



THE PLANNING ACT 2008
THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES
2010

Boston Alternative Energy Facility

Secretary of State Additional Information Request

Natural England's updated advice on Air Quality

For:

The construction and operation of Boston Alternative Energy Facility (AEF) that would generate approximately 102 MW of renewable energy and is located immediately south of Boston town, Lincolnshire.

Planning Inspectorate Reference: EN010095

10th March 2023

Natural England response to letter from SoS on 10 Jan 2023 – Air Quality

1. This response addresses the SoS query in para 8 of the letter:

‘Natural England is invited to comment on the information provided by the Applicant to the second consultation in relation to air pollution impacts on habitats and protected sites, in particular whether an adverse effect on integrity of any protected site due to changes in air quality can now be excluded.’

2. Natural England has therefore reviewed information provided in the Applicant’s doc ref 9.108 dated 9 December 2022 “Applicant’s Response to Secretary of State’s Letter of 25th November 2022”.

Summary

3. In summary, substantial progress has been made towards having sufficient evidence to allow us to advise that an adverse effect on integrity (AEOI) as a result of air quality can be excluded. However, a few issues remain so we cannot yet make this statement.
4. Queries resolved (with the associated paragraph/ section number from our 11 November response) include:
 - Clarification of nitrogen sensitivity of qualifying features, and the relevant critical levels of ammonia and SO_x (para 2 and 3)
 - Consideration of revised critical loads for saltmarsh habitats (para 4/ para 25)
 - Consideration of the critical loads for acidity and consideration of acid deposition (para 5)
 - Confirmation of the methodology for in-combination assessment (para 7)
 - An assessment of impacts of trace pollutants (para 10)
 - Clarification of mitigation/ monitoring proposals (para 15)
 - Consideration of the conservation objectives within the appropriate assessment (section 5/ para 17)
 - Confirmation of consideration of construction impacts within appropriate assessment (section 5/ para 19 onwards)
 - Consideration of operational impacts of NO_x and ammonia (para 27)

5. Further information should be provided to exclude to allow potential for an AEOI:
- A **quantification of the loss of agricultural land** as a result of the proposed Alternative Energy Facility (AEF), and **how this will affect any existing emission profile**, in terms of ammonia and NO_x concentrations, and nitrogen deposition (not including any impacts on the water nutrient content). Although this does not necessarily imply that emissions from the AEF would not lead to an AEOI, in this case, justification could be provided in the appropriate assessment that replacing one emission source with another would result in no undermining of the conservation objective to maintain the site below the relevant critical level/ load. This is important because the background concentration is close to the critical load for nitrogen deposition and critical level for ammonia and would provide justification that additions would not take the protected sites over these thresholds.

It is also unclear how the undertaking of compensation measures which may result in the loss of agricultural has been taken into account.

- A **justification of using the “grid average” background concentration** to inform the Predicted Environmental Concentration (PEC) at the protected sites. This may underestimate deposition at the most sensitive points in the grid square, as it is a weighted average of deposition at land use types within the grid square (including arable and urban land cover, which generally have lower deposition velocities than “rougher” habitats) – therefore deposition may be higher at some points, including at the more sensitive habitat types. This is important because the background concentration is close to the critical load for nitrogen deposition and critical level for ammonia, and a precautionary approach is needed to ensure that any additions would not take the protected sites over these thresholds.
6. As previously, this advice applies to the European designated sites subject to Habitats Regulations Assessment (HRA) at:
- The Wash SPA (site code UK9008021).
 - The Wash and North Norfolk Coast SAC (site code UK0017075).
 - The Wash Ramsar site (site number 395).
7. The same advice applies at the habitats at Havenside Local Nature Reserve, Slippery Gowt Sea Bank Local Wildlife Site (LWS), South Forty Foot Drain LWS, the Habitat Mitigation Area, and other areas of priority saltmarsh in The Haven. Where these habitats support populations of species associated with designated sites (including

Annex I SPA birds), any changes in the plant communities caused by pollution could also affect the qualifying features indirectly. Insufficient information has been provided on the air quality impacts of the protected sites to be able to rule out such adverse effects.

8. Natural England advises that due to residual concerns in relation to succession/coarse grasses that additional ecological monitoring should be undertaken. We advise that the emission/ deposition monitoring strategy should also include baseline pre-construction ecological survey, during construction and operational ecological surveying is required which determines if impacts are as predicted and if greater ensure further mitigation measures will be implemented.

Detailed Comments

9. The Applicant split their response into sections, drawing on themes raised in our “updated advice on potential Air Quality impacts” dated 11 November 2022. This response addresses these sections in turn.

10. Natural England notes that the December 2002 submission also considers our Deadline 2 submissions.

Applicant

- 1) *Identification of Appropriate Critical Levels and Critical Loads*

- i) Allocation of habitat types and Critical Levels/Loads

11. Our comment on the relevant critical levels and critical loads not being fully identified in the original application has been resolved by the provision of Table 2.1 in this response, which is a helpful addition. The Applicant states that only habitats present in the area of concern are identified, and habitats or features included within the qualifying features of the designated sites, but not in the area affected by air quality emissions from the AEF have therefore been excluded. This clarification resolves the omission we had identified (for example Table 14.9 in the Air Quality ES chapter identified only critical loads and not the associated critical levels – which are dependent on the relevant habitat type and whether lichens or bryophytes are integral). Table 2.1 also indicates the acid sensitivity

of the qualifying features present in the relevant areas of the protected sites, as requested. The justifications provided for using the higher ammonia and SO_x critical levels are reasonable.

ii) Loss of agricultural emissions

12. Source apportionment for nitrogen deposition (Ndep) is also provided, indicating the highest contributions in the area are from European imports and agricultural inputs (livestock and fertiliser application). The importance of water contributions to the nutrient status of the area are also highlighted – with the River Witham catchment having “poor nutrient management”, again with agricultural inputs and rural management being cited as key reasons. Although the importance of overall nutrient input into the protected sites is acknowledged, in terms of nitrogen deposition, impacts are not solely related to nutrient input. Aerial nitrogen deposition can impact habitats through “runoff” of nitrogen into the soil and uptake of those nutrients (nitrate and ammonium ions) through the soil water via roots (with changes in competitiveness of species resulting in changes to the habitat composition and microenvironment of the habitat). However, impacts can also be direct, through uptake by leaves/ stomata (especially the case for lichens and bryophytes), or by changing microbial activity in the soil or mycorrhizal effectiveness. These impacts are not caused in the same way as increased nitrogen loading in the water catchment/soil water caused by agricultural fertiliser runoff.

13. It is noted that the current use of the Boston AEF site is agricultural (largely maize production). Paragraph 2.1.10/11 notes:

“The current agricultural use of the site contributes to N losses that ultimately increase the N loading in The Wash. Surface runoff is one of the primary routes for such agricultural N losses and considerable proportions of agricultural N are lost during rainfall events following fertiliser application.....

...Conversion of the land from agricultural use to industrial sources is expected to significantly reduce the N losses from the current land use. The sources of N in industrial settings are much more limited and are expected to have a lower concentration and be less frequent than that which is reasonably expected from the current agricultural use of the site. It is anticipated that the current agricultural use of the site contributes significantly higher N loads than the future industrial use, including the effect of air emissions.”

14. As acknowledged in the last sentence of the quoted section above, replacing agricultural land use with an industrial land use will change the emission profile of the area. In particular, ammonia emissions to air (and the contribution of that ammonia to Ndep) would be expected to decrease – and this may partly counteract emissions of ammonia (and Ndep) emitted by the proposed AEF. However, this has not been quantified by the Applicant – either in terms of the area of agricultural land to be taken out of agricultural use, or how this would affect the emission profile or the background pollutant concentrations at the protected sites. It should be noted that an “improvement” of the emissions from an area does not necessarily imply that there will be no adverse effect on the integrity of a protected site, or that the conservation objectives of the site would not be undermined. Emissions could still exceed the level at which harm could occur. However, such a consideration is a reasonable piece of evidence to include within the appropriate assessment. **Therefore, a quantification of the “loss” of aerial emissions through taking land out of agriculture should be provided.**

iii) Use of revised Critical Loads

15. Paragraph 2.1.12 / Table 2.2 of the Applicant’s response acknowledges the revised critical loads for Ndep in saltmarsh. This is in response to a Europe-wide assessment of the most up-to-date evidence of impacts arising from N deposition, and the lowered range of critical loads is indicative of further knowledge on the impact of pollution on this habitat type since the last review in 2011. Natural England accepts that this information was not published prior to the closure of the examination but welcomes its consideration by the Applicant. As for all critical loads, the lower point in any range should be used at the “Likely Significant Effect” stage of HRA – however, within the appropriate assessment, evidence can be used to indicate if a higher point could be more appropriate. This has been carried out by the Applicant for the saltmarsh vegetation (such as that at Havenside LNR and The Wash SAC) at paragraphs 2.1.13-19.

16. This included consideration of the large N loadings used in the experiments informing the critical load review, and that at concentrations closer to those predicted to be emitted by the AEF there were no significant changes in the saltmarsh communities identified. The lack of evidence from field experiments with lower N additions over a longer period of time was also noted in the recent review. Further evidence was reviewed by the Applicant (e.g. Boorman & Hazelden 2012) which indicated that, for the saltmarsh in Wales that the study addressed, additional loading within the critical load range was unlikely to have any major detrimental effect on the N status of the marsh or the growth

of its vegetation. It was also noted that “*forms of soluble N within the rooting zone of salt marsh plants can either be taken up by the plants or they could be washed out by the regular tidal inundation*”. The study authors concluded that inputs within the 20-30 kgN/ha/yr range were unlikely to have a damaging effect. This would include an increase in late successional species, including graminoids, and an increase in productivity. However, the most sensitive parts of the ecosystem were the upper marsh communities where interspecific competition is greatest. They therefore concluded that the lower point of the range be applied to the more densely vegetated upper marsh, and to areas subject to direct runoff from adjacent catchments.

17. Although the Applicant does not conclude whether the revised critical loads for saltmarsh are appropriate for use here, the argument is made that the current range (20-30 kgN/ha/yr) is likely to be sufficiently precautionary to prevent vegetation change – and that the lower point of the current range (20 kgN/ha/yr) should be applied to the more Nitrogen-sensitive densely vegetated areas of the marsh, more at risk of direct runoff.

18. Background concentrations at the Haven and The Wash are above the revised lower critical load (10-20 kgN/ha/yr). If these are adopted, they would move the conservation objective at the Wash from “maintain” to “restore” – meaning that further additions above the lower critical load risk undermining the conservation objectives. However, the arguments provided by the Applicant (paragraphs 2.1.13-19 – and summarised in para 19 below) – combined with the potential quantitative argument to be made that removing agricultural emissions will counteract the “new” emissions from the AEF – suggest that the argument that there will be no undermining of the conservation objective as a result could be reasonable.

19. It is noted that the background nitrogen deposition shown in Table 2.2 is lower than the background deposition on APIS for “moorland” (low-lying, non-woodland) vegetation (in the region of 12kgN/ha/yr compared to in the region of 18kgN/ha/yr). It is assumed the “grid average” data was used. **An explanation why that was selected as the most precautionary deposition velocity should be provided.** The “grid average” does not represent a single vegetation type – but provides a weighted average for each grid square based on land cover within that grid square – with deposition velocities for five land cover categories: forest, moorland, grassland, arable and urban. The lower deposition velocities are generally the less sensitive land cover types (urban/ arable) and these can therefore “weight” the grid average deposition lower than deposition received at the more sensitive ecosystems. Natural England therefore advises that the

“moorland” deposition velocity should be used for “less than knee height” vegetation as a precautionary approach unless there is a reason why this is not appropriate in a particular area. In this area, although it is recognised that the sensitive ecosystems (saltmarsh etc) are not “moorland”, and there may be justification for using a lower deposition velocity – it must be justified that the grid average is not being weighted by the “arable” nature of the grid square. Given the proximity of some of the PECs to the lower end of the current critical load range (and close to the upper end of the revised range), it is important that a realistic, yet precautionary background is applied.

iv) Impacts of predicted deposition on protected sites and features

20. At the saltmarsh sites closest to the proposed AEF (Havenside LNR, with higher background and proposed N deposition than The Wash) the Applicant identifies some signs of ecological succession, likely due to its position, being constrained by the seawall. Therefore, pioneer vegetation cannot develop. The steep slope and subjection to runoff and wash also prevents pioneer vegetation from developing. It is concluded that the presence of late successional grasses is typical for saltmarshes that are continuing to accrete sediment and are moving away from the influence of the tide. The presence on some non-graminoid diversity suggests that existing levels of nutrients at this location are not affecting vegetation.
21. It is understood from the Natural England area team, that The Wash SAC is currently partly grazed. The area nearest the AEF (on the south side of The Haven) is grazed by horses, and the rest in that area by cattle. It is understood that this grazing keeps some of the coarser grasses (indicative of succession) in check. As continued grazing cannot be ensured, it is important that the Applicant confirms that any potential increase in grasses at this location is a true successional stage, and not just as a result of increased nitrogen – and that additions from the proposed AEF (possibly taking into account any reduced deposition arising from loss of agricultural land) will not worsen this. This could form part of the monitoring proposed at para 29 (assessing how grass cover at the site changes over the monitoring programme).
22. Mudflats (not covered by seawater at low tide) are not given a critical load on APIS, and the Applicant’s argument that Ndep from agriculture and European imports will form the majority of deposition to these habitats is reasonable. In addition, inputs of nutrients from seawater will be substantial, assuming the mudflats are submerged at high tide.

Intertidal habitats are generally not considered as susceptible to aerial N addition than those with fewer sources of nutrients.

23. The Applicant's clarification that acid deposition has not been considered because the habitats of concern are not sensitive to acidity is reasonable. Features of the SPA and underlying SSSI (primarily bird species) do have some sensitivity, but overall, the species broad habitat is concluded to mean there would be no expected negative impact. The Wash SAC is also designated for otter, but the assessment concluded that there were no recent records of otter and no suitable habitat for holt building. It is therefore reasonable to conclude there would be no adverse effect as a result of air quality on this qualifying feature.

2) *Consideration of sources and pollutants*

24. It is understood that the in-combination assessment included two other projects – both industrial/ power generation in nature. Natural England's query at paragraph 7 of our 11 November response was seeking confirmation that projects from other sectors (especially agricultural) had been considered as well. However, the Applicant's response made at Deadline 1 (Applicant's comments on Relevant Representations – Table 1.13, line 105 – not previously seen) had outlines the in-combination methodology, which indicates that planning portals were searched for applications that would have triggered Natural England's Impact Risk Zones. This method would have included relevant air quality applications from different sectors – so we agree that the in-combination assessment was carried out appropriately.

25. Para 2.1.24 indicates that ammonia from construction vehicles had been screened out as the 1000AADT screening threshold was not met. However, the contribution to NOx and Ndep from traffic emissions was included in the PEC at the only protected site (South Forty Foot Drain LWS) within 200m of the associated road network. As there are no roads within 200m of The Wash SAC, the impact of ammonia from roads would not result in a LSE from this source. The other construction ammonia source is identified as vessel emission. Although the Applicant's justification that "*it is unlikely that a significant proportion of vessels utilised by the Facility would utilise this new technology*" (that would generate ammonia) is not strong or quantified, overall it is considered that the short-term nature of construction activities, and intermittent nature of the relevant vessels would be sufficient to exclude a LSE arising, especially as operational ammonia emissions are included within the assessment, and critical levels are not exceeded.

26. Operational ammonia at the designated sites was calculated to be up to 15% of the 3 µg/m³ critical level (0.45 µg/m³) – para 2.1.26. However, the fact the sites remain under the critical level even with the addition from the AEF is relevant – and the appropriate assessment would be expected to place great weight on that, despite the increasing background. In addition, the argument previously made – that emissions would replace emissions from agriculture (expected to be primarily ammonia) – could support this argument, as long as quantification of existing emissions from the farmland can be provided. **It is therefore accepted that ammonia arising from the AEF would not result in AEOI at The Wash or an unacceptable impact at other sites.**

27. The assessment of impacts arising from heavy metals, dioxins, furans and PCBs (para 2.1.27-30) is welcome, and the methodology and conclusions reached seem appropriate given the uncertainties within the assessment and the small amounts. The argument that “*emissions from the Facility would present a betterment in comparison to existing energy-from-waste plants*” (para 2.1.30) does not exclude the potential for an adverse environmental effect/ AEOI. However, as there is no accepted assessment methodology to establish environmental impacts, the information provided and safeguards in place under the environmental permit are considered appropriate.

3) *Clarification on screening approach*

28. The clarification of the screening/ LSE methodology is helpful. Natural England accepts that although the Applicant did not properly follow the two-stage process for some identified LSEs, the evidence informing the conclusions would have been the same at appropriate assessment. This would apply to conclusions on construction emissions. It was initially assumed that only operational nitrogen deposition was originally screened into the appropriate assessment whereas emissions exceeded 1% of the relevant critical level or load for other pollutants too. However, para 2.1.39 of this response (as addressed in the appropriate assessment section below) confirms that other operational pollutants were also screened in.

4) *Clarification on mitigation and the realistic emissions scenario*

29. At Deadline 5 it was unclear if the “realistic emission scenarios” outlined (as identified in para 2.1.35) were intended as mitigation. In which case they should be included within the appropriate assessment, and commitment ensured through the DCO, as requested

in Natural England's Deadline 5 submission REP5-014. This response clarifies that they are not intended as mitigation, and therefore the "realistic worst case" should continue to be the operational emission limits which will be prescribed in the Environmental Permit. No further consideration of this is necessary, as the HRA has used these realistic worst case (Environmental Permit) values.

30. The commitment to monitoring outlined in the Air Quality Deposition Monitoring Plan (document reference 9.51(1), REP6-027) – subject to agreement on the details prior to commencement of the survey, and review of the initial year of monitoring data - is welcome. Natural England agrees with the Environment Agency's comments (agreed by the Applicant) that "*monitoring could be used to confirm actual future N deposition and ambient concentrations at the saltmarsh habitats*". In addition, monitoring should consider any changes in vegetation cover, including grasses.

5) *Further discussion on Appropriate Assessment*

31. Clarification on the approach to appropriate assessment is welcome (para 2.1.39). The original appropriate assessment, including the screening matrices did not separate out "air quality" into the pollutants (e.g. Ndep, NOx, ammonia) and section A17.6.142 onwards of the HRA refers to deposition (implying critical loads) rather than concentrations (implying critical levels). However, this response specifies that it addressed airborne concentrations of Nox, SO2 and ammonia and Ndep within the boundaries of protected sites as a result of the operational emissions from the AEF.

32. Further consideration of the conservation objectives of the sites, and consideration on the sensitivity of the relevant designated features has been undertaken by the Applicant (as discussed at para 19 onwards herein). Overall, it is concluded that the results of the original assessment apply, and that there would be no AEOI resulting.

33. This further assessment is considered robust, and Natural England does not have reason to believe an AEOI is likely based on the information provided. The proposed development will likely not undermine the conservation objective to "maintain the sites below relevant critical loads/ levels". However, in order to exclude this beyond reasonable scientific doubt, a quantification of the loss of emissions from the current agricultural land should be set against the emissions from the proposed development.

This is because the background concentrations at the SAC are close to the (current) lower critical load for nitrogen deposition (and in the middle of the revised range), and background concentrations of ammonia appear to be increasing in the area, although still below the critical level. Confirmation that some of the AEF emissions will be offset, will allow exclusion of any AEOI arising.