Whitehall Pier, Stronsay
Dredging Best Practicable Environmental Option Report

November 2023

CONTROL SHEET

Client: Orkney Islands Council
Project Title: Whitehall Pier, Stronsay
Report Title: Dredging Best Practicable Environmental Option Report
Document number: 13769
Project number: 678518

Issue Record

Issue	Status	Author	Reviewer	Approver	Issue Date
1	Final	CCAS	GD	GD	14/11/2023
2					

EnviroCentre Limited Office Locations:

Glasgow **Edinburgh** **Inverness** **Banchory**

Registered Office: Craighall Business Park 8 Eagle Street Glasgow G4 9XA
Tel 0141 341 5040 info@envirocentre.co.uk www.envirocentre.co.uk

EnviroCentre Limited is registered in Scotland under no. SC161777.

VAT no. GB 348 6770 57.

Contents

Appendices

Tables

1 INTRODUCTION

EnviroCentre Ltd. has been appointed by Orkney Islands Council Harbour Authority (OICHA) to undertake a Best Practicable Environmental Options appraisal (BPEO) in support of the dredge licence for maintenance dredging to help maintain the navigable channel and approaches to Whitehall Pier in the Papa Sound north of Stronsay.

Dredging will be undertaken to a maximum depth of 1.0m or less from the existing bed level across the dredge areas to be licenced. The proposed dredging works will be undertaken to achieve a depth of -4.0m CD on the navigable channel on approach to Whitehall Pier. Approximately up to 9,500 m^3 of material is estimated to be dredged.

Dredge area and sampling locations are detailed in within Drawing No. 678518-GIS001 provided in Appendix A.

As part of the licensing process applicants are required to undertake a Best Practicable Environmental Option (BPEO) assessment for the disposal routes for the prospective dredge material in conjunction with the assessment of the chemical and physical properties of the same material to ensure that quality of the material is suitable for the identified disposal route(s).

1.1 Background Information

As outlined above, the proposed dredging requirements are throughout the navigable channel.

Sampling was undertaken in September 2023 which comprised collection of 3 grab samples from the dredge area as per the agreed sample plan. The samples were predominately sand with minor silt and gravel content.

1.2 Scope of Report

The purpose of this report is to review each of the available potential disposal options for the dredged materials. The options which are not considered to be practicable are rejected and the reasons for doing so are explained.

Those options which are practicable are examined in detail and assessed against the following considerations: -

- Environmental;
- Strategic; and
- Cost.

The report then compares the practicable disposal options and draws a conclusion on the BPEO.

1.3 Sediment Sampling and Nature of Marine Sediments on Site

Samples from the proposed dredge area were collected in September 2023 and submitted for analysis in line with Marine Scotland's guidance and the agreed sampling plan. The sample logs are provided in Appendix B with Laboratory certificates and data summary tables in Appendix C.

1.3.1 Sample Results

No exceedances of Revised Action Level 1 (RAL1) were recorded for the samples with all anthropogenic contaminants of concern noted as being below detectable limits in all 3 samples.

No asbestos was recorded within the samples.

1.4 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre Limited.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre Limited for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

Whilst the Client has a right to use the information as appropriate, EnviroCentre Limited retains ownership of and intellectual content of this report. Any distribution of this report should be managed to avoid compromising the validity of the information or legal responsibilities held by both the Client and EnviroCentre Limited (including those of third party copyright). EnviroCentre Limited does not accept liability to any third party for the contents of this report unless written agreement is secured in advance, stating the intended use of the information.

EnviroCentre Limited accepts no liability for use of the report for purposes other than those for which it was originally provided, or where EnviroCentre Limited has confirmed it is appropriate for the new context.

2 DISCUSSION OF AVAILABLE DISPOSAL OPTIONS

The BPEO process is geared towards identifying a preferred overall strategy from the perspective of the environment as a whole, as opposed to detailed optimisation of any one selected scheme. It is a structured and systematic process to identify and compare strategic options in a transparent manner. Alternatives are evaluated in terms of their projected implications for the environment together with consideration of practicability, social and economic issues as well as within a wider strategic context.

The key stages of a BPEO are:

- Identification of options;
- Screening of options;
- Selection of assessment criteria;
- Analysis and evaluation of criteria; and
- Evaluation of BPEO.

Further details on methodology are provided within each section.

2.1 Identification and Screening of Available Disposal Options

A number of options are available for disposal of dredged sediments. The options considered are provided in Table 2-1 along with justification for screening out those options which have not been taken forward for further consideration.

Table 2-1: Initial Best Practicable Available Options

Location	Options	Screening Assessment	Carry forward?
Shore/Estuary/ Riverbank	Leave in situ	Not an option due to the project specific requirements to maintain access to the pier for the ferry and other marine traffic.	No
	Infilling of an existing dry dock/harbour facility/development site (re-use)	There are currently no projects on Stronsay which require this material.	No
	Beach Nourishment	Specific beach nourishment projects would require to be supported by Environmental Assessments as a minimum to inform how the project could affect the environment as a result of disturbance to the intertidal area, changes to the sediment levels, the variable composition and quality of the material and measures devised from the assessment outcomes to minimise impacts on the environment. The dredge material comprises a mixture of gravel, sand and silt. There are currently no known requirements for beach nourishment local to the source of material.	No
Land	Landfill Disposal	This is possible but it is unlikely that this option will offer long term solution due to lack of space at landfills. Landfill space is currently at a premium and does not offer a sustainable solution either financially or environmentally for the disposal of dredged arisings. Dredged material likely to require treatment first in a dewatering facility. Significant cost associated with set up of dewatering facility at the quayside plus transportation and additional costs associated with gaining the necessary planning and regulatory consents. OIC were previously contacted with regards to landfill capacity in the area. Bossack Waste Transfer and Landfill Facility near Kirkwall has a daily capacity of 225 tonnes of inert waste or 5,000 tonnes /year so would not be a viable option for disposal. Transporting to another landfill would require marine transport plus road transport.	No
	Land Incineration	The dredged material consists of non-combustible material (silts, sands, gravels, shells) with a low combustible component and very high-water content.	No

	Application to Agricultural Land	The dredged material would need to be treated to reduce salt concentrations to acceptable levels. Would require detailed chemical analysis and assessment as well as a Waste Management License Exemption. Would require special precautions during spreading in relation to the risk of odour and watercourses / aquifers. The availability of land for this option will be limited within a reasonable haulage distance of the dredge arisings. Large volumes each year are unlikely to be viable to dispose of in this manner and would potentially have a detrimental effect on existing terrestrial habitats.	No
	Recycling	Recycling of dredged material is theoretically possible, however, due to the varied lithology there would need to be either segregation during dredging works to minimise the entrainment of fine-grained material into the sands, or energy and water rich processing on land.	No
Sea	Aquatic disposal direct to seabed.	Relatively low cost, minimal transportation requirements compared to all other options and potential for low environmental risk. The closest spoil grounds is Orkney FI020 some 5.6km north east. Previous dredging works associated with this site was dredged under Marine Licence 03969/11/0 and disposed of at Marine Disposal site Orkney FI020.	Yes

2.2 Summary of Identified BPEO Options

Following review of the available options within the screening process, due to the remote nature of the site, there are no other viable disposal routes available for consideration beyond the traditional sea disposal approach. The remote nature of the site and distance from the mainland, precludes the majority of the other options on the basis of not being practical options.

The chemical quality of the material is below RAL1 which is typically considered suitable for sea based disposal without additional assessment of data. Further consideration of the potential impacts associated with the disposal of dredged material are considered within Section 3.

3 FURTHER ASSESSMENT

3.1 Water Framework Directive Assessment

As outlined in the Water Framework Directive Assessment: estuarine and coastal waters, there are several key receptors which can be impacted upon including the following:

- Hydromorphology
- Biology – habitats
- Biology – fish
- Water quality
- Protected areas

Each of these points are considered in Table 3-1 below:

Table 3-1: Receptor Risk Assessment

Key Receptor[1]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Hydromorphology (Source Area and Disposal Site)	Morphological conditions, for example depth variation, the seabed and intertidal zone structure tidal patterns, for example dominant currents, freshwater flow and wave exposure	No	The dredge sites are within the Start Point to Burgh Head Water Body which has an overall classification of good and hydromorphological classification of High. The closest disposal site Orkney FI020 is located also within the Start Point to Burgh Head Water Body which has an overall classification of good and is not considered to be heavily Modified. The classification of this water body takes into account the presence of the disposal site, so no further assessment is considered to be required.
Biology - habitats	Included to assess potential impacts to sensitive/high value habitats.	No	The dredge site has been previously dredged so not considered further as it is not a new dredge site. The proposed disposal site (Orkney FI020) has previously been used for the disposal of suitable dredged material therefore not considered further in the assessment. This site was used for the last dredge campaign at Whitehall pier approaches.
Biology – fish	Consideration of fish both within the estuary and also potential effects on migratory fish in transit through the estuary	No	The dredge sites and disposal sites are within coastal waters and not located within an estuary. The works are unlikely to have a significant or sustained effect on the migration of fish. No further assessment considered necessary.

[1] https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

Key Receptor[1]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Water Quality	Consideration must be given to water quality when contaminants are present in exceedance of CEFAS RAL1.	No	No exceedances of RAL1 were recorded in the samples collected. According to SEPA, the Start Point to Burgh Head water body has good status in 2020.

Key Receptor[1]	Brief Summary of Potential Effects on Receptor	Further Consideration Required?	Comment
Protected Areas	If your activity is within 2km of any WFD protected area, include each identified area in your impact assessment. • special areas of conservation (SAC) • special protection areas (SPA) • shellfish waters • bathing waters • nutrient sensitive areas	No	There are no protected areas within 2km of the dredge or disposal site. The dredge and disposal site is not located within 2km of any designated bathing waters, with all bathing waters noted to be on the Scottish Mainland. The dredge and disposal sites are not designated as shellfish water or within 2km of a designated shellfish water. The closest protected shellfish waters is noted as the Bay of Firth, some 30km south west.

3.2 Potential Risk to Water Quality and Marine Life

The potential risks to water quality at the dredge sites and disposal site are further considered below.

Contaminant levels within the proposed dredge material for sea disposal are considered to be very low and not considered to represent a significant risk to the overall water quality either at the dredge site or proposed disposal site as they are below RAL1. The key risks to water quality are from the dredging exercise and also disposal where there may be periods of higher suspended solids which are likely to be both localised and temporary in nature. The larger grained material like gravel and sands will drop to the sea floor quickly, and any changes in suspended solids/turbidity will be driven by the finer grained material content, silts and clay sized particles. Where finer grained materials are cohesive, they will sink to the sea floor rapidly. The average content of various particle sizes is detailed below in Table 3-2.

Table 3-2: Summary of PSA Data

Dredge Area	Gravel (>2mm)	Sand (0.063mm<Sand<2mm)	Silt & Clay (<0.063mm)	Quantity to be dredged m^3
Stronsay	0.37%	96.4%	3.3%	9,500
	35m^3	9,158m^3	313m^3	

The dominant sediment type across the majority of the dredge areas is sand. Considering the dredge volume as a whole using averaged particle size analysis data, the dominant sediment type is sand comprising 96% of the total and the remainder made up of 3.3% silt and 0.37% comprising gravel sized fractions.

Given that an average of 97% of the sediment across all dredge areas comprises sand and gravel, it is considered that the majority of the deposited sediment will fall out of suspension quickly at the disposal site with limited lateral spread.

The remaining portion of the dredge 3.3% or 313m^3 of dredge material comprises silt/clay sized particles. This material is considered to have a longer suspension time than sand and gravel sized particles when in suspension. Any effects from the disposal of the material is considered to be both localised and temporary.

In summary, the associated risk with degradation of water quality directly associated with the proposed disposal is considered to be Low i.e. unlikely to cause a change in status of the waterbodies in question at both the dredge and disposal sites.

3.3 Conclusions and Recommendations

The samples collected across the dredge site recorded concentrations of the key contaminants of concern below RAL1 and in many instances, below the relevant LOD. As a result, risks to the marine environment and water quality associated with the dredging and disposal are considered to be low, with the main risk being identified as the temporary and localised increases in suspended sediments as per any dredging exercise.

Based on the chemical quality of the sediment samples retrieved and tested from the dredge site, the sea disposal and re-use of the material is considered to have no significant long-term impact on the marine environment.

REFERENCES

Marine Scotland (2017). Pre-Dredge Sampling Guidance Version 2: Scottish Government.
Marine Scotland (2015). Guidance for Marine Licence Applicants Version 2: Scottish Government.

APPENDICES

A FIGURES

B SAMPLE LOGS

Sample ID	Sample Description	Comments
Grab A	Light grey coarse sand	Initial samples encountered cobbles and gravel with no fines
Grab B	Ligh grey coarse sand	Worm present
Grab C	Fine to coarse light brown grey sand	Tube worms present

Photograph 1: Grab A

Photograph 2: Grab B

Photograph 3: Grab C

C DATA SUMMARY TABLES AND LAB CERTIFICATES