

Lower Thames Crossing Consultation – March 2016

1. Introduction

1.1 The RAC Foundation is an independent transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation carries out independent and authoritative research with which it promotes informed debate and advocates policy in the interests of responsible road users.

1.2 The Foundation is responding to this consultation¹ because of the importance of the current Dartford crossing to the country's strategic road network - with 70% of its traffic being either national or regional² and, as a critical link in the London Orbital, the frequent disruptions to its operation have implications around the entire M25, including the heavily congested western section and connecting roads³. The crossing also forms part of the Trans-European Road Network⁴.

2. The case for a new crossing - to the east

2.1. The existing crossing at Dartford has been developed in stages since the first tunnel was built in 1963; with the addition of a second tunnel in 1980, the opening of the Queen Elizabeth II Bridge in 1991 and the elimination of cash tolls in 2014. Whilst the traffic demand through the crossing is expected to grow substantially over the next twenty five years⁵ further expansion of the existing crossing would be extremely disruptive and costly and thus, in our view, impracticable.

2.2. A new crossing therefore would:

- Relieve current and prospective congestion⁶, and improve reliability and safety, at the Dartford crossing and its approaches. The existing crossing is already carrying more traffic than its design capacity and is one of the least reliable sections of England's trunk road network⁷.
- Improve the resilience of the strategic road system to the east of London by providing a discrete alternative to the existing Dartford crossing complex.
- Enhance accessibility between the large areas of Kent and Essex presently impaired by both extended/unreliable journey times using the existing Dartford Crossings - with their 50mph speed limit and restrictions on vehicles with dangerous loads⁸.

¹ Highways England 2016.

² Highways England 2016a, figure 3.5.

³ Highways England 2016b, figure A5.1.1.

⁴ European Commission 2013.

⁵ Ibid, section 4.5.

⁶ Highways England 2016c, figure 9.2.

⁷ Highways England 2016d, paras 2.2.4 and 2.2.6.

⁸ Highways England 2016a, table 3.1.

- Be an important element of an overarching strategy for the development of the Thames corridor to the east of London, supporting new developments⁹ estimated yield 80 thousand additional households and over 100 thousand new jobs between 2009 and 2025¹⁰, such as Ebbsfleet Garden City¹¹, London Gateway Port and Logistics Park¹² and the London Paramount Entertainment Resort with its proposed 14,000 visitor parking spaces¹³. Development in the Thames Gateway has not matched past expectations but it has recently been described as ‘probably this country’s greatest single prospective area for growth.’¹⁴

2.3. Whilst a new crossing in the existing corridor would bring some of these benefits the proposed easterly alignment is to be strongly preferred because:

- It would provide a faster and more direct route between the M1, A1(M), M11 & A12 and the M2/M20 to and from the Continent and shorten travel time and distances between Thurrock, Brentwood, Chelmsford, Castle Point, Southend, Basildon, Rochford and Malden in the north and Medway, Maidstone, Swale, Tonbridge & Malling, Ashford and Canterbury in the south. As an example the travel time between Basildon and Rochester would be 15 mins shorter with the eastern route compared with that in the existing Dartford corridor¹⁵. These areas have a population of almost 2 million people¹⁶ and nearly 1 million jobs¹⁷ and therefore we would expect to see agglomeration benefits from giving employers access to a wider skill-base and residents access to a wider range of employment.
- As well as providing this improved connectivity it would avoid increasing traffic loadings between the Dartford crossing and the A2 in the south and the A13 or, in the case of Route 4, the A127 and A128 in the north¹⁸, both of which are forecast to be severely congested by 2040 in the National Policy Statement for National Networks¹⁹. This would result in its capacity being 12% greater²⁰ and would carry about 10% more traffic in 2041²¹.
- Result in significantly less congestion during the construction period²² because the eastern routes avoid interference with the existing crossing and its approaches.

2.4 The improved connectivity of the easterly route would result in wider economic benefits estimated to be over £7bn and an additional 5,000 jobs²³. Either route would have environmental impacts with the western crossing passing through the urban

⁹ South East Local Economic Partnership 2014.

¹⁰ Highways England 2016j, table A5.1.2.

¹¹ AECOM 2015.

¹² Thames Gateway and South Essex 2016.

¹³ London Resort Company Holdings 2015.

¹⁴ Lord Heseltine 2012.

¹⁵ Highways England 2016b, figure 4.11

¹⁶ ONS 2015.

¹⁷ ONS 2016.

¹⁸ Highways England 2016e.

¹⁹ DfT 2014, page 95.

²⁰ Highways England 2016b, table 4.1.

²¹ Ibid, table 4.4.

²² Ibid, table 6.3.

²³ Highways England 2016d, para 2.7.5.

areas of Purfleet and Dartford and the eastern crossing skirting Gravesend on one side and clipping the western extremity of the sensitive Thameside marshland site to the east.

2.5 That said, achievement of the full benefits will require a degree of systematic planning, design and delivery that would view both the Essex and the Kent Thameside developments as a single 'development area', bounded by the Dartford Crossing to the west and the new crossing to the east, abutting, as it would, environmentally protected land and waterway. In thinking about development in this way, we would question the wisdom of having 'local' access junctions near to the crossing, unless these are on a scale to cope with significant local movement – the stretch of M25 south of the Dartford crossing requires the navigation of three junctions in swift succession, with consequent challenges for the smooth management of traffic flow.

3. Which route north of the river?

3.1 To the north of the proposed easterly crossing three routes have been identified as possibilities. Routes 2 and 3 are shorter than route 4 by at least 2 miles and are at least £300m less expensive.²⁴ These routes access the M25 at a new junction to the south of North Ockenden. These would only require connections to and from the north on the M25, making for a relatively simple two level interchange and avoid the need to remodel the existing A127/M25 interchange to accommodate this additional traffic - and also the widening of the A127 between the A128 and the M25. All three routes would require complex multi-level interchanges with the A13. We would therefore suggest that the choice of preferred option lies between routes 2 and 3.

3.2 Of these two, route 3 is shorter. There is little difference in their capital and operating costs. The key differences are that route 3 avoids the use of the A1089, has shorter journey times and is slightly more resilient resulting in higher benefits than route 2²⁵. Route 3 attracts more traffic from the existing crossing than routes 2 or 4²⁶. Both routes would have some environmental impact which would have to be managed in the detailed design process but of the two the route 3 is the least damaging in this respect²⁷.

3.3 Hence, for us, Route 3 is the preferred route north of the river Thames as:

- It is the shortest route between the M25 and the new crossing and requires a simple two movement junction with the M25.
- It avoids using the A1089, provides the fastest connection, is more resilient and provides the maximum relief to the existing crossing.
- It is the least environmentally disruptive.

4. Which route south of the river?

4.1 South of the River Thames each of the two options has a connection with the A226, but from there they diverge with the westerly route connecting to the A2 and the easterly with the M2²⁸. The westerly route is shorter (by 0.8 miles) but connects to the A2 and means

²⁴ Highways England 2016, page 22.

²⁵ Highways England 2016f, table 4.1.

²⁶ Highways England 2016b, tables 4.4 & 4.4.

²⁷ Highways England 2016d, para. 2.9.7.

²⁸ Highways England 2016g, Appendix 3.18, drawing HML-CBOMLZZZML-DR-RD-1000

longer ('round the corner') journeys (by 1.6 miles)²⁹ for the main traffic movement to and from the south west³⁰. The easterly route would parallel the alignment of the A226 for about a mile and then connect directly into the western terminus of the M2 where it changes into the A2. The proximity of the HS1 line has constrained the design of the westerly junction, shown in the consultation³¹ and would substantially restrict the speeds on the limited radius links between the two roads. This is not a problem with the easterly junction with the M2- where full motorway design standard connections could be provided by adding new links to the north of the existing A2/M2/A289 interchange³².

4.2 The easterly link would produce greater benefits (£556m³³) but it would be more expensive (by £100m³⁴). It would also generate greater wider economic benefits (£324m³⁵) so from a pure transport viewpoint the eastern link is clearly preferable. However the easterly link has a greater impact on the environment³⁶ - on the Kent AONB, the Shorne Conservation Area and some local woodlands - and its design would need to minimise the community and environmental impacts if it were to be chosen, which could be hard to achieve and involve a significant increase in cost.

4.3 Earlier studies³⁷ considered the possibility of improving the A229 between the M2 and the M20 and concluded that this would present significant engineering challenges and would be of only limited traffic value to a lower Thames crossing. However its benefits were estimated to be similar to its costs with a dual two lane crossing whereas if a higher capacity crossing were built it would almost certainly have a positive Benefit/Cost ratio. Therefore the possibility of remodelling the M2/A229 and M20/A229 junctions to improve the existing M2/M20 connection at this point should not be lost sight of.

4.4 South of the River Thames the easterly alignment is arguably superior as:

- It provides the most direct for the main traffic movements to and from the south east
- It provides a direct full standard motorway/motorway link and
- Its overall benefits are up to nine times its incremental cost.

4.5 However, mitigating the environmental impacts could be difficult and costly. We cannot give a definitive view on this without more work being done to establish the most appropriate design and mitigation, and also the scope for improving the A229 link between the M2 and M20, which will be used by some of the traffic from the new crossing. This could then be compared more realistically with a westerly alignment with the A2 junction remodelled to replace the sub-standard loop squeezed in between the A2 and the HS1 tracks with a more suitable connection the A2 westbound possibly by a fly-over and an underpass.

5. What form should the crossing take?

²⁹ Highways England 2016b, figure 4.12

³⁰ Ibid, figure 4.4.

³¹ Highways England 2016g, Appendix 3.7, drawing HML-CB1JC01AJL-DR-RD-0001.

³² Ibid, Appendix 3.10, drawing HML-CD1JC01AJL-DR-RD-0001.

³³ Highways England 2016b, table 5.3.

³⁴ Ibid, table 5.4.

³⁵ Ibid, table 5.3.

³⁶ Highways England 2016h, table 7.4.

³⁷ DfT 2013.

5.1 The (most likely) capital costs of the three types of crossing for the preferred route are £3,921m for a bored tunnel (3.23kms between portals³⁸), £3,966m for a bridge (3.96kms between portals³⁹) and £4,222m for an immersed tube (2.74kms between portals⁴⁰) which makes the latter significantly more expensive to build⁴¹. Operating costs for a bridge would be about 60% of those for a tunnel⁴². Purely on costs grounds a bridge looks preferable followed by a bored tunnel with an immersed tube being the most expensive. However, although we note provision has been made for wind-shielding in the cost estimates, we wonder whether there is enough to ensure that the dual-three lane crossing, that we think is needed, can reliably stay open to heavy traffic in all but the most extreme weather conditions. For a structure of the necessary height, span and load bearing capacity we think this would pose a significant engineering challenge.

5.2 However an immersed tube crossing would involve the least vertical displacement and would provide greater flexibility in approach ramp gradients and portal locations. Moreover the cross-section of an immersed tube could be tailor-made to accommodate traffic and services – without the circular section requirements of a bored tunnel. This means that it would be much easier to include facilities for pedestrians, cyclists or even segregated public transport. However the most economically productive use of an additional lane in each direction would probably be for motor traffic, and it is unlikely that such a long tunnel would be an attractive option for pedestrians or cyclists. But we can see that there are likely to be issues with the RAMSAR protected marine conservation area and If this proves to be an insurmountable obstacle, as it might, attention needs to move swiftly to a bored alternative.

5.3 The history of downstream Thames crossings is one of one of capacity being insufficient to cope with traffic volumes after a relatively short period. Given the cost of a new Lower Thames crossing it would be foolish to repeat these past mistakes. It is expected that with a dual two lane crossing there would be congestion on part of the crossing complex in 2041⁴³ and the analysis of a higher capacity crossing in the form of a dual 3 lane facility shows that the additional costs to be in the range of £0.17bn to £0.5bn and this would still result in a high adjusted BCR⁴⁴. We would argue that the design of a crossing of the scale envisaged should take a time horizon at least out to 2050, and that serious consideration should be given to providing a higher capacity, dual three-lane crossing that could be used for general traffic from day 1, or be designed to provide for segregated users (e.g. a bus/high-occupancy vehicle lane).

5.4. The location of the easterly crossing raises important environmental issues – particularly in respect of habitat and biodiversity as it borders on Thames Estuary and Marshes Ramsar site⁴⁵ and Thames Estuary and Marshes Special Protection Area (SPA). This site covers an area of over 21 square miles mainly on the south side of the Thames where the proposed crossing clips the western edge. A bridge would have a permanent, but limited, direct impact on this site in terms of biodiversity (as opposed to visual intrusion) whereas an

³⁸ Highways England 2016g, Apps part 5 of 5, RD 0104.

³⁹ Ibid, Apps part 5 of 5, RD 0304.

⁴⁰ Ibid, Apps part 5 of 5, RD 0204.

⁴¹ Highways England 2016i, table 7.3.

⁴² Ibid, table 7.9.

⁴³ Highways England 2016j, tables 8.1 & 8.2.

⁴⁴ Highways England 2016b, para 9.2.3.

⁴⁵ Ramsar 2007.

immersed tube would have an impact during construction and larger footprint on the edge of the SPA, in addition to ongoing disturbance to the downstream marine environment. Problems of disturbance to the marine environment from immersed tubes have been successfully addressed at a number of sites including the Øresund link⁴⁶, the Fehmarnbelt crossing⁴⁷, the Söderström rail link in central Stockholm⁴⁸ and, closer to home, the Medway tunnel⁴⁹.

5.5 Of the three options, it is clear that a bored tunnel would have the least environmental impact during construction and subsequently. If a basic dual two lane crossing is to be provided then the preferred format looks to be a twin bored tunnel as:

- It is the least costly to build (although its operating costs are the highest); and
- It is the least environmentally intrusive.

5.6. We would argue that there is a strong case for a dual three lane crossing. This would ensure congestion free crossing of this section of the Thames for many years to come and make the eastern side of the M25 the preferred route for a higher proportion of transit traffic so easing pressures on the hard pressed western section of the M25. It would also remove a possible impediment to the realisation of the huge development potential of the Thames Gateway described in 'No Stone Unturned'⁵⁰ which The Thames Estuary Growth Commission has recently been set up to promote⁵¹. The question of whether that should be provided by bored tunnel or immersed tube will come down to a balance of cost and environmental impact.

6. Should the Crossing be charged for?

6.1 The consultation document assumes that users will pay to use the new crossing as they do with the existing crossing at Dartford⁵². It is also proposed that any new road crossings between Dartford and the Blackwall tunnel will also be subject to user charges⁵³. While the current charge at the Dartford crossing is a congestion charge, rather than a toll collected to fund the construction and maintenance of the bridges and tunnels, a basket of costs could be developed relating to the existing crossing and the new crossing with a toll set to help cover them. The revenues from tolls would clearly reduce the costs to the public purse of providing the new crossing - for the preferred scheme (£0.843bn against a capital cost of £2.29bn⁵⁴ (37%) on the same price basis).

6.2 Charging for these crossings will mean a substantial increase in road toll revenues in England – concentrated in a twenty mile stretch of the Thames to the east of London. There has also been heavy public spending recently on cross river rail capacity in the western section of this corridor without any specific toll charges. And there is the question of what, if any, local discounts should apply for residents. Attempts to use tolling to help fund non-estuarial road schemes since the construction of the M6 toll road have been unsuccessful –

⁴⁶ Francke 2000.

⁴⁷ Rambold 2013.

⁴⁸ Railway Gazette 2013.

⁴⁹ Rochester Bridge Trust 2016.

⁵⁰ Lord Heseltine 2012.

⁵¹ Osborne 2016.

⁵² Highways England 2016d, section 5.4.

⁵³ Transport for London 2015.

⁵⁴ Highways England 2016b, tables 5.4 & 5.5.

illustrated by the failure to incorporate tolling in the A14 improvement scheme⁵⁵. In the absence of proposals for any major new roads meeting the criteria set out by the government in December 2013 – ‘in very limited circumstances where schemes deliver new roads or transform an existing road into an entirely new route beyond all recognition’⁵⁶ – other than recent proposals for new Thames crossings, this policy in effect impacts disproportionately on this corner of the strategic road network. We have to ask whether this is fair.

6.3. Since the policy of charging tolls for certain types of new road capacity was introduced the government has decided to hypothecate the proceeds of vehicle excise duty for a Road Fund to support investment in the road system⁵⁷. Before taking a final decision on whether to toll this, and other prospective Thames road crossings, the December 2013 policy should be reviewed in the light of the establishment of a Roads Fund to which the users of any new Thames crossings would be contributors.

6.4 What is clear is that if there is to be a toll for the new crossing, that will have to be devised in a joined-up way with charges for crossings upstream, and taking account on the traffic impact on the hugely congested western sections of the M25.

7. Conclusion

7.1. The Foundation supports the principle of a new lower Thames crossing and agrees that that, on balance, the scheme preferred by the Highways England is the best option but with these qualifications:

- The design of (the easterly) section south of the river must be formulated to minimise impacts on the Kent AONB, the Shorne Conservation Area and local woodlands and if development of adequate mitigation proves impracticable and the western route is chosen then the junction with the A2 needs to be redesigned;
- The scope for improving the A229 link between the M2 and M20, which will be used by some of the traffic from the new crossing, should be re-examined;
- A new crossing will be a massive undertaking, and should have at least a 30 if not a 50 year design horizon. We believe there is a powerful case for a dual three lane crossing. Moving to dual three might create further cost advantages for an immersed tube crossing if a satisfactory way could be found through the current extent of RAMSAR designation, as has been found elsewhere.
- In light of the prospectively disproportionate use of tolling in the east Thames corridor and the establishment of a national Road Fund the Government needs to revisit the policy statement on tolling that it has inherited taking account of the wider implications for this scheme, in particular the traffic implications for the western sections of the M25, and other potentially similar projects such as the Stonehenge Tunnel and a possible new trans-Pennine route.

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⁵⁵ Highways England 2014.

⁵⁶ Butcher 2013.

⁵⁷ HMT, 2015.

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