

Norfolk Boreas Offshore Wind Farm Updated information on cumulative and in combination effects with the Dudgeon and Sheringham Shoal Extension Projects

Applicant: Norfolk Boreas Limited
Document Reference: ExA.AS-3.D21.V1
Deadline: 20 August 2021

Date: August 2021
Revision: Version 1
Author: Royal HaskoningDHV

Photo: Ormonde Offshore Wind Farm

Table of Contents

1	Introduction	1
2	Information from the DEP and SEP projects PEIR.....	2
2.1	Potential cumulative EIA effects with the DEP and SEP project	2
2.2	Potential in-combination HRA effects with the DEP and SEP project	15
3	Summary	17

Glossary of Acronyms

AEoI	Adverse Effect on Integrity
CIA	Cumulative Impact Assessment
DCO	Development Consent Order
DEP	Dudgeon Extension Project
EIA	Environmental Impact Assessment
EMF	Electromagnetic Frequency
HGV	Heavy Goods Vehicle
HHW	Haisborough, Hammond and Winterton
HRA	Habitats Regulations Assessment
MMO	Marine Management Organisation
OCoCP	Outline Code of Construction Practice
PEIR	Preliminary Environmental Information Report
PPE	Personal Protective Equipment
PRoW	Public Rights of Way
SAC	Special Area of Conservation
SEP	Sheringham Extension Project
SoS	Secretary of State
SPA	Special Protection Area

1 INTRODUCTION

1. The Norfolk Boreas application for development consent was submitted in June 2019 and was examined between November 2019 and October 2020. The Dudgeon Extension Project (DEP) and the Sheringham Shoal Extension Project (SEP) submitted a scoping report in October 2019, and although the project was considered by the Applicant at a high level, the scoping document did not include enough information to allow meaningful consideration of any cumulative impacts with the Norfolk Boreas project. During Issue Specific Hearing 5 on 24 July 2020 possible cumulative effects with DEP and SEP were discussed and the Applicant's position was set out in [REP13-016]. The DEP and SEP Preliminary Environmental Information Report (PEIR) and Draft Information for Habitats Regulations Assessment (HRA) were both published in April 2021 and these documents included a preliminary assessment of cumulative and in-combination impacts with other projects, including Norfolk Boreas. The Applicant has reviewed the DEP and SEP PEIR and the Draft Information for HRA¹ documents which have also been used for the Section 42 consultation which was recently undertaken by DEP and SEP.
2. The Applicant's review gives consideration to the potential for likely significant effects to arise as a result of DEP and SEP when considered cumulatively with Norfolk Boreas, as well as the potential for adverse effects on integrity to arise in respect of any European sites when DEP and SEP is considered in-combination with the Norfolk Boreas project. Two tables are presented in section 2 below, the first considers the potential for cumulative effects between Norfolk Boreas and DEP and SEP with respect to EIA topics (both offshore and onshore), the second considers the potential for in-combination effects between Norfolk Boreas and DEP and SEP with respect to HRA.

¹ <https://sepanddep.commonplace.is/proposals/11-peir-documentation>

2 INFORMATION FROM THE DEP AND SEP PROJECTS PEIR

2.1 Potential cumulative EIA effects with the DEP and SEP project

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
Offshore EIA Topics	
General	<p>The wind farm sites for the Dudgeon and Sheringham Shoal Offshore Extension projects (DEP and SEP) are located approximately 83km from Norfolk Boreas at the closest point.</p> <p>In Chapter 5 Project Description of the DEP and SEP PEIRs the earliest construction start date for the main works is stated to be 2025 and the latest is 2028. Offshore works are programmed to begin in Year 3 of construction, starting in 2027 at the earliest, however offshore construction may not start until 2030. Norfolk Boreas offshore construction works are programmed for completion in 2027 (with foundation installation completed in 2026). This will result in some construction overlap between the projects but this is unlikely to include concurrent piling between projects.</p> <p>Therefore, the Applicant considers that due to the distance and likely timescales for offshore construction activity there is only a very limited or no pathway for any cumulative effects to occur for the majority of EIA topics.</p>
Offshore Topics not contributing to Cumulative Impacts	<p>The CIA completed for the DEP and SEP PEIR concludes that no cumulative effects (with any other project) would occur at all for: Marine Geology, Oceanography and Physical Processes and marine sediment and water quality. Due to the localised nature of the impacts associated with these topics and the spatial distance between DEP and SEP and Norfolk Boreas there is no pathway for cumulative impacts to occur.</p> <p>The conclusions of the DEP and SEP PEIR did not identify Norfolk Boreas as a project that would contribute to cumulative impact for: Benthic and intertidal ecology, Marine Sediment and Water Quality, Commercial Fisheries, Offshore Archaeology, Aviation and Radar, and Petroleum Industry and Other Marine Users.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that given the spatial distance between the projects and Norfolk Boreas there would be no cumulative effects for these topics.</p>
Fish and Shellfish Ecology (Chapter 11)	<p>The DEP and SEP PEIR does identify possible cumulative impacts for fish and shellfish ecology in respect of underwater noise, habitat loss and introduced hard substrate. However, the impacts are all assessed as being not significant in EIA terms. The Applicant considers that although Norfolk Boreas is included within the CIA, due to the considerable distance between the wind farms (83km), the contribution of Norfolk Boreas to</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>the impacts for fish and shellfish ecology would be extremely small. Therefore following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there would be no likely significant cumulative effects for fish and shellfish.</p>
<p>Marine Mammals (Chapter 12)</p>	<p>The DEP and SEP PEIR does identify overlap in piling activity with Norfolk Boreas as a potential source of cumulative impact for the following species:</p> <ul style="list-style-type: none"> • Harbour porpoise, • Bottlenose dolphin, • White beaked dolphin, • Minke whale; and • Grey and harbour seal. <p>The assessment of underwater noise due to piling concluded that if all offshore windfarms (included in the assessment) were single piling at the same time as DEP and SEP, there is the potential for a negligible to low magnitude of impact (dependent on species). However, it is highly unlikely that all offshore windfarms could be piling at exactly the same time. A medium receptor sensitivity for all marine mammal species was used in the assessment and therefore the conclusion was cumulative impacts of minor adverse significance (and therefore not significant in EIA terms) could occur to marine mammal species. The Applicant agrees with the findings of the CIA but notes that, given the distance (83km) between the DEP and SEP projects and the Norfolk Boreas wind farm, the contribution to the cumulative effects assessed in the DEP and SEP marine mammal assessment would be very low.</p>
<p>Offshore Ornithology (Chapter 13)</p>	<p>The PEIR for the DEP and SEP projects screened in cumulative ornithological impacts due to the risks of operational displacement and collision together with other UK offshore wind farms, including Norfolk Boreas. The cumulative impacts were assessed against populations at both the biogeographic and biologically defined minimum population scales, with consideration given to how the impacts could affect background mortality rates and the predictions obtained from population models comparing the populations obtained with and without the impacts. Using these methods, which are those advised by Natural England, all the impacts were assessed as being not significant in EIA terms due to the small magnitudes of predicted change in the status of the seabird populations (e.g. due to increases in mortality of less than 1%, which are considered undetectable, or small reductions in the population size or growth rate as predicted by population models). These are the same approaches used by the Applicant in the Norfolk Boreas cumulative impact assessment. The Applicant has reviewed the DEP and SEP assessments and concludes that there would be no likely significant cumulative effects. Notwithstanding this, the Applicant has included the DEP and SEP PEIR collision and displacement estimates in the updated cumulative tables requested by the SoS (document reference 8.26 and ExA.AS-2.D21.V1), since Natural England have requested their inclusion in recent project assessments.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
Shipping and Navigation (Chapter 15)	<p>The PEIR for the DEP and SEP projects screens in Norfolk Boreas as a project with the potential to act cumulatively with DEP and SEP to result in impacts to shipping and navigation. However, for all possible shipping and navigation impacts the DEP and SEP PEIR concludes that <i>“Given the distances and orientation of cumulative projects from DEP and SEP the impact in EIA terms is the same as DEP and SEP together.”</i> Therefore, concluding that Norfolk Boreas would not contribute to cumulative impacts to shipping and navigation. Following the Applicant's review of the information provided in the DEP and SEP PEIR the Applicant concludes that there would be no likely significant cumulative effects given the distance between the projects.</p>
Offshore Summary	<p>In summary, the PEIR for DEP and SEP concludes that there is no likely significant effects from cumulative impacts with Norfolk Boreas, and due to the large distance between the wind farm sites and the predicted timescales for construction activity the Applicant agrees with these conclusions.</p>
Onshore EIA Topics	
General	<p>DEP and SEP will make landfall at Weybourne in North Norfolk and propose to install a 60km buried cable system which heads in a southerly direction between the landfall at Weybourne and the grid connection south of Norwich. Three build out scenarios are described within the PEIR showing the earliest construction start date for DEP and SEP as 2025, but construction could start as late as 2028.</p> <p>Norfolk Boreas will make landfall at Happisburgh in North Norfolk, with a 60km onshore buried cable system that heads in a westerly direction between landfall at Happisburgh and the grid connection point near Necton. The Norfolk Boreas onshore construction works are programmed to be undertaken between 2023 and 2026, under the worst case scenario, Scenario 2, which assumes that Norfolk Vanguard would not proceed to construction. Under Scenario 2 peak construction activity would occur in 2023/2024 associated with the cable duct installation and substation civil engineering works.</p> <p>The Norfolk Boreas onshore substation location near Necton is approximately 30km from the proposed DEP and SEP onshore substation site options at Norwich; however, there is a physical overlap of the Norfolk Boreas and DEP and SEP onshore cable routes where they cross in the area to the east of Cawston.</p> <p>Given that there would be no overlap of peak construction activities between DEP and SEP and Norfolk Boreas (which are programmed to be at least a year apart, under the worst case Scenario 2) there is limited scope for any significant cumulative impacts to be realised. In any event the majority of potential cumulative impacts would be localised to the area in proximity to the crossing point of the onshore cable routes, which is located in arable land away from any sensitive receptors. However, given some impact types extend beyond this localised area, for example impacts on the road traffic network and impacts to river catchments, each of the onshore EIA topics is considered below for completeness.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:														
<p>Ground Conditions and Contamination (Chapter 19)</p>	<p>There are no known sources of contamination in proximity to the crossing point of the Norfolk Boreas and DEP and SEP onshore cable routes. The impact assessments for both projects identify the potential for short term risks to construction worker health associated with exposing unexpected contamination. This risk is managed by both projects through the use of appropriate working practices and the use of personal protective equipment (PPE). In addition both projects commit to producing a written scheme defining the procedures for the management of contaminated soils and groundwaters.</p> <p>The DEP and SEP PEIR assesses that there is no cumulative risk to human health associated with exposing unexpected contamination between DEP and SEP and Norfolk Boreas.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there would be no likely significant cumulative effects, given that there would be no overlap of peak construction activities, and that both DEP and SEP and Norfolk Boreas commit to the use of appropriate working practices and the use of PPE.</p>														
<p>Water Resources and Flood Risk (Chapter 20)</p>	<p>Norfolk Boreas and DEP and SEP will both cross watercourses in the River Bure catchment using an open cut method. There is the potential that these projects could act cumulatively to cause a greater level of direct disturbance to surface watercourses than each alone.</p> <table border="1" data-bbox="423 906 2022 1034"> <thead> <tr> <th>Catchment</th> <th>Sensitivity</th> <th>No. crossings made by NB</th> <th>No. crossings made by DEP/SEP</th> <th>Total no. crossings</th> <th>Residual impact NB</th> <th>Residual impact DEP/SEP</th> </tr> </thead> <tbody> <tr> <td>River Bure</td> <td>Medium</td> <td>5</td> <td>2</td> <td>7</td> <td>Minor adverse</td> <td>Minor adverse</td> </tr> </tbody> </table> <p>Norfolk Boreas proposes to cross five watercourses using open cut methods, and DEP and SEP proposes to cross two watercourses using the open cut method. The total of seven open cut crossings remains a low magnitude of effect, therefore the cumulative effect of both Norfolk Boreas and DEP and SEP in the River Bure catchment will not increase the impact reported for Norfolk Boreas alone, i.e. no greater than minor adverse significance. It should also be noted that these activities would be undertaken in different years, with Norfolk Boreas proposing to undertake watercourse crossings in 2023/2024, and DEP and SEP proposing to undertake them at the earliest in 2025, in effect meaning that there would be no mechanism to realise any potential cumulative impact.</p>	Catchment	Sensitivity	No. crossings made by NB	No. crossings made by DEP/SEP	Total no. crossings	Residual impact NB	Residual impact DEP/SEP	River Bure	Medium	5	2	7	Minor adverse	Minor adverse
Catchment	Sensitivity	No. crossings made by NB	No. crossings made by DEP/SEP	Total no. crossings	Residual impact NB	Residual impact DEP/SEP									
River Bure	Medium	5	2	7	Minor adverse	Minor adverse									

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>The DEP and SEP PEIR assesses that there is no cumulative risk with Norfolk Boreas to the River Bure catchment associated with open cut trenching of watercourses.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there would be no likely significant cumulative effects as the combined number of open cut crossings within the River Bure catchment would not increase the magnitude of effect compared to Norfolk Boreas alone.</p>
<p>Land Use and Agriculture (Chapter 21)</p>	<p>The Norfolk Boreas and DEP and SEP cable routes are both present within two agricultural fields to the east of Cawston. There is the potential that cumulatively this could increase disruption to farming practices and the underground agricultural drainage systems within these two fields.</p> <p>Norfolk Boreas and DEP and SEP both commit to use a specialist drainage contractor to locate existing drainage systems and develop detailed preconstruction drainage plans. Cables from both projects would be installed at a depth below the level of typical field drainage pipes to minimise impacts and interaction with agricultural drainage post-construction. In addition, both projects commit to seek private agreements (or provide compensation in line with the compulsory purchase compensation code) with affected landowners/occupiers and the land will be reinstated to preconstruction condition.</p> <p>The DEP and SEP PEIR assesses that there is no residual cumulative impact to agricultural farming practices or agricultural drainage systems associated with the construction of Norfolk Boreas and DEP and SEP.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there would be no likely significant cumulative effects as both projects commit to seek private agreements (or provide compensation in line with the compulsory purchase compensation code) with affected landowners/occupiers and the land will be reinstated to preconstruction condition.</p>
<p>Onshore Ecology (Chapter 22) and Onshore Ornithology (Chapter 23)</p>	<p>Both DEP and SEP and Norfolk Boreas cross the River Wensum Special Area of Conservation and Site of Special Scientific Interest. However, the crossing point of DEP and SEP is approximately 14km further downstream from the Norfolk Boreas crossing point and there would be no mechanism for cumulative impacts associated with DEP and SEP to be experienced upstream at the Norfolk Boreas crossing point. There are no other designated or non-designated sites for nature conservation that are affected by both projects.</p> <p>The point where the two onshore cable routes would cross is located within arable land to the east of Cawston. There is a single species poor hedgerow present within both project footprints and the area is considered to be of low ecological value. There is a single water body approximately 200m from the crossing location – a reservoir just east of the B1149. Whilst this was not accessible during the Norfolk Boreas pre-</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>application surveys, it has subsequently been surveyed as part of ongoing ecology surveys that Norfolk Boreas has undertaken during 2020 and 2021. The 2020 Norfolk Boreas survey findings show that this reservoir does not support great crested newts. There are no other features in proximity to the crossing point identified with any specific ecological value reported for either Norfolk Boreas or DEP and SEP.</p> <p>The DEP and SEP PEIR does not provide a cumulative impact assessment for onshore ecology as ecological surveys are continuing through 2021. However, given the Norfolk Boreas ecology survey findings and the low ecological value of the arable land that the two projects cross, the Applicant concludes that there would be no likely significant cumulative effects upon onshore ecological receptors within the arable land where the cable routes from both projects cross.</p>
<p>Traffic and Transport (Chapter 24)</p>	<p>Norfolk Boreas onshore construction works are programmed to take place between 2023 and 2026 under Scenario 2, with peak construction traffic occurring in 2023/2024 associated with the cable duct installation and substation civil engineering works. In the absence of mitigation, two road links in proximity to the proposed DEP and SEP crossing point were identified as having potentially significant cumulative traffic impacts (cumulatively between Norfolk Boreas and Hornsea Project Three) during the peak construction year for Scenario 2 (2023) – Link 34 (B1145 through Cawston) and Link 68 (The Street at Oulton). This is presented in Chapter 24 Traffic and Transport [APP-237]. A scheme of mitigation has been secured for each of these road links within the Outline Traffic Management Plan (Version 7) [REP18-021] that introduces a suite of measures to mitigate the potential for construction traffic impacts, including, passing places, parking restrictions, temporary speed limits and a cap to the maximum number of heavy goods vehicle (HGVs) that may use these routes. This limits the number of HGVs associated with the worst case Norfolk Boreas construction (Scenario 2) that may use Link 34 to 56 daily HGV deliveries (112 daily movements). The number of HGVs associated with the Norfolk Boreas construction that may use Link 68 will be limited to 40 daily HGV deliveries (80 daily HGV movements).</p> <p>For Link 34 there is also a commitment from Hornsea Project Three to not exceed 63.5 daily HGV deliveries (127 daily HGV movements) and represents an overall limit of 239 daily HGV movements between Norfolk Boreas and Hornsea Project Three to avoid significant cumulative impacts along Link 34.</p> <p>For Link 68 there is also a commitment from Hornsea Project Three to not exceed 59 daily HGV deliveries (118 daily HGV movements) and represents an overall limit of 99 daily HGV deliveries (198 daily HGV movements) between Norfolk Boreas and Hornsea Project Three to avoid significant cumulative impacts along Link 68 (The Street).</p> <p>With these measures in place there would be no residual significant traffic impacts. Outside of the peak cumulative construction period (cumulative with Hornsea Project Three) no significant traffic impacts associated with Norfolk Boreas were identified.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>During 2025 and 2026 Norfolk Boreas construction activities (under Scenario 2) are associated with the cable pull along the onshore cable route, which will generate significantly fewer HGV movements.</p> <p>DEP and SEP onshore construction has three build out scenarios, the earliest of which would have an onshore construction start in 2025 and within the DEP and SEP PEIR the peak construction traffic is reported to occur in 2025. Within the DEP and SEP PEIR there is a commitment to not route any construction traffic through Cawston (B1145 -Link 34). The DEP and SEP PEIR does identify The Street (Link 68) as a route required for their construction traffic, with a maximum peak construction traffic of 9 daily HGV deliveries (18 daily HGV movements) during the peak construction year (2025).</p> <p>The potential for cumulative construction traffic impacts between Norfolk Boreas and DEP and SEP was screened out within the DEP and SEP PEIR on the basis that there would be little to no overlap of the construction activities and peak construction activities do not overlap.</p> <p>During 2025 construction traffic movements along Link 68 (The Street) associated with Norfolk Boreas would be limited to deliveries to the cable logistics area to support the cable pulling works, which would be five daily HGV deliveries (ten daily HGV movements). Hornsea Project Three would maintain 59 daily HGV deliveries (118 daily HGV movements) throughout their construction phase and DEP and SEP indicate the potential for 9 daily HGV deliveries (18 HGV movements) during 2025. These numbers are significantly lower than the 198 daily HGV movements combined cap that has been committed to by Norfolk Boreas and Hornsea Project Three to mitigate construction traffic impacts.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative effects for traffic and transport because, there would be little overlap of construction activities, Norfolk Boreas construction traffic generation during 2025 would be extremely low, and DEP and SEP has committed to avoid routing any construction traffic through Cawston.</p>
<p>Noise and Vibration (Chapter 25)</p>	<p><i>Construction noise</i></p> <p>The proposed DEP and SEP onshore cable route would cross the Norfolk Boreas cable route east of Cawston. There is a common noise sensitive receptor in proximity to both projects (CRR12 as shown on Figure 25.2 of ES chapter 25 Noise and Vibration [APP-470]). Construction noise at CRR12 for Norfolk Boreas was assessed as no impact during the peak construction phase (2023/2024). The DEP and SEP cumulative impact assessment concluded that there would be no cumulative construction noise impacts with Norfolk Boreas.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative effects for construction noise as Norfolk Boreas alone would have no impact at noise sensitive receptor CRR12, and in addition there would be no overlap of peak construction activities under Scenario 2.</p> <p><i>Traffic-borne noise</i></p> <p>In the absence of mitigation, two road links were identified as having potentially significant cumulative traffic borne noise impacts (cumulatively between Norfolk Boreas (Scenario 2) and Hornsea Project Three) during the peak construction year (2023) – Link 34 (B1145 through Cawston) and Link 68 (The Street at Oulton). This is presented in Chapter 24 Traffic and Transport [APP-237]. A scheme of mitigation has been secured for each of these road links within the Outline Traffic Management Plan [REP18-021] that introduces a suite of measures to mitigate the potential for construction traffic noise impacts, including resurfacing of the road surface, temporary speed limits and a cap to the maximum number of HGVs that may use these routes. This limits the number of HGVs associated with the Norfolk Boreas construction that may use The Street to 40 daily HGV deliveries (80 daily HGV movements). This is combined with a commitment from Hornsea Project Three to not exceed 59 daily HGV deliveries (118 daily HGV movements) and represents an overall limit of 99 daily HGV deliveries (198 daily HGV movements) across projects to avoid significant cumulative impacts along Link 68 (The Street). With these measures in place there would be no significant cumulative residual impacts between Norfolk Boreas and Hornsea Project Three. Outside of the peak cumulative construction period no significant traffic-borne noise impacts associated with Norfolk Boreas were identified.</p> <p>The DEP and SEP PEIR does not provide a cumulative impact assessment for traffic borne noise along the B1145 through Cawston. However, within the DEP and SEP PEIR documentation there is a commitment to not route any HGV traffic along the B1145 through Cawston. On this basis the Applicant concludes there would be no likely significant cumulative effect for traffic borne noise on the B1145 through Cawston with DEP and SEP.</p> <p>The DEP and SEP PEIR does not provide a cumulative impact assessment for traffic borne noise along The Street at Oulton. The DEP and SEP PEIR identifies The Street as a route required for DEP and SEP construction traffic, with a maximum peak construction traffic of 9 daily HGV deliveries (18 daily HGV movements) during the peak construction year (2025). During 2025 construction traffic movements along The Street associated with Norfolk Boreas would be limited to deliveries to the cable logistics area to support the cable pulling works, which would be five daily HGV deliveries (ten daily HGV movements). Hornsea Project Three would maintain 59 daily HGV deliveries (118 daily HGV movements) throughout their construction phase. These numbers are significantly lower than the 198 daily HGV movements combined cap that has been committed to by Norfolk Boreas and Hornsea Project Three to mitigate noise impacts. The Applicant concludes there would be no likely significant cumulative effects for traffic borne noise on The Street at Oulton between DEP and SEP, Norfolk Boreas and Hornsea Project Three, on the basis that Norfolk Boreas construction traffic generation during 2025 would be extremely low.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
<p>Air Quality (Chapter 26)</p>	<p><i>Dust generation</i></p> <p>The potential worst case generation of particulate matter during the Norfolk Boreas construction works is related to the larger earthworks associated with the cable duct installation programmed to take place during 2023 and 2024. The works undertaken during 2025 and 2026 (cable pulling) would take place directly at joint locations with only limited excavation works to expose joint areas. The Norfolk Boreas Outline Code of Construction Practice (OCocP) [REP18-019] secures measures to suppress the generation of dust associated with all construction activities. With the implementation of the appropriate mitigation measures, the residual impacts from construction would be not significant.</p> <p>DEP and SEP onshore construction has three build out scenarios, the earliest of which would have an onshore construction start in 2025 and within the DEP and SEP PEIR the peak construction activity is reported to occur in 2025. DEP and SEP has also committed to measures to suppress the generation of dust associated with construction activities, reducing impacts to not significant.</p> <p>Within the DEP and SEP PEIR the cumulative impact assessment concludes that there would be no significant cumulative impacts associated with construction phase dust emissions from other projects combined with DEP and SEP.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative effects in relation to construction phase dust, given that there would be no overlap of the main earth moving construction activities between DEP and SEP and Norfolk Boreas, that dust generation during 2025 for Norfolk Boreas would be negligible, and that both projects commit to implement measures to suppress dust generation.</p> <p><i>Vehicle emissions</i></p> <p>Norfolk Boreas onshore construction works are programmed to take place between 2023 and 2026, with peak construction traffic occurring in 2023/2024 associated with the cable duct installation and substation civil engineering works. During the peak construction activities vehicle emissions were assessed as not significant at all receptors. During 2025 and 2026 construction activities would be associated with the cable pull along the onshore cable route and will generate significantly lower construction traffic and therefore significantly lower vehicle emissions.</p> <p>DEP and SEP onshore construction has three build out scenarios, the earliest of which would have an onshore construction start in 2025 and within the DEP and SEP PEIR the peak construction traffic is reported to occur in 2025. Vehicle emissions were assessed to be negligible at all receptors during the peak construction year (2025).</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>Within the DEP and SEP PEIR the cumulative impact assessment concludes that potential air quality impacts at all receptors were considered to be not significant for DEP and SEP, and that there are no significant cumulative impacts with other projects including Norfolk Boreas</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative effects, given that there would be no overlap of peak construction activities between DEP and SEP and Norfolk Boreas, and vehicle emissions for both projects were assessed as not significant.</p>
<p>Human Health (Chapter 27)</p>	<p>The Norfolk Boreas assessment identified potential minor adverse construction health impacts related to noise, air quality, physical activity and increased journey times during the peak construction years (2023/2024); and minor adverse operational health impacts related to electric and magnetic fields (EMF) associated with the Norfolk Boreas buried cables crossing Hornsea Project Three buried cables.</p> <p>The potential for cumulative impacts during construction related to noise, air quality and traffic are considered separately within this table and conclude that there would be no likely significant cumulative effects between DEP and SEP and Norfolk Boreas. The potential impact related to physical activity relates to the temporary disruption to Public Rights of Way (PRoW). However, there are no PRoWs that are directly affected by both projects.</p> <p>Within the DEP and SEP PEIR the cumulative impact assessment concludes that potential cumulative human health impacts during construction would be negligible for the general population and minor adverse for vulnerable groups, which is not significant in EIA terms.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative human health effects during construction.</p> <p>The potential for cumulative impacts during operation relates to the buried cables and EMFs. The location of the Norfolk Boreas and DEP and SEP buried cables is approximately 4km east of the crossing point between the Norfolk Boreas and Hornsea Project Three buried cables. Any cumulative EMF effect associated with the crossing point of two sets of cables is localised to the immediate area. There would be no additive effect from the DEP and SEP crossing point at a distance of 4km, over and above that already identified for Norfolk Boreas. The cumulative impact of the crossing point for Norfolk Boreas and DEP and SEP would be similar to that for Norfolk Boreas and Hornsea Project Three, i.e. minor adverse significance.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>Within the DEP and SEP PEIR the cumulative impact assessment concludes that there would be no cumulative human health impact related to operational EMFs for both the general population and vulnerable groups.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative human health effects during operation associated with the buried cable systems and EMFs.</p>
<p>Onshore Archaeology and Cultural Heritage (Chapter 28)</p>	<p>The point where the two onshore cable routes would cross is located within arable land to the east of Cawston. This location falls outside of any designated or non-designated features of heritage significance, and was not identified as requiring priority pre-application geophysical survey by either project. Both Norfolk Boreas and DEP and SEP have committed to strategies that would reduce (or offset) the impact to any unknown buried archaeology to a level considered non-significant in EIA terms.</p> <p>Within the DEP and SEP PEIR the cumulative impact assessment concludes that cumulative impacts on unknown buried archaeology are not significant.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative effects on buried archaeology during construction, given that both projects commit to strategies that would reduce (or offset) any potential impact.</p>
<p>Landscape and Visual Impact (Chapter 29)</p>	<p>The only location where there would be potential visibility of both DEP and SEP and Norfolk Boreas is at the point where the two onshore cable routes would cross during construction. This is arable land to the east of Cawston. There is a single species poor hedgerow present within both project footprints, which would be temporarily removed, but no trees are present at this location.</p> <p>The Norfolk Boreas onshore cable installation works would be relatively small in scale with a construction presence at any one location for no more than 2-3 weeks. Some very localised effects may occur associated with the more notable mobilisation areas, however, the nearest mobilisation area to this crossing point is approximately 2km to the east. It should also be noted that mobilisation areas are only required for the cable duct installation works (programmed for 2023/2024). Owing to the arable nature of the land, the relatively small section of species poor hedgerow to be temporarily removed, and the short-term nature of the Norfolk Boreas construction works in each location, any effects on landscape and visual receptors were assessed as not significant for Norfolk Boreas.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
	<p>It should also be noted that it would not be possible for both DEP and SEP and Norfolk Boreas to have a construction presence, at the cable crossing point, at the same time. The first project would need to complete cable duct installation works and the second project would then cross the installed ducts. As such, there could never be more than one construction presence at a time at the location where the cables cross.</p> <p>DEP and SEP onshore construction has three build out scenarios, the earliest of which would have an onshore construction start in 2025. The DEP and SEP PEIR concludes that there would be no cumulative visual effects arising during construction.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative effects, given that there would be no overlap of peak construction activities between DEP and SEP and Norfolk Boreas, the short timescale that construction would be present in any one location (2-3 weeks) and that it would not be possible for both DEP and SEP and Norfolk Boreas to have a construction presence at the cable crossing at the same time.</p>
<p>Tourism and Recreation (Chapter 30)</p>	<p>Potential cumulative impacts between DEP and SEP and Norfolk Boreas would be limited to inland tourism and recreation. This includes: disturbance effects (construction noise, lighting and general visibility of construction at the point the two cable routes cross), obstruction effects of PRoWs, other paths and public open spaces (where the same feature is affected by both projects), and traffic delays to tourism destinations (on construction road links shared by both projects). There are no PRoWs, paths, or public open spaces in proximity to the point where Norfolk Boreas and the DEP and SEP cable routes would overlap. Potential cumulative disturbance effects (noise, lighting, general visibility of construction activities) and delays to traffic would be linked to the potential for any overlap of the construction activities.</p> <p>The Norfolk Boreas onshore cable installation works would be relatively small in scale with a construction presence at any one location for no more than 2-3 weeks with peak construction activity occurring during the cable duct installation works programmed for 2023/2024. DEP and SEP onshore construction has three build out scenarios, the earliest of which would have an onshore construction start in 2025.</p> <p>The DEP and SEP PEIR concludes that there would be no cumulative effects on inland tourism and recreation receptors during construction.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there are no likely significant cumulative effects given that there would be no overlap of peak construction activities between DEP and SEP and Norfolk Boreas, and that there are no tourist or recreation features in proximity to the crossover point of the projects.</p>

Topic (NV Chapter number)	Potential for cumulative effects / impacts:
Socio-economics (Chapter 31)	<p>The Norfolk Boreas assessment identified potential minor to major beneficial impacts related to job creation and the supply chain during construction and operation, and potential minor adverse impacts to community infrastructure during construction related to construction noise and general visibility of the construction works. The potential for cumulative impacts between DEP and SEP and Norfolk Boreas related to construction noise and visual impacts are considered elsewhere in this table and conclude no likely significant effects.</p> <p>Norfolk Boreas onshore construction works are programmed to take place between 2023 and 2026, with peak construction activity occurring in 2023/2024 associated with the cable duct installation and substation civil engineering works. DEP and SEP onshore construction has three build out scenarios, the earliest of which would have an onshore construction start in 2025, which is identified as the peak construction year.</p> <p>The DEP and SEP PEIR concludes that there would be no cumulative socio-economic effects during construction between DEP and SEP and Norfolk Boreas related to community infrastructure. The Applicant concludes that there are no likely significant cumulative effects on community infrastructure given that there would be no significant cumulative visual impacts or cumulative noise impacts during construction where the projects' onshore cable routes overlap.</p> <p>The DEP and SEP PEIR concludes that there would be a moderate beneficial cumulative impact related to job creation and the supply chain during operation of all the major projects proposed in East Anglia, including Norfolk Boreas, but no cumulative impact during construction.</p> <p>Following a review of the available information provided within the DEP and SEP PEIR the Applicant concludes that there is the potential for likely significant beneficial cumulative effects associated with the operation of all these schemes related to job creation and the supply chain. Should DEP and SEP be constructed and become fully operational it would further reinforce the area as a hub of offshore operations in the UK which could have an additional multiplier effect to the cumulative beneficial impacts in relation to job creation reported for Norfolk Boreas.</p>
Onshore summary	<p>The potential for likely significant effects to arise cumulatively between DEP and SEP and Norfolk Boreas was considered following a review of the DEP and SEP PEIR published in April 2021. The DEP and SEP PEIR concluded no adverse likely significant cumulative effects with Norfolk Boreas for any of the onshore topic areas assessed. Having reviewed the information provided within the DEP and SEP PEIR, and as identified in the table above, the Applicant concludes that there are no adverse likely significant cumulative effects.</p>

2.2 Potential in-combination HRA effects with the DEP and SEP project

Topic	Potential for cumulative effects / impacts:
Offshore HRA topics	
Benthic	<p>The DEP and SEP Draft information for HRA does not identify any potential effects on the Haisborough, Hammond and Winterton (HHW) Special Area of Conservation (SAC) as it is outside of the zone of influence for the DEP and SEP projects. The HHW SAC is the only SAC designated for benthic features which could be affected by the Norfolk Boreas project, and therefore DEP and SEP would not act in combination to cause an effect on any benthic features. Therefore, the Applicant concludes that there would be no adverse effect on integrity caused by an in-combination impact from DEP and SEP and Norfolk Boreas.</p>
Marine Mammals	<p>There are three SACs, designated for marine mammal features, that the DEP and SEP Draft Information for HRA has screened in for the DEP and SEP projects and the Norfolk Boreas project. These are:</p> <ul style="list-style-type: none"> • The Wash and North Norfolk Coast SAC (designated for Harbour seal <i>Phoca vitulina</i>) • The Southern North Sea SAC (designated for Harbour porpoise <i>Phocoena phocoena</i>) and • The Humber Estuary SAC (designated for Grey seal <i>Halichoerus grypus</i>) <p>Neither DEP and SEP nor the Norfolk Boreas Project are located within The Wash and North Norfolk Coast SAC and the projects are separated by approximately 1.3km (SEP) and 34km (Norfolk Boreas) respectively from the nearest point of the SAC. Norfolk Boreas is located within the Southern North Sea SAC, whereas DEP and SEP are located more than 14.1km (DEP) from it at the closest point. Neither Norfolk Boreas nor DEP and SEP are located within the Humber Estuary SAC. Norfolk Boreas is 112km and DEP and SEP are 59.7km away from the Humber Estuary SAC at their closest points. No SAC designated for marine mammals, overlaps directly with the DEP and SEP and Norfolk Boreas wind farm projects, thus reducing the likelihood of significant effects.</p> <p>As stated in the PEIR the earliest DEP and SEP construction start date for the main works is 2025 and the latest is 2028. Offshore works are programmed to begin in Year 3 of construction, starting in 2027 at the earliest, however offshore construction may not start until 2030. Norfolk Boreas offshore construction works are due for completion in 2027 (with foundation installation in 2026). Therefore there is a chance that construction programmes could overlap between the projects and that there is a possibility of an overlap in piling activity (should the chosen foundation type for both projects require piling). Therefore, Norfolk Boreas is identified in the DEP and SEP Draft information for HRA as a project which could contribute to in-combination effects with the DEP and SEP projects. However, given the current predicted timelines for piling activity of the projects (see general section in table 2.1 above), an overlap in piling activity is not predicted to occur.</p>

Topic	Potential for cumulative effects / impacts:
	<p>The DEP and SEP draft Information for HRA concluded that an Adverse Effect on Integrity can be ruled out for all possible effects on marine mammals for the DEP and SEP projects alone and that the project specific SIP for the SNS SAC would manage and reduce potential for disturbance from in-combination effects. The Applicant agrees with DEP and SEP conclusions and due to the significant distance between the projects (83km), also concludes that no AEol will arise from in-combination impacts given the requirement for project specific SIPs, which will ensure that any overlapping construction timeframes, can be appropriately managed. The Applicant has already committed to manage such impacts within the In Principle Norfolk Boreas Southern North Sea Site Integrity Plan [REP5-042]. This will remove the risk of AEol for in combination effects with the DEP and SEP projects for all SACs designated for marine mammal features.</p>
<p>Offshore Ornithology</p>	<p>A number of SPAs, designated for seabird features have been screened in for both the DEP and SEP projects and the Norfolk Boreas project. These are:</p> <ul style="list-style-type: none"> • Greater Wash SPA (assessed for breeding Sandwich tern, breeding common tern and over-wintering red-throated diver) • Alde Ore Estuary SPA (assessed for breeding lesser black-backed gull) • Flamborough and Filey Coast SPA (assessed for breeding gannet, kittiwake, guillemot and razorbill) <p>The Norfolk Boreas in-combination assessment, undertaken prior to the DEP and SEP PEIR, concluded there would be no adverse effects on integrity of these SPAs due to the project alone or in-combination with other plans and projects. The DEP and SEP PIER has built on the previous in-combination assessments (i.e. including that for Norfolk Boreas) and concludes that adverse effects on integrity can be ruled out for all possible effects on these seabird species due to the projects alone and in combination with other projects and the Applicant agrees with this updated assessment.</p>
<p>HRA summary</p>	<p>The potential for adverse effects on integrity to arise as a result of DEP and SEP in-combination with Norfolk Boreas was considered following a review of the DEP and SEP Draft Information for HRA, published in April 2021. The DEP and SEP Draft Information for HRA concluded that there would be no adverse effect on integrity for any European site as a result of in-combination impacts with Norfolk Boreas. Having reviewed this, and as identified in the table above, the Applicant concludes that there will be no adverse effect on integrity from DEP and SEP in-combination with Norfolk Boreas.</p>

3 SUMMARY

In summary the Applicant has reviewed the information that is available in the DEP and SEP PEIR and Draft Information for HRA and generally agrees with the conclusions reached in both the cumulative impact assessments for EIA and the in-combination effects assessments for HRA. For clarity, following the Applicant's review of the information provided the Applicant concludes that there would be **no adverse likely significant cumulative effects** for any onshore or offshore topics and that there will be **no adverse effect on integrity** as a result of in combination effects on European sites.