

Norfolk Vanguard Offshore Wind Farm

Air quality assessment for Old Railway Gatehouse Position Statement

Issue Specific Hearing 6 Action Point 15

Applicant: Norfolk Vanguard Limited
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Deadline 7

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Photo: Kentish Flats Offshore Wind Farm



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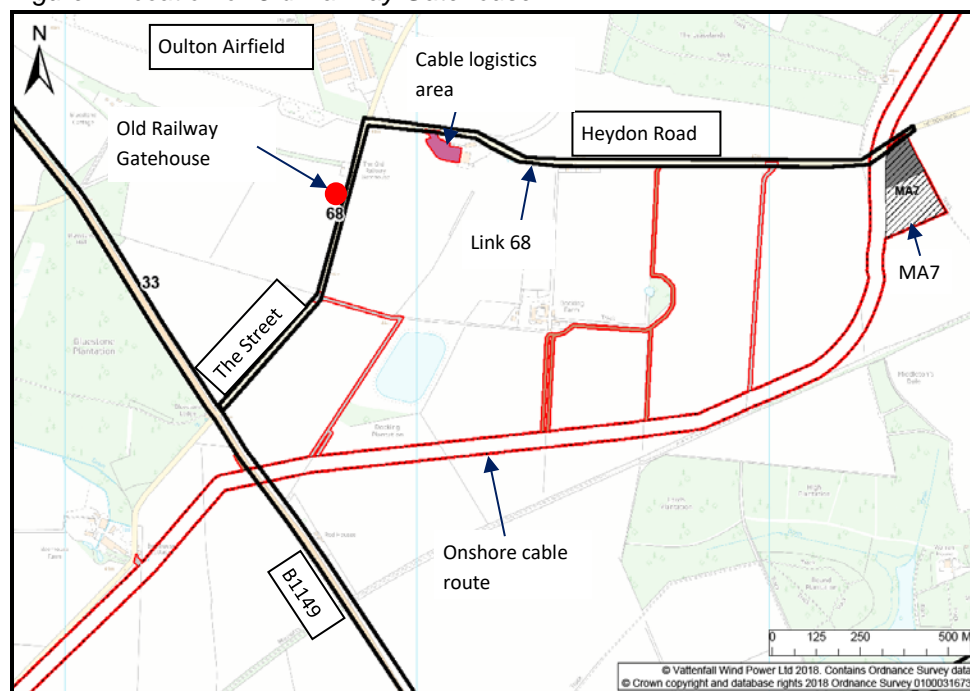
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1 Air Quality – The Old Railway Gatehouse

1.1 Introduction

1. During the Issue Specific Hearing on Environmental Matters (ISH6) on the 24 April 2019, the Examining Authority (ExA) requested a position statement from the Applicant setting out the latest position in relation to:
 - Air quality assessment at the Old Railway Gatehouse along Link 68 (Action Point 15).
2. Link 68 was not previously identified as a specific receptor in the updated CIA submitted at Deadline 5 (ExA; ISH1; 10.D5.3). The ExA also requested that the assessment considered ammonia and other background pollutants from existing nearby polluting activities.
3. A cumulative air quality impact assessment was submitted to the examination at Deadline 5 which was based on the previously agreed air quality receptors in proximity to the construction traffic access routes for the Project. The Old Railway Gatehouse was not identified as one of the air quality receptors for Norfolk Vanguard alone and hence the CIA submitted at Deadline 5 did not include that property. The Applicant has subsequently re-run the air quality model separately for this property for completeness.
4. The location of the Old Railway Gatehouse along Link 68 as modelled is shown on Figure 1 below.

Figure 1 Location of Old Railway Gatehouse



1.2 Air quality impact assessment methodology

5. The assessment presented in the updated CIA submitted at Deadline 5 and subsequently employed for the assessment of the Old Railway Gatehouse followed the agreed air quality impact assessment methodology as set out in section 26.4.1.2 of Environmental Statement Chapter 26 Air Quality, which includes details of the dispersion model used (Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v4.1.1), the assessment scenarios modelled, the emission factors provided by Defra, the meteorological data used and the model verification process undertaken.
6. Air quality assessments are, in their nature, desk-based as atmospheric dispersion modelling is used to predict pollutant concentrations from developments which are not yet operational. The air quality assessment undertaken for Norfolk Vanguard has made use of Defra mapped background pollutant concentrations, which is standard industry practice, is referenced in statutory technical guidance, is recommended by the relevant statutory bodies for use in such assessments and was the approach agreed for Norfolk Vanguard through the evidence plan process. The background maps include contributions of existing road, industry, commercial and domestic emission sources. The air quality impact assessment for the Old Railway Gatehouse using the accepted Defra pollutant concentrations is presented in section 1.3.1.

1.2.1 Other polluting activities

7. In response to queries raised during ISH 6 the Applicant has repeated the air quality assessment taking into account background pollutants associated with a consented biomass boiler. In addition, the potential for traffic using Link 68 and having to wait in proximity to the Old Railway Gatehouse has also been taken into account.

1.2.1.1 Consented biomass boiler

8. An air quality assessment was carried out in respect of a consented biomass boiler which would provide contributions of NO₂ and PM₁₀ from the biomass boiler. These contributions have been added to the modelled road contributions to provide the combined cumulative increase in NO₂ and PM₁₀ emissions from Norfolk Vanguard, Hornsea Project 3 and the biomass boiler.

1.2.1.2 Heavy Goods Vehicles (HGVs) waiting in proximity to the Old Railway Gatehouse

9. The width of The Street immediately adjacent to The Old Railway Gatehouse is sufficiently narrow that two HGVs would have difficulty passing. The scheme of mitigation proposed by the Applicant along The Street proposes a passing bay set back 40m from The Old Railway Gatehouse and the inclusion of a sign to give priority to oncoming vehicles, i.e. to ensure that vehicles do not attempt to pass each other directly outside of the property.

10. This 40m distance is designed to allow a loaded HGV to traverse through their gears avoiding HGVs changing gear directly outside the property. Furthermore, there is an existing 'informal' passing bay which is already used by vehicles waiting to pass at the Old Railway Gatehouse, thus the introduction of a passing bay as part of the scheme of mitigation formalises an existing arrangement, albeit the intensity of the frequency of the events would increase.
11. Idling and slower vehicle speeds may result in higher pollutant emissions in this vicinity. A sensitivity test was therefore carried out to consider the changes in pollutant concentrations at the Old Railway Gatehouse, on Link 68, associated with traffic travelling at lower speeds. The model considers the number of light and heavy duty vehicles expected to travel along this road both without (i.e. the baseline) and with Norfolk Vanguard and Hornsea Project 3 on Link 68, at a speed of 5kph (3mph). This is the lowest speed it is possible to include in the model and is considered to be a reasonable conservative representation of average speeds associated with HGVs slowing, momentarily idling, and then pulling away and increasing in speed.
12. Only a small proportion of passing vehicles would be required to stop at the proposed passing place at The Old Railway Gatehouse. For the purpose of this note, two scenarios have been tested, based on professional judgement:
 - Low scenario - that during the daytime 10% of the cumulative HGVs along Link 68 would have to stop at the passing place.
 - High scenario - that during the daytime 25% of the cumulative HGVs along Link 68 would have to stop at the passing place.

1.2.1.3 Ammonia

13. National air quality Objectives have been set by UK Government for atmospheric pollutants which have known impacts on human health, based on atmospheric emissions, likely population exposures and epidemiological studies; there is currently no UK air quality Objective (or EU Limit Value on which UK legislation is based) for ammonia.
14. Ammonia is principally of concern in relation to ecological sites due to the deposition of eutrophying pollutants and through its contribution to acidification. However, it does also contribute to the formation of secondary particulate matter (particles formed in the atmosphere rather than directly emitted), which does have implications for human health.
15. Particulate matter has health-based Objectives, and the contribution from secondary particulate matter formation is included within the Defra mapped background data used in the assessment. It is not possible to calculate the proportion of secondary particulate

matter which may form as a result of vehicle emissions; the formation of secondary particles in the atmosphere is slow and within this time frame the pollution can travel long distances and lead to impacts far from the original source.

16. The primary source of ammonia in the UK is agriculture; whilst there is a contribution from diesel fuel, it is nominal in comparison to emissions of NO₂ and PM₁₀ from Heavy Goods Vehicles (HGVs) which do have health-based air quality Objectives. A comparison of the emissions of ammonia and particulate matter for HGVs and agriculture is provided in Table 1 – this shows the contribution across the whole of the UK.

Table 1 – Comparison ammonia and particulate matter emissions for HGVs and agriculture UK wide

Source (2016 data)	Units	Ammonia	NOx as NO ₂	PM ₁₀ Exhaust and brake and tyre wear	PM _{2.5} Exhaust and brake and tyre wear
All Road transport HGVs rural driving	tonnes/yr	100	16,040	900	620
Road transport - HGV articulated - rural driving	tonnes/yr	50	5,770	449	303
Road transport - HGV rigid - rural driving	tonnes/yr	50	10,270	451	316
Agriculture	tonnes/yr	253,000	-	-	-

* source: UK National Atmospheric Emissions Inventory

17. On this basis construction traffic associated with Norfolk Vanguard and Hornsea Project Three are not considered to be significant contributors of ammonia and ammonia has not been considered further in this assessment.

1.2.1.4 Other polluting activities assessment

18. The assessment for the Old Railway Gatehouse using the accepted Defra pollutant concentrations plus the biomass development plus the introduction of up to 25% of vehicles using Link 68 and having to stop in proximity to the Old Railway Gatehouse as a result of Norfolk Vanguard and Hornsea Project Three is presented in section 1.3.2.

1.3 Results

1.3.1 Magnitude and significance – human receptors

19. Guidance provided by the Institute of Air Quality Management and Environmental Protection UK has been used to determine the magnitude and significance of a project's impact on local air quality. The impact descriptors that take account of the magnitude of changes in pollutant concentrations, and the concentration in relation to the air quality objectives, are detailed in Table 2.

Table 2 – Impact significance

Long term average concentration at receptor in assessment year	% Change in concentration relative to the air quality objective			
	1	2 - 5	6 - 10	>10
75% or less of Objective	Negligible	Negligible	Slight	Moderate

1.3.2 Old Railway Gatehouse – using Defra mapped background data

20. Existing traffic flows along Link 68 were growthed to the peak assessment year (2023) and then modelled for increases in NO₂, PM₁₀, and PM_{2.5} using peak cumulative construction traffic for both Norfolk Vanguard and Hornsea Project Three. The results of this standalone assessment for the Old Railway Gatehouse are provided in Tables 3-5.

Table 3 – Cumulative NO₂ concentrations at the Old Railway Gatehouse

Annual Mean NO ₂ Concentration					
Without Norfolk Vanguard and Hornsea Project 3 (µg/m ³)	With Norfolk Vanguard and Hornsea Project 3 (µg/m ³)	Change (µg/m ³)	Annual mean air quality Objective (µg/m ³)	Change as % of Objective	Impact Significance
9.06	9.57	0.51	40	1.28	Negligible

Table 4 – Cumulative PM₁₀ concentrations at the Old Railway Gatehouse

Annual Mean PM ₁₀ Concentration					
Without Norfolk Vanguard and Hornsea Project 3 (µg/m ³)	With Norfolk Vanguard and Hornsea Project 3 (µg/m ³)	Change (µg/m ³)	Annual mean air quality Objective (µg/m ³)	Change as % of Objective	Impact Significance
14.25	14.30	0.05	40	0.13	Negligible

Table 5 – Cumulative PM_{2.5} concentrations at the Old Railway Gatehouse

Annual Mean PM _{2.5} Concentration					
Without Norfolk Vanguard and Hornsea Project 3 (µg/m ³)	With Norfolk Vanguard and Hornsea Project 3 (µg/m ³)	Change (µg/m ³)	Annual mean air quality Objective (µg/m ³)	Change as % of Objective	Impact Significance
9.24	9.27	0.03	25	0.12	Negligible

21. The predicted concentrations for NO₂, PM₁₀ and PM_{2.5} are all well below the Objectives both without and with the two projects. The inclusion of cumulative traffic does not result in a change in concentrations any greater than 1.28% of the relevant air quality Objectives and the cumulative air quality impact is considered to be **negligible** in all cases.

1.3.3 Old Railway Gatehouse – using Defra mapped background data + known additional polluting activities and influence of vehicles waiting in proximity to the Old Railway Gatehouse

22. Existing traffic flows along Link 68 were growthed to the peak assessment year (2023) and then modelled for increases in NO₂, PM₁₀, and PM_{2.5} with and without the following additional potentially polluting activities:

- peak cumulative construction traffic for both Norfolk Vanguard and Hornsea Project Three;
- road contributions associated with the consented biomass boiler; and
- the influence of 10% and 25% of vehicles using Link 68 having to slow in proximity to the Old Railway Gatehouse.

23. The results are provided in Tables 6-8.

Table 6 – Cumulative NO₂ concentrations at the Old Railway Gatehouse

Annual Mean NO ₂ Concentration						
% vehicles queuing	Without NV and HP3 (µg/m ³)	With NV and HP3 + other activities (µg/m ³)	Change (µg/m ³)	Annual mean air quality Objective (µg/m ³)	Change as % of Objective	Impact Significance
10%	9.06	10.07	1.01	40	2.53	Negligible
25%	9.06	10.78	1.72	40	4.30	Negligible

Table 7 – Cumulative PM₁₀ concentrations at the Old Railway Gatehouse

Annual Mean PM ₁₀ Concentration						
% vehicles queuing	Without NV and HP3 (µg/m ³)	With NV and HP3 + other activities (µg/m ³)	Change (µg/m ³)	Annual mean air quality Objective (µg/m ³)	Change as % of Objective	Impact Significance
10%	14.25	14.36	0.11	40	0.28	Negligible
25%	14.25	14.37	0.12	40	0.30	Negligible

Table 8 – Cumulative PM_{2.5} concentrations at the Old Railway Gatehouse

Annual Mean PM _{2.5} Concentration						
% vehicles queuing	Without NV and HP3 (µg/m ³)	With NV and HP3 + other activities (µg/m ³)	Change (µg/m ³)	Annual mean air quality Objective (µg/m ³)	Change as % of Objective	Impact Significance
10%	9.24	9.34	0.10	25	0.40	Negligible
25%	9.24	9.35	0.11	25	0.44	Negligible

24. The predicted concentrations for NO₂, PM₁₀ and PM_{2.5} for the combined cumulative traffic plus other polluting activities scenario are all well below the Objectives both without and with the two projects. The inclusion of the cumulative traffic plus other polluting activities does not result in a change in concentrations any greater than 4.3% of the relevant air quality Objectives and the cumulative air quality impact is considered to be **negligible** in all cases.