



Department
for Transport

Options for a New Lower Thames Crossing

Consultation Document

May 2013

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1. Executive summary

- 1.1** This consultation is designed to gather views on the preferred location for additional road-based river crossing capacity in the Lower Thames area. Responses to this consultation will form part of the evidence base that Government will use to make a decision on where to locate a new crossing.
- 1.2** Government recognises the strategic importance of the existing Dartford-Thurrock crossing and that the congestion problems currently experienced have serious implications for businesses and the national economy. Government acknowledged the need for additional crossing capacity in the Lower Thames area in the 2010 Comprehensive Spending Review announcement¹ and in the November 2011 update to the National Infrastructure Plan,² which included the Lower Thames crossing as one of the top 40 priority infrastructure projects.
- 1.3** Evidence of the need for additional road-based river crossing capacity in the Lower Thames area is presented in this document, together with three different location options for a new crossing and a further variant of one of the options. Conceptual designs have shown that it would be feasible to construct a new crossing at each of the proposed location options and to connect this new crossing to the wider strategic road network.
- 1.4** The location options considered are:
- 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_{variant}: 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.
- 1.5** The location options were appraised in comparison with a base case, which represents the situation without a new crossing, to determine their relative performance in relation to a number of economic, social and environmental factors.

1 Department for Transport, Transport spending review 2010 announcement, available at <https://www.gov.uk/government/news/transport-spending-review-2010>

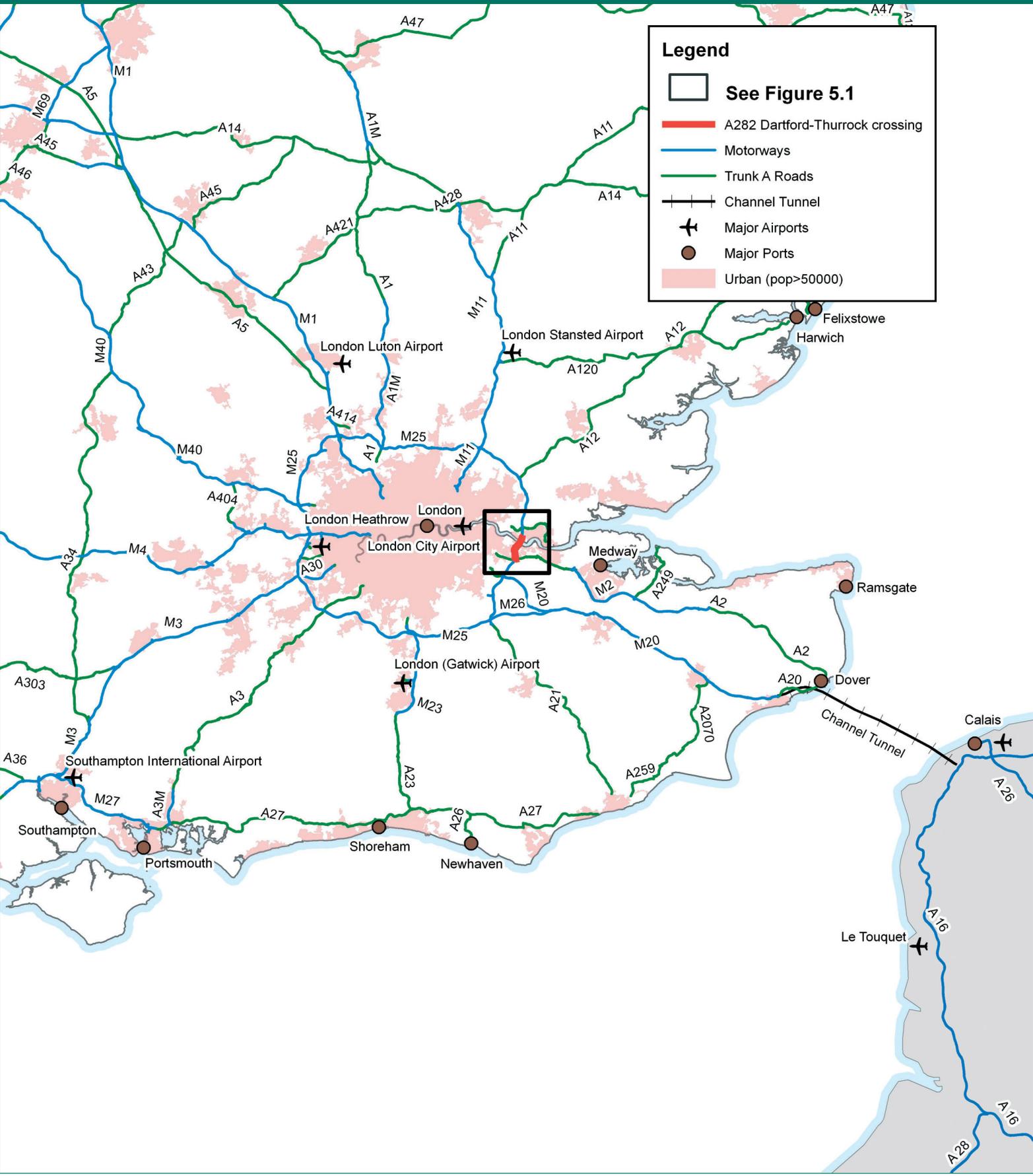
2 HM Treasury and Infrastructure UK National Infrastructure Plan 2011, November 2011, available at, http://cdn.hm-treasury.gov.uk/national_infrastructure_plan291111.pdf

- 1.6** The views and comments received in response to this document will be analysed and interpreted to help inform the selection of the location for a new crossing.
- 1.7** This is the first stage of decision making. Once Government has reached a decision on the location for a new crossing, there is potential for work to commence on developing a scheme, which will include further consideration of the financing options.
- 1.8** To respond to this consultation please either fill in the online response form or complete a paper copy of the response form and post or email to the address provided in Chapter 10: How to respond. Online and paper response forms are available at: <https://www.gov.uk/government/organisations/department-for-transport/series/lower-thames-crossing>.

2. Scope

- 2.1** This document sets out the need for additional road-based river crossing capacity in the Lower Thames area and invites views on the relative merits of three location options, and one variant option, where a scheme could be developed. This document does not present specific scheme proposals. Illustrative routes have been identified in order to inform the review, but these do not represent proposed schemes.
- 2.2** This consultation is designed to gather opinion on the preferred location for a new crossing and on the relative importance of the factors on which a decision will be based.
- 2.3** The decision on where to locate a new Lower Thames crossing will be based on the extent to which a new crossing at each location will:
- contribute to the national economy, through improving journey times and the connectivity of the strategic road network, both to and within the Thames Gateway and the South East;
 - reduce congestion at the existing crossing and improve the resilience of the strategic road network;
 - contribute to reducing greenhouse gas emissions;
 - avoid unacceptable impacts on environmentally sensitive areas and improve quality of life; and
 - avoid unacceptable impacts on committed development.
- 2.4** In addition, each location option will be considered in terms of the distributional impacts on different income groups. The decision on where to locate a new Lower Thames crossing will also be based on cost, the impact that has on affordability, and value for money.
- 2.5** The existing Dartford-Thurrock crossing forms part of the strategic road network, which is made up of England's motorways and trunk roads. The strategic road network is maintained and operated by the Highways Agency on behalf of the Department for Transport.
- 2.6** The location of the existing Dartford-Thurrock crossing is illustrated in Figure 2.1.

Figure 2.1 The existing Dartford-Thurrock crossing in the context of the strategic road network



3. Context

- 3.1** The Dartford-Thurrock river crossing, the A282, connects the M25 north and south of the River Thames and provides the only river crossing on the strategic road network east of London. The crossing consists of two bored tunnels for northbound traffic and a bridge for southbound traffic. The crossing serves traffic travelling to and from north of the Thames to south London, Kent, Sussex and continental Europe via the Kent ports and the Channel Tunnel, whilst also serving local traffic. The existing crossing is located in the Thames Gateway area, which successive Governments have recognised as a national priority for redevelopment and growth.
- 3.2** The strategic road network has a vital role to play in delivering key Government objectives around facilitating and promoting economic growth and competitiveness, and carries approximately four million vehicles each day.³ The existing crossing experiences high levels of traffic, catering for 140,000 vehicles each day.⁴ Nearly half of the traffic that uses the existing crossing is made up of freight and business users,⁵ meaning it is vital to the functioning of the national economy.
- 3.3** The existing crossing plays an important role in the national connectivity of the strategic road network. It forms a key link in the M25 which circles London and facilitates journeys to and from the Kent ports to areas north of the River Thames. An estimated 40% of journeys made using the existing crossing in cars and light vans are for more than 50 miles, and it is estimated that over 30% of heavy goods vehicle journeys made using the existing crossing are for long distances to and from the port of Dover.⁶ The crossing also accommodates regional and local trips, although only 6% of journeys made using the crossing are for distances of less than 12 miles.⁷ This highlights the important role that the existing crossing, as part of the strategic road network, plays in moving people and goods to and from Europe, and around the country.
- 3.4** Successive studies have investigated the need for additional crossing capacity in the Lower Thames area and where to locate it. These studies

3 Highways Agency Business Plan 2012-13, available at http://assets.highways.gov.uk/about-us/corporate-documents-business-plans/S110461_Business_Plan_2012-13_Final.pdf

4 Highways Agency traffic flow data, available at <http://www.highways.gov.uk/our-road-network/managing-our-roads/area-teams/area-5/the-dartford-thurrock-river-crossing/traffic-flow/>

5 Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 3.3

6 Parsons Brinkerhoff, Dartford River Crossing Study into Capacity Requirements, Final Report, January 2009, Chapter 5, link provided in Annex B

7 Parsons Brinkerhoff, Dartford River Crossing Study into Capacity Requirements, Final Report, January 2009, Chapter 5, link provided in Annex B

were commissioned by both central and local government, and a sample of relevant studies can be found at Annex B.

- 3.5** The Department for Transport commissioned a study in 2009 to review the ways in which the capacity constraints at the existing crossing could be addressed. The 2009 study concluded that there was a problem at the existing crossing which required resolution through the provision of additional road-based river crossing capacity in the Lower Thames area.⁸ It also concluded that the provision of rail freight as part of any new Lower Thames crossing would not address the rail freight capacity issues that are forecast for the area. Passenger flow volumes on a cross-river rail route east of London are also likely to be limited, meaning the inclusion of passenger rail services would be unlikely to represent value for money.⁹ As such, rail infrastructure has not been included within the proposals discussed in this document.
- 3.6** The 2009 study identified five location options that could help alleviate the congestion problems at the existing crossing. Two of the five options were not considered worthy of further investigation. Both were located further east than any of the other options considered and were shown to bring very limited congestion relief to the existing crossing. Both were also shown to encourage a low level of traffic demand, which, when coupled with the relatively high scheme costs, meant that they would be unlikely to provide value for money.¹⁰
- 3.7** Government recognises the strategic importance of the existing crossing and that the congestion problems currently experienced have serious implications for business productivity and the national economy. Government acknowledged the need for additional crossing capacity in the Lower Thames area in the 2010 Comprehensive Spending Review announcement¹¹ and committed to review the options for increasing future capacity at the existing crossing. In addition, there was commitment to implement short and medium-term improvements such as a charge suspension protocol at times of severe congestion, and free-flow charging. The charge suspension protocol was introduced in 2011, and free-flow charging is due to be introduced in 2014. The November 2011 update to the National Infrastructure Plan¹² also included the Lower Thames crossing as one of the top 40 priority infrastructure projects.

8 Parsons Brinkerhoff, Dartford River Crossing Study into Capacity Requirements, Final Report, January 2009, Chapter 11, link provided in Annex B

9 Parsons Brinkerhoff, Dartford River Crossing Study into Capacity Requirements, Final Report, January 2009, Chapter 6, link provided in Annex B

10 Parsons Brinkerhoff, Dartford River Crossing Study into Capacity Requirements, Final Report, January 2009, Chapter 10, link provided in Annex B

11 Department for Transport, Transport spending review 2010 announcement, available at <https://www.gov.uk/government/news/transport-spending-review-2010>

12 HM Treasury and Infrastructure UK National Infrastructure Plan 2011, November 2011, available at, http://cdn.hm-treasury.gov.uk/national_infrastructure_plan291111.pdf

3.8 A review was commissioned in 2012 with the objective of assessing the merits of the three location options recommended in the 2009 study. The review findings are set out in a number of reports, with the Final Review Report summarising the information collected during the review. A hierarchy of the reports produced can be found in Figure 3.1. These reports can be found at: <https://www.gov.uk/government/organisations/department-for-transport/series/lower-thames-crossing>

Figure 3.1 Final Review Report hierarchy



4. The need for change

The current problem

- 4.1** The existing Dartford-Thurrock river crossing experiences several problems that are driven by a lack of capacity, partly due to the lack of alternative routes on the strategic road network.
- 4.2** The existing crossing experiences high levels of traffic, with typical daily traffic flows of 140,000 vehicles compared to the original design capacity of the crossing, which was 135,000 vehicles.¹³ Traffic flows fluctuate relatively little during the year and there is little variation in flow between weekdays, although weekends experience slightly lower flows. The existing crossing was found to have operated above its design capacity on 257 days during 2010.¹⁴
- 4.3** The existing crossing has also been shown to experience the third highest level of delay across the strategic road network, with delays in excess of nine minutes experienced by almost half of users travelling in both directions.¹⁵ The annual cost of these delays to the economy is estimated in the form of 'lost time' for users and businesses and was valued at £15 million.¹⁶
- 4.4** The complex road layout and toll plaza at the existing crossing lead to a higher frequency of incidents than on other parts of the strategic road network owing to the need to change lane to find the appropriate toll booth. The 2009 study found that the injury rate associated with the bridge, tunnels, toll plazas and approaches to the crossing was twice the national average for a motorway.¹⁷ The impact of incidents and accidents is great, owing to the fact that the crossing is often operating at, or above, capacity. This means that the crossing has poor resilience and that motorists experience significant variation in their journey times. Between October 2011 and September 2012, the crossing was the least reliable section of the strategic road network, with data from the year to April 2012 showing that only 60.2% of northbound journeys and 56.3% of southbound journeys were completed within the expected time.¹⁸

13 Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 3.3

14 Highways Agency HATRIS data

15 Parsons Brinkerhoff, Dartford River Crossing Study into Capacity Requirements, Final Report, January 2009, Chapter 5, link provided in Annex B

16 Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 3.3

17 Parsons Brinkerhoff, Dartford River Crossing Study into Capacity Requirements, Final Report, January 2009, Chapter 5, link provided in Annex B

18 Highways Agency data, accessible at <http://data.gov.uk/dataset/journey-reliability-highways-agency-network>

- 4.5** The high levels of traffic using the crossing and the congestion experienced leads to a negative impact on the environment, especially on air quality. There are Air Quality Management Areas (AQMAs) in Dartford and Thurrock. AQMAs are declared where an area is unlikely to meet national air quality objectives, and a plan is then developed to help improve the air quality in the area.¹⁹
- 4.6** The problems at the crossing also affect connectivity between the local authority areas on either side of the crossing. The proportion of local work trips that use the crossing is relatively small,²⁰ and this lack of interaction can be expected to limit economic growth within the Thames Gateway area.
- 4.7** The 2009 study concluded that some short and medium-term improvements could be made that would positively impact the performance of the crossing by making best use of the existing capacity, such as introducing a charge suspension protocol at times of severe congestion and free-flow charging. The 2009 study highlighted that these improvements would only create marginal headroom and that a more strategic solution would be needed to resolve the capacity problem at the existing crossing.

The future problem

- 4.8** The 2012 review included consideration of the likely situation at the existing crossing if no new crossing was built. The south east of England is forecast to experience higher population growth than the rest of the country, which is a significant factor underpinning the forecast increase in traffic flows.²¹ In the absence of a new crossing, traffic flows are forecast to increase by 10–20% southbound and by 2–10% northbound between 2009 and 2041. The 2012 review found that on a typical day, with no incidents, delays resulting from queuing on the crossing could exceed 10 minutes northbound (from around 3 minutes in 2009) and 3 minutes southbound (from around 1 minute in 2009) by 2041.²² As mentioned in paragraph 4.3, existing evidence shows that almost half of users experience delays of over nine minutes, so in reality the delays experienced by most users are likely to be much longer than the average delays listed above. This illustrates that, even once medium-term improvements such as free-flow charging have been implemented, the congestion problems at the existing crossing would soon return.
- 4.9** The review also found that the existing crossing would be placed under significant stress by 2041 if no new crossing were to be provided. Stress is the ratio between the average annual daily traffic flow and the flow at which significant congestion problems are likely to be experienced. If no new crossing were to be provided, the existing crossing would operate at stress

19 Defra website, accessed on 16 April 2013, available at <http://aqma.defra.gov.uk/aqma/home.html>

20 Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 3.3

21 Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 4.3

22 Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 4.3

levels of 112% by 2041, meaning that, on average, the existing crossing would operate in significantly worsened congested conditions.²³

4.10 The high levels of congestion predicted mean that the existing crossing would also be likely to experience significant resilience and reliability issues, in excess of what is currently experienced.

4.11 It is important to recognise that parts of the strategic road network near to the crossing are also likely to experience longer delays by 2041, owing to volumes of traffic using them. Significant delays, adding approximately 17 seconds to the time needed to travel each kilometre of the existing crossing, are likely to be experienced by users of the existing crossing in the southbound direction and the A229 northbound. Users of the existing crossing in the northbound direction, the A13 east of M25 junction 30 and the A229 southbound would be likely to experience delays of approximately 49 seconds to travel each kilometre at these locations.²⁴

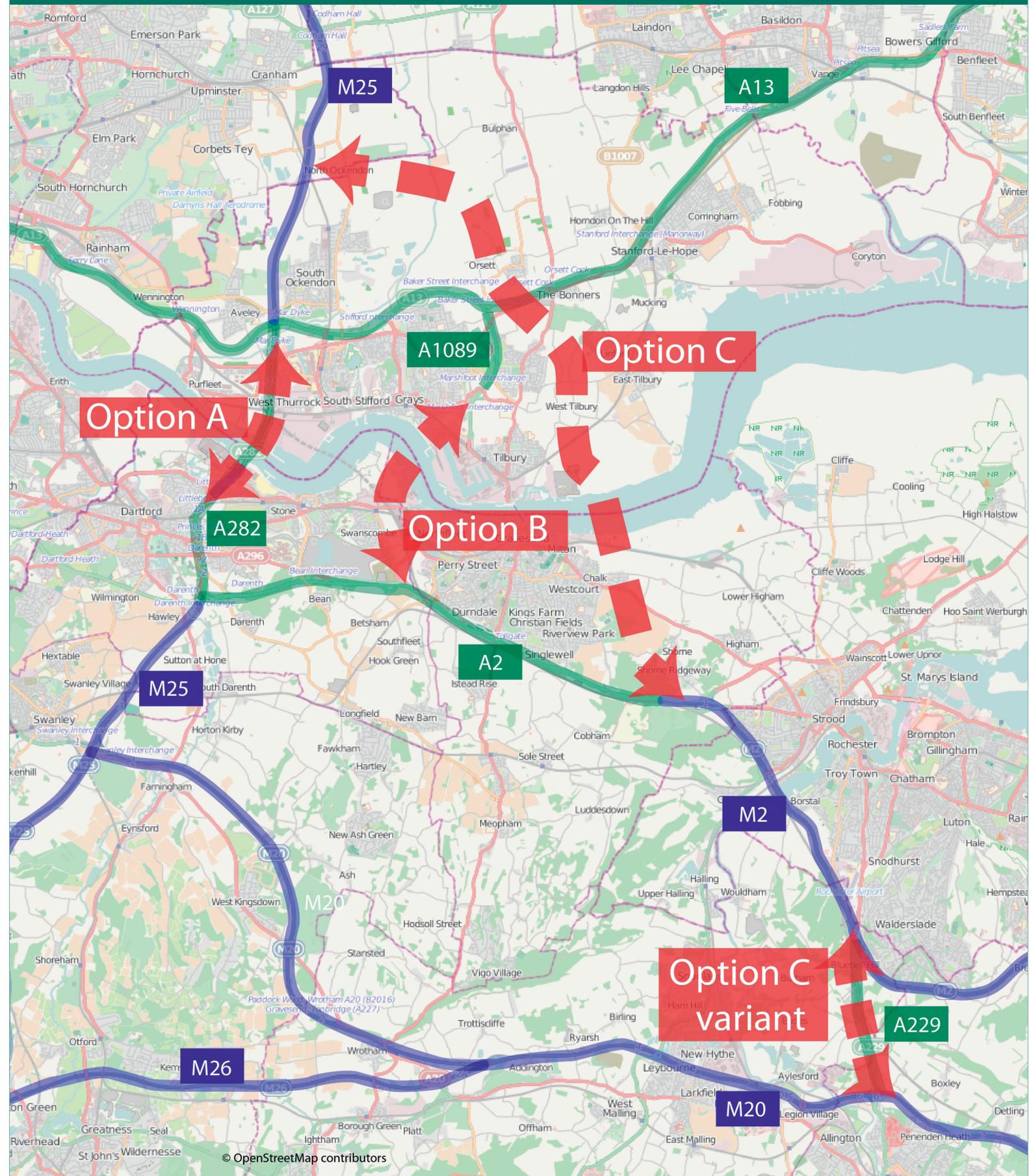
23 Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 4.4

24 Review of Lower Thames Crossing Options: Final Review Report, April 2013, Figure 4.2

5. The options

- 5.1** The three options investigated as part of the 2012 review are:
- **Option A:** At the site of the existing A282 Dartford-Thurrock crossing;
 - **Option B:** Connecting the A2 with the A1089; and
 - **Option C:** Connecting the M2 with the A13 and the M25 between junctions 29 and 30.
- 5.2** A variant of Option C was also considered that would involve widening the A229 between the M2 and the M20. The variant was considered to understand whether the added value of widening the A229 would materially improve the business case for Option C.
- 5.3** Option A is expected to provide additional long-term capacity at the site of the existing crossing and offers the shortest route of the three options investigated. A crossing at Option B would be located between the Swanscombe Peninsula and the A1089. Option C would be located between east of Gravesend and east of Tilbury. This would form a major new piece of infrastructure on the strategic road network, and provide a direct route for longer distance journeys using the M25 and the M20.
- 5.4** Figure 5.1 displays the locations of the three options and the variant of Option C.

Figure 5.1 Location options for a new Lower Thames crossing



6. The review approach

Approach

- 6.1** The analysis of the location options was conducted in line with the Department for Transport's *Transport Business Case Guidance*,²⁵ using the format of a five case model to assemble and present the evidence. The *Transport Business Case Guidance* sets out the Department for Transport's approach to producing business cases to support Ministerial decisions. This approach ensures decisions are made by taking account of all the relevant information set out in five cases, consistent with HM Treasury's *The Green Book*,²⁶ specifically, to show whether schemes:
- are supported by a robust case for change that fits with wider public policy objectives – the 'strategic case';
 - demonstrate value for money – the 'economic case' which covers economic, environmental and social impacts;
 - are commercially viable – the 'commercial case';
 - are financially affordable – the 'financial case'; and
 - are achievable – the 'management case'.
- 6.2** To enable the location options to be appraised against the factors set out in Chapter 2: Scope, modelled forecasts of future traffic flows and conceptual designs of the new crossings at each location were prepared. Patterns of demand using the existing crossing were modelled for two future years. These were 2025, which represents the opening year of the new crossing assumed for the purposes of the review, and 2041, which represents a future year when demand for the crossing might be expected to have matured. Major infrastructure projects, such as those considered in this review, are designed to cater for future requirements, far beyond the anticipated year of opening. The year 2041 was therefore chosen to compare the impacts that each new location option would be expected to have relative to the base case.
- 6.3** Three engineering solutions were considered: a bridge, an immersed tunnel and a bored tunnel. More detail can be found in the Design and Costing Report. An immersed tunnel is a shallow depth tunnel submerged in a trench in the riverbed, while a bored tunnel requires the construction of a

25 Department for Transport, *Transport Business Case Guidance* April 2011, available at <https://www.gov.uk/government/publications/transport-business-case>

26 HM Treasury, *The Green Book*, available at <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

circular tunnel at depth, without removing the ground above. The capital costs of the location options were estimated for the three engineering solutions. More detail can be found in the Methodology Chapter of the Final Review Report, section 2.6.

- 6.4** The location options were considered against a base case (see section 6.10: Base case) to assess their expected performance in relation to the factors described in Chapter 2: Scope. In order to do this, the impacts of each location were assessed against a number of economic, social and environmental factors which are set out in Table 6.1.

Table 6.1 Impacts assessed

Economic	Social	Environmental
Impacts on business users Congestion and resilience Wider economic impacts Regeneration	Impacts on consumers (users for personal and commuting trips) Distributional impacts on different income groups Impacts on accident numbers	Exposure of population to noise Air quality Greenhouse gas emissions Townscape/landscape and heritage Habitats and biodiversity Water

- 6.5** The location options were also assessed to establish whether they would be likely to represent value for money. Value for money considers the level of costs and benefits that can be expected from a proposal and it is a key consideration in Government's decision about whether a proposal should go ahead.
- 6.6** Impacts were monetised where possible, and otherwise assessed qualitatively. The monetised and qualitative information are considered together to establish the value for money of each location option. The monetary appraisal used to prepare the value for money assessments is conducted over 60 years, from 2025, the assumed opening year of the new crossing, to 2084. This methodology is in accordance with Department for Transport's Transport Analysis Guidance.²⁷
- 6.7** The benefit to cost ratio (BCR) is traditionally used to assess value for money. It represents the ratio of benefits to costs. If the benefits of a proposal are smaller than the costs, i.e. if the BCR is less than 1, it would represent poor value for money. Generally, the higher the BCR, the better the value for money.
- 6.8** The value for money calculations were completed twice, firstly without the inclusion of wider economic impacts, and secondly including wider economic impacts. Wider economic impacts are those benefits to the

²⁷ Department for Transport, Transport Analysis Guidance, available at <http://www.dft.gov.uk/webtag/index.php>

economy in addition to the benefits arising directly from transport impacts such as congestion. More details can be found in the appendices to the Final Review Report. Wider impacts are subject to greater uncertainty when compared to the other monetised impacts. No non-monetised impacts have been included in the value for money calculations.

Assumptions

- 6.9** A number of assumptions were made to inform the review and do not pre-empt future decision making. The review assumes that:
- Government would seek to recover the cost of providing the additional crossing capacity through tolling, as is the case for other estuarial crossings;
 - for the purposes of outline assessment of affordability, that the public sector would collect toll revenues from the new crossing, although depending on the commercial model used to deliver the crossing, the toll could be collected by a private concessionaire;
 - toll levels for road users at the new crossing would be the same as the charge levels at the existing crossing;
 - the same proportion of users of the new crossing would receive a discount on the tolls as currently receive a discount at the existing crossing; and
 - 2025 would be the opening date for the new crossing.

Base case

- 6.10** The location options were considered against a base case which represents the situation if no new crossing is built. The base case assumes that:
- free-flow charging for the existing crossing is in place from 2014;
 - charges take into account planned increases up to 2014. After 2014, increases in line with inflation are assumed;
 - in the absence of a new crossing traffic flows are forecast to increase by 10–20% southbound and by 2–10% northbound between 2009 and 2041; and
 - additions to the road network which are planned to take place independently of any decision regarding a new crossing will go ahead.

7. The review findings

Common features

- 7.1** Each crossing option presents a road-based solution that would need to be linked to the existing strategic road network. At each location option, the design of a scheme would be subject to the River Thames navigation requirements and highway and junction design standards, which will influence the cost of any future structure. The review has concluded that, subject to the appraisal and consideration of the environmental impacts, it would be feasible to build a new crossing and link it to the existing strategic road network at all three location options, although significant engineering difficulties have been identified in relation to Option C_{variant}.
- 7.2** The findings of the review indicate that the benefits, including wider economic impacts, of all the location options are likely to outweigh the costs, meaning that at this early stage each option is deemed economically justified. For all options, public funding will be needed to initiate scheme development, and thereafter decisions will be made about which commercial model to use to deliver the scheme. Initial financial and commercial analysis does not rule out the possibility of delivering any of the options.²⁸ It does, though, highlight that the financing of Options C or C_{variant} is likely to require public funding support, in part because they may not generate enough toll revenue to be self-funding.
- 7.3** A new crossing at any of the location options could, depending on the structure used, potentially impact on the Thames Estuary marine environment, and would also have varying impacts on the noise and air quality levels in the surrounding areas. A future scheme at any of the location options would need to carefully consider and mitigate any potential adverse environmental impacts.
- 7.4** The forecasts generated show that a new crossing would be expected to change travel patterns and traffic levels, provide economic benefits, but also bring a range of environmental and social impacts. Compared with a situation where no new crossing has been provided, all location options are likely to deliver the following, albeit to varying extents:
- increase the level of traffic crossing the Lower Thames;
 - reduce congestion, and therefore delay, on the existing crossing;
 - provide a large benefit to business users including freight, due to reduced congestion;

²⁸ Review of Lower Thames Crossing Options: Final Review Report, April 2013, section 6.7

- improve journey times for trips made using the existing crossing;
- increase the population experiencing levels of noise from the strategic road network; and
- lead to some relocation of jobs eastwards from London into the Thames Gateway area.

7.5 The future development of a scheme will have to consider decisions made, or pending, on other transport and development projects. Potential project dependencies that were identified include:

- developments in the Thames Gateway area; and
- improvements at the M25 J30.

7.6 The M25 J30 is where the M25 intersects the A13, and this junction is currently operating at capacity during peak hours. Depending on which option is taken forward, there may be a need to consider further improvements at this junction.

Comparison of impacts of the options

7.7 Option A is predicted to perform better than the other options in terms of alleviating congestion on the existing crossing and adjacent sections of the M25, but could add delay to A13 eastbound. It would not improve the connectivity of the strategic road network and is therefore forecast to stimulate relatively limited economic growth when compared with the other options. The reduction in congestion that Option A is predicted to deliver also leads to a modest reduction in greenhouse gas emissions.

7.8 Forecasts show that there is the potential for congestion around junctions 30 and 2 of the M25 if a new crossing is located at Option A. Improvements to these junctions may need to be considered in future.

7.9 Option A is the shortest route of all the options. It would potentially impact on a number of planned developments within Dartford and Thurrock but would have the least overall impact on the natural environment of all the options.

7.10 Option B is predicted to alleviate congestion at the existing crossing to a lesser extent than Option A, but could add delay to the A2 and A13 east of Basildon. This option would improve connectivity and is therefore forecast to be more effective than Option A in supporting the development of economic activity in the local area. The route changes forecast for Option B do not offset the forecast growth in traffic, leading to a forecast increase in greenhouse gas emissions.

7.11 Option B traverses planned development sites north of the A2 in the area of the Swanscombe Peninsula. Any future development in this location would have to carefully consider its impact on these sites. In addition, a new route would cross an area of nationally important heritage and archaeological value and would therefore cause more environmental harm than Option A.

- 7.12** Option C is predicted to alleviate congestion at the existing crossing to a similar extent as Option B but is less likely to add delay to the A2 and A13 east of Basildon. It is, therefore, expected to result in greater journey time savings than Option B. As a result of the improved connectivity, this option is forecast to achieve more economic benefit resulting from the agglomeration of business activity than Options A and B. Option C provides a more direct route for many journeys, which is forecast to result in a large decrease in greenhouse gas emissions.
- 7.13** Option C is the longest route of all the options, passing largely through undeveloped land that is designated as Green Belt. A route at this location would also pass through environmentally sensitive areas, including the Kent Downs Area of Outstanding Natural Beauty, ancient woodland and the Thames Marshes Ramsar site,²⁹ where development would need to be proven to be of ‘overriding public interest’ before it could go ahead. Overall, Option C would result in the greatest impacts on environmentally sensitive areas of all the options.
- 7.14** Option C_{variant} additionally involves widening the A229 between the M2 and the M20. It has been shown to have similar impacts to Option C but, owing to the enhanced connectivity it provides, it is expected to bring the largest economic benefits.
- 7.15** Table 7.1 summarises and compares the forecast impacts of the location options. Unless a specific year is indicated, all impacts are assessed over a 60-year period. Values are given in present values over 60 years at 2010 market prices and have been rounded. Table 7.1 also indicates where more information can be found in the review documentation.

Key to Table 7.1

✓✓	Very positive impact
✓	Positive impact
—	No discernible impact
×	Negative impact
xx	Very negative impact

²⁹ Wetlands of international importance, designated under the Ramsar Convention

Table 7.1 Summary guide to the relative merits of the location options

(Based on assessment of forecast impacts over 60 years, except where year is otherwise indicated)

	Option A	Option B	Options C and C_{variant}	Location of information
	Impact	Impact	Impact	
Contribution to the national economy				
Time saved to business users	£700m ✓	£1,100m ✓	£1,900m–£2,600m ✓✓	Tables 4.4–4.7, Final Review Report
Wider economic benefits	£250m ✓	£600m ✓	£1,200m–£1,500m ✓✓	
Improved connectivity (by 2025)	500 jobs relocated to the Thames Gateway area ✓	2,100 jobs relocated to the Thames Gateway area ✓✓	3,000–3,200 jobs relocated to the Thames Gateway area ✓✓	
Journey times using new crossing	New crossing would be located next to existing crossing, so see commentary below	Shortened between some towns in Essex and Kent if new crossing used ✓	Many journeys shortened when new crossing is used, both within the south east and nationally ✓✓	Table 4.2, Final Review Report
Congestion and resilience of the crossing and the strategic road network				
Conditions at existing crossing (2041)	Operates at 75% capacity or less than capacity, which should result in uncongested conditions ✓✓	Operates at around 90% capacity, occasional queues ✓	Operates at around 90% capacity, occasional queues ✓	Table 4.4, Final Review Report
Journey times using existing crossing (2041)	7 minutes shorter in evening peak ✓✓	5 minutes shorter in evening peak ✓✓	5 minutes shorter in evening peak ✓✓	Section 4.4, Central Forecasts and Sensitivity Tests Report
Queues at existing crossing (2041)	Shorter queues in northbound direction in the evening peak ✓	Shorter queues in northbound direction in the evening peak ✓	Shorter queues in northbound direction in the evening peak ✓	

Table 7.1 Summary guide to the relative merits of the location options

(Based on assessment of forecast impacts over 60 years, except where year is otherwise indicated)

	Option A	Option B	Options C and C_{variant}	Location of information
	Impact	Impact	Impact	
Resilience on other parts of the strategic road network	Delays on A13 eastbound are worsened xx Delays on A229 northbound are slightly worsened x Potential for additional congestion around M25 junctions 30 and 2 x	Delays on A13 eastbound are worsened east of Basildon x Delays on A229 northbound are slightly worsened x Adds pressure to A2 x	Delays on A13 eastbound are slightly improved ✓ Delays on A229 are worsened in both directions by Option C xx Delays on A229 are improved in both directions by Option C _{variant} ✓✓	Figures 4.7–4.8, Final Review Report and section 8.5, Final Review Report
Number of accidents	Accidents are forecast to increase across the area due to the increase in total traffic predicted due to the provision of a new crossing			Tables 4.4–4.7, Final Review Report
	Increases by 26,000 over 60 years x	Increases by 58,000 over 60 years xx	Increases by 60,000–62,000 over 60 years xx	
Contribute to reducing greenhouse gas emissions				
Greenhouse gas emissions over 60 year period	Reductions of 693,000 tonnes ✓	Increased emissions of 1,300,000 tonnes x	Reduction of 6–8 million tonnes due to many journeys being shortened ✓✓	Tables 4.4–4.7, Final Review Report
Avoid unacceptable impacts on environmentally sensitive areas and improve quality of life				
Impact on landscape/townscape and heritage	Least adverse impacts of the location options x	Moderate to large adverse impacts, including proximity to housing south of Grays xx	Largest adverse impact of the location options, including significant impacts on land designated as Green Belt north and south of the Thames xx	Table 4.8, Final Review Report

Table 7.1 Summary guide to the relative merits of the location options

(Based on assessment of forecast impacts over 60 years, except where year is otherwise indicated)

	Option A	Option B	Options C and C_{variant}	Location of information
	Impact	Impact	Impact	
Habitats and biodiversity	Slight to large adverse impacts x	Moderate to large adverse impacts x	Very large adverse impacts xx	Table 4.8, Final Review Report
Numbers of people affected by noise (by 2041)*	Smallest net increase of the location options of 245 people x	Middling net increase of the location options of 1,857 people xx	Largest net increase of the location options of 1,769-1,932 people xx	Tables 4.4–4.7, Final Review Report
Impacts on air quality (2025)	Improvements in local air quality for a greater proportion of zones (road links) than deterioration. Air quality may deteriorate at Dartford and Thurrock AQMAs.	Improvements in local air quality for a greater proportion of zones (road links) than deterioration. Air quality may deteriorate at AQMAs adjacent to A226 and Bean Interchange.	Improvements in local air quality for a slightly greater proportion of zones (road links) than deterioration. Air quality may deteriorate at AQMAs adjacent to the A2.	Table 4.12, Final Review Report
Avoid unacceptable impacts on committed development				
Impacts on committed development	Possible impacts on a number of planned developments within Dartford and Thurrock x	Impacts on development sites within Ebbsfleet Valley development area xx	As most of the area is designated as Green Belt, there is limited development in the area —	Chapters 5–8, Design and Costing Report

* This reference has been corrected to “by 2041” from “by 2015”.

Table 7.1 Summary guide to the relative merits of the location options

(Based on assessment of forecast impacts over 60 years, except where year is otherwise indicated)

	Option A	Option B	Options C and C_{variant}	Location of information
	Impact	Impact	Impact	
Distributional impacts on different income groups				
Time saving benefits/ disbenefits	Benefits associated with longer journeys favour people in higher income groups	Disbenefits associated with short trips more adversely affect middle & higher income groups	Disbenefits associated with short trips more adversely affect middle and higher income groups	Tables 4.4–4.7, Final Review Report, column headed ‘Social and distributional impact’, row ‘Social, Commuting and other users’
Noise	Large adverse impact on lowest income group x	No particular bias in adverse impacts towards higher or lower income groups —	Option C has a large adverse impact on lower income groups, and a beneficial impact on higher income groups. Option C _{variant} also adversely impacts higher income groups. xx	
Air quality	Positive impacts on all income groups, but highest income groups benefit the most ✓✓	Positive impact on lowest income group but adverse impact on other income groups xx	Positive impact on lowest income group but adverse impact on other income groups xx	

Costs, affordability and value for money

7.16 This section summarises information presented in the Methodology Chapter of the Final Review Report, section 2.6, and the summaries of the Financial and Commercial Case chapters of the Final Review Report, sections 5.6 and 6.7. More details of the value for money calculations can be found within the Economic Case chapter of the Final Review Report, sections 4.8–4.12.

7.17 The monetary values expressed in the paragraphs and tables below are expressed in 2010 values and prices and do not include any non-monetised

impacts. Table 7.2 compares the estimated capital costs of the location options and the benefit cost ratio of each, both with and without the inclusion of monetised wider impacts. All values are presented as ranges. The range of values presented for each location option reflects the differences between the costs and benefits of the three engineering solutions.

Table 7.2 Comparison of costs and value for money

	Option A	Option B	Option C	Option C_{variant}
Estimated capital cost range	£1.2bn – £1.6bn	£1.8bn – £2.2bn	£3.1bn – £3.2bn	£4.9bn – £5.0bn
Indicative BCR without wider impacts	1.0 – 1.8	0.5 – 0.8	1.2 – 1.3	1.2
Indicative BCR with wider impacts	1.4 – 2.4	1.1 – 1.7	1.9 – 2.0	1.7

- 7.18** The construction costs of Options C and C_{variant} are substantially greater than those for Options A and B. This may mean that any revenues received from crossing users are not sufficient to meet the total project costs over the projected length of the project concession. Additional financial support may therefore be required from public finances in the event that the Government chooses to develop Options C or C_{variant}.
- 7.19** Without the inclusion of wider impacts, Option A produces the highest BCR of 1.8. Option B produces the lowest BCR. Option A is forecast to generate more benefit to users than negative impact upon the transport budget. In contrast, the costs of Option B outweigh the expected benefits. Options C and C_{variant} both have BCRs greater than 1. Moreover, Option C_{variant} produces a BCR lower than or equal to Option C for each engineering solution, meaning that it does not improve the business case for Option C.
- 7.20** The inclusion of monetised wider impacts leads to an increase in the BCRs of all options. Conversely, however, consideration within the value for money assessment of the non-monetised wider impacts, such as the impacts on the natural environment, including biodiversity and landscape, acts, on balance, to reduce the case for all options.
- 7.21** On the basis of the monetised wider impacts, a bridge at Option A produces the highest BCR of the three locations (2.4) and, comparably, a bridge at Option B the lowest (1.7). On the same basis, Option C has a BCR of 2.0. When Option C_{variant} is compared with Option C, the costs of the additional infrastructure outweighs nearly all of the additional benefits, implying that the economic case for Option C does not rely on it being delivered in conjunction with the variant.

8. Conclusion

- 8.1** This consultation document sets out three location options, and one variant option, for the development of a new Lower Thames crossing. Each location option was appraised to determine how well it performed against the factors set out in Chapter 2: Scope. The findings of the review were summarised in Chapter 7: The review findings.
- 8.2** The review concluded that each location option is likely to be feasible to deliver, in terms of construction, value for money and financing. Each location option has been shown to reduce congestion at the existing crossing, albeit to varying extents. The location options were also shown to produce varying social and environmental effects.
- 8.3** This consultation seeks public opinion on the location options and on the relative importance of the factors on which their performance and suitability will be judged.
- 8.4** A set of consultation questions are included in Chapter 9: Consultation questions, to allow readers to express their preferences and opinions.

9. Consultation questions

Q1. Do you agree that there is a strong case to increase road-based river crossing capacity in the Lower Thames area?

- Agree
- Disagree
- Neither agree nor disagree

Please explain your reasons.

Q2. Which of the following location options for a new crossing do you prefer?

- 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
- Option C_{variant}: 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
- Other

If other, please provide details.

Q3. Please indicate how important the following factors were in influencing your preference for the location of a new crossing, in answer to Q2. Please mark whether they were very important, important or not important.

- Forecast contributions to the national economy
- Forecast reductions in congestion at the existing Dartford-Thurrock crossing and forecast improvements to the resilience of the surrounding road network
- Forecast reductions in greenhouse gas emissions
- Smaller forecast adverse impacts on environmentally sensitive areas and larger forecast improvements in quality of life relative to other location options
- Smaller forecast adverse impacts on planned development relative to other location options

- The distribution of forecast impacts on people within a range of different income groups
- Lower estimated costs relative to other location options
- Forecast value for money
- Other

If other, please provide details.

Q4a. Is your preference for the location of a new crossing, in answer to Q2, conditional on whether a bridge, bored tunnel³⁰ or immersed tunnel³¹ is provided?

- Yes
- No

Q4b. If yes, please indicate which type of crossing you would prefer:

- Bridge
- Immersed tunnel
- Bored tunnel

Q5. Do you wish to add any further comments?

³⁰ A bored tunnel is a circular tunnel at depth, constructed without removing the ground above using a tunnel boring machine.

³¹ An immersed tunnel is a shallow depth tunnel submerged in a trench in the riverbed.

10. How to respond

- 10.1** The consultation period began on 21 May and will run until 16 July. Please ensure that your response reaches us by the closing date. Further copies of this consultation document, together with online and paper response forms can be found at <https://www.gov.uk/government/organisations/department-for-transport/series/lower-thames-crossing> or you can contact the address below.
- 10.2** Please either complete the online response form or send a paper copy of the consultation response form to:
- Lower Thames Crossing Consultation
Department for Transport
Zone 3/29, Great Minster House
33 Horseferry Road
London, SW1P 4DR
- lowerthamescrossing@dft.gsi.gov.uk

11. Next steps

- 11.1** This is the first stage of decision making. Government intends to consider the responses to this consultation and announce a decision in autumn 2013. At that point the summary of responses, including next steps, will be published online. Paper copies will be available on request.
- 11.2** Once Government has announced a decision on the location for a new crossing, there is potential for work to commence on developing a scheme which would include further consideration of the financing options. This would involve more detailed surveying and forecasting in order to further develop the assessment of economic, environmental and social impacts. Route options would then be considered, and a detailed design developed in due course. More detailed preparation of costs and consideration of impacts on properties would also be completed. An Environmental Impact Assessment would also be undertaken in due course. The analysis would be completed with a view to securing a Development Consent Order under the Planning Act 2008 (as amended by the Localism Act 2011).
- 11.3** Further public consultations would be undertaken in the course of developing a future scheme once the location of a new crossing has been identified.

12. Frequently asked questions

- 12.1** Below is a list of frequently asked questions about these proposals which have been provided to assist in responding to the consultation. However, if you require additional information before responding, please contact:

Lower Thames Crossing Consultation
Department for Transport
Zone 3/29, Great Minster House
33 Horseferry Road
London, SW1P 4DR

lowerthamescrossing@dft.gsi.gov.uk

- 12.2** Further background information can be found at: <https://www.gov.uk/government/organisations/department-for-transport/series/lower-thames-crossing>.

Which is Government's preferred option?

No decision has yet been made on where to locate a new crossing. Department for Transport Ministers are responsible for key decisions on the potential new crossing and will want to consider all the evidence including the consultation responses before making a decision.

In assessing the benefits of different location options what account has Government taken of the national economy?

The review included a comparative assessment of journey time savings which impact on business productivity. It also considered wider economic benefits, including:

- benefits resulting from the agglomeration of business activity in the South East, which along with many other benefits would accrue to the national economy; and
- forecasts of changes to employment.

Why is there no strategic environmental assessment of the options?

The review assessed likely environmental impacts of locating a new crossing at each location. The evidence is outlined in the 'economic case' in the Final Review Report and also the supporting documentation, which can be found at: <https://www.gov.uk/government/organisations/department-for-transport/series/lower-thames-crossing>. A formal strategic environmental assessment under the terms of the Strategic Environmental Assessment Directive does not formally apply at this

stage as the Directive applies to plans and programmes rather than projects. Once a decision is made on location, a future scheme for a new Lower Thames crossing would be subject to a detailed environmental impact assessment as part of the statutory planning processes.

Is Government likely to fund a new crossing through tolls?

It is normal practice for costs of constructing estuarial river crossings to be recovered through tolling. For the purposes of assessing location options, the review included an assumption that a new crossing would be tolled at a rate equal to the charges on the existing Dartford-Thurrock river crossing. No decisions have yet been made, however, about the financing of a new crossing including detailed matters such as tolling.

What is the timeline for delivering a new crossing?

We should be able to outline a possible timetable for a new crossing once decisions have been reached on where to locate and how to deliver the potential new crossing. At this stage the review has assumed that construction could begin in 2021, based on the timescales taken to progress previous major road schemes, but the dates will depend on what we are to deliver and how. As you may know, we are looking hard at the opportunities to accelerate infrastructure delivery, and we will apply any relevant learning to proposals for the Lower Thames.

Can't Government speed up delivery of infrastructure?

Across Government we are working hard to find ways to accelerate the delivery of infrastructure without inadvertently introducing new reasons for incurring delay. Government is currently piloting an accelerated approach to the delivery of major schemes. The following four schemes are currently piloting this approach:

- Surrey, M3 J2 to 4a managed motorway;
- the West Midlands, M6 J10a to 13 managed motorway;
- Derbyshire, M1 J28 to 31 managed motorway; and
- A160/A180 Immingham dualling scheme.

Why only the three options (and variant) and no others?

The Parsons Brinckerhoff Study for the Department for Transport, which reported in 2009, considered two additional locations further east. The study forecast that a new crossing at the locations further east, would do little to alleviate congestion at the existing Dartford-Thurrock crossing (e.g. by 5% or less by 2031) and would achieve fewer agglomeration and other wider economic benefits. It also forecast low demand at the location furthest east. For these reasons the 2009 study recommended that the eastern most locations should not be progressed further.

What compensation package is being made available for areas blighted by this proposal?

It is too early to think about compensation for those who may be affected by a new crossing scheme. We are currently consulting on the general location for a potential crossing scheme but, as yet, there is no actual scheme. Once we have decided where a new crossing could be located, there is potential for work to commence on developing a scheme. As any scheme develops, the nature and extent of the compensation that would need to be paid to those affected would become clearer. We do not, however, purchase land and property, or pay compensation, at such an early stage of developing an infrastructure proposal.

What will a new crossing cost and who will pay?

The analysis undertaken for this review indicates that a new crossing – including the roads required to link it into the road network – could cost between £1.2bn and £3.2bn depending on location and whether it is constructed as a bridge or a tunnel. If Option C_{variant} (widening the A229 between the M2 and M20) were to be provided, the total cost could rise to £5bn. No decisions have yet been made about the financing of a new crossing and further work would be required on the financing options and the value for money which they offer, once the location has been selected.

How will Government use the responses to this consultation?

Responses to this consultation will help Government understand the range of opinion on the options for a new crossing in the Lower Thames area, and the relative importance attributed to different factors used to compare the merits of the location options. This will contribute to the evidence that will inform Government's decision-making on where to locate a new crossing.

Annex A: Consultation principles

The consultation is being conducted in line with the Government's key consultation principles. Further information is available on the gov.uk website at <https://www.gov.uk/government/publications/consultation-principles-guidance>

If you have any comments about the consultation process please contact:

Consultation Co-ordinator
Department for Transport
Zone 1/14 Great Minster House
London SW1P 4DR
Email consultation@dft.gsi.gov.uk

Annex B: Sample of relevant studies

Study title	Commissioning body	Date	Link where available
Assessment of Lower Thames Crossing Capacity (MVA, Gifford, Capita)	Essex County Council Kent County Council	2008	https://shareweb.kent.gov.uk/Documents/News/lower-thames-crossing-gifford.pdf
Dartford River Crossing Study into Capacity Requirements (Parsons Brinkerhoff)	Department for Transport	2009	http://webarchive.nationalarchives.gov.uk/+/http://www.dft.gov.uk/about/strategy/capacityrequirements/dartfordrivercrossing/
The Lower Thames Crossing (KPMG)	Kent County Council	2010	https://shareweb.kent.gov.uk/Documents/News/lower-thames-crossing-KPMG-report.pdf
London Orbital Multi-Modal Study (KKR)	Department for Transport	2002	–