

Document Control Sheet

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Document prepared by:

Highways	т	0845 603 7631
Regent House 90-96 Victoria Road, Chelmsford, Essex. CM1 1QU	E W	claire.stephens@jacobs.com <u>www.essex.gov.uk/highways</u>
	Highways Regent House 90-96 Victoria Road, Chelmsford, Essex. CM1 1QU	Highways T Regent House E 90-96 Victoria Road, W Chelmsford, Essex. CM1 1QU

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Project Sponsor	lan Turner	1
Project Owner	Alan Lindsay	1



1 Project Identification & Objectives

1.1 Introduction

Colchester, Tendring and Braintree are in the process of updating their Local Plans. Several existing transport models cover the north Essex region:

- Colchester Transport Model (CTM)
- Essex Countywide Model
- Braintree A120 Model

From these options, the Colchester Transport Model (CTM) emerges as the most suitable choice for updating the Local Plans due to its wider coverage area encompassing all three districts and the inclusion of a public transport assignment model as well as a highway model. While the CTM's detail level reduces somewhat when extending into Tendring and Braintree, it still provides a more solid foundation than the alternatives.

1.2 Study Objectives

This proposal sets out how the Colchester Transport Model (CTM) can be enhanced in order to support the Tendring Local Plan update. The CTM enhancements covering Braintree and Colchester are expected to be carried out in parallel to work in Tendring, which will provide economies of scale for each of the planning authorities; since it is more cost effective to update the three district areas covered by the transport model at the same time.

In order to identify the enhancements required, a review of the CTM has been carried out from the perspective of meeting the Local Plan requirements related to a strategic level transport assessment of alternative spatial planning options. Unlike Colchester, which benefits from a detailed network and zoning system, including modelled junction capacity, the network in Tendring is less defined and does not model junctions in detail. This is because the CTM was primarily built for the purposes of modelling and testing schemes in Colchester. In addition, the COVID-19 pandemic has demonstrably impacted travel behaviour. The Department for Transport (DfT) acknowledges that COVID-19 has had a long-term effect on travel patterns, rendering pre-2020 transport models potentially inaccurate.

Consequently, the following actions to enhance the CTM to meet Local Plan requirements in Tendring are proposed:

- **Partial Conversion of Network Updates**: The CTM around Tendring will be updated to incorporate detailed junction capacity modelling in targeted areas where Local Plan development is being planned.
- Implementation of Post-COVID Adjustments: The CTM will be adjusted to account for the lasting effects of the COVID-19 pandemic on travel patterns.
- Incorporation of NTEM v.8.1 Updates: The model will be updated to reflect the latest guidance and data provided in National Trip End Model (NTEM) version 8.1.



2 Tasks

In order to deliver the actions to enhance the CTM, the following stages and tasks are proposed. Section 3 explains the reasons for the changes and provides a detailed methodology.

COVID	Task 1	Review and Processing of Data
Adjustments	Task 2	Base Year Demand
Outcome 1: U	pdated Dema	nd

Tendring Model Updates	Task 3	Partial Network Detail
Outcome 2:	Updated Netw	vork

Calibration	Task 4	Calibration and Validation
Validation	Task 5	Technical Note
Outcome 3: U	pdated CTM a	nd Technical Note

Local Plan	Task 6	Meetings
ordination	Task 7	Option sifting support
Meeting atter	idance and Op	ation shifting support



3 Methodology

3.1 Introduction

The Colchester Transport Model (CTM) covers the following areas:

- <u>Area of Detailed Modelling (AoDM).</u> It covers **Colchester City** and has the most granular zone system and detailed modelling of junction capacity (simulation network). All bus routes and rail services that serve Colchester are represented.
- <u>The rest of the Fully Modelled Area (FMA)</u>. It surrounds Colchester city including Tendring, Colchester city and Braintree district. Its zonal detail is based on the Essex Countywide Model (Essex CW) with targeted improvements, and it models the capacity restraint based on speed-flow (volume-delay) relationships, which does not represent each junction in detail. Full representation of the rail and bus network across the area is also used.
- External Area (the rest of Essex, South East and the remainder of Great Britain). Its zonal detail is progressively aggregated away from the FMA. In external areas, which still form part of Essex, the network structure of Essex CW was retained, but converted to fixed speed as it does not influence the route choice through the Fully Modelled Area and helps reduce model run times and improve convergence. The remainder of Great Britain is covered by a skeleton network of main roads (consistent with Essex CW) to enable modelling of the full length of trips in VDM. A similar approach has been followed in the public transport model, with the rail network providing the skeletal coverage of public transport across Great Britain.

The modelled areas are presented in Figure 3-1.





Figure 3-1: Modelled Areas

3.1.1 CTM Suitability

For each district, the suitability of using the Colchester Transport Model (CTM) has been reviewed. This is summarised below in Table 3-1. The review has indicated that some adjustments will need to be made regarding the network detail in Tendring.

However, for all three districts, as they are all within the FMA, any trip starting or ending within the FMA is within the scope of the demand model, and is fully responsive to cost changes, and hence no additional work will be required for this. It is worth noting as well that all three districts are included within the current forecasting spreadsheets and model processes, again meaning no additional work is required here.



Table 3-1: CTM Model Review Summary

	Colchester	Tendring	Braintree		
Study Area	Area of Detailed Modelling	Rest of Fully Modelled Area	Rest of Fully Modelled Area		
Zoning	Detailed - OA	Less detail	Less detail		
Network Structure	All junctions coded	Link speed flow curves	Link speed flow curves		

3.1.2 COVID Recommendations

Jacobs have undertaken an initial assessment of traffic flow changes between 2019 and 2023, which have showed different profiles and changes. As can be seen in the table below, the majority of roads shows decreases of traffic, while others increase. Notably, the traffic decreases are most pronounced during the AM and PM peaks, with the IP showing more increases of traffic in 2023 compared to 2019.

Table 3-2: Traffic flow changes between 2019 and 2023

													/																																		
	2019 2020						2021				2022						2023																														
	AM	AM IP PM		AM IP PM		AM IP PM		AM IP PM		AM IP PM		AM IP PM		M IP PM		AM IP PM		AM IP PM		M IP PM		A IP PM		AI	М	- 1		PN	Λ	AI	И	IP		PN	N	A	М	IP		PI	N	A	М	IP		PN	И
	VISUM 2019	1- VISUM- 2019	VISUM 2019	VISUM 2019	2019	VISUM 2019	2019	VISUM 2019	2019	VISUM 2019	2019	VISUM- 2019	2019	VISUM- 2019	2019	VISUM 2019	2019	VISUM- 2019	2019																												
A 133 Colchester Rd GT BENTLEY	-9%	-7%	-5%	-40%	-34%	-28%	-23%	-27%	-23%	-7%	2%	-7%	1%	-5%	0%	-9%	0%	-10%	-3%	-6%	-1%	-11%	-2%	-7%	0%	-8%	-3%																				
A 133 Weeley Bypass CLACTON										-6%		7%		-1%		-7%		6%		1%		-9%		7%		-2%																					
A137 Colchester Rd ARDLEIGH	15%	9%	8%	-26%	-35%	-9%	-16%	-30%	-35%							8%	-6%	13%	4%	6%	-2%	6%	-8%	10%	2%	-1%	-8%																				
B1027 Colchester Rd ALRESFORD	-7%	2%	-12%	-35%	- 29 %	-6%	-8%	-33%	-23%	-16%	-9%	6%	4%	-16%	-4%	-11%	-4%	5%	3%	-12%	0%	-12%	-5%	6%	4%	-11%	1%																				
B1033 Frinton Rd THORPE LE SOKEN	1%	17%	5%	-29%	- 29 %	4%	-11%	-13%	-17%	-2%	-2%	19%	2%	4%	-1%	-4%	-5%	13%	-3%	2%	-3%	-7%	-8%	11%	-5%	-1%	-6%																				
	00/	544	404	224	224/	4.004	4.407	2644	3544	00/	201	601	201		201	504		50/	0.04	201	201	784	601	E.e.(004	504																					

This work has identified the need for the CTM to be updated, to reflect this change in traffic patterns. Otherwise, the model has too much traffic in, which will hinder potential for Local Plan development.

3.1.3 NTEM 8 Updates

All districts would need to be updated to use NTEM v8.1 for forecasting, which would take place in a later phase of work. The NTEM v8.1 update ensures that the background level of traffic growth is in line with DfT forecasts. However, this work has been procured via the TCBGC developer, Latimer.



3.2 Adjust Model for Post Covid Representation

As it has been agreed with ECC, the adjustment of models will follow the proportionate accounting guidance in TAG¹. We will create a 'present-day' forecast by adjusting the existing base models to be representative (to the extent that is possible given the available data) of present-day travel conditions. New traffic forecasts will be created by pivoting off this present day forecast in the usual manner.

The suggested approach prioritises model robustness and validation. It involves adjusting existing base models using observed data (if available) to reflect current travel conditions. This observed data allows us to compare the model's results with real-world scenarios, enhancing its reliability.

However, if suitable observed data is unavailable, we will employ the alternative approach recommended by TAG², using whatever national data or official statistics can be found.

In addition to the COVID adjustment, any developments or schemes implemented between 2018 and the present-day forecast will be added to the model. The methodology of the suggested approach is presented in the following sections and assumes the CTM is being updated alongside the updates in Colchester and Braintree.

This section discusses the proposed approach for creating a present day forecast by adjusting the existing CTM 2019 base year model.

3.2.1 Task 1: Review and Processing of Data

It is not proposed that any new data is collected as part of this task, with only existing traffic counts being used.

The existing traffic counts from the Essex Highways database will be reviewed for suitability. For consistency with the 2019 CTM model build, this will include count data only in neutral months (May, June, October and November), neutral days (Monday to Thursday) and for 2023 only. Following the review, the data will be checked and processed for use in the model adjustments.

Within Tendring District there are 6 continuous traffic counts, 1 Vivacity permanent traffic counts and 15 temporary 2023 count sites. These will be checked and processed for the purposes of this project.

There may also be a need to utilise 2022 and 2024 data, normalising this to a 2023 base (using the same approach as taken for the 2019 CTM data collection and build). Should this be required,

¹ <u>https://assets.publishing.service.gov.uk/media/65a6bdbf64060200143cb7b0/tag-unit-m4-forecasting-and-uncertainty.pdf</u>

² "Apply adjustments to a forecast year model to produce a new scheme opening year forecast, or the first required forecast year, that include a COVID-19 impact to that point. This will be the new pivot off which further forecast years are base."



or further count data required, this will be discussed and agreed with Tendring District Council (TDC) in advance.

The journey time routes (as used in the 2019 base year) will be updated with more recent information. The DfT GPS Data held within the Essex Highways team will be used. The DfT GPS dataset is made available to local authorities and is based on the data gathered using satellite navigation devices installed in vehicles. The data covers links within the Integrated Transport Network (ITN). This will be the primary source of data. To ensure a neutral representation of travel times, only data from Monday to Thursday during neutral months in 2023 will be used.

In addition, the possibility of updating public transport trip-making data within the model will be investigated. Potential data sources include rail station exit and entrance data, bus patronage data (subject to availability from bus operators) and changes recorded in the National Travel Survey (NTS). In addition, it is recognised that there will have been changes to public transport timetables which will be reviewed and updated within the CTM. However, this proposal does not consider collecting any new data, and only data that has already been collected and cleaned will be used for this purpose.

3.2.2 Task 2: Base Year Demand

The existing traffic count data will be processed and incorporated into the calibration/validation database. This process ensures the data is formatted and structured appropriately for use in refining and verifying the accuracy of the model. It is not proposed to update prior matrices due to the need to source updated data for this (i.e. mobile phone data).

The adjustments needed to the base year demand will comprise of the following:

- Vehicle Type: The impact of factors like remote work might differ across vehicle types (e.g., cars vs. trucks). We will consider these variations when adjusting the data.
- Trip Purpose: Travel patterns might have changed more significantly for specific trip purposes, such as commuting due to the work-from-home shift. Adjustments will focus on trip purposes most likely affected by recent changes. This might exclude categories like leisure or shopping trips that may not have seen a significant shift.
- Model period: Adjustments may vary by modelled period.

Any adjustments from traffic counts will be done on an aggregate basis. This will mean that at each individual count location there may not be a perfect match, but checking across all sites should show an overall improvement in fit. Any adjustments to matrices will be applied globally as a default.

3.3 Model Updates in Tendring

3.3.1 Task 3: Partial Conversion to AoDM

This task requires knowledge of where the Local Plan development is likely to be located, as the model updates will be targeted in these areas only. This work will inform the sustainable location of spatial development options. Accordingly, it is expected that developments, and hence parts



of the model that will be enhanced will focus on existing centres such as Harwich and Frinton / Manningtree (TBC). For the purposes of this scope, it has been assumed that these two areas within Tendring will be updated, and as such we have costed to allow for 60 hours of consultant time for network updates. We expected this will be sufficient to enhance these two new areas of the model. The time will be tracked, and we will provide the client with an EWN if extra time is needed. This could arise if the changes in one of the locations is more extensive than expected or if an additional area of the model needs to be enhanced.

For these two areas, all existing roads in the FMA in the base model, currently coded with speed flow curves will be converted to AoDM (junction simulation). This update will include conversion so all junctions will be modelled in detail with VISUM's Intersection Capacity Analysis (ICA), alongside links, link types and signal phasing and timings.

It is not proposed to change any of the existing zone structure and connectors in Tendring, unless dummy zones need to be added and allocated for bigger developments in the Local Plan modelling.

3.4 Calibration and Validation

3.4.1 Task 4: Calibration and Validation

Following TAG guidance, we will undertake a validation process on the present-day base traffic model in the areas where the network has been updated in Tendring. This process ensures that the model accurately reflects real-world traffic patterns and can be used with confidence for generating reliable forecasts.

Unlike a full base year model build, splitting this process into formal calibration and validation sets is less important as matrix estimation is not applied, if there are sufficient numbers of counts, this could be useful to give an independent check of the model.

The present-day base year validation will involve the following key assessments:

- Comparison with Traffic Count Data: We will compare the model's predicted traffic volumes on specific road segments (links) with actual traffic counts.
- Evaluation of Journey Time Data: We will assess how well the model replicates realworld travel times on various routes.

By performing these assessments, valuable insights into the strengths and weaknesses of the model in the context of using outputs to inform the forecast baseline development and identification of network hotspots can be obtained. However, some judgment may be required in this stage, as it may not be possible to fully align with validation standards set out in TAG, a level of suitability is required.

The programme assumes that model calibration and validation will be undertaken within five weeks. An early warning will be raised at the earliest opportunity if this is taking longer than planned.



This approach effectively provides a "new base year" in which the costs and demand are maintained in the initial base year.

3.4.2 Task 5: Technical Report

A Technical Report will be prepared to summarise the data used in the present-day base year update, assumptions, the model's suitability and potential limitations or weaknesses that should be considered for the development of the local plan modelling. This will be an addendum to the current CTM Model Development and CTM Forecasting reports.

3.5 Local Plan Co-ordination

3.5.1 Task 6: Meeting Allowance

Allowance has been made for three one-hour meetings during the model update project. This includes for a scoping meeting which will primarily discuss information gathering and the data that is required to progress the model update tasks.

One progress meeting will be held during the project, along with the model update close-out meeting. This meeting will present the updated model results and confirm the approach for modelling the Local Plan scenarios.

3.5.2 Task 7: Support in Sifting Spatial Options

To assist Tendring District Council (TDC) with their list of emerging Local Plan spatial options, a qualitative exercise will be undertaken, with TDC and ECC, to shift these options based on transport implications to reduce the number of scenarios needed for modelling. This sifting will be based on local knowledge, pinch-points and consideration of propensity for sustainable travel. This task has been costed as an optional extra.

Tendring Local Plan – Modelling Approach BRIEF RESPONSE



4 Project Team

Jacobs Project Manager: Charles Freeman Jacobs Project Director: Jenny Jones Jacobs Task Manager: Claire Stephens Jacobs Project Principal: Martin Whittles Key Technical Team Members: Alessandra Bernardi, Theofili Apostola, Diana Ribeiro ECC Project Manager: Ian Turner

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5 Risks

The analysis of risk and proposed mitigation measures will be discussed in detail as part of the project inception. A risk register will be developed and reviewed / updated regular intervals throughout the project delivery. Any issues that arise will be reported to Essex County Council through ongoing liaison between the Essex Highways PM and the County Council lead and documented in monthly progress reports.

The table below summarises the current risks and proposed mitigation measures which exist for the Local Plan Modelling Approach study.

Risk Number	Risk Detail	Start Date	End Date	Risk Rating (High, Medium, Low)	Mitigation	Risk Owner
Programm	e					
1	Availability of information relating to Local Plan developments.	June 2024	September 2024	Low	Jacobs / ECC PMs to liaise with relevant ECC officers to ensure that information is made available in a timely manner.	ECC/EH
2	Local Plan programme is tight to fit into planning process	June 2024	2025	Medium	Manage expectation of model run times with ECC. Ensure all information needed is provided before modelling commences.	EH/ECC
3	Individual districts update their traffic models at different times which could extend project timelines, increase overall costs and pose a challenge in meeting LP examination requirements	June 2024	September 2024	Medium	Early and ongoing communication with LP authorities to explain the chosen approach to model updates and address any potential concerns regarding LP exam requirements	EH/ECC
Client Satis	faction					
4	Alignment with other ECC strategies, policies and ongoing works.	June 2024	September 2024	Low	Close liaison with relevant ECC officers to ensure consistency in approach and ability to capture relevant outcomes from other studies. Jacobs PM and Assistant PM to ensure consistency is maintained through liaison with the ECC project lead.	EH/ECC



Risk Number	Risk Detail	Start Date	End Date	Risk Rating (High, Medium, Low)	Mitigation	Risk Owner
Technical	·					
5	Traffic flows in Colchester, Tendring and Braintree change significantly in 2024.	June 2024	September 2024	Low	Monitoring of traffic flows is already undertaken. If significant changes are shown, adjustments may be required to the methodology to account for this.	EH
6	Stakeholder 'buy-in'.	June 2024	September 2024	Low	Ensure key stakeholders are kept informed throughout the Local Plan study and are given the opportunity to input into the process.	ECC/EH
7	Study area / focus of strategy.	June 2024	September 2024	Low	Internal / external expectations regarding the focus of the study to be managed through close liaison between the LCC and Jacobs PM's.	EH
8	Validation is difficult to achieve within timescales and budget	June 2024	September 2024	Medium	Discuss progress with ECC on fortnightly calls and flag early warning if this is proving difficult or cannot be achieved within the five-week timescales.	EH
9	The proposed methodology is not accepted by National Highway, or other stakeholders	June 2024	September 2024	Low	The CTM has already been reviewed by National Highways and accepted as fit for purpose.	EH
10	Model runs do not provide expected results and further investigation, or model runs are needed	June 2024	September 2024	Medium	The CTM has been used for numerous scenarios, although this is the first time the model will be locally updated outside of Colchester city	EH
11	Model runs do not converge	June 2024	September 2024	Low	The CTM has been used for numerous scenarios. We have assumed that if the model doesn't converge, we will only include one attempt to resolve this. Any further convergence tests are not included in this scope of work. Convergence should be less of an issue than NTEM 7.2 due to the lower levels of growth in the model.	EH
12	Public transport changes are more extensive as at this stage the level of detail is unknown	June 2024	September 2024	Medium	Focus on essential changes that make a tangible difference and avoid excessive time on non- strategic changes. It should be recognised that a some point the underlying matrix of trip patterns	EH

Tendring Local Plan – Modelling Approach

BRIEF RESPONSE



Risk Number	Risk Detail	Start Date	End Date	Risk Rating (High, Medium, Low)	Mitigation	Risk Owner
					will be updated, but the focus for the Local Plan	
					will be looking at the strategic level impacts.	

Essex Highways

6 Deliverables, Programme & Indicative Costs

The costs for each task are set out in the table below. Please note, that it is assumed that CTM will be updated simultaneously for all three districts. This approach leverages economies of scale and minimising duplication of effort, and therefore achieves maximum cost-effectiveness and efficiency.

Any delay to any of the districts in decision-making and provision of data will have an impact on both costs and timescales for all of the districts.

The costs included within this proposal cover the base year modelling only. A further proposal will be provided which covers the costs of modelling the Local Plan allocations.

A more detailed programme has been emailed on 1st July "20240701 Local Plan Programme" and "20240701 – Local Plan – Actions".

The support in shifting the spatial options has been included as an optional extra in the table below, alongside two totals (one including this, and one excluding).



6.1 **Proposed Deliverables, Programme and Fees**

Stage		Deliverable	Delivery Date	RJ Cost					
Covid Adjustments									
1	Review and Processing of Data	Technical Note	August 2024	£5,603					
2	Base Year Demand	Technical Note	August 2024	£5,537					
Tendring Model Updates									
3	Partial Network Detail	Technical Note	August 2024	£6,509					
Calibration and Validation									
4	Calibration and Validation	Technical Note	September 2024	£37,025					
Optional									
5	Support in Sifting Spatial Options	Summary of Options	July 2024	£2,694					
Total (including Optional Item 5)									
Total (excluding Optional Item 5)									