

Appendix 17.1 Marine Water and Sediment Quality – Inception Report



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Orkney's Community Wind Farm Project – Faray

Marine water and sediment quality - Inception Report

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1. Introduction

1.1. Orkney's Community Wind Farm Project – Faray – new extended slipway and landing jetty

As part of the Orkney's Community Wind Farm Project – Faray there is a requirement for a new extended slipway and a new landing jetty to be constructed on the south-east of Faray (referred to as the 'Proposed Development'). This would include works below the Mean High Water Spring (MHWS).

The Proposed Development comprises:

- A new extended slipway to replace the existing facility. The extant slipway is presently c.20 m long by 3.5 m wide, though this was originally longer. This slipway would be upgraded to a maximum 36 m long and 8 m wide. The design of the slipway would be sufficient to enable access by larger vessels with the bow or stern gate and would be built to a standard design for the Orkney Islands to allow access for local vessels.
- A new landing jetty to accommodate abnormal loads. The jetty would comprise a causeway up to 55 m long and 10 m wide (550 m²), terminating in square structure for docking measuring up to 20 m by 20 m (400 m²). The square docking structure would likely be constructed on site from sheet piles. The causeway would be in-filled and capped-off with concrete batched onsite.
- Dredging will be required for c. 3,000 m³ of sand and sandstone, dredge areas are provided in (Figure 1.1) to a maximum dredge depth of 1 m, which will require disposal at sea of dredged sediment. It is anticipated that the dredged material will be disposed of at a licenced disposal site close to the development. The preferred site, to be confirmed within the marine licence application, is Stromness A.

The dredge sample plan has been reviewed by Marine Scotland who confirmed on 04 March 2021 that they are content with the sample locations selected and approved the project to progress with the sediment sampling. Sampling is scheduled to be undertaken in late March 2021, the agreed sample locations are shown on Figure 1.1.

An Environmental Impact Assessment Report (EIA) for the project is currently in preparation, including an assessment of underwater noise.

1.2. Marine water and sediment quality - Scoping

Initial discussions with Marine Scotland and NatureScot have indicated that as well as the underwater noise EIA Report chapter already in production, it is likely that an additional EIA Report chapter would be required to assess the potential impact of the Proposed Development on marine water and sediment quality from the proposed dredging activities. This report provides information on the scope of the marine water and sediment quality assessment to be shared with and agreed with Marine Scotland and NatureScot.

Scoping of potential impacts identifies the following:

Marine water and Sediment Quality

- Construction: Local capital dredging at the Development Site will be required, likely to be back hoe dredger, supported by a barge with the potential to have local and temporary effects upon marine water quality. This will be mainly by sediment disturbance from dredging activity. Relevant receptors: **marine water quality and marine sediment quality.**

- Operation: maintenance dredging by of the berth pocket will have a local effect on water quality, although it is expected that maintenance dredge requirements will be very small Relevant receptors: **Marine water quality; and, Marine sediment quality.**

To note the assessment of potential impacts on marine water and sediment quality would not include assessment of disposal on the basis that the disposal is at a site that is already an accepted and regulated activity. It is anticipated that the dredged material will be disposed of at a licenced disposal site close to the development. The preferred site, to be confirmed within the marine licence application, is Stromness A.

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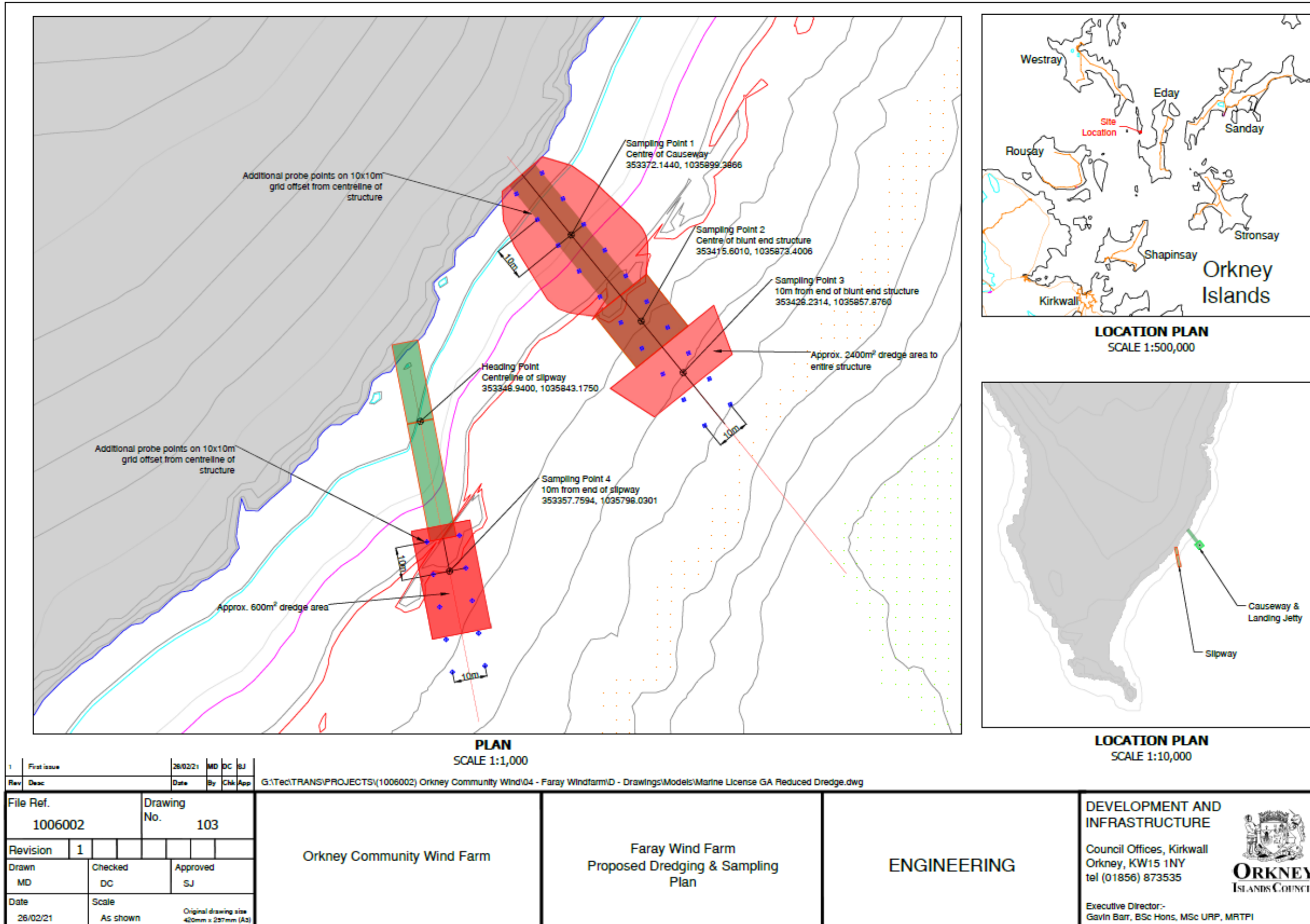


Figure 1.1: Location of Proposed Development and indication of sediment sampling locations

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1.3. Purpose of this note

This inception report provides a briefing to Marine Scotland and NatureScot on the proposed marine water and sediment quality assessments needed for the Proposed Development EIA.

2. Environmental Assessment approach

2.1. Overview

One EIA Report topic chapter will present the assessment information in the required format, applying EIA significance methods (See Section 2.2 below) and address other statutory requirements for the content of EIA. This EIA Report chapter will be focussed on groups of EIA receptors, and draw on technical annexes to present an overall assessment.

The technical annexes will present descriptions of the desk-based study and sediment chemical analysis.

2.2. Assessment of Significance

The assessment methodology will adopt a receptor-led approach such that impacts are assessed in relation to the environmental receptors (i.e. the features and components of the natural environment that are potentially affected by the Proposed Development on Faray).

2.2.1. Receptors

The relevant receptors that will be considered are:

- Marine water quality; and
- Marine sediment quality.

The assessment of potential impacts on these two receptors will include consideration of potential for increases in suspended sediment concentration and the potential for resuspension of chemicals that may be associated with the sediments to be dredged. It is expected any impacts will be in the near vicinity to the Proposed Development.

The approach to assessing impacts will be guided by the use of an Impact Assessment Matrix (IAM) that establishes a consistent framework for determining impact significances by considering the sensitivity and value of a receptor along with the magnitude of the effect to which the receptor is exposed.

The approach to assessing impacts will also take into account the likelihood (i.e. probability) that a receptor will be exposed to the effect. However, the use of the IAM will be moderated by the use of professional / expert judgement.

It should be noted that this assessment will not consider secondary effects upon other human or ecological receptors, as these will be addressed elsewhere in the ES by other topic authors.

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2.2.2. Terminology

For the purposes of clarity, the terms ‘impacts’ and ‘effects’ are defined below and used in accordance with these definitions throughout this document.

Effects are considered to be the changes to the environmental receptors that occur as a result of a development or regulated activity (e.g. specific types of construction works or operations).

Impacts are considered to be the (significant) consequences of the effects on the environmental receptors. Positive / negative impacts are those impacts that are considered to have beneficial / adverse outcomes for the environmental receptors as a result of the development. Direct / indirect impacts are those impacts that are considered to be directly / indirectly attributable to the development.

A principal point of differentiation between effects and impacts relates to the sensitivity of the environmental receptors; hence, effects will lead to impacts if the environmental receptors are sufficiently sensitive to changes caused by the development (i.e. the environmental receptors are unable to accommodate and/or tolerate the effects).

2.2.3. Proposed significance criteria

For the purposes of the marine water and sediment quality assessments, an indication of the magnitude (or extent) of change from observed values will be provided based on desk study. Where possible, the assessment will be quantified through comparison of predictions with known values. Where it is possible to define a significance to this alteration with respect to sediment and water quality, this will be provided.

Effect Magnitude

The magnitude of a potential effect is defined by the extent of environmental change caused by the development. The extent of change can be defined by the area over which the effect occurs (i.e. the spatial dimension of the effect), the duration over which the effect occurs (i.e. the temporal dimension of the effect), and the reversibility of an effect (i.e. whether the effect is reversible (e.g. due to natural recovery, or intervention to mitigate the effect), or is irreversible).

Table 2.1 identifies the guideline descriptions for the range of effect magnitudes used in the proposed marine water and sediment quality ES Chapter.

Table 2.1: Guideline descriptions for effect magnitude for marine water and sediment quality

Effect Magnitude	Guideline Descriptions
High	Large scale changes to a marine physical process receptor over the whole development area and potentially beyond. A permanent effect on quality standards or potential risk of downgrades to water body status. Indicatively, those effects potentially extending over >3 km from the Proposed Development.
Medium	Medium scale changes to a marine physical process receptor over the majority of the development area and potentially beyond. A temporary effect on quality standards that may cross water or sediment threshold levels. Indicatively, those effects potentially extending 1-3 km from the Proposed Development.
Low	Noticeable but small scale changes to a marine physical process receptor over part of the development area and potentially beyond. A temporary effect on water or sediment quality

Effect Magnitude	Guideline Descriptions
	standards whose magnitude are detectable but would not risk exceedance of threshold levels. Indicatively, those effects potentially extending 0.5-1 km from the Proposed Development.
Negligible	Noticeable but very small scale change or barely discernible changes to a marine physical process receptor over a small part of the development area and potentially beyond. A temporary effect on water or sediment quality standards whose magnitude may be detectable but would not cross threshold levels. Indicatively, those effects potentially extending <0.5 km from the Proposed Development

Receptor value and sensitivity

Unlike some other environmental receptors, there are not generally attributable values for seawater quality receptors. Nonetheless, in order to provide as transparent an assessment as possible, receptor values have been identified in Table 2.2. These values are often related to other topic receptors.

Table 2.2: Receptor value and sensitivity for marine water and sediment quality

Value	Example receptor value and sensitivity
High	The presence of designated sites for water quality (e.g. designated bathing waters, shellfish waters) or coastal geological interest. The presence of other protected sites that are reliant on water or sediment quality (SACs, SPAs etc). Many pathways for environmental change exist between the project activities and receptors. Critical social or economic uses, e.g. water supply.
Medium	Supports aquatic species that are protected by national or international law. Few pathways for environmental change exist between the project activities and receptors. Receptor is close to threshold levels and does not show wide natural variability. Important social or economic uses, e.g. water supply.
Low	Receptor is not protected by specific water quality designations but is protected by wider water quality legislation. Limited or no pathways from between the project and receptors. Receptor is well within threshold levels and/ or is subject to wide natural variability.
Negligible	The receptor is tolerant of any changes which may occur and has no legislative thresholds controlling it. No pathways exist under which the receptor could be exposed to the project's activities under consideration.

Assessment of Significance

The concept of significance is a key element of the EIA process because it is the likely significant impacts on the environment – both positive (beneficial) and negative (adverse) - that are important to decisions about granting consent for a particular development and/or regulated activity.

The level of impact significance and the likelihood of the impact occurring also inform the priorities for identifying and adopting mitigation measures and monitoring. Table 2.3 presents the Impact Assessment Matrix (IAM). The approach to assessing impacts will be guided by the use of the IAM but moderated or adapted by the use of professional / expert judgement.

Table 2.3: Impact Assessment Matrix for Significance

		Sensitivity of Receptor / Receiving Environment to Change			
		High	Medium	Low	Negligible
Magnitude of Impact/Change	High	major	moderate to major	minor to moderate	negligible
	Medium	moderate to major	moderate	minor	negligible
	Low	minor to moderate	minor	negligible to minor	negligible
	Negligible	negligible	negligible	negligible	negligible

3. Specialist studies

A number of specialist studies will be needed to support the assessments of impacts for marine water and sediment receptors. These desk studies are outlined in the sections below.

3.1. Sediment dispersion desk study

Sediment releases from dredging and reclamation will arise during the construction activities. A desk study on sediment plumes is proposed, based on the low-risk nature of the dredging associated with the slipway and jetty.

During consideration of the studies required for the Proposed Development, the following assumptions have been considered when identifying a desk-study as the appropriate approach:

- The dredging volume is relatively small and the substrate is likely to be sand or sandstone;
- The sandstone is likely to be approximately 5-10% clay;
- The sand is likely to be “coarse sediment”, with clay/silt content estimated to be 5% or less;
- Dredging is likely to require a large backhoe with an associated barge, which would require approximately 2 days of dredging (including moving and down time) to complete the dredging required;
- Currents are small $\leq 0.5\text{m/s}$;
(<https://marinescotland.atkinsgeospatial.com/nmpi/default.aspx?layers=68>);
- Background surface suspended sediment concentration levels estimated to be ~ 1mg/l to 3 mg/l some years (Cefas sea surface satellite measurements). Concentrations lower in the water column are likely to be greater; and
- Estimated plume likely to be very small in magnitude.

The sediment type, including percentage of fine material will be confirmed during the sediment sampling which is scheduled to be undertaken in late March 2021.

A search will be performed to determine if there are more suitable baseline suspended sediment concentration datasets than the Cefas sea surface satellite measurements, including those that may be held by Marine Scotland.

As such, due to the small scale of the dredge proposed, the likely dredge method, the likely sediment composition and the background levels, it is anticipated that any plume will be very small. A desk study (i.e. without modelling) should therefore be sufficient to provide the details of sediment dispersion in the vicinity of the Proposed Development.

The desk study will consider:

- the nature of tidal flows in the area,
- an understanding of the rate of sediment release from dredging, and
- the sediment properties,

to provide an estimation of the likely dispersal of material from the dredging location.

This will provide information on likely dispersion of fines from the Proposed Development in distance (m) for the depth-averaged increase above background (mg/l).

3.2. Cumulative effects

In line with normal practice, other relevant existing and planned schemes that may affect the marine water and sediment quality regime can be included alongside the Proposed Development. A search of Marine Scotland's marine licence application database (<https://marine.gov.scot/marine-licence-applications>) has been undertaken, with the following applications identified within 10km of the Proposed Development:

- Deployment of Tidal Turbine Bert 6 at EMEC's Fall of Warness Tidal Test Centre. Located c. 5 km to the south of Faray, on the south west coast of Eday;
- Eday Sound Fish Farm marine licence renewal. Located on the south east of Eday, c. 7km to the southeast of Faray;
- Construction and operation of a high stability floating platform (ATIR) at EMEC's Fall of Warness Tidal Test Centre. Located c. 7.5 km south of Faray, on the south west coast of Eday;
- Bay of Ham Fish Farm marine licence renewal. Located c. 9 km to the west of Faray; and
- Discharge from wellboat enclosure at Eday fish farm. Located on the south east of Eday, c. 7 km to the southeast of Faray.

Those projects with an interface with marine water and sediment quality ES chapter will be considered, although an initial review would suggest none of the identified projects are likely to interact with the Proposed Development due to the small nature of the dredging and the distances involved.

3.3. Marine water and sediment quality

The assessment of effects on marine water and sediment quality will be based on the preceding desk study utilising sediment samples specifically collected for this project. Any other near-by marine water quality data will also be collated, if readily available. Data sources that will be accessed comprise:

- SEPA (subject to data availability following reported cyber attack);
- Cefas;
- Other secondary sources recommended by Marine Scotland or NatureScot.

No new water quality sampling is proposed.

The seabed sampling plan for the Proposed Development has been shared and agreed with Marine Scotland, including the range of sample analysis required. This data will be key to informing the assessment of effects on water and sediment quality.

3.4. Reporting

Technical reports will be produced as supporting documents to the Environmental Statement chapters. The following technical reports are envisaged:

- Sediment release and dispersion desks study report.

4. Environmental Statement chapter

The following ES chapter is envisaged:

- Marine water and sediment quality.

The ES chapter will draw on the above desk studies and literature reviews in order to prepare an evaluation of the environment and the likely impacts resulting from the Proposed Development in relation to the receptors identified in Section 2.2.1.

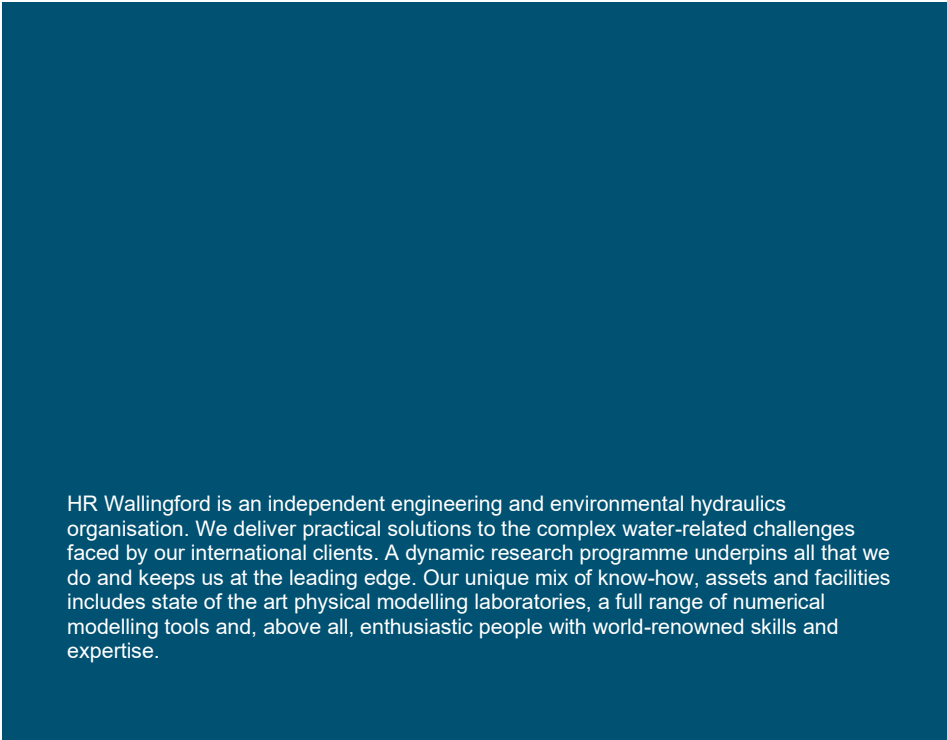
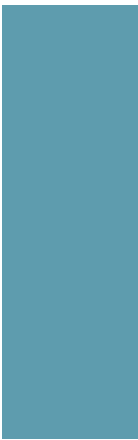
Content of the ES chapter will include:

- Introduction and legal framework;
- Assessment methodology;
- Baseline environment;
- Impact assessment and mitigation measures;
- Cumulative assessment; and,
- Conclusions and references.

To note the assessment of potential impacts on marine water and sediment quality does not include assessment of disposal at the existing disposal site (Stromness A), or consideration of effects upon human or ecological receptors.



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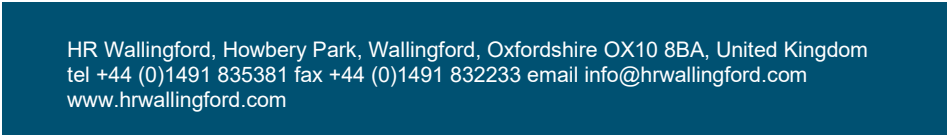
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