REPORT

CMAL SVRP

Colintraive Best Practicable Environmental Option (BPEO)

Client:	CMAL
Reference:	PC5424-HAS-DR-CV-RP-EV-1000
Status:	S2/P01
Date:	12 December 2025

Haskoning
Enhancing Society Together

HASKONING UK LTD.

74/2 Commercial Quay
Leith
Commercial Street
Edinburgh
EH6 6LX
United Kingdom
Water & Maritime
VAT registration number: 792428892

Phone: +44 131 5550506
Email: info@uk.haskoning.com
Website: haskoning.com

Document title:	CMAL SVRP
Subtitle:	Colintraive Best Practicable Environmental Option (BPEO)
Reference:	PC5424-HAS-DR-CV-RP-EV-1000
Your reference	n/a
Status:	S2/P01
Date:	12 December 2025
Project name:	CMAL SVRP
Project number:	PC5424
Author(s):	RG
Drafted by:	RG / EB
Checked by:	EM
Date:	26/11/2025
Approved by:	EM
Date:	17/12/25
Classification:	Project related

Table of Contents

Table of Tables

Table of Figures

1 Introduction

1.1 Background information

Caledonian Maritime Assets Ltd's (CMAL) Small Vessel Replacement Programme (SVRP) aims to renew a number of the aging small vessels fleet with new low emissions vessels. As part of the SVRP it is proposed to undertake upgrades to the existing Colintraive ferry terminal to facilitate the new vessels. These upgrades will include dredging of the approach to allow safe navigation onto the slipway and manoeuvring on the overnight berth and the addition of onshore power to enable charging of the vessel.

1.2 Purpose of this document

Under the Marine (Scotland) Act 2010, Section 21(1), a Marine Licence issued by the Marine Directorate Licensing Operations Team (MD-LOT) is required for the dredging and the deposit of substances or objects within waters adjacent to Scotland. Under Part 4, Section 27(2), the Marine Directorate has an obligation to consider the availability of practical alternatives when considering applications involving disposal of material at sea, in order to identify the best practicable environmental option. Applications for a Marine Licence to dispose of dredged material at sea therefore require a Best Practicable Environmental Option (BPEO) assessment, demonstrating that alternatives to sea disposal have been investigated in accordance with Scotland's Waste Hierarchy (**Figure 1-1**), as outlined in Scotland's circular economy and waste route map to 2030[1]. Marine Licences for capital works are valid for the duration of the activities, to be specified in the Marine Licence application and agreed with the Marine Directorate.

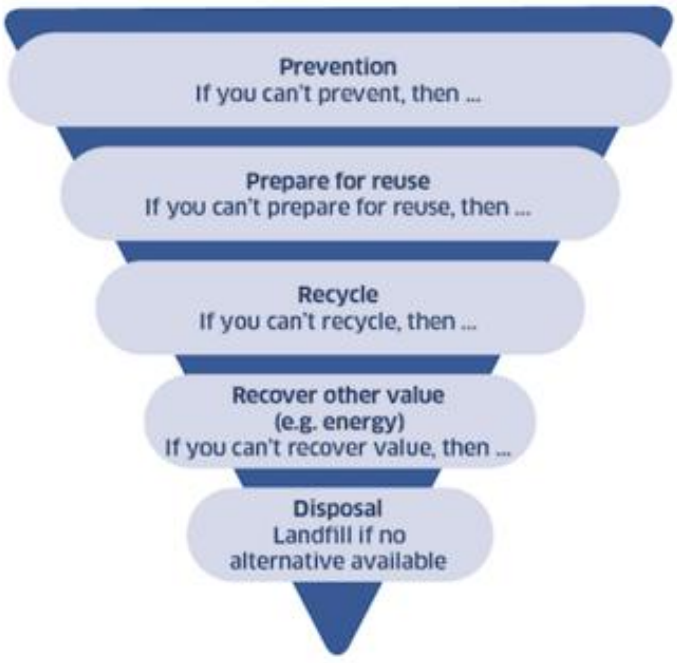


Figure 1-1 Scotland's waste hierarchy[2]

[2] *Scottish Government (2024) Scotland's Circular Economy and Waste Route Map to 2030.*

This report has been produced in support of a Marine Licence application for the disposal of capital dredge material at sea as a result of the proposed deepening of the approach to the Colintraive ferry terminal. It compares various options for the disposal of dredge material and identifies the BPEO.

2 Proposed Dredging Activity

2.1 Dredge volume

It is proposed to dredge a small section of the toe and the approach of the slipway, which allows for under-keel clearances for the new low emissions vessels, without restrictions from tidal regimes. A 500mm tolerance has been applied to allow for sedimentation. The proposed work includes the dredging of shallower areas on the approach slipway. The dredge levels are based on vessels being on the slipway at the lowest astronomical tide and a design draught of 2.14m.

The maximum dredge area is anticipated to be in the region of 20m x 20m to a maximum depth of 0.5m. Resulting in a maximum dredge volume of 200m³ although more likely to be around 110m^3, calculated based on the proposed dredge levels. The total required dredge area is shown on drawing PC5424-HAS-DR-CV-D-EV-1001. Selection of appropriate dredging plant and equipment will be the responsibility of the Contractor, however it is likely that dredging using backhoe dredging techniques will be favoured. The distance from low water (LAT) on the slipway to the maximum extent of the proposed dredge area is approximately 35m, which appears to preclude the use of a land-based backhoe excavator positioned on the slipway. Hence, the dredging will likely require the mobilisation of either a backhoe dredger (stationary dredger with a hydraulic excavator installed on a spudded pontoon) or an amphibious excavator (self-propelled mechanical excavator that can operate from land and over-water).

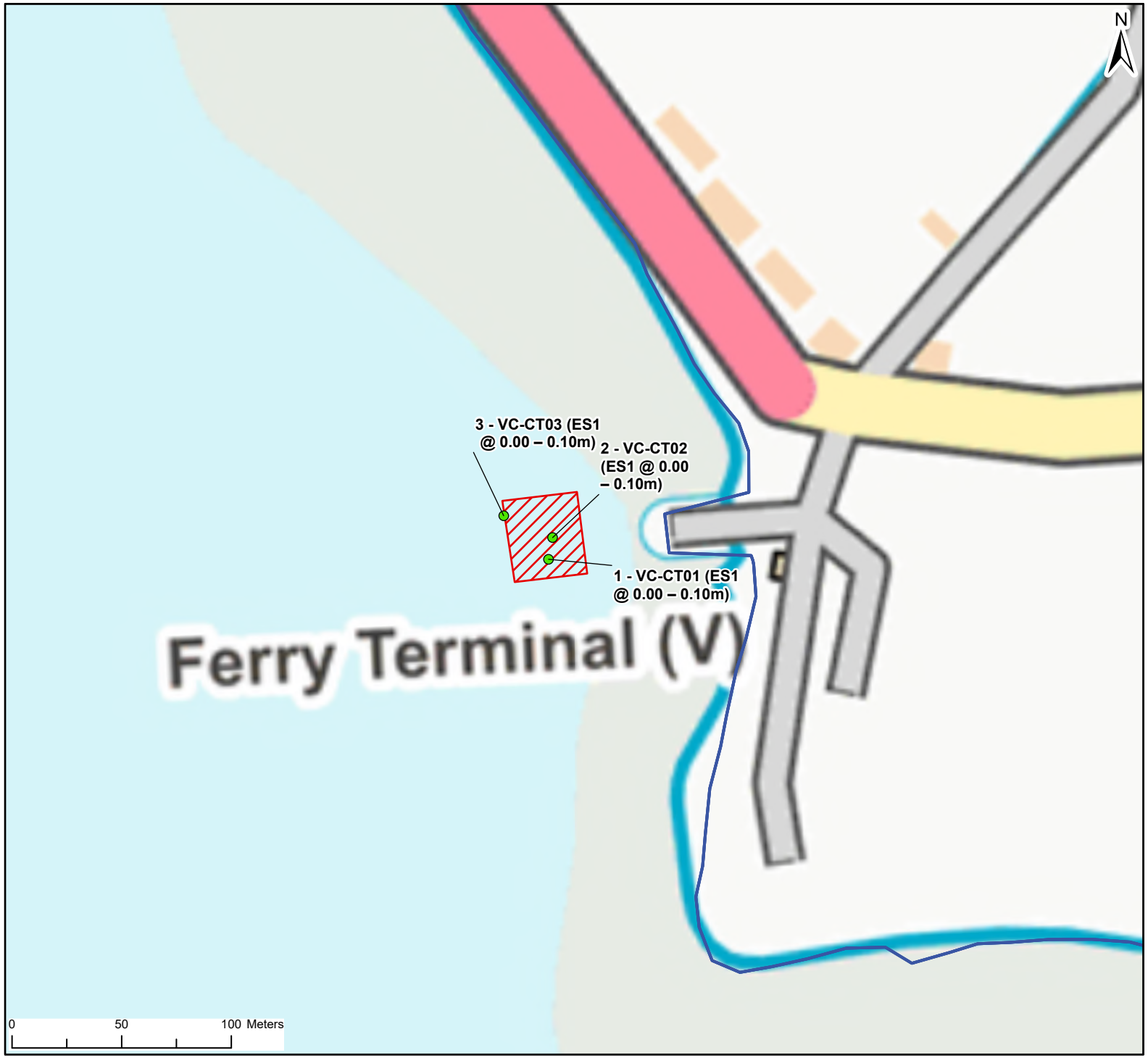
2.2 Dredge material characteristics

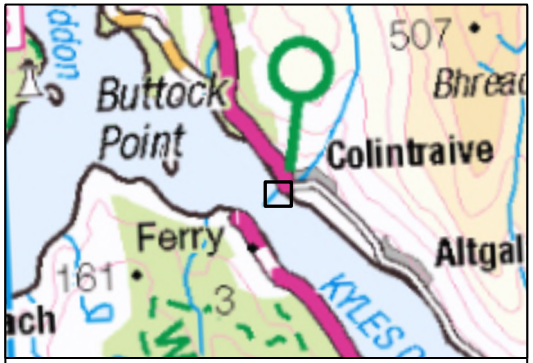
In support of this study, sediment samples were collected from the proposed dredge area and analysed for their physical characteristics (Particle Size Analysis – PSA), metals, organotins, organohalogens and polycyclic aromatic hydrocarbons (PAH's). The pre-dredge sampling plan (submitted on 19th September 2024) was agreed with the MD-LOT prior to the surveys and subsequent sample analysis.

The sample locations are listed in **Table 2-1** and marked on **Figure 2-1**. A site-specific sampling survey was undertaken between 4th September 2025.

Table 2-1 Sample locations

Point	Lat	Long
1 - VC-CT01 (ES1 @ 0.00 – 0.10m)	55 º 55.396'N	-5 º 9.217'W
2 - VC-CT02 (ES1 @ 0.00 – 0.10m)	55 º 55.399'N	-5 º 9.216'W
3 - VC-CT03 (ES1 @ 0.00 – 0.10m)	55 º 55.402'N	-5 º 9.228'W





Legend:

- Sediment Sample Locations
- Mean High Water Mark
- Dredge Area

Project: CMAL SVRP

Title: Colintraive Sediment Samples

Figure:	Drawing No:				
2-1	PC5424-HAS-DR-CV-D-EV-xxxx				
Revision:	**Date:**	**Drawn:**	**Checked:**	**Size:**	**Scale:**
01	28/11/2025	OB	EB	A4	1:2,500

Co-ordinate system: WGS 1984

Haskoning
Enhancing Society Together

2.3 Characteristics of the material to be dredged

Sediment within the dredge area is comprised primarily of gravel and sand, detailed in **Table 2-2**.

Table 2-2 Physical properties of the sampled sediment

Sample ID	Type of sample	Sample depth (m)	Gravel (>2 mm) (%)	Sand (63-2000 µm) (%)	Silt (<63 µm) (%)
VC-CT01 (ES1 @ 0.00-0.1m)	Grab	0.00 – 0.10	76.77	20.03	3.2
VC-CT02 (ES1 @ 0.00-0.1m)	Grab	0.00 – 0.10	62.87	35.09	2.05
VC-CT03 (ES1 @ 0.00-0.1m)	Grab	0.00 – 0.10	54.86	42.21	2.94

2.4 Contaminants

Analysis of sediment collected during sampling in September 2025 indicated an exceedance of Action Level 1 in one sample (VC-CT01) which showed elevated levels of PAHs slightly above AL1 (**Table 2-3)**. However, on average for the dredge area levels of PAHs were below AL1. All other contaminants analysed were below their respective ALs (Marine Scotland, 2017).

Table 2-3 Sediment contaminant results for sample VC-CT01 (ES1 @ 0.00 - 0.10m) elevated results only

CONTAMINANT	BAA	BAP	BBF	BKF	CHRYSENE	DBENZAH	FLUORANT	PYRENE
Results (µg/kg)	120	147	101	111	120	20.2	273	190

3 Assessment of Disposal Options

3.1 Do nothing

As described in section 1.1, the proposed dredge is required to enable safe operation of the new low-emissions vessels proposed under the SVRP. Therefore, the Do Nothing option would compromise CMAL's ability to implement the SVRP.

This option has been discounted.

3.2 Construction fill / material

Dredged sediments could be reused for construction fill on site. For the Proposed Development, there is limited requirement for construction fill on site. The presence of coarse-grained particles and shells within the dredged material may limit the possibility for beneficial use within the scheme as engineered fill. On site processing (e.g. by picking, screening and crushing) would be required prior to use as fill. The saline content of the dredge material would require washing as well as the drying and storage challenges, which makes this option impractical and uneconomic.

This option has been discounted.

3.3 Beneficial re-use

This includes the use of dredged sediments for beach restoration or habitat creation. Ideally, using dredged materials for beach recharge or habitat restoration would generate a purpose for the material that benefits a local amenity.

Consultation with NatureScot highlighted a potential pilot project for sediment re-use within the Inner Clyde SPA/SSSI but the project is not yet active. It was also noted that seagrass restoration projects may be able to use the dredged material, although sediment composition is important. The dredged sediments do contain a proportion of sand, however they comprise predominantly gravel or larger, which is unsuitable for seagrass restoration. There are no known sites available within close proximity to the Proposed Development that require beach recharge.

Therefore, no suitable opportunities for beneficial re-use of the dredged material has been identified.

This option has been discounted.

3.4 Disposal on land

This option involves transporting dredged materials from the dredge site to an appropriate onshore commercial waste facility. Three processes would need to be undertaken to make the dredged materials suitable for landfill disposal.

- Materials would need to be transported onshore for treatment/dewatering prior to disposal.
- Sediments would need to be dewatered prior to disposal or treatment. The water removed from the sediment would require containment and further sampling to avoid land contamination from the effluent. There is no area at Colintraive to undertake this process and therefore an alternative location would have to be found.
- Dewatered/treated material would need to be transported by road using HGVs to a landfill site. Transportation of material from the dewatering/treatment site to a landfill site would generate additional vehicle movements on local roads, contributing to traffic congestion and air and noise pollution with associated carbon emissions.

Suitable land for drying/treating the dredge material is not available within the vicinity of the proposed development and thus, would be impractical. The closest operational landfill site is Dalinlongart landfill, Dunoon, 16 miles east by minor road.

The Scottish Government has released several targets across different legislation aiming to reduce waste destined for disposal to landfills significantly by 2025. Scotland's Zero Waste Plan (2010) set a long-term target of reducing waste sent to landfill to no more than 5%. This is mirrored within the Climate Change Plan update 2018 -2032 and Circular Economy (Scotland) Act 2024[3].

This option has been discounted.

3.5 Incineration

This process would involve landing the dredged material, dewatering, storing and transportation to an incinerator. The residual incineration ash would then require disposal. Options for disposal of ash include landfill, reclamation and spreading on agricultural land. The dredged sediments consist broadly of gravel and sand. Incinerator operators generally require material to have an organic content above 20% to ensure

[3] *Scotland's circular economy and waste route map to 2030 - gov.scot*

efficient combustion and would most likely reject material with an organic content below this threshold. The sediment results have shown an average total organic content of 0.24% therefore, the material would be rejected for incineration.

This option has been discounted.

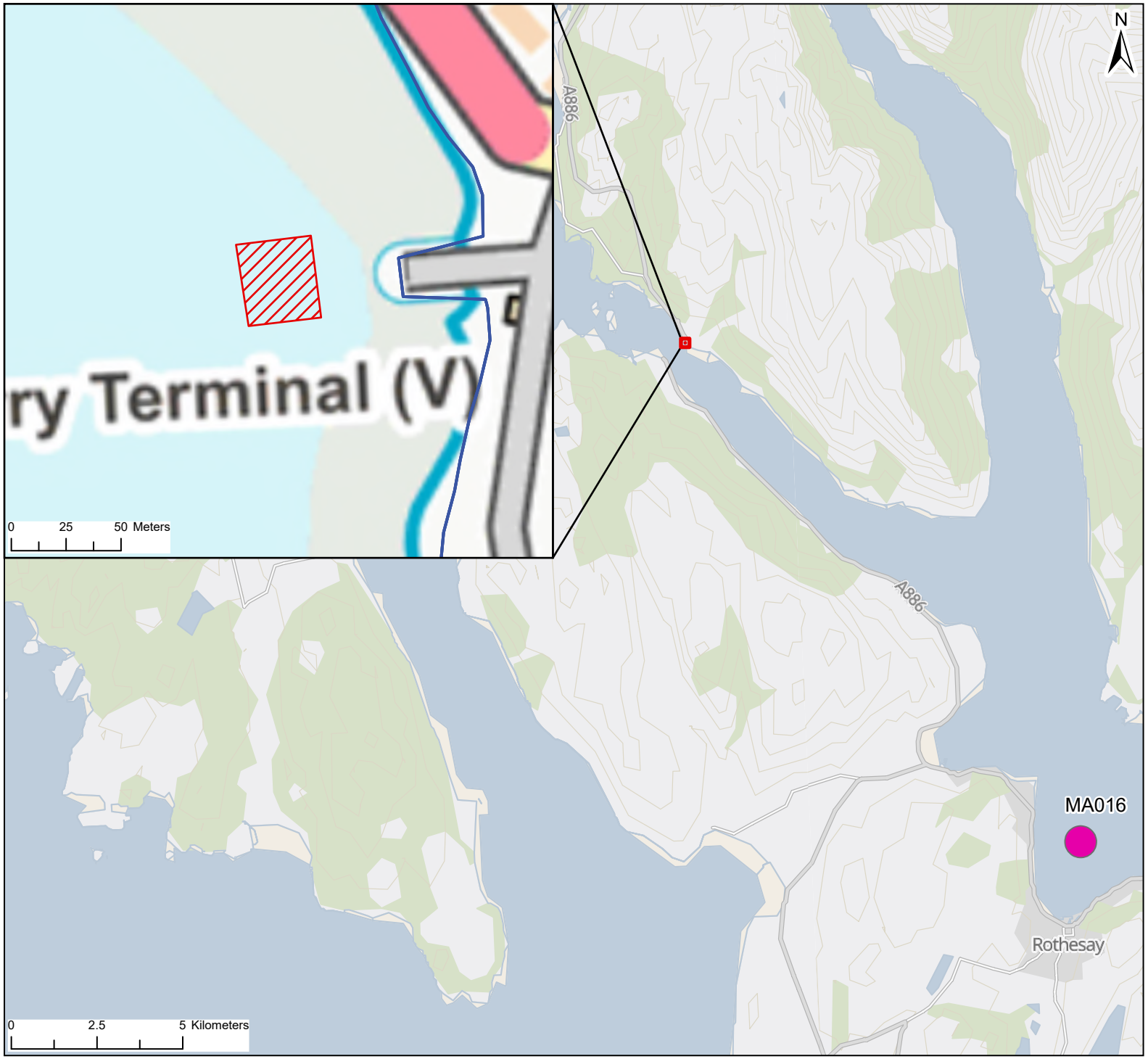
3.6 Disposal to sea

This option involves the transportation and disposal of dredge materials to a licensed disposal site in a dredging vessel. It takes place at sea and does not require the landing of any materials. The dredger or barge transits to a licensed spoil disposal ground and releases the materials, generally through bottom doors or a split hull. To ensure even distribution of material across the disposal site and at the correct depths, a grid pattern will be applied across the disposal site, and will be tracked using a global positioning system (GPS) to record the spoil discharge locations.

The closest dredge and disposal site to the Proposed Development is Rothesay Bay (MA016) located 10km to the south (**Figure 3-1**). This disposal site is within an accessible distance from the Proposed Development and, given the extremely small volume of material to be dredged, is likely to have the capacity to store the dredge material from Colintraive.

In addition to the practicalities of disposal at sea, this option has the added benefit of retaining marine sediment within the Firth of Clyde, preventing loss of sediment from the system, which is generally considered to be good practice (Manning *et al.,* 2021).

This option has been chosen.



Legend:

- Mean High Water Mark
- Disposal Site
- Dredge Area

Project: CMAL SVRP

Title: Colintraive Disposal Site

Figure: 3-1

Drawing No: PC5424-HAS-DR-CV-D-EV-xxxx

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	28/11/2025	OB	EB	A4	1:160,000

Co-ordinate system: WGS 1984

Haskoning
Enhancing Society Together

4 Summary

The BPEO assessment has not identified any immediate opportunities for the re-use of the dredge material. Without any suitable uses available at present, disposal in the marine environment at a licenced disposal ground is considered the BPEO. The optimum disposal location is determined through consideration of practical, environmental and economic parameters. The disposal site has been selected to be as close as practical to the dredge site. This minimises transport time to each site and reduces the carbon footprint whilst minimising transportation cost. The disposal site has no known current exclusions that would preclude the deposition of the dredge material.

5 References

Manning, W.D., Scott, C.R and Leegwater. E. (eds) (2021). Restoring Estuarine and Coastal Habitats with Dredged Sediment: A Handbook. Environment Agency, Bristol, UK.

Marine Scotland, 2017. Pre-disposal Sampling Guidance. Version 2 – November 2017.