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 potential Air Quality impacts

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

11th November 2022

Natural England's updated advice on Air Quality impacts

This response has regard to:

- REP6-035 - Comparison of Predicted Critical Load and Level Results Using Maximum Permissible Emissions Limits and Realistic Emission Scenarios (doc ref 9.72) (8 Feb 2022)
- REP5-014 - Appendix D3 to Natural England's Deadline 5 Submission - Natural England's Advice on Outline Air Quality and Dust Management Plan [REP3- 015] and Air Quality Deposition Monitoring Plan [REP4-016] (25 Jan 2022)
- REP2-042 - Appendix D2 to Natural England's Deadline 2 Submission - Natural England's Comments on the Applicant's Deadline 1 Submissions in Relation to Air Quality [REP1-007, REP1-021, REP1-028] (11 Nov 2021)
- REP4-016 - Air Quality Deposition Monitoring Plan (Tracked) Document Reference: 9.51(1) (8 Feb 2022)
- REP1-006 – Environmental Statement - Chapter 14 Air Quality (tracked) (doc ref 6.2.14 (1)) (19 Oct 2021)
- APP-050 - Environmental Statement - Chapter 12 - Terrestrial Ecology (doc ref 6.2.12) (23 March 2021)
- REP5-006 - Environmental Statement - Chapter 17 - Marine and Coastal Ecology (Tracked) (doc ref 6.2.17 (1)) (24 March 2022)
- AS-005 - Appendix 17.1 Habitats Regulations Assessment (Tracked) (Doc Ref 6.4.18 (1)) (24 March 2022)

Summary

Natural England **cannot advise that an adverse effect on integrity as a result of air quality can be excluded**. Insufficient information has been provided on the air quality impacts of the protected sites to be able to rule out such adverse effects. This 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).

Whilst the focus of Natural England advice is in response to the Secretary of States Habitats Regulations Assessment query [October 2022] we also highlight that the same omissions are likely to significantly impact 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. And, 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.

In particular, further information on ammonia impacts at construction and operation, and impacts arising from nitrogen deposition (operation) and acid deposition (construction and operation) should be provided. Consideration of potential impacts of trace pollutants on the integrity of the sites should also be made. If adverse effects on the integrity of the sites cannot be ruled out, mitigation to reduce these impacts must be provided.

It is noted that not all key issues highlighted by Natural England in **REP5-014** and **REP2-042** have been addressed clearly by the Applicant. These include:

- Consideration of ammonia in construction assessment [**point D5 of REP2-042**]
- The absence of mitigation to reduce identified impacts, and the fact that monitoring does not fulfil this requirement [**point D7 and D1(red) of REP2-042 and points 5, 6 and 7 of REP5-014**]
- Incorporation of mitigation measures into the Code of Construction Practice [**point D1 and final point in of REP2-042**]
- Clarification of what the "permitted levels" would be – in quantitative terms [**point 1 of REP5-014**] – **REP6-035** provides the modelling results requested at point 2, but there is no commitment to ensure the "realistic" levels would be used.

Detailed Comments

1) Approach to establishing Adverse Effect on Integrity

1. Natural England's air quality guidance (NEA001[1]) as referred to in the applicant's Air Quality ES Chapter **[REP1-006]** indicates that assessment of air quality risk for the Habitats Regulations Assessment should be undertaken in two stages. The first stage determines if there is a Likely Significant Effect. This stage considers only the process contribution of the plan or project alone and in-combination with other plans or projects. If a Likely Significant Effect cannot be ruled out, an appropriate assessment is required

[1] Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations – June 2018. - Although this was written to relate to road traffic emissions, the process to be followed applies to non-road sources as well.

(Stage 2) to establish whether an adverse effect on integrity would occur, considering the extent to which air pollution that might undermine the conservation objectives of the site. Please see comments below in relation to the conclusion of the HRA.

2) Identification of Critical Levels and Critical Loads

2. The qualifying features of the designated sites are outlined in **Tables A17-1 – A17-3** in the HRA **[AS-005]**. However, this does not determine if they are sensitive to air pollution. Natural England advises that the Air Pollution Information System (APIS[2]) indicates that features in all the sites are sensitive to acidity and/or nitrogen.

3. Natural England notes that Table 14.7 in the Air Quality ES chapter **[REP1-006]** identifies the critical levels used in the assessment (NOx, SOx, NH_3 and HF). However, the critical levels for ammonia (NH_3) and sulphur oxide (SOx) are dependent on whether lower plants (lichens and bryophytes) are an important feature of the relevant habitat. Because t**his information is not provided by the Applicant we are currently unable to provide advice further on the significance of the critical loads**

4. Natural England notes that **Table 14.9** identifies critical loads for nitrogen deposition. These identify the relevant habitats as "pioneer low-mid, mid-upper saltmarshes" and the critical load is identified as (20 – 30 kgN/ha/yr). It should be noted that European critical loads have been subject to review[3] and the range for two of the three saltmarsh ecosystems is now 10-20 kgN/ha/yr which is likely to increase the significance of impact. **However, we advise that it is not clear which habitat type the Applicant considers to be most appropriate for each site and unable to advice further on the significance of the impacts until further information is provided.**

5. **Natural England advises that consideration should be given to the critical loads for acidity.** Consideration of acidity is important in this case given the identified emissions of SOx and Hafnium (HF) which are both acidifying pollutants. Natural England notes Section 14.4.59 indicates the saltmarsh habitats are not sensitive to acidity so this was not considered, and none of the other qualifying species were present in the study area. However, this should be considered in the appropriate assessment and not the screening stage, and justification provided – given that some features are recorded on APIS as being sensitive to acidity.

[2] APIS app | Air Pollution Information System
[3] Review and revision of empirical critical loads of nitrogen for Europe 2022 (FINAL) | Umweltbundesamt

3) Application of the screening thresholds

6. As outlined in NEA001, the screening threshold for nitrogen (NOx, NH_3 and N deposition) and acid deposition is an increase of 1% of the relevant critical level or critical load at the designated site. In the case of traffic emissions, average annual daily traffic flow can be used as a proxy.

7. An HRA should be carried out for the project alone, and in combination with other plans or projects (that do not form part of the background air quality in the area). We advise that only if the in-combination assessment results in an increase of less than 1% can a Likely Significant Effect be excluded. However, we note that **Section 14.4.49 [REP1-006]** indicates two additional projects were identified for the in-combination assessment - Biomass UK No. 3 Ltd project, located adjacent to the Facility, and a gas-fired peaking power plant located at Lealand Way, 350 m to the north which may exceed the 1% threshold. **Appendix 14.2 (**Dispersion Modelling Methodology) indicates that road traffic, stack emissions and vessel emissions were also considered, but again it is not clear what the cumulative impacts are.

8. We advise that this assessment should not incorporate measures to reduce emissions[4]. If needed, these can be considered at the appropriate assessment stage.

9. It is important to recognise that a project such as this resulting in >1% of the critical level/load will not necessarily undermine the conservation objectives of a designated site such as to cause an adverse effect on site integrity. But we currently advise that an AEoI can't be excluded beyond reasonable scientific doubt without further consideration and evidence presented in an appropriate assessment.

10. Operational stack emissions – Natural England notes that the results of this assessment are outlined in section 14.7 and **REP6-035**. This assessment included embedded mitigation measures to limit the emissions to BAT-AEL. Although mitigation is not recognised at the screening stage of HRA, in this case, it is considered unrealistic to exclude these measures, so we accept the assessment with them included. REP6-035 indicates:

    - In-combination process contribution of **nutrient nitrogen (nitrogen deposition)** (as a % of the Critical Load (kgN/ha/yr)) would be 2.1% if emissions were at the "emission limit" and 0.7% at "realistic" emissions.

[4] The "People Over Wind" judgment – CJEU C-323/17

- In-combination process contribution of **NOx (nitrogen oxides)** (as a % of the Critical Level (µg/m^3)) would be 2.8% if emissions were at the "emission limit" and 2.3% at "realistic" emissions.
- In-combination process contribution of **NH3 (ammonia)** (as a % of the Critical Level (µg/m^3)) would be 2.2% if emissions were at the "emission limit" and 0.4% at "realistic" emissions.
- Operational assessment of **acid deposition** has not been considered. However, emissions of HF were modelled at 2.1-2.4% of the critical level, and SOx at 1% of the critical level (Table 14.30 of REP1-006) suggesting that acid deposition should be addressed – please see further points.
- **An assessment of operational emissions of dioxins and furans, PCBs and trace metals (termed trace pollutants) has not been carried out for ecological receptors.** While primarily considered as human health risks, there is also potential for such pollutants to have ecotoxic impacts[5] on plants and their associated fauna. Although impacts of such pollutants are less well qualified, and limited critical loads etc exist, we advise that they should be addressed within the appropriate assessment – using the quantification undertaken for the human health risk assessment referenced at 14.7.75 onwards.

11. Based on the information provided it was considered by the Applicant that *construction impacts* arising from dust and plant emissions, and construction vehicle emissions are unlikely to result in a Likely Significant Effect at the identified designated sites. However, there is a potential construction impact arising from **SOx,** predicted to increase by 1.4% of the critical level during construction, which is above the screening threshold for further consideration. We advise that SOx is taken forward in to the HRA with construction **ammonia** concentrations also being considered.

12. *Operational impacts* appear to have been considered in-combination only. Two options are provided (emission limit vs realistic). We advise that the more precautionary of the two should be used at screening. Likely Significant Effects arising from **nitrogen**

[5] For example –
Hanano, A., Almousally, I., Shaban, M. et al. Differential tissue accumulation of 2,3,7,8-Tetrachlorinated dibenzo-p-dioxin in Arabidopsis thaliana affects plant chronology, lipid metabolism and seed yield. BMC Plant Biol 15, 193 (2015). [redacted]

Goyal, D. et al. (2020). Effect of Heavy Metals on Plant Growth: An Overview. In: Naeem, M., Ansari, A., Gill, S. (eds) Contaminants in Agriculture. Springer, Cham. [redacted]

deposition, **NOx, ammonia**, **acid deposition** and **trace pollutants** should be considered within the appropriate assessment.

4) **Consideration of mitigation**

13. The Air Quality Deposition Monitoring Plan **[REP4-016]** indicates that a reduction of emissions from the "worst case basis" of 100% of the (Environmental Permit) permitted levels would be "likely". This is based on emissions monitoring results of other EfW plants in the UK – showing typical emissions of NOx are at approximately 80% of the permitted level and NH_3 are at around 20% of the permitted level. This is shown in **[REP6-035]**.

14. However, Natural England advises that there is no commitment by the Applicant to cap emissions at these levels, and it must therefore be assumed the assessed "emission limits" are a reasonable worst case in the assessment. **This is not therefore considered mitigation for the purpose of reducing potential impacts at the designated sites**.

15. **Monitoring of the saltmarsh habitats is also proposed. However, we advise this is not considered mitigation, as it would not reduce the impact of any emissions from the proposed development. There is no commitment to actions to be taken should a significant change be recorded in the proposed monitoring. In addition, the proposed year of monitoring is insufficient to identify annual changes in pollutant levels, having regard for meteorological conditions.**

5) Appropriate Assessment

16. We advise that within the appropriate assessment, further evidence should be considered relating to the conservation objectives of the site and whether the air pollution would undermine them. This can relate to the site itself (such as species present and their location in relation to the pollution footprint or any site features that may justify use of the higher range of the critical load rather than the lower), the proposed development (such as mitigation to reduce emissions or consideration of the duration or extent of emissions) or the background environment (such as whether the critical load/level is currently exceeded, or whether there are trends/ trajectories in pollution concentrations which the proposed development would not impact).

17. **We advise that the Applicant has not provided a full assessment of the conservation objectives of the site and whether air pollution could undermine them. It is therefore not possible to establish whether an Adverse Effect on Integrity would arise. Although some justification has been given for some aspects of the habitats and some pollutants, the assessment is not complete or robust.**

18. **Appendix 17.1 [AS-005]** highlights the potential for nitrogen oxides (NOx), sulphur dioxide (SO2), nitrogen, acid and ammonia deposition on the designated sites during the construction and operation of the Facility and therefore this is an impact pathway which should be considered further in an HRA.

19. Natural England notes that *Construction impacts* were screened out of further consideration on the grounds of non-exceedance of the Critical Levels and Critical Loads, and also that in the intertidal zone, as these areas are inundated regularly, there is no potential for a build-up of nitrogen or acid deposition. Natural England advises that this consideration should be made within the appropriate assessment rather than at screening, which should address only the process contribution.

20. As indicated above, SOx at the construction stage exceeded the 1% of the critical load screening threshold, and ammonia was not considered. Although the saltmarsh habitats are recorded as being not sensitive to acidity on APIS, other qualifying features should be considered – such as the otter (*Lutra lutra*) qualifying feature of the SAC which is sensitive to acidity due to impacts on the species' broad habitat. In addition, we advise some bird qualifying features of the SPA are reliant on grassland within (and possibly outside) the SPA which is sensitive to acid deposition. This habitat could well include habitat in the non-SPA designations such as at Havenside LNR or the Local Wildlife Sites which are subject to much higher predicted increases in acidity. Although the comparatively short-term duration of the construction impact can be taken into account, further consideration is required to exclude the possibility of any undermining of the conservation objectives as a result of acid deposition.

21. We advise that ammonia impacts must also be addressed. Although the higher ammonia critical level of 3µg/m^3 would be relevant, as bryophytes and lichens are not important features of the relevant habitats, ammonia concentrations in the area have rapidly increased since 2015 (Figure 1) and are now at approximately 2.4µg/m^3 from < 1µg/m^3 in 2015. Therefore, any addition as a result of the proposed development risks approaching or potentially exceeding the critical level which could adversely affect the

integrity of the site. The absence of this pollutant in the construction impact calculations is therefore an important omission.

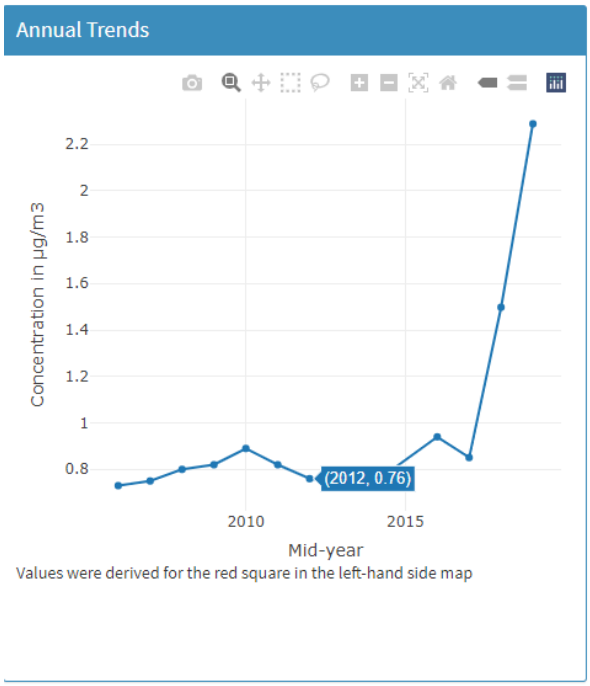

Figure 1: Screenshot from APIS showing trends in ammonia concentration at The Wash SAC[6]

22. Natural England notes that *Operational impacts* were addressed in the appropriate assessment. These included increases in N deposition, NOx, and ammonia (all annual means). However, trace pollutants and acid deposition were not considered.

23. Natural England notes that **Section A17.6.142 onwards of AS-005** concluded that

> *"overall deposition of contaminants (specifically nitrogen) is generally of low importance for saltmarshes as the inputs are generally significantly below the large nutrient loadings from riverine and tidal inputs. Mature, upper areas of saltmarsh (like those found along The Haven) are also likely to be subject to direct run-off from the surrounding catchment. Biogeochemical cycling of nutrients through microbial activity is quite rapid in this open system and nitrogen losses via denitrification may be considerable (Barnes & Owen, 1998)….*

[6] It should be noted that the most recent annual point partly reflects a change in the model used by APIS to provide a more accurate representation of ammonia concentrations, but this is likely to be the more realistic concentration, and the previous data point also shows an increasing amount of ammonia in the area following a much slower increase since 2005.

With regards to deposition on to intertidal habitats (such as mudflats and shellfish beds that are exposed and covered at every state of the tide), where although deposition may occur in-between tides, this would be washed away with the tide; although there is the potential for this to contribute to a change in water quality, in the context of the wider water column, this is not considered to be significant."

24. Natural England advises that while such arguments may be appropriate, it is not possible to conclude if this applies at The Wash itself – or indeed at any habitats supporting qualifying features, including the LNRs/ LWSs which would be subject to much higher N deposition. We advise that the potential for such habitats to be fully/partially/not inundated at each tide should be considered for the entirety of the habitat at The Wash, to determine if they are potentially less sensitive to N deposition.

25. We draw your attention to the fact that the critical load for N deposition for various saltmarsh habitats has recently been revised downwards to 10-20kgN/ha/yr [7] suggesting air pollution can be an important factor in affecting the integrity of such habitats, and as a result, species which rely on them. It is likely that nitrogen deposition could increase growth of some species – but this is likely to be at the expense of others, resulting in a change in community. This revision incorporated relevant information on the impacts of nitrogen nutrient addition on communities from recent studies (including those published since the last critical load review in 2011). However, it is acknowledged that evidence is limited – and that long-term N addition studies with low doses of N application are needed for typical intertidal communities of high conservation value. We advise that in order to establish if an adverse effect on integrity is likely from the proposed addition of <0.43kgN/ha/yr [**as per REP6-035**] - an increase of 4.3% of the revised lower critical load, further consideration would be required.

26. **Figure 2 below, from APIS**, indicates that current background (mid year 2019) N deposition levels are approximately 19.4kgN/ha/yr, (approaching double the new lower critical load) with the trends showing a sharp increase in recent years[8].

[7] Review and revision of empirical critical loads of nitrogen for Europe 2022 (FINAL) | Umweltbundesamt

[8] As referenced under Figure 1 for ammonia, the most recent annual point partly reflects a change in the model used by APIS, and likely represents the increased contribution of ammonia to nitrogen deposition. This is likely to be the more realistic concentration, and the previous data point also shows an increasing amount of N deposition in the area following it having been roughly constant since 2005.

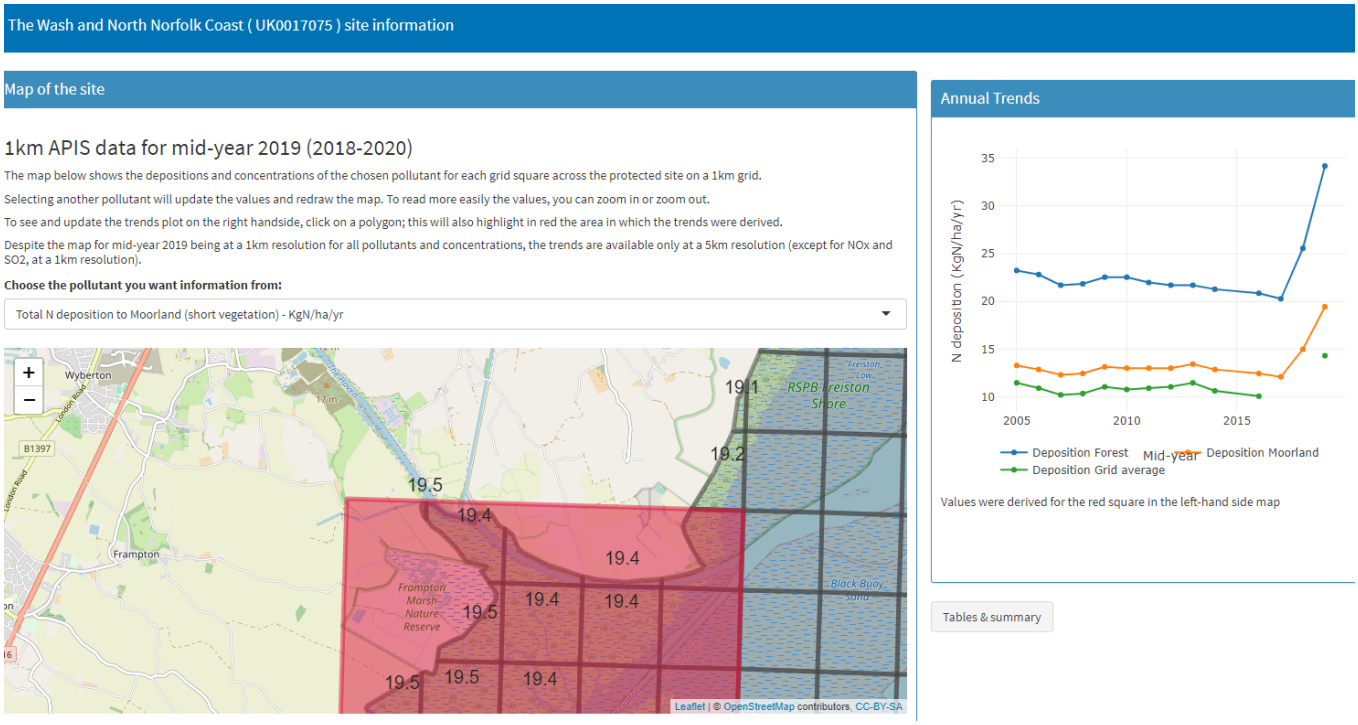

Figure 2: Screenshot from APIS showing nitrogen deposition at The Wash SAC, and trends in N deposition from 2005

27. We advise that gaseous concentrations of NOx and ammonia are also modelled as being above 1% of their critical levels – 2.2% in the case of ammonia and 2.8% for NOx. These can result in different impacts to plants and ecosystems than effects from deposition, and impacts would not be reduced by periodic inundation (if that is relevant at the areas of concern). **However, the Applicant has not considered the potential impact of these pollutants on the integrity of the designated sites, or proposed mitigation to reduce them.** In the case of NOx, the background concentration is substantially below the critical level of 30µg/m^3 (approximately 10µg/m^3 and the trend is declining) but in the case of ammonia, although still below the critical level (3 µg/m^3) there has been a sharp increase in concentrations recently (Figure 1) and an adverse effect on the ecosystem integrity with continued increases cannot be excluded without further consideration.

28. **We advise that acid deposition and potential impacts of trace pollutants should be addressed by the Applicant in the appropriate assessment of operational impacts.** In relation to acid deposition, this is potentially important, as although the saltmarsh aspect of the habitat may only be marginally sensitive to acidity (especially if parts of it are inundated, which would dilute any impacts) other qualifying features (and their associated habitat) should also be considered, which could be more sensitive. As outlined in the construction impact section, habitat outside the designated sites

supporting some of the qualifying species (especially SPA birds) may also be affected and is predicted to be exposed to higher acid deposition.