Greater Dublin Drainage Project Addendum

Environmental Impact Assessment Report Addendum: Volume 3A Part B of 6

Appendix A9.3 - Written Responses to Biodiversity (Marine) Queries at the 2019 Oral Hearing

Uisce Éireann

October 2023

An Bord Pleanála Oral Hearing

Irish Water

Greater Dublin Drainage

Response to Inspector's Questions

Marine (Ecology) – Ian Wilson

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Recolonisation of Benthos following Construction of the Marine Outfall Pipeline:

"Impact of the Proposed Project on Shellfish Waters"

Submission:

1 Two submissions[1] raised issues regarding the impact of the Proposed Project on designated shellfish waters (Section 10.3.5 of Irish Water's Response to An Bord Pleanála (dated 11 January 2019)).

Response:

2 The proposed outfall pipeline route (marine section) is located outside the Designated Shellfish Waters for Malahide although the route passes through areas recognised as active for shellfish fishery production. The impact from the Construction of the proposed outfall pipeline route (marine section) will be limited to a physical disturbance to the surface sediments and a localised impact along the pipeline itself as presented in Section 9.3.4 in Chapter 9 in Volume 3 Part A of the EIAR. Localised disturbance to the marine benthos and the sand-dwelling shellfish (such as the razor clam) is expected to be high from sediment removal or smothering of stored or plume-dispersed material but limited to a relatively small area of the trenched route (approximately 0.16km^2), and neighbouring sediments (approximately 1km^2). The benthos along the proposed outfall pipeline route (marine section) is based predominantly on sands, particularly in the western inshore section of the proposed route where the water depth is very shallow and subject to continuous reworking by wave induced currents. The central part of the proposed outfall pipeline route (marine section) is in silty sand, becoming increasingly coarser towards a muddy sandy gravel near the proposed marine diffuser location. There is an absence of any developed biogenic or geogenic features with any significant epifaunal component. The physical recovery of the surface sediments along the proposed outfall pipeline route (marine section) following construction is, therefore, expected to be rapid with a re-colonisation by the benthos in the dredged footprint localised areas occurring within six months for the majority of species, and one to two years for larger, slower-growing taxa.

3 The impact on water quality during the Operational Phase of the Proposed Project is covered under a separate brief of evidence. Section 9.5 in Chapter 9 in Volume 3 Part A of the EIAR summarises the expected high dispersion and significant near-field mixing zone of treated wastewater on discharge. The model confirms that an 'excellent' water quality status set out for 'coastal' waters will be maintained and will prevent impact to nearby bathing and shellfish waters. The modelled data for the discharge indicates that the impact plume has a limited spatial impact and will disperse significantly into the prevailing oceanography at the site. This fact, coupled with the discharge parameters will ensure there will be no ecological impact to shellfish waters.

4 **The following paragraphs provide further details on why rapid recolonization of benthos will occur following construction of the marine outfall pipeline:**

5 Paragraph 58 of the Marine Biodiversity brief of evidence, states that the physical recovery of the surface sediments along the proposed outfall pipeline route, following dredging and construction, is expected to be rapid with a re-colonisation by the benthos in the dredged footprint localised areas occurring within six months for the majority of species, and one to two years for larger, slower-growing taxa.

6 The details of the macroinvertebrate community along the proposed pipeline route is outlined in Section 9.3.4 of the EIAR. Surveys taken between 2012 and 2017 indicated that the benthic environment is naturally dynamic with the biological population constantly varying between years, due to the different success rates by some species during larval recruitment. This affects the relative dominance of key species between survey

[1] *Charles Heasman; Velvet Strand Sea Swimmers and Beach Users*

years and would be expected to continue to change constantly in the survey area. Changes in the biological community from 2012 to 2013 were attributed to higher abundances of the more dominant species recorded in 2012, whilst changes in 2017 showed that the population altered further with a change in the top five species. Stations within the sand classification found along the shallower part of the proposed outfall pipeline route also differed due to lower species dominance, but high numbers of the polychaete *Magelona mirabilis*. This species typically burrows in fine sand at low water and in the shallow sublittoral environments and is adapted for life in highly unstable sediments, characterised by surf, strong currents and sediment mobility. Furthermore, the shallow sands within the survey area are regularly dredged for razor clams on a 2 to 3 year cycle.

7 The impact to the benthos following construction dredging was detailed in section 9.4.3. of the EIAR. This concluded that the benthos may be impacted as a result of either physical removal of substratum from the seabed or a subsequent deposition of material through side casting or settlement of suspended sediment. A review of the impact of aggregate dredging in European coastal waters suggests that marine communities conform to well-established principles of ecological succession, and that these allow some realistic predictions on the likely recovery of benthic communities following cessation of dredging (Newell *et al.,* 1998)[a]. In general, communities living in fine mobile deposits, such as estuarine sediments, are characterised by large populations with a restricted variety of species that are well adapted to rapid recolonisation of deposits that are subject to frequent disturbance. Recolonisation of dredged deposits is initially by these 'opportunistic' species, and the community is subsequently supplemented by an increased species variety of long-lived and slow-growing 'equilibrium' species that characterise stable undisturbed deposits such as coarse gravels and reefs. Rates of recovery reported in the literature suggest that a recovery time of six to eight months is characteristic of many estuarine muds where frequent disturbance of the deposits precludes the establishment of long-lived components. In contrast, the community of sands and gravels may take two to three years to establish, depending on the proportion of sand and level of environmental disturbance by waves and currents, and may take even longer where rare slow-growing components were present in the community prior to dredging. As the deposits get coarser along a gradient of environmental stability, estimates of five to 10 years are probably realistic for development of the complex biological associations between the slow-growing components of equilibrium community characteristic of reef structures.

8 The benthos along approximately 75% of the proposed outfall pipeline route are based predominantly on sands, particularly in the western inshore section of the proposed outfall pipeline route. Here, the water depth is very shallow and subject to continuous reworking by wave induced currents. The central part of the proposed outfall pipeline route is a silty sand, becoming increasingly coarser towards a muddy sandy gravel near the proposed marine diffuser location. There is an absence of any developed biogenic or geogenic features with any significant epifaunal component.

9 Unlike most dredging related studies, which are based on aggregate recovery where the surface sediments are removed or altered significantly, material from the dredging works is not lost from the seabed but simply sidecast before being used to back-fill the trench on completion of the pipe lay. Consequently, a significant proportion of the marine benthos will survive the initial dredging operation and remain within the substrate post trenching, particularly in the sandy sediments west of the shelf break where backhoe dredging operations are envisaged. In these areas the physical recovery of the surface sediments along the proposed outfall pipeline route are expected to show recovery within a few months. The recruitment of a new larval cohort is expected to occur within the surviving fauna, as well as those of unaffected populations nearby, once or twice in the year during the spring to autumn months. Consequently, a recolonisation for the majority of species is expected to occur within six months, but possibly one to two years for some of the larger slower-growing taxa.

10 This prediction is generally supported by a study carried out by Collie *et al*., (2000)[b] who attempted to quantify recovery timescales within benthic communities from bottom towed fishing gear. The study concluded that sandy sediment communities were able to recover rapidly, although this was dependent upon the spatial scale of the impact. It was estimated that recovery from a small-scale impact, such as a fishing trawl (the impact width of which is similar to a pipeline trench) could occur within about 100 days. This assumed recolonisation through immigration into the disturbed area rather than from settlement or reproduction which

would accelerate the process but would be subject to the timing of the impact prior to a larval recruitment cycle.

11 Furthermore, a series of large-scale field experiments carried out by Dernie *et al*., (2003)[c] investigated the community response to physical disturbance of marine benthic communities within a variety of four sediment types ranging from (clean sand through to muds). Of the four sediment types investigated, the communities from clean sands (such as those prevalent along the pipeline route) had the most rapid recovery rate following disturbance.

12 In conclusion, the sediments and benthic community found along the majority of the proposed pipeline route is indicative of a mobile sand. The nature of the proposed dredging method will allow for the preservation of the existing sediment type as well as maintain some species within the re-instated sediments such that recolonisation of the benthic community will commence immediately on completion of the works. This benthic community should be well-established within six months for the majority of species, and one to two years for larger, slower-growing taxa.

References

a. Newell RC, Seiderer LJ & Hitchcock DR (1998). The impact of dredging works in coastal waters: A review of the sensitivity to disturbance and subsequent recovery of biological resources on the sea bed. Oceanography and Marine Biology: An Annual Review 36: 127-178.

b. Collie JS, Hall SJ, Kaiser MJ, Pointer IR (2000). A quantitative analysis of fishing impacts on shelf-sea benthos. J AnimEcol 69:785–799

c. Dernie, Kaiser and Warwick (2003). Recovery rates of benthic communities following physical disturbance. J Animal Ecol. V72, p 1043-1056

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Irish Water

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Response to Questions raised by the following:

1. **Fingal County Council (Statement 26th March) - Point 1 – Ireland's Eye**
2. **Fingal County Council (Statement 26th March) Point 3 – Potential for Cumulative Impacts on Harbour Porpoise**
3. **Codling Nursery**

Statement by Ian Wilson (27th March 2019)

Ireland Eye SAC

Irelands Eye cSAC was included in Section 4.3 of the NIS which listed the European Sites within the Study Area of the Proposed Project. Table 4-2 listed the European Sites potentially affected by the Proposed Project and summarised the potential pathways for Likely Significant Effects (LSE).

It was noted in the table that Irelands Eye SAC is designated for terrestrial habitats, specifically vegetated sea cliffs ['Perennial vegetation of stony banks [1220] habitat']. No marine habitats are included in the Qualifying Interests. As the island is fundamentally based on a bedrock outcrop, the aquifer that supports surface soils will be isolated from the marine section of the works by this underlying formation. No construction operations are proposed for the island and therefore there is no potential pathway for LSE.

Consideration has been given to the possible interface with the coastline via sea spray particularly on the designated habitat 'Perennial vegetation of stony banks [1220] habitat'. The NPWS (2017) Conservation Objectives: Ireland's Eye SAC 002193. Version 1 states that the full distribution of the 1220 habitat on the island has not been fully mapped although the habitat was recorded by Moore and Wilson (1999) and by Ryle *et al*. (2009). Shingle occurs on the western shore between sand hills and a sandy beach. Map 3 of the document, indicates the plotted habitat on the southern tip of the main island (see Figure 1 reproduced below). The document also states that the shingle beach at Ireland's Eye SAC has poor vegetation, mainly limited to some marram (*Ammophila arenaria*) at the back of the beach. Curled dock (*Rumex crispus*), silverweed (*Potentilla anserina*) with spear-leaved orache (*Atriplex prostrata*) was also recorded.

The Perennial vegetation of stony banks habitat is recorded on the south and possibly western side of the island. This is the opposite side of Island to the proposed project and plume trajectories. All locations where perennial vegetation of stony banks habitat is recorded within the SAC are in a sheltered part of the island where the likelihood of significant seawater spray is reduced. Furthermore, should it occur, the impact from seawater spray would not cause any impact to this habitat as elevations in suspended sediments or other elevated nutrients from a project would be imperceptible.

In the context of the above, Ireland's Eye SAC was screened out in relation to LSE on the following basis:

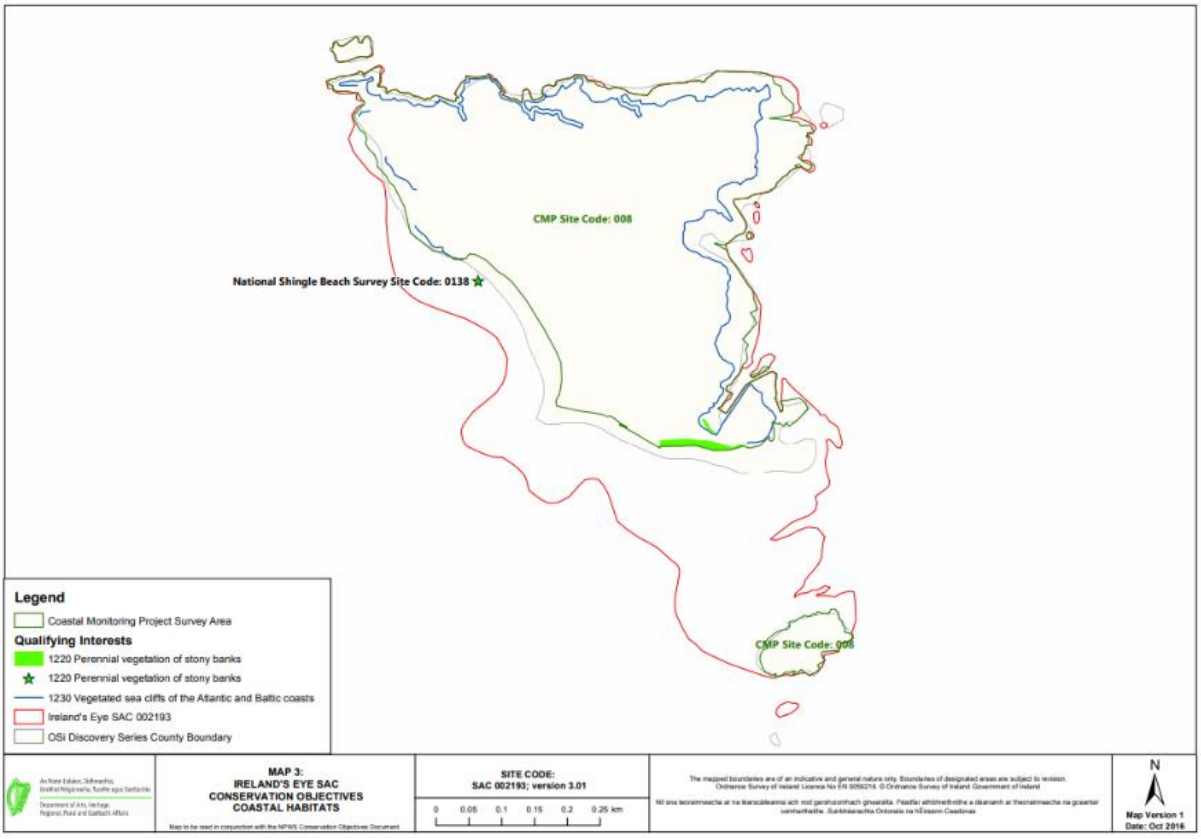
Construction Stage:

- The hydrodynamic model indicated that plume effects during construction dredging on the adjacent north face of Irelands Eye were negligible. A maximum possible predicted elevation, of between 5 and 10mg/l for suspended solids was predicted. This is well below the natural variability of the waters surrounding the island throughout the year (which varied from 15-162mg/l and a median of 23mg/l). The Perennial vegetation of stony banks habitat for which the SAC is designated, is recorded on the south and possibly western side of the island. This is the opposite side of island to the proposed project and plume trajectories.

Operational Phase

- The hydrodynamic model indicated that the operational plume did not impact waters immediately adjacent to the Ireland's Eye SAC.
- All locations where Perennial vegetation of stony banks habitat is recorded within the SAC are in a sheltered part of the island where the likelihood of significant seawater spray is reduced.
- Furthermore the impact from seawater spray which 'might' contain imperceptible elevations in suspended sediments or other elevated nutrients from a project-related plume would not cause any impact to this habitat, should it occur.

Figure 1 Map 3 of the Conservation Objectives for Ireland Eye SAC



Cumulative Impacts on Harbour Porpoise

Fingal County Council sought further clarification on the potential cumulative impacts on harbour porpoise, a qualifying interest of the Rockabill to Dalkey SAC, from the Proposed Project in combination with the Dublin Array Project. Clarification was also sought in relation to in combination impacts with Dublin Port, including the dredge disposal site at Burford and also Howth Harbour Fishery Development.

The activities of the Proposed Project that have the potential give rise to in combination impacts on harbour porpoise include:

- The tunnel/dredging interface approximately 600m from the beach. This will require the construction of a coffer dam using piling. Works at this interface are expected to take 1 month, however it is expected that the piling operation will take place at the start of the activity. The noise associated with this piling activity could give rise to disturbance / displacement impacts on harbour porpoise (see Table 4.1 of the NIS).
- Fibre optic cable crossing point, which is located midway to the diffuser. Similar to the tunnel/dredge interface, this will require the construction of a coffer dam using piling. Works at this crossing are expected to take 1 month, however it is expected that the piling operation will take place at the start of the activity. The noise associated with this piling activity could give rise to disturbance / displacement impacts on harbour porpoise (see Section 6.3.2.3 of the NIS).
- Dredging of marine outfall pipeline. This activity will take approximately 6 months to complete. The plume associated with this activity could give rise to disturbance / displacement impacts on harbour porpoise by impacting on their food source. The noise associated with this activity could give rise to disturbance / displacement impacts on harbour porpoise (see Table 4.1 of the NIS).

It is not considered that the operation of the proposed Project could give rise to in-combination effects on harbour porpoise due to disturbance / displacement impacts on harbour porpoise by impacting on their food source. This is because the size of the discharge plume constitutes a small fraction of the animal's habitat range, is imperceptible above background conditions with no significant effect on the animals foraging ability or behaviour. Therefore the operation of the Proposed Project in combination with other plans or projects will not result in likely significant effects on harbour porpoise or the Rockabill to Dalkey Island SAC in view of its conservation objectives, and no reasonable scientific doubt remains as to the absence of such effects.

Dublin Array

The Dublin Array Project is a proposed offshore windfarm that will be located on the Kish and Bray Banks in the Irish Sea, off the coast of Dublin and Wicklow. The project area is located outside the Rockabill to Dalkey Island SAC and range approximately 13km to 28km from the proposed outfall pipeline (marine section). The types of activities normally associated with construction of offshore wind farms that could give rise to in-combination effects on harbour porpoise include:

- Piling (installation of monopiles) associated with construction of bases for turbines. The noise associated with this activity could give rise to disturbance / displacement impacts on harbour porpoise;
- Installation of cables in the sea bed. The plume associated with this activity could give rise to disturbance / displacement impacts on harbour porpoise by impacting on their food source. The noise associated with this activity could give rise to disturbance / displacement impacts on harbour porpoise;
- Significant vessel activity in and out of Dublin port and large numbers of static vessels remaining inside the area during construction.

Although the project already has a Foreshore Lease (since 2000), there is no defined timeline for when construction operations will occur. It is expected that the construction of an offshore wind farm of this scale would take approximately 3 years to complete with the various tasks required for construction such as piling taking place at

intervals during the construction programme. Assuming a 'worse-case scenario' that the construction activities for the Proposed Project overlap with the above activities for the Dublin Array Project, , then the wind farm project would create a displacement impact to harbour porpoises in its project area during construction. The literature shows that the construction of a wind farm does not exclude harbour porpoises from the area of the project, but reduces the population size in the vicinity of the operations by approximately 3-5 fold, but this is temporary (e.g. Nabe-Nielsen *et al.,* 2011 and Carstensen *et al.,* 2006) . During construction, the installation of turbine monopiles is typically carried out in an incremental manner with only 5% of the site under construction at any given time. This will limit the area of impact to a smaller area.

The harbour porpoise has a very large foraging range and the limited construction activities carried out at Dublin Array will not create a barrier to harbour porpoises moving along the coast or coming inshore to feed. Furthermore, the very short overlap in construction activities associated with piling for the Proposed Project, will reduce the potential for in-combination effects from disturbance / displacement impacts from noise to inconsequential levels.

Similarly, the potential for in-combination effects from disturbance / displacement impacts on their food source would similarly be inconsequential because of the limited spatial impact and short operational period from the dredging proposed.

To conclude, piling is required for two short periods relating to the tunnel/dredging interface pit and the fibre optic cable crossing point mid-way to the diffuser. In both cases, these are outside the Rockabill to Dalkey SAC and are expected to be completed within a very short period of time (ca. 1 month). Impacts to harbour porpoises from noise disturbance and dredging are expected to be through site avoidance and predicted to be of no significance by virtue of their high ecological status and the very short duration of the works. The coincidental operation of other developments relating to disturbances and noise sources well away from the Proposed Project will not result in significant cumulative effects, nor will it alter the finding of 'no adverse effect' in the GDD NIS.

The construction of the Proposed Project in combination with the Dublin Array Wind Farm project will not result in likely significant effects on harbour porpoise or the Rockabill to Dalkey Island SAC in view of its conservation objectives, and no reasonable scientific doubt remains as to the absence of such effects.

<u>Dublin Port (Alexander Basin Redevelopment or ABR)</u>

The EIAR for the ABR project assessed several marine biodiversity impacts relating to the proposed development and dredging and concluded that detectable impacts on seals or harbour porpoises were unlikely. Impacts are considered for both disturbance from the piling and dredging operations within the port basin, as well as the effect of the discharge of dredge spoil on Burford Bank, located within the Rockabill to Dalkey SAC. The impact from noise related issues during pile driving were dealt with using extensive mitigation within the port area, but the dumping of dredged material is stated as unlikely to cause any adverse effects on seals or harbour porpoise as any impact from the displacement from prey species will be temporary, with fish returning to the area at the completion of dumping activity.

The ABR project will dispose of approximately 6 million cubic metres of uncontaminated sediments over the period 2017 to 2023, resulting in an annual disposal of approximately 1.0 million m^3 of sediment annually. It was proposed that dredging and disposal will only occur during a six-month period (from October to March) each year, although recent changes to the dredging protocols are expected to shorten this period to 1-2 months, with updated sediment dispersion modelling carried out and validated for that project.

Sediment plumes may present habitat disturbance to local cetaceans foraging in the area. Porpoises feed mainly on small shoaling fishes, with many prey items taken on or close to the benthos. Dumping of dredged material will smother benthic communities, and shoaling fish are likely to move away from the dump site during operations, with potential loss of foraging opportunities for harbour porpoise. The Burford Bank disposal site has been routinely used

for dredged material over many years, with permits for dumping issued for approximately eight million tonnes of material between 1997 and 2012. It is not considered to be a significant or established feeding area for cetaceans or seals and therefore any displacement resulting from impacts on available prey is inconsequential. The Proposed Project in combination with the ABR project will not result in significant cumulative effects. The construction of the Proposed Project in combination with the ABR project will not result in likely significant effects on harbour porpoise or the Rockabill to Dalkey Island SAC in view of its conservation objectives, and no reasonable scientific doubt remains as to the absence of such effects.

Howth Harbour Development

The Howth Fishery Harbour application was granted permission on 10 July 2018 and was therefore not included in the Proposed Project Planning Application which was lodged on 20 June 2018. However, the Howth NIS has been reviewed and the potential for cumulative impacts with the GDD project assessed.

The Howth Fishery Harbour application relates to dredging and construction activities inside the harbour boundary. Far-field impacts included a temporary reduction in water quality through increased suspended sediments and contamination from the harbour muds. The document estimated suspended sediment loads of 26mg/l and 47mg/l during respective spring and neap tidal cycles at the mouth, approximately 3km south of the proposed diffuser location. The hydrodynamic model produced for the GDD project indicates a clear southeast-northwest component to the dispersion of material leaving the harbour mouth demonstrating that sediment plumes are unlikely to coincide between the two project. No cumulative impacts are predicted.

In addition to operations carried out within Howth harbour, the project also has a spoil dumping permit (S0010-01 consented in August 2011) which allows for the annual disposal of a maximum of 120,000 tonnes of dredged material with no time limits prescribed for the application. Further data, supplied as a response at the request of the EPA in relation to Alexandra Basin Redevelopment (ABR), confirmed this to be predominantly limestone rock with 20% uncompacted, grey black sandy silty sediment. This would be discharged at the Burford Bank disposal site (8.7km south of the GDD diffuser location) discharged at an estimated rate 1,200 tonnes per day using a floating barge/dredger with excavator or grab bucket to load a split bottom hopper. A computational model, looking at the cumulative impact of both the Howth discharge in conjunction with spoil dumped from Alexander Basin, concluded that suspended sediment concentrations at the offshore dump site would remain below 20 mg/l above background except in the area around the dump barge. Hydrodynamic modelling indicates that this disperses quickly to below 15mg/l within 2km of the discharge point. This would have no effect on the inconsequential effects already predicted for the ABR project disposal.

The Proposed Project in combination with the Howth projects will not result in significant cumulative effects. The construction of the Proposed Project in combination with the Howth projects will not result in likely significant effects on harbour porpoise or the Rockabill to Dalkey Island SAC in view of its conservation objectives, and no reasonable scientific doubt remains as to the absence of such effects.

Overall Conclusions

It can be concluded that there is no potential for impacts arising from disturbance and / or displacement as a result of noise or dredge plumes in combination with other projects for the following reasons:

- The piling required for the Proposed Project will be over a very short period (approximate 1 month over two periods) and in shallow inshore waters where noise propagation is more extensive;
- The deposition of the dredge spoil at the Burford Bank has been carried out at this site for significant number of years and will produce only a limited plume on discharge prior to settling. The area of impact, limiting prey

species for harbour porpoises transiting through the SAC, will be limited in area and over a short-term duration.

- Overlap of construction activities for the Dublin Array OWF are unlikely, but should this occur, monopile construction is expected to be limited to one pile at a time. This will induce some avoidance behaviour but will not create a barrier to the movement of porpoises up and down the coast.
- All piling operations carried out for both the Proposed Project and the Dublin Array construction will be subject to guidelines to manage the risk to marine mammals from man-made sound sources in Irish waters (NPWS 2014).

Overall, the Proposed Project, either alone or in combination with other projects nearby, will not create any artificial barriers restricting the range of the species and any disturbance of this species is minimised so as not to adversely affect the harbour porpoise community at the site.

Reference

Carstensen, J, O. D. Henriksen and J. Teilmann, 2006. Impacts of offshore wind farm construction on harbour porpoises: acoustic monitoring of echo-location activity using porpoise detectors (T-PODs) National Environmental Research Institute, Denmark. Mar Ecol Prog SerVol. 321: 295–308.

NPWS 2014. Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters. National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht.

Nabe-Nielsen, J, J. Tougaard, J. Teilmann & S. Sveegaard, 2011. Effects Of Wind Farms On Harbour Porpoise Behaviour And Population Dynamics Report commissioned by The Environmental Group under the Danish Environmental Monitoring Programme Department of Bioscience, Aarhus University.

Codling Nursery

Potential impacts on a 'codling nursery' have been raised during day 4 of the hearing.

The presence and importance of cod within the Project Area is clearly outlined in Section 9.3.8 of the EIAR. The proposed route was highlighted as a high intensity cod nursery (Table 9.15 of the EIAR) with spawning predicted between the months of February and March. The species is predicted to be present within the area between January and April. Cod is listed as having low conservation importance in Table 9.18 of the EIAR as it is listed as threatened under OSPAR and vulnerable under the IUCN Red List. Several specimens were recorded during the inshore fisheries assessments carried out in 2015 and 2017.

Section 9.4.3 discusses the possible impacts to the cod nursery from the dredging operation. However, the magnitude of the impact is considered negligible due to the small area affected by the dredging for the Proposed Project and the temporary duration of works.