

**Lower Thames Crossing
9.153 Applicant's response to
comments made by Natural
England on HRA matters and
Response to ExA
ExQ2_Q11.5.1**

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1 Introduction

1.1 Purpose of this document

- 1.1.1 This document provides responses to Natural England’s Deadline 5 submission [REP5-109] where issues relate to Habitats Regulations Assessment (HRA) and to the Examining Authority’s (ExA’s) ExQ2_Q11.5.1. The Applicant has already provided sufficient information to inform the drafting of the Report on the Implications on European Sites (RIES).
- 1.1.2 The Applicant continues to positively engage with Natural England in regard to unresolved issues raised by them. Natural England’s Deadline 5 submission [REP5-109] included a number of new issues, as well as further detailed commentary on those matters that have been under discussion for some time. A number of technical issues remain unresolved where the Applicant does not agree with Natural England’s advice or its comments on the proposals and assessments that support them. A summary of the history of engagement with Natural England is included at Annex A and a joint statement from the Applicant and Natural England on the position on HRA matters at Deadline 6 is included in Annex B.
- 1.1.3 The Applicant will respond in further detail to each technical point raised by Natural England in their Deadline 5 submission at Deadline 8 together with the Applicant’s comments on the draft RIES and responses to any further written questions, which will provide a comprehensive package of information in response to issues raised by Natural England.
- 1.1.4 This document provides a summary of the position of the Applicant with regard to the issues raised by Natural England, to aid the Examining Authority in drafting the RIES. The Applicant considers that this is an appropriate and proportionate response to the issues raised by Natural England in the context of the timescales of the Examination. Supporting air quality assessment information is included at Annex C.

2 Non-technical summary of fundamental issues

2.1 The purpose of and approach to HRA

- 2.1.1 The aim of the Habitats Directive, which was transcribed into UK law through the original Habitats Regulations, is to help ensure biodiversity through the conservation of wildlife and natural habitats. This aim is confirmed in Article 2, where focus is put on the outcomes for nature conservation rather than the process of the assessment: *“The aim of this Directive shall be to contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora ...”* (emphasis added).

2.2 Best available scientific knowledge in the field

- 2.2.1 Case law has established that HRA should be informed by the best available scientific knowledge in the field as evidenced in the judgements below.

- 2.2.2 Wyatt v Fareham BC [2021] EWHC 1434 (Admin), paragraph 32:

“32. Fourthly, a high standard of investigation is demanded in line with the precautionary principle. This has been stated and reiterated in a large number of cases, including in particular Waddenzee (Case C-127/02) [2004] Env LR 14 and the Dutch Nitrogen case. In Waddenzee, Advocate General Kokott stated that the burden on the competent authority was to prove that there would be no adverse effects, not to a standard of absolute certainty but to being “at least satisfied that there is no reasonable doubt as to the absence of adverse effects on the integrity of the site concerned”. A requirement of absolute certainty would be impossible of scientific attainment as well as being disproportionate (see paras 99, 104, 107 and 108). The ECJ accepted the Advocate General’s interpretation of the Habitats Directive in the light of these general principles of EU law, expressing their conclusions in a slightly different way (see paras 44, 58, 59 and 61). At para 58 the CJEU confirmed that the authorisation criterion in the Habitats Directive “integrated” the precautionary principle.”

- 2.2.3 Waddenzee, C-127/02, paragraph 61:

“61 In view of the foregoing, the answer to the fourth question must be that, under Article 6(3) of the Habitats Directive, an appropriate assessment of the implications for the site concerned of the plan or project implies that, prior to its approval, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site’s conservation objectives must be identified in the light of the best scientific knowledge in the field. The competent national authorities, taking account of the appropriate assessment of the implications of mechanical cockle fishing for the site concerned in the light of the site’s conservation objectives, are to authorise such an activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects.”

- 2.2.4 In light of the judgements in *Wyatt v Fareham and Waddenzee*, the Applicant considers that the competent authority needs to consider whether or not reasonable information has been provided to inform the HRA, but not to a standard of absolute certainty or definitive proof. In relation to the assessment of air quality impacts, this would relate to the following aspects:
- a. **Traffic** – Is reasonable information provided to predict the change in traffic generated by the Project? The Applicant has followed the latest Government guidance (TAG) and considers that the assessment is therefore fit for purpose in providing predictive changes in traffic flows as a result of the project for the purposes of HRA.
 - b. **Air quality** – Is reasonable information provided to predict the change in pollutants from the change in traffic? The Applicant has utilised the latest air quality modelling tools and guidance and considers that the assessment is therefore fit for purpose to predict changes in pollutants for the purposes of HRA.
 - c. **Ecological** – Is reasonable information provided to assess the change in ecological situation (integrity/biodiversity/nature conservation) from the predicted change in levels of pollutants? Detailed surveys have been carried out on all sites and a number of criteria assessed such as the sensitivity of the species present to the impact, the scale of the effect in terms of proportion of the site, etc, which are used by competent experts to make professional judgements on whether the integrity of the sites would be adversely impacted i.e. whether the coherence of the habitats would be adversely impacted.
 - d. **In-combination** – Is reasonable information provided on other plans and projects within the assessment of traffic and non-traffic sources to determine any combined effect there may be in the future? The traffic model follows government guidance in assessment of traffic sources and non-traffic sources are considered in the HRA, using guidance from organisations such as the Environment Agency.
- 2.2.5 On the basis of the evidence provided; the Applicant considers that no reasonable scientific doubt exists in relation to the conclusions of the HRA, namely that the proposal will not have an adverse effect on the integrity of the site.
- 2.2.6 The Application notes the importance of having regard to:
- a. Whether the ‘evidence’ sought by Natural England (e.g. inclusion of inconsequential NOx values into a model and assessment of pollutant deposition beyond 200m) would provide meaningful insight to inform an HRA, in terms of:
 - i. Measurability: could such small changes be identified in the real world given the sensitivity of available equipment?

- ii. Evidential need: has existing evidence already shown that effects from small changes would be absent or insignificant under certain circumstances, regardless of the outputs from predictive models?
- b. Whether the ‘evidence’ that Natural England seek would require an unachievable level of certainty regarding future traffic movements rather than consideration of reasonably foreseeable development in concert with other precautionary assumptions, as used by the Applicant, to allow likely effects on air quality to be demonstrated beyond reasonable scientific doubt.
- c. Whether the concerns Natural England raise are of a scale to feasibly make a material difference, e.g.:
- i. The total nitrogen deposition on the land predicted to be ‘affected’ is of an inconsequential scale that could be expected to be deposited by a number of other sources in much greater scale, e.g. there is an increase of 1.1kg over an area of 7.7ha at Epping Forest in the opening year. The proportion of additional nitrogen from the Project to the total nitrogen at Epping Forest is around 0.5%.
 - ii. The estimated additional nitrogen is dwarfed by the background variability of nitrogen, which is much more influenced by, for example, meteorological conditions and sources that are regional, international and from sectors that are not transport related (e.g. agriculture).
 - iii. The surveys of the site show that there is no gradation of vegetation with distance from the road. If traffic-generated pollution was a significant contributor to adverse change in habitat, it would be expected that this would be identifiable by survey.
 - iv. The shift in the absolute concentration as a result of the Project at the transect with the maximum change in concentration is predicted to be in the region of 1 metre (i.e. the concentration without the Project at 15 metres within the site would be around 16 metres with the Project), which is considered to be inconsequential (see Annex C).
 - v. A minor change to a minor contributor on a tiny proportion of the site that has no sensitive species would be inconsequential to the coherence of the habitats and their constituent species and therefore their contribution to biodiversity and nature conservation.

- vi. The change as a result of the Project will not hamper the attainment of the site conservation objectives because road traffic emissions will continue to decline as greater numbers of zero-emission vehicles enter the fleet. The reduction in emissions from transport will, for example, be much quicker than other sectors such as agriculture, which is a major contributor to nitrogen and emissions of NH₃.

2.2.7 While the precautionary approach must be taken, this must be considered in the context of whether any reasonable scientific doubt exists in relation to the conclusions of the HRA. It is the Applicant’s position that the scientific evidence presented already demonstrates that no such doubt arises notwithstanding the the existence of residual theoretical considerations (see section 2.3 below).

2.3 Policy and guidance

2.3.1 The Department for Environment, Food and Rural Affairs’ (Defra’s) recent Environmental Principles Policy Statement (2023) says that *“It is fundamental to the principle that the level of uncertainty determines the acceptable level of risk. As the risk of serious damage increases, the level of certainty required before action is taken reduces. However, in all cases, for the precautionary principle to apply, there must be sufficient evidence that the risk of serious or irreversible damage is plausible and real, and where choices are considered to prevent or reduce the environmental degradation in question, they should be cost-effective. This means the precautionary principle should not be applied speculatively and policymakers are not required to prove that a policy is without risk in order to proceed as planned.”*

2.3.2 Natural England’s earlier guidance states that under the Habitats Regulations, when undertaking an assessment of ‘likely significant effects’, there must be credible evidence that there is a real, rather than hypothetical, risk. The guidance sets out Natural England’s approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001) (Natural England, 2018). It states at paragraph 4.3:

“In undertaking an assessment of ‘likely significant effects’ under the Habitats Regulations, authoritative case law has established that:

- *An effect is likely if it ‘cannot be excluded on the basis of objective information’¹*
- *An effect is significant if it ‘is likely to undermine the conservation objectives’²*
- *In undertaking a screening assessment for likely significant effects ‘it is not that significant effects are probable, a risk is sufficient’.... ‘but there must be credible evidence that there is ‘a real, rather than a hypothetical, risk’³.”*

¹ Case C127-02 Waddenzee (refer para 45)

² Case C127-02 Waddenzee (refer para 48)

³ Boggis v Natural England and Waveney DC [2009] EWCA Civ 1061 (refer paras 36-37)

- 2.3.3 When assessing impacts from air quality on European sites, it is therefore necessary to consider whether the available scientific information is identifying a real impact, as distinct from a hypothetical risk of impact. If a potential impact is identified, it must then be determined if this could lead to any real effects on biodiversity and nature conservation through adverse effects on the integrity of qualifying interests of European sites.
- 2.3.4 In order to inform an appropriate assessment in relation to the impact of air quality effects on European sites, and subsequent decision making by the competent authority, the following must be demonstrated:
- a. That the scientific information available to inform the appropriate assessment is reasonable in demonstrating:
 - i. Whether or not there would be a real (not hypothetical) change in pollutant loads on the site's habitats
 - ii. Whether or not any change in pollutant loads identified could lead to a detrimental effect on biodiversity and nature conservation
 - b. In light of the information provided, whether or not the following has been demonstrated beyond reasonable scientific doubt:
 - i. The impacts would not result in an adverse effect on the integrity of the site
 - ii. The impacts would not undermine the achievement of the site's conservation objectives
- 2.3.5 It is the view of the Applicant that the HRA has demonstrated beyond reasonable scientific doubt the matters identified in paragraph 2.3.4 (b), above, as all reasonable scientific information has been provided. Subsequent sections of this document explain why the matters raised by Natural England in respect of the HRA are theoretical and do not change this conclusion.

3 Response to Natural England’s Deadline 5 submission (in relation to HRA)

3.1 Core issues

- 3.1.1 In this section, the Applicant has summarised its understanding of the core issues relating to HRA that Natural England has raised, together with a summary response. A detailed response to individual issues raised will be provided at Deadline 8.
- 3.1.2 Natural England essentially raise two core issues: the assessment of effects in combination, and the methods used to assess the effects of air quality changes as a result of vehicle emissions for the Project alone.
- 3.1.3 While the Applicant continues to work positively with Natural England and there is confidence that further agreement can be found, its position at Deadline 6 in response to the core issues raised is as follows.

In-combination assessment

Methodology – spatial growth

- 3.1.4 Natural England contends that the in-combination assessment does not fully address in-combination effects, as the effects caused by ‘new’ development in the future baseline are not considered in-combination for the purposes of the HRA. The in-combination traffic is calculated by “DS-DM”, so the resulting in-combination numbers do not include traffic from developments that would go forward without the requirement for the Project to be constructed. These projects are included in the future baseline. However, Natural England do agree that the Lower Thames Area Model does include future forecast growth, and therefore some in-combination traffic is included.
- 3.1.5 The Applicant has responded previously to these concerns in Annex C.12: Response to Natural England advice on air quality impacts on European Sites, of the Statement of Common Ground (SoCG) between National Highways and Natural England [[REP5-038](#)].
- 3.1.6 The Applicant is of the view that, in the context of the growth assumptions that have been used in the assessment, any further assessment of individual developments would not identify any material difference in the traffic generated (and therefore emissions generated) and so would have no material influence on the conclusions of the HRA. The Applicant considers this advice to be theoretical in nature and inconsequential in determining any real change.
- 3.1.7 The Applicant continues to engage with Natural England to demonstrate that the HRA of air quality effects is sufficiently precautionary.

Methodology – use of the opening year (2030) to assess operational impacts

- 3.1.8 In its Written Representations ([\[REP1-262\]](#) e.g. paragraph 4.1.56, Natural England expressed concerns about the use of the opening year (2030) to assess operational impacts, stating that this excludes impacts from traffic arising after 2030 (modelled opening year) and therefore potentially

underestimates impacts to protected sites arising from the Project. The design year of 2045 was used to establish the duration of impacts across the designated sites. The design year emissions are lower than the opening year and therefore the Applicant is confident that the worst-case year has been used in respect of the operational impacts for the purpose of the HRA. Natural England also accepts therefore that additional projects that are predicted to come ‘online’ between 2030 and 2045 are partly included in the assessment.

- 3.1.9 The Applicant is of the view that, in the context of the growth assumptions that have been used in the assessment, any further assessment of traffic arising after 2030 is not required. For European sites, the emissions in the opening year are higher than the design year. The Applicant considers this advice to be theoretical in nature and inconsequential in determining any real change but continues to engage with Natural England to demonstrate that the HRA of air quality effects is sufficiently precautionary.

Methodology – alternative scenarios

- 3.1.10 Natural England are concerned that the Applicant has not assessed alternative scenarios including local plan allocations.
- 3.1.11 The Applicant contends that the growth assumptions have regard for reasonably foreseeable development in the in-combination assessment and that looked at in conjunction with the methodology used for the air quality assessment (see 3.1.12 and 3.1.13, below), present a sufficiently precautionary approach such that no reasonable scientific doubt as to the absence of adverse effects on integrity remains. The Applicant considers that Natural England’s concerns appear to be related to the lack of absolute scientific proof. Case law⁴ states that, while the ‘beyond reasonable scientific doubt’ test demands a high standard of investigation, the burden on the competent authority is to authorise an activity “*only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects*” and “*that a requirement of absolute certainty would be impossible of scientific attainment as well as being disproportionate.*”
- 3.1.12 Air quality assessments are based on the most reasonable, robust and representative methodologies, taking advice from published guidance, as are traffic models that inform the assessments. The results are verified against monitoring data and can be used to inform a professional judgement. However, while the modelled results are reasonable there is still some element of residual uncertainty, hereafter referred to as the ‘measure of uncertainty’. This is due to inherent uncertainty in air quality monitoring, modelling and the traffic data used in the assessment. The approach to describing the measure of uncertainty is based around Defra’s (2022) published advice in Local Air Quality Management – Technical Guidance (TG22) (LAQM.TG(22)) on the desirability of achieving 10% verification (between modelled and monitored concentrations) where concentrations are close to or above the air quality threshold. Any uncertainty should be addressed by applying precautionary rates to variables; in the case of the Project, the Applicant has applied this precautionary principle in a number of ways:

⁴ Waddenzee, C-127/02, paragraph 61; Wyatt v Fareham BC [2021] EWHC 1434 (Admin), paragraph 32

- a. Application of LTT_{E6}⁵ which significantly uplifts the modelled results in the future compared to the use of current tools
- b. Applied a lower concentration to describe imperceptibility in comparison to human health assessments (0.3µg/m³ of NO_x as opposed to 0.4µg/m³ of NO₂ equivalent to around 0.8µg/m³ of NO_x)
- c. The background nitrogen (N) deposition when the Project opens is assumed to be the current deposition rates contained within Air Pollution Information System (APIS) (2020 based) and therefore assumes background N does not reduce in the future – this is conservative as evidence suggests that N deposition will reduce in the future.

3.1.13 The Applicant discussed Natural England’s concerns in relation to the precautionary nature of the assessment at a meeting between the two parties on 26 October 2023. The Applicant notes that the LTTE₆ approach significantly uplifts the modelled NO₂ concentrations when compared to the modelled outputs from the Government issued tools (such as the Emissions Factors Toolkit v11 (Defra, 2021)) that feed into the N deposition calculations for all the ecological sites. This process effectively more than doubles the road component of the total NO₂ concentrations. To get these values from the air quality model without using the LTTE₆ uplift (i.e. just basing the assessment on the government-issued tools), the Applicant would effectively have to more than double the total volume of road traffic on the links next to the sites (which for the M25 would effectively mean instead of 150,000 Annual Average Daily Traffic (AADT) it would be over 300,000 AADT, which plainly would not happen). This illustrates how precautionary the assessment of air quality impacts is and that it is compliant with the precautionary principle and fit for purpose for HRA.

Methodology – inclusion of “non traffic” developments

3.1.14 Natural England is concerned that it is not clear how plans and projects were identified for inclusion in the in-combination assessment of Epping Forest Special Area of Conservation (SAC), North Downs Woodlands SAC and Thames Estuary and Marshes Special Protection Area (SPA)/Ramsar, or others screened out of the in-combination assessment for the HRA. Natural England recommends providing a list of which local planning authority planning portals were searched, which key words were used to search planning portals/permit registers, or what criteria were used to exclude planning applications from further consideration. Natural England also recommend using their Impact Risk Zones to identify project types of differing sizes at different distances from protected sites.

3.1.15 The Applicant has provided the list of plans and projects considered in the assessment in its response to ExQ1_Q11.9.8 [[REP4-194](#)].

3.1.16 A detailed description of the investigation of the presence of other potential sources of in-combination effects will be provided at Deadline 8. However,

⁵ LTT_{E6} – Long Term Trends approach required as part of the Design Manual for Roads and Bridges LA 105 Air Quality standard (Highways England, 2019) results in slower improvements in NO_x/NO₂ comparison to utilising the Defra issued air quality modelling tools.

the Applicant considers the existing assessment to be robust and sufficient to provide a reasonable scientific approach to assessing in-combination effects. The Applicant considers that Natural England’s concern that there are potentially other sources of evidence that could provide more certainty on the contributions of pollutants is theoretical. The Applicant is not aware of additional data sources available that could identify contributions of pollutants in the future, nor has Natural England identified any that could reasonably be useful for this purpose.

Assessment of air quality effects (alone)

- 3.1.17 The Applicant considers that Natural England’s advice on the methodology is seeking absolute scientific proof. The Applicant is of the view that the data and models used are the best available scientific knowledge that follows government guidance.
- 3.1.18 Given that NO_x and NH₃ have a direct toxic effect and that the site surveys have been undertaken across a pollution gradient (i.e. closer and further from the roads) where the change in NO_x and NH₃ are over 40 and 20 times the change as a result of the Project (see Annex C), if a change as small as that predicted as a result of the Project was going to affect the vegetation and colonisation as implied by Natural England then increased colonisation of species would have been identified through the surveys. It is the Applicant’s view that this constitutes the best scientific evidence available, as surveys that are undertaken across the site provide a means of understanding how the existing pollution from the road affects the site and what the condition of the site may look like in the future when emissions reduce. As concentrations reduce in the future, conditions currently experienced further from the road will reflect the conditions the site will experience in the future closer to the road.
- 3.1.19 It is also worth putting into context what the change in N deposition is across the 7.7ha of Epping Forest SAC (total area of over 1,600ha) affected by the Project. This is presented in Table 3.1.
- 3.1.20 The total N deposition per year as a result of background, the road component in the base year, do minimum and do something are presented in the Table 3.1. This was generated from the air quality modelled points over the grid where the Project impacts on concentration within Epping Forest SAC. The points modelled were converted from kgN/ha/yr to generate the total nitrogen deposited over the area affected.

Table 3.1 Total nitrogen deposited on the area of Epping Forest SAC as a result of the background and road emissions

Area (ha)	Total N deposition in kg over area of Epping Forest SAC affected by the Project				
	Background ⁶	Base Year Road component	Do Minimum Opening Road component	Do Something Opening Road component	Change Road component (DS-DM)
7.7	209.5	40.1	35.6	36.7	1.1

⁶ Based on the latest APIS backgrounds (27.2kg/ha/yr) 2020 mid-year.

- 3.1.21 As can be seen from Table 3.1, the background alone within the area affected by the Project deposits 209.5kg of nitrogen on the 7.7 hectares of the SAC. The road component deposits 40.1kg in the Base Year reducing to 35.6kg in the Do Minimum scenario (Without Project in 2030). As a result of the Project there is an increase of 1.1kg of nitrogen over 7.7 hectares with the Project (Do Something scenario). The total nitrogen in the Do Minimum is 245.1kg (209.5 + 35.6); the change in nitrogen of 1.1kg over the year as a result of the Project therefore represents an increase in nitrogen of 0.5%.

Submission of assessment of NO_x, NH₃ and nitrogen deposition individually for each protected site

- 3.1.22 Natural England welcomed the Applicant's agreement to assess ammonia (NH₃) and nitrogen deposition even where NO_x is imperceptible, and the Applicant's agreement to consider NH₃ and NO_x as pollutants in their own right, and not just as a component of nitrogen deposition. However, Natural England disagrees with the assessments being submitted as without prejudice.
- 3.1.23 The Applicant considers the assessments submitted as supporting information to the application for a DCO to be robust and sufficient for the purposes of HRA. The assessments submitted on a without-prejudice basis were submitted in due regard to the representations from Natural England on the basis of a sensitivity test of their suggested methodologies and on the basis that the results of such sensitivity tests demonstrate that no material difference to the submitted HRA conclusions is evident.
- 3.1.24 The Applicant proposes to update the HRA assessment of air quality effects (vehicle emissions) in light of Natural England's Deadline 5 comments and submit it into the Examination at Deadline 8.
- 3.1.25 The Applicant and Natural England request that the ExA provide clarity on the meaning of "updated HRA response" within ExQ2_Q11.5.1, to inform future submissions. However, the Applicant proposes, ahead of clarity on the request from the ExA, to submit an HRA addendum document. The addendum will be submitted on the basis that it replaces the relevant sections of the HRA submitted at application, and not on a without-prejudice basis. It is hoped that the addendum will lead to more conclusions being agreed with Natural England. The Applicant considers that this will provide the Secretary of State with the necessary information to undertake their appropriate assessment.
- 3.1.26 The Applicant will, however, review and amend its proposed submissions in light of the ExA's view on them.

Methodology – Likely Significant Effects

- 3.1.27 Natural England considers that the assessment undertaken does not follow the methodology the Project set out. As an example, at paragraph 5.1.9 (referencing Table 5.3) in the without-prejudice assessment, likely significant effect is excluded for impacts of ammonia at the Thames Estuary and Marshes SPA/Ramsar site, even though the Project would add up to 7% of the critical level of ammonia during construction. However, likely significant effect is excluded on the grounds that the critical level is not exceeded overall.
- 3.1.28 The Applicant has used the 1% critical load advised by Natural England but after consideration as to whether or not the critical level (all pollutants) is

exceeded by the total levels predicted by the Do Something scenario (with Project). The critical loads used do not appear to be disputed by Natural England, but the order in which they are used does. However, given that all of the sites are taken forward to appropriate assessment in some guise, the information with regard to the effects of nitrogen is discussed when concluding no adverse effect on integrity (AEol). Therefore, the appropriate information is available for use by the Planning Inspectorate when compiling the RIES and, by virtue of this, available to the Secretary of State, as the competent authority, to complete the appropriate assessment in accordance with Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended).

- 3.1.29 The Applicant continues to positively engage with Natural England and proposes to update the assessment (as per paragraph 3.1.25). The updated assessment will only use the 1% Critical Level / Lower Critical Load to identify likely significant effects as advised by Natural England.

Methodology – critical levels for ammonia

- 3.1.30 Natural England considers that a critical level of $3\mu\text{g}/\text{m}^3$ identified for North Downs Woodlands SAC, which is classed as “W1f lowland deciduous woodland”, is wrongly classified. Natural England are also unclear why bryophytes are not considered to be integral to such woodland. However, the identification of $1\mu\text{g}/\text{m}^3$ for Epping Forest SAC and $3\mu\text{g}/\text{m}^3$ for Thames Estuary and Marshes SPA are considered appropriate.
- 3.1.31 The critical level for ammonia is identified on APIS for the North Downs Woodlands SAC at 1 or $3\mu\text{g}/\text{m}^3$ in relation to the broad leaf woodland qualifying feature and cites National Vegetation Classification (NVC) types W12 and W14 in relation to this. For the coniferous woodland qualifying feature, APIS cites $3\mu\text{g}/\text{m}^3$ and cites NVC type W13.
- 3.1.32 In deciding the most appropriate critical level to use, the Applicant considered the habitat type recorded within the woodland within 200m of the Affected Road Network (ARN), W1f, in relation to the equivalent NVC codes, using the UK Habitat Classification Field Key⁷, to confirm broadly which ammonia critical level would be the most appropriate. W1f does not correspond to either W12, W14 or W13, it corresponds to W8. Therefore, given the presence of W13 (SAC qualifying feature) habitat was confirmed through the detailed survey work at approximately 500m from the ARN, it was considered that $3\mu\text{g}/\text{m}^3$ was the appropriate critical level to use.
- 3.1.33 The Applicant continues to positively engage with Natural England and proposes to update the assessment (as per paragraph 3.1.25), and the updated assessment will use the advised $1\mu\text{g}/\text{m}^3$ threshold for ammonia at North Downs Woodland SAC.

Methodology – critical loads for nitrogen deposition

- 3.1.34 Natural England considers that the critical loads for 2022 should be used, rather than the 2011 critical loads used by the Applicant for the assessment based on the requirement for “no reasonable scientific doubt”, consistent with case law (C-127/02 Waddenzee, paragraph 61). However, Natural England accepts that it is reasonable for a “line to be drawn” and does not require

⁷ https://ecountability.co.uk/wp-content/uploads/2018/05/UK-Habitat-Classification-Field-Key_May2018.pdf

reassessment of the Sites of Special Scientific Interest assessed within the Environmental Statement.

- 3.1.35 The Applicant considers that a line should be drawn on the inclusion of new data and guidance into assessments to provide a coherent and consistent assessment that is reasonable in the timescale of application for and examination of the DCO.
- 3.1.36 The Applicant is of the view that the change in Critical Loads will have no material impact on the assessment of the ecological effects for the purposes of the HRA.
- 3.1.37 Nevertheless, having due regard to Natural England’s advice, the Applicant proposes to update the assessment (as per paragraph 3.1.25), and the updated assessment will use the 2022 updated APIS LCLs for N deposition as advised by Natural England.

Methodology – assessment of effect on integrity/Appropriate Assessment methodology

- 3.1.38 Natural England considers that the approach set out in DMRB LA 105 (Highways England, 2019), the steps of which are reported in the without-prejudice assessment at paragraph 3.4.2, is that a detailed site investigation is only undertaken if the 0.4kgN/ha/yr criterion is exceeded. This approach is not consistent with the approach to undertaking an appropriate assessment in Natural England’s published guidance NEA001 as numerical thresholds are considered inappropriate to establish AEoI.
- 3.1.39 The Applicant has completed detailed site investigations on sites where likely significant effects could occur and for the HRA did not use the 0.4kgN/ha/yr criterion to determine whether or not detailed investigations should occur. A detailed site investigation has been undertaken on all three European sites assessed.
- 3.1.40 The Applicant accepts that the HRA requires further clarity on this issue and proposes to update the assessment (as per paragraph 3.1.25), and the updated assessment will be clear as to the methodological steps undertaken, e.g. detailed site investigation has been completed for all sites where the advised 1% likely significant effect threshold is met.

Identification of N-sensitive species

- 3.1.41 Natural England considers that the lack of N-sensitive species does not mean that the area/site is not sensitive to further additions of nitrogen deposition (or ammonia or NOx), as such species could be affected by the existing and historic pollution levels in the area and the proposed development could delay ecological recovery.
- 3.1.42 The Applicant has considered the lack of N-sensitive species as only one of a number of considerations to come to a reasoned balanced judgement on whether identified impacts would lead to an adverse effect on the integrity of qualifying interest habitats. It is only a theoretical possibility that sensitive species were ever present (particularly since the habitat was designated) or that they might colonise in the future. It would be impossible to predict (or measure in the future) whether any future colonisation of such species would be as a

result of pollutant levels or other factors such as climate change or management regimes. The target is to “*Restore as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System*”, but not to ‘restore’ the constituent species of the habitat to a hypothetical future baseline. It is not appropriate to assess against such a hypothetical situation when the best available scientific information is that species sensitive to the identified impact are absent. It will take many decades to achieve the lower critical loads and requires substantive reductions in sectors other than roads.

- 3.1.43 The surveys have been undertaken in conditions where pollutant levels are higher than they will be in the opening year of the Project and therefore theoretically in a worse condition in terms of pollutants. Any consideration of the likelihood of colonisation of sensitive species should also be seen in this context. The Applicant considers it is not credible that the contribution from the Project through a minor delay to the overall reduction in pollutants from background sources could conceivably form a real risk to the coherence of the habitats. If this were the case, the Applicant would expect to have identified increased colonisation of sensitive species (and/or differences in habitat composition) with distance from the road source.
- 3.1.44 The Applicant is considering how it might be able to provide further clarity in the HRA with regard to the inconsequential nature of the effects in terms of the sensitivity of the habitats.

Full footprint of exceedance >1% for Ndep has not been calculated extending 200m ARN

- 3.1.45 Natural England considers that pollutant impacts beyond 200m should be modelled to gain a better understanding of the true footprint of exceedances. They acknowledged that NO_x impact alone drops below 1% within 200m of the road and that, at North Downs Woodland SAC, the qualifying features of the SAC are not in the area experiencing the greatest addition of nitrogen (i.e. within 200m), and therefore Natural England consider the conservation objectives for these features would not be undermined by the pollution arising from the Project.
- 3.1.46 The Applicant considers that it is entirely appropriate to use the 200m zone to delineate the area where there is potential for likely significant effects or adverse effects on integrity. Evidence shows that pollutants such as nitrogen deposition, NH₃ and NO_x all deposit rapidly with distance from the source road and the 200m criterion has been an agreed assessment threshold for a considerable time in both DMRB (Highways England, 2019) and Natural England's own guidance (Natural England, 2018).
- 3.1.47 A report published by the Defra on the changes in NO₂ concentrations with increased distance from roads (Air Quality Consultants, 2008), acknowledges that beyond 50m from the road, NO₂ concentrations approach background levels. Therefore, at 100m or more from the road, the difference between the total concentration, including any contribution from the road, and the background concentration should be as close to zero as it will make virtually no difference.

- 3.1.48 While it is acknowledged that there is less monitoring undertaken for NH₃, compared to NO₂, there is evidence from monitoring which indicates the drop off of NH₃ with distance. In particular, the Centre for Ecology and Hydrology (CEH) published a paper on concentration-dependent deposition velocities for ammonia: moving from lab to field, which provided results of monitoring along a transect (Cape *et al.*, 2008). This paper showed that, even where concentrations of NH₃ close to the source were higher than 100µg/m³ (over 10 times the concentrations modelled as a result of roads), concentrations were close to zero at just over 100m. Monitoring of NH₃ next to a road in Ashdown Forest by Air Quality Consultants (2020) also illustrated the rapid drop off in NH₃ close to the road, especially within the first 30m. These studies further provide robust evidence that 200m is more than sufficient to assess the impacts from road schemes. Natural England has not provided any evidence that the Applicant can reference that does not support this view.
- 3.1.49 It should be noted that the air quality model is conservative as it does not account for plume depletion (i.e. the model will not alter the concentrations in air to account for material lost through deposition). Pollutants will be deposited from the atmosphere as the plume travels from the source (i.e. the exhaust) to the vegetation and is accounted for as part of the N deposition calculations. Therefore, while the model will predict changes in concentrations at distance, in reality pollutants will be lost to depletion from the plume which means that they will be no longer available to be dispersed. This is why evidence such as real world monitoring, which informs the guidance on confining impact assessments to 200m, should be utilised alongside the use of the predictive air quality modelling tools.
- 3.1.50 It should be noted that Natural England’s own guidance NEA001 (Natural England, 2018) states:
- “With regard to potential risks from road traffic emissions, Natural England and Highways England are in agreement that protected sites falling within 200 metres of the edge of a road affected by a plan or project need to be considered further. This is based on evidence presented in ENRR580 (Bignal et al. 200410) and is consistent with more current literature (Ricardo-AEA, 201611). However, where (unusually) there is a credible risk that air quality impacts might extend beyond 200 metres from a road, Natural England may advise that additional sites should also be scoped into the HRA”. (paragraph 4.10)*
- “If the consultation does not fall within the distance criterion for designated sites (i.e. 200m for road traffic proposals), no further steps of the assessment are necessary. Such proposals are likely to have no effect on sites at all and so do not need to be subject to assessment in-combination with other plans and projects. A screening conclusion of no likely significant effect on the site can be advised with regard to the risk of road traffic emissions affecting air quality”. (paragraph 4.12)*
- 3.1.51 Natural England has made no representations during extensive consultation on the development of the HRA methodology that alluded to there being credible evidence to extend the screening distance above 200m. Their new concern raised at Deadline 5 that further assessment beyond 200m is required is considered by the Applicant to be theoretical in nature and seeking absolute

proof. The Applicant contends that the existing evidence already supports a robust conclusion with no reasonable scientific doubt.

- 3.1.52 The Applicant nonetheless proposes to update the assessment (as per paragraph 3.1.25), and the updated assessment will include further explanation of the evidence that is available to reasonably exclude effects beyond 200m.

4 Response to ExA ExQ2_Q11.5.1

- 4.1.1 In this document, the Applicant has sought to provide sufficient response to the issues raised by Natural England to support the drafting of the RIES.
- 4.1.2 As noted earlier, the Applicant and Natural England request that the ExA provide clarity on the meaning of “updated HRA response” within ExQ2_Q11.5.1, to inform future submissions. However, the Applicant proposes, ahead of clarity on the request from the ExA, to submit an HRA addendum document. The addendum will be submitted on the basis that it replaces the relevant sections of the HRA submitted at application, and not on a without-prejudice basis. It is hoped that the addendum will lead to more conclusions being agreed with Natural England. The Applicant considers that this will provide the Secretary of State with the necessary information to undertake their appropriate assessment.
- 4.1.3 An updated SoCG with Natural England will be provided at Deadline 7. A joint statement with Natural England on this matter is provided at Annex B.
- 4.1.4 The Applicant considers that a review of methodologies and conclusions has already been undertaken and responses to Natural England’s issues already provided in Annex C.12: Response to Natural England advice on air quality impacts on European Sites, of the SoCG between National Highways and Natural England [REP5-038]. A list of the plans and projects considered in the ‘in-combination’ assessment has been provided in the response to ExQ1_Q11.9.8 [REP4-194]. The Applicant set out in Section 3 a summary of the core issues that Natural England has raised and its responses to these. A detailed response will be provided at Deadline 8.
- 4.1.5 The Applicant continues to engage with Natural England with regard to unresolved issues raised by them. Regular calls are held with Natural England at least weekly as well as technical workshops.
- 4.1.6 However, Natural England’s Deadline 5 submission [REP5-109], which has come after four years of engagement on the Project, included a number of new issues, as well as further detailed commentary on matters that have been under discussion for some time. A number of technical issues remain unresolved where the Applicant does not agree with Natural England’s advice or its comments on the proposals and assessments completed. The Applicant is of the view that the advice from Natural England addresses theoretical and hypothetical risks and would not provide objective evidence affecting the conclusions about material change to biodiversity or nature conservation in the HRA which the Applicant considers are already demonstrated beyond reasonable scientific doubt.
- 4.1.7 The Applicant will submit a full technical response to Natural England’s advice (including in their Deadline 5 submission) and why it has reached the conclusions it has at Deadline 8; together with the Applicant’s comments on the draft Report on the Implications for European Sites (RIES) and responses to any further written questions, which will provide a comprehensive package of information in response to issues raised by Natural England. This document provides a summary of the position of the Applicant with regard to the issues raised by Natural England, to aid the Examining Authority in drafting the RIES.

The Applicant considers that this is an appropriate and proportionate response to the issues raised by Natural England in the context of the timescales of the Examination.

- 4.1.8 The Applicant continues to actively engage with Natural England with the intention of working towards an agreed position on as many matters as possible before submitting an updated SoCG at Deadline 7. The deferral of the submission of an updated SoCG to Deadline 7 will enable greater technical engagement between the Applicant and Natural England, which will in turn facilitate the development of SoCG matters remaining under discussion, including technical meetings between the Applicant's and Natural England's relevant specialists. A very positive meeting involving HRA and air quality specialists from both parties was held on 26 October 2023.
- 4.1.9 The SoCG to be submitted at Deadline 7 will document the progress made at the meeting on 26 October 2023, and will set out a clear, updated position from each party on any matters outstanding.
- 4.1.10 The Applicant and Natural England will then submit a further updated SoCG at Deadline 8, which will summarise whether the issues still outstanding at Deadline 7 have been resolved by that time or provide justifications for the parties reserving their positions if matters remain unresolved.

Annexes

Annex A History of engagement

- A.1.1 A history of engagement with Natural England has been provided within the SoCG submitted at Deadline 5 [\[REP5-038\]](#) as well as within the HRA Appendix C: Evidence Plan [\[APP-487\]](#).
- A.1.2 Key areas of discussion before and post-application are summarised below.

A.2 Preapplication consultation – as described in the HRA Appendix C: Evidence Plan [APP-487]

A.2.1 Key areas of discussion actions prior to submission are shown in the table below.

Theme	Advice from Natural England	Date/form of advice (taken from Table C.8 of HRA Appendix C: Evidence Plan)	Action by Applicant
Pollutants considered	Request to ammonia (NH ₃) as a contributor to Nitrogen deposition (Ndep)	30/04/2020 Feedback received from Natural England Annex O2 of REP2-195	Air quality (AQ) model updated to include the contribution of NH ₃ as well as NOx to predict Ndep (reported in Environmental Statement (ES) Chapter 5: Air Quality APP-143 and HRA report APP-487). AQ model also updated at this point to only model Ndep where NOx change was greater than 0.3µgm ⁻³ , see inconsequential NOx issue.
Methodology used	Do not agree use DMRB LA105 Fig 2.98 as a methodology for assessment, advice use NEA001	26/02/2020 AQ Methodology briefing note issued – Annex E1 of REP2-195 02/04/2020 Feedback received from Natural England – Annex E2 of REP2-195 30/06/2020 Feedback received from Natural England – Annex F2 of REP2-195	Produced a comparison of DMRB and NEA001 methods vs our assessment (REP4-196 Annex CC - 10 September 2020 DCO1.0 Stage 1 Screening – Appendix H – LA 105 NEA001 Comparison)
Thresholds	Thresholds to conclude no likely significant effect - Do not use the DMRB LA105 Fig 2.98 threshold 0.4kgNha-1yr-1, but determine likely significant effect at the point of considering 1% LCL	Lower Thames Crossing Habitats Regulations Assessment Stage 1 Screening Report dated 2 June 2020 30/06/2020 Feedback received from Natural England – Annex F2 of REP2-195	Likely significant effect threshold agreed (1% LCL within 200m of the ARN) as per published DCO HRA APP-487
In combination – lists of projects	The types of project that are listed does not appear to include all those which could result in sources of airborne nitrogen and as such it may be appropriate for the list and in-combination assessment to be updated to reflect the broader range of projects which could potentially act in-combination. It is understood that in-combination assessment is an intrinsic element of the DMRB model, however more clarity is needed regarding what those assessments include and is considered “reasonably foreseeable”. These issues have arisen, not just in major schemes, but also with considerations of Local Plan housing allocations. Concerns over inconsistencies in traffic model results between LTC and Maidstone Local Plan, particularly as North Downs Woodlands SAC. SoCG issue at submission	Lower Thames Crossing Habitats Regulations Assessment Stage 1 Screening Report dated 2 June 2020 30/04/2020 Feedback received from Natural England Annex O2 of REP2-195 30/06/2020 Feedback received from Natural England – Annex F2 of REP2-195	Various AQ and technical notes to explain how the traffic modelling works in relation to inclusion of other plans and projects that contribute to traffic and in particular local plan allocations, specifically Maidstone.
Epping Forest AEol	Of the view that AEol cannot be ruled out for Epping Forest SAC & agree that a speed limit is the most effective mechanism for avoiding AEol. SoCG issue at submission	03 Dec 2021 Feedback received from Natural England Annex QQ of REP4-199	Provision of a without prejudice commitment to the use of a speed limit to avoid effects at Epping Forest SAC Annex C.7 of the SoCG APP-099
Use of inconsequential NOx to determine Ndep	Becomes an “issue” when AQ modelling used a threshold after NH ₃ was included. See SoCG issue submission	See SoCG issue submission in section 2.	

A.3 Natural England advice post application – HRA [APP-487] and SoCG [APP-099] at submission 31 Oct 2022

A.3.1 At application, there were the following areas remaining “under discussion” in the SoCG. The matter relating to Epping Forest SAC was “not agreed” and remains so.

A.3.2 The changes in “opinion”/language are highlighted in yellow.

Issue	Natural England SoCG at DCO submission [APP-099]	Natural England Relevant Representation [RR-0784]	Natural England further advice received 11/04/2023 Annex G of the Written Representation [REP1-262]	LTC Actions	Natural England Deadline 5 submission [REP-109]
Use of inconsequential NOx threshold	Natural England is seeking clarification from specialists on the use of inconsequential nitrogen oxide (NOx) in the methodology for modelling Nitrogen deposition. Natural England is, however, confident that agreement on this matter can be achieved within Examination timeframes.	We have commissioned additional work on the application of the Habitats Regulations to the matter of ‘inconsequential NOx’. We have received initial advice from our contractor which is under review by our specialists pending any further advice to this project. Our concern is that National Highways has not considered Nitrogen deposition (or ammonia) as pollutants in their own right, because the increase in NOx is less than 0.3µg/m ³ . Natural England does not consider that this is compliant with case law.	Natural England has been advised that accepting this approach (i.e. that very small effects may be dismissed without further consideration, either due to their scale or uncertainties in their derivation) would be vulnerable to legal challenge and would also be inconsistent with the advice provided by Natural England to other public bodies. It is also recommended that NOx, ammonia and nitrogen deposition are calculated separately for each protected site, and compared against the relevant critical levels and critical load. If the 1% threshold for any of them is exceeded, further consideration will be required within an appropriate assessment.	Calculate Ndep (NH ₃ and NOx contributions) regardless of whether or not the NOx change exceeds 0.3ug/m ³ . Included within the without-prejudice assessment of the air quality effects on European sites following Natural England advice (WPA) [REP2-068]	Disagree with the assessment being submitted as without prejudice. ADDED new issue: <ul style="list-style-type: none"> Consider the thresholds to be “incorrectly” used. i.e. disagree that the total DS contribution of any particular pollutant should be considered no likely significant effect if it does not exceed the relevant CL/LC. NE consider that the only threshold used should be the assessment of the DS-DM change against 1% CL/LCL.
Ammonia modelling	Natural England welcomes the inclusion of ammonia modelling in the air quality assessment of Nitrogen deposition. Natural England is continuing to have constructive discussions on the assessment of ammonia and is confident that agreement on this matter can be achieved within Examination timeframes	Our concern is that National Highways has not considered Nitrogen deposition (or ammonia) as pollutants in their own right, because the increase in NOx is less than 0.3µg/m ³ . Natural England does not consider that this is compliant with case law.	It is also recommended that NOx, ammonia and nitrogen deposition are calculated separately for each protected site, and compared against the relevant critical levels and critical load. If the 1% threshold for any of them is exceeded, further consideration will be required within an appropriate assessment.	Calculate the concentration of both NOx/NO ₂ and NH ₃ and include a review against the critical levels (CL) at Screening stage, and if changes exceed 1% of the CL then consider further at Stage 2 AA. Included within the without-prejudice assessment of the air quality effects on European sites following Natural England advice (WPA) [REP2-068]	Disagree with the assessment being submitted as without prejudice. ADDED new issues <ul style="list-style-type: none"> Extents assessed should be extended to more than 200m Suggest assessment should also consider the future baseline and lack of N sensitive species not a reason to conclude no AEoI Request consideration of the new APIS CLS Consider wrong CL used for ammonia at North Downs Woodlands
AQ in-combination – traffic model	Natural England is seeking confirmation that the LTC traffic model builds in the same data for in-combination development as Local Authorities use for their Local Plan allocation planning. Subject to written confirmation that this additional traffic is accounted for through growth factors, Natural England would agree this conclusion.	Natural England is seeking confirmation that the Lower Thames Crossing traffic model builds in the same data for in-combination development as Local Authorities use for their Local Plan allocations and that it includes consented and unconsented allocations. This concern relates to the general traffic and air quality modelling work, and therefore applies to a range of	The approach to identifying whether a road requires further assessment is based on the difference between the “do something” traffic model (i.e. with the scheme) compared to the “do minimum” forecast traffic (without the scheme) in the opening year of the scheme. The “1000AADT” criteria (or other criteria relating to HDV AADT, speed banding or road alignment) is applied, and only then is the 1% threshold (of the relevant ecological end point – in this case the critical level for annual NOx) applied. Therefore, if the 1000AADT criteria is not met (in the	Annex C.12: Response to Natural England advice on air quality impacts on European Sites, of the SoCG between National Highways and Natural England [REP5-038]	The in-combination assessment does not fully address in-combination effects, as the effects caused by “new” development in the future baseline are not considered in-combination for the purposes of the HRA Expanded the issue <ul style="list-style-type: none"> In combination – non traffic project search areas questioned

Issue	Natural England SoCG at DCO submission [APP-099]	Natural England Relevant Representation [RR-0784]	Natural England further advice received 11/04/2023 Annex G of the Written Representation [REP1-262]	LTC Actions	Natural England Deadline 5 submission [REP-109]
		<p>ecological receptors sensitive to air quality impacts, rather than one specific receptor. Natural England has yet to receive adequate assurances that all allocated development (including those with and without planning permission) within Local Plans which will generate a volume of traffic has been appropriately accounted for in the calculations informing the ES / HRA assessments. Progress on this issue appears to be hindered by the methodology being unable to expressly confirm the traffic figures in a translatable manner which can be used with confidence for HRA in-combination purposes (i.e. comparing growth factors with traffic numbers). Thus Natural England is not yet confident that the Project can demonstrate that it has fully taken account of Local Plans within the in-combination test.</p>	<p>opening year) – no further ecological consideration is made. Therefore, the 1000AADT (and the 1%) threshold does not appear to be applied to the scheme in a manner which takes account of other plans and projects in a robust manner. Natural England has been advised that this approach is vulnerable to challenge for failing to properly consider other projects in combination. it is recommended that National Highways follows the methodology outlined in Natural England guidance NEA001 which takes into account the Wealden decision in terms of in-combination assessment.</p>		<ul style="list-style-type: none"> Requiring list of planning portals searched and search terms used
Epping Forest No AEoI conclusion	<p>Natural England does not agree with the conclusion of no adverse effects on Epping Forest SAC, and has advised that mitigation is required.</p>	<p>Natural England does not agree with the conclusion of no adverse effect on the integrity of the Epping Forest SAC and advises that the operational air quality effects to the SAC require mitigation measures to reduce the pollutant contribution of the Project to acceptable levels, consistent with the conservation objectives to ‘restore’ the site to below its critical levels or loads. The matter of ‘inconsequential NOx’ is also relevant to Epping Forest SAC in so far as the area of SAC affected would increase. Natural England advises that a REAC commitment should be used to secure the identified mitigation measure (an enforceable speed limit reduction on the M25).</p>	<p>No further advice received.</p>	<p>Without-prejudice mitigation is presented in Annex A.7 of the SoCG [APP-099]. Matter to remain as not agreed.</p>	<p>As above the matter remains not agreed and the additional issues noted above also apply here.</p>

Annex B Joint statement with Natural England on response to ExA2 Q11.5.1

- B.1.1 The Applicant and Natural England have agreed a joint statement whereby an updated SoCG will not be submitted until Deadline 7 at the latest (we will use best endeavours to submit it as soon as possible). Due to the time and engagement required to progress these complex technical matters from Deadline 5, both parties agree that submitting an SoCG at Deadline 6 would not allow sufficient time for any significant progress to either party's position on these matters to be captured.
- B.1.2 The Applicant continues to actively engage with Natural England with the intention of working towards an agreed position on as many matters as possible before submitting an updated SoCG by Deadline 7. The deferral of the submission of an updated SoCG to Deadline 7 will enable greater technical engagement between the Applicant and Natural England, which will in turn facilitate the development of SoCG matters remaining under discussion, including a technical meeting between the Applicant's and Natural England's relevant specialists on 26 October 2023.
- B.1.3 The SoCG to be submitted by Deadline 7 will document the progress made at the meeting on 26 October 2023, and will set out a clear, updated position from each party on any matters outstanding.
- B.1.4 The Applicant and Natural England will then submit a further updated SoCG at Deadline 8, which will summarise whether the issues still outstanding by Deadline 7 have been resolved by that time or provide justifications for the parties reserving their positions if matters remain unresolved.
- B.1.5 The Applicant and Natural England request that the ExA provide clarity on the meaning of "updated HRA response" within ExQ2_Q11.5.1, to inform future submissions.

Annex C Supporting air quality assessment information

C.1 Approach

- C.1.1 The approach to describing the measure of uncertainty is based around Defra’s (2022) published advice in LAQM.TG(22) on the desirability of achieving 10% verification (between modelled and monitored concentrations) where concentrations are close to or above the air quality threshold. Any uncertainty should be addressed by applying precautionary rates to variables, in the case of the Lower Thames Crossing the Applicant has applied this precautionary principle in a number of ways:
- a. Application of LTT_{E6} which significantly uplifts the modelled results in the future compared to the use of current tools
 - b. Applied a lower concentration to describe imperceptibility in comparison to human health assessments ($0.3\mu\text{g}/\text{m}^3$ of NO_x as opposed to $0.4\mu\text{g}/\text{m}^3$ of NO_2 equivalent to around $0.8\mu\text{g}/\text{m}^3$ of NO_x).
- C.1.2 Natural England make reference to the Wyatt case when referencing assessments beyond scientific doubt. In summary, Wyatt relates to outline planning of eight 4-5 bedroom homes where nitrogen neutrality calculations were based on an occupancy of 2.4 people per property, the claimant argues the occupancy would be higher. A Natural England (2020) Advice Note (the ‘Advice Note’) set out guidance on calculating a nitrogen budget to establish whether nitrogen neutrality is attainable. The Advice Note provided that the “*nutrient neutrality calculation includes key inputs and assumptions that are based on the best-available scientific evidence and research*”, but that it had been developed as a pragmatic tool and recognised that each input was associated with a degree of uncertainty. DMRB LA 105 gives the same pragmatic approach; therefore, the Applicant’s assessment is consistent with the principles of this judgement.
- C.1.3 The following sections provide additional context in relation to each of the pollutants assessed in terms of impacts on Epping Forest.

C.2 Oxides of nitrogen (NO_x)

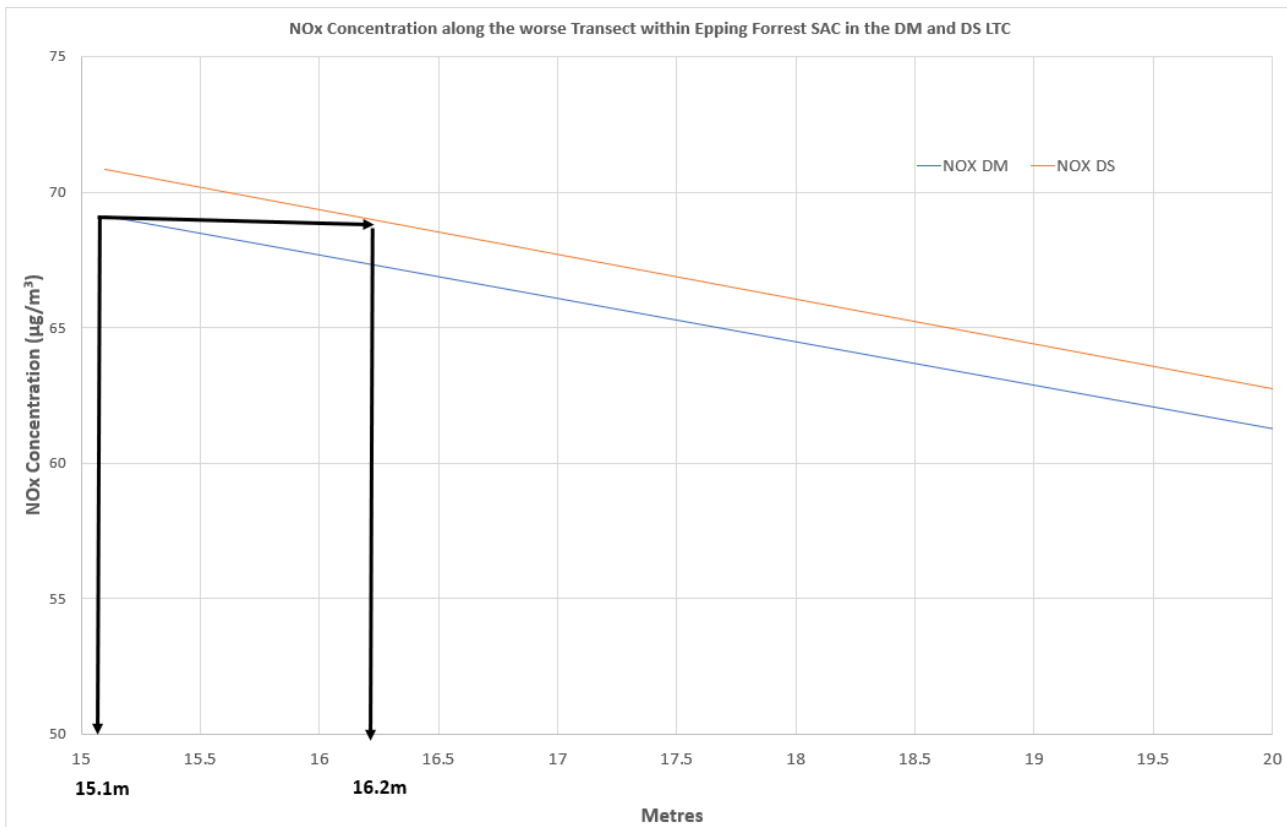
- C.2.1 The change in NO_x concentrations as a result of the Project are presented in Table C.1 at the transect across the Epping Forest SAC which experiences the maximum change as a result of the Project. The maximum change in NO_x as a result of the project is $1.7\mu\text{g}/\text{m}^3$ at the nearest point to the M25.

Table C.1 NOx changes in the Do Minimum and Do Something on transect in SAC

Receptor	X	Y	Distance from road edge (m)	Annual mean NOX DM ($\mu\text{g}/\text{m}^3$)	Annual mean NOX DS ($\mu\text{g}/\text{m}^3$)	Change in annual mean NOx impact ($\mu\text{g}/\text{m}^3$)
EPF_193	544584.1	201025.2	15.1	69.1	70.8	1.7
EPF_192	544584.1	201018	22.3	57.6	59.0	1.4
EPF_191	544584.1	201010.9	29.4	50.1	51.2	1.1
EPF_190	544584.1	201003.7	36.5	44.8	45.7	0.9
EPF_189	544584.1	200996.6	43.6	40.8	41.6	0.8
EPF_188	544584.1	200989.4	50.8	37.7	38.3	0.7
EPF_187	544584.1	200982.2	57.9	35.2	35.8	0.6
EPF_186	544584.1	200975.1	65.0	33.1	33.6	0.5
EPF_185	544584.1	200967.9	72.2	31.4	31.9	0.4
EPF_184	544584.1	200960.7	79.3	30.0	30.4	0.4
EPF_183	544584.1	200953.6	86.4	28.8	29.1	0.4
EPF_182	544584.1	200946.4	93.6	27.7	28.0	0.3
EPF_181	544584.1	200939.3	100.7	26.8	27.1	0.3
EPF_180	544584.1	200932.1	107.8	26.0	26.3	0.3
EPF_179	544584.1	200924.9	114.9	25.3	25.6	0.3
EPF_178	544584.1	200917.8	122.1	24.7	24.9	0.2
EPF_177	544584.1	200910.6	129.2	24.1	24.4	0.2
EPF_176	544584.1	200903.4	136.3	23.6	23.8	0.2
EPF_175	544584.1	200896.3	143.5	23.2	23.4	0.2
EPF_174	544584.1	200889.1	150.6	22.8	23.0	0.2
EPF_173	544584.1	200882	157.7	22.4	22.6	0.2
EPF_172	544584.1	200874.8	164.8	22.1	22.3	0.2
EPF_171	544584.1	200867.6	172.0	21.8	21.9	0.2
EPF_170	544584.1	200860.5	179.1	21.5	21.7	0.2
EPF_169	544584.1	200853.3	186.2	21.3	21.4	0.1
EPF_168	544584.1	200846.1	193.4	21.0	21.1	0.1
EPF_167	544584.1	200839	200.5	20.8	20.9	0.1

- C.2.2 The maximum change in annual mean NO_x is therefore 5.6% of the critical level (30µg/m³). It should be noted that exceedance of 1% of the critical level does not mean that there will be an adverse effect on site integrity, it just means that the impacts cannot be screened out.
- C.2.3 The change in NO_x rapidly decreases with distance from the M25 within the SAC. There is predicted to be exceedances of the critical level up to 80m into the SAC regardless of whether the Project is progressed.
- C.2.4 The change in NO_x between the first and end modelled point in the Base Year is 72.9µg/m³ - this is a factor of over 40 times the maximum change that the Project leads to on the SAC. That is also at the boundary of the site; at a point 10m into the site it is over 50 times the change as a result of the Project. Therefore, if a change in structure and function cannot be identified from the site visits across the pollution gradient, a change of NO_x of 1.7µg/m³, which is 40 times less than what would have been observed on the site visit, cannot reasonably be considered to impact on site integrity.
- C.2.5 The surveys have been undertaken in conditions where NO_x concentrations will be higher than they are in the opening year of the Project, so in worse condition in terms of NO_x concentrations and theoretically therefore NO_x is having a greater impact on the SAC than it would be when the concentrations are smaller in the future, regardless of whether the Project is progressed.
- C.2.6 In addition, if we analyse the shift in the absolute concentration at the first transect points, with and without the Project, the Lower Thames Crossing effectively shifts concentrations into the site by just over 1m as shown in Plate C.1.

Plate C.1 NOx concentrations in the Do Minimum and Do Something scenarios



C.2.7 As shown in the graph in Plate C.1, the Project effectively shifts the absolute NOx concentration 1m into Epping Forest with the opening of the Project compared to the without Project scenario. This illustrates how small the impact is on the SAC as it will be the absolute concentration that will have a theoretical effect on the vegetation.

C.2.8 Trends in NOx at roadside sites has been rapidly declining in recent years. Data available from the UK government website (<https://www.gov.uk/government/statistical-data-sets/env02-air-quality-statistics>) which sits behind the discussion on trends on the UK government website (<https://www.gov.uk/government/statistics/air-quality-statistics/nitrogen-dioxide#trends-in-concentrations-of-no2-in-the-uk>) has been downloaded. The trend in roadside NO₂ has decreased by on average 1.8µg/m³ between 2006 and 2019. Using the same roadside monitoring stations and analysing the trend in NOx concentrations indicates that the average reduction in NOx during the same period is 5µg/m³. These reductions would be as a result of new Euro 6/VI vehicles entering the fleet, which have much better emission performance. Given that electric vehicles and hybrids are also starting to enter the fleet in larger numbers and continue to increase in market share, it is a sound scientific assumption based on the evidence that roadside NOx emissions will continue to decline.

- C.2.9 It should be noted that postponing the delay of new sales of petrol and diesel cars from 2030 to 2035 will not affect the air quality modelling in the assessment. This is because the road traffic forecasts published in Sheet 1.3.9 of the DfT’s TAG Databook, which were used in the development of the Emissions Factors Toolkit, do not currently allow for the introduction of the Zero Emissions Mandate. Therefore, the proposed delay to the ban to 2035 would not affect the traffic fleets in the TAG Databook, which in turn would not affect the fleets in the Emissions Factors Toolkit and consequently nor would it affect the modelling undertaken to date for this Project.
- C.2.10 While a delay to the ban of conventional powered vehicles may slow down the reductions in NOx, it will not stop those reductions and roadside NOx concentrations will continue to decline.

C.3 Ammonia (NH₃)

- C.3.1 NH₃ emissions from vehicles are small. As a sector, transport is responsible for a small proportion of total NH₃ emissions in the UK compared to other sectors such as agriculture. The change in NH₃ as a result of the Project is presented in Table C.2.

Table C.2 Change in NH₃ concentrations in the Do Minimum and Do Something scenarios (µg/m³)

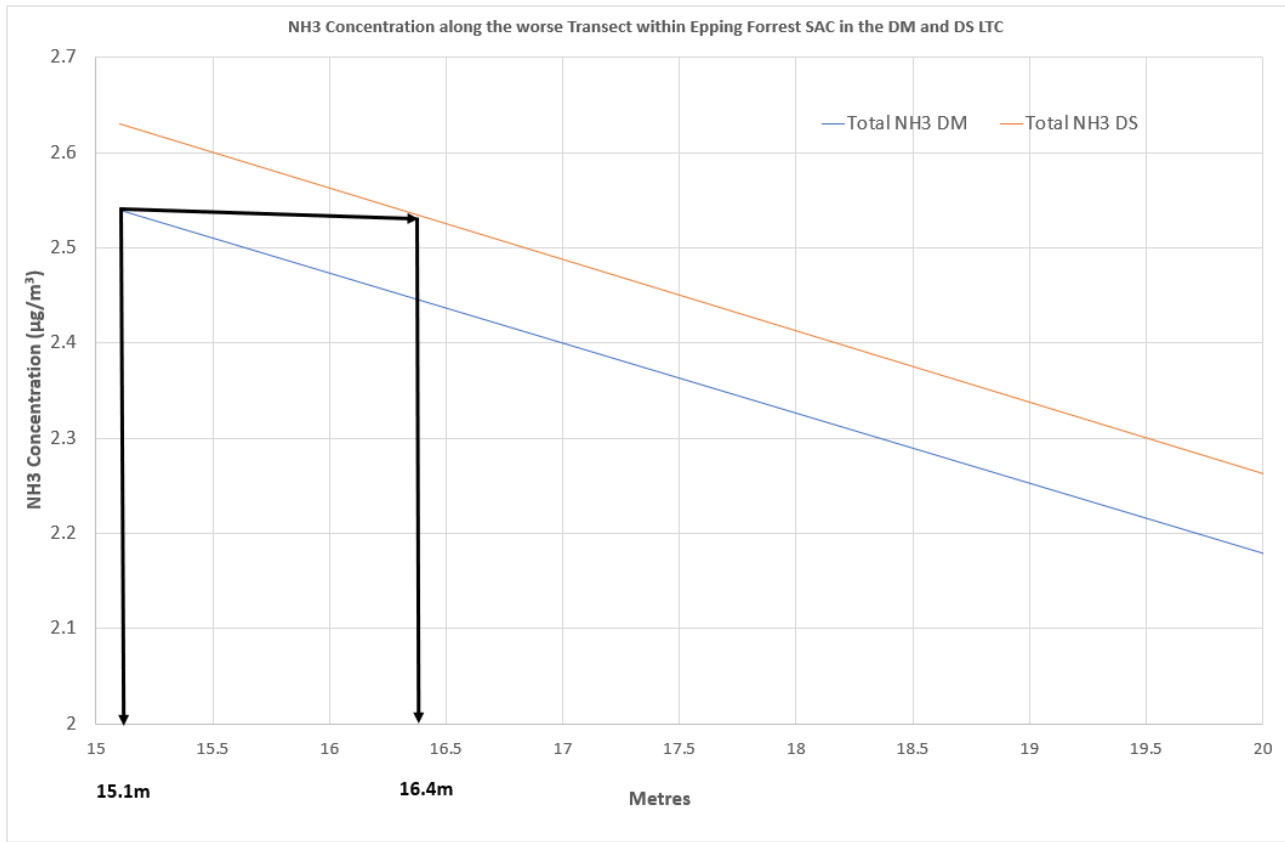
Receptor	X	Y	Distance from Road Edge (m)	NH ₃ DM	NH ₃ DS	Impact
EPF_193	544584.1	201025.2	15.1	2.54	2.63	0.09
EPF_192	544584.1	201018	22.3	2.01	2.09	0.08
EPF_191	544584.1	201010.9	29.4	1.66	1.73	0.07
EPF_190	544584.1	201003.7	36.5	1.42	1.47	0.05
EPF_189	544584.1	200996.6	43.6	1.24	1.28	0.04
EPF_188	544584.1	200989.4	50.8	1.09	1.14	0.05
EPF_187	544584.1	200982.2	57.9	0.98	1.01	0.03
EPF_186	544584.1	200975.1	65	0.88	0.91	0.03
EPF_185	544584.1	200967.9	72.2	0.8	0.83	0.03
EPF_184	544584.1	200960.7	79.3	0.73	0.77	0.04
EPF_183	544584.1	200953.6	86.4	0.68	0.7	0.02
EPF_182	544584.1	200946.4	93.6	0.63	0.65	0.02
EPF_181	544584.1	200939.3	100.7	0.59	0.61	0.02
EPF_180	544584.1	200932.1	107.8	0.55	0.58	0.03
EPF_179	544584.1	200924.9	114.9	0.52	0.53	0.01
EPF_178	544584.1	200917.8	122.1	0.49	0.51	0.02

Receptor	X	Y	Distance from Road Edge (m)	NH ₃ DM	NH ₃ DS	Impact
EPF_177	544584.1	200910.6	129.2	0.46	0.48	0.02
EPF_176	544584.1	200903.4	136.3	0.44	0.45	0.01
EPF_175	544584.1	200896.3	143.5	0.42	0.43	0.01
EPF_174	544584.1	200889.1	150.6	0.4	0.42	0.02
EPF_173	544584.1	200882	157.7	0.38	0.4	0.02
EPF_172	544584.1	200874.8	164.8	0.36	0.38	0.02
EPF_171	544584.1	200867.6	172	0.35	0.36	0.01
EPF_170	544584.1	200860.5	179.1	0.34	0.35	0.01
EPF_169	544584.1	200853.3	186.2	0.33	0.34	0.01
EPF_168	544584.1	200846.1	193.4	0.32	0.33	0.01
EPF_167	544584.1	200839	200.5	0.31	0.32	0.01

C.3.2 The change in NH₃ between the first and end modelled point in the Base Year is 1.9µg/m³ - this is a factor of over 20 times the maximum change that the Project leads to on the SAC. Therefore, if a change in vegetation condition cannot be identified from the site visits when walking across the pollution gradient, a change of NH₃ of 0.09µg/m³, which is 20 times less than what would have been observed on the site visit, cannot impact on site integrity.

C.3.3 It is worth noting that if we look at the absolute concentration at the first transect points, the Project effectively shifts concentrations into the site by just over 1m as shown in Plate C.2.

Plate C.2 NH₃ concentrations in the Do Minimum and Do Something scenarios



- C.3.4 As shown in the graph in Plate C.2, the Project effectively shifts the absolute NH₃ concentration just over 1m into Epping Forest with the opening of the Project compared to the without Project scenario. This illustrates how small the impact is on the SAC as it will be the absolute concentration that will have a theoretical effect on the vegetation.
- C.3.5 The Joint Nature Conservation Committee (JNCC) have published a report outlining the findings of the Nitrogen Futures project, which analysed the future trends in nitrogen deposition under a number of modelled future scenarios (Dragosits *et al.*, 2020). The main aim of the project was to update and further develop the UK evidence base of the effectiveness of spatial targeting of mitigation measures for designated habitats and to test a range of potential options for future UK policy development.
- C.3.6 In the 2030 ‘Business as Usual’ scenario, NH₃ emissions increase between 2017 and 2030 by 1%. This is due to an increase in ammonia emissions from UK poultry and pig farming of 3% for both sectors, and an increase in non-agricultural emissions of 11% which is reportedly due to anaerobic digestion. However, agriculture is by far the largest emitter of NH₃. As with NO_x, vehicle emissions of NH₃ will reduce in the future due to increased numbers of full electric vehicles in the fleet. While there is some uncertainty in the medium term

in relation to increases in emissions of NH₃ due to potential increases in petrol hybrids, there is still going to be a shift towards full EVs and therefore tailpipe emissions of NH₃ will reduce. The Project will have no effect on what the fleet composition of vehicles is in the future.

C.3.7 It should also be noted that, as described in the JNCC Nitrogen Future documents, NH₃ emissions are still largely driven by agriculture.

C.4 Nitrogen deposition

C.4.1 While there are exceedances of 1% of the Lower Critical load as a result of the Project, which triggers the requirements to undertake additional work, it is worth putting into context the total nitrogen that is being deposited over Epping Forest as a result of the Project. The area affected by the Project is approximately 77,000 square metres or 7.7 hectares (total size of Epping SAC is around 1,628 hectares).

C.4.2 The total N deposition per year as a result of background, the road component in the base year, do minimum and do something are presented in the Table C.3.

Table C.3 Total nitrogen deposited on the area of Epping SAC as a result of the background and road emissions

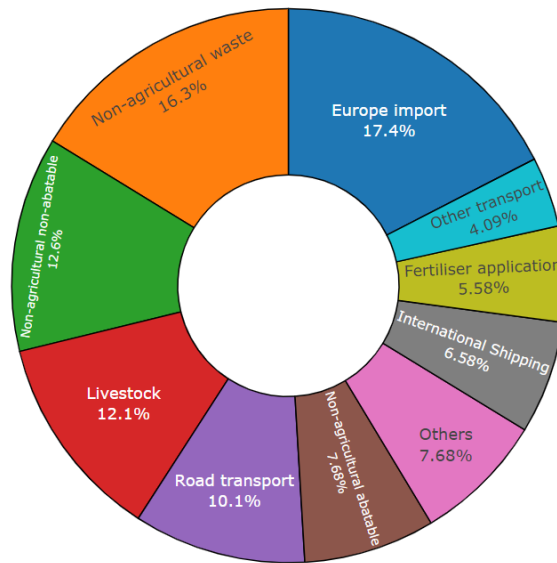
Area (ha)	Total N deposition in kg over area affected by Epping				
	Background	Base Year road component	Do Minimum opening road component	Do Something opening road component	Change road component (DS-DM)
7.7	209.5	40.1	35.6	36.7	1.1

C.4.3 As can be seen from Table C.3, the background alone within the area affected by the Project deposits 209.5kg of nitrogen on the 7.7 hectares of the SAC. The road component deposits 40.1kg in the Base Year, reducing to 35.6kg without the Project in 2030. As a result of the Project, there is an increase of 1.1kg of nitrogen in the opening year over 7.7 hectares. The total nitrogen in the Do Minimum is 245.1kg (209.5 + 35.6); the change in nitrogen of 1.1kg as a result of the Project therefore represents an increase in nitrogen of 0.5%.

C.4.4 The sources of the N deposition on the Epping Forest SAC are shown in Plate C.3 from APIS.

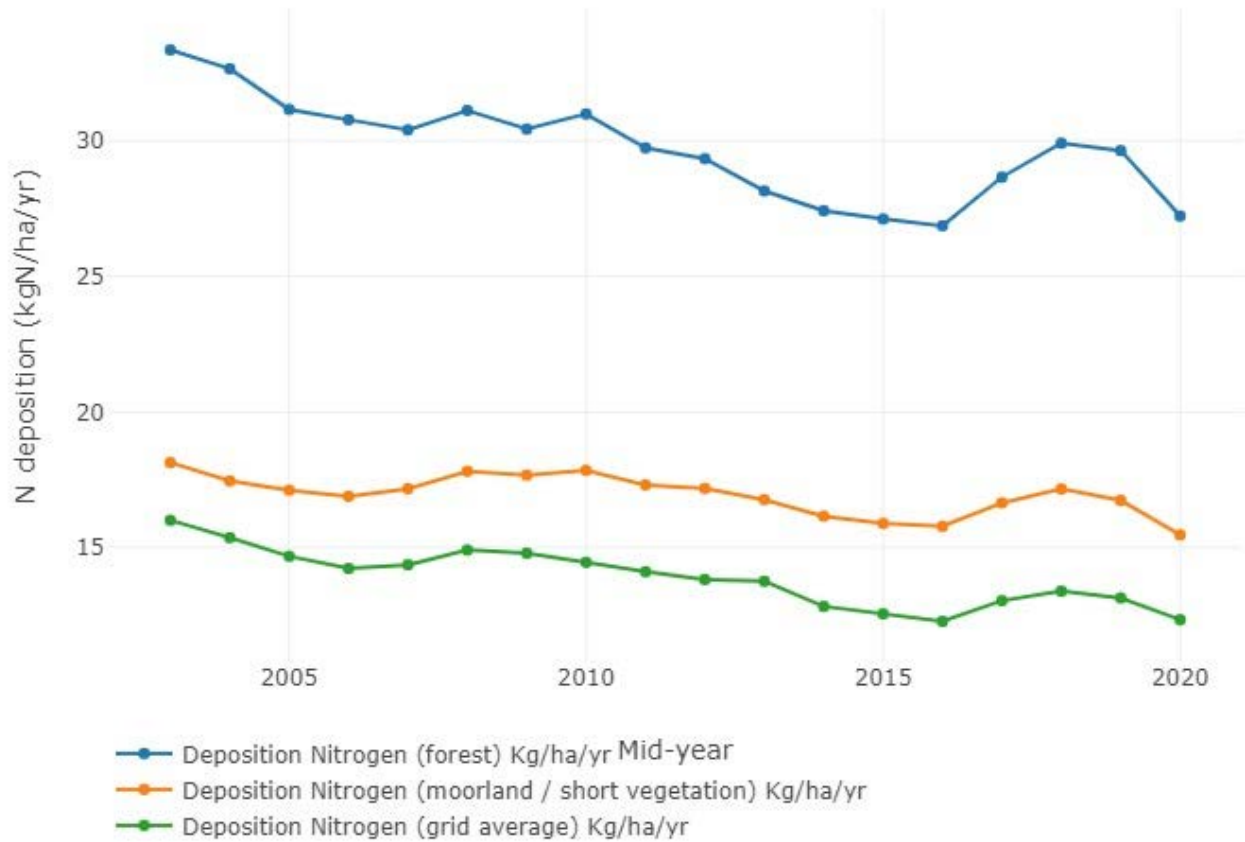
Plate C.3 Sources of nitrogen deposition on the Epping Forest SAC

Sources ranked by total Nitrogen deposition (KgN/ha/yr) from combined UK sources



- C.4.5 Road transport is responsible for 10.1%, therefore just over 2kgN/ha/yr. Even if this source was removed entirely, it would require a further reduction of 15kgN/ha/yr to achieve the critical load of 10kgN/ha/yr which would be required to achieve the conservation objectives.
- C.4.6 Increases in electric vehicle sales will reduce nitrogen deposition from road transport far quicker than other sectors, for example agriculture.
- C.4.7 To further put the increase in N deposition as a result of the Project into context, the trend in N deposition as reported on APIS was downloaded and presented in Plate C.4.

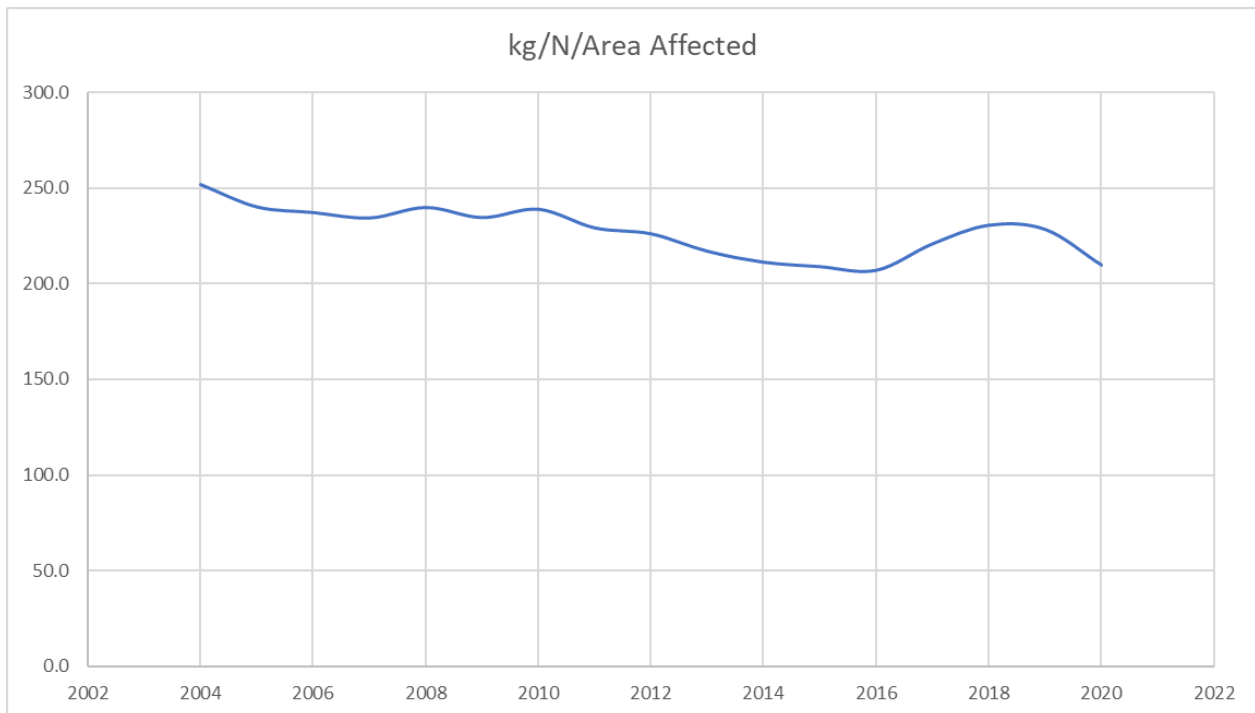
Plate C.4 Trend in N deposition from APIS



C.4.8 As can be seen above, the background fluctuates but is generally trending downward.

C.4.9 To put into context the 1.1kg change as a result of the Project, the total N deposited on the area the Project affects (7.7ha) between 2004 and 2020 is presented on Plate C.5.

Plate C.5 Total N deposited on the 7.7 hectares of the SAC due to backgrounds only



- C.4.10 It should be noted that between 2016 and 2017, the background deposition resulted in an increase of N on the area affected by the Project of Epping of 13.8kg. This is over 13 times the change due to the Project. The Applicant is not aware that, as a result of this, site integrity was affected to a point that meant that the conservation objectives to achieve the lower critical load were made obsolete. In other words, regardless of the total Nitrogen deposition, the conservation objectives are still to achieve the lower critical load and there is not a point at which the change as a result of the background is so great that the conservation objectives become irrelevant. This is because, regardless of whether the site is well above the LCL or just above the LCL, the site would benefit ecologically to be below the LCL.
- C.4.11 To conclude, the Project increase of 1.1kg is inconsequential and cannot impact on the attainment of the conservation objectives due to the fact that the road component is already a small proportion of the background and will continue to get much smaller in the future, much faster than other sectors, due to decarbonisation policies.

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Glossary

Term	Abbreviation	Explanation
A122		The new A122 trunk road to be constructed as part of the Lower Thames Crossing project, including links, as defined in Part 2, Schedule 5 (Classification of Roads) in the draft DCO (Application Document 3.1)
A122 Lower Thames Crossing	Project	A proposed new crossing of the Thames Estuary linking the county of Kent with the county of Essex, at or east of the existing Dartford Crossing.
Application Document		In the context of the Project, a document submitted to the Planning Inspectorate as part of the application for development consent.
Construction		Activity on and/or offsite required to implement the Project. The construction phase is considered to commence with the first activity on site (e.g. creation of site access), and ends with demobilisation.
Design Manual for Roads and Bridges	DMRB	A comprehensive manual containing requirements, advice and other published documents relating to works on motorway and all-purpose trunk roads for which one of the Overseeing Organisations (National Highways, Transport Scotland, the Welsh Government or the Department for Regional Development (Northern Ireland)) is highway authority. For the A122 Lower Thames Crossing the Overseeing Organisation is National Highways.
Development Consent Order	DCO	Means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects (NSIP) under the Planning Act 2008.
Development Consent Order application	DCO application	The Project Application Documents, collectively known as the ‘DCO application’.
Environmental Statement	ES	A document produced to support an application for development consent that is subject to Environmental Impact Assessment (EIA), which sets out the likely impacts on the environment arising from the proposed development.
National Highways		A UK government-owned company with responsibility for managing the motorways and major roads in England. Formerly known as Highways England.
Operation		Describes the operational phase of a completed development and is considered to commence at the end of the construction phase, after demobilisation.
Order Limits		The outermost extent of the Project, indicated on the Plans by a red line. This is the Limit of Land to be Acquired or Used (LLAU) by the Project. This is the area in which the DCO would apply.

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