

**This document has been withdrawn as the preferred route for the Lower Thames Crossing has been announced.**

## **Lower Thames Crossing Project: Module 5**

### **Technical Note –**

## **Review of Potential Employment and Housing Growth**

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	Originated by	Checked by	Reviewed by
<b>ORIGINAL</b>	NAME <b>Marc Postle / Jon Waite</b>	NAME <b>Huw William / Stuart Henworth</b>	NAME : <b>Dorney Burgdorf/ Denise Meade</b>
<b>Approved by</b>	NAME <b>Stephen Rutherford</b>	As Project Manager I confirm that the above document(s) have been subjected to Jacobs' Check and Review procedure and that I <b>approve them for issue</b>	INITIALS <b>SAR</b>
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### **1.1 Introduction and Background**

This Technical Note has been developed for the Lower Thames Crossing (LTC) Project. Its purpose is to inform the Strategic Case for LTC Options A, C and Cvariant.

The existing A282 Dartford River Crossing forms a key link within the Strategic Road Network, joining the M25 between Junctions 31 and J1a, completing the orbital route around London and is the only Thames river crossing east of London. In addition, the Dartford River Crossing provides a strategic link both within the Thames Gateway, which is a major regeneration area, and for the movement of goods between the Port of Dover and Channel Tunnel and the rest of the UK north of London.

The Government recognises that the existing river crossing capacity within the Thames Gateway is operating above capacity. This results in significant and prolonged peak hour congestion, and journey time unreliability generally which has negative consequences for road users, businesses and the UK economy as a whole.

In 2009 the Department of Transport (DfT) assessed how the capacity issues at the existing Dartford-Thurrock river crossing on the Lower Thames could be addressed. This study concluded that additional capacity was required and shortlisted three crossing options and a variant, as follows:

- Option A: at the site of the existing A282 Dartford-Thurrock crossing;
- Option B: connecting the A2 with the A1089;
- Option C: connecting the M2 with the A13 and the M25 between junctions 29 and 30; and
- Option C<sub>variant</sub>: connecting the M2 with the A13 and the M25 between junctions 29 and 30, and additionally widening the A229 between the M2 and the M20.

The DfT's review in 2013 assessed the merits of the shortlisted options. In 2013, the DfT launched a consultation exercise to gather views on these options.

### **1.2 Purpose and Scope of the Technical Note**

Jacobs has been commissioned by the DfT to develop a Technical Note which sets out a high level assessment of the opportunities for potential future development, including redevelopment within the Thames Gateway, which may be associated with the alternate crossing options, the potential traffic demand consequences and the implications for the strategic case for options A, C and C<sub>variant</sub>.

The scope of work included in this report can be summarised as follows:

1. To review the evidence used by DfT as the basis for the Review and the local authority commissioned 2010 study by URS consultants
2. To assess how and to what extent the crossing options could change the planning context within which any new development proposals would be advanced
3. To assess the overall significance to the case for each of the crossing options of potential scales and patterns of development and associated traffic generation.

### **1.3 Structure of Technical Note**

The structure of the Technical Note is as set out below:

1. Introduction to the study and purpose of the Technical Note
2. Methodology used to cover the scope of work
3. Comparison of Reports (Final Review Report, DfT and Regeneration Report, URS)
4. Further Analysis of Traffic Forecasts and Trip Distribution
5. Potential Future Development Scenarios
6. Summary

**2.1 Methodological Approach**

The approach to developing the Technical Note for Module 5: Review of Potential Employment and Housing Growth is outlined below.

**2.1.1 Comparison of the Reports**

A comparison of two key reports was undertaken to provide further evidence in relation to the strategic case for each LTC option. The reports were:

- URS, “*Third Thames Crossing Regeneration Impact Assessment Final Report*” (December 2012)<sup>1</sup> hereafter referred to as the Regeneration Report. The report was commissioned by Kent and Essex County Councils and Thurrock Council. The report considers the provision of additional crossing capacity on the Lower Thames, how to address Kent County Council’s overall strategy for Growth without Gridlock (GWG), and how strategic growth policies for both Essex and Thurrock Councils might be met.
- Aecom, “*Review of Lower Thames Crossing Options: Final Review Report*” (April 2013)<sup>2</sup> hereafter referred to as the Final Review Report. This report was commissioned by the DfT to review the merits of the three options, to inform public consultation and to inform the government decision making process.

The comparison provides a succinct overview of the scope, methodology, key assumptions, geographical interest and the findings presented in each report. Observations are made to build upon the existing evidence base and to portray a combined picture of what the respective reports infer.

It should be noted that this part of the Technical Note serves as an explanatory commentary of the Regeneration Report and the Final Review Report. A fuller understanding of the forecast economic impacts of the Lower Thames Crossing options can be gained by reading this in conjunction with both full reports.

**2.1.2 Further analysis of trip patterns**

To analyse changes in trip patterns in the ‘Do Minimum’ scenario and resulting from providing a new crossing at each location option we:

- Extracted sector to sector trip movements from the traffic model developed by AECOM (hereafter referred to as the LTC Model) for both Do Minimum scenarios and new crossing options;
- Converted the entire zoning plan to a 10 sector level;
- Compared trip changes between the Do Minimum and Do Something options (with new crossings in place at each location) over the sector system, to assess the impact of the options on trip patterns.

<sup>1</sup> Available at <https://shareweb.kent.gov.uk/Documents/roads-and-transport/road-policies/local-transport-plan/Third%20Thames%20Crossing%20Final%20Report.pdf>

<sup>2</sup> Available at <https://www.gov.uk/government/publications/review-of-lower-thames-crossing-options-final-review-report>

AECOM provided us with the final output demand and Journey Time matrices from the LTC demand model.

### **2.1.3 Planning Policy Overview**

Planning policy is fundamental in shaping development patterns and scales of development. Therefore, to assess how, and to what extent, the crossing options could change the planning context within which any new development proposals would be advanced, a review of current and relevant international, national and local planning policy was first carried out. Then, using professional judgement and experience, consideration was given to how this policy could change in the future.

The AECOM Central Forecasts and Sensitivity Tests Report (November 2012) included a potential growth rate for population and employment informed by local authority planning information. We considered the implications of this growth rate and higher growth in the context of possible future planning policy as well as potential future scales and patterns of development.

**3.1 Key Findings of the Comparison of Reports**

The two reports were reviewed across the elements of scope, methods and results. The key findings of the comparison of the Regeneration Report and Final Review Report are presented in Table 3A.

*Table 3-A Key findings of Comparison*

<b>Element</b>	<b>The Regeneration Report (2012)</b>	<b>The Final Review Report (2013)</b>
<b>Scope – Options considered</b>	<p>Option A - Improved capacity at A282 Dartford River Crossing, free-flow-tolling, London Gateway M25 J30.</p> <p>Option C - New crossing to the east of Gravesend and the east of Tilbury, free-flow-tolling, London Gateway M25 J30.</p> <p>Option C<sub>variant</sub> was not included in this assessment.</p>	<p>Option A - Improved capacity at the A282 Dartford River Crossing, existing planned works (such as free-flow-tolling, improvements to the A226)</p> <p>Option C - New crossing to the east of Gravesend and Thurrock, existing planned works (such as free-flow-tolling, improvements to the A226)</p> <p>Option C<sub>variant</sub> - New crossing to the east of Gravesend and Thurrock, an additional link to the M20 for long distance traffic, existing planned works (such as free-flow-tolling, improvements to the A226)</p>
<b>Scope – Timescale and key dates</b>	<p>2021 – assumed opening date of a new crossing.</p> <p>2031 – Date by which “the extent of growth opportunities will have been fully realised”</p>	<p>2025 – assumed opening date of a new crossing.</p> <p>2041 – a year “by which demand for the new crossing might be expected to have matured”</p>
<b>Scope – Impacts assessed and definition</b>	<p>Job creation (jobs enabled or brought forward due to development)</p> <p>The delivery of housing (housing enabled or brought forward due to development)</p>	<p>Job movements into the area (new jobs as a result of the relocation of business/industry)</p> <p>Wider Impacts, including agglomeration and changes in output in imperfect competition</p>
<b>Methods – Methodology</b>	<p>English Partnerships guidance and qualitative assessments (English Partnerships’ Additionality Guidance, 2008)</p>	<p>Used WebTAG (DfT) guidance to assess Wider Impacts and job relocation, using the Lower Thames Crossing (LTC) Model (DfT) as a data source.</p>
<b>Methods – Geography</b>	<p>Assessment extends to the Kent and Essex area, focusing on development areas in vicinity to the options (south Essex and north Kent)</p>	<p>Assessment incorporates the entire UK, but gives more weight to areas that are closer to the options (South East and London area)</p>
<b>Methods = Evidence of Sensitivity Testing</b>	<p>No Sensitivity Testing undertaken within this report.</p>	<p>Alternative Growth Scenarios</p>
<b>Results – Jobs</b>	<p>Jobs created over baseline, through development, by 2031 (date by which growth opportunities are fully realised).</p> <p>Option A: approx. 17,500 jobs Option C: approx. 25,000 jobs</p>	<p>Jobs movements to the area by 2025 (scheme opening year) upon opening of the scheme.</p> <p>Option A: 500 jobs Option C: 3,000 jobs Option Cvar: 3,200 jobs</p>



Element	The Regeneration Report (2012)	The Final Review Report (2013)
<b>Results – Homes delivery</b>	Homes delivered over baseline, through development, by 2031 (date by which growth opportunities are fully realised)  Option A: approx. 13,000 homes Option C: approx 21,000 homes	Not assessed.
<b>Results – Wider Impacts</b>	The wider impacts were not assessed.	Significant wider economic impacts expected to occur, Net Present Value NPV), cumulative 2025 to 2084.  Option A: £251 million Option C: £1,162 million Option Cvar: £1,504 million

### 3.1.1 Comparison of Scope

The scope of options considered is defined in Table 3A. The Regeneration Report does not consider Option C<sub>variant</sub>.

Additionally, the reports differ in what is assumed to be the opening year for the new crossing, with the Regeneration Report making the assumption that the scheme will open in 2021 and that the full impacts on development will have materialised within ten years, by 2031. The Final Review Report assumes an opening year of 2025 and that the demand for the crossing will have matured after 16 years, in 2041. Therefore the baselines and assumptions presented in each report differ significantly.

The Regeneration Report states the study objectives as being the assessment of how the crossing options could generate, or bring forward, the development of employment (jobs) and homes. The Review Report looks at the wider economic impacts and the regeneration case in terms of jobs relocated to the study area.

The Regeneration Report is confined to the geographic area of Essex and Kent, with detailed analysis in the area of south Essex and north Kent. In comparison, the Review Report, using the LTC Model as a basis, has a geographic scope covering the entire UK, although the focus of more detailed analysis is the South East and London area.

### 3.1.2 Comparison of Method

In addition to the differences in geographic scope, as discussed above, there are also differences in the overall methodology applied to each of the reports. The Regeneration Report is based upon the English Partnership’s Additionality Guide (2008), which is recommended by HM Treasury Green Book for assessing regeneration impacts of a range of interventions, including transport interventions such as infrastructure. The key components are:

- A demand uplift methodology, where increases in demand were based on market attractiveness, physical constraints, planning policy and accessibility
- Positive multipliers (scale: low, medium, high) which are based on additional economic benefits that could occur as a result of the scheme.
- Negative multipliers: (scale: low, medium, high) which account for leakage, displacement, substitution.

The report combined these components with local data (planning policies), professional judgement, knowledge of the strategic and local road networks, and qualitative analysis.

The Final Review Report is based upon WebTAG guidance (DfT) and specifically on the outputs of the LTC Model. It calculates the productivity changes due to agglomeration. The land use impacts, derived from the outputs of the model, are also used to produce a qualitative assessment of job relocation. The key components are:

- Output of LTC Model showing forecast trip distribution
- Agglomeration Benefits of the LTC option calculated using WebTAG (3.5.14)
- Land use change and qualitative assessment

The methodological approach to the geographical scope used by the two reports also differ. The Regeneration Report divides its area of consideration into local (Medway, Gravesham, Dartford and Thurrock) and hinterland (the rest of Kent and Essex). Within the study area, the report uses local planning policy and strategy documents to identify areas to be considered as clusters of development with more than one housing, employment or mixed use development. 29 sites were identified, including 11 sub-sites. These are presented in [Appendix 1](#). Within the hinterland development clusters were not identified as the report considered that individual sites were less relevant in the wider geographical context. The development clusters identified were assessed in terms of accessibility and non-accessibility factors.

The assessment of accessibility involved:

- Each development cluster was rated based on the baseline accessibility of the cluster, the extent to which additional works would be required to improve access, and the current public transport links. High scores represented a cluster with good accessibility to the highway network and good public transport links.

The non-accessibility factors used are:

- Market Attractiveness – this assessed current land value, evidence of public funding for development, market activity and developer interest. High scores represented areas where development was both viable and there was evidence of interest.
- Physical Constraints – this assessed issues such as contamination, flood risk and the potential cost of resolving these issues. High scores represented a site with few issues, or where the constraints could be resolved cheaply.
- Planning policy – this assessed local designations, such as green belt and protected areas, and the existence of spatial strategies that incorporated development at the site. High scores represented a site that is well aligned with strategic policy and priorities.

The accessibility assessment was applied to development clusters associated with each of the crossing options. Where the accessibility of a development cluster was improved after the opening of a new crossing it was awarded a higher rating.

The accessibility and non-accessibility assessments formed a “weighted, *combined appraisal*”. Non-accessibility factors were weighted at “1”, while the accessibility improvement from the crossing option was weighted at “2”. The combined appraisal

score determined the total uplifts that was applied to the job creation and delivery of homes determined for the reference case. These uplifts were taken from the English Partnerships Additionality Guidance. The Regeneration Report states that based on the professional judgement that a major crossing has the ability to trigger other development, the job creation uplift factors were multiplied by catalytic factors.

In order to represent a measure of the potential benefits of each crossing option, a series of leakage, displacement, substitution and economic multiplier factors were also applied, based on URS’s judgement and secondary research. These can be summarised as:

- Leakage refers to economic benefits that would go outside the study area, in this case Essex and Kent. The report assessed this area as having a low rate of leakage, resulting in a reduction of the uplift of 10%.
- Displacement refers to economic benefits that result in inputs or market share being taken or displaced from existing firms or organisations. The report assessed the area as having a low rate of displacement, resulting in a reduction of the uplift of 25%.
- Substitution refers to when an economic benefit is reduced due to movement of resources within firms. The report assessed the area as having a low rate of substitution, resulting in a reduction of the uplift by 25%.
- The economic multiplier effects are additional benefits accrued due to further economic activity. The baseline scenario, which assumed free-flow-tolling and some other traffic interventions, was given a multiplier of 1.1. The crossing options were given multipliers of 1.3.
- Impacts in the hinterland area were reduced by 25% to account for the larger geography.

The final set up uplifts is presented in Table 3-B below.

**Table 3-B Final Local Area Uplift, including demand uplift, leakage, displacement, substitution and economic multipliers**

Combined Appraisal Result	Job Creation Final Uplift (All factors)	Housing Final Uplift (All factors)
Low	6.75%	3.3%
Medium	13.8%	6.6%
High	21.2%	9.9%
High+	25%	13.1%

The Final Review Report uses two different geographic approaches to cover the assessment of wider impacts and the assessment of regeneration. Wider impacts were calculated using the LTC Model, which provided greater granularity and weighting for those areas closer to the proposed crossing options. The model was developed in accordance with WebTAG Units 3.5.6, 3.5.8 and 3.5.14 (Department for Transport, 2012). The wider impacts comprised an assessment of agglomeration and reduction in imperfect competition, and were developed from the LTC Model. This model consisted of 148 zones, of which 129 were in London, South East or East of England, and 19 were external zones. This approach was used to inform the assessment of job movements and wider impacts of the crossing options. The

regeneration impacts within the Final Review Report are calculated for London, Kent and Essex.

The wider impact of agglomeration benefits was calculated for 2025 and 2041, corresponding to the assumed opening date of the new crossing and to 16 years after the opening of the new crossing, for both a baseline case and for the options. The method uses effective densities, which represent the mass of economic activity across the modelled area, and generalised costs of transport. The interaction of these variables produces a productivity change estimate.

The wider impact of Imperfectly Competitive Markets benefit arises from changes in the input prices of businesses, and the knock-on impact on prices to consumers. Due to the assumption that businesses are not in perfect markets, only 10% of the business cost change is assumed to be passed on to consumers.

The WebTAG regeneration assessment refers to the redistribution of employment and economic activity. In the Final Review Report, it was not considered appropriate to undertake a full “*Regeneration Report*”, the methodology for which is designed to assess specific, small interventions. Instead the Final Review Report makes qualitative estimates based upon the land use change outputs of the LTC model, and presents the results for the assumed opening year for the new crossing, 2025, of those jobs that will have relocated to the area due to the option choice.

Both reports identify the employment benefits associated with a new crossing option. The Regeneration Report assesses job creation in the form of opportunities enabled or brought forward due to development of a crossing option. The extent of growth opportunities (jobs) is based upon those that will have been fully realised by 2031. The Final Review Report assesses job movements into the area as a result of the relocation of economic opportunities (jobs); this is assessed for 2025 (assumed opening year of the new crossing). The report also assumed that by 2041 demand for the new crossing might be expected to have matured. The Final Review Report also quantified the wider impacts, including agglomeration benefits; this type of assessment is not included in the Regeneration Report.

It should be noted that the job creation benefits identified in the Regeneration Report include ‘displacement’ which is theoretically equivalent to the job movements identified in the Final Review Report. However, this represents a sub-component of the overall analysis and assessment and is not presented in a comparable way. Due to the significant differences in the methodology used, the scale of ‘displacement’ and ‘job movement’ will not necessarily be equal in terms of number of jobs.

The use of sensitivity testing is also a key differentiator of the reports. The Final Review Report makes use of the standard sensitivity tests from the WebTAG guidance:

- Changes in freight costs
- Changes in land use
- Incorporating the fast decay of agglomeration benefits

This provides an indication of the most likely range within which the actual result will fit. The Regeneration Report does not include sensitivity testing and presents a single case.

**3.1.3 Comparison of the Headline Results**

The results of the Regeneration Report and the Final Review Report are not directly comparable due to the differences in their methodology and assumptions. However, they are both focused on identifying the benefits of LTC options and therefore provide a complementary evidence base to inform decision making. Whilst the unit and definition of benefits differ, they provide a relative order for the impact of each of the LTC options assessed. The baseline assumptions and objective of each report must be duly considered when comparing their respective conclusions in this way.

The findings of the comparison of reports, which must be considered when reviewing the overall results, can be summarised as:

- The Regeneration Report assesses the Options’ impacts upon job creation (by 2031).
- The Review Report assesses job movements into the area, rather than job creation (by 2025)
- The Regeneration Report assesses the delivery of homes, which is not assessed in the Review Report (2031).
- The Review Report assesses the cumulative Wider Impacts between 2025 and 2084 and generates a Net Present Value.
- The Review Report presents benefits arising from both agglomeration and the changes in imperfect competition. These are not assessed in the Regeneration Report.

**a) The Regeneration Report**

The headline figures from the Regeneration Report are presented in Table 3C, which shows job creation and delivery of homes between 2012 (base year) and 2031 (extent of growth opportunities have been fully realised).

**Table 3-C Total Employment and Homes Growth, Regeneration Report 2013**

	2012 2031		
	Baseline	Option A	Option C
Job Creation	102,436	120,002 (+17,566)	127,661 (+25,225)
Delivery of Homes	194,089	206,977 (+12,888)	215,172 (+21,082)

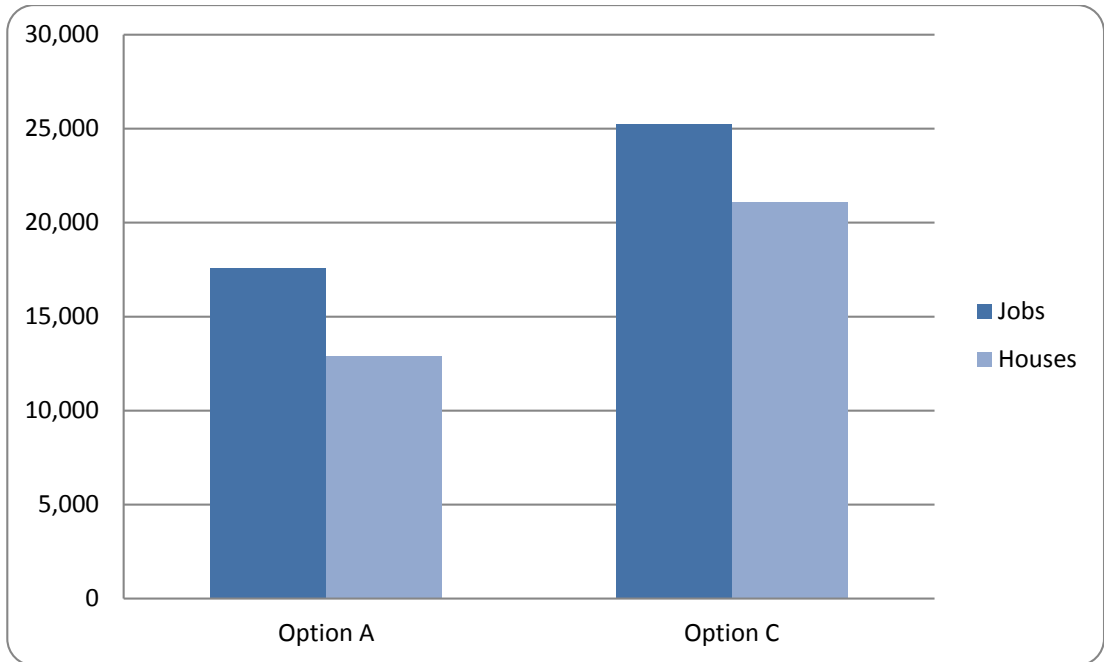
The results show that both Options A and C generate higher levels of job creation and delivery of homes that the baseline. Option C generates the highest level of growth by 2031. The report summarises that the assessed benefits of improved accessibility of the development clusters will be greater under Option C.

Contrasted with the baseline, the following comparisons can be made:

- Option A achieves +17.1% growth in job creation.
- Option C achieves +24.6% growth in job creation.
- Option A achieves +6.7% growth in the delivery of homes.
- Option C achieves +10.9% growth in the delivery of homes.

The difference between the forecast jobs and housing growth is presented graphically in **Figure 3A**.

**Figure 3-A Total additional jobs and homes in the long term (2031), from the Regeneration Report**



The conclusion of the Regeneration Report does not make any judgement on whether the greater benefit of Option C represents the most cost-effective option in terms of job creation and the delivery of homes.

The Regeneration Report presents results for the local area and the hinterland area. This is reproduced in **Table 3D** and displayed in **Error! Reference source not found.** and

**Table 3-D Local and Hinterland Employment and Homes Growth**

		2012 2031		
		Baseline	Option A	Option C
Local	Job Creation	16,503	22,609 (+6,106)	24,403 (+7,900)
	Delivery of Homes	34,375	36,618 (+2,243)	37,343 (+2,968)
Hinterland	Job Creation	85,933	97,393 (+11,460)	103,259 (+17,325)
	Delivery of Homes	159,714	170,359 (+10,645)	177,829 (+18,115)

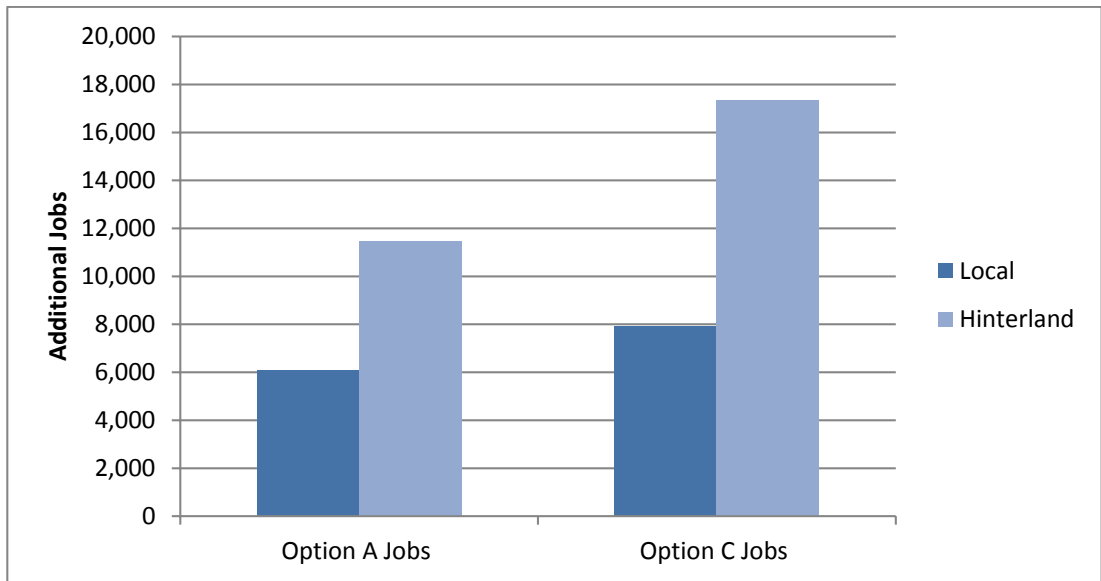
The local and hinterland growth under the crossing options can be contrasted against the baseline:

- For Option A job growth is +37.0% in the local area and +13.3% in the hinterland.
- For Option C job growth is +47.9% in the local area and +20.2% in the hinterland.
- For Option A housing delivery growth is +6.5% in the local area and +6.7% in the hinterland.

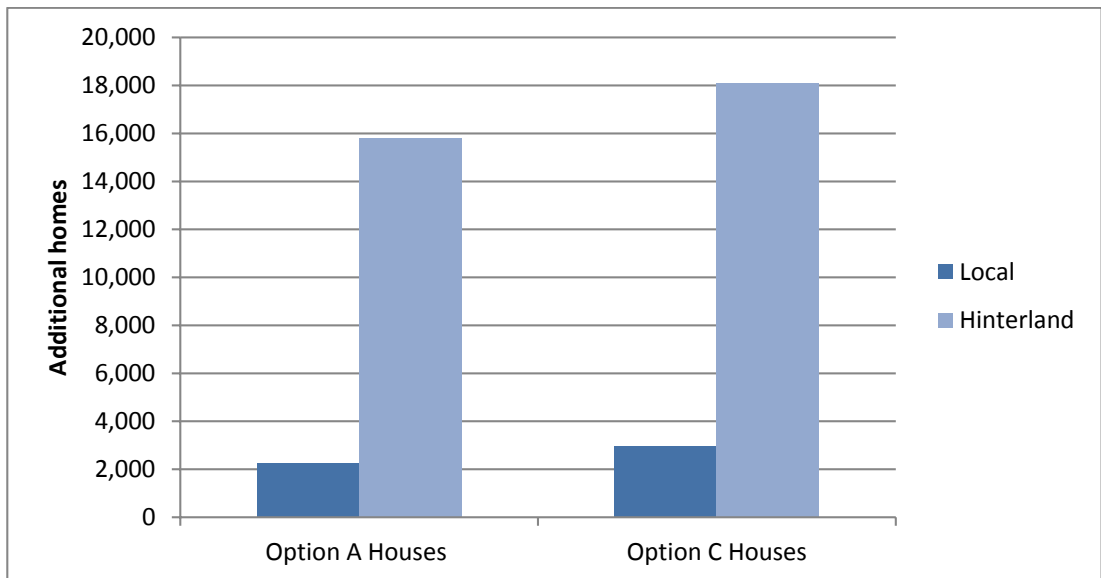
- For Option C housing delivery growth is +8.6% in the local area and +10.6% in the hinterland.

This analysis, supported by **Table 3D**, **Figure 3B** and **Figure 3C**, identifies that there would be greater job creation and delivery of homes in the hinterland, in absolute terms, but proportionally more growth in the local area. The report outlines that Option C is forecast to generate the highest level of job creation and delivery of homes at these levels of disaggregation, and that the proportional difference is amplified in the local area.

**Figure 3-B Jobs creation by 2031, from the Regeneration Report**



**Figure 3-C Delivery of homes, by 2031, from the Regeneration Report**



The report concludes that all options are able to deliver growth in job creation and new homes. However, Option C is described as bringing about the highest level of growth, due to the uplift in demand in the local area and hinterland caused by improved accessibility.

**b) The Final Review Report**

**Table 3E** presents a summary of the economic impacts determined by the Final Review Report.

**Table 3-E Final Review Report Development and Regeneration Impacts**

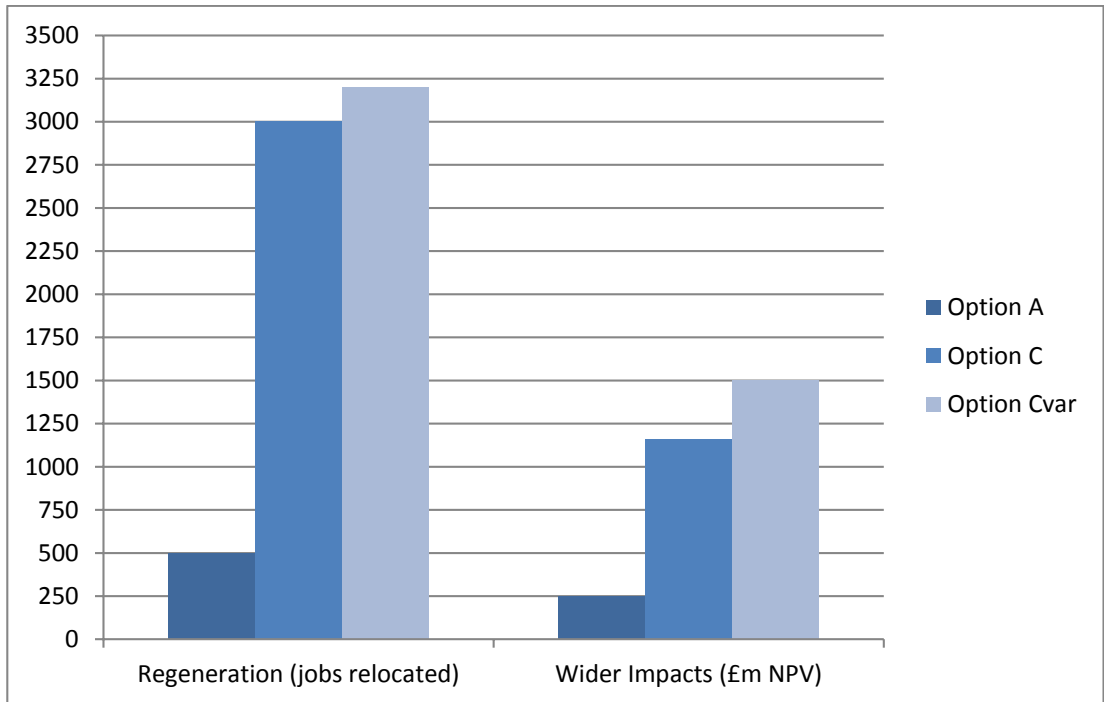
	60 year appraisal (2025 2084)					
	Option A		Option C		Option C <sub>variant</sub>	
	Qualitative / Quantitative	Monetary NPV	Qualitative / Quantitative	Monetary NPV	Qualitative / Quantitative	Monetary NPV
<b>Regeneration (jobs relocated to local area)</b>	+500 jobs in area by 2025	n/a	+3,000 jobs in area by 2025	n/a	+3,200 jobs in area by 2025	n/a
<b>Wider Impacts</b>	Agglomeration : £195m Indirect Competition: £56m	£251m	Agglomeration : £999m Indirect Competition: £162m	£1,162m	Agglomeration : £1,275m Indirect Competition: £227m	£1,504m

**Table 3E** indicates that Option C<sub>variant</sub> provides the highest benefits in each of the impact categories assessed. As the Final Review Report does not present the baseline figures, just the change from the baseline, it was not possible to contrast the impacts with the baseline. However, it is clear that the magnitude of benefits varies as follows compared to Option A:

- Job Movement benefits of Option C are shown as 6 times greater and the benefits of Option C<sub>variant</sub> as 6.4 times greater.
- Wider Impact benefits of Option C are shown as 4.6 times greater and the benefits of Option C<sub>variant</sub> as 6 times greater.

**Figure 3-D Job movements (2025) and Wider Impacts, from the Final Review Report**





This analysis, supported by **Table 3E** and **Figure 3D**, shows that all of the options are likely to deliver regeneration and wider impact benefits when compared to the baseline. Option C<sub>variant</sub> delivers the greatest benefit in terms of wider economic impact and job movements into the area.

The Final Review Report states that Option A: *“is forecast to stimulate a relatively limited improvement in productivity and new employment”*, while Option C (and C<sub>variant</sub>) *“results in the largest forecast wider economic benefits, particularly those resulting from agglomeration of business activity”*.

**4 Further Analysis of Traffic Forecasts**

**4.1.1 Trip Pattern Analysis**

We used the LTC Model developed by AECOM to analyse trip patterns in the Do Minimum scenario (with no new crossing) and changes in the trip patterns resulting from the provision of a new crossing at each location.

We extended the previous analysis by assessing the trip pattern impact of the crossing options on trip patterns over the entire study area, as opposed to individual origins and destinations.

Our methodology to undertake this additional analysis is described in section 2.1.2 above. The sector definition that we devised is illustrated in **Figure 4A** below:

**Figure 4-A Sector Map**



We analysed sector-to-sector changes in trip patterns as a result of Options A, C and Cvariant. The comparison was based on changes in trip patterns in respective LTC options from a Do minimum scenario in the assumed year of opening.

Tables 4-A, 4-B and 4-C below show a comparison of changes in trip patterns (2025, Annual Average Daily Trips (AADT)) between Option A and the Do Minimum, Option C and the Do Minimum and Option Cvariant and the Do Minimum respectively. The red highlighted cells in the tables show sector-to-sector trip-movements which are

reduced as a result of LTC options when compared to the Do Minimum scenario i.e. without a new crossing. The light green shaded cells show an increase in trip-movements and green shaded cells show where the increase in trips due to LTC options are more than 100 trips per day.

**Table 4A Change in AADT Trip Patterns in Option A compared to DM (opening year 2025)**

	0	1	2	3	4	5	6	7	8	9	10	Total
0	26	44	1	-2	0	3	-1	0	-3	17	0	86
1	50	1063	27	-16	-54	-74	79	34	-2	71	24	1203
2	1	24	-3	-22	-18	-27	21	29	2	33	4	44
3	0	115	-12	-80	103	-83	32	16	-27	3	3	366
4	0	349	-47	414	456	750	236	213	-14	75	15	1492
5	-1	559	149	319	648	1752	823	338	23	255	88	1901
6	1	486	59	62	651	2019	1156	591	-34	216	-23	1258
7	0	78	29	38	491	1383	1182	169	50	120	-34	901
8	-2	42	6	-38	79	83	-52	-51	-74	-86	-7	100
9	21	601	85	83	240	1032	379	137	-70	342	-87	1047
10	2	105	14	8	64	230	122	-40	-5	-49	-42	166
<b>TOTAL</b>	97	1420	11	700	245	2065	1700	-20	155	360	-59	

**Table 4B Change in AADT Trip Patterns in Option C compared to DM (opening year 2025)**

	0	1	2	3	4	5	6	7	8	9	10	TOTAL
0	118	29	1	-1	1	2	9	-2	-3	18	6	-58
1	32	6952	-8	144	206	345	475	40	36	634	163	6273
2	0	-41	503	-27	-9	331	151	29	6	207	44	474
3	0	212	-16	168	-2	142	158	31	64	124	30	133
4	0	385	-17	286	2548	474	956	345	-3	267	88	2056
5	-7	573	343	306	568	10183	4148	443	74	1189	1069	3921
6	13	829	180	160	1717	5321	1472	246	0	586	924	4990
7	0	76	32	34	928	1565	708	662	32	135	-58	1102
8	-3	48	9	42	122	178	-23	-40	-38	113	2	184
9	22	1194	219	192	528	2009	831	167	-84	1083	121	1878
10	9	246	69	33	162	974	1204	-18	5	119	135	292
<b>TOTAL</b>	-51	5741	379	472	1260	1426	1660	247	89	404	432	

**Table 4C Change in AADT Trip Patterns in Option Cvariant compared to DM (opening year 2025)**

	0	1	2	3	4	5	6	7	8	9	10	TOTAL
0	-93	27	1	-1	1	1	11	-1	-3	17	7	-33
1	29	6367	-21	175	251	393	496	37	36	766	259	5584
2	0	-42	475	-27	-12	350	150	27	6	231	64	430
3	0	278	-18	112	-92	165	153	30	31	165	65	220
4	1	420	-20	353	2438	482	869	253	-30	421	321	1878
5	-8	622	368	343	382	10897	3846	376	61	1414	1539	4618
6	13	790	177	146	1535	5152	4150	269	5	433	2539	6373
7	0	77	31	37	840	1537	925	627	1	-40	282	1213
8	-3	54	9	30	111	178	6	-38	3	128	27	248
9	34	1377	251	231	696	2301	446	-96	110	2303	470	2355
10	10	320	89	50	377	1329	1761	218	7	498	2164	1500
<b>TOTAL</b>	-16	5085	345	515	1149	1788	2662	-90	5	479	2470	

Regarding Option A, the most significant impact is to increase trip movements between South Essex and North Kent by around 3,000 trips per day, at the expense of internal trips within South Essex. Thus, the provision of Option A, would provide slightly better accessibility between South Essex and North Ken and encourage more trips to cross the Thames rather than staying within South Essex. These 3,000 trips AADT represent only 0.2% of the total internal trips within South Essex. However South Essex is a large sector and it is to be expected that these trips are small in percentage terms of overall trips, whilst being significant in absolute terms of additional trips crossing the River Thames. Other sector pairs where there would be an increase in trip movements due to Option A include: between South Essex and SE London (around 1,700 AADT) and between South Essex and the rest of the South East (around 1,300 AADT).

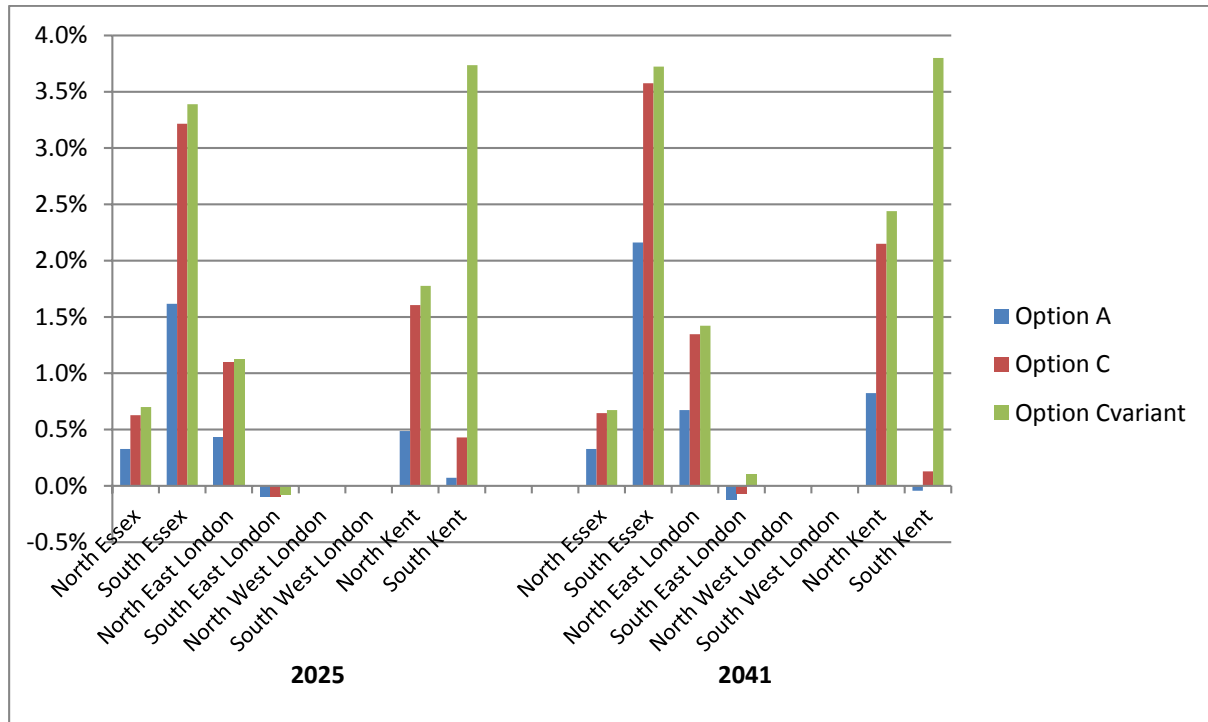
Similarly, the most significant impact of Option C is to increase trip movements between South Essex and North Kent, but by a much larger amount of around 9,500 trips per day, at the expense of internal trips within South Essex (9,500 represents 0.6% of total internal trips within South Essex). Thus, the provision of Option C would provide better accessibility between South Essex and North Kent, and encourage more trips to cross the Thames rather than staying within South Essex. Other sector pairs where there would be a significant increase in trip movements due to Option C include: between the rest of the South East and South Essex (around 3,200 AADT), between North East London and North Kent (around 2,500 AADT); between South Essex and South Kent (around 2,000 AADT); between South Essex and South East London (around 2,000 AADT) and rest of South East to rest of UK (around 1,800 AADT).

Similarly, the most significant impact of Option Cvariant is to increase trip movements between South Essex and North Kent by around 9,000 trips per day, at the expense of internal trips within South Essex. However, the impact of Option Cvariant on trip patterns is marked over a wider geographic area than for Option C, particularly in South Kent. Other sector pairs with increased trip numbers due to Option Cvariant include: rest of South East to/from South Essex (around 3,700 AADT); North Kent to/from North East London (around 2,400 AADT); South Kent to/from South Essex (1,900 AADT) and South East London to South Essex (around 1,900 AADT). The redistribution of these trips crossing the River Thames due to Option Cvariant is mainly away from 'internal' trips that would otherwise occur within South Essex; North Kent; South Kent; North East London and rest of South East.

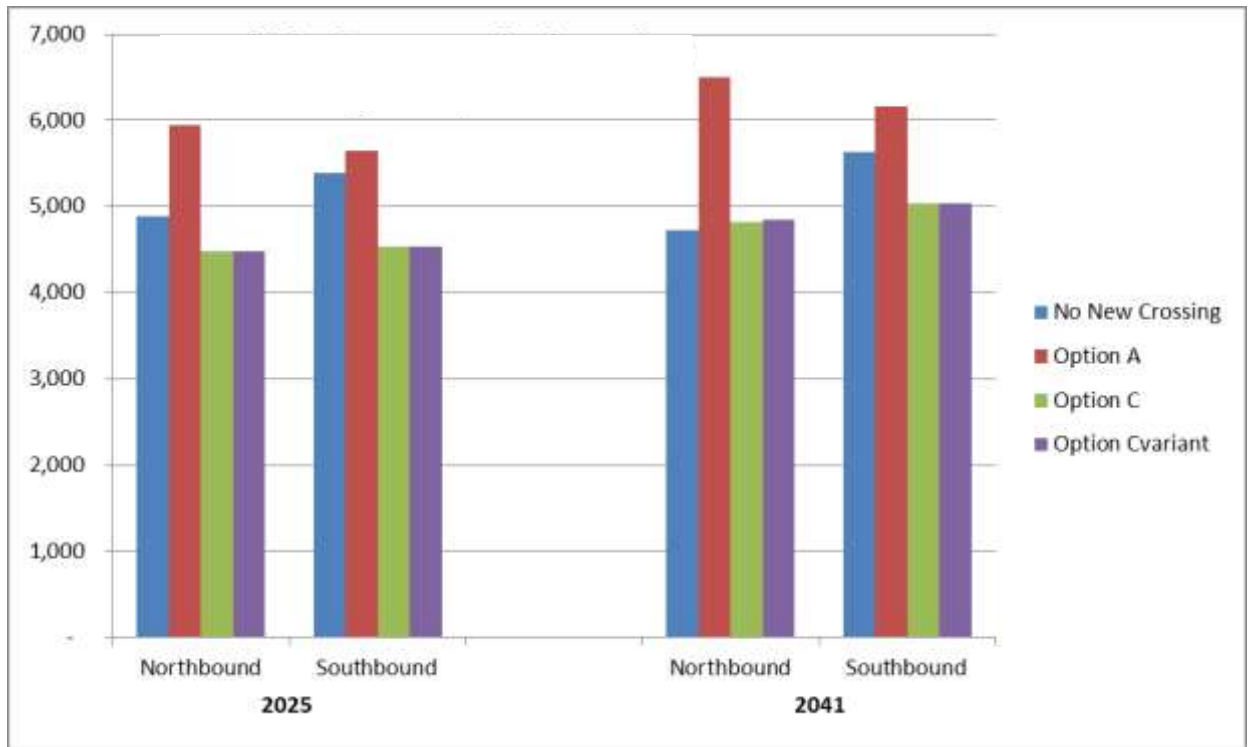
The percentage increases in trip origin pairs are similar across all time periods for each option, suggesting that the predicted impacts would apply similarly to all trip purposes, rather than just employers' business or commuting trip purposes.

The impact of the different options on trip redistribution within London and the South East is illustrated in **Figure 4B**, where the percentage difference in trips originating from all sectors due to Option A is significantly less than either Option C or option Cvariant.

**Figure 4-B Percentage increase in vehicle traffic crossing the Lower Thames, Annual Average Daily Traffic 2025, by trip origin**



**Figure 4-C Traffic flows at Dartford Crossing, Average flows per hour between 0700-1900**



Furthermore we also analysed the impact of a new crossing on the existing Dartford Crossing traffic flows (see Figure 4C above). Our analysis confirmed that, as expected, Option A is predicted to increase traffic flows on the Dartford Crossing, whereas both Options C and Cvariant are predicted to decrease traffic flows on the existing Dartford Crossing. The figures above illustrate the absolute predicted traffic flows in vehicles per hour, over a 12 hour period.

The purpose of this chapter is to assess how, and to what extent, the crossing options could change the planning context within which any new development proposals would be advanced. This has been undertaken in order to inform the significance to the case for each option of potential scales and patterns of development and associated traffic generation.

The focus of this chapter is on development as defined by planning legislation, particularly that which is determined at local level under the provisions of the Town and Country Planning Act 1990; namely residential, employment and associated development.

The new Lower Thames Crossing itself will be a Nationally Significant Infrastructure Project (NSIP) which would be consented through the Planning Act 2008 by Development Consent Order (DCO). That act provides for the preparation of National Policy Statements as the framework against which applications are assessed. The Department for Transport issued for consultation a draft National Networks National Policy Statement on 4th December 2013.

**(a) Relevant International Policy and Legislation**

Although overarching planning policy and legislation in the UK is established at a national level, there is a range of European policy and legislation that impacts on planning. This includes air quality targets, Trans-European Networks and the Human Rights Act. As this study looks at land use planning and allocations in development plans, only land designations at European level are considered in this section as a number of key environmental designations in the UK are based on European legislation.

The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992) requires EU Member States to create a network of protected wildlife areas, known as Natural 2000 sites, across the European Union. This network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), established to protect wild birds under the Birds Directive (Council Directive 79/409/EEC of 2 April 1979). Ramsar sites are wetlands of international importance, designated under the Ramsar Convention and are also covered by the Habitats Directive.

As these designations are deemed important enough to protect at a European level they provide some of the highest levels of protection and constraint to land use planning

**(b) National Planning Policy**

As stated at the start of this chapter nationally significant infrastructure is subject to policy set out in relevant National Policy Statements. The focus of this chapter is on residential, employment and associated development subject to terms of the Town and Country Planning Act but it is important to acknowledge that nationally significant infrastructure can affect housing and employment development.

Planning policy at a national level relevant to housing and employment development is set out in the Government's National Planning Policy Framework (NPPF) and associated guidance. The NPPF was adopted in March 2012 and contains policies

for consideration when local authorities produce their Local Plans and determine planning applications.

The NPPF contains an overarching presumption in favour of sustainable development. On page 2 it acknowledges that this has an economic, environmental and social role. It states that:

‘an economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

a social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being; and

an environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.’

The guidance means that when making planning decisions, Local Planning Authorities (LPAs) must weigh up the need to protect the natural and historic environment, whilst at the same time allowing development that will sustain and boost our economy and allow everyone to live in a decent home.

The NPPF has policies on key designations such as Green Belt which is particularly relevant to the Lower Thames area as large parts of the area are designated Metropolitan Green Belt. Only very limited types of development are allowed in the Green Belt (such as infill and certain types of redevelopment) and the NPPF states that ‘Very special circumstances’ would need to exist to allow other types of development. The NPPF states the Green Belt serves five purposes. These are:

- “to check the unrestricted sprawl of large built-up areas;
- to prevent neighbouring towns merging into one another;
- to assist in safeguarding the countryside from encroachment;
- to preserve the setting and special character of historic towns; and
- to assist in urban regeneration, by encouraging the recycling of derelict and other urban land”.

The Green Belt is not an environmental designation, rather a planning designation. The boundary of the Green Belt itself is established by the local authority in their Local Plan for the borough/district. The NPPF states that ‘Once established, Green Belt boundaries should only be altered in exceptional circumstances through the preparation or review of the Local Plan’ (para 83). It states ‘When drawing up or reviewing Green Belt boundaries local planning authorities should take account of the need to promote sustainable patterns of development’ (para 85). The extent of the Green Belt in the Lower Thames area is shown in [Appendix 2](#) of this report. The change to the boundary along with the rest of Local Plan would be examined in public and the Inspector would need to be convinced that the change to the boundary was sound.



There are also Areas of Outstanding Natural Beauty (AONB) in the South East which the NPPF confirms has the highest status of protection in relation to landscape and scenic beauty. The NPPF states that planning permission should be refused for major developments in AONBs except in exceptional circumstances where it can be demonstrated that they are in the public interest. When considering such applications para 116 states that the following should be assessed:

- ‘the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;
- the cost of, and scope for, developing elsewhere outside the designated area, or meeting the need for it in some other way; and
- any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.’

At the same time the NPPF has policies that support economic growth in rural and urban areas and the delivery of housing to meet an objectively assessed housing need. The NPPF also recognises that appropriate infrastructure is necessary for economic development (see roles of sustainable development above)

### **(c) Local Level**

Local authorities are responsible for the preparation of local plans that, along with the NPPF, set out the framework and policies against which planning applications are determined. Once the plan is adopted, the policies in local plans are valid for the plan period. The Lower Thames area is covered by plans at various stages of development. Some have been adopted and others are in the process of being produced or are under review.

For reference, **Appendix 3** sets out the key local plan policies for Dartford, Gravesham, Medway, Thurrock and Havering. The plans have policies on key environmental designations and establish the boundaries of the Green Belt locally.

Used as a basis in the Regeneration Report, the Local Plans also contain policies to deliver housing and employment development growth. Table 5-A provides a summary of the scale of development proposed by these Plans.

**Figure 5-A Summary of Local Plans**

	<b>Dartford</b>	<b>Gravesham</b>	<b>Havering</b>	<b>Medway</b>	<b>Thurrock</b>
<b>No of Homes</b>	Total: 17,300  This includes: Dartford Town Centre inc Northern Gateway (up to 3,070 homes)  Ebbsfleet to Stone (up to 7,850 homes)  Thames Waterfront (up to 3,750)  Other sites north of A2 (up to 2,400 homes)  Sites south of A2, normally provided within village boundaries (200 homes)	Total: 4,600  Larger sites include:  Northfleet Embankment and Swanscombe Peninsula East Opportunity Area (1,028 homes)  Gravesend Riverside East and North East Gravesend Opportunity Area (780 homes)  Gravesend Town Centre (873 homes)  Ebbsfleet (Gravesham) (672 homes)	Total: 9,700  Larger sites include (total number of homes not specified) :  Harold Wood Hospital (15.5ha)  Whitworth and Broxhill centres (12ha)  London Riverside –  Beam Park (11.6ha)  Rainham West (23ha)  Areas of Romford	Total: 17,930  Larger sites include  Chatham (4,437 homes)  Rochester (2,940 homes)  Gillingham (1,363 homes)  Strood (2,106 homes)  Medway Valley (569 homes)  Hoo Peninsula (5,236 homes)	Total: 23,250  Locations include 01 - 21  Purfleet (3,180 homes)  West Thurrock / Lakeside (3,365 homes)  Grays (2,605 homes)  Tilbury (470 homes)  Chadwell St Mary (390 homes)  Aveley and Ockendon (2,100 homes)  Stanford and Corringham (580 homes)  2021 – 2026  4,750 homes
<b>No of Jobs</b>	26,500This includes:  Dartford Town Centre (1,500 jobs)  Northern Gateway (1,200 jobs)  Ebbsfleet to Stone (9,700 jobs)  Thames Waterfront (11,800 jobs)  Other sites north of A2 (up to 700 jobs)  Sites south of A2 (100 jobs)	4,600  Larger scale sites include:  Northfleet Embankment and Swanscombe Peninsula East Opportunity Area (2,269 jobs)  Gravesend Riverside East and North East Gravesend Opportunity Area (548 jobs)  Gravesend Town Centre (401 jobs)  Ebbsfleet (Gravesham) (1,416 jobs)	N/A	8,200 – 20,300 (Core Strategy has a range of potential job growth - likely to be lower end) main areas of growth proposed are Chatham, Isle of Grain and Kingsnorth Commercial Park	26,000  Options include  Purfleet (2,800 jobs)  West Thurrock / Lakeside (7,000 – 9,000 jobs)  Grays (1,600 jobs)  Tilbury (1,600 – 3,800 jobs)  London Gateway (11,000 – 13,000 jobs)
<b>End of Plan</b>	2026	2028	2021	Not yet adopted	2026

As well as producing statutory development plans, local authorities will have their own strategies and mechanisms to help their towns and economies prosper and enable development to come forward.

Local authorities also form part of multi-disciplinary cross boundary partnerships to bring forward development. Recently Local Enterprise Partnerships (LEPs) have been created which brings together local government and business to explore opportunities for enterprise while addressing barriers to growth. The Lower Thames area is within the area covered by the South East LEP who are preparing a Local Growth Deal and Strategic Economic Plan to facilitate growth and investment.

The Thames Gateway Partnerships for London, Kent and Essex are local authority / business partnerships tasked with bringing forward economic growth in the Thames Gateway area.

The URS study identified clusters where more than one housing, employment or mixed use development was planned or considered likely. These are shown in **Appendix 1**. In addition, there are a number of key transport centres in the South East and many have expressed aspirations to expand. These include:

- Development of Dover Western Terminal;
- London Southend Airport;
- Manston Airport - Masterplan produced in November 2009 – Predicts by 2033 the airport will serve 4.75 million passengers a year and cater for 400,000 tonnes of freight per annum;
- Lydd Airport (London Ashford Airport) – Recently received permission for a runway extension and new passenger terminal building (capable of processing 500,000 passengers per annum). Location C / C variant would help with passenger movements north; and
- London Gateway Development.

It is possible that a crossing could help with the viability of these aspirations by improving access to the wider road network, London and the north.

### **5.1.2 How might these Policies Change in the Future?**

Using professional judgment and experience, this section considers how policies highlighted in the preceding section are likely or unlikely to change. It is considered unlikely that the key environmental designations established in EU legislation will change in the foreseeable future. There is currently no prospect of the legislation changing substantially and even if there was, changes to EU legislation take time.

It is also considered unlikely that the thrust of national planning policy will change from that of planned sustainable growth. Statistics released in November 2013 suggest that the UK population will increase by 9.6 million over the next 25 years (National Population Projections 2012 Based Statistical Bulletin – 06 November 2013 – National Statistics). It is, therefore, reasonable to assume that the demand for more housing and jobs will continue and planning policy will need to reflect this. Policies in the NPPF may be subject to further refinement in the future, but it is reasonable to expect them to remain substantially unchanged.

There is scope for nationally significant infrastructure projects other than the Lower Thames crossing to be promoted in future which could have significant impacts on the context for planning in this area. For example, the Airports Commission appointed by Government, is currently undertaking additional analysis to reach a view on

whether or not a new airport on the Isle of Grain would offer a credible proposal for further consideration.

The level of planning policy where there is the most scope for change in the future is at the local level. Many local plans in the Lower Thames area are due to finish around the notional completion year of 2025 for the LTC. It is therefore possible that the increased accessibility resulting from a crossing option could change the planning context of future local plans in the Lower Thames area and beyond.

One example would be the Green Belt. As explained above, Green Belt is a planning designation and the boundary is established in local authority Local Plans. A local authority may wish to make an amendment to their Green Belt boundary in their next Local Plan to promote sustainable patterns of development (as stated in para 85 of the NPPF – see above) subject to the Local Plan examination process.

What is not known at this time, however, is the future level of growth we could see in the Lower Thames area. The extent to which local policies may change will be influenced by the scale of growth for which they have to cater. In monitoring and updating their Local Plans, planning authorities will need to be clear about how much development they are planning to accommodate within their area. This will affect the choices they make on how to allocate or constrain land for development. With Local Plans extending only to 2021 or 2028, there is no coherent view at local level as to what the scale and distribution of future development may be beyond the mid 2020's.

**5.1.3 Possible Scales of Growth and Development Patterns**

Using the review of policy and possible changes to it above, this section considers potential scales of growth and development patterns in the Lower Thames area and South East for each location option. In terms of possible scales of future growth as a base, it is reasonable to begin with what is known. Accordingly the AECOM Central Forecasts and Sensitivity Report (November 2012)<sup>3</sup> drew on the local authority data constrained by TEMPRO and projected that forward for population and employment (see table 3.1 of the AECOM report). AECOM also undertook a sensitivity test of higher traffic growth, albeit it without specifying how much of this growth may be based on an increased scale of development.

**Figure 5B** below sets out potential scales and patterns of development for each location option by looking at the AECOM growth rate and a higher growth rate in the context of future planning policy outlined above.

<p><b>Option A</b></p> <p>The URS study identified clusters in urban areas where more than one housing, employment or mixed use development was planned or considered likely in the north Kent and South Essex area, close to the route options. These are shown in <b>Appendix 1</b>. These clusters can give an indication of where future growth could continue to happen, particularly in the more immediate area to Option A where the benefits of the route would be most felt.</p> <p>Option A would help alleviate current congestion at the Dartford crossing, potentially making the surrounding area more attractive for new development by improving access to east London and the north and south of England.</p>
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<sup>3</sup> The report can be found at <https://www.gov.uk/government/publications/lower-thames-crossing-central-forecasts-and-sensitivity-tests-report>

The urban areas of Dartford, Thurrock, Gravesham and Medway are, however, already heavily developed and many parts are allocated for redevelopment in current Local Plans. If the take up for these allocations were to slip, improved accessibility on the national road network for Option A could act as a catalyst for their development. The figures quoted by AECOM<sup>4</sup> show a slight slowing down of population / employment growth in North Kent in later years beyond 2025. This trend would be unlikely in the Thurrock, Tilbury, Dartford, Gravesham and Medway, however, if Option A were taken forward as demand for development could be expected to increase as a result of improved connectivity.

Beyond the urban areas, however, is the Metropolitan Green Belt. Current Local Plans have policies that protect the Green Belt from inappropriate development (see **Appendix 2**). As set out in the policy review section above, it is within the gift of local authorities to set Green Belt boundaries in their Local Plans.

Local authorities will need to consider the level of brownfield sites in urban areas they have to redevelop (see clusters in urban areas identified in URS study in Appendix 1). If this is insufficient to cover development needs they may need to amend green belt boundaries avoiding protected habitats wherever possible.

Demand for development is likely to increase in the Dartford, Thurrock, Gravesham and Medway area as a result of Option A but less so further afield in Kent and Essex.

If local authorities were required to accommodate higher growth rates it is possible that future Local Plans would contain more significant Green Belt boundary reviews or larger strategic allocations extending urban areas in Dartford, Thurrock, Gravesham and Medway.

The extent of such reviews of the Green Belt would be dependent on the level of growth required and the availability of brownfield sites for redevelopment.

**Option C**

Option C would also help relieve congestion on the existing Dartford crossing so has the potential to increase the attractiveness of the areas around the existing crossing. In a similar way as for Option A, Local authorities will need to consider the level of brownfield sites in urban areas they have to redevelop. If this is insufficient to cover development needs they may need to amend Green Belt boundaries avoiding protected habitats. However, Option C also offers a brand new transport corridor which would have beneficial impacts on journey times elsewhere. This is where the difference between Option A and C is most apparent.

New employment opportunities and associated residential development could be created in the urban areas of Ashford, Maidstone, Tonbridge & Malling and Canterbury and potentially further to Dover and the Ramsgate area. There could also be further limited growth in some of the larger rural settlements. Option C could also act as a catalyst for development in Ashford, Maidstone, Tonbridge and Malling if allocations in local plans are not forthcoming.

The new transport corridor could also help growth aspirations for Manston Airport, Dover Western Terminal and Lydd Airport. These expansions could

<sup>4</sup> The report can be found at <https://www.gov.uk/government/publications/lower-thames-crossing-central-forecasts-and-sensitivity-tests-report> Table 3.1

bring their own increased need for further employment development and associated housing so growth around these areas could be expected.

Option C would also improve links to the M25 and elsewhere for other parts of South Essex, including the London Gateway Development and surrounding area. This could lead to growth at the London Gateway Development and further related housing and services development in the vicinity. Similar benefits and patterns of development could be seen for London Southend Airport and Southend on Sea.

Similar to Option A, a higher growth rate could result in future Local Plans containing more significant Green Belt boundary reviews or larger strategic allocations extending urban areas in Dartford, Thurrock, Gravesham and Medway. Due the benefit of Option C covering a wider area, the impact on the Green Belt is likely to be more significant.

Improved access to the strategic road network could make further urban extensions in the Maidstone, Tonbridge and Canterbury areas as well as further limited growth in the larger rural settlements, a more sustainable choice.

If expansion continued at the London Gateway Development and at the transport centres (see section 5.1.1 (c) above) further associated development could be expected.

As stated above for option A, the AECOM report shows a slight slowing down of population / employment growth in North Kent in later years beyond 2025. This trend would be unlikely however with Option C considering the development patterns listed above.

**Option C Variant**

This variant was assessed by the Aecom Report, but not by the URS Report. It would additionally provide a faster link between the M20 and the M2 by expanding the A229. The consequences set out above for Option C would apply but additionally the widening of the A229 could change the planning context and levels of growth further for the nearby urban and larger rural settlements in Ashford, Maidstone and Tonbridge and Malling. There could also be added benefits to the Lydd Airport and Folkestone areas by improving journeys north. Higher growth rates could result in urban extensions in the Ashford, Maidstone and Tonbridge & Malling areas.

We list below the summary key points from each of the three areas of technical analysis.

### 6.1.1 Comparison of Reports

We compared two key reports to provide further evidence in relation to the strategic case for each LTC option. The reports were: “Third Thames Crossing Regeneration Impact Assessment Final Report” (URS, December 2012, commissioned by Kent and Essex County Councils and Thurrock Council) and “Review of Lower Thames Crossing Options: Final Review Report” (Aecom, April 2013, commissioned by the DfT).

The two reports consider the impact of the LTC on employment. The URS report also looked at housing development. Both reports provide information that is relevant to the Strategic Case for LTC options and offer complementary evidence to inform future decision making.

The two reports both consider the South East of England, particularly Kent and Essex, at a greater level of detail than the rest of the country. The two reports adopt different aims, objectives and scope and make use of very different methodologies, in terms of guidance used and approach to the geographies considered. It is therefore unsurprising that the estimations of housing and job growth differ for each report. What is significant, however, is that the two reports both reach consistent conclusions regarding the relative ranking of the crossing options, with Option C and Option Cvariant demonstrating the greatest benefits, i.e complementary evidence for the conclusions is reached by Aecom and DfT.

### 6.1.2 Trip Pattern Analysis

We further analysed the trip pattern changes from the Lower Thames Crossing Traffic Model developed by Aecom, to illustrate at a sector level, changes in trip patterns resulting from providing a new crossing at each location.

The most significant impact of the provision of Option A is to increase trip movements between South Essex and North Kent by around 3,000 trips per day, at the expense of internal trips within South Essex. These 3,000 trips represent only 0.2% of the total internal trips within South Essex. The trip redistribution affects are significantly lower than either Option C or Option Cvariant.

The most significant impact of Option C is to increase trip movements between South Essex and North Kent by around 9,500 trips per day, at the expense of internal trips within South Essex. Other sectors experiencing a significant increase in trip movements due to Option C include: between the rest of the South East and South Essex; between North East London and North Kent; between South Essex and South Kent; between South Essex and South East London and rest of South East to rest of UK. All other sector pairs experience little or no increase in trip patterns.

Similarly, the most significant impact of Option Cvariant is to increase trip movements between South Essex and North Kent by around 9,000 trips per day, at the expense of internal trips within South Essex. However, the impact of Option Cvariant on trip patterns is marked over a wider geographic area than for Option C, particularly in South Kent. Other sector pairs with increased trip patterns due to Option Cvariant

include: rest of South East to/from South Essex; North Kent to/from North East London; South Kent to/from South Essex and South East London to South Essex.

The redistribution of these trips crossing the River Thames due to Option C and Cvariant is mainly from internal trips in sectors: South Essex; North Kent; South Kent; North East London and rest of South East.

The increases in trip origins due to the trip redistribution described above are reasonably consistent across all time periods, suggesting that these impacts are being observed across all trip purposes, rather than just employers' business or commuting trip purposes.

### **6.1.3 Planning Issues**

Policy at the international, national and local level influences the scale and pattern of development. In this study we have only looked at housing and employment development.

International and national planning policy is less likely to change significantly in the future. However local planning policy has the most scope to change, e.g. a Local Authority could decide to release some Green Belt land for development.

Option A is likely to enable further redevelopment in the urban areas of Dartford, Thurrock, Gravesham and Medway – also minor or more significant amendments to the Green Belt boundary depending on the scale of growth and availability of re-developable land.

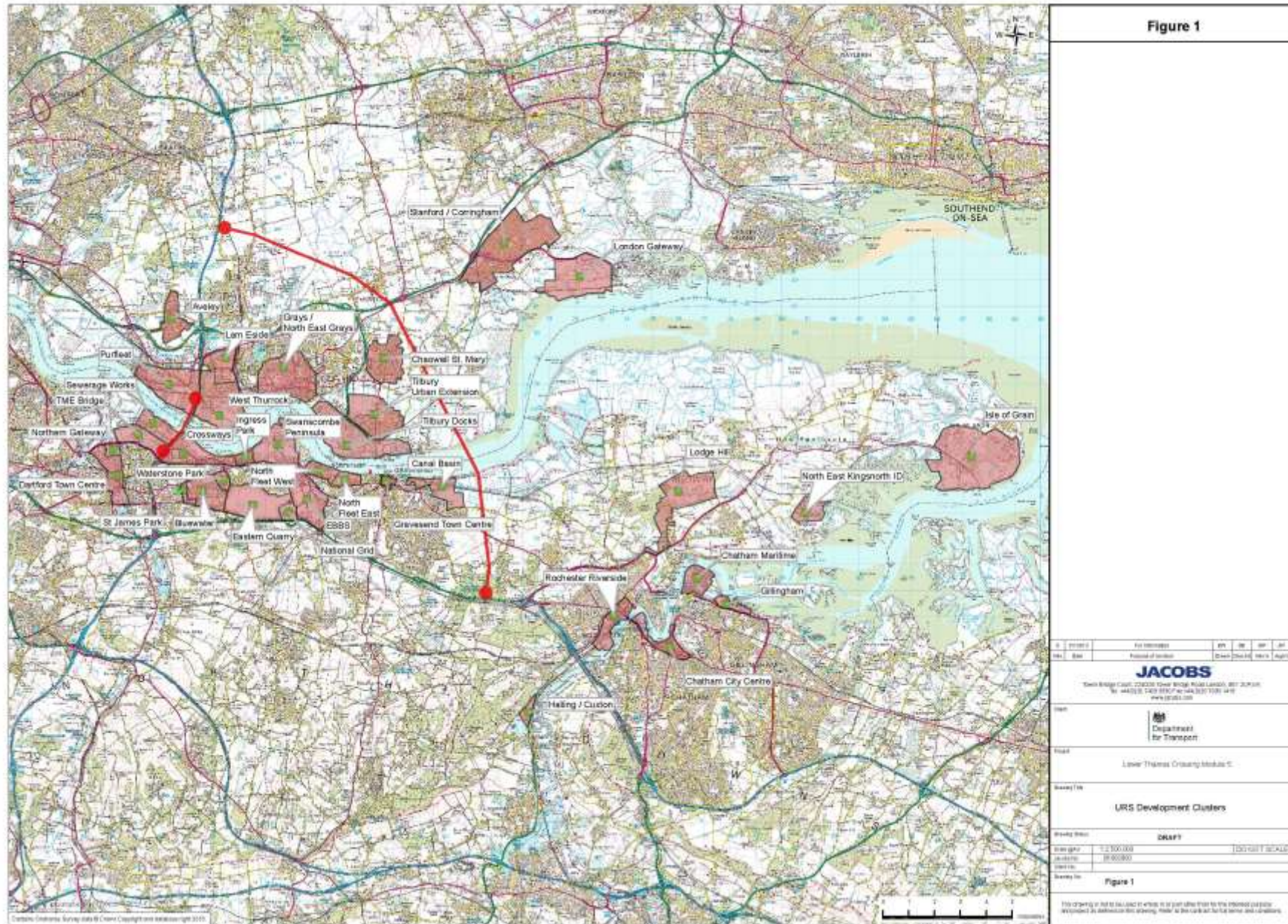
Option C would similarly support development in the Dartford, Thurrock, Gravesham and Medway area – and, in addition the accessibility effects would be felt further afield, supporting urban extensions in the Ashford, Maidstone, Tonbridge and Canterbury areas as well as further east including Dover and Ramsgate area – also in and around key transport centres in the South East.

Although there is less evidence for Option Cvariant, it could additionally enable further growth in the Ashford, Maidstone and Tonbridge and Malling areas. Added benefits to the Lydd Airport and Folkestone areas could also result in associated residential and employment development.



**Appendix 1: URS Development Clusters**

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**Appendix 2: Metropolitan Green Belt**



Drawing number  
B1962800/LE/04

None

**Legend**

Green Belt

0	27/11/13	FIRST ISSUE	DG	JW	JW	JW
Rev	Revision Date	Purpose of revision	Drawn	Checked	Reviewed	App'd

**JACOBS**

Midway House, 10 - 11 Lower Stone Street, Marking Lane, ME15 9DD, England  
Tel: 01752 898000 Fax: 01752 898001 www.jacobs.com

Project  
Options A and C  
Lower Thames Crossing

Drawing title  
Metropolitan Green Belt

Drawing status  
First Issue

Scale  
1:375,218 @ A3 Do not scale

Drawing number  
B1962800/LE/04

0

This drawing is not to be used in whole or in part other than for the intended purpose and project as defined in this drawing. Refer to the contract for full terms and conditions.

## Appendix 3: Planning Policy Constraints on Local Development Proposals

The table below lists key policies and environmental constraints in these areas that may impact on future development. Many of the local plans will be finished by the time the LTC has been completed so the benefits/impacts of the crossing will need to be considered beyond the plan periods.

### Constraints Identified in Local Planning Policy Documents within the URS Study Area

Area	Name of Plan	End of Plan	Key Environmental Designations / Potential Constraints to Future Development
Dartford	Adopted Core Strategy September 2011	2026	<ul style="list-style-type: none"> <li>Green Belt (Policy CS13),</li> <li>Inner Thames Grazing Marsh (Local Plan Policy CS16),</li> <li>Ancient Woodland (Local Plan Policy CS11),</li> <li>Thameside Green Corridor Biodiversity Opportunity Area (Local Plan Policy CS16);</li> <li>Central North Downs Biodiversity Opportunity Area (Local Plan Policy CS16); and</li> <li>Contaminated land (Local Plan Policy DL1).</li> </ul>
Gravesham	Proposed Submission Core Strategy December 2012	2028	<ul style="list-style-type: none"> <li>Green Belt (Policy CS02),</li> <li>Kent Downs AONB (Policy CS12);</li> <li>Special Protection Area (Policy CS12); and</li> <li>Ramsar site (Policy CS12).</li> </ul>
Medway	Submission Draft Core Strategy 2012	Unknown depends when adopted – 2029?	<ul style="list-style-type: none"> <li>Flood Zone (Policy CS5)</li> <li>Special Area of Conservation (Policy CS6);</li> <li>Sites of Special Scientific Interest (Policy CS6);</li> <li>Regionally Important Geological Site (Policy CS6);</li> <li>Local Nature Reserves (Policy CS6);</li> <li>Green Belt (Policy CS7); and</li> <li>AONB (Policy CS7).</li> </ul>
Thurrock	Core Strategy and Policies for Management of Development Adopted December 2011	2026	<ul style="list-style-type: none"> <li>Green Belt (Policy CSSP4 and PMD6) ; and</li> <li>Ramsar site (Policy PMD7).</li> </ul>
Havering	Core Strategy and Development Control Policies DPD Adopted 2008	2021	<ul style="list-style-type: none"> <li>Green Belt (Policy CP14, and DC45);</li> <li>Sites of Special Scientific Interest (Policy CP16 and DC58);</li> <li>Flood Zone (Policy CP15 and DC48); and</li> <li>Marshes and Community Forests (Policy CP16 and DC58).</li> </ul>