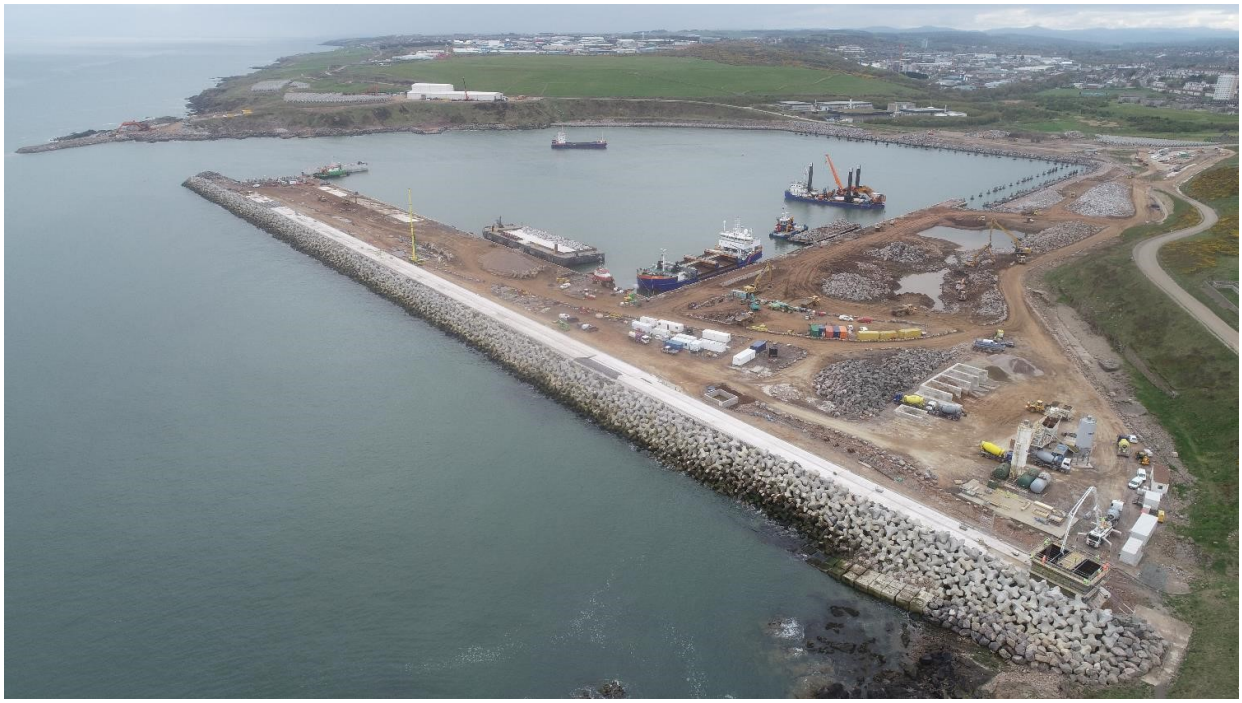

Aberdeen Harbour Expansion Project

Request to vary Construction Marine Licence: Supporting Environmental Document

July 2021

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Contents

Document history

Document reference	Date	Notes
AHB-REP1-R1	3 June 2021	Draft for client review
AHB-REP1-R2	15 June 2021	Final issue
AHB-REP1-R3	20 July 2021	Updated Table 2
AHB-REP1-R4	29 July 2021	Updated monitoring data and HRA

1. Introduction

The Aberdeen Harbour Expansion Project (AHEP) is located in Nigg Bay approximately 0.8 km south of the existing Aberdeen North Harbour. The key marine construction activities include:

- Dredging to depths varying from 9.0 m to 10.5 m below Chart Datum
- Profiling the southern slopes of the bay to reduce wave reflection
- Construction of two rubble mound breakwaters (north and south)
- Construction of closed and open quays to provide a combined total of over 1,400 m of quayside
- Land reclamation to provide a paved area to the rear of the quayside
- Provision of welfare accommodation, quayside furniture and water tank installations.

To support the original marine licence applications, an Environmental Statement (ES) was produced in 2015, supplemented by an Additional Environmental Information Report in 2016 (hereafter collectively referred to as 'the 2016 EIA'). To support a variation to the licences, an Environmental Impact Assessment Report (EIAR) was produced in 2019 (hereafter referred to as 'the 2019 EIAR').

Construction of the AHEP commenced in 2017 and is authorised by following marine licences:

- Marine Construction Licence 07161/20/0 expiring 31 December 2021
- Dredging and Deposit Licence 07035/20/0 expiring 31 December 2021

Construction of the AHEP was due for completion by the end of 2021. The Covid-19 pandemic has brought significant challenges to the project during 2020-21, including prolonged periods of restricted work on site and delays in procuring materials and services. Despite these delays, the majority of the marine construction is on schedule for completion by the end of 2021; however, some marine works may extend into 2022, as described in Section 2. To facilitate these works, Aberdeen Harbour Board (AHB) requests an extension to the Marine Construction Licence to 31 October 2022. There is no requirement to vary the Dredging and Deposit Licence as the works authorised by this Licence will be complete by 31 December 2021.

As a condition of the Marine Licences, a Construction Environmental Management Document (CEMD) was produced and has been updated as required during the construction programme. The latest approved version of the CEMD is dated 17 October 2019 (hereafter referred to as 'the 2019 CEMD'). It is proposed that the 2019 CEMD remains valid for the extension period, as the only aspects that are not applicable to works carried out in 2022 relate to the description of the construction timeline in Chapter 3.

In June 2021, AHB requested an EIA screening opinion from MS-LOT under the Marine Works (EIA) (Scotland) Regulations 2017 for the proposal to vary the Construction Marine Licence. In July 2021, MS-LOT issued a screening opinion stating that an EIA is not required to be carried out for the proposed variation.

This report describes the need for the variation, the works to be covered by the variation, and considers each environmental topic to identify whether there could be additional environmental effects resulting from the extension of limited elements of the marine construction programme by up to 10 months.

2. Need for the variation

Construction of the AHEP was due for completion by the end of 2021. The Covid-19 pandemic has brought significant challenges to the project during 2020-21, including prolonged periods of restricted working on site, delays in procuring materials and services, and reduced workforce due to Covid-19 restrictions and protocols.

In addition, the main contractor, Dragados UK, left the project in 2020 and it has been necessary for AHB to re-tender the outstanding works, which has further delayed construction.

Despite these delays, the majority of the marine construction is on schedule for completion by the end of 2021. However, due to the additional time required to procure contractors for the remaining works, and seasonal restrictions on construction, the following aspects of the marine construction may extend into 2022, as shown on Figure 1:

- Final section of the south breakwater (up to 150 m)
- Marine rotary piling of up to 5 piles on the West and North Quays
- Installation of 4 spar buoys along the southern edge of the entrance channel
- Scour protection for the caissons

3. Description of works covered by the variation

The works to be covered by the variation request are described below. All other marine aspects of the AHEP construction and dredging will be complete by the end of 2021 in accordance with the existing Marine Licences.

Completion of the marine works is expected by Q1 2022; however, to incorporate contingency due to unforeseen delays, an extension to the Construction Marine Licence is requested until 31 October 2022. No extension is required for the Dredging and Deposit Marine Licence as dredging will be complete by the end of 2021.

3.1. South breakwater

Van Oord has been appointed to complete the south breakwater, and construction re-commenced in April 2021. It is possible that the final section of the south breakwater (up to 150 m, as shown on Figure 1) may not be complete by the end of 2021.

The breakwater construction method is described in Section 5.2 of Chapter 3 of the 2019 CEMD (Construction Method Statement). The design, footprint, materials and construction methodology are unchanged from the consented scheme.

3.2. Marine rotary piling

The marine rotary piles for the suspended West and North West Quays were installed during 2018-19. Due to challenging ground conditions, the bearing strength has not been achieved for five of the piles (four on the West Quay and one on the North West Quay, as shown on Figure 1), so it is necessary to drill a new pile adjacent to the existing one. The existing piles will be left in situ and incorporated into the suspended deck.

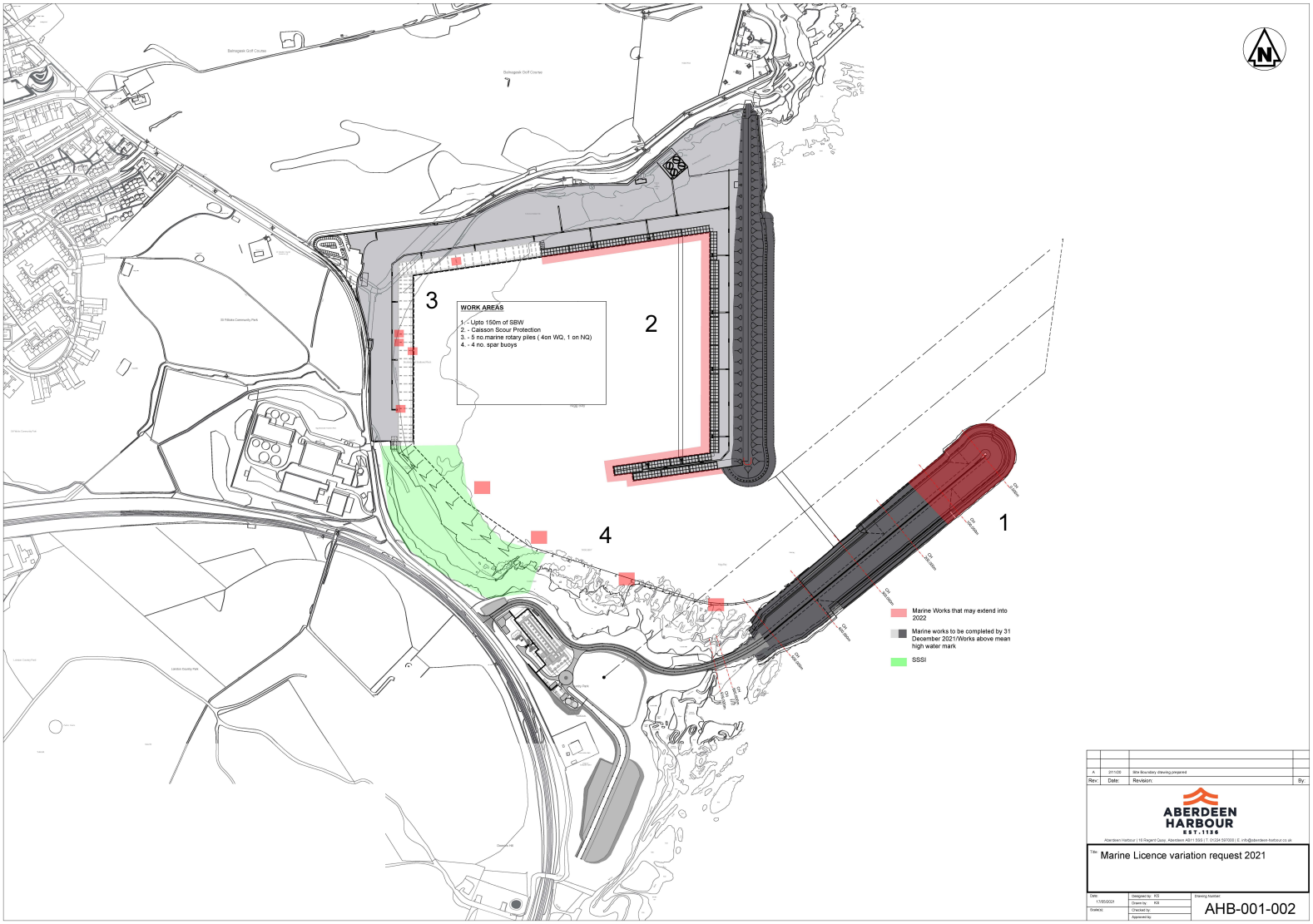

Figure 1 Works covered by the proposed extension

Each pile will take approximately 2-3 days to drill. In total, the pile installation will take approximately 30 days.

The marine rotary piling technique is described in Section 5.4.7.1 in Chapter 3 of the 2019 CEMD (Construction Method Statement), and Section 14.3 in Chapter 14 of the 2019 CEMD (Piling Method Statement). The installation method for the five replacement piles will be as described in these documents.

3.3. Spar buoys

The four spar buoys (navigation aids) along the southern edge of the AHEP entrance channel as shown on Figure 1 will be installed at the end of the construction programme, once all dredging and other marine works are complete. Whilst it may be possible to install these before the end of 2021, if dredging continues until late 2021 there may not be sufficient time to install the buoys this year. As a contingency, the spar buoys are included in the variation request.

The design, footprint, materials and installation methodology are unchanged from the consented scheme. Seabed material will be excavated locally and underwater concrete will be poured to create a base, to which a chain and buoy will be attached. As this activity generates minimal noise and seabed disturbance, and is contained within the new operational harbour area, there are no additional environmental effects associated with installing them during the proposed extension period in 2022 rather than in 2021, so they are not considered further in this report.

3.4. Scour protection for caissons

All caissons will be installed by the end of 2021; however, the installation of scour protection to prevent undermining of the caissons (as shown on Figure 1) may extend into 2022.

The installation method will be as described in Chapter 3 of the 2019 CEMD (Construction Method Statement), i.e. quarry supplied stone, proprietary scour mattresses and in-situ underwater concrete will be placed at the outside edges of the caisson. As this activity generates minimal noise and seabed disturbance, and is contained within the new operational harbour area, there are no additional environmental effects associated with installing them during the proposed extension period in 2022 rather than in 2021, so they are not considered further in this report.

4. Cumulative impacts

An assessment of cumulative impacts was included in the 2016 EIA and 2019 EIAR. The list of plans and projects that may give rise to cumulative impacts with the marine works to be carried out during the proposed extension period has been reviewed and updated, and is presented in Table 1.

For each topic where additional environmental assessment is required (see Section 5), an assessment of cumulative impacts is included.

Table 1 Plans and projects considered in the cumulative impact assessment

Project/ Proposed Development	Description	Location	Approx. Distance to Project (By Sea) [km]	Status	Comments
Aberdeen maintenance dredging	Harbour maintenance dredging	Aberdeen	1	Consented, ongoing	As the AHEP capital dredging and sea deposition will be complete by the end of 2021 under the existing Marine Licences, there will be no cumulative effects of increased suspended sediments during the proposed extension period.
Kincardine offshore wind farm	Floating offshore wind farm	South-east Aberdeen	12	Consented, in construction	Construction due for completion by end of 2021.
Seagreen Alpha and Bravo offshore wind farm	Round 3 offshore wind farm	Outer Firth of Forth	64	Consent, in construction	Marine construction underway. Stage 1 turbine installation and export cable installation to take place throughout 2022.
Inch Cape Round 3 wind farm	Scottish Territorial Waters offshore wind farm	Outer Firth of Forth	65	Consent approved	Construction timeline not available. Marine construction not expected to commence in 2022.
Neart na Gaoithe Round 3 wind farm	Scottish Territorial Waters offshore wind farm	Outer Firth of Forth	95	Consented, in construction	Marine construction commenced August 2020 and is due to complete by the end of 2022.
Moray East offshore wind farm	Round 3 offshore wind farm	Outer Moray Firth	130	Consented, in construction	Offshore construction activities commenced in May 2019. Due to be fully operational in April 2022. Piling is complete.
Moray West offshore wind farm	Round 3 offshore wind farm	Outer Moray Firth	130	Application	Offshore construction due to commence in Q1 2022 and complete by 2024. Piling (if applicable) is scheduled for Q2 2022 – Q1 2023.
Beatrice Round 3 offshore wind farm (BOWL)	Scottish territorial waters offshore wind farm	Outer Moray Firth	135	Operational	Fully operational.

5. Assessment of additional environmental effects

The vast majority of the marine works will be completed under the existing Marine Licences. However, as the variation request extends the time period of the marine construction by up to 10 months, this section explores whether there will be additional environmental impacts that were not considered in the previous assessments.

Table 2 lists each environmental topic in the 2016 EIA and 2019 EIAR and considers whether there could be additional environmental effects resulting from the extension of the construction programme by 10 months. The assessment considers only construction phase impacts, as there are no changes to the operational phase. For those topics where additional assessment is required, it is presented in the remainder of this section.

Table 2 Consideration of potential additional environmental effects

Topic	Potential additional environmental effects	Justification
Marine physical environment	No	The project design, footprint, materials, and construction methodology are unchanged from the consented scheme. The proposal to extend limited aspects of the construction programme by up to 10 months is highly unlikely to result in impacts on the seabed bathymetry, wave and tidal regimes, sediment transport, and erosion or accretion processes, over and above those that have already been assessed and consented.
Marine water and sediment quality	No	The project design, footprint, materials, and construction methodology are unchanged from the consented scheme. The capital dredging will be complete within the existing Marine Licence period. The proposal to extend limited aspects of the construction programme by up to 10 months is highly unlikely to result in additional impacts on sediment disturbance, suspended sediment levels, contaminant levels or water and sediment circulation patterns, over and above those that have already been assessed and consented.
Flood risk and surface water	No	The project design, footprint, materials, and construction methodology are unchanged from the consented scheme. The proposal to extend limited aspects of the construction programme by up to 10 months is highly unlikely to result in additional impacts on flood risk and surface water, over and above those that have already been assessed and consented.
Ground conditions and contamination	No	The project design, footprint, materials, and construction methodology are unchanged from the consented scheme. During the construction to date, no unanticipated risks have been identified to human health, the water environment or ecological receptors from soil/groundwater contamination or ground gas. The proposal to extend limited aspects of the construction programme by up to 10 months is highly unlikely to result in impacts on ground conditions and contamination, over and above those that have already been assessed and consented.
Nature conservation	Yes for Nigg Bay Site of Special Scientific Interest (SSSI)	Potential effects of the proposed extension of the construction programme on the Nigg Bay SSSI are considered in Section 5.1. The HRA has been updated to consider the extension of limited aspects of the construction programme by up to 10 months, as presented in Section 7.

Topic	Potential additional environmental effects	Justification
Terrestrial ecology	No	The proposal to extend limited aspects of the construction programme by up to 10 months will not result in any increased loss of terrestrial habitat or associated species over and above those already assessed and consented. Key terrestrial species, including otter, are subject to licence compliance monitoring.
Benthic ecology	No	The area of benthic habitat loss and disturbance is unchanged. It is already accepted that benthic habitat within Nigg Bay will mostly be removed or severely modified due to the AHEP and will continue to be disturbed during its operation due to maintenance dredging and vessel movements.
Fish and shellfish ecology	Yes – see Section 5.2	The extension of limited aspects of the marine works by up to 10 months has the potential to disturb fish and shellfish for a longer time period than was previously assessed.
Marine birds	Yes – see Section 5.3	The extension of limited aspects of the marine works by up to 10 months has the potential to disturb marine birds for a longer time period than was previously assessed.
Marine mammals	Yes – see Section 5.4	The extension of limited aspects of the marine works by up to 10 months has the potential to disturb marine mammals for a longer time period than was previously assessed.
Socio-economics	No	The extension of the construction programme by up to 10 months will not change the overall project design or operation of the harbour and so economic effects of the AHEP will not be altered. The design and footprint of the AHEP remains unchanged so there will be no significant changes to the availability of paths and routes, wildlife watching, cruise tourism and amenity use over and above those already assessed and accepted.
Seascape, landscape and visual assessment	No	The extension of the construction programme by up to 10 months will not change the design of the AHEP and so there is no change to visual impacts over and above those already assessed and accepted.
Traffic and transport	No	The 2016 ES assessed the impact of approximately 436 construction-related Heavy Goods Vehicle (HGV) journeys per day (218 in each direction) during peak construction activity. The designated route for all construction HGV trips is south along Coast Road and Hareness Road (through the Altens Industrial Estate) and on to Wellington Road, utilising roads which have few sensitive residential

Topic	Potential additional environmental effects	Justification
		receptors. The 2016 ES concluded that the effects of HGV movements on the operational capacity of Coast Road and Hareness Road, and on disruption and driver delay, would be of negligible significance. Approximately 80% of the rock required to complete the south breakwater will continue to be delivered to the site by barge, and also transported across the bay to its end location by barge. This significantly reduces construction-related HGV movements on public roads during the proposed extension period. HGV movements associated with the rotary piling are limited to the one-off arrival and departure of the piling rig, and the delivery of concrete to site. Construction-related HGV movements during the proposed extension period are expected to be approximately 100 journeys per day (50 in each direction); this is significantly lower than during the peak construction period. So, despite the extended duration, the effects on traffic and transport are considered to be no worse than those already assessed and accepted. The mitigation measures within the Construction Traffic Management Plan (Chapter 6 of the 2019 CEMD) will continue to apply during the proposed extension period.
Air quality	No	Overall vehicle transit to and from the site will not significantly increase due to the proposed extension of limited aspects of the marine works by up to 10 months. The extension will not require significantly more plant machinery to be used. Similarly, dust from construction activities will not increase as the extent of the construction activities will remain the same but undertaken over a longer period. Vehicle and plant activity during the proposed extension period will continue to comply with the mitigation measures in the Pollution Prevention Plan (Chapter 15 of the 2019 CEMD) to minimise emissions to air.
Terrestrial noise and vibration	No	The 2016 ES assessed the effects of terrestrial noise and vibration from the key construction activities, including breakwater construction and piling, and concluded that the residual effects would be negligible to moderate adverse; these assessments remain valid for the proposed extension period. The extension of limited aspects of the marine construction activities by up to 10 months is not expected to result in additional impacts over and above those that have already been assessed and consented.

Topic	Potential additional environmental effects	Justification
		In recent months, there have been some exceedances of the night-time noise trigger levels at the monitoring station at Girdleness Lighthouse, associated with the unloading of rock from barges onto the North Quay, and the loading of rock into barges and wagons for transport to the south breakwater. All exceedances and noise complaints have been investigated by AHB and their contractors, and where exceedances are attributable to construction activities, additional mitigation has been implemented as set out in the Noise Complaints Procedure within the Noise and Vibration Management Plan (Chapter 13 of the 2019 CEMD). The mitigation and monitoring measures in Chapter 13 of the CEMD will continue to apply during the proposed extension period.
Shipping and navigation	No	During the proposed extension period, construction-related vessels will be limited to a delivery of rock to the North Quay approximately once every two days, and a small number of slow-moving support vessels such as safety and survey boats. All construction vessels will continue to comply with the Vessel Management Plan (Chapter 17 of the 2019 CEMD). No additional impacts are anticipated over and above those that have already been assessed and consented.
Commercial fishing	No	The assessment in the 2016 EIA was based upon commercial fishing being displaced from the new harbour area during construction and operation. Therefore, the extension of marine construction works by up to 10 months does not alter the impact on commercial fishing.
Other users	No	The assessment in the 2016 EIA was based upon other users being displaced from the harbour during construction and operation. Therefore, the extension of marine construction works by up to 10 months does not alter the impact on other users.
Archaeology and cultural heritage	No	The footprint and scale of the works has not changed so the risk to archaeological features remains unchanged. The protocols for unexpected archaeological discoveries presented in Chapter 4 of the 2019 CEMD (Archaeology Plan) will continue to be observed during the proposed extension period.
Habitats Regulations Appraisal	Yes – see Section 7	The extension of marine works by up to 10 months has the potential for Likely Significant Effects on designated sites due to the increased construction period.

5.1. Nigg Bay SSSI

5.1.1. Summary characterisation

The Nigg Bay SSSI lies within the boundary of the AHEP. The geological notified natural feature for the Nigg Bay SSSI is 'Quaternary of Scotland', and the site illustrates several of the characteristic glacial deposits of the area. NatureScot's Sitelink website shows that the site was last assessed on 4 March 2014 and was found to be 'Favourable Recovered' (https://sitelink.nature.scot/site/1224).

The Site Management Statement set two management objectives:

- Maintain the visibility of the exposures. Vegetation growth has obscured some of the exposures. The vegetation stabilises the slope and is relatively easy to clear, so NatureScot recommends that it only needs to be removed if suitable research projects arise. It is noted that NatureScot will continue to monitor the extent of vegetation and may seek a clearing programme if cover increases and reduces the extent of the exposures; and
- Maintain access to the site and to the exposures.

5.1.2. Assessment of potential effects

The key potential effect on the Nigg Bay SSSI is cliff destabilisation caused by construction activities.

To minimise the likelihood of a slippage occurring due to AHEP construction works, weekly observations and vantage point photographs of cliff features have been taken since September 2017 for monitoring of any change in slope conditions during construction. Distinct features within exposed cliff faces and distinctive earth edges have been selected for monitoring of any movement which might be indicative of potential slope face slippage. The monitoring has revealed that most slippage occurs following heavy rainfall events.

In addition, a remote vibration monitor is located adjacent to the cliff slope within the SSSI to record vibrations. The vibration meter is set with a low-level early warning trigger of 8 mm/s, which is indicative of possible slope instability.

The monitoring described above will continue during the proposed extension period, and any changes will continue to be investigated and reported to NatureScot.

The marine rotary piling and south breakwater construction to be carried out during the proposed extension period are a minimum distance of approximately 100 m and 800 m (respectively) from the SSSI cliff. Neither of these activities involves percussive techniques that would generate significant vibrations at such a distance from the SSSI, to an extent that could increase the potential for a slope failure and slippage of the SSSI cliff. During underwater blasting in 2018 which took place closer to the SSSI cliff, the monitoring showed no evidence of slippage.

The extension of the marine rotary piling and south breakwater construction by up to 10 months is not predicted to have effects on the Nigg Bay SSSI over and above those that have already been assessed and consented.

5.1.3. Cumulative impacts

None of the plans or projects identified in Section 4 are anticipated to result in cumulative impacts on the Nigg Bay SSSI greater than those arising from the AHEP in isolation.

5.2. Fish and shellfish ecology

5.2.1. Summary characterisation

Fish and shellfish assemblages in the wider area comprise a mix of temporary visitors, migrants and permanent residents. Species composition in Nigg Bay and local coastal waters is likely to fluctuate seasonally especially in relation to natural seasonal spawning behaviours.

Temporary species include juvenile cod (*Gadus morhua)*, haddock (*Melanogrammus aeglefinus*), whiting (*Merlangius merlangus*), plaice (*Pleuronectes platessa*) and dab (*Limanda limanda*) which use the local inshore waters as nursery habitat before moving to offshore deeper water as they mature. Observations of juvenile whiting and herring during post-consent monitoring surveys suggest that Nigg Bay continues to support juvenile fish despite ongoing AHEP construction.

Permanent residents within local waters include gobies, (*Gobbiidae*), blennies (*Blenniidae*) and dragonets (*Callionymidae*) as well as shellfish species such as the common whelk (*Buccinum undatum*), king scallop (*Pecten maximus)* and various crab species. The use of Nigg Bay by these types of species during AHEP construction is unclear but due to the extensive capital dredging and other marine activities within the bay, these species are expected to have been reduced or displaced as predicted in the 2016 EIA.

Migrant species within the wider region include Atlantic salmon (*Salmo salar*), sea trout (*Salmo trutta*), European eel (*Anguilla anguilla*) and sea lamprey (*Petromyzon marinus*). These species are likely to pass close to the AHEP on their entry to, or emergence from, the River Dee, or other freshwater environments. More information on salmon and sea trout is provided in Section 5.3 of the 2019 EIAR.

Sand eels are keystone species as prey for marine mammals, birds and other fish such as salmon. Although some individual sand eels were found in Nigg Bay during the baseline surveys for the 2016 EIA, the main sand eel habitat of clean medium and coarse sand is found outside of Nigg Bay and beyond the area of AHEP construction.

Further information on fish and shellfish ecology is available in Section 5 of the 2019 EIAR.

5.2.2. Assessment of potential effects

The 2016 EIA and 2019 EIAR identified the following potential effects on fish and shellfish during the construction of the AHEP:

Potential effect	Relevant to proposed extension
Mortality, startle reaction and avoidance due to underwater drilling, blasting and piling	Yes – considered below
Temporary seabed disturbances due to capital dredging	No - relates to dredging and deposit activities, which will be completed under the existing Marine Licence and so do not require further consideration. Minimal sediment plumes are generated by the activities to be carried out during the proposed extension period
Temporary increases in suspended sediment concentrations due to capital dredging in Nigg Bay	
Temporary deposition of sediment plumes arising from dredging	
Accidental releases of environmentally harmful substances	Yes – considered below
Disposal of dredged material from the capital dredge at the offshore disposal site	No - relates to dredging and deposit activities, which will be completed under the existing Marine Licence and so do not require further consideration

Mortality, startle reaction and avoidance due to underwater drilling, blasting and piling

During the 2016 EIA and 2019 EIAR consultations, and regular engagement with stakeholders during the construction process, the key concerns relating to fish and shellfish have focused on underwater noise generated by impact piling and underwater blasting activities, and suspended sediment plumes generated by capital dredging and deposition at sea. There will be no marine impact piling, underwater blasting or dredging during the proposed extension period.

Marine rotary piling: the final AHEP design removed all marine impact piling from the construction programme, and instead deployed a marine rotary piling method, which uses a drilling technique with no impact/percussive piling and therefore no impulsive noise. The vast majority of marine rotary piling has already been completed; however, due to challenging ground conditions it is necessary to install an additional five piles on the West and North West Quays, as described in Section 3.2.

Due to the significant reduction in underwater noise compared to the impact piling technique considered in the 2016 EIA, the installation of five piles using the rotary piling technique over a period of approximately 30 days during the proposed extension period, is not predicted to have significant adverse effects on fish and shellfish over and above those that have already been assessed and consented. Propagation of underwater noise outside the bay from the rotary piling locations will be substantially reduced by the presence of the fully constructed north breakwater and partially constructed south breakwater, as shown on Figure 1.

South breakwater construction: the breakwater construction method is described in Section 3.1. It involves the placement of rock from vessels and/or HGVs directly onto the seabed, rock movement by bulldozer and the installation of accropodes. Underwater noise generated during these activities is minimal and was not identified as a potential impact on fish and shellfish in the 2016 EIA or during subsequent engagement with stakeholders throughout the construction process. The extension of the south breakwater construction by up to 10 months is not predicted to have significant adverse effects on fish and shellfish over and above those that have already been assessed and consented.

Accidental releases of environmentally harmful substances

Chapter 13 of the 2016 EIA concluded that releases of chemicals such as fuel, oil and lubricants into the marine environment during construction could have a major adverse effect on fish and shellfish; however, this was mitigated by the implementation of an Environmental Management Plan, which reduced the effect to negligible.

The activities carried out during the proposed extension period will be in accordance with Chapter 15 of the 2019 CEMD (Pollution Prevention Plan). Compliance with the 2019 CEMD will ensure that there is no increased risk of accidental releases of environmentally harmful substances during the proposed extension period.

5.2.3. Cumulative impacts

Table 1 lists the offshore wind farm projects that are expected to be in construction or operational during the proposed 10 month extension period in 2022.

During construction of offshore wind farms, underwater noise from pile driving of foundations has the potential to cause mortality, startle reaction and avoidance in fish species. The offshore wind farms that are expected to be undertaking piling during the proposed AHEP extension period are: Seagreen Alpha and Bravo; Neart na Gaoithe; and Moray West. Fish may experience cumulative impacts if they were to encounter a significant adverse noise source during the construction of one of these offshore wind farms whilst recovering from an impact from the AHEP construction. This is, however, considered highly unlikely as the AHEP marine activities that will be carried out during the proposed 10 month extension period are limited, and will not generate loud impulsive noise, as described in Section 5.2.2. As such, cumulative impacts due to underwater noise are not anticipated.

5.3. Marine birds

5.3.1. Summary characterisation

Pelagic bird species mostly use the waters offshore of the AHEP although some, such as common guillemot (*Uria aalge*), razorbill (*Alca torda*) northern fulmar (*Fulmarus glacialis*) and kittiwake (*Rissa tridactyla*), are known to use local cliffs to the south of the site for breeding and occasionally feed outside Nigg Bay where there is suitable prey (sand eel) habitat (see Section 5.2.1).

Coastal birds include passage or migrant species such as dunlin (*Calidris alpina*), common sandpiper (*Actitus hypoleucos*), curlew (*Numenius arquata*) and sanderling (*Calidris alba*). These species were infrequent or temporary users of Nigg Bay during the baseline surveys for the 2016 EIA and were generally present in low numbers. Red-throated divers (*Gravia stellata*) were observed all year round prior to construction of the AHEP but only in small numbers passing the Nigg Bay headlands.

Sandwich tern (*Thalasseus sandvicensis*) and common tern (*Sterna hirundo*) use the rocky shore at Greyhope Bay for roosting, and the outer areas of Nigg Bay for feeding where there is sand eel habitat. Little tern (*Sternula albifrons*) breed at the nearby Ythan Estuary, Sands of Forvie and Meikle Loch Special Protection Area (SPA) but have not been recorded within or around the AHEP during site surveys. All three species of terns are likely to use the area offshore of Nigg Bay for foraging.

Modelled foraging ranges for Sandwich tern and little tern colonies of the Ythan Estuary, Sands of Forvie and Loch Meikle SPA (NatureScot, 2016) suggest that the Sandwich terns from this colony make only moderate or low use of the AHEP while little tern do not use the local area at all.

Further information on marine birds is provided in Chapter 14 of the 2016 EIA and Section 7 of the 2019 EIAR.

Eider duck monitoring during construction

As described in the 2016 EIA, flocks of eider duck (*Somateria mollissima*) regularly occurred in large numbers within Nigg Bay for shelter within the lee of the rocky headlands, as well as at the nearby Greyhope Bay and Girdleness during their summer moult.

Eider duck abundance within and around Nigg Bay has been monitored throughout the AHEP construction, commencing in August 2017. There were no surveys undertaken between March and September 2020 (inclusive) due to restrictions associated with the Covid-19 pandemic. This section summarises the results of the vantage point and walk-over surveys, and the survey reports are available from AHB on request.

The focus of the vantage point surveys was on birds present within Nigg Bay where construction activities were occurring. The location for the majority of the vantage point surveys, and the walkover survey units 1 – 15, are shown in Figure 2.

Figure 2 Eider duck survey locations

Figure 3 shows the maximum number of eider recorded during each vantage point survey from August 2017 to June 2021. Eider appear to have remained present in relatively low numbers in Nigg Bay throughout the construction period, with higher numbers present during the summer months.

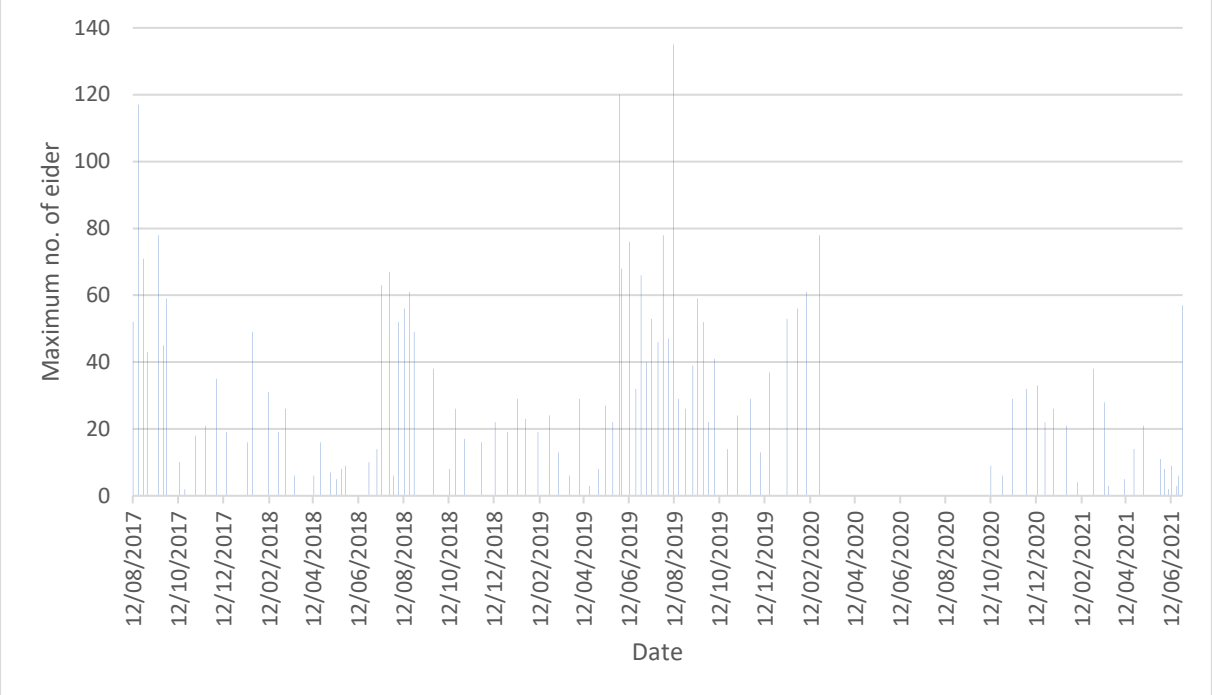

Figure 3 Maximum number of eider recorded during vantage point surveys August 2017 – June 2021

Figure 4 shows the maximum number of eider recorded during the walk-over surveys. The 15 survey zones have been grouped into four areas: River Dee/Aberdeen North Harbour; Greyhope Bay and Girdleness; Nigg Bay; and Gregness. Despite their apparent displacement from Nigg Bay, eider duck remain local to key sites in Greyhope Bay and Girdleness, particularly during the summer months.

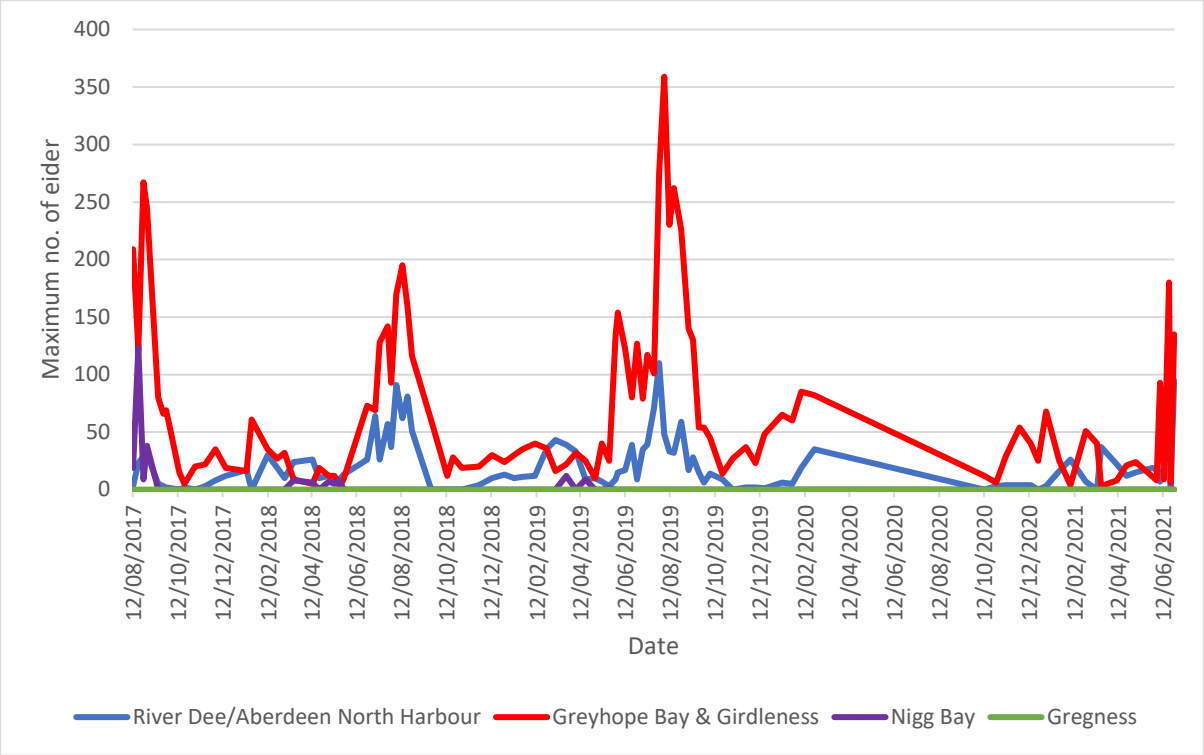

Figure 4 Maximum number of eider recorded during walk-over surveys August 2017 – June 2021

Figure 5 presents the timeline of key marine construction activities since commencement in July 2017 to present. There is no apparent correlation between eider numbers within Nigg Bay (Figure 3) and the commencement (or continuation) of key marine construction activities, including breakwater construction and marine rotary piling.

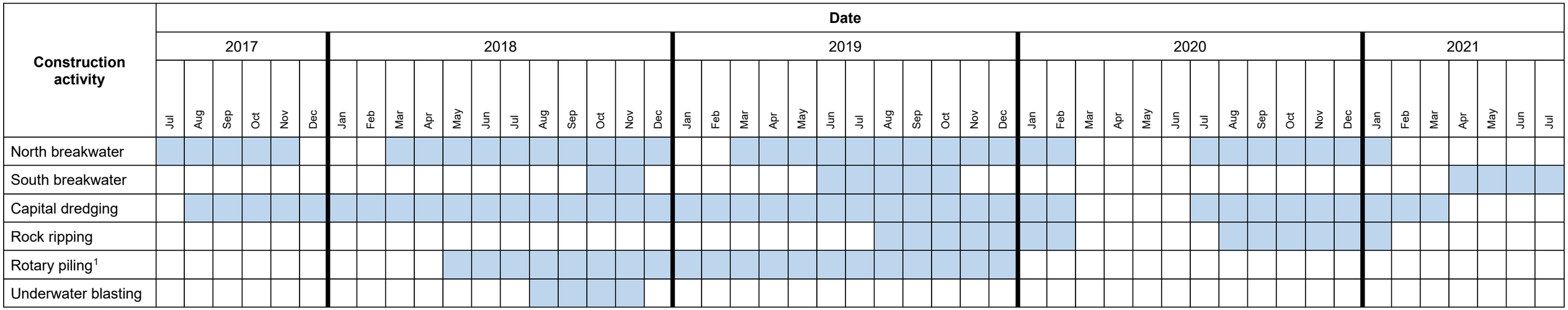

Figure 5 AHEP construction timeline: key marine activities

[1] Comprising rotary piling above and below the mean high water mark on the West and North West Quays

5.3.2. Assessment of potential effects

The 2016 EIA and 2019 EIAR identified the following potential effects on marine birds during the construction of the AHEP:

Potential effect	Relevant to proposed extension
Disturbance and displacement due to marine construction activities	Yes – considered below
Reduced prey availability for visual predators due to the presence of sediment plumes	No - relates to sediment plumes from dredging and deposit activities, which will be completed under the existing Marine Licence. Minimal sediment plumes are generated by the activities to be carried out during the proposed extension period.
Accidental release of environmentally harmful substances	Yes – already considered in Section 5.2.2. Compliance with the 2019 CEMD will ensure that there is no increased risk during the proposed extension period.
Reduced prey availability	No - relates to disturbance from dredging and deposit activities, which will be completed under the existing Marine Licence.
Increase in the risk of collision with vessels	Yes – considered below

Disturbance and displacement due to marine construction activities

Marine rotary piling: the West and North West Quays are under construction and there are frequent movements of plant and site workers within these areas. As such, the area is highly unlikely to provide suitable habitat for breeding, roosting or feeding birds. As indicated by the eider monitoring data (Section 5.3.1), eider have been present in Nigg Bay in relatively low numbers since the start of AHEP construction in 2017, with larger numbers congregating in Greyhope Bay and Girdleness to the north of the AHEP site. The installation of five piles using the rotary piling technique, over a period of approximately 30 days during the proposed extension period, is not expected to disturb or displace marine birds.

South breakwater construction: breakwater construction has the potential to locally displace birds due to visual and noise disturbance, particularly eider duck which were known to frequent Nigg Bay prior to construction commencing. The breakwater construction method is described in Section 3.1. It involves the placement of rock from vessels and/or HGVs directly onto the seabed, rock movement by bulldozer and the installation of accropodes. Breakwater construction is a 24-hour activity at times, and is expected to proceed with minimal breaks until it is complete, provided adverse weather conditions do not prevent work. As such, marine birds are unlikely to congregate on the partially constructed south breakwater during the proposed extension period, and if they do it is assumed that they are able to tolerate disturbance caused by construction activities. As indicated by the eider monitoring data (Section 5.3.1), eider numbers in the south of Nigg Bay and at Gregness have been very low since the start of AHEP construction in 2017, with larger numbers congregating in Greyhope Bay and Girdleness to the north of the AHEP site. The extension of the south breakwater construction by up to 10 months is not anticipated to have adverse effects on marine birds over and above those that have already been assessed and consented.

Increase in the risk of collision with vessels

The 2016 EIA concluded that the risk of increased collision during construction was negligible or minor adverse for all marine bird species. During the proposed extension period of up to 10 months, construction-related vessels will be limited to the delivery of rock to the North Quay approximately once every two days and a small number of slow-moving support vessels such as safety and survey boats. The risk of collision between construction-related vessels and marine birds is negligible.

5.3.3. Cumulative impacts

Table 1 lists the offshore wind farm projects that are expected to be in construction or operational during the proposed 10 month extension period in 2022. The closest is Kincardine Offshore Wind Farm 12 km south of Nigg Bay (which will be operational by the end of 2021), followed by Seagreen Alpha and Bravo offshore wind farm 64 km south of Nigg Bay (which is expected to be in construction during 2022).

As the AHEP south breakwater construction and marine rotary piling are not anticipated to disturb or displace marine birds from Nigg Bay, there is no mechanism for offshore wind farms at considerable distances from the AHEP to have cumulative effects on the disturbance or displacement of marine birds during AHEP construction.

5.4. Marine mammals

5.4.1. Summary characterisation

The region supports a number of cetacean and pinniped species including bottlenose dolphin (*Tursiops truncatus*), harbour porpoise (*Phocoena phocoena*), Risso's dolphin (*Grampus griseus*), white-beaked dolphin (*Lagenorhynchus albirostris*) and Minke whale (*Balaenoptera acutorostrata*). Grey seal (*Halichoerus grypus*) is the most commonly occurring pinniped in Aberdeenshire waters. Harbour seals (*Phoca vitulina*) are occasionally recorded. Grey seal and bottlenose dolphin are qualifying features of the Isle of May Special Area of Conservation (SAC), 108 km to the south and Moray Firth SAC, at approximately 150 km north-west.

Further information on marine mammals is provided in Chapter 15 of the 2016 ES and Section 6 of the 2019 EIAR.

Marine mammal C-POD monitoring during construction

There are two C-PODs deployed off Nigg Bay (one to the north and one to the south) to continuously record cetacean presence around the AHEP during construction. Data (click trains) are periodically downloaded from the C-PODs and reported as detection positive hours (DPH) for dolphin and harbour porpoise.

In August 2019, the northern C-POD was found to be absent, and in January 2020 the southern C-POD was also found to be absent, and this was reported to Marine Scotland – Licensing Operations Team (MS-LOT). Two new C-PODs were deployed at the same locations in February 2020 and were used until 19 May 2020. C-PODs were redeployed on 7 September 2020 when a new contractor was appointed to recommence marine works. Further losses of C-PODs since September 2020 are reported in Table 3. If the lost C-PODs are found, reports for those periods may be reanalysed and reissued.

C-POD data downloads from April 2018 – July 2021 are summarised below. The individual C-POD reports are available from AHB on request. Further information on marine mammal monitoring during construction is presented in Section 6.2.6 of the 2019 EIAR.

Table 3 and Figure 6 show the median DPH per day for harbour porpoise and dolphins from April 2018 – July 2021. Dolphins and harbour porpoise have been detected throughout the construction period. Detected activity for dolphins was consistently lower than for harbour porpoise.

Figure 5 presents the timeline of key marine construction activities since commencement in July 2017 to present. There is no apparent correlation between the DPH per day for harbour porpoise or dolphin, and the commencement (and continuation) of key construction activities, including breakwater construction and marine rotary piling.

Table 3 C-POD deployments April 2020 - July 2021

Deployment Period	C-POD	Porpoise Median and Inter- Quartile Range DPH	Dolphin Median and Inter- Quartile Range DPH	Observations
27/04/18 – 06/05/18	North	3 (2-4)	3.5 (3-4)	Detections of porpoise were generally higher at the south C-POD except on 30th April and 3rd May when more porpoise were detected at the north C-POD. Detections of dolphin were fairly consistent with a slight increase at the north site on 29th April and a decrease at the south site on 2nd May
	South	5 (3.25-6)	4 (3-4)	
03/08/18 – 06/09/18	North	10 (7-15)	1 (0-2.5)	Detections of porpoises were highest during the first week and increased slightly towards the end, and were generally higher for dolphins during the first half
	South	10 (7-14.5)	2 (0-3)	
06/09/18 – 08/12/18	North	10 (7-14)	0 (0-1)	Detections of porpoises were variable and were low for dolphins
	South	5 (3-7)	0 (0-2)	
08/12/18 – 10/01/19	North	No data	No data	Detections of porpoises and dolphins were similar to previous deployments
	South	12 (9-15.75)	1 (0-3)	
10/01/09 – 31/01/19	North	No data	No data	Detections were high for porpoises and low for dolphins
	South	18.5 (16-21.75)	2 (1-3)	
31/01/19 – 25/03/19	North	No data	No data	Detections of porpoises were high, particularly during the first half. Detections of dolphins were low
	South	16 (12.25-19)	2 (1-3)	
25/03/19 – 07/05/19	North	No data	No data	Detections of porpoises were higher during the first half of the survey period and lower during the second half. Detections of dolphins were low yet fairly consistent
	South	5.5 (2-16)	2.6 (1-7)	
07/05/19 – 19/06/19	North	0 (0-0)	3 (2-4)	Detections of porpoises and dolphins were low
	South	1 (0-2)	3 (2-3)	

Deployment Period	C-POD	Porpoise Median and Inter- Quartile Range DPH	Dolphin Median and Inter- Quartile Range DPH	Observations
19/09/19 – 21/07/19	North	3 (1-5)	2 (1-4)	Detections of porpoises and dolphins were low
	South	2 (1-4)	3 (1-5)	
21/07/19 – 13/08/19	North	No data	No data	Detections of porpoises and dolphins were similar to previous deployments
	South	4.5 (5-8.25)	4.5 (2-5.25)	
13/08/19 – 20/09/19	North	No data	No data	Detections of porpoises and dolphins were similar to previous deployments
	South	11 (7.5-13)	3 (1-5)	
20/09/19 – 30/10/19	North	No data	No data	Detections of porpoises and dolphins were similar to previous deployments
	South	14 (9-16)	2 (1-3)	
30/10/19 – 02/12/19	North	No data	No data	Detections of porpoises and dolphins were similar to previous deployments
	South	14 (10-18)	2 (1-3.75)	
13/02/20 – 18/03/20	North	9 (6-11.5)	2 (1-3)	Detections of porpoises and dolphins were similar to previous deployments
	South	13 (11.5-16)	2 (1-3)	
18/03/20 – 23/04/20	North	8 (5-10)	2 (1-3)	Detections of porpoises and dolphins were similar to previous deployments
	South	11 (8-14)	2 (2-4)	
23/04/20 – 19/05/20	North	2 (1-7)	3 (2-3.5)	Detections of porpoises were lower than previous deployments and detections of dolphins were similar to previous deployments
	South	2 (1-8)	3 (2.5-4.5)	
07/09/20 – 08/10/20	North	No data[2]	No data	Detections of porpoises were much higher than previous deployments and detections of dolphins were lower than previous deployments.
	South	14 (9.5-20.25)	0 (0-0.25)	

[2] On recovery the north C-POD was found to be absent and was replaced on 8 October 2020.

Deployment Period	C-POD	Porpoise Median and Inter- Quartile Range DPH	Dolphin Median and Inter- Quartile Range DPH	Observations
08/10/20 – 05/11/20	North	16 (14-20)	0 (0-1)	Detections of porpoises and dolphins were similar to the previous deployment
	South	15 (12-19)	0 (0-1)	
05/11/20 – 03/12/20	North	7 (3-10)	0 (0-1)	Detections of porpoises were lower than previous deployments, and dolphins were similar to previous deployments
	South	No data[3]	No data	
03/12/20 – 06/01/21	North	10 (6-14)	1 (0.2)	Detections of porpoises were higher than previous deployments, and dolphins were similar to previous deployments
	South	No data[4]	No data	
06/01/21 – 11/02/21	North	16 (14-18)	1 (0-2)	Detections of porpoises were higher than previous deployments, and dolphins were similar to previous deployments
	South	18 (15-21)	1 (0-2)	
05/03/21 – 02/04/21	North	10 (8-14)	2 (1-3)	Detections of porpoises were lower than previous deployments, and dolphins were similar to previous deployments
	South	15 (11-17)	2 (0-3)	
02/04/21 - 03/05/21	North	6 (2.75–8)	2 (1-4)	Detections of porpoises were lower than the previous deployment, and dolphins were similar to previous deployments.
	South	7 (4-10)	3 (1-4.25)	
03/05/21 - 31/05/21	North	2 (1-3)	1 (0-2)	Detections of porpoises were lower than previous deployments, and detections of dolphins were similar to previous deployments.
	South	No data[5]	No data	
31/05/21 - 02/07/21	North	1 (0-2)	2 (1-3)	Detections of porpoises were lower than previous deployments, and detections of dolphins were similar to previous deployments.
	South	No data	No data	

[3] Only the north C-POD recorded data; the south C-POD was found to have ceased operating shortly after deployment.
[4] On recovery the south C-POD was found to be absent and was replaced on 6 January 2021.
[5] On recovery the south C-POD was found to be absent.

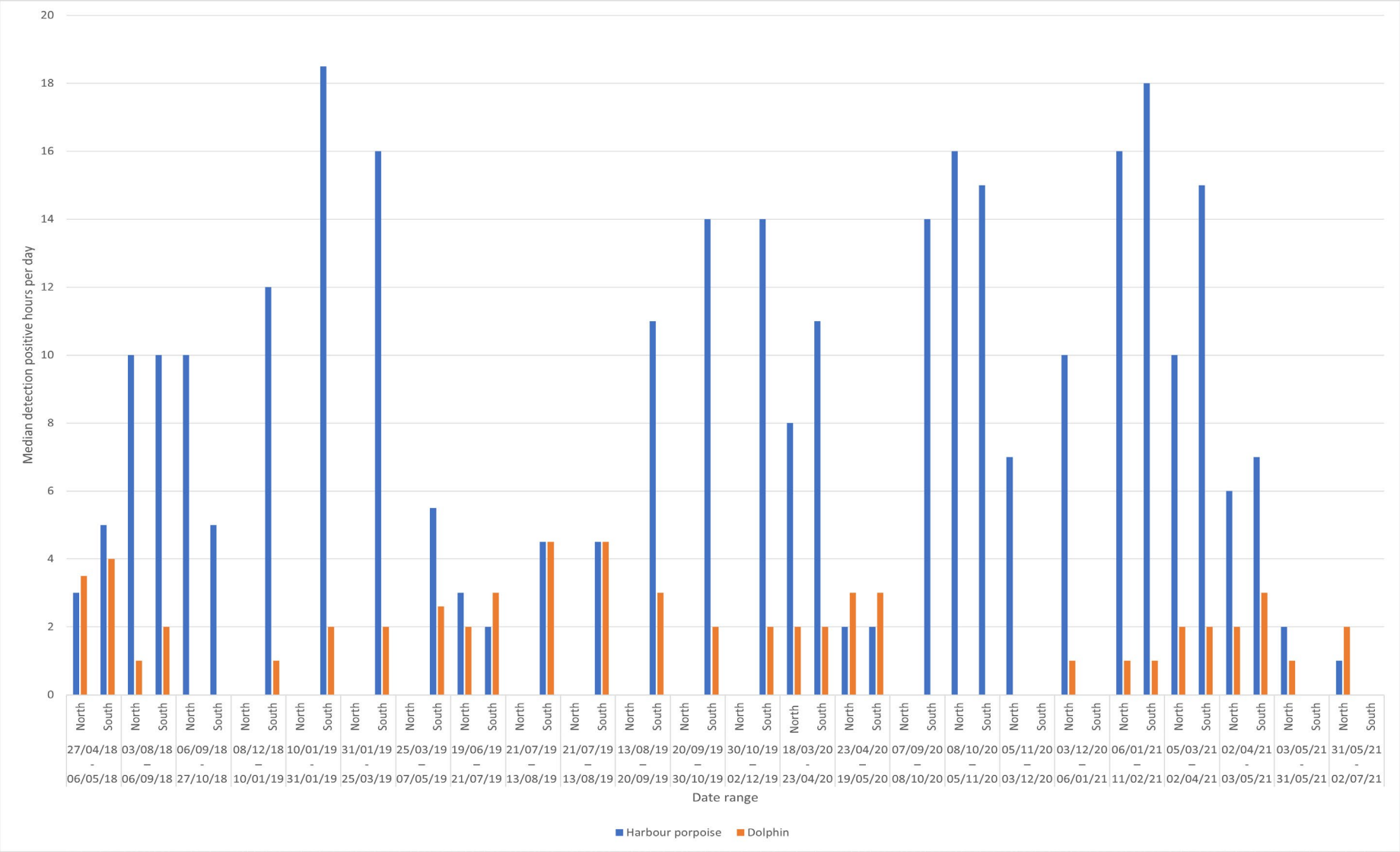

Figure 6 C-POD median detection positive hours per day for harbour porpoise and dolphins from April 2018 to July 2021

5.4.2. Assessment of potential effects

The 2016 EIA and 2019 EIAR identified the following potential effects on marine mammals during the marine construction of the AHEP:

Potential effect	Relevant to proposed extension
Effects relating to noise	
Mortality, startle reaction and avoidance due to piling, drilling and blasting	Yes – considered below
Startle reaction and avoidance due to material deposition offshore	No – relates to dredging and deposit activities, which will be completed under the existing Marine Licence and so do not require further consideration.
Disturbance and avoidance due to dredging noise	
Disturbance due vessel noise	Yes – considered below
Effects relating to increased suspended sediment concentrations	
Temporary increases in suspended sediment concentrations due to dredging	No – relates to dredging and deposit activities, which will be completed under the existing Marine Licence and so do not require further consideration. Minimal sediment plumes are generated by the activities to be carried out during the proposed extension period.
Temporary increases in suspended sediment concentrations due to disposal of sediments at a licensed site	
Effects related to construction vessel activity	
Mortality or physical injury due to collisions with vessels	Yes – considered below
Disturbance due to vessel movements	Yes – considered below
Effects relating to accidental release of pollutants	
Interaction of pollutants with marine mammals due to accidental spills	Yes – already considered in Section 5.2.2. Compliance with the CEMD will ensure that there is no increased risk during the proposed extension period.
Interaction of pollutants with marine mammals due to release of sediment contaminants	No – relates to dredging and deposit activities, which will be completed under the existing Marine Licence and so do not require further consideration. Minimal sediment plumes are generated by the activities to be carried out during the proposed extension period.

Effects relating to changes in prey resource	
Changes to prey availability	No - Chapter 15 of the 2016 EIA highlighted the potential for localised reductions in the abundance of fish and shellfish prey items resulting from the use of impact piling, increase in suspended sediment concentrations due to dredging and deposit activities, and effects on water quality. No impact piling or dredging will take place during the proposed extension period. As no significant adverse effects are predicted on fish and shellfish due to the proposed extension (see Section 5.2), there are no predicted corresponding effects on prey availability for marine mammals.

Mortality, startle reaction and avoidance due to piling, drilling and blasting

During the production of the 2016 EIA, the 2019 EIAR and regular engagement with stakeholders throughout the construction process, the key concerns relating to marine mammals have focused on underwater noise generated by underwater blasting and marine impact piling. There will be no underwater blasting or marine impact piling during the proposed extension period.

Marine rotary piling: the final AHEP design removed all marine impact piling from the construction programme, and instead deployed a marine rotary piling method, which uses a drilling technique with no impact/percussive piling and therefore no loud impulsive noise. The vast majority of marine rotary piling has already been completed; however, due to challenging ground conditions it is necessary to install an additional five piles on the West and North West Quays, as described in Section 3.2.

Propagation of underwater noise from the rotary piling locations will be substantially reduced by the presence of the fully constructed north breakwater and partially constructed south breakwater, as shown on Figure 1. Under the existing Construction Marine Licence and the 2019 CEMD, there is no marine mammal mitigation required during marine rotary piling activities. The installation of five piles over a period of approximately 30 days during the proposed extension period is not predicted to have significant adverse effects on marine mammals over and above those that have already been assessed and consented.

South breakwater construction: the breakwater construction method is described in Section 3.1. It will, at times, be a 24 hour a day operation involving the placement of rock from HGVs and vessels directly onto the seabed, rock movement by bulldozer and the installation of accropodes. There is a risk that some marine mammal species, particularly seals, may come close to the breakwater operations during construction due to their inquisitive nature and desire to haul out.

Chapter 11 of the 2019 CEMD (Marine Mammal Mitigation Plan) describes the mitigation and monitoring that will be in place to protect marine mammals. Specific to breakwater construction work, a trained non-dedicated Marine Mammal Observer (MMO) will carry out a MMO watch to a distance of 50 m from the seaward end of the breakwater for 2 minutes to ensure the area is free of marine mammals before rock is placed on the seabed or accropodes are installed. If animals (most likely seals) are observed in the area, rock placement or accropode installation will be halted until the marine mammal has voluntarily left the area.

With this mitigation in place, extending south breakwater construction by up to 10 months is not predicted to have significant adverse effects on marine mammals over and above those that have already been assessed and consented.

Mortality or physical injury due to vessel collision; disturbance due vessel movements and noise

Chapter 15 of the 2016 EIA concluded that the effects of construction-related vessel movements and noise on marine mammals would be minor adverse. Chapter 17 of the 2019 CEMD (Vessel Management Plan) requires all project-related vessels to adhere to the Aberdeen Harbour Dolphin Code. During the proposed 10-month extension period, construction-related vessels will be limited to the delivery of rock to the North Quay approximately once every two days, and a small number of slow-moving support vessels such as safety and survey boats. The risk of collision between the limited number of slow-moving construction-related vessels and marine mammals, or of significant disturbance due to vessel movements or noise, is very low and will be no worse than has already been assessed and consented.

5.4.3. Cumulative effects

Table 1 lists the offshore wind farm projects that are expected to be in construction or operational during the proposed 10 month extension period in 2022. Potential cumulative effects for each of the impacts identified in Section 5.4.2 are considered below.

Mortality, startle reaction and avoidance due to piling, drilling and blasting

No plans or projects have been identified close to the AHEP that are likely to generate significant underwater noise, although several offshore wind farm projects are located some distance from the AHEP which may be within the range of marine mammals using the area around the AHEP (as listed in Table 1).

It is widely accepted that the main potential impact upon marine mammals from offshore wind farm development is underwater noise during construction, resulting from pile driving of foundations. The offshore wind farms that are expected to be undertaking piling or other construction activities during the proposed AHEP extension period are: Seagreen Alpha and Bravo; Neart na Gaoithe; and Moray West. Marine mammals may experience cumulative impacts if they were to encounter a significant adverse noise source during the construction of one of these offshore wind farms whilst recovering from an impact from the AHEP construction (or vice versa). This is, however, considered highly unlikely as the marine activities that will be carried out during the proposed AHEP 10-month extension period are limited, and will not generate loud impulsive noise, as described in Section 5.4.2. As such, cumulative impacts due to underwater noise are not anticipated.

Mortality or physical injury due to vessel collision; disturbance due vessel movements and noise

As described in Section 5.4.2, during the proposed 10 month extension period the risk of collision between the limited number of slow-moving AHEP construction-related vessels and marine mammals, or of significant disturbance due to vessel movements or noise, is very low.

Vessel collision or disturbance was not identified as a significant issue in the EIA Reports for any of the offshore wind farms listed above, either during construction or operation. As such, cumulative impacts due to vessel collision or disturbance are not anticipated.

6. Conclusion

The proposal to extend limited aspects of the AHEP construction programme by up to 10 months will not give rise to any new significant environmental effects. Mitigation identified within the 2019 CEMD remains appropriate and will continue to be implemented during the proposed extension period.

7. Habitats Regulations Appraisal

This chapter updates the Habitats Regulation Appraisals (HRA) which accompanied the 2016 EIA and 2019 EIAR, and informs the Competent Authority's Appropriate Assessment (AA) for the determination of the application to vary the AHEP Construction Marine Licence.

The HRA submitted with the 2016 ES included an extensive screening exercise to identify and assess potential interactions between the proposed AHEP activities and the interest features of Natura 2000 sites including Special Protection Areas (SPA), Special Areas of Conservation (SAC) and proposed SPAs (pSPAs) that were within predicted zones of influence of the proposals and/or within the range movement of relevant qualifying species. The HRA concluded that there would be no likely significant effects (LSE) of AHEP activities on the integrity of the designated sites. MS-LOT, as the Competent Authority, subsequently undertook an AA (2016), which concluded that the AHEP proposals would not adversely affect the integrity of SACs, SPAs or pSPAs.

The 2019 EIAR included an updated HRA to consider the effects of an extended construction programme, including an extended underwater blasting period. This HRA concluded that there would be no LSE of AHEP activities on the integrity of the designated sites. MS-LOT subsequently undertook a further AA in 2020, which concluded that the AHEP proposals would not adversely affect the integrity of SACs or SPAs.

The HRA has been reviewed and updated to consider the proposed extension of limited elements of the AHEP marine construction by up to 10 months. Table 4 lists the designated sites and respective qualifying features that are considered in this HRA, as identified in MS-LOT's 2020 AA. Section 7.1 considers effects on site integrity.

Table 4 Designated sites and their qualifying features and conservation objectives

Site and qualifying features	Conservation objectives
River Dee SAC (approx. 0.8 km from AHEP) Qualifying species: • Atlantic salmon (*Salmo salar*) • Fresh water pearl mussel (*Margaritifera margaritifera*)	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species, including range of genetic types for salmon, as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Distribution and viability of freshwater pearl mussel host species; • Structure, function and supporting processes of habitats supporting the species; • Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species; • No significant disturbance of the species.
Ythan Estuary, Sands of Forvie and Meikle Loch SPA (approx. 2 km from AHEP) Qualifying species: • Common tern (*Sterna hirundo*) • Eider (*Somateria mollissima*) • Little tern (*Sterna albifrons*) • Sandwich tern (*Sterna sandvicensis*) • Lapwing (*Vanellus vanellus*) • Pink-footed goose (*Anser brachyrhynchus*) • Redshank (*Tringa totanus*) • Waterfowl assemblage	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Structure, function and supporting processes of habitats supporting the species; • No significant disturbance of the species.

Isle of May SAC (approx. 110 km from AHEP) Qualifying species : • Grey seal (*Halichoerus grypus*)	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Structure, function and supporting processes of habitats supporting the species; • No significant disturbance of the species.
Moray Firth SAC (approx. 160 km from AHEP) Qualifying Species: • Bottlenose dolphin (*Tursiops truncatus*)	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained, and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features and to ensure for the qualifying species that the following are established then maintained in the long term: • Population of the species as a viable component of the site; • Distribution of the species within site; • Distribution and extent of habitats supporting the species; • Structure, function and supporting processes of habitats supporting the species; • No significant disturbance of the species.

7.1. Assessment of effects on site integrity

7.1.1. River Dee SAC

The River Dee SAC is located 0.8 km from the AHEP. Atlantic salmon migrate to and from the River Dee, and when smolts leave the river they may swim towards the direction of Nigg Bay. Adult salmon are thought to return to the River Dee through the coastal waters from the south and may traverse the AHEP from south to north prior to entry to the river mouth. Further information on Atlantic salmon is provided in Section 5.2.1 of this report and Section 5.3 of the 2019 EIAR.

The 2020 AA identified underwater blasting, and capital dredging and deposition at sea, as activities with a potential LSE on the qualifying interests of the River Dee SAC. Neither of these activities will take place during the proposed extension period.

Section 5.2.2 of this report considers the potential effects of the marine activities that will take place during the proposed extension period on fish and shellfish, and concludes that the extension of the south breakwater construction by up to 10 months, and the installation of five marine rotary piles over a period of approximately 30 days, are not predicted to have effects on fish and shellfish over and above those that have already been assessed and consented, either alone or in combination with other projects.

It is concluded that providing the 2019 CEMD is adhered to there will be no adverse effect on the site integrity of the River Dee SAC.

7.1.2. Ythan Estuary, Sands of Forvie and Meikle Loch SPA

The Ythan Estuary, Sands of Forvie and Meikle Loch SPA is located 2 km from the AHEP. As reported in the 2019 EIAR, the AHEP lies outside of the mean breeding season foraging ranges for Sandwich tern (11.5 km) and Common tern (4.5 km) using the Ythan Estuary, Sands of Forvie and Meikle Loch SPA but is within maximum ranges for these species. Modelled foraging distributions indicate that the Sandwich tern colony of this SPA only makes low use of local area around Nigg Bay while the Little tern colony does not use the site or local environs at all. As presented in the 2016 EIA, baseline surveys recorded terns using offshore areas outside of Nigg Bay where there is sand eel habitat for foraging and also using the rocky shores in Greyhope Bay for roosting and as crèches for their young in summer.

Eider duck are already displaced from Nigg Bay due to AHEP construction, as predicted in the 2016 EIA, although individuals are occasionally present within the AHEP boundaries. Eider are able to use other areas within the region and large numbers are known to occur at Blackdog Bridge of Don. Local moulting habitats at Girdleness and Greyhope Bay remain well utilised despite on-going AHEP construction (see Section 5.3.1 of this report).

As described in Section 5.3.1 of this report, while seabirds have been largely displaced from Nigg Bay due to AHEP construction, the wider area supports a range of bird species through provision of habitat for the birds and their prey species (sand eel). Sand eel individuals have been reported in Nigg Bay; however, the main sand eel habitat of clean medium and coarse sand is only found outside of Nigg Bay, therefore no impacts on the species and consequent prey availability are anticipated.

As reported in the 2020 AA, the overall extension of the project duration (at that time to 31 December 2021) is likely to extend the temporal displacement of the bird species from Nigg Bay, although suitable alternative habitat has been adopted by the birds.

Section 5.3.2 of this report considers potential effects on marine birds, and concludes that the extension of the south breakwater construction by up to 10 months, and the installation of five marine rotary piles over a period of approximately 30 days, are not predicted to have effects on marine birds over and above those that have already been assessed and consented, either alone or in combination with other projects.

It is concluded that providing the 2019 CEMD is adhered to, there will be no adverse effect on the site integrity of the Ythan Estuary, Sands of Forvie and Meikle Loch SPA.

7.1.3. Isle of May SAC

The Isle of May SAC is located 110 km from the AHEP. Grey seals forage widely throughout the east coast of Scotland and are seen foraging and resting in the AHEP area despite ongoing construction. As reported in the 2019 EIAR, seal tracking studies showed that the Isle of May SAC grey seals likely travel through or close to the AHEP and use local waters.

The 2020 AA identified underwater blasting as the key activity with a potential LSE on the qualifying interests of the Isle of May SAC. Underwater blasting will not take place during the proposed extension period.

Section 5.4.2 of this report considers the potential effects on marine mammals, and concludes that the extension of the south breakwater construction by up to 10 months, and the installation of five marine rotary piles over a period of approximately 30 days, are not predicted to have effects on marine mammals over and above those that have already been assessed and consented, either alone or in combination with other projects.

As required by the 2019 CEMD, during breakwater construction, a MMO watch will be carried out to a distance of 50 m from the seaward end of the breakwater for 2 minutes to ensure the area is free of marine mammals before rock is placed on the seabed or accropodes are installed. If animals (most likely seals) are observed in the area, rock placement or accropode installation will be halted until the marine mammal has voluntarily left the area.

It is concluded that providing the 2019 CEMD is adhered to, there will be no adverse effect on the site integrity of the Isle of May SAC.

7.1.4. Moray Firth SAC

The Moray Firth SAC is located 160 km from the AHEP. As described in Section 5.4.1 of this report and in the 2019 EIAR, bottlenose dolphins were frequently recorded in the vicinity of the AHEP during pre-construction vantage point surveys and continue to use the local area during marine construction activities.

The 2020 AA identified underwater blasting as the key activity with a potential LSE on the qualifying interests of the Moray Firth SAC. Underwater blasting will not take place during the proposed extension period.

The 2016 AA included a Population Viability Analysis (PVA) model to assess the in-combination effects of underwater noise generated by the construction of the AHEP and offshore wind farm projects on the bottlenose dolphin population. This work was updated as part of the 2019 EIAR in the form of an interim population consequences of disturbance (IPCOD) model. Both the PVA and IPCOD modelling considered the effects of loud impulsive noise sources, i.e. percussive/impact piling and underwater blasting. Due to the nature of the works to be carried out during the proposed AHEP extension period, no loud impulsive noise is generated so there is no requirement to update the population modelling.

Section 5.4.2 of this report considers the potential effects on marine mammals, and concludes that the extension of the south breakwater construction by up to 10 months, and the installation of five marine rotary piles over a period of approximately 30 days, are not predicted to have effects on marine mammals over and above those that have already been assessed and consented, either alone or in combination with other projects.

It is concluded that providing the 2019 CEMD is adhered to, there will be no adverse effect on the site integrity of the Moray Firth SAC.

7.2. HRA conclusion

During the production of the 2016 EIA, the 2019 EIAR and regular engagement with stakeholders throughout the AHEP construction process, the key concerns relating to the qualifying interests of the Natura 2000 sites identified in this HRA have focused on underwater noise generated by blasting and marine impact piling, and increased suspended sediment concentrations generated by capital dredging and deposition of material at sea. None of these activities will take place during the proposed 10-month extension of the AHEP marine construction programme.

It is concluded that providing the 2019 CEMD is adhered to, there will be no adverse effect on the site integrity of the River Dee SAC, Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Isle of May SAC or Moray Firth SAC, from the proposed extension of the AHEP marine construction programme, either in isolation or in combination with other projects.

8. References

NatureScot (2016). Proposed marine extension to the Ythan Estuary, Sands of Forvie and Meikle Loch Special Protection Area (SPA) NO. UK9002221 SPA Site Selection Document: The scientific case for the extension to the site.