Chadwell St Mary. No mitigation is identified.
- 6.3.20 Stantec advises the Council to seek further details on the methods of mitigation of the effects of the LTC on local roads, the A13 and associated interchanges.

Resilience

- 6.3.21 The LTC has been designed for a life span of some 100 years, yet there is no modelling for resilience to future change, such as travel trends, mode shift and emerging technologies. Such work would provide flexibility, for example:
- to consider lower use of and/or electric/hydrogen powered private vehicles and HGVs in recognition of the climate change emergency;
 - to accommodate high occupancy/public transport prioritised lanes in the future to facilitate technologies such as autonomous shuttle buses;
 - to safeguard/ deliver bus priority advance lanes to and from the tunnel enabling a dedicated public transport links across the river between Thurrock and Kent, particularly to the railway (offering more direct regular services into London) and/or Kent Thameside Fastrack services at Gravesend.; and
 - to accommodate rail across the river.
- 6.3.22 There is no assessment regarding when the existing Dartford crossing will reach its capacity as a result of the relief that the LTC brings and prediction on induced traffic. However, as the Supplementary Consultation results show higher traffic flows across Dartford crossing, this suggests that this may be earlier than shown within the previous Statutory Consultation Scheme. Similarly, there appears to be a general increase in traffic on the west side of the Borough in comparison with the Statutory Consultation model, minimising benefit on M25 junction 30, junction 31 and on the A13.
- 6.3.23 Stantec advises the Council to seek evidence that Highways England has included resilience in the proposals for future changes in the composition of transport and travel modes.

A13 widening

- 6.3.24 Work is currently underway to widen the A13 from two to three lanes in both directions between the A128 (Orsett Cock roundabout) and the A1014 (Manorway, Stanford-le-Hope roundabout).
- 6.3.25 When complete, the widened section will join with the existing three lane section of the A13, west of the A128, providing a continuous three lane road in both directions between the M25 and Stanford-le-Hope.
- 6.3.26 As part of the work, four bridges will be replaced, the Orsett Cock roundabout will be widened and new traffic lights will be installed to help manage vehicle flow.
- 6.3.27 It cannot be confirmed, from the information provided with the Supplementary Consultation, whether this scheme has been coded correctly in the model. The models do not appear to include traffic signals at the roundabout and the number of approach lanes may be incorrect (note: this can be seen in the Statutory Consultation fixed matrix cordon model provided). Whether correct or not, the widening scheme provides additional capacity for current traffic and for future traffic.
- 6.3.28 Figure 5-40 (page 61) of the Guide to Supplementary Consultation document is misleading as it fails to identify that traffic needs to join the A13 prior to Orsett Cock in order to gain access to LTC. Access to LTC northbound is not readily available without significant detour from much of Thurrock, including East Tilbury, Chadwell St Mary, Linford and Orsett.
- 6.3.29 The LTC appears to take up this capacity and overload the network in this location. The capacity created by the widening will therefore not be available to accommodate the emerging Local Plan development.
- 6.3.30 The capacity benefits of the widening of A13 should be safeguarded for local growth and not eroded by the strategic proposals. The effects of the LTC on the A13 east of the LTC are not adequately mitigated.

A13 Orsett Cock and A13/A1014 Manorway junction performance

- 6.3.31 Orsett Cock and Manorway junctions suffer with increased congestion with the introduction of the LTC. It should be noted that the Traffic Modelling Update does not provide adequate detail to understand any performance changes, but it does show there is increased traffic flow which would be expected to exacerbate the issues.
- 6.3.32 Figures 6.1 and 6.2 show the differences in delays in seconds in the AM and PM peaks respectively from the Statutory Consultation fixed matrix cordon model at points within the model. This shows that the performance of the Orsett Cock and Manorway junctions deteriorate in both peak hours from the baseline.



Figure 6.1: Differences in Delays in AM Peak Hour with LTC (Statutory Consultation Fixed Matrix Cordon Model)



Figure 6.2: Differences in Delays in PM Peak Hour with LTC (Statutory Consultation Fixed Matrix Cordon Model)

Journey times from the M2/A2 to the Port of Tilbury

6.3.33 A review of journey times, using the latest Statutory Consultation fixed matrix cordon model, indicates that, traffic is likely to arrive from the M2/A2, via the A1013 or via Chadwell St Mary to the Port of Tilbury. This route appears quicker than via Dartford Crossing, as shown in Figures 6.3 and 6.4. These routes, however, do not reflect the local constraints or suitability of those corridors. These include the semi-rural nature of those routes and the impacts on settlements along the route. It is therefore of significant concern that vehicles would be attracted to these less suitable routes without mitigation.

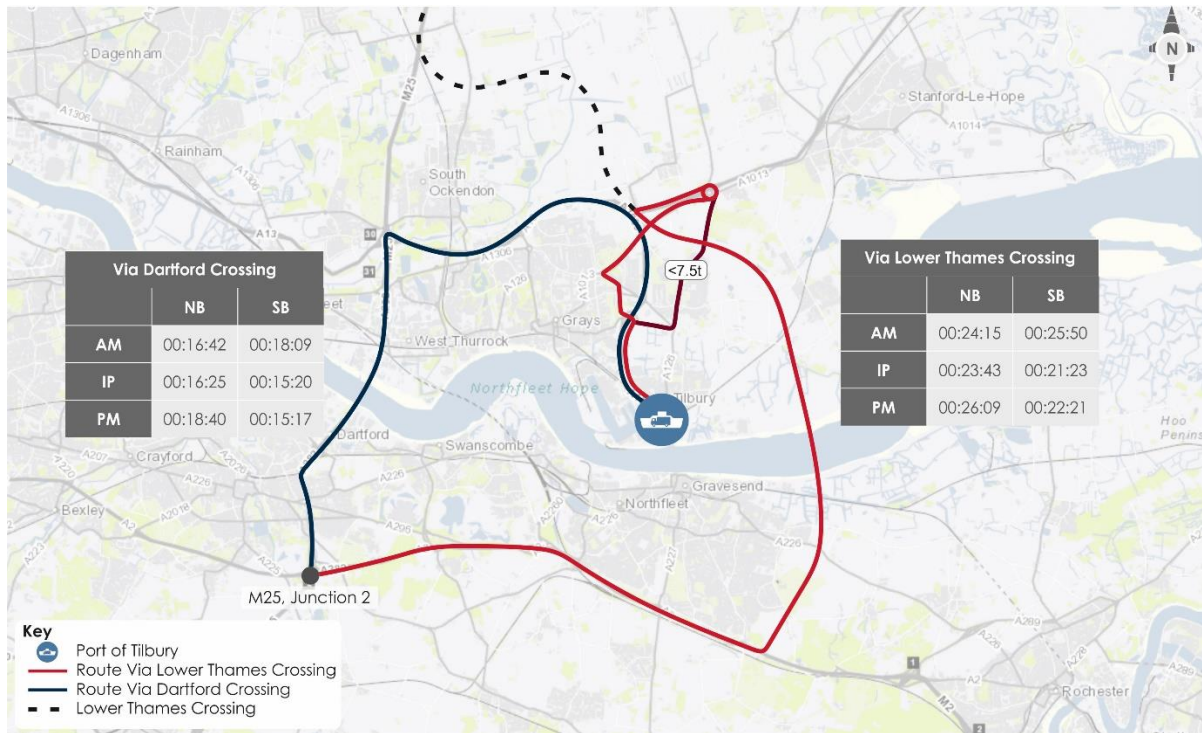


Figure 6.3: Journey Times from A2/Old Watling Street Roundabout to the Port of Tilbury - 2026

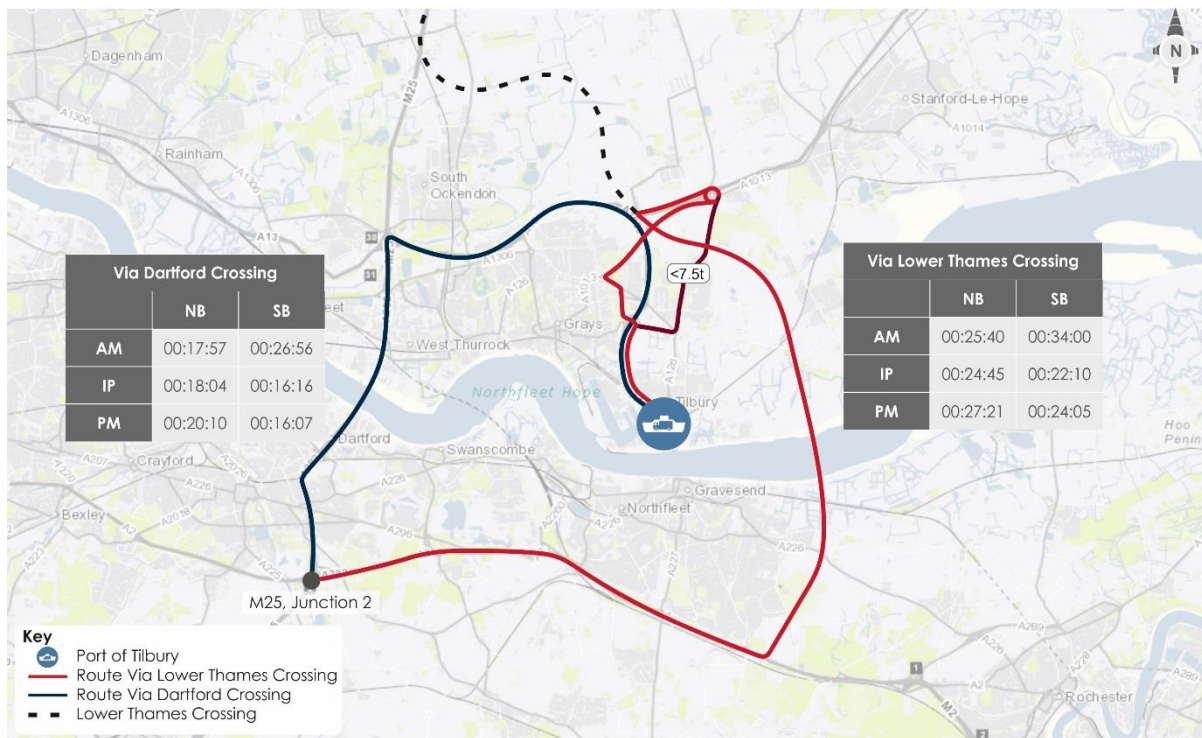


Figure 6.4: Journey Times from A2/Old Watling Street Roundabout to the Port of Tilbury – 2041

Connection between the LTC and the Port of Tilbury

6.3.34 The lack of connection from the LTC to the Port of Tilbury will bring about severely adverse impacts on inappropriate roads and induce congestion issues on the A13 east of the LTC. It does not support growth at a National Port already hindered by the capacity of the trunk road at

A1089 ASDA roundabout, the main and only route to the strategic road network. The LTC (via a Tilbury Link Road) would provide new connections to labour pools south of the River Thames and markets in the south east.

- 6.3.35 It continues to remain unjustified why the connection between the LTC to the Port of Tilbury has been removed and the proposed junction at Tilbury has now also been removed since Statutory Consultation option testing has not been made available to justify its exclusion.
- 6.3.36 Without this connection there is little opportunity to attract public transport operators to provide services across the River Thames between Grays and Gravesend. Indeed, they would be unworkable without local connections to the public transport customers in Thurrock and Gravesham.
- 6.3.37 As part of the Thames Gateway development agenda, improvements north and south of the river, by non-car methods is being investigated by Transport East and Transport for South East groups. The lack of measures and access opportunities does not assist the case in terms of Highways England's Objectives 1, 4 and 5.
- 6.3.38 Stantec advises the Council to seek an understanding from Highways England as to how cross river public transport connectivity is to be facilitated by the LTC.

Journey times from the M2/A2 to the centre of Grays

- 6.3.39 There is significant probability that traffic from the south on the LTC would route via the LTC and U-turn at Orsett Cock (see Figure 6.5) to reach the centre of Grays. In the reverse direction traffic is forced to travel via Docks Road (see Figure 6.6) due to the weakness of the connection from A13 west to LTC south.



Figure 6.5: Route via the LTC via U-Turn at Orsett Cock

- Local Road Impacts – The Council should reserve the right to provide additional representations when the fixed matrix cordon Supplementary Consultation model is issued, as the results reported in the Traffic Modelling Update are insufficient to understand, in any detail, the effects of the proposals on the local highway network.
- Growth Assumptions – Highways England should include the emerging Local Plan housing numbers to demonstrate the resilience of the network for local strategic growth in the modelling.
- Induced Traffic – Highways England should consider and assess impacts such as: severance, impact on pedestrian and cyclist delay and amenity, fear and intimidation, accidents and safety and as well as pollution, dust and dirt in the ES and HEqIA prior to the DCO submission for both construction and operation stages of the project.
- Resilience – Highways England should assess future scenarios to understand resilience of the proposals for future change, such as travel trends, mode shift and emerging technologies and to make those assessments available to the Council.
- A13 Widening – Highways England should consider mitigating the impact on the safeguarded capacity improvements as a result of the A13 widening scheme to protect this investment for the Council's emerging Local Plan development.
- A13 Orsett Cock and A13/A1014 Manorway Junction Performance – Highways England should identify mitigation at these junctions to accommodate the increased traffic levels associated with the LTC and to safeguard capacity to enable the required local growth to occur. This must be demonstrated through the updated fixed matrix cordon model and provided to the Council for review and to suggest mitigation, as the traffic flows have significantly increased in this location from the Statutory Consultation model. The models must reflect the proposed modifications to the junction at Orsett Cock, which includes traffic signal controls at the junction.
- Journey Times from the M2/A2 to the Port of Tilbury – Highways England should identify measures to prevent traffic routing via the A1013 or via Chadwell St Mary and in particular HGVs. Commitment should be made to monitor the use of these routes and implement the identified measures. This must be demonstrated through the updated fixed matrix cordon model and provided to the Council for review and suggest mitigation, as the traffic flows have significantly increased in this location from the Statutory Consultation model.
- Connection between the LTC and the Port of Tilbury – Highways England should provide modelling and commentary evidence to the Council to understand why a connection from the LTC to the Port of Tilbury has been discounted.
- Journey Times from the M2/A2 to the centre of Grays – it is recommended that Highways England undertakes further investigation into the risk that traffic would route via the LTC and U-turn at Orsett Cock to reach the centre of Grays and will travel via Docks Road to return to the LTC southbound. Commitment should be made to monitor the use of the Docks Road route; deliver upgrades at Orsett Cock junction; and implement measures to discourage the use of unsuitable routes. This must be demonstrated through the updated fixed matrix cordon model and provided to the Council for review and suggest mitigation, as the traffic flows have significantly increased in this location from the Statutory Consultation model.
- Incidents – it is recommended that the effects of incidents on the LTC are tested and presented to the Council, to understand the local roads that will be at risk of impact. Mitigation measures should be implemented to minimise the use of unsuitable routes.
- Construction Traffic – Highways England should provide any modelling of construction traffic to understand the impacts and to determine any mitigation to the Council.

7 Proposed Route Changes

7.1 Overview

- 7.1.1 In the Foreword to the Guide to Supplementary Consultation (page 4), it is stated that the LTC “...will boost local, regional and national economies, while offering new connections, better journeys and fewer delays”. In addition, at Chapter 2 (page 7), one of the aims of the LTC is “...to support sustainable local development and regional economic growth in the medium and long term”.
- 7.1.2 The route of the LTC sterilises large sections of development potential within Thurrock, restricting options for growth through the severance caused by the corridor. This is not proposed to be tested through the EIA, with the assessment of Transport effects not being considered specifically as one of the EIA topic chapters.
- 7.1.3 Highways England proposes no interchanges to provide useful access to areas within Thurrock and minimal crossings of the LTC route. The deletion of the RaSA, which is welcomed by the Council, has included the removal of the Tilbury junction. This further reduces opportunities for the Council to gain any future connectivity to the LTC or to create a link to the Port of Tilbury—which would ease congestion on A1089 and the junction with Thurrock Park Way (Asda Roundabout). Whilst the Council welcomes the removal of the RaSA, it remains concerned that this will negatively impact on local roads and services through drivers being forced to find facilities in the local area or parking on local roads unless alternative appropriate provision is made elsewhere on Highways England’s road network.

7.2 Development sterilisation

- 7.2.1 In its current form the proposed LTC continues to sterilise great swathes of potentially developable land, both during the construction phase and permanently, and provides no local access or facilitate future access to those areas. Connections across the route are proposed at Muckingford Road; Hoford Road; Brentwood Road; Stanford Road; Stifford Clays Road; Green Lane; and North Road.
- 7.2.2 From the minimum information that is provided within the Guide to Supplementary Consultation document, each crossing provides the minimum corridor width, significantly hampering opportunities for future growth and for high quality sustainable transport connections, such as bus corridors, walking and cycling routes. The crossings as proposed do not provide high quality links across the corridor and will *not* “boost local ...economies”, “offer new connections” or “support sustainable local development and regional economic growth”.
- 7.2.3 The key to the changes on page 45 of the Guide to Supplementary Consultation states at point 1 that “A new route for walkers, cyclists and horse riders is proposed along Muckingford Road”. This is misleading in that the route currently exists but would be diverted from its existing alignment through the construction of the LTC. No detail is given as to the design of that diverted route and as such it is not possible to reflect how the proposals would align with possible future growth within Thurrock. The infrastructure to support that growth could include modifications to the nature of the route between East Tilbury and Chadwell St Mary. The corridor as proposed appears to be in the region of 10m wide, including footways, with that strategy continuing across the over-bridge. Such a corridor width does not allow sufficiently for a high quality “green bridge”, as described at point 1 on page 90 of the Guide to Supplementary Consultation, and does not futureproof the crossing for high public transport connections, footways and cycle connections along Muckingford Road. Highways England should reconsider this connection strategy and take full allowance of the future requirements.
- 7.2.4 At North Road, the same is true with a minimalist crossing proposed and with no detail provided as to the configuration of the crossing, other than to state that a “shared path” would be provided.

- 7.2.5 The LTC proposal as presented in the Guide to Supplementary Consultation does not meet the stated aims and objectives for the route.

7.3 Indirect impacts on local routes

- 7.3.1 Highways England states in Chapter 3 of the Guide to Supplementary Consultation (page 42) *“that it is not necessary to include the rest and service area in our proposals, but it would be beneficial for one to be located in the vicinity of the LTC”*.
- 7.3.2 The deletion of the RaSA is welcomed by the Council, however, Highways England does not propose alternative provision, which is a concern, as this could result in drivers seeking opportunities to access local facilities via the unsuitable connections currently proposed within the project at the interchange with A13.
- 7.3.3 Through the absence of high-quality connections to Thurrock, drivers would be forced to access local services through the convoluted connections at Orsett Cock and the Manorway junction, adding further pressure to those busy interchanges and the connecting links. Having left the LTC, those drivers are not able to rejoin the route without following further convoluted routes on local roads.
- 7.3.4 Highways England considers that *“it would be beneficial”* for a RaSA to be associated with the LTC but gives no information as to how that demand would be satisfied and identifies no mitigation. It is inappropriate to neglect to deal with the demand for a RaSA through the current proposals, instead transferring the burden of this assessment to the affected Local Planning Authority. Drivers requiring a break, perhaps due to driving hours regulations, could be forced to park up on local roads causing conflict and nuisance and an enforcement burden for the Council.
- 7.3.5 Together with the removal of the Tilbury junction and with no breaks in the central reservation, there is no turn-back facilities within the design of the LTC corridor. If the tunnel is closed in an emergency and no opportunity to run contra-flow in the northbound tunnel, drivers north of A13 would be directed to use the links between LTC to Stanford-le-hope returning on A13 and on to M25 junction 30. The network would not be able to cope with this additional increase in traffic. For those vehicles trapped south of the LTC eastbound off-slip (approximately 6 kilometres) drivers would undoubtedly be directed to use the emergency / service connection to Station Road with many then using the unsuitable network in East Tilbury to the Orsett Cock junction or west through Grays rather than the further convoluted links to A13 westbound via the Manorway junction. Highways England must consider the strategy for managing incidents on the LTC and how that strategy would impact on the operation of local roads and the A13 corridor.
- 7.3.6 Highways England must take note of the challenges experienced with the latest Smart Motorways initiatives and with lessons learned about the absence of emergency turn-back facilities within solid central reservations. Highways England must explain what the strategy would be for LTC if the review of Smart Motorways reveals that the configuration is not appropriate or safe. The corridor for the LTC and connections would be fundamentally altered and would need to be appraised.

7.4 LTC to Orsett Cock link operational safety concern

- 7.4.1 The revised layout put forward within the Supplementary Consultation, for the A13 eastbound off-slip at Orsett Cock and the connection link between LTC and A13 eastbound, seeks to untangle the unsatisfactory arrangement as proposed at the time of the Statutory Consultation.
- 7.4.2 The latest proposed arrangement replaces the former flawed arrangement with an equally flawed configuration. The connection and weaving distance (circa 240 m) between the LTC to A13 eastbound link and the A13 eastbound exit slip to the Orsett Cock junction creates a conflict between those vehicles heading north on A128 from A13 and those heading south on Brentwood Road and A1013 from LTC. That weaving would occur within the increased

queueing zone on the eastbound approach to Orsett Cock, which is to be increased through the rise in movements at that junction and the absence of any mitigation. Following completion of the project the challenges associated with the operation and management of the sub-standard Orsett Cock interchange will become the responsibility of Thurrock Council as local Highway Authority under their role as Network Manager, unless the entire junction is to be trunked.

- 7.4.3 It is noted through the modelling work undertaken that the eastbound approach to the Orsett Cock junction (the current A13 off slip) experiences queues in peak periods. The impact of the LTC and associated connections will add to these delays and disruption. The proposed revisions to the LTC to Orsett Cock link would be unsafe by now including weaving traffic close to the junction.
- 7.4.4 It is a concern that the coding within the models does not accurately reflect this interaction and weaving. Furthermore, the assumptions within the model do not reflect the proposed alterations to the Orsett Cock junction – including partial signal control and increased flares.
- 7.4.5 Highways England should revise its models to accurately reflect these concerns.
- 7.4.6 The reduction of the connection between LTC and A13 and the Orsett Cock interchange from a three lane link to two lanes significantly impacts on the safe resilience of the network. The final sections of merge are reduced to single lane adding to the concerns over resilience and effective management.
- 7.4.7 A small incident or breakdown on the link route would be sufficient to have a severe effect on the operation of the interchange between the corridors and also the operation of the LTC. Recovery from that incident would almost certainly result in closure of the links and challenges for the emergency services and network managers to access that incident. The complexity of the links, with weaving over short distances will lead to much confusion and low safety.
- 7.4.8 Highways England do not provide information on their contingency planning and network resilience. This detail must be provided in order to make a reasoned judgement on these impacts.
- 7.4.9 Having negotiated the Orsett Cock junction, the configuration of the proposed interchange between LTC and A13 continues to increase demand on the Manorway junction at Stanford-le-Hope, including significant demand for u-turning traffic to return to A1089 via the revised interchange with A13. It is understood that Highways England does not propose to mitigate this impact.
- 7.4.10 The LTC A13 junction configuration, as set out in Supplementary Consultation, continues to be overly complicated. Highways England should work with the Council to explore opportunities to value engineer the interchange and the corridor which would facilitate accesses to local growth opportunities whilst not impacting on the operation of the LTC and A13 corridors.
- 7.4.11 The current configuration does not clearly assist with the extension and improvement of public transport infrastructure and connectivity, not just at the interchange with A13 and Orsett Cock but at the corridor cross connections and where Highways England's modelling identifies increased delays and disruption. Amended configuration should make provision for public transport links, which could also be supported and delivered through local development.

7.5 Future corridor capacity

- 7.5.1 Highways England has concluded to reduce the corridor width to the north of A13 to two lanes in each direction. The Council requires assurances that this is the correct conclusion and avoids the previous errors of prediction such as around M25 junction 30.

7.6 Trunking of routes

- 7.6.1 The Land Use Plans indicate significant areas of existing highway network and adjoining land which is proposed to be permanently acquired through the DCO. There is no definition within the consultation material as to where the jurisdiction of Highways England will be transferred, and where Thurrock Council would continue to have Network Management duties. This includes the Orsett Cock junction and the new links to that interchange. Irrespective of the adequacy of the configuration of the new links at the interchange, it would be significantly challenging for Thurrock Council to maintain and manage that junction, without comprehensive connections from their network to those links.
- 7.6.2 If it is the aspiration of Highways England to extend the trunk network to include the Orsett Cock junction then the Application Boundary must be amended to include the mitigation work that would be required for the Highways England to adopt those roads – including any temporary construction requirements.
- 7.6.3 Highways England must provide comprehensive details of the routes and sections of route that are proposed to be trunked along with assurances to the Council of the management of those areas, including a management and maintenance strategy and regime. This must be developed in collaboration with the Council to ensure that the Council will continue to be able to execute its Network Management duties on those roads under its jurisdiction.
- 7.6.4 The Land Use Plans include the apparent permanent trunking of:
- A13 towards Stanford-le-Hope (excluding the Manorway junction);
 - A1013 between Orsett Cock and northeast boundary of Little Thurrock (Land Use Plans Sheet 12a); and
 - Hornsby Lane (Land Use Plans Sheet 12).

Potential effects

- 7.6.5 The absence of connections between the LTC and the road network within Thurrock will hamper opportunities for local growth and will negatively impact on the operation of the existing network, including the A13 junctions with Orsett Cock and Manorway.
- 7.6.6 Where existing routes are severed by the LTC, the amended cross links as proposed appear not to facilitate strong future connections to development growth within Thurrock.

7.7 Recommendations

- 7.7.1 Highways England should reconsider opportunities positively to influence future growth through the provision of local junctions and high-quality cross connections.
- 7.7.2 The proposals should also be developed accurately to reflect the effects of the operation of the LTC on local junctions and roads – with particular reference to the Orsett Cock and Manorway junctions. Having accurately reflected the impacts on the local routes and junctions, Highways England should propose suitable changes to the LTC proposals and ES in accordance with Institute of Environmental Management and Assessment (IEMA) guidelines against criteria including delay, severance, fear and intimidation to road users.

8 Review of Walking, Cycling and Horse-riding Network

8.1 Overview

- 8.1.1 This chapter provides a review of Highways England's proposals for maintaining, improving and upgrading the walking, cycling and horse-riding network. There is a total of 8 groups of updates to the proposals for the walking, cycling and horse-riding network, 4 of which are located north of the river within Thurrock. This review considers the proposals located north of the river only.
- 8.1.2 It is stated in Chapter 2 of the Guide to Supplementary Consultation at page 10 that Highways England "*have developed a **detailed** set of proposals for maintaining, **improving and upgrading** the walking, cycling and horse-riding network in the vicinity of the project*". The only information provided at Chapter 5 is to indicate the PRowWs that are impacted by the proposals.
- 8.1.3 The supplementary consultation material has very limited detail as to the proposals such that only a provisional response can be made subject to that refined information being shared in due course.
- 8.1.4 The Guide to Supplementary Consultation outlines a series of proposals purportedly to enhance and improve the PRow and the wider network for walking, cycling or horse riding in the vicinity of the LTC corridor. These are noted but the extent to which those proposals mitigate the impacts cannot be considered properly without the detail of the proposal. It is not known if the proposals would leave the vulnerable users of those routes in unsafe locations, through the provision of an incomplete network link or by providing inadequate facilities. For example, several key links are shown running beside busy roads with no clarity as to whether off-road provision will be delivered.
- 8.1.5 The proposed modifications do not represent a comprehensive strategy to deliver a step change in the use of active travel along the corridor of the LTC. Parts of the network are modified but a more strategic approach is required by Highways England.
- 8.1.6 If longer distance utility cycling is to be encouraged between settlements, the modifications must suit that sort of riding which requires all weather surfacing that is not rutted by use or by horse riding. Similarly, those modification must allow for safe use by equestrians, which can require a more giving surface. Highways England must demonstrate how they will address this dichotomy.

8.2 Review of the proposals for the walking, cycling and horse-riding network

- 8.2.1 The Guide to Supplementary Consultation identifies the many PRowWs that are affected by the proposals but no detail is given as to what will be provided by way of mitigation or the measures that are "*improving and upgrading*" facilities for walking cycling or horse riding. The Guide to Supplementary Consultation simply includes a list of aspirational proposals.
- 8.2.2 A provisional response on the list of proposals is given at Appendix E. A comprehensive response would require the detail to which Highways England refers for a fuller response to be provided.
- 8.2.3 Throughout the engagement process with Highways England, the Council and Local Access Forum have highlighted the opportunities to provide meaningful enhancement to the network for walking cycling and horse riding through the Borough and it is disappointing to see the fragmented approach presented in the Guide to Supplementary Consultation. Provided that adequate provision is made along roads there is an opportunity to provide a link from the Thames Chase Forest Centre through to Coalhouse Fort with only minor amendments to the proposed routes. This will require a commitment to provide bridleways wherever possible rather

than 'shared use' (which normally exclude horse-riders). The Coastal Path and Two Forts Way route could be enhanced through strategic land raising using excavated material. These opportunities should be explored.

- 8.2.4 The approach to investment in the network for walking, cycling and horse riding does not appear to be supported by a strategic approach, instead targeting areas for adaptation without demonstrating how the investment would facilitate a step change in the use of environmentally sensitive travel and promoting active travel.

8.3 Potential effects

- 8.3.1 If delivered well, the changes to the facilities for walkers, cyclists and horse riders would bring some improvements to the local networks. The level of information currently provided by Highways England, however, is insufficient to reliably respond on that point and to confirm the adequacy of connectivity between points and settlements.

8.4 Recommendations

- 8.4.1 Highways England must provide greater detail as to the proposals for each location where the proposed LTC affects the network for walkers, cyclists and horse riders. Those details must be supported by the rationale behind those proposals and indicate how the network would be delivered, operated and maintained in a comprehensive and complete strategy in order to facilitate a step change to the use of walking and cycling for longer distance utility travel, reducing the need for car based travel. This should be supported by a strategy to promote and encourage the use of these modes of travel.
- 8.4.2 Highways England should provide information as to why there is a proposal to make modifications to the networks for walking cycling and horse riding, but no proposals are put forward for enhancements to public transport connections.

9 Review of Utilities Update

9.1 Overview

9.1.1 This chapter provides a review of the proposed utilities updates presented in Highways England's Supplementary Consultation exercise. There are 8 updates to the proposals for utility diversions and installation, 6 of which are located north of the river. This review considers the proposed utilities updates located north of the river only.

9.2 Review of the proposals for utility diversions and installation

Utility proposals around Tilbury

- 9.2.1 A significant number of properties in Linford between Hoford Road and Buckingham Hill Road are shown to be within the Application Boundary. They are shown on the Land Use Plans to be Partially Affected or as having their Access Partially Affected. The affect is due to proposed work on the existing overhead electricity lines in the area. The Land Use Plans show the proposed land use for these properties as Temporary Possession and Permanent Acquisition of Rights.
- 9.2.2 The extent of the Application Boundary shown for the stated land use appears to result from the use of prescribed off-sets for working areas and widths associated with the overhead electricity works. These off-sets and widths appear to have been positioned around the affected pylons and overhead line assets without due consideration to the actual process of construction and reasonable requirement of land take needed for the operations. The effect is that the Application Boundary and the Temporary Possession and Permanent Acquisition of Rights are encompassing local roads and a significant number of properties within it. It is questionable as to whether the full extent of this land use is required and we would welcome a review of the land take in this area.
- 9.2.3 The question is asked whether it is the asset owners standard practice to obtain Temporary Possession and Permanent Acquisition Rights to significant numbers of private properties to enable them to work on their existing assets, considering that they will have existing wayleaves or easement rights for such work under their own statutory instruments, and will undertake such work within these areas as part of their standard regulatory activities. For example, it could be considered unlikely that a statutory undertaker would generally seek to take temporary possession of a residential street of properties in order to re-string a pylon.
- 9.2.4 It would be considered acceptable for the Land Use Plans (Map Book 2) in this location to be adjusted to show the Application Boundary trimmed to the limits of the private property boundaries, with notation to describe that the actual construction methodology will involve works within the airspace above/nearby only and within the existing easement or wayleaves held; or where new easements are required, that they are reduced to the minimum extents possible.
- 9.2.5 Limited information is provided regarding the installation of a new gas connection to existing utility assets located north of Station Road. Properties on Love Lane and Station Road appear to have access affected by this work. No diversion route, alternative access roads or haul routes away from the existing access roads are shown. It is suggested that re-routing the gas pipe into private land or providing a new temporary access road may mitigate this impact on the residences.
- 9.2.6 Works are shown regarding the installation of utilities for the temporary substation that would power the tunnel boring machine (TBM), the design for which is currently in development. A new permanent substation would also be located in the service area next to the northern tunnel entrance to provide permanent power to the northern side of the tunnel. It is anticipated that the electrical load required, for temporary works and the TBM will be significant. Reinforcement is shown for the new supplies, but the impact of this on the existing electrical capacity in the area

is not made clear. Confirmation is required that existing available electrical capacity, that could be used for other developments in the Tilbury area, is not being consumed by the needs of the LTC, which would result in restrictive additional costs to other developers.

- 9.2.7 Of particular concern is that, due to changes to the utility designs, the utilities work will extend into West Tilbury Conservation Area. It is noted that this increases the adverse effect assessed in the PEIR with the potential to impact on the outcomes of HEqIA. We request that further information is provided on proposed mitigation for further consultation prior to submission of the DCO application.

Utility proposals around the A13/A1089 junction (east)

- 9.2.8 Near Orsett Heath diverted overhead lines are being constructed close to residents' properties. It is welcomed that though these properties are close to the diversionary works, Temporary Acquisition of Land and Permanent Acquisition of Rights over the residents' properties are not being sought under the DCO. It is reasonable to assume that this is because the diversionary works can be completed without impacting on them.
- 9.2.9 This does highlight some inconsistency within the Land Use Plans, in that these properties are shown as Land Not Included in Order Limits, but for example, properties in Linford located at a greater distance from similar works are shown as requiring Temporary Acquisition of Land and Permanent Acquisition of Rights. It is questioned as to whether all the land highlighted as being required due to utility works is required and justifiable, and that the determination of Land Use is revisited to minimise impact on properties and reduce that included in order limits.
- 9.2.10 It is noted in the Utilities Update that the exact location of the exclusion zone for the diverted gas pipeline near Orsett Heath, that is required for safety reasons, is dependent on the position of the pipeline and would be submitted as part of the DCO application.
- 9.2.11 It is unacceptable that though the route of the proposed diversion is shown on the Land Use Plans that the exclusion zones and possible impacts on the local area have not been identified at this stage. The pipeline will run close to residential properties and through Orsett Showground. We question the justification for an alignment that is proposed without information on exclusion zones required for safety purposes. It is requested that this is addressed to fully inform all stakeholders of the resultant impacts, and any limiting impact on future developments in the area, prior to submission of the DCO to allow for a reasonable period of consultation.
- 9.2.12 A significant number of utilities are shown as needing to be diverted, or will be required for new supply works, around the new junction of the proposed LTC and the A13/A1089. This will lead to potential road diversions and lane closures in the area. The Utilities Update notes that work in this area will be ongoing for several years, which will cause significant impact on local road routes. It is queried whether these impacts have been thoroughly investigated as detail provided is limited.
- 9.2.13 The location of the large compound to the east of Heath Place and north of the new road alignment lies in very close proximity to the Scheduled Monument of the Orsett Causewayed enclosure. Any short or long term development will impact the setting and associated features of the monument.

Utility proposals around the A13/A1089 junction (west)

- 9.2.14 It is understood that many of the proposals in this area are detailed as per the utility proposals around the A13/A1089 junction (east) and comments regarding these are found in the previous section. It is noted that the changes proposed have a net increase in adverse environmental effects compared with those reported in the PEIR.
- 9.2.15 The diverted gas pipe parallel to the south of Green Lane, and the additional gas pipe diversion shown in this area parallel to the north of Green Lane, are proposed to be constructed through

a combination of open-cut and trenchless techniques, and will need to be installed at a significant depth beneath the proposed LTC. It is noted that the land take and corridor associated with this diversion does not appear to be aligned with the use of trenchless techniques, as a continuous extensive corridor and large swathes of land are identified on the Land Use Plans for Temporary Possession of Land and Permanent Acquisition of Rights. It is questioned as to whether this land use is required and how such extended land take and its associated impact on landowners is justifiable. The proposals for the use of trenchless technology are to mitigate environmental impacts when compared with the use of open trench construction. Clarification is sought on the extent of the use of trenchless technology.

- 9.2.16 There are works being undertaken on overhead electrical lines in the area for diversionary works. The extent of the Application Boundary shown for the stated land use appears to result from the use of prescribed off-sets for working areas and widths associated with the overhead electricity works. These off-sets and widths appear to have been positioned around the affected pylons and overhead line assets without due consideration to the actual process of construction and likely true requirement of land take. The effect is that the Application Boundary and the Temporary Possession and Permanent Acquisition of Rights are encompassing a significant area of land. It is questionable as to whether the full extent of this land use is required and we would welcome a review of the land take in this area.
- 9.2.17 It is queried as to why it is deemed necessary to obtain Temporary Possession and Permanent Acquisition Rights over a significant area of private land to enable the utility asset owners to work on their existing assets, considering they already have existing wayleaves or easement rights for such. Also questioned is the large offset distances for working areas that are shown on new diversion route corridors and how these are considered justifiable land take for stringing a pylon, which as noted on page eight of the LTC Utilities Update, being generally undertaken by pulling a cable using a tractor.
- 9.2.18 It is requested that the Land Use Plans in this location be adjusted to show the Application Boundary trimmed to the minimum limits of works that are required or removed where works can be undertaken under existing easements and wayleaves. Clarity should be provided on what the actual construction methodology will involve.
- 9.2.19 The proposed gas alignment running north south to the west of Orsett will impact on the Bronze Age Scheduled Monument of a Springfield Style enclosure which is located near Mill House. Consideration needs to minimise the impact on this scheduled monument or find an alternative route for the pipeline.

Utility proposals around Ockendon

- 9.2.20 The changes proposed have a net increase in adverse environmental effects compared with those reported in the PEIR. A large amount of land has been identified as requiring Temporary Possession of Land and Permanent Acquisition of Rights for utility works in this area. There is an increased likely significant effect on the recorded location of a non-designated Romano-British cremation and inhumation cemetery, which would be a significant increase on the effect assessed in the PEIR. Impacts on the B186 and severance /temporary closures/diversions of the local footpath network are of concern and represent a worsening of those reported in the PEIR. Clarification and assurances are sought on the proposed construction methods and extent of suitable technology to mitigate the utility work impacts, which appear to be worsening. Further impacts need to be identified through the HEqIA.
- 9.2.21 North of the Ockendon landfill site a large number of gas diversionary works are shown on the Land Use Plans. It is noted that the extensive land take associated with these diversions and that they do not appear to be aligned with the use of trenchless techniques, as a large swathe of land is identified on the Land Use Plans for Temporary Possession of Land and Permanent Acquisition of Rights. The proposals for the use of trenchless technology are to mitigate environmental impacts when compared with the use of open trench construction. Clarification is sought on the extent of where the trenchless technology will be used. It is questionable as to

whether the full extent of this land use is required and we would welcome a review of the land take in this area.

- 9.2.22 Diversion works are proposed for overhead electrical lines in the area including the existing line between Orsett and North Ockendon. The extent of the Application Boundary shown for the stated land use appears to result from the use of prescribed off-sets for working areas and widths associated with the overhead electricity works. These off-sets and widths appear to have been positioned around the affected pylons and overhead line assets without due consideration to the actual process of construction and likely true requirement of land take. The effect is that the Application Boundary and the Temporary Possession and Permanent Acquisition of Rights are encompassing a significant area of farmland. The large offset distances for working areas shown relate to works on an 'existing' overhead line and we question how this land take is considered justifiable for re-stringing a pylon.
- 9.2.23 It is requested that the Land Use Plans in this location be adjusted to show the Application Boundary trimmed to the minimum limits of works that are required or removed where works can be undertaken under existing easements and wayleaves. Clarity should be provided on what the actual construction methodology will involve.

Utility proposals around the LTC/M25 junction

- 9.2.24 Several properties in North Ockendon are shown to be within the Application Boundary. They are shown on the Land Use Plans as being subject to Temporary Possession of Land and Permanent Acquisition of Rights. The affect is shown as due to proposed work on the existing overhead electricity lines in the area.
- 9.2.25 The extent of the Application Boundary shown for the stated land use appears to result from the use of prescribed off-sets for working areas and widths associated with the overhead electricity works. These off-sets and widths appear to have been positioned around the affected pylons and overhead line assets without due consideration to the actual process of construction and likely true requirement of land take. The effect is that the Application Boundary and the Temporary Possession and Permanent Acquisition of Rights are encompassing local roads and several properties within it. It is questionable as to whether the full extent of this land use is required and we would welcome a review of the land take in this area.
- 9.2.26 The question is asked as to whether it is the asset owners standard practice to obtain Temporary Possession and Permanent Acquisition Rights to significant numbers of private properties to enable them to work on their existing assets, considering they already have existing wayleaves or easement rights for such. For example, it could be considered unlikely that an undertaker would generally take temporary possession of residential properties in order to re-string a pylon.
- 9.2.27 It would be considered acceptable for the Land Use Plans in this location to be adjusted to show the Application Boundary trimmed to the limits of the private property boundaries, with notation to describe that the actual construction methodology will involve works within the airspace above/nearby and within the existing easement or wayleaves held.
- 9.2.28 A change from the Statutory Consultation Scheme is that diversion work now proposed within the Thames Chase Community Forest area that may also involve tree removal and damage to this valued community asset. The proposed changes would be expected to lead to a worsening of the effects reported in the PEIR and effects to health and the well-being of the community which need to be mitigated
- 9.2.29 We note the statement that it is possible the forest areas temporarily required for this work could be reduced subject to further investigations and stakeholder engagement, and that certain techniques could minimise impacts on Thames Chase Community Forest. We request that these investigations and construction methodology are progressed and consulted on prior to submission of the DCO application to ensure all avenues to mitigate impacts on this location have been examined and agreed. The current speculation on this is unclear.

- 9.2.30 The utilities work area now extends further towards North Ockendon Conservation Area and the increase in the area required for the utilities works as a result of the changes also increases the adverse effect on any archaeological remains within the works area. This leads to a worsening of the effects reported in the PEIR. The mitigation proposals to be put in place are unclear. We request that investigations and construction methodology are progressed and consulted on prior to submission of the DCO application to ensure all avenues to mitigate impacts on this location have been examined and agreed.

Utility proposals around the M25 junction 29

- 9.2.31 There are three potential gas diversions are shown in this area: at Folkes Lane, the M25 junction and in fields south east of the M25 junction. The LTC Utility Update notes that a trenchless crossing is currently being considered under the M25, but that design refinements to the proposed LTC are also being explored that may avoid some of the gas diversions. Whilst any reduction in works required is welcomed, finalised designs should be provided prior to submission of the DCO application for consultation to provide full clarity on proposals.
- 9.2.32 The extent of the Application Boundary and land required for gas diversionary works are shown on the Land Use Plans. The extensive land take associated with these diversions does not appear to be aligned with the use of trenchless techniques, as large corridors of land are identified on the Land Use Plans for Temporary Possession of Land and Permanent Acquisition of Rights. The proposals for the use of trenchless technology are to mitigate environmental impacts when compared with the use of open trench construction. We would like clarification on the extent of where the trenchless technology will actually be used as it appears current proposals are to use trenchless techniques to divert utilities under the proposed LTC and the M25 only. St Mary's Lane (B187) may be affected by closures and diversions, and we suggest that such techniques are applied to this and other diversions in the area to further mitigate impacts. It is questioned whether all of the land use shown is required and how such extended land take and its associated impact on landowners is justifiable.

9.3 Recommendations

- 9.3.1 A significant number of properties including residential premises are shown on the Land Use Plans to be Partially Affected, as having their 'Access Partially Affected', or as being subjected to 'Temporary Possession and Permanent Acquisition of Rights' due to the utility works proposals.
- 9.3.2 The extent of the Application Boundary shown for this land use appears to result from the use of exaggerated working areas and corridors for the utility works. An example is highlighted in areas where off-sets and widths appear to have been positioned around affected overhead line assets without due consideration to the actual process of construction and likely true requirement of land take. The effect is that the Application Boundary and the Temporary Possession and Permanent Acquisition of Rights are encompassing roads and properties that would likely be unaffected by such works if they were undertaken during the utility owner's standard regulatory activities. It is therefore questionable as to why it is shown this way for the DCO application plans and whether this land use is required. Any land take that is shown but not proven to be required for these activities in question are considered to unjustifiable and unacceptable.
- 9.3.3 In a similar fashion the gas diversionary works do not appear to be aligned with the use of trenchless techniques proposed to mitigate the environmental impacts. Large areas of land are identified on the Land Use Plans for Temporary Possession of Land and Permanent Acquisition of Rights. The proposals for the use of trenchless technology are to mitigate environmental impacts and to minimise required land take when compared with the use of open trench construction. Clarity on the level and extent to which these techniques will be used for each diversion/new supply activity should be provided for consultation so the true impact of the work can be ascertained.

- 9.3.4 The level of land take shown for the utility works and the direct impact on residential premises are of concern. The land take shown for utilities works should be rationalised to the minimum possible area required to complete them. Standard off-set distances should be re-visited on an individual basis to ensure there is no unnecessary impact on residents and landowners or other impacted receptors.

10 Constructing and Operating the Proposed LTC

10.1 Introduction

10.1.1 This chapter reviews the information presented within the Guide for Supplementary Consultation and comments on the proposed construction traffic routes north of the river, the proposed construction processes, and the impact to the Councils day to day operations.

10.2 Construction Logistics

Construction traffic routes

- 10.2.1 Highways England indicates that it would propose the use of the A1089 corridor to Tilbury (page 109 of the Guide to Supplementary Consultation) for construction traffic to construction Areas B and C. It does not substantiate what transport implications this is projected to inflict on this corridor, yet Highways England has previously acknowledged that the junction of A1089 / Thurrock Park Way (the Asda Roundabout) will exceed operational theoretical capacity by 2026/2027 simply through background growth on the network. The location of this construction route is through one of the Borough's most deprived areas where, on average, residents have a lower life expectancy and poor quality of health. There are also concerns of the use of construction traffic through Linford and Grays and the proximity to schools and hospitals, namely Orsett Hospital and medical centre in Corringham, Tilbury and Purfleet.
- 10.2.2 The health, safety and social effects on communities around the construction areas and the routes for construction vehicles must be assessed by Highways England. This must reflect the significant increase in HGVs using those routes.
- 10.2.3 The estimation of construction traffic at the table on page 106 of the Guide to Supplementary Consultation is not refined and gives only a headline of the number of HGV visits without setting out what is assumed to be included. It should be noted that the number of **movements** on the network is double the number in the table (i.e. one visit is that vehicle travelling in and out of the works = two movements on the road network).
- 10.2.4 The predictions do not include for the Utilities diversions, which are significant projects in themselves. Each contractor will require their own subsidiary contracts which will attract further movements, including for site maintenance and sundry activities such as fuel, welfare maintenance, and small plant and equipment.
- 10.2.5 The size of equipment and plant will require many Abnormal Indivisible Load which will require specific planning and often transported overnight or in the early hours. These are not captured within the standard working hours assumptions.
- 10.2.6 It is disappointing that Highways England has not provided evidence to demonstrate how or whether potential impacts have been assessed. The potential impacts from the proposed construction traffic routes will need to be assessed within the EIA and HEqIA along with the long-term effects of road closures and how this impacts access to hospitals.
- 10.2.7 Highways England commits to undertaking a range of works overnight and at weekends, to seek to minimise impacts on local routes and residents. They do not specify how this would be translated to the contractors as a commitment to minimise impacts on the surrounding area. Night time and weekend works are comparatively costly and contractors would be inclined to avoid these added costs unless they are otherwise incentivised.
- 10.2.8 The routing diagram at page 109 of the Guide to Supplementary Consultation indicates a single route into construction Area B and Area C via Tilbury and the Port. Clear management will be required for contractors using the shared route to ensure contractors vehicles are not directed

to the wrong compound with consequential additional movements and confusion and interference with the safe and efficient operation of the live port.

CoCP

- 10.2.9 In its response to the Statutory Consultation of the LTC proposals, the Council expressed that it should be involved from an early stage of the derivation of the CoCP and CEMP. To date, no meaningful engagement has occurred. The Council continues to require that it is consulted in the development of the CoCP and CEMPs and that it would be the approving authority in relation to these documents, which affect the travel network under its jurisdiction, and which affect communities and residents which it represents. The CEMPs should include details of the management of construction logistics if separate Construction Logistics Plans; Marine Logistics; Construction Traffic Management Plans; and Workforce Travel Plans are not prepared. Highways England relies heavily on the mitigation proposals to be contained within these documents.
- 10.2.10 The phasing of those documents must allow for regular reviews to keep the documents current, recognising that programmes slip and change and that working practices will develop during the course of the construction.
- 10.2.11 The CoCP and CEMP must include a method of determining the deleterious effects that the extraordinary traffic would cause along the Councils routes to the contractor's compounds and works. That method must set out how those impacts would be identified, recorded and mitigated by Highways England. A proactive approach should be adopted where the routes are known not to be suited to that use, rather than reacting to damage, which could be unsafe and cause disruption to the network. The method would be agreed through the consent of the CoCP and CEMP but Highways England should commit to this undertaking as part of the draft documents.
- 10.2.12 Of particular concern to the Council is the likely effects on Thurrock's communities arising from the extended construction working hours now proposed by Highways England in the Supplementary Consultation documents.

Jetties

- 10.2.13 The Council has previously raised concern about the integrity of the current jetty configuration within the indicative construction Area B for the transshipment of heavy equipment, such as the sections of the Tunnel Boring Machines. These concerns remain unanswered and could require other strategies for the delivery of the large plant and equipment via other means. Highways England must respond to these challenges.
- 10.2.14 Section 6.5.5 of the Council's response to the Statutory Consultation proposals responded on the possible use of interim consolidation of materials, plant and equipment for distribution within the works areas. Highways England should provide further detail on this initiative.
- 10.2.15 The access routes for construction Area D identifies Medebridge Road as a key corridor into the works. The format for this haul route should be confirmed with the Council such that future use could be made of it once the scheme has been constructed.
- 10.2.16 The interface of the construction of the LTC would require considerable careful programming and management to ensure communities are not cut off for long periods of time and do not experience long delays and diversions to their normal routes. Highways England must prepare a full schedule of interfaces and the method of management on those corridors, including for how that disruption will occur. Most significantly that programming must include the phased impacts on the operation of the A13 and how those works would impact on adjoining routes and communities, such as diverted access through West Thurrock, Grays or East Tilbury. Highways England states that route closures would be kept to a "minimum" but does not define what this means and how this commitment will be translated to the contractors.

10.2.17 This appraisal must not neglect the complex mobilisation period for the works, which will include site enclosures and hoardings and preliminary works to establish the compounds and construction areas.

Tunnel Boring Machine

10.2.18 No major corridors or method are identified for the import of the Tunnel Boring Machine(s). It is not possible to respond on these critical phases of the construction process, without information on the method of moving the machines into and away from the pit heads for the tunnelling operations. The transportation of these massive machine(s) require careful planning and forethought to avoid later challenges and disruption during the preparations for the construction.

10.2.19 If the major components are to be brought in by river/marine transport there will still be major movements associated with the subsidiary sections of the machines and the need for heavy lifting.

10.2.20 The supply chain for pipes, rails, conveyors and gantries is not known at this stage and so the final routing will need to be assessed for suitability.

General construction practices

10.2.21 No information is provided on the environmental principles that Highways England and its contractors will adopt during the construction phases, such as emissions and safety standards that are required to be adopted by the contractors and their sub-contractors, hauliers and supply chain. At a minimum those companies with vehicles involved in the construction of the route should be required to conform to Euro VI (for vehicles with heavy duty engines) and Euro 6 (for vehicles with light duty engines). Those vehicles should be fitted with safety equipment equivalent to no less than the FORS Silver standards (even if those suppliers, hauliers or contractors are not required to be accredited with FORS Silver standards).

10.2.22 Where dispensations are required due to specialist suppliers or specialist vehicles, evidence should be provided to the Local Authorities to justify why that supplier, haulier or contractor will not meet the requirements.

10.2.23 Furthermore, the use of innovative approaches to construction and the materials used is not evidenced in the Supplementary Consultation. The use of emerging automation, off-site construction techniques; on site batching and reuse of materials; environmentally sound materials and time saving methods, must be explored and evidenced.

10.2.24 The revised construction hours are concerning and the impact this has on local residents. It is understood that a balance should be struck on taking steps to reduce the construction programme whilst managing construction working hours. Consideration of the revised construction hours should be included within an HEqIA.

10.2.25 There is a lack of information regarding work force accommodation (location and impact to local highway network in terms of travel). This have the potential to give rise to socio-economic and traffic related impacts. The location of work force accommodation will need careful consideration and should be included within the HEqIA.

10.2.26 The movement of the construction workforce requires major transport strategies, with several main contractors employing a larger range of different sub-contractors. The proliferation of contracts and worksites will require movement on many local roads and include welfare supplies and maintenance and other sundry movements.

10.2.27 A comprehensive strategy that looks at the safe and efficient movement of the contractors' workforce by environmentally sound modes of transport must be demonstrated by Highways England. That strategy could include the use of temporary rail and ride or park and ride facilities from stations or suitably located parking facilities. The impact on existing bus and rail services

must be reviewed, to ensure that the current workforce in Tilbury and Grays is not impacted. The strategy must consider the co-ordinated distribution of workers across the works compounds to minimise impacts on local roads, using internal haul roads where feasible.

10.2.28 Furthermore, more opportunities for local employment, apprenticeships and training programmes, need to be provided for as part of the construction work for the LTC.

10.2.29 The Council raised through its response to the Statutory Consultation Scheme that the materials strategies including for the disposal of excavated material; segments manufacture; the supply of grout; cement and sand and aggregates has not been clearly developed. Highways England must provide information on the supply strategies, focusing on local supply to minimise travel and maximise local economic benefits to the affected communities. Where practicable marine transport should be used, or an explanation given as to why that is not feasible.

10.3 Effects on the Council's operations

10.3.1 As highlighted in the Council's response to the Statutory Consultation exercise, consideration needs to be given by Highways England to the potential effects of the proposed LTC on the Council's day to day operations, particularly in relation to additional spending by Borough which may be required as a consequence of the LTC. Such matters might include:

- Construction traffic management and controlling rat-running;
- Waste collection/road sweeping and road maintenance;
- Additional pressures on Council's social services (and on the resources of Essex's health and emergency services) arising during the construction phase, particularly around the construction camps; and
- Controlling and designing for crime.

10.3.2 Experience drawn from other major long-term construction works indicates that there is the potential for significant additional costs to arise to the Council. Details are required of the provision being made by Highways England to take account of these additional costs incurred by the Borough. This would include the additional expense incurred by the Council in maintaining routes damaged by the extraordinary traffic along those corridors – Section 59 of the Highways Act 1980 refers. The method for assessing this impact is referenced earlier in this chapter. Those affected corridors would include construction traffic routes and routes along which traffic is diverted during the construction and operational periods.

10.3.3 Corridors that would be affected by the construction of new cross connections must be managed such that the phased works do not impact inappropriately on the operation of those corridors and affect the adjoining communities. Highways England must take account of the cumulative impacts of other concurrent or consecutive works, to minimise the impacts on routes and communities.

10.3.4 This would include the construction of the changes to the Stanford Road corridor and cross connection. The effective operation of this highly important local corridor must be maintained throughout the works, requiring the building off structures to be off-line from the current corridor.

10.3.5 In executing its role as Network Manager for the roads within the Borough, the management of the works must be in partnership with the Council. This will include confirming the phasing of works and the co-ordination with other planned and emergency works; drafting and making Traffic Regulation Orders, managing works permits and inspections, and any lane rentals. The commitment to co-ordination and collaboration must be made by Highways England within the draft CoCP and confirmed through the agreed CoCP.

10.4 Local Residents Discount Scheme and Tolling

- 10.4.1 The Local Residents Discount Scheme (LRDS) is not set out in detail by Highways England. It is not known to whom it would relate within Thurrock and Gravesham or over what section of the route but it can only be a token gesture if there are no junctions for residents to exit and enter the Borough. This cannot count as mitigation. The road cuts straight through the Borough and bypasses the residents and, in combination with other large scale infrastructure, causes further localised disconnection. The LRDS should be replaced by a hypothecated toll fund, which the Dartford crossing used to have, to recognise that mitigation work for the LTC is on-going, long-term, and needs to involve the local authority in mitigating harm in a meaningful and effective way for the future lifespan of the project. This would also allow for future mitigation work that was unknown at the time of design; acting as a phased contingency budget for mitigation.
- 10.4.2 The Supplementary Consultation documents do not set out how the toll would be applied to the route. It is not known whether tolls would be applied for travel through the tunnel only or to the whole route. With links only at M25, M2 and A13, the only section to which the toll would not apply would be between M25 and A13.
- 10.4.3 Furthermore, it is not known whether there will be a differential charge which might reflect favourably on the less polluting vehicles and whether residents would be entitled to discounts to for both the LTC and the Dartford Crossing.

10.5 Recommendations

- The potential impacts from the proposed construction traffic routes will need to be assessed within the EIA and HEqIA along with the long-term effects of road closures and how this impacts access to hospitals.
- The CoCP and CEMP must include a method of determining the deleterious effects that the extraordinary traffic would cause along the Councils routes to the contractor's compounds and works. That method must set out how those impacts would be identified, recorded and mitigated by Highways England.
- Further engagement with the Council on the potential effects on Thurrock's communities arising from the extended construction working hours now proposed by Highways England in the Supplementary Consultation documents.
- Highways England to provide further details of the initiative on the possible use of interim consolidation of materials, plant and equipment for distribution within the works areas.
- The format for Medebridge Road as a haul route should be confirmed with the Council such that future use could be made of it once the scheme has been constructed.
- Highways England to consider careful programming and management to ensure communities are not cut off for long periods of time and do not experience long delays and diversions to their normal routes.
- Highways England to confirm corridors or method for the import of the TBMs. Consideration should be given to river/marine transport.
- Highways England to confirm environmental principles its contractors will adopt during the construction phases, such as emissions and safety standards that are required to be adopted by the contractors and their sub-contractors, hauliers and supply chain.

- Highways England to confirm innovative approaches to construction and material used. i.e. the use of emerging automation, off-site construction techniques; on site batching and reuse of materials; environmentally sound materials and time saving methods.
- Highways England to confirm methods to reduce impacts on local communities from extended working hours and method. And confirm location and impact from workforce accommodation.
- Further work should be undertaken to confirm opportunities for local employment, apprenticeships and training programmes.
- Confirm effects on Councils day to day operations, particularly in relation to additional spending by Borough which may be required as a consequence of the LTC.
- Highways England to confirm the toll structure and details of the LRDS.

Part 3 – Summary and Recommendations

11 Recommendations and Next Steps

11.1 Review findings and the Council's Position

11.1.1 The review of Highways England's Supplementary Consultation Scheme, and associated material, has been undertaken to identify and assess potential issues arising from the LTC which may be of concern to the Council as a 'host authority'.

11.1.2 In general, the information presented by Highways England is deficient of the detail required for stakeholders to provide an informed response to the proposed design changes. Furthermore, it is disappointing that Highways England has not provided technical information as part of its ongoing programme of engagement in a timelier manner, which may have allowed a greater level of detail to be included in this consultation exercise.

11.1.3 Each design change is complex and, as set out in the Guide to Supplementary Consultation, gives rise to a number of subsequent revisions to the design and structure of the scheme. The expected effects and "what we are doing and why" presented in the Environmental Impacts Update are not specific to receptors, or at times to the effects anticipated to change. The high level and generic nature of the commentary means it is difficult to understand the true impacts of the design changes or to make specific recommendations regarding mitigation measures which ought to be sought.

11.1.4 The Council's principal areas of concern relate to:

- **National and Strategic Policy** - the proposed LTC does not meet several of the national and Highways England's strategic policy tests and scheme objectives;
- **National Planning Practice** - the assessments presented by Highways England to date do not give adequate consideration to the NPPF;
- **Emerging Local Plan and its interface with the proposed LTC** – the proposed LTC does not make provision for, and is inconsistent with, the housing and development potential for Thurrock and the aspirations for the Borough and for the wider South Essex area as set out in Thurrock's emerging Local Plan and South Essex Joint Strategic Plan;
- **Design Quality** – the need for the LTC scheme, if approved, to provide good quality design;
- **Effects on Thurrock's communities and environment** – the proposed LTC would give rise to adverse effects during the construction and operation of the scheme which would significantly affect Thurrock's communities and environment;
- **Effects on Thurrock's economy** – The scheme will have significant economic costs on residents and businesses in the Borough, principally due to direct loss of land, disruption to access and movement in the Borough and the creation of blight across the LTC corridor;
- **Effects on Thurrock's operations** – potential effects from the construction and operation of the LTC scheme on the Council's day to day operations;
- **Creating a lasting legacy** – the importance of ensuring a lasting beneficial legacy - covering community infrastructure, environment, health and wellbeing and skills;
- **Configuration of the proposed LTC** – concerns relating to the configuration of the proposed LTC, for example at the interchange between the LTC and A13, in the

reduction in number of lanes southbound from the M25, and more generally in relation to facilitating future local growth;

- **DCO process, technical engagement and LTC application programme** - the Council has raised concerns with Highways England and the Planning Inspectorate in the past, and is now raising this point again, in relation to the limited amount of meaningful technical engagement which has taken place to date, the adequacy of consultation and relating to DCO Requirements. This remains a considerable concern to the Council.

Technical assessments

11.1.5 The following areas require further assessment work and engagement with the Council:

- **Environmental Impact Assessment** – significant information gaps and the potential for under reporting potential impacts. Further increases to the Application Boundary made since EIA Scoping Opinion (2017) which are likely to give rise to new or altered likely significant environmental effects. A further scoping exercise should be undertaken;
- **Health Impact Assessment** – Highways England has confirmed that this will be provided in the form of the Health and Equalities Impact Assessment (HEqIA) however, no detail has been provided in order to consider the potential effects of the scheme and any associated mitigation and it is understood that that no detailed information will be provided by Highways England until the DCO application is submitted;
- **Assessment of cumulative effects and interaction of effects** – potential prolonged adverse effects on the communities and environment of Thurrock from major construction projects in the Borough;
- **CoCP/CEMP** – a strong reliance placed by Highways England on these documents although no detail seen by the Council as yet;
- **Traffic modelling** – does not include the results of any option testing and has insufficient detail to understand the impacts of the Supplementary Consultation Scheme on the local road networks as well as residents, businesses, open countryside and designated environmental areas in the Borough;
- **Utilities** – concerns relating to the extent of land take proposed for the utility works and the direct impact on residential premises.

11.2 Supplementary Consultation Scheme - recommendations

11.2.1 Recommendations relating to the Supplementary Consultation Scheme are presented in this report and are set out in the following sections:

- Chapter 4 – Design Quality
- Chapter 5 – Review of Environmental Impacts
- Chapter 6 - Review of Traffic Modelling Update
- Chapter 7 - Proposed Route Changes
- Chapter 8 - Review of Walking, Cycling and Horse-riding Network
- Chapter 9 - Review of Utilities Update

- Chapter 10 - Constructing and Operating the Proposed LTC
- Appendix D - Review of Environmental Impacts Update - Design Changes 8 – 19
- Appendix E - Review of Walking, Cycling and Horse-riding Network
- Appendix F - The Strategic Importance of Thurrock and the South Essex Region

11.2.2 The intention is that these should be collated, agreed with the Council and used as a checklist to ensure that the Council's concerns are addressed as the LTC design and assessment work progresses. Recommendations arising from this review

11.3 Specific areas of technical engagement

11.3.1 The review of the Supplementary Consultation documents has highlighted further technical engagement is requirement across all environmental topics prior to the submission of the DCO Application to address the concerns of the Council, for example:

- Further engagement on the scope, assessment outcomes and recommendations of the HEqIA considering the potential for significant adverse health impacts.
- Further engagement is required regarding the scope and approach being taken for construction traffic modelling, subsequent air quality, noise and health effects arising from construction traffic will need to be discussed and appropriate mitigation agreed before the DCO application is made.
- Highways England states that operational air quality modelling is ongoing, and that impacts are "difficult to predict" in absence of such modelling. This has meant no informed view of the scheme can be provided by consultees regarding operational air quality effects as part of this consultation exercise. Further engagement is required on this important environmental topic.
- The final list of LVIA representative viewpoints and photomontages should be shared and agreed with the Council prior to submission of the DCO.
- Highways England should engage more proactively with the Council to reduce impacts on the Council-owned Coalhouse Fort, a nationally important heritage asset and popular tourist attraction / leisure asset, and to realise opportunities to improve and enhance the asset for the benefit of cultural heritage and community health and wellbeing. However, the future of Coalhouse Fort is uncertain at present following the charity which managed the heritage asset folding in February 2020. The construction phase may impact upon the number of potential viable users of the heritage asset going forward.
- Highways England should continue detailed liaison with Thurrock's heritage Advisors, and Historic England, to agree a methodology for assessing impact upon the historic environment at all levels together with discussions regarding potential mitigation and enhancement.
- Highways England has identified potential habitat replacement sites, and Map Book 2: Land Use Plan shows large swathes of land marked as 'environmental mitigation'. Further detail needs to be provided on the proposals for these areas, and how they have been determined as suitable sustainable mitigation areas.
- Further engagement is required to agree the detail of measures to handle, store and transport materials and waste, which will be secured in the COCP and CEMP.

- It appears that carbon modelling to understand the projects contributions to climate change and human health impacts is ongoing. The scope and details of that modelling and any subsequent assessment should be shared with the Council.

11.4 Engaging with the Council

11.4.1 The Council's concerns about the limited amount of meaningful technical engagement are well documented in this report. As noted in its response to the Statutory Consultation exercise, the nature of the DCO process is to encourage close and meaningful engagement with the promoter as the design proceeds and the Council would wish to ensure that this can be achieved in the time available up to submission of the DCO application.

11.4.2 Therefore, in addition to the technical engagement which is recommended in this report - in relation to, for example, the scheme design and configuration, the on-going technical assessment work (ie. EIA, HEqIA) and traffic modelling - the Council would wish to see further discussion in relation to some of other aspects of the proposal which would have a direct bearing on the Council and its communities should consent for the scheme be granted. These aspects would comprise, but are not limited to:

- Addressing the aspirations set out in the emerging Local Plan and delivering sustainable local growth;
- Mitigation for the likely economic costs to the Borough (see report in Appendix C);
- Delivering a lasting legacy and securing local benefits; and
- Agreeing relevant draft DCO Requirements and s106 draft Heads of Terms.

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Appendix A Thurrock Council's Response to Highways England's Statutory Consultation (2018)

Lower Thames Crossing

Review of Statutory Consultation Documents

Thurrock Council Document Reference – Appendix A

On behalf of **Thurrock Council**



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This report has been prepared by Peter Brett Associates LLP ('PBA') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which PBA was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). PBA accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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Appendix A – Review of LTC PEIR

Executive Summary

Introduction

1. Highways England's (HE) latest proposals for the Lower Thames Crossing (LTC) were published for formal consultation on 10 October 2018. The consultation period closes on 20 December 2018. The Consultation Scheme comprises:
 - a bored tunnel crossing under the River Thames east of Gravesend and Tilbury;
 - a new motorway north of the river which will join the M25 between junctions 29 and 30;
 - a new road south of the river which will join the A2 east of Gravesend;
 - a new Rest and Services Area (RaSA) at the Tilbury Junction (East Tilbury);
 - new structures and changes to existing ones (including bridges, buildings, tunnel entrances, viaducts, and utilities such as electricity pylons) along the length of the new road;
 - Junctions, proposed at the following locations:
 - a new junction with the A2 to the east of Gravesend;
 - a new junction east of Tilbury (to access the proposed RaSA);
 - a modified junction with the A13/A1089 in Thurrock;
 - a new junction with north-facing slip roads on the M25 between junctions 29 and 30.
2. HE proposes that the scheme would include a *'free-flow charging system, where drivers pay remotely, similar to that at the Dartford Crossing'*.
3. If granted consent, HE envisages that construction of the scheme would commence in 2021 with an opening year of 2027.
4. Consent for the project is being sought under the Planning Act 2008 (PA 2008) and, if approved, a Development Consent Order (DCO) will be granted to construct and operate the project. Under this consent process, HE has a duty to consult, among others, local authorities and the local community about the emerging proposals prior to the submission of the DCO application. HE also has a duty to take account of the responses to consultation as it develops the Consultation Scheme further before submitting the DCO application.
5. This report has been prepared for Thurrock Council to provide a review of the Consultation Scheme and related statutory consultation documents. Its purpose is to identify areas of concern, potentially significant issues and suggest areas of further work required by HE, in order to assist the Council in preparing its response to the LTC statutory consultation exercise.

6. Overall, the Council has been actively engaging with Highways England however, based upon the consultation material available, the Consultation Scheme proposals appear contrary to important national and strategic policy tests. Due to deficiencies in the available information, particularly on the option appraisal and likely impacts, it is recommended that the Council should reserve an entitlement to supplement or modify its consultation response in light of additional information which is likely to be forthcoming.

Consultation materials

7. Some 42 separate items have been presented by HE as part of this formal consultation exercise. These include the 'Case for the Project', the 'Approach to Design, Construction and Operation', and the 'Preliminary Environmental Information Report'. The latter is one of the key documents in the consultation exercise as it provides preliminary environmental information on the Consultation Scheme so that consultees are able to develop an informed view of its likely significant environmental effects.

Review process

8. The review of the consultation materials seeks to 'test' the consultation scheme's performance in the following areas:
 - National and strategic policy – the performance of the Consultation Scheme against national and strategic policies as well as HE's scheme objectives;
 - Design elements – the performance of specific design elements of the Consultation Scheme tested against provision in the emerging Local Plan and wider aspirations for growth in Thurrock and the South Essex Region;
 - HE's proposals and assumptions made for construction phase logistics and utilities diversions;
 - Health and environmental effects as reported in the PEIR;
 - DCO process and adequacy of consultation.
9. This report concludes with recommendations for next steps in the engagement process with the HE team and the Planning Inspectorate.

Review findings

10. On the basis of the consultation information provided, including the information set out in the Preliminary Environmental Information Report (PEIR), the following conclusions and recommendations to HE are presented in this report:
 - i. The Consultation Scheme does not meet several of the national and HE's strategic policy tests and scheme objectives, particularly relating to option testing, the delivery of economic growth and achieving sustainable local growth (chapters 4 and 5);
 - ii. The Consultation Scheme does not make provision for, and is inconsistent with, the housing and development potential for Thurrock and the aspirations for the

- Borough and for the wider South Essex area as set out in the emerging Local Plan (chapters 3 and 5);
- iii. There are specific design elements of the Consultation Scheme (chapter 5) which require modification and/or further consideration by HE in order to contribute to meeting the Government's and LTC's policy and scheme objectives. These are:
 - a. Re-instatement of the Tilbury Link Road into the Consultation Scheme;
 - b. Options for alternatives sites inside and outside the Borough for the proposed Rest and Services Area (RaSA) proposed in East Tilbury;
 - c. Reconfiguration of the A13 connections: Orsett Cock junction, A13 widening works and Manor Way junction, and the alignment of Rectory Road;
 - d. Alternative design options for the treatment of the crossing through the Mardyke Valley to reduce potential adverse environmental effects;
 - e. Alternative design options for the treatment of the viaduct over the Tilbury Loop Line to reduce potential adverse environmental effects;
 - f. Consideration and assessment of suitable alternative locations for the Traveller site at Gammon Field which will be affected by the LTC;
 - g. Proposed physical design mitigation to address potential adverse effects on the Borough's residents eg bunds, cut and cover tunnels or lowering vertical alignment particularly where it is close to residential areas.
 11. It is considered that the information contained in the consultation materials and the consultation undertaken with HE to date do not satisfactorily explain the options tested which give rise to the configuration of the Consultation Scheme (chapter 5). The traffic modelling output available as part of the consultation materials does not include the results of any option testing and has insufficient detail to understand the impacts of the Consultation Scheme on the local networks as well as residents, businesses, open countryside and designated environmental areas in the Borough.
 12. Health and Environmental effects: in relation to the information presented in the PEIR, there are significant information gaps and potential under reporting of potential impacts, such that the effects of the scheme have not been and cannot be properly considered. Further engagement is required, particularly in relation to the assessment of health impacts (chapter 7).
 13. Construction effects: whilst it is acknowledged that the information relating to the construction phase and the proposed off-site and on-site enabling works are still at an early stage, it is recommended that the Council actively engages with the HE design team to ensure that the areas of potential concern, highlighted in this report, can be appropriately addressed by the team as the scheme design and assessment work progresses. Areas for further engagement are listed in the report (chapter 6).
 14. DCO process and EIA scoping: it is considered that the recent changes to the application boundary and the scheme made since the EIA Scoping Opinion was issued are likely to give rise to new or altered likely significant environmental effects. It is recommended that the Consultation Scheme should undergo a further scoping exercise to ensure that all potential likely significant environmental effects are

identified and that any Scoping Opinion will reflect the scheme for which consent is being sought (chapter 8).

15. The nature of the DCO process is to encourage close and meaningful engagement with the promoter as the design proceeds. A programme of engagement with HE is suggested (chapter 9) as one of the next steps in the process, which should cover the following key areas:
- Emerging Local Plan and delivering growth;
 - Option testing/traffic modelling;
 - Treatment of northern portal;
 - Specific aspects including: Tilbury Link Road, Junctions, Motorway Rest Area, passive provision for potential future development;
 - Health and environmental impacts;
 - Construction phase works and effects, including off- and on-site enabling works, and related mitigation (including the Code of Construction Practice); and
 - Securing local benefits.

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Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
ASELA	The Association of South Essex Local Authorities
AQMA	Air Quality Management Area
CEMP	Construction Environmental Management Plan
COCP	Code of Construction Practice
CRTN	Calculation of Road Traffic Noise
CTMP	Construction Travel Management Plan
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
ES	Environmental Statement
FRA	Flood Risk Assessment
HE	Highways England
HIA	Health Impact Assessment
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
JSP	Joint Strategic Plan
LOAEL	Lowest observed adverse effect level (noise criterion)
LTC	Lower Thames Crossing
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
MHCLG	Ministry of Housing, Communities and Local Government
NNNPS	National Networks National Policy Statement
NPPF	National Planning Policy Framework
OHL	Overhead Line
PA 2008	Planning Act 2008

PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PRoW	Public Right of Way
RaSA	Rest and Service Area
RIS	Road Investment Strategy
SHMA	Strategic Housing Market Assessment
SOAEL	significant observed adverse effect level (noise criterion)
SRN	Strategic Road Network
TBM	Tunnel Boring Machine
WFD	Water Framework Directive
WHO	World Health Organisation

1 Introduction

1.1 Overview

1.1.1 Highways England's (HE) latest proposals for the Lower Thames Crossing (LTC) were published for formal consultation on 10 October 2018. The consultation period closes on 20 December 2018. The Consultation Scheme comprises:

- a bored tunnel crossing under the River Thames east of Gravesend and Tilbury (Location C);
- a new motorway north of the river which will join the M25 between junctions 29 and 30 (Route 3); and
- a new road south of the river which will join the A2 east of Gravesend (the Western Southern Link).

1.1.2 As the LTC is classified as a Nationally Significant Infrastructure Project, consent for the project will be sought under the Planning Act 2008 (PA 2008). This means that the Planning Inspectorate will consider the application and make a recommendation to the Secretary of State for Transport. If approved, a Development Consent Order (DCO) will be granted to construct and operate the project.

1.1.3 Under the PA 2008 DCO application process, HE has a duty to consult, among others, local authorities and the local community about the emerging proposals in the period prior to the submission of the DCO application. HE also has a duty to take account of the responses to consultation as it develops the Consultation Scheme further before submitting the DCO application.

1.2 Purpose of this report

1.2.1 This report has been prepared for Thurrock Council (the 'Council') to provide a review of the LTC Consultation Scheme and related statutory consultation documents published by HE on 10 October 2018. The purpose of both the review and this report is to highlight potentially significant issues and assist the Council in preparing its response to the LTC statutory consultation.

1.2.2 The review seeks to identify those areas which are of concern to the Council as a statutory consultee and any potential deficiencies within the Consultation Scheme and related materials as presented by HE. It is based on an assessment of the October 2018 consultation material and is therefore subject to change as the LTC design and assessment progresses. This report has been prepared by an experienced consultant team supplemented by comments from Council officers, as appropriate.

1.3 Review findings and the Council's position

1.3.1 On the basis of the consultation information provided, including the information set out in the Preliminary Environmental Information Report (PEIR), the following conclusions and recommendations are presented in this report:

- a. The Consultation Scheme does not meet several of the national and HE's strategic policy tests and scheme objectives, particularly relating to option testing, the delivery of economic growth and achieving sustainable local growth (see chapters 4 and 5);
- b. The Consultation Scheme does not make provision for, and is inconsistent with, the housing and development potential for Thurrock and the aspirations for the Borough and for the wider South Essex area as set out in the emerging Local Plan (see chapters 3 and 5);
- c. There are specific design elements of the Consultation Scheme which require modification and/or further consideration by HE in order to contribute to meeting the Government's and LTC's policy and scheme objectives (see chapter 5). These are:
 - i. Re-instatement of the Tilbury Link Road into the Consultation Scheme;
 - ii. Options for alternative sites inside and outside the Borough for the proposed Rest and Services Area (RaSA) proposed in East Tilbury;
 - iii. Reconfiguration of the A13 connections: Orsett Cock junction, A13 widening works and Manor Way junction, and the alignment of Rectory Road;
 - iv. Alternative design options for the treatment of the crossing through the Mardyke Valley to reduce potential adverse environmental effects;
 - v. Alternative design options for the treatment of the viaduct over the Tilbury Loop Line to reduce potential adverse environmental effects;
 - vi. Consideration and assessment of suitable alternative locations for the Traveller site at Gammon Field which will be affected by the LTC;
 - vii. Proposed physical design mitigation to address potential adverse effects on the Borough's residents eg bunds, cut and cover tunnels or lowering vertical alignment particularly where it is close to residential areas.
- d. It is considered that the information contained in the consultation materials and the consultation undertaken with HE to date do not satisfactorily explain the options tested which give rise to the configuration of the Consultation Scheme (see chapter 5). The traffic modelling output available as part of the consultation materials does not include the results of any option testing and has insufficient detail to understand the impacts of the Consultation Scheme on the local networks as well as residents, businesses, open countryside and designated environmental areas in the Borough.
- e. Specific comments relating to potential effects of the Consultation Scheme and the DCO (and EIA) process are:
 - i. Health and Environmental effects: in relation to the information presented in the PEIR, there are significant information gaps and

potential under reporting of potential impacts, such that the effects of the scheme have not been and cannot be properly considered. Further engagement is required, particularly in relation to the assessment of health impacts (see chapter 7);

- ii. Construction effects: whilst it is acknowledged that the information relating to the construction phase and the proposed off-site and on-site enabling works are still at an early stage, it is recommended that the Council actively engages with the HE design team to ensure that the areas of potential concern, highlighted in this report, can be appropriately addressed by the team as the scheme design and assessment work progresses (see chapter 6);
- iii. DCO process and EIA scoping: it is considered that the recent changes to the application boundary and the scheme made since the EIA Scoping Opinion was issued are likely to give rise to new or altered likely significant environmental effects. It is recommended that the Consultation Scheme should undergo a further scoping exercise to ensure that all potential likely significant environmental effects are identified and that any Scoping Opinion will reflect the scheme for which consent is being sought (see chapter 8).

1.3.2 The nature of the DCO process is to encourage close and meaningful engagement with the promoter as the design proceeds. A programme of engagement with HE is suggested (see chapter 9) as one of the next steps in the process, which should cover the following key areas:

- Emerging Local Plan and delivering growth;
- Option testing/traffic modelling;
- Treatment of northern portal;
- Specific aspects including: Tilbury Link Road, Junctions, Motorway Rest Area, passive provision for potential future development;
- Health and environmental impacts;
- Construction phase works and effects, including off- and on-site enabling works, and related mitigation (including the Code of Construction Practice); and
- Securing local benefits.

1.4 Report structure

1.4.1 This report is structured as follows:

Part 1 – The Consultation Scheme

- Chapter 2 describes the Consultation Scheme, lists the material which HE is consulting upon and sets out the indicative programme for the project;

Part 2 – Strategic Context

- Chapter 3 describes the strategic importance of Thurrock and the south Essex region, providing the development planning context in which the LTC will be set;

Part 3 – The Policy Context and Compliance

- Chapter 4 sets out the LTC’s policy context and scheme objectives and considers how the Consultation Scheme performs against the relevant national and strategic policies and objectives;

Part 4 – Reviewing and Testing the Consultation Scheme

- Chapter 5 considers the specific design elements proposed for the Consultation Scheme and how these perform against policy and objectives as well as the development planning context set out in Chapter 3;
- Chapter 6 considers the approach to construction, logistics and utility diversions required for the Consultation Scheme;
- Chapter 7 provides a review of the information contained in the PEIR;
- Chapter 8 examines the DCO process and the adequacy of consultation;

Part 5 - Recommendations and Next Steps

- Chapter 9 sets out the recommendations and suggested next steps for further engagement with the HE design team.

2 The Consultation Scheme

2.1 The Lower Thames Crossing Consultation Scheme

2.1.1 Non-statutory public consultation was undertaken in 2013, 2014, and in 2016 on the route options. Following the announcement of the Preferred Route in 2017, HE has undertaken further work to prepare the Consultation Scheme upon which it is now consulting. Details of the Consultation Scheme can be found at the following link: <https://highwaysengland.co.uk/lower-thames-crossing-home/>.

2.1.2 As described in the LTC consultation material (PEI Summary), the Consultation Scheme comprises:

- approximately 14.5 miles (23km) of new motorway connecting to the existing road network from the A2/M2 to the M25;
- two 2.5-mile (4km) tunnels, one southbound and one northbound;
- three lanes in both directions with a maximum speed limit of 70mph;
- improvements to the M25, A2 and A13, where the Lower Thames Crossing connects to the road network;
- a new Rest and Services Area (RaSA) at the Tilbury Junction (East Tilbury);
- new structures and changes to existing ones (including bridges, buildings, tunnel entrances, viaducts, and utilities such as electricity pylons) along the length of the new road; and
- a free-flow charging system, where drivers pay remotely, similar to that at the Dartford Crossing.

2.1.3 Junctions are proposed at the following locations:

- a new junction with the A2 to the east of Gravesend;
- a new junction east of Tilbury (to access the proposed RaSA);
- a modified junction with the A13/A1089 in Thurrock;
- a new junction with north-facing slip roads on the M25 between junctions 29 and 30.

2.1.4 The consultation material continues, stating that '*...the main road between the A2 and the M25 would be 3 lanes in both directions, using technology for lane control and variable speed limits. There would be no hard shoulders but there would be hard strips, motorway vehicle restrictions, emergency refuge areas and a rest and service area. Modern safety measures and construction standards will be used with technology to manage traffic and provide better information to drivers:*

- variable message signs on gantries to display travel information, hazard warnings and both advisory and mandatory signage to drivers;

- CCTV cameras to manage and investigate incidents, monitor onsite activities, protect assets, gauge network usage and prevent and detect crime;
- above ground traffic detectors to control automatic traffic management systems (like variable speed limits) and to collect data on traffic flows;
- Existing side roads affected by the route will be reconnected to ensure that existing communities and public rights of way remain connected. In most locations, the affected side roads would go over the new route' (Section 2, Preliminary Environmental Information Summary).

2.2 Consultation materials

2.2.1 The documents which comprise HE's consultation can be viewed and downloaded at this link: <https://highwaysengland.citizenspace.com/ltc/consultation/>. The material available at this link is as follows:

1. Your Guide to Consultation
2. Consultation Response form
3. Information leaflet
4. Consultation events leaflet
5. Case for the Project
6. Approach to Design, Construction and Operation
7. Preliminary Environmental Information Summary
8. Preliminary Environmental Information Report
9. Preliminary Environmental Information Report – Appendices
10. Preliminary Environmental Information Report Figures - Chapter 2 Project Description
11. Preliminary Environmental Information Report Figures - Chapter 6 Air Quality
12. Preliminary Environmental Information Report Figures - Chapter 7 Cultural Heritage
13. Preliminary Environmental Information Report Figures - Chapter 8 Landscape
14. Preliminary Environmental Information Report Figures - Chapter 9 Terrestrial Biodiversity
15. Preliminary Environmental Information Report Figures - Chapter 11 Geology and Soils
16. Preliminary Environmental Information Report Figures - Chapter 12 Materials
17. Preliminary Environmental Information Report Figures - Chapter 10 Marine Biodiversity
18. Preliminary Environmental Information Report Figures - Chapter 13 Noise and Vibration
19. Preliminary Environmental Information Report Figures - Chapter 14 People and Communities
20. Preliminary Environmental Information Report Figures - Chapter 15 Road Drainage and Water Environment
21. Map - Environmental Constraints
22. 2017 Environmental Impact Assessment - Scoping Report
23. 2017 Environmental Impact Assessment - Scoping Report Appendices
24. Environmental Impact Assessment - Scoping Report Appendices A – G
25. Environmental Impact Assessment - Scoping Report Appendix F (PART 1)

26. Environmental Impact Assessment - Scoping Report Appendix F (PART 2)
27. 2017 Environmental Impact Assessment - Scoping Opinion
28. Traffic Forecasts Non-Technical Summary
29. Traffic Forecasting Report
30. Traffic Forecasting Report Appendix
31. Map Book 1 - General Arrangements
32. Map Book 2 – Land Use Plans
33. Map Book 3 - Engineering Plans
34. Map - General Arrangement of Whole Scheme
35. Map - Large Scale General Arrangements
36. Map - Land Use Plan
37. Your Property and Blight
38. Your Property and Compulsory Purchase
39. Your Property and Discretionary Purchase
40. Statement of Community Consultation (SoCC)
41. Section 47 Notice
42. Section 48 Notice

Preliminary Environmental Information Report (PEIR)

- 2.2.2 One of the key documents in the review exercise has been the Preliminary Environmental Information Report (PEIR). The purpose of this is for the applicant [HE] to provide preliminary information on the Consultation Scheme so that consultees are able to develop an informed view of its likely significant environmental effects. Regulation 12(2) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) defines preliminary environmental information as “*information referred to in regulation 14(2) which:*
- a. *has been compiled by the applicant; and*
 - b. *is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development).”*
- 2.2.3 Further details on the intended purpose and contents of a PEIR are provided in Planning Inspectorate Advice Note 7: *EIA: Process, Preliminary Environmental Information, and Environmental Statements*.
- 2.2.4 Chapter 7 and Appendix A provide a review of the information contained in the PEIR.

2.3 Project programme

2.3.1 The consultation materials set out the indicative timetable for the LTC, set out in Table 2.1.

Table 2.1: indicative timetable for LTC

Stage	Indicative timetable
Development Consent Order application submitted	2019
Examination	2020
Consent (if granted)	2021
Construction phase	2021 onwards
Opening year	2027

3 The Strategic Importance of Thurrock and the South Essex Region

3.1 Introduction

3.1.1 Thurrock Council's adopted Core Strategy sets out, as an objective the delivery of 18,300 homes¹ and 21,000 jobs in the period between 2009-26. Thurrock's Economic Growth Strategy (2016) identifies five key components as being necessary to deliver employment and broader economic growth in the borough, namely:

- Strategic employment sites;
- Business spaces and premises;
- Quality access infrastructure, including road and rail linkages that facilitate effective movement of goods and people;
- Refreshed town centres; and
- Housing.

3.1.2 The Consultation Scheme has direct impacts on three of these key components in terms of:

- prejudicing the delivery of strategic employment sites (see para 3.2.6 et seq);
- compromising the ability to meet the need for new housing in Thurrock and the wider sub region in a sustainable manner (see para 3.3.12 et seq); and
- not providing the quality of access infrastructure needed in Thurrock to support these economic ambitions (for example, see section 5.3 relating to the removal of the Tilbury Link Road from the LTC scheme).

3.1.3 As a consequence, Thurrock's economy will continue to underperform and the aspirations for new necessary housing and improvements to its town centres will not be realised; nor will the market conditions necessary to viably deliver the quality of business space and premises envisaged.

3.1.4 In February 2014, the Council made the decision to bring forward a new Local Plan, the reasons for this being:

- 'The need for a more up-to-date statutory planning framework to coordinate the delivery of the Council's ambitious growth strategy for Thurrock
- The revocation of the East of England Plan and the requirement for local planning authorities to undertake a fresh assessment of their future development needs

¹ CSTP1 Strategic Housing Provision

- The need for the Council to identify a deliverable five-year housing land supply and bring forward more sites for development to support economic growth
- A need to consider the possible impacts of a decision by Government on the route and location of the proposed Lower Thames Crossing'

3.1.5 Supporting housing delivery and economic growth in Thurrock are central pillars of this emerging plan; and the scale of that growth represents a step-change in Thurrock's ambitions. The South Essex Strategic Housing Market Assessment (SHMA, 2017) which identified an objectively assessed housing need of 1,381 dwellings per annum; this represents over a third of identified needs across the whole South Essex housing market area. This includes a significant upward adjustment of 307 dwellings per annum to support economic growth in the Borough and underlines how the growth ambitions for Thurrock's economy are interlinked with housing growth.

3.1.6 However, progress on this new Local Plan has already been significantly delayed by the uncertainty created by the LTC, particularly given the changes in terms of the land affected directly by the route, the alterations in alignment and removal of junctions on the route. This places the Council at risk of failing to meet the requirements of the NPPF in terms of not having a five-year housing land supply and failing the new delivery test. The latter point is already confirmed by MHCLG and underscores the impact the LTC has already had on Thurrock's ability to meet housing needs, even in the short term. In the absence of an adopted up-to-date plan, this places Thurrock at risk of being unable to resist applications for unplanned development in unsustainable locations

3.1.7 In addition to the new Local Plan, Thurrock also forms part of the Association of South Essex Local Authorities (ASELA) which has committed to bringing forward a Joint Strategic Plan (JSP) to cover the period to 2038; the first round of consultation on the JSP is planned for spring 2019. While the JSP will not allocate specific sites and these will be brought forward through the new Local Plan, it will identify a range of broad strategic locations and priorities for new development and infrastructure delivery. However, the scale of growth to be allocated to Thurrock through the JSP is closely influenced by the extent which the LTC supports rather than prejudices those strategic locations.

3.2 Thurrock's economy and the role of the LTC

3.2.1 The Thurrock economy is worth £2.9 billion² and the Council is committed to growing this and closing the relative underperformance, in productivity terms, against the rest of South Essex. Within the wider South Essex economy, the Borough is an important driver in the retail and warehousing, and transport and logistics sectors, which are highlighted as key growth sectors going forward. Transport and logistics growth is driven by the key ports of Tilbury, Purfleet and London Gateway. The Port of Tilbury is identified in Core Strategy Policy CSSP2 as part of the Tilbury key strategic economic hub; realising the potential beneficial effects the LTC could have on the Port is therefore a critical consideration.

² South Essex Economic Development Needs Assessment (2017) Table 5

- 3.2.2 Development plan policy gives explicit support to the expanded role of Tilbury. Core Strategy Policy CSTP17 (Strategic freight movement and access to ports) enshrines the Council's support for the logistics and freight sectors including "...*facilitating a shift to rail freight and freight carried on the River Thames ... [by] promoting the use of rail and water borne freight facilities by supporting the development of appropriate infrastructure*".
- 3.2.3 The significance of the alignment of the LTC and the junctions on the Council's wider portfolio of employment sites is captured in the Economic Development Needs Assessment (2017). As well as providing an alternative strategic road link for existing and allocated sites to connect into, there is potential for the LTC to allow additional future employment sites along the new road; but that "...*in order to realise this opportunity the appropriate local junctions and connections must be provided so that existing and new sites can access the network, without which the positive influence of this new road infrastructure will be severely limited*"³.
- 3.2.4 The Needs Assessment's review of employment sites⁴, particularly in relation to the Port of Tilbury, confirms that investment is needed to improve the stock quality, including sites at:
- Thames Industrial Estate (14.4ha): this is identified as requiring significant intervention to attract new employment occupiers; and
 - Thurrock Park (21.4ha); this is noted to have vacancies within the site which might require medium- to long-term support to address to ensure that the site is fulfilling its potential for B8 (warehousing and distribution) port-related activities.
- 3.2.5 Beyond port-related activities, an important part of the Council's ambitions is to diversify the economy so that it is less dependent on a relatively narrow range of sectors, without compromising growth within those core sectors of transport and logistics and retail and warehousing. For this to be realised, the Council's ambitions are focused on increasing the supply of viable economic development land. This is not achieved by the Consultation Scheme.

Effects of the Consultation Scheme

- 3.2.6 The Consultation Scheme does not provide appropriate local junctions and connections at strategic locations in the Borough that capitalise on local areas of significant employment growth. The lack of provision of the Tilbury Link Road is an example where, rather than creating additional opportunities, the effect is to sterilise development land and reduce the potential for growth. This is discussed in greater detail in section 5.3 below.
- 3.2.7 The consequence of this missed opportunity to invest will be that the Council's ability to grow and diversify its economy will not be supported by the Consultation Scheme and the higher-skilled and higher-wage sectors which currently do not play a major role in its economy will continue to locate elsewhere in South Essex and the wider South East.

³ Para. 9.67

⁴ Table 35

3.3 Supporting housing growth in the Borough

- 3.3.1 Based on the South Essex Strategic Housing Market Assessment (SHMA, 2017), an objectively assessed housing need of 1,381 dwellings per annum is identified; this represents over a third of identified needs across the whole HMA⁵. This includes a significant upward adjustment of 307 dwellings per annum to support economic growth in the Borough. The Government's recently published standard method for assessing local housing need⁶ confirms a requirement for the Borough of 1,023 dwellings per annum. The NPPF confirms that this is the minimum number of homes.
- 3.3.2 The forecast housing need in the Borough accounts for more than a quarter of housing growth across the wider South Essex⁷ area. The Borough's strategic location straddling the two travel-to-work areas of London and Southend confirms how this forecast housing growth is needed to support not only the growth of the Borough's economy but also the wider South Essex and London economies.
- 3.3.3 The adopted Core Strategy identifies the Thurrock Urban Area⁸ as 'the main focus for growth for new housing, employment and associated development'⁹ and for the period to 2021, Policy CSSP1 allocates modest growth at Chadwell St Mary (390 homes) and a portion of 580 homes at East Tilbury. However, to support the significantly higher level of growth required by the NPPF and in the context of limited supply of allocated land, the Council is aware that the emerging development plan must allocate substantial land for housing.
- 3.3.4 In principle, the LTC presents, along its route, an opportunity to support and enable growth in sustainable locations, particularly in East Tilbury, Chadwell St Mary and South Ockendon that have come forward from the recent call for sites. However, this is premised on the appropriate alignment of the LTC and, critically, access. The Consultation Scheme does not accommodate this and instead severely limits the scale of potential housing growth that could be delivered.
- 3.3.5 These figures of potential homes affected by the LTC are estimates and can only be estimates because of the lack of uncertainty over the detail of the LTC. Certainty and detail is critical for Thurrock to be able to undertake the necessary work to understand the exact implications for these key locations. For this reason, engagement with Highways England on potential improvements to the route is essential to not only ensure that Thurrock's new Local Plan complies with the NPPF's requirement that it should be positively prepared, but also so that Thurrock's role in the wider JSP is not fundamentally changed by it moving from potentially helping other South Essex authorities meet their housing needs but instead needing to export housing to elsewhere.

⁵ Comprising Basildon Borough, Castle Point District, Rochford District, Southend-on-Sea Borough and Thurrock

⁶ Planning Practice Guidance Reference ID: 2a-002-20180913

⁷ Calculated against either the SHMA 2017 (South Essex HMA comprises Basildon, Castle Point, Rochford, Southend-on-Sea, Thurrock) or using the Government's standard method set out in the PPG for the Association of South Essex Local Authorities (ASELA) which comprises all the HMA authorities and Brentwood Borough.

⁸ Includes Chadwell St Mary

⁹ Para. 5.98

East Tilbury

- 3.3.6 Delivering growth at East Tilbury is particularly important because of the potential that this growth has to support wider regeneration to overcome severance issues and improve access to shopping, services and key community uses, including a secondary school. However, providing these uses, some of which are very space hungry, requires land but the supply of land is more constrained by the alignment and design of the Consultation Scheme.
- 3.3.7 This is particularly important at East Tilbury, where the current configuration of the Consultation Scheme means that while it may be possible to accommodate some additional housing, it will not be of the critical scale to fund the infrastructure improvements necessary to meet the Council's aspirations to improve the range of services within the existing town as well enhance connectivity for existing residents. East Tilbury is physically separated from the Borough's main urban area by the Green Belt and suffers from severance issues arising from traffic delays at the existing level crossing. This means that for East Tilbury to be a sustainable location for growth, supporting social infrastructure, including education, must be provided as part of the expansion of East Tilbury; but to achieve this, there is a critical mass of development required. The alternative is that connectivity improvements will be required to link the settlement with existing social infrastructure provision outside East Tilbury; a solution which is complicated by the need for growth at East Tilbury to address the existing severance issues imposed by the railway level crossing which is currently closed for 40 minutes in every hour.
- 3.3.8 The Consultation Scheme supports neither solution in that it reduces the developable area to primarily the west of the existing settlement so that the scale of potential growth will not be sufficient to fund the linkage improvements either within or to East Tilbury, nor will it be possible, because of this lack of critical mass, to provide the social infrastructure needed to regenerate the existing and relatively isolated settlement and support existing and new residents' needs. The provision of an access to the Consultation Scheme at Tilbury, with appropriate traffic management to prevent rat-running in the event of congestion on the LTC, would go some way to mitigate these impacts.

Chadwell St Mary

- 3.3.9 The expansion of Chadwell St Mary is focused to the east of the existing settlement. The alignment of the Consultation Scheme reduces the scale of potential housing growth. More significantly though, growth may be dependent on improved strategic transport links to mitigate the impact on the local road network within Chadwell St Mary. For development to fund such a link, it will require a critical mass which is unlikely to be possible with the proposed alignment of the Consultation Scheme; in these circumstances, for the scheme to fulfil its economic objective of supporting sustainable local development the provision of significantly improved access (for example a bridge over the railway line) will be essential to alleviate pressure on the local road network, including the A13.

South Ockendon

- 3.3.10 South Ockendon has the potential to accommodate a large-scale urban extension comprising an interlinked network of garden villages to the north and east of the

existing urban area. With sufficient scale comes the opportunity to advance a strategic transport solution (road and rail) for the town. It could also support the regeneration of the urban area, including additional community facilities. An access onto the Consultation Scheme, to the north of South Ockendon, would potentially support this potential future housing growth as well as allowing relocation sites for non-conforming existing employment sites which currently do not have direct access onto the strategic road network.

South Essex

- 3.3.11 In addition to Thurrock's needs, housing growth must be viewed in the wider South Essex context. Thurrock, together with Basildon, Brentwood, Castle Point, Rochford and Southend councils and Essex County Council (ASELA¹⁰), are preparing a Joint Strategic Plan. The scale and distribution of housing growth is a critical consideration across South Essex. In the same way that Thurrock is constrained, so too is the rest of South Essex and in many cases, these constraints are more severe such that there may be the expectation that Thurrock might be able to accommodate housing needs from other parts of South Essex. Because the Consultation Scheme means that Thurrock potentially cannot meet its own requirements, it follows that it can no longer play a role in assisting with the wider growth objectives for South Essex and instead would become a net exporter of housing needs. Without refinement, the proposal is contrary to ASELA's memorandum of understanding which identifies transforming transport connectivity and opening-up spaces for housing and businesses amongst its aims.

Effects of the Consultation Scheme

- 3.3.12 The forecast housing need in the Borough accounts for more than a quarter of housing growth across the wider South Essex¹¹ area which reflects the Borough's strategic location between London and Southend and the need to support not only the growth of the Borough's economy but also the wider South Essex and London economies.
- 3.3.13 The adopted Core Strategy identifies the Thurrock Urban Area¹² as 'the main focus for growth for new housing, employment and associated development'¹³. However, to support the significantly higher level of growth required by the NPPF and in the context of limited supply of allocated land, the Council is aware that the emerging development plan must allocate substantial land for housing.
- 3.3.14 The Borough is highly constrained with locations for housing growth requiring green belt release and the emerging plan is balancing these constraints in order to identify sufficient housing land in sustainable locations to be able to meet local

¹⁰ The focus of ASELA is: "on the strategic opportunities, regardless of individual local authority boundaries for the South Essex Economic Corridor to influence and secure the strategic areas that will help our individual areas to flourish and realise their full economic and social potential."

¹¹ Calculated against either the SHMA 2017 (South Essex HMA comprises Basildon, Castle Point, Rochford, Southend-on-Sea, Thurrock) or using the Government's standard method set out in the PPG for the Association of South Essex Local Authorities (ASELA) which comprises all the HMA authorities and Brentwood Borough.

¹² Includes Chadwell St Mary

¹³ Para. 5.98

housing need. Jeopardising the potential for development at South Ockendon, Chadwell St Mary and East Tilbury, through the Consultation Scheme, could significantly affect the Council's ability to allocate sufficient housing in locations that meet local priorities including the support for economic growth.

3.3.15 In principle, the LTC presents a huge opportunity to support and enable this growth in sustainable locations, particularly in East Tilbury, Chadwell St Mary and South Ockendon. However, this is premised on the appropriate alignment of the LTC and, critically, access into these new and growing communities. The Consultation Scheme does not accommodate this and instead severely limits the scale of sustainable housing growth to meet the substantial development needs that could be delivered.

3.4 Indirect Effects

3.4.1 In addition to the direct effects of the Consultation Scheme, consideration should be given to any indirect effects which the scheme may have on the Borough's economic growth strategy. These might include:

- Housing and job growth needed to fund/support town centre regeneration;
- Improvement in employment market conditions needed to improve rental/yield returns on non-B8 development – only possible with longer term improvement of workforce (improvement in quality of housing supply/skills agenda); and
- The attractiveness of the Borough as a place to live and work.

3.5 Environmental impacts

Greengrid policy

3.5.1 The Consultation Scheme risks prejudicing the delivery of a sustainable Greengrid (Core Strategy Policy CSSP5). This strategic spatial policy is related to seven strategic environment policies (CSTP18-24 Green Infrastructure, Biodiversity, Open Space, Productive Land, Thurrock Design, Thurrock Character and Distinctiveness and Heritage Assets and the Historic Environment).

3.5.2 The Greengrid Strategy is premised on the principle 'that improved green access links between green assets is key to maximising the benefits derived from green assets for residents, workers and visitors'¹⁴. The proposed alignment crosses through five of the eight Greengrid Improvement Zones¹⁵. Within these zones, the policy requirement is to '*ensure that the location, planning, design and ongoing management of sites is appropriate, and that opportunities are sought to make best use of land and green infrastructure assets in delivering ecosystem services*'.

3.5.3 Policy CSSP5 states that development will not be permitted which compromises the integrity of green and historic assets or the overall Green Infrastructure network and that developer contributions will be used to facilitate improvements to the quality, use and provision of multi-functional green assets and linkages. As set out in section 5.8 below, the Consultation Scheme provides only one green

¹⁴ Para. 4.34

¹⁵ CSSP5.2 i. Avey and South Ockendon, ii. Mardyke Valley, v. North Grays and Chadwell St Mary, vi. Grays Riverside/Tilbury and vii. East Thurrock/Rural Riverside

bridge in the Borough (Green Lane) for which there is little detail. Without improvement in provision, the scheme is in contravention of the development plan.

PEIR

- 3.5.4 A review of the PEIR, which has been prepared for this consultation exercise, has been undertaken and the findings are discussed in chapter 7. This considers the potential environmental effects of the Consultation Scheme on the local environment and the performance of the scheme against policy objectives.

4 National and Strategic Policy Context and LTC Scheme Objectives

4.1 Introduction

4.1.1 It is important to consider the performance of the Consultation Scheme against national and strategic policies as well as the scheme objectives. This chapter considers this context and sets out the ‘tests’ against which the Consultation Scheme has been considered; the tests are reported in chapter 5.

4.2 National Policy Statement for National Networks

4.2.1 Strategic Policy is contained in the National Networks National Policy Statement (NNNPS) which sets out the policy framework and need case for strategic highway schemes such as the LTC. The following policies are of relevance.

Driving prosperity

4.2.2 Para 2.13 of the NNNPS states “*..the Strategic Road Network provides critical links between cities, joins up communities, connects our major ports, airports and rail terminals. It provides a vital role in people's journeys, and drives prosperity by supporting new and existing development, encouraging trade and attracting investment. A well-functioning Strategic Road Network is critical in enabling safe and reliable journeys and the movement of goods in support of the national and regional economies*”.

Considering beneficial and adverse impacts

4.2.3 At para 4.3 the NNNPS states “*...in considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account:*

- *its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits;*
- *its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts”.*

Options appraisal

4.2.4 At paragraph 4.27 the NNNPS states that “*...all projects should be subject to an options appraisal. The appraisal should consider viable modal alternatives and may also consider other options (in light of paragraphs 3.23 to 3.27 of this NPS). Where projects have been subject to full options appraisal in achieving their status within Road or Rail Investment Strategies or other appropriate policies or investment plans, option testing need not be considered by the examining authority or the decision maker. For national road and rail schemes, proportionate option consideration of alternatives will have been undertaken as part of the investment decision making process. It is not necessary for the Examining*

Authority and the decision maker to reconsider this process, but they should be satisfied that this assessment has been undertaken”.

4.3 HE Strategy Documents

Road Investment Strategy

4.3.1 The Road Investment Strategy, March 2015 states that *“the Company [HE] will, therefore, engage with other infrastructure providers and private developers to build long-standing relationships that help unlock opportunities for growth, including the construction of new housing, industrial and business sites, while also collaborating with local authorities to identify interventions on and off the network.”*

4.3.2 The strategy states that the *“RIS does not seek to predict the future, but takes into account a range of possible outcomes, underpinned by broad evidence, which the Department will continue to build on and review. The Department and the Company [HE] must be an active contributor in efforts to ensure the UK takes advantage of these global technology trends, facilitates investment and boosts overall UK capability.”*

The Road to Growth: our Strategic Economic Growth Plan

4.3.3 The Road to Growth: our strategic economic growth plan, March 2017 sets out *“the practical steps which HE is taking to increase its economic contribution in 4 areas:*

- *Supporting business productivity and competitiveness, and enabling the performance of SRN-reliant sectors;*
- *Providing efficient routes to global markets through international gateways;*
- *Stimulating and supporting the sustainable development of homes and employment spaces;*
- *Providing employment, skills and business opportunities within our sector”.*

HE’s Strategic Business Plan

4.3.4 HE’s Strategic Business Plan, October 2017 states that *“...we will improve our planning for the next decade and beyond. This will mean:*

- *Taking a more responsive and coherent approach to planning – one that is better understood by our customers, staff, suppliers and partners;*
- *Giving stakeholders more of a say in how we develop the network at a national, route and local level;*
- *Exploring new and better ways to stimulate growth;*
- *Encouraging innovation especially to exploit the benefits of vehicle and roadside technology;*
- *Ensuring our customers have more of a voice in determining investment priorities and how work is delivered;*

- *Providing for the needs of cyclists, pedestrians and others who walk or ride on, near or across the network”.*

4.4 LTC scheme objectives

4.4.1 The published scheme objectives are as follows:

- | | |
|----------------------------------|---|
| Economic | <ul style="list-style-type: none">• To support sustainable local development and regional economic growth in the medium to long term• To be affordable to government and users• To achieve value for money |
| Transport | <ul style="list-style-type: none">• To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free flowing north-south capacity• To improve resilience of the Thames crossings and the major road network• To improve safety |
| Community and Environment | <ul style="list-style-type: none">• To minimise adverse impacts on health and environment |

Source: Lower Thames Crossing, Summary Business Case, Route Consultation 2016, Table 2.1

4.5 Testing the Consultation Scheme against strategic policy and scheme objectives

4.5.1 The above policy context and the scheme objectives have been distilled into seven core themes which have been used to ‘test’ the performance of the Consultation Scheme, which is reported in chapter 5. The policy and objectives tests are as follows:

1. Economic growth and driving prosperity
2. Sustainable local development
3. Adequacy of options appraisal
4. Improving accessibility
5. Limiting and reversing environment impacts
6. Innovation and future proofing
7. Robust consultation

4.5.2 These are considered in turn below.

Test 1 - Economic growth and driving prosperity

4.5.3 National Policy Statement for National Networks (referred to as the NNNPS) para 2.13 *“The Strategic Road Network provides critical links between cities, joins up communities, connects our major ports, airports and rail terminals. It provides a vital role in people’s journeys, and drives prosperity by supporting new and existing development, encouraging trade and attracting investment.”*

4.5.4 *The Road to Growth: Our strategic economic growth plan, March 2017 explains that there are “Three roles that the SRN can play in supporting the economy have been identified:*

1. Supporting business productivity and competitiveness, and enabling the performance of SRN-reliant sectors

2. Providing efficient routes to global markets through international gateways

3. Stimulating and supporting the sustainable development of homes and employment spaces.”

The Consultation Scheme objectives include “to support sustainable local development and regional economic growth in the medium to long term”.

4.5.5 Road Investment Strategy, March 2015 sets out “...four strategic goals of the National Network National Policy Statement (NNNPS)”. The first explained in more detail as:

1. “Providing capacity and connectivity to support national and local economic activity

The SRN is vital to British businesses and to the successful functioning of our local and national economies. The network not only includes England’s main freight and logistics arteries, which connect our international gateways, logistics interchanges and distribution centres, but also inter-urban connections, which help put more people within reach of a wider range of jobs...”

“Ports

With approximately 95% of the UK’s goods trade by volume, and 75% of its value, being handled by ports in England and Wales, along with two thirds of all freight being carried on the SRN, the linkages between our ports and strategic roads are vital. Their importance will only grow with the forecast long-term growth in imports and exports by sea. The SRN must enable smooth access to ports, allowing goods and services to be moved into and around the country efficiently and reliably.”

“Encouraging economic growth

To ensure the SRN positively impacts growth, we must tackle congestion and delay on the network, particularly on the main freight arteries that connect cities and international gateways. The network must dovetail with other transport developments over the coming decades to improve domestic connectivity, encourage trade and investment, and enable British business to compete in international markets. The Company will, therefore, engage with other

infrastructure providers and private developers to build long-standing relationships that help unlock opportunities for growth, including the construction of new housing, industrial and business sites, while also collaborating with local authorities to identify interventions on and off the network.”

- 4.5.6 Road Investment Strategy post 2020: Planning Ahead, March 2016 sets out under Aim 1: Economy that:

“The road network needs to support key goals of improving productivity and building a stronger economy. We will be particularly alert to opportunities for:

- *Helping business to get goods to market: Provide good connections within the UK, as well as to overseas markets via ports and airports....”*
- *Improving access to jobs: Provide better connections that let people find work in more places, and help wider agglomerations to form”.*

- 4.5.7 Under Aim 4: Integration:

“...We will therefore seek new opportunities for:

- *Linking the strategic road network with ports, airports and rail: Intermodal connections need to be made easy and we will use the opportunity of long-term planning to see where improvements to one mode can support other forms of transport;*
- *Integrating the strategic road network with local road networks: Road users want a smooth and reliable journey regardless of which stretch of the network they are driving on. We will continue to work with local highways authorities to ensure that the different parts of the network work as an integrated whole.”*

Test 2 - Sustainable local growth

- 4.5.8 The NNNPS para 4.3 states *“In considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account:*

- *its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits.”*

- 4.5.9 At para 2.13, the NNNPS states *“The Strategic Road Network provides critical links between cities, joins up communities, connects our major ports, airports and rail terminals. It provides a vital role in people’s journeys, and drives prosperity by supporting new and existing development, encouraging trade and attracting investment.”*

- 4.5.10 ‘The Road to Growth: Our strategic economic growth plan’, March 2017 gives three roles that the SRN can play in supporting the economy, which include: *“...stimulating and supporting the sustainable development of homes and employment spaces.”*

- 4.5.11 Road Investment Strategy, March 2015 states that *“the Company [HE] will, therefore, engage with other infrastructure providers and private developers to*

build long-standing relationships that help unlock opportunities for growth, including the construction of new housing, industrial and business sites, while also collaborating with local authorities to identify interventions on and off the network.”

- 4.5.12 ‘Road Investment Strategy post 2020: Planning Ahead’, March 2016 includes under Aim 1: Economy “*creating new opportunities for housing and development: Provide the transport capacity to allow towns and cities to grow*”.

Test 3 - Adequacy of options appraisal

- 4.5.13 At para 4.27, the NNNPS states that “*..all projects should be subject to an options appraisal. The appraisal should consider viable modal alternatives and may also consider other options (in light of the paragraphs 3.23 to 3.27 of the NNNPS)*”.
- 4.5.14 NNNPS para 4.27 states “*..where projects have been subject to full options appraisal in achieving their status within Road or Rail Investment Strategies or other appropriate policies or investment plans, option testing need not be considered by the examining authority or the decision maker. For national road and rail schemes, proportionate option consideration of alternatives will have been undertaken as part of the investment decision making process. It is not necessary for the Examining Authority and the decision maker to reconsider this process, but they should be satisfied that this assessment has been undertaken.*”

Test 4 - Improving accessibility

- 4.5.15 HE’s ‘Accessibility Strategy - Our approach’ states that “*..we want to address the barriers our roads can sometimes create, help expand people’s travel choices, enhance and improve network facilities, and make everyday journeys as easy as possible. This will be achieved by ensuring our network supports and contributes to accessible, inclusive and integrated journeys which are safe, secure, comfortable and attractive.*”
- 4.5.16 Road Investment Strategy, March 2015 states that “*..the government is committed to improving active travel options, such as cycling and walking. Too often the SRN often acts as a barrier to these activities, so we are committed to improving access through building new bridges, crossings and cycle paths...The Company [HE] has also committed to cycle-proofing new schemes as standard, as well as working with Local Authorities to improve end-to-end cycling and walking journeys.*”

Test 5 - Limiting and reversing environment impacts

- 4.5.17 The Consultation Scheme objectives include “*to minimise adverse impacts on health and environment*”. In addition, Road Investment Strategy, March 2015 states that “*...working closely with local authorities and environmental groups, will allow the Company [HE] to limit, and even reverse, the effects that the network has on its surroundings. It will also move us towards our aspiration of a dramatically lower emission SRN that delivers a net gain in biodiversity and leaves a strong environmental legacy.*” “*A greener network: through its use of environmentally and visually sensitive ‘green infrastructure’, and management of the verges and open spaces, good design will minimise the air, light, noise, and visual impacts of the SRN. Enhancements to the SRN will meet high standards of design, responding to a local sense of place, and working wherever possible in*

harmony with the natural, built and historic environments....A more integrated network: the SRN will be managed as an integrated part of a wider transport network so that users do not encounter friction at the points where it joins other networks when planning or undertaking journeys. Cyclists, pedestrians and equestrians will enjoy safe, extended and integrated network infrastructure that is attractive both for work and leisure travel.”

- 4.5.18 ‘Environment Strategy - Our approach’, April 2017 states that *“This strategy outlines our commitment to improving our environmental outcomes. In doing this, it seeks to help protect, manage and enhance the quality of the surrounding environment, with a focus on people and the built, natural and historic environment. It will be delivered through all aspects of our business and in particular the operation, maintenance and improvement of our network.”*
- 4.5.19 These policies have been considered in the review of the information contained in the PEIR (Chapter 7 and Appendix A).

Test 6 - Innovation and future-proofing

- 4.5.20 The Consultation Scheme objectives include *“to improve resilience of the Thames crossings and the major road network”*. In addition, the Road Investment Strategy, March 2015 states that the *“RIS does not seek to predict the future, but takes into account a range of possible outcomes, underpinned by broad evidence, which the Department will continue to build on and review. The Department and the Company [HE] must be an active contributor in efforts to ensure the UK takes advantage of these global technology trends, facilitates investment and boosts overall UK capability.”*

Test 7 - Robust consultation

- 4.5.21 The Strategic Business Plan, October 2017 states that *“..we will improve our planning for the next decade and beyond. This will mean:*
- *Taking a more responsive and coherent approach to planning – one that is better understood by our customers, staff, suppliers and partners;*
 - *Giving stakeholders more of a say in how we develop the network at a national, route and local level;*
 - *Exploring new and better ways to stimulate growth;*
 - *Encouraging innovation, especially to exploit the benefits of vehicle and roadside technology;*
 - *Ensuring our customers have more of a voice in determining investment priorities and how work is delivered;*
 - *Providing for the needs of cyclists, pedestrians and others who walk or ride on, near or across the network”.*
- 4.5.22 This test is considered under the adequacy of consultation in chapter 8.

5 Reviewing and Testing the Consultation Scheme - Design Elements

5.1 Introduction

5.1.1 This section covers the following design elements of the scheme:

- Adequacy of options appraisal;
- The Port of Tilbury and Tilbury Link Road;
- Rest and Services Area (RaSA) in East Tilbury;
- A13 connections: Orsett Cock and Manorway junction;
- Proposed road structures, road realignments and control buildings;
- Resilience;
- Public Rights of Way (PRoW) and Green Bridges;
- Effects on the Green Belt;
- Travellers' Site;
- Effects on Special Category Land;
- Mitigation for the Operational Scheme; and
- Design Features - landscape, flooding and ecology.

5.2 Adequacy of options appraisal

5.2.1 Although an options appraisal has been undertaken to select the preferred route for the LTC, there is no available evidence that an options appraisal has been carried out to inform the configuration of the Consultation Scheme (junction locations, junction types, restricted movements, Public Rights of Way crossing locations, scheme height, alternative modes, etc).

5.2.2 Whilst the LTC is not part of the Road Investment Strategy it is identified as a scheme to be developed for the next 'Road Period'. It is included in the draft Road Investment Strategy 2. The consultations undertaken in 2013 and 2016 consider the location options and route options respectively but it is considered that the appraisal which is available and the consultations to date have not satisfactorily considered options on the configuration of the Consultation Scheme.

5.2.3 The traffic modelling output available with the consultation documentation does not include results of any option testing and is not detailed enough to understand the scheme impacts on the local networks and residents, businesses, open countryside and designated environmental areas.

- 5.2.4 Local junction improvements and other mitigation may be necessary and should be funded and delivered with the scheme.
- 5.2.5 The Council is actively engaging with Highways England however based upon the consultation material available the Consultation Scheme proposals appear contrary to Test 3 (Options Appraisal) and Test 7 (Robust Consultation).
- 5.2.6 Due to deficiencies in the available information on the option appraisal and impacts, it is recommended that the Council should reserve an entitlement to supplement or modify its consultation response in light of additional information which is likely to be forthcoming.

5.3 The Port of Tilbury and Tilbury Link Road

Context

- 5.3.1 The Tilbury Link Road was included in the non-statutory consultation, which closed in March 2016, but has not been included in the Consultation Scheme and the rationale for this is not clearly stated in the consultation materials, particularly as the Department of Transport England's 'Port Connectivity: the current picture' confirms that the Lower Thames Crossing is expected to offer new connections, as well as improved journey times and network reliability.
- 5.3.2 The Port of Tilbury is of National and Regional importance bringing £388m Gross Value added to UK, handling some:
- 16m tonnes of cargo processed each year;
 - 3.5m tonnes paper and forest products paper year: Largest paper handling port in UK;
 - 2m tonnes recycled products p.a: largest waste/recycling export port in UK;
 - 1.4m tonnes of imported/exported Grain p.a: largest import and export terminal for grain in UK. Handling about 17% of the country's total import wheat requirements.
- 5.3.3 Other statistics relating to the Port include:
- The port is home to the London Container Terminal (LCT) and the largest reefer facility in the UK;
 - 1,400 reefer plugs: Europe's largest terminal for refrigerated containers;
 - 25,000 NFT Chilled Distribution pallets are stored;
 - 100,000 cars per year imported/exported;
 - 100,000 cruise passengers p.a;
 - 500,000 containers p.a.
- 5.3.4 The Port of Tilbury is one of the largest employers in Thurrock with:

- 3,500 employees at the Port;
- 50 apprentices;
- 8,300 local jobs supported by the Port;
- 5,500+ new jobs due to be generated at the London Distribution Park and Tilbury 2 sites.

- 5.3.5 Port-related employment accounts for some 1 in 5 of the employed population of the Borough (estimated 12,443) and 20,000 jobs (25%) of the total employed in the ports sector in England (2015) are employed at London and Medway ports, which includes the Port of Tilbury. Some £2,100m Gross Value Added (34%) of the total contribution made by all ports in England (2015) is made by the London and Medway ports.
- 5.3.6 The largest Amazon fulfilment centre in Britain is already being built on site and “...will help triple employee numbers at Tilbury from 4,000 to 12,000 in the next decade” (Financial Times 5 Feb 2017).
- 5.3.7 The Tilbury 2 investment will see the amount of trade passing through the port reach 32 million tonnes each year, equivalent to more than 1 tonne every second. Ports directly generate £1.7 billion of trade every year, however their true value to the UK economy is worth more than three times that figure (£5.4 billion) when indirect impacts such as the port industry’s spending on vehicles, construction and business services are considered.
- 5.3.8 The Port of Tilbury and the people that work there will play a major role in helping the UK to increase international trade after the UK leaves the European Union. (see <https://www.gov.uk/government/news/tilbury-port-to-capitalise-on-opportunities-to-boost-trade> Government press release, 18 Oct 2018).
- 5.3.9 Whilst traffic leaving the port will be able to access the Consultation Scheme to travel north-bound and south-bound, traffic access to the port is not straight forward, as would be expected for a major port facility, and will still need arrive via the A13 (see para 5.3.12 below). The journey time from the M2 to the Port of Tilbury would be expected to be significantly shorter with direct access from the LTC.

Review findings

- 5.3.10 It is not clear from the evidence presented within consultation materials why the proposed connection to the Port of Tilbury has been removed and option testing is not provided. Without the Tilbury Link Road, traffic ‘to’ the port will not be able to use the Consultation Scheme. From the south east, traffic will need to continue to use the A2, Dartford Crossing, A13 and A1089 route. From the north, traffic will continue to use the M25, A13, and A1089.
- 5.3.11 It is understood that the A1089 (Asda) roundabout has been tested and options considered to provide direct access from the Consultation Scheme ‘to’ A1089/Port of Tilbury, although this testing is not available in the consultation documentation. It is also understood that due to land constraints, a solution for direct access was not identified. It is not clear in the consultation documents why the Tilbury Link

Road has not been considered as an alternative solution to achieve direct access to the Port of Tilbury.

- 5.3.12 It is considered that the re-instatement of the Tilbury Link Road in the LTC scheme, with appropriate traffic management to prevent rat-running in the event of congestion on the LTC, would offer new connections, improved journey times and network reliability to a port facility of strategic importance. Its exclusion from the Consultation Scheme is considered to be contrary to Test 1 (Driving prosperity), Test 3 (Options Appraisal) and Test 4 (Improving Accessibility). There is no evidence that the configuration selected for the Consultation Scheme optimises journey times, reliability and accessibility to the Port of Tilbury to support its planned and aspirational growth, associated with opening new markets and attracting new businesses.

5.4 Rest and Services Area (RaSA) in East Tilbury

- 5.4.1 Section 12.4 of the LTC 'Approach to Design, Construction and Operation' document sets out information relating to the Rest and Services Area (RaSA) proposed in East Tilbury however it is not evident that the full range of potential options and locations has been considered, contrary to Test 3 (Options Appraisal). An option further north should be considered, either inside or outside of the Borough, which could provide a new junction to enable a potential future growth area around South Ockendon to meet Test 2 (Sustainable local growth).
- 5.4.2 The RaSA is located on land that has been put forward through the Borough's 'Call for Sites' for housing at East Tilbury. This potentially affects the Borough's ability to deliver its development needs (see para 3.3.6 et seq.) and is therefore contrary to Test 2 (Sustainable local development).
- 5.4.3 The RaSA is expected to operate 24 hours every day. The RaSA is likely to give rise to noise, air quality, visual and lighting impacts on local residents and other sensitive receptors arising from the scale and nature of the development and related activities, there are also concerns about the land quality in this area and the ability of any mitigation planting to establish. Overall it is considered that this is therefore contrary to Test 5 (Limiting and reversing environment impacts).
- 5.4.4 As the RaSA is expected to be privately delivered, which would introduce another level of uncertainty; it is important that the any detailed designs and environmental controls are agreed by the Council, as planning and highway authority, including any approvals relating to the discharge of related DCO Requirements.

5.5 A13 connections: Orsett Cock and Manorway junction

- 5.5.1 There are a number of significantly restricted movements at the proposed junction with the Consultation Scheme and the A13, due to its proposed configuration. These are:
- From the Consultation Scheme south, travelling north-bound:
 - to the A13 (west) - the A13 towards Thurrock urban area cannot be reached directly - this requires traffic to

undertake a detour along the A13 to u-turn at the Orsett Cock junction.

- to the A1089/Tilbury Port - the A1089 to Tilbury Port cannot be reached directly - this requires traffic to undertake a significant detour along the A13 to u-turn at the Manorway junction.
- To the Consultation Scheme south, travelling south-bound:
 - from the A13 (west) - traffic cannot arrive from the A13 (west) from Thurrock urban area - this requires traffic to undertake a significant detour along the A13 to u-turn at the Manorway junction.
 - from A128 - traffic cannot arrive from the A128 – traffic would need a major detour down the A13 to u-turn at the Stifford interchange (with the A1019), then back along the A13 eastwards to u-turn at Manorway junction.
- From the Consultation Scheme north, travelling south-bound:
 - to the A13 (west) - the A13 towards Thurrock urban area cannot be reached directly - this requires traffic to undertake a detour along the A13 to u-turn at the Orsett Cock junction. It is acknowledged that the existing M25 will continue to provide an attractive route.
 - to the A1089/Tilbury Port - the A1089 to Tilbury Port cannot be reached directly - this requires traffic to undertake a significant detour along the A13 to u-turn at the Manorway junction.
- To the Consultation Scheme north, travelling north-bound:
 - from the A13 (west) - traffic cannot arrive from the A13 (west) from Thurrock urban area - this requires traffic to undertake a significant detour along the A13 to u-turn at the Manorway junction. It is acknowledged that the existing M25 will continue to provide an attractive route.
 - from A128 - traffic cannot arrive from the A128 – traffic would need a major detour down the A13 to u-turn at the Stifford interchange (with the A1019), then back along the A13 eastwards to u-turn at Manorway junction.

Note: direct access to/from the A1013 Stanford Road and/or B188 Baker Street is also not possible on to the Consultation Scheme, as an alternative.

5.5.2 There is no evidence within the consultation documentation to explain the selected junction configuration or the options tested. This is therefore contrary to Test 3 (Options Appraisal).

- 5.5.3 There are therefore no direct connections between Thurrock urban area and the Consultation Scheme, except 'from' the A1089. These restricted movements (alongside the removal of the Tilbury Link Road from the Consultation Scheme) constrain the potential for the scheme to improve accessibility to/from the Borough, and therefore economic growth and local development.
- 5.5.4 The inclusion of the Tilbury Link Road, as discussed above, would provide the opportunity to relieve the currently proposed u-turning operations at Orsett Cock and Manorway junctions.
- 5.5.5 The junction at A13 to/from Lakeside Shopping Centre has suffered with significant congestion problems for many years due to the lack of east-facing slip roads. After 20 years and much lobbying, east facing slip roads are now planned. There is no evidence to demonstrate that similar issues will not arise due to the restricted movements planned at the A13 junctions. It is understood that the Council is concerned that history will be repeated without west-facing slips on the LTC to/from the A13.
- 5.5.6 Overall, the Consultation Scheme would appear contrary to Test 1 (Economic growth and driving prosperity), Test 2 (Sustainable local development), Test 4 (Improving Accessibility) and Test 6 (Innovation and future proofing).

5.6 Proposed road structures, road realignments and control buildings

Road structures – Mardyke and E Tilbury

- 5.6.1 The evidence is not available to demonstrate what opportunities have been explored to lower the vertical alignment of the Consultation Scheme, particularly through the Mardyke Valley and at Tilbury over the railway loop line. This is contrary to Test 3 (Options Appraisal).
- 5.6.2 At Mardyke, it is understood that there are various design restrictions relating to, for example, clearance height required for dredging, however, the potential visual impact is high. In order to ensure that potential environmental impacts are limited (Test 5), it is recommended that the design parameters and potential restrictions are thoroughly examined.
- 5.6.3 At East Tilbury, consideration in the design needs to be given to provision for rapid access for emergency vehicles. It is understood that a problem currently exists (see para 3.3.7 above) and it is considered that this will be exacerbated by the Consultation Scheme proposals, contrary to Test 4 (Improving accessibility).

False cuttings and other design mitigation

- 5.6.4 The assessment of the adequacy of the proposed false cutting to mitigate noise, visual and health impact is not available, contrary to Test 3 (Options Appraisal) and potentially Test 5 (Limiting and reversing environment impacts).
- 5.6.5 It is recommended HE engages with the Council in the suitability, design and effectiveness of this and other proposed physical design mitigation to address potential adverse effects on the Borough's residents eg bunds, cut and cover tunnels or lowering vertical alignment particularly where it is close to residential areas.

Passive provision for future development

5.6.6 As part of the on-going consultation, it is recommended that HE works with the Council to seek to ensure that appropriate passive provision is made in the Consultation Scheme to deliver future development planned in the Borough, in order to fulfil policy Test 6 (innovation and future-proofing).

Realignment of Rectory Road

5.6.7 As part of the proposed reconfiguration of the A13 Junction the Consultation Scheme makes provision for the realignment of Rectory Road. This would effectively sever the Orsett Showgrounds and be contrary to Test 5 (Limiting and reversing environment impacts).

Tunnel control buildings

5.6.8 The location and configuration of the proposed tunnel control buildings and access road at the North Portal approach are shown in the followings extracts from the consultation materials in Plates 5.1 and 5.2 below.

Plate 5.1: extract from consultation materials showing indicative location and alignment of LTC control buildings and access road

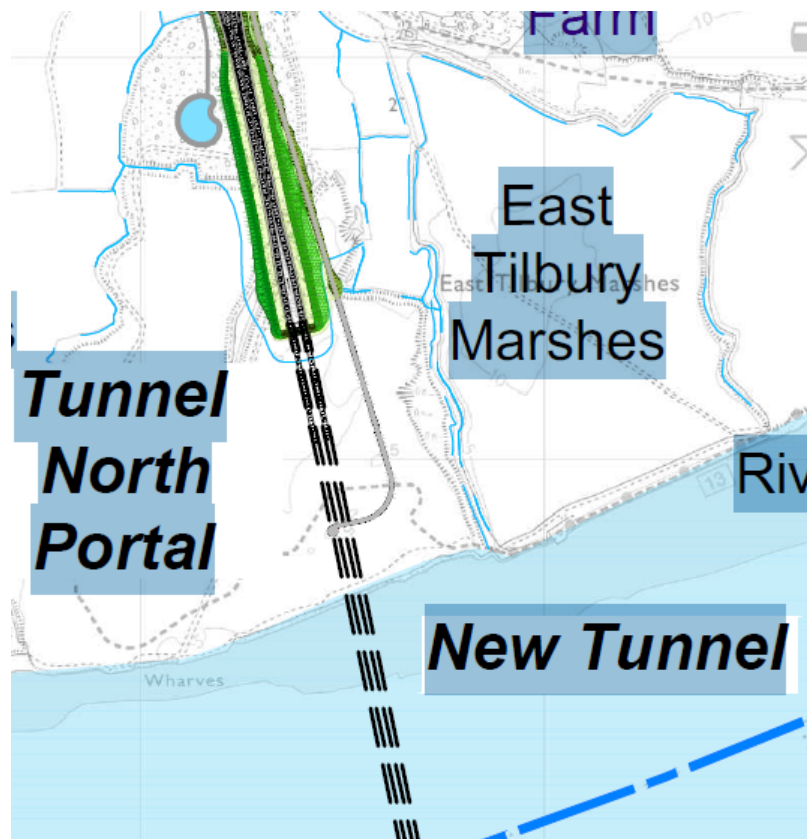


Plate 5.2: extract from consultation materials showing illustration of LTC control buildings and access road



5.6.9 The evidence is not available to demonstrate what options have been explored in relation to the location and design for control buildings and access road, as shown in the above plates. This is contrary to Test 3 (Options Appraisal).

5.6.10 In order to ensure that potential environmental impacts are limited (Test 5), it is recommended that the design and locational parameters can be presented by HE.

5.7 Resilience

5.7.1 The LTC has been designed for a life span of some 100 years, yet there is no evidence within the consultation material which presents where the design has considered or safeguarded for resilience to future change, such as travel trends, mode shift and emerging technologies. Such work would provide flexibility, for example:

- to accommodate high occupancy/public transport prioritised lanes in the future to facilitate technologies such as autonomous shuttle buses;
- to safeguard/ deliver bus priority advance lanes to and from the tunnel enabling dedicated public transport links across the river between Thurrock and Kent, particularly to the railway (offering more direct regular services into London) and/or Kent Thameside Fastrack services at Gravesend;
- to accommodate rail across the river.

5.7.2 By way of example, the west facing only slip roads were delivered in the 1980s at the A13/A126 junction to provide access to Lakeside shopping centre. A recent

government announcement has allocated £50m to deliver new A13 slip roads, after decades of congestion caused by the restricted access. There is concern that the restrictions into and out of the Borough which are part of the Consultation Scheme will cause similar delays and constraint on connectivity and economic growth. This is contrary to Test 6 (Innovation and future-proofing).

5.8 Public Rights of Way (PRoW) and Green Bridges

Policy context

- 5.8.1 HE's Road Investment Strategy, March 2015 states that *"working closely with local authorities and environmental groups, will allow the Company to limit, and even reverse, the effects that the network has on its surroundings. It will also move us towards our aspiration of a dramatically lower emission SRN that delivers a net gain in biodiversity and leaves a strong environmental legacy.".... "A greener network: through its use of environmentally and visually sensitive 'green infrastructure', and management of the verges and open spaces, good design will minimise the air, light, noise, and visual impacts of the SRN. Enhancements to the SRN will meet high standards of design, responding to a local sense of place, and working wherever possible in harmony with the natural, built and historic environments....A more integrated network: the SRN will be managed as an integrated part of a wider transport network so that users do not encounter friction at the points where it joins other networks when planning or undertaking journeys. Cyclists, pedestrians and equestrians will enjoy safe, extended and integrated network infrastructure that is attractive both for work and leisure travel."*
- 5.8.2 HE's Environment Strategy - Our approach, April 2017 states that *"This strategy outlines our commitment to improving our environmental outcomes. In doing this, it seeks to help protect, manage and enhance the quality of the surrounding environment, with a focus on people and the built, natural and historic environment. It will be delivered through all aspects of our business and in particular the operation, maintenance and improvement of our network."*
- 5.8.3 These policies should be considered in the light of the following discussion relating to PRoW and Green Bridges.

PRoW

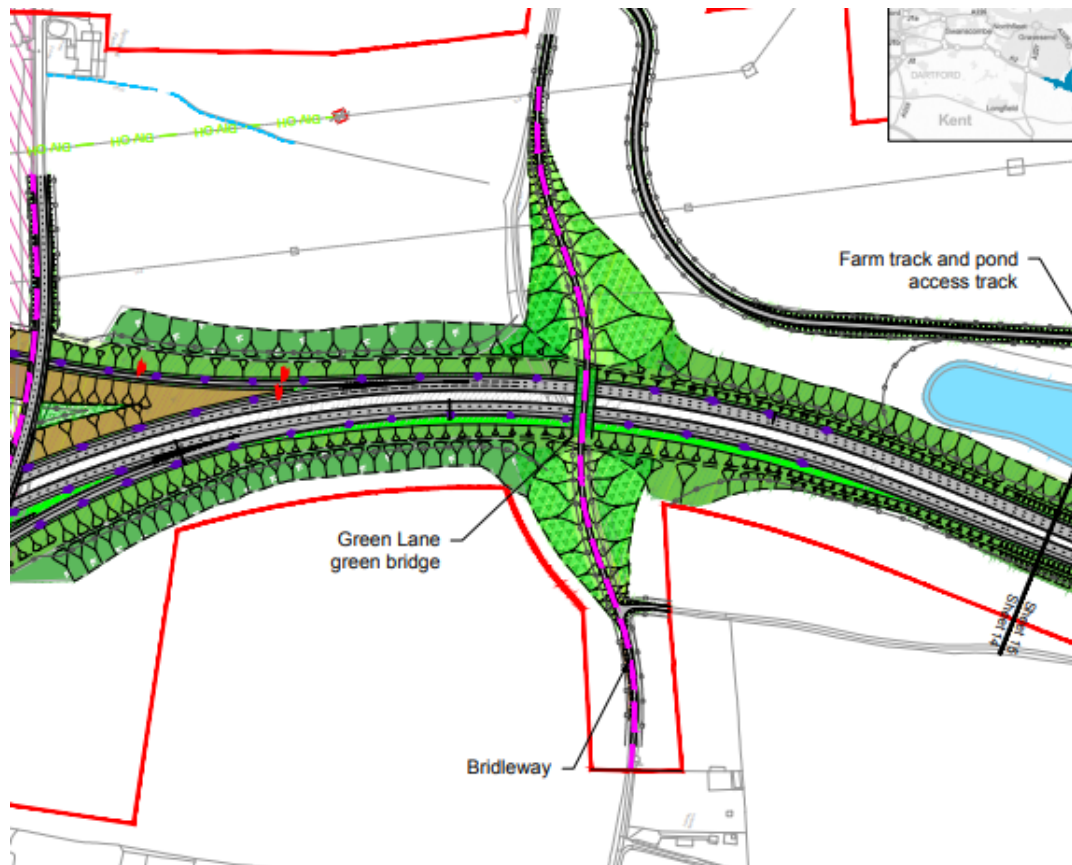
- 5.8.4 The Consultation Scheme makes provision for the replacement/re-provision of PRoW which are affected by the proposals however further details are sought in relation to the temporary provision during the construction phase. In addition, as encouraged by policy outlined above, it is recommended that opportunities are explored as to the creation of new or re-provision of existing PRoW as Green Bridges, where this is appropriate.

Green infrastructure – Green Bridges

- 5.8.5 Green infrastructure is referred to in the PEIR in a number of sections as a potential form of mitigation for loss of habitats and other environmental impacts. Proposals for green infrastructure are to be developed in association with Green Infrastructure Report to be provided at an unspecified date.

- 5.8.6 The only forms of green infrastructure specified in the consultation documents are 'green bridges', and 'green structures on the A2 corridor'. It is unclear what other forms of green infrastructure, if any, may be utilised in the Consultation Scheme as mitigation.
- 5.8.7 Green bridges, among other forms of green infrastructure are recommended in the NNNPS as potential forms of environmental mitigation in support of new and existing habitats (section 5.36). The location of the potential green bridge is presented in Map Book 1: General Arrangements. The purpose of green structures is to mitigate any fragmentation effects and improve mobility of species through the provision of green corridors between existing habitats. In addition, such bridges provide the potential to reduce the visual impact of standard bridge crossings.
- 5.8.8 The example below (Plate 5.3) is from Sheet 14 of Map Book 1: General Arrangements Map, showing the proposed Green Lane Green Bridge.

Plate 5.3: extract from consultation materials showing proposed Green Lane Green Bridge



- 5.8.9 The design and specifications of a green bridge, and its effectiveness as a form of mitigation, is not discussed in the PEIR or Approach to Design Construction and Operation document. It is therefore considered that the proposals are contrary to Test 3 (Options Appraisal) and there is no evidence to demonstrate the Consultation Scheme meets Test 5 (Limiting and reversing environment impacts).

5.9 Effects on the Green Belt

5.9.1 The Consultation Scheme is located, in part, in designed Green Belt within the Borough. Whilst it is acknowledged that the Council is itself under pressure to release Green Belt land (for example, see para 3.3.14 above) this release will be in areas that are most sustainable. In relation to the Consultation Scheme, it is noted that the 'very special circumstances' test will apply for inappropriate development in the Green Belt.

5.10 Travellers' site

5.10.1 The Consultation Scheme proposes to remove a Travellers' site located at Gammon Field, in the vicinity of the proposed A13 junction. No information is provided on impacts on this community or their future accommodation. A potential area is proposed (in red), as shown on General Arrangement Plan Sheet 12, reproduced below. The site is displayed however no proper or effective assessment of the site is provided in the PEIR or other consultation material relating to the site characteristics (above face value characteristics shown on the plan), why this site was selected against other options, or any specific consultation held with the Traveller community. For these reasons, this provision fails Test 3 (Options Appraisal).

5.10.2 In consideration of the site at face value, location-wise, it is the type of site that has the potential to be suitable for a Travellers' site. However, any site selection should be subject to a variety of assessments to ensure suitability, on:

- the impacts of noise and similar effects of the Consultation Scheme on future residents;
- the ability of the site to serve the community in terms of size, and site arrangements including after the removal of undevelopable land through, for example, any potential buffer for pylons, Flood Zones 2 or 3, or land with unsuitable contours;
- landscape and visual impact; and
- impact on the Green Belt.

5.10.3 For this reason, it cannot be assured that this site selection meets the requirements of Test 5 (Limiting and reversing environment impacts).

Plate 5.4: extract from consultation materials showing indicative location for replacement Travellers' site



5.11 Effects on Special Category Land

5.11.1 It is unclear the extent to which Special Category Land is affected by the Consultation Scheme, if any. It is recommended that the Council seek an early opportunity to discuss this with HE.

5.12 Mitigation for the Operational Scheme

5.12.1 There are a range of elements relating to mitigation for the operational scheme which are likely to require further engagement between the Council, other stakeholders such as the police and emergency services and HE, those elements highlighted at this stage are:

- Tunnel operations – procedures for dealing with accidents and emergencies in the tunnel;
- Tunnel operation – measures put in place to avoid rat-running during routine closure of the Dartford Crossing;
- Operation of the RaSA - treatment of illegal HGV parking and maintaining cleanliness of laybys;
- Effects on wider network – trunking the A13 from the A1089 to Manorway;
- Effects on wider network – traffic safety and treatment of existing accident hotspots;
- Mitigation planting – possible use of willow planting as a sustainable crop.

5.13 Design Features - landscape, flooding and ecology

Introduction

- 5.13.1 This section deals with the 'environmental' design features relating to the Consultation Scheme.

Mardyke crossing

- 5.13.2 There are extensive areas of Flood Zone 3 across the area associated with the Mardyke floodplain. North of the A13 junction the route is proposed to be at about ground level for about 1km before climbing to cross the flood plain of the Mardyke. The route crosses the Mardyke flood plain for 2km with about 1.5km of embankment up to 7.5m high and a 450m long viaduct across the Mardyke river and nearby Golden Bridge Sewer.
- 5.13.3 Initially the route between the A13 and M25 crossed the Mardyke Valley on a low embankment about 4m high. It also crossed the Mardyke river and the nearby main rivers (Orsett Fen Sewer and Golden Bridge Sewer) on short individual single span structures which were slightly wider than the rivers. Subsequently a hybrid option was chosen with a shorter viaduct (about 450m) over the Mardyke river and Golden Bridge Sewer and embankment (about 980m total length) across the rest of the area with a single span (about 50m) over Orsett Fen Sewer.
- 5.13.4 The main reasons for selecting this option are cited as: *"Including a viaduct gives a more open aspect reducing the visual impact in this open area; A combination of viaduct and embankment is a more cost-effective solution than a viaduct over the whole of the valley; A shorter viaduct will be less of a long-term maintenance issue than the longer viaduct while it will still present an opportunity for architectural treatment that minimises visual impact; Reducing the length of embankment reduces the volume of flood compensation and consequently the amount of land compared to the preferred route and option 1 making it easier to find suitable land."*
- 5.13.5 While the consultation material suggests that a balance has been struck between the solutions of a viaduct or embankment, both still offer significant adverse impacts on the landscape in terms of visual amenity and substantial land modification, with all of its associated risks. It is not apparent that options to form a tunnel for all or part of the route have been considered in order to eliminate these environmental impacts. For these reasons this element of the Consultation Scheme is considered to fail Test 3 and Test 5.

Flood Risk Assessment – compensation and mitigation

- 5.13.6 A great deal of integral environmental information is withheld from the consultation material pending the publication of a Flood Risk Assessment (FRA).
- 5.13.7 Areas for flood plain compensation are selected in consultation with the Environment Agency in the process of preparing an FRA. Flood compensation areas are created by earthworks which increase the capacity of a flood plain in response to the impacts the project will have on drainage capacity in an area, and to mitigate for increased risk of flooding caused during construction and operation of the Consultation Scheme.

- 5.13.8 HE proposes a staged approach to flood compensation, with areas progressively growing as the need for flood compensation capacity develops. Flood compensation will be needed for the temporary works as well as permanent works. The implementation of these areas will form part of the early construction programme (enabling works).
- 5.13.9 In addition to provision for flood area compensation, the scheme must also consider mitigation measures for flooding and impacts on water quality as a result of the scheme. These include the uptake, location and detailed design of the following measures:
- flood defences of the north tunnel portal;
 - bridge deck levels and spans;
 - road levels;
 - a main drainage strategy including dealing with exceedance flows;
 - pollution control and water quality;
 - runoff assessment;
 - location of surface water balancing facilities; and
 - specific techniques that may be used to mitigate pollutant runoff include attenuation ponds and swales.
- 5.13.10 Prior to the FRA being completed, it is not possible to meaningfully comprehend the significance of flood risk impacts or respond to options for compensation and mitigation approaches yet to be included in the Consultation Scheme. For this reason it is considered that the Consultation Scheme fails Test 3 and Test 7.

Approach to ecological and habitat replacement areas

- 5.13.11 The PEIR states that the process of determining areas for habitat creation is ongoing in preparation of the ES. The purpose this ongoing process is to identify the most suitable areas for potential habitat creation where significant effects on designated areas and protected species have been identified. These areas fall under the following categories (contained in Map Book 1): Ancient Woodland, Replacement Open access Land, Environmental Improvement Works, Proposed Woodland Planting, Proposed Grassland planting, and Areas Returned to Agriculture.
- 5.13.12 The process for selecting and assessing the effectiveness of these areas as forms of mitigation is not made clear in the PEIR. It is not detailed if new areas of compensation are commensurate with the loss caused by the project. It is also not identified if further work to identify such areas will be the subject of engagement with stakeholders such as the Council. It is recommended that this is clarified by HE.

Potential receptor sites for translocation of protected species

- 5.13.13 HE has identified potential habitat replacement areas where protected species can be translocated. To avoid undue stress to species HE proposes to prepare multiple replacement habitat areas, including an area for translocation of species affected by early construction activity. This approach removes the need for multiple translocations of individuals. It also has the added benefit that significant areas of replacement habitat will have more time to develop.
- 5.13.14 Potential receptor sites are identified in Map Book 1: General Arrangements. Two significant potential sites are located just to the east of the route near the Thames on the northern side. It is recommended that the Council and HE maintain dialogue to seek agreement about the suitability of the proposed sites and their long-term use and maintenance.

Potential receptor site for excavated material/landscape enhancement

- 5.13.15 A large potential receptor site for excavated tunnel material is identified in Map Book 1 around the land at Goshems Farm, on the Thames side of the northern tunnel portal. This land also comprises a designated LWS (Local Wildlife Site), however it is anticipated a large proportion of this (70ha) will have been destroyed during 2018 due to the importing of spoil from Thames Tideway and spreading it to raise the height of the land at Goshems Farm. Accordingly, it is likely to be deselected as a LWS and therefore its value reduced however the effect of the LTC mitigation works here on the mitigation associated with the Tideway project need to be considered. It is recommended that the Council and HE maintain dialogue to seek agreement about the suitability of the proposals and long-term use and maintenance of the site.

6 Reviewing and Testing the Consultation Scheme - Construction, Logistics & Utilities

6.1 Introduction

6.1.1 This chapter considers those aspects which relate to the construction of the Consultation Scheme together with the proposed utilities diversion works which are required to enable the develop of the scheme. It is acknowledged that the information relating to these aspects, presented in the consultation materials, is still at an early stage in design development, however the intention of this chapter is to provide observations and highlight those areas of potential concern which will need to be addressed by the HE design team as the scheme design and assessment work progresses.

6.2 Construction arrangements and methods

6.2.1 Overall there is little detail at this stage on the actual methods of construction to be employed, and, importantly, the interaction that these methods might have with design. Methods of construction can have significant impacts on the design of such projects and their potential environmental impacts. For example, if site-won sand and gravels are used, supplemented by marine imported aggregates, there would be a considerable reduction on the impact of vehicle movement on the local roads.

6.2.2 There is no evidence of the consideration given to the interaction of method, design and the potential reduction of impacts. Due to this, it is not known where potential adverse effects could in fact be designed out of the project and hence avoided, as opposed to fully or partially mitigated at potentially great effort and cost.

6.2.3 Little indication is made of the construction techniques to be employed. The mitigations imply, though, that these will be conventional.

CEMP and CoCP

6.2.4 Section 2.18 of the PEIR indicates that activities during the construction phase will be subject to measures defined within a Construction Environmental Management Plan (CEMP) and that a Code of Construction Practice (CoCP) will be prepared "*..which will outline the measures to be implemented through the CEMP to minimise adverse effects during the construction phase, including measures for control of pollution*". The Council would welcome an early understanding of the content of these documents and how they will be applied during the construction phase.

6.3 Construction compounds

6.3.1 The main tunnelling compound is large and appears to contain the main site offices. The main compounds at the A13 and M25 are mentioned but no location indicated and no land take specifically indicated.

6.3.2 Access to compounds with the use of local roads is possible although the creation of temporary haul roads from more major roads will be considered. Temporary haul routes for the tunnel are being considered from the A1089 or Fort Rd via RWE. It is noted that the former is likely to be a considerable road in its own right.

6.4 Land take

6.4.1 New motorway schemes are generally constructed within the site boundaries with additional land potentially required for related necessary activities. Some activities are noted below:

- Site compounds – currently identified for the tunnel activity;
- Borrow pits and surplus/unacceptable spoil deposition –surplus deposition is identified. No borrow pits for earthworks are identified;
- Materials abstraction (e.g. granular materials) – the use of a potential borrow pit for sand and gravel within the development area is mentioned. It is not clear if this is taken from within the development boundary or additional land will be taken;
- Temporary works (e.g. road diversions) – none identified;
- Utility diversions – relocation of overhead lines identified only;
- Special requirements – potential jetty shown, including access from site.

6.5 Construction logistics

6.5.1 Table 12.9 in the PEIR (Potential effects and mitigation measures during construction – PEIR, Ch 12) states “..the Project is expected to require a significant quantity of materials during construction”. This is a certainty, yet there is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established.

6.5.2 A segment factory located in the Borough at the North tunnel portal is considered, which produces tunnel segments onsite to enable easy access to the tunnel. The supply or materials for this plant is not specifically discussed but the mode used for transporting these materials may have significant effects, particularly on the road network.

6.5.3 There is insufficient detail on the likely haul routes and the impacts on local roads. The proposed Construction Travel Management Plan (CTMP) would need to be extremely robust to support the management of the haul roads and marine movements and would need to include, amongst other things, a Navigational Risk Assessment on marine movements.

6.5.4 Marine transport is considered in outline for the delivery of the Tunnel Boring Machine (TBM) and materials delivery and removal although it is not clear what these are and the benefits. It is unclear is the current jetty arrangement indicated is sufficiently sized for these tasks. It extends the existing East Tilbury jetty used for land raising.

- 6.5.5 If materials are to be transported by road, it would be positive to see consideration of the option to deliver the majority of materials to the LTC A13 main compound, which can then be distributed along the line of the works. This would reduce the potential impact upon the local road network.
- 6.5.6 The PEIR makes general statements about the aspiration to source materials locally but no reference is made to the criterion on which these decisions will be made, for example e.g. price, availability, or other.
- 6.5.7 Spoil disposal and reuse for the tunnelling materials is not clear. It is noted that the slurry can be a difficult material to handle in the short and long term.

6.6 Construction phase: materials sourcing, employment and accommodation

- 6.6.1 The Council has no surety that local sourcing would be given proper consideration. This should be extended not only to materials but to workers, plant and equipment, thereby helping to support local workers and businesses and to minimise the environmental effects of these resource streams.
- 6.6.2 Section 2.18 of the PEIR indicates that one of the 'key components of the construction compounds' is the provision of 'welfare and staff accommodation facilities'. Details of the strategy for worker accommodation and related mitigation should be provided by HE which should include:
- a. Review of the strategy objectives;
 - b. Accommodation options being considered (eg. floating accommodation, new build (temporary), new build (permanent), other off-site);
 - c. Volume, location and phasing of housing/landtake needed (both peak/average, in or outside red line boundary);
 - d. Consideration of potential social/community effects, associated mitigation, and other ancillary social provision, both temporary and permanent;
 - e. Post construction uses: options considered and phasing i.e when does this become available for non-LTC uses?
 - f. Identification of benchmarks and exemplar projects.

6.7 Utilities

- 6.7.1 Given the strategic location of the Borough and south Essex, there is an extensive range of utilities running through the area, a significant number of which are proposed to be diverted or altered as part of the enabling works for the Consultation Scheme. The extent of these is described in section 2.17 of the PEIR and an indicative plan of utility diversions is provided in PEIR Figure 2.
- 6.7.2 Para 2.17.1 of the PEIR states that "...the route will require the diversion or alteration of overhead high voltage electricity transmission and distribution lines. In addition, there are large high pressure gas feeder mains that will need diversion".

Para 2.17.2 continues “..at the three main junctions, the A2, A13 and the M25, the route will require complex diversions including: high, medium and low-pressure gas distribution mains, high pressure water mains and sewers, underground electricity distribution cables and a range of telecommunications cables including fibre optic cables. In addition, there could be low voltage electricity cables, small water mains and other utilities that may need diversion or protection works”.

6.7.3 The PEIR goes on to state that disruption of existing services “will be minimised through careful planning and liaison with the utility providers and construction works programme” and that it is assumed that some of the major diversions will be done as part of early enabling works.

6.7.4 The full extent of proposed diversions, the phasing of the works, identification of any development land that may be sterilised, and any mitigation measures is required to fully understand the extent of the disruption to the Borough and the likely significant environmental effects. This would include any temporary or permanent utility works required to service the tunnelling and construction activities.

6.7.5 In order to fully understand the potential effects, it is recommended that all utility works required for the scheme, including those which may be undertaken under Permitted Development rights or for which consent would be sought via another (non-DCO) consent process, are fully assessed by HE and reported in the Environmental Statement.

6.8 Treatment of northern tunnel portal

6.8.1 It is understood that one option being considered for the beneficial re-use of tunnel spoil material is to deposit it close to source at the northern portal. This is considered a sustainable option, minimising the distance the waste is transported and providing the opportunity for the improvement of brownfield land in this location.

6.8.2 It is acknowledged that consideration of this option is at an early stage and therefore the Council would wish to be involved in the design process to ensure that the outcomes align with its aspirations for future development in this area, should the LTC scheme proceed. The specific areas of interest to the Council are likely to be:

- a. Land improvement and waste treatment strategy for the northern portal construction area;
- b. Realising benefits of land improvement at the northern tunnel portal and how these can align with long term plans for area;
- c. Identifying the location of new development platforms and the nature of suitable end uses and any constraints on future development;
- d. Identifying the location of landscaped areas;
- e. Understanding of spoil treatment methods, including:
 - i. Potential effects (construction) and mitigation for sensitive receptors;

- ii. Potential effects (permanent), particularly any landscape/visual/heritage assets;
- f. Phasing – when will sites are available and the potential for temporary (meanwhile) and permanent uses;
- g. Availability of sites - LTC only (during construction) or TC uses?
- h. Long term ownership/maintenance requirements of the improved land.

6.9 Recommendations

6.9.1 It is acknowledged that the information relating to the construction phase and the proposed enabling works are still at an early stage in design development however it is recommended that the Council actively engages with the HE design team to ensure that the areas of potential concern, highlighted above, can be appropriately addressed by the team as the scheme design and assessment work progresses. Areas for further engagement include:

- a. further information should be supplied by HE as to proposed construction arrangements, methods and logistics. This would be to ensure that potential adverse effects are avoided or minimised and that appropriate mitigation can be considered for likely significant residual effects. Information sought should include, but not be limited to, details relating to:
 - Construction compounds – outline layout and principal construction activities;
 - Construction logistics and off-site facilities eg segment factory;
 - Materials abstraction and waste management strategy;
 - Borrow pits and haul road strategy;
 - Temporary works (e.g. road diversions);
 - On- and off-site enabling works;
 - Special requirements, including use of jetty and import of abnormal loads.
- b. Utilities: information should be supplied by HE as to the full extent of proposed utility diversions, the phasing of the works and any mitigation measures. This would include any temporary or permanent utility works required to service the tunnelling and construction activities;
- c. Construction Environmental Management Plan (CEMP), Code of Construction Practice (CoCP) and the Construction Travel Management Plan (CTMP): draft documents should be supplied by HE for early consideration by the Council;
- d. Construction phase: materials sourcing, employment and accommodation. HE to supply details of consideration being given to local sourcing of

materials and workers together with the draft strategy for worker accommodation;

- e. Northern portal: the Council would wish to be involved in the design process to ensure that the outcomes proposed for any land improvement at the Northern Tunnel Portal align with its long-term development aspirations.

7 Health and Environmental Impacts – Review of the PEIR

7.1 Introduction

- 7.1.1 This chapter summarises the findings of the review of the PEIR, seeking to identify any significant omissions and/or limitations in the assessment currently being undertaken by HE.
- 7.1.2 The policy test which has been considered in this aspect of the review has been principally Test 5 (Limiting and reversing environmental impacts (see paras 4.2.17-19).
- 7.1.3 This chapter continues with consideration of the health impact assessment work followed by a summary of the findings of the review of the PEIR.

7.2 Assessment of Health Impacts

Context

- 7.2.1 A Community Impacts Advisory Group has been established by HE, comprising: an external chairperson, members of the LTC team and representatives from each of the local authorities potentially affected by the LTC scheme together with Public Health England. It is understood that the intention is for this group to meet regularly to discuss topics which include health and well-being and equalities. As a precursor to the first meeting, HE has indicated (in September 2018) that a standalone Health Impact Assessment (HIA) will be prepared and that the Advisory Group will provide input to the methodology and perhaps scope of the HIA workstream. The review presented here is based on the consultation materials presented by HE in October 2018.

Overview

- 7.2.2 The PEIR does not contain a standalone assessment of human health impacts, instead taking the approach that the assessment can be carried out via other chapters. The approach taken is described in the LTC Scoping Report in Section 5.5.4: “[...] It is anticipated that effects on human health will be addressed in the People and Communities assessment and that effects reported in other chapters for example, air quality, noise and vibration will be used to inform this assessment.” In its Scoping Opinion, the Secretary of State broadly agrees with the approach, noting in Section 3.3.4:

“The Inspectorate notes that it is proposed in paragraph 5.5.4 to consider effects on human health in the People and Communities chapter, to be informed by other chapters including the Air Quality and Noise and Vibration chapters. The Inspectorate has had regard to the information provided in the Scoping Report and has taken into account the nature and characteristics of the Proposed Development and is generally content with this approach. However, the Inspectorate considers that human health effects may also be relevant to soil handling and waste management, which is understood to be assessed within the

‘Geology and Soils’ and the ‘Materials’ chapters respectively, and to the Road Drainage and Water Environment chapter.’

- 7.2.3 It is acknowledged that the Scoping Report was published some time ago (October 2017) and that both the scheme and approach to the assessment have developed since that time. However, it considered that the risks posed to the health of community are sufficient to warrant a standalone and proportionate HIA that would provide a coherent, integrated and comprehensive assessment of health impacts, brought together as a single point of reference.

Definition and understanding of human health in the EIA context

- 7.2.4 Whilst overarching consideration of human health is provided in the People and Communities chapter, the context and background is not clear. Furthermore, a working definition of human health has not been provided in the chapter, which makes it unclear how determinants of health of relevance to the Consultation Scheme have been identified.

Data limitations

- 7.2.5 There are limitations in data used to understand human health. Health Baseline data at the Local Authority level is not sufficiently detailed to understand nuances of the health baseline. Data should be provided at the Lower Layer Super Output Area (LSOA) level (as committed for the HIA) and the assessment should consider differential impact on specific groups. No deprivation data (key areas of deprivation in Tilbury, Chadwell St Mary, South Ockendon) or understanding of vulnerable groups to be considered is provided.

Engagement

- 7.2.6 It is not clear how vulnerable or ‘hard to reach’ groups have been engaged – the elderly, those with disabilities, those who may not be able to read or read English.

Engagement and stress impacts

- 7.2.7 Potential impacts on human health during construction include stress related to the planning process itself. In this respect an assessment on human health should include how communities have been engaged.

Key health impacts not identified

- 7.2.8 A key potential impact during operation is the severance of communities from social networks and facilities, and natural capital. Additionally, there is no preliminary Transport Assessment in the PEIR using standard practice methodology which assesses fear and intimidation, pedestrian amenity and delay, which will be key health determinants associated with the scheme.

Recommendations

- 7.2.9 Given the recent establishment by HE of the Community Impacts Advisory Group whose remit will include topics (and oversight) of the assessments relating to health and well-being and equalities, a watching brief is recommended to ensure

that the scope of the assessment, issues and potential mitigation being appropriately addressed as the assessment work proceeds.

7.3 PEIR-stage Environmental Assessment Methodology

7.3.1 Chapter 5 of the PEIR outlines the approach of each of the environmental topics presented. Each of the chapters, with the exception of Climate, is structured in the same format and approaches each topic consistently. The following therefore provides some background on critical points relevant to all chapters.

Identification of receptors

7.3.2 Identifies receptors and puts them on a scale of Negligible to Very High based on a number of criteria, generally related to scale and perceived importance. The determination of the significance of the receptors was undertaken by the applicant, in the absence of input from local authorities like Thurrock Council should be rectified.

Data limitations

7.3.3 A number of surveys are reported as still ongoing and will input into the environmental assessment at a later date, but have not informed the PEIR. These are surveys that relate to ground investigation, ecological, archaeological, air quality and noise.

Significance of Environmental Effects

7.3.4 The PEIR states that, in the ES, the significance of environmental effects will be assessed using criteria that reflect current best practice, as set out in the EIA Scoping Report, and taking into consideration the Scoping Opinion provided by PINS. It is considered that the Scoping Opinion does not reflect the likely significant environmental effects of the Consultation Scheme and that a new scoping exercise should be undertaken (see Section 8.2 below).

Cumulative Effects

7.3.5 No preliminary assessment of cumulative effects has been provided in the PEIR. The ES proposes to include an assessment of the cumulative effects of the Project, as set out in the EIA Scoping Report, and following the guidance in PINS' Advice Note 17: Cumulative Effects Assessment. A list of developments for inclusion in the assessment of cumulative effects shown be drawn by HE, in consultation with affected local authorities.

7.4 Approach to Mitigation

7.4.1 Specific measures to mitigate adverse environmental effects during the construction phase of the LTC are not described in the consultation documents. Each environmental topic in PEIR Volume 1 concludes with a section on Potential Effects and Mitigation Measures. The measures contained therein are generic approaches to mitigation. Specific mitigation measures are instead proposed to be incorporated within a Code of Construction Practice (CoCP) as part of the Environmental Statement. These mitigation measures will relate to the

construction phase of the project. Provisions relating to operational phase mitigation are discussed at the ends of these sections.

7.5 Environmental impacts of Construction and the CoCP

7.5.1 The consultation material puts a strong reliance on developing a Code of Construction Practice (CoCP) in order to control environmental impacts during construction. No discussion has been identified about designing out the construction impacts from the outset which help to assure consultees that adverse environmental impacts were not only being mitigated, but avoided entirely, where possible. It is recommended that a technical meeting is convened early with the Council to engage over this critical document.

7.6 Summary of review of PEIR environmental chapters

Introduction and review methodology

7.6.1 The following table presents a summary of the findings of the review of the PEIR, the details of which are presented in Appendix A. the Red-Amber Green rating which has been used is as follows:

- Red = needs addressing immediately/requires amendment to Consultation Scheme
- Amber = further work with Thurrock Council required prior to DCO submission
- Green = satisfactory

Summary Table

Table 7.1: Summary table of PEIR review

PEIR Chapter	RAG
<p>Health impacts:</p> <ul style="list-style-type: none"> • No standalone Health Impact Assessment (HIA) is provided as part of the consultation material, which is a substantial omission, considering the significant health impacts of this scheme. • Some considerations that would otherwise be made in an HIA are considered in other sections, however there are also key omissions and limitations, including: <ul style="list-style-type: none"> -No overarching definition of health is adopted in the report -The appropriate selection of datasets (for example, the exclusion of LSOA level data) -A lack of evidence that 'hard to reach' groups have been engaged with -Stress impacts related to engagement are not considered 	
<p>Air Quality:</p> <ul style="list-style-type: none"> • A number of potential significant effects are misrepresented or excluded because of flawed assumptions or inconsistencies. For example: <ul style="list-style-type: none"> -The PEIR has not included an assessment of construction phase traffic effects which may be significant for a scheme like LTC. 	

PEIR Chapter	RAG
<p>-The PEIR has not assessed all relevant road receptors following modelled changes in traffic.</p> <p>-The PEIR does not consider a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5})</p> <ul style="list-style-type: none"> • The PEIR provides standard techniques for mitigating effects such as construction dust, but omits numerous effective techniques that warrant consideration. • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed there won't be, so the analysis does not speculate as to what these might be in the scheme. 	
<p>Cultural Heritage (including Archaeology):</p> <ul style="list-style-type: none"> • The LTC project should establish a Heritage Panel, involving local authorities like Thurrock Council, to ensure a proactive, consistent and engaged approach to the scheme. • The PEIR should acknowledge all appropriate guidance principles – including Historic England's GPA2 and GPA3 principles. • The PEIR should consider all relevant effects within its own cultural heritage analysis, such as Historic Landscape, and the effects of vibration on the fabric of heritage assets • A study area of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • It is recommended that HE engages proactively with Thurrock Council to reduce impacts on the Thurrock Council-owned Coalhouse Fort, an important heritage asset and popular tourist attraction. • The PEIR needs to extend its assessment to significant non-designated assets, for example those associated with the Grey Goose Farm scheduled monument. • There is concern that the sensitive nature of the area of the grave terraces and interface with the grazing marsh is not fully acknowledged with the submitted documentation • Intrusive surveys need to be undertaken in order to properly determine the significance of the heritage assets to be impacted. 	
<p>Landscape:</p> <ul style="list-style-type: none"> • The PEIR should be more explicit on which guidance it is using for its assessment methodology. • the PIER's methodology does not clearly set out how levels of sensitivity and magnitude have been defined and how these judgements may be combined within the LVIA to establish significant effects for receptors. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the Thurrock Landscape Capacity Study. • The assessment should consider 'distant' viewpoints, including identified strategic and local views. • Early indication of operational mitigation proposals would 	

PEIR Chapter	RAG
<p>suggest they may not be adequate or effective.</p>	
<p>Terrestrial Biodiversity:</p> <ul style="list-style-type: none"> • The omission of an analysis of temporary loss of functional land potentially used by SPA species during construction means significant effects could have been missed, and furthermore may inflate the compensation areas required as mitigation. • The PEIR has not indicated any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy, and local policy • The extent of surveys has fallen short of minimum standards in the case of Barn Owl studies. • The effectiveness of recreating particular habitats, including LWS sites, is highly limited in some cases, and it is offered as potential mitigation in the PEIR. This mitigation should be given scrutiny against alternatives. 	
<p>Marine Biodiversity:</p> <ul style="list-style-type: none"> • The PEIR is limited by its sole reliance, so far, on desk-based studies, and as such the determination of impacts and mitigation are likely to be less accurate and reliable. • There is a lack of clarity on the Zone of Influence of the project, and therefore the justification of both the European sites, and the National Sites taken forward for assessment. • The PEIR does not provide opportunities for enhancement for marine receptors, as suggested by the NNNPS. 	
<p>Geology and Soils:</p> <ul style="list-style-type: none"> • The lack of intrusive investigations mean that it is not possible to be sure that HE have considered the environmental implications of worst case scenarios that can only be understood if long-term monitoring is carried out. • A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. • The study area of 250m is insufficient as it may not capture areas outside the buffer that may contain higher risk features. • The analysis excludes the potential for leachate and cavity formation in made ground, which are environmental risks that should be considered. 	
<p>Materials:</p> <ul style="list-style-type: none"> • There is insufficient detail on the possible use of the river and rail for the movement of materials, and the environmental and transport impacts of such a move. Considering the benefits of these modes, they should be seriously considered. • The analysis should also include the movements of other suitable materials, plant and equipment, and potentially transport by river/rail. • The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. • The PEIR does not demonstrate how the reuse within the project of materials has been maximised to minimise the 	

PEIR Chapter	RAG
<p>need for off-site haulage and handling.</p> <ul style="list-style-type: none"> The LTC should make a genuine commitment to local sourcing, extending to materials, workers, plant and equipment, where possible. 	
<p>Noise and Vibration:</p> <ul style="list-style-type: none"> The study area boundary of 300m is not justified - reasoning behind why impacts beyond this distance are unlikely is not explained and should consider the night-time construction activities proposed. The impacts assessment from construction should consider other sensitive receptors beyond dwellings and include schools, hospitals, and so on. A number of methodological issues are present, including, for example: <ul style="list-style-type: none"> -In line with national policy, assessment of impacts associated with the road traffic scheme should also be assigned specifically to LOAEL and SOAEL's defined in PPG. -There is no reference to topography data being applied in the modelling used. There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform Thurrock Council and other stakeholders of the significance of impacts identified. The mitigation options should explore means of designing out adverse noise effects, through for example changes to the vertical alignment or of speed restrictions. 	
<p>People and Communities:</p> <ul style="list-style-type: none"> The PEIR does not give adequate consideration to the NPPF and the presumption of sustainable development for communities, and especially falls short of demonstrating that the benefits are not significantly outweighed by adverse impacts. The PEIR takes a selective approach to identifying proposals for new employment, residential and leisure development within the local and wider region, and numbers that are provided are not properly evidenced. The PEIR refers to lower life expectancy, higher rates of cardiovascular deaths and worse levels of excess weight, some of which is evidenced and some of which appears to be anecdotal. A number of other issues have been identified related to potential effects and mitigation measures (see relevant section in Appendix A). 	
<p>Road Drainage and Water Environment</p> <ul style="list-style-type: none"> Key relevant guidance – such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991) – have not been reference in this section. The PEIR does not make it clear if the EIA will be underpinned by a whole system water balance approach 	

PEIR Chapter	RAG
<ul style="list-style-type: none"> The PEIR lacks important information on existing flood defences and their condition 	
<p>Climate:</p> <ul style="list-style-type: none"> The United Kingdom Climate Projections 2018 (UKCP18) have been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. It is unclear on the scope of Greenhouse Gases to be assessed. 	

8 The DCO Process and Adequacy of Consultation

8.1 Introduction

8.1.1 This chapter considers the DCO process, incorporating the environmental impact assessment, together with a commentary on the adequacy of consultation.

8.2 DCO process

8.2.1 In relation to the DCO process, and related EIA work, which has been carried out to date, there are three areas of potential concern which should be highlighted at this stage, as follows:

- Changes to the application boundary;
- Changes to the scheme; and
- Reporting the effects of transport and traffic.

The application boundary

8.2.2 In the Scoping Opinion (December 2017), the Secretary of State for Communities and Local Government provided his views on scoping the environmental effects based on the scheme that was submitted at the time. The area covered by the application 'red line' boundary for the Consultation Scheme has significantly increased, predominantly in the Borough - from 12.76 to 21.45 square km equating to an increase of approx. 68% - from that which was presented in the HE's Scoping Report and upon which the Scoping Opinion is based.

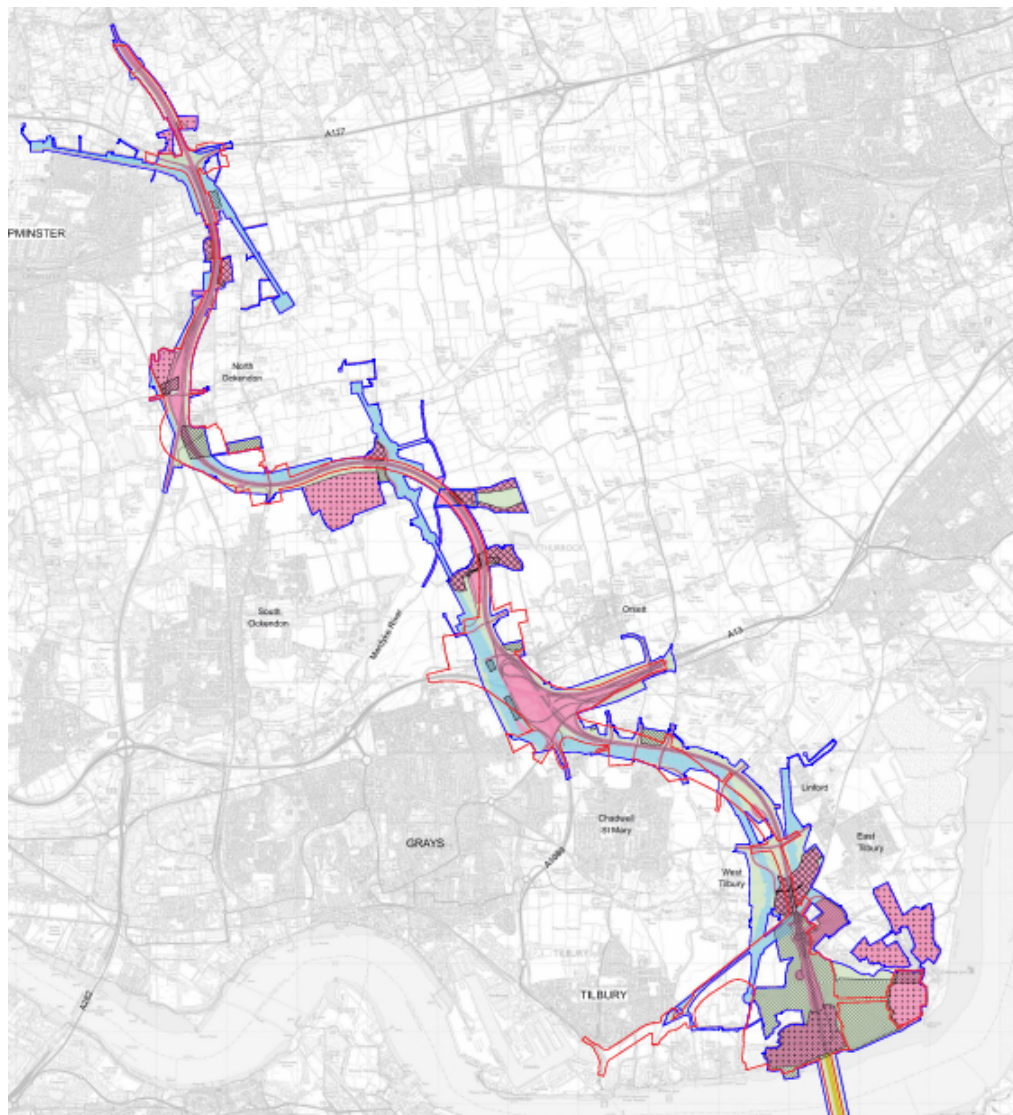
8.2.3 The map extract (Plate 8.1) below shows the application boundary for the scheme as it existed at the time of the publication of the Scoping Report in red, the application boundary which has been used for the Consultation Scheme is shown in blue.

8.2.4 Whilst it is acknowledged that there is a need for flexibility, and the Scoping Opinion notes this, section 2.3.15 of the Opinion also notes that "*...if the Proposed Development changes substantially during the EIA process and prior to submission of the application the Applicant may wish to consider requesting a new scoping opinion*". This point is particularly important given the recent changes to the EIA Regulations which place a greater emphasis on the content of Scoping Opinion. Regulation 14(3)(a) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017 No.572) states that "*...the environmental statement... must, where a scoping opinion has been adopted, be based on the most recent scoping opinion adopted (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion)*".

8.2.5 Given the increase in area covered by the Consultation Scheme, it is suggested that the EIA Scoping Exercise was undertaken prematurely as noted in Para 4.9 of PINS Advice Note 7: Environmental Impact Assessment: Process, Preliminary

Environmental Information and Environmental Statements, states that “..Applicants should consider carefully the best time to request a scoping opinion. In order to gain the most benefit, Applicants should consider requesting the opinion once there is sufficient certainty about the design of the Proposed Development and the main design elements likely to have a significant environmental effect.”

Plate 8.1: DCO application boundaries: Consultation Scheme (blue line) and LTC scheme which was the subject of EIA Scoping Opinion



Scheme changes

8.2.6 A short exercise has been undertaken to review the LTC scheme which was the subject of the Scoping Opinion and compare this with the Consultation Scheme. It is considered that there have been several significant changes to the LTC scheme since the publication of the Scoping Opinion, as follows:

1. **Removal of Tilbury Link Road from the Consultation Scheme:** the LTC Scoping Report cited the purpose of the link road as being to

“improve traffic flow and provide an alternative route for HGVs” (p. 38) as well as having the potential to offer substantial local benefits to the Borough. This removal of the road is considered to be material and likely to give rise to new or a change in environmental effects identified in the Scoping Opinion.

2. **Reconfiguration of A13 Junction:** the LTC junction with the A13 has been significantly altered, shifting the bulk of the land required closer to the north-east of Grays. There is also additional land-take east of the A13 junction and provision for the Rectory Road Diversion. This change is considered to be material and likely to give rise to new or a change in environmental effects identified in the Scoping Opinion.
3. **Relocation of pylons and accommodation of Overhead Lines (OHLs):** additional land has been identified for the accommodation of relocated OHLs and associated pylons required by the Consultation Scheme. As OHLs can have significant impacts on landscape and visual amenity, this change is considered to be material and likely to give rise to new or a change in environmental effects identified in the Scoping Opinion.
4. **Rest and Services Area (RaSA) at Tilbury Junction (East Tilbury):** the provision of the RaSA at Tilbury Junction, discussed in section 5.4 of this report, is an addition to the scheme covering a substantial area of land in the East Tilbury area. The addition of the RaSA is considered to be material and likely to give rise to new or a change in environmental effects identified in the Scoping Opinion.
5. **Additional land-take around East Tilbury:** areas around East Tilbury have been included in the new scheme in order to accommodate areas, particularly, for Potential Relocation site for the Translocation of Protected Species, and a further large unidentified area. The addition of this land is considered to be material and likely to give rise to new or a change in environmental effects identified in the Scoping Opinion.

Reporting the effects of transport and traffic

- 8.2.7 The Scoping Opinion states at para 3.3.2: *“...while the structure of the ES remains for the Applicant to decide, the information that would be expected to appear in a Transport chapter must be provided in the ES. The ES must demonstrate where the information gathered as part of the traffic assessment has been applied to other assessments within the ES. The absence of a Transport chapter, supported by a Transport Assessment, has been noted by Essex County Council (ECC), the London Borough of Havering (LBH), and Thurrock Council (TC). The Inspectorate considers that these concerns should be addressed.”*
- 8.2.8 The PEIR addresses certain aspects relating to the effects of traffic and transport (eg PRoW severance, road user impacts and driver stress are considered in the “People and Communities” chapter) however, as it is preliminary in nature, it is difficult to determine if the information gaps relating to this topic in the PEIR are omissions or due to lack of information at this stage. It is recommended that details are sought from HE as per the requirements of para 3.3.2 of the Scoping Opinion.

Recommendation

- 8.2.9 Overall, it is considered that the increase in area covered by the application boundary and the changes to the scheme since scoping are material and likely to give rise to new or different environmental effects as identified in the Scoping Report. For this reason, it is considered that the Consultation Scheme, or any updated scheme, should undergo a further scoping exercise to ensure that all potential likely significant environmental effects are identified and that any Scoping Opinion will reflect the scheme for which consent is being sought.

8.3 Adequacy of consultation

Overview

- 8.3.1 This section examines factors which the Council may wish to consider in relation to determining the adequacy of this round of formal consultation.

- 8.3.2 On submission of the DCO application, the Council will be requested by the Planning Inspectorate to provide an adequacy of consultation statement. This exercise will require the Council to review the HE's Consultation Report and provide a statement as to whether or not HE has complied with sections 42, 47 and 48 of the 2008 PA which relate to the duty to consult relevant local authorities and other statutory consultees, the local community as well as publicising the application.

- 8.3.3 Para 7.1 of PINS Advice Note 2: The role of local authorities in the development consent process, Feb 2015, relates to concerns about the pre-application consultation:

"If members of the public raise issues or concerns about the quality of a developer's consultation during the preapplication stage, the Planning Inspectorate will advise them to contact their local authority. Relevant local authorities will be invited to submit an adequacy of consultation (AoC) representation.... If they wish, local authorities can append any correspondence received about a developer's consultation from members of the public or others to the AoC representation if they consider it could be useful to the SoS's decision about whether or not to accept the application for examination."

- 8.3.4 At this pre-application stage, if there is sufficient cause for concern about the adequacy of consultation, the Council may wish to contact PINS top seek corrective action.

Importance of consultation

- 8.3.5 Consultation is an essential element of the DCO process. In addition, as noted in section 4.5 above, HE's Strategic Business Plan, October 2017 includes stakeholder consultation as a means of improving its planning process "...we will improve our planning for the next decade and beyond. This will mean:

- Taking a more responsive and coherent approach to planning – one that is better understood by our customers, staff, suppliers and partners

- Giving stakeholders more of a say in how we develop the network at a national, route and local level
- Exploring new and better ways to stimulate growth
- Encouraging innovation, especially to exploit the benefits of vehicle and roadside technology
- Ensuring our customers have more of a voice in determining investment priorities and how work is delivered
- Providing for the needs of cyclists, pedestrians and others who walk or ride on, near or across the network.”

8.3.6 Test 7, set out in chapter 4, seeks to determine whether the consultation which has been undertaken is adequate and appropriate. The factors to be considered here are likely to be in relation to:

- SoCC;
- Consultation materials; and
- Equalities and engaging with harder to reach groups.

8.3.7 It is understood that the Council has compiled information in relation to these factors and will present its case directly to HE. It should be noted that, in relation to equalities and engaging with harder to reach groups, the volume of information being consulted upon, much of which is technical in nature, is likely to prove a challenge for many sectors of the community to engage fully in the statutory consultation.

9 Recommendations and Next Steps

9.1 Recommendations

9.1.1 A large number of recommendations is presented in this report, the intention is that these should be collated, agreed with the Council and used as a checklist to ensure that the Council's concerns are addressed as the LTC design and assessment work progresses.

9.2 Next Steps

9.2.1 The nature of the DCO process is to encourage close and meaningful engagement with the promoter as the design proceeds. A programme of engagement with HE is suggested as the next steps in the process, which it is recommended should cover the following key areas:

- Emerging Local Plan and delivering growth;
- Option testing/traffic modelling;
- Treatment of northern portal;
- Specific aspects including: Tilbury Link Road, Junctions, Motorway Rest Area, passive provision for potential future development;
- Health and environmental impacts;
- Construction phase works and effects, including off- and on-site enabling works, and related mitigation (including the Code of Construction Practice); and
- Securing local benefits.

9.2.2 It is anticipated that the above will be used as a reference to inform the on-going technical meetings being held with the HE team.

9.3 Potential Effects on Council Operations

9.3.1 One final element which requires consideration as a next step is in relation to the effects of the LTC scheme on the Council's day to day operations, particularly in relation to public sector resource spending. Such matters might include:

- Traffic management and controlling rat-running;
- Waste collection/road sweeping;
- Additional pressures on Council's social services;
- Controlling and designing for crime.

9.3.2 In the first instance, it is suggested that the Council may wish to consult with other local authorities which may have experienced similar works and potential effects and draw upon that experience.

Appendix A Review of LTC PEIR

A.1 Introduction

A.1.1 This appendix sets out a review of the PEIR topic chapters.

A.2 PEIR Chapter 6: Air Quality

Air quality modelling

A.2.1 The modelling has been undertaken in accordance with DMRB procedures which identify affected roads as where there is a change in traffic of more than 1,000 AADT. Even using these criteria, the PEIR has not assessed all road links/receptors where this change occurs (Para 6.3.18) and therefore there may be locations which have significant impacts that have not been assessed, which limits the ability of Thurrock Council and other stakeholders to fully understand the significance of effects of the proposal.

Measurement of pollutant concentrations

A.2.2 The traffic data has only been considered where the change is more than 1,000 Annual Average Daily Traffic (AADT) (and presumably the same methodology will be used for the ES). This is higher than the thresholds advised by the Institute of Air Quality Management (IAQM) in Land-Use Planning & Development Control: Planning For Air Quality which are 500 AADT outside of an AQMA and 100 AADT inside for considering when an assessment is necessary. Changes of these magnitudes could lead to significant changes in pollutant concentrations especially if combined with greater changes on adjacent roads. By not considering smaller changes, the assessment has not complied with Paragraph 5.11 of the NNNPS regarding impacts on AQMAs, and fails to fully inform Thurrock Council and other stakeholders.

AQS Objectives

A.2.3 In the answer to the NNNPS requirement 5.7, Table 6.3 it is stated that a definitive judgement on significance has not been undertaken as it would require an assessment of all locations which are likely to exceed AQS Objectives, and not just worst case locations (i.e. the locations that have been assessed in the PEIR). Worst case locations should also include those locations that are likely to exceed AQS Objectives and therefore the PEIR is deficient in the assessment of significance that has been provided.

Changes thresholds

A.2.4 The proposed significance criteria for the assessment is also flawed in that it allocates a threshold of the number of receptors affected for small and medium changes below which the change would not be considered significant, i.e. there can be 9 medium changes, 29 small changes and an infinitive number of imperceptible changes where the objective is exceeded, and the scheme would be judged not to be significant. By applying the same number thresholds to all Highways England schemes there is potentially an inconsistency in the allocation of significance between different schemes with different numbers of receptors, which may fail to inform Thurrock Council and other stakeholders.

PM_{2.5} concentrations and the Clean Air Strategy

A.2.5 The PEIR has not considered changes in PM_{2.5} concentrations and instead has related the likely impact of the changes in PM_{2.5} concentrations to changes in PM₁₀. The justification for this is that PM_{2.5} concentrations are likely to be well below the current objective of 25 µg/m³. This does not take into account the World Health Organisation guideline value of 10 µg/m³. The draft Clean Air Strategy published for consultation in May 2018 by Defra stated that: *We will reduce PM2.5 levels in order to halve the number of people living in locations where concentrations of particulate matter are above 10 µg/m³ by 2025.* Given this aim, and the known health effects of PM_{2.5}, it is considered that the PEIR is deficient in not considering this pollutant explicitly against the WHO guideline value and this needs to be undertaken for the ES. For Thurrock Council, this means the information provided does not contain a key component of analysis that could affect air quality in the Thurrock area.

Nitrogen and acid deposition

A.2.6 Only the change in NO_x concentrations is provided at sensitive ecological receptors; there is no data provided on nitrogen or acid deposition at the receptors which is a significant omission. At Cobham Woods SSSI, Shorne and Ashbank Wood SSSI, Hailing to Trottscliffe Escarpment SSSI the increase in NO_x concentrations is very much larger than 1% of the assessment level. Without the corresponding increase in nitrogen and acid deposition at these sites it is not possible to make a correct assessment of the likely significant effects of the scheme, which fails to inform Thurrock Council and other stakeholders.

NO_x concentration inconsistency

A.2.7 The increase in NO_x concentration is compared to a threshold value of 0.4 µg/m³ which is inconsistent to the generally accepted threshold of significance of 1% of the assessment level, i.e. 1% of 30 µg/m³ is 0.3 µg/m³. Inconsistency with such thresholds makes it harder for Thurrock Council and other stakeholders to form informed opinions based on data that can be compared to accepted standards and other schemes.

Construction phase traffic effects on air quality

A.2.8 No assessment of construction phase traffic effects has been carried out in the PEIR. For the majority of schemes increases in construction traffic, when averaged over a full calendar year, are normally not significant. However, given the extent of the scheme this may not be the case for the LTC and therefore the PEIR would appear deficient in this regard. A full assessment of construction phase traffic will be necessary in the ES to inform the Council and other stakeholders of the full extent of effects across the 7-year construction phase of the scheme.

Model Verification – annualization of monitoring data

A.2.9 Defra TG(16) guidance require that the model traffic year, monitoring data year and meteorological data year are all the same. The PEIR modelling has been verified using 2016 traffic data and meteorological data, but monitoring data from a variety of years. It is claimed that where the data is not from 2016, it has been annualised in accordance with TG(16) Box 7.9. This procedure is for annualising part year data to a full year. It does not translate the data from one year to another (Paragraph 6.3.10

says that the HE monitoring data is from 2013 – 2017), and there is no accepted procedure for doing this. The model verification is therefore flawed as it does not compare actual monitored data from the same year as the traffic and meteorological data. It needs repeating using the correct procedures. As the model verification is fundamental to the prediction of pollutant concentrations it calls into doubt the predictions made in the PEIR.

Model Verification – model verification factor

A.2.10 The resultant model verification factor is also unreasonably high for two of the 13 verification zones (7 and 10) which indicates that the model is not performing very well in these locations.

Adjustment factors for NO_x and NO₂ concentrations

A.2.11 Background concentrations of NO₂ have been adjusted by comparing monitored background NO₂ concentrations with Defra predictions. The same adjustment factor has been applied to background NO_x concentrations. As NO_x and NO₂ relationships differ, a separate adjustment factor should have been applied to the NO_x background concentrations, not the same one as for NO₂.

HE Guidance Notes

A.2.12 All the HE quoted guidance notes (IANs) are out of date when compared to the latest vehicle emission factors issued by Defra. Paragraph 6.3.43 states that updated speed band emission factors have been used, but as an update to IAN 185/15 has not been published by HE it is unclear what has been done. Additionally, paragraph 6.3.44 states that future uncertainty in vehicle emission factors has been accounted for by undertaking a LTT gap analysis. The procedure for this is described in IAN 170/12v3 published in November 2013. From page 5 of IAN 170/12v3 it is clear that there was an intention to update the IAN as it was effectively out of date, which has not been done. It therefore appears that out of date guidance has been used to correct the assessment made by following out of date guidance.

NO₂ concentrations at human health receptors

A.2.13 The results of the modelled annual mean NO₂ concentrations at human health receptors in Thurrock is that they are either predicted to increase by an imperceptible amount or decrease where the objective is exceeded. However, these results should be seen in the context of the deficiencies and omissions in the modelling.

Mitigation

A.2.14 The only reference to specific mitigation in the Chapter 6 of the PEIR is in relation to construction dust emissions and Non-Road Mobile Machinery and standard mitigation measures are proposed for these activities. No reference is made to additional mitigation measures that could be adopted such as all deliveries by Euro VI compliant HDVs; all construction traffic to be Euro 4 petrol/Euro 6 diesel, the use of freight consolidation or the provision of transport for construction workers etc.

A.2.15 If the results of the ES are the same as for the PEIR for the operational effects, HE do not intend to provide any specific air quality mitigation for the project. In paragraph 6.6.51 it is stated that: *'The preliminary air quality assessment undertaken here suggests that the Project is unlikely to require air quality-specific mitigation...'* and *'If*

the full detailed assessment predicts a significant impact, mitigation will be required as part of a Scheme Air Quality Action Plan'. This suggests that if there are no significant impacts predicted in the ES, then no operational traffic mitigation will be provided. Furthermore, unless the project provides specific commitments to mitigation measures in the design, e.g. the provision of electric vehicle charging points, then HE are not intending in providing them.

A.3 PEIR Chapter 7: Cultural heritage

A.3.1 The review of this topic has been split up to cover: the surface historic environment (in this section); and archaeology (in the following section).

Harm to historic environment

A.3.2 Throughout the PIER, it is concluded that the business case for the route as shown at present will outweigh any harm to the historic environment. This conclusion is not evidence based and implies an inflexible approach which disregards heritage implications. A distinction between hypothesis and conclusions should be made within future reports.

Historic landscapes

A.3.3 The report correctly explains that there are expected to be interrelationships between the potential effects on cultural heritage and other disciplines reported on in the PIER. Whilst this is accurate, it is important that aspects such as the analysis and interpretation of historic landscapes is considered within both the Cultural Heritage and Landscape chapters to better inform the conclusions of each discipline. Similarly, potential impacts of noise and vibration must also be analysed and interpreted within the heritage section given these have the potential to alter how we experienced and interpret heritage assets - as well as potentially cause damage to their fabric in the case of vibration. This approach is supported by Historic England's GPA3 – Note 3 (Second Edition) The Setting of Heritage Assets.

Heritage Panel

A.3.4 Highways England is advised to work in partnership with all relevant local planning authorities and consider forming a dedicated heritage panel to ensure a proactive, consistent and engaged approach to the scheme. This is important when agreeing the correct methodology as well as considering heritage assets on, or near, district boundaries. Further to this, it is important that meetings regarding heritage should include heritage representatives from all relevant stakeholders including Historic England and neighbouring authorities. On occasion, it may also be fortuitous to include representatives from landscape and other disciplines.

Methodology – national guidance

A.3.5 With regards to methodology, the PIER does not appear to reference nationally recognised guidance relating to heritage such as Conservation Principles, GPA 2 – Managing Significance in Decision Taking in the Historic Environment or GPA 3 – The Setting of Heritage Assets.

Methodology – appropriateness of study area

A.3.6 The PIER has opted for a 1km study area surrounding the site and states that the appropriateness of this was demonstrated by cross referencing a preliminary Zone of Theoretical Visibility and recorded heritage assets. No evidence has been seen to-date to evidence this conclusion and as such the appropriateness of this conclusion cannot be verified. Unless it can be demonstrated otherwise a 2km study area is considered more appropriate. It is also noted that the Figures 7.1 and 7.2 in Volume 3 referenced in Volume 1 which show the locations of designated and non-designated heritage assets was not issued to Place Services and as such has not been assessed.

Further information required

A.3.7 In relation to further information required, a 100m study area for collecting condition information on designated heritage assets is not considered wide enough. It is also important to note that interior inspections of many buildings will be required at an early stage of the assessment to better understand direct and indirect impacts upon these heritage assets. This is important to allow for the condition of properties to be fully understood so that conclusions are accurate and reliable as well as to assess the impact of the proposed from interior spaces (views and noise). One such indirect impact will be the requirement for secondary glazing to historic properties due to noise implications upon residents and this impact this will have upon the significance of these assets. This impact must be identified and assessed within future reports. A Level 3 Building Recording, in accordance with Historic England's Guidance, must be provided at an early stage for all designated heritage assets proposed for demolition so that their special interest can be fully understood.

Coalhouse Fort and Tilbury Fort

A.3.8 Coalhouse Fort is located 4km to the east of Tilbury Fort. Built in 1867–1874, the fort was part of the defence against the potential threat of French invasion. It is listed as a scheduled monument and is owned by the Council. Coalhouse Fort is a Scheduled Ancient Monument, an important heritage asset and popular tourist attraction. The fort is included in the Heritage at Risk Register and the area adjacent to the fort is an open space recreational area and the surroundings support rare botanical species, wildlife and birdlife.

A.3.9 It is understood that the Council is considering opportunities to develop Coalhouse Fort into an events facility and visitor attraction and has been awarded funding to assist with the preparation of a business plan.

A.3.10 The Consultation Scheme is likely to give rise to significant adverse effects and is contrary to the Policy CSTP24 of the Council's adopted Core Strategy committed to preserving or enhancing the historic environment at Tilbury Fort and Coalhouse Fort.

A.3.11 It is recommended that HE engages proactively with the Council on scheme design changes which need to be made to remove the significant adverse effects on this asset.

A.4 PEIR Chapter 7: Cultural Heritage (Archaeology)

Scheduled Monument of Grey Goose Farm

- A.4.1 Within the Borough, the Historic Environment Record shows the proposed route of the Consultation Scheme as affecting a large area of archaeological deposits extending from Stifford Clays Road, south to the area between West and East Tilbury. This comprises a large complex of probably related archaeological sites, of multi-period date, known from aerial photograph, which includes the Scheduled Monument of Grey Goose Farm at its northern end. This Scheduled Monument comprises extensive complexes of features recorded from aerial photos and is the largest Scheduled Area within the Borough. A large part of this nationally important monument will be destroyed by the proposed scheme along with a significant proportion of the remainder of the non-designated assets associated with it. The level of assessment needs to define the significance of not just the Scheduled Monument, but also other elements of the complex that may be of national significance, as well as understanding how the whole complex is or is not related.
- A.4.2 For this reason, it is considered that the analysis lacks the integral consideration of the interaction of these non-scheduled and scheduled heritage elements. These cropmark complexes have been interpreted as multi-period landscapes from the prehistoric through to the early medieval period.

Gravel terrace deposits

- A.4.3 There is concern that the sensitive nature of the area of the gravel terraces and interface with the grazing marsh is not fully acknowledged with the submitted documentation. The route of the Consultation Scheme will also cut through the highly sensitive gravel terraces and former historic grazing marsh on the northern side of the Thames. This area contains important deposits dating from the Palaeolithic through to the modern day. It is essential that the significance of the historic environment assets and deposits within this area and the impact of the proposed scheme on these is understood to allow the inspector to make an informed decision.

Baseline information limitation

- A.4.4 Joint discussions on cultural heritage have taken place with Highways England, Historic England and ECC historic environment advisors at which the need for an appropriate level of assessment to ensure that the significance of, and impact on, the historic environment is fully understood. The PEIR document identifies that a programme of desk-based assessment is to be undertaken to assess the extent and significance of the historic environment assets. In addition to the desk-based assessment, a programme of aerial photographic assessment has been commissioned. Similarly, specialists in geo-archaeology, Palaeolithic and military specialists are to be commissioned. This is fully supported and will help to obtain a basic baseline of the heritage data, however, it is unlikely that this will provide enough detail to assess the significance of the heritage assets.

Setting of significant non-designated assets

- A.4.5 The PEIR states that only the setting of designated assets such as listed buildings and Scheduled Monuments will be assessed, however, it is recommended that this

should be extended to assessing the setting of significant non-designated assets such as the long mortuary enclosure and other enclosures within the cropmark complex which may be of a similar importance.

Future consultation

- A.4.6 As part of the future consultation by HE or its consultants it is recommended that joint meetings with the heritage advisors both from national and local authority bodies takes place. This would ensure a consistent approach to understanding the historic environment implications of the scheme. Previous discussions with the LTC consultants have identified concerns that an appropriate assessment is to be undertaken. The implications have been that the proposed assessment methodology would use a minimal level of intrusive survey to assess the significance of the heritage assets to be impacted, which is regarded as deficient to provide an appropriate level of understanding of the impact of the scheme.
- A.4.7 Without the trial trenching it is very difficult/if not impossible in some cases to provide a date for the deposits identified, especially from aerial photography, or the complexity of the surviving archaeology. By undertaking trial trenching both the date can be defined, and the extent and complexity of the deposits can be understood. This allows an informed understanding of the significance of the assets identified, their importance, and the potential cost if these have to be recorded due to the proposed scheme (i.e. by open area excavation).

A.5 PEIR Chapter 8: Landscape and Visual Impacts

Assessment methodology

- A.5.1 It is not clear which guidance the assessment will follow, stating that both the Design Manual for Roads and Bridges Volume 11, Section 3, Part 1 and associated Interim Advice Notes 135/10 and the Guidelines for Landscape and Visual Impact Assessment 3rd Edition will both be considered. As the project is a road scheme the applicant should undertake a IAN 135/10 Detailed Assessment but they should make it clear where they deviate from this approach or where parts of the assessment is based on GLVIA3.

Determining receptors and the significance of effects

- A.5.2 The methodology set out within the PIER does not clearly set out how levels of sensitivity, magnitude (nature of change) have been defined and how these judgements may be combined within the LVIA to establish the likely level of significant effects for each receptor. It is not clear how HE has selected receptors, but if the assessment is based on a narrow 2km study area, more distant receptors may be missed. The PEIR is not clear about what receptors are located within the 5km study area and if these are scoped in or out of the assessment.

Engagement on key issues

- A.5.3 The PIER does not clearly state which parties have been or will be consulted on the developing design of the LTC, the assessment methodology, extent of study area, likely effected landscape and visual receptors.

Other landscape considerations

A.5.4 Potential effects on National Character Areas, Marine Character Areas, Special Landscape Areas (Mardyke Valley and Langdon Hills), landscape features and tranquillity have not been set out in the PIER. The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the Thurrock Landscape Capacity Study.

Engagement on receptors

A.5.5 Visual effects should be assessed for receptors within 5 km of the proposed development, including 'distant' viewpoints including from the settlements of Mucking, Orsett and Bulphan, strategic and local views as covered under Policies PMD2, CSTP23, CSTP28 and those listed in Paragraph 8.3.13 of the PIER. The Applicant should consult with Thurrock Council on which visual receptors to include or 'scope' out of the LVIA.

Mitigation

A.5.6 Early indication of mitigation proposals would suggest they may not be adequate or effective in the operation phase. At this early consultation stage and not knowing the full extent of likely landscape and visual effects, it is difficult to determine if the proposed mitigation is sufficient or not. Mitigation to reduce the likely effects of the operational proposed development on landscape and visual receptors along with any proposed off-site landscape should be clearly stated. The current proposals focus on a narrow corridor following the scheme route. Mitigation should directly respond to specific landscape or visual effects of the proposed development and this may result in mitigation extending beyond 2km of the route.

Future engagement on landscape mitigation

A.5.7 It is recommended that HE should work closely with its landscape and ecological consultants to design a suitable mitigation scheme, actively engage with land owners through their community engagement teams. Mitigation proposals should be informed by Thurrock Council Landscape Capacity Study (2005) (relevance Landscape Character Types/Areas), A landscape Strategy for Thurrock 2002-2017, Greengrid Strategy and the Green Infrastructure Plan (2006) in accordance with Policy SSO12. Proposed mitigation and off-site landscape proposals should integrate with the Land of the Fanns Landscape Partnership projects and GreenArc partnership, helping to deliver objectives of their Landscape Management Plan or projects.

A.6 PEIR Chapter 9: Terrestrial Biodiversity

Potential significant effects missed and resultant inflation of land requirement

A.6.1 The PEIR does not identify the potential construction impact from temporary loss of functional land potentially used by SPA species during construction. There is also potential for the Habitats Regulations Assessment to conclude likely significant effects to the Thames Estuary and Marshes SPA, and further compensatory habitat provision may be required during construction phase, which could result in a greater land requirement in the Thurrock area and others.

Biodiversity Net Gain

A.6.2 No commitment has been made within the proposed mitigation for the provision of Biodiversity Net Gain. To comply with the NPPF 2018, Highways England policy, and local policy, the scheme will need to demonstrate Biodiversity Net Gain. The scheme should ensure ecological, landscaping, and flood compensation areas contain high quality habitats which are appropriate for the locality, and Thurrock Council and other stakeholder should be consulted on the appropriateness of these.

Tunnelling material and Goshems Farm

A.6.3 It appears excavated tunnelling material may be placed on the north bank of the River Thames. Further information is required to support the idea that this the most appropriate place for the disposal of excavated tunnelling material next to the option of transport the excavated material elsewhere, such as in Crossrail and Wallasea Island RSPB reserve examples. Including this in the analysis would provide the Council and other stakeholders with some assurance that other options for the disposal of excavated material had been considered, which could produce a more sustainable outcome for terrestrial biodiversity.

Impacts on Barn Owls

A.6.4 Barn owls survey undertaken only occurred up to 500m from the application boundary. This is contrary to industry standard of 1.5 km. Traffic collisions are known to result in the depletion of local breeding populations within 1.5 km of a major trunk road causing the permanent loss of breeding barn owls within 3 km wide corridors. The survey approach taken for LTC is likely to result in an underestimate of impacts to the population within Thurrock, and therefore inadequate measures to mitigate and compensate for impacts.

Thames Terrace Grassland habitat

A.6.5 The development of the Consultation Scheme will result in the loss of Thames Terrace Grassland, a unique habitat only found in south Essex, which supports a diverse invertebrate assemblage. Loss of this habitat, some of which from within the non-statutory designated site Low Street Pit LWS, will deplete this locally important habitat. As permanent mitigation, it is proposed to replace this habitat elsewhere but given the specific environmental requirements for this habitat to form, over nutrient-poor sand and gravel substrates¹⁶, successful recreation may be difficult to achieve. Further information should be provided to the Council and other stakeholders to give assurance of this approach, and that alternatives have been considered.

9.4 PEIR Chapter 10: Marine Biodiversity

Desk study survey data used in PEIR

A.6.6 The Marine Biodiversity chapter is informed by a desk study only, and it is proposed that a suite of surveys and more detailed desk-studies will inform the ES. This PIER chapter therefore does not provide as much up front information as other PIER chapters, and as such the determination of impacts and mitigation are likely to be less

¹⁶ Buglife (2013) The state of brownfields in the Thames Gateway

accurate and reliable for Thurrock Council and other stakeholders to effectively engage with.

Conservation of Habitats and Species Regulations 2017

A.6.7 Reference is made in Table 10.1 to the Conservation of Habitats and Species Regulations 2010, where the most up to date regulations are from 2017. This error should be corrected to provide assurance to the Council and other stakeholders that the most relevant guidance/ legislation is being considered.

Zone of Influence – International/ European Designated Sites

A.6.8 There is a lack of clarity on the Zone of Influence of the project for marine biodiversity, and therefore the justification of the European sites taken forward for assessment. It is typically expected that a source receptor pathway justification be provided. More detail should be provided in the baseline determination section to allow the Council and other stakeholders to comment and agree method.

Zone of Influence – National Designated Sites

A.6.9 There is a lack of clarity on the Zone of Influence of the project for marine biodiversity, and therefore the justification of the National Sites taken forward for the assessment. The assessment should use the Natural England Impact Risk Zones to select Sites of Special Scientific Interest to be taken forward for assessment. More detail should be provided in the baseline determination section to allow the Council and other stakeholders to comment and agree method.

PEIR commitments

A.6.10 Table 10.2 identifies the requirements of the National Networks National Policy Statement (NNNPS). It states that the *PEIR identifies the opportunities taken to protect and enhance biodiversity and geological conservation interests*, but does not provide opportunities for enhancement for marine receptors, as suggested, which falls short of providing a level of betterment that the Council believes the scheme should provide.

A.7 PEIR Chapter 11: Geology and Soils

Intrusive investigation and monitoring

A.7.1 The chapter states that “an intrusive investigation will be carried out” (Table 11.2). However the scope of that investigation and also the longer-term monitoring of groundwater and land gas conditions is not defined. The risk of this, depending on the duration of the post-investigation monitoring, is that adequate baseline information is not collated, which should be included for obtaining any seasonal, atmospheric or tidal variations to ensure that the risk assessments undertaken thereon consider worst case conditions that the Council and other stakeholders can fully consider.

Minerals Safeguarding Assessment commitments

A.7.2 The chapter states in Table 11.2 that a mineral safeguarding assessment will be prepared and discussions held with the regulatory authorities. This should be undertaken at an early stage, such that any restrictions or requirements that could

impinge on land outside the footprint of the proposed works are known and that any subsequent additional studies, such as transport assessments, noise, dust etc. are taken into consideration. Minerals safeguarded may be required also for other uses including landfill restoration or other construction activities and allowance would need to be made other than for construction of the development.

Preliminary Sources Study Report (PSSR)

A.7.3 Section 11.3 Methodology clearly states that the study is informed by a PSSR. A PSSR has not been provided so it is not possible assess the detail of the chapter as a consequence at this stage. This document will be required as part of subsequent ES together with any additional supporting studies and assessments.

Study area

A.7.4 The chapter states (11.3.3 and 11.4.49) that the preliminary site walkover “focused on areas of potential interest”. This is then contradictory with the definition of study area in subsequent section 11.3.4 which suggests that the “field assessment” included “the land within the development boundary plus a 250m buffer.” The buffer zone has been taken as being 250m as being a distance over which significant effects can reasonably be thought to have the potential to occur. In the case of areas of potential contamination this should be reviewed in light of the geological and hydrogeological setting and may need to be increased especially where such higher risk features exist just outside the 250m buffer zone.

Hydrogeology and potential for leachate

A.7.5 With regards to hydrogeology, no commentary is provided with respect to potential perched groundwater in made ground, and/or leachate within landfills. Leachate may present a significant risk both during construction and operation should the works result in uncontrolled breaches of any containment or protective layers.

Risk of natural cavity occurrence

A.7.6 No comment is made on the risk of natural cavity occurrence which may be masked by quarrying activities or overlying deposits including made ground/landfill. In addition, it should be recognised that Soluble rocks are present at depth north of the river and as such dissolution features could be present. This should be expanded upon such that the risk of triggering unstable ground in neighbouring ground can be appraised.

Mitigation

A.7.7 Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such no commentary can be provided at this stage. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided

A.8 PEIR Chapter 12: Materials

Transportation of excavated materials

- A.8.1 There is insufficient detail on the possible use of the river for the movement of materials – this should have received more than a superficial reference (Volume 1 paragraphs 2.18.30 and 12.5.8) and contains only passing reference to the supposed absence of feasible jetty or wharf provision.
- A.8.2 At Section 12 Table 12.4, it is assumed that aggregate alone would amount to 225 million tonnes - by far the largest materials stream. If this material is transported by road (assuming 20t per load) the Project would require 22,500,000 movements.
- A.8.3 The absence of marine logistics for import or export of materials, plant and equipment results in the assumption that all of these will be transported by road – with many hundreds of thousands of movements during the lifetime of the project using strategic and local roads. Fundamentally and significantly the prospect of the tunnel drives occurring from the north (**paragraph 2.18.7**) would result in all tunnel bore excavated material being transported away along the A1089 corridor to the A13 and the tunnel construction material imported along the same corridors.
- A.8.4 There is no recognition of the option to transport material across the river to reuse or disposal sites south of the river, or conversely to import material from suppliers in the south across the river – avoiding adding to congestion at the existing crossing and through Thurrock. Using small 1000t barges would reduce the movement to 225,000 barge visits. In this location on the Thames it would be totally viable to increase the size of barges or vessels.

Transportation of other suitable materials, plant and equipment

- A.8.5 The analysis does not include the movements of other suitable materials, plant and equipment. The likely supply for the TBM and components would be from Continental Europe (often France or Germany). No evidence is given of exploring opportunities to bring this equipment and components in by sea/river and transshipping locally. The Port of Tilbury seems to have been largely ignored.

Transportation by rail

- A.8.6 The use of rail has been dismissed for excavated material but there is no mention about using rail for other materials, plant or equipment, including TBM components. The PEIR does not appear to specify the focus of the rail study or substantiate how the conclusions were drawn. For example, it is not made clear if existing facilities such as the EWS depot to the east of Gravesend reviewed, or if the opportunity to introduce new rail interchange from the Tilbury Loop was considered. The dismissal of the use of rail (either north or south of the river) does nothing to mitigate the impact of transporting everything by road. This continues to assume substantial impacts on the road network in and around Thurrock.

Innovative mitigation of traffic movement effects

- A.8.7 The use of highly sustainable and innovative methods of movements should be appraised – seeking the use of clean fuel and hybrid vehicles within the supply chain and on site – potentially within the worksite boundary and minimising the use of diesel

road vehicles and non-road based plant. Aside from the reference to a Construction Traffic Management Plan (CTMP) there appears no evidence that the massive transport impact on Thurrock during the construction period would be mitigated through the use of low polluting vehicles and plant.

- A.8.8 The opportunity is missed to use the project to drive up standards in road logistics and modernising plant.

Reuse of materials to reduce need for waste transport

- A.8.9 References are made to the waste hierarchy for materials but there is no quantitative evidence of how this approach will minimise resource use. The PEIR does not demonstrate how the reuse within the project of materials has been maximised to minimise the need for off-site haulage and handling. Rather than freely dismissing the possible reuse of materials, significant investment should be made into establishing new practices and innovation to minimise the need for exporting and importing materials. Not maximising reuse through the Project does not minimise the import and export movement of material – leaving Thurrock to suffer the impacts of traffic movements.

Local sourcing of materials

- A.8.10 The PEIR makes statements about the aspiration to source materials locally but no reference is made to the criterion on which these decisions will be made, e.g. price, availability, or other factor. Thurrock Council has no surety that local sourcing would be given proper consideration. This should be extended not only to materials but to workers, plant and equipment – helping to protect local workers and businesses and to minimise the environmental effects of these resource streams.

A.9 PEIR Chapter 13: Noise and Vibration

Study Area

- A.9.1 The study area for the construction phase comprises an area up to 300 m from the development boundary. The PEIR goes on to state that the potential for significant impacts at residential receptors beyond 300 m are unlikely with receptors outside of 300 m to be considered where required. The reasoning behind why impacts beyond this distance are unlikely is not explained and should consider the night-time construction activities proposed which based on lower guidance limits could impact further from the site.
- A.9.2 Furthermore, the assessment of impacts from construction should consider other sensitive receptors beyond dwellings and include schools, hospitals etc as has been stated for the operational study area.
- A.9.3 The operational study area within the PEIR focuses on existing routes that are being bypassed or improved. However, it doesn't consider other affected routes (ie roads not being improved but may have change in traffic flows) as required by DMRB. The PEIR states that this would be undertaken in the ES. Therefore, the full extent of impacts cannot be determined based on the PEIR, which limits the ability of Thurrock Council and other stakeholders to fully understand the significance of effects of the proposal.

Baseline Surveys

- A.9.4 Surveys were undertaken in accordance with the CRTN shortened measurement procedure (3 consecutive hours between 10:00 and 17:00). We would highlight that this procedure is suitable for determining noise levels from a consistent traffic source such as a trunk road. It determines the noise levels over a short time period and uses this to predict the noise levels over an 18 hour time interval. However, in some areas the dominant noise source may not be from road traffic alone or traffic flows at quieter sites are likely to be low and the traffic pattern throughout the 18-hour period may be more variable than compared with the noisier sites where traffic flows are likely to be higher. Therefore, to confirm that the predictive nature of the shortened measurement procedure is robust we would expect to see longer term measurements to be undertaken to confirm the baseline conditions.
- A.9.5 Further surveys would also be required during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation plant and construction during different time periods as it is mentioned that some construction may require extended hours or night-time operations. These should form part of the ES.

Operational Road Traffic Methodology

- A.9.6 The assessment of impacts associated with the road traffic scheme is based on criteria outlined in DMRB. However, in line with national policy these should also be assigned specifically to Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL)'s defined in PPG. The methodology is also not specific in determining the significance level at which point the scheme would provide mitigation measures.
- A.9.7 The calculations have been based on modelling software IMMI and incorporate traffic information. However, there is no reference to topography data being applied in the modelling. We would expect this to be included in the modelling.
- A.9.8 Furthermore, it is not stated if the acoustic model has been validated using the survey data compiled. We would expect this to be undertaken. We note this is mentioned later in section 13.5.3 in that it would be undertaken and presented in the ES but would question if this has been undertaken for the PEIR.
- A.9.9 The PEIR reports potential impacts for two scenarios which are in line with the 'simple' assessment from DMRB. It is not clear why the three scenarios as required for the 'detailed' assessment have not been undertaken at this stage.

Construction and Tunnel Ventilation

- A.9.10 At this stage, no methodology/criteria/assessment have been outlined for impacts associated with construction plant, ventilation tunnel and methods of transport to be used through either road/river. However, these should form part of the ES.

Existing Conditions

- A.9.11 As indicated earlier the baseline surveys would need to be updated to account for different time periods in order to inform construction noise and tunnel ventilation assessments.

A.9.12 Furthermore, for the following road sections, the PEIR reports that no ambient/baseline sound survey data has been collected:

- Along existing A13 between Project and M25 at junction 30
- Along the existing M25 between junction 28 and the Dartford Crossing
- Along the existing A282 between Dartford Crossing and the M25/A2 junction

A.9.13 It is expected that these surveys would be undertaken and the results presented in the ES.

Potential Noise Impacts

A.9.14 Acoustic modelling has been undertaken to determine the impacts in the long-term and short term. However, there is no quantitative description of the number of noise sensitive receptors that could be impacted. The PEIR is generic in stating that receptors could be impacted but doesn't provide a number (i.e. are these a few isolated receptors or a larger number of receptors). This fails to inform Thurrock Council and other stakeholders of the significance of impacts identified.

Mitigation

A.9.15 At this stage the PEIR is generic in its mitigation, with options outlined. There are no specifics of where for example barriers could be positioned to attenuate adverse changes in noise levels.

A.9.16 In the mitigation options, there is no mention of exploring vertical alignment (i.e. keeping a route low within the natural topography to exploit any natural screening and enhancing this by the use of cuttings) or of the potential impact of speed restrictions on reducing noise impacts.

A.10 PEIR Chapter 14: People and Communities

Planning policy and legislative requirements

A.10.1 The consideration of the NPPF is superficial. Only four paragraphs, relating the overall approach of supporting sustainable development under a plan-led system and agricultural land, are referenced. While it is agreed that the NPPF does not amount to a criterion against which every application should be judged, it remains a material consideration.

A.10.2 As drafted, the PEIR does not give adequate consideration to the NPPF and the implications for Thurrock. The PEIR does not appear to have regard to the key NPPF paragraph 11 which sets out a presumption in favour of sustainable development. The critical arm of this policy is in relation to decision taking in circumstances '*where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless: i. the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.*' In the case of the Thurrock, the PEIR does not consider the scheme against the policies of the NPPF as a whole, nor has it been demonstrated that the benefits are

not significantly outweighed by adverse impacts, so it cannot be concluded that the scheme represents sustainable development which should be approved.

Existing environmental conditions

A.10.3 The socio-economic data referred to the PEIR is not the most-recently published information. Furthermore, because it relies on the ONS's annual population survey which is based on very small samples and is notoriously volatile as a result, it does not form a reliable baseline against which to assess the impact of the development. It will be critical for the submission to consider the latest available information in the context of how this sits in the historical trends to understand the true scale of impact.

Commercial and private assets

A.10.4 Assets within 500m of the application boundary are identified in the PEIR. However, no rationale is provided to justify the choice of 500m. The impact of the Consultation Scheme proposal may therefore be greater than assessed.

Development land

A.10.5 The PEIR takes a selective approach to identifying proposals for new employment, residential and leisure development within the local and wider region. While residential development is listed, in fact it gets only two references, under 'other proposed developments of relevance': firstly at Ebbsfleet (14.4.5b) and then secondly under 'the regeneration of Thurrock' (14.4.5g).

A.10.6 Reference is made to proposals for the creation of 3,000 additional homes and 9,000 jobs; however, it is unclear how this has been derived. While there is a reference to the Local Development Framework, as set out in Section 3, the figures cited do not match those set out in Thurrock's development plan and instead understate the scale of both housing and job growth.

Non-motorised users

A.10.7 The PEIR provides a number of tables (14.8-14.11) which sets out the footpaths and bridleways affected by the Consultation Scheme. While references are assigned to them, these references are not used in Figure 14.1 so understanding the potential impact of the Consultation Scheme on these links is challenging.

A.10.8 IN addition, while some routes are noted as not providing 'any key linkages', the criteria used to judge what constitutes a 'key linkage' is not explained. By implication, it suggests that all other routes are deemed to provide 'key linkages'. Under the current classification, there are four key linkages directly affected by the Consultation Scheme and a further three indirectly affected in the Borough. An additional two classified as not key linkages are identified as being indirectly affected.

A.10.9 Therefore, it is not possible to confirm whether the PEIR's designation of the links is correct. Nor is consideration given to the way in which these paths may be used by future development in the Borough which may revise the role played by these links.

Human health and wellbeing

A.10.10 The PEIR refers to lower life expectancy, higher rates of cardiovascular deaths and worse levels of excess weight in the Borough relative to the England average.

While some of this information is clearly sourced, other elements appear more as anecdotes. Given the severity of the issues, for the impacts of the proposal to be understood, the submission will need to deal with these points more comprehensively.

A.10.11 In relation to the future baseline, reference is made to the South East Local Enterprise Partnership's growth ambitions in the period up to 2020. This document does not form part of the development plan and does not cover the period in which the impact of the scheme will be assessed. The NPPF's standard method for local housing needs, which identified a need for over 1,000 homes per annum in the Borough alone, which will include significantly higher annual population growth than that set out in Table 14.4, is a much more reliable basis upon which to assess future impact.

Potential effects and mitigation measures

A.10.12 In view of the above concerns, Table 14.15 which sets out effects and mitigation during construction is lacking in the following areas:

- Development land: the effect of delaying development of both housing and employment land is not identified or any mitigation proposed
- Local and wider economy: the effect of construction on access to the port and associated freight transport movement is not adequately considered
- Community severance: for the reasons set out above, in terms of the nature of linkages affected by the scheme, it is not possible to understand whether the potential mitigation proposed will be sufficient.
- Changes in amenity for local residents: concerns over the negative impacts are set elsewhere in this report, particularly in relation to air quality, noise and landscape.

A.10.13 In relation to Table 14.16 which summarises the likely effects and mitigation during operation, there are a number of deficiencies:

- Development land: for the reasons set out in Section 3 of this report, the PEIR understates the scale of impact on development land in Thurrock. Only through amendments to scheme alignment and through additional junctions will these impacts be mitigated.
- Local economy: Thurrock's economy is underpinned by transport and logistics. However, for the reasons set out in Section 3, because there are no local connections onto the LTC, the project will have no benefit to Thurrock's economy. In fact, it is likely to harm it because the likely impact on housing land supply and the knock-on for local labour force constraints. Again, only mitigation through scheme realignment and additional junctions will overcome this.
- Changes in amenity for local residents: the effects after mitigation from issues such as noise and visual impact are expected to be negative or neutral. However, there is no evidence provided in the PEIR to demonstrate that the effect would be neutral.

- Human health and wellbeing: while impacts such as improved access to employment is identified, this does not recognise that the local level, the Consultation Scheme would not improve access the local jobs for local residents (current and future). In addition, there are concerns over both the potential nature of the effect and potential mitigation that have been identified under the review of Chapters 6 and 13 of the PEIR.

A.11 PEIR Chapter 15: Road Drainage and Water Environment

Legislative requirements

A.11.1 The chapter identifies the principal Acts of relevance when considering the water environment, however it excludes other guidance that should be incorporated into this section, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991).

Significance of likely effects

A.11.2 The chapter refers to the DMRB for the methodology used to assess the potential for the Project to change existing conditions, but does not adequately detail the methodology for assessing the significance of likely effects itself. This should be included for clarity.

Whole system water balance approach

A.11.3 The chapter identifies key receptors such as the Thames Estuary and Marshes (Ramsar sites). The overall water balance of such systems is often a complex interaction between, inter alia, surface water, groundwater and artificial controls. However, it is not clear whether a whole system water balance approach will underpin the EIA and, if so, what this will comprise in terms of data collection.

Flood defence infrastructure

A.11.4 Information regarding the nature, configuration and condition of flood defence infrastructure and flood management assets appears limited and a flood defence condition survey is likely to be required in support of the ES.

Surface water quality sampling

A.11.5 Section 15.5 sets out the further surveys and assessments to be undertaken in support of the EIA, including a FRA and WFD Compliance Assessment. Although groundwater quality sampling is identified, it is not clear what is proposed in terms of surface water quality sampling. This fails to assure Thurrock Council and other stakeholders that the analysis will be comprehensive.

Mitigation

A.11.6 Section 15.6 summarises receptors, potential effects and mitigation measures. This touches on measures such as a Code of Construction Practice, which is typically categorised as 'embedded mitigation'. However, the chapter does not include a schedule of embedded mitigation measures.

Cumulative effects

A.11.7 The PEIR does not include sufficient details regarding the methodology for assessing cumulative effects, the Zone of Influence proposed for the 'water' topic, or the inclusion and exclusion threshold criteria to be applied to the 'long list' of other development, et cetera, all of which require consultation with Thurrock Council and other stakeholders. This limits stakeholders' understanding of how the cumulative effects of the proposal will be assessed.

Flood Risk Assessment

A.11.8 The figures presented in Volume 3 show that significant areas of the Development Boundary lie within Flood Zone 3 and interact with watercourses and flood defence/flood management infrastructure. There is therefore the potential for significant flood risk impacts and detailed assessment will be required (i.e. to understand floodplain extents and identify impact mitigation measures). The chapter notes that hydraulic modelling will be undertaken as part of the FRA, but details are not presented and presumably this is the subject of the FRA scoping process referred to in the chapter. It will not be possible to establish whether (i) the nature of flood risk impacts has been adequately assessed and (ii) deliverable impact mitigation measures have been identified until the FRA has been completed.

A.12 PEIR Chapter 14: Climate

UKCP18 Data

A.12.1 The United Kingdom Climate Projections 2018 (UKCP18) have since been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. Recommend regional projections which are only available on emissions scenario RCP8.5, which is most similar to the high emissions scenario in UKCP09.

In-Combination Effects

A.12.2 In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. This should be an assessment within relevant technical chapters of how impacts of the project will alter the future baseline, using the UKCP18 projections, and the ability of receptors to respond to climate change in combination with the impacts of the project. This will be assessed as part of the FRA, however chapters, notably Biodiversity and People and Communities, should also consider this.

Greenhouse Gases Emissions Assessment

A.12.3 It is unclear on the scope of Greenhouse Gases to be assessed. The PEIR outlines a quantitative assessment will be undertaken and therefore should align with PAS 2080:2016 Carbon management in infrastructure and BS EN 15978:2011 Sustainability of construction works, Assessment of environmental performance of buildings, Calculation method, as set out in IEMA guidance.

Significance

A.12.4 The EIA Regulations require that the ES describes the likely significant effects of the proposed development. The PEIR climate change chapter makes no reference to defining the significance of effects. Due to complexities of global weather variables, there is an absence of significance criteria or a defined threshold for determining the significance of climate impacts in guidance documents. For ease in decision making, it should be clear how significance has been determined, highlighting the uncertainties within the assessment.

-0-

Appendix B Proposed scheme design changes

B.1.1 Table B.1 below sets out the detail of each proposed design change north of the river. These have been grouped together into the following four areas:

- Tilbury (Design Change 8-10);
- A13/A1089 junction (Design Change 11-14);
- LTC/M25 junction (Design Change 15-18);
- M25 junction 29 (Design Change 19).

B.1.2 The review which has been undertaken seeks to identify and assess potential issues arising from Highways England's Supplementary Consultation Scheme, and associated material, which may be of concern to the Council as a 'host authority'.

Table B.1: Description of proposed design changes

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Impacts Update)	Design change description (as per Highways England's Guide to Supplementary Consultation)
8	Removal of Tilbury junction, the rest and service area and maintenance depot	<ol style="list-style-type: none"> 1. A new route for walkers, cyclists and horse riders is proposed along Muckingford Road. 2. The height of the LTC has been reduced by approximately 1.5 metres under Muckingford Road to tie in with the lower Tilbury alignment. This will reduce earthworks and utilities diversions. 3. Connecting slip roads have been removed. 4. Station Road has been retained and would pass beneath the viaduct with a minimum clearance of 5.3 metres.
9	Tilbury viaduct length reduced	<ol style="list-style-type: none"> 5. Removal of Tilbury junction, enabling us to reduce the overall size of the viaduct. This is due to the rest and service area and maintenance depot being removed.
10	Muckingford Road realignment and green bridge	<ol style="list-style-type: none"> 6. Private maintenance and access roads from the LTC and Station Road to provide access to the tunnel control building. <p>This structure has been revised.</p> <ol style="list-style-type: none"> 7. Muckingford Road bridge has been upgraded to a green bridge. As a result of the removal of the proposed Tilbury junction, several structures have been revised. <p>As a result of the removal of the proposed Tilbury junction, several structures have been revised.</p> <ol style="list-style-type: none"> 8. Muckingford Road has been moved slightly south to reduce the overall height, while providing the required structural headroom as it crosses over the LTC. 9. Clearance over Tilbury railway, where the viaduct crosses, will be lowered to 6.8 metres. 10. Length of the viaduct has decreased to approximately 660 metres.
11	LTC route realignment near Chadwell St Mary and Linford	<ol style="list-style-type: none"> 1. Green Lane has been moved slightly north due to the changes to the A13 westbound and A1089 northbound slip roads, which join the LTC northbound.
12	A13/A1089 junction changes	<ol style="list-style-type: none"> 2. Stifford Clays Road has been moved slightly south due to the changes to the A13 westbound and A1089 northbound slip roads, which join the LTC northbound.
13	Rectory Road realignment	<ol style="list-style-type: none"> 3. The slip roads from the LTC northbound and southbound, to the A13 eastbound and Orsett Cock junction, have been redesigned removing the need for drivers to change lanes on the A13.
14	Hornsby Lane closure	<ol style="list-style-type: none"> 4. A13 junction slip roads have been designed to tie into the Orsett Cock junction improvement works, which are currently under construction. 5. The Rectory Road diversion shown during statutory consultation has been removed so the alignment follows the existing Rectory Road.

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Impacts Update)	Design change description (as per Highways England's Guide to Supplementary Consultation)
		<ol style="list-style-type: none"> 6. A new link road north of the A13 has been included to provide access from the LTC northbound and southbound to the Orsett Cock junction. 7. The A13 eastbound has been reduced to two lanes from four lanes, near the Orsett Cock roundabout. This removes the need for drivers to change lanes on the A13. 8. Improved slip road layout for drivers heading north on the A1089 or west on the A13 wishing to head north on the LTC. 9. We have identified two potential locations for the relocation of the travellers' site. One is adjacent to its current location with access off Long Lane, the other is further to the west along Long Lane opposite the junction with Kerry Road. These locations are shown in the Map Book 1: General Arrangements. 10. A13 westbound to LTC northbound link road has been moved further north and further away from the A1013 and local properties. 11. A shared path for walkers and cyclists is proposed along the A1013 Stanford Road. 12. The A1013 has been moved closer to its existing position. 13. Gammonfields Way has been realigned to connect into Long Lane, which could provide access to the relocated travellers site. 14. The A1013 from the north of Whitecroft Care Home to the west side of the A1089 has been moved. It will run over the A1089, LTC and link roads to ease traffic management during construction. 15. The A1089 northbound to LTC northbound slip road has been moved further north to reduce the impact on a local school. 16. Baker Street will be moved so it runs under the LTC link roads and connects to the existing A1013 slightly further east of its current position. This is because the new LTC runs through this section of Baker Street. Its realignment will also help construction of the bridges. 17. Heath Road has been moved to tie in with the redesigned A1013. Emergency access off Heath Road to the A1089 southbound has been provided so emergency services can maintain response times from the fire station at Orsett Cock junction to Tilbury Port. 18. The A13 westbound to the LTC southbound link road has been moved further west increasing the distance between this road and the Whitecroft Care Home on the A1013. 19. The A13 westbound slip road to the A1089 southbound has been revised to improve traffic movements between A-roads and the LTC. 20. Part of Hornsby Lane would be permanently closed, with areas provided for turning either side of the LTC. This closure would avoid having to move some overhead lines.

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Impacts Update)	Design change description (as per Highways England's Guide to Supplementary Consultation)
		<p>21. Emergency access will be provided from Brentwood Road on to the LTC northbound and southbound to improve response times for services from Orsett and Grays. Access to properties will be maintained.</p> <p>22. The LTC east of Chadwell St. Mary has been moved approximately 60 metres north-east to avoid moving some overhead cables and pylons.</p> <p>As a result of revisions to the A13/A1089 junction, several structures have been revised.</p> <p>23. The viaduct across the Orsett Fen Sewer has been increased in length from 50 metres to 200 metres to manage the risk of flooding.</p> <p>24. Green Lane bridge upgraded to a green bridge.</p> <p>25. A new underbridge has been included to take the slip roads underneath the A13.</p> <p>26. The A1013 on the west side of the A1089 has been revised to reduce the impact on the proposed school sports field development and move the route further away from local properties. This allows the new bridge over the A1089 to be built off the local road network, without the existing road having to be closed.</p> <p>27. A new Rectory Road bridge will be built over the A13. The height has been increased to achieve clearance over the slip roads connecting into the Orsett Cock roundabout.</p> <p>28. Removal of Hornsby Lane bridge.</p> <p>29. Hoford Road has been realigned to protect existing laneway and structure upgraded to a green bridge.</p> <p>30. The LTC has been raised by approximately one metre under Hoford Road, so Hoford Road crosses the LTC with sufficient structural headroom and avoids a watercourse diversion.</p>
15	M25 to A13 southbound lane removal	1. One lane has been removed from the M25 to A13 southbound.
16	Routing through the Mardyke	2. Added a shared path along North Road to provide better access to the wider network of public rights of way.
17	The height of the LTC and North Road	3. Changes to the height of the LTC and North Road to reduce impact on properties.
18	Thames Chase Community Forest – new bridge	<p>4. Road moved approximately 200 metres south-west.</p> <p>5. The viaduct across the Mardyke River and Golden Bridge Sewer river has been shortened from approximately 450 metres to 350 metres.</p> <p>As a result of revisions to the LTC/M25 junction, several structures have been revised.</p> <p>6. A new bridge suitable for horse riders to connect the east and west side of Thames Chase Forest over the M25.</p> <p>7. Footpath 252 has been moved south and now consists of two bridges, one to cross the railway line and another to cross over the LTC. The new location ties in more effectively with existing routes for walkers, cyclists and horse riders. North Road upgraded to a green bridge and includes shared cycle and footpath facilities.</p> <p>8.</p>

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Impacts Update)	Design change description (as per Highways England's Guide to Supplementary Consultation)
		9. Footpath 136 over the LTC has been realigned because the LTC route has moved south-west.
19	M25 junction 29 changes	1. M25 southbound slip road shortened to approximately 580 metres, to shorten the scheme and reduce impact on Folkes Lane footbridge. 2. Segregated turning lanes moved closer to the roundabout. The following structure has been revised. 3. Franks Farm rail bridge has been raised.

Appendix C Economic Costs Study (Hatch Report)



HATCH
REGENERIS

Lower Thames Crossing Economic Costs Study

Executive Summary

Report by Hatch Regeneris
February 2020

Thurrock Council

Lower Thames Crossing Economic Costs Study

Executive Summary

This report contains the expression of the professional opinion of Hatch Regeneris (the trading name of Hatch Associates UK). It is based upon information available at the time of its preparation. The quality of the information, conclusions and estimates contained in the report is consistent with the intended level of accuracy as set out in this report, as well as the circumstances and constraints under which this report was prepared.

The report was prepared for the sole and exclusive use of Thurrock Council. Hatch Associates Limited shall only be liable to Thurrock Council and is not liable to any third party who intends to rely on or has relied or is currently relying upon this report (in whole or part).

February 2020

www.hatchregeneris.com

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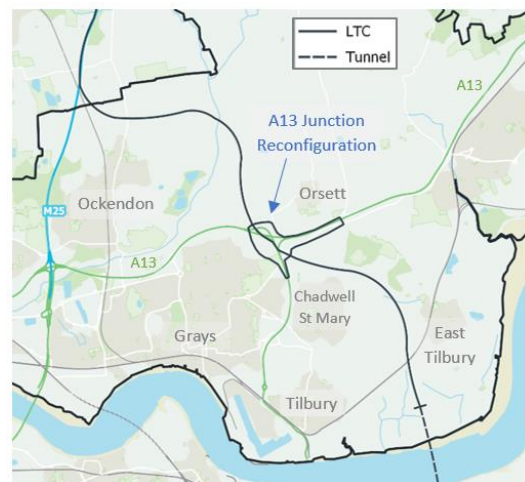
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Executive Summary

- i. 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).
- ii. 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.

The LTC Scheme

- iii. The proposed LTC scheme is a nationally significant infrastructure project developed by Highways England. It consists of a tunnel crossing beneath the Thames to connect the areas around Kent, Thurrock and Essex
- iv. The latest proposals incorporate the following two design elements with the Thurrock Area:
 - 3-lane, 70mph, dual carriageway (with the exception of the southbound section from the M25 to the A13 that will be 2-lane only)
 - Reconfiguration of A13 junctions with the A1089 and the A128 to incorporate partial connectivity between the LTC and the A13 and A1089 but loss of movement from the A128 southbound to the A1089 southbound.



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

Thurrock's Position

- v. 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.
- vi. As set out within their 2018 Statutory Consultation Response, 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.
- vii. From a direct transport perspective, the LTC Scheme 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.
- viii. 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.

Study Area Context

ix. The Thurrock area is characterised by the following key metrics:

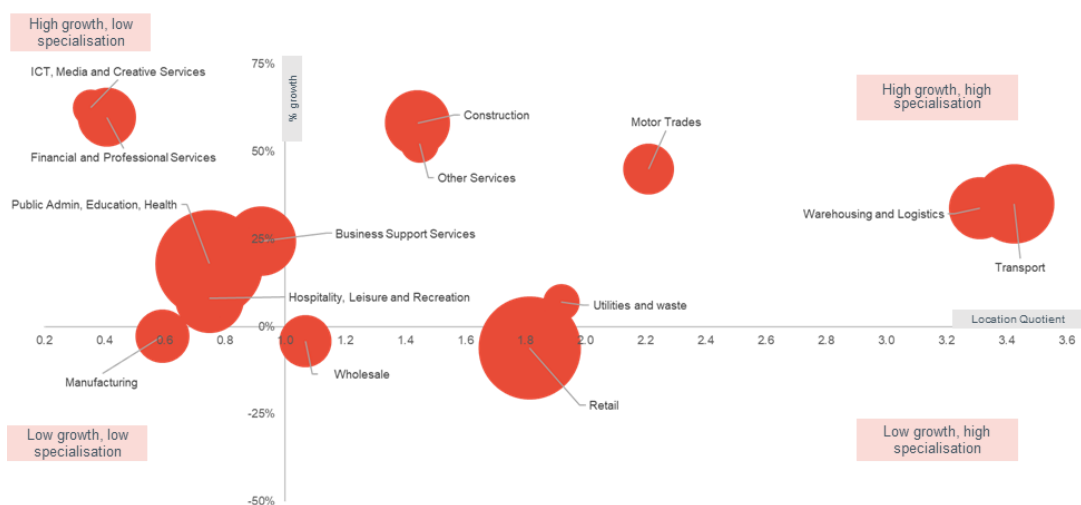
Current Transport Network

- The Strategic Road Network focuses around M25 and A13, with A1089 spur providing access to Port of Tilbury. The A128 is also an important connector to the A127 from Brentwood. The A13/A1089 and A13/A128 junctions will be significantly impacted by the LTC Scheme, as well as the A13/A1014 junction.
- Around 16 local roads or tracks currently cross the proposed LTC alignment and provided connectivity between urban areas and local villages / hamlets, such as routes between Chadwell St Mary and East Tilbury.
- The bus network is focused around connections to and from Grays and Lakeside, with nine services crossing the area potentially affected by the LTC Scheme, 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 the LTC Scheme.

Business and Economy

- The economy has been performing well and shown strong growth over last 5 years (+29% employment, +43% businesses).
- Around 2,200 businesses (employing 12,500 workers), are located within the direct corridor around the LTC Scheme alignment (18% of all Thurrock workers and 34% of Thurrock businesses).
- Across the wider Thurrock economy, the Transport and Logistics sectors are particularly specialist; however, there are aspirations to diversify Thurrock's economy and grow a number of 'opportunity sectors', including the creative industries and environment and energy sector.

Sector Size, Specialisation and Growth, Thurrock



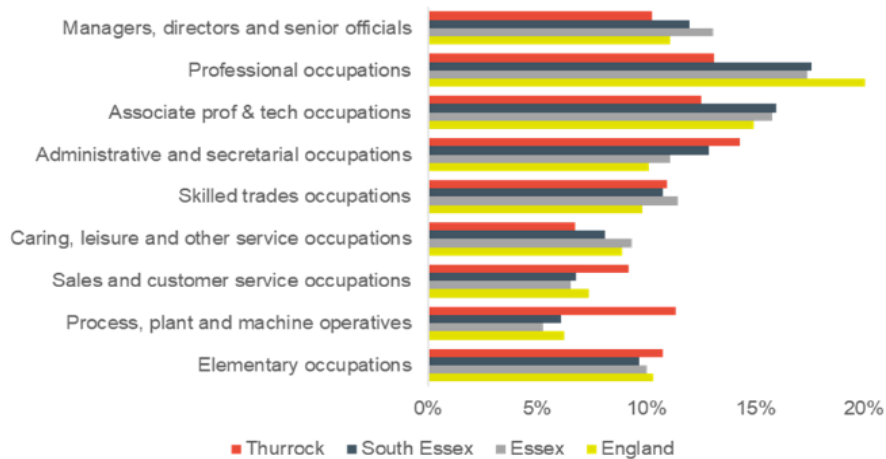
Source: BRES 2017

- Thurrock has a strong SME base compared to the South Essex average, and has received a large amount of venture capital investment in recent years.
- There has been investment from major organisations into Thurrock in recent years (Port of Tilbury, DP World, Amazon, UPS, Made.com, Lidl) and the construction of Tilbury2 development is progressing rapidly. This recent investment has delivered a large number of jobs, although further investment could secure a higher proportion of skilled jobs in the area.
- Vacancy rates for Industrial, Office and Retail are all higher than the average for South Essex.

Community

- Around 57,300 residents are located within the direct corridor around the LTC Scheme 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 than the immediate surrounding areas. 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.

Occupational Profile, Thurrock



Source: Annual Population Survey 2018 (ONS)

- 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 Scheme are within the top 30% most deprived in the country.
- Some areas of Thurrock struggle with significant health and wellbeing challenges, including obesity, 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.
- However, the data in this section clearly shows that there are areas of Thurrock which struggle significantly with many challenges. In particular, the communities living in and around Tilbury and South Ockendon are characterised by high deprivation, low incomes and poor health outcomes.

Environment

- The area is characterised by a mosaic of landscapes, including coastal marsh, low-lying fenland, farmland and more developed urban areas.
- There are designated Sites of Special Scientific Interest, including Hangman's Wood and the Mucking Flat Marshes, within the LTC Corridor, 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 alignment.
- 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 Survey¹ 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 Scheme is also likely to pass through/nearby to cycle routes, Coalhouse Fort and golf courses.

Connectivity Impacts

Construction Phase

- x. Whilst Highways England has yet to provide detailed construction plans, the construction phase of the LTC Scheme is forecast to have the following impacts:
- Works to reconfigure the A13/A1089 and A13/A128 junctions results in an estimated increase of 875,000 travel hours per annum, equivalent to an economic loss of value of £10.5 million across a single year
 - Forecast road closures, diversions, and additional construction traffic are forecast to have the following impacts²:
 - **Major Adverse** impact on Station Road and Muckingford Road
 - **Moderate Adverse** impact on Brentwood Road, Stanford Road, Baker Street, Heath Road, and Stifford Clays Road
 - **Minor Adverse** impact on North Road
 - Around 17 PRoWs will be closed for substantial periods of the construction phase.
 - There will be around 11,700 monthly HGV movements that may increase traffic flows on certain routes by as much as 5%. In addition to this there will also be further traffic movements bringing workers to and from compound sites.

¹ <https://www.ordnancesurvey.co.uk/business-government/products/openspace>

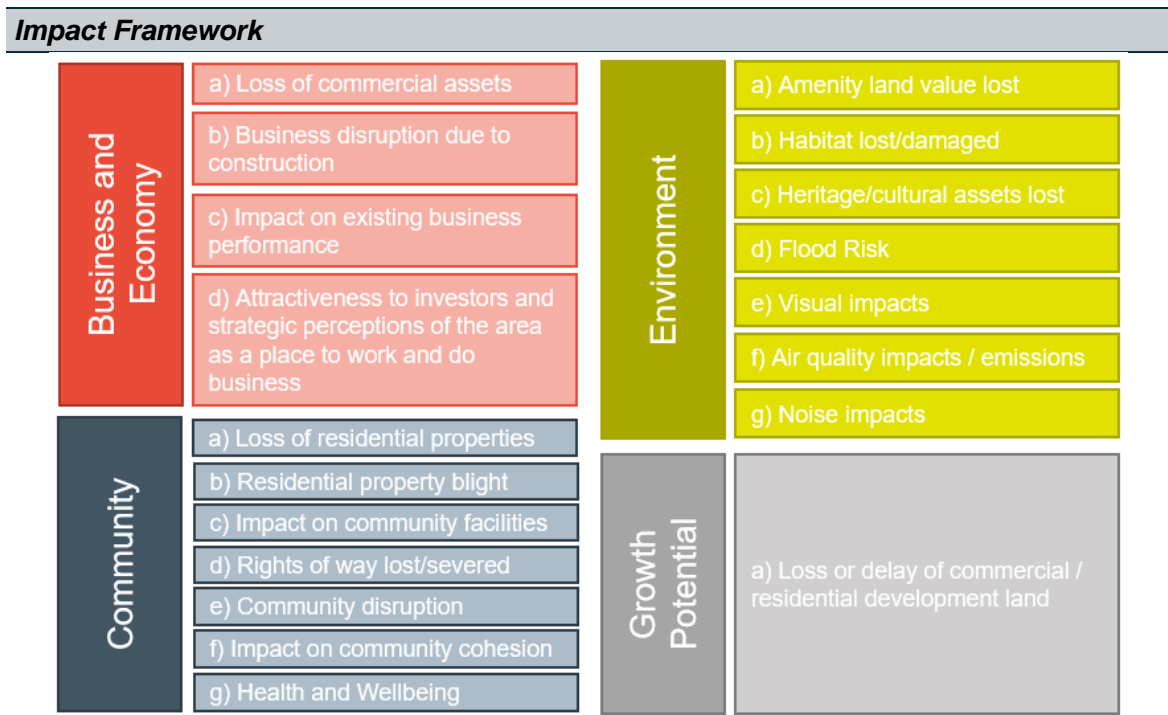
² Scale: neutral = no noticeable impact on travel; minor adverse impact = a relatively small effect on travel over a long duration of time (months) or a medium to high impact for a very short time period (a few days); moderate adverse impact = a medium effect on travel over a long duration of time (months) 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)

Operational Phase

- xi. Whilst the majority of local roads will be re-established once the LTC is operational there will still be some on-going impact upon connectivity, as follows:
- Reconfiguration of the A13/A1089 and A13/A128 junctions will result in an estimated increase of up to 55,000 travel hours per annum, equivalent to an economic loss of value of £650,000 across a single year.
 - Loss of the additional third lane being created on the A13, east of the A1014 junction, that will become part of the off-slip for LTC.
 - The likely need to reconfigure the A13/A1014 junction to mitigate significant impacts on who this junction will function when the LTC Scheme is in operation
 - Potential realignment of Station Road adding journey time to private car trips and the 374 bus route.
 - Closure of Hornsby Lane for through movements.
 - Permanent amendments and diversions to at least nine PRoW and/or tracks, with one potential closure (FP 61).
 - Potential risk of significant local transport network disruption in the event of concurrent incidents on the LTC and Dartford Crossing that are estimated could happen as often as once every 80 to 160 days.

Impact Framework

- xii. The baseline socio-economic context, along with the forecast transport impacts of the LTC Scheme, have been used to development an assessment framework with which to assess the economic and social costs of the LTC Scheme within Thurrock.
- xiii. The cost impacts have been categorised into four main themes, and associated sub-themes, presented in the diagram below.



Source: Hatch Regeneris

Business and Economy Cost Impacts

- xiv. The LTC Scheme will have a significant negative impact upon the local economy and businesses in Thurrock, as a result of the disruption caused by the construction and subsequent operation of the scheme.
- **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 and subsequent levels of business rates and rental incomes.

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 GVA Impact
	115 FTE 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 (across Thurrock)</i>

Source: Hatch Regeneris



Community Cost Impacts

- xv. 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 wellbeing³** of local residents. 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. This study 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.

³ 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) 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

xvi. 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 a number of scheduled monuments and three Grade II listed residential properties. In addition, there will be blight impacts upon a further four Grade II listed buildings and numerous undesignated heritage assets.
- 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 PRoW 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. Whilst air quality increases will likely still remain below national limits. The impact on communities located near to the LTC Scheme could be significant.

- Both the construction and operation of the LTC scheme will generate significant **noise impacts**. Over 250 properties, and a range of other sensitive receptors (e.g. Treetops, Treetops 2 and Orsett Heath Schools), will be in close proximity to the LTC scheme 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 and East Tilbury.

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

Source: Hatch Regeneris

subject to future modelling exercises and more detailed analysis

Growth Cost Impacts

- xvii. 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

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

xix. 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

- xx. 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.
- xxi. 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 could be affected by blight from the LTC Scheme, with an estimated economic loss of between £17m and £23m.

Conclusions

- xxii. 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 future residential and commercial development. The loss of economic value for the area could equate to as much as **£96 million**.
 - The construction phase will **significantly disrupt access and movement**, affecting local business operations and creating community severance. 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**.



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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

This report contains the expression of the professional opinion of Hatch Regeneris (the trading name of Hatch Associates UK). It is based upon information available at the time of its preparation. The quality of the information, conclusions and estimates contained in the report is consistent with the intended level of accuracy as set out in this report, as well as the circumstances and constraints under which this report was prepared.

The report was prepared for the sole and exclusive use of Thurrock Council. Hatch Associates Limited shall only be liable to Thurrock Council and is not liable to any third party who intends to rely on or has relied or is currently relying upon this report (in whole or part).

February 2020

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Appendix A - Assessment of Community Facilities

Appendix B - Designated Heritage Assets

Appendix C - LTC Buffer Zones

Appendix D - Qualitative Assessment Scale

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

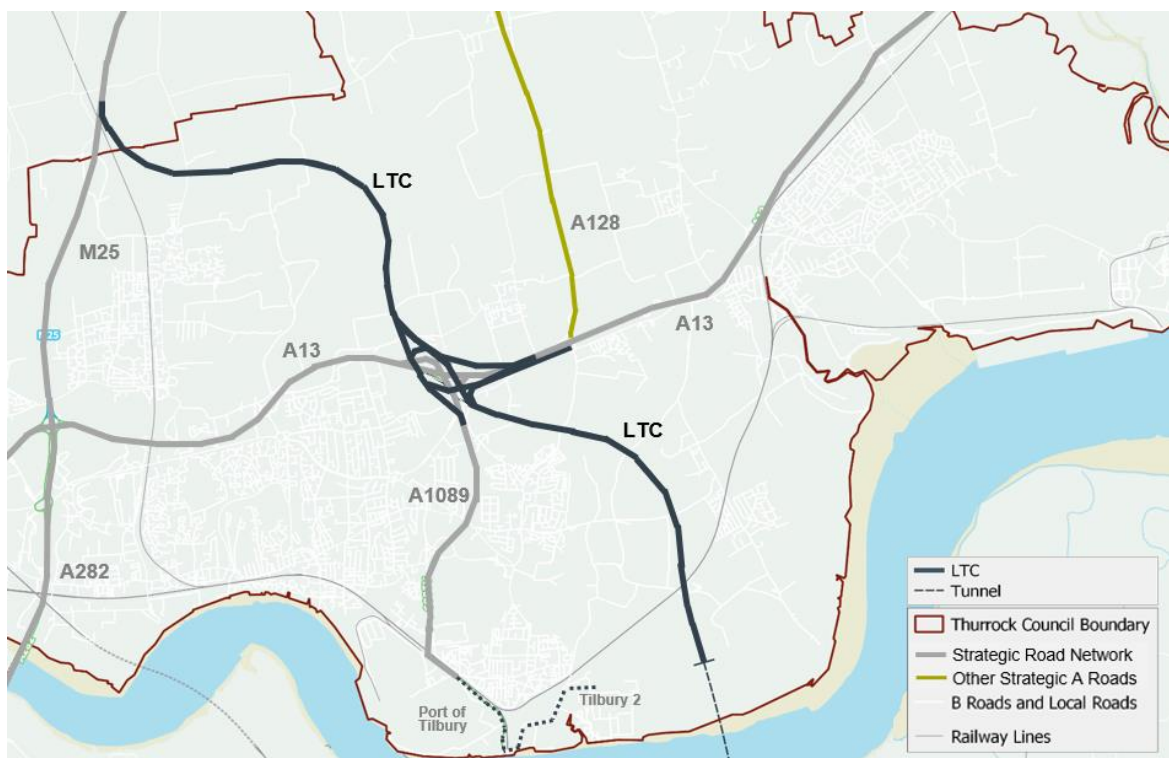
What is the LTC?

- 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



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

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

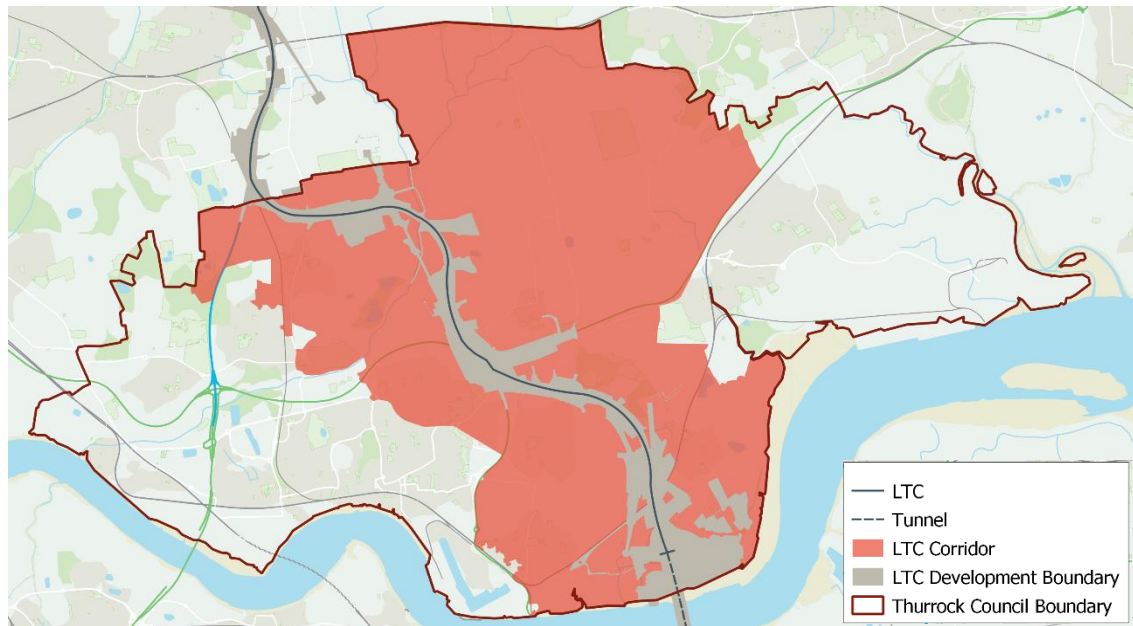
Overview

- 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

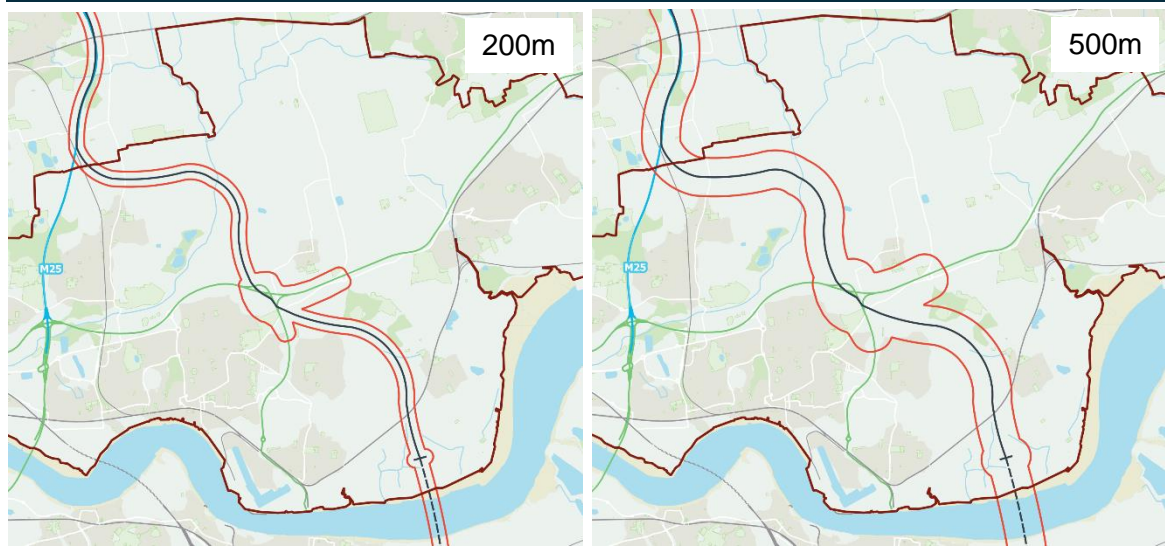


Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

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

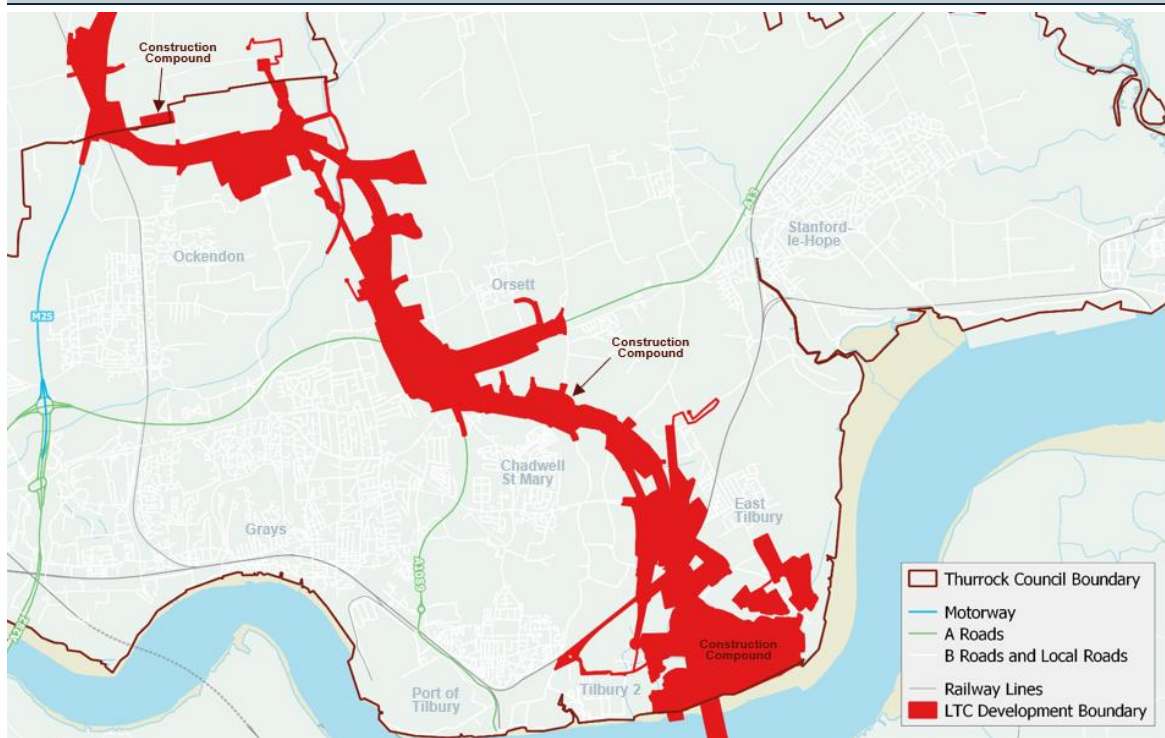
- 2.3 The analysis contained within this report is based upon Thurrock's understanding of the proposed LTC Scheme in Autumn 2019 and related to data made available by Highways England at that time. This specifically includes the following documents:
- The 2018 **Statutory Consultation Preliminary Environmental Information Report²** (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

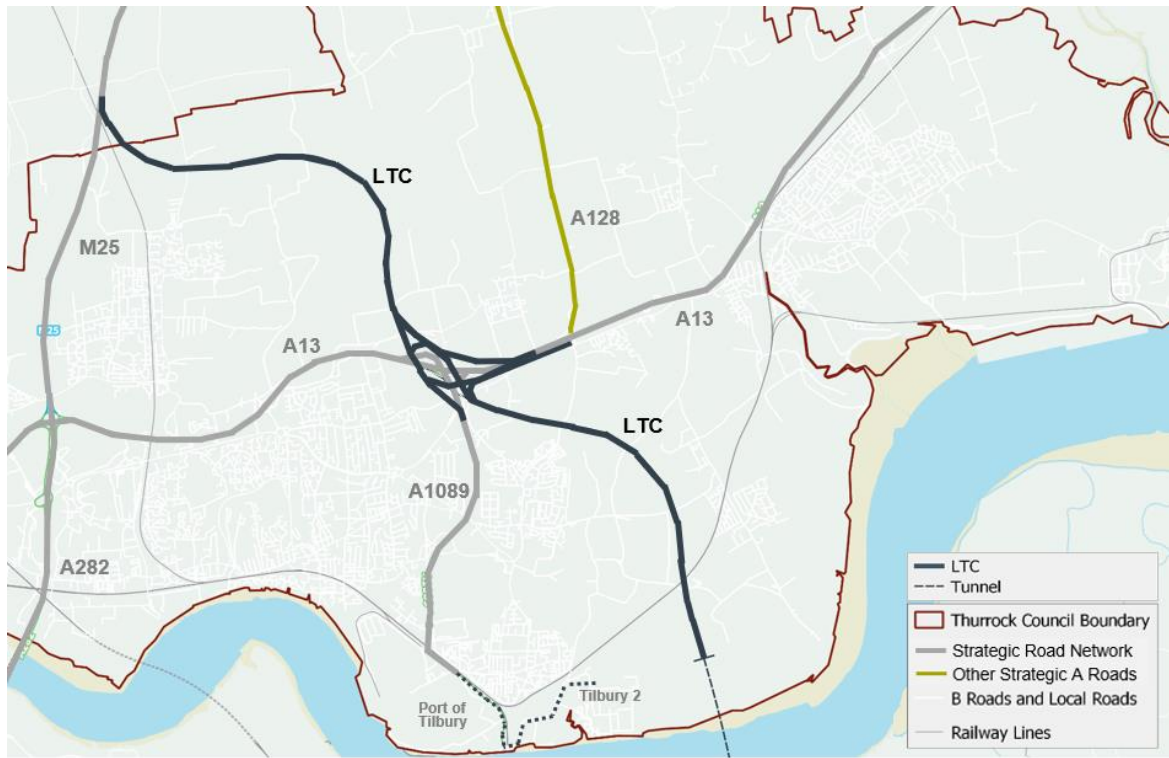
2.7 The following additional information forms the basis of the assessment of the construction phase:

- 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.

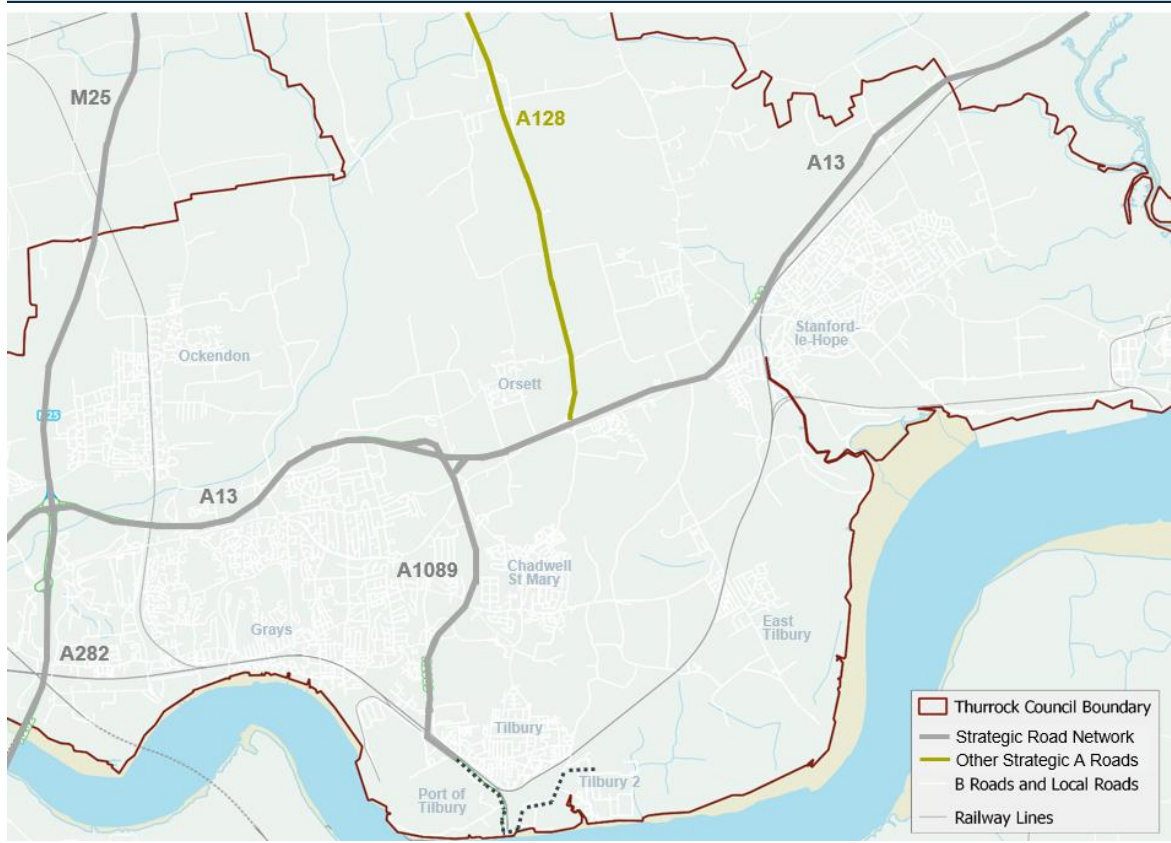
Current Transport Network

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

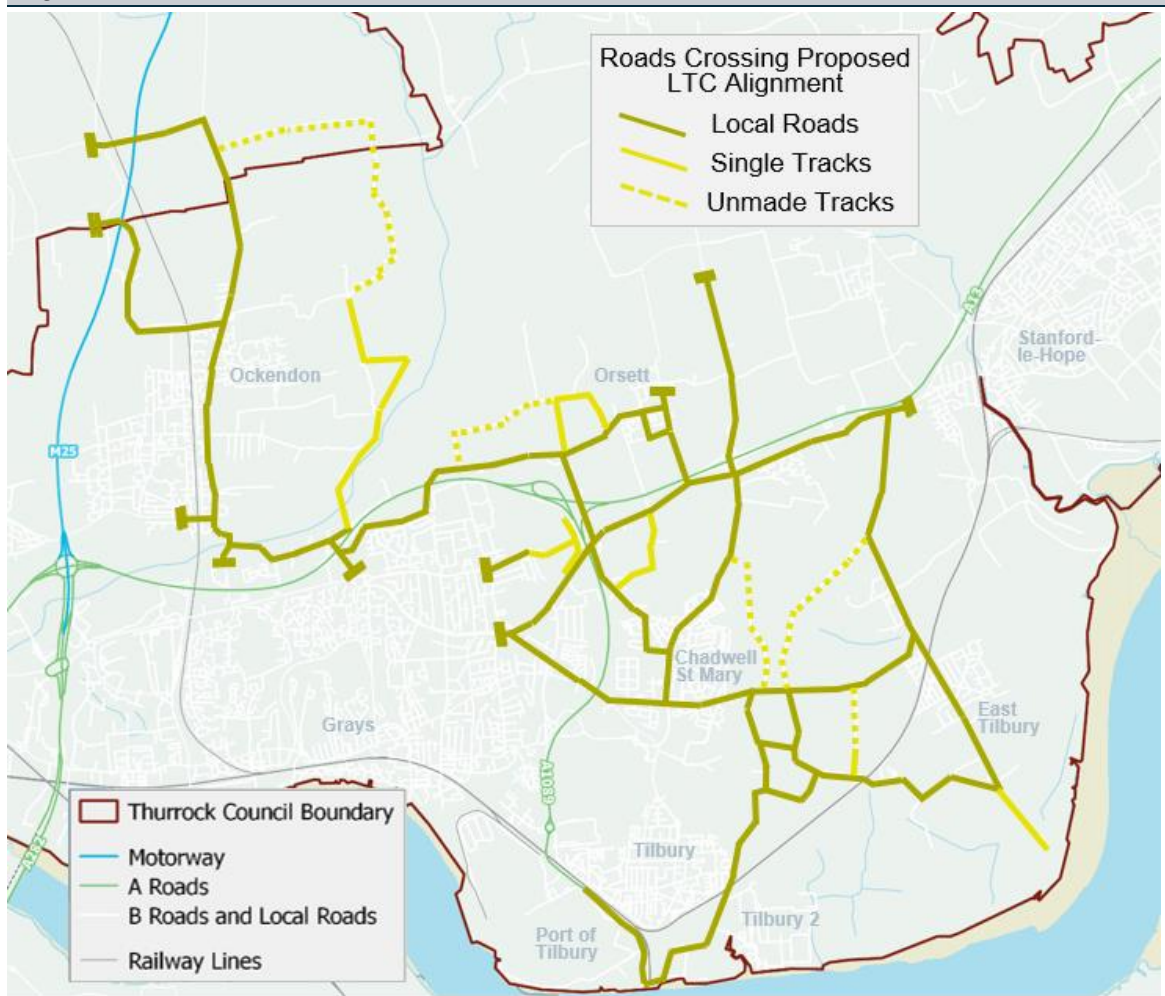
- 3.9 If constructed, the LTC Scheme will represent a significant additional element of strategic road network across the borough, partially connecting with the A13 and A1089 within the Thurrock, as well as the M25 to the northeast of the borough boundary.

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*

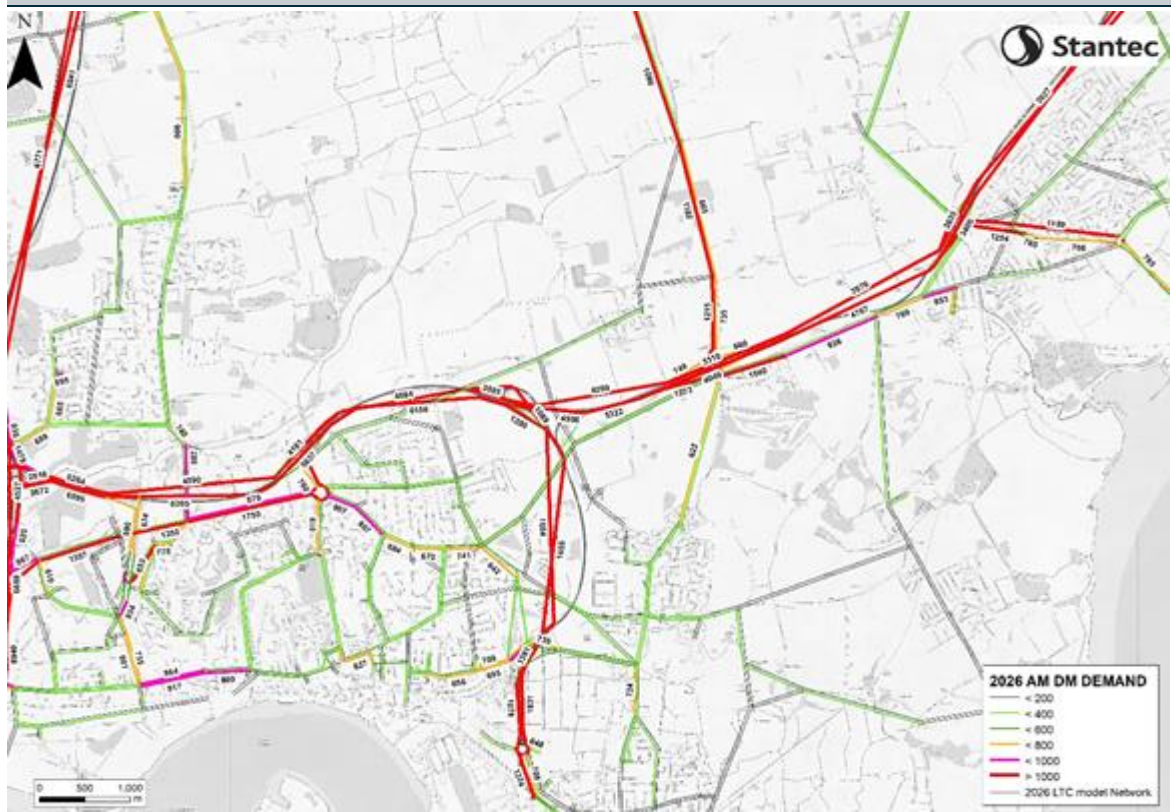
3.13 These local routes are particularly important connectors to a number of the villages and hamlets around Thurrock, including East Tilbury, Linford, Low Street, West Tilbury, Orsett Heath, Baker Street, and Orsett. They also provide important links to the urban areas of Tilbury, Chadwell St Mary,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

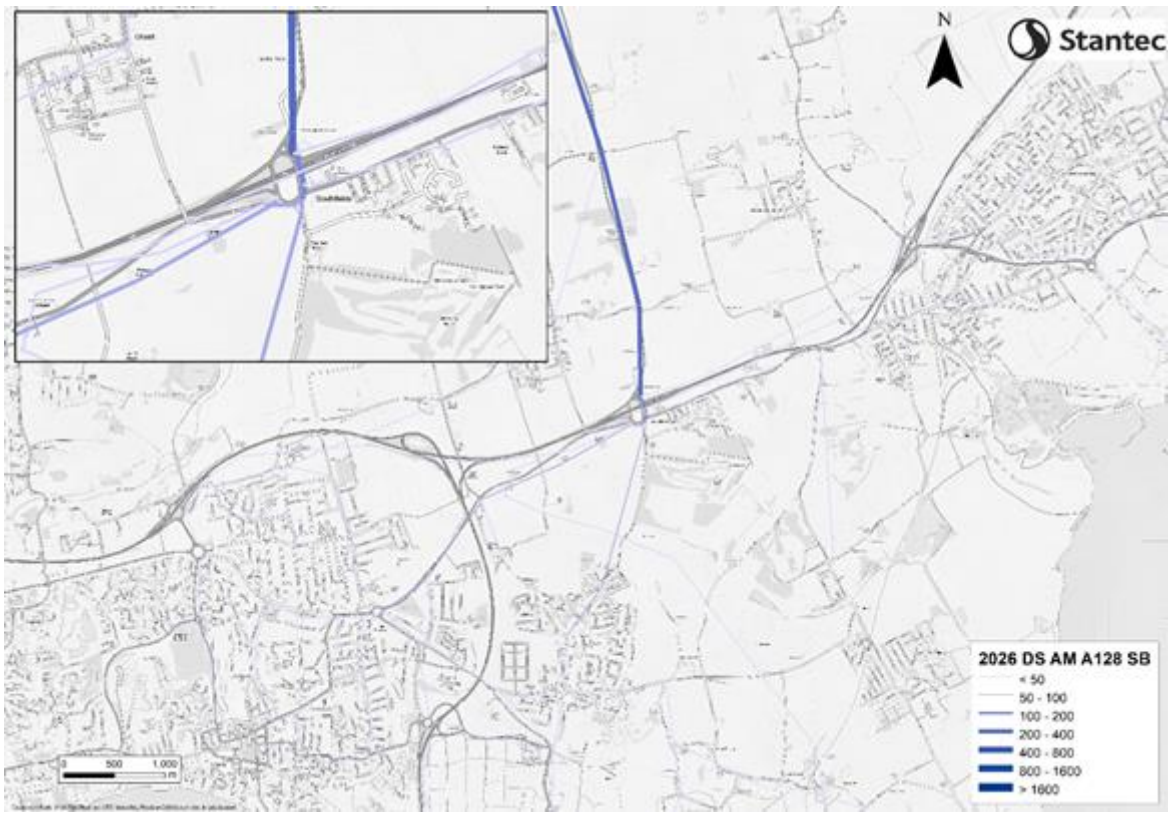
Route	Forecast 2026 Daily Traffic Flow
Station Road	3,350
Muckingford Road	750
Brentwood Road	9,600
Stanford Road	9,400
Baker Street	2,250
Heath Road	3,350
Stifford Clays Road	4,750
North Road	12,450

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

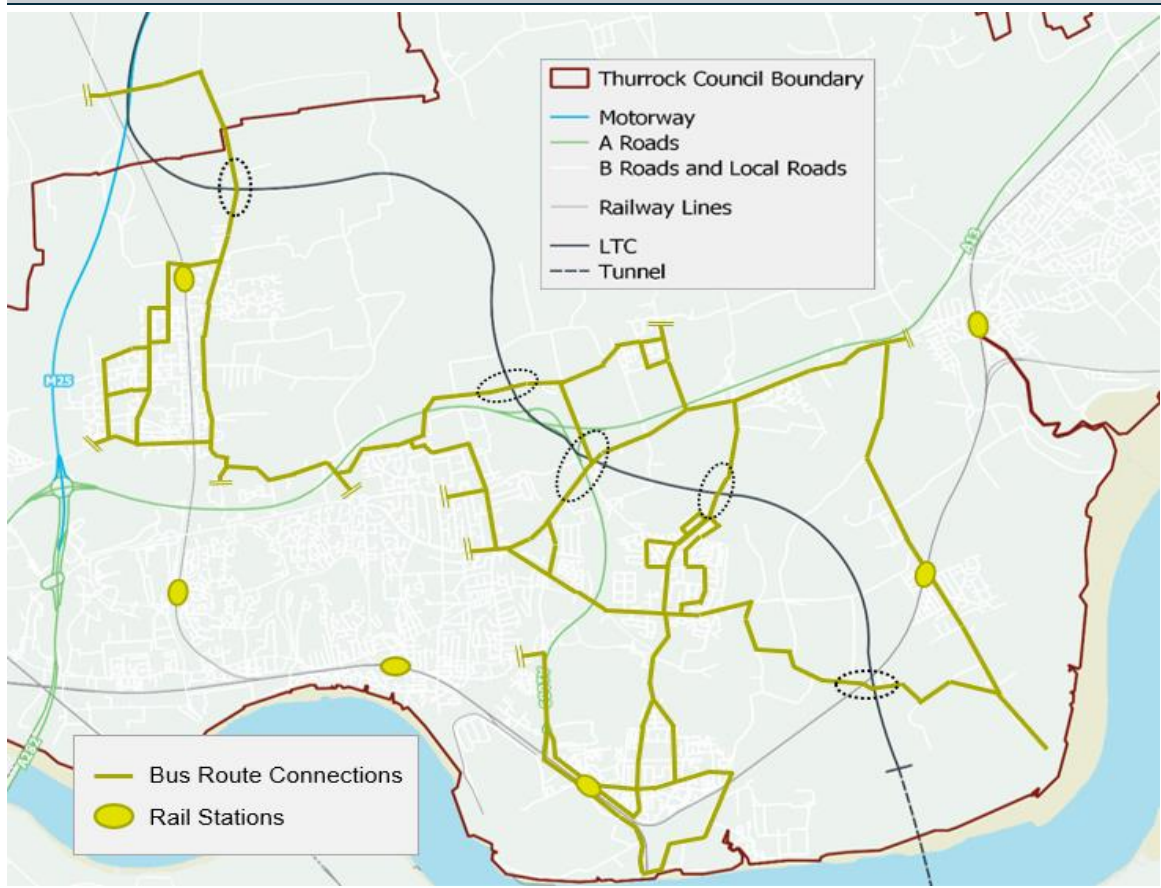
Local Rail Provision

- 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:

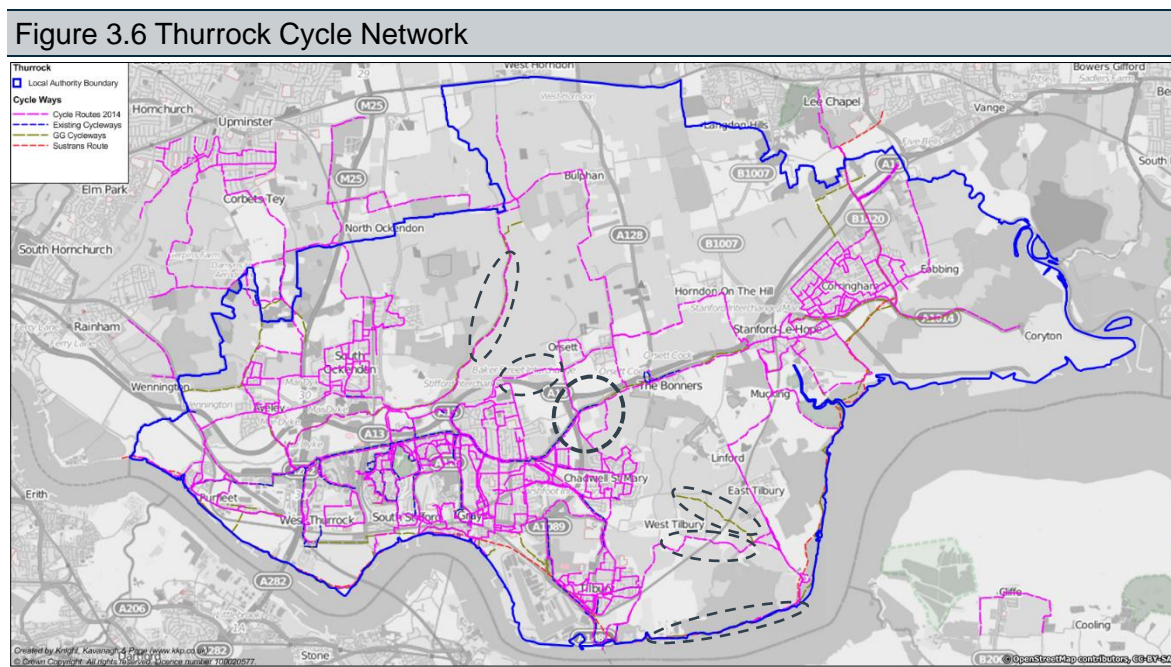
- **Route 12:** running east from Grays, through Chadwell St Mary and the eastwards along Linford Road before turning down Turnpike Lane and Rectory Road to serve West Tilbury. It then proceeds along Church Road, Low Street Lane and Station Road, crossing the 'Tilbury Loop' rail line before joining Princess 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.



Source: Knight, Kavanagh & Page.

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

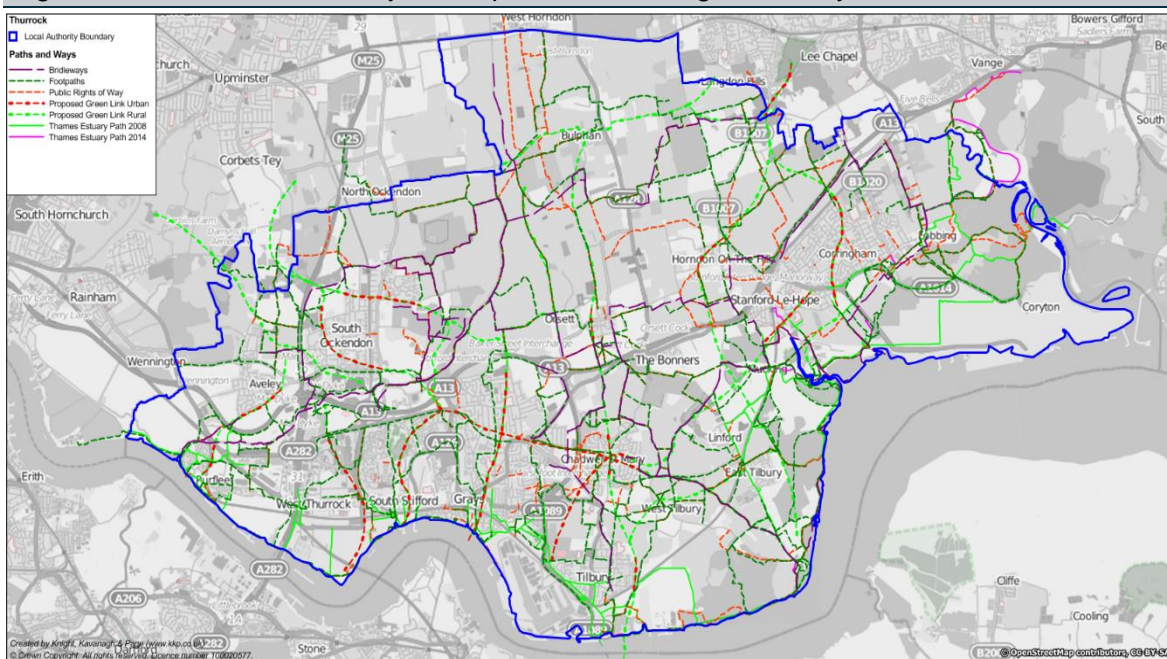
- Route 13 incorporates three separate sections across Thurrock. The first two elements follow the river, from east to the west side of Grays, and then from, effectively, Tilbury Town Rail Station all the way round to Coalhouse Fort. The gap between these sections relates to the location of the Port 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

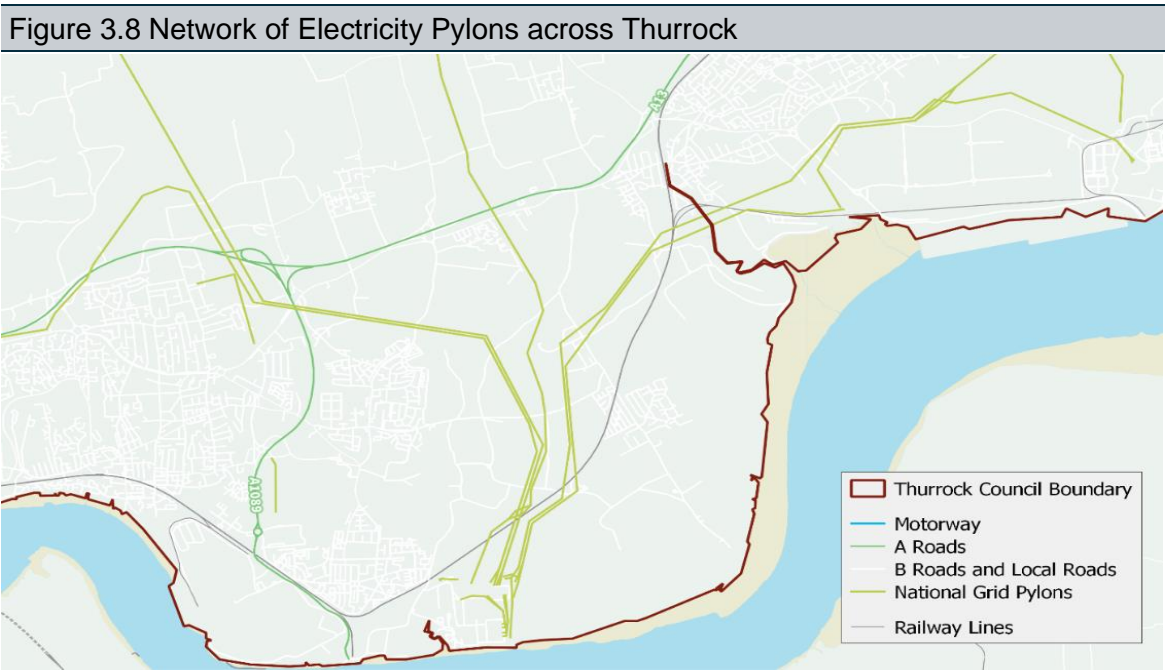


Source: Knight, Kavanagh & Page.

- 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.



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%

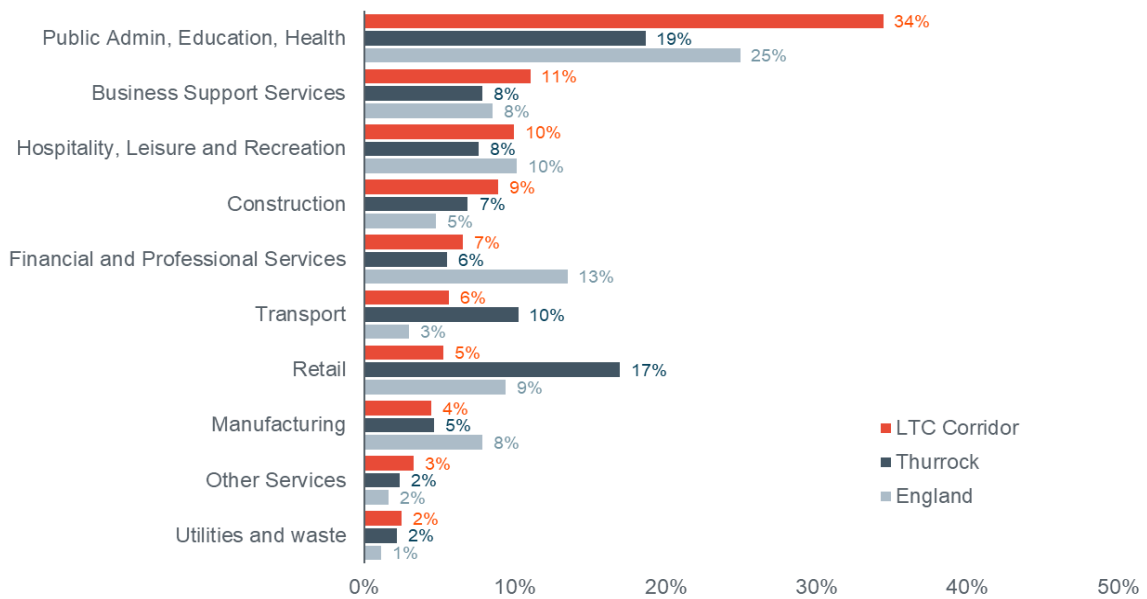
Source: BRES 2018, 2013; UK Business Count 2018, 2013

- 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.

	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%.

	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.

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 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

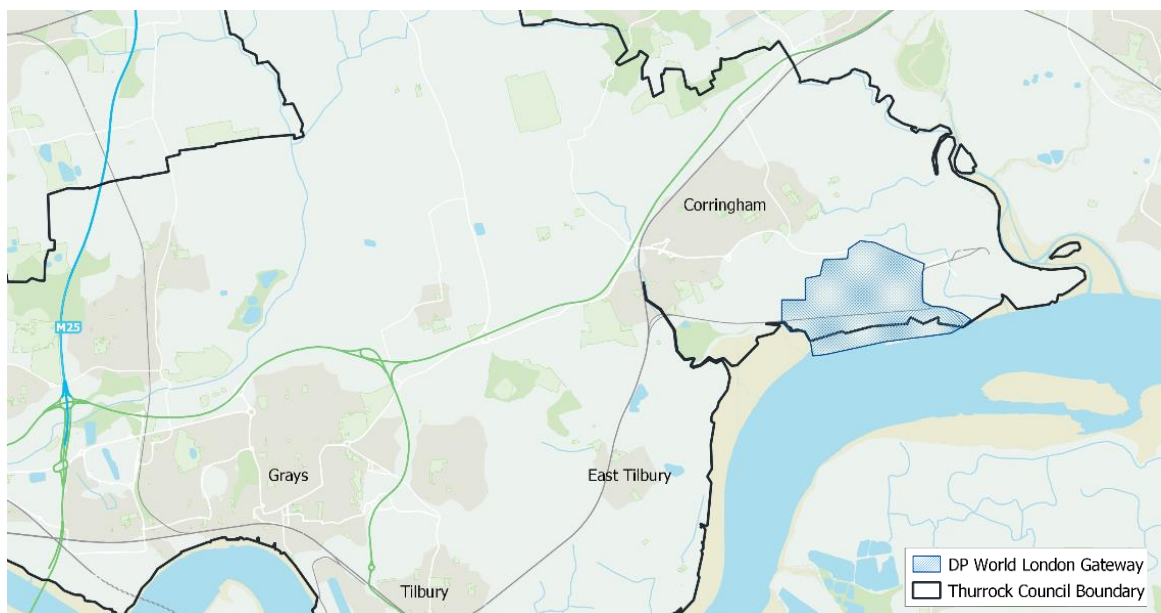
Tilbury2

- 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.

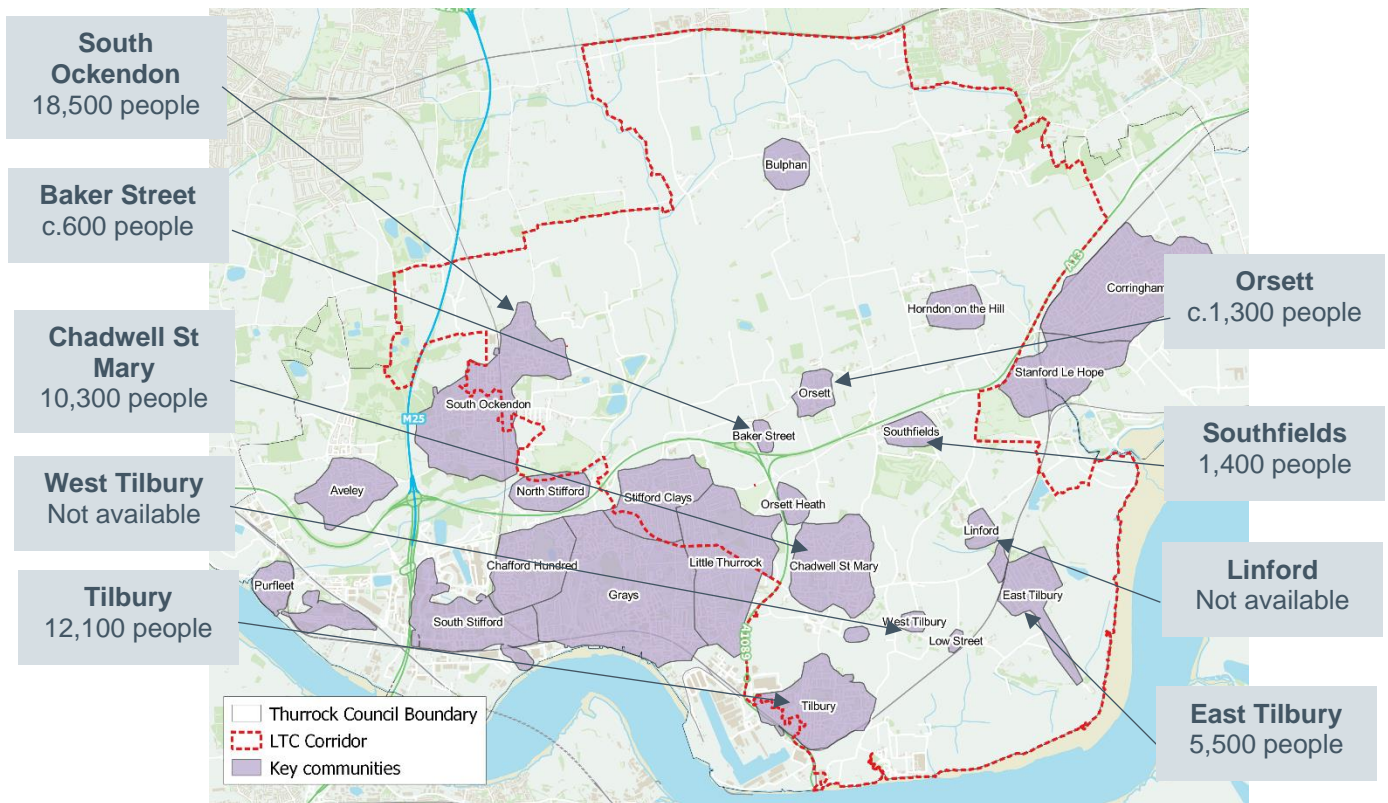
Figure 3.17 Population

	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



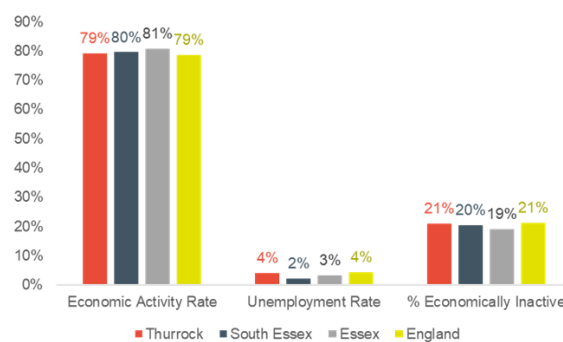
Source: Hatch Regeneris. Data from the ONS, 2017. Contains OS data © Crown copyright and database right 2019

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

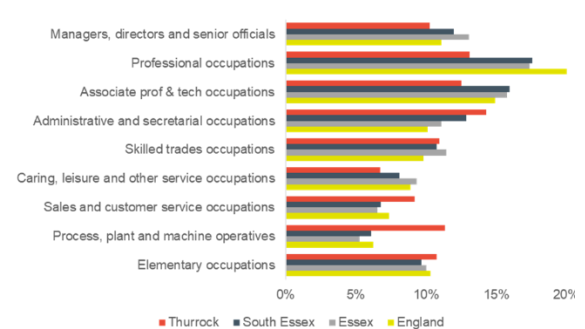
3.59 Figures from the Annual Population Survey give an insight on the economic participation of residents living in an area. Figures 3.19 and 3.20 show that Thurrock has a slightly lower economic activity rate than the comparator areas and a higher unemployment rate than the immediate surrounding areas.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



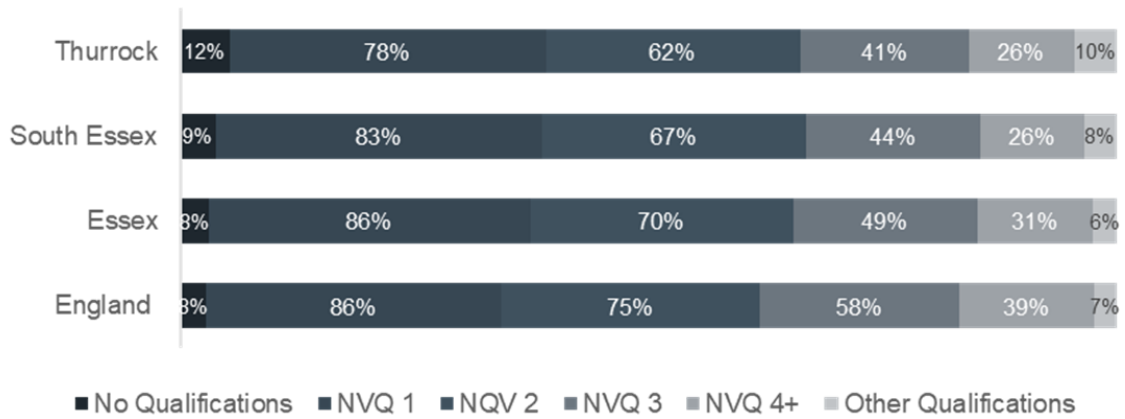
Source: Annual Population Survey 2018

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>

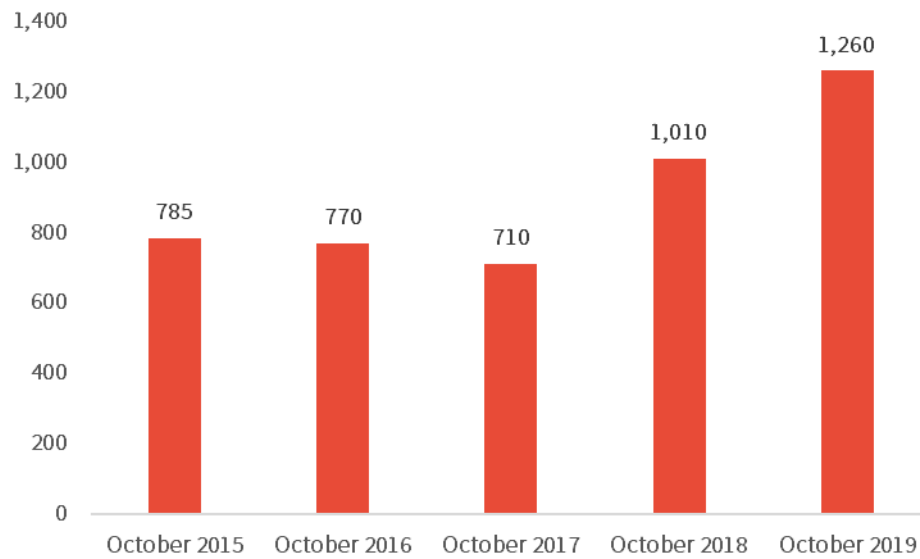
Figure 3.21 Qualifications Levels



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.

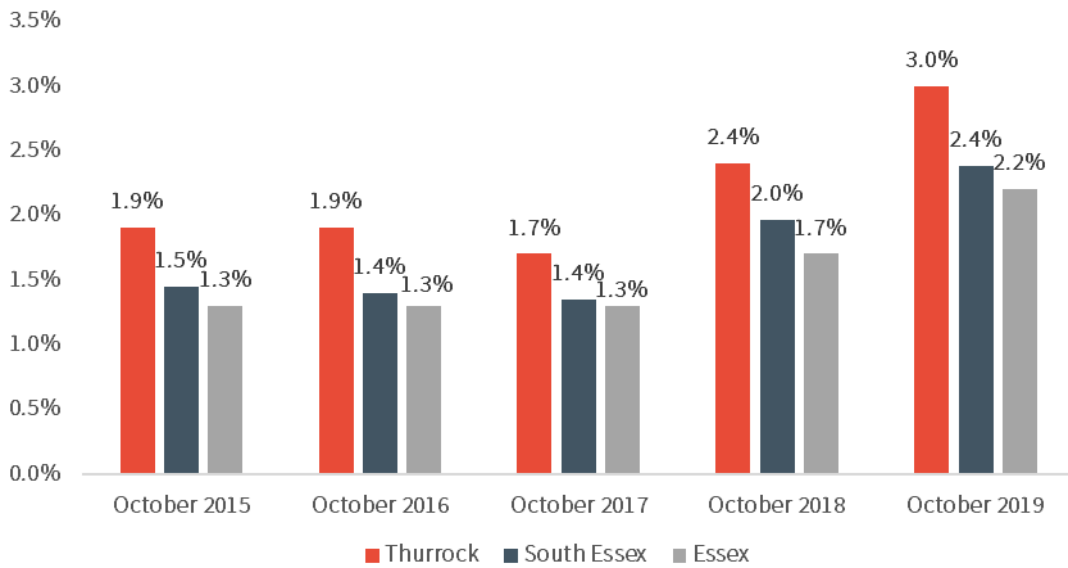
Figure 3.22 Claimant Count in the LTC Corridor, October 2015-2019



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

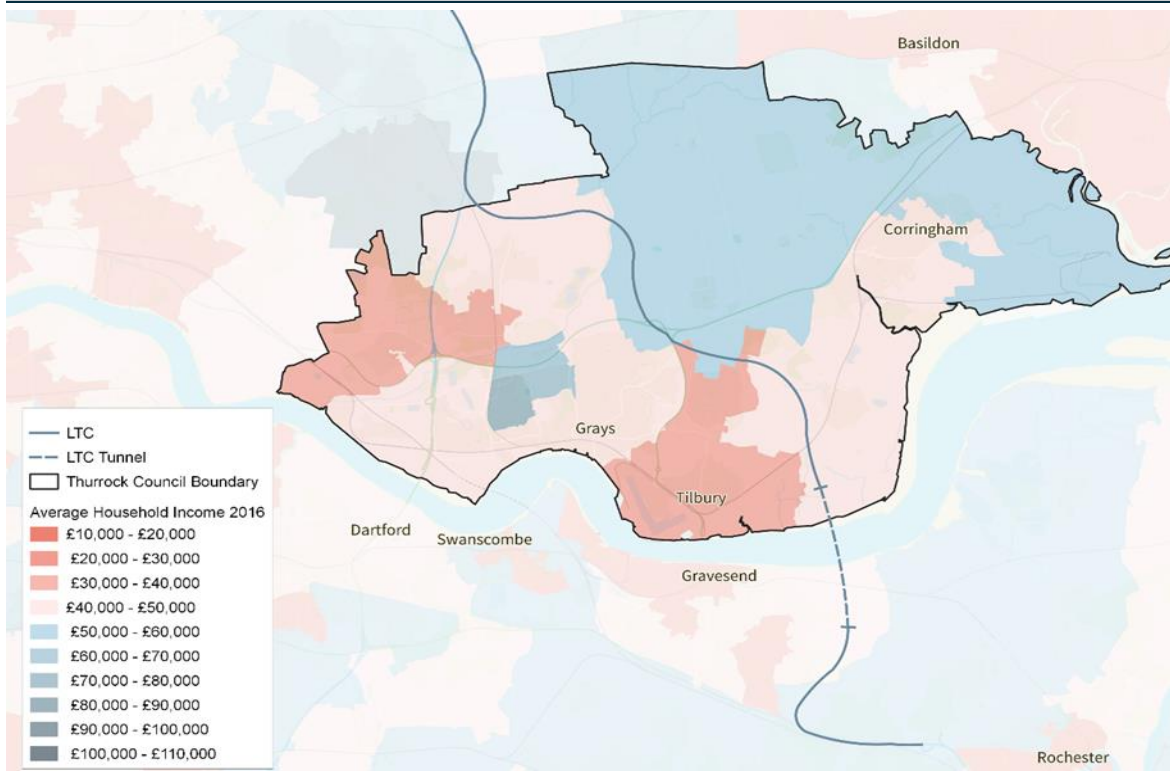


Source: Hatch Regeneris. Data from 'Claimant Count', ONS, 2015-2019

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



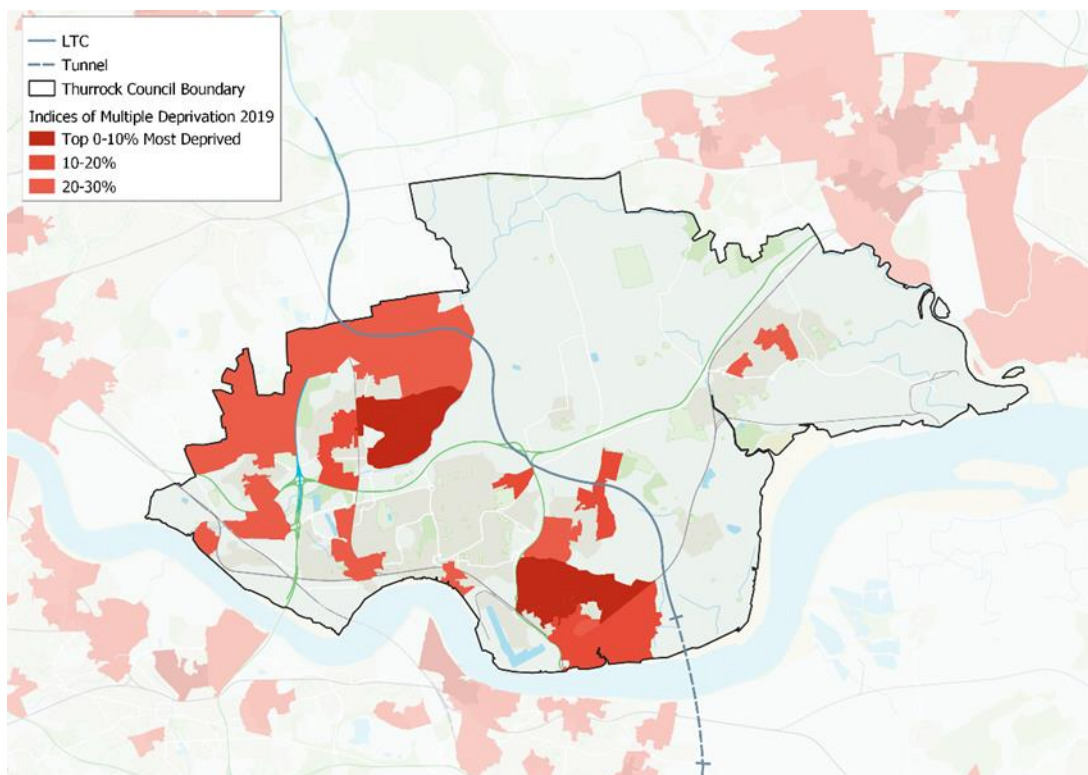
Source: Hatch Regeneris. Data from ONS 2016. Contains OS data © Crown copyright and database right 2019

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.

	% 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

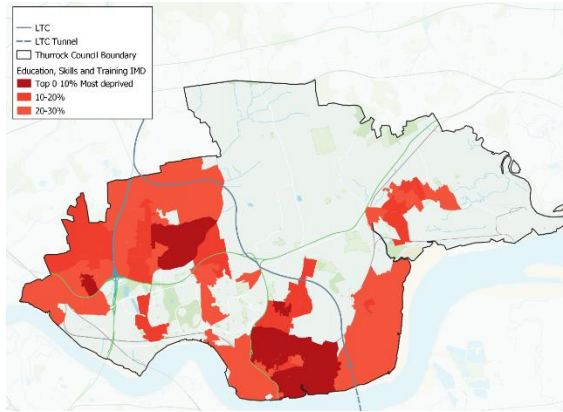
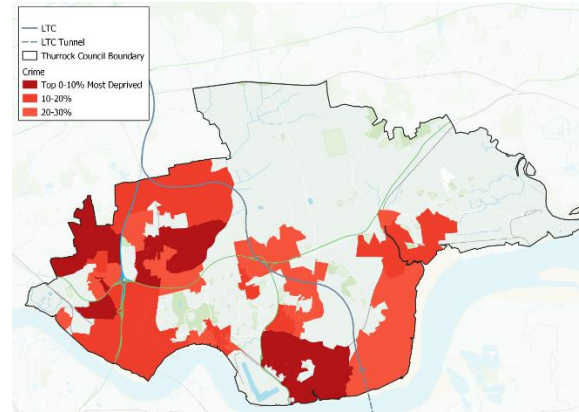


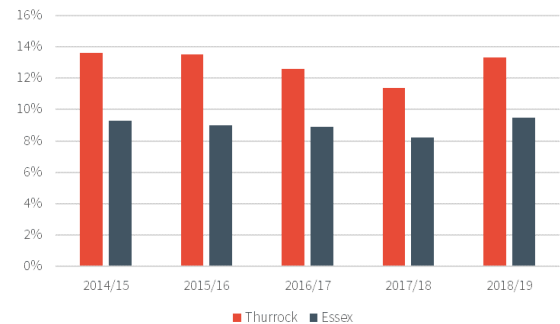
Figure 3.28 Crime Deprivation – Top 30% Most Deprived LSOAs Nationally



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

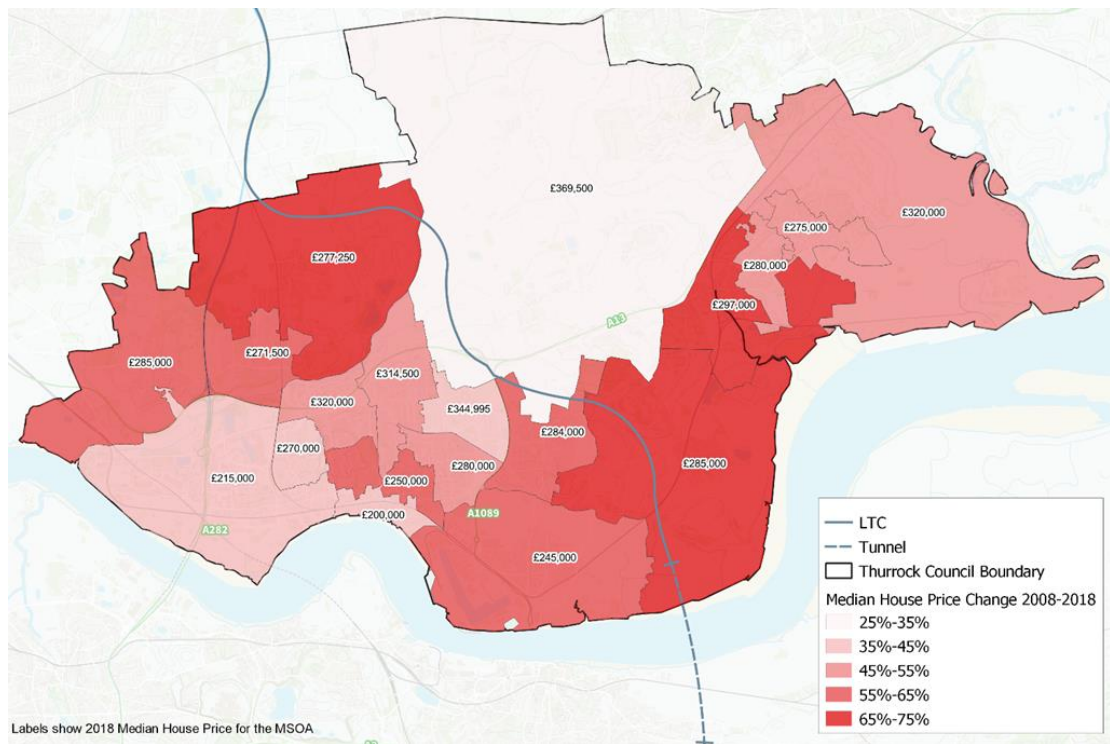
- 3.70 Across the LTC Corridor, the median house price is £302,900. This is slightly higher than the Thurrock average, however the Corridor is characterised by significant variation in prices with higher house prices found in the north of Thurrock in and around Orsett. Median house prices here are almost £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

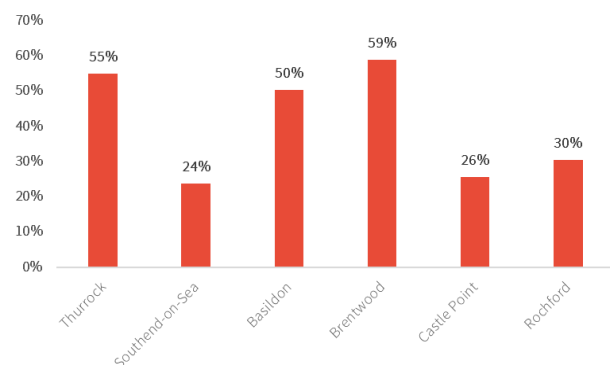


Source: Hatch Regeneris. Data from the ONS 2008, 2018. Contains OS data © Crown copyright and database right 2019

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.

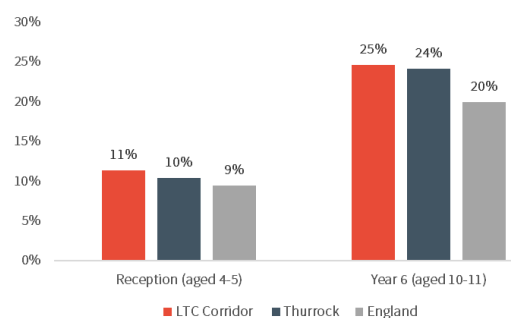
Health and Wellbeing

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 resident 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.

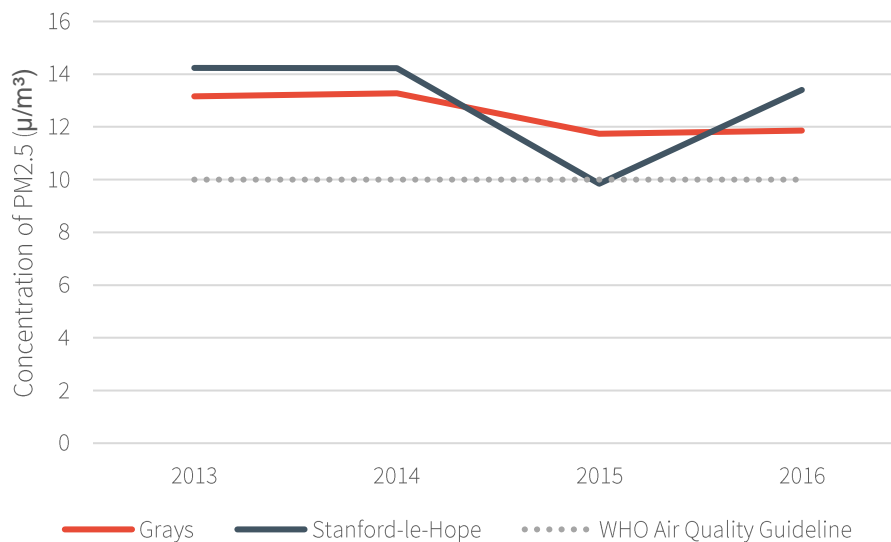
Environment

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.

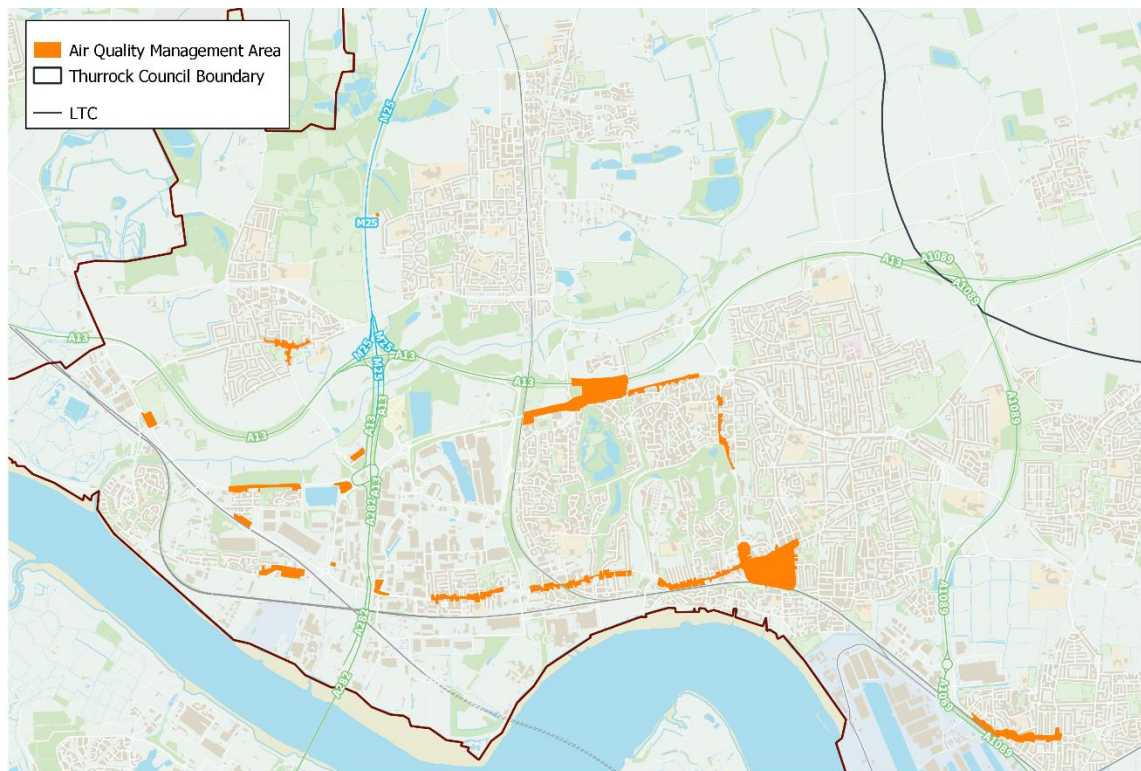
Figure 3.34 WHO Ambient Air Quality PM_{2.5}



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



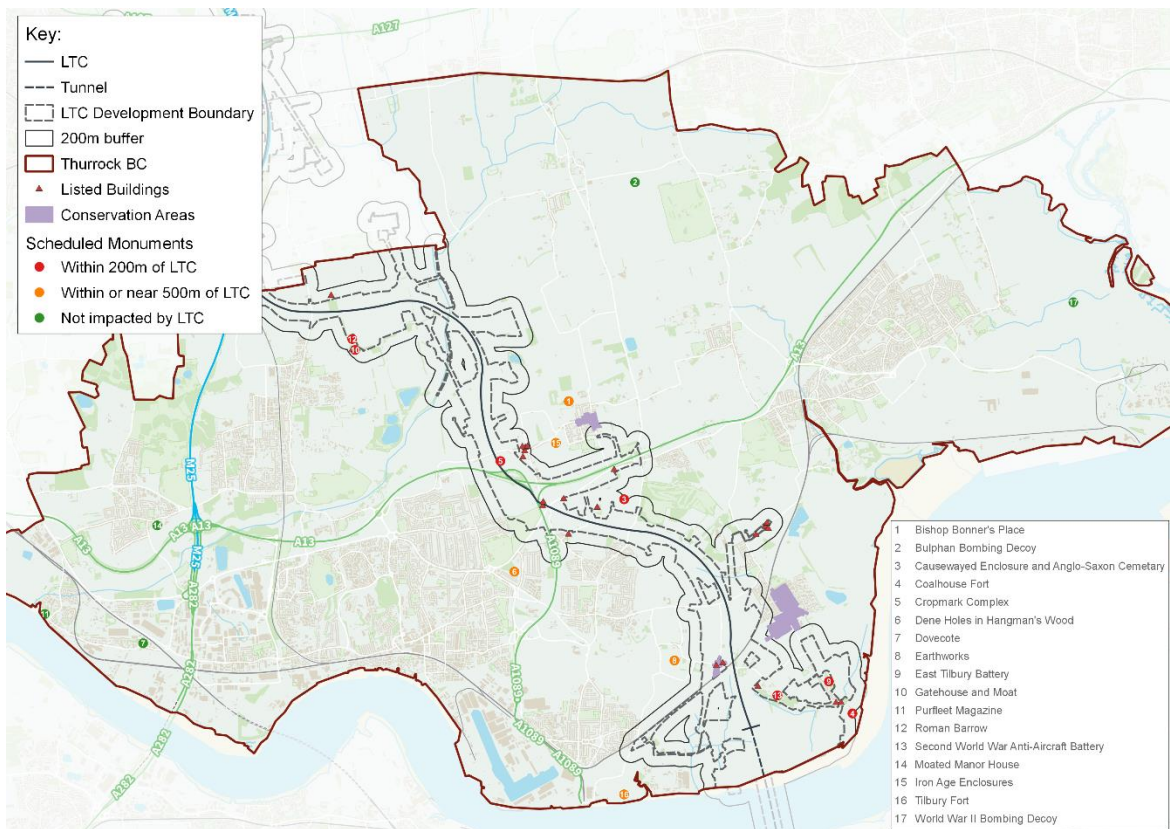
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Heritage Assets

- 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

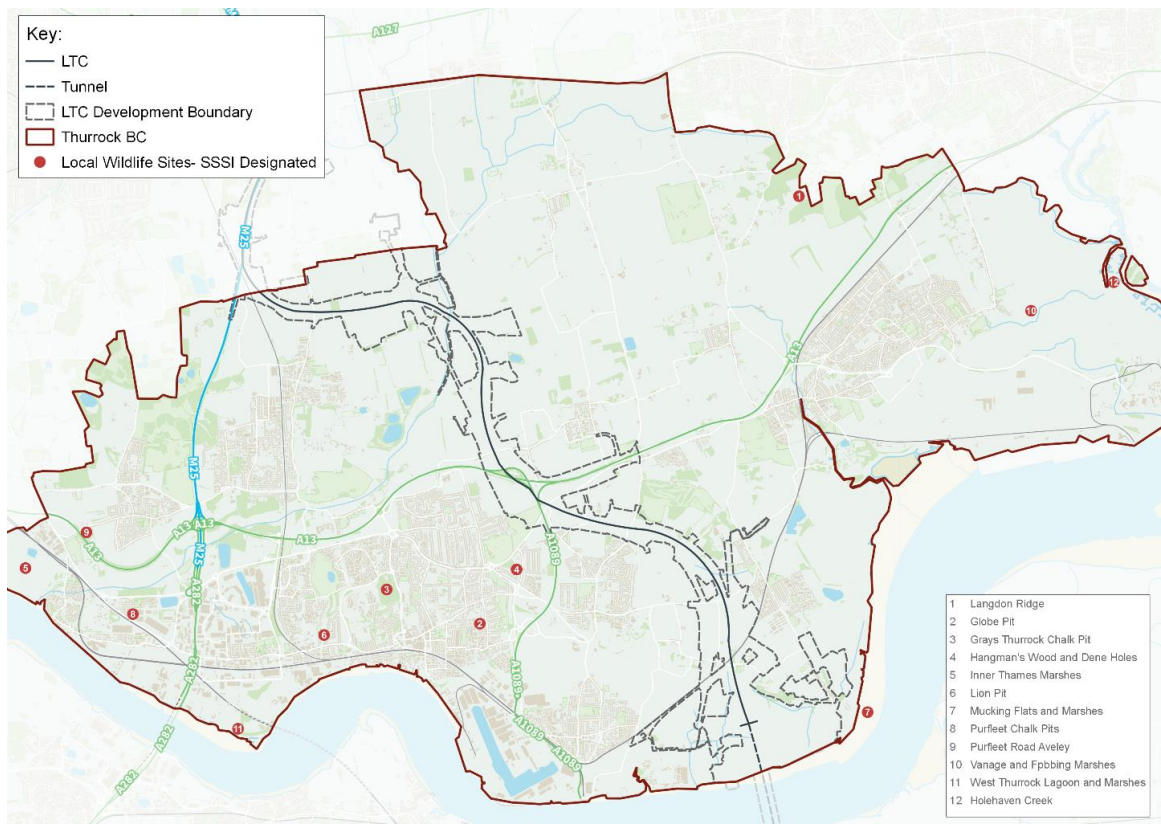


Source: Hatch Regeneris. Data from Thurrock Scheduled Monuments: Assessment of Settings Report, 2019 and Historic England 2019. Contains OS data © Crown copyright and database right 2019

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.

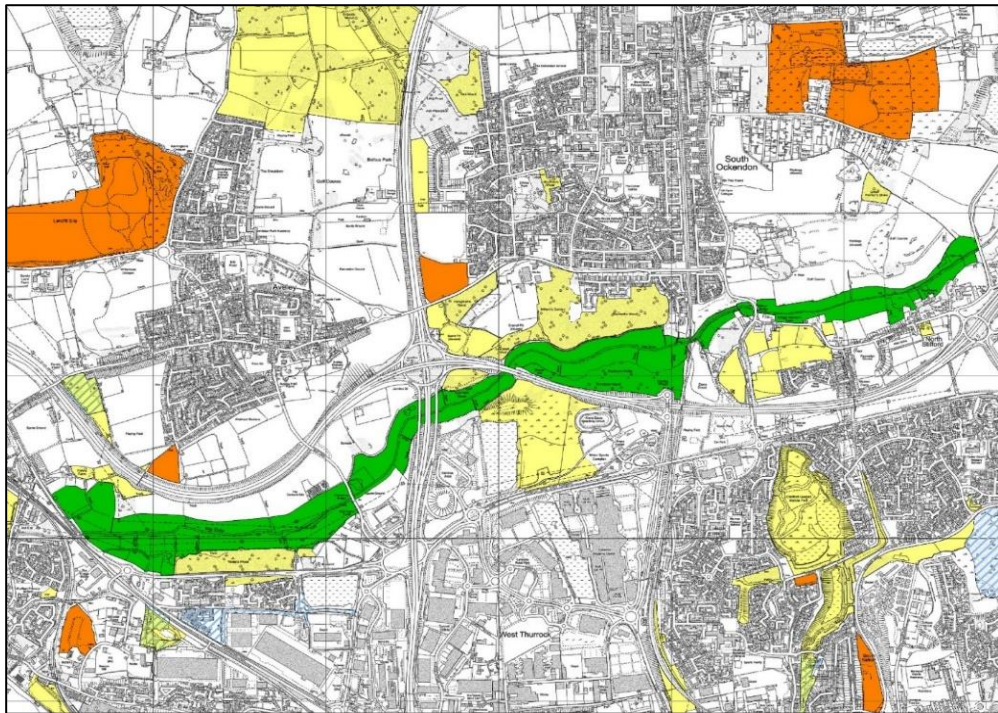
Figure 3.37 Wildlife Sites in Thurrock



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

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 undesignated sites

Figure 3.38 Mardyke Valley Wildlife Corridor

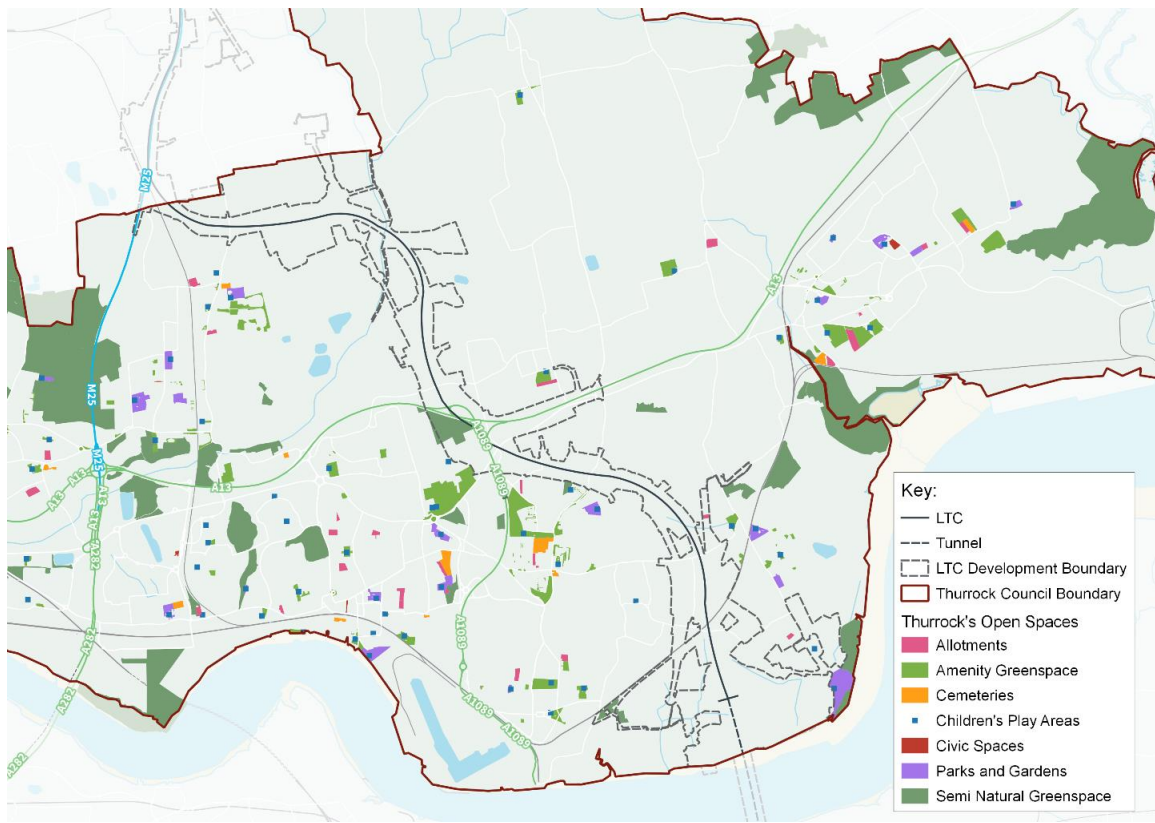


Source: Thurrock Local Wildlife Sites Review

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

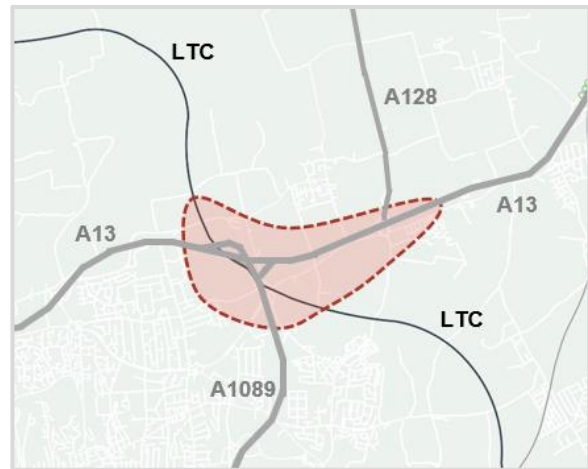
- 4.7 The construction of the LTC Scheme will require the physical closure of a number of local roads and PRow for varying lengths of time. In addition, it is likely that some of the more major routes through the area will also suffer periods of disruption and loss of capacity as part of delivering the 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.



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

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.

- 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

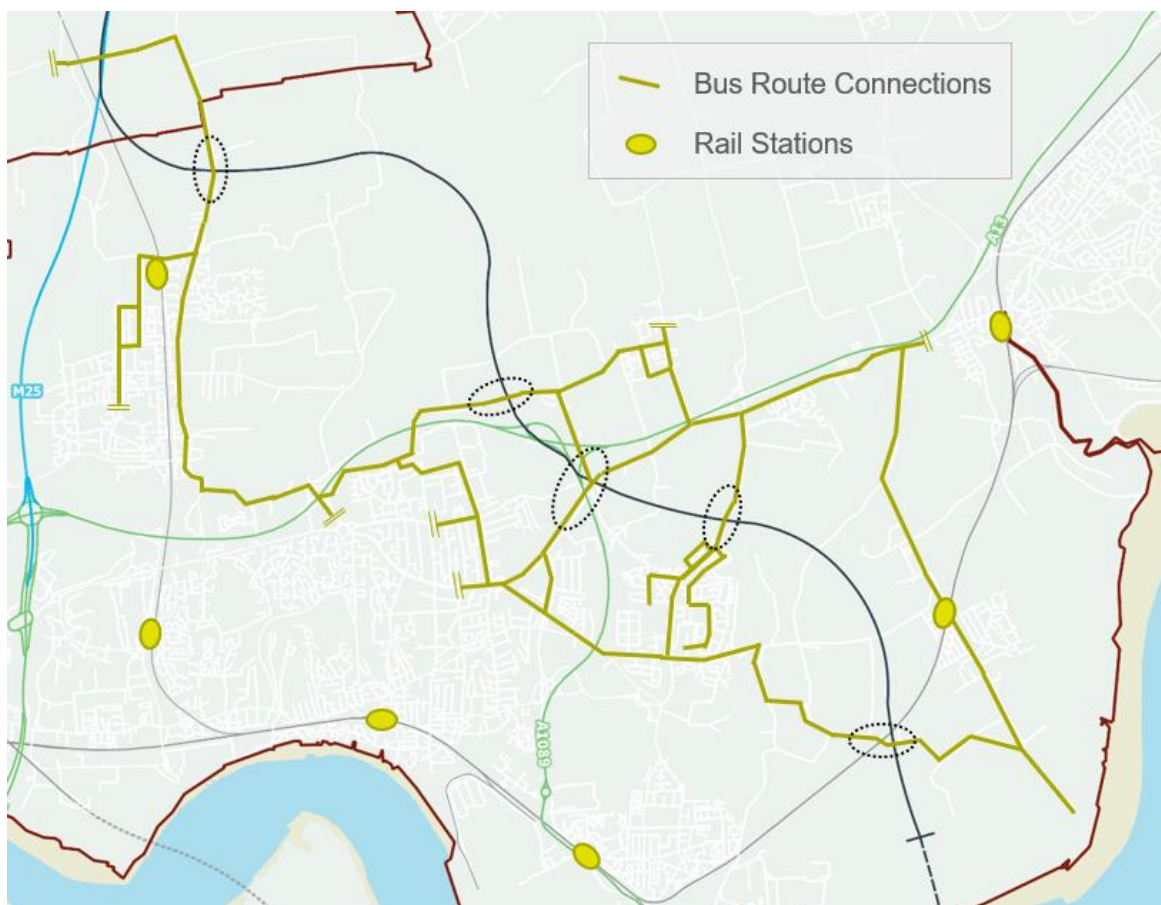
- 4.19 In addition, the four temporary local road closures that may occur around the A13 junction, highlighted in the section above, a further four local roads will be affected by the LTC Scheme:
- Station Road
 - Muckingford Road
 - Brentwood Road
 - North Road
- 4.20 Whilst it is not yet clear over 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



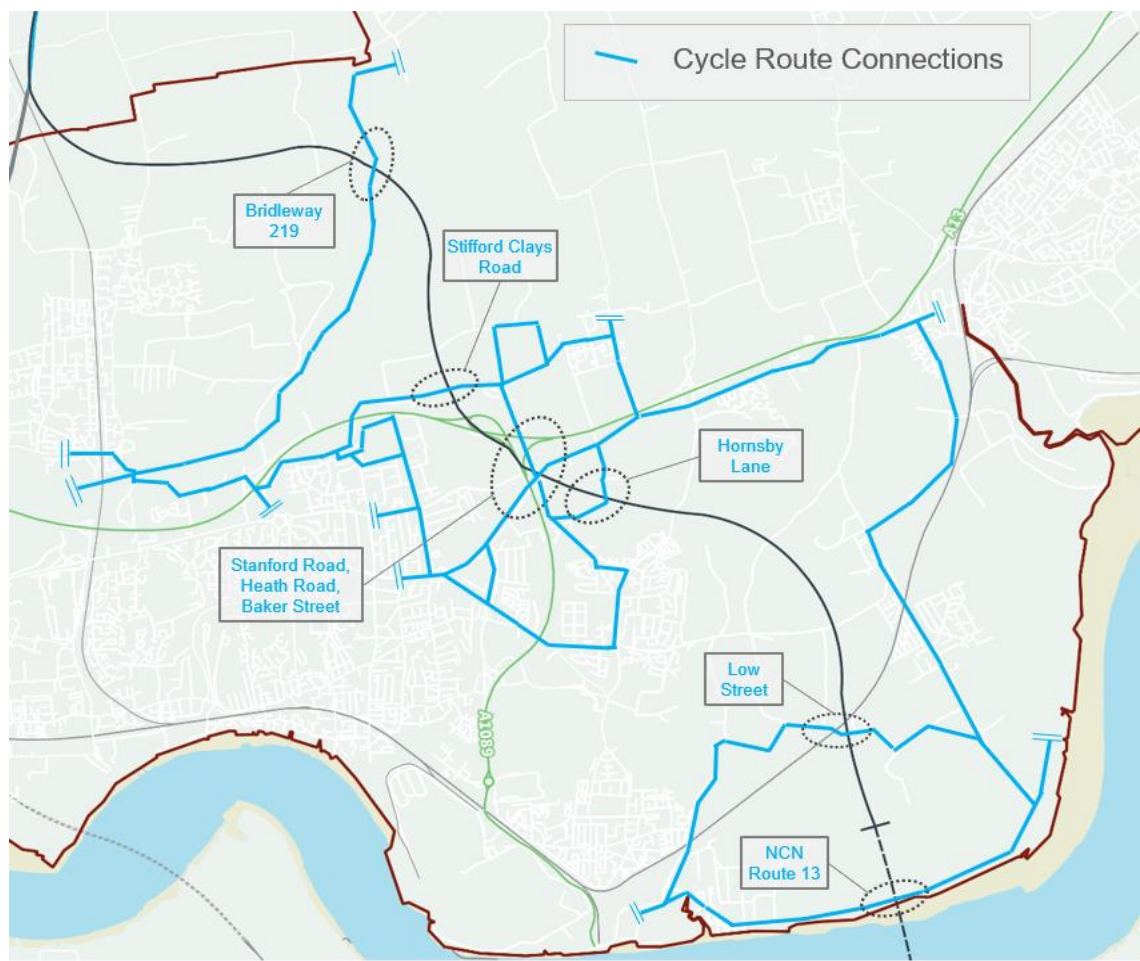
Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- **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:

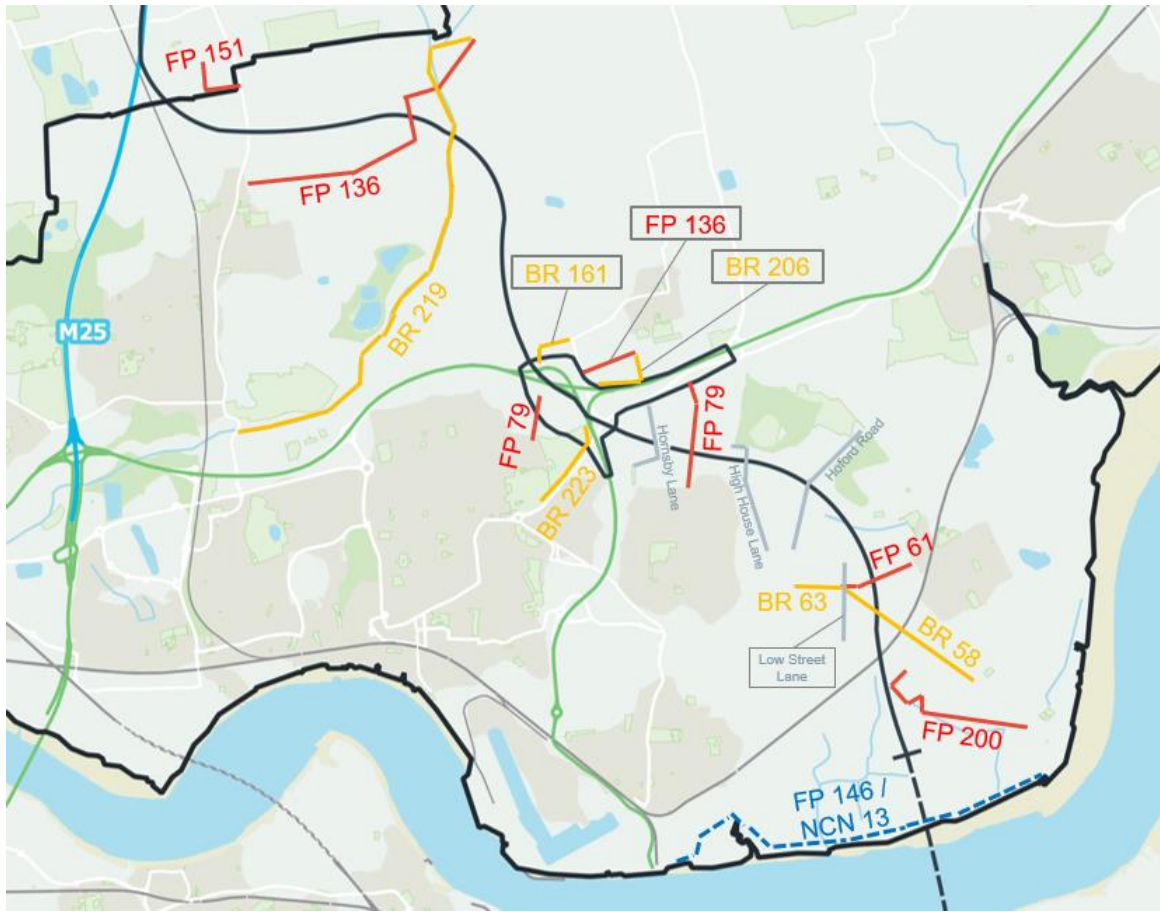
- **Station Road: Major adverse** impact either through road closure (predicted high duration) or construction-related traffic (forecast up to 14% increase in flows from construction traffic and significant HGV turning movements along the route)
- **Muckingford Road: Major adverse** impact either through 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

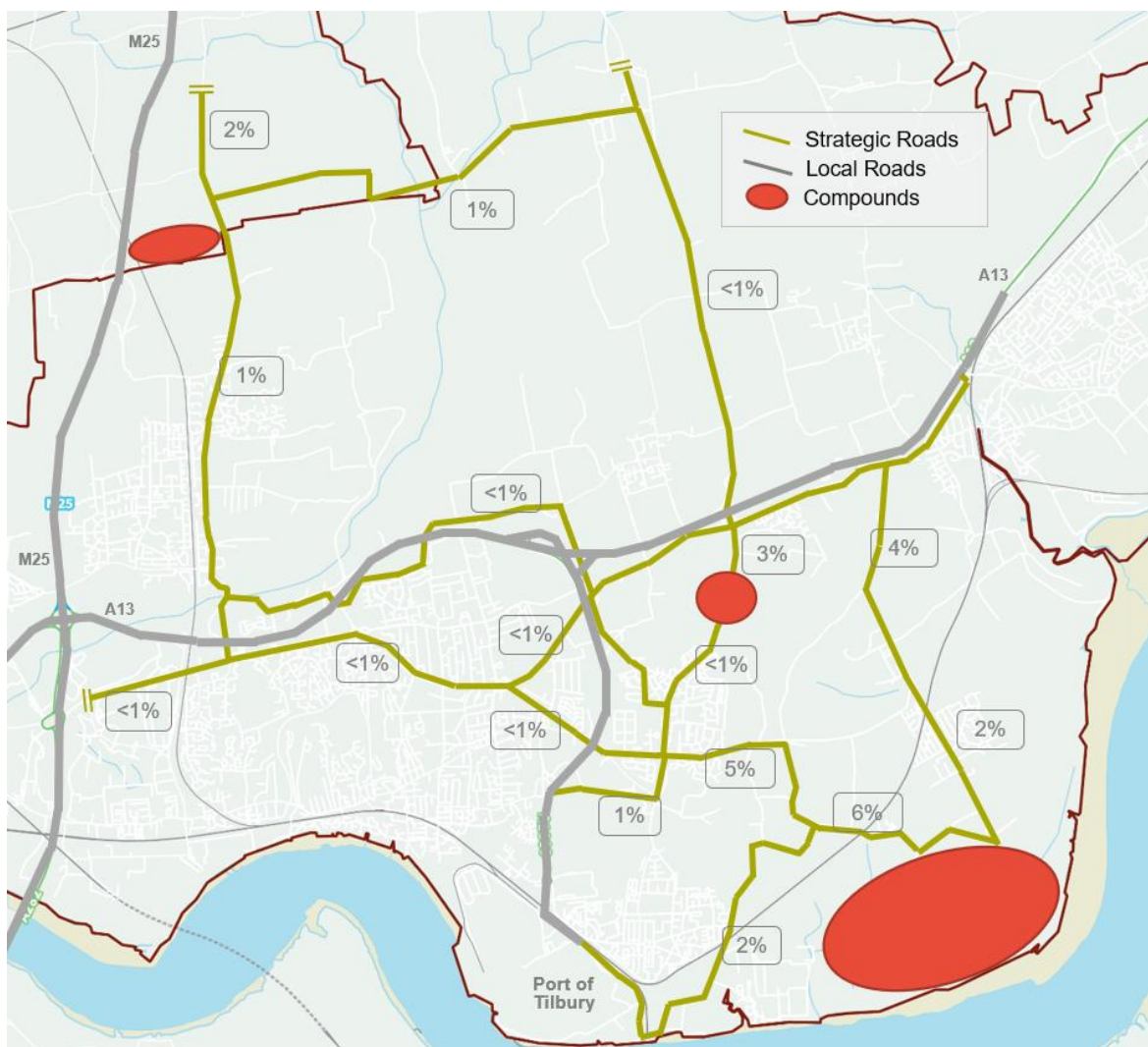
Table 4.2 Forecast HGV Movements per Month to Compounds

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.

Figure 4.4 Estimated impact of HGV construction traffic upon local road network flows



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

Workers moving to and from construction compounds

- 4.36 Along with the HGV movements to the compound sites, there will also be a need to bring workers to and from the site. It is estimated that there will be circa 1,900 workers on sites to the north of the river, of whom 800 will be focused within the Tilbury area.
- 4.37 No information is currently available around how these workers will be brought to and from the sites; however, given the remote locations of the sites, it is likely that there will be dedicated bus provision to minimise the impacts of travel.
- 4.38 It is estimated there may be a requirement for between 90 and 130 bus movements per day across the three sites. This would equate to between 1,800 and 2,700 bus movements on the local road network per month.
- 4.39 This could result in a further additional 1% increase in daily traffic movements, on top of the HGV movements, on certain routes. These impacts could be even more significant on the basis of the need for temporary road closures during the construction phase (as outlined in section 4.19 above), which could result in even higher flows along individual routes. Insufficient information is currently available to effectively assess this impact.

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.

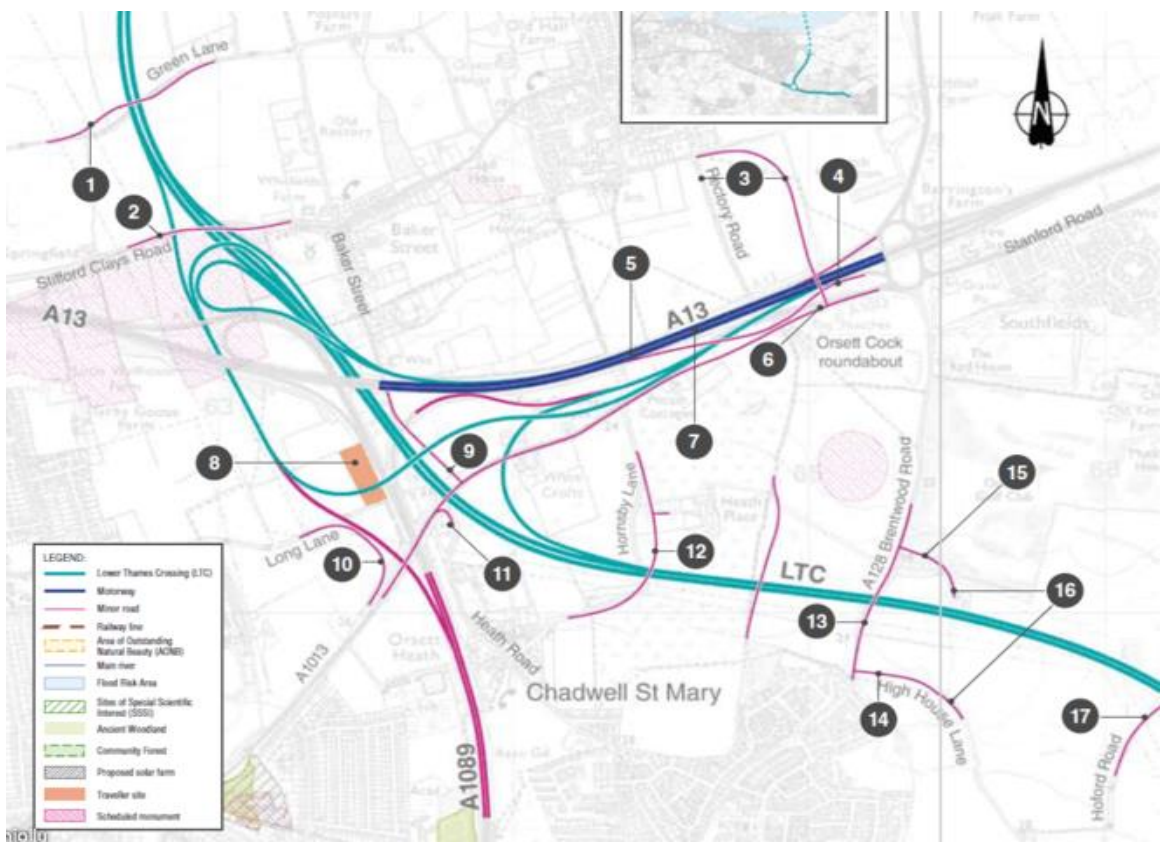
¹² Source: Freedom of Information request (Essex Live)

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

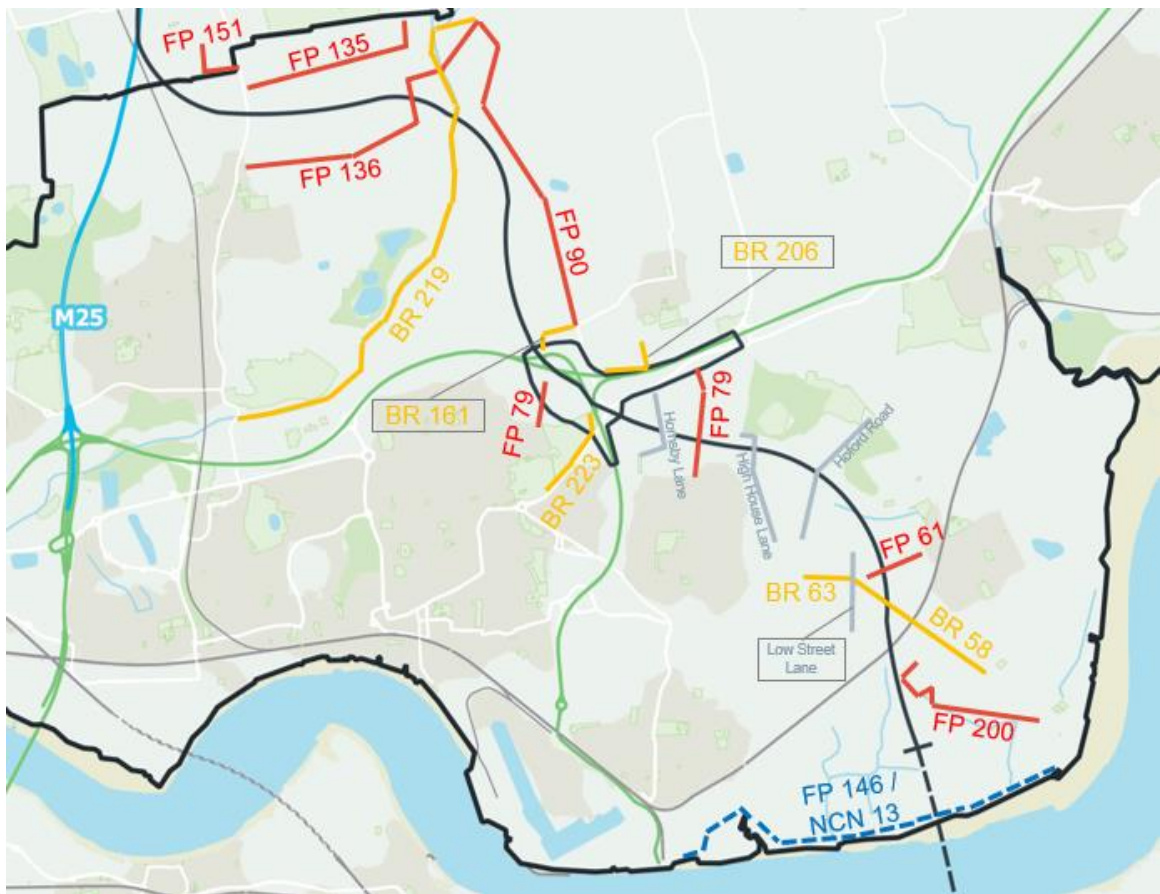
- 4.65 Alongside the realignment of local roads, one road will be permanently closed as a through route by LTC. This is Hornsby Lane. It is a single-track route that provides an alternative connection from Orsett Heath to Stanford Road and gives access to some local properties. There is no traffic flow 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

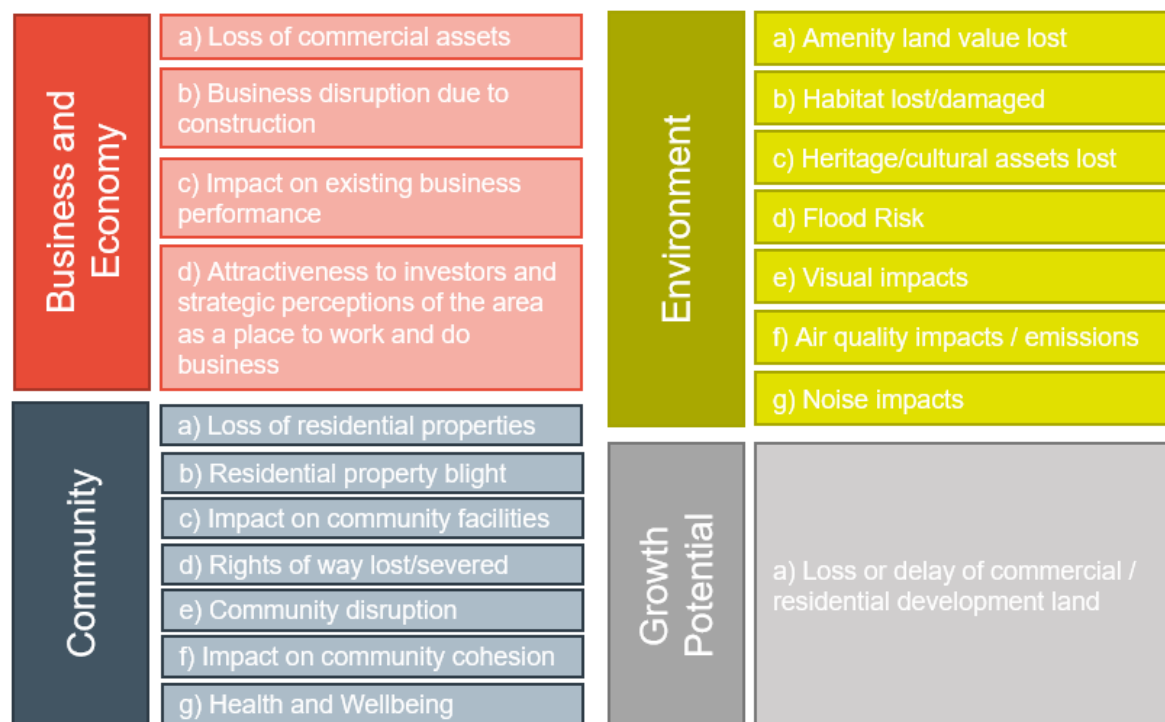
Operational phase

- 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

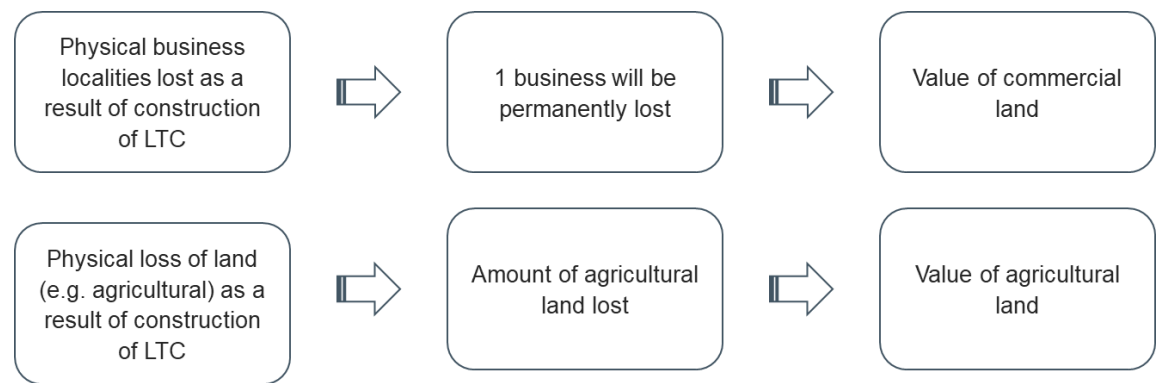
- 6.5 The delivery of LTC will require the temporary and permanent loss of commercial assets in Thurrock. Commercial assets include business premises or land used for commercial purposes, such as agriculture.

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.

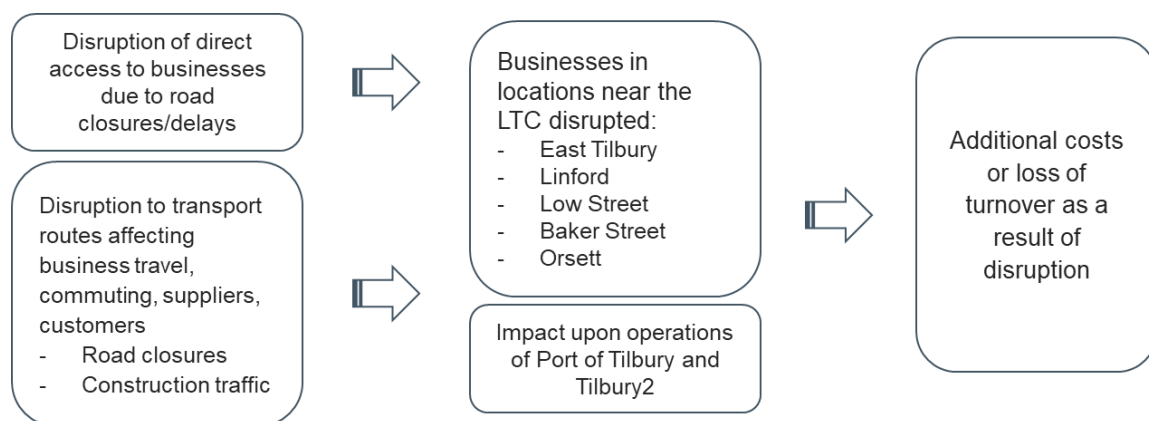
b) Business Disruption due to LTC Construction

- 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:

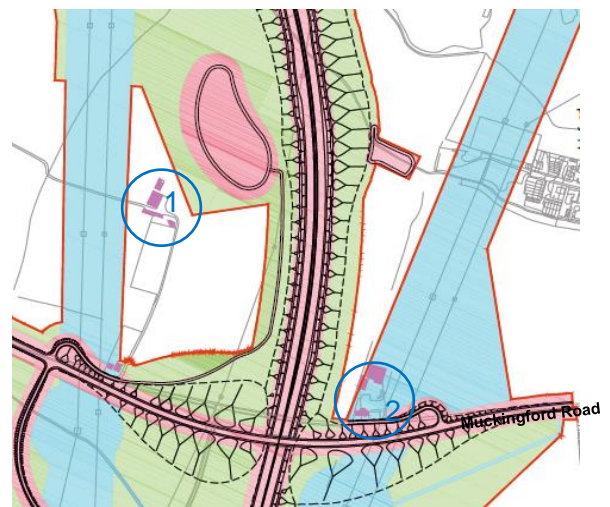
1) Disruption to direct access

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 translate 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

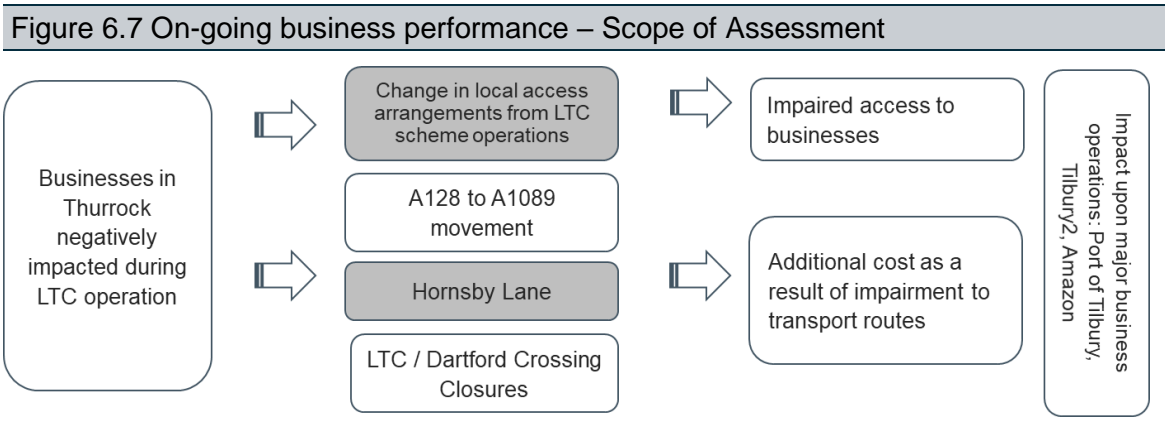
Source: Hatch Regeneris

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.



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.

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 GVA Impact
	115 FTE 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_Values_2017.pdf

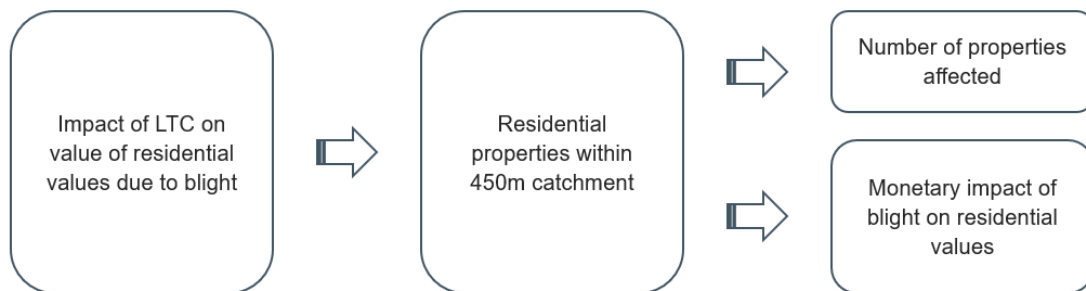
b) Residential Property Blight

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

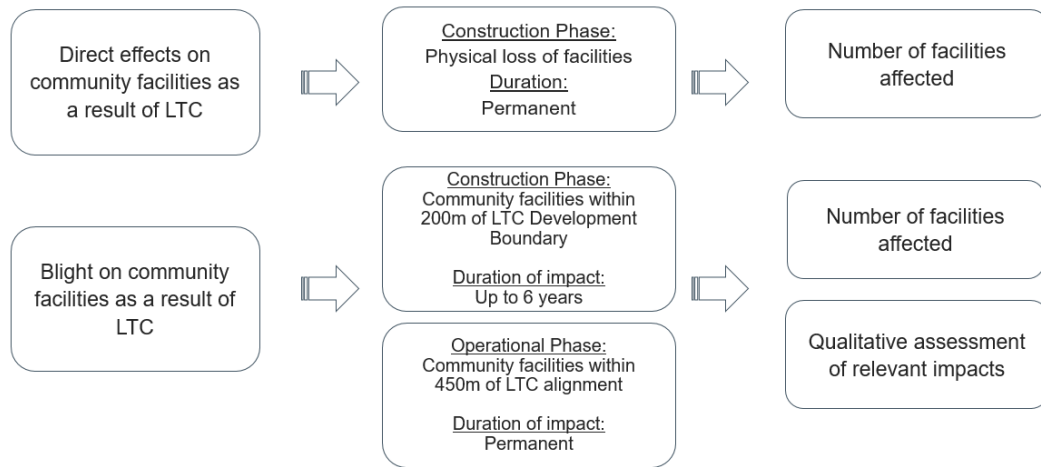
- 7.19 Within this report, community facilities are defined as public or publicly funded resources that provide for the physical, social, cultural and/or intellectual development or welfare of the community. This includes, but is not limited to, resources such as educational facilities care homes, health 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.

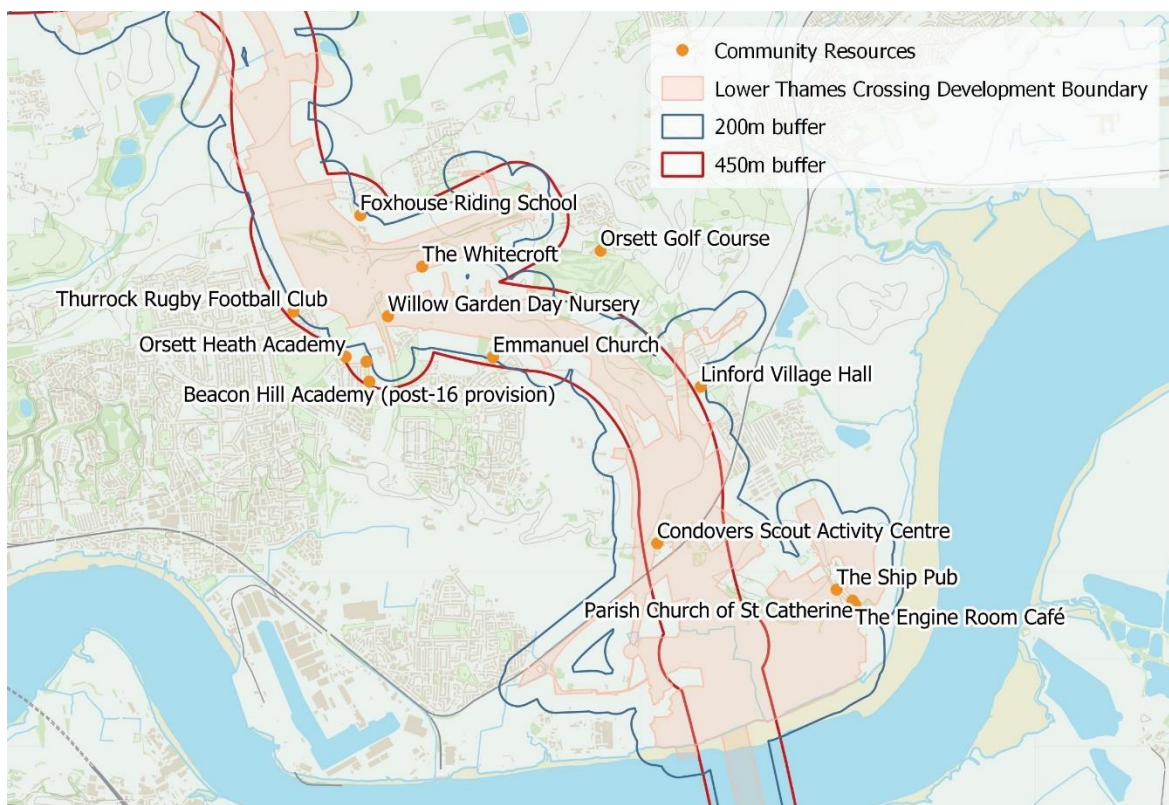
Table 7.3 Significance of effects					
Significance		Impact magnitude			Negligible
		High	Medium	Low	
Sensitivity of users	High	Major adverse (significant)	Major adverse (significant)	Moderate adverse (significant)	Minor adverse (not significant)
	Medium	Major adverse (significant)	Moderate adverse (significant)	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.

Condovers Scout Activity Centre

- 7.32 Land required for the diversion of utilities spans across the entire site of the Condovers 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.

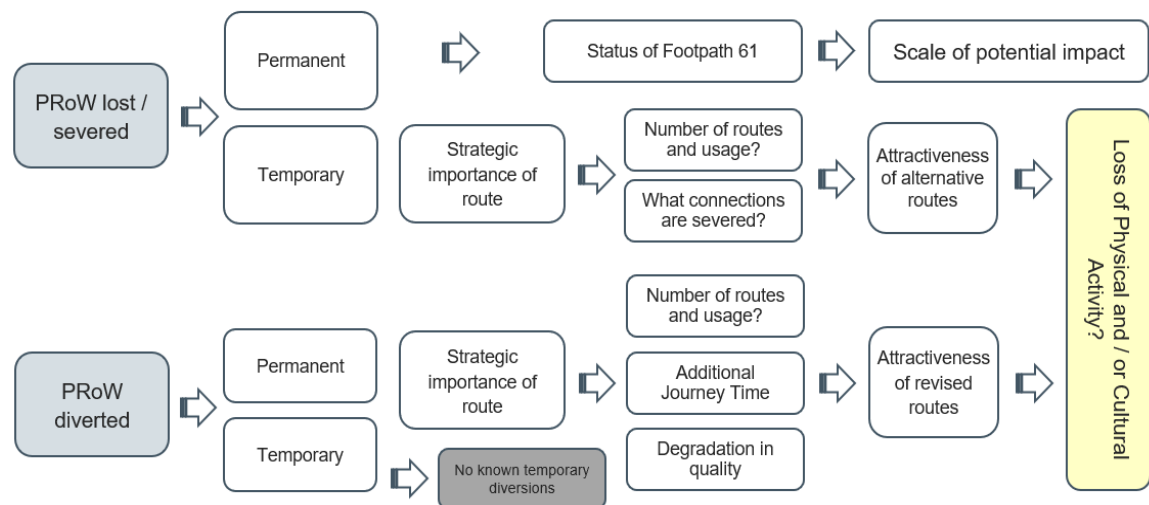
Willow Garden Day Nursery

- 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

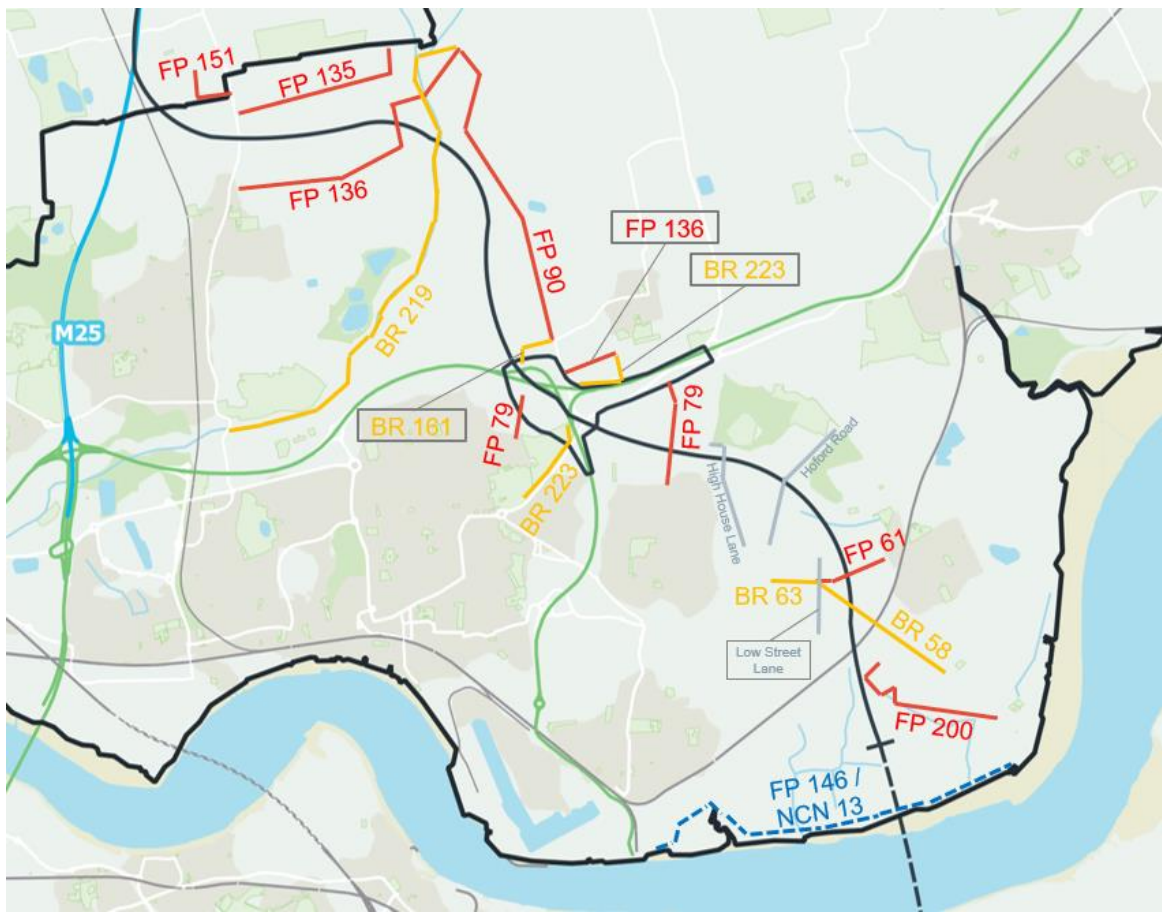
Permanent Severance

- 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

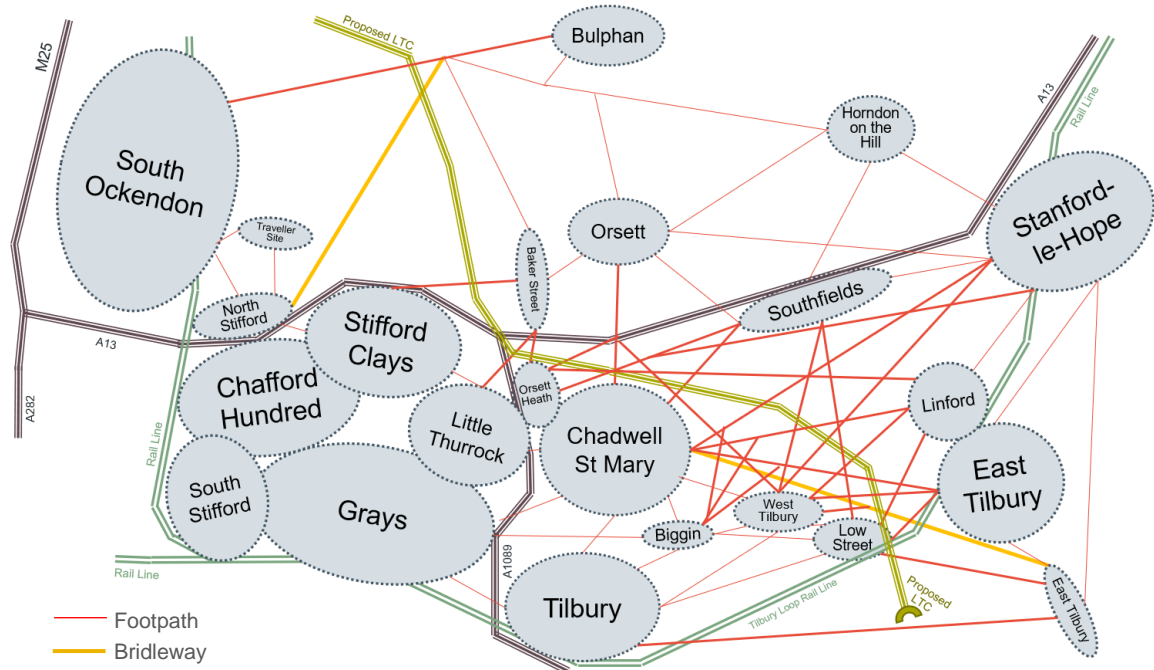


Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 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 PRoWs 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 PRoW, Cycle Routes, and Tracks Impacted by LTC



Source: Hatch Regeneris

It is estimated that a total of 29 different PRoW 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 PRoW Connections

Area	Communities	PRoW 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

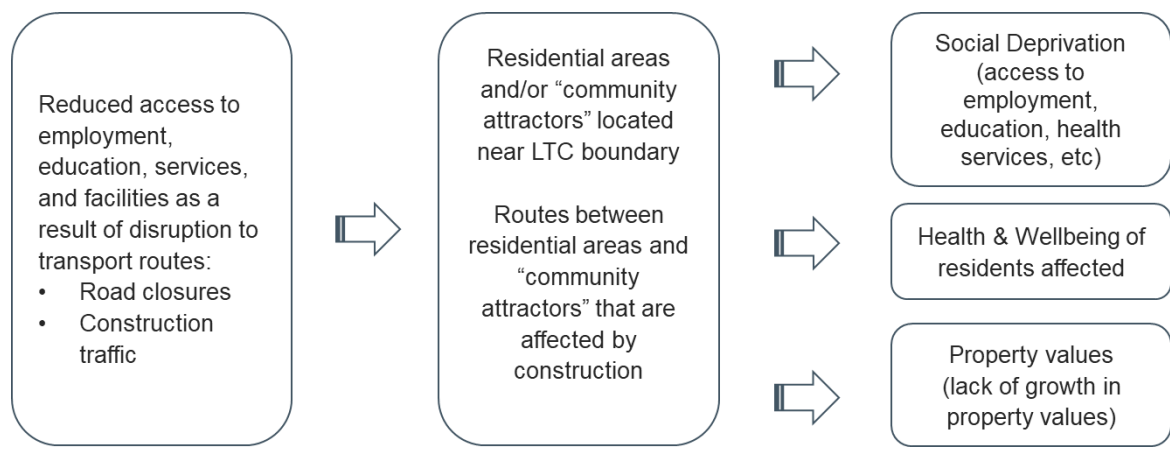
7.75 The construction of the LTC is likely to disrupt the communities living around the route, particularly those living in already isolated parts of Thurrock. The ability for local residents to access employment, community facilities or services such as education and healthcare may be affected due to:

- 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



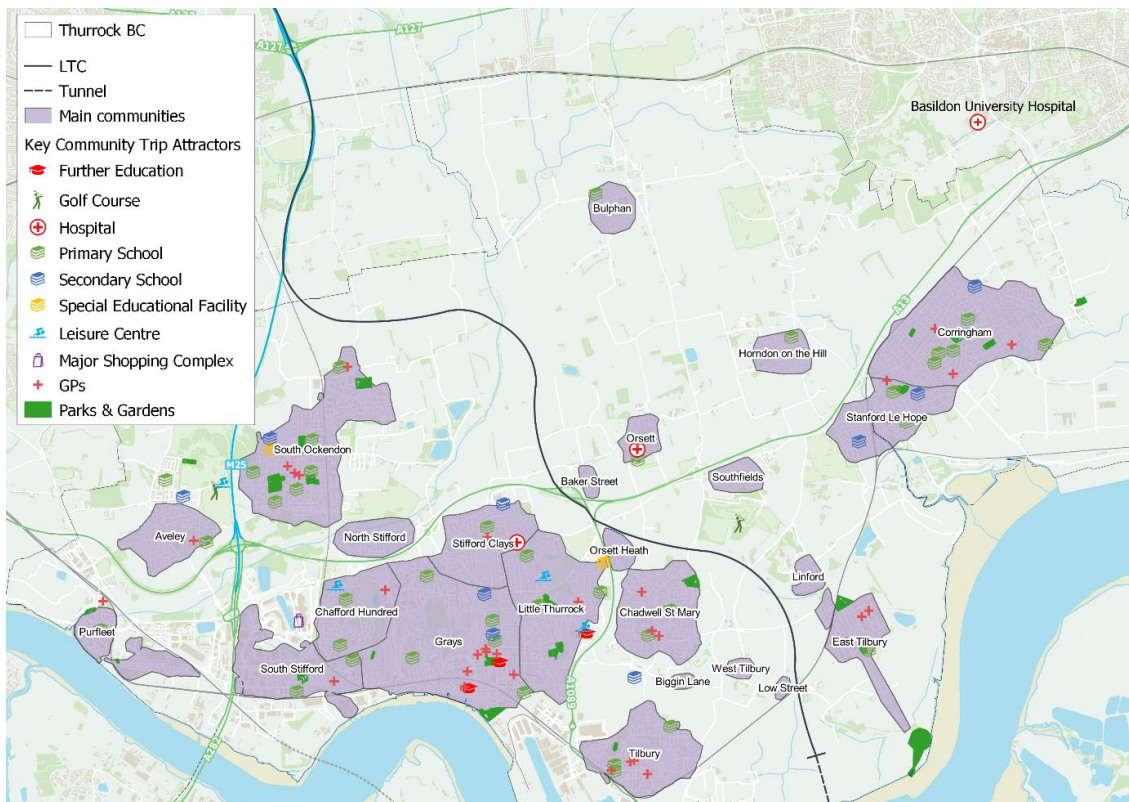
Source: Hatch Regeneris

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	1	56.5
Little Thurrock	Urban Area	2	55.5
Stifford Clays	Urban Area	2	55.5
Aveley	Small Town	4	55
Chafford Hundred	Urban Area	5	54.5
North Stifford	Village	5	54.5
South Stifford	Urban Area	7	53.5
South Ockendon	Small Town	7	53.5
Tilbury	Small Town	9	53
Horndon on the Hill	Village	9	53
Orsett Heath	Settlement/Hamlet	11	52
Corringham	Small Town	11	52
Biggin Lane	Settlement/Hamlet	11	52
Chadwell St Mary	Small Town	11	52
Stanford Le Hope	Small Town	15	51
Purfleet	Small Town	16	50.5
West Tilbury	Settlement/Hamlet	17	46
Bulphan	Village	18	44
Low Street	Settlement/Hamlet	19	42
Linford	Settlement/Hamlet	20	40
East Tilbury	Village	21	38
Orsett	Village	22	35
Baker Street	Settlement/Hamlet	23	30
Southfields	Settlement/Hamlet	23	30

Source: Hatch Regeneris

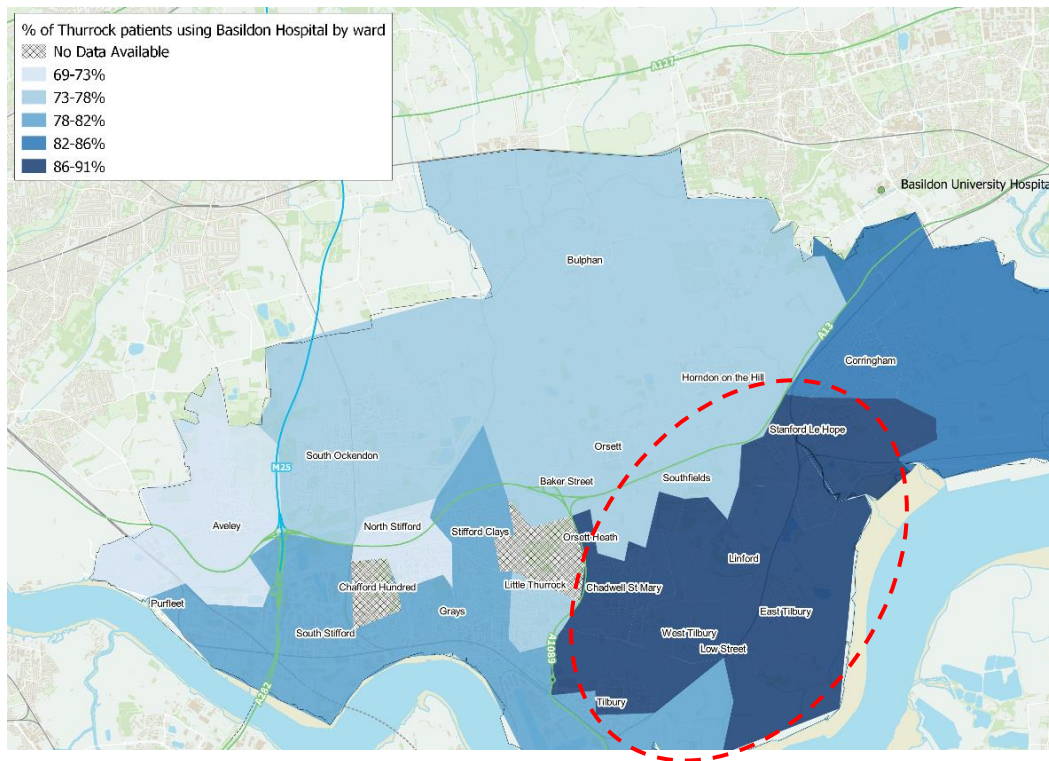
Access to A&E

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.

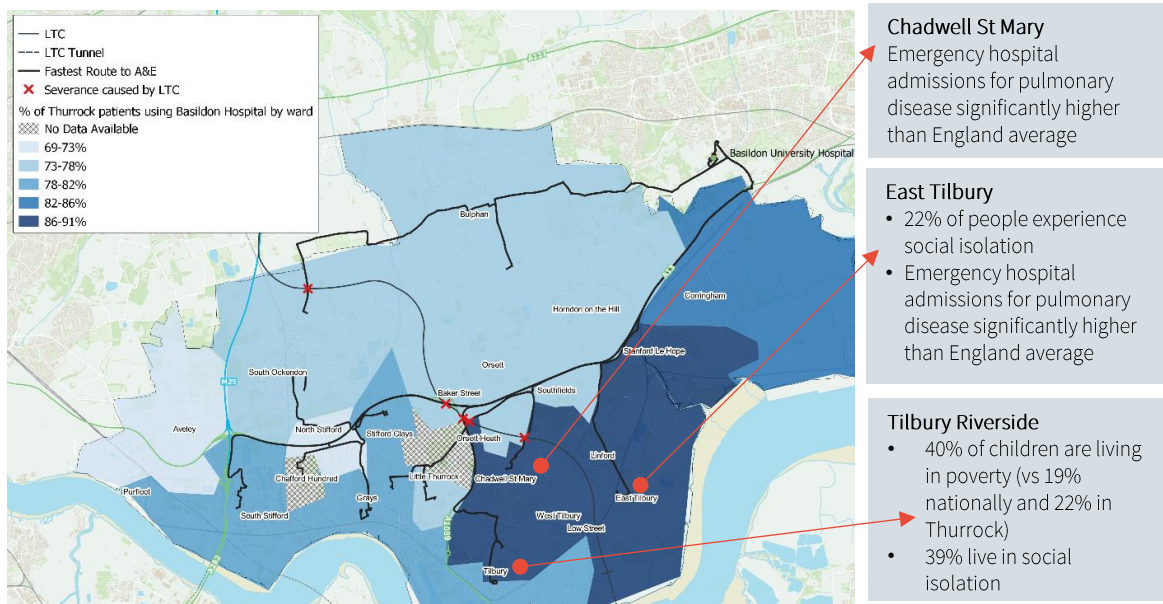
Figure 7.12 Reliance on Basildon Hospital by Thurrock Patients



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.

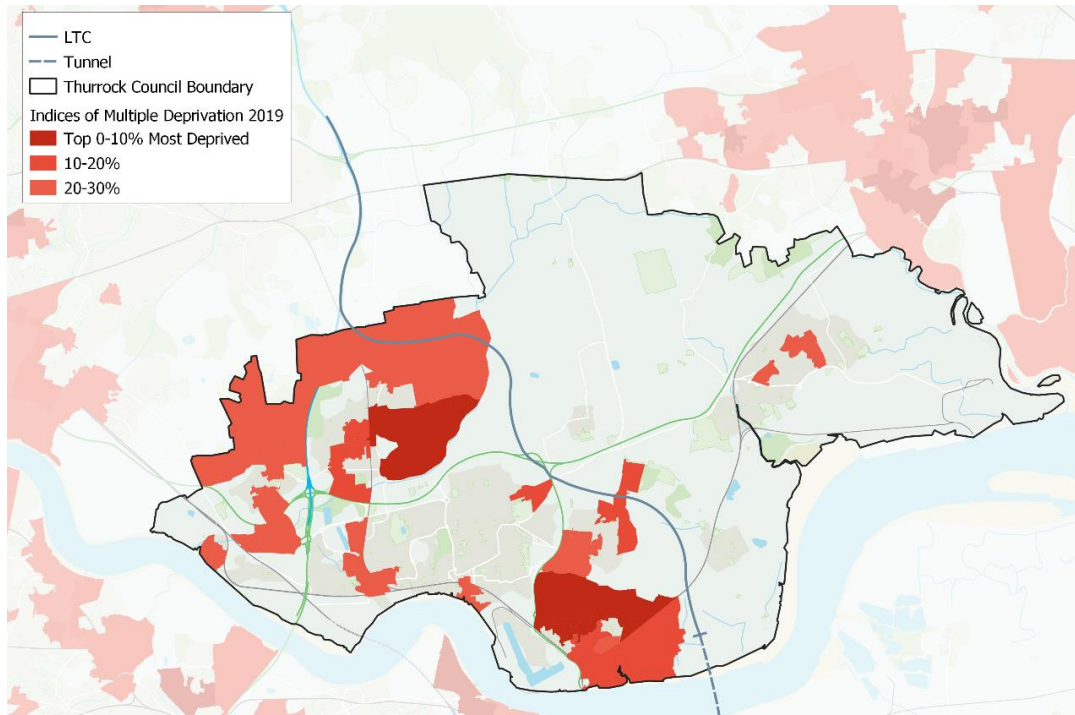
Figure 7.13 Disruption caused by LTC on routes to Basildon Hospital



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 £5.7 m and £18.3m

A13/A1089 Junction Impacts

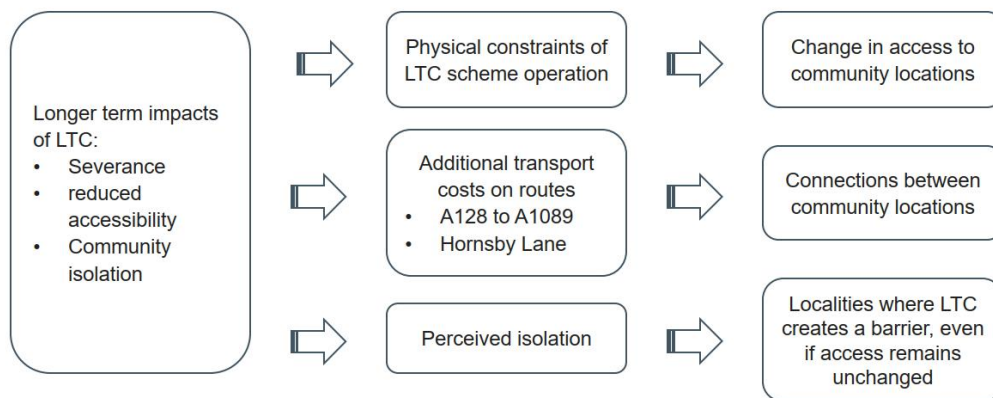
- 7.107 Section 4 outlines the potential construction related impacts of LTC on the operation of the current A13 / A1089 junction. Whilst specific traffic management plans are unavailable it has been assumed that some speed restrictions, lane reductions, and occasional road closures will be in place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

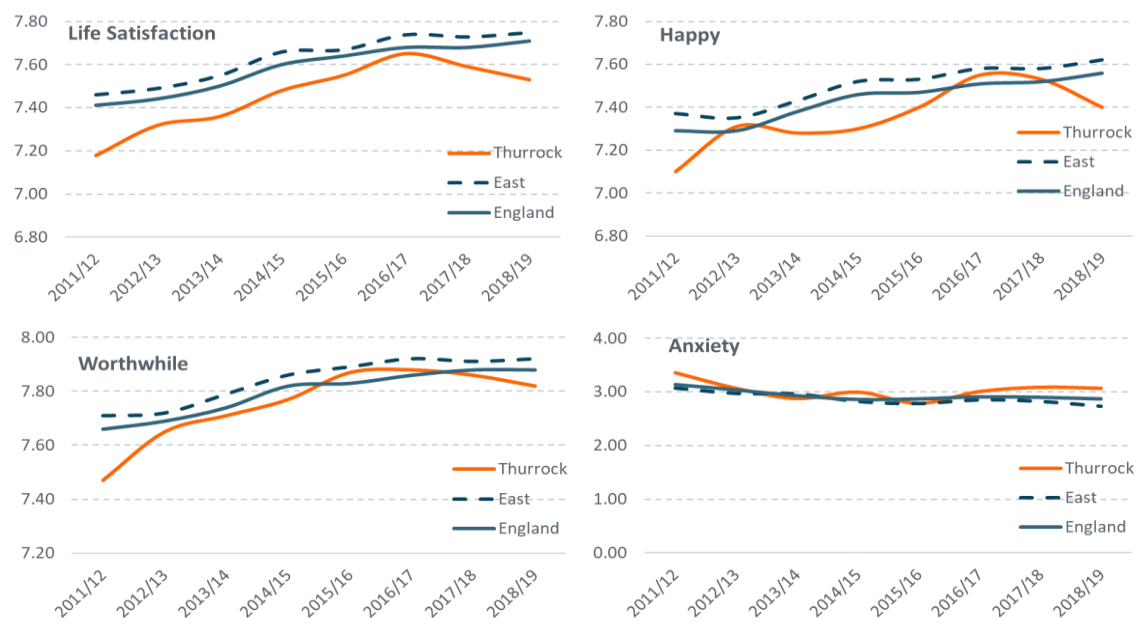
Prior to 2016, the population of Thurrock experienced a general improvement across all well-being indicators (as shown in Figure 7.17 below). Thereafter, personal well-being has been in decline, with latest figures showing that the population of Thurrock have lower personal well-being (across all indicators)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

Figure 7.16 Personal well-being 2018/19

	Thurrock	East	England
Life satisfaction	7.53	7.75	7.71
Worthwhile	7.82	7.92	7.88
Happiness	7.40	7.62	7.56
Anxiety	3.07	2.73	2.87

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

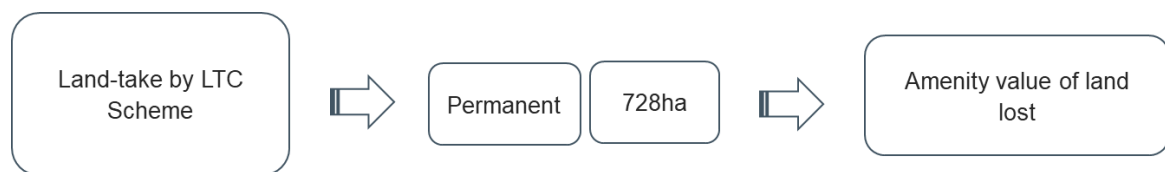
a) Amenity Value of Land Lost

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

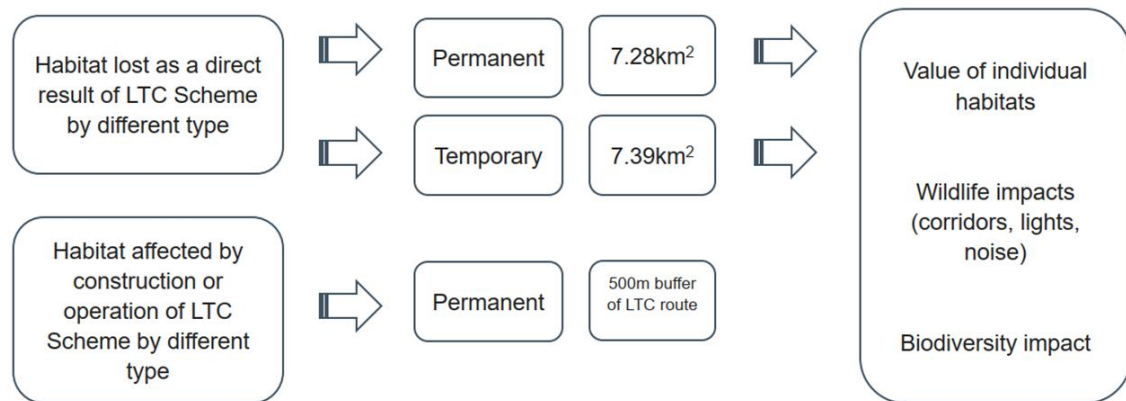
b) Habitat Loss

- 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.

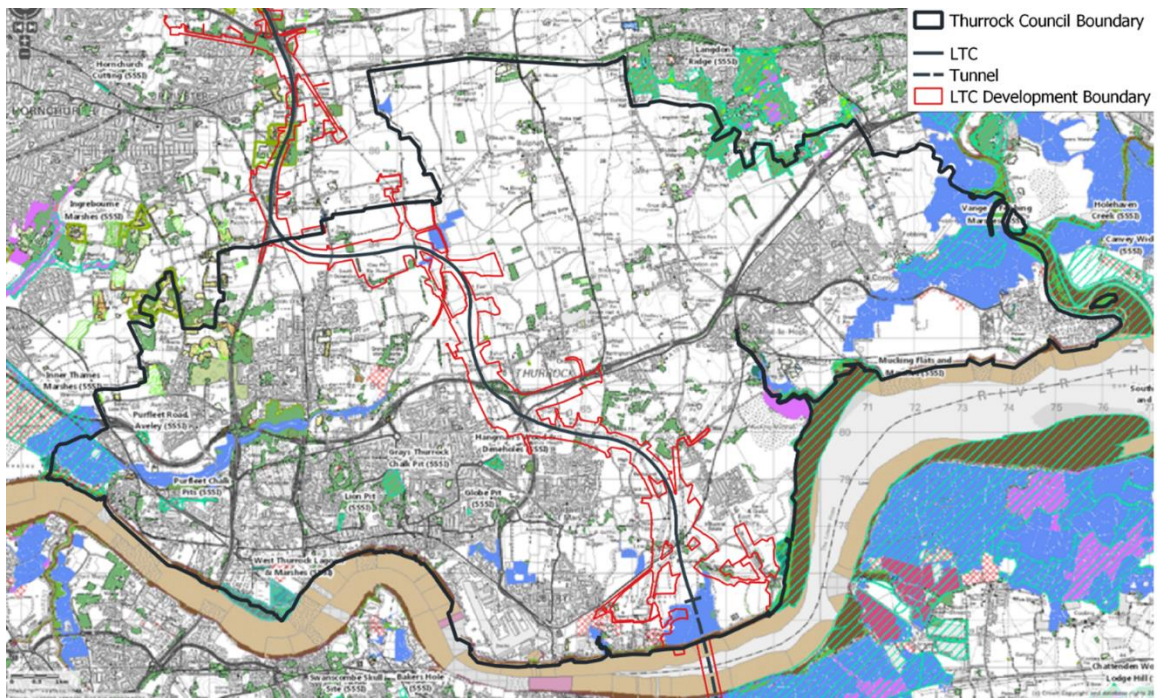
Direct effects

- 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.

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"> Condovers 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

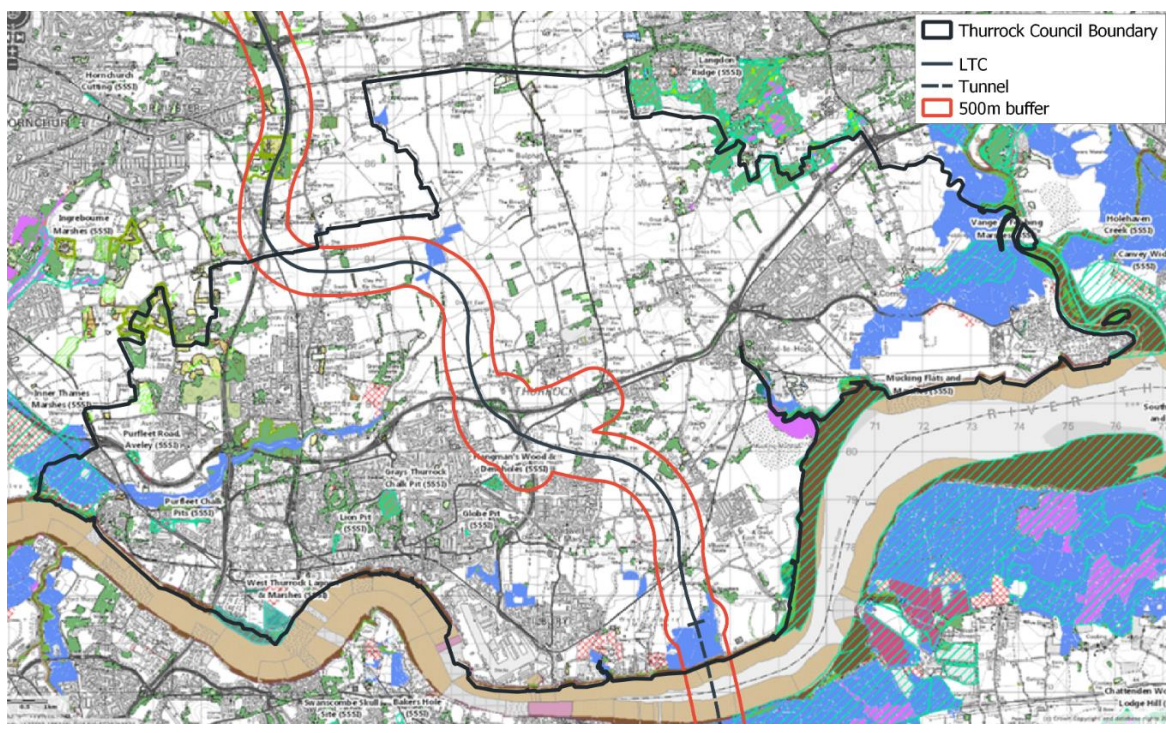
Source: DEFRA (2019) – MAGIC. Available at: <https://magic.defra.gov.uk/>

- 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



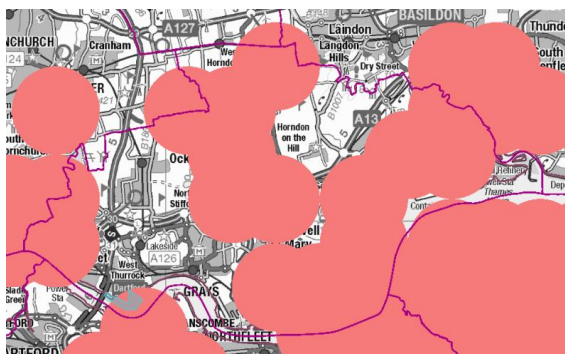
Source: Hatch Regeneris. Data from DEFRA (2019)

- 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;

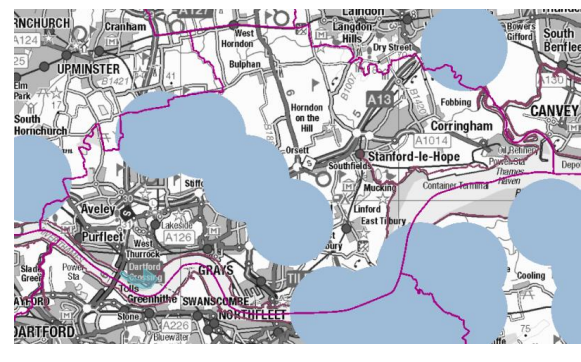
- A 3ha area of deciduous woodland is located to the west of the A1089 and is also an ancient and semi-natural woodland;
- Hangman’s Wood and Denehole (SSSI): A 5.2ha woodland located 550m from the LTC alignment. The site has been identified as an important underground hibernation site for bats in Essex. 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



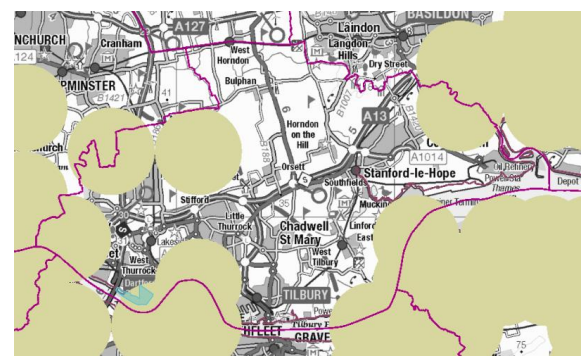
Source: DEFRA (2019)

Figure 8.7 Lapwing



Source: DEFRA (2019)

Figure 8.8 Redshank



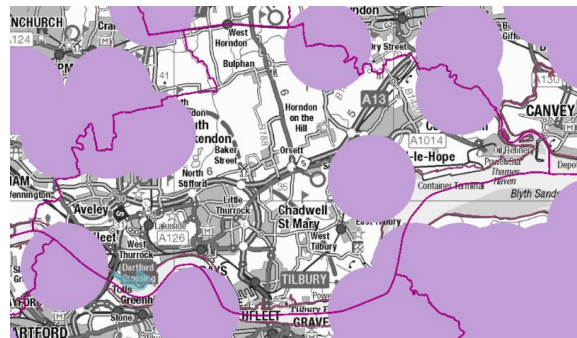
Source: DEFRA (2019)

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:

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.

		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.

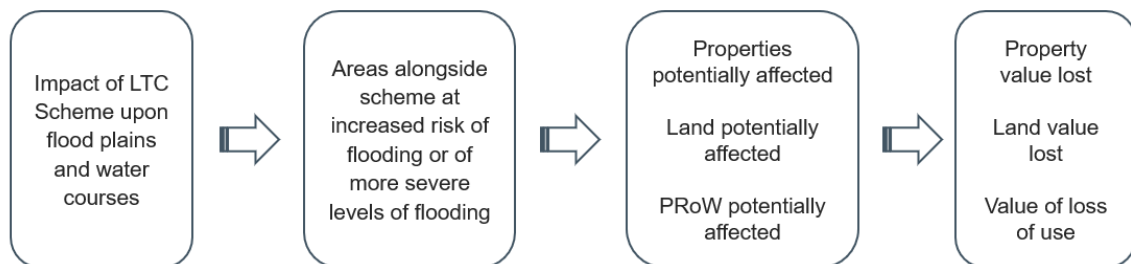
d) Flood Risk

- 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.

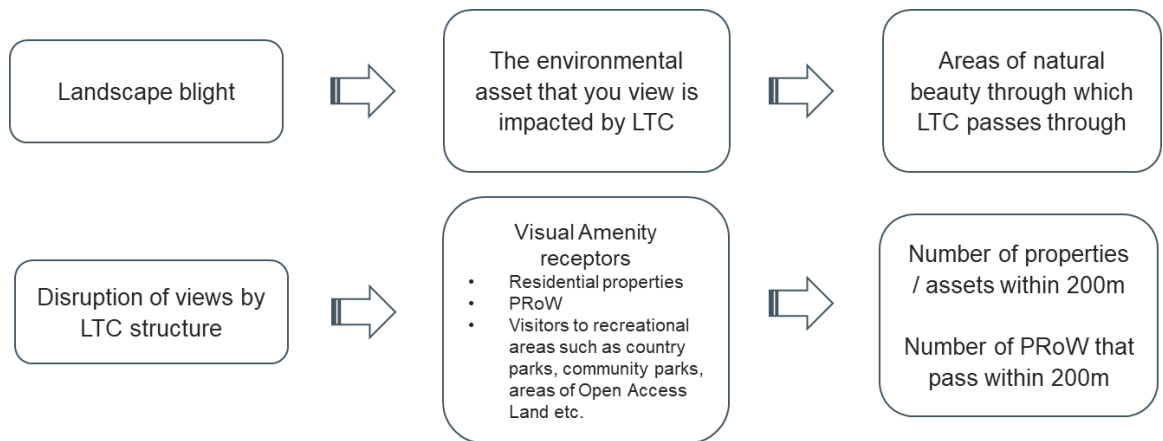
Scope and Methodology of Assessment

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.

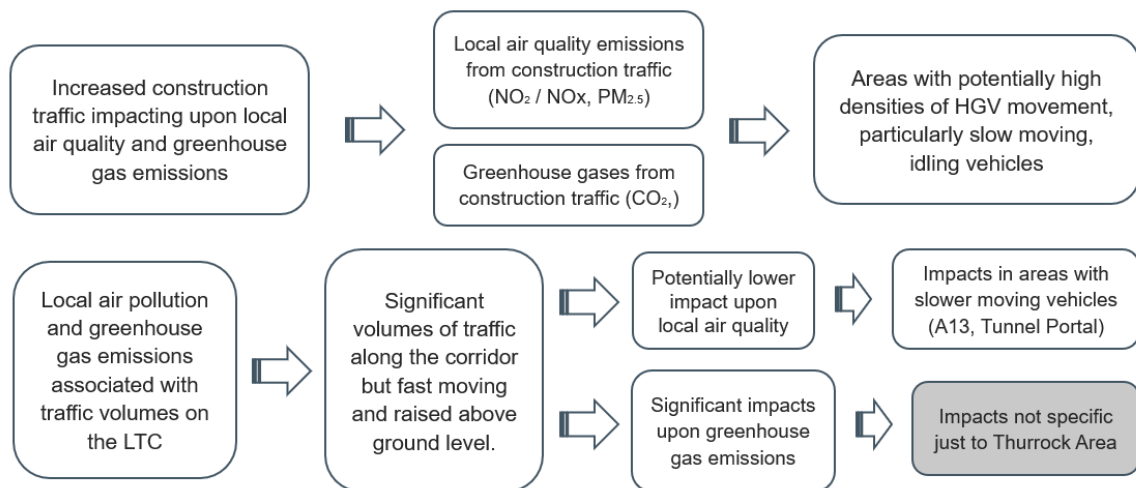
f) Air Quality/Emissions

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.

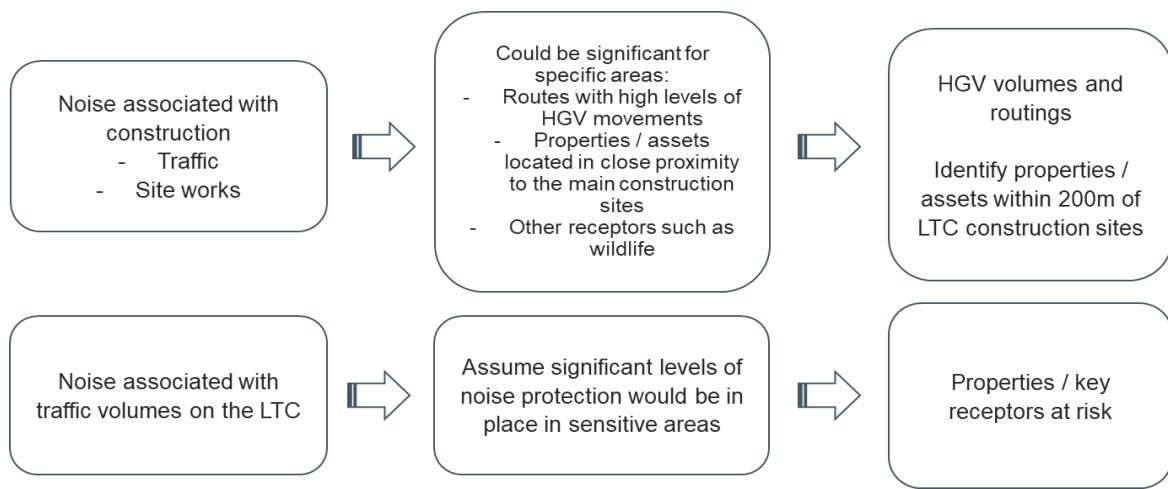
g) Noise Impacts

- 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.

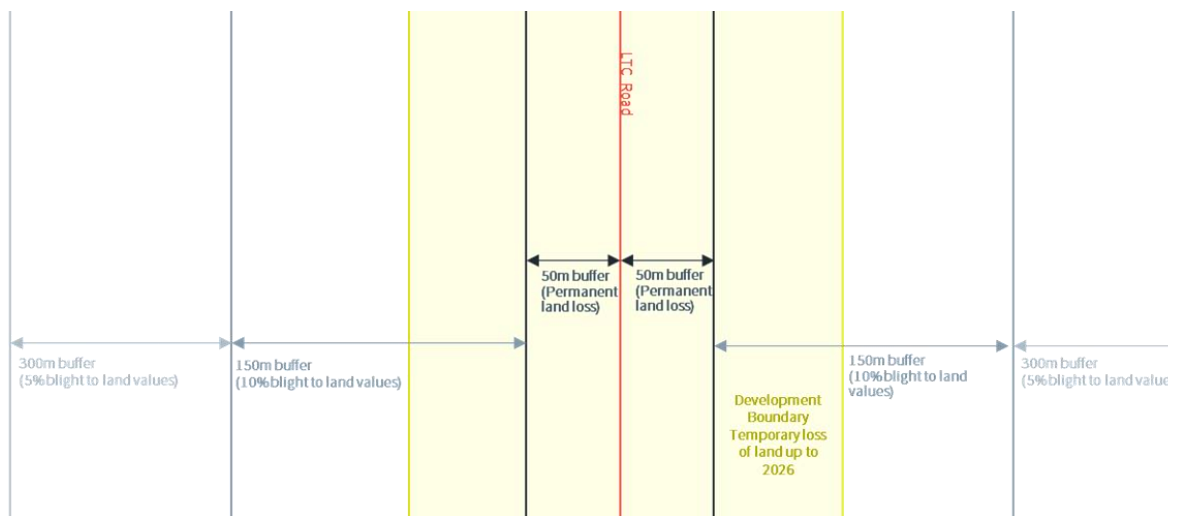
Impact Assessment

- 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



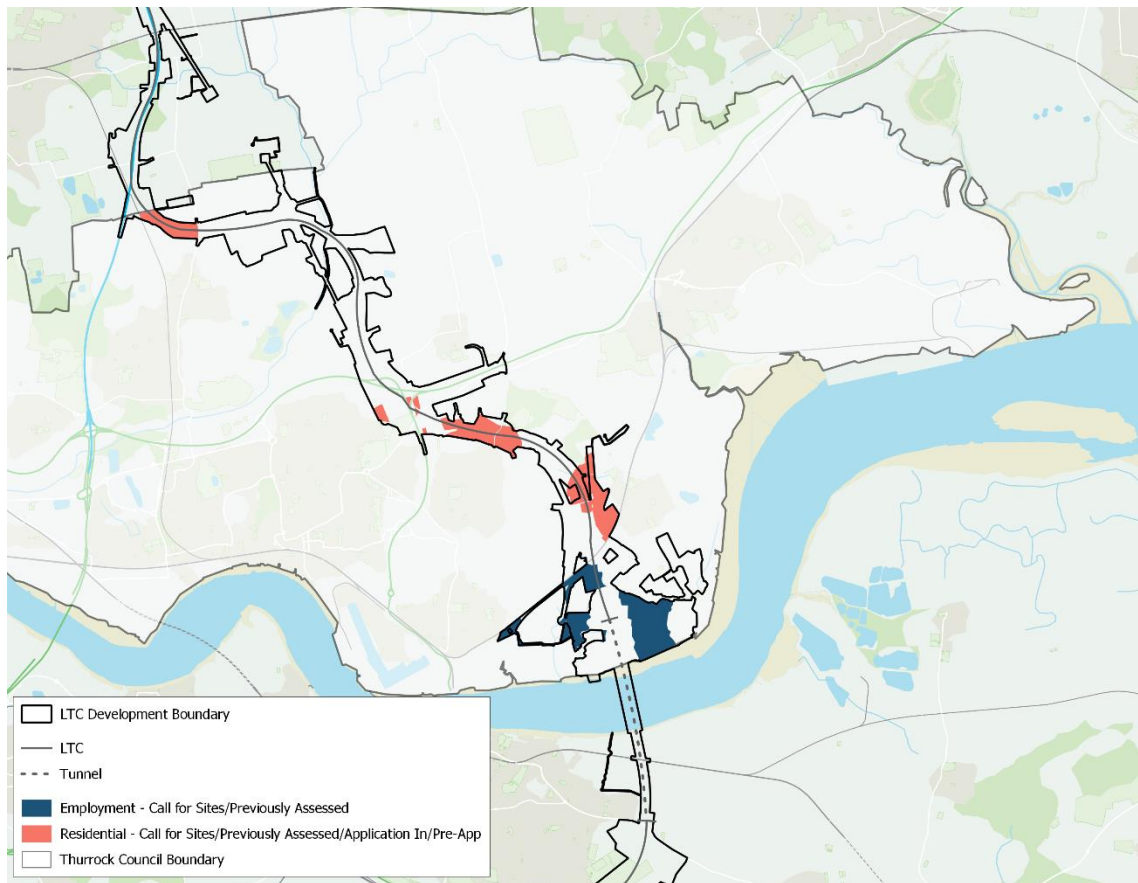
Source: Hatch Regeneris. Contains OS data © Crown copyright and database right 2019

- 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

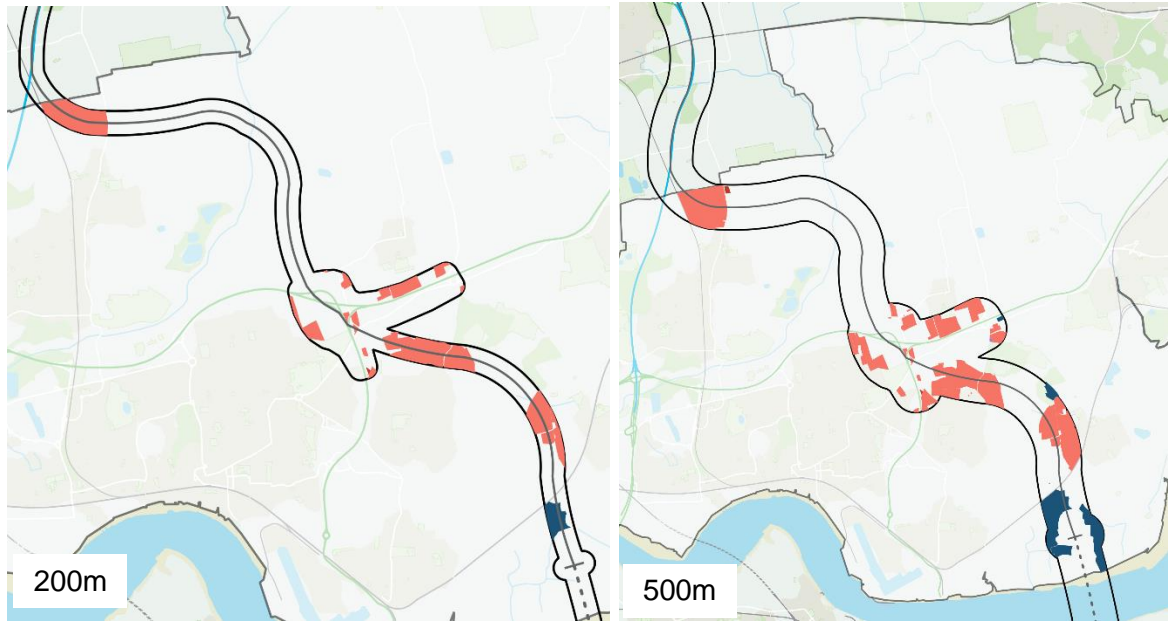
- 9.26 The scale of potential residential development affected is estimated to be between 2,330 – 2,660 homes, with an associated gross economic value of between £16m and £18.5m.

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 GVA Impact
	115 FTE 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	Moderate adverse (within LTC Corridor)
d) PRoW severance/disruption	Moderate adverse (within LTC Corridor)
e) Community disruption during construction	Moderate adverse (across Thurrock) (up to £36 million direct transport impacts #1)
f) On-going impact on community cohesion	Moderate adverse (across Thurrock) (up to £21 million direct transport impacts #1)
g) Health & Wellbeing	Moderate adverse(across Thurrock) #2

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
Condovers 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 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

<p>Emmanuel Church, Sleepers Farm Road, Chadwell St Mary.</p> <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. 	<p>Construction</p> <ul style="list-style-type: none"> • Reduced access to the church due to road closures and construction traffic 	<p>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).</p>	<p>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).</p>	<p>Minor adverse effect which is not significant.</p>
	<p>Operational</p> <ul style="list-style-type: none"> • Potential noise disturbance during service hours 	<p>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.</p>	<p>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).</p>	<p>Negligible adverse effect which is not significant</p>
<p>Orsett Golf Course, Brentwood Road, Orsett</p> <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. 	<p>Construction</p> <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 	<p>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</p>	<p>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.</p>	<p>Minor adverse effect which is not significant.</p>
	<p>Operational</p> <ul style="list-style-type: none"> • Permanent environmental changes 	<p>Low: permanent environmental impacts are likely to have little or no effect on the well-being of users.</p>	<p>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.</p>	<p>Negligible adverse effect which is not significant</p>
<p>Willow Garden Day Nursery, 176 Heath Road, Orsett Heath</p> <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. 	<p>Construction</p> <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 	<p>Medium: impacts will continue throughout the six-year construction period</p>	<p>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.</p>	<p>Significant major adverse effect</p>
	<p>Operational</p> <ul style="list-style-type: none"> • Permanent environmental changes 	<p>Low: while permanent impacts are anticipated, the environmental changes are</p>	<p>High: young children are the primary users of this facility. Changes in noise levels will have</p>	<p>Significant moderate adverse effect</p>

				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 closures Temporary 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 	<p>Low: permanent environmental impacts are likely to have little or no effect on the well-being of users.</p>	<p>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.</p>	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 from the LTC Development Boundary Specialist 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 Road Adverse environmental impacts (such as noise and vibration effects) which can disturb learning. 	<p>Medium: impacts will continue throughout the six-year construction period</p>	<p>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.</p>	Significant major adverse effect
		Operational	<ul style="list-style-type: none"> Permanent environmental changes 	<p>Negligible: permanent environmental impacts are likely to have little or no effect on the well-being of users.</p>	<p>High: children with learning difficulties are the primary users of this facility.</p>	Minor adverse effect which is not significant .
Beacon Hill Academy (Post-16 Provision), Buxton Road, Grays	<ul style="list-style-type: none"> Located 110m from the LTC Development Boundary Specialist 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 Road Adverse environmental impacts (such as noise and vibration effects) which can disturb learning. 	<p>Medium: impacts will continue throughout the six-year construction period</p>	<p>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.</p>	Significant major adverse effect
		Operational	<ul style="list-style-type: none"> Permanent environmental changes 	<p>Negligible: permanent environmental impacts are likely to have little or no effect on the well-being of users.</p>	<p>High: children with learning difficulties are the primary users of this facility.</p>	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
Causewayed 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

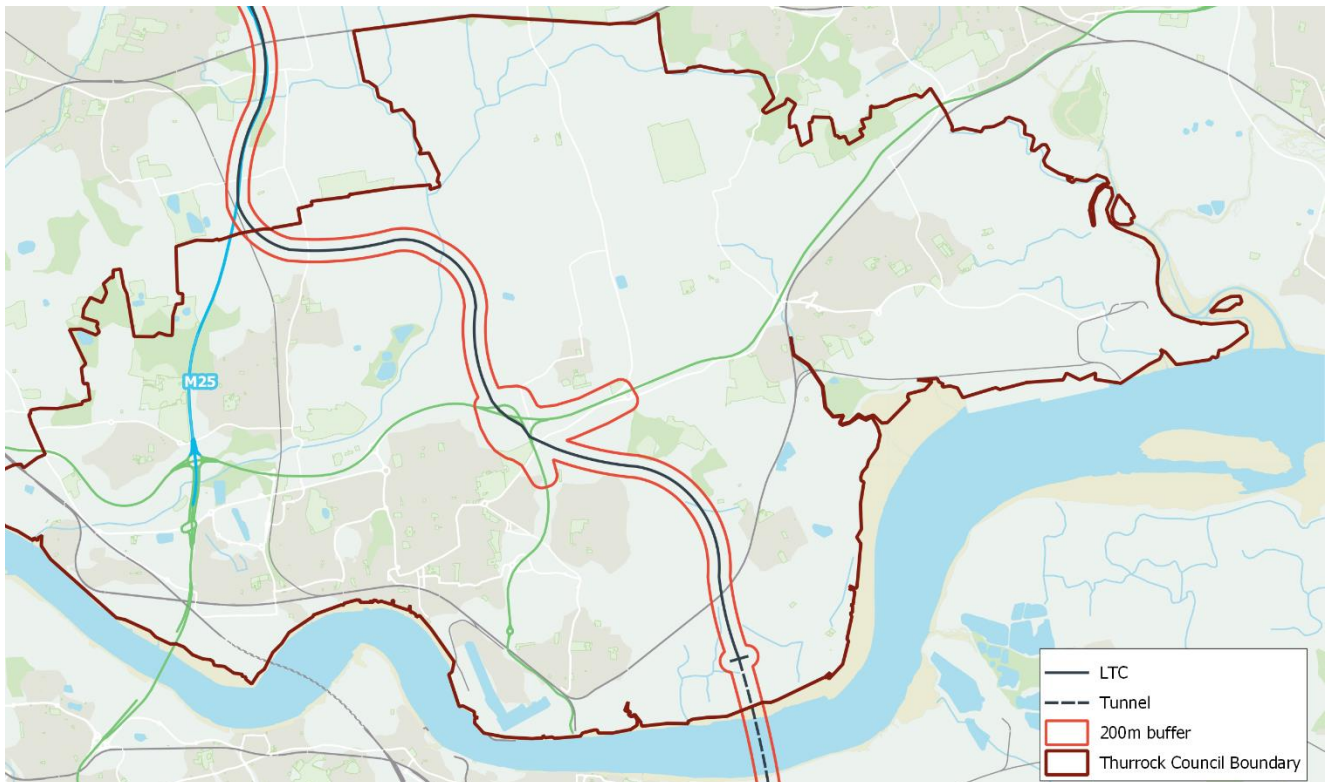
** Asset located within LTC Development Boundary

Appendix C - LTC Buffer Zones

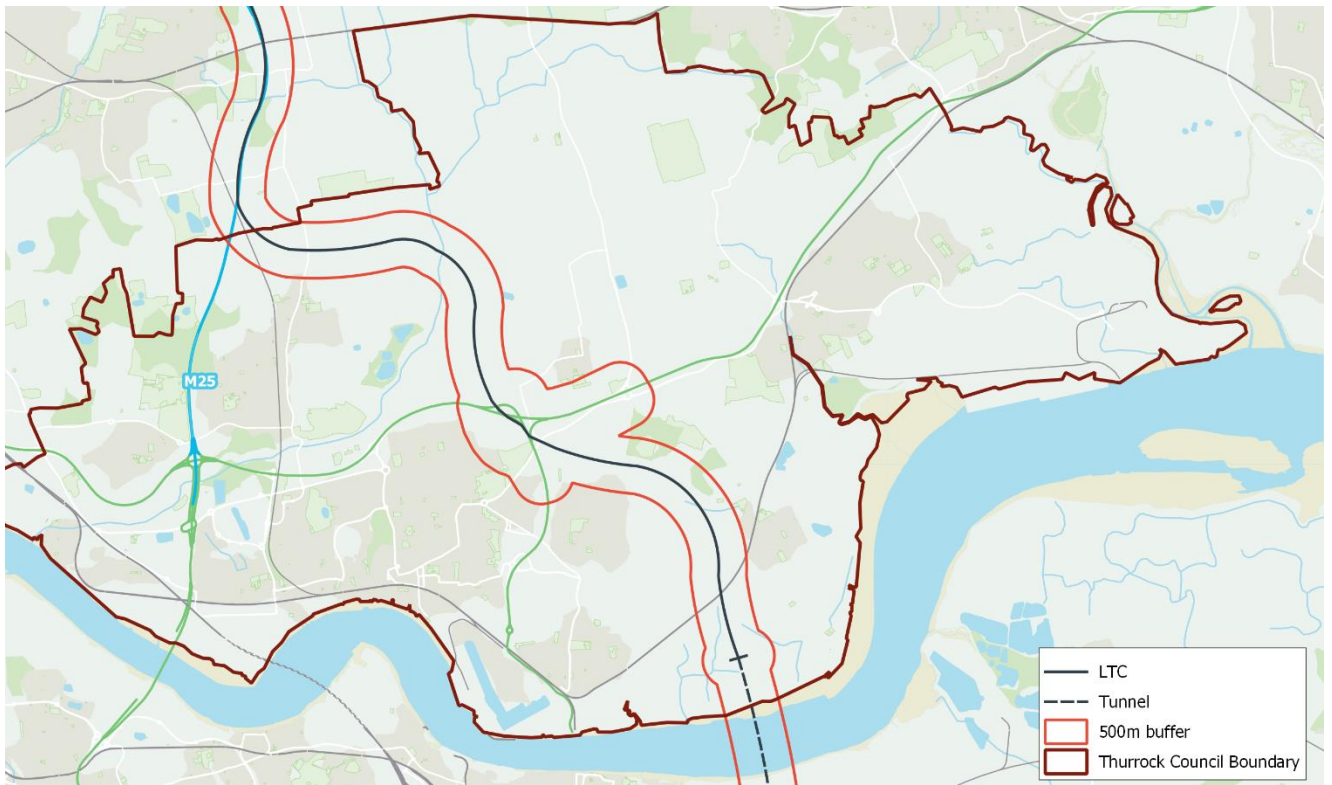
C.1 LTC Alignment with 50m Buffer



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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Appendix D Review of Environmental Impacts Update – Design Changes 8 – 19

D.1 Review of Tilbury Proposal

The review of the Tilbury proposals includes Design Changes 8, 9 and 10, as set out in the below table:

Design change ref. (Highways England's reference)	Design change (as per Highways England's Environmental Update Report)	Design change description (as per Highways England's Guide to Supplementary Consultation)
8	Removal of Tilbury junction, the rest and service area and maintenance depot	<ol style="list-style-type: none"> 1. A new route for walkers, cyclists and horse riders is proposed along Muckingford Road. 2. The height of the LTC has been reduced by approximately 1.5 metres under Muckingford Road to tie in with the lower Tilbury alignment. This will reduce earthworks and utilities diversions. 3. Connecting slip roads have been removed. 4. Station Road has been retained and would pass beneath the viaduct with a minimum clearance of 5.3 metres. 5. Removal of Tilbury junction, enabling us to reduce the overall size of the viaduct. This is due to the rest and service area and maintenance depot being removed. 6. Private maintenance and access roads from the LTC and Station Road to provide access to the tunnel control building. 7. Muckingford Road bridge has been upgraded to a green bridge. As a result of the removal of the proposed Tilbury junction, several structures have been revised. This structure has been revised. 8. Muckingford Road has been moved slightly south to reduce the overall height, while providing the required structural headroom as it crosses over the LTC. As a result of the removal of the proposed Tilbury junction, several structures have been revised. 9. Clearance over Tilbury railway, where the viaduct crosses, will be lowered to 6.8 metres. 10. Length of the viaduct has decreased to approximately 660 metres.
9	Tilbury viaduct length reduced	
10	Muckingford Road realignment and green bridge	

Removal of Tilbury Junction, the rest and service area and maintenance depot - Design Change 8

Summary of design change: Removal of Tilbury junction, the rest and service area and maintenance depot.

Table D.1: Review of Design Change 8

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the Preliminary Environmental Information Report (PEIR) is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the Environmental Statement (ES). Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No assessment of construction phase traffic effects is presented in the Supplementary Consultation documents which may be significant for this scheme. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • There is a concern that some road links in this area have not been assessed in the PEIR and therefore the assessment of effects presented are misrepresented. 	Yellow
	Operation	<p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by World Health Organisation (WHO) guidelines. It is recommended that a new air quality modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council. The Environmental Impacts Update states that impacts are difficult to predict in the absence of detailed air quality modelling, however, changes have the potential to change the effects reported in the PEIR. Detailed air quality modelling should be undertaken to inform the design. Until such changes have been modelled, the impacts should remain as stated in the PEIR.</p> <p>The assessment in the Environmental Impacts Update and PEIR would suggest that no significant adverse impacts are predicted as no operational mitigation is provided. This remains a concern considering the magnitude of the scheme and the absence of a standalone Health Impact Assessment (HIA). A full and comprehensive HIA has been requested by the Council and the Director of Public Health. Highways England has confirmed that this will be provided in the form of a combined Health and Equalities Impact Assessment (HEIA).</p>	Red

		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • A HEIA is not provided in the Supplementary Consultation documents, which is a substantial omission, considering the significant potential health impacts of this scheme. It is understood that a HEIA is being submitted as part of the Development Consent Order (DCO) Application. However, the Council is yet to receive any information on the assessment of the HEIA or recommendations to mitigate potential health effects. • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. • The PEIR did not assess all relevant road links and receptors in this area. Therefore, the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}) 	
Noise and Vibration	Construction	<p>As stated in Paragraph 13.4.20 of the PEIR, no baseline noise surveys were undertaken during the PEIR assessment along this section of the route. It is therefore unclear how the assessment has been undertaken. The Environmental Impacts Update states that there remain temporary significant adverse effects. Construction techniques should be explored to design out significant adverse effects. Construction effects are proposed to be controlled through mitigation measures set out in the Code of Construction Practice (CoCP) and a Construction Environmental Management Plan (CEMP), however no details of the proposed measures have been provided.</p> <p>The Environmental Impacts Update also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Construction methods should be explored to design out significant adverse impacts. • Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. • Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. • Lack of information provided to enable an informed view of the project to be made. 	

		<ul style="list-style-type: none"> There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
	Operation	<p>The lack of noise assessment remains a concern. The removal of Tilbury junction and subsequent reduction in height of the Tilbury viaduct potentially moves the route closer to potential noise sensitive receptors.</p> <p>The Environmental Impacts Update states that there is unlikely to be a material difference to the potential road traffic noise effects as described in the PEIR and potential mitigation measures described in the PEIR would remain appropriate. The mitigation measures outlined in the PEIR are generic. It is therefore unclear which noise sensitive receptors would continue to experience a change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. Potential impacts during the operational phase on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
Cultural Heritage	Construction	<p>Potential impacts to cultural heritage and archaeology are likely to see an improvement due to the removal of the previously proposed rest and service area (RaSa). However, it is unclear if the removal of Tilbury junction presents a change in significant detrimental impact to heritage features such as views from West Tilbury and East Tilbury Conservation Areas, Coalhouse Fort, East Tilbury Battery or Tilbury Fort Scheduled Monuments. The secondary impact of operational measures such as land raising, and ecological mitigation will need to be defined and assessed.</p> <p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Furthermore, Highways England have not taken the opportunity to share further information regarding the likely significant effects to archaeological remains. An incomplete archaeological desk-based assessment has only just been released and no trial trenching has yet to commence in this area.</p> <p>Impact of construction stage (including compounds) remains a serious concern.</p>	

		<p>The future of Coalhouse Fort is uncertain at present following the charity which managed the heritage asset folding in February 2020. The construction phase may impact upon the number of potential viable uses of the heritage asset going forward.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • Much greater consideration is needed of the impact upon the historic environment (including the setting of heritage assets) during construction phase including temporary compounds, access and the storage of spoil and equipment. The heritage assessment should consider Historic Landscape. • The assessment should extend to significant non designated assets. • Intrusive surveys need to be undertaken to properly determine the significance of the heritage assets to be impacted and understand mitigation requirements. • There is concern that the sensitive nature of the area of the gravel terraces and interface with the grazing marsh is not fully acknowledged with the submitted documentation. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	<p>Operation</p>	<p>Potential impacts to cultural heritage and archaeology are likely to see an improvement due to the removal of the previously proposed rest and service area. However, it is unclear if the removal of Tilbury junction presents a change in significant detrimental impact to heritage features such as views from West Tilbury and East Tilbury Conservation Areas, Coalhouse Fort, East Tilbury Battery or Tilbury Fort Scheduled Monuments. The secondary impact of operational measures such as land raising, and ecological mitigation will need to be defined and assessed.</p> <p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Furthermore, Highways England have not taken the opportunity to share further information regarding the likely significant effects to archaeological remains. An incomplete archaeological desk-based assessment has only just been released and no trial trenching has yet to commence in this area.</p> <p>It is unclear at present whether there will be provision provided for a local junction to be built at a later date designing into the scheme.</p>	

		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • The heritage assessment should consider Historic Landscape. • The assessment should extend to significant non designated assets. • Intrusive surveys need to be undertaken in order to properly determine the significance of the heritage assets to be impacted and understand mitigation requirements. • There is concern that the sensitive nature of the area of the gravel terraces and interface with the grazing marsh is not fully acknowledged with the submitted documentation. • The only available meaningful mitigation measure to preserve the setting of numerous heritage assets in this highly sensitive location remains for the tunnel to be extended beneath the railway. Now that the service area has been removed this should be reconsidered. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that there is likely to still be a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors as a result of this design change. It also states that the widespread nature of the construction activity would continue to be experienced in close proximity to the visual receptors but fails to acknowledge what the visual receptors are and if any new receptors have been assessed</p> <p>The Environmental Impacts Update refers to fen landscape restoration; however, there is no indication showing what this might entail. There is concern that in this area (and throughout the route) that heavily engineered balancing ponds are being proposed which would have limited landscape and biodiversity benefit and unlikely to achieve fen landscape restoration.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The Landscape and Visual Impacts Assessment (LVIA) should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. 	
	Operation	<p>The Environmental Impacts Update states that operational impacts are likely to ‘slightly improve’ as a result of the design change of the viaduct, although these will continue to result in major negative landscape change. However, it is unclear which receptors will experience a change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. 	

		<ul style="list-style-type: none"> • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. • The Supplementary Consultation documents state that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. • Early indication of operational mitigation proposals presented in the PEIR suggested they may not be adequate or effective to mitigate against adverse landscape and visual impacts. 	
Biodiversity (terrestrial and marine)	Construction	<p>The Environmental Impacts Update states that the design change would reduce the need for the mitigation measures described in the PEIR. The Environmental Impacts Update goes on to state that, the design change “<i>would not lead to a reduction in the significance level of the assessment conclusion</i>”. It is unclear how the design change would lead to the reduction of mitigation, as there would still be direct impacts on Low Street Local Wildlife Site (LWS). The impacts remain as stated in the PEIR. However, there is a lack of level of significance assigned to effects within the assessment provided within the PEIR to be able to make a comparison.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>The balancing ponds seem to be positioned where they are needed to meet engineering needs, designed with steep sides and no intention for integration into the existing landscape. They will likely become a features with the sole function of draining water and as a result there is a missed opportunity to deliver additional biodiversity mitigation (enhancement).</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • An assessment of an effects would need to be provided to determine which habitats and species are affected. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with National Planning Policy Framework (NPPF) 2018, Highways England policy and local policy. • Where flood prevention measures are needed, they should integrate balancing ponds with ecology, landscape and leisure features so that they are visually pleasing and useful features beyond their flood prevention purposes. Figures 5.53 and 5.54 of the Guide to Supplementary Consultation shows this intention but it is not reflected with certainty. • Balancing ponds should have less steep sides to allow for better integration as wildlife habitats and other uses with amenity value rather than the standard ‘deep ditch’ balancing pond detail. 	

	Operation	<p>The Environmental Impacts Update states that the design change would reduce the extent of the air quality change and noise/visual disturbance reported in the PEIR. However, the effects set out in the PEIR are considered to have several potential significant effects misrepresented or excluded because of flawed assumptions or inconsistencies.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • An assessment of an effects would need to be provided to determine which habitats and species are affected. • Further work should be provided to show a commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy, and local policy. • Further information on what mitigation is proposed to be removed. • The extent of surveys has fallen short of minimum standards in the case of Barn Owl studies. 	
Road drainage and the water environment	Construction	<p>Although the benefits of this design change would result in a reduction in the construction footprint within the defended floodplain and a reduction in impermeable land take, in the area previously proposed for the RaSa, Tilbury junction is still located in Flood Zone 3. Furthermore, the Application Boundary has changed substantially, that this cannot be regarded as an improvement from the Statutory Consultation scheme.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the Environmental Impact Assessment (EIA) will be underpinned by a whole system water balance approach. 	
	Operation	<p>As stated in the Environmental Impacts Update <i>“The design change would prevent minor adverse effects on the rainfall runoff/land drainage regime locally and would remove land use activity with a pollution risk.”</i> There would still be a land use activity with a pollution risk in this locality from the new highway. It is unclear how this conclusion has been reached.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR. No assessment has been provided within the Environmental Impacts Update to demonstrate that a ‘no change’ assessment is feasible.</p>	

		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects • A minerals safeguarding assessment and Preliminary Sources Study Report (PSSR) have not been included in the PEIR which are important sources of information that would assist stakeholders. • The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. • The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. 	
	Operation	<p>The Environmental Impacts Update states that design change would have a negligible effect on the assessment presented in the PEIR. No assessment has been provided within the Environmental Impacts Update to demonstrate that a 'no change' assessment if feasible.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required. • The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features 	
Materials and Waste	Construction	<p>Although the benefits of this design change would result in a reduction in construction material and waste in this locality, the Application Boundary has changed substantially, that this cannot be regarded as an improvement from the Statutory Consultation scheme.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further detailed required for use of rail and river for movement of material, plant and equipment and the environmental and transport impacts of this movement. • The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. • Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. • Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. • The assessment does not state where material will be reused to minimise the need for off-site haulage and handling. • There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	

	Operation	It is agreed that the change in design is likely to have a negligible effect on the assessment in the PEIR.	
People and Communities	Construction	<p>The Environmental Impacts Update states that “<i>Overall, there would be a beneficial effect and an improvement to those effects reports in the PEIR at this location.</i>” It is agreed that there is likely to be an improvement to the effects reported in the PEIR, as there will be less construction work and the removal of the RaSA, however, it is unclear how the design change would result in a beneficial effect.</p> <p>There is no mention of the mitigation works for the wider area or that they will exist, which would be realised under a s106 agreement in most developments, which is concerning.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. • More detail on the development sites in the area which will be considered in the assessment is required • An update on design principles and wider planning obligations would be helpful. • A skills and employment plan that aims to train, employ, and up-skill existing residents would benefit the Borough. This should be included as a DCO Requirement. • A business support strategy that aims to give local businesses access to contracts associated with the construction of the road and ancillary activities. 	
	Operation	<p>The Environmental Impacts Update states that “<i>Overall, there would be a beneficial effect and an improvement to those effects reports in the PEIR at this location.</i>” The construction of the LTC would continue to form a major linear intervention within this area, it is unclear how an overall beneficial effect has been concluded for People and Communities. The removal of Tilbury Junction is an impediment to economic development in the Tilbury area. A link road could have improved access to Tilbury Port and provided an alternative route away from residential areas for traffic. Also, there should be a potential to create a route through to East Tilbury and Coalhouse Fort.</p> <p>It is unclear how the Local Residents Discount Scheme (LRDS) will benefit the people of Thurrock, as the road cuts straight through the borough and, in combination with other largescale infrastructure, bypasses the residents and causes further disconnection.</p> <p>The removal of the Tilbury junction will actually likely have a negative impact on people and communities in terms of the economic benefits the proposed road is meant to bring to the borough. There is no consideration of the negative impact for Tilbury and the Docks, identified as a growth sector for employment and business. This area is an area of high deprivation and poor health outcomes which now appears to be further impacted by not being able to benefit from the new crossing. Any potential benefit of new supporting infrastructure as a result of the scheme has now been reduced.</p>	

		<p>The removal of the access also means that operationally there will be an over-reliance on the existing road network to the Port and other industry in the area. This could increase the negative impacts on health and well-being to residents living close to these existing routes. This needs to be adequately assessed in the HEIA.</p> <p>While removal of the RaS is supported, the removal of the junction places pressure upon the Council to identify, fund and maintain any link road provision that will facilitate growth and access in Tilbury.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • More detail on the development sites in the area which will be considered in the assessment is required. • The key emergency services (East of England Ambulance Service NHS Trust, Essex Police, Essex County Fire and Rescue Service and the relevant local Acute Hospital Trusts with A&E facilities) should be consulted on this proposed new crossing, as a future potential increase in incidents and accidents will have a direct impact on their capacity to respond. • Highways England should consider other discount schemes, such as a hypothecated toll fund, which the Dartford crossing used to have. • Where flood prevention measures are needed, they should integrate balancing ponds with ecology, landscape and leisure features so that they are visually pleasing and useful features beyond their flood prevention purposes. Figures 5.53 and 5.54 on page 74 of the Guide to Supplementary Consultation show this intention but the it is not reflected with certainty. This will have beneficial health and well-being impacts if properly designed. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation Documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	

	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	
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Tilbury viaduct length reduced - Design Change 9

Summary of design change: Reduction in the height and length of the viaduct that crosses over the railway line to the north of the tunnel entrance.

Table D.2: Review of Design Change 9

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No assessment of construction phase traffic effects is presented in the supplementary consultation documents which may be significant for this scheme. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • There is concern that some road links in this area have not been assessed in the PEIR and therefore the assessment of effects presented are misrepresented. 	Yellow
	Operation	<p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>The Environmental Impacts Update states that impacts are difficult to predict in the absence of detailed air quality modelling, however, changes have the potential to change the effects reported in the PEIR. Detailed air quality modelling should be continuously undertaken to inform the design. Until such changes have been modelled, the impacts should remain as stated in the PEIR.</p> <p>The assessment in the Environmental Update and PEIR would suggest that no significant adverse impacts are predicted as no operational mitigation is provided. This remains a concern considering the magnitude of the scheme and the absence of a standalone HIA. A full and comprehensive HIA has been requested by the Council and the Director of Public Health. Highways England has confirmed that this will be provided in the form of a combined HEIA.</p> <p>Recommendation & Observation</p>	Red

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • A HEIA is not provided is provided in the supplementary consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. It is understood that a HEIA is being submitted as part of the DCO application. The Council is yet to receive any information on the assessment of the HEIA or recommendations to mitigate health effects. • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. • The PEIR did not assess all relevant road links and receptors in this area. Therefore, the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}) 	
Noise and Vibration	Construction	<p>As stated at Paragraph 13.4.20 in the PEIR, no baseline noise surveys were undertaken during the PEIR assessment along this section of the route. It is therefore unclear how the assessment has been undertaken. The Environmental Impacts Update states that there remain temporary significant adverse effects, construction techniques should be explored to design out significant adverse effects. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>It also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Construction methods should be explored to design out significant adverse impacts. • Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. • Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. • Lack of information provided to enable an informed view of the project to be made. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform Thurrock Council ('the Council') and other stakeholders of the significance of impacts identified. 	

Topic	Phase	Review findings	RAG
	Operation	<p>The lack of noise assessment remains a concern. The removal of Tilbury junction and subsequent reduction in height of the Tilbury viaduct potentially moves the route closer to potential noise sensitive receptors.</p> <p>The Environmental Impacts Update states that there is unlikely to be a material difference to the potential road traffic noise effects as described in the PEIR and potential mitigation measures described in the PEIR would remain appropriate. The mitigation measures outlined in the PEIR are generic. It is therefore unclear which noise sensitive receptors would continue to experience a change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. • Potential impacts during the operational phase on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
Cultural Heritage	Construction	<p>It is unclear if the removal of Tilbury junction and subsequent reduction in height of the Tilbury viaduct presents a change in significant detrimental impact to heritage features such as views from West Tilbury and East Tilbury Conservation Areas, Coalhouse Fort, East Tilbury Battery or Tilbury Fort Scheduled Monuments together with listed buildings in close proximity.</p> <p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Furthermore, Highways England have not taken the opportunity to share further information regarding the likely significant effects to archaeological remains. An incomplete archaeological desk-based assessment has only just been released and no trial trenching has yet to commence in this area.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • The heritage assessment should consider Historic Landscape and effects from vibration the fabric of heritage assets. • The assessment should extend to significant non designated assets. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Intrusive surveys need to be undertaken to properly determine the significance of the heritage assets to be impacted and understand mitigation requirements. • There is concern that the sensitive nature of the area of the gravel terraces and interface with the grazing marsh is not fully acknowledged with the submitted documentation. • Much greater consideration is needed of the impact upon the historic environment (including the setting of heritage assets) during construction phase including temporary compounds, access and the storage of spoil and equipment. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>It is unclear if the removal of Tilbury junction and subsequent reduction in height of the Tilbury viaduct presents a change in significant detrimental impact to heritage features such as views from West Tilbury and East Tilbury Conservation Areas, Coalhouse Fort, East Tilbury Battery or Tilbury Fort Scheduled Monuments together with listed buildings in close proximity. The secondary impact of operational measures such as land raising, and ecological mitigation will need to be defined and assessed. It remains unclear the aesthetic impact together with the overall height (lighting, sound barriers, gantries and signage etc)</p> <p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Furthermore, Highways England have not taken the opportunity to share further information regarding the likely significant effects to archaeological remains. An incomplete archaeological desk-based assessment has only just been released and no trial trenching has yet to commence in this area.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • Further verified views need to be agreed as soon as possible • The heritage assessment should consider Historic Landscape and effects from vibration the fabric of heritage assets. • The only available meaning full mitigation measure to preserve the setting of numerous conservation areas and listed buildings in this highly sensitive location remains for the tunnel to be extended beneath the railway. Now that the service area has been removed this should be reconsidered. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	

Topic	Phase	Review findings	RAG
Landscape and Visual	Construction	<p>The change in the design of the viaduct is likely to have a change in the landscape views, however, this is not reported in the Environmental Impacts Update nor the Guide to Supplementary Consultation. Impacts are likely to remain a major negative change for a range of visual receptors.</p> <p>As yet no detailed design of the structure, including acoustic fencing, lighting and gantries has been provided. Map Book 3: Engineering Plans only provides an indicative elevation out of context with the surrounding landscape features.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. 	
	Operation	<p>The Environmental Impacts Update states that operational impacts are likely to 'slightly improve' as a result of the design change of the viaduct. While the overall height of the viaduct is to be reduced no illustrations have been provided showing the proposed design including fencing, lighting and gantries, therefore a slight improvement is unlikely. It is unclear which receptors will experience a change.</p> <p>The Environmental Impacts Update refers to fen landscape restoration; however, there is no indication showing what this might entail. There is concern that in this area (and throughout the route) that heavily engineered balancing ponds are being proposed which would have limited landscape and biodiversity benefit and unlikely to achieve fen landscape restoration.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. • The Supplementary Consultation documents state that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. • Early indication of operational mitigation proposals presented in the PEIR suggested they may not be adequate or effective to mitigate against adverse landscape and visual impacts 	
Biodiversity (terrestrial and marine)	Construction	<p>The design change of viaduct height and length is unlikely to change the impacts set out in the PEIR. It is unclear how species and habitats within close proximity to the viaduct will be impacted due to the design change i.e. severance through woodland and potential changes in shading impacts.</p> <p>Furthermore, the Environmental Impacts Update is silent on potential impacts from the reconfiguration of the reservoirs as set out on Sheet 9 within Map Book 1: General Arrangements.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • An assessment of an effects would need to be provided to determine which habitats and species are affected. • No reference in the PEIR and Supplementary Consultation Documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy 	
	Operation	<p>The design change of viaduct height and length is unlikely to change the impacts set out in the PEIR. It is unclear how species and habitats within close proximity to the viaduct will be impacted due to the design change i.e. severance through woodland and potential changes in shading impacts.</p> <p>Furthermore, the Environmental Impacts Update is silent on potential impacts from the reconfiguration of the reservoirs as set out on Sheet 9 within Map Book 1: General Arrangements.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • An assessment of an effects would need to be provided to determine which habitats and species are affected. • No reference in the PEIR and Supplementary Consultation Documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that the design change would not further impact road drainage and the water environment during the construction when compared to the Statutory Consultation scheme. Construction effects are proposed to be controlled through mitigation measures set out in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>Figure 5.33 within the Guide to Supplementary Consultation shows a single pond on the western side of the route. Whereas during Statutory Consultation there were two ponds, one either side of the route. It is unclear why the flood storage has been reduced in this area.</p> <p>The Environmental Impacts Update is silent on potential impacts from the reconfiguration of the reservoirs as set out on Sheet 9 within Map Book 1: General Arrangements.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR on ground conditions during the construction phase.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided. It also states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Highways England have not shared any detail of initial findings from its ground investigations campaign which commenced in August 2019.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	

Topic	Phase	Review findings	RAG
Materials and Waste	Construction	<p>The Environmental Impacts Update states that the design change would have a negligible effect to the assessment reported in the PEIR on materials and waste during construction. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>The Environmental Impacts Update also states that measures to manage the storage of construction materials and wastes on site would be detailed in the ES, CoCP and CEMP. No evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to the storage, transport and/or handling of construction materials and waste.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further detail required for use of rail and river for the movement of materials, plant and equipment and waste and the environmental and transport impacts of these movements. • The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. • HE to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. • Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. • There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	Yellow
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	
People and Communities	Construction	<p>The Environmental Impacts Update states that the design change would lessen the temporary adverse construction impacts on local communities, such as East Tilbury and West Tilbury and would result in a beneficial effect.</p> <p>The design change is likely to be an improvement from that of the Statutory Consultation scheme to these communities, but it is unclear how the construction phase of the LTC in this area is constitutes a beneficial effect.</p> <p>Recommendation & Observation</p>	Yellow

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. • More detail on the development sites in the area which will be considered in the assessment is required. 	
	Operation	<p>The Environmental Impacts Update states that the design change would result in a beneficial effect to local communities such as East Tilbury and West Tilbury by reducing amenity impacts. Also, the report states that as the design change <i>“would minimise land take required for the project, which would lessen the effects on local communities and businesses and lessen the requirement for mitigations measures”</i>. Taking into consideration the significant environmental impacts (as stated in the Environmental Impacts Update) likely to remain significant, it is not clear how Highways England have concluded that the operation of the LTC would result in beneficial impacts to local communities and why the requirement for mitigation would be reduced.</p> <p>Furthermore, the reduction in height of the viaduct results in a close proximity to the overhead lines relating to the railway line. There is no assessment on potential hazards within the Supplementary Consultation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • More detail on the development sites in the area which will be considered in the assessment are required. • The key emergency services (East of England Ambulance Service NHS Trust, Essex Police, Essex County Fire and Rescue Service and the relevant local Acute Hospital Trusts with A&E facilities) should be consulted on this proposed new crossing, as a future potential increase in incidents and accidents will have a direct impact on their capacity to respond. • More detail on the health and well-being impacts on the local community. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme’s overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance ‘EIA Guide to Climate Change Resilience and Adaptation’, the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

Muckingford Road realignment and green bridge - Design Change 10

Summary of design change: Muckingford Road has moved slightly south to reduce the overall height, while providing the required structural headroom as it crosses over the LTC. It has also been upgraded to a green bridge with provision for walkers, cyclist and horse riders.

Table D.3: Review of Design Change 10

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No assessment of construction phase traffic effects is presented in the Supplementary Consultation documents which may be significant for this scheme. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • There is concern that some road links in this area have not been assessed in the PEIR and therefore the assessment of effects presented are misrepresented. 	Yellow
	Operation	<p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>The Environmental Impacts Update states that impacts are difficult to predict in the absence of detailed air quality modelling, however, changes have the potential to change the effects reported in the PEIR. Detailed air quality modelling should be undertaken to inform the design. Until such changes have been modelled, the impacts should remain as stated in the PEIR.</p> <p>The assessment in the Environmental Impacts Update and PEIR would suggest that no significant adverse impacts are predicted as no operational mitigation is provided. This remains a concern considering the magnitude of the scheme and the absence of a standalone HEIA.</p>	Red

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> No standalone HEIA is provided in the Supplementary Consultation documents, which is a substantial omission, considering the potential significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO Application. The Council is yet to receive any information on the assessment of the HEIA or recommendations to mitigate potential health effects. Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. The PEIR did not assess all relevant road links and receptors in this area. Therefore, the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM2.5) 	
Noise and Vibration	Construction	<p>The proposed construction work is likely to be closer to noise sensitive receptors, e.g. dwellings along Muckingford Road as a result of this design change. Temporary significant adverse impacts are predicted within the Environmental Impacts Update; however, no specific mitigation is provided. Construction techniques should be explored to design out significant adverse effects.</p> <p>It is unclear if noise monitoring around the Muckingford Road has been undertaken. The information in Figure 13.2 in Volume 3 of the PEIR is poorly presented. The noise monitoring locations are presented on a low-resolution map of the whole route which makes it difficult for the reviewer to understand where the monitoring locations are.</p> <p>The Environmental Impacts Update also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. Construction methods should be explored to design out significant adverse impacts. Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Lack of information provided to enable an informed view of the project to be made. There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
	Operation	<p>The area surrounding Muckingford Road is considered to be tranquil. The LTC would pass through this area with Muckingford Road raised over the LTC as embankment/green bridge. The LTC route has moved slightly closer to the properties on the north side of Muckingford Road, whereby their access is affected but the properties are retained.</p> <p>It is unclear if noise monitoring around the Muckingford Road has been undertaken. The information in Figure 13.2 in Volume 3 of the PEIR is poorly presented. The noise monitoring locations are presented on a low-resolution map of the whole route which makes it difficult for the reviewer to understand the locations of the monitoring points.</p> <p>The impacts outlined within the PEIR are not specific to individual receptors, which makes it challenging to quantify if the design change would further effect noise sensitive receptors in the area.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
Cultural Heritage	Construction	<p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Furthermore, Highways England have not haven't taken the opportunity to share further information regarding the likely significant effects to archaeological remains. An incomplete archaeological desk-based assessment has only just been released and no trial trenching has yet to commence in this area.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Further verified views need to be agreed as soon as possible especially from West and East Tilbury • The heritage assessment should consider Historic Landscape. • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets to be impacted and to inform the mitigation requirements. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • Further verified views need to be agreed as soon as possible especially from West and East Tilbury • The heritage assessment should consider Historic Landscape. • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets to be impacted and to inform the mitigation requirements. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that there is likely to still be a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors as a result of this design change. It also states that the widespread nature of the construction activity would continue to be experienced in close proximity to the visual receptors but fails to acknowledge what the visual receptors are and if any new receptors have been assessed.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. 	
	Operation	<p>The Environmental Impacts Update states that there is likely to still be a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors as a result of this design change. It is noted the benefits of this design change in terms of the provision of a green bridge; although as yet no detail</p>	

Topic	Phase	Review findings	RAG
		<p>has been provided to indicate the overall design of this structure and what the extent of the 'green' components will be.</p> <p>The report also states that some mitigation proposals previously presented are no longer being taken forward, such as false cuttings with slackened slopes due to engineering constraints. As the project would continue to form a major linear intervention within this area, it would be expected that further mitigation would be provided and that at this stage of the project, the mitigation should be specific to the impacts, which it is not.</p> <p>The LTC route has moved slightly closer to the properties on the north side of Muckingford Road, whereby their access is affected but the properties are retained. Further options should be explored to lower the LTC to preserve the tranquil nature of the area.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. • The Supplementary Consultation documents state that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. • Early indication of operational mitigation proposals presented in the PEIR suggested they may not be adequate or effective to mitigate against adverse landscape and visual impacts. Despite this it is implied that the false cuttings which form part of the mitigation might be reduced. 	
Biodiversity (terrestrial and marine)	Construction	<p>The area surrounding Muckingford Road is considered to be tranquil, made up of arable landscape. The LTC would pass through this area in false cutting with Muckingford Road raised over the LTC as embankment/green bridge. The LTC route has moved slightly closer to the properties on the north side of Muckingford Road, whereby their access is affected but the properties are retained.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • An assessment of an effects would need to be provided to determine which habitats and species are affected. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy 	

Topic	Phase	Review findings	RAG
	Operation	<p>It is noted the potential benefits of this design change in terms of the green bridge and increase in habitat provision. The green bridge will allow species to traverse the LTC; however, no indication is given as to the structure and extent of any habitat provision.</p> <p>Potential receptor sites for translocation of protected species is illustrated within Map Book 1 General Arrangements Sheet 10. It is unclear which species these sites are designed for and if the site layout, size, orientation of the receptor sites has been thought through. i.e. a potential receptor site for translocation of protected species, is adjacent to two urban areas - East Tilbury and Linford.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • An assessment of an effects would need to be provided to determine which habitats and species are affected. • Further work should be provided to show a commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy, and local policy. • Further information on what mitigation is proposed to be removed is required. • The extent of surveys has fallen short of minimum standards in the case of Barn Owl studies. 	
Road drainage and the water environment	Construction	<p>The realignment of Muckingford Road and green bridge would not alter the construction impact on Road Drainage and the Water Environment set out in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>Sheet 10 of Map Book 1: General Arrangements identifies a new pond located close to residential properties. Careful design, layout and orientation should be considered to not cause undue flood risk to nearby receptors.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR. No assessment has been provided within the Environmental Impacts Update to demonstrate that a 'no change' assessment is feasible.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. 	
	Operation	<p>The Environmental Impacts Update states that design change would have a negligible effect on the assessment presented in the PEIR. No assessment has been provided within the Environmental Impacts Update to demonstrate that a 'no change' assessment if feasible.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
Materials and Waste	Construction	<p>Although the benefits of this design change would result in a reduction in construction material and waste in this locality, the Application Boundary has changed substantially, that this cannot be regarded as an improvement from the Statutory Consultation scheme.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detailed required for use of rail and river for movement of material, plant and equipment and the environmental and transport impacts of this movement. The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	
	Operation	It is agreed that the change in design is likely to have a negligible effect on the assessment in the PEIR.	

Topic	Phase	Review findings	RAG
People and Communities	Construction	<p>The Environmental Impacts Update states that “<i>overall, there would be a beneficial effect and an improvement to those effects reports in the PEIR at this location.</i>” It is agreed that there is likely to be an improvement to the effects reported in the PEIR, however, it is unclear how the design change would result in a beneficial effect.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. • More detail on the development sites in the area which will be considered in the assessment is required. 	
	Operation	<p>The Environmental Impacts Update states that “<i>overall, there would be a beneficial effect and an improvement to those effects reports in the PEIR at this location.</i>” Whilst the green bridge would represent some form of mitigation in terms of severance for people and communities and walking/cycling active connections, it is dependent on how the green bridge is designed, planted and maintained to encourage public use. Furthermore, the construction of the LTC would still continue through this area, therefore an overall beneficial effect is considered unlikely.</p> <p>Furthermore, the proposed route for walking, cycling horse riding along Muckingford Road should connect Linford and Chadwell St Mary. However, the route currently stops between Low Street and Blue Anchor Lane.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • More detail on the development sites in the area which will be considered in the assessment is required. • The key emergency services (East of England Ambulance Service NHS Trust, Essex Police, Essex County Fire and Rescue Service and the relevant local Acute Hospital Trusts with A&E facilities) should be consulted on this proposed new crossing, as a future potential increase in incidents and accidents will have a direct impact on their capacity to respond. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme’s overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> UKCP18 has been released. The scenario used within the assessment will need to be agreed with the Council as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

D.2 Review of the A13/A1089 junction proposals

The review of the A13/A1089 junction proposals includes Design Changes 11,12,13 and 14, as set out in the below table:

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Update Report)	Design change description (as per Highways England's Guide to Supplementary Consultation)
11	LTC route realignment near Chadwell St Mary and Linford	1. Green Lane has been moved slightly north due to the changes to the A13 westbound and A1089 northbound slip roads, which join the LTC northbound.
12	A13/A1089 junction changes	2. Stifford Clays Road has been moved slightly south due to the changes to the A13 westbound and A1089 northbound slip roads, which join the LTC northbound.
13	Rectory Road realignment	3. The slip roads from the LTC northbound and southbound, to the A13 eastbound and Orsett Cock junction, have been redesigned removing the need for drivers to change lanes on the A13.
14	Hornsby Lane closure	4. A13 junction slip roads have been designed to tie into the Orsett Cock junction improvement works, which are currently under construction. 5. The Rectory Road diversion shown during statutory consultation has been removed so the alignment follows the existing Rectory Road. 6. A new link road north of the A13 has been included to provide access from the LTC northbound and southbound to the Orsett Cock junction. 7. The A13 eastbound has been reduced to two lanes from four lanes, near the Orsett Cock roundabout. This removes the need for drivers to change lanes on the A13. 8. Improved slip road layout for drivers heading north on the A1089 or west on the A13 wishing to head north on the LTC. 9. We have identified two potential locations for the relocation of the travellers' site. One is adjacent to its current location with access off Long Lane, the other is further to the west along Long Lane opposite the junction with Kerry Road. These locations are shown in the Map Book 1: General Arrangements. 10. A13 westbound to LTC northbound link road has been moved further north and further away from the A1013 and local properties. 11. A shared path for walkers and cyclists is proposed along the A1013 Stanford Road. 12. The A1013 has been moved closer to its existing position. 13. Gammonfields Way has been realigned to connect into Long Lane, which could provide access to the relocated travellers site. 14. The A1013 from the north of Whitecroft Care Home to the west side of the A1089 has been moved. It will run over the A1089, LTC and link roads to ease traffic management during construction.

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Update Report)	Design change description (as per Highways England's Guide to Supplementary Consultation)
		<p>15. The A1089 northbound to LTC northbound slip road has been moved further north to reduce the impact on a local school.</p> <p>16. Baker Street will be moved so it runs under the LTC link roads and connects to the existing A1013 slightly further east of its current position. This is because the new LTC runs through this section of Baker Street. Its realignment will also help construction of the bridges.</p> <p>17. Heath Road has been moved to tie in with the redesigned A1013. Emergency access off Heath Road to the A1089 southbound has been provided so emergency services can maintain response times from the fire station at Orsett Cock junction to Tilbury Port.</p> <p>18. The A13 westbound to the LTC southbound link road has been moved further west increasing the distance between this road and the Whitecroft Care Home on the A1013.</p> <p>19. The A13 westbound slip road to the A1089 southbound has been revised to improve traffic movements between A-roads and the LTC.</p> <p>20. Part of Hornsby Lane would be permanently closed, with areas provided for turning either side of the LTC. This closure would avoid having to move some overhead lines.</p> <p>21. Emergency access will be provided from Brentwood Road on to the LTC northbound and southbound to improve response times for services from Orsett and Grays. Access to properties will be maintained.</p> <p>22. The LTC east of Chadwell St. Mary has been moved approximately 60 metres north-east to avoid moving some overhead cables and pylons.</p> <p>As a result of revisions to the A13/A1089 junction, several structures have been revised.</p> <p>23. The viaduct across the Orsett Fen Sewer has been increased in length from 50 metres to 200 metres to manage the risk of flooding.</p> <p>24. Green Lane bridge upgraded to a green bridge.</p> <p>25. A new underbridge has been included to take the slip roads underneath the A13.</p> <p>26. The A1013 on the west side of the A1089 has been revised to reduce the impact on the proposed school sports field development and move the route further away from local properties. This allows the new bridge over the A1089 to be built off the local road network, without the existing road having to be closed.</p> <p>27. A new Rectory Road bridge will be built over the A13. The height has been increased to achieve clearance over the slip roads connecting into the Orsett Cock roundabout.</p> <p>28. Removal of Hornsby Lane bridge.</p> <p>29. Holford Road has been realigned to protect existing laneway and structure upgraded to a green bridge.</p> <p>30. The LTC has been raised by approximately one metre under Holford Road, so Holford Road crosses the LTC with sufficient structural headroom and avoids a watercourse diversion.</p>

LTC route realignment near Chadwell St. Mary and Linford – Design Change 11

Summary of design change: The route has moved to the south of the A13 and east of Chadwell St. Mary, approximately 60 metres closer to Linford to avoid having to move some overhead cables and pylons.

Table D.4: Review of Design Change 11

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No assessment of construction phase traffic effects is presented in the Supplementary Consultation documents which may be significant for this scheme. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • Effects on receptors during construction are currently unknown. 	Yellow
	Operation	<p>The Environmental Impacts Update states that no change in operational air quality effects reported in the PEIR are anticipated from this change as there are no receptors within 200 metres of this alignment change. However, it appears from the maps presented that some properties in Linford could be within 200 metres.</p> <p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>The impact to the Linford community would need to be properly assessed. At present there is no detail on potential impact and specific mitigation in terms of air quality.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No standalone HEIA is provided in the Supplementary Consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO application. The Council is yet to receive information on the assessment of the HEIA or recommendations to mitigate potential health effects. 	Red

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. • The PEIR did not assess all relevant road links and receptors in this area. Therefore, there the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM2.5). • The Environmental Impacts Update does not explain whether there are any new direct/indirect air quality effects on the site proposed for the translocation of protected species. 	
Noise and Vibration	Construction	<p>The Environmental Impacts Update states that there is the potential for temporary adverse effects to arise during the construction period as a result of the proximity to noise sensitive receptors (e.g. local residents in Linford) and the scale of the construction works. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>It also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Construction methods should be explored to design out significant adverse impacts. • Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. • Construction hours should be restricted to avoid significant noise effects during construction if necessary. • Lack of information provided to enable an informed view of the project to be made. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
	Operation	<p>The Environmental Impacts Update states that no material differences from the potential effects from road traffic described in the PEIR is expected to arise from this design change as a result of the movement toward Linford.</p>	

Topic	Phase	Review findings	RAG
		<p>It states that operational mitigation measures described in the PEIR remain appropriate and would be incorporated into the design, however no details of the proposed measures have been provided. The impact to the Linford community would need to be properly assessed. At present there is no detail on potential impact and specific mitigation in terms of noise and vibration.</p> <p>The Environmental Impacts Update also states noise and vibration continues to be assessed and will be presented in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to noise and vibration.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. • The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. • Impacts from the scheme's operation on other sensitive receptors, such as the proposed translocation sites for protected species, should be considered. 	
Cultural Heritage	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment described in the PEIR. It also states that mitigation of impacts on archaeological remains would follow the approach set out in the PEIR.</p> <p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets. It is concerning that the Environmental Impacts Update does not explicitly confirm whether there are any new direct or indirect effects on the nearby scheduled monument (Neolithic Causewayed Enclosure and Anglo-Saxon cemetery) considering the footprint of the development appears to be in closer proximity to this asset. (the identified compound immediately to the south of the Scheduled Monument will have a serious impact on the setting of the monument).</p> <p>Furthermore, Highways England have not taken the opportunity to share further information regarding the likely significant effects to archaeological remains, or provide any detail on the proposed mitigation measures, given that an incomplete archaeological desk-based assessment has only just been released and trial trenching evaluation works are underway.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • The heritage assessment should consider the effects on the setting of the Scheduled Monument. • The assessment should extend to significant non-designated assets. • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets to be impacted and to inform the mitigation requirements. • It is concerning that the sensitive nature of the Causewayed Enclosure and Anglo-Saxon cemetery is not fully acknowledged in the Supplementary Consultation material. • Much greater consideration is needed of the impact upon the historic environment (including the setting of heritage assets) during construction phase including temporary compounds, access and the storage of spoil and equipment. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>The Environmental Impacts Update states that there would be no significant change to the assessment described in the PEIR. However, it is unclear if it has considered any new impacts to the setting of the nearby scheduled monument (Anglo-Saxon cemetery).</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets. Both areas should be expanded. • The assessment should extend to assessing the significance of non-designated assets. • It is concerning that the sensitive nature of the Causewayed Enclosure and Anglo-Saxon cemetery is not fully acknowledged in the Supplementary Consultation documents. • In developing this design change and the landscape strategy, consideration should be given to the location of the Scheduled Monument to minimise any impacts on its setting. Where possible screening vegetation and earthworks should be proposed. • The likely effects on the Scheduled Monument should be considered in the cumulative assessment. • The assessment should acknowledge all appropriate guidance principles – including Historic England's GPA2 and GPA3 principles • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors). It also states that the widespread nature of the construction activity would continue</p>	

Topic	Phase	Review findings	RAG
		<p>to be experienced in close proximity to the visual receptors. The report fails to acknowledge what the visual sensitive receptors are and if any new receptors have been assessed as a result of moving the route 60 metres closer to Linford.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. 	
	Operation	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors). It states that some mitigation proposals previously presented are no longer being taken forward, such as false cuttings with slackened slopes, but does not provide justification or explanation for this. As the project would continue to form a major linear intervention within this area, it would be expected that further mitigation would be provided and that at this stage of the project, the mitigation should be specific to the impacts, which it is not.</p> <p>Furthermore, it also states that a full assessment supported by representative photomontages will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant landscape and visual effects related to the scheme's operation.</p> <p>The impact to the Linford community would need to be properly assessed. At present there is no detail on potential impact and specific mitigation in terms of landscape and views.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. • The Environmental Impacts Update states that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. • The report does not explicitly state the visual receptors and if any new receptors have been assessed as a result of moving the route 60 metres closer to Linford. • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The Council still does not know whether there will be acoustic fencing and what the visual and noise effects will be for local people. • The Council is still waiting for modelling showing the visual effects of the project on local viewpoints, so is unable to make an informed view of the potential effects yet. 	

Topic	Phase	Review findings	RAG
Biodiversity (terrestrial and marine)	Construction	<p>The Environmental Impacts Update states that the extent of habitat loss in this area would be reduced compared to that presented in the PEIR as a result of avoiding utilities works but the design change would not lead to a reduction in the significance level of the assessment conclusion. However, there is a lack of level of significance assessment provided within the PEIR to be able to make a comparison.</p> <p>None of the Supplementary Consultation documents refer to the effect on Rainbow Shaw LWS which is ancient woodland. Highways England has acknowledged that the realignment will result in the permanent loss of part of this site although as, yet no detail has been provided as to the extent of this loss of priority habitat. This loss will require additional woodland creation of an appropriate scale to compensate for this habitat loss.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
	Operation	<p>The Environmental Impacts Update states that there would be no significant change to the assessment described in the PEIR. However, there is a lack of level of significance assigned to effects within the assessment provided within the PEIR to be able to make a comparison.</p> <p>Operational effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>A green bridge is proposed on Hoford Road however no design detail has been provided so it is not possible to determine if it will provide meaningful ecological connectivity.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, Barn Owl studies. • Further information required on the proposed sites for translocation of protected species. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. No reference in the PEIR and Supplementary Consultation Documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that the design change would not further impact road drainage and the water environment during the construction when compared to the Statutory Consultation scheme. Construction effects are proposed to be controlled through mitigation measures set out in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>The Environmental Impacts Update states that the minor adverse effect reported in the PEIR would be reduced as the realignment would allow for an open waterbody to be partially retained.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR on ground conditions during the construction phase.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided. It also states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Highways England have not shared any detail of initial findings from its ground investigations campaign which commenced in August 2019.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. • The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. • The study area outlined in the PEIR is 250 m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required. • The study area outlined in the PEIR is 250 m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
Materials and Waste	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR on materials and waste during construction. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>The Environmental Impacts Update also states that measures to manage the storage of construction materials and wastes on site would be detailed in the ES, CoCP and CEMP. No evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to the storage, transport and/or handling of construction materials and waste.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further detail required for use of rail and river for the movement of materials, plant, equipment and waste and the environmental and transport impacts of these movements. • The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. • Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. • Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	
People and Communities	Construction	<p>The Environmental Impacts Update states that this design change may increase the temporary adverse construction effects experienced by residents of Linford due to the route moving 60 metres closer to the area, whilst potentially reducing adverse effects on local residents of Chadwell St. Mary. The Environmental Impacts Update then suggests that this would result in an improvement to the effects set out in the PEIR. It is not clear how this conclusion has been reached and which receptors are affected (e.g. community open space, community severance, economy, health).</p> <p>The Environmental Impacts Update also states that assessments continue to be undertaken in relation to the design change to develop mitigation measures. Therefore, no evidence has been presented in the Supplementary Consultation which confirms appropriate mitigation measures at this location.</p> <p>Furthermore, some mitigation has been removed (false cuttings) without justification or an assessment of the change. There does not appear to be anything other than minimum mitigation in place, it is unclear how Highways England intend to compensate and improve the residential amenity</p> <p>The impact to the Linford community would need to be properly assessed. At present there is no detail on potential impact and specific mitigation for this community.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. More detail on the development sites in the area which will be considered in the assessment is required. 	
	Operation	<p>The Environmental Impacts Update states this design change would reduce the operational impacts of the project on local residents of Chadwell St. Mary, but residents of Linford may experience potential impacts of the project due to the increased proximity of the project. It then suggests that this would result in an improvement to the effects presented in the PEIR but fails to identify what the improvements are and the</p>	

Topic	Phase	Review findings	RAG
		<p>justification behind this. Therefore, this design change cannot be regarded as an improvement from the Statutory Consultation scheme.</p> <p>The Environmental Impacts Update also states that assessments continue to be undertaken in relation to the design change to develop mitigation measures. Therefore, no evidence has been presented in the Supplementary Consultation documents which confirms appropriate mitigation measures at this location.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • More detail on the development sites in the area which will be considered in the assessment is required. • The key emergency services (East of England Ambulance Service NHS Trust, Essex Police, Essex County Fire and Rescue Service and the relevant local Acute Hospital Trusts with A&E facilities) should be consulted on this proposed new crossing, as a future potential increase in incidents and accidents will have a direct impact on their capacity to respond. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR.</p> <p>It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

A13/A1089 junction changes - Design Change 12

Summary of design change: Changes to the layout of the A13 junctions and modification of a number of connections at the junction between LTC, A13, A1089 and A1013. These changes include, moving roads away from nearby properties and improving safety at the junctions.

Table D.5: Review of Design Change 12

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No assessment of construction phase traffic effects is presented in the supplementary consultation documents which may be significant for this scheme. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • There is concern that some road links in this area have not been assessed in the PEIR and therefore the assessment of effects presented are misrepresented. 	Yellow
	Operation	<p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>The Environmental Impacts Update states that impacts are difficult to predict in the absence of detailed air quality modelling, however, changes have the potential to change the effects reported in the PEIR. Detailed air quality modelling should be undertaken to inform the design. Until such changes have been modelled, the impacts should remain as stated in the PEIR.</p> <p>The assessment in the Environmental Impacts Update and PEIR would suggest that no significant adverse impacts are predicted as no operational mitigation is provided. This remains a concern considering the magnitude of the scheme and the absence of a standalone HEIA.</p> <p>Recommendation & Observation</p>	Red

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • No standalone HEIA is provided in the Supplementary Consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO Application. The Council is yet to receive information on the assessment of the HEIA or recommendations to mitigate potential health effects (namely to communities surrounding Whitcrofts, Orsett Heath, Baker Street and North of Chadwell St Mary). • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. • The PEIR did not assess all relevant road links and receptors in this area. Therefore, there the assessment of effects discussed in the Supplementary Consultation Documents could be misrepresented. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}) 	
Noise and Vibration	Construction	<p>As stated in Paragraph 13.4.20 of the PEIR, no baseline noise surveys were undertaken during the PEIR assessment along this section of the route. It is therefore unclear how the assessment has been undertaken. The Environmental Impacts Update states that there remain temporary significant adverse effects, construction techniques should be explored to design out significant adverse effects. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>It also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Construction methods should be explored to design out significant adverse impacts. • Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. • Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. • Lack of information provided to enable an informed view of the project to be made. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	

Topic	Phase	Review findings	RAG
	Operation	<p>Significant changes have occurred to the junction of the A13, A1089 and LTC. It is clear from a review of Map Book 2: Land Use Plans, that further buildings are required for demolition as part of the Supplementary Consultation design changes, however, it is unclear if there are further receptors now included within the noise and vibration assessment. The lack of noise assessment remains a concern</p> <p>The Environmental Impacts Update states that there is unlikely to be a material difference to the potential road traffic noise effects as described in the PEIR and potential mitigation measures described in the PEIR would remain appropriate. The mitigation measures outlined in the PEIR are generic. It is therefore unclear which noise sensitive receptors would continue to experience a change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. • Potential impacts during the operational phase on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
Cultural Heritage	Construction	<p>Specific mitigation remains to be presented in order to reduce the impacts to Orsett Crop Mark Complex Scheduled Ancient Monument. The route directly impacts this Scheduled Ancient Monument, which is a permanent loss and a significant impact.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>It is concerning that the sensitive nature of the Orsett cropmark complex is not fully acknowledged in the Supplementary Consultation documents.</p> <p>No comment is given on the impact on listed buildings, and in at least two cases they are not identified on the maps provided in Map Book 1: General Arrangements (see Sheet 12 and 13).</p> <p>Recommendation & Observation</p>	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. • The heritage assessment should consider Historic Landscape and effects from vibration the fabric of heritage assets. Appropriate assessment and identification of the listed buildings together with all available potential mitigation measures. • Much greater consideration is needed of the impact upon the historic environment (including the setting of heritage assets) during construction phase including temporary compounds, access and the storage of spoil and equipment. • The assessment should extend to significant non designated assets. • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets to be impacted and to inform the mitigation requirements. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>Specific mitigation remains to be presented in order to reduce the impacts to Orsett Crop Mark Complex Scheduled Ancient Monument. The route directly impacts this Scheduled Ancient Monument, which is a permanent loss and a significant impact.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets. Both areas should be expanded. • The assessment should extend to assessing the significance of non-designated assets. • In developing this design change and the landscape strategy, consideration should be given to the Orsett Crop Mark Complex Scheduled Ancient Monument to minimise its impacts. • Appropriate assessment of the listed buildings • Agree appropriate view locations and extent with the Council. • The assessment should acknowledge all appropriate guidance principles - including Historic England's GPA 2 and GPA3 principles • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors). It also states that the widespread nature of the construction activity would continue	

Topic	Phase	Review findings	RAG
		<p>to be experienced in close proximity to the visual receptors. The report fails to acknowledge what the visual sensitive receptors are and if any new receptors have been assessed.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. 	
	Operation	<p>A moderate to major negative change is still experienced to a range of visual receptors. No further construction related mitigation is provided.</p> <p>The junction would continue to result in the encroachment of road infrastructure, including structures, embankments, signs, gantries and street lighting into the local landscape as a result of the intertwined string of new link road connecting the A13 with the LTC.</p> <p>It is unclear why mitigation has been removed in the assessment presented in the Environmental Impacts Update considering the impacts have not changed from the PEIR.</p> <p><i>“There are mitigation proposals that are no longer being taken forward (landscape earthworks strategy at the A13 Junction, and false cutting earthworks to the perimeter of the junction”.</i></p> <p>In addition to the removal of earthworks and false cuttings, Figures 5.44 and 5.45 of the Guide to Supplementary Consultation show a significant reduction in the amount of tree planting.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. • The Supplementary Consultation documents state that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme and it appears that this mitigation has been further reduced since the PIER. • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • Early indication of operational mitigation proposals presented in the PEIR suggested they may not be adequate or effective to mitigate against adverse landscape and visual impacts. 	
Biodiversity (terrestrial and marine)	Construction	<p>The Application Boundary has changed drastically, especially around the area of the A13/A1089 junction. It is unclear how this change impacts species and habitats loss. Significant amount of land take is proposed in this area which includes the loss of woodland. The Environmental Impacts Update does not provide any further detail of quantum and quality of habitat loss or species disturbance.</p>	

Topic	Phase	Review findings	RAG
		<p>The plans provided as part of the Supplementary Consultation do not indicate the extent of effects on Blackshots Nature Area LWS and whether these will result in any direct habitat loss. It is understood that this site has not been surveyed.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. Blackshots Nature Area Local Nature Park is designated in part for its invertebrate interest and therefore appropriate surveys should be carried out to information what mitigation/compensation is required. • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
	Operation	<p>The Application Boundary has changed drastically, especially around the area of the A13/A1089 junction. It is unclear how this change impacts species and habitats loss. Significant amount of land take is proposed in this area which includes the loss of woodland. The Environmental Impacts Update does not provide any further detail of quantum and quality of habitat loss or species disturbance.</p> <p>Operational effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, Owl studies and invertebrate assessments • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	

Topic	Phase	Review findings	RAG
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that the design change would not further impact road drainage and the water environment during the construction when compared to the Statutory Consultation scheme. Construction effects are proposed to be controlled through mitigation measures set out in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>The Environmental Impacts Update states that the minor adverse effect reported in the PEIR would be reduced as the realignment would allow for an open waterbody to be partially retained.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR on ground conditions during the construction phase.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided. It also states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Highways England have not shared any detail of initial findings from its ground investigations campaign which commenced in August 2019.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	

Topic	Phase	Review findings	RAG
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further details are required. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
Materials and Waste	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR on materials and waste during construction. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>The Environmental Impacts Update also states that measures to manage the storage of construction materials and wastes on site would be detailed in the ES, CoCP and CEMP. No evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to the storage, transport and/or handling of construction materials and waste.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required for use of rail and river for the movement of materials, plant, equipment and waste and the environmental and transport impacts of these movements. The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p>	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	
People and Communities	Construction	<p>The Environmental Impacts Update states that there would be a reduction in impacts on nearby properties in terms of land take, access and construction impacts. However, the assessment is silent on the impact of the relocation of the traveller site.</p> <p>As stated above within the Noise and Vibration section of this table, it is clear that there are further buildings subject to demolition than compared to the Statutory Consultation scheme. The Environmental Impacts Update states that there is likely to be a beneficial effect and the Supplementary Consultation scheme would result in a beneficial effect. It is unclear how the assessment has concluded this.</p> <p>Blackshots Nature Area is an important natural greenspace that is well-used by local residents for dog walking and other recreational activities. No consideration is given to the effects on recreational use of this site.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. A HEIA is required for the DCO Application and should include impact on the Traveller community. Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. More detail on the development sites in the area which will be considered in the assessment is required. 	
	Operation	<p>The Environmental Impacts Update states that there would be a reduction in impacts on nearby properties in terms of land take, access and construction impacts. However, the assessment fails to mention the impact of the scheme on the relocation of the traveller site.</p> <p>As stated above within the Noise and Vibration section of this table, it is clear that there are further buildings subject to demolition than compared to the Statutory Consultation scheme. The Environmental Impacts Update states that there is likely to be a beneficial effect and the Supplementary Consultation scheme would result in a beneficial effect. It is unclear how the assessment has concluded this.</p> <p>Does this design change lead to a lane gain / designated lane arrangement for traffic travelling on the A13 (from the east) and accessing LTC south? The arrangement is confusing and could lead to weaving / merging. It is unclear how the LTC scheme will mitigate against weaving and possible safety concerns.</p> <p>Recommendation & Observation</p>	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • More detail on the development sites in the area which will be considered in the assessment is required. • Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. A HEIA is required for the DCO Application and should include impact on the Traveller community. • The key emergency services (East of England Ambulance Service NHS Trust, Essex Police, Essex County Fire and Rescue Service and the relevant local Acute Hospital Trusts with A&E facilities) should be consulted on this proposed new crossing, as a future potential increase in incidents and accidents will have a direct impact on their capacity to respond. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR.</p> <p>It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"><li data-bbox="562 228 1854 316">• In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed.	

Rectory Road Realignment - Design Change 13

Summary of design change: The Rectory Road diversion presented at Highways England's Statutory Consultation in 2018 has been removed so the alignment follows the existing Rectory Road.

Table D.6: Review of Design Change 13

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No assessment of construction phase traffic effects is presented in the Supplementary Consultation documents which may be significant for this scheme. In particular, if the Old Rectory Road will be closed during the construction of LTC, Highways England should demonstrate the implications for air quality on the Orsett Cock junction as this closure will encourage more traffic to temporarily use the junction via Baker Street to access Orsett. Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration Effects on receptors during construction are currently unknown. 	Yellow
	Operation	<p>The Environmental Impacts Update states that no change in the adverse operational air quality effects reported in the PEIR are anticipated from this change based on the distance between Rectory Road and receptors on Stanford Road.</p> <p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No standalone HEIA is provided is provided in the Supplementary Consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO application. The Council has still not received any information on the assessment of the HEIA or recommendations to mitigate potential health effects. 	Red

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. • The PEIR did not assess all relevant road links and receptors in this area. Therefore, the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}). 	
Noise and Vibration	Construction	<p>The Environmental Impacts Update states that there is the potential for temporary adverse effects to arise during the construction period as a result of the proximity to noise sensitive receptors on Rectory Road. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>It also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Impacts from construction on other sensitive receptors such as schools, health centres and hospitals should be considered. • Construction methods should be explored to design out significant adverse impacts. • Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. • Construction hours should be restricted to avoid significant noise effects during construction if necessary • Explanation of Noise Important Areas should be included. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides generic techniques for mitigating effects. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
	Operation	<p>The Environmental Impacts Update states that no material differences from the potential effects from road traffic noise described in the PEIR is expected to arise from this design change. However, it is not clear what is meant by 'material differences' and what noise sensitive receptors on Rectory Road will experience these 'material differences'.</p>	

Topic	Phase	Review findings	RAG
		<p>The Environmental Impacts Update also states that operational mitigation measures described in the PEIR remain appropriate and would be incorporated into the design, however no details of the proposed measures have been provided.</p> <p>Furthermore, noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation documents which confirms or otherwise the likely significant effects related to noise and vibration.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. • The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. • Consideration for a long-term monitor in Baker Street. 	
Cultural Heritage	Construction	<p>The Environmental Impacts Update states that there would be a reduction in the area of land required and, therefore, a minor improvement in the adverse effects to archaeological remains reported in the PEIR. Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets at Murrells Cottage to be impacted and to inform the mitigation requirements. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>The Environmental Impacts Update states that no significant change to the assessment described in the PEIR. Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment should extend to assessing the significance of non-designated assets. • The assessment should acknowledge all appropriate guidance principles – including Historic England’s GPA2 and GPA3 principles. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The A13 junction will require significant visual and noise mitigation. In developing the mitigation strategy, consideration should be given to the location of built heritage and historic landscape to minimise any impacts on the asset's sitting. The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors) as the altered structure's location would still require the same level of construction. Mitigation is referred back to the PEIR, which does not provide specific design mitigation for significant adverse impacts to receptors.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The assessment fails to explicitly cite which guidance it is using for its assessment methodology. The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. The LVIA should consider 'distant' viewpoints including identified strategic and local views from the settlements of Orsett. 	
	Operation	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors). It states that some mitigation proposals previously presented are no longer being taken forward, such as the landscape earthworks strategy at the A13 junction and false cuttings with slackened slopes but does not explain the implications of this. Given the nature of the effects, it would be expected that further mitigation would be provided and that at this stage of the project, the mitigation should be specific to the impacts, which it is not.</p> <p>Furthermore, it also states that a full assessment supported by representative photomontages will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant landscape and visual effects related to the scheme's operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. The LVIA should consider 'distant' viewpoints including identified strategic and local views from the settlements of Orsett. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The Environmental Impacts Update states that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. The assessment fails to explicitly cite which guidance it is using for its assessment methodology. The Council still does not know whether there will be acoustic fencing and what the visual and noise effects will be for local people. The Council is still waiting for modelling showing the visual effects of the project on local viewpoints, so is unable to make an informed view of the potential effects yet. 	
Biodiversity (terrestrial and marine)	Construction	<p>The Environmental Impacts Update states that removing the diversion would reduce the extent of habitat loss in this area compared to that presented in the PEIR. It also states that, although beneficial, the design change would not lead to a reduction in the significance level of the assessment conclusion. However, there is a lack of level of significance assessment provided within the PEIR to be able to make a comparison.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. No reference in the PEIR and Supplementary Consultation Documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
	Operation	<p>The Environmental Impacts Update states that there would be no significant change to the assessment described in the PEIR. However, there is a lack of level of significance assessment provided within the PEIR to be able to make a comparison. Furthermore, the Environmental Impacts Update does not explain whether there are any new direct/indirect effects on the nearby LWS (Blackshots Nature Area, Orsett Camp Quarry and Mucking Heath/Orsett Golf Course) as a result of the Supplementary Consultation design changes.</p> <p>Operational effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Additional surveys required as the extent of surveys to date has fallen short of minimum standards. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that the effects reported in the PEIR remain. Construction effects are proposed to be controlled through mitigation measures set out in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. No reference in the PEIR and Supplementary Consultation documents on the methodology for assessing cumulative effects. 	
	Operation	<p>The Environmental Impacts Update states that the effects reported in the PEIR remain. It also states that mitigation measures presented in the PEIR remain appropriate.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. No reference in the PEIR and Supplementary Consultation documents on the methodology for assessing cumulative effects. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant changes to the assessment and effects reported in the PEIR.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided. It also states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Highways England have not shared any detail of initial findings from its ground investigations campaign which commenced in August 2019.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects. A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
Materials and Waste	Construction	<p>The Environmental Impacts Update states the change in design is likely to have a negligible effect on the assessment reported in the PEIR. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>The Environmental Impacts Update states that Highways England continues to refine their approach to balancing earthworks across the project to maximise the re-use of excavated materials onsite and within the design proposals. It also states that measures to manage the storage of construction materials and wastes on site would be detailed in the ES, CoCP and CEMP. No evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to the storage, transport and/or handling of construction materials and waste.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required for use of rail and river for the movement of materials, plant, equipment and waste and the environmental and transport impacts of these movements. The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	
People and Communities	Construction	<p>The Environmental Impacts Update states that there would be an improvement to those effects reported in the PEIR at this location due to the reduction in construction land take. It also states that this design change would remove the impact on Orsett Showground and, therefore, no mitigation is required as a result of this change. However, the construction of the LTC would still continue through this area, including potential utility works, therefore negative effects could still occur, and appropriate mitigation measures should be considered.</p> <p>Furthermore, the proposed roads suggested for closure and use by construction vehicles could limit access to hospitals.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. Further impacts on health and well-being need to be assessed Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. More detail on the development sites in the area which will be considered in the assessment is required. Long term closure of Rectory Road will cause significant disruption for the residents of Orsett. With Baker Street also scheduled for a long-term closure and the works planned for Stifford Clays Road suggesting the need for weekend/night closures, the timing of these works will need to be carefully considered to reduce the impact on the residents of Orsett. The long-term closure of Rectory Road and planned works to other access points into Orsett could reduce the ability to deliver housing growth in Orsett in the first 5 years of the Local Plan due to the reduction in local highway capacity and resilience during the construction phase of the LTC. 	

Topic	Phase	Review findings	RAG
	Operation	<p>The Environmental Impacts Update states that there would be a material improvement to the effects reported in the PEIR as the route would no longer pass directly through Orsett Showground. It is not clear how this conclusion has been reached and which receptors are affected (e.g. community open space, community severance, economy, health) as the Environmental Impacts Update presents no significance assessment to be able to make a comparison.</p> <p>It also states that as this change would remove the impact on Orsett Showground, then no mitigation is required. However, utility works are proposed in this area. Therefore, appropriate mitigation measures should be considered.</p> <p>Furthermore, the overall design of this route is important as it is one of the main access routes into Orsett. It is also a key link for walkers, cyclists and horse riders.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. Further impacts on health and well-being need to be assessed • More detail on the development sites in the area which will be considered in the assessment is required. • The key emergency services (East of England Ambulance Service NHS Trust, Essex Police, Essex County Fire and Rescue Service and the relevant local Acute Hospital Trusts with A&E facilities) should be consulted on this proposed new crossing, as a future potential increase in incidents and accidents will have a direct impact on their capacity to respond. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

Hornsby Lane Closure - Design Change 14

Summary of design change: Part of Hornsby Lane would be permanently closed, as the bridge to carry Hornsby Road has been removed. Areas provided for turning either side of the LTC. Alternative access would be via Heath Road or the A1013. This closure would avoid disruption caused by having to move overhead lines.

Table D.7: Review of Design Change 14

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No assessment of construction phase traffic effects is presented in the Supplementary Consultation documents which may be significant for this scheme. Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. Effects on receptors during construction are currently unknown. 	Yellow
	Operation	<p>The Environmental Impacts Update states that no change in operational air quality effects reported in the PEIR are anticipated from this change as there are no air quality receptors included along Hornsby Lane.</p> <p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No standalone HEIA is provided is provided in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO application. Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. 	Red

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. • The PEIR did not assess all relevant road links and receptors in this area. Therefore, there the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}) • The Environmental Impacts Update does not explain whether there are any direct/indirect air quality effects on the site proposed for the translocation of protected species. 	
Noise and Vibration	Construction	<p>The Environmental Impacts Update states that there is the potential for temporary adverse effects in the vicinity of the works but fails to set out which noise sensitive receptors will be affected. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no specific details of the proposed measures have been provided.</p> <p>It also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Baseline noise surveys and subsequent noise modelling should be undertaken, and construction methods should be explored to design out significant adverse impacts. Measures to control and monitor construction noise should be detailed in the CoCP. • Construction hours should be restricted to avoid significant noise effects during construction if necessary. 	
	Operation	<p>The Environmental Impacts Update states that no material differences from the potential effects from road traffic described in the PEIR is expected from this design change. It states that operational mitigation measures described in the PEIR remain appropriate and would be incorporated into the design, however no details of the proposed measures have been provided.</p> <p>The Environmental Impacts Update also states noise and vibration continues to be assessed and will be presented in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to noise and vibration.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The PEIR referenced potential mitigation measures such as low-noise road surfaces and environmental barriers. These details of the anticipated effects and any detailed plans for mitigation have not been shared. • Impacts from the scheme's operation on other sensitive receptors, such as the proposed translocation sites for protected species, should be considered. 	

Topic	Phase	Review findings	RAG
Cultural Heritage	Construction	<p>The Environmental Impacts Update states that there would be a reduction in the works area and, therefore, a minor beneficial improvement in the adverse effects to archaeological remains reported in the PEIR. Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no specific details of the proposed measures have been provided.</p> <p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified nor is 100 m for collecting condition information on designated heritage assets – both areas should be expanded. • Heritage assessment should consider the setting of Heath Place. • The assessment should extend to significant non-designated assets. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>The Environmental Impacts Update states that the removal of the overbridge from the proposed development would be a marginal improvement to the adverse Grade II listed Heath Place reported in the PEIR, resulting from the change to setting. It also states that the closure of this route would result in a marginal worsening of the adverse effects reported in the PEIR to the historic landscape. However, it is not clear how these conclusions have been reached.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets. Both areas should be expanded. • In developing this design change and the landscape strategy, consideration should be given to the historic landscape and the location of the Grade II listed Heath Place to minimise any impacts. • The assessment should acknowledge all appropriate guidance principles – including Historic England’s GPA2 and GPA3 principles • Opportunities to reinstate or improve access including pedestrian links to the bridleway from Hornsby Lane. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors).</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> The assessment fails to explicitly cite which guidance it is using for its assessment methodology. The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. 	
	Operation	<p>The Environmental Impacts Update states that there would be a slight benefit to the reported effects set out in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range or visual receptors). As a result of the associated structural and design changes in this area, the report suggests that there would be a reduced direct impact on the setting to the Grade II listed Heath Place within this rural landscape.</p> <p>It states that some mitigation proposals previously presented are no longer being taken forward, such as false cuttings with slackened slopes. At this stage of the project, the mitigation should be specific to the impacts, which it is not.</p> <p>Furthermore, it also states that a full assessment supported by representative photomontages will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant landscape and visual effects related to the scheme's operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The assessment fails to explicitly cite which guidance it is using for its assessment methodology. The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. The Environmental Impacts Update states that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. Highways England should confirm with the Council whether there will be acoustic fencing and what the visual and noise effects will be for local people. Modelling showing the visual effects of the project on local viewpoints, so is unable to make an informed view of the potential effects yet should be issued to the Council, when available 	
Biodiversity (terrestrial and marine)	Construction	<p>The Environmental Impacts Update states that the extent of habitat loss in this area would be reduced compared to that presented in the PEIR as a result of avoiding utilities works but the design change would not lead to a reduction in the significance level of the assessment conclusion. However, there is a lack of level of significance assessment provided within the PEIR to be able to make a comparison.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. • No reference in the PEIR and Supplementary Consultation Documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
	Operation	<p>Highways England do not expect this design change to alter the assessment of effects described in the PEIR. However, there is a lack of level of significance assigned to effects within the assessment provided within the PEIR to be able to make a comparison.</p> <p>Operational effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • Further information required on the proposed sites for translocation of protected species. • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that the design change would not further impact road drainage and the water environment during the construction when compared to the Statutory Consultation scheme. Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. 	

Topic	Phase	Review findings	RAG
	Operation	<p>The Environmental Impacts Update states that the design change would not further impact road drainage and the water environment during the scheme's operation when compared to the Statutory Consultation scheme. Operational effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR on ground conditions during the construction phase.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided. It also states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Highways England have not shared any detail of initial findings from its ground investigations campaign which commenced in August 2019.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not 	

Topic	Phase	Review findings	RAG
		<p>likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required.</p> <ul style="list-style-type: none"> The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
Materials and Waste	Construction	<p>The Environmental Impacts Update states that the change would result in a slight improvement on the scenario presented in the PEIR due to a reduction in the demand for construction materials, but this would remain as a negligible effect. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required for use of rail and river for the movement of materials, plant, equipment and waste and the environmental and transport impacts of these movements. The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	
People and Communities	Construction	<p>Residential properties, local businesses and community facilities in Orsett Heath would no longer be accessible via Hornsby Lane from the north but an alternative means of access would remain available. As such, the Environmental Impacts Update suggests that no additional adverse effect is considered as a result of the closure. However, it is not clear how this has been assessed.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. Further impact on health and well-being to be understood. 	
	Operation	<p>Residential properties, local businesses and community facilities in Orsett Heath would no longer be accessible via Hornsby Lane from the north but an alternative means of access would remain available. As such, the</p>	

Topic	Phase	Review findings	RAG
		<p>Environmental Impacts Update suggests that no additional adverse effect is considered as a result of the closure. However, it is not clear how this has been assessed.</p> <p>The Environmental Impacts Update also states that engagement with local stakeholders is ongoing to fully understand the implications of the closure of Hornsby Lane at this location and develop appropriate mitigation. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise of the likely significant effects.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Expect a consultation with residents and Ward councillors regarding the proposed closure. • Main concern is about fly tipping as it will block the road and block the residents in. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR.</p> <p>It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p>	

Topic	Phase	Review findings	RAG
		<p data-bbox="562 228 981 255">Recommendation & Observation</p> <ul data-bbox="562 260 1854 406" style="list-style-type: none"> <li data-bbox="562 260 1854 320">• UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. <li data-bbox="562 325 1854 406">• In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

D.3 Review of the LTC/M25 junction proposals

The review of the LTC/M25 junction proposals includes Design Changes 15, 16, 17, and 18, as set out in the below table:

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Update Report)	Design change description (as per Highways England's Guide to Supplementary Consultation)
15	M25 to A13 southbound lane removal	<ol style="list-style-type: none"> 1. One lane has been removed from the M25 to A13 southbound. 2. Added a shared path along North Road to provide better access to the wider network of public rights of way. 3. Changes to the height of the LTC and North Road to reduce impact on properties. 4. Road moved approximately 200 metres south-west. 5. The viaduct across the Mardyke River and Golden Bridge Sewer river has been shortened from approximately 450 metres to 350 metres. <p>As a result of revisions to the LTC/M25 junction, several structures have been revised.</p> <ol style="list-style-type: none"> 6. A new bridge suitable for horse riders to connect the east and west side of Thames Chase Forest over the M25. 7. Footpath 252 has been moved south and now consists of two bridges, one to cross the railway line and another to cross over the LTC. The new location ties in more effectively with existing routes for walkers, cyclists and horse riders. North Road upgraded to a green bridge and includes shared cycle and footpath facilities. 8. Footpath 136 over the LTC has been realigned because the LTC route has moved south-west.
16	Routing through the Mardyke	
17	The height of the LTC and North Road	
18	Thames Chase Community Forest – new bridge	

M25 to A13 southbound lane removal - Design Change 15

Summary of design change: One lane has been removed southbound between the M25 and A13 junctions, reducing the number of lanes from three to two. The design change further results in there no longer being a need to realign Ockendon Road or make changes to the bridge where the road passes over the M25.

Table D.8: Review of Design Change 15

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No assessment of construction phase traffic effects is presented in the Supplementary Consultation documents which may be significant for this scheme. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • There is concern that some road links in this area have not been assessed in the PEIR and therefore the assessment of effects presented are misrepresented. 	Yellow
	Operation	<p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>The Environmental Impacts Update states that impacts are difficult to predict in the absence of detailed air quality modelling, however, changes have the potential to change the effects reported in the PEIR. Detailed air quality modelling should be undertaken to inform the design. Until such changes have been modelled, the impacts should remain as stated in the PEIR.</p> <p>The assessment in the Environmental Impacts Update and PEIR would suggest that no significant adverse impacts are predicted as no operational mitigation is provided. This remains a concern considering the magnitude of the scheme and the absence of a standalone HEIA.</p>	Red

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> No standalone HEIA is provided in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO application. The Council has still not received any information on the assessment of the HEIA or recommendations to mitigate health effects. Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. The PEIR did not assess all relevant road links and receptors in this area. Therefore, the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}) 	
Noise and Vibration	Construction	<p>As stated in the PEIR (Para 13.4.20), no baseline noise surveys were undertaken during the PEIR assessment along this section of the route. It is therefore unclear how the assessment has been undertaken. The Environmental Impacts Update states that there remain temporary significant adverse effects, construction techniques should be explored to design out significant adverse effects. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>It also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects from noise and vibration during the construction phase.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. Construction methods should be explored to design out significant adverse impacts. Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. Lack of information provided to enable an informed view of the project to be made. There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	

Topic	Phase	Review findings	RAG
	Operation	<p>As part of this design change, further woodland planting is proposed along the southbound lane of the M25, this is likely to be a positive change to noise conditions in the area, e.g. St Mary Magdalene and North Ockendon Conservation Areas.</p> <p>However, green landscaping has been removed from the Supplementary Consultation Scheme when compared to the Statutory Consultation Scheme along the M25, exposing the residential properties on the north side of Ockendon Road. The noise and visual conditions at these properties are unlikely to change from the existing baseline, however, there is a missed opportunity to provide an improvement to these properties. Furthermore, it is our understanding that noise surveys are yet to be undertaken along this section of the route.</p> <p>The lack of noise assessment remains a concern. The Environmental Impacts Update states that there is unlikely to be a material difference to the potential road traffic noise effects as described in the PEIR and potential mitigation measures described in the PEIR would remain appropriate. The mitigation measures outlined in the PEIR are generic. It is therefore considered that further evidence should be provided to demonstrate a no change effect.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. • Potential impacts during the operational phase on other sensitive receptors such as ecological receptors, school's health centres and hospitals, should be considered. • Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. • The Environmental Impacts Update does not explain whether there are any new direct/indirect air quality effects on the site proposed for the translocation of protected species. 	
Cultural Heritage	Construction	<p>There is likely to be less disruption to the heritage setting, due to there no longer being a need to realign Ockendon Road or make changes to the bridge where the road passes over the M25. However, this has not been re-assessed.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>As part of this design change, further woodland planting is proposed along the southbound lane of the M25, this is likely to be a positive change to cultural heritage assets in the area, e.g. St Mary Magdalene and North Ockendon Conservation Areas and listed buildings. However, this is not reported in the Environmental Impacts Update.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The nature of effects would be similar to those stated in the PEIR i.e. a major to moderate negative landscape change and a typically minor to major negative change in views for visual receptors, even with the removal of a lane and reduction in modifications to existing road infrastructure.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The assessment fails to explicitly cite which guidance it is using for its assessment methodology. The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment 	
	Operation	<p>Green landscaping has been removed from the Supplementary Consultation scheme when compared to the Statutory Consultation scheme along the M25, exposing the residential properties on the north side of Ockendon Road to the M25. The conditions at these properties are unlikely to change from the existing baseline, however, there is potential for the design to provide a betterment to these properties</p> <p>Design change 15 within the Environmental Impacts Update discusses viaducts and embankments crossing floodplain for the construction landscape section. Design change 15 relates to the M25 to A13 southbound lane removal. Therefore, it is unclear if the correct design change has been assessed in this section.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The assessment fails to explicitly cite which guidance it is using for its assessment methodology. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. The Environmental Impacts Update states that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. Early indication of operational mitigation proposals presented in the PEIR suggested they may not be adequate or effective to mitigate against adverse landscape and visual impacts 	
Biodiversity (terrestrial and marine)	Construction	<p>The Environmental Impacts Update states that the design change is “<i>unlikely to lead to a reduction in the significance level of the assessment conclusion</i>”. However, there is a lack of level of significance assigned to effects within the assessment provided within the PEIR to be able to make a comparison.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. An assessment of an effects would need to be provided to determine which habitats and species are affected. No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
	Operation	<p>The Environmental Impacts Update states that it is not expected that the change will alter the assessment of effects. However, there is a lack of level of significance assigned to effects within the assessment provided within the PEIR to be able to make a comparison.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. An assessment of an effects would need to be provided to determine which habitats and species are affected. No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	

Topic	Phase	Review findings	RAG
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that the minor to moderate adverse effects in the PEIR would be reduced as a result of the design change, due to a reduced footprint and a reduction of the effects on local drainage, but also on watercourse crossings and culverts would be shorter in length. However, there is a lack of detail/assessment within the Environmental Impacts Update and Guide to Supplementary Consultation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>The Environmental Impacts Update states that the minor adverse effect reported in the PEIR would be reduced, however, there is a lack of detail/assessment within the Environmental Impacts Update and Guide to Supplementary Consultation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR on ground conditions during the construction phase.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided. It also states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Highways England have not shared any detail of initial findings from its ground investigations campaign which commenced in August 2019.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects. A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
Materials and Waste	Construction	<p>The Environmental Impacts Update states that there would result in a slight improvement, due to the reduction in demand for construction material. No evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to the storage, transport and/or handling of construction materials and waste.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required for use of rail and river for the movement of materials and waste and the environmental and transport impacts of these movements. The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	

Topic	Phase	Review findings	RAG
People and Communities	Construction	<p>The Environmental Impacts Update states that the design change would result in an improvement effects to agricultural land and businesses. However, it is not clear how this has been assessed and how much land is no longer being developed as a result of the design change. No justification has been provided to validate that the assessment would see improved outcomes.</p> <p>Furthermore, new residential properties along Ockendon Road are subject to demolition. Therefore, it is unlikely that the design change would result in improvement to the impacts reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. • Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. • More detail on the development sites in the area which will be considered in the assessment is required. 	
	Operation	<p>The Environmental Impacts Update states that the design change would result in an improvement effects to agricultural land and businesses. However, it is not clear how this has been assessed and how much land is no longer being developed as a result of the design change. Ockendon Road is no longer being realigned, which would mean less disturbance to the community, however this is not addressed in the Environmental Impacts Update.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. • Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. • More detail on the development sites in the area which will be considered in the assessment is required. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • (UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR.</p> <p>It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

Routing through the Mardyke – Design Change 16

Summary of design change: The viaduct across the Mardyke River and Golden Bridge Sewer river has been shortened from approximately 450 metres to 350 metres; and, the route has moved approximately 200 metres south-west to reduce the diversion work required to move an existing gas main. Changes to the structures over the Mardyke River, Golden Bridge Sewer and the Orsett Fen Sewer have been developed.

Table D.9: Review of Design Change 16

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The route has moved approximately 200m south-west, closer to South Ockendon. It is unclear if new receptors have been identified and assessed.</p> <p>The Environmental Impacts Update states that, with mitigation in place, there should be no significant adverse impacts arising from dust. The assessment remains to address potential impacts from construction traffic on the local highway network. No detail provided regarding any alterations to construction traffic routing.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Health effects, and whether Highways England anticipate changes to this from these design changes is not mentioned in the consultation material. This is a substantial omission considering the significant health impacts of this scheme. • No assessment of construction phase traffic effects which may be significant for a scheme like LTC. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • Effects on receptors during construction are currently unknown. 	Yellow
	Operation	<p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>The assessment in the Environmental Impacts Update and PEIR would suggest that no significant adverse impacts are predicted as no operational mitigation is provided. This remains a concern considering the magnitude of the scheme and the absence of a standalone HEIA.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No standalone HEIA is provided as part of the Supplementary Consultation material, which is a substantial omission, considering the potentially significant health impacts of this scheme. 	Red

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the assessment. • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. • Not all relevant road receptors have been assessed following modelled changes in traffic. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}). 	
Noise and Vibration	Construction	<p>No baseline noise surveys were undertaken during the PEIR assessment along this section of the route (as stated Para 13.4.20 of PEIR). Therefore, there is no evidence to support the rationale that receptors north-east of the route would have reduced impacts as a result of this design change (as stated within the Environmental Impacts Update). The Environmental Impacts Update states that there remains temporary significant adverse effects south-west, there is a lack of information regarding which receptors are subject to a significant adverse impact.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Construction methods should be explored to design out significant adverse impacts. • Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. • Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. • Lack of information provided to enable an informed view of the project to be made. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified 	
	Operation	<p>The route has moved approximately 200 metres south-west to reduce the work required to move an existing gas main. As stated in the Environmental Impacts Update there is a larger magnitude of change in road traffic noise to receptors south-west of the route, however no change to the significance is predicted.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. • Potential impacts during the operational phase on other sensitive receptors such as ecological receptors, school's health centres and hospitals, should be considered. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. • The Environmental Impacts Update does not explain whether there are any new direct/indirect air quality effects on the site proposed for the translocation of protected species. 	
Cultural Heritage	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment described in the PEIR. It also states that mitigation of impacts on archaeological remains would follow the approach set out in the PEIR.</p> <p>Given that the nature of the design change will have the potential to affect the setting of built heritage assets, these will need to be assessed. Furthermore, Highways England have not taken the opportunity to share further information regarding the likely significant effects to archaeological remains, or provide any detail on the proposed mitigation measures, given that an incomplete archaeological desk-based assessment has only just been released and trial trenching evaluation works are due to start.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets and to understand the mitigation requirements. • Appropriate heritage impact assessments including impact from mitigation measures should be completed for Grove Farm • Much greater consideration is needed of the impact upon the historic environment (including the setting of heritage assets) during construction phase including temporary compounds, access and the storage of spoil and equipment. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>It is unclear if any new heritage receptors have been identified as a result of the realignment in this area, or whether effects on known assets have changed. The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR, however detail on specific receptors affected by the realignment is absent from the consultation documents.</p> <p>Furthermore, Highways England have not taken the opportunity to share further information regarding the likely significant effects to archaeological remains, or provide any detail on the proposed mitigation measures, given that an incomplete archaeological desk-based assessment has only just been released. A programme of trenching has been proposed but has not commenced.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Findings of the archaeological desk-based assessment are required to understand the potential effects of the realignment in this area. • Appropriate heritage impact assessments including impact from mitigation measures should be completed for Grove Farm • The results of intrusive surveys need to be considered to properly determine the significance of the heritage assets and to understand the mitigation requirements. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and typically a moderate to major negative change in views for a range of visual receptors). It suggests that the main impact would occur within the Orsett Fen as construction activities associated with the viaduct and embankments would be prominent and affect a number of rural reports including Public Rights of Way (PRoW) and isolated residential properties.</p> <p>Throughout the early part of 2019 Highways England dedicated several design workshops to their proposals to provide a longer, higher and better designed viaduct that would remove the need for significant embankments within the valley which they believed would reduce the landscape and visual impacts of the scheme. Without any further discussion however, the scheme has reverted back to a broadly similar design as proposed at Statutory Consultation despite the Highways England design team recognising that there was a better alternative. Thorough justification for this design change rather than the alternative discussed has not been provided in the Supplementary Consultation documents.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. • The PEIR sites a number of mitigation measures which will be 'considered' however no confirmation of what measures are to be implemented in this location have been provided. 	
	Operation	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those set out in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors) due to the elevated nature of the project. It states that mitigation proposals continue to reflect those presented in the PEIR but does not confirm what measures are to be implemented in this location. It would be expected that at this stage of the project, the mitigation should be specific to the impacts, which it is not.</p>	

Topic	Phase	Review findings	RAG
		<p>The viaduct across the Mardyke River and Golden Bridge Sewer river has been shortened from approximately 450m to 350m. As reiterated in the Council's response on the Statutory Consultation scheme <i>"Including a viaduct gives a more open aspect reducing the visual impact in this open area; A combination of viaduct and embankment is a more cost-effective solution than a viaduct over the whole of the valley; A shorter viaduct will be less of a long-term maintenance issue than the longer viaduct while it will still present an opportunity for architectural treatment that minimises visual impact; Reducing the length of embankment reduces the volume of flood compensation and consequently the amount of land compared to the preferred route and option 1 making it easier to find suitable land."</i> The shortened viaduct subsequently means a longer embankment. Therefore, not only increasing the volume of flood compensation, but <i>"closing"</i> off views which would have been otherwise through a viaduct in this location.</p> <p>It is not clear if the elevation of the viaduct has been altered.</p> <p>No landscape mitigation measures have been shown that could mitigate this structure within an expansive, flat open landscape.</p> <p>Recommendation:</p> <ul style="list-style-type: none"> • While the Supplementary Consultation documents suggest that a balance has been struck between the solutions of a viaduct or embankment, both still offer significant adverse impacts on the landscape in terms of visual amenity and substantial land modification, with all of its associated risks. Thorough justification for this design change rather than the alternative discussed in 2019 has not been provided in the Supplementary Consultation documents. • It is not apparent that options to form a tunnel for all or part of the route have been considered in order to eliminate these environmental impacts. • Significance of the expected effects needs to be confirmed in order to determine whether the design change has provided sufficient mitigation, and whether likely significant effects remain for landscape characters and visual receptors in this area. • The Council is still waiting for modelling showing the visual effects of the project on local viewpoints, so is unable to make an informed view of the potential effects yet. • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. 	
Biodiversity (terrestrial and marine)	Construction	<p>The Environmental Impacts Update states that the extent of habitat loss in this area would be reduced compared to that presented in the PEIR, however, no quantum is provided. It is not clear how a larger embankment as part of these proposals results in a reduction of habitat loss. Despite the reduction in habitat loss predicted, the design change would not lead to a reduction in the significance level of the assessment conclusion presented in the PEIR. However, there is a lack of level of significance assessment provided within the PEIR to be able to make a comparison.</p>	

Topic	Phase	Review findings	RAG
		<p>The assumption stated in the Environmental Impacts Update that “<i>the structures over the Mardyke River would support greater botanical diversity in this area</i>” has no evidence to support this.</p> <p>Figure 5.54 of the Guide to Supplementary Consultation shows some areas of wetland creation. Map Book 1: General Arrangements shows areas for potential protected species receptors within this area. It is noted however that there are engineered balancing ponds situated on either side of the LTC which are disconnected from the ecological mitigation areas. It is considered that such an approach is a significant missed opportunity to achieve meaningful ecological and landscape benefits while addressing water management and road runoff issues. Overall there is no firm proposals as to what the extent of any mitigation would be in this sensitive area.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. It is not detailed if new areas of compensation are commensurate with the loss caused by the project. It is also not identified if further work to identify such areas will be the subject of engagement with stakeholders such as the Council. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
	Operation	<p>The Environmental Impacts Update states that the design change would not alter the assessment of effects reported in the PEIR. It is unclear how a larger embankment over a flood plain would result in no change to the assessment. As reiterated in the Council’s response on the Statutory Consultation scheme “... <i>Reducing the length of embankment reduces the volume of flood compensation and consequently the amount of land compared to the preferred route and option 1 making it easier to find suitable land.</i>” Therefore, this design change would require an increase in flood compensation, i.e. an increase in habitat loss.</p> <p>The Environmental Impacts Update also notes that the landscape design would incorporate a more diverse habitat proposals in this area which would be beneficial to the overall Environmental Masterplan design and the project’s biodiversity value. Operational effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Agreement should be reached on the suitability of the proposed sites for translocation of protected species and their long-term use and maintenance. • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, Barn Owl studies. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Further information required on the proposed sites for translocation of protected species. • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
Road drainage and the water environment	Construction	<p>It is stated in the Environmental Impacts Update that detailed hydraulic modelling of the Mardyke River, Golden Bridge Sewer and the Orsett Fen Sewer has reduced the moderate adverse effects assessed in the PEIR. However, in the PEIR it suggests that an increased embankment would increase the flood compensation required.</p> <p>The route crosses the Mardyke flood plain for 2km with about 1.5km of embankment up to 7.5m high and a 450m long viaduct across the Mardyke river and nearby Golden Bridge Sewer.</p> <p>Design changes to the proposed crossing of the Mardyke River and its tributaries would reduce flood risk and hydromorphology, however, further information on the assessment conclusion is required.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further information of the hydraulic modelling is required to determine the level of accuracy of the revised Road and Water Environment construction assessment • Further detail regarding any changes to run-off should be provided as there is potential for is to contain higher levels of hydrocarbons etc. and this should not be able to flow directly into the Mardyke without some form of filtering e.g. through reedbeds. Such features could be of landscape and ecological benefits if designed appropriately. • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>As stated in the Environmental Impacts Update, the moderate adverse impacts reported in the PEIR would be reduced due to these design changes (as stated under the construction section). There is insufficient evidence presented in the Environmental Impacts Update to demonstrate the change in assessment.</p> <p>As stated within Table 3.3 of the PEIR (Volume 1) <i>“Reducing the length of embankment would need less flood compensation”</i>. Therefore, it is unclear whether further flood compensation is required as a result of this design change.</p> <p>Recommendation & Observation</p>	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. Further assessment should confirm the amount of flood compensation for the scheme. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant changes to the assessment and effects report in the PEIR and reiterates that construction effects would be controlled through a CoCP and a CEMP.</p> <p>It states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects. A minerals safeguarding assessment and Potential Sources Study Report have not been included in the PEIR which are important sources of information that would assist stakeholders. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. Appropriateness of any proposed mitigation measures can only be confirmed once the outcomes of the ground investigations have been shared. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No recommendations can be made in absence of further assessment and confirmation of effects. 	
Materials and Waste	Construction	<p>A slight worsening of the impacts to materials and waste a result of this design change is predicted within the Environmental Impacts Update. However, it states that the level of impact remains the same as the PEIR (negligible).</p> <p>The Environmental Impacts Update also states that measures to manage the storage of construction materials and wastes on site would be detailed in the ES, CoCP and CEMP. No evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to the storage, transport and/or handling of construction materials and waste.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further detail required for use of rail and river for the movement of materials, plant, equipment and waste and the environmental and transport impacts of these movements. • The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. • Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. • Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. • There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No recommendations can be made in absence of further assessment and confirmation of effects. 	
People and Communities	Construction	<p>As stated in the Environmental Impacts Update, the proposed design change would reduce the impact to 'the wildness' (an area of woodland) and would move the route further from local footpaths. It states that the change would reduce the impact on local recreational users in this area and represent an improvement to those effects reported in the PEIR. However, the report does not demonstrate if change to recreational users is likely north of South Ockendon or what other receptors could be affected by this change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further evidence should be provided to demonstrate that recreational users north of South Ockendon will not be impacted due to the change in location of the route. • Health is not mentioned in the supplementary consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. • Impact on the bridleway and isolated residential properties would need full assessment. • Further information on the design and mitigation measures proposed for North Road Green Bridge. • Further information of the mitigation measures should be provided. 	
	Operation	<p>As stated in the Environmental Impacts Update, the proposed design change would reduce the impact to 'the wildness' (an area of woodland) and would move the route further from local footpaths. It states that the change would reduce the impact on local recreational users in this location and represent an improvement to</p>	

Topic	Phase	Review findings	RAG
		<p>those effects reported in the PEIR. However, the report does not demonstrate if change to recreational users is likely north of South Ockendon or what other receptors could be affected by this change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further evidence should be provided to demonstrate that recreational users north of South Ockendon will not be impacted due to the change in location of the route. • Health is not mentioned in the supplementary consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. • Further information of the mitigation measures should be provided. 	
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The United Kingdom Climate Projections 2018 (UKCP18) have been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation Documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR.</p> <p>It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • Further impacts to climate as a result of the design change cannot be ruled out until a detailed hydraulic modelling assessment has been provided for review. 	

The height of the LTC and North Road - Design Change 17

Summary of design change: The LTC has been lowered by two metres and, as a result, North Road has also been lowered by two metres.

Table D.10: Review of Design Change 17

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be presented in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Health effects, and whether Highways England anticipate changes to this from these design changes is not mentioned in the consultation material. This is a substantial omission considering the potentially significant health impacts of this scheme. • No assessment of construction phase traffic effects which may be significant for a scheme like LTC. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • Effects on receptors during construction are currently unknown. 	
	Operation	<p>The Environmental Impacts Update states that no change in operational air quality effects reported in the PEIR are anticipated from this design change, as vertical alignments are not included in the dispersion modelling.</p> <p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No standalone HEIA is provided as part of the consultation material, which is a substantial omission, considering the potentially significant health impacts of this scheme. The Council has still not received any information on the assessment of the HEIA or recommendations to mitigate potential health effects. • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the assessment. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. Not all relevant road receptors have been assessed following modelled changes in traffic. No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}). 	
Noise and Vibration	Construction	<p>The Environmental Impacts Update states that there remains potential for temporary adverse effects to arise during the construction period.</p> <p>Construction effects are proposed to be controlled through mitigation measures in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Baseline noise surveys and subsequent noise modelling should be undertaken, and construction methods should be explored to design out significant adverse impacts. Measures to control and monitor construction noise should be detailed in the CoCP. Construction hours should be restricted to avoid significant noise effects during construction if necessary. 	
	Operation	<p>The Environmental Impacts Update states that no material differences from the potential effects from road traffic noise described in the PEIR to arise from this design change.</p> <p>It states that operational mitigation measures described in the PEIR remain appropriate and would be incorporated into the design.</p> <p>The PEIR referenced potential mitigation measures such as low-noise road surfaces and environmental barriers. These details of the anticipated effects and any detailed plans for mitigation have not been shared.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Details of the anticipated effects and significance of those effects have not been reported, these will be required to understand what design changes may be required to mitigate any potential adverse effects. Appropriate mitigation to avoid or reduce any adverse effects need to be established. 	
Cultural Heritage	Construction	<p>Assuming the footprint of the development has not changed (which is not explicitly confirmed in the Supplementary Consultation material) it is agreed that there would be no significant change to the assessment reported in the PEIR for construction effects on cultural heritage.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Agree viewpoints from Scheduled Monuments, listed buildings and Conservation Areas. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>Assuming the footprint of the development has not changed (which is not explicitly confirmed in the Supplementary Consultation documents) it is agreed that there would be no significant change to the assessment reported in the PEIR for operational effects on cultural heritage.</p> <p>No comment is provided regarding any change to the effects on setting / significance of nearby scheduled monuments and Grade II listed buildings.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The significance of likely effects has not been reported in the PEIR or the Supplementary Consultation documents, an informed view of likely changes to the assessment of cultural heritage assets therefore cannot be made. Assessment of the contribution north road makes to the setting of the listed buildings, scheduled monument and Conservation Areas. The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that the nature of the effects would be similar to those reported in the PEIR (i.e. a major negative landscape change and a moderate to major negative change in the view for a range of visual receptors).</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The PEIR sites a number of mitigation measures which will be 'considered' however no confirmation of what measures are to be implemented in this location have been provided. 	
	Operation	<p>The Environmental Impacts Update states that there would be a slight benefit to the nature of effects reported in the PEIR (i.e. a moderate negative landscape change and a moderate to minor negative change in the view for a range of visual receptors) as a result of moving the alignment in the shallow cutting. This reduction in adverse effect is welcomed.</p> <p>It states that some mitigation proposals previously presented are no longer being taken forward, such as false cuttings with slackened slopes, but does not explain the implications of this. It would be expected that at this stage of the project, the mitigation should be specific to the impacts, which it is not.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> Significance of the expected effects needs to be confirmed in order to determine whether the design change has provided sufficient mitigation, and whether likely significant effects remain for landscape characters and visual receptors in this area. Justification for no longer taking forward certain mitigation measures, and the alternatives that have been considered should be shared and discussed with consultees. 	
Biodiversity (terrestrial and marine)	Construction	<p>Assuming the footprint of the development has not changed (which is not explicitly confirmed in the Supplementary Consultation material) it is agreed that there would be no significant change to the assessment reported in the PEIR for construction effects on terrestrial biodiversity arising from this design change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The extent of either temporary or permanent habitat disturbance or loss needs to be confirmed. 	
	Operation	<p>Assuming the footprint of the development has not changed (which is not explicitly confirmed in the Supplementary Consultation documents) it is agreed that there would be no significant change to the assessment reported in the PEIR for operational effects on terrestrial biodiversity arising from this design change.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The extent of either temporary or permanent habitat disturbance or loss needs to be confirmed. 	
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that initial assessments indicate a negligible change to the effects reported in the PEIR. It also states that a hydrogeological risk assessment will continue to be informed by ongoing ground investigations and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects during the construction phase.</p> <p>Pollution risks are proposed to be controlled through mitigation measures set out in the CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Specific effects on locally groundwater dependent features in this area need to be confirmed. Mitigation measures should be confirmed once the ongoing ground investigations, and any assessments they may inform, are complete. 	
	Operation	<p>The Environmental Impacts Update states that initial assessments indicate a negligible change to the effects reported in the PEIR. It also states that a hydrogeological risk assessment will continue to be informed by ongoing ground investigations and will be reported in the ES. Therefore, no evidence has been presented in</p>	

Topic	Phase	Review findings	RAG
		<p>the Supplementary Consultation which confirms or otherwise the likely significant effects during the scheme's operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures should be confirmed once the ongoing ground investigations, and any assessments they may inform, are complete. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant changes to the assessment and effects report in the PEIR and reiterates that construction effects would be controlled through a CoCP and a CEMP.</p> <p>It states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects. A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. Appropriateness of any proposed mitigation measures can only be confirmed once the outcomes of the ground investigations have been shared. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No recommendations can be made in absence of further assessment and confirmation of effects. 	
Materials and Waste	Construction	<p>It states in the Environmental Impacts Update that the change in design is likely to have a negligible effect on the assessment reported in the PEIR. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>It notes that Highways England continue to refine its approach to balancing earthworks across the project to maximise the re-use of excavated materials onsite and within the design proposals and that measures to manage construction materials and wastes will be detailed in the ES, CoCP and CEMP.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> It is not clear what impact, if any, this design change has on assumptions made relating to construction traffic numbers and movements. The detail of the measures proposed to be included in the COCP should be discussed and confirmed with the Council. 	
	Operation	<p>It is agreed that the change in design is likely to have a negligible effect on the assessment in the PEIR.</p> <p>Recommendation & Observation:</p> <ul style="list-style-type: none"> Further detail required on potential materials management and any targets/objectives that will be written into contractual documentation. 	
People and Communities	Construction	<p>The Environmental Impacts Update states that the temporary adverse construction effects on local residents and communities in the North and South Ockendon area would remain as presented in the PEIR. It also states that Highways England are continuing to assess the impact of the proposed change to develop mitigation measures and lessen any negative impact. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects to the local community during the construction phase.</p> <p>Recommendation & Observation:</p> <ul style="list-style-type: none"> The people and communities' chapter include a wide range of topics, notably the communities in the North and South Ockendon areas may be affected by construction works in this location. The extent of those effects is unknown and further consultation with the Council is required. 	
	Operation	<p>The Environmental Impacts Update states that there would be an improvement to residential amenity for local communities of North and South Ockendon as a result of a reduction in the height of the route at this location. The report also states that assessments are being undertaken to develop mitigation measures and lessen the negative impact. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects on the local community.</p> <p>Recommendation & Observation:</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. Further impact on health and wellbeing should be assessed. The people and communities' chapter include a wide range of topics, notably the communities in the North and South Ockendon areas may be affected by the scheme in this location. The nature and extent of those effects are not confirmed in the Environmental Impacts Update. 	
Climate	Construction	<p>It is agreed that the change in design is likely to have a negligible effect on the assessment in the PEIR.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation:</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • Carbon modelling to understand the projects contributions to climate change is ongoing and therefore climate effects currently remain unknown. 	
	Operation	<p>It is agreed that the change in design is likely to have a negligible effect on the assessment in the PEIR.</p> <p>Recommendation & Observation:</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the LPA as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • Carbon modelling to understand the projects contributions to climate change is ongoing and therefore climate effects currently remain unknown. 	

Thames Chase Forest Centre - New Bridge – Design Change 18

Summary of design change: A new bridge suitable for walkers, cyclists and horse rider is proposed to connect the east and west side of the Thames Chase Forest. It should be noted that Highways England refer in the documentation to the Thames Chase Community Forest, which is incorrect, the reference ought to be in this instance to the Thames Chase Forest Centre.

Table D.11: Review of Design Change 18

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The new bridge which is proposed to cross the LTC and the M25 for Non-Motorised Users (NMU's) of the Thames Chase Forest Centre, results in new provisions of a PRoW further to the east and west of the route. The construction of the new PRoW is close to residential properties in North Ockendon. No further receptors have been identified as part of the Environmental Impacts Update.</p> <p>Potential temporary impacts from construction in terms of air quality within Thames Chase Forest Centre should does not appear to have been considered within the Environmental Impacts Update.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No assessment of construction phase traffic effects is presented in the Supplementary Consultation documents which may be significant for this scheme. • Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. • There is concern that some road links in this area have not been assessed in the PEIR and therefore the assessment of effects presented are misrepresented. 	Yellow
	Operation	<p>The new bridge is unlikely to have a further operational impact on air quality. Therefore, there is unlikely to be a change to air quality impacts. However, no further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No standalone HEIA is provided in the supplementary consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO application. • Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. 	Red

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. The PEIR did not assess all relevant road links and receptors in this area. Therefore, there the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM2.5). 	
Noise and Vibration	Construction	<p>The new bridge to across the LTC and the M25 for NMU of the Thames Chase Forest Centre, results in new provisions of a PRoW further to the east and west of the route. The construction of the new PRoW is close to residential properties in North Ockendon. No further receptors have been identified as part of the Environmental Impacts Update.</p> <p>Potential temporary impacts from construction noise within Thames Chase Community Forest does not appear to have been considered within the Environmental Impacts Update.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. Construction methods should be explored to design out significant adverse impacts. Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. Lack of information provided to enable an informed view of the project to be made. There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
	Operation	<p>The new bridge is unlikely to be further operational impacts from noise and vibration. Therefore, there is unlikely to be a change to the impacts reported in the PEIR. However, the lack of noise assessment remains a concern.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The Environmental Impacts Update does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. Potential impacts during the operational phase on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. The Environmental Impacts Update does not explain whether there are any new direct/indirect air quality effects on the site proposed for the translocation of protected species. 	
Cultural Heritage	Construction	<p>It is unclear if the Environmental Impacts Update has considered the likely effects of this design change on built heritage and historic landscapes, as well as appropriate mitigation measures for these heritage assets.</p> <p>Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>It is unclear how the construction of the proposed new route would impact on any unknown buried archaeology.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. The heritage assessment should consider Historic Landscape effects. The assessment should extend to significant non designated assets. Intrusive surveys need to be undertaken in order to properly determine the significance of the heritage assets to be impacted and understand mitigation requirements. The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>The new bridge is unlikely to have a further operational impact on built cultural heritage.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets – both areas should be expanded. The heritage assessment should consider Historic Landscape effects The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The design change has the potential to result in temporary construction impacts closer to communities (i.e. North Ockendon) in terms of visual intrusion from construction equipment, e.g. cranes, etc</p>	

Topic	Phase	Review findings	RAG
		<p>Views within Thames Chase Forest Centre are likely to be impacted. The Environmental Impacts Update does not provide further assessment on potentially sensitive visual /landscape receptors.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment. 	
	Operation	<p>It is noted the benefits of this design change in terms of the provision of a bridge. However, no information on the design of the new bridge is provided. The design of the new bridge should be sensitive to the surrounding area in terms of the operational views within Thames Chase Community Forest.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The assessment fails to explicitly cite which guidance it is using for its assessment methodology. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the Thurrock Landscape Capacity Study. • The Supplementary Consultation documents state that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. • The LVIA should consider all relevant landscape character area, features, key characteristics, key landscape qualities and key landscape conditions as set out in the draft Landscape Character Assessment • Early indication of operational mitigation proposals presented in the PEIR suggested they may not be adequate or effective to mitigate against adverse landscape and visual impacts. 	
Biodiversity (terrestrial and marine)	Construction	<p>The Application Boundary further encroaches into Thames Chase Community Forest as a result of the new bridge and PRoW. Further habitat loss and impacts from the construction of the PRoW have not been taken into consideration in the Environmental Impacts Update.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. • An assessment of an effects would need to be provided to determine which habitats and species are affected. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. 	
	Operation	<p>It is noted the benefits of this design change in terms of the provision of a bridge. However, the Environmental Impacts Update and Guide to Supplementary Consultation is silent on the design of the new bridge and PRow. The new bridge provides a connection to the east and west sections of the Thames Chase Forest Centre, the design of the new bridge should therefore be considered in terms of species movement.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> An assessment of an effects would need to be provided to determine which habitats and species are affected. Further work should be provided to show a commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy, and local policy. Further information on what mitigation is proposed to be removed. The extent of surveys has fallen short of minimum standards in the case of Barn Owl studies. 	
Road drainage and the water environment	Construction	<p>The Application Boundary further encroaches into Thames Chase Community Forest as a result of the new bridge and PRow. Further loss of land and potential flood storage during the construction of the new PRow has not been considered in the Environmental Impacts Update.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>The new bridge is unlikely to have a further operational impact on road drainage and the water environment. Therefore, there is unlikely to be a change to the impacts reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment reported in the PEIR. No assessment has been provided within the Environmental Impacts Update to demonstrate that a 'no change' assessment if feasible.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. 	
	Operation	<p>The Environmental Impacts Update states that design change would have a negligible effect on the assessment presented in the PEIR. No assessment has been provided within the Environmental Impacts Update to demonstrate that a 'no change' assessment if feasible.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further detail is required. The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features 	
Materials and Waste	Construction	<p>The Environmental Impacts Update states that there would a negligible effect pm the assessment reported in the PEIR on materials and waste during construction. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>The Environmental Impacts Update also states that measures to manage the storage of construction materials and wastes on site would be detailed in the ES, CoCP and CEMP. No evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to the storage, transport and/or handling of construction materials and waste.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required for use of rail and river for the movement of materials and waste and the environmental and transport impacts of these movements. The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. The assessment does not state what material will be reused to minimise the need for off-site haulage and handling. There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	Yellow
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	Green
People and Communities	Construction	<p>As stated above, there is the potential impact to new receptors within North Ockendon as construction works are closer to this community.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. More detail on the development sites in the area which will be considered in the assessment is required. 	Yellow
	Operation	<p>The new bridge across the M25 and the LTC would have a positive impact on the local communities. The assessment within the Environmental Impacts Update is accepted.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant health impacts of this scheme. Further information of the mitigation measures should be provided. 	Yellow
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p>	Yellow

Topic	Phase	Review findings	RAG
		<p>The Environmental Impacts Update report states this design change would have a negligible effect on the assessment presented in the PEIR.</p> <p>It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the Council as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant effects related to greenhouse gases. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the Council as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	

D.4 Review of the M25 junction 29 proposals

The review of the M25 junction 29 proposals includes Design Change 19, as set out in the below table:

Design change ref. (Highways England reference)	Design change (as per Highways England's Environmental Update Report)	Design change description (as per Highways England's Guide to Supplementary Consultation)
19	M25 junction 29 changes	<ol style="list-style-type: none">1. M25 southbound slip road shortened to approximately 580 metres, to shorten the scheme and reduce impact on Folkes Lane footbridge.2. Segregated turning lanes moved closer to the roundabout. The following structure has been revised. <ol style="list-style-type: none">3. Franks Farm rail bridge has been raised.

M25 junction 29 changes - Design Change 19

Summary of design change: The layout at junction 29 of the M25 has been altered to reduce the amount of overhead cable diversions. As a result of this design change, the M25 southbound slip road has been shortened to approximately 580 metres and the segregating turning lanes have been moved closer to the roundabout. Franks Farm rail bridge has been raised by approximately 1.6 metres to match the height of the existing bridge over the Upminster to Shoeburyness railway.

Table D.12: Review of Design Change 19

Topic	Phase	Review findings	RAG
Air Quality	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that construction vehicle modelling is being undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which confirms or otherwise the likely significant air quality effects arising from construction traffic.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No assessment of construction phase traffic effects is presented in the supplementary consultation documents which may be significant for this scheme. Reference is made to the mitigation set out in the PEIR, however the PEIR only provides standard techniques for mitigating effects such as construction dust but omits numerous effective techniques that warrant consideration. Effects on receptors during construction are currently unknown. 	
	Operation	<p>The Environmental Impacts Update states that no change in operational air quality effects reported in the PEIR are anticipated from this change as there are no receptors within 200 metres of this junction.</p> <p>No further detail has been provided since Statutory Consultation. No further consideration has been given to assessing a key pollutant with known health effects (PM_{2.5}), recommended by WHO guidelines in the Supplementary Consultation documents. It is recommended that a new air modelling assessment is undertaken across the Borough which considers changes in PM_{2.5} and PM₁₀ concentrations and this is presented to the Council.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> No standalone HEIA is provided is provided in the supplementary consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. It is understood that a standalone HEIA is being submitted as part of the DCO Application. The Council is yet to receive any information on the assessment of the HEIA or recommendations to mitigate potential health effects. Most local authorities monitor air quality on a rolling annual basis (as stated in the PEIR), therefore baseline conditions should be updated and reflected in the air quality assessment. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> • Techniques for mitigation during operational stage will only be considered if the ES determines there will be significant effects. It is currently assumed that there won't be so the analysis does not speculate as to what these might be in the scheme. • The PEIR did not assess all relevant road links and receptors. Therefore, there the assessment of effects discussed in the Supplementary Consultation documents could be misrepresented. • No further consideration has been given to assessing a key pollutant with known health effects, recommended by WHO guidelines (PM_{2.5}) • The Environmental Impacts Update does not explain whether there are any new direct/indirect air quality effects on the site proposed for the ancient woodland compensation. 	
Noise and Vibration	Construction	<p>The Environmental Impacts Update states that there is the potential for temporary adverse effects to arise during the construction period. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>It also states that noise and vibration assessments continue to be undertaken and will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which aids confirmation or otherwise that likely significant effects from noise and vibration during the construction phase are not expected.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Impacts from construction on other sensitive receptors such as ecological receptors, schools, health centres and hospitals, should be considered. • Construction methods should be explored to design out significant adverse impacts. • Further surveys should be undertaken during daytime, evening and night-time periods to gather background/ambient noise levels for the assessment of ventilation and construction during different time periods as some construction activities may require extended hours or night-time operations. • Night-time construction activities proposed should be fully considered and, where appropriate, should be limited to reduce potential effects. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. 	
	Operation	<p>The Environmental Impacts Update states that no material differences from the potential effects from road traffic described in the PEIR is expected to arise from this design change. It states that operational mitigation measures described in the PEIR remain appropriate and would be incorporated into the design, however no details of the proposed measures have been provided.</p>	

Topic	Phase	Review findings	RAG
		<p>The Environmental Impacts Update also states noise and vibration continues to be assessed and will be presented in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which aids confirmation or otherwise of likely significant effects related to noise and vibration.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Mitigation options should explore means of designing out adverse noise effects through, for example, speed restrictions. • The Environmental Impacts Update Report does not provide any detail about how noise conditions have changed or if new noise sensitive receptors have been identified as a result of the design change, further baseline noise surveys and modelling should be undertaken. • There is no quantitative description of the number of noise sensitive receptors that could be impacted, which fails to inform the Council and other stakeholders of the significance of impacts identified. • Impacts from the scheme's operation on other sensitive receptors. 	
Cultural Heritage	Construction	<p>The Environmental Impacts Update states that there would be no significant change to the assessment described in the PEIR. Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets. Both areas should be expanded. • The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
	Operation	<p>The Environmental Impacts Update states that no significant change to the assessment reported in the PEIR. Mitigation of impacts on archaeological remains the same as the approach outlined in the PEIR, however no details of the proposed measures have been provided.</p> <p>There is no mention on potential effects on built heritage as a result of this design change despite the footprint of the development appearing to be in close proximity to a Grade II listed building.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • The study area, outlined in the PEIR, of 1km is not justified, nor is 100m for collecting condition information on designated heritage assets. Both areas should be expanded. • The assessment should acknowledge all appropriate guidance principles – including Historic England's GPA2 and GPA3 principles. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The Supplementary Consultation is limited in scope to the design changes and therefore does not respond to concerns raised during the previous consultation. The Supplementary Consultation reflects an earlier scheme and therefore comments provided do not respond to the scheme as it has developed. 	
Landscape and Visual	Construction	<p>The Environmental Impacts Update states that the nature of the effects would be worse to those reported in the PEIR (i.e. a minor negative landscape change and a major negative change to isolate receptors) as a result of the removal of vegetation at this junction. However, it fails to explain which receptors will be most affected.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The assessment fails to explicitly cite which guidance it is using for its assessment methodology. The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions- It is not clear if the footprint of the development has changed but the LVIA should consider 'distant' viewpoints including identified strategic and local views from the settlements of Cranham. 	
	Operation	<p>The Environmental Impacts Update states that there would be new adverse effects compared to those reported in the PEIR for a range of visual receptors. However, the report fails to explain which receptors will be affected and whether there are any new direct/indirect visual effects from raising the Frank Farm rail bridge.</p> <p>The Environmental Impacts Update states that there will be new mitigation proposals in this location, where possible, but does not explain what proposals are being considered. Given the nature of the effects, it would be expected that further mitigation would be provided and that at this stage of the project, the mitigation should be specific to the impacts, which it is not.</p> <p>Furthermore, it also states that a full assessment supported by representative photomontages will be reported in the ES. Therefore, no evidence has been presented in the Supplementary Consultation which aids confirmation or otherwise that likely significant landscape and visual effects related to the scheme's operation are or are not expected.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> The LVIA should consider all relevant landscape character areas, features, key characteristics, key landscape qualities and key landscape conditions. It is not clear if the footprint of the development has changed but the LVIA should consider 'distant' viewpoints including identified strategic and local views from the settlements of Cranham. The Supplementary Consultation documents state that mitigation, if appropriate, will be in line with the proposals set out in the PEIR. However, the operational mitigation proposals presented in the PEIR are not considered adequate or effective to mitigate against potential negative impacts from the scheme. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> The assessment fails to explicitly cite which guidance it is using for its assessment methodology. The Council still does not know whether there will be acoustic fencing and what the visual and noise effects will be for local people. The Council is still waiting for modelling showing the visual effects of the project on local viewpoints, so is unable to make an informed view of the potential effects yet. 	
Biodiversity (terrestrial and marine)	Construction	<p>The Environmental Impacts Update states that avoiding utilities works would reduce the extent of habitat loss in this area compared to that presented in the PEIR. It also states that, although beneficial, the design change would not lead to a reduction in the significance level of the assessment conclusion. However, there is a lack of level of significance assessment provided within the PEIR to be able to make a comparison.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided, and the extent of any temporary disturbance to habitats is not clear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Additional surveys required as the extent of surveys to date has fallen short of minimum standards. For example, barn owls should be considered, and surveys undertaken (if required), as barn owls have the potential to be impacted within a buffer zone of up to 1.5km from new roads. Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. The Environmental Impacts Update does not explain whether there are any new direct/indirect effects on the nearby LWS, LNRs or Ancient Woodland as a result of the design changes. 	
	Operation	<p>The Environmental Impacts Update states that the extent of habitat loss in this area would be reduced compared to that presented in the PEIR as a result of avoiding utilities works but the design change would not lead to a reduction in the significance level of the assessment conclusion. However, there is a lack of level of significance assessment provided within the PEIR to be able to make a comparison.</p> <p>Operational effects are proposed to be controlled through mitigation measures set out in the PEIR, however no details of the proposed measures have been provided.</p> <p>There are areas which have been identified as potential receptor sites for ancient woodland compensation, however the Supplementary Consultation documents do not set out the process for selecting and assessing the effectiveness of these areas as forms of mitigation in light of the design changes.</p>	

Topic	Phase	Review findings	RAG
		<p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Additional surveys required as the extent of surveys to date has fallen short of minimum standards. • Recreating particular habitats is offered as potential mitigation in the PEIR, including LWS sites. The effectiveness of habitat recreation is highly limited in some cases and more detail is required to understand the proposals for this. • No reference in the PEIR and Supplementary Consultation documents to any commitment to delivering a Biodiversity Net Gain in accordance with NPPF 2018, Highways England policy and local policy. • Additional information required on the potential receptor sites for ancient woodland compensation. 	
Road drainage and the water environment	Construction	<p>The Environmental Impacts Update states that the effects on road drainage and the water environment would be the same as those presented in the PEIR. Construction effects are proposed to be controlled through mitigation measures set out in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. 	
	Operation	<p>The Environmental Impacts Update states that the effects on road drainage and the water environment would be the same as those presented in the PEIR. However, there is no reference in the Supplementary Consultation documents to the removal of the Flood Compensation Area in this area and whether there are any new direct/indirect effects as a result of this.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • No reference in the PEIR and Supplementary Consultation documents on the methodology for assessing cumulative effects. • Reference to relevant guidance used in the assessment should be stated, such as The Environmental Permitting Regulations (2016), PINS Advice Notes (i.e. Advice Note 18 regarding the Water Framework Directive) and The Land Drainage Act (1991). • It is not clear if the EIA will be underpinned by a whole system water balance approach. • Further detail on proposed Flood Compensation Areas is required. 	
Geology and Soils	Construction	<p>The Environmental Impacts Update states that there would be no significant changes to the assessment and effects reported in the PEIR. Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided. It also states that should any contamination be encountered during ground investigations that an assessment and remediation strategy would be developed if required.</p>	

Topic	Phase	Review findings	RAG
		<p>Highways England have not shared any detail of initial findings from its ground investigations campaign which commenced in August 2019.</p> <p>Recommendation & Observation:</p> <ul style="list-style-type: none"> • Initial findings of ground investigations would be useful to understand the emerging findings and likely significant effects • A minerals safeguarding assessment and PSSR have not been included in the PEIR which are important sources of information that would assist stakeholders. • The assessment should consider leachate and cavity formation in made ground, which are environmental risks that should be considered. • The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
	Operation	<p>The Environmental Impacts Update states that there would be a negligible effect on the assessment presented in the PEIR, which reported that it was unlikely there would be significant effects on geology and soils during operation.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Mitigation measures are predicated on the findings of future studies and risk assessments which are yet to be undertaken and as such potential measures have still not been cited. The statement that the effect is not likely to be significant will depend wholly on the findings of those studies and mitigation provided. Further details are required. • The study area outlined in the PEIR is 250m, this is insufficient as it may not capture areas outside the buffer that may contain high risk features. 	
Materials and Waste	Construction	<p>The Environmental Impacts Update states that the change in design is likely to have a negligible effect on the assessment reported in the PEIR. Mitigation measures for materials and waste remains as described in the PEIR.</p> <p>The Environmental Impacts Update states that Highways England continue to refine their approach to balancing earthworks across the project to maximise the re-use of excavated materials onsite and within the design proposals. It also states that measures to manage the storage of construction materials and wastes on site would be detailed in the ES, CoCP and CEMP.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • Further detail required for use of rail and river for the movement of materials, plant, equipment and waste and the environmental and transport impacts of these movements. • The use of highly sustainable and innovative methods of movements should be appraised, such as the use of clean fuel and hybrid vehicles in the supply chain and on site. 	

Topic	Phase	Review findings	RAG
		<ul style="list-style-type: none"> Highways England to fully study where material can be re-used for the benefit of Thurrock, to include consideration for when the market might be 'swamped' with other material from cumulative schemes and identify the specific sources for materials and detailed construction impacts of these. Highways England should make commitments, secured in an appropriate DCO Requirement to local sourcing, extending to materials, workers, plant and equipment, where possible. There is little evidence that the requirements for materials has been researched and that a robust supply, use and disposal strategy established. 	
	Operation	<p>The Environmental Impacts Update states that there would be negligible effect on the assessment reported in the PEIR.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Further detail required on potential materials management requirements and targets/objectives that will be written into contractual documentation. 	
People and Communities	Construction	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that assessments are being undertaken in relation to the proposed design change to develop mitigation measures and lessen the negative impact.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the supplementary consultation documents, which is a substantial omission, considering the potentially significant health impacts of this scheme. Further evidence of the numbers provided in the PEIR of employment, residential and development within the local and wider region is required, as well as an update on whether they are still relevant in light of proposed design changes. More detail on the development sites in the area which will be considered in the assessment is required. 	
	Operation	<p>The Environmental Impacts Update states that the preliminary assessment of effects presented in the PEIR is unaffected by this change. It also states that assessments are being undertaken in relation to the proposed design change to develop mitigation measures and lessen the negative impact.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> Health is not mentioned in the Supplementary Consultation documents, which is a substantial omission, considering the significant potential health impacts of this scheme. More detail on the development sites in the area which will be considered in the assessment is required. The key emergency services (East of England Ambulance Service NHS Trust, Essex Police, Essex County Fire and Rescue Service and the relevant local Acute Hospital Trusts with A&E facilities) should be consulted on this proposed new crossing, as a future potential increase in incidents and accidents will have a direct impact on their capacity to respond. 	

Topic	Phase	Review findings	RAG
Climate	Construction	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Construction effects are proposed to be controlled through mitigation measures set out in the CoCP and a CEMP, however no details of the proposed measures have been provided.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the Council as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. • There is no mention in the PEIR and Supplementary Consultation documents of local greenhouse gas emissions to the scheme or embodied carbon from the construction industry. 	
	Operation	<p>The Environmental Impacts Update states this design change would have a negligible effect on the assessment presented in the PEIR. It also states carbon modelling is being undertaken to understand the scheme's overall contribution to climate through greenhouse gas emissions. Furthermore, the scope of greenhouses gases being assessed remains unclear.</p> <p>Recommendation & Observation</p> <ul style="list-style-type: none"> • UKCP18 has been released. The scenario used within the assessment will need to be agreed with the Council as the high emissions scenario at the 50% probability level using UKCP09 is no longer applicable. • In accordance with IEMA guidance 'EIA Guide to Climate Change Resilience and Adaptation', the in-combination effects of climate change with the likely significant impacts of the proposed development should be assessed. 	

Appendix E Review of Walking, Cycling and Horse-riding Network

Table E.1: Review of walking, cycling and horse-riding network

Guide to Supplementary Consultation Chapter 5 - Walkers, cyclists and horse riders [Sections north of the river]	
Item	Response
Section 3	
<p>Section 3 Point 1: Green bridge at Muckingford Lane</p> <p>PROWs affected: None</p>	<p>Comment: Absence of any detail on proposal. Map Book 3 “Engineering Plans” sheet 10 suggests bridge corridor in the region of 15m between parapets, widening to 25-30m across the structure.</p> <p>Width of corridor would be insufficient for high quality connections between Linford / East Tilbury and Chadwell St Mary / Grays. Inappropriate connections would stifle development growth in the area but must be in keeping with the local environment.</p> <p>The layout for this corridor, including the bridge crossing, should not constrain future growth opportunities within Thurrock. This should reflect the aspiration to enhance connections by public transport.</p> <p>Walkers: Footways should be provided to both sides of the corridor to facilitate strong connections along Muckingford Lane and allow extension into future development growth.</p> <p>Cyclists: Strategic approach to cycle infrastructure required to facilitate comprehensive sustainable travel associated with future development growth in the area – which could include off-carriageway cycle ways.</p> <p>Horse riders: While this section of Muckingford Road is not anticipated to be a primary leisure route for equestrians, suitable parapets and protection should be provided to make the bridge structure secure to horse riding.</p>
<p>Section 3 Point 2: Shared path on Muckingford Lane</p> <p>PROWs affected: None</p>	<p>Comment: Absence of any detail on proposal - such as route upgrades or differentiation between leisure / recreational use and utility use. Map Book 3 “Engineering Plans” sheet 10 suggests an overall corridor in the region of 10m wide. Insufficient for high quality connections between Linford / East Tilbury and Chadwell St Mary / Grays. Muckingford Road is anticipated to be an important local distributor road in the emerging growth strategy for Thurrock and inappropriate connections would stifle development growth in the area but must be in keeping with the local environment.</p> <p>Walkers: It is important to facilitate strong connections along Muckingford Lane, but system of footways should be comprehensive and allow extension into future development growth.</p> <p>Cyclists: Strategic approach to cycle infrastructure required to facilitate comprehensive sustainable travel associated with future development growth in the area which could include off-carriageway cycle ways.</p> <p>Horse riders: Longer distance riding would require suitable surfacing along this corridor. The road could provide an important potential link for riders traveling north to south through the Borough if safe provision is made enabling riders</p>

Guide to Supplementary Consultation Chapter 5 - Walkers, cyclists and horse riders [Sections north of the river]	
Item	Response
	to connect High House Lane and Hoford Road with the Coal Road (BW58)
<p>Section 3 Point 3: Existing paths impacted and diverted</p> <p>PROWs affected: BR58 (Coal Road); FP61 (Low Street Lane);</p>	<p>Comment: Footpath 61 (FP61) and bridleway 58 (BR58) require diversion due to the impact of the LTC viaduct and severance of Coal Road. Details of the provision are not available within the Supplementary Consultation material. An informed response is not feasible - such as route upgrades or differentiation between leisure / recreational use and utility use.</p> <p>Walkers: The route of FP61 is extended by approximately 700m (approximately 7 minutes' walk).</p> <p>Cyclists: Route of FP61 retained as footpath only – no provision for cycling. Consider enhancing BR63 and BR58 for cycle use.</p> <p>Horse riders: BR58 should be suitably diverted to allow good all-weather alternative routeing. The length of the revised route is extended by approximately 250m.</p>
<p>Section 3 Point 4: FP200 diverted</p> <p>PROWs affected: FP200 (Station Road)</p>	<p>Comment: The diversion of FP200 is marginal and would have a limited effect on its use. The benefit of a strategic approach to connect to other routes, the Thames and Coalhouse Fort should be explored.</p> <p>Walkers: No significant changes.</p> <p>Cyclists: Footpath only.</p> <p>Horse riders: Footpath only.</p>
Section 4	
<p>Section 4 Point 1: New shared path from BR219 to Green Lane.</p> <p>PROWs affected: BR219</p>	<p>Comment: Insufficient detail is provided to give an informed response on this proposal. Route is shown to remain within the ownership of Highways England but the format of the "shared path" is not known.</p> <p>The route is expected to be primarily for leisure use but surfacing, lighting and safety designs are not known. The opportunity to connect this corridor to FP97 to create a continuous link to Long Lane is noted but cannot be commented on in the absence of information.</p> <p>Walkers: Insufficient detail to provide an informed response.</p> <p>Cyclists: Highways England suggests that the route is "shared" but without detail as to the format of the route. An informed response is not possible.</p> <p>Horse riders: It is not known if the route is proposed for equestrian use; however given that it links two bridleways this is considered to be essential in order to achieve any positive enhancement of the network.</p>
<p>Section 4 Point 2: New shared path from Green Lane to Stifford Clays Road.</p> <p>PROWs affected: None</p>	As Section 4 Point 1
<p>Section 4 Point 3: New shared path along Stifford Clays Road</p> <p>PROWs affected: N71 cycle route</p>	<p>Comment: Positive provision for cyclists and pedestrians is welcomed, however, the provision should connect westward to the existing shared facility along the southern side of Stifford Clays Road to provide a completed link (Land Use Plans Sheet 14 refers).</p> <p>Walkers: The completion of this link to Baker Street would provide an important connection to Chafford Hundred and Grays.</p>

Guide to Supplementary Consultation Chapter 5 - Walkers, cyclists and horse riders [Sections north of the river]	
Item	Response
	<p>Cyclists: The completion of this link to Baker Street would provide an important connection to Chafford Hundred and Grays.</p> <p>Horse riders: It is not anticipated that this link would be of significant benefit to equestrians.</p>
<p>Section 4 Point 4: FP97 diverted due to links from A1089.</p> <p>PROWs affected: FP97 (west of A13/A1089 junc)</p>	<p>Comment: The diversion of FP97 will not materially affect the use of the footpath. The opportunity to extend the footpath through to Stifford Clays Road is considered to be an important enhancement to the network but should include provision for cyclists and riders as well as walkers.</p> <p>Walkers: No significant impact. Connection to Stifford Clays Road would be positive</p> <p>Cyclists: Connection between FP97 and Stifford Clays Road should include an upgrade to a shared pedestrian and cyclist corridor.</p> <p>Horse riders: It is not anticipated that FP97 would be of use to equestrians unless the route is provided through to Stifford Clays Road and suitably surfaced with sufficient headroom when passing under the A13. A strategic approach must be considered to upgrade all new provision to bridleway standards.</p>
<p>Section 4 Point 5: New cycle path along Baker Street</p> <p>PROWs affected: None</p>	<p>Comment: The realignment of Baker Street is unfortunate and will provide an unpleasant environment for cycling and walking, with little surveillance. New facilities, however, must be provided as a comprehensive system and not abandon cyclists and walkers at unsafe locations along the network.</p> <p>Walkers: The environment between the link roads of LTC, A1089 and A13 will be unpleasant, however, walking facilities must be comprehensive and safe to use.</p> <p>Cyclists: As with facilities for walkers, new facilities must be comprehensive and safe to access and leave to/from on-road facilities. The interchange with facilities on A1013 must be well configured and simple to navigate. This should include a review of the suitability of off-carriageway facilities.</p> <p>Horse riders: It is not anticipated that off-carriageway facilities in this location would be used by equestrians.</p>
<p>Section 4 Point 6: Diverted bridleway connection to BR206.</p> <p>PROWs affected: BR206; FP82; FP93; FP94</p>	<p>Comment: The relocation of the permissive path connection between Baker Street and BR206 must be formalised as a designated bridleway to replace the existing permissive path. It is anticipated that this route would be primarily for leisure access, however, details are not available for an informed response.</p> <p>Walkers: The route along Rectory Road to A1013 should be the preferred route along which to direct utility walkers.</p> <p>Cyclists: The route along Rectory Road to A1013 should be the preferred route along which to direct cyclists.</p> <p>Horse riders: The surface of the new bridleway should be suitable for horse riding in all weathers.</p>
<p>Section 4 Point 7: Widened shared path on A1013 (Stanford Road)</p> <p>PROWs affected: None</p>	<p>Comment: Details of the proposed provision are not available to make an informed response. Facilities proposed should be comprehensive and connect fully to existing facilities. It is noted that the current facility does not include a safety edge strip and is not continuous across the A1089 overbridge.</p>

Guide to Supplementary Consultation Chapter 5 - Walkers, cyclists and horse riders [Sections north of the river]	
Item	Response
	<p>Walkers: improvements to the facilities along A1013 should be comprehensive and sufficiently wide (2.5m minimum) to share with cyclists.</p> <p>Cyclists: facilities on A1013 must provide a sustainable comprehensive link and not abandon cyclists in vulnerable locations. The review should consider the appropriateness of off-carriageway provision.</p> <p>Horse riders: It is not anticipated that off-carriageway facilities in this location would be used by equestrians.</p>
<p>Section 4 Point 8: Rectory Road bridge widening with Pegasus crossing on A1013.</p> <p>PROWs affected: none</p>	<p>Comment: The link from Rectory Road to A1013 and on to FP79 would retain an important link to the walking and cycling facilities along the A1013 and the walking route of FP79. There is no detailed information to provide an informed response on the proposals.</p> <p>The location of the Pegasus crossing is not known. It is not known whether A1013 is to become a trunk road or remain under the jurisdiction of Thurrock Council. If the route is not to be trunked, sufficient funds must be made available for the on-going management and maintenance of the facilities. The design and configuration of the crossing and adjacent junction with Rectory Road must be approved by Thurrock Council.</p> <p>Walkers: must be provided with a safe crossing location to connect to the footway facilities on the southern side of A1013.</p> <p>Cyclists: as with the comment on walkers, cyclists must be provided with a safe crossing location to connect to the facilities on the southern side of A1013.</p> <p>Horse riders: The Pegasus crossing does not clearly relate to an equestrian network in the absence of upgrading FP79 to a full bridleway status. Comprehensive linked facilities must be provided or a safe transition back to the carriageway. The design of the overbridge of A13 must reflect the surfacing and parapet heights required for safe horse riding.</p>
<p>Section 4 Point 9: Bridge over LTC upgrade to equestrian standard</p> <p>PROWs affected: FP79 (northwest of Brentwood Road)</p>	<p>Comment: Realignment of corridor introduces a 300m diversion across an undefined bridge. Plans do not indicate that FP79 is to be changed to a bridleway – as would be required to allow equestrian and cycle use. Land Use Plans indicate permanent acquisition of the land under the DCO. Highways England should confirm who will maintain the bridge and where there is to be a change in jurisdiction / management along the new bridleway.</p> <p>Walkers: connections should be provided to footways within Chadwell St Mary to form a comprehensive link.</p> <p>Cyclists: bridleway crossing of LTC should be surfaced suitable for utility cycling with appropriate parapets and provision made to connect to Chadwell St Mary.</p> <p>Horse riders: details required on the format of the route, including the width of the crossing and surfacing and the links to the Pegasus crossing on Stanford Road.</p>
<p>Section 4 Point 10: Upgrade FP78 (and FP79?) to bridleway.</p> <p>PROWs affected: FP78</p>	<p>Comment: Highways England should confirm who will maintain the new route and how the route will interface / cross Brentwood Road and link to footway provision within Chadwell St Mary</p>

Guide to Supplementary Consultation Chapter 5 - Walkers, cyclists and horse riders [Sections north of the river]	
Item	Response
	<p>Walkers: connections with footways within Chadwell St Mary required to form a comprehensive link.</p> <p>Cyclists: bridleway should be surfaced and wide enough suitable for utility cycling and provision made to connect to Chadwell St Mary using shared off-carriageway facility.</p> <p>Horse riders: details required on the format of the route, including the width and surfacing, including link to FP78 and suitable crossing of Brentwood Road</p>
<p>Section 4 Point 11: Upgrade FP78 to bridleway.</p> <p>PROWs affected: FP78</p>	<p>Comment: No definition as to what format the link would take. Land Use Plans suggest a roadway with footways. Ownership is not shown to be transferred to Highways England and so clarity is required as to the format of the route and the on-going management and maintenance.</p> <p>Walkers: as per Section 4 Point 10</p> <p>Cyclists: as per Section 4 Point 10</p> <p>Horse riders: as per Section 4 Point 10</p>
Section 5	
<p>Section 5 Point 1: Shared path on North Road bridge</p> <p>PROWs affected: None</p>	<p>Comment: No details provided of format of bridge. Land Use plans indicate circa 10-15m corridor with no detail on how the proposals would connect to the adjacent network and the safety of that provision and proposal. The bridge and associated links should be configured such that it does not stifle opportunities for future growth within Thurrock. Opportunities for local connection to LTC should be explored to assist with facilitating safe local permeability and further relieving demand on access to the trunk road network at A13 / Stifford junction.</p> <p>Walkers: Useful link between North Ockendon and South Ockendon, in principle, if the footways connect.</p> <p>Cyclists: details required on the format of the route, including the width of the crossing and surfacing.</p> <p>Horse riders: details required on the format of the route, including the width of the crossing and surfacing.</p>
<p>Section 5 Point 2: Upgrade to bridleway in places and connection to North Road</p> <p>PROWs affected: FP135</p>	<p>Comment: No definition as to what format the link would take and how it links to FP151. Highways England should confirm who will maintain the new route and why an improved link to an upgraded FP151 is not promoted.</p> <p>Walkers: This route would be anticipated to be for leisure use. Passive surveillance would be minimal.</p> <p>Cyclists: Utility cycling on this route would require surfacing suitable for all weathers. Details are not provided by Highways England. Passive surveillance would be minimal.</p> <p>Horse riders: details required on the format of the route, including the width and surfacing.</p>
<p>Section 5 Point 3: New bridleway to connect FP135 and FP136</p> <p>PROWs affected: New</p>	<p>Comment: as per Section 5 Point 2</p> <p>Walkers:</p> <p>Cyclists:</p> <p>Horse riders:</p>
<p>Section 5 Point 4: Surface changes and upgrade to bridleway</p> <p>PROWs affected: FP136</p>	<p>Comment: as per Section 5 Point 2. Details are also required of the bridge over LTC.</p> <p>Walkers:</p> <p>Cyclists:</p> <p>Horse riders:</p>
<p>Section 5 Point 5: new bridge to link to BR219 and new shared path</p>	<p>Comment: This route is proposed as a continuation of the new bridleways on FP135 and FP136. Highways England</p>

Guide to Supplementary Consultation Chapter 5 - Walkers, cyclists and horse riders [Sections north of the river]	
Item	Response
<p>PROWs affected: BR219</p>	<p>should explain why this section is proposed only as a “Shared path” and not a bridleway? “Shared path” implies walking and cycling and not equestrian Walkers: comments as per Section 5 Point 2 Cyclists: comments as per Section 5 Point 2 Horse riders: Details needed on whether equestrians would be able to use this route. If not, why not?</p>
<p>Section 5 Point 6: Bridleway surface changed</p> <p>PROWs affected: BR219</p>	<p>Comment: No details are provided on how the surface has been “improved” to allow for use by cyclists for utility purposes at the same time as horse riding. The option to create a circular recreational route should be considered. Walkers: comments as per Section 5 Point 2 Cyclists: comments as per Section 5 Point 2 Horse riders: comments as per Section 5 Point 2</p>
Section 6	
<p>Section 6 Point 1: New shared path along Dennis Road and Dennises Lane</p> <p>PROWs affected: None</p>	<p>Comment: No definition as to what format the link would take. Highways England should confirm who will maintain the new route. Walkers: This route would be anticipated to be for leisure use. Passive surveillance would be minimal. Cyclists: Utility cycling on this route would require surfacing suitable for all weathers. Details are not provided by Highways England. Passive surveillance would be minimal. Horse riders: details required on the format of the route, including the width and surfacing.</p>
<p>Section 6 Point 2: Relocated bridge and shared path connections – along Thurrock boundary</p> <p>PROWs affected: FP252</p>	<p>Comment: Route along Thurrock boundary. No definition as to what format the link and bridges would take. Highways England should confirm who will maintain the new route. Walkers: comments as per Section 6 Point 1 Cyclists: comments as per Section 6 Point 1 Horse riders: Details needed on whether equestrians would be able to use this route. If not, why not?</p>
<p>Section 6 Point 3: Resurfaced footpath to bridleway – outside Thurrock boundary</p> <p>PROWs affected: FP151</p>	<p>Comment: Route outside Thurrock boundary. Walkers: comments as per Section 6 Point 1 Cyclists: comments as per Section 6 Point 1 Horse riders: comments as per Section 6 Point 1</p>
<p>Section 6 Point 4: Resurfaced footpath to bridleway – along Thurrock boundary</p> <p>PROWs affected: FP151</p>	<p>Comment: Route along Thurrock boundary. No definition as to what format the link would take. Highways England should confirm who will maintain the new route. Walkers: comments as per Section 6 Point 1 Cyclists: comments as per Section 6 Point 1 Horse riders: comments as per Section 6 Point 1</p>
<p>Section 6 Point 5: Shared path on North Road bridge</p> <p>PROWs affected: None</p>	<p>Comment: Repeat of Section 5 Point 1 Walkers: Cyclists: Horse riders:</p>
<p>Section 6 Point 6: Shared path on North Road bridge</p> <p>PROWs affected: None</p>	<p>Comment: Absence of any detail on proposal. Sufficient provision must be made for high quality connections into South Ockendon to allow for an appropriate connection so as not to stifle development growth in the area but must be in keeping with the local environment. Walkers: It is important to facilitate strong connections along North Road, but system of footways should be comprehensive.</p>

**Guide to Supplementary Consultation Chapter 5 - Walkers, cyclists and horse riders
[Sections north of the river]**

Item	Response
	<p>Cyclists: Strategic approach to cycle infrastructure required to facilitate sustainable travel associated with future development growth in the area.</p> <p>Horse riders: The link between FP135 and FP151, which should be upgraded for horse riding.</p>

Appendix F The Strategic Importance of Thurrock and the South Essex Region

F.1 Introduction

F.1.1 A detailed review of the strategic importance of Thurrock and the South East Region and planning context for the proposed LTC was presented in the *Review of Statutory Consultation Documents* (see Appendix A, Chapter 3). This chapter reviews the strategic importance of the Borough in light of the Supplementary Consultation Scheme and should be read in conjunction with Chapter 3 of Appendix A.

F.2 Planning context

F.2.1 Thurrock Council's adopted Core Strategy (2015) (as amended) sets out, as an objective the delivery of 18,300 homes and 21,000 jobs in the period between 2009-26. Thurrock's Economic Growth Strategy (2016) identifies five key components as being necessary to deliver employment and broader economic growth in the Borough, namely:

- Strategic employment sites;
- Business spaces and premises;
- Quality access infrastructure, including road and rail linkages that facilitate effective movement of goods and people;
- Refreshed town centres; and
- Housing.

F.2.2 In February 2014, the Council made the decision to bring forward a new Local Plan, the reasons for this being:

- 'The need for a more up-to-date statutory planning framework to coordinate the delivery of the Council's ambitious growth strategy for Thurrock;
- The revocation of the East of England Plan and the requirement for local planning authorities to undertake a fresh assessment of their future development needs;
- The need for the Council to identify a deliverable five-year housing land supply and bring forward more sites for development to support economic growth; and
- A need to consider the possible impacts of a decision by Government on the route and location of the proposed Lower Thames Crossing'.

F.2.3 Supporting housing delivery and economic growth in Thurrock are central pillars of this emerging plan; and the scale of that growth represents a step-change in Thurrock's ambitions. The South Essex Strategic Housing Market Assessment (SHMA, 2017) which identified an objectively assessed housing need of 1,381 dwellings per annum; this represents over a third of identified needs across the whole South Essex housing market area. This includes a significant upward adjustment of 307 dwellings per annum to support economic growth in the Borough and underlines how the growth ambitions for Thurrock's economy are interlinked with housing growth.

F.2.4 However, progress on this new Local Plan has already been significantly delayed by the uncertainty created by the proposed LTC, particularly given the changes in terms of the land affected directly by the route, the alterations in alignment and removal of junctions on the route.

This places the Council at risk of failing to meet the requirements of the NPPF in terms of not having a five-year housing land supply and failing the new delivery test. The latter point is already confirmed by MHCLG and underscores the impact the proposed LTC has already had on Thurrock's ability to meet housing needs, even in the short term. In the absence of an adopted up-to-date plan, this places Thurrock at risk of being unable to resist applications for unplanned development in unsustainable locations.

- F.2.5 To mitigate some of this risk, the Council undertook a second Issues and Options consultation on the new Local Plan between December 2018 and March 2019. This explicitly acknowledged the uncertainty imposed by the proposed LTC on the spatial strategy for the Borough, confirming that *'it will not be possible for the Council to submit the Local Plan for Examination until such time as a final decision has been made on the route and location of the Lower Thames Crossing'*.
- F.2.6 In addition to the new Local Plan, Thurrock also forms part of the Association of South Essex Local Authorities (ASELA) which has committed to bringing forward a Joint Strategic Plan (JSP) to cover the period to 2038. While the JSP will not allocate specific sites and these will be brought forward through the new Local Plan, it will identify a range of broad strategic locations and priorities for new development and infrastructure delivery. However, the scale of growth to be allocated to Thurrock through the JSP is closely influenced by the extent which the proposed LTC supports rather than prejudices those strategic locations.

F.3 Thurrock's economy and the role of the proposed LTC

- F.3.1 The Thurrock economy is worth £2.9 billion and the Council is committed to growing this and closing the relative underperformance, in productivity terms, against the rest of South Essex. Within the wider South Essex economy, the Borough is an important driver in the retail and warehousing, and transport and logistics sectors, which are highlighted as key growth sectors going forward. Transport and logistics growth is driven by the key ports of Tilbury, Purfleet and London Gateway. The Port of Tilbury is identified in Core Strategy Policy CSSP2 as part of the Tilbury key strategic economic hub; realising the potential beneficial effects the proposed LTC could have on the Port is therefore a critical consideration.
- F.3.2 Development plan policy gives explicit support to the expanded role of Tilbury. Core Strategy Policy CSTP17 (Strategic freight movement and access to ports) enshrines the Council's support for the logistics and freight sectors including *"...facilitating a shift to rail freight and freight carried on the River Thames ... [by] promoting the use of rail and water borne freight facilities by supporting the development of appropriate infrastructure"*.
- F.3.3 The significance of the alignment of the proposed LTC and the junctions on the Council's wider portfolio of employment sites is captured in the Economic Development Needs Assessment (2017). As well as providing an alternative strategic road link for existing and allocated sites to connect into, there is potential for the proposed LTC to allow additional future employment sites along the new road; but that *"...in order to realise this opportunity the appropriate local junctions and connections must be provided so that existing and new sites can access the network, without which the positive influence of this new road infrastructure will be severely limited"*.
- F.3.4 The Needs Assessment's review of employment sites, particularly in relation to the Port of Tilbury, confirms that investment is needed to improve the stock quality, including sites at:
- Thames Industrial Estate (14.4ha): this is identified as requiring significant intervention to attract new employment occupiers; and
 - Thurrock Park (21.4ha); this is noted to have vacancies within the site which might require medium- to long-term support to address to ensure that the site is fulfilling its potential for B8 (warehousing and distribution) port-related activities.
- F.3.5 Beyond port-related activities, an important part of the Council's ambitions is to diversify the economy so that it is less dependent on a relatively narrow range of sectors, without

compromising growth within those core sectors of transport and logistics and retail and warehousing. For this to be realised, the Council's ambitions are focused on increasing the supply of viable economic development land. This is not achieved by the proposed LTC.

F.4 Supporting housing growth in Thurrock

- F.4.1 Based on the South Essex Strategic Housing Market Assessment (SHMA, 2017), an objectively assessed housing need of 1,381 dwellings per annum is identified; this represents over a third of identified needs across the whole HMA. This includes a significant upward adjustment of 307 dwellings per annum to support economic growth in the Borough. The Government's recently published standard method for assessing local housing need confirms a requirement for the Borough of 1,167 dwellings per annum. The NPPF confirms that this is the minimum number of homes.
- F.4.2 The forecast housing need in the Borough accounts for more than a quarter of housing growth across the wider South Essex area. The Borough's strategic location straddling the two travel-to-work areas of London and Southend confirms how this forecast housing growth is needed to support not only the growth of the Borough's economy but also the wider South Essex and London economies.
- F.4.3 The adopted Core Strategy identifies the Thurrock Urban Area as 'the main focus for growth for new housing, employment and associated development' and for the period to 2021, Policy CSSP1 allocates modest growth at Chadwell St Mary (390 homes) and a portion of 580 homes at East Tilbury. However, to support the significantly higher level of growth required by the NPPF and in the context of limited supply of allocated land, the Council is aware that the emerging development plan must allocate substantial land for housing.
- F.4.4 In principle, the proposed LTC presents, along its route, an opportunity to support and enable growth in sustainable locations, particularly in East Tilbury, Chadwell St Mary and South Ockendon that have come forward from the recent call for sites. However, this is premised on the appropriate alignment of the proposed LTC and, critically, access. The proposed LTC does not accommodate this and instead severely limits the scale of potential housing growth that could be delivered. Indeed, the Supplementary Consultation scheme includes the temporary provision of a multi-modal bridge to provide access to East Tilbury during the construction period which would then be removed before the LTC opens. It is the Council's view that the permanent provision of such a link is critical to the address the severance which the LTC will create and so ensure East Tilbury's expansion can be done in a sustainable way, facilitating safe and reliable access by all modes of travel but with an emphasis on walking, cycling and public transport.
- F.4.5 These figures of potential homes affected by the proposed LTC are estimates and can only be estimates because of the lack of uncertainty over the detail of the proposed LTC. Certainty and detail are critical for Thurrock to be able to undertake the necessary work to understand the exact implications for these key locations. For this reason, engagement with HE on potential improvements to the route is essential to not only ensure that Thurrock's new Local Plan complies with the NPPF's requirement that it should be positively prepared, but also so that Thurrock's role in the wider JSP is not fundamentally changed by it moving from potentially helping other South Essex authorities meet their housing needs but instead needing to export housing to elsewhere.

F.5 Potential effects of the Supplementary Consultation Scheme on Thurrock

- F.5.1 The response provided to the Consultation Scheme set out how the proposed LTC would jeopardise both housing and economic growth in Thurrock and wider South Essex. Key to resolving this was to provide a mechanism for facilitating future local growth. This was present in the Supplementary Consultation Scheme. Consequently, the main opportunity of the proposed LTC to support and enable growth in sustainable locations will continue to be missed.

Direct effects

Thurrock's economy

- F.5.2 The Supplementary Consultation Scheme does not provide appropriate local junctions and connections at strategic locations in the Borough that support areas of significant employment growth. The previous concerns raised over the lack of provision of the Tilbury Link Road remain unresolved by the Supplementary Consultation Scheme.
- F.5.3 As a result, the ability of Thurrock's economy to grow and diversify, including supporting higher-skilled and higher-wage sectors which do not currently locate in the Borough, will continue to be constrained.

Thurrock's planned housing growth

- F.5.4 It remains the case that Thurrock does not have a five-year housing land supply. This underlines the urgency to get a new plan in place. In the absence of this, the Borough has to look beyond the adopted allocations for housing growth.
- F.5.5 Since the previous consultation, Thurrock has undertaken extensive work to demonstrate to Highways England how future accesses to key housing growth areas at Chadwell St Mary, East Tilbury and South Ockenden could unlock growth and overcome concern that the proposed LTC will mean that development in these locations cannot achieve the necessary critical mass to fund the cost of sustainable infrastructure. However, the Supplementary Consultation Scheme does not include any changes to accommodate such provision; instead, the proposed LTC will severely limit the scale of potential housing growth.

Environment

- F.5.6 The response to the previous consultation confirmed that the Borough is highly constrained which means that in order to accommodate growth, development will have to take place on the green belt. The emerging Local Plan will have to consider strategic green belt release; however, because the NPPF's tilted balance applies, the Council is already under pressure. The question over the scale of growth that can be accommodated in the key growth locations of Chadwell St Mary, East Tilbury and South Ockenden raises the risk of greater environmental impact because of either needing to grant permission for development within the green belt or in the long term to over-allocate housing and employment land to mitigate the risks imposed by the proposed LTC on housing and economic development delivery.
- F.5.7 There has been some response in the Supplementary Consultation Scheme to previous concerns expressed in relation to the proposed LTC's impact on the Borough's Greengrid Strategy, specifically that without improvement in provision, the Consultation Scheme was in contravention of the development plan (Policy CSSP5). There are now four green bridges north of the river (i.e. three additional bridges have been included as part of the Supplementary Consultation Scheme); while these are welcome, further information is needed for the Council to be able to conclude that the proposed LTC does not conflict with the development plan.

Indirect effects

- F.5.8 In addition to the potential direct effects of the Supplementary Consultation Scheme, consideration should be given to any indirect effects which the Supplementary Consultation Scheme may have on the Borough's growth strategy. As set out in the response to the Consultation Scheme, these might include:
- Housing and job growth needed to fund/support town centre regeneration

- Improvements in employment market conditions needed to improve the relative viability of non-industrial development which will only be possible with the longer-term upskilling of Thurrock's workforce
- The attractiveness of the Borough as a place to live and work

F.5.9 These indirect effects remain unmitigated by the Supplementary Consultation Scheme.

F.6 Emerging Local Plan

F.6.1 The Council is taking a pragmatic approach to bringing forward their Local Plan in spite of the uncertainty imposed by the proposed LTC. The December 2018 Issues and Options (Stage 2) consultation confirms that, in relation to the LTC, the new Local Plan will need to:

- Safeguard the alignment of the route including the location of junctions;
- Address the economic impacts of the proposal including the need to protect existing businesses and promote future economic growth;
- Help mitigate the short-, medium- and longer-term environmental impacts of the proposed crossing on existing communities, settlements and the Borough's historic assets and environmental infrastructure;
- Support and not constrain the ability of the Borough to meet its future development needs, including an increase in housing delivery;
- Address the need to ensure the beneficial restoration or reuse of land used in the construction of the project;
- Protect and enhance local access routes and reduces the negative impact of severance on local communities;
- Protect and improve transport connectivity both to, through, and within Thurrock for local businesses and residents; and
- Ensure that the cumulative environmental impacts (air quality, cultural heritage, landscape, biodiversity, geology and soils materials, noise and vibration, people and communities, rain drainage and water environment) of proposed Local Plan allocations and the LTC are properly assessed and mitigated where necessary.

F.6.2 The emerging Local Plan identifies the following (not exhaustive) adverse impacts from the proposed LTC, which, despite these being in the public domain since December 2018, the Supplementary Consultation Scheme does nothing to mitigate:

- 'The sterilisation of development opportunities in sustainable locations around existing settlements;
- Poor local connectivity and a failure to explicitly plan and design a scheme with the objective of supporting the delivery of strategic sites for housing and economic growth;
- The need to mitigate the impact of noise, air quality, severance and flood risk considerations which has led to an increase in land take in locations where future development capacity exists.²

² p.53

F.6.3 The table below looks specifically at the potential effects of the Supplementary Consultation Scheme against the key issues set out in the emerging Local Plan which will be pursued irrespective of what is brought forward as a Preferred Option:

Table F.1: Review of the Supplementary Consultation Scheme against emerging Local Plan policy principle

Draft policy principle	Direct effect	Indirect effect
Delivering the right infrastructure, in the right place and at the right time	The Supplementary Consultation does not make any provision (passive or otherwise) for any junctions on the LTC within Thurrock.	The previous concerns raised that the Consultation Scheme would mean that housing growth will not be of the critical scale necessary to fund and therefore deliver the infrastructure improvements necessary to support growth. This concern remains unaddressed by the Supplementary Consultation Scheme.
Positive health and well-being impact	The PEIR does not include any assessment of the health impacts of the Supplementary Consultation Scheme. It is therefore not possible for Thurrock to ensure their emerging Local Plan principle in this regard is met – whether directly or indirectly.	
Meeting Thurrock's housing needs	The Supplementary Consultation Scheme risks prejudicing several key housing locations (South Ockenden, East Tilbury and Chadwell St Mary). The emerging Local Plan identifies all these places as potential Major Urban Extensions. As with the Consultation Scheme, there remains no provision for access (either passive or otherwise) to these locations which would allow the scale of growth needed to meet housing needs and also ensure that these needs are sustainably met by allowing the first policy principle of securing appropriate and timely infrastructure delivery.	The threat to the Borough's ability to meet their housing needs will prejudice the supply of labour within Thurrock and impact on the ability of the Borough to fulfil its economic potential.
Protecting and enhancing the character of existing communities	Existing communities will not be protected or enhanced by the Supplementary Consultation Scheme and instead will be isolated by it (notably Orsett and East Tilbury). For example, the existing Hornsby Lane link between Orsett and Chadwell St Mary has been removed to resolve an issue with overhead powerlines but no consideration has been given to local communities using that access. The revisions to the A13/A1089 junction mean that there will be further encroachment and impact	As set out above, the potential of Chadwell St Mary as a major urban extension is limited by the Supplementary Consultation Scheme. This also prejudices the potential of the existing centre to be regenerated by this growth. The same is true of South Ockenden where growth could 'support the regeneration of the urban area' ³

³ p.66

Draft policy principle	Direct effect	Indirect effect
	<p>on Orsett; the Supplementary Consultation Scheme does not consider or mitigate this in any way.</p>	
<p>Minimising carbon emissions</p>	<p>There remains no evidence that that the Supplementary Consultation Scheme has been designed with resilience in mind. This relates specifically to future provision for more sustainable transport modes that would minimise carbon emissions, including allowing for high occupancy/public transport prioritised lanes, safeguard/delivering bus priority lanes to enable dedicated public transport links across the river or the ability the accommodate a rail link across the river.</p>	<p>While the Supplementary Consultation Scheme includes a change to remove a southbound lane between the M25 and A13, which may bring about a direct reduction in carbon footprint, the indirect effects of impinging on the future flexibility to respond to changing travel demands, and the associated lower carbon emissions, have not been considered.</p>