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Information to Inform the Habitats Regulations Appraisal (HRA) for the Proposed St Margaret's Hope Pier Extension.

Version 1

Report to St Margaret's Hope Pier Trustees

Issued by Aquatera Ltd

P998 – June 2022

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Issue record

The version number is indicated on the front cover.

Version	Date	Details
V1	30.06.2022	Issued with marine licence application to MSLOT

Members of:

OREF ORKNEY RENEWABLE ENERGY FORUM

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1 INFORMATION TO INFORM HRA

1.1 INTRODUCTION

A Habitats Regulations Appraisal (HRA) has been undertaken for St Margaret's Hope Pier Trustees (SMHPT)'s proposed extension of St Margaret's Hope Pier (the 'Project') to determine whether the proposal has the potential to affect any European sites (i.e., Special Protection Areas (SPAs) or Special Areas of Conservation (SACs)) within the UK-wide network of protected sites (UK site network).

A Screening response was received from Marine Scotland in March 2022 which indicated that an EIA was not required. The consultation feedback received from stakeholders, primarily NatureScot[1], during the pre-application process has been used to inform the scope of this assessment (see Section 1.4 Consultation Responses).

No SACs have been identified that could potentially be affected by the Project therefore this assessment considers the effects of the Project on SPAs only.

1.2 REGULATORY BACKGROUND

The requirements of the Habitats Directive and the Wild Birds Directive are transposed into domestic law in Scotland by The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). These Regulations apply on land in Scotland, and in Scottish inshore waters (the area of sea adjacent to Scotland from 0 to 12 nautical miles). The UK's exit from the European Union has resulted in some changes in terminology regarding the Habitats Regulations. European sites are no longer part of the European Union's Natura 2000 network. Instead, they form a UK-wide network of protected sites. The UK site network is made up of SACs and SPAs. It is Scottish Government policy to afford the same protection to proposed SPAs (pSPAs) and candidate SACs (cSACs) as fully classified sites.

1.3 OVERVIEW OF HABITATS REGULATIONS APPRAISAL PROCESS

Where a plan or project could affect a site within the UK site network, the Habitats Regulations require the competent authority to consider the provisions of Regulation 61. This means that the competent authority has a duty to:

- determine whether the proposal is directly connected with or necessary to site management for conservation; and, if not
- determine whether the proposal is likely to have a significant effect (Likely Significant Effect, (LSE)) on the site either individually or in-combination with other plans or projects; and, if so, then
- make an appropriate assessment of the implications (of the proposal) for the site in view of that site's conservation objectives.

This process is now commonly referred to as HRA. HRA applies to any plan or project which has the potential to affect the qualifying features of a site within the UK site network, even when those interests may be at some distance from that site. The competent authority, in this instance Marine Scotland, will decide whether an appropriate assessment is necessary and carry it out (with advice provided by NatureScot) if required. It is the applicant, in this instance SMHPT, who is usually required to provide the information to inform the appropriate assessment.

[1] Scottish Natural Heritage (SNH) changed its name to NatureScot as of 24 August 2020.

The approach to HRA follows the three-step process as detailed in NatureScot guidance (SNH, 2018). The information in this HRA is presented in a format to answer the following three questions:

- Step 1: Is the proposal directly connected with or necessary to the conservation management of a SPA or pSPA?
- Step 2: Is the proposal likely to have a significant effect (LSE) on the qualifying features of a SPA or pSPA either alone or in-combination with other plans or projects?
- Step 3: Can it be ascertained that the proposal will not adversely affect the integrity of a SPA or pSPA?

1.4 CONSULTATION RESPONSES

Consultation feedback specific to the HRA was received during pre-application consultation. Details of each of the comments received and how these have been incorporated into the assessment to allow completion of the HRA is presented in Table 1-1.

Table 1-1 Consultation responses specific to the HRA

Comment/information request	Response/Action taken
NatureScot, email, 4 May 2022	
The pier extension will straddle the boundary of Scapa Flow Special Protection Area (SPA), which is designated for breeding red-throated diver and non-breeding (i.e. wintering) black-throated diver, eider, goldeneye, great northern diver, long-tailed duck, red-breasted merganser, shag and slavonian grebe. Consequently, Marine Scotland, with input from NatureScot, will have to carry out an assessment of the implications of the proposal for the SPA, known as a Habitat Regulations Appraisal (HRA) before it can issue a licence.	Noted. An HRA has been undertaken to assess whether the Project will have a likely significant effect on Scapa Flow SPA and information has been provided to inform an appropriate assessment.
During the winter months (roughly September to April) small numbers of black-throated diver, eider, goldeneye, long-tailed duck, shag and Slavonian grebe can be found around the mouth of the hope, and red-breasted merganser occur at moderate density in and around the bay. Breeding red-throated divers are not thought to make significant use of the hope.	A desk-based assessment has been undertaken to characterise the baseline conditions for each of the nine Scapa Flow SPA qualifying features (see Section 2.3.2).
The onshore works are not likely to have a significant effect on any of the SPA bird species as the area is already subject to disturbance from the existing activity at the pier and construction work is unlikely to add much to this. Similarly, the loss of a small area of potential foraging habitat within the footprint of the extended pontoon will not be significant as this is unlikely to be used by any of the birds due to existing activity at the pier.	Noted. These impacts have been considered and have been scoped out of the assessment (see Section 2.2.3).
Replacement of the pontoon and installation of the mooring dolphin could displace a small number of mergansers if it is carried out in the winter months, but this is not likely to have a long-term impact on the SPA, although it could be avoided by carrying out the work between May and August.	Noted. Installation of a mooring dolphin is no longer proposed for this Project. The in-water construction works will include the installation of the moorings for the new concrete pontoons and removal of the existing temporary steel barge and associated moorings Potential disturbance due to in-water construction activities has been assessed (see Section 2.3.3).

Comment/information request	Response/Action taken
NatureScot, email, 4 May 2022	
Depending on the timing, the route(s) used and the number of vessel movements required, towing the new pontoon to the site and removing the old barge could disturb SPA bird species elsewhere in Scapa Flow. To allow this to be assessed you should include details of these aspects of the project in your Marine Licence application.	Noted. Disturbance due to vessel activity required for the removal of the existing temporary barge and installation of the new pontoons has been assessed (see Section 2.3.4).

1.5 PROJECT LOCATION

The HRA was undertaken for the Project using the boundary shown in Figure 1.1.

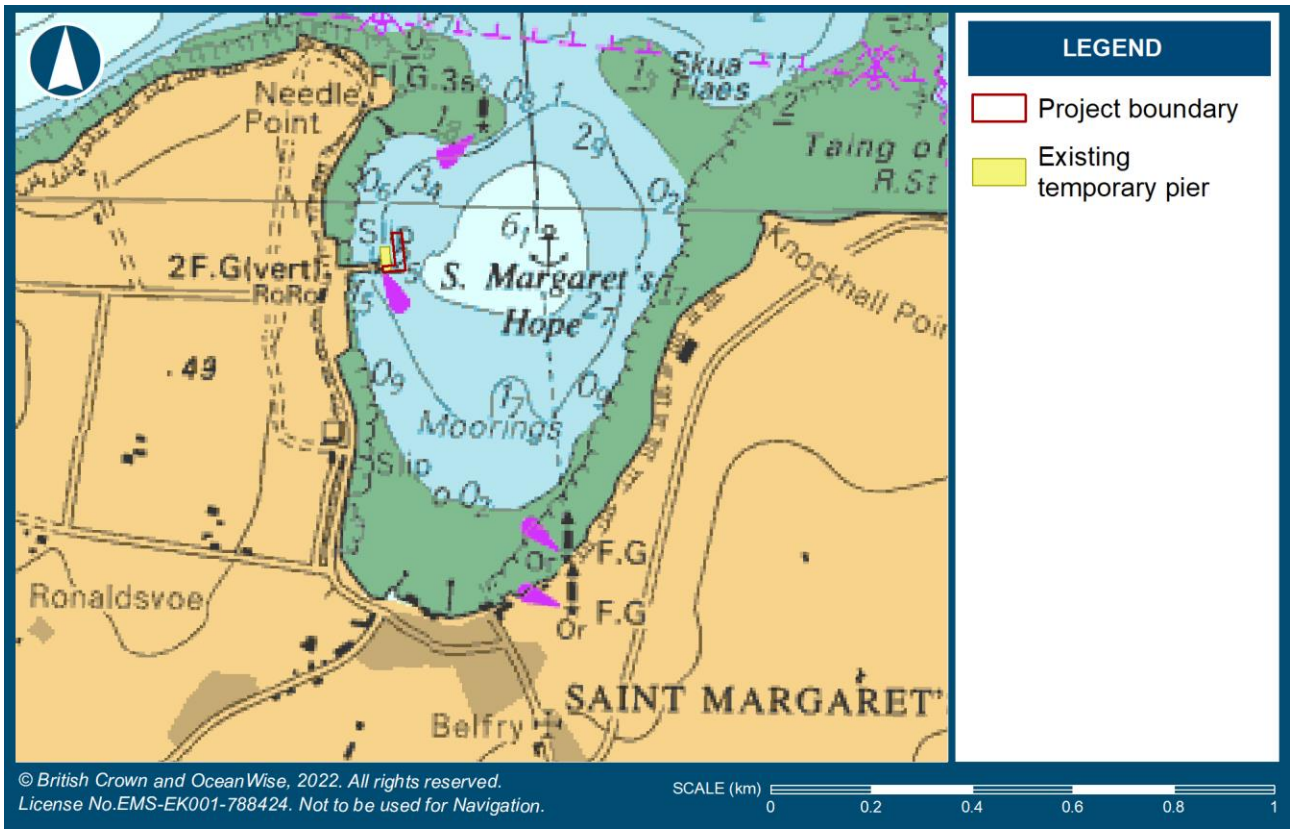

Figure 1.1 Location of the Project

2 SPAS AND PROPOSED SPAS

2.1 STEP ONE: IS THE PROPOSAL DIRECTLY CONNECTED WITH OR NECESSARY TO THE CONSERVATION MANAGEMENT OF A SPA OR PROPOSED SPA?

No, the proposal is not directly connected with or necessary to site management for the conservation of any SPAs or pSPAs and therefore consideration of Step 2 is required.

2.2 STEP TWO: IS THE PROPOSAL LIKELY TO HAVE A SIGNIFICANT EFFECT (LSE) ON THE QUALIFYING FEATURES OF THE SPAS/PROPOSED SPAS EITHER ALONE OR IN-COMBINATION WITH OTHER PLANS OR PROJECTS?

2.2.1 Identification of sites relevant to the Project

Scapa Flow SPA

The Project overlaps with the Scapa Flow SPA boundary (Figure 2.1).

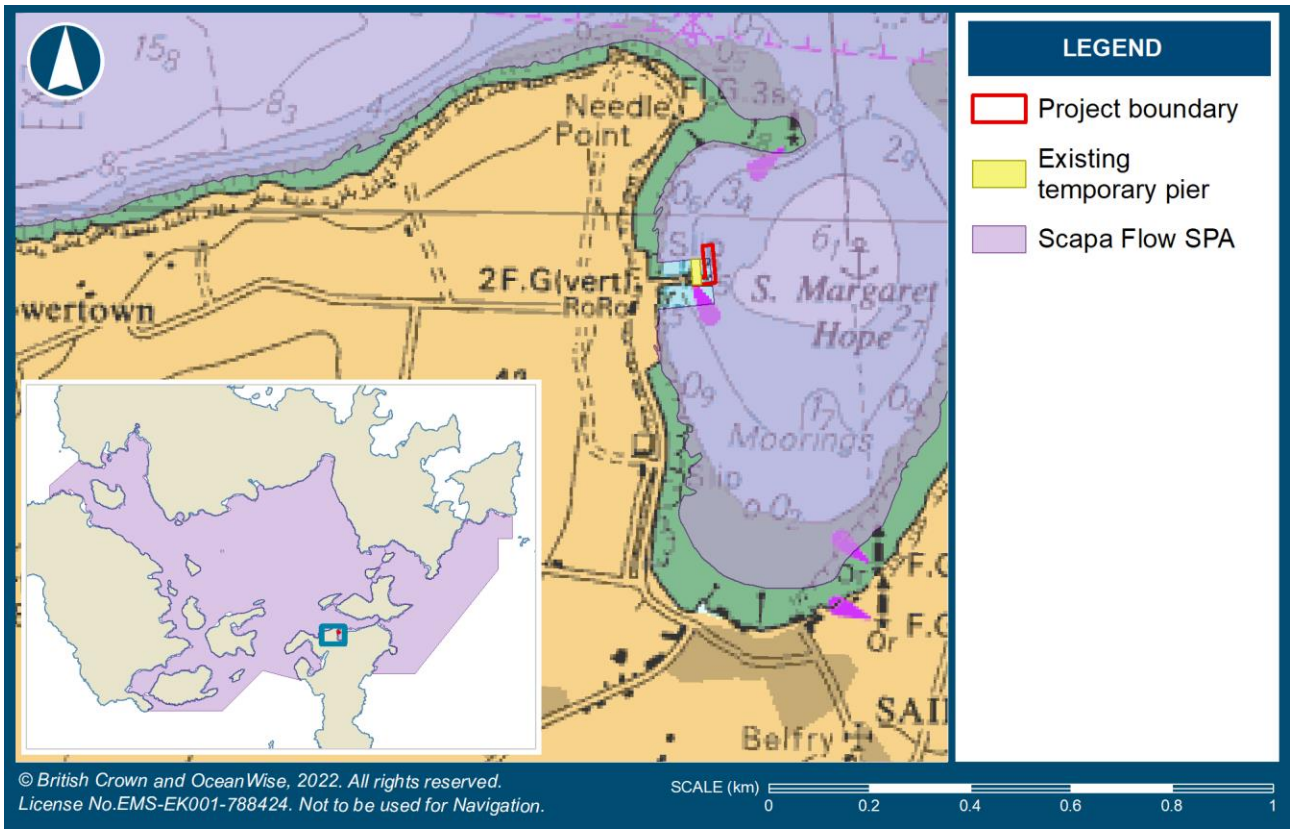

Figure 2.1 Location of the Project in relation to Scapa Flow SPA

Scapa Flow SPA is an extensive site comprising an area of 370.66 km^2, designated to provide protection for important habitat used by breeding red-throated diver *Gavia stellata* and a number of wintering waterfowl species. The qualifying features of Scapa Flow SPA are listed in Table 2-1.

Table 2-1 Scapa Flow qualifying interests

Qualifying feature	Breeding / Non-breeding season interest	Population size in Scapa Flow SPA (NatureScot, 2022) (individuals)
Red-throated diver *Gavia stellata*	Breeding	76 (pairs)
Black-throated diver *Gavia arctica*	Non-breeding	57
Great northern diver *Gavia immer*	Non-breeding	505
European shag *Phalacrocorax aristotelis*	Non-breeding	2,927
Common eider *Somateria mollissima*	Non-breeding	1,997
Common goldeneye *Bucephala clangula*	Non-breeding	219
Long-tailed duck *Clangula hyemalis*	Non-breeding	1,395
Red-breasted merganser *Mergus serrator*	Non-breeding	539
Slavonian grebe *Podiceps auritus*	Non-breeding	135

Other SPAs

The Project area is within foraging range of several species of birds that are qualifying features of SPAs designated to protect breeding seabird populations in the wider area. During the breeding season, many seabird species regularly fly considerable distances on foraging trips from nest sites; therefore, SPAs at considerable distances from the Project could have potential connectivity for particular qualifying features. However, given the Project is to remove and replace an existing temporary pier structure within a busy working pier area, the Project will not affect any seabird foraging areas and it is not anticipated to result in any likely significant effects to foraging seabirds therefore all other SPAs have been scoped out of the assessment.

2.2.2 Impacts associated with the Project

The following potential impacts associated with the Project have been considered in the HRA:

Construction phase

- Potential disturbance (noise and visual) of sensitive bird species due to in-water construction activities.
- Potential disturbance of sensitive bird species through vessel movements required for the removal of the existing temporary barge and installation of the new pontoons.

Operation and maintenance phase

No impacts during the operation and maintenance phase have been identified that could affect ornithological receptors.

Decommissioning phase

Impacts during the decommissioning phase are likely to be similar to or less than those during the construction phase.

Cumulative and in-combination effects are assessed in Section 2.3.5.

2.2.3 Impacts scoped out of the HRA

The following impacts have been scoped out of the HRA as there is no potential for likely significant effects (see Table 2-2):

Table 2-2 Impacts scoped out of the HRA

Impact	Justification
Construction	
Potential disturbance of sensitive bird species due to onshore construction activities.	The onshore construction activities will occur within the existing St Margaret's Hope pierhead area. The area within which onshore construction works will occur is already subject to human disturbance due to the existing activities associated with the working pier. The construction programme is anticipated to last approximately six months commencing in January 2023. Given the nature of the onshore construction works and their location within an area already affected by disturbance, these works are not anticipated to cause disturbance of bird species that would result in any likely significant effects on any of the qualifying interests of Scapa Flow SPA.
Potential loss or damage to prey-supporting habitats due to installation of the in-water infrastructure.	The Project is to remove and replace the existing temporary extension to the stone-built pier at St Margaret's Hope, with a larger permanent extension increasing the working area from 900 m^2 of the existing temporary barge to 1,750 m^2. The proposed pier extension is located adjacent to the location of the existing temporary barge therefore although the permanent extension covers a larger footprint compared to the temporary barge, this area is not anticipated to provide important prey-supporting habitats for any marine bird species given its proximity to the existing temporary pier extension and its location within the working pier area. The loss of a small area of potential foraging habitat within the footprint of the pier extension is not anticipated to result in any likely significant effects as this area is unlikely to be used by any of the Scapa Flow SPA qualifying interests due to the existing activity at the pier.
Operation and maintenance	
Potential for direct displacement of qualifying features from critical habitats due to presence of the Project.	Although the permanent pier extension will cover a larger footprint compared to the temporary barge, its proximity to the existing temporary pier extension and its location adjacent to the working pier area are such that the Project area is already subject to disturbance due to vessel activities associated with the working pier. This area therefore, is not likely to provide critical habitat for any of the Scapa Flow SPA qualifying interests. There is no potential for any likely significant effects as a result of direct displacement of qualifying features from critical habitats due to the presence of the Project.

2.2.4 Determination of potential for likely significant effects

An assessment has been made to determine whether the Project is likely to have a significant effect on any of the qualifying interests from Scapa Flow SPA. The Likely Significant Effect (LSE) test has been applied on a precautionary basis, following NatureScot advice[2]. Effects were identified through any reasonable links between the Project's effects and the site's qualifying interests, and they were considered to trigger LSE unless they could be objectively ruled out with certainty.

[2] https://www.nature.scot/professional-advice/planning-and-development/environmental-assessment/habitats-regulations-appraisal-hra/habitats-regulations-appraisal-hra-likely

Table 2-3 Determination of potential for likely significant effects

Site	Distance to Project (km)	Qualifying features	Potential for connectivity with the Project area?	Potential for LSE?
Scapa Flow SPA	0	Red-throated diver Great northern diver Black-throated diver Slavonian grebe Common eider Long-tailed duck Red-breasted merganser European shag Common goldeneye	**Yes** – there is potential for these qualifying features to the present at the Project site.	**Yes**

2.3 STEP THREE: CAN IT BE ASCERTAINED THAT THE PROPOSAL WILL NOT ADVERSELY AFFECT THE INTEGRITY OF THE SITE?

As there is potential for Likely Significant Effects on qualifying features from Scapa Flow SPA as a result of the Project, the Competent Authority, in this instance Marine Scotland must carry out an appropriate assessment to ascertain that the proposal will not adversely affect the integrity of the SPA. Information is provided in this section to inform that appropriate assessment.

In determining whether the Project has the potential for adverse effects on site integrity, each of the potential impacts has been considered for each of the qualifying features taking into consideration knowledge of the baseline conditions of each species (see Section 2.3.2), their behavioural ecology and the characteristics and context of the Project to assess whether there is potential for any of the relevant conservation objectives to be undermined.

2.3.1 Draft conservation objectives of Scapa Flow SPA

The draft conservation objectives of Scapa Flow SPA are:

1. To ensure that the qualifying features of the Scapa Flow SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.
2. To ensure that the integrity of the Scapa Flow SPA is maintained in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:

    2a. The populations of qualifying features are viable components of the site.

    2b. The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species.

    2c. The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained.

2.3.2 Baseline conditions

A desk-based assessment was undertaken to gather information on baseline conditions for each of the qualifying features where there is potential for likely significant effects, as a result of the Project.

Scapa Flow SPA qualifying interests

All SPA qualifying features are protected throughout the whole Scapa Flow SPA boundary irrespective of the species-specific distributions within it. The Scapa Flow Site Selection Document (SNH, 2016) provides details of the abundance and distribution of each of the qualifying species within the site boundary. A survey of the distribution and abundance of the eight wintering Scapa Flow SPA qualifying features within the Scapa Flow SPA was undertaken in the winter of 2017/18 (Jackson, 2018). This data provides information on the relative importance of areas within the SPA for each species, including the Project site. A summary of the distribution and abundance of these species in relation to the Project site and wider Scapa Flow area is provided here.

Red-throated diver

During the breeding season (April to September) red-throated divers habitually forage in inshore coastal waters within 10 km of inland breeding sites. The Project site and wider vicinity of St Margaret's Hope Bay are not predicted to hold foraging areas for red-throated diver (SNH, 2016). The main concentrations of red-throated divers in Scapa Flow are predicted to occur in the bays off the east coast of Hoy around the islands of Cava and Fara; around the northeast coast of Hoy and Graemsay; and along the northern coast of Scapa Flow from Bay of Houton to Scapa Bay. Lowest densities of red-throated divers are predicted to occur in the eastern side of Scapa Flow, and around the coasts of Burray.

These areas are most intensively used during the chick-rearing period (July-August) and during the post-fledging period (August) when juvenile red-throated divers are initially brought to the same inshore areas previously used for foraging by their parents (Okill and Wanless, 1990), where they continue to be fed by their parents before leaving for their wintering grounds (Okill, 2002).

Great northern diver

Great northern divers migrate to Scapa Flow SPA during the non-breeding season from their northern breeding grounds. The Project site and wider St Margaret's Hope Bay area is located within an area with a mean count of 0.25–0.5 great northern divers per km^2 (SNH, 2016). The highest densities of this species are found throughout the deeper waters in central Scapa Flow and in the relatively sheltered coastal waters off the east coast of Hoy. The 2017/18 winter surveys recorded a peak count of 1,016 individuals within the survey area during the January count, with numbers remaining relatively high throughout February and March (Jackson, 2018). Within Scapa Flow, the central 'offshore' sub-area held a mean of 55 % of all great northern divers recorded during the surveys. The Project site is located within the 'inshore southeast' sub-area of Scapa Flow which covers the area from Hunda to Widewall Bay. This area held a maximum of 83 birds in the January count and a mean of 5.6 % of the count. Records of one to three birds were recorded within the vicinity of the Project site during the November and January counts (Jackson, 2018).

Black-throated diver

The species distribution map for black-throated diver shows that this species is widely distributed around the nearshore waters in Scapa Flow, noted most frequently around the north coast of Scapa Flow between Houton and Roo Point in Orphir and along the eastern coast of Scapa Flow between Scapa Bay and Howequoy Head off the west coast of Holm (SNH, 2016). Black-throated divers migrate to Scapa Flow SPA during the non-breeding season from their northern breeding grounds. The Project site and wider St Margaret's Bay area are located in an area where no birds were recorded (SNH, 2016). The 2017/18 surveys recorded a peak count of 39 birds within the survey area during the February count (Jackson, 2018) however no black-throated divers were recorded in the 'inshore southeast' sub-area, within which the Project site is located, during any of the surveys (Jackson, 2018). The majority of birds were recorded in the 'inshore north' sub-area from Houton Head to Greenigoe which held a mean of 64 % of the birds recorded. The central 'offshore' Scapa Flow sub-area held a mean of 28 % of the birds recorded with all records distributed around the periphery, either close to the northern or western edges or between the islands of Cava and Rysa Little.

Slavonian grebe

Slavonian grebes migrate to Scapa Flow SPA during the non-breeding season from their breeding grounds. The Project site is located within an area with a mean count of '1 or less' Slavonian grebes per km^2 (SNH, 2016). Slavonian grebes are most frequently recorded in the shallow coastal areas of Scapa Flow with the greatest concentrations recorded along the eastern coast of Scapa Flow particularly in the sheltered bays around South Ronaldsay, Burray and off the west coast of Holm. A peak count of 161 individuals was recorded during the February count of the 2017/18 winter surveys (Jackson, 2018). The 'inshore southeast' sub-area, within which the Project site is located, held a mean of 1.6 % of the count with a record of one to three birds recorded within the vicinity of the Project site during the March count. There was a noticeable redistribution of birds recorded throughout the winter with relatively few birds seen between South Ronaldsay and Burray in the November count with greater numbers recorded in this area during the January/February and March counts.

Common eider

Common eiders are resident in Scapa Flow and can be found year-round. The Project site is located within an area with a mean count of 4-8 common eiders per km^2 (SNH, 2016a). This species is found around the shallower areas of Scapa Flow with the greatest concentrations recorded off the east and southeast coasts of Hoy and right across the southern and western reaches of Scapa Flow. The 2017/18 surveys recorded a peak count of 2,324 birds within the survey area during the November count with numbers remaining relatively consistent throughout the winter months (Jackson, 2018). The 'inshore southeast' sub-area, within which the Project site is located, held a mean of 1.3 % of the count compared to the 'inshore west' sub-area along the east coast of Hoy that held a mean of 57 % of the total count. Flocks of one to ten birds were recorded within the vicinity of the Project site during the November and January counts with many more records further out in St Margaret's Hope Bay and the wider Water Sound area during all counts (Jackson, 2018).

Long-tailed duck

Long-tailed ducks migrate to Scapa Flow SPA during the non-breeding season from their northern breeding grounds. The species distribution map for long-tailed ducks shows that this species is recorded in the shallower coastal fringes of Scapa Flow with noticeable concentrations in two areas: in the east between South Ronaldsay and Burray, and to the west between northeast Hoy and the Orphir coastline. The Project site is located within an area with a mean count of 1-2 long-tailed ducks per km^2 (SNH, 2016). A peak count of 1,996 birds was recorded during the March count of the 2017/18 surveys (Jackson, 2018). The highest count, late in the winter season may indicate an influx of birds from more southerly wintering sites as birds start to head back north to their Arctic breeding grounds (Jackson, 2018). The 'inshore southeast' sub-area within which the Project site is located, held a mean of 1.4 % of the count. Flocks of one to ten birds were recorded within the vicinity of the Project site during the March count with two flocks of one to ten birds recorded with St Margaret's Hope Bay in the January/February count. This species was widely distributed within the wider Water Sound area during all counts (Jackson, 2018). The highest density of long-tailed ducks was recorded in the 'inshore west' sub-area along the east coast of Hoy that held a mean of 39.5 % of the count.

Red-breasted merganser

Red-breasted mergansers are short distance migrants. The Project site is located within an area with a mean count of 0.35-0.5 red-breasted mergansers per km^2 (SNH, 2016). The species distribution map for red-breasted mergansers shows that this species mainly occurs in the sheltered coastal waters in Scapa Flow often in the narrower stretches between islands (SNH, 2016). The greatest concentrations are found off the east coast of Hoy around Fara; around the north coast of South Ronaldsay and Burray and around Stromness and Graemsay. The 2017/18 winter surveys recorded a peak count of 370 birds within the survey area during the November count with numbers decreasing steadily throughout the winter months (Jackson, 2018). The 'inshore southeast' sub-area, within which the Project site is located, held a mean of 2 % of the count. A count of two to seven birds was recorded within the vicinity of the Project site during

the November count with three records of one to two birds recorded in the outer St Margaret's Hope Bay area during the January/February count (Jackson, 2018). This species was recorded in the Water Sound area during all counts.

European shag

European shags are resident in Scapa Flow and can be found year-round. The species distribution map for European shag shows that this species frequents the open deeper waters of Scapa Flow as well as the coastal areas. The Project site is located in an area with a mean count of 25 or less birds per km^2 (SNH, 2016). The 2017/18 surveys recorded a peak count of 3,726 birds within the survey area during the November count (Jackson, 2018). The count total for the November survey was nearly three times higher than those for the December/January and January/February counts highlighting the importance of Scapa Flow for this species in the early part of the winter season. The counts totals in mid-winter were relatively constant however the number recorded in the March count was down by approximately half which is likely to reflect birds departing from Scapa Flow to return to their breeding colonies. The 'inshore southeast' sub-area, within which the Project site is located, held a mean of 7 % of the count with highest numbers recorded in the 'inshore northwest' sub-area between Stromness and Houton Head which held a mean of 20.8 % of the birds recorded. One to three birds were recorded roosting on land within the vicinity of the Project site during the November count. There were no records of shags recorded within St Margaret's Hope Bay during any of the surveys however this species was frequently recorded within the wider Water Sound area during all surveys (Jackson, 2018).

Common goldeneye

Common goldeneyes migrate to Scapa Flow SPA during the non-breeding season from their breeding grounds. The distribution map for common goldeneye shows that this species is widely distributed in the coastal areas of Scapa Flow, noticeably concentrated in two broad areas: in the east between Widewall Bay in South Ronaldsay to St Mary's Bay, Holm and in the western Scapa Flow area around Bay of Ireland and Graemsay. No common goldeneyes were recorded at the Project site however within the wider Water Sound area, a mean count of 3-7 common goldeneyes per km^2 has been recorded (SNH, 2016). The 2017/18 surveys recorded a peak count of 51 birds within the survey area during the January/February count (Jackson, 2018). Common goldeneyes were recorded in the 'inshore southeast' sub-area, within which the Project site is located, during all counts and this area held a mean of 14.8 % of the count. During the December/January count, one common goldeneye was recorded within the vicinity of the Project site and two birds were recorded off The Golt (Jackson, 2018). The inner Water Sound area also held one-two birds in all but the March count.

2.3.3 Potential disturbance (noise and visual) of sensitive bird species due to in-water construction activities

Nature of impact

Noise and visual disturbance from in-water construction activities has the potential to cause disturbance to sensitive bird species that may be present foraging or loafing in the nearby area. Disturbance from human activities may result in birds increasing their energy expenditure by flying away from the source of disturbance. Disturbance from human activities may also result in reduced energy intake as birds show alert responses rather than foraging, preening or resting behaviour (Livezey *et al.*, 2016). Some species are more sensitive to disturbance whilst others can show signs of habituation to regular human activity in an area.

The in-water construction activities will be carried out at the Project site by experienced operators using one, occasionally two, multi-cat type workboats. The final construction methodology will be determined by the appointed contractor. There will be an increase in activity of personnel on site for the duration of the works. The in-water works will include the installation of the moorings for the new concrete pontoons and removal of the existing temporary steel barge and associated moorings. The new concrete pontoons will be floated into position by workboat and attached to the moorings

facilitated by divers. The Project does not require piling of any kind. The in-water construction activities are anticipated to last approximately three months, commencing in March 2023 (subject to funding and consents).

At the Project site and surrounding St Margaret's Hope Bay area, all Scapa Flow SPA qualifying species with the exception of black-throated diver and red-throated diver are likely to be present in relatively low numbers. As black-throated diver and red-throated diver are not present in the area, there is no potential for disturbance from in-water construction activities. Of the other non-breeding Scapa Flow SPA qualifying features, a study of short-term responses of wintering waterbirds to marine activity in Orkney found Slavonian grebe and red-breasted merganser to have very high sensitivity to vessel disturbance (Jarrett *et al*., 2018). Great northern diver and long-tailed duck were found to have high sensitivity to vessel activity; European shag and common eider were both found to have medium sensitivity to vessel activity and due to limited data on common goldeneye, the study was unable to make any conclusions on the sensitivity of this species (Jarrett *et al*., 2018).

Another study of disturbance distances for a range of human disturbance activities at the coast found great northern diver and common goldeneye to have high sensitivity to disturbance and both species are likely to be easily disturbed on foraging grounds during the non-breeding season (Goodship & Furness, 2019). Red-breasted merganser, eider, shag and Slavonian grebe were all assessed to have medium sensitivity to human disturbance activities at the coast therefore there is the potential for these species to be disturbed on foraging grounds at the coast during the non-breeding season however they may be able to tolerate some level of disturbance (Goodship & Furness, 2019). Long-tailed duck was assessed to have a low sensitivity to human disturbance due to coastal activities and it is considered that this species is unlikely to be disturbed on foraging grounds as a result of coastal activities during the non-breeding season (Goodship & Furness, 2019).

The Project site is located at St Margaret's Hope pier which is an area already subject to relatively high levels of disturbance from marine activity as the area is regularly used by a variety of vessels including frequent ferry traffic, aquaculture and inshore fishing vessel traffic and recreational boat traffic. Birds using this area are therefore likely to show some habituation to disturbance and may be able to tolerate higher levels of marine activity and tolerate a shorter disturbance distance.

Determination of effects on site integrity in relation to potential disturbance (noise and visual) of sensitive bird species due to in-water construction activities

The timing of the in-water construction works, scheduled to occur from March to May 2023, has the potential to overlap with the late winter period (March-April) in which the eight non-breeding season SPA qualifying interests are still present within the Scapa Flow SPA. At the Project site and surrounding St Margaret's Hope Bay area, seven of the Scapa Flow SPA qualifying species are likely to be present in relatively low numbers; these are great northern diver, Slavonian grebe, common eider, long-tailed duck, red-breasted merganser, European shag and common goldeneye. By the late winter period, numbers of some species such as red-breasted merganser and European shag are likely to have reduced as birds will have already left the area to return to their breeding grounds. For other species such as long-tailed duck, highest counts were found to occur late in the winter season as birds stop off in Scapa Flow on their migration route north to their Arctic breeding grounds from more southerly wintering grounds.

Disturbance from in-water construction activities would be temporary, of short duration and transient with no lasting effects anticipated. Relatively low numbers of birds were found to occur within the vicinity of the Project site and wider St Margaret's Hope Bay area. The in-water construction activities are not anticipated to result in levels of disturbance that would affect any of the qualifying species' distribution and use of the site, such that their ability to survive and/or breed is compromised in the long-term. The Scapa Flow SPA draft conservation objectives relevant to disturbance are:

1. *'To ensure that the qualifying features of the Scapa Flow SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status',* and
2. *'To ensure that the integrity of the Scapa Flow SPA is maintained in the context of environmental changes by meeting objective 2b: 'The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species*.'

The Project is not anticipated to result in disturbance effects that would undermine either of these conservation objectives. It can therefore be concluded that there will be **no adverse effects on site integrity** for Scapa Flow SPA.

2.3.4 Potential disturbance of sensitive bird species through vessel movements required for the removal of the existing temporary barge and installation of the new pontoons.

Nature of impact

An increase in vessel movements in the marine environment has the potential to negatively impact breeding red-throated divers or wintering waterbird populations through increased disturbance. A passing vessel has the potential to cause temporary disturbance to foraging activities or may elicit an evasive behavioural response in birds present in the area such as flight, swim or dive activity. Evasive behavioural responses may increase energy expenditure or reduce time available for foraging and if repeated disturbance occurs, this may potentially lead to adverse effects on reproduction, growth or survival (Agness *et al*., 2013).

The sensitivity of species to vessel activity varies, with very highly sensitive species more likely to take evasive action at much greater distances from the source of disturbance and more likely to take flight than swim or dive. Low sensitivity species are least likely to show any response to vessel movements. A study of short-term responses of wintering waterbirds to marine activity in Orkney found red-throated diver, black-throated diver, Slavonian grebe and red-breasted merganser to have very high sensitivity to vessel activity (Jarrett *et al*., 2018). Great northern diver and long-tailed duck were found to have high sensitivity to vessel activity; European shag and common eider were both found to have medium sensitivity to vessel activity and due to limited data on common goldeneye, the study was unable to make any conclusions on the sensitivity of this species (Jarrett *et al*., 2018). Red-throated diver is most sensitive to disturbance during the chick-rearing (July-August) and post-fledging (August) periods.

The construction programme is anticipated to last six months (subject to funding and consents), with the in-water construction activities expected to be completed within three months, commencing in March 2023. All in-water construction activities will be undertaken using one, occasionally two, multi-cat workboats. The removal of the existing temporary barge and installation of the new pontoons will be concomitant. A maximum of four vessel movements will be required to remove the existing temporary barge and moorings. The temporary barge will be transported to a safe port, either at Lyness, Hoy or Widewall Bay, South Ronaldsay. Approximately 20 vessel movements will be required during installation of the new moorings and pontoons. The concrete pontoons will be transported into Scapa Flow by heavy lift ship. The pontoons will be offloaded from the ship and towed to the Project site by a multi-cat workboat with up to four vessel movements required to tow the pontoons to the Project site.

The vessel movements required for the removal of the existing temporary barge and installation of the new pontoons is a relatively small increase in the volume of existing vessel traffic within the vicinity of St Margaret's Hope pier and the wider Scapa Flow area. Scapa Flow is part of Orkney Harbour Authority's harbour area and is regularly used by a variety of vessels including oil tankers visiting the nearby Flotta Oil Terminal, inter-island ferry traffic, recreational dive boat traffic, aquaculture vessels, inshore fishing vessels and recreational sailing boats.

Determination of effects on site integrity in relation to potential disturbance of sensitive bird species through vessel movements required for the removal of the existing temporary barge and installation of the new pontoons

The timing of the vessel movements required for the in-water construction activities are scheduled to occur from March to May 2023 therefore coinciding with the late winter period (March-April) when the eight wintering species are still present and the early part of the red-throated diver breeding season (May). At the Project site and surrounding St Margaret's Hope Bay area, all Scapa Flow SPA qualifying species with the exception of black-throated diver and red-throated diver are likely to be present in relatively low numbers. By the late winter period, numbers of some species such as red-breasted merganser and European shag are likely to have reduced as birds will have already left the area to return to their breeding grounds whereas for other species such as long-tailed duck, higher numbers are recorded late in the winter season due to an influx of birds arriving in Scapa Flow from more southerly wintering grounds, on their way back north to their Arctic breeding grounds.

The vessel transit route between the central Scapa Flow area and the Project site is likely to hold great northern diver, common eider, long-tailed duck and European shag. Of these, great northern diver and long-tailed duck have high sensitivity to vessel disturbance and eider and shag have medium sensitivity to vessel disturbance. The other wintering species are not likely to be present along this vessel transit route and this area is not predicted to hold foraging areas for red-throated diver. Approximately 20 vessel movements will be required during installation of the new moorings and pontoons. The pontoons will be towed to the Project site from central Scapa Flow by a multi-cat workboat with up to four vessel movements required to tow the pontoons to the Project site. The frequency of vessel movements during the installation of the new moorings and transportation of the pontoons to the Project site is relatively low.

The vessel transit route options for transporting the existing temporary barge to either Lyness or Widewall Bay would be used for one vessel movement only. All of the Scapa Flow SPA qualifying species are likely to be present along both of these vessel transit routes, with the exception of red-throated diver that is only predicted to occur in the area off the southeast of Hoy around Lyness.

The vessel movements required for the in-water construction activities will result in a relatively small increase in vessel traffic in an area that is already subject to relatively high levels of vessel traffic associated with ferry, aquaculture, inshore fishing, oil and gas industry and recreational vessels. A multi-cat type workboat will be used for all operations. The nature of the towing operations will require the vessel to maintain a speed not in excess of 4 knots, therefore reducing any effects of disturbance to birds in the vicinity.

Disturbance from vessel traffic movements during the construction activities would be temporary, of short duration and transient with no lasting effects anticipated. The timing of the in-water construction works is scheduled to occur between March and May 2023 therefore potentially coinciding with the late winter season period for the wintering species and the early breeding season period for red-throated divers. The level of vessel traffic is not anticipated to result in levels of disturbance that would affect any of the qualifying species' distribution and use of the site, such that their ability to survive and/or breed is compromised in the long-term. The Scapa Flow SPA draft conservation objectives relevant to vessel disturbance are:

1. '*To ensure that the qualifying features of the Scapa Flow SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status',* and
2. '*To ensure that the integrity of the Scapa Flow SPA is maintained in the context of environmental changes by meeting objective 2b: 'The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species*.'

The relatively low level of vessel traffic required for the Project is not anticipated to result in disturbance effects that would undermine either of these conservation objectives. It can therefore be concluded that there will be **no adverse effects on site integrity** for Scapa Flow SPA.

2.3.5 Cumulative and in-combination effects

The potential effects of the Project must be considered cumulatively and in-combination with other projects that are planned, proposed or that exist in the surrounding area.

Identification of planned, proposed or existing developments

Scapa Flow SPA was formally designated in February 2022 therefore all existing developments operating at the time of designation are considered part of the baseline conditions. A search of Orkney Islands Council's planning portal identified a number of proposed or recently consented developments that may require consideration in a cumulative and in-combination assessment (Table 2-4).

Table 2-4 Proposed or recently consented developments in Scapa Flow

Name of development, applicant	Current status	Considered in this cumulative assessment?
Bring Head Fish Farm, Hoy (replacement of existing equipment) (21/411/MAR). Scottish Sea Farms	Application submitted. Awaiting decision.	Yes
Toyness Fish Farm, Orphir (replacement of existing equipment) (21/410/MAR). Scottish Sea Farms	Application submitted. Awaiting decision.	Yes
Chalmers Hope Fish Farm (20/231/MAR). Cooke Aquaculture	Approved March 2021.	Yes
South Cava Fish Farm, Scapa Flow (17/134/MAR). Cooke Aquaculture	Approved March 2018.	Yes
Scapa Deep Water Quay (21/186/MLSCO). Orkney Islands Council	Scoping report submitted.	No. The proposals for the Scapa Deep Water Quay are currently at the Scoping stage therefore there is no information currently available on these proposals to be included in a cumulative assessment.

The locations of the four fish farm developments requiring consideration in the cumulative and in-combination assessment are shown in relation to the Project in Figure 2.2.

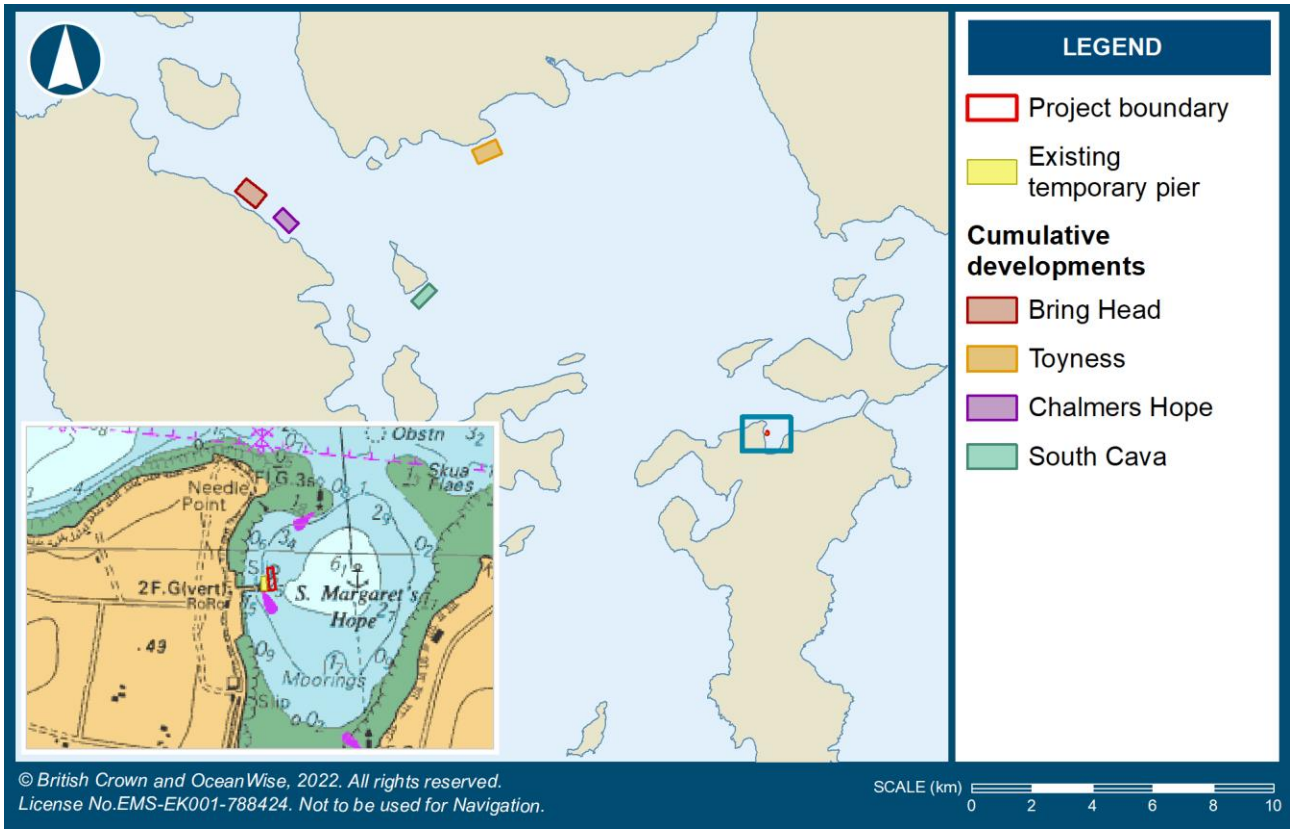

Figure 2.2 Location of proposed and consented fish farm developments considered in the cumulative and in-combination assessment

Identification of cumulative or in-combination impacts

An assessment of the potential effects of the Project has been considered cumulatively and in-combination with each of the other proposed or recently consented developments in Scapa Flow. All of the qualifying features of Scapa Flow SPA have been considered in this assessment. The four fish farm developments to be considered in the cumulative assessment are all located in the western Scapa Flow area therefore there is no scope for cumulative effects in relation to the potential disturbance (noise and visual) of sensitive bird species due to in-water construction activities as a result of the Project (see Figure 2.2). The potential disturbance of sensitive bird species through vessel movements required for the removal of the existing temporary barge and installation of the new pontoons have been considered cumulatively and in-combination with the four fish farm developments.

Determination of effects on site integrity in relation to cumulative effects of potential disturbance of sensitive bird species through vessel movements required for the removal of the existing temporary barge and installation of the new pontoons

Details of the vessel activity for each of the proposed and recently consented developments is summarised in Table 2-5.

Table 2-5 Vessel activity and vessel transit routes for proposed and consented developments

Name of development, applicant	Current status	Relevant project details[3]
Bring Head Fish Farm, Hoy (replacement of existing equipment) (21/411/MAR). (Scottish Sea Farms)	Application submitted. Awaiting decision.	Vessel movements during decommissioning and cage installation activities will adhere to specified vessel transit routes to avoid disturbance to key areas used by red-throated divers. Vessel transit routes for decommissioning activities are between the site and Burray boatyard. The vessel transit routes for mooring installation (anticipated 3-7 days) will involve one return trip per day between the site and either Stromness or Houton. The vessel transit route to the site to be utilised during cage installation activities will enter Scapa Flow from the southern approach through Sound of Hoxa, passing to the east of the island of Cava.
Toyness Fish Farm, Orphir (replacement of existing equipment) (21/410/MAR). (Scottish Sea Farms)	Application submitted. Awaiting decision.	During existing site decommissioning activities, the site maintenance vessel must adhere to a specified vessel transit route when moving between the site and Burray boatyard. Vessel transit routes for the site maintenance vessel undertaking mooring installations will be the same as those used for daily operations for the existing fish farm. The frequency of vessel activity during mooring installation would be similar to the current daily operational vessel movements already experienced at the existing fish farm, with one return trip per day by the site maintenance vessel. During cage installation activities, vessel movements will adhere to a specified vessel transit route which will enter Scapa Flow from the southern approach through Sound of Hoxa, passing to the east of the island of Cava.
Chalmers Hope Fish Farm (re-development of an existing site) (20/231/MAR). (Cooke Aquaculture)	Approved March 2021.	The site will ordinarily be accessed from Stromness. The site may also be serviced from Lyness. Vessel speeds will be limited to 10 knots or less, which is considered to be sufficiently low to allow protected species to safely vacate vessel transit routes. Decommissioning and construction works will avoid the most sensitive period of July and August.
South Cava, Scapa Flow (17/134/MAR). (Cooke Aquaculture)	Approved March 2018.	Daily vessel transit routes between Stromness and Lyness. Vessel speeds will be limited to 10 knots or less, which is considered to be sufficiently low to allow protected species to safely vacate vessel transit routes. To minimise disturbance to red-throated divers, for the period 1st July to 31st August inclusive, vessel movements using the transit route to the west of the island of Cava will be avoided. Vessel movements relating to the construction phase at South Cava will avoid vessel movements between Lyness and South Cava site.

No likely significant effects were identified for any of the eight wintering species of Scapa Flow SPA for any of the proposed or consented developments therefore there is no potential for cumulative or in-combination effects on any of the eight wintering Scapa Flow SPA interests.

[3] Information from OIC's online planning portal available at: https://planningandwarrant.orkney.gov.uk/online-applications/search.do?action=simple&searchType=Application [accessed on 21 June 2022].

The vessel transit route for transportation of the pontoons from central Scapa Flow to the Project site is located in an area that is not predicted to hold foraging areas for red-throated diver therefore there is no potential for likely significant effects.

There is potential for the Project to have likely significant effects on red-throated diver from Scapa Flow SPA, as a result of vessel disturbance during the removal of the existing temporary barge when considered cumulatively or in-combination with each of the other sites. However, the vessel transit route options for transporting the existing temporary barge to either Lyness or Widewall Bay would be used for one vessel movement only and red-throated diver is only predicted to occur in the area off the southeast of Hoy around Lyness. The timing of the vessel movements required for the in-water construction activities are scheduled to occur from March to May 2023 therefore coinciding with the early part of the red-throated diver breeding season (May).

The vessel activity during decommissioning and construction activities for the Bring Head and Toyness fish farms will adhere to specified vessel transit routes to avoid disturbance to key areas used by red-throated divers. Decommissioning and construction work for the Chalmer's Hope fish farm will avoid works during the most sensitive period of July and August. The South Cava fish farm will also implement measures to avoid disturbance to red-throated divers during the period 1 July to 31 August inclusive, when vessel movements using the transit route to the west of the island of Cava will be avoided and vessel movements relating to the construction phase at South Cava will avoid vessel movements between Lyness and South Cava site.

Although there is potential for likely significant effects on red-throated diver as a result of vessel disturbance during the removal of the existing temporary barge when considered cumulatively and in-combination with the four proposed and consented fish farms, disturbance from vessel traffic movements during the removal of the temporary barge would be temporary, of short duration and transient with no lasting effects anticipated. The timing of the in-water construction works is scheduled to occur between March and May 2023 therefore potentially coinciding with the early breeding season period for red-throated divers. The level of vessel traffic is not anticipated to result in levels of disturbance that would affect red-throated divers' distribution and use of the site, such that their ability to survive and/or breed is compromised in the long-term. The Scapa Flow SPA draft conservation objectives relevant to vessel disturbance are:

1. 'To ensure that the qualifying features of the Scapa Flow SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status', and
2. 'To ensure that the integrity of the Scapa Flow SPA is maintained in the context of environmental changes by meeting objective 2b: 'The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species.'

The relatively low level of vessel traffic required for the Project, when considered cumulatively and in-combination with the four proposed or consented fish farm developments is not anticipated to result in disturbance effects that would undermine either of these conservation objectives.

There will be **no adverse effects on site integrity** as a result of cumulative and in-combination effects for Scapa Flow SPA.

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