



Dudgeon and Sheringham Shoal Offshore Wind Farm Extensions

Preliminary Environmental Information Report

Volume 3

Appendix 24.4 - Designated Ecological Sites and Critical
Load Values in the Air Quality Study Area

April 2021

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Dudgeon and Sheringham Shoal Offshore Wind Farm Extensions Preliminary Environmental Information Report Appendix 24.4 Designated Ecological Sites and Critical Load Values in the Air Quality Study Area	
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Glossary of Terms

The Applicant	Equinor New Energy Limited
The Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension site as well as all onshore and offshore infrastructure.
The Sheringham Shoal Offshore Wind Farm Extension Project (SEP)	The Sheringham Offshore Wind Farm Extension site as well as all onshore and offshore infrastructure.

24.4 DESIGNATED ECOLOGICAL SITES AND CRITICAL LOAD VALUES

24.4.1 Introduction

1. A number of designated ecological sites are located within 200m of roads which are anticipated to experience increases in construction-related traffic flows above the criteria detailed in **Table 24-10** of **Chapter 24 Air Quality** (inclusive of traffic growth from 2018 to 2025). The APIS website (CEH, 2021) was consulted to identify any habitats or features of these designated sites that are sensitive to nutrient nitrogen and acid deposition. Where sensitive habitats or features were found, the Critical Loads for nutrient nitrogen and acid deposition were obtained.
2. An assessment of the potential impact of the Dudgeon Offshore Wind Farm Extension Project (DEP) and Sheringham Shoal Offshore Wind Farm Extension Project (SEP) will be presented at the Environmental Statement (ES) stage. The designated ecological sites, and associated Critical Load values, that will be considered in the assessment at the ES stage are detailed in **Table 24.4.1** and are shown in **Figure 24.4**.

Table 24.4.1: Designated ecological sites and Critical Load values

Designated Ecological Site	Link	Distance (m)	Habitat or Feature		Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
					Critical Load Range	CLminN	CLmaxS	CLmaxN
Pereers Wood Ancient Woodland	4	20	Broadleaved		10-20	0.142	1.69	1.832
Bullfer Grove Ancient Woodland	4	155	Broadleaved		10-20	0.142	10.881	11.023
Ancient Woodland (near Bodham)	13	0	Broadleaved		10-20	0.142	1.668	1.81
		30	Conifer		5-15			
Great Wood Ancient Woodland	13	7	Broadleaved		10-20	0.142	1.155	1.297
		22	Conifer		5-15			
Felbrigg Wood SSSI	13	5	Broad-leaved, mixed and yew woodland		10-20	0.142	1.155	1.297
	14	0				0.142	1.662	1.804
Broadland Ramsar and SPA	20	125	Hen harrier	Dwarf shrub heath	10-20	0.499	0.176	0.837
	30	50	Fen, marsh and swamp		15-30	-	-	-
	34 39	0 195	Littoral sediment		20-30	-	-	-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature		Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
					Critical Load Range	CLminN	CLmaxS	CLmaxN
			Great bittern	Fen, marsh and swamp	15-30	-	-	-
			Eurasian marsh harrier	Fen, marsh and swamp	15-30	-	-	-
			Eurasian wigeon	Littoral sediment	20-30	-	-	-
			Ruff	Littoral sediment	20-30	-	-	-
				Neutral grassland		0.223	0.176	0.542
			Tundra swan		N/A	-	-	-
			Whooper swan			-	-	-
			Gadwall			-	-	-
			Northern shoveler			-	-	-
The Broads SAC	20	125	Transition mires and quaking bogs		10-15	0.321	0.176	0.497
	21	0	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)		15-25	0.438	0.176	0.542
	30	50	Calcareous fens with Cladium mariscus and species of the Caricion davallianae		15-30	-	-	-
	34	0						
	39	195						

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
			Alkaline fens				
			Fen orchid	10-20	0.856	4	4.856
			Hard oligo-mesotrophic waters with benthic vegetation of Chara spp	N/A	-	-	-
			Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation				
			Desmoulin`s whorl snail				
			Otter				
			Ramshorn snail				
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	-	-	-	-			
Ant Broads and Marshes SSSI	20	125	Fen, marsh and swamp (Carex rostrata - Calliergon cuspidatum/giganteum (Calliergonella cuspidata/Calliergon giganteum) mire)	10-15	0.321	0.18	0.501

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
			Fen, marsh and swamp (<i>Carex rostrata</i> - <i>Potentilla palustris</i> swamp)		0.223	0.18	0.546
			Fen, marsh and swamp (<i>Carex rostrata</i> - <i>Sphagnum squarrosum</i> mire)		0.321	0.18	0.501
			Broad-leaved, mixed and yew woodland (<i>Alnus glutinosa</i> - <i>Carex paniculata</i> woodland)	10-20	0.142	0.24	0.525
			Broad-leaved, mixed and yew woodland (<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland)				
			Broad-leaved, mixed and yew woodland (<i>Salix cinerea</i> - <i>Betula pubescens</i> - <i>Phragmites australis</i> woodland)				
			Fen, marsh and swamp (<i>Cladium mariscus</i> swamp and sedge-beds)	15-30	-	-	-
			Fen, marsh and swamp (<i>Molinia caerulea</i> - <i>Cirsium dissectum</i> fen-meadow)		0.223	0.18	0.546
			Fen, marsh and swamp (<i>Phragmites australis</i> -		-	-	-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
			Peucedanum palustris tall-herb fen)				
			Fen Orchid	10-20	-	-	-
			Vascular Plant Assemblage	N/A	-	-	-
			Invertebrate Assemblage	N/A	-	-	-
			Lowland Open Waters and Their Margins	-	-	-	-
Trinity Broads SSSI	21	0	Broad-leaved, mixed and yew woodland (Alnus glutinosa - Carex paniculata woodland)	10-20	0.285	0.235	0.52
			Broad-leaved, mixed and yew woodland (Salix cinerea - Betula pubescens - Phragmites australis woodland)				
			Fen, marsh and swamp (Cladium mariscus swamp and sedge-beds)	15-30	-	-	-
			Fen, marsh and swamp (Juncus subnodulosus - Cirsium palustre fen meadow)		0.366	0.185	0.551
			Fen, marsh and swamp (Phragmites australis -		-	-	-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)			
				Critical Load Range	CLminN	CLmaxS	CLmaxN	
			Peucedanum palustris tall-herb fen)					
			Vascular Plant Assemblage	N/A	-	-	-	
			Bittern	Fen, marsh and swamp	15-30	-	-	-
			Marsh Harrier	Fen, marsh and swamp	15-30	-	-	-
			Pochard	Littoral sediment	20-30	-	-	-
				Standing open water and canals	N/A	-	-	-
			Tufted Duck	Littoral sediment	20-30	-	-	-
				Standing open water and canals	N/A	-	-	-
			Shoveler	Standing open water and canals	N/A	-	-	-
			Invertebrate Assemblage					
			Otter					

Designated Ecological Site	Link	Distance (m)	Habitat or Feature		Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .y ⁻¹)		
					Critical Load Range	CLminN	CLmaxS	CLmaxN
			Lowland Open Waters and Their Margins		-	-	-	-
Outer Thames Estuary SPA	23 24 25 34	0 0 0 75	Common tern	Supralittoral sediment (acidic type)	8-10	0.223	0.189	0.555
				Supralittoral sediment	10-20	-	-	-
				Supralittoral sediment (calcareous type)	10-15	0.856	4	4.856
				Standing open water and canals	N/A	-	-	-
			Little tern	Supralittoral sediment (acidic type)	8-10	0.223	0.189	0.555
				Supralittoral sediment (calcareous type)	10-15	0.856	4	4.856
				Supralittoral sediment	10-20	-	-	-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature		Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
					Critical Load Range	CLminN	CLmaxS	CLmaxN
			Red-throated diver	Inshore sublittoral sediment	-	-	-	-
Breydon Water Ramsar and SPA	25 34	0 40	Common tern	Supralittoral sediment (acidic type)	8-10	0.223	0.88	1.103
				Supralittoral sediment (calcareous type)	10-15	0.856	4	4.856
				Supralittoral sediment	10-20	-	-	-
				Standing open water and canals	N/A	-	-	-
			Pied avocet	Littoral sediment	20-30	-	-	-
			European golden plover	Littoral sediment	20-30	-	-	-
				Neutral grassland	20-30	0.223	0.88	1.103
				Improved grassland	-	-	-	-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature		Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)					
					Critical Load Range	CLminN	CLmaxS	CLmaxN			
			Northern lapwing	Littoral sediment	20-30	-	-	-			
				Arable and horticulture	-	-	-	-			
			Ruff	Littoral sediment	20-30	-	-	-			
				Neutral grassland	20-30	0.223	0.88	1.103			
			Tundra swan	Standing open water and canals	N/A	-	-	-			
				Arable and horticulture	-	-	-	-			
				Improved grassland	-	-	-	-			
			Breydon Water SSSI	25 34	0 40	Littoral sediment (Zostera communities)		-	N/A	N/A	N/A
						Vascular plant assemblage		N/A	N/A	N/A	N/A
Wigeon	Littoral sediment	20-30				-	-	-			
	Standing open water and canals	N/A				-	-	-			
Shelduck	Littoral sediment	20-30				-	-	-			

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
			Bewick's Swan	N/A	N/A	N/A	N/A
Foxburrow Wood Ancient Woodland	28	0	Broadleaved	10-20	0.357	1.489	1.846
Barnby Broad and Marshes SSSI	30	50	Fen, marsh and swamp (Juncus subnodulosus - Cirsium palustre fen meadow)	15-30	0.438	4.13	4.568
			Fen, marsh and swamp (Molinia caerulea - Cirsium dissectum fen-meadow)				
			Vascular Plant Assemblage	N/A	N/A	N/A	N/A
			Fen, marsh and swamp (Glyceria maxima swamp)	-	-	-	-
			Variety of Breeding Bird Species	-	-	-	-
Ravensingham Covert Ancient Woodland	30	0	Broadleaved	10-20	0.357	2.365	2.722
		85	Conifer	5-15	0.357	2.364	2.721
Blacks Grove Ancient Woodland	30	165	Broadleaved	10-20	0.357	2.365	2.722

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
Damgate Marshes, Acle SSSI	34	0	Vascular plant assemblage	N/A	N/A	N/A	N/A
Ancient Woodland (Ortolan's Grove)	35	105	Broadleaved	10-20	0.142	1.589	1.731
Smallburgh Fen SSSI	39	195	Broad-leaved, mixed and yew woodland (Alnus glutinosa - Carex paniculata woodland)	10-20	0.142	1.592	1.734
			Broad-leaved, mixed and yew woodland (Alnus glutinosa - Urtica dioica woodland)				
			Fen, marsh and swamp (Juncus subnodulosus - Cirsium palustre fen meadow)	15-30	0.223	0.86	1.083
			Fen, marsh and swamp (Schoenus nigricans - Juncus subnodulosus mire)		-	-	-
Ancient Woodland (near Dobb's Beck)	40	20	Broadleaved	10-20	0.142	1.591	1.733

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
Sprowston Wood Ancient Woodland	40	75	Conifer	5-15	0.142	1.59	1.732
Ancient Woodland (near Hevingham)	43	160	Broadleaved	10-20	0.285	0.765	1.05
Norfolk Valley Fens SAC	49 86	50 0	Northern Atlantic wet heaths with Erica tetralix	10-20	0.499	0.23	0.882
			European dry heaths	10-20	0.499	0.23	0.882
			Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	15-25	0.856	4	4.856
			Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	15-25	0.223	0.23	0.606
			Calcareous fens with Cladium mariscus and species of the Caricion davallianae	15-30	-	-	-
			Alkaline fens	15-30	-	-	-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)			
				Critical Load Range	CLminN	CLmaxS	CLmaxN	
			Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)	-	-	-	-	
			Narrow-mouthed whorl snail	Inland rock	5-10	-	-	-
				Neutral grassland	20-30	0.856	4	4.856
			Desmoulin`s whorl snail	Rivers and streams	N/A	-	-	-
Buxton Heath SSSI	49	50	Dwarf shrub heath (<i>Calluna vulgaris</i> - <i>Ulex gallii</i> heath)	10-20	0.642	0.24	0.882	
			Dwarf shrub heath (<i>Erica tetralix</i> - <i>Sphagnum compactum</i> wet heath)					
			Fen, marsh and swamp (<i>Juncus subnodulosus</i> - <i>Cirsium palustre</i> fen meadow)	15-30	0.223	0.24	0.606	
			Fen, marsh and swamp (<i>Molinia caerulea</i> - <i>Cirsium dissectum</i> fen-meadow)					
			Fen, marsh and swamp (<i>Schoenus nigricans</i> - <i>Juncus subnodulosus</i> mire)					-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
			Invertebrate Assemblage	N/A	N/A	N/A	N/A
			Silver-Studded Blue	-	-	-	-
Great Wood Ancient Woodland	49	160	Conifer	5-15	0.142	1.124	1.266
Cawston and Marsham Heaths SSSI	51	90	Dwarf shrub heath (<i>Calluna vulgaris</i> - <i>Ulex gallii</i> heath)	10-20	0.892	0.49	1.382
River Wensum SAC	79 80	0 0	Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	-	N/A	N/A	N/A
			Desmoulin`s whorl snail	N/A	N/A	N/A	N/A
			White-clawed (or Atlantic stream) crayfish	N/A	N/A	N/A	N/A
			Brook lamprey	N/A	N/A	N/A	N/A
			Bullhead	N/A	N/A	N/A	N/A
River Wensum SSSI	79 80	0 0	Fen, marsh and swamp (<i>Carex paniculata</i> swamp)	15-30	-	-	-
			Fen, marsh and swamp (<i>Phragmites australis</i> -				

Designated Ecological Site	Link	Distance (m)	Habitat or Feature		Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
					Critical Load Range	CLminN	CLmaxS	CLmaxN
			Eupatorium cannabinum tall-herb fen)					
			Fen, marsh and swamp (Phragmites australis swamp and reed-beds)					
			Fen, marsh and swamp (Carex acutiformis swamp)		-	-	-	-
			Fen, marsh and swamp (Glyceria maxima swamp)		-	-	-	-
			White-Clawed (Or Atlantic Stream) Crayfish	Freshwater	N/A	N/A	N/A	N/A
			Desmoulin's Whorl Snail	Freshwater	N/A	N/A	N/A	N/A
Holly Farm Meadow, Wendling SSSI	86	8	Fen, marsh and swamp (Juncus subnodulosus - Cirsium palustre fen meadow)		15-30	0.223	4.16	4.383
			Fen, marsh and swamp (Phragmites australis - Eupatorium cannabinum tall-herb fen)			-	-	-

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
			Neutral grassland (<i>Cynosurus cristatus</i> - <i>Caltha palustris</i> grassland)	20-30	0.223	4.16	4.383
Potter and Scarning Fens, East Dereham SSSI	86	0	Fen, marsh and swamp (<i>Juncus subnodulosus</i> - <i>Cirsium palustre</i> fen meadow)	15-30	0.223	4.16	4.383
			Fen, marsh and swamp (<i>Schoenus nigricans</i> - <i>Juncus subnodulosus</i> mire)		-	-	-
			Small Red Damselfly	-	N/A	N/A	N/A
			Invertebrate Assemblage	N/A	N/A	N/A	N/A
East Winch Common SSSI	87	0	Dwarf shrub heath (<i>Calluna vulgaris</i> - <i>Festuca ovina</i> heath)	10-20	0.714	0.23	0.944
			Dwarf shrub heath (<i>Erica tetralix</i> - <i>Sphagnum compactum</i> wet heath)				
Reffley Wood Ancient Woodland	88	5	Broadleaved	10-20	0.357	8.274	8.631
			Conifer	5-15	0.357	8.274	8.631
Ancient Woodland (near Ketteringham)	114	5	Broadleaved	10-20	0.357	2.378	2.735

Designated Ecological Site	Link	Distance (m)	Habitat or Feature	Nutrient Nitrogen (kgN.ha ⁻¹ .y ⁻¹)	Acidity Critical Load (keq.ha ⁻¹ .yr ⁻¹)		
				Critical Load Range	CLminN	CLmaxS	CLmaxN
Smeeth Wood Ancient Woodland	114	30	Broadleaved	10-20	0.357	2.378	2.735
		135	Conifer	5-15	0.357	2.378	2.735

