



AIR QUALITY TECHNICAL NOTE 3

Drax Bioenergy with Carbon Capture and Storage

The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations, 2009
– Regulation 5(2)(a)

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DOCUMENT NO. REV. NO:	8.20	DOCUMENT OWNER :	WSP UK Limited
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SUBJECT: Updated Background Concentrations and Critical Loads on APIS			

FOREWORD

The Environmental Statement (ES) for the Proposed Scheme was issued to the Planning Inspectorate in May 2022. For the assessment of impacts on ecological receptors, background pollutant concentration and deposition data were obtained from the Air Pollution Information System (APIS) provided by the Centre for Ecology and Hydrology (www.apis.ac.uk).

Since the submission of the ES, the data held by APIS have been updated.

This Technical Note (“Technical Note 3”) provides a discussion of the changes to the air quality assessment resulting from the changes to the background data. The details and discussion presented below demonstrate that the updates on APIS do not adversely affect the conclusions of the ES.

INTRODUCTION

The latest update to the APIS data took effect from 25 May 2023 and covers:

- The inclusion of modelled 2020 and 2021 pollutant concentration and deposition data, with data provided as an **average from 2019-2021** instead of the 2017-2019 used for the ES;
- Enhanced resolution of ammonia concentration and nitrogen/acid deposition data, with all data provided on a **1km x 1km grid** instead of the 5km x5km grid used to generate data for the ES; and
- **Correction** of a geographical error in the **ammonia** concentration data

BACKGROUND ECOLOGICAL CONCENTRATIONS AND CRITICAL LOADS

The original (as used in Chapter 6 (Air Quality) of the ES, (APP-042)) and updated background annual mean pollutant concentrations and deposition are presented in **Table 1** and **Table 2** below. The update to APIS affects the reported background concentrations for Nitrogen Oxides (NO_x), Sulphur Dioxide (SO₂), Ammonia (NH₃), and background Nitrogen and Acid Deposition.

Table 1 shows the background annual mean pollutant concentrations at ecological receptors within 15km of Drax as used in the Air Quality ES and as updated in this Technical Note. **Table**

2 shows the deposition rates and critical loads for the same ecological sites as used in the Air Quality ES and as updated in this Technical Note.

Table 1 – Background Annual Mean Pollutant Concentrations at Ecological Receptors included in the Operational Phase Assessment. (Green/Red numbers indicate change results in reduction/increase in total predicted concentrations)

Ecological Receptor	As Applied in the ES (Table 6.11, APP-042)			As Updated in June 2023		
	NOx	SO ₂	NH ₃	NOx	SO ₂	NH ₃
Thorne Moor SAC	13.2	1.3	2.6	10.3	1.1	1.9
Thorne & Hatfield SPA	13.2	1.3	2.6	10.9	1.3	1.9
Thorne, Crowle & Goole	13.2	1.3	2.6	10.3	1.1	1.9
Lower Derwent Valley SAC	8.2 - 9.9	1.1 - 1.7	4.6	6.7 - 8.4	0.9 - 1.4	2.4
Lower Derwent Valley SPA						
Lower Derwent Valley Ramsar						
River Derwent SAC	11.9	3.9	4.6	8.4	1.4	2.2
Skipwith Common SAC	9.8	1.4	2.6	8.0	1.2	2.2
Skipwith Common SSSI						
Humber Estuary SAC	12.2* (within 15km) 46.96 (anywhere on site)	7.5	3.6	14.5	2.1	2.1
Humber Estuary SPA						
Humber Estuary SSSI						
Brighton Meadows SSSI	9.9	1.7	3.1	7.8	1.2	2.2
Eskamhorn Meadows SSSI	11.4	1.3	2.4	8.8	1.1	2.0
Derwent Ings SSSI	9.8	1.7	4.6	8.4	1.4	2.4
Barn Hill Meadows SSSI	12.9	1.8	2.3	10.1	2.0	2.1
Burr Closes SSSI	10.5	1.2	2.5	8.6	1.1	2.1
Went Ings Meadows	12.1	1.3	2.4	9.8	1.1	1.9

*Humber Estuary NOx Concentration: 46.96µg/m³ – the maximum over the entire SAC/SPA was applied in Appendix 6.5 of the ES. This concentration occurs well outside the study area for the Proposed Scheme. The value quote in Table 6.11 of the ES and shown above was the maximum concentration within the study area (+/-15km of the main stack at Drax Power Station).



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Table 2 - Background Annual Mean Deposition Rates and Critical Loads for Ecological Receptors included in the Operational Phase Assessment. (Green numbers indicate change results in reduction of total deposition and/or reduction in impact expressed as a % of critical load)

Ecological Receptor	As Reported in the ES (Table 6.11, APP-042)			As Updated in June 2023		
	Nitrogen Deposition Rate	Acid Deposition Rate	Acid Critical Load	Nitrogen Deposition Rate	Acid Deposition Rate	Acid Critical Load
Thorne Moor SAC	21.3	1.73	0.462	16.1	1.10	0.462
Thorne & Hatfield SPA	21.3	Species within broad habitat not sensitive to acid deposition		16.1	Species within broad habitat not sensitive to acid deposition	
Thorne, Crowle & Goole	21.3	1.73	0.462	16.1	1.10	0.462
Lower Derwent Valley SAC	30.2	2.4	0.643	18.1	1.31	4.856
Lower Derwent Valley SPA		No expected negative impact on species due to impacts on the species' broad habitat (SPA)			No expected negative impact on species due to impacts on the species' broad habitat (SPA)	
Lower Derwent Valley Ramsar		No expected negative impact on species due to impacts on the species' broad habitat (SPA)			No expected negative impact on species due to impacts on the species' broad habitat (SPA)	
River Derwent SAC	14.8	No sensitive habitats		17.7	No sensitive habitats	
Skipwith Common SAC	21.1	1.73	0.802	17.2	1.24	0.462
Skipwith Common SSSI						
Humber Estuary SAC	28.9	No expected negative impact on species due to impacts on the species' broad habitat (SPA)		16.9	No expected negative impact on species due to impacts on the species' broad habitat (SPA)	
Humber Estuary SPA		No sensitive habitats (SAC & SSSI)			No sensitive habitats (SAC & SSSI)	
Humber Estuary SSSI		No sensitive habitats (SAC & SSSI)			No sensitive habitats (SAC & SSSI)	

Ecological Receptor	As Reported in the ES (Table 6.11, APP-042)			As Updated in June 2023		
	Nitrogen Deposition Rate	Acid Deposition Rate	Acid Critical Load	Nitrogen Deposition Rate	Acid Deposition Rate	Acid Critical Load
Brighton Meadows SSSI	23.5	1.92	0.643	17.3	1.24	4.856
Eskamhorn Meadows SSSI	20	1.64	2.000	16.1	1.15	5.071
Derwent Ings SSSI	30.2	2.4	0.643	18.9	1.36	4.856
Barn Hill Meadows SSSI	20.4	1.69	0.633	17.0	1.22	4.856
Burr Closes SSSI	20.6	1.68	1.248	16.5	1.21	5.071
Went Ings Meadows	19.4	1.59	2.008	15.8	1.12	5.071

REVISED RESULTS: ECOLOGICAL RECEPTORS

The updated APIS data affect the Maximum Predicted Environmental Concentration (PEC) both in an absolute sense (since the background data change) and, where the critical load changes, the impact as a percentage of the Critical Level/Loads. In addition, whilst the updates do not result in any change in the magnitude of the modelled Maximum Process Contribution (PC), where the critical load changes, they impact on the reported PC as a percentage of the critical load.

The updated concentration and deposition data are generally lower than the data presented in the ES. That is to say, for the majority of the sites, the background pollutant concentrations and nitrogen and acid deposition decrease between the 2017-2019 data (as used in the ES) and the 2019–2021 data (updated Jun 2023). This reduction results in a corresponding reduction in the PEC for pollutant concentrations and deposition on the majority of the ecological receptors.

The updates do not result in any adverse changes to the findings of the Environmental Statement. Importantly, no additional sites are identified as having a possible significant effect over and above those that were considered in detail by the Project ecologists for the ES (Appendix 6.5, REP2-034, Rev04 to be submitted at Deadline 8) and the HRA Report (REP6-021), and where the critical levels/loads are exceeded, the margin of exceedance is reduced.

There is a minor increase in background SO₂ concentration over Barn Hill Meadows, but the PEC remains well within the critical level.

There are a small number of sites where the updates result in the removal of the risk of a significant effect. These changes are illustrated in **Table 3** below for the cumulative, mitigated mid merit scenario, and relate to:

- Reduction in background NO_x concentrations over the Humber Estuary SAC/SPA/SSSI, where in comparison to data reported in Appendix 6.5 of the ES (REP2-034, Rev04 to

be submitted at Deadline 8), the site is moved from a situation where the PEC exceeds the critical level to a situation where the PEC is within the critical level, and

- Increase in critical load for acid deposition over Lower Derwent Valley SAC and Barn Hill Meadows SSSI, where the site is moved from a situation where the PEC exceeds the critical load and the PC is greater than 1% of the critical load to a situation where the PEC is within the critical load and the maximum PC is less than 1% of the critical load.

Appendix 6.5 of the ES (REP2-034, Rev04 to be submitted at Deadline 8) has been updated to take account of the change in background NO_x concentrations over Humber Estuary and the updated critical load for acid deposition over Lower Derwent Valley SAC and Barn Hill Meadows SSSI.

Table 3: Examples of updated model results where APIS changes result in a change to risk of significant effects (Model scenario: Cumulative impacts, mid-merit with mitigation) (Green figures show improvement with APIS changes)

Change: Decrease in Background NO_x Concentration (Model scenario: Cumulative, Mid Merit With Mitigation)				
Ecological Receptor	Background NO_x Reported in ES (Appendix 6.5) - µg/m³	Max Cumulative Annual Mean PEC - µg/m³ (as % of CL) as Reported in ES (Appendix 6.5)	Updated Background NO_x - µg/m³	Updated Max Cumulative PEC -µg/m³ (as % of CL)
Humber Estuary	46.96	47.48 (158.3%)	14.50	15.03 (50.1%)

Change: Increase in Acid Critical Load (Model scenario: Cumulative, Mid Merit With Mitigation)

Ecological Receptor	Critical Load Reported in Air Quality ES (keq/ha/yr)	Max PC Impact as % of Updated CL	Max PEC as % of Updated CL	Critical Load Updated in this Technical Note (keq/ha/yr)	Max PC Impact as % of Updated CL	Max PEC as % of Updated CL
Lower Derwent Valley	0.643	1.6%	376.4%	4.846	0.2%	49.8%
Barn Hill Meadows	0.633	1.5%	269.3%	4.846	0.2%	35.1%