

TECHNICAL NOTE

Job Name: Lower Thames Crossing, Thurrock
Job No: 43879
Note No: HE 002B
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Prepared By: PBA
Subject: Task Force Summary Note – Traffic Modelling

1. Introduction

At the LTC taskforce meeting on the 10th December, it was requested that a modelling paper is prepared for discussion at the next LTC meeting (Monday 14th Jan – 6pm).

This paper briefly explains the findings of our review of available documents and our discussions at meetings with Highways England (HE). This includes an explanation of the modelling that has been undertaken by HE, where gaps exist, and where additional modelling or support is required.

2. An explanation of the modelling information that has been provided to the Council to date.

Documents and Meetings

A number of documents have been provided by Highways England (HE), which give some insight to the modelling results:

- Local Model Validation Report (LMVR)
- Traffic Forecasts Non-Technical Summary
- Forecast Modelling Report (FMR)
- Approach to Design Construction and Operation

A number of workshops/meetings have been attended or are arranged with HE to understand the design and assessment of the LTC:

- 16 November 2018 - to understand the high level context of the scheme selection and to agree a process for understanding the modelling and design
- 6 December 2018 – to understand both traffic modelling and road design matters of the Statutory Consultation scheme proposals.
- 11 January 2019 – to undertake an interactive modelling session to review the modelling.

DOCUMENT ISSUE RECORD

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TECHNICAL NOTE

Base Model

There are two primary components of the Lower Thames Area Model (LTAM):

- The Variable Demand Model (DIADEM software) which is used to predict the future levels of demand for travel; and
- The Highway Assignment Model (SATURN software) which is used to predict a variety of different characteristics of travelling on the highway network such as traffic flows, speeds, delays, routes and journey costs etc.

The base year LTAM model has been created to reflect travel patterns and conditions on the road network for an average weekday in March 2016. The modelled hours are:

- AM peak hour (07:00 – 08:00);
- Average inter peak hour (09:00 – 15:00); and
- PM peak hour (17:00 – 18:00).

Forecast Model

An opening year of 2026 has been modelled as well as three forecast years of 2031, 2041 and 2051. The 2041 project design year forecasts have been used by the engineers to design the scheme.

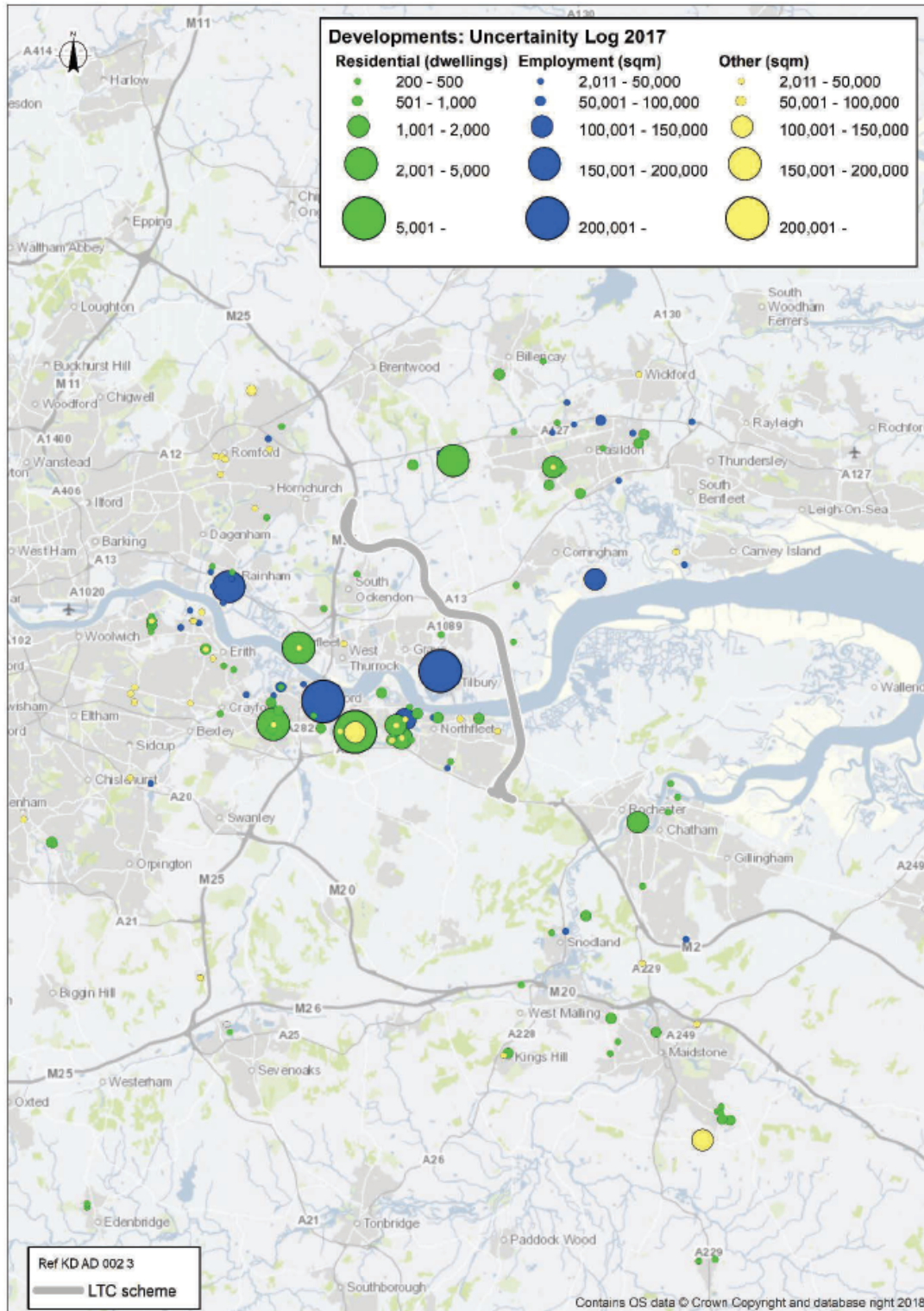
Development growth has been estimated for:

- Committed development – using available data and their spatial location (as shown in the Figure 1), and
- Non-committed development – using TEMPro 7.2 applied across the borough
- Light goods vehicles and heavy goods - vehicles is taken from the DfT's Road Traffic Forecasts, published in 2015 (RTF15), but is due to be updated with data from DfT's emerging update of the Freight Model (GBFM).

The Trip End Model Presentation Program (TEMPro) provides information for forecast trip ends based on Local Authority (LA) plans, monitoring reports and targets/plans for the whole LA, Census, ONS 2012-based population projections, employment projections and distribution. The zones within TEMPro are based primarily on 2011 Census MSOA boundaries, with version 7.2 being the most recent version issued by the Department for Transport.

TECHNICAL NOTE

Figure 1 - Development Growth Included in the Model

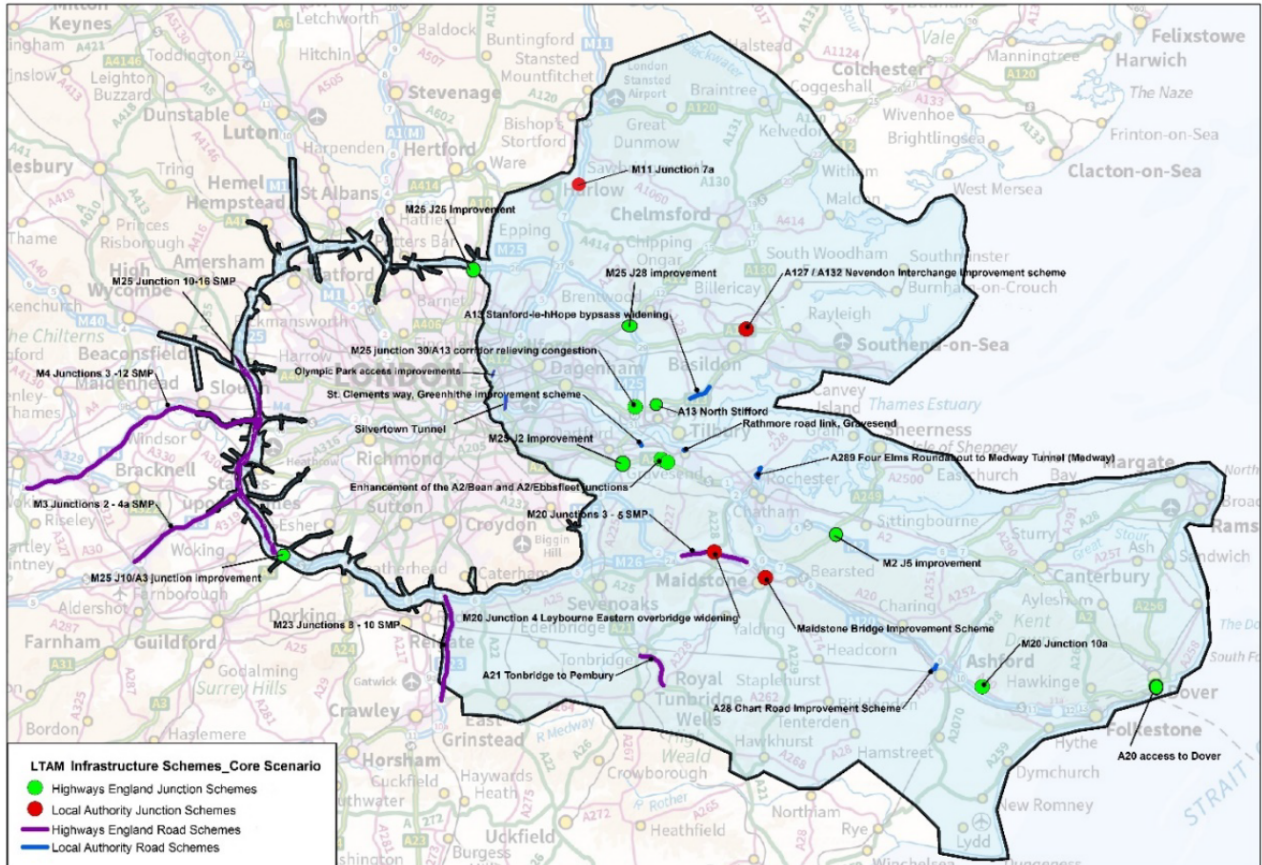


The emerging Local Plan developments are therefore only considered as a global factor and therefore, not spatially considered to levels forecast in TEMPro 7.2. This means that traffic increases are not development specific as they are spread across the network. In reality, traffic growth will be higher on the parts of the network closest to future developments and lower where no development is planned. As such junctions away from developments may operate better than modelled and junctions close to developments may operate worse than modelled.

TECHNICAL NOTE

The highway network in the model for each forecast year has been updated to include changes to the network that have funding or are more than likely to be built. This includes all schemes included in Highways England’s Road Investment Strategy Phase 1 and some local authority schemes. These schemes are shown in Figure 2.

Figure 2 - Transport Schemes in Core Scenario



The Variable Demand Model enables forecasts to be made on how highway users will change their behaviour depending on a range of factors such as changes in the levels of congestion, the cost of fuel, the fuel efficiency of the fleet and change in incomes (which affects people’s ability to afford the trips they wish to make).

TECHNICAL NOTE

Forecast Model Results

The model results show that the LTC Consultation Scheme will provide relief to the A13, M25 and A282 Dartford Crossing in Thurrock and improve journey times on these routes, as shown in Figure 3 and Tables 1 and 2 for the AM peak.

Figure 3 - Actual Flow Comparison Plot – 2041 Core DM Vs DS AM Peak



(green – increase in traffic, blue – reduction in traffic)

A brief explanation of the core routes within the model are summarised below, the results are presented in passenger car units (pcus). This is a value which enables an accurate method of comparison by converting larger vehicles, usually heavy goods vehicles to an equivalent number of light vehicles such as cars.

Current traffic levels on the Dartford Crossing is reported to range between 11,500 - 14,000 pcus depending upon time of day. This shows predicted reductions in traffic on Dartford Crossing from 14,000 - 16,000 pcus to 11,500 - 14,000 two-way pcus in 2041 accounting for the predicted traffic growth.

Traffic levels are expected to reduce from 5,100 - 5,600 pcus to 4,400 – 5,600 pcus east bound on the A13 in 2041. In the west-bound direction from 5,700 – 6,200 pcus to 4,600 – 5,700 pcus.

TECHNICAL NOTE

3. An Explanation on how the Consultation Scheme has been Selected confirmed in the Meetings to Date with HE.

There is no detail given in the available reports, on any options tested to select the LTC Consultation Scheme.

The meetings to date have however, provided an explanation on how the LTC Consultation Scheme has been selected. A further meeting on the 11th January 2019 will provide more detail on the modelling results of options tested.

The A13/LTC junction and Tilbury Link Road (TLR)

The TLR was considered by Highways England (HE) in November 2017, when scheme development was still underway and the previous traffic model was being used (which modelled the hours of 08:00- 09:00, instead of 07:00- 08:00 which has now been identified to be the peak hour). At this time, HE was investigating options, including an A13 all movement junction option.

One of the options for the A13/LTC junction considered elevated western slips to/from A13 to/from the LTC, but this option was discounted as a result of concerns over the visual impact of the junction.

When western slip roads were modelled (respecting the fact they would need to be elevated) traffic was attracted from the LTC along the A13 to the M25, therefore removing the journey time benefits seen on this section of the A13 with the current consultation scheme.

Another option considered was the idea of an HGV ban on the A1089 (to reduce traffic at the junction) and a separate road from Tilbury that could be used by HGVs to get onto the LTC. This enabled an 'all moves' junction design on the A13 to be identified within the available land and without the elevated western slip roads that could accommodate the lower traffic flows. Discussion with Tilbury Port confirmed that their priority demand was to maintain the use of the free-flow slips from A1089 on to the A13 and therefore this option was discounted.

The model results showed that when the TLR was introduced, it caused an increase in traffic on local roads, especially cars and was not used by most of the traffic (only 6%) going to/from the existing port at Tilbury, as the Port currently provides access to London and the North. Some of the traffic using the TLR was doing so to avoid the future congestion at the Asda roundabout. The Transport Assessment supporting the DCO application shows that 75% of Tilbury 2 traffic would use the TLR, although the actual numbers are low.

As a result of not identifying a preferred option, the scheme development was refreshed with the casting of three design principles to help prioritise the design requirements:

1. Provide for the traffic movements for which a new river crossing east of Dartford would provide the natural route.
2. Maintain current major movement routes.
3. Do not create inappropriate use of local roads in order to get to the SRN.

The model and supporting traffic surveys showed that approximately one lane of traffic travels between the A2 and the M25 north and approximately one lane of traffic travels between A2 and A13 east. These therefore, form the priority movements for the A13/LTC junction.

The land availability and the design of the A13/LTC junction (allowing the priority movements identified above) enabled the provision of traffic movements 'from' (but not 'to') the A1089/Port. This therefore continues to allow the Port of Tilbury current free-flow access via the A1089 to A13, plus additional new egress on the LTC both north and south-bound. As previously stated,

TECHNICAL NOTE

the limited use of the TLR by Tilbury Port (1& 2) traffic and the Port's requirements to use the free-flow slips from A1089 on to the A13 has led to the design as proposed.

The modelling shows (that without western slips onto the A13) traffic relief would be seen on the Dartford Crossing and specifically at M25 J30. The right turning traffic from the A13 toward the M25 north at J30 is significantly reduced with the LTC, which is currently constraining the operation of this junction. At the time of the issuing of this technical note, no further information regarding the turning movements at this junction could be sought, further detail will be requested at the meeting on January 11th.

Due to the limited use of the TLR by Tilbury traffic (based upon current data/forecasts) and the increasing usage on the local roads due to rerouting of traffic, HE has concluded that Highways England (not the LTC project within HE) and Thurrock BC should take forward the business case, design and implementation of the TLR in the future, as part of a separate study. The junction at Tilbury is considered to provide opportunity to deliver this at a later date.

Manorway junction

The modelling showed that, with the LTC Consultation Scheme, very few people would U-turn at Manorway junction, as the journey time is quicker via the M25 – A13 route. This has resulted in no junction improvements being proposed at Manorway junction.

Note: Thurrock Council is advised to seek RIS2 funding. The meeting on 11th

Orsett Cock junction

The model shows, with the LTC Consultation Scheme, that few people come from the A1089 and want to travel towards Kent, therefore a direct link to the LTC is not considered a high priority and impacts on the current operation of the Orsett Cock junction are insignificant. Note: Thurrock Council is advised to seek RIS2 funding.

LTC Lanes/width

The modelling shows that 40% of traffic will be HGVs in the inter-peak along the northern part of the LTC (between the A13 and the M25). Three lanes are therefore proposed to allow additional capacity for weaving to occur to/from the LTC and A13 to improve the performance of the route. In addition, by providing three lanes along this section of the LTC, it does not preclude the introduction of a junction at South Ockendon at a later date, without the need to further widen the LTC.

Rest and Service Area (RaSA)

The RaSA was confirmed to be located at Tilbury due to service area spacing/closure of the services at the LTC/A2 junction and to enable vehicle refuelling before the tunnel to minimise risk of breakdowns in the tunnel. A turnaround facility is also required in advance of the tunnel, therefore a junction in this location provides this facility.

HE confirmed local access will only be to the car park, with drivers being required to walk to the services (so no vehicle access on to LTC). HE confirmed that any bunding or other screening will be determined through the Environmental Assessment.

4. Requests to HE for further data

TECHNICAL NOTE

A number of requests have been made for additional data, which have not been provided. PBA has however attended meetings to discuss the design and modelling of the scheme. HE confirmed that during statutory consultation, legal advice must be taken prior to the release of any further modelling information.

Table 1 provides a summary of these requests.

Table 1 – Summary Requests, Responses and Outstanding Information

Request	HE response/outstanding information	Status
Representation of base and forecast travel demand in and around Thurrock	<p>HE suggested reviewing the forecast flows and volume/capacity ratios in the GIS shapefiles provided and the FMR and LMVR (already reviewed).</p> <p>TC requested additional data on speeds and/or journey times - not provided.</p> <p>TC requested data on options tested - not provided</p>	Outstanding - Meeting on 11th January organised
Data collection location diagrams	Data pack provided to Thurrock Council, however this has been processed for model use. The raw data has been requested	Outstanding
Access to the LTAM model	<p>HE has confirmed that they are unable to grant access to the LTAM model, but offered to run the model for scenarios that would be of value to Thurrock Council (see detail in section 5).</p> <p>Note: it is considered that modelling information could be shared in the future for development of a model for the Thurrock Borough, subject obtaining permissions from other licensees such as Transport for London and for a system to be established to maintain the confidentiality of such information.</p>	TC to advise on runs
Understanding of traffic modelling and potential impacts on local roads	<p>HE suggested reviewing the FMR (already reviewed).</p> <p>TC requested additional data on speeds and/or journey times - not provided.</p> <p>TC requested access or review of microsimulation modelling of junctions with in Thurrock – not provided</p>	Outstanding - Meeting on 11th January organised
Output from the option tests carried out to determine the configuration/location/number of the scheme and junctions on the LTC	<p>Verbal explanation as outlined in section 3.</p> <p>Modelling Output - not provided.</p>	Outstanding - Meeting on 11th January organised
Option tests that includes Tilbury Link Road	HE confirmed that they have tested various options for the Tilbury Link Road, but would like to meet to discuss what model runs TC wish to receive.	Outstanding - Meeting on 11th January organised
Comparison of the current traffic model with previous models	HE confirmed that they have not compiled a report that directly compares the current and previous traffic model.	Explanation provided at meeting 6th December

TECHNICAL NOTE

		2018, but no data to provide any detail.
Confirmation of any variations in land use tested during the optioneering stage	HE confirmed that committed development (based on available data and their spatial location) and non-committed development (based on TEMPro 7.2 has been applied across the borough). No future variations have been considered, as TC has not provided any emerging development plans.	TC to confirm any development tests
Review of the travel demand for each zone in the Thurrock area – forecast trip ends and travel patterns.	Data not provided yet, meeting offered	Outstanding - Meeting on 11th January organised
Comparison of the base and forecast travel demands (origin and destination by zone) to understand where the future increases in travel demand are forecast to occur.	Data not provided yet, meeting offered	Outstanding - Meeting on 11th January organised
Confirmation as how the economic and operational benefits been quantified for Thurrock	Data not provided yet, meeting offered	Outstanding - Meeting on 11th January organised
Confirmation of specific benefits will the scheme bring for Thurrock in relation to supporting sustainable local development and regional economic growth	HE has considered the near certain development (e.g. committed) and more than likely development (e.g. within an adopted Local Plan) No detail provided yet, meeting offered	Outstanding - Meeting on 11th January organised

5. HE's Offer to support TBC with focussed modelling / micro-simulation

Emerging Local Plan Development

HE has suggested that their wider area model could be used to test development growth options and microsimulation models could be used to understand the future operation of specific junctions.

Key Junctions

HE has explained that the LTC does not result in any significant impact on junctions, such as: the A1089 Asda roundabout, Orsett Cock, and offers relief to J30. HE has raised that the A1089 Asda roundabout is operating at capacity and improvements (not part of the LTC) are likely to be needed. HE is only required to mitigate the impact of the scheme and therefore not required to make improvements for current operational issues or future development growth.

The microsimulation models have been created for the junctions on the A road network. These will show the detailed operation of these junctions with and without the LTC and also the effects of growth currently tested. Improvements to junctions may need to be made in the future to allow for planned growth and/or emerging Local Plan development growth. Identifying these improvements will enable TC to seek RIS2 funding, other funding and/or development contributions to deliver these upgrades. There may also be an opportunity to divert funding, if improvements are no longer necessary or a priority with the LTC.

TECHNICAL NOTE

Tilbury Link Road

HE has recommended that Highways England (not the LTC project within HE) and Thurrock BC should take forward the business case, design and implementation of the TLR in future, as part of a separate study (and potentially a future RIS scheme).

A meeting on 11th January 2019 will seek to understand what modelling and assumptions have been considered to date.

TC will need to consider whether they wish to take forward a separate study with HE.

Incidents

Hypothetical tests could potentially be carried out on the model by closing lanes within the model network and reviewing the route changes and the operation of the junctions/turning facilities. This will show a significant worst case scenario, as in reality any incidents will be reported to drivers via sat navigation systems, radio travel news, variable message signs, etc. and drivers will choose to not travel, change mode, time of day, route or destination. This cannot be accurately modelled, and therefore only sensitivity testing could be carried out by factoring down the traffic flows within the model.

6. Consideration should be given TC's priorities for investigation with HE.

HE has suggested that TC should consider how they would like to influence the scheme. A number of opportunities are listed in Table 2, but these are not exhaustive.

Table 2 – Summary of Possible Requests, Responses and Outstanding Information

Potential Opportunities to seek from HE	Consideration
Access or safeguards (car, HGV and/or public transport) to provide access to/from the Tilbury junction	<p>TC could request that the principle of a future access is agreed:</p> <ul style="list-style-type: none"> a) west to Tilbury and/or b) east to a potential development area. <p>The junction design should be demonstrated to be able to accommodate these access points.</p> <p>The land should be safeguarded to deliver these accesses in the future within the redline (including through the RaSA)</p>
Tilbury Link Road	<p>HE has confirmed that they believe this is not needed to mitigate the LTC or for Tilbury 1 and 2, as currently proposed.</p> <p>Modelling to date is reported to attract traffic on to local roads, causing impacts which will need much greater investigation, therefore a separate study is proposed.</p> <p>TC to decide whether to object to the loss of the scheme on grounds other than modelling (if possible, as the modelling evidence, as reported, demonstrates that it is not required) or request that a separate study is progressed with HE.</p>

TECHNICAL NOTE

Rest area at South Ockendon and/or access or safeguards for junction at South Ockendon	<p>TC could request that the principle of a future access to South Ockendon is agreed.</p> <p>The junction design should be demonstrated to be able to accommodate the access.</p>
Slip roads between A13 west to/from LTC	<p>TC to decide whether to request further investigation into the inclusion of western slip roads</p> <p>These would be elevated and therefore result in visual impact</p>
Improvements at Orsett Cock junction	<p>TC to decide whether to request further investigation into the operation of the junction for inclusion in the scheme (noting that the modelling evidence shows improvements are not needed to mitigate the scheme) or for future planning and funding purposes. Note: Thurrock Council is advised to seek RIS2 funding. It needs to be determined whether the capacity provided by the A13 widening (Stanford-le-Hope Bypass) commencing this month is retained with the LTC.</p>
Improvements at Manorway junction	<p>TC to decide whether to request further investigation into the operation of the junction for inclusion in the scheme (noting that the modelling evidence shows improvements are not needed to mitigate the scheme) or for future planning and funding purposes. Note: Thurrock Council is advised to seek RIS2 funding.</p>
Utilities to be relocated away from Chadwell St Mary and safeguards for access	<p>A workshop has been suggested to investigate options for the planned utility diversions to potentially open up development opportunities.</p>
Public transport/coach interchange facilities and/or public transport priority safeguards	<p>TC to investigate opportunities for HE to explore</p>
Relocation of Drainage or other mitigation within the redline to accommodate future development sites	<p>A workshop has been suggested by HE to determine opportunities to change the proposals within the mitigation area.</p>
Cut and cover through Mardyke Valley Higher/greater length of false cuttings	<p>TC to decide whether to request further investigation on the opportunities and benefits</p>
Noise/landscape bunding/screening at the RaSA	<p>TC to decide whether to request further investigation on the opportunities and benefits</p>