

Forecasting Methodology Technical Note

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Forecasting Methodology Technical Note

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1. Introduction

1.1 Foreword

As Kent Transport Model (KTM) custodian to Kent County Council (KCC), Jacobs have been asked to develop the required strategic modelling necessary to provide the evidence base for the Regulation 19 (Reg19) Local Plan consultation for Medway Council (MC). This warrants development of the Medway Transport Model based on an existing cordon of the KTM, developed to support the neighbouring Gravesham Transport Model. The Medway Transport Model needs to follow a standard sufficient for this purpose, with due regard to Transport Analysis Guidance (TAG).

The purpose of this Forecasting Methodology Technical Note is to set out the forecasting assumptions and methodology to assess the possible highway impacts of the emerging Medway Local Plan for Reg19 consultation and outlines the development of the 2040 Reference Case and Do Something Local Plan scenarios.

1.2 Background Information

1.2.1 Model Background

KCC commissioned Jacobs to develop the Medway Transport Model, inherited from the KTM. The KTM was built to help KCC understand how people currently travel strategically around the region and how this might change with future growth and as major schemes and strategic interventions are implemented. The KTM was built with the following objectives:

- To help to develop countywide transport strategies;
- To help to assess the combined strategic impact of major highway schemes;
- To help to provide evidence for early appraisal and sifting of strategic major scheme options and to support the development consent order and town and country planning process on key schemes;
- To help to assess the combined strategic impact of Local Plans on the network, including providing evidence for Local Plan development and hearings (and cumulative impacts once Local Plans are in place);
- To provide evidence and robust, responsive, and persuasive arguments to a range of internal and external stakeholders, including responses to Government department or company consultations;
- The ability to help understand and mitigate the impact of external influences, e.g. Brexit, Housing allocations, National Highways schemes;
- To help to understand suitable phasing of maintenance and utilities work to manage congestion impacts;
- To provide a potential platform for a suite of strategic town/sub-area models or scheme-specific models requiring greater detail;
- To provide a potential basis for highway corridor micro-simulation models in the PTV VISSIM software platform; and
- To provide a potential platform for future dynamic and/or real-time predictive modelling solutions that could help optimise the performance of the existing Kent transport network using technology

The Medway Transport Model, based on the KTM, has been developed as the primary transport evidence base to inform the Regulation 19 consultation and mitigation development for the emerging Local Plan and will be

useful to assess any future development planning / network management work in Medway over the next few years.

The base year Medway Transport Model is based on the KTM cordoned model Gravesham Transport Model. The network and zoning detail in the Medway Transport Model was enhanced and refined as part of the local model revalidation process. The Area of Detailed Modelling (AODM) has been defined using the Medway district boundary with the addition of 2km buffer and two junctions on the strategic road network.

The Medway model will be used as the basis for developing a 2040 Reference Case ('Do Minimum' – e.g without the Local Plan) in which committed developments and infrastructure will be modelled, in addition to adjusted background growth. Subsequently a 2040 'Do Something' model (e.g with the Local Plan option) will be developed to assess the proposed Local Plan allocations, to be consulted on as part of Reg19.

1.2.2 Objectives of a Local Plan Detailed Assessment

The objectives of Local Plan (LP) assessments are to:

1. Assess the quality and capacity of transport infrastructure across the borough and its ability to meet forecast demands – this can be developed through the traffic modelling proposed here.
2. Assess the cumulative impacts of the LP development options on the borough's transport network – this can be developed through the traffic modelling proposed here.
3. Identify proposals and potential measures to mitigate the impacts of development to inform the infrastructure requirements associated with the LP. This should include, but is not limited to:
 - a. Identification of potential measures to enable and achieve higher levels of sustainable transport mode share across the borough.
 - b. Identification of the potential barriers to the utilisation of sustainable transport modes across the borough.
 - c. Identification of potential intervention measures on the transport network.

1.2.3 Medway Local Plan

MC are required to undertake traffic modelling assessments to inform decision making on the Medway Local Plan for Reg19 consultation, which is proposed for 2024. This Forecasting Methodology Technical Note outlines the assumptions and inputs that underpin the development of the Medway Transport Model 2040 Reference Case and Do Something scenarios and should be read in conjunction with the Local Model Validation Report (LMVR).

1.3 Report Structure

The remainder of this Technical Note is set out as follows:

- **Section 2** – Approach to Forecasting;
- **Section 3** – Forecasting Demand;
- **Section 4** – Forecast Networks; and,
- **Section 5** – Summary and Conclusion.

2. Approach to Forecasting

2.1 Introduction

Forecast modelling consists of two core elements: forecast supply (transport infrastructure) and forecast demand. Following the development of the base year Medway Transport Model, Reference Case and Do Something forecast scenarios will be developed to assess the impact of the proposed Local Plan allocations for Regulation 19 consultation. This section sets out the general approach to forecasting, including information about the forecasting models and description of the collection of future development data that will be included in the models.

2.2 Software

PTV's VISUM 2022 has been used as the software platform for the highway component of the model. This was the latest version at the time of the base year Medway Transport Model development and therefore forecasting will remain consistent with this.

2.3 Forecast Year and Scenarios

In agreement with KCC and MC, the forecasting scenarios will be developed and used to assess the impacts of the potential Local Plan site allocations for a single year of 2040, as the end of the proposed Local Plan period. The scenarios will represent the AM Peak (08:00-09:00) and PM Peak (17:00-18:00).

2.4 Forecast Scenarios

Using the Medway Transport Model calibrated base, the following 2040 forecast scenarios will be developed:

- **Reference Case (Do Minimum)** – will include completions and consented development and infrastructure planned for the 2019-2040 growth period within Medway; outside of the Area of Detailed Modelling, 'near certain' developments will be modelled in adjoining authorities (Gravesham, Tonbridge & Malling, Maidstone and Swale) and background car growth will come from TEMPro v8 (using alternative assumptions tool for adjoining authorities to ensure no double counting). Goods vehicle growth across the model will be provided by Road Traffic Forecasts (RTF).
- **Reference Case with Lower Thames Crossing** – a sensitivity test to ascertain changes to the highway impacts with the inclusion of the Lower Thames Crossing (LTC); the only difference between the Reference Case and Reference Case with LTC will be the inclusion of the crossing itself (e.g the demand will remain consistent and the only change between Reference Case and Reference Case with LTC relates to the network).
- **Do Something** – will build upon the Reference Case scenario, with the inclusive of proposed Local Plan allocations and associated infrastructure (where appropriate). The only difference between the Reference Case and the Do Something will be the proposed Local Plan demand and infrastructure.
- **Do Something with Lower Thames Crossing** – a sensitivity test to ascertain changes to the highway impacts with the inclusion of LTC; the only difference between the Do Something and Do Something with LTC will be the inclusion of the crossing itself (e.g the demand will remain consistent and the only change between Do Something and Do Something with LTC relates to the network).

Further details on each of the scenarios are further explained in Section 4: Forecasting Networks.

2.5 The Uncertainty Log

The primary purpose for developing the Uncertainty Log is to provide the spatial distribution of planned developments and transport schemes by using Local Authority planning data for housing and employment developments as well as National Highways transport schemes.

The Medway Transport Model represents a 2019 base year and so it is important to first consider housing and employment development that have been build out (or demolished) between 2019 and 2023.

In order to develop the Medway forecast scenarios, Uncertainty Log information has been provided by MC and includes information on completions/demolitions since the model base year and a list of future committed developments and infrastructure schemes within Medway and the AODM.

The Uncertainty Log information includes:

- Latest available information at the time of model development on completions/demolitions since 2019, including location and size;
- Committed development locations, land use, and size (number of dwellings or floorspace);
- Access arrangements and any changes to the existing network related to developments; and
- Committed infrastructure schemes or network changes (e.g major junction upgrade or local speed reductions).

MC provided Jacobs with a list of committed employment by location and area (sqm) – where information on the number of jobs was not publicly available, the number of jobs has been calculated using the employment sqm information provided and applying the Employment Density Guide (produced by the Home and Communities Agency); these conversion rates are shown in Table 2-1.

Table 2-1 – Employment Density Matrix

Land Use	1 Employee per Density (sqm)	Notes
A1 - Retail	18	Net Internal Area (NIA)
A2 – Finance & Professional Services	16	NIA
A3 – Restaurants & Cafes	18	NIA
B1a – General Office	12	NIA
B1b – Retail & Dining	50	NIA
B1c – Light Industrial	47	NIA
B2 – Industrial	36	Gross External Area (GEA)
B8 – Storage & Distribution	77	GEA
C1 – Hotels	2	Per bed
D2 – Leisure	70	Gross Internal Area (GIA)
SG – Sui Generis	60	GEA

The Uncertainty Log was prepared in accordance with TAG Unit M4 and draft DMRB guidance Volume 5, Section 1, Part 2. According to TAG Unit M4, the probability of a development can be classified as described in Table 2-2. The table includes the development status and the assumption to include in core or alternative scenarios.

Table 2-2 - Classification of Future Inputs from (TAG Unit M4, Table A2)

Probability of the Input	Status	Core Scenario Assumption
Near certain: The outcome will happen or there is a high probability that it will happen.	Intent announced by proponent to regulatory agencies. Approved development proposals. Projects under construction.	This should form part of the core scenario.
More than likely: The outcome is likely to happen but there is some uncertainty.	Submission of planning or consent application imminent. Development application within the consent process.	This could form part of the core scenario.

Probability of the Input	Status	Core Scenario Assumption
<p>Reasonably foreseeable: The outcome may happen, but there is significant uncertainty.</p>	<p>Identified within a development plan. Not directly associated with the transport strategy/ scheme but may occur if the strategy/scheme is implemented. Development conditional upon the transport strategy/scheme proceeding. Or, a committed policy goal, subject to tests (e.g., of deliverability) whose outcomes are subject to significant uncertainty</p>	<p>These should be excluded from the core scenario but may form part of the alternative scenarios.</p>
<p>Hypothetical: There is considerable uncertainty whether the outcome will ever happen.</p>	<p>Conjecture based upon currently available information. Discussed on a conceptual basis. One of a number of possible inputs in an initial consultation process. Or, a policy aspiration.</p>	<p>These should be excluded from the core scenario but may form part of the alternative scenarios.</p>

For the development of the Medway forecast models, all 'Near Certain' developments and infrastructure will be included in Medway, this will form the only car growth in the borough.

In the neighbouring authorities of Gravesham, Tonbridge & Malling, Maidstone and Swale, 'near certain' developments will be included and background growth factors from TEMPro will be applied, using the alternative assumptions tool to deduct housing and jobs associated with the 'near certain' developments.

Growth outside of Medway and neighbouring Gravesham, Tonbridge & Malling, Maidstone and Swale, will come solely from TEMPro and RTF background growth (discussed in more detail in section 3).

3. Forecasting Demand

3.1 Introduction

This section sets out the methodology for determining the forecast growth in the Reference Case, Reference Case with LTCm Do Something and Do Something with LTC scenarios. This section discusses the provision of uncertainty log information, trip generation based on trip rates and trip distribution. It also describes the application of car and good vehicle background growth.

3.2 Highway Growth

The Reference Case Highway (car) demand in 2040 is based upon car growth derived from future committed developments and background growth generated from TEMPro v8.0. This growth is applied to the AM Peak and PM Peak hour OD demand matrices through a furnessing process to obtain the final 2040 Reference Case demand matrix.

The following steps are considered to derive the future matrices for 2040:

- Identification of planning data (Uncertainty log);
- TEMPro background growth for car trips outside of the AODM and then applying these to OD trip ends;
- Development trip matrix trip ends calculations in OD format; and
- Combining background growth matrix trip ends with the development trip matrix trip ends and then Furness.

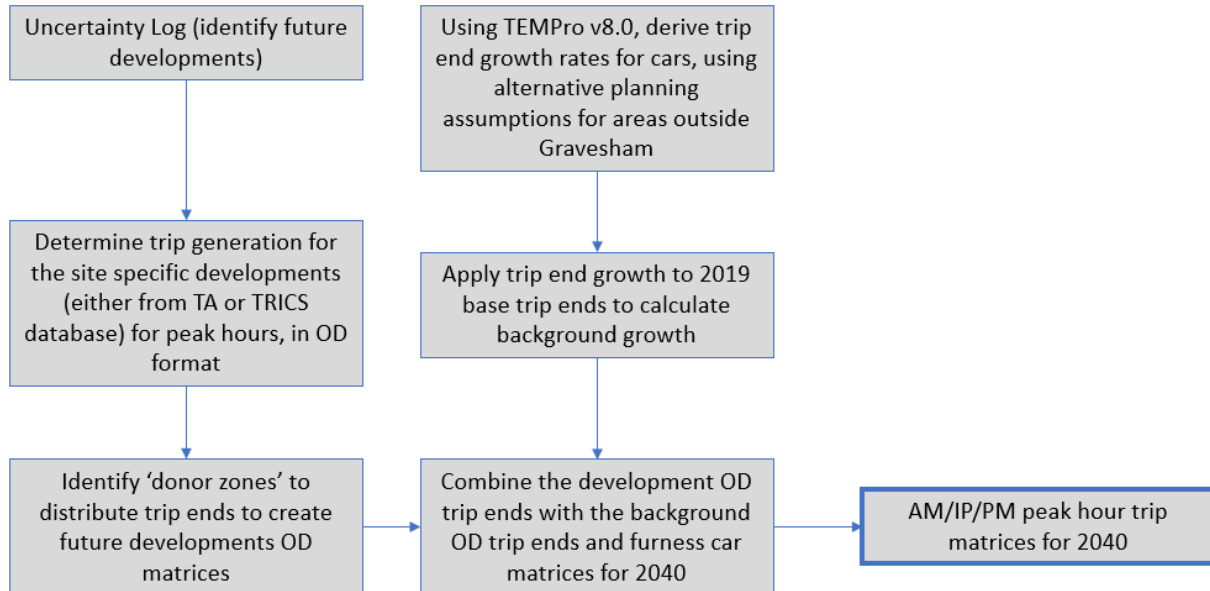


Figure 3-1 - Overview of the Future Year OD Matrix Development Process

The Do Something demand reflects the Reference Case demand plus the trip generation associated with the proposed Reg19 Local Plan Allocations. A summary of the growth assumptions for the Reference Case and Do Something scenarios is shown in Figure 3-2.

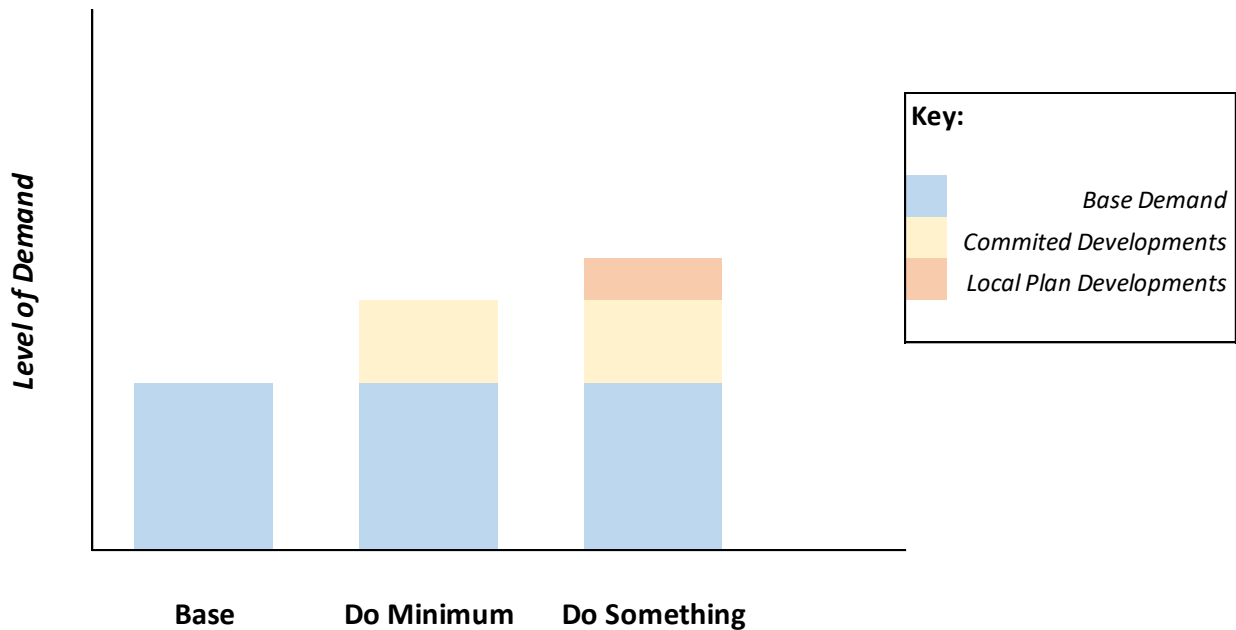
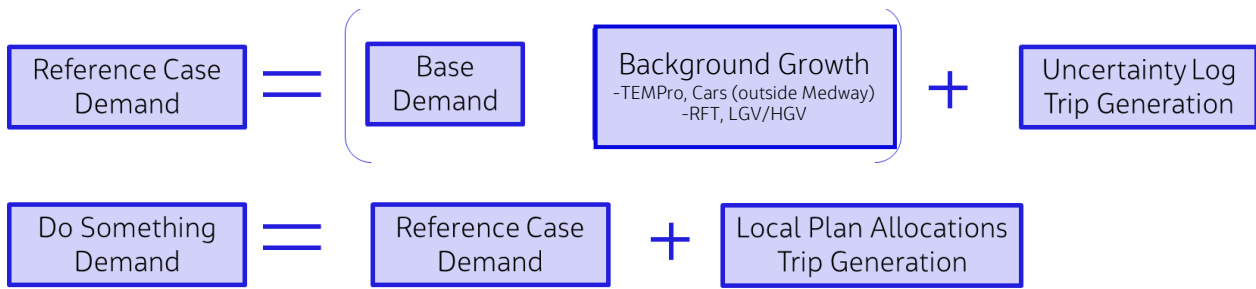


Figure 3-2 – Reference Case vs Do Something Demand Development in Medway

3.3 Reference Case

3.3.1 Uncertainty Log

As described in Section 2.5, the Uncertainty Log has been provided by MC and analysed to understand the completions since 2019 (model base year) and the committed developments forecast to be delivered before 2040. The final increase of dwellings and floorspace between 2019 and 2040 for Medway is shown in Table 3-1; this represents the latest available information at the time of model development.

Table 3-1 - Uncertainty Log (2019-2040), Medway

Growth	Dwellings	Floorspace (sqm)
Completions	4,264	32,004
Committed	7,489	1,410,057
Reference Case Total	11,753	1,444,061

Figure 3-3 and Figure 3-4 present the location and size of the completed and committed developments from the Uncertainty Log; this represents all 'near certain' developments development sites across Medway.

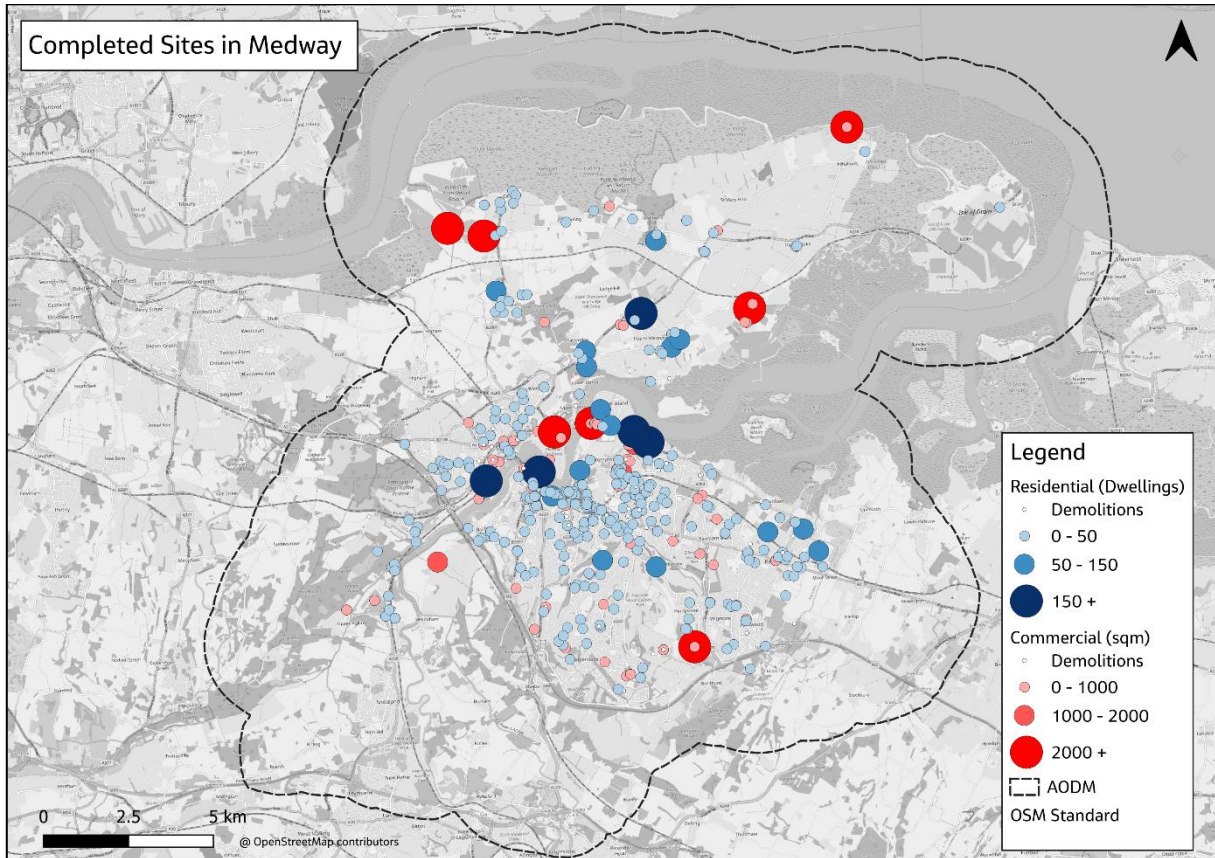


Figure 3-3 - Completions and Demolitions

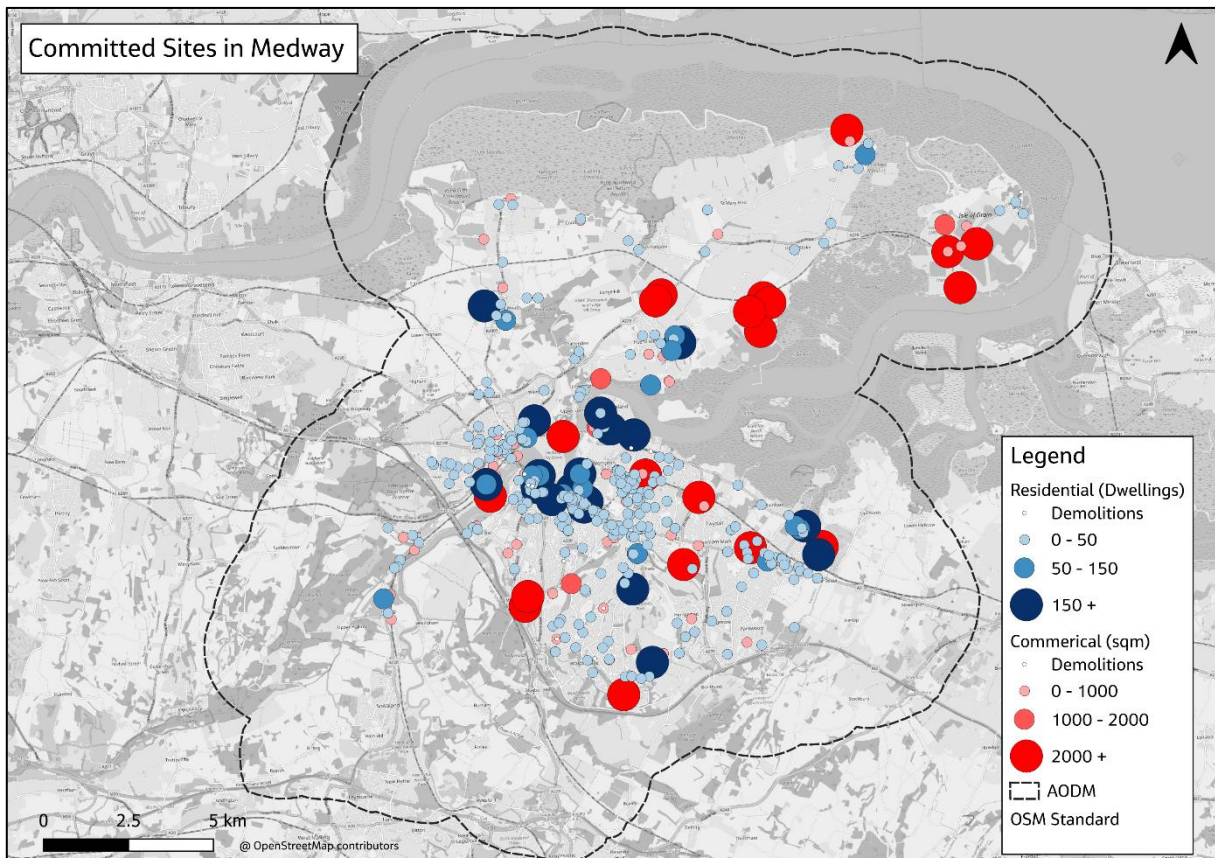


Figure 3-4 - Committed Developments

Additionally, information available on 'near certain' developments in neighbouring authorities of Gravesham, Tonbridge & Malling, Maidstone and Swale, collated by Jacobs as part of the KTM development and updated for recent work to assess the impacts of Lower Thames Crossing in Kent, will be used to inform growth assumptions outside of Medway. The total growth will be constrained to TEMPro using the Alternative Assumptions tool.

Car growth in the remaining parts of Kent, that fall within the Medway Transport Model cordon, will come from TEMPro growth factors only.

3.3.2 Kingsnorth and Isle of Grain

For developing the Reference Case, there are two developments for which an alternative methodology is proposed by Medway Council, for agreement by NH, and is discussed within this section.

The Medway Local Plan 2003 contains two strategic policies for allocations at Kingsnorth and the Isle of Grain, i.e. Policy S12 (Kingsnorth) and Policy S13 (Isle of Grain). Kingsnorth and Grain are among the largest sites for economic growth in the Thames Estuary and the wider region.

Policy S12 designated a 219 ha site at Kingsnorth for industrial, storage or distribution and Sui Generis uses (B1c, B2, B8 prior to 1 September 2020). The policy provides for the expansion or relocation of businesses in the urban area.

Policy S13 designated a 630 ha site on the Isle of Grain for port activities and industrial, storage or distribution and Sui Generis uses (B1c, B2, B8 prior to 1 September 2020). The site benefits from a railhead and deep water berths.

London Medway Commercial Park, located at Kingsnorth, was granted outline planning permission in 2009. There have been many reserved matters applications for the individual plots, such as Plot 1a which was completed in 2019 to accommodate Amazon's distribution warehouse. An 8,925 sqm extension to Damhead Creek Power Station has been implemented, but it is not under construction. More recently, Medway Council's Planning Committee resolved to grant outline planning permission for MedwayOne (MC/21/0979), a 324,450 sqm development of employment floorspace (Class E), on the former Kingsnorth Power Station.

MedwayOne

In Medway Council's determination of the MedwayOne planning application, a National Highways representation noted concerns about both congestion and safety at M2 Junction 1, specifically the northbound off-slip and the southbound on-slip links. National Highways considered that the junction has limited spare capacity, i.e. 60 movements during either the AM or the PM peaks. The junction will need to be improved to accommodate further development once this spare capacity has been exceeded.

Following Medway Council's resolution to grant planning permission, the conditions include an initial trip cap of 60 movements through these links to enable a phase of development to come forward, along with a Monitor and Manage Framework.

Grain Business Park

Grain Business Park was granted outline planning permission (MC/09/1628) in 2009. In 2015, a reserved matters application took account of a revised masterplan which reduced the maximum permitted floorspace to 298,383 sqm. A subsequent reserved matters application was also granted in 2015 for the first phase of 16,770 sqm. The residual permitted floorspace is therefore 282,203 sqm. In February 2020, a Lawful Development Certificate was approved confirming that the outline permission had commenced. The landowner, National Grid, intends to realise the full potential of the Isle of Grain site. A 'call for sites' submission notes the need to retain a broad range of uses in an allocation in the new Local Plan.

The 'Agreed Figure' associated with the outline planning permission is defined in the Section 106 Agreement at para 1.1:

"... means a predicted number of passenger car units of 1058 in either the period of 0800-0900 or the period of 1700-1800 on a typical Monday to Friday inclusive."

This relates to the provisions at page 12, para 5.4.2, which limit the need for any further highway contributions as long as the Agreed Figure is not exceeded based on a reasonable forecast of net new traffic movements associated with the future development of the site and the wider site.

The proposed trip generation to be included in the 2040 Reference Case, has been calculated using the trip rates from the consented Transport Assessment (where available); TRICs trip rates have been used for subsequent land uses where consented trip rates weren't available. The trip generation for Grain Business Park is presented in Table 3-2.

Table 3-2 – Grain Business Park, Trip Generation

Land Use	SQM	AM Peak (08:00 – 09:00)						PM Peak (17:00 – 18:00)					
		Trip Rates			Trip Generation			Trip Rates			Trip Generation		
		Origin	Dest	2-Way	Origin	Dest	2-Way	Origin	Dest	2-Way	Origin	Dest	2-Way
B1c	29,839	0.27	0.06	0.34	82	18	100	0.04	0.35	0.39	12	103	115
B2	29,839	0.30	0.16	0.46	88	49	137	0.10	0.21	0.30	28	62	90
B8	238,706	0.06	0.03	0.10	153	79	232	0.03	0.05	0.08	64	124	189
B1a	120	0.49	0.24	0.73	1	0	1	0.16	0.34	0.50	0	0	1
A1	40	3.95	3.64	7.59	2	1	3	4.83	5.22	10.05	2	2	4
A3	40	3.95	3.64	7.59	2	1	3	4.83	5.22	10.05	2	2	4
A5	40	3.95	3.64	7.59	2	1	3	4.83	5.22	10.05	2	2	4
Total Trips		478						407					

This trip generation demonstrated in Table 3-2 uses the TRICs trip rates presented within this report and shows a two-way trip generation of 478 vehicles in the AM Peak and 407 vehicles in the PM Peak. This is within the proposed trip cap and therefore no further adjustment is required.

Proposed Lower Thames Crossing

Both MedwayOne and Grain Business Park have been excluded from traffic modelling to support the proposed Lower Thames Crossing application for development consent.

For MedwayOne, the Applicant (i.e. the Lower Thames Crossing project team working on behalf of National Highways) has stated its position in paragraph 4.1.13 of the Combined Modelling and Appraisal Report Appendix C: Transport Forecasting Package [APP-522]. In summary, the proposed MedwayOne development, was excluded on the basis that it did not include necessary highway interventions that would maintain the integrity of the road network.

Grain Business Park has also been excluded from the LTAM core scenario because Medway Council did not have an opportunity to review the Uncertainty Log during the period October 2021 to early 2022.

Medway Transport Model – Proposed Methodology

To ensure the Reference Case only includes growth that can realistically come forward before the Local Plan, it is suggested that the inclusion of MedwayOne is limited to include a quantum that restricts trip generation on the northbound off-slip and the southbound on-slip at M2J1 to 60 trips. As stated in Condition 33 of the Outline Planning Consent (MC/21/0979) that the development should not generate traffic that would exceed the agreed trip cap in the AM or PM peak on these links.

To consider the maximum development quantum that can be built out at the MedwayOne site, before the trip cap is met, the existing trips from the existing polygon zone will be considered. The location of existing

polygone zone is detailed in Figure 3-5 and the distribution displayed for the 2019 Base Medway Transport Model in Figure 3-6 for the AM (left) and PM (right) peak.

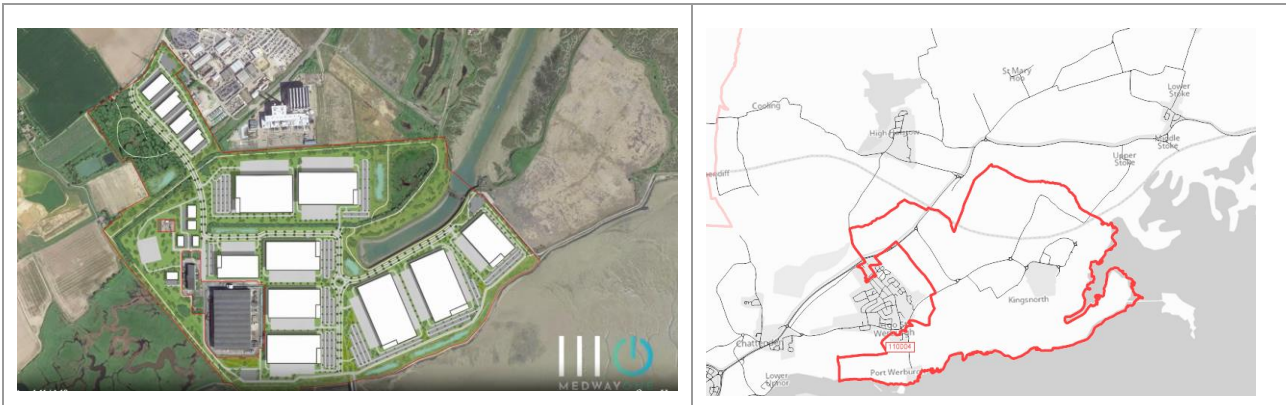


Figure 3-5 – Polygon Zone used for MedwayOne Trip Distribution



Figure 3-6 – Proportions of Trips from Existing Zone using M2J1 AM (left) / PM (right)

The trip cap is triggered when the northbound off-slip or the southbound on-slip at M2J1 have an additional 60 MedwayOne trips. To quantify the potential development that could be built ahead of the trip cap being triggered; flow bundles displayed in Figure 3-6 have been used to inform which peak would hit the cap first; this shows that the PM peak in the Base scenario has the largest proportion of all flows using the two slips in question (43%).

Based on the proposed maximum development quantum possible for each land use type and the existing proportions of flow using the M2J1, development quantum will be pro-rated down to ensure the total trip generation that uses either slips does not exceed 60 trips in either the AM or PM peak hour.

MedwayOne will be modelled in full in the Do Something scenarios and will subsequently be considered within a proportionality assessment to seek contributions towards what mitigation is required at M2J1.

In line with the agreed figure associated with MC/09/1628 (outline consent) and defined in the Section 106 agreement, it is proposed that the forecast modelling for Grain Business Park (MC/09/1628 outline consent + MC/15/1051 reserved matters, phase 1) allows for 1,058 two-way trips at the development only. National Grid's land on the Isle of Grain is likely to make a significant contribution to meeting Medway's development needs for employment land to 2040. Medway Council will continue to work with National Grid to determine preferred land uses and quantum in a strategic allocation policy for the new Local Plan.

Furthermore, further investigation was undertaken for developments categorized under "Other" in their land use descriptions in the Uncertainty Log to verify the accuracy of trip generation data. The design assessment conducted as part of the planning application process determined that these specific developments are unlikely to impact the road network as they would either generate the same amount of trips (as an existing land use) or an additional of one or two HGV trips weekly. Table 3-3 shows the list of developments with zero net trips.

Table 3-3 - Developments With No Trip Generation

Reference (Planning/SLAA)	Development Name	Land Use	Trip Generation Data
MC181185	Medway City Estate Whitewall Road Frindsbury	Other	Planning Statement mentions limited visits to the site for operation or maintenance. No impact to transport network
MC182505	Rochester Airport Maidstone Road Chatham	Other	Planning Statement mentions airport will continue operation as previously with no additional trips expected
MC192871	National Grid Grain LNG Terminal Grain Road Grain	Other	Planning Statement mentions only two HGVs will be require per month, hence traffic will be negligible
MC20090961	Combined Cycle Gas Turbine Power Station Damhead Creek Eschol Road Kingsnorth	Other	Planning Statement mentions limited visits to the site for operation or maintenance. No impact to transport network
MC201047	Land west of Grain Road Grain	Other	Planning Statement mentions the site can be accessed by HGVs and due to low level of traffic no significant impact on the existing network
MC211825	National Grid LNG Terminal Grain Road Grain	Other	Planning Statement mentions trip generation when the site is operational will be negligible to road network

3.3.3 Trip Rates

Where information is publicly available, trips rates will be extracted from consented Transport Assessments to ensure that the assessment methodology and impacts associated with committed developments is assessed as consistently as realistically possible.

To supplement these trip rates and for developments where publicly available trip rates are not already available, a bespoke set of Medway Transport Model trip rates have been developed using TRICS to reflect the varying geography across the borough. TRICS version 8.0 has been used to obtain appropriate and representative origin and destination trip rate factors by Land Use type (residential, commercial, retail and leisure) and location (town centre, edge of town centre, suburban area, edge of town and neighbourhood centre).

The selection criteria in TRICS can be defined based on the location, land use, and sub-category of available surveys. For the purposes of defining trip rates for the Medway Transport Model, sites within London and outside of England were excluded, as well as surveys undertaken during the COVID pandemic period – as this is not considered to reflect representative trip rates. In addition, only weekdays were included and only sites with surveys post 1st January 2015 (the default 8 year cut off in TRICS) have been used. Figure 3-7 shows the TRICS location classification for development sites within Medway. For sites located outside the areas shown, the TRICS location will be determined on an individual basis.

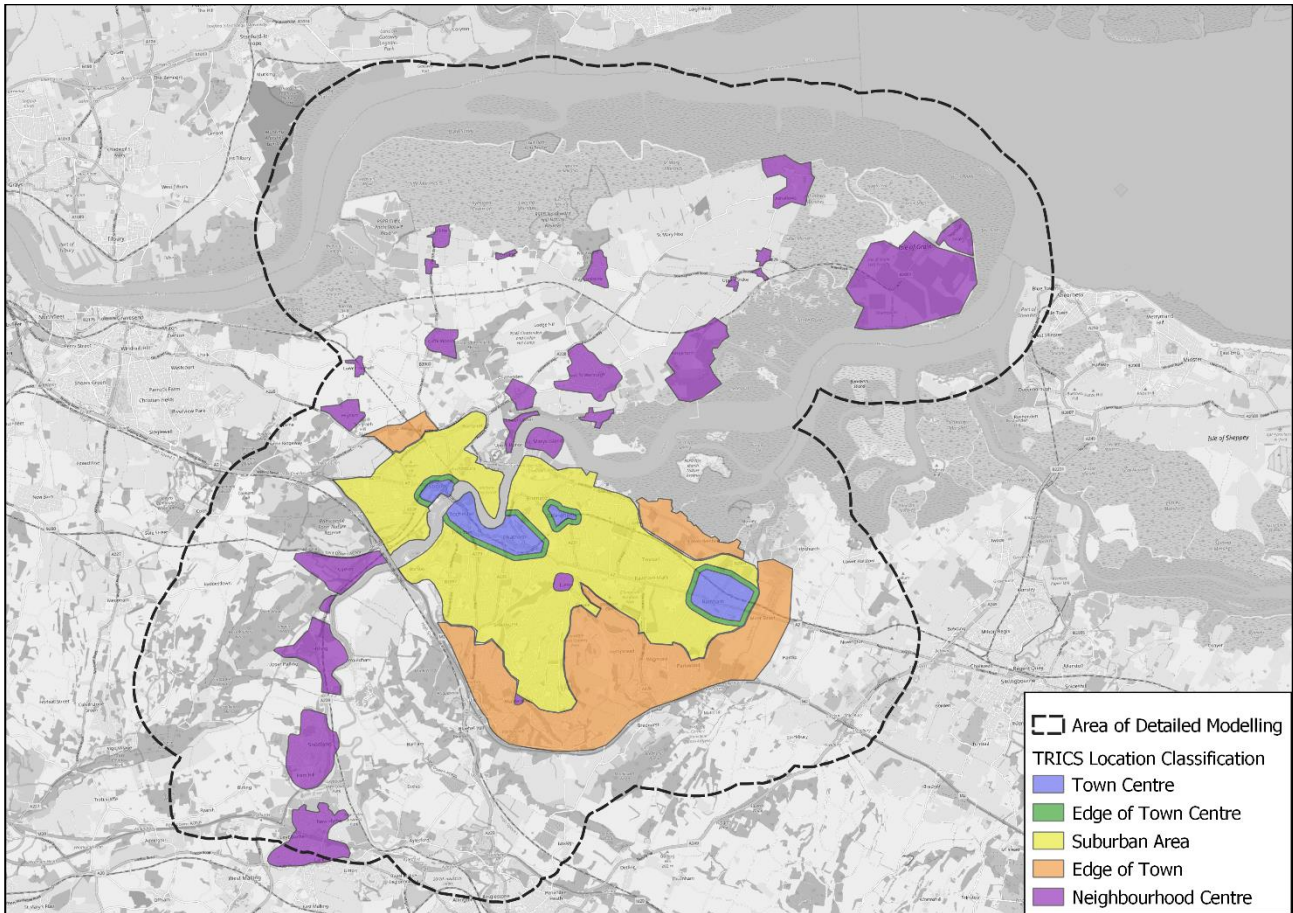


Figure 3-7 - TRICS Location Classification for Developments within Medway

The resulting trip rates for Residential, Retail, Commercial and Leisure land uses are shown in Table 3-4 to Table 3-9; the trip rates are classified by location and private/affordable (where appropriate). Detailed information relating to the trip rates can be found in Appendix A.

Table 3-4 - TRICS Retail (A1) Trip Rates (Per 100sqm)

Land Use	Location	AM Peak			PM Peak		
		Arr	Dep	Total	Arr	Dep	Total
Local Shops (A1)	Town Centre	0.193	0.193	0.386	1.354	1.354	2.708
Local Shops (A1)	Edge of Town Centre	0.188	0.000	0.188	1.438	1.750	3.188
Local Shops (A1)	Suburban Area	8.277	7.389	15.666	13.393	13.961	27.354
Local Shops (A1)	Edge of Town	5.340	4.563	9.903	6.990	6.990	13.980
Local Shops (A1)	Neighbourhood Centre	3.949	3.636	7.585	4.829	5.220	10.049
Food superstore (A1)	Town Centre	3.887	3.085	6.972	5.746	5.014	10.760
Food superstore (A1)	Suburban Area	1.517	1.295	2.812	2.001	2.217	4.218

Table 3-5 - TRICS Employment (B1a, B2, B8) Trip Rates (Per 100 sqm)

Land Use	Location	AM Peak			PM Peak		
		Arr	Dep	Total	Arr	Dep	Total
Office (B1a)	Town Centre	0.943	0.038	0.981	0.113	0.792	0.905
Office (B1a)	Suburban Area	1.267	0.124	1.391	0.178	0.746	0.924
Office (B1a)	Edge of Town	2.169	0.150	2.319	0.100	2.124	2.224
Industrial (B2)	Suburban Area	0.412	0.126	0.538	0.124	0.305	0.429
Industrial (B2)	Neighbourhood Centre	0.486	0.243	0.729	0.159	0.339	0.498
Industrial (B2)	Edge of Town	0.408	0.161	0.569	0.124	0.375	0.499
Warehouse - Commercial (B8)	Suburban Area	0.054	0.036	0.090	0.070	0.043	0.113
Warehouse - Commercial (B8)	Edge of Town	0.187	0.124	0.311	0.103	0.212	0.315
Warehouse - Commercial (B8)	Edge of Town Centre	1.194	0.133	1.327	NA	1.194	1.194
Parcel distribution centres (B8)	Edge of Town	0.067	0.401	0.468	0.134	0.535	0.669

Table 3-6 - TRICS Hotel (C1) Food-Drink (A3) Trip Rates (Per 100 sqm, Hotel- Per Bed)

Land Use	Location	AM Peak			PM Peak		
		Arr	Dep	Total	Arr	Dep	Total
Restaurants/cafes (A3)	Town Centre	NA	NA	NA	1.503	0.347	1.850
Restaurants/cafes (A3)	Suburban Area	NA	NA	NA	1.340	0.515	1.855
Restaurants/cafes (A3)	Edge of Town Centre	NA	NA	NA	0.968	0.261	1.229
Hotels (C1) – per bed	Town Centre	0.065	0.111	0.176	0.070	0.035	0.105
Hotels (C1) – per bed	Neighbourhood Centre	0.125	0.107	0.232	0.464	0.339	0.803
Hotels (C1) – per bed	Suburban Area	0.037	0.083	0.120	0.092	0.046	0.138
Hotels (C1) – per bed	Edge of Town	0.195	0.249	0.444	0.221	0.191	0.412
Hotels (C1) – per 100 sqm	Town Centre	0.121	0.206	0.327	0.13	0.065	0.195

Table 3-7 – TRICS Non-Residential Institutions (D1) Trip Rates (Per 100 sqm)

Land Use	Location	AM Peak			PM Peak		
		Arr	Dep	Total	Arr	Dep	Total
Care Home (C2-Health)	Mixed	0.081	0.053	0.134	0.041	0.086	0.127
GP Surgery (D1-Health)	Mixed	2.665	1.613	4.278	1.317	1.933	3.250
Nursery (D1-Education)	Mixed	2.600	2.151	4.751	1.838	0.751	2.589
College University (D1-Education)	Mixed	0.901	0.262	1.163	0.191	0.377	0.568
Primary School (D1-Education)	Mixed	5.395	4.358	9.753	0.204	0.452	0.656
Secondary School (D1-Education)	Mixed	1.097	0.828	1.925	0.191	0.231	0.422

Table 3-8 – TRICS Assembly and Leisure (D2) Trip Rates (Per 1 Ha)

Land Use	Location	AM Peak			PM Peak		
		Arr	Dep	Total	Arr	Dep	Total
Community Centre (D2)	Mixed	30.841	15.888	46.729	21.569	23.039	44.608
Leisure Centre (D2)	Mixed	17.849	9.421	27.270	20.740	21.716	42.456

Table 3-9 - TRICS Residential (C3) Trip Rates (Per Dwelling)

Land Use	Location	AM Peak			PM Peak		
		Arr	Dep	Total	Arr	Dep	Total
Flats - Private (C3)	Town Centre	0.05	0.125	0.175	0.175	0.2	0.375
Flats – Affordable (C3)	Town Centre	0.042	0.125	0.167	0.042	0.042	0.084
Flats – Private (C3)	Edge of Town Centre	0.043	0.189	0.232	0.170	0.082	0.252
Flats – Affordable (C3)	Edge of Town Centre	0.074	0.105	0.179	0.087	0.087	0.174
Flats/Houses – Mixed (C3)	Edge of Town Centre	0.102	0.293	0.395	0.277	0.151	0.428
Flats – Private (C3)	Suburban Area	0.050	0.182	0.232	0.151	0.084	0.235
Flats – Affordable (C3)	Suburban Area	0.091	0.155	0.246	0.127	0.182	0.309
Flats – Private (C3)	Neighbourhood Centre	NA	0.111	0.111	0.222	NA	0.222
Flats/Houses – Mixed (C3)	Neighbourhood Centre	0.133	0.369	0.502	0.318	0.159	0.477
Houses – Private (C3)	Town Centre / Edge of Town Centre	0.138	0.291	0.429	0.283	0.170	0.453

Land Use	Location	AM Peak			PM Peak		
		Arr	Dep	Total	Arr	Dep	Total
Houses – Affordable (C3)	Town Centre / Edge of Town Centre	0.078	0.094	0.172	0.133	0.102	0.235
Flats/Houses – Mixed (C3)	Town Centre / Edge of Town Centre	0.102	0.293	0.395	0.277	0.151	0.428
Houses – Private (C3)	Suburban Area	0.117	0.394	0.511	0.371	0.187	0.558
Houses – Affordable (C3)	Suburban Area	0.186	0.276	0.462	0.436	0.340	0.776
Houses – Private (C3)	Neighbourhood Centre	0.139	0.296	0.435	0.271	0.141	0.412
Houses – Affordable (C3)	Neighbourhood Centre	0.077	0.219	0.296	0.190	0.116	0.306

3.3.4 Trip Generation

The trip generation and growth application will vary based on the size of the development, as presented in Table 3-10.

Table 3-10 - Forecast Growth Thresholds and Application

No. HHs / Jobs	Growth Application
<250	Trip rates are applied based on specific land use information and trip generation is added to existing model polygon zone within which the development falls
>250	Trip rates are applied based on specific land use information and trip generation is added to a new model zone that specifically represents a unique development, with access arrangements coded into the model to represent accurate zone loading points

For developments with fewer than 500 HHs/jobs trip generation is calculated by applying trip rates extracted from Transport Assessments (where publicly available) or the appropriate trip rate from Table 3-4 to Table 3-9 based on the developments land uses and location, to the development quantum.

The resulting trips for developments with less than 500 HHs/jobs will be added to the existing polygon zone within which the development falls. For developments (or combination of nearby sites) with greater than 500 HHs/jobs, the trip generation will be added to a new model point zone that specifically represents the development (or cluster). In this case, zone loading points will be coded to reflect specific development access arrangements.

3.3.5 Trip Distribution

For each development zone, a donor zone from the base year model will be chosen to replicate its trip pattern. This selected zone will have the same land use as the development zone and will be located in the proximity of the development.

- For developments with lower than 500 HHs/jobs, the land use of the zone where this development falls will be compared to the new development. If the land use match, the existing zone distribution will be used for the new trips. Where this is not the case, the 'donor zone' method will be applied.
- For developments with higher than 500 HHs/jobs, a new zone will be added to the network. Trip distribution for this zone will be based on a nearby donor zone (or several zones) with similar land uses and likely distribution of trips.

3.3.6 Background Growth

Car Growth

Trip End Model Presentation Program (TEMPro) is a software provided by DfT, which calculates growth factors and planning data to account for changes in population, employment, housing, and car ownership. The values are extracted from the National Trip End Model (NTEM) Core Scenario, and criteria is selected by defining a geographical area, base and future year, time periods, car users, etc.

The adjusted background growth for districts outside of Medway will be calculated using the latest available version of TEMPro at the time of model development (Version 8.0); planning data has been exported for Medway, neighbouring authorities and the Rest of Kent and is presented in Table 3-11.

Table 3-11 – TEMPro v8 2019-2040 Planning Assumptions

Local Authority	Households	Jobs
Medway	10,889	8,647
Gravesham	2,857	2,772
Tonbridge and Malling	6,787	4,893
Swale	12,403	4,150
Maidstone	11,674	6,633
Rest of Kent	59,406	36,222

TEMPro planning assumptions are used to produce factors for the NTEM-based background growth in trip ends. These factors will be applied to the base year OD demand matrices to calculate the forecast demand. Adjusted planning assumptions will be generated to deduct the committed growth coming forward in Gravesham, Tonbridge & Malling, Maidstone and Swale to avoid double counting. Car growth in the 'Rest of Kent' area will be generated by unadjusted TEMPro factors. The only car growth in Medway will come from the uncertainty log (completions and committed developments) information.

Goods Vehicle Growth

General growth in LGV and HGV demand will be produced by constraining to growth factors derived from the Road Traffic Forecasts (RTF) published by DfT. The RTF produces forecasts to a horizon year of 2040 in 5-year intervals for all regions in England and Wales.

For the purposes of this work, the RTF Scenario 1 will be adopted, namely the 'central' macroeconomic assumption, a positive and declining income relationship, and using historic averages for trip rates. The RTF traffic mileage data for all road types was extracted from Scenario 1 for LGV and HGV and then interpolated to derive growth factors for 2040 from 2019 for Southeast region. The resulting growth factors can be found in Table 3-12.

Table 3-12 - LGV and HGV Growth Factors

Region	Vehicle Type	2019-2040 Growth Factor
South East	LGV	1.275
South East	HGV	1.106

3.4 Do Something

As discussed in Section 4.2 and presented in Figure 3-2, the Do Something demand will represent the Reference Case demand with the addition of the trip generation associated with the proposed Local Plan allocations.

Medway Council are still refining their Proposed Allocations and therefore, the number of dwellings/jobs/sqm is not currently known. Once this information has been provided, the trip rates presented in Table 3-4 to Table 3-9 will be used to calculate the trip generation associated with the proposed Local Plan allocations and the resulting trips will be added to the model using the methodology set out in Table 3-10.

MedwayOne will be modelled in full within the Do Something scenario.

3.5 Summary

The housing and employment completions, that have been built out (or demolished) since the 2019 base year model, up to April 2023, have been presented within this section for inclusion within the forecast scenarios. Medway have provided Jacobs with the latest available list of committed housing and employment developments and their trip generation will be calculated and included within the 2040 Reference Case, Reference Case with LTC, Do Something and Do Something with Lower Thames Crossing scenarios.

4. Forecasting Networks

4.1 Introduction

This section outlines the network changes to the base year Medway Transport Model to account for completed or consented infrastructure changes across the borough, in addition to any changes relating to the proposed Local Plan Allocations in order to develop the Reference Case, Do Something and Do Something with Lower Thames Crossing forecast scenarios.

4.2 Reference Case

The 2040 Reference Case network will be developed using the base year Medway Transport Model network and incorporating the following:

- Any infrastructure or speed changes since 2019;
- Any committed infrastructure or speed changes forecast to be delivered before the 2040 forecast year.

It is generally considered that strategic schemes will be included across the model cordon area however local schemes (e.g minor junction change or speed reduction) will only be modelled when they occur in the AODM.

4.2.1 Completed or Committed Infrastructure Changes

National Highways schemes will be included as part of the forecast infrastructure changes; Table 4-1 shows strategic highway schemes that although are not in the Medway AODM, are contained within the cordoned model area. Therefore, they should be considered as they may have impacts on the network in Medway.

Table 4-1 - National Highway Schemes from KTM within Medway Model Area

Scheme Name	Description
A2 Bean and Ebbsfleet Junction Improvements	Capacity improvement scheme
M2 Junction 5 Improvements	Improvements to the slip roads and junction approaches at the M2 junction. Delivery expected by 2024-25.

The coding for these improvements will be completed using the information provided for the Kent Countywide Model and cross-checked against what has been delivered using google streetview where available and appropriate.

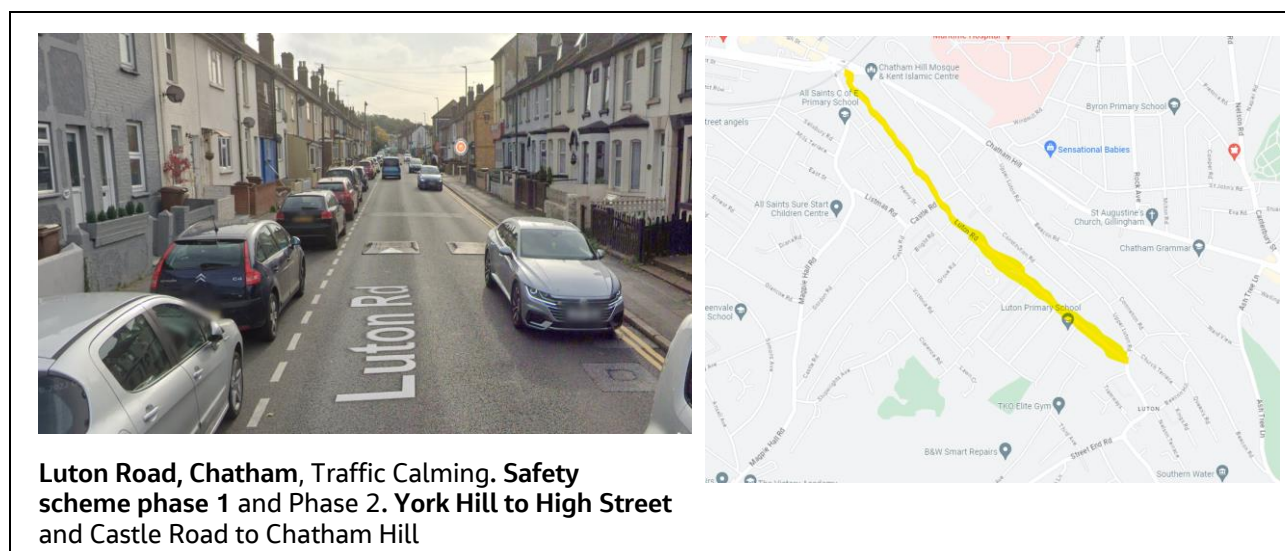
MC provided Jacobs with a list of infrastructure schemes that have been completed or forecast to complete within the AODM between the KTM Base Model build and the 2040 forecast year, these have been outlined in Table 4-2. Some of these schemes are only considered '*more than likely*' however they are close to consent and it is therefore proposed that they are included within the modelling.

Table 4-2 – Medway Highway Changes since 2019

Scheme Name	Description	Year of completion
Stood Town centre scheme – Local Growth Fund scheme	Changes to lane designation and pedestrian crossings.	2019
Medway City Estate slip road	Junction improvement scheme, new slip road to bypass the roundabout.	2021/22
Luton Road, Chatham. Safety scheme phase 1	Traffic calming scheme.	2022/23
Ash Tree Lane, Chatham	Speed reduction.	2021/22
Pear Tree Lane, Chatham	Speed reduction.	2022/23

Scheme Name	Description	Year of completion
Otterham Quay Lane, Rainham – Leigh Academy	Traffic calming scheme, new crossings and roundabout junction.	2021/22
Chatham Bus/Rail Interchange, Chatham	Junction improvement scheme, removing island infrastructure and formalising pedestrian crossing.	2021/22
A299 Maidstone Road/Horsted Retail Park	Junction improvement scheme, left turn flare.	2020/21
Deanwood Drive, Rainham	Speed limit increase.	2021/22
Horsted Park, Chatham	Controlled pedestrian crossing facility.	More than likely in 2024/25
Horsted Gyratory, A229 City Way junction with A230 Maidstone Road Chatham	Horsted Gyratory scheme.	More than likely, no potential delivery date.
Luton Road, Chatham. Safety scheme phase 2	Traffic calming scheme.	More than likely in 2024/25
A2 High Street, Rainham and Mierscourt Road	Capacity improvement.	More than likely in 2024/25
A2 Birling Avenue and A2 London Road, Rainham	Junction improvement. Widening road junction.	More than likely in 2024/25

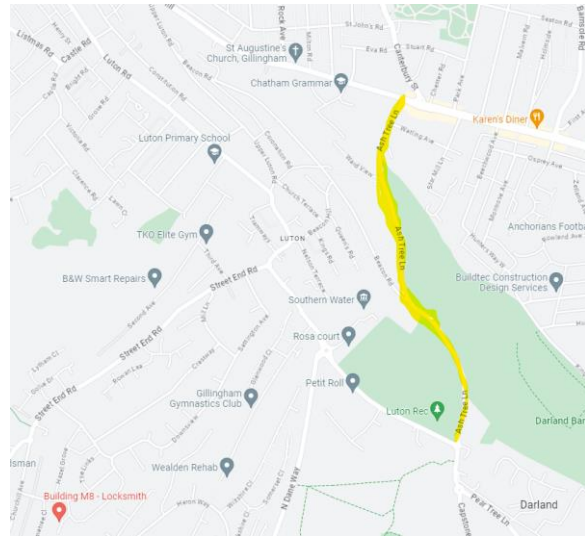
Alongside Highway changes provided by MC; KCC have an ongoing project to map all Traffic Regulation Orders (TROs) in Kent and this live mapping will be checked as the forecast coding is undertaken to make sure the latest changes are being captured. Some examples of highway coding changes captured between the 2019 Base Model and forecast year networks are outlined in Figure 4-1.





Ash Tree Lane, National speed limit reduced to 40mph.

Pear Tree Lane, Chatham between Dukes Meadow Drive to Capstone Road. Reduced 50mph limit to 40mph.



Deanwood Drive, Rainham. Speed limit increase from 30mph to 40mph, allowing improved 30mph speed limit gateway.

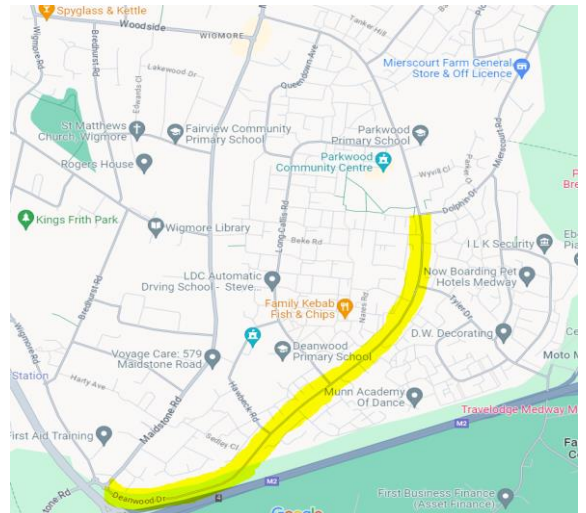


Figure 4-1 - Speed Changes in Medway

4.2.2 Committed Development Infrastructure

Changes to the Reference Case network will depend on the size of committed developments; as mentioned in section 3, for developments with more than 500 HHs/jobs a new zone will be added, and access

arrangements will be coded into the model. Access arrangements will be coded based on publicly available information submitted as part of the planning applications and/or cross-checked with KCC and Medway.

4.2.3 Forecast Year Values of Time and Vehicle Operating Costs

The values of the ppm and ppk parameters used for the base year Medway Transport Model highway assignment are based on the latest TAG Unit A1.3 guidance and Data Book available at the time of the Base Model development (May 2023 v1.21). Vehicle operating costs were derived using the tables provided in the National Highways calculation spreadsheet. Network average speed and OGV1/OGV2 proportions were inherited from the base model.

The final calculated values for highway VoT and VOC for the 2040 forecast year of the Medway forecasting models are provided in Table 4-3. The final input for implementation in VISUM is also shown in the table; the formats required being a coefficient for pence per metre (ppmetre) for VOC as a weighted ratio of the VoT pence per second (pps). The HGV VoT values are doubled, consistent with the base model.

Table 4-3 – 2040 Highway Generalised Cost Parameters

Time Period	User Class	2040 Forecast Year TAG Databook Value		2040 Forecast Year VISUM Units		2040 Forecast Year Final VISUM Coefficients	
		VoT (ppm)	VOC (ppk)	VoT (pps)	VOC (ppmetre)	VOT	VOC
AM	UC1 Car Commute	26.17	4.71	0.4361	0.0047	1.00	0.01
	UC2 Car Business	39.02	9.30	0.6503	0.0093	1.00	0.01
	UC3 Car Other	18.05	4.71	0.3009	0.0047	1.00	0.02
	LGV	28.28	11.64	0.4713	0.0116	1.00	0.02
	HGV (doubled VoT)	56.32	39.57	0.9387	0.0396	1.00	0.04
PM	UC1 Car Commute	26.26	4.71	0.4376	0.0047	1.00	0.01
	UC2 Car Business	39.58	9.30	0.6597	0.0093	1.00	0.01
	UC3 Car Other	18.91	4.71	0.3151	0.0047	1.00	0.01
	LGV	28.28	11.64	0.4713	0.0116	1.00	0.02
	HGV (doubled VoT)	56.32	39.57	0.9387	0.0396	1.00	0.04

4.2.4 Tolls and Fares

Monetary tolls will be added to the Reference Case network for Dartford Crossing. National Highways have statutory powers to increase the charges at Dartford Crossing in line with the Retail Price Index (RPI). It was therefore intended to apply RPI-based inflation (including use of the GDP deflator using the TAG Databook) to the charge at Dartford Crossing.

The above means that the charging regimes and inflation-indexing methodology assumed in the 2040 Medway Transport Model are consistent with the approach used in the Lower Thames Area Model (LTAM) and the previous Kent Transport Model forecasting work.

4.3 2040 Do Something

The Medway 'Do Something' forecast network will include all network changes explained in section 4.2, with the addition of development specific access arrangements or infrastructure (e.g through-roads) associated with the proposed preferred option Local Plan allocations.

The network changes for the Local Plan allocations will follow the methodology explained for 'Do Minimum' scenario. For developments with less than 500 HHs/jobs, the trip generation will be added to an existing model zone and therefore no change will be made to the network. For developments with more than 500 HHs/jobs, development specific access arrangements will be coded into the Do Something network.

4.4 With LTC Scenarios

The Medway 'with LTC' forecast networks will include committed developments and infrastructure changes in the Reference Case/Do Something networks with the inclusion of the Lower Thames Crossing (LTC). These scenario will be compared against the Reference Case/Do Something (without LTC) scenarios to understand the potential re-distribution of vehicles following completion of the strategic scheme.

The Lower Thames Crossing (LTC) is a Nationally Significant Infrastructure Project (NSIP) that will link the counties of Kent and Essex through an additional Thames River crossing. It will connect to the M25 in the North and to the M2/A2 in the South as shown in Figure 4-2.

The LTC will be coded using the latest publicly available information and information made available to Jacobs/KCC as part of recent LTC assessments undertaken using the Kent Countywide Model.

Figure 4-2 shows an example of LTC coded in the Gravesham Transport Model; similarly, as the Medway Transport Model is a cordon of the existing KTM and does not include areas north of the Thames, the LTC itself will be coded and connectors will be added to the existing zones which connect to the Northbound and Southbound lanes of the Dartford Crossing respectively. This will allow for appropriate re-routing to be assessed and impacts determined.

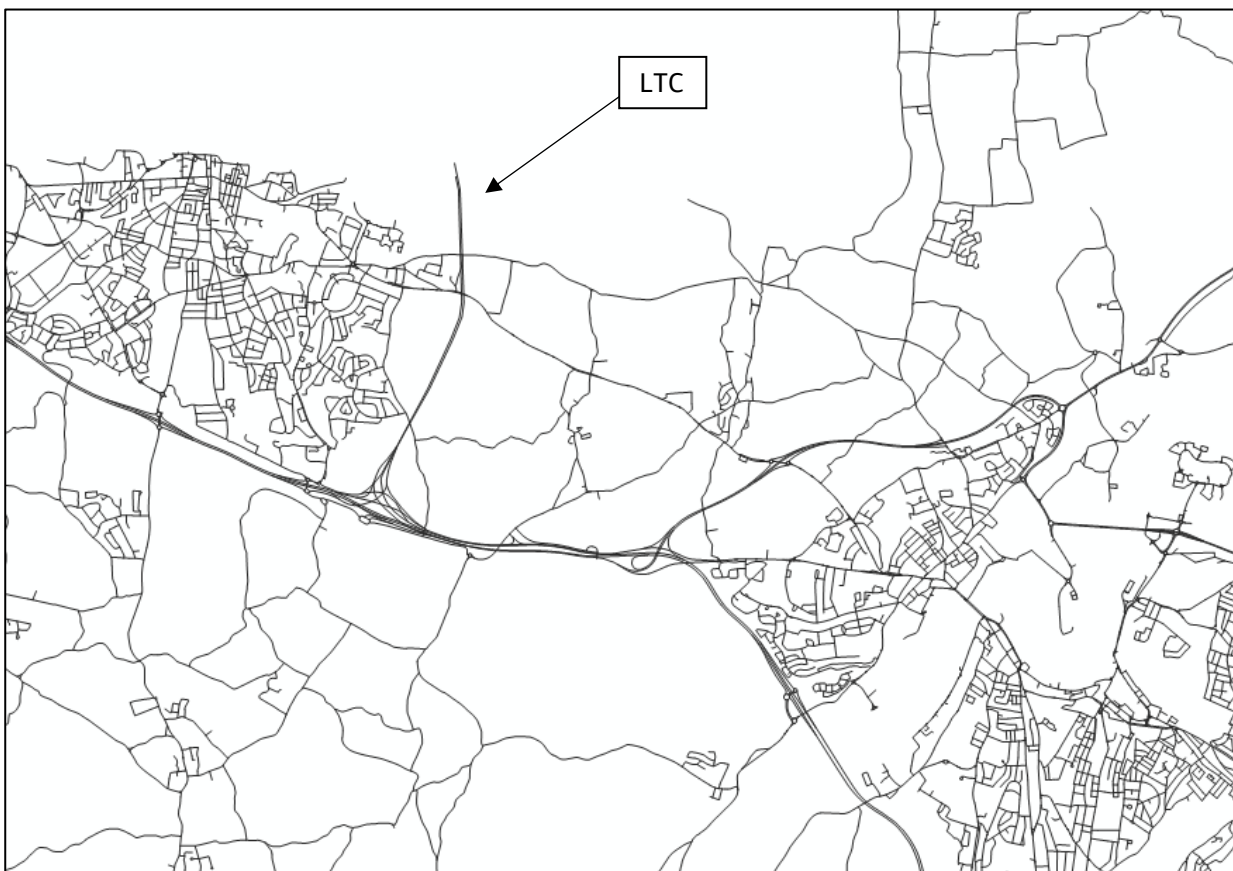


Figure 4-2 – Indicative LTC Coding (as per KTM)

4.4.1 Tolls and Fares

Monetary tolls will be added to the 'Do Something' network for Lower Thames Crossing. It will be assumed that the proposed toll will be the same as the charges for Dartford Crossing.

5. Summary and Conclusion

5.1 Summary

This Technical Note outlines the proposed methodology to develop the 2040 Reference Case and Do Something forecast scenarios to assess the proposed Medway Local Plan allocations.

A forecast year of 2040 has been decided in accordance with the end year of the proposed Local Plan period. A record of central forecasting assumptions, in the form of the Uncertainty Log, will be used to underpin the Reference Case, supported by TEMPro background growth for areas outside of the AODM and RTF factors for good vehicles.

Trips from developments in the Uncertainty Log will be calculated by using trip rates from consented Transport Assessments; where unavailable, a bespoke set of trip rates have been determined, that consider both different geographical parameters and whether residential dwellings are private or affordable. The application of trip generation will depend on the size of committed and consented developments, using the existing zone distribution where the development is located or using a nearby zone with similar land use where appropriate.

General growth in LGV and HGV demand will be produced by applying growth factors derived from the Road Traffic Forecasts (RTF) (2018) published by DfT.

Forecast networks will be developed by considering network changes from the committed developments and infrastructure schemes defined by MC as having 'near certain' certainty status, or those already completed since the 2019 base year. Depending on the size of the development, a new zone will be added to the network and new access in the network will be included where appropriate. Behavioural parameters such as values of time and vehicle operating costs have also been derived for the 2040 forecast year using data provided in the TAG Databook.

Different forecast scenarios will be developed to ascertain the impacts of the proposed Local Plan, Reference Case vs Do Something, and the potential changes in distribution following implementation of LTC through comparison of Do Something with LTC vs Reference Case with LTC.

5.2 Conclusion

The development of Reference Case and Do Something forecast models is necessary to assess the impacts of the Medway proposed Local Plan allocations. This Technical Note has been written to detail the assumptions required to develop these scenarios and the necessary inputs. The document describes the steps, tools and inputs required for the forecast demand development and forecast networks development.

The forecast approach methodology is in line with current best practice as set out in TAG.

Appendix A

									Trip Rates					
									AM Peak			PM Peak		
Look up ID	Lookup string	Land Use	Land Use	Units	Location	Sub-category	Resi	Arr	Dep	Total	Arr	Dep	Total	
C3-F_Town Centre	Town Centre,Flats,Private	Residential	C3-F	per dwelling	Town Centre	Flats	Private	0.050	0.125	0.175	0.175	0.200	0.375	
C3-F_Town Centre	Town Centre,Flats,Affordable	Residential	C3-F	per dwelling	Town Centre	Flats	Affordable	0.042	0.125	0.167	0.042	0.042	0.084	
C3-F_Edge of Town Centre	Edge of Town Centre,Flats,Private	Residential	C3-F	per dwelling	Edge of Town Centre	Flats	Private	0.043	0.189	0.232	0.170	0.082	0.252	
C3-F_Edge of Town Centre	Edge of Town Centre,Flats,Affordable	Residential	C3-F	per dwelling	Edge of Town Centre	Flats	Affordable	0.074	0.105	0.179	0.087	0.087	0.174	
C3-H/F_Edge of Town Centre	Edge of Town Centre,Flats/Houses,Mixed	Residential	C3-H/F	per dwelling	Edge of Town Centre	Flats/Houses	Mixed	0.102	0.293	0.395	0.277	0.151	0.428	
C3-F_Suburban Area	Suburban Area,Flats,Private	Residential	C3-F	per dwelling	Suburban Area	Flats	Private	0.050	0.182	0.232	0.151	0.084	0.235	
C3-F_Suburban Area	Suburban Area,Flats,Affordable	Residential	C3-F	per dwelling	Suburban Area	Flats	Affordable	0.091	0.155	0.246	0.127	0.182	0.309	
C3-F_Neighbourhood Centre	Neighbourhood Centre,Flats,Private	Residential	C3-F	per dwelling	Neighbourhood Centre	Flats	Private	0.000	0.111	0.111	0.222	0.000	0.222	
C3-H/F_Neighbourhood Centre	Neighbourhood Centre,Flats/Houses,Mixed	Residential	C3-H/F	per dwelling	Neighbourhood Centre	Flats/Houses	Mixed	0.133	0.369	0.502	0.318	0.159	0.477	
C3-H_Edge of Town Centre	Edge of Town Centre,Houses,Private	Residential	C3-H	per dwelling	Edge of Town Centre	Houses	Private	0.138	0.291	0.429	0.283	0.170	0.453	
C3-H_Edge of Town Centre	Edge of Town Centre,Houses,Affordable	Residential	C3-H	per dwelling	Edge of Town Centre	Houses	Affordable	0.078	0.094	0.172	0.133	0.102	0.235	
C3-H/F_Edge of Town Centre	Edge of Town Centre,Flats/Houses,Mixed	Residential	C3-H/F	per dwelling	Edge of Town Centre	Flats/Houses	Mixed	0.102	0.293	0.395	0.277	0.151	0.428	
C3-H_Suburban Area	Suburban Area,Houses,Private	Residential	C3-H	per dwelling	Suburban Area	Houses	Private	0.117	0.394	0.511	0.371	0.187	0.558	
C3-H_Suburban Area	Suburban Area,Houses,Affordable	Residential	C3-H	per dwelling	Suburban Area	Houses	Affordable	0.186	0.276	0.462	0.436	0.340	0.776	
C3-H_Neighbourhood Centre	Neighbourhood Centre,Houses,Private	Residential	C3-H	per dwelling	Neighbourhood Centre	Houses	Private	0.139	0.296	0.435	0.271	0.141	0.412	
C3-H_Neighbourhood Centre	Neighbourhood Centre,Houses,Affordable	Residential	C3-H	per dwelling	Neighbourhood Centre	Houses	Affordable	0.077	0.219	0.296	0.190	0.116	0.306	
A1_Town Centre	Town Centre,Local Shops,	Retail	A1	per 100sqm	Town Centre	Local Shops		0.193	0.193	0.386	1.354	1.354	2.708	
A1_Edge of Town Centre	Edge of Town Centre,Local Shops,	Retail	A1	per 100sqm	Edge of Town Centre	Local Shops		0.188	0.000	0.188	1.438	1.750	3.188	
A1_Suburban Area	Suburban Area,Local Shops,	Retail	A1	per 100sqm	Suburban Area	Local Shops		8.277	7.389	15.666	13.393	13.961	27.354	
A1_Edge of Town	Edge of Town,Local Shops,	Retail	A1	per 100sqm	Edge of Town	Local Shops		5.340	4.563	9.903	6.990	6.990	13.980	
A1_Neighbourhood Centre	Neighbourhood Centre,Local Shops,	Retail	A1	per 100sqm	Neighbourhood Centre	Local Shops		3.949	3.636	7.585	4.829	5.220	10.049	
A1_Town Centre	Town Centre,Food superstore,	Retail	A1	per 100sqm	Town Centre	Food superstore		3.887	3.085	6.972	5.746	5.014	10.760	
A1_Suburban Area	Suburban Area,Food superstore,	Retail	A1	per 100sqm	Suburban Area	Food superstore		1.517	1.295	2.812	2.001	2.217	4.218	
B1_Town Centre	Town Centre,Office,	Employment	B1	per 100sqm	Town Centre	Office		0.943	0.038	0.981	0.113	0.792	0.905	
B1_Suburban Area	Suburban Area,Office,	Employment	B1	per 100sqm	Suburban Area	Office		1.267	0.124	1.391	0.178	0.746	0.924	
B1_Edge of Town	Edge of Town,Office,	Employment	B1	per 100sqm	Edge of Town	Office		2.169	0.150	2.319	0.100	2.124	2.224	
B2_Suburban Area	Suburban Area,Industrial Estate,	Employment	B2	per 100sqm	Suburban Area	Industrial Estate		0.412	0.126	0.538	0.124	0.305	0.429	
B2_Neighbourhood Centre	Neighbourhood Centre,Industrial Estate,	Employment	B2	per 100sqm	Neighbourhood Centre	Industrial Estate		0.486	0.243	0.729	0.159	0.339	0.498	
B2_Edge of Town	Edge of Town,Industrial Estate,	Employment	B2	per 100sqm	Edge of Town	Industrial Estate		0.408	0.161	0.569	0.124	0.375	0.499	
B8_Suburban Area	Suburban Area,Warehouse - Commercial,	Employment	B8	per 100sqm	Suburban Area	Warehouse - Commercial		0.054	0.036	0.090	0.070	0.043	0.113	
B8_Edge of Town	Edge of Town,Warehouse - Commercial,	Employment	B8	per 100sqm	Edge of Town	Warehouse - Commercial		0.187	0.124	0.311	0.103	0.212	0.315	
B8_Edge of Town Centre	Edge of Town Centre,Warehouse - Commercial,	Employment	B8	per 100sqm	Edge of Town Centre	Warehouse - Commercial		1.194	0.133	1.327	0.000	1.194	1.194	
B8 - PD_Edge of Town	Edge of Town,Warehouse - Parcel distribution	Employment	B8 - PD	per 100sqm	Edge of Town	Warehouse - Parcel distribution		0.067	0.401	0.468	0.134	0.535	0.669	
A3_Town Centre	Town Centre,Restaurants/cafes,	Hotel-food-drink	A3	per 100sqm	Town Centre	Restaurants/cafes		0.000	0.000	0.000	1.503	0.347	1.850	
A3_Suburban Area	Suburban Area,Restaurants/cafes,	Hotel-food-drink	A3	per 100sqm	Suburban Area	Restaurants/cafes		0.000	0.000	0.000	1.340	0.515	1.855	
A3_Edge of Town Centre	Edge of Town Centre,Restaurants/cafes,	Hotel-food-drink	A3	per 100sqm	Edge of Town Centre	Restaurants/cafes		0.000	0.000	0.000	0.968	0.261	1.229	
C1-Beds_Town Centre	Town Centre,Hotels - per bed,	Hotel-food-drink	C1	per bed	Town Centre	Hotels - per bed		0.065	0.111	0.176	0.070	0.035	0.105	
C1-Beds_Neighbourhood Centre	Neighbourhood Centre,Hotels - per bed,	Hotel-food-drink	C1	per bed	Neighbourhood Centre	Hotels - per bed		0.125	0.107	0.232	0.464	0.339	0.803	
C1-Beds_Suburban Area	Suburban Area,Hotels - per bed,	Hotel-food-drink	C1	per bed	Suburban Area	Hotels - per bed		0.037	0.083	0.120	0.092	0.046	0.138	
C1-Beds_Edge of Town	Edge of Town,Hotels - per bed,	Hotel-food-drink	C1	per bed	Edge of Town	Hotels - per bed		0.195	0.249	0.444	0.221	0.191	0.412	
C1-SQM-Town Centre	Town Centre,Hotels - per100sqm,	Hotel-food-drink	C1	per 100sqm	Town Centre	Hotels - per100sqm		0.121	0.206	0.327	0.130	0.065	0.195	
C2-Mixed	Mixed,Per Resident,	Health - Care Home	C2	per 1 Resident	Mixed	Per Resident		0.081	0.053	0.134	0.041	0.086	0.127	
D2-CC_Mixed	Mixed,Community Centre,	Leisure	D2-CC	per 1 ha	Mixed	Community Centre		30.841	15.888	46.729	21.569	23.039	44.608	
D2-LC_Mixed	Mixed,Leisure Centre,	Leisure	D2-LC	per 1 ha	Mixed	Leisure Centre		17.849	9.421	27.270	20.740	21.716	42.456	
D1-GP_Mixed	Mixed,GP Surgery,	Health	D1-GP	per100sqm	Mixed	GP Surgery		2.665	1.613	4.278	1.317	1.933	3.250	
D1-EN_Mixed	Mixed,Education Nursery,	Education	D1-EN	per100sqm	Mixed	Education Nursery		2.600	2.151	4.751	1.838	0.751	2.589	
D1-CU_Mixed	Mixed,College University,	Education	D1-CU	per100sqm	Mixed	College University		0.901	0.262	1.163	0.191	0.377	0.568	
D1-PS_Mixed	Mixed,Primary School,	Education	D1-PS	per100sqm	Mixed	Primary School		5.395	4.358	9.753	0.204	0.452	0.656	
D1-SS_Mixed	Mixed,Secondary School,	Education	D1-SS	per100sqm	Mixed	Secondary School		1.097	0.828	1.925	0.191	0.231	0.422	