

Uttlesford Transport Study

300 – MODELLING DEVELOPMENT

TN 320 – Trip Generation

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TN 320 - Trip Generation
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1 | Introduction

1. INTRODUCTION

1.1 Background

- 1.1.1 This technical note summarises the methodology used to derive development trip generation rates for use in the Uttlesford Transport Study.

1.2 The Uttlesford Local Plan

- 1.2.1 The emerging Uttlesford Local Plan will cover the period between 2023 and 2040. It has a requirement to deliver almost 17,000 new dwellings within this timeframe together with approximately 34,900 sqm of employment space.

1.3 Modelling Process Overview

- 1.3.1 To help inform preparation of the new Local Plan a two stage appraisal process is being used to identify the cumulative traffic impacts of the spatial options being considered. The two stages are set out as follows:
- **Stage 1** - The Uttlesford Strategic Model (USM) which is a hybrid VISUM / spreadsheet model has been used to provide a high level understanding of the comparative traffic impacts of the alternative spatial options. This stage applied generic TRICS trip generation rates with no reductions to reflect sustainable travel / trip internalisation. As such the outputs of Stage 1 are very robust and are only intended to provide a high level comparative appraisal of the alternative spatial options.
 - **Stage 2** – bespoke VISUM models are being created covering Saffron Walden and the A120 corridor within the district. These models will be capable of trip reassignment and will be used to identify the detailed traffic implications of the preferred spatial option and to determine what transport mitigation is required. This stage will apply trip generation derived using the methodology set out in this report to reflect the sustainable travel / trip internalisation benefits that can be expected from larger developments.

1.4 Report Structure

- 1.4.1 This technical note is structured as follows:
- Chapter 1 – Introduction
 - Chapter 2 – Approach to Trip Generation
 - Chapter 3 – Development Types
 - Chapter 4 – TRICS Interrogation Methodology
 - Chapter 5 – Journey Purpose Analysis
 - Chapter 6 – Internalisation of Trips
 - Chapter 7 – Modal Splits
 - Chapter 8 – External Vehicle Trip Rates
 - Chapter 9 – Application of the Rates

2 | Approach to Trip Generation

2. APPROACH TO TRIP GENERATION

2.1 Introduction

- 2.1.1 Technical Note 02.X '*Transport Assumptions Associated with the Development of Garden Villages and other Sustainable Communities*' reviewed a range of case studies and high-level strategic documents to identify the trip rate considerations that informed those development proposals.
- 2.1.2 The note focussed on new standalone, sustainable communities recently granted planning permission (notably eco-towns and garden towns & villages) in the south-east and east of England, to provide the best possible comparison with the Uttlesford context. Based on this review a methodology for calculating trip rates was identified which is outlined below.

2.2 Methodology Summary

- 2.2.1 For major new settlements, the methodology identifies a staged approach which is summarised as follows:
- **Stage 1 – Development Detail**
 - Identify the development location and scale
 - **Stage 2 – Person Trips**
 - Estimate total person trip generation using TRICS person trip rates
 - **Stage 3 – Journey Purpose**
 - Estimate person trips by journey purpose
 - **Stage 4 – Internalisation of Trips**
 - Determine person trips that remain within the site (internal) and those that travel off-site (external)
 - **Stage 5 – Modal Splits**
 - Convert external person trips to trips by all modes by applying local modal splits
- 2.2.2 The subsequent chapters of this report detail how this methodology has been applied to derive residential trip generation rates to estimate the likely external traffic generation from the new settlement allocations being considered as part of the emerging Uttlesford Local Plan. For smaller residential developments within the district (allocations or development identified through the Uncertainty Log), unadjusted TRICS vehicle trip generation rates have been applied.
- 2.2.3 Where external residential trip rates take into account internalisation due to employment uses on the same site (i.e. to reflect living and working on the same site) trip discounts have been calculated and applied to the employment end of the journey so that the origin-destination trips are discounted. This is to prevent double counting and the adjustment is applied in the VISUM trip matrices.
- 2.2.4 For new employment uses within the district and for all new development outside of the district identified through the Uncertainty Log, trip generation has been estimated by applying TRICS vehicle trip rates without any adjustments for internalisation. This is primarily to avoid over complicating the trip generation process and is considered to be a robust approach.

3 | Development Details

3. DEVELOPMENT DETAILS

3.1 Introduction

3.1.1 This section of the report examines the different types of development for which trip generation rates need to be derived for the Local Plan transport study. This includes ‘committed’ development within Uttlesford and adjacent authority areas and proposed Local Plan allocation development.

3.2 Nature of Development

3.2.1 A DfT Transport Analysis Guidance (TAG) compliant Uncertainty Log has been compiled to assist with the building of a Core Scenario reference case model. The reference case represents the situation that will exist at the 2040 assessment year (end of Local Plan period) without the addition of any Local Plan allocation traffic. This is the ‘benchmark’ against which the impacts of Local Plan traffic will be assessed.

3.2.2 WebTAG states that “*the primary basis of evidence should be the **core scenario**, which should be developed using unbiased and realistic assumptions*”. The core scenario takes into account development sites identified as being ‘near certain’ and ‘more than likely’ to occur as per the WebTAG definition of the Core Scenario.

3.2.3 Development details that meet the definitions of the core scenario have been supplied by Uttlesford District Council (UDC) and neighbouring authorities. UDC have also provided details of the proposed Local Plan allocation development within the district.

3.2.4 The different development uses identified through this process are summarised in the table below. Trip generation rates are required for each of these uses so that transport implications can be assessed in the study.

Table 1 – Main Development Use Classes

Use-Classes	Description
C3	Dwelling Houses
E(a)	Retail
E(g)i	Office
E(g)ii	Research & Development
E(g)iii	Industrial Processes - which can be carried out in any residential area
B2	General Industry - industrial processes not falling into use-class E(g)
B8	Storage and Distribution

3.2.5 Most of the development identified through the uncertainty log process falls into the main use-classes summarised in **Table 1**. However, a small proportion of other use-classes has also been identified as summarised in the table below.

Table 2 – Other Development Use Classes

Use-Classes	Description
C1	Hotels, boarding and guest houses
C2	Residential Institutions
E(e)	Medical services not attached to the residence of the practitioner
E(f)	Non-residential creche, day centre or nursery
F1	Schools, non-residential education and training centres, museums, public libraries, public halls, exhibition halls, places of worship, law courts

3.2.6 The specific developments that fall into these ‘other’ use-classes are summarised in **Table 3**.

Table 3 – ‘Other’ Development Details

Use-Classes	Development Details	District
C1	85 Bedroom Hotel, Bishop's Stortford Goods Yard	East Herts
C2	55 Bedroom Care Home, Bishop's Stortford Goods Yard	East Herts
F1a	Primary School, Bishop's Stortford South	East Herts
F1a, E(e), E(f), F2	Two primary schools, community uses, creche and possible healthcare facilities, Bishops Stortford North	East Herts

3.2.7 It can be seen that the C1 and C2 uses classes are on the same development site in Bishop's Stortford and both are small. Both of these use-classes have very low trip generation characteristics during the AM and PM peaks and have therefore been ignored for the purposes of the transport study.

3.2.8 A new primary school (use-class F1a) is proposed on the Bishop's Stortford South development and two new primary schools (use-class F1a), community uses (use-class F2), a creche (use-class E(f)) and possible healthcare facilities (use-class E(e)) are proposed on the Bishops Stortford North development. These uses will principally meet the needs of the new housing being delivered on these developments and are therefore unlikely to have any material traffic implications on the wider highway network. They have therefore been ignored for the purposes of the transport study.

3.2.9 As part of the preparation of the reference case the development details obtained through the uncertainty log process are compared against the development assumptions contained within the current version of the Department for Transport trip-end model (TEMPro). Residential and employment development is compared at a district level against the data contained within TEMPro. Districts with development in excess of the TEMPro predictions have been left unchanged. Districts with development totals falling short of TEMPro have been uplifted to match TEMPro, in accordance with WebTAG guidance. TEMPro Data is presented in **Appendix B**.

3.2.10 In the case of East Herts both the Residential and Employment details supplied by the local authority for the uncertainty log fell short of the data contained within TEMPro and have therefore been uplifted

to match TEMPro. Ignoring the development in **Table 3** is therefore also compensated for as part of this process.

3.3 Settlement Size

3.3.1 The scale of new residential developments influences which services, facilities and infrastructure can be delivered as an integral part of the development. This in turn influences how many of the trips generated by the development will remain internal to the development, for example by education needs being met by the provision of new schools on-site, thereby reducing the need for off-site travel.

3.3.2 A review has been undertaken of the main facilities typically required in support of new housing developments and the thresholds at which services are usually required to be delivered. This is summarised in the table below.

Table 4 – Development Scale and Supporting Facilities

Facility	Provision Ratio	Approximate Threshold for new Provision	Comments	Source
Early Years Education	0.09 children per dwelling	>250 dwellings	Provision of a 56 place day nursery	ECC Developers Guide to Infrastructure Contributions 2019
Primary Education	0.3 children per dwelling	1,400 dwellings	Provision of a two form entry primary school (420 places)	
Secondary Education	0.2 children per dwelling	4,500 dwellings	Provision of a 900 place secondary school	
Youth Provision	0.2 persons per dwelling	>1,200 dwellings	Provision of a bespoke youth centre or dedicated youth space	
Primary Health Care	-	4,500 dwellings	Provision of a 'Primary Care Spoke'	North Essex and Mid Essex Clinical Commissioning Groups (CCGs)
Local Health Care	-	600 – 800 dwellings	One GP surgery per 1,500 - 2,000 new population. Based on Uttlesford average of 2.5 residents per household.	TCPA 'Practical Guides for Creating Successful New Communities – Guide 8: Creating Health Promoting Environments', December 2017.
Community Centre	-	>1,000 dwellings	Provision of a local community centre	Braintree IDP report identifies provision of a large community centre (500sqm) for approximately every 1,000 to 1,300 dwellings.
Local Centres	-	>1,400 dwellings	Local parade of shops	Assumption based on scale of development likely to generate interest from commercial operators.

3.3.3 The list of facilities in **Table 4** is not exhaustive but covers the main services, facilities and infrastructure, which if provided as part of a residential development, helps to minimise the need for travel off-site (i.e. education, healthcare and retail). The other main factor being accessibility to employment, which is covered later.

3.3.4 Site specific characteristics, such as the availability of spare capacity in existing local schools, will also be taken into account when identifying the need for new facilities. However, at this stage of the Local Plan this level of detail is not available and the thresholds summarised in **Table 4** provide a useful general guide.

- 3.3.5 It can be seen from **Table 4** that developments smaller than 250 dwellings are typically wholly reliant on the use of existing facilities in the local area. Developers will be required to make financial contributions towards enhancing the capacity of existing local facilities, but generally no new facilities are provided as an integral part of smaller residential developments. Small developments therefore typically have minimal opportunity to ‘internalise’ trips.
- 3.3.6 Residential developments of circa 1,400 or more houses are expected to provide new facilities on-site that may include a nursery, primary school, youth provision, local health care, retail and possibly a community hall / centre which would result in a proportion of the total trips generated remaining internal to the site.
- 3.3.7 Larger developments of 4,500 or more dwellings would be required to deliver new secondary schools and primary care facilities on site, in addition to the facilities mentioned above for sites of circa 1,400 or more dwellings. Developments of this scale therefore offer the greatest potential for the internalisation of trips by virtue of the wider range and scale of supporting facilities that are provided on-site as an integral part of the development.
- 3.3.8 To reflect this logic, consideration is given to development scale in Chapter 5 of this report when estimating trips by journey purpose, using the following residential development scale bands:

Table 5 – Residential Development Scale Bands

Band	Dwellings	General Description
0	1 – 1,399	Little or no scope for trip internalisation
1	1,400 - 4,499	Scope for trip internalisation
2	4,500 +	Good scope for trip internalisation

3.5 Development Phasing

- 3.5.1 The transport study will consider the transport implications of the reference case plus new development at a single forecast year of 2040, which corresponds to the end of the Local Plan period.
- 3.5.2 Except for planned new settlements, all development (within and outside of the district) will be assumed to be fully built-out and occupied by 2040.
- 3.5.3 The council is considering the allocation of possible new settlement(s) which will each deliver 3,000 dwellings by 2040 and up to circa 5,000 dwellings by 2060.
- 3.5.4 A sensitivity test will therefore be undertaken that also examines the full 5,000 dwelling build-out of each new settlement(s) at 2040.

3.6 Summary

- 3.6.1 Trip generation rates are required for each of the uses summarised in **Table 1** so that transport implications can be assessed in the study.

4 | TRICS Interrogation Methodology

4. TRICS INTERROGATION METHODOLOGY

4.1 Introduction

4.1.1 This chapter summarises how the TRICS 7.8.4 online database has been interrogated to obtain trip rates for the development use classes summarised in **Table 1** on page 11.

4.1.2 The TRICS Good Practice Guide provides guidance on how to extrapolate data from the database to obtain the most representative results. The guidance states that the most reliable data is obtained by selecting sites from all regions and excluding location types. The Good Practice Guide states:

‘Therefore, our current guidance is that regional selection should not be a major consideration when applying trip rate calculation filtering criteria, whilst TRICS® location type appears to be one of the most influential factors in terms of trip generation, and therefore should be one of the main filtering considerations.’

4.1.3 The main location type is considered to be one of the most important data fields in terms of site selection compatibility. A general guide to compatibility by main location category is shown in the table below:

Figure 1: TRICS General Guide to Site Compatibility

Location Type	Town Centre	Edge of Town Centre	Suburban Area	Edge of Town	Neighbourhood Centre	Free Standing
Town Centre	-	Possibly compatible	Not compatible	Not compatible	Not compatible	Not compatible
Edge of Town Centre	Possibly compatible	-	Possibly compatible	Possibly compatible	Not compatible	Not compatible
Suburban Area	Not compatible	Possibly compatible	-	Possibly compatible	Possibly compatible	Not compatible
Edge of Town	Not compatible	Possibly compatible	Possibly compatible	-	Possibly compatible	Possibly compatible
Neighbourhood Centre	Not compatible	Not compatible	Possibly compatible	Possibly compatible	-	Not compatible
Free Standing	Not compatible	Not compatible	Not compatible	Possibly compatible	Not compatible	-

4.2 TRICS Interrogation

4.2.1 The following selection criteria were applied consistently across all land uses:

- Calculate multi-modal trip rates selected
- All regions selected
- All areas selected
- Only surveys from Monday to Friday selected
- Only pre-Covid19 data used (31 December 2019 applied as cut-off date)
- Population within 1 mile > 20,000 excluded¹
- Population within 5 miles > 100,000 excluded

¹ Except for retail and Storage & Distribution uses where no population exclusions were applied due to the limited sample sizes.

4.2.2 Unless detailed in the table below all other TRICS selection criteria were left at their default settings.

Table 6 – TRICS Interrogation Parameters

Use-Classes	Main Land Use	Sub-Land Use	Trip Rate Parameter	Locations Excluded ²	Surveys Selected
C3 Residential	Residential	Houses Privately Owned	Dwellings	Edge of Town Centre Free Standing	49
E(a) Retail	Retail	Shopping Centre – Local Shops	Gross Floor Area	Town Centre	3
E(g)i Office	Employment	Office	Gross Floor Area	Town Centre Neighbourhood Centre	7
E(g)ii R & D	Employment	Business Park	Gross Floor Area	Town Centre Neighbourhood Centre	3
E(g)iii Light Industrial	Employment	Industrial Unit	Gross Floor Area	Free Standing	4
B2 General Industrial	Employment	Industrial Estates	Gross Floor Area	Edge of Town Centre Free Standing	10
B8 Storage & Distribution	Employment	Warehousing (Commercial)	Gross Floor Area	Free Standing	4

4.2.3 The C3 Dwelling Houses use-class could be divided into multiple sub-categories including privately owned, non-privately owned, affordable accommodation, assisted living accommodation, flats, bungalows, mixed developments etc. However, given that this is a strategic transport study that takes into account development across multiple planning authorities it is not feasible to consider residential sub-division due to the large number of sites involved, the absence of any detail being available in many cases, and the complexity that it would add to the calculations.

4.2.4 ‘Privately owned’ housing has a higher trip rate than ‘mixed private and affordable’ housing within the TRICS database. For the purposes of the transport study all residential development has therefore been assumed to comprise ‘Houses Privately Owned’ to provide a ‘worst case scenario’ in terms of trip generation, which is considered to be a robust approach.

² The ‘Locations Excluded’ category was adjusted to comply with TRICS site compatibility and remove warnings (see para’ 4.1.3).

4.3 Person Trip Rates

4.3.1 Full details of the TRICS outputs can be found in **Appendix A**. The resultant person trip rates are summarised in the table below.

Table 7 – Person Trip Rates (Person trips per dwelling / 100sqm GFA)

Use-Classes	AM Peak (0800-0900)			PM Peak (1700-1800)		
	Inbound	Outbound	Two-Way	Inbound	Outbound	Two-Way
C3 Residential	0.220	0.818	1.038	0.632	0.314	0.946
E(a) Retail	5.920	5.635	11.555	11.808	11.523	23.331
E(g)i Office	2.945	0.147	3.092	0.143	2.409	2.552
E(g)ii R & D	3.165	0.227	3.392	0.227	2.728	2.955
E(g)iii Light Industrial	0.292	0.045	0.337	0.160	0.415	0.575
B2 General Industrial	0.201	0.058	0.259	0.049	0.182	0.231
B8 Storage & Distribution	0.609	0.118	0.727	0.226	0.653	0.879

4.4 Vehicle Trip Rates

4.4.1 Vehicle trip rates obtained from TRICS are summarised in the table below.

Table 8 – Vehicle Trip Rates (Vehicle trips per dwelling / 100sqm GFA)

Use-Classes	AM Peak (0800-0900)			PM Peak (1700-1800)		
	Inbound	Outbound	Two-Way	Inbound	Outbound	Two-Way
C3 Residential	0.146	0.417	0.563	0.378	0.189	0.567
E(a) Retail	3.482	3.261	6.743	6.110	5.920	12.030
E(g)i Office	1.517	0.154	1.671	0.116	1.182	1.298
E(g)ii R & D	2.594	0.209	2.803	0.181	2.156	2.337
E(g)iii Light Industrial	0.230	0.039	0.269	0.052	0.294	0.346
B2 General Industrial	0.142	0.048	0.190	0.033	0.122	0.155
B8 Storage & Distribution	0.395	0.096	0.491	0.145	0.429	0.574

5 | Journey Purpose Analysis

5. JOURNEY PURPOSE ANALYSIS

5.1 Introduction

5.1.1 This chapter examines the different trip purposes in the weekday peaks for residential developments, to help with estimating how many of those trips can realistically remain internal to the site for the new settlements.

5.2 Destinations from Residential Use

5.2.1 The TEMPro 7.2 dataset has been interrogated to obtain weekday AM and PM peak period trips for the 2040 forecast year (end of Plan period) categorised by journey purpose. Trips for all modes combined were obtained with data aggregated at the Uttlesford authority level, which provides the greatest level of confidence in accordance with the TEMPro dataset notes.

5.2.2 The extracted TEMPro data is presented in **Appendix B** and is summarised in the table below. All Home Based (HB) trips have been summarised in **Table 9** below.

Table 9 – 2040 Homebased Person Trips by Journey Purpose

Homebased Trip Purposes	Weekday AM Peak (0700-1000hrs)		Weekday PM Peak (1600-1900hrs)	
	Origin	Destination	Origin	Destination
Work	16,634	18,203	14,635	13,589
Employers Business	2,186	2,110	2,013	2,056
Education	18,044	20,093	5,363	4,704
Shopping	6,072	5,483	8,336	8,590
Personal Business	4,020	3,085	3,820	4,082
Holiday / Day Trips	1,023	937	2,269	2,254
Other (Social / Recreation)	2,403	1,906	11,329	10,791
Totals	50,382	51,817	47,765	46,066

5.2.3 The TEMPro data covers three hour periods in the AM and PM peaks which is considered to be a good proxy for the AM and PM peak hours applied in the transport study. Because the TEMPro data relates to homebased trips the destination trip data is equivalent to departures from the home and the origin trip data is equivalent to arrivals at the home. The data in **Table 9** has been converted into percentages and the origin/destination relabelled as Arrivals and Departures, to be consistent with the usual trip presentation format. This is summarised in **Table 10** on the next page.

Table 10 – 2040 Homebased Person Trip Percentages by Journey Purpose

Homebased Trip Purposes	Weekday AM		Weekday PM	
	Arrivals	Departures	Arrivals	Departures
Work	33%	35%	31%	29%
Employers Business	4%	4%	4%	4%
Education	36%	39%	11%	10%
Shopping	12%	11%	17%	19%
Personal Business	8%	6%	8%	9%
Holiday / Day Trips	2%	2%	5%	5%
Other (Social / Recreation)	5%	4%	24%	23%
Totals	100%	100%	100%	100%

5.2.4 The Department for Transport’s National Travel Survey (NTS) is another commonly used data source for identifying trip journey purpose. However, the NTS is derived from national household surveys and has a much smaller sample size and is not location specific. TEMPro data is therefore considered to provide a more robust and reliable source of data at the district level.

6 | Internalisation of Trips

6. INTERNALISATION OF TRIPS

6.1 Introduction

6.1.1 This chapter considers the trips by journey purpose that are likely to remain internal to residential developments depending on the scale of the development proposed. These assumptions will be applied to the proposed new settlement(s) being considered within Uttlesford. For each journey purpose the estimated number of internal person trips is presented for notional development sizes of 1,000, 3,000 and 5,000 dwellings.

6.2 Journey Purposes

6.2.1 Peak period residential trips can be broken down into the following main journey purposes:

- Work – commuting to a place of work, trips from home to meetings etc.
- Education – pupil / student / escort trips to/from education establishments
- Shopping – trips for food and non-food retail
- Personal Business – trips for medical appointments, banks, solicitors, hairdressers etc.
- Other (Social / Recreation / Holiday) – visiting friends, trips to the gym, holidays etc.

6.3 Internalisation of Trips by Journey Purpose

Work Trips

6.3.1 The internalisation of work trips has been determined by using 2011 Census data for existing settlements within Uttlesford. The percentage of workers (excluding home workers) who live and work in the same Middle Super Output Area (MSOA), along with the number who work elsewhere within Uttlesford District have been derived from the total number of non-home workers within each MSOA. The results of this analysis are summarised in the table below and full details can be found in **Appendix C**.

Table 11 – Percentage of Workers Living and Working in the same MSOA

MSOA Name	Area Description	Economic Active	Mainly work from home	Of those who don't work at home			Jobs in MSOA (JTW arrivals)	Jobs in MSOA taken by MSOA residents
				Live/Work in same MSOA	Work elsewhere in UD	Work outside UD		
Uttlesford 001	Great Chesterford/Rural	3,586	17%	10%	30%	60%	2,892	10%
Uttlesford 002	Saffron Walden	6,506	10%	29%	22%	48%	4,605	41%
Uttlesford 003	Newport/Rural	4,206	19%	10%	24%	66%	1,316	27%
Uttlesford 004	Thaxted/Rural	4,182	20%	22%	26%	51%	2,127	36%
Uttlesford 005	Stansted Mountfitchet	6,662	15%	10%	18%	72%	2,495	21%
Uttlesford 006	Takeley/Rural	4,253	14%	17%	17%	65%	10,512	6%
Uttlesford 007	Great Dunmow	3,902	11%	18%	23%	59%	2,840	21%
Uttlesford 008	Felsted/Rural	5,305	16%	11%	23%	66%	2,007	23%
Uttlesford 009	Hatfield Broad Oak/Rural	3,871	20%	9%	13%	78%	1,830	15%
District Totals		42,473	16%	37%		63%	30,624	18%

- 6.3.2 The area of the district with the largest proportion of employees living and working in the same MSOA is Saffron Walden (29%), which isn't surprising as it's the largest town in the district with a range of employment opportunities available. Thaxted (22%), Takeley, which contains Stansted airport (17%), and Great Dunmow (18%) also all exhibit higher proportions of employees living and working in the same MSOA than the more rural areas of the district, which exhibit around 10% on average.
- 6.3.3 At this stage of the Local Plan process no details are available of the employment offering that will be provided in the planned new settlements. Therefore, a high level assumption needs to be made for the purposes of estimating likely commuter trip internalisation. Based on the analysis of 2011 Census data it is considered reasonable to assume that at least 10% of employment related trips will remain internal to the larger planned developments (i.e. equivalent to the rural areas of the district which have the least employment offering). Therefore, for the purposes of this study the percentages summarised in the table below have been assumed.

Table 12 – Internalisation of Residents Employment Trips

Band	Dwellings	Employment Trip Internalisation	2-Way Internal Person Trips by No. Dwellings					
			1,000		3,000		5,000	
			AM	PM	AM	PM	AM	PM
0	1 – 1,399	0%	0	0	-	-	-	-
1	1,400 - 4,499	10%	-	-	108	86	-	-
2	4,500 +	10%	-	-	-	-	180	143

- 6.3.4 To provide a logic check the estimated employment trip internalisation has been equated to the floor area of employment uses that would be required to generate this number of jobs to see if this could reasonably be provided as part of new Local Plan development.
- 6.3.5 Details of this calculation can be found in **Appendix D**. The calculation derives the total number of person trips from a development comprising 3,000 dwellings, identifies the proportion of the total trips that are related to employment and identifies the 10% that are assumed to be employed within the site. The calculation then applies employment densities taken from the Homes and Communities Agency (HCA) "Employment Density Guide, 3rd Edition, Nov 2015" to estimate the employment floor area required to deliver this number of jobs on site.
- 6.3.6 Applying this methodology a development comprising 3,000 dwellings would generate a total of 862 work related person trip departures in the AM peak. Applying the assumed 10% for internalisation means 86 persons will be employed within the site.
- 6.3.7 Applying the HCA employment densities to the 86 persons gives the estimated floor area required to deliver this number of jobs. These areas have then been adjusted to reflect the district average percentage of jobs in an MSOA that are taken by residents living in the same MSOA which is 18%, which means that 82% of jobs are taken by employees from outside of the MSOA (see **Table 11** on the previous page) to estimate the total floor area required. The results are presented in **Table 13** on the next page. Note that only one of the listed employment uses would be needed to deliver the required number of jobs and the table presents data for a range of employment uses for information.

Table 13 – Employment Internalisation Logic Check – 3,000 Dwellings

Use-Classes	Floor Area per Employee (sqm)	Employment Floor Area for Local Employees (sqm)	Total Employment Floor Area Required (sqm)
E(a) Retail	18	1,552	8,621
E(g)i Office	12	1,034	5,747
E(g)ii R & D	50	4,310	23,947
E(g)iii Light Industrial	47	4,052	22,510
B2 General Industrial	36	3,103	17,242
B8 Storage & Distribution	77	6,638	36,878

6.3.8 As can be seen from **Table 13** the employment floor areas required to accommodate the assumed 10% employment trip internalisation are relatively modest and should be achievable within the scale of employment development is expected to be delivered as part of the major new developments within the district.

Employers Business Trips

6.3.9 Employers business trips include trips made from home for the purpose of work but which are not a person's usual commuting journey (i.e. travelling to a site visit or meeting from home). As all employers business trips will be made off site, a 0% internalisation factor will be applied to all trips in this category. For the purposes of this study the percentages summarised in the table below have been assumed for the AM / PM peaks.

Table 14 – Internalisation of Employers Business Trips

Band	Dwellings	Employers Business Trip Internalisation	2-Way Internal Person Trips by No. Dwellings					
			1,000		3,000		5,000	
			AM	PM	AM	PM	AM	PM
0	1 – 1,399	0%	0	0	-	-	-	-
1	1,400 - 4,499	0%	-	-	0	0	-	-
2	4,500 +	0%	-	-	-	-	0	0

Education Trips

6.3.10 Developments of between 1,400 and 4,499 dwellings (Band 1) are usually required to provide a new two form entry primary school (420 places) as part of the development but secondary education needs are still met by existing schools in the local area.

6.3.11 Developments of 4,500 and more dwellings (Band 2) are required to provide new primary and secondary schools, and in theory all education needs should be addressed on-site for a development of this scale. However, when estimating internalisation for school trips, a number of factors will affect the number of pupils attending the schools within the development such as parental choice, available

capacity in adjacent schools and children remaining in previous schools when families move to the new development. As a result 100% internalisation of education trips is unlikely to be achieved.

- 6.3.12 Site specific details are not available at this stage of the Local Plan so it is not possible to quantify the effects of these factors. An assumption has therefore been applied that 25% of the total education related trips will travel off-site even if enough primary and secondary school places are provided on site to meet the full demand.
- 6.3.13 The provision ratios for primary and secondary school places (see **Table 4** on page 13) are as follows:
- Primary education – 0.3 children per dwelling
 - Secondary education – 0.2 children per dwelling
- 6.3.14 Based on these ratios 60% of total education trips relate to primary education and 40% relate to secondary education. Applying the assumed 25% for trips that will travel off-site regardless gives an internalisation of 45% for primary education and 30% for secondary education. Therefore, for a development providing a primary school only (Band 1) the total education internalisation will be 45% and for a development providing primary and secondary schools (Band 2) the total education internalisation will be 75%. This is summarised in the table below.

Table 15 – Internalisation of Education Trips

Band	Dwellings	Education Trip Internalisation	2-Way Internal Person Trips by No. Dwellings					
			1,000		3,000		5,000	
			AM	PM	AM	PM	AM	PM
0	1 – 1,399	0%	0	0	-	-	-	-
1	1,400 - 4,499	45%	-	-	535	139	-	-
2	4,500 +	75%	-	-	-	-	1,485	386

Shopping Trips

- 6.3.15 It is assumed that most shopping trips made during the AM and PM peaks will be related to food (convenience) shopping for lower value daily essentials such as food, drink, newspapers and non-durable household goods, as opposed to non-food (comparison) shopping for higher value items such as clothes, shoes, electronic devices, furniture, household appliances etc.
- 6.3.16 It is also assumed that most food shopping trips made during the AM and PM peaks will be for 'topping up' daily essentials as opposed to the main weekly shop which typically occurs outside of the peaks or at weekends.
- 6.3.17 On this basis most shopping requirements are expected to be met by a local supermarket or convenience store, which all larger developments should provide on-site, in scale with the size of development (see **Table 4** on page 13).
- 6.3.18 Presently the level of comparison / non-comparison retail facilities are unknown. Therefore, for the purposes of this study the percentages summarised in the table below have been assumed for the

internalisation of shopping trips. These figures are subject to change once masterplanning commences and there is greater certainty of the quantum of proposed facilities.

6.3.19 Data presented on the Statista website³ confirms that on average 51% of shoppers travel less than a quarter of a mile to their local convenience store (based on 2021 survey data), and 80% travel less than one mile, which supports the assumptions presented below.

Table 16 – Internalisation of Shopping Trips

Band	Dwellings	Shopping Trip Internalisation	2-Way Internal Person Trips by No. Dwellings					
			1,000		3,000		5,000	
			AM	PM	AM	PM	AM	PM
0	1 – 1,399	0%	0	0	-	-	-	-
1	1,400 - 4,499	25%	-	-	85	127	-	-
2	4,500 +	50%	-	-	-	-	283	422

Personal Business Trips

6.3.20 The TEMPro definition of personal business includes visits to services including hairdressers, betting shops, dry cleaners, solicitors, banks, estate agents, libraries, churches and medical consultations. Trips to these types of services during the AM and PM peaks are more likely to be focused on medical appointments and visits to the types of services typically available in a local / neighbourhood centre.

6.3.21 Based on the thresholds for the provision of new facilities (see **Table 4** on page 13) it has been assumed that larger developments will be expected to provide facilities including:

- GP Surgery / Dental Surgery
- Community centre
- Local shops – which may include hairdressers, betting shops, dry cleaners, solicitors, banks, estate agents etc.

6.3.22 The exact facilities provided will vary by location and will depend on local commercial factors, however the larger the development the greater likelihood of these types of services being provided on site so for the purposes of this study the percentages summarised in the table below have been assumed. These figures are subject to change once masterplanning commences and there is greater certainty of the quantum of proposed facilities.

Table 17 – Internalisation of Personal Business

Band	Dwellings	Personal Business Trip Internalisation	2-Way Internal Person Trips by No. Dwellings					
			1,000		3,000		5,000	
			AM	PM	AM	PM	AM	PM
0	1 – 1,399	0%	0	0	-	-	-	-
1	1,400 - 4,499	25%	-	-	50	59	-	-

³ <https://www.statista.com/statistics/292855/distances-shoppers-travel-to-convenience-stores-in-great-britain/>

2	4,500 +	50%	-	-	-	-	166	196
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Holiday / Day Trips

6.3.23 Holiday / day trips include activities such as travelling to holiday destinations both in the UK and also abroad which will include trips to public transport hubs, ferry / crossing terminals and airports. Day trips include trips to / from other leisure destinations. As holiday / day trips will be taken off site, a 0% internalisation factor will be applied to all trips in this category. For the purposes of this study the percentages summarised in the table below have been assumed for the AM / PM peaks.

Table 18 – Internalisation of Holiday / Day Trips

Band	Dwellings	Holiday / Day Trip Internalisation	2-Way Internal Person Trips by No. Dwellings					
			1,000		3,000		5,000	
			AM	PM	AM	PM	AM	PM
0	1 – 1,399	0%	0	0	-	-	-	-
1	1,400 - 4,499	0%	-	-	0	0	-	-
2	4,500 +	0%	-	-	-	-	0	0

Recreation / Social Trips

6.3.24 Recreation trips include activities such as visits to parks and children's play areas, visits to gyms, sports/leisure facilities and visits to friends etc. For the purposes of this study the percentages summarised in the table below have been assumed for the AM / PM peaks.

Table 19 – Internalisation of Recreation / Social Trips

Band	Dwellings	Recreation / Social Trip Internalisation	2-Way Internal Person Trips by No. Dwellings					
			1,000		3,000		5,000	
			AM	PM	AM	PM	AM	PM
0	1 – 1,399	0%	0	0	-	-	-	-
1	1,400 - 4,499	25%	-	-	30	168	-	-
2	4,500 +	50%	-	-	-	-	101	559

6.4 Summary

6.4.1 Taking account of the above, **Table 20** provides a summary of trip internalisation for different journey purposes, and this has then been applied to calculate the internal / external split of residential generated person trips.

Table 20 – Summary of Residential Peak Period Trip Internalisation

Trip Purpose	Band 0 - Splits		Band 1 - Splits		Band 2 - Splits	
	Internal	External	Internal	External	Internal	External
Work	0%	100%	10%	90%	10%	90%
Employers Business	0%	100%	0%	100%	0%	100%
Education	0%	100%	45%	55%	75%	25%
Shopping	0%	100%	25%	75%	50%	50%
Personal Business	0%	100%	25%	75%	50%	50%
Holiday / Day Trips	0%	100%	0%	100%	0%	100%
Other (Social / Recreation)	0%	100%	25%	75%	50%	50%

7 | Modal Splits

7. MODAL SPLITS

7.1 Introduction

7.1.1 Travel to work modal splits have been obtained from the 2011 Census for the usual Resident Population of Uttlesford. Modal splits are summarised by the main settlements within the district and an average has been calculated for the rural areas.

7.2 2011 Census Modal Split Data

7.2.1 Details of the analysis of the 2011 Census data can be found in **Appendix C**. Summaries are provided in the table below.

Table 21 – 2011 Census (Resident Population) Travel to Work Modal Splits

Location	Rail	Bus & Taxi	M/Cycle	Car	Car Passenger	Bicycle	Walk
District Average	10.20%	1.93%	0.64%	71.27%	4.02%	1.23%	10.06%
District Average ⁴	9.17%	1.84%	0.70%	73.76%	3.71%	1.25%	8.86%
Urban Average	7.02%	1.97%	0.60%	67.35%	4.07%	1.20%	17.16%
Rural Average	11.56%	1.82%	0.72%	73.12%	3.84%	1.35%	6.91%
Rural Average ⁵	10.53%	1.85%	0.76%	73.45%	3.70%	1.48%	7.52%
Great Dunmow	5.56%	1.84%	0.57%	74.47%	3.51%	0.74%	12.66%
Saffron Walden	7.85%	2.04%	0.61%	63.33%	4.39%	1.46%	19.71%
Stansted Mountfitchet	17.08%	1.70%	0.46%	67.64%	4.52%	1.05%	7.09%
Thaxted	7.07%	1.77%	0.52%	74.59%	4.39%	0.65%	10.28%
Takeley	7.82%	3.01%	0.52%	79.06%	4.26%	1.12%	3.65%

7.2.2 The car modal split highlighted in green in the table above have been derived from 2011 Census data for the urban areas of the district (average of Saffron Walden and Great Dunmow Wards, the Stansted Mountfitchet & Stansted Ward was excluded because it contains Stansted airport). This modal split has been applied to external person trips generated by new settlements within the district to estimate residential external vehicle trips.

7.2.3 The urban average modal split is considered to best reflect the range of facilities that will be provided as part of the larger new settlements. This modal split has been applied for all locations except Saffron Walden where location specific modal splits have been applied (highlighted in orange in the table above).

7.2.4 As a comparison, multi modal trip rates have been extrapolated from the TRICS database and are presented in **Table 22** on the next page.

⁴ Data excludes rural areas that are close to rail stations.

⁵ Data excludes rural areas that are close to rail stations.

7.2.5 Comparing the TRICS modal splits for residential use against the Resident Population 2011 Census data it can be seen that bus / taxi, motorcycle and cycle use is broadly similar. Car, rail and walking are all lower in TRICS with the main difference being made up by a higher number of vehicle passengers in TRICS.

Table 22 – TRICS Modal Percentage per Land Use Class

Land Use Class	Rail	Bus & Taxi	M/Cycle	Car	Vehicle Passenger	Bicycle	Walk	Other	Total
C3 Residential	0.55%	1.86%	0.20%	51.31%	27.27%	1.76%	11.84%	5.19%	100.00%
E(a) Retail	0.00%	1.73%	0.00%	47.91%	18.06%	0.91%	25.86%	5.54%	100.00%
E(g)i Office	7.57%	16.53%	1.44%	46.97%	5.60%	3.14%	15.86%	2.91%	100.00%
E(g)ii R & D	0.00%	3.89%	0.38%	76.29%	14.65%	0.90%	1.76%	2.13%	100.00%
E(g)iii Light Industrial	0.00%	6.03%	0.55%	55.81%	21.49%	1.54%	3.84%	10.75%	100.00%
B2 General Industrial	0.00%	2.24%	0.41%	51.84%	21.84%	1.22%	4.29%	18.16%	100.00%
B8 Storage & Distribution	2.62%	9.84%	0.75%	48.82%	12.89%	1.37%	6.72%	17.00%	100.00%

7.2.6 Whilst not all trips made during the peaks are work related it is considered reasonable to apply 2011 Census Travel to Work modal splits to the external person trips in this instance because they have already been adjusted for internalisation and the majority of the residual trips are therefore work related.

7.2.7 For this reason it's not appropriate to apply a similar methodology to derive residential external vehicle trips for smaller sites which offer minimal internalisation, which is why unadjusted TRICS vehicle trip rates have been applied to residential developments of less than 1,400 dwellings, to avoid distorting trip rates by applying Travel to Work modal splits to person trip rates that still include a large proportion of non-work related trips.

7.3 Potential for Modal Shift

7.3.1 No adjustments have been applied to the Census 2011 modal splits to reflect potential future infrastructure or service enhancements which may encourage greater use of sustainable modes than observed in the Census data. The use of observed modal splits in this way is considered to be robust.

7.4 Potential for Peak Spreading and Home Working

7.4.1 No adjustments have been applied to the trip generation calculations to reflect potential future peak spreading, or home working which may result in lower demand for travel in the 'traditional' highway peaks of 0800-0900 AM and 1700-1800 PM. This is also considered to be robust.

7.4.2 Covid-19 affected data was specifically excluded from the TRICS interrogation and the use of 2011 Census data means that all the trip generation calculations presented in this report reflect pre-Covid conditions.

8 | Residential External Vehicle Trip Rates

8. RESIDENTIAL EXTERNAL VEHICLE TRIP RATES

8.1 Introduction

8.1.1 This chapter describes how residential external person trip rates are converted to residential external vehicle trip rates by applying observed 2011 Census modal splits.

8.2 Residential External Vehicle Trip Rates

8.2.1 Residential external vehicle trip rates have been calculated by applying the modal split percentages identified in Chapter 7 to the residential external person trips identified in Chapter 4, after reductions for internalisation to reflect development scale have been applied (as identified in Chapter 6). The calculation process is summarised as follows.

Table 23 – Residential Person Trip Rates (person trips per dwelling)

Use-Class	AM Peak (0800-0900)			PM Peak (1700-1800)		
	Arrivals	Departures	2-Way	Arrivals	Departures	2-Way
C3 Residential	0.220	0.818	1.038	0.632	0.314	0.946

Table 24 – Trip Internalisation Reduction Percentages

Band	AM			PM		
	Arrivals	Departures	2-Way	Arrivals	Departures	2-Way
Band 0	0%	0%	0%	0%	0%	0%
Band 1	26%	26%	26%	20%	20%	20%
Band 2	43%	43%	43%	36%	36%	36%

8.2.2 Applying the reduction percentages in **Table 24** to the person trip rates in **Table 23** gives the external person trip rates summarised in **Table 25**.

Table 25 – Residential External Person Trip Rates (person trips per dwelling)

Band	AM			PM		
	Arrivals	Departures	2-Way	Arrivals	Departures	2-Way
Band 0	0.220	0.818	1.038	0.632	0.314	0.946
Band 1	0.164	0.605	0.769	0.503	0.250	0.753
Band 2	0.126	0.469	0.595	0.404	0.201	0.605

8.2.3 Modal splits are summarised in the following table. These are derived from the 2011 Census for the resident population. These have been applied to the residential external person trip rates to obtain external vehicle trip rates for different locations within the district.

Table 26 – 2011 Census Modal Splits (Resident Population)

Location	Car Driver Modal Split %
Urban Average	67.35%
Great Dunmow	67.35%
Saffron Walden	63.33%
Stansted Mountfitchet	67.35%
Thaxted	67.35%
Takeley	67.35%

8.2.4 Applying the above Car Driver modal split percentages to the respective residential external person trip rates in **Table 25** gives the residential external vehicle trip rates summarised in the table below.

Table 27 – Residential External Vehicle Trip Rates (vehicle trips per dwelling)

Scale Bands	Location	AM			PM		
		Arrivals	Departures	2-Way	Arrivals	Departures	2-Way
Band 0	Rural Average	-	-	-	-	-	-
	Great Dunmow	-	-	-	-	-	-
	Saffron Walden	-	-	-	-	-	-
	Stansted Mountfitchet	-	-	-	-	-	-
	Thaxted	-	-	-	-	-	-
	Takeley	-	-	-	-	-	-
Band 1	Rural Average	0.110	0.408	0.518	0.339	0.169	0.507
	Great Dunmow	0.110	0.408	0.518	0.339	0.169	0.507
	Saffron Walden	0.104	0.383	0.487	0.319	0.159	0.477
	Stansted Mountfitchet	0.110	0.408	0.518	0.339	0.169	0.507
	Thaxted	0.110	0.408	0.518	0.339	0.169	0.507
	Takeley	0.110	0.408	0.518	0.339	0.169	0.507
Band 2	Rural Average	0.085	0.316	0.401	0.272	0.135	0.407
	Great Dunmow	0.085	0.316	0.401	0.272	0.135	0.407
	Saffron Walden	0.080	0.297	0.377	0.256	0.127	0.383
	Stansted Mountfitchet	0.085	0.316	0.401	0.272	0.135	0.407
	Thaxted	0.085	0.316	0.401	0.272	0.135	0.407
	Takeley	0.085	0.316	0.401	0.272	0.135	0.407

8.3 Comparison

8.3.1 A comparison has been undertaken between the TRICS residential vehicle trip rates and the residential external vehicle trip rates derived through the process described in this report. The results of this comparison are summarised in the table on the following page.

Table 28 – TRICS Vehicle Trip Rates compared to Residential External Vehicle Trip Rates

Scale Bands	Location	AM			PM		
		Arrivals	Departures	2-Way	Arrivals	Departures	2-Way
TRICS Vehicle Trip Rates (Vehicles per Dwelling)							
TRICS Vehicle Trip Rates		0.146	0.417	0.563	0.378	0.189	0.567
Percentage Difference Compared to Residential External Vehicle Trip Rates in Table 27							
Band 0	Rural Average	-	-	-	-	-	-
	Great Dunmow	-	-	-	-	-	-
	Saffron Walden	-	-	-	-	-	-
	Stansted Mountfitchet	-	-	-	-	-	-
	Thaxted	-	-	-	-	-	-
	Takeley	-	-	-	-	-	-
Band 1	Rural Average	75%	98%	92%	90%	89%	89%
	Great Dunmow	75%	98%	92%	90%	89%	89%
	Saffron Walden	71%	92%	86%	84%	84%	84%
	Stansted Mountfitchet	75%	98%	92%	90%	89%	89%
	Thaxted	75%	98%	92%	90%	89%	89%
	Takeley	75%	98%	92%	90%	89%	89%
Band 2	Rural Average	58%	76%	71%	72%	72%	72%
	Great Dunmow	58%	76%	71%	72%	72%	72%
	Saffron Walden	55%	71%	67%	68%	67%	68%
	Stansted Mountfitchet	58%	76%	71%	72%	72%	72%
	Thaxted	58%	76%	71%	72%	72%	72%
	Takeley	58%	76%	71%	72%	72%	72%

8.3.2 For developments in Band 0 no internalisation is assumed so unadjusted TRICS vehicle trip rates will be applied to estimate trip generation for all Band 0 development. For this reason the Band 0 entries in Table 27 and 28 are left blank.

8.3.3 For Band 1 and Band 2 the derived external vehicle trip generation rates are lower than the average TRICS vehicle trip rates (a reduction in two-way trips of circa 10% for Band 1 and circa 30% for Band 2). The external vehicle trip generation rates get smaller as the settlement size increases because more trip internalisation is achieved due to a greater range of facilities being provided on-site.

9 | Applying the Trip Rates

9. APPLYING THE TRIP RATES

9.1 Introduction

9.1.1 This chapter describes how the trip rates discussed in this report will be applied in the transport study.

9.2 Residential Development within the District

9.2.1 For residential developments within the district that fall into Band 0 (i.e. less than 1,400 dwellings) the unadjusted TRICS vehicle trip rates identified in **Table 8** on page 19 will be applied.

9.2.2 For new settlements within the district (i.e. residential developments of more than 1,400 dwellings) the residential external trip rates identified in **Table 27** on page 37 will be applied.

9.2.3 This will apply to all Local Plan residential allocations and all residential development within the district identified through the Uncertainty Log.

9.3 Employment Development within the District

9.3.1 The unadjusted TRICS vehicle trip rates identified in **Table 8** on page 19 will be applied to all new employment development within Uttlesford (i.e. all Local Plan employment allocations and all employment development identified within the district through the Uncertainty Log).

9.4 All Development Outside of the District

9.4.1 The unadjusted TRICS vehicle trip rates identified in **Table 8** on page 19 will be applied to all new development identified outside of the district through the Uncertainty Log (residential and employment).

APPENDICES

APPENDIX A - TRICS DATA

APPENDIX B – TEMPRO JOURNEY PURPOSE DATA

APPENDIX C – MODAL SPLIT ANALYSIS

APPENDIX D – TRIP RATE CALCULATIONS

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