SHEPHERD+ WEDDERBURN

RESPONSE TO EXQ2 ON BEHALF OF

(1) BARROW OFFSHORE WIND LIMITED (REF: 20049595) (2) BURBO EXTENSION LTD (REF: 20049590) (3) WALNEY EXTENSION LIMITED (REF: 20048542) (4) MORECAMBE WIND LIMITED (REF: 20049596) (5) WALNEY (UK) OFFSHORE WINDFARMS LIMITED (REF: 20049592) (6) ØRSTED BURBO (UK) LIMITED (REF: 20049589) (THE "ØRSTED IPs")

IN CONNECTION WITH THE Application by Morgan Offshore Wind Limited for an Order Granting Development Consent for the Morgan Offshore Wind Farm

## Introduction

1.1 We represent six owners[1] of operational offshore windfarms in the East Irish Sea, who we refer to together as the "**Ørsted IPs**" in respect of the application by Morgan Offshore Wind Farm Limited (the "**Applicant**") for an Order under the Planning Act 2008 (the "**Act**") granting Development Consent for the Morgan Offshore Wind Farm (the **"Project**").

1.2 This document contains the Ørsted IPs' responses to the second written questions of the examining authority ("**ExQ2**") (set out in the table overleaf). The Ørsted IPs have responded to the following questions, which have been directed towards them:

1.2.1 INF2.5

1.2.2 INF2.6

1.2.3 INF2.8; and

1.2.4 INF2.9.

1.3 The Ørsted IPs have also provided a response to SN2.7.

1.4 It is noted the examining authority has requested a response to question INF2.7 at deadline 6.

**Shepherd & Wedderburn LLP**

**16.01.2024**

[1] As set out relevant representations RR-005, RR-007, RR-023, RR-032, RR-043, RR-044.

<table>
<tr><th>Question Ref</th><th>Parties</th><th>Question</th><th>Ørsted IPs' answers</th></tr>
<tr>
<td>INF 2.5</td>
<td>Barrow Offshore Wind Limited<br>Burbo Extension Limited<br>Walney Extension Limited<br>Morecambe Wind Limited<br>Walney (UK) Offshore Windfarms Limited<br>Ørsted Burbo (UK) Limited<br>(collectively "the Ørsted IPs")</td>
<td>Potential wake effects 2<br><br>Tables 5-4 and 5-5 of the Wake Impact Assessment Report [REP4-049] provide a summary of the results of the wake loss assessment for each of the main scenarios on each of the Ørsted IPs windfarms, expressed as a percentage wake loss. Could the Ørsted IPs update the tables to include the following additional information:<br><br>i) Identify the percentage losses in terms of a quantified total energy loss (in kWh) for each scenario and OWF affected each year.<br><br>ii) Taking into account the above, what the overall quantified total energy loss would be for each OWF having regard to the current operational life of each.</td>
<td>i) The Orsted IPs have deliberately not disclosed the expected energy loss in kWh as this would reveal the internal view of the expected annual energy yield for each asset. This is commercially sensitive information. UK Government is currently considering creating market mechanisms for older projects, the disclosure of such information would also not be appropriate in that context.<br><br>However, a conservative view could be achieved by using the installed capacities of each wind farm alongside average capacity/load factor for offshore wind. Recently, the applicant in the Mona Offshore Windfarm examination utilised OFGEM figures giving the actual capacity factors relating to historic energy production at the Orsted IPs assets, in a technical note produced for the purposes of calculating the net GHG impact of that Project. While the Orsted IPs do not consider this figure provides an accurate representation of future loss, these capacity factors can be utilised to provide a ballpark estimate of potential energy loss as shown in the tables below. However, this is likely to be conservative for the Orsted IPs.<br><br>Calculation formula for indicative quantified energy loss:<br><br>Quantified Energy Loss per annum (kWh) = Project capacity (kW) * Capacity factor * Hours in a year (8766h) * Wake loss percentage.<br><br>The following indicative annual energy losses for each Ørsted IP is presented below for both the Morgan alone impacts and cumulatively with Mona and Morecambe.<br><br><u>Morgan only</u>
<table>
<tr><th></th><th>Installed capacity (MW)</th><th>Actual capacity factor</th><th>Average AEP (MWh)</th><th>Wake Loss Percentage (%)</th><th>Indicative annual quantified energy loss (MWh)</th></tr>
<tr><td>Barrow</td><td>90</td><td>34%</td><td>271,958</td><td>-0.45%</td><td>-1,224</td></tr>
<tr><td>Walney 1</td><td>183.6</td><td>39%</td><td>626,410</td><td>-1.58%</td><td>-9,897</td></tr>
<tr><td>Walney 2</td><td>183.6</td><td>44%</td><td>708,959</td><td>-2.18%</td><td>-15,455</td></tr>
<tr><td>Walney Extension 3</td><td>330</td><td>45%</td><td>1,298,967</td><td>-3.35%</td><td>-43,515</td></tr>
<tr><td>Walney Extension 4</td><td>329</td><td>45%</td><td>1,298,967</td><td>-3.22%</td><td>-41,827</td></tr>
<tr><td>West of Duddon Sands</td><td>388.8</td><td>43%</td><td>1,476,949</td><td>-1.28%</td><td>-18,905</td></tr>
<tr><td>Burbo Bank</td><td>90</td><td>32%</td><td>251,954</td><td>-0.25%</td><td>-630</td></tr>
<tr><td>Burbo Bank Extension</td><td>256</td><td>40%</td><td>896,197</td><td>-0.20%</td><td>-1,792</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Total</td><td>-133,246</td></tr>
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**Cumulative**

| | Installed capacity (MW) | Implied capacity factor | Average AEP (MWh) | Wake Loss Percentage (%) | Indicative annual quantified energy loss (kWh) |
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| Barrow | 90 | 34% | 271,958 | -3.09% | -8,404 |
| Walney 1 | 183.6 | 39% | 626,410 | -3.78% | -23,678 |
| Walney 2 | 183.6 | 44% | 708,959 | -3.69% | -26,161 |
| Walney Extension 3 | 330 | 45% | 1,298,967 | -4.13% | -53,647 |
| Walney Extension 4 | 329 | 45% | 1,298,967 | -5.21% | -67,676 |
| West of Duddon Sands | 388.8 | 43% | 1,476,949 | -3.86% | -57,010 |
| Burbo Bank | 90 | 32% | 251,954 | -1.63% | -4,107 |
| Burbo Bank Extension | 256 | 40% | 896,197 | -1.84% | -16,490 |
| | | | | **Total** | **-257,173** |

Ii) The annual energy loss calculated above would then apply for each year of the projects remaining life post construction of the asset(s) causing the wake. As previously indicated the remaining lifetime of the projects is not a defined value and Orsted A/S have stated that the remaining lifetime of the affected assets may be impacted by the wake as a result of the Applicants development. In this case it would be the entire production of the wind farm that would be lost.

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| **INF 2.6** | **Applicant**<br><br>**The Ørsted IPs** | **Potential wake effects 3**<br><br>Provide a commentary on how you consider the matter of any loss of renewable energy yield from other OWFs might be a matter to be demonstrated in the mitigation hierarchy and in consideration of Critical National Priority, and how it might be weighed in the planning balance. | The NPS-EN3 provides that (at 2.1.8) Applicants for Critical National Priority Infrastructure *"...must show how any likely significant negative effects would be avoided, reduced, mitigated or compensated for, following the mitigation hierarchy. Early application of the mitigation hierarchy is strongly encouraged, as is engagement with key stakeholders including SNCBs, both before and at the formal pre-application stage"*. In light of the material impacts the wake assessment report [REP4-049] indicates the Project will have at the Ørsted IPs' developments, the Ørsted IPs consider this paragraph is engaged. Additionally, paragraph 2.8.35 requires that the secretary of state should be satisfied that *"...site selection and site design of a proposed offshore wind farm and offshore transmission has been made with a view to avoiding or minimising disruption or economic loss…to other offshore industries."*<br><br>The Ørsted IPs consider that, as with other adverse effects of proposed CNP Infrastructure, wake loss is an effect capable of being addressed through the mitigation hierarchy. Once a potential impact is assessed and understood, it is possible to avoid, reduce or mitigate the effect through steps such as site selection and project design, the application of operational mitigation measures, and compensation. Any residual adverse effects must be weighted in the overall planning balance.<br><br>In this case, the Applicant has failed to cooperate in any meaningful way regarding the assessment of wake effects or to explore the potential for mitigation. Therefore, no attempt has been made to avoid or mitigate those effects and, it is not possible for the Applicant to demonstrate compliance with the mitigation hierarchy.<br><br>It is noted that while the Project is supported by the CNP policies in the NPS-EN3, this does not exempt the Applicant from needing to demonstrate compliance with the mitigation hierarchy. It is also noted that, the Ørsted IPs combined capacity totals 1,854 MW with all but two developments |

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| | | | meeting the threshold for Nationally Significant Infrastructure projects which would be covered by the CNP Infrastructure, if consented today. This highlights the significance of Ørsted IPs' developments for renewable energy generation in the UK, and the importance of ensuring that the Project seeks to coexist with these preexisting developments.<br><br>The Ørsted IPs consider the loss of renewable energy yield at existing developments as a result of new development is a factor to be weighed in the planning balance against the benefits of new development, in accordance with section 104(7) of the Planning Act 2008.<br><br>As highlighted in previous submissions [REP4-047] and [REP3-053] in addition to immediate energy generation loss, weight should be given to the potential for the impacts of new development to contribute to the long-term future viability of existing developments. This is also relevant to the consideration of whether new development aims to successfully coexist with existing development, which is a cornerstone of decision-making under the NPS-EN3.<br><br>It is also noted that coexistence is at the heart of marine policy and planning. For example, the North West Marine Plan 2021 provides, at policy NW-CO-1, that proposals which "*incorporate opportunities for co- existence and cooperation with existing activities will be supported*." Proposals that may have significant adverse impacts on existing activities must demonstrate that they will avoid, minimise and mitigate such adverse effects on an existing activity so they are no longer significant. Non-compliance with policies in marine planning documents could deter investments in which could hinder the UK's ambitions for offshore wind (that is, 43-50GW by 2030, as set out in the Clean Power 2030 Action Plan, and 65GW-140GW by 2050, under the Balanced Pathway Scenario of the 6th Carbon Budget). A focus on short term results in decision-making could hamper future investment.<br><br>It is acknowledged that 4.1.7 of the NPS-EN1 provides that, where an applicant for CNP Infrastructure is required to mitigate an effect as far as possible, but the Secretary of State considers that after the implementation of mitigation there would be residual effects "*…it is likely that the need case will outweigh the residual effects in all but the most exceptional cases".*<br><br>However, given the Applicant has made no attempt to mitigate or even assess the wake effects of the Project, the Ørsted IPs consider the Project does not benefit from this paragraph. Regardless, given the Applicant's approach to this matter, in particular its refusal to engage meaningfully with the Ørsted IPs and in light of the potential significance of this effect, it should be given considerable weight in the planning balance. |
| **INF 2.8** | **Applicant**<br><br>**The Ørsted IPs** | **Wake Loss – potential mitigation**<br><br>The Ørsted IPs response to ISH2 Action Point 13 [REP4-047] includes potential mitigation measures to reduce loss of AEP including design and operational changes such as installing a smaller number of large turbines, reducing capacity, increasing separation distance, wind sector management and wake steering. They consider that a commercial side agreement would assist in ensuring their interests are adequately protected, but that this would require meaningful engagement from the Applicant.<br><br>The Applicant's response (HAP_ISH2_13 [REP4-004]) refers to the final design process and the Crown Estate's 7.5km separation distance, and maintains that an assessment is not required and that the matters are not suitable for either protective provisions nor a commercial side agreement.<br><br>i) The Ørsted IPs are asked to explain what is meant by 'wind sector management' and 'wake steering'.<br><br>ii) The Applicant is asked to comment on the potential mitigation measures referred to by the Ørsted IPs.<br><br>iii) Both the Ørsted IPs and the Applicant are asked to comment on the following as a potential means of resolving the issue of wake loss: NPS EN-3 Paragraph 2.8.262 states that "*In some circumstances, the Secretary of State may wish to consider the potential to use requirements involving* | i) For both approaches the mitigation relies on the applicant turbines to harvest less of the incoming wind in order to reduce the wake impacts on the Orsted assets.<br><br>Wind sector management refers to the process of adapting a different operating mode on the Applicants turbines when the wind direction is such that it will cause wake on the Orsted IPs.<br><br>Under normal conditions, wind turbines aim to operate as efficiently as possible to extract energy from the wind, The more energy that is extracted from the wind, the more the wind speed decreases after it passes through the rotor and the higher the wakes will be. Turbines can change their operating setting to be less aggressive and hence extract less energy from the incoming wind with a subsequent reduction of the wake effect. The changes to operating modes would not be required for wind directions which don't results in wakes on the Orsted assets and additionally would not be required for low and high wind speeds when the wakes have less impact.<br><br>The balance between turbine efficiency and wakes is not linear (i.e a 1% reduction in turbine efficiency for the Applicant would not equal a 1% improvement of the wake effect) and would require a site-specific analysis to determine the cost/benefit of this approach. |

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| | | *arbitration as a means of resolving how adverse impacts on other commercial activities will be addressed*." | Wind sector management is a technically mature solution that is most commonly used to protect turbines from excessive loads due to upstream obstacles (eg mountains) or for turbines to operate in a reduced noise mode.<br><br>Wake steering refers to a practice where turbines are deliberately yawed out of the wind to deflect the wake away from the turbine immediately behind. Similarly to wind sector management, there is a reduction in efficiency to the turbines that are yawing as the optimum efficiency is when the turbine rotor is perpendicular to the incoming wind. It may be possible to collectively yaw the turbines of the applicant wind farm to avoid or reduce wakes on the Orsted IP turbines. Again, a site-specific analysis of this mitigation would be required to assess the cost / benefit of this approach for the Applicant against the Orsted IPs.<br><br>Wake steering is a less mature technology, which has demonstrated overall wake reduction within the wind farm itself (internal wakes) but not yet demonstrated whether it could be a solution to mitigating wakes on neighbouring wind farms (external wakes).<br><br>In respect of (iii), the Ørsted IPs consider that, if the Applicant does not take the appropriate steps to resolve this matter prior to the close of the examination, arbitration may be an appropriate route to addressing the issue. However, this would be as a last resort following attempts to mitigate the impacts of the Project. Arbitration would likely only be possible following a final decision on layout and potentially following decision-making on lifetime extensions.<br><br>The Ørsted IPs consider that the arbitration process would be a viable alternative if (i) both parties agree for the outcome of the arbitration to be legally binding and (ii) if the appropriate mitigation or compensation for the wake effects of the Project are directly linked to the outcomes of a wake assessment. |
| **INF 2.9** | **Mooir Vannin Offshore Wind Farm Limited**<br><br>**Ørsted IPs** | **Mooir Vannin Offshore Wind Farm Application**<br><br>The Applicant's response to the Ørsted IPs D3 submission on wake effects [REP4-009], point REP3-070.24] notes that*:*<br><br>*"The Mooir Vannin Scoping Report does not contain reference to wake effects … it appears that Ørsted do not consider it necessary for their own projects to make an assessment of such matters (as has been the case for the other six Ørsted projects that have been brought forward under the Planning Act to date). Further, the Applicant cannot see any response to the Scoping Report from the Ørsted IPs to Mooir Vannin in the Scoping Opinion. The Applicant is surprised by this given the Ørsted IPs claimed importance of an assessment being undertaken for all of the Round 4 developments (both within the Irish Sea and North Sea). The Mooir Vannin project is of a similar size, location and distance from the Ørsted IPs assets compared to the Morgan Generation Assets and is therefore assumed to have an equivalent wake effects potential on the Ørsted IPs assets".*<br><br>Mooir Vannin Offshore Wind Farm Limited are asked:<br><br>i) Has a wake loss assessment been carried out regarding effects on AEP of the Ørsted IPs existing OWFs within the Irish Sea, and if so, will it inform the forthcoming submission for Marine Infrastructure Consent, including consideration of any mitigation?<br><br>ii) Is there any reference in Isle of Man policy or legislation or seabed leasing conditions for such an assessment?<br><br>The Ørsted IPs are asked to provide comment on the Applicant's response [REP4-009] in respect of potential wake effects of Mooir Vannin Offshore Wind Farm, and its comments in relation to ISH2 action point 11 [REP4-004] regarding the specific | In response to the Applicant's comments in [REP4-004], the Ørsted IPs' view is that the effects of wake should be shared effectively managed. Ørsted A/S has historically taken a consistent approach to this issue in respect of its own developments and will continue to do so. As outlined in their deadline 4 submission [REP4-048], the Ørsted IPs are aware that wake effects were openly considered during the consenting process for the Burbo Bank Extension offshore wind farm, the Walney Extension offshore wind farm, and the Hornsea 2 offshore windfarm (which are Ørsted developments). In those circumstances, the issue was dropped by the relevant party due to lack of effect or resolved through negotiation.<br><br>Mooir Vannin was not included in the wake assessment undertaken by Wood Thilsted [REP4-049] for a number of reasons, including that it is at a much earlier stage of development, with consent applications not expected to be lodged until Spring 2025. Therefore, the level of information available regarding Mooir Vannin is considerably less certain at this point of its development. It is not clear, as the Applicant has suggested, that Mooir Vannin would have similar effects to the Project.<br><br>In contrast, the Project, along with the proposed Mona and Morecambe offshore windfarms, is considerably progressed in the DCO examination process, with the applicants for each development refusing to engage with the Ørsted IPs on the issue of wake loss. Therefore, the Ørsted IPs only option has been to assess the effects of those developments as accurately as possible, and given that the predicted effects are material, pursue the issue in the examination process.<br><br>The Mooir Vannin project falls within a separate legal jurisdiction and therefore will be subject to a different decision-making process. Additionally, it is noted that the Mooir Vannin site was awarded to Ørsted in 2015, well before the round 4 bidding process relevant to the Project commenced. As a result, prospective developers were on notice of potential wake effects from Mooir Vannin at the time of bidding and would have had the opportunity to build the consequences of those effects into their business cases. In contrast, the Ørsted IPs could not have been aware of the Project (or the |

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| | | exclusion of Mooir Vannin Offshore Wind Farm from the Wake Impact Assessment Report [REP4-049]. | proposed Mona or Morecambe offshore windfarms) at the time investment decisions were being made regarding their developments. |
| **SN2.7** | **Maritime and Coastguard Agency**<br>**Stena Line**<br>**UK Chamber of Shipping**<br>**Any Other Interested Parties** | **Security for continuation of the Marine Navigation Engagement Forum**<br>The listed IPs are asked to confirm if they consider that adequate security for post-consent stakeholder engagement would be provided by Commitment Co72 in the Commitments Register [REP4-025] which commits to continued engagement of the Marine Navigation Engagement Forum (MNEF) post-consent, and if not, why not. | Walney Extension Limited ("**WEL**") and Morecambe Wind Limited ("**MWL**") have raised concerns regarding shipping and navigation and the Marine Navigation Engagement Forum ("**MNEF**").<br>WEL and MWL do not consider the application documentation currently provides adequate security for post-consent stakeholder engagement. As noted in previous submissions, WEL and MWL seek to be specifically named as consultees in the Outline Vessel Traffic Management Plan ("**OVTMP**") [REP2-018].<br>MWL and WEL are not satisfied that the commitment to engage with "existing sea users" or through the MNEF provides sufficient certainty that they will be engaged with. We note that it is common that the party responsible for constructing and operating offshore wind development is different to the party applying for consent. In such circumstances, the developer/operator may not be keenly aware of the relevant interests at play.<br>MWL and WEL therefore seek a formal commitment to ensuring they have the opportunity to review the VTMP pre-submission to the Licensing Authority pre-construction in the interests of navigational safety within the vicinity of the Ørsted IPs assets, as a named consultee in the VTMP. The Ørsted IPs also expect close co-operation on the MPCP and ERCoP to ensure mutually beneficial outcomes.<br>MWL and WEL note the provisions regarding the MNEF currently in the OVTMP are relatively high-level and do not detail in sufficiently clear or specific terms how the MNEF will be engaged with in respect of the VTMP, MPCP or ERCoP. |