



Best Practicable Environmental Option Assessment

Port of Aberdeen Maintenance Dredging
North and South Harbours

July 2022

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Appendix C	Correspondence with ACC and Aberdeenshire Council regarding beach recharge

Document history

Version	Date	Notes
POA-BPEO--R1	20 July 2022	Draft issued for review
POA-BPEO—R2	27 July 2022	Final issue

1. Introduction

The Port of Aberdeen is the major port serving the North-East of Scotland. There are approximately 8,000 vessel arrivals and 5 million tonnes of cargo handled in the North Harbour each year, supporting 10,000 full time equivalent jobs. It is the mainland port for the lifeline service to the Northern Isles and as well as general cargo and passengers. Aberdeen is the largest support harbour for the North Sea Energy Industry.

In 2022, the new South Harbour will become operational.

As a statutory harbour authority, the Port of Aberdeen is required to carry out maintenance dredging of navigation channels and berths to maintain safe navigable depths and support customers' business needs. The Aberdeen Harbour Revision Order 2016 gives Port of Aberdeen powers to dredge within its statutory harbour limits.

This report presents the Best Practicable Environmental Option (BPEO) assessment for maintenance dredged material from Aberdeen North and South Harbours, to support an application to Marine Scotland – Licensing Operations Team (MS-LOT) to deposit dredged material at sea.

BPEO assessment is a method for identifying the option that provides the *most environmental benefit* or *least environmental damage*. It assesses the performance of different options using a range of criteria such as environmental impact, technical feasibility and cost.

2. Description of dredging activity and dredged material

2.1. Dredging activity

2.1.1. North Harbour

Aberdeen North Harbour has a record of dredging going back around 200 years, although it is likely that dredging has been ongoing in some form throughout the Port of Aberdeen's 900+ year history. In recent years, maintenance dredging has been carried out mainly with a trailer suction hopper dredger (TSHD), working in conjunction with a bed levelling tug. The latter is used to smooth out any local 'high spots' that either develop naturally or are left by the TSHD. The dredged material is taken by the TSHD to the designated offshore deposit site Aberdeen CR110, approximately 2.5 nautical miles to the southeast of the harbour entrance.

Maintenance dredging is typically carried out once a year within the areas shown in Figure 1, although sometimes an additional winter dredging campaign is required due to accretion of material in the navigation channel and River Dee caused by winter storms.

Maintenance dredging is typically carried out in spring each year, after any winter storms, depending on the availability of dredging plant. The duration of the campaign will vary from two to four weeks depending on the dredge volumes and weather/operational delays.

The volume of material removed annually from the harbour and channel varies between 100,000 to 200,000 m³ in-situ sand and silt. The maintained dredge depths vary throughout the North Harbour, as shown on Figure 1.

2.1.2. South Harbour

From 2017-2021, capital dredging was carried out as part of the construction of the South Harbour, and in August 2022 the first maintenance dredge is due to take place to reinstate the depths of 10.5 m below Chart Datum (CD) at the East Quay and entrance channel, and 9.0 m below CD across the rest of the harbour, as shown on Figure 2.

The dredging method is the same as the North Harbour (see Section 2.1.1). A backhoe dredger may be used at the South Harbour instead of, or in addition to, a TSHD.

This BPEO considers the material to be dredged using a TSHD or backhoe. For plough dredging in the North and South Harbours, there is no 'disposal' so a BPEO is not required.

2.2. Material to be dredged

2.2.1. Physical characteristics

North Harbour

In June 2022, ten surface sediment samples were collected from the areas to be dredged as agreed with MS-LOT. Full sampling results are provided in Appendix A.

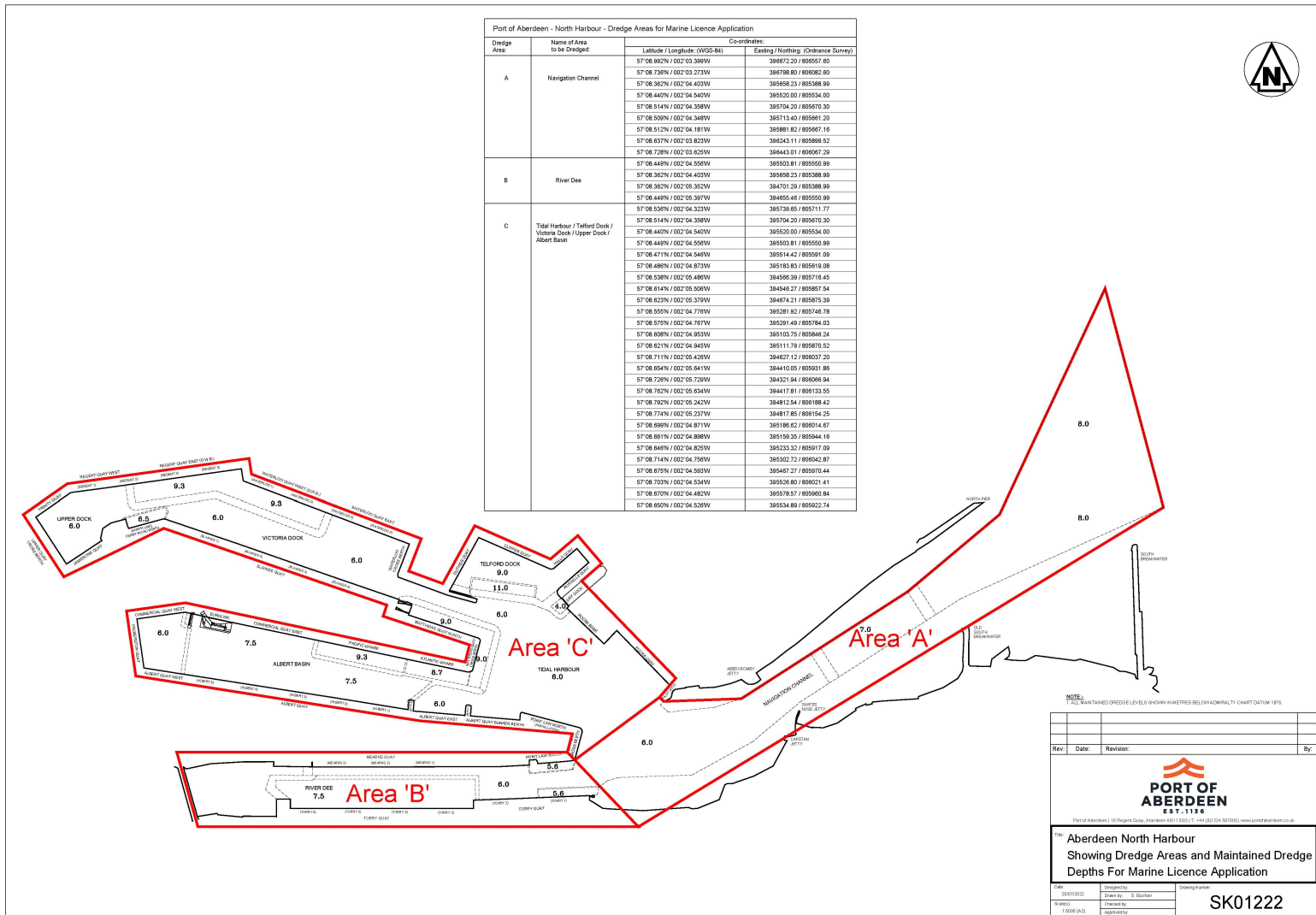
Sample analysis reveals that the dredged material is predominantly silt (average 62%) with some sand (average 38%), and a very small gravel fraction (average 0.4%).

South Harbour

In March 2022, six surface sediment samples were collected from the areas to be dredged as agreed with MS-LOT. Full sampling results are provided in Appendix B.

Sample analysis reveals that the dredged material is predominantly silt (average 67%) with some sand (average 33%), and a very small gravel fraction (average 0.3%).

Sample 1 contains a significantly higher proportion of gravel than the other samples (68%) but as the volume to be dredged from this area is very small and will most likely be ploughed, it is not representative of the material to be 'disposed' so is excluded from the averages provided above.



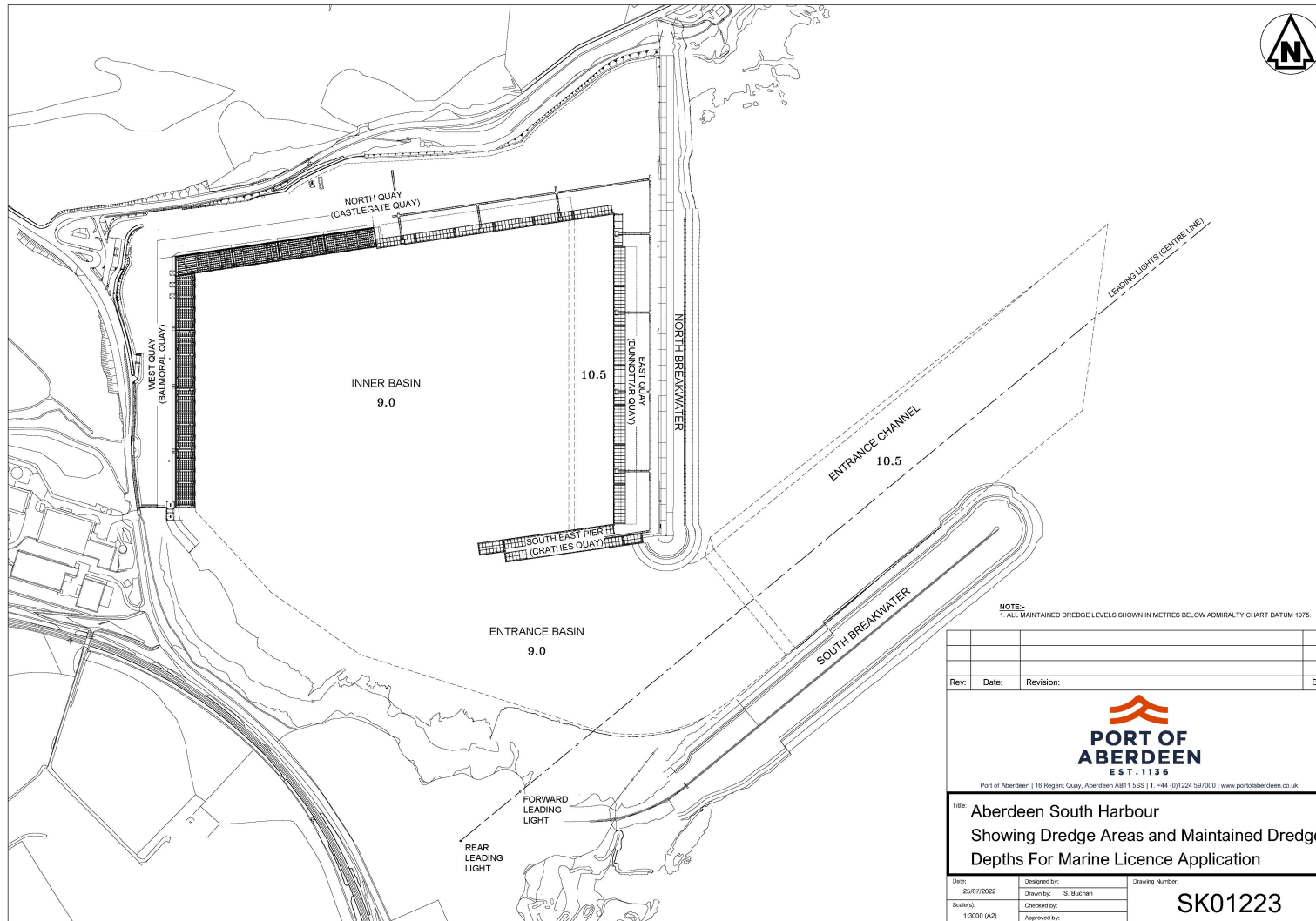


Figure 2 Areas to be dredged: South Harbour

2.2.2. Chemical characteristics

The chemical analysis of sediment samples has been compared to the Marine Scotland Revised Action Levels, which are used to determine the contaminant loading of the material and its suitability for deposition at sea.

North Harbour

For heavy metals, levels of copper were elevated above Action Level 1 in six of the samples analysed. In all cases the levels were well below Action Level 2. Levels of all other heavy metals, polychlorinated biphenyls, tributyl tin and dibutyl tin were below Action Level 1 in all samples.

Levels of polycyclic aromatic hydrocarbons (PAHs) were elevated above Action Level 1 in eight of the samples analysed. As shown in the 'PR Details' sheet in Appendix A, the average wet weight concentration from all samples is below Action Level 1 for all PAHs and total hydrocarbons.

The levels observed in the 2022 samples are comparable to or lower than the samples analysed in 2020, which were deemed acceptable for sea deposition by MS-LOT.

South Harbour

For heavy metals, there was one marginal exceedance of Action Level 1 for cadmium in sample 4, and minor exceedances of Action Level 1 for copper in samples 2 and 3. In all cases Action Level 1 was only marginally exceeded. All other results were below Action Level 1. As shown in the 'PR Details' sheet in Appendix B, the average wet weight concentration from all six samples is below Action Level 1 for all heavy metals.

For PAHs, there were minor exceedances of Action Level 1 in samples 2, 3 and 6. Total hydrocarbons exceeded Action Level 1 in four of the six samples. As shown in the 'PR Details' sheet in Appendix A, the average wet weight concentration from all six samples was below Action Level 1 for all PAHs, and only marginally exceeded Action Level 1 for total hydrocarbons.

There were no exceedances of Action Level 1 for organotins or polychlorinated biphenyls.

These sampling results were submitted with the 2022 stand-alone marine licence application to deposit material at sea from South Harbour maintenance dredging, for which a licence was granted by MS-LOT, so the material is deemed suitable for sea deposit.

3. Scoping of potential options

This section describes potential options for the dredged material. Where an option is not considered feasible, the reason is given and it is not taken forward to the assessment stage. Options that are considered practicable are considered in detail in Section 4.

3.1. Option 1: Landfill

The most common use of dredged material within landfill sites is as capping or restoration material. Material would need to be brought ashore within the port estate and dewatered before being transported to trucks and taken by road to a landfill site. Suitable land for drying lagoons is not available within the port estate.

There are no suitable landfill sites in the immediate vicinity of the Port of Aberdeen that could cope with a relatively large quantity of material on an annual basis. The closest operational landfill site to Aberdeen Harbour that is authorised by the Scottish Environment Protection Agency (SEPA) is Loch Hills Quarry in Dyce, approximately 15 km to the north by road from Aberdeen South Harbour (SEPA, 2022).

Existing landfill sites must cope with large volumes of domestic and industrial requirements, and marine dredgings on the present scale would place an intolerable burden on such sites. Dredged material is relatively inert by landfill standards, so disposal at a landfill site is not usually necessary or recommended unless it is significantly contaminated, which it is not in this case (see Section 2.2.2).

Transportation of material from the harbour to a landfill site would generate significant vehicle movements on local roads, contributing to traffic congestion and air and noise pollution.

This option has been discounted.

3.2. Option 2: Deposition at sea

The dredged material meets the chemical requirements for deposition at sea (see Section 2.2.2).

Deposit sites in the marine environment are designated by MS-LOT. The closest licensed sea deposit site to the Port of Aberdeen is CR110 (Aberdeen), approximately 20 minutes' sailing time from the harbour. Dredged material from Aberdeen North Harbour has been deposited at this site for at least 80 years.

The nature of the dredged material and the proximity of a suitable licensed site makes deposition at sea a viable option, and it is explored in more detail in Section 4.

3.3. Option 3: Agriculture use

The north-east of Scotland is a rural farming area with an abundance of good arable land and there is no known requirement for a supply of imported material. The dredged material would have to be de-watered and desalinated to make it suitable for soil conditioning or spreading, and no land is available within the port estate to locate a drying lagoon.

This option has been discounted.

3.4. Option 4: Use in land reclamation

Dredged material can be suitable for land reclamation. The material grade and quality are critical: material suitable for reclamation is generally medium to coarse sands and gravel fractions, typically in large volumes. The material to be dredged is predominantly silt with some sand (see Section 2.2.1) so is unlikely to be suitable for land reclamation.

Furthermore, no land reclamation projects have been identified within Aberdeen or the locality which require dredged material for land reclamation purposes.

This option is discounted for the current marine licence application; however, it will be kept under review in future revisions of the BPEO should there be a local need that aligns with the timescale required for maintenance dredging.

3.5. Option 5: Use as construction material

The saline content of the dredged material makes it unsuitable as a construction material. The grading and washing required coupled with the drying and storage challenges previously identified makes this option uneconomical and unpractical.

This option has been discounted.

3.6. Option 6: Beach recharge

The use of dredged material for beach recharge is a sustainable beneficial use: it generates a purpose for the material that benefits a local amenity. Material can be deposited direct from the dredging vessel via a pipeline or by 'rainbowing' onto the beach, where it is reprofiled using land-based plant.

This option is considered feasible and is explored in more detail in Section 4.

3.1. Summary of options scoping

The scoping of potential options concludes that options 1 (landfill), 3 (agricultural use), 4 (use in land reclamation) and 5 (use as construction material) are not viable for the reasons described above. The following options will be taken forward to assessment:

- Deposition at sea
- Beach recharge

4. Assessment of options

In this section, deposition at sea and beach recharge are assessed further for strategic, environmental and financial considerations.

4.1. Assessment methodology

MS-LOT's general licensing guidance (MS-LOT, 2015) states the following in relation to BPEO assessment: *'consideration must be given to the availability of practical alternatives when considering any applications involving disposal of material at sea. In order for MS-LOT to assess the available alternative options, all sea disposal licence applications must be supported by a detailed assessment of the alternative options. This should include a statement setting out the reasons, including financial, that have led to the conclusion that deposit of the materials at sea is the BPEO.'*

There is no formal guidance available in Scotland on BPEO assessment for disposal of dredged material. This BPEO adopts an approach that considers three aspects: strategic, environmental and financial. The strategic and environmental considerations for each option are described in Sections 4.2 and 4.3, and an evaluation of the relative operating costs of each option is provided in Section 4.4. Section 5 then summarises the option assessment and concludes the BPEO.

4.2. Deposition at sea

4.2.1. Strategic considerations

Operational considerations

The operational practicalities of depositing dredged material at a licensed sea deposit site are straightforward: a split hopper barge would discharge material directly at the deposit site. No preparation of the material is required prior to deposition.

Availability of suitable sites

Dredging and deposition at sea has been carried out at Aberdeen North Harbour throughout its history. For the past 80 years at least, material dredged from the North Harbour has been deposited at the same offshore site used solely by the Port of Aberdeen: Aberdeen CR110. In August 2022, maintenance dredged material from the South Harbour will be deposited at Aberdeen CR110 under a separate marine licence.

Legislative implications

The Port of Aberdeen has powers to dredge under the Aberdeen Harbour Revision Order 2016, provided that the activity is approved by the Scottish Ministers. A marine licence is required from MS-LOT to deposit material at sea.

Section 34 of the Environmental Protection Act 1990 (as amended) makes it a duty to take all measures available as are reasonable in the circumstances to apply the waste hierarchy set out in Article 4(1) of the Waste Directive. The waste hierarchy ranks waste management options according to the best environmental outcome taking into consideration the lifecycle of the material. In its simplest form, the waste hierarchy gives top priority to preventing waste.

When waste is created, it gives priority to reuse, then recycling, then other recovery, and last of all disposal. The option to deposit the dredged material at sea ranks poorly on the waste hierarchy as it is classed as disposal.

4.2.2. Environmental considerations

Safety implications

Deposition at sea has negligible implications for safety providing that standard navigation and maritime safety procedures are observed.

Public health implications

There are no threats to public health associated with deposition of uncontaminated dredged material at sea.

Local Acceptability

There are no anticipated local acceptability issues with continuing the long-standing method of depositing dredged material at sea. The Port of Aberdeen has never received a complaint or enquiry from a member of the public regarding deposition at sea of maintenance dredged material from the North Harbour, and is not aware of any objections received by MS-LOT from members of the public relating to previous marine licence applications.

Pollution/contamination implications

As described in Section 2.2.2, the material to be dredged is considered suitable for deposition at sea according to the Marine Scotland Revised Action Levels, so the risk of pollution/contamination of the marine environment is very low.

Interference with other legitimate interests

The Aberdeen sea deposit site is located in open water outwith shipping channels. There is the potential for interference between the dredging vessel and other users of the sea (e.g. fishing or recreational vessels), which can be managed through compliance with harbour byelaws and standard communications between the dredging crew, Port of Aberdeen and other users. The risk of interference with other legitimate interests is low.

Amenity/aesthetic implications

There are no amenity or aesthetic implications of depositing material at a designated offshore site.

Ecological Implications

Deposition at sea can smother marine life on the seabed within and around the site. As the Aberdeen site has been in use for many years and is subject to annual deposition of material from the North Harbour, it is likely that any benthic species in and around the site can tolerate the periodic disturbance caused by deposition and temporary increases in turbidity.

A dedicated Marine Mammal Observer (MMO) watch will be kept by a nominated crew member aboard the dredger, following the general guidance for and acting in the role of a MMO, to ensure that marine mammals are not in the vicinity when deposition takes place.

4.3. Beach recharge

4.3.1. Strategic considerations

Operational considerations

Beach recharge (sometimes called beach nourishment) requires clean, sandy material. The dredged material is predominantly silt with some sand (see Section 2.2.1) so is unlikely to be suitable.

Beach recharge/nourishment would require either a pipeline connected to the dredger to pump material ashore onto the beach, or a dredger capable of accessing the nearshore area to discharge material directly using a ‘rainbowing’ technique.

For the pipeline method, the loaded dredger would moor at a suitable point offshore and a floating pipeline would pump material onto the beach, where it would then be reprofiled using land-based mechanical plant. For the rainbowing method, the dredging vessel must have sufficiently shallow draft to access the shallow nearshore area. Once ashore, the material would typically be stockpiled in a bund, then recovered and spread during low water.

Both the pipeline and rainbowing methods take significantly longer to discharge than the open water bottom-dumping method used in sea disposal.

Availability of suitable sites

At each marine licence renewal, the Port of Aberdeen contacts Aberdeen City Council (ACC) and Aberdeenshire Council to discuss opportunities to use dredged material for beach recharge or other projects. Aberdeenshire Council has no plans for beach recharge works. ACC is currently undertaking studies into coastal management solutions at Aberdeen Beach, which may include beach recharge, but there is no definite project at this time. It is likely that any requirement for material will be within the duration of the proposed marine licence. Relevant correspondence is provided in Appendix C.

The Port of Aberdeen will continue to liaise with ACC and Aberdeenshire Council, and if a project materialises that could make use of the dredged material, it will be considered in a future revision of the BPEO.

Legislative implications

Standing advice from SEPA states that waste material, which includes dredged material, deposited above the low water mark is subject to Waste Management Licensing controls regulated by SEPA unless it is subject to a licence issued under Part 4 of the Marine (Scotland) Act 2010, in which case it is excluded from such controls (SEPA, 2016), provided that it does not constitute a landfill. As beach recharge would require a marine licence, it is assumed that a Waste Management Licence would not be required.

The option to reuse the dredged material for beach recharge ranks favourably on the waste hierarchy; it negates the need to otherwise dispose of the material.

Dredged material to be used for beach recharge requires a licence from the Crown Estate Scotland, and a royalty is payable by the end user for the material.

4.3.2. Environmental considerations

Safety implications

The use of a floating pipeline presents a potential hazard to navigation which would require marking and lighting in accordance with standard industry practices.

Pumping or rainbowing material onto the beach and subsequent reprofiling may present a hazard to beach users. It would be necessary to cordon off areas of the beach during the recharge operation.

Public health implications

As described in Section 2.2.2, the material to be dredged is considered suitable for deposition at sea according to the Marine Scotland Revised Action Levels, so the use of the material on the beach is highly unlikely to present issues for public health.

Pollution/contamination implications

As described in Section 2.2.2, the material to be dredged is considered suitable for deposition at sea according to the Marine Scotland Revised Action Levels, so the risk of pollution/contamination of the beach environment is very low.

Interference with other legitimate interests / Amenity implications

As described above, during a beach recharge operation it would be necessary to restrict access to areas of Aberdeen Beach and the inshore waters around the dredger. It is possible that dredging would take place in the summer months when the beach is a popular local destination.

This is unlikely to be a significant concern due to the short term nature of the operation.

Ecological Implications

There are no significant ecological issues with using dredged material for beach recharge. It is preferable for the source material to match the existing beach material: the material to be dredged is predominantly silt with some sand (see Section 2.2.1).

4.4. Operational cost evaluation

Table 1 and Table 2 present estimates of the relative operating costs of deposition at sea and beach recharge for 100,000 m³ of dredged material, based on the Port of Aberdeen's experience of the UK dredging industry. Dredging costs can vary considerably year-to-year depending on dredger availability, fuel prices and other factors.

Table 1 Estimated cost of sea deposit of 100,000 m³

Dredger Mobilisation	£50,000
Dredger Costs @ £2.50/m ³	£250,000
TOTAL	£300,000

Table 2 Estimated cost of dredging 100,000 m³ of material, of which 20,000 m³ is suitable for beach recharge¹

Lag Pipeline	£400,000
Dismantle Pipeline	£100,000
Hire of Plant	£50,000
Pumping Costs @ £1/m ³	£20,000
Dredger Mobilisation	£50,000
Dredge Costs @ £2.50/m ³	£250,000
TOTAL	£870,000

[Excludes royalty payable to The Crown Estate Scotland by the end user if dredged material were to be used for beach recharge]

5. Best practicable environmental option

Two potential options are considered in the assessment: deposition at sea and beach recharge.

Operationally, both options are technically practicable but deposition at sea is the preferred option as it is a simpler and more efficient operation, maintains the maximum flexibility of dredging equipment, and utilises an existing licensed sea deposit site (Aberdeen CR110). In any event, a suitable beach recharge site is a fundamental requirement, and discussions with ACC and Aberdeenshire Council have confirmed that they are unlikely to require material within the timeframe of the current marine licence application.

Environmentally, beach recharge is the preferred option according to the waste hierarchy as it uses a material that would otherwise be disposed; however, neither option is likely to cause significant adverse environmental impacts. Neither option would cause significant safety, public health, amenity or pollution/contamination issues.

Financially, the costs are almost three times greater for beach recharge than for deposition at sea.

Considering all three aspects, deposition of material at sea at Aberdeen CR110 is considered to be the BPEO.

ACC is currently undertaking studies into coastal management solutions at Aberdeen Beach, but there is no definite beach recharge project at this time. If such a project materialises, it will be considered in a future revision of this BPEO.

¹ 20% is a reasonable assumption considering the average sand content is 36%, not all of which could be extracted/separated from silts during the dredging process.

6. References

MS-LOT (2015). Marine Scotland Guidance for Marine Licence Applicants: Version 2 - June 2015. <https://www.gov.scot/publications/marine-licensing-applications-and-guidance/> [accessed 20 July 2021].

SEPA (2022) <https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/> [accessed 7 April 2022].

SEPA (2016) Land Use Planning System SEPA Guidance Note 13: SEPA standing advice for The Department of Energy and Climate Change and Marine Scotland on marine consultations. Issue No. 5. Issued 29/09/2016.

Appendix A

North Harbour 2022 sediment sampling results

Applicant Information

Applicant:	Port of Aberdeen
Description of dredging:	North Harbour maintenance dredging
Total amount to be dredged (wet tonnes)	295,500 in-situ

Sample Details & Physical Properties

Explanatory Notes:
An example of a 'Dredge area' is: 'Dock A, Harbour X'
Provide description of the dredge area and the latitude and longitude co-ordinates (WGS84) for each sample location. Co-ordinates taken from GPS equipment should be set to WGS84.
Note for sample depth that the seabed is 0 metres.
Gravel is defined as >2mm, Sand is defined as >63um<2mm, Silt is defined as <63um).

Sample information:

Sample ID	Dredge area	Latitude										Longitude										Type of sample	Sample depth (m)	Total solids (%)	Gravel (%)	Sand (%)	Silt (%)	TOC (%)	Specific gravity	Asbestos	
MAR01468.00	No 1	5	7	°	0	8	.	6	8	1	'N	0	0	2	°	0	3	.	7	1	4	'W	Grab	0	45.9	0	43.62	56.38		2.6	No
MAR01468.00	No 2	5	7	°	0	8	.	6	1	4	'N	0	0	2	°	0	3	.	7	5	9	'W	Grab	0	38.2	0	40.41	59.59		2.58	No
MAR01468.00	No 3	5	7	°	0	8	.	5	7	6	'N	0	0	2	°	0	3	.	8	7	9	'W	Grab	0	37.8	0.48	44.21	55.31		2.57	No
MAR01468.00	No 4	5	7	°	0	8	.	4	3	0	'N	0	0	2	°	0	4	.	2	9	8	'W	Grab	0	35.5	0	33.74	66.26		2.54	No
MAR01468.00	No 5	5	7	°	0	8	.	5	5	9	'N	0	0	2	°	0	4	.	7	0	6	'W	Grab	0	50	1.2	48.59	50.21		2.61	No
MAR01468.00	No 6	5	7	°	0	8	.	6	4	2	'N	0	0	2	°	0	4	.	6	4	6	'W	Grab	0	41.6	0.93	32.33	66.74		2.54	No
MAR01468.00	No 7	5	7	°	0	8	.	7	4	4	'N	0	0	2	°	0	5	.	4	8	0	'W	Grab	0	44.1	0.07	30.79	69.15		2.54	No
MAR01468.00	No 8	5	7	°	0	8	.	5	4	3	'N	0	0	2	°	0	5	.	2	2	0	'W	Grab	0	33.8	0	30.93	69.07		2.51	No
MAR01468.00	No 9	5	7	°	0	8	.	5	6	4	'N	0	0	2	°	0	5	.	0	5	8	'W	Grab	0	42.1	0	30.33	69.67		2.51	No
MAR01468.01	No 10	5	7	°	0	8	.	3	9	8	'N	0	0	2	°	0	5	.	1	1	2	'W	Grab	0	36.3	0.9	43.5	55.61		2.53	No
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				°		.					'N				°		.					'W									
				°		.					'N																				

Trace Metals & Organotins

Explanatory Notes:

Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

Sample information:

[illegible]

Polyaromatic Hydrocarbons (PAH)

Explanatory Notes:

Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

Definitions:

ACENAPTH	Acenaphthene
ACENAPHY	Acenaphthylene
ANTHRACN	Anthracene
BAA	Benz(a)anthracene
BAP	Benzo(a)pyrene
BBF	Benzo(b)fluoranthene
BEP	Benzo(e)pyrene
BENZGHIP	Benzo(ghi)perylene
BKF	Benzo(K)fluoranthene
C1N	C1-naphthalenes
C1PHEN	C1-phenanthrene
C2N	C2-naphthalenes
C3N	C3-naphthalenes
CHRYSENE	Chrysene
DBENZAH	Diben(ah)anthracene
FLUORANT	Fluoranthene
FLUORENE	Fluorene
INDPYR	Indeno(1,2,3-cd)pyrene
NAPTH	Naphthalene
PERYLENE	Perylene
PHENANT	Phenanthrene
PYRENE	Pyrene
THC	Total Hydrocarbon Content

Sample information:

[illegible]

[illegible]

[illegible]

Organohalogens

Explanatory Notes:

Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red. ICES7 is the sum of PCB 28,52,101,138,153,180 and 118.

Definitions:

AHCH	alpha-Hexachlorocyclohexane
BHCH	beta-Hexachlorocyclohexane
GHCH	gamma-Hexachlorocyclohexane
DIELDRIN	Dieldrin
HCB	Hexachlorobenzene
PPDDE	p,p'-Dichlorodiphenyldichloroethylene
PPDDT	p,p'-Dichlorodiphenyltrichloroethane
PPTDE	p,p'-Dichlorodiphenyldichloroethane

Sample information:

[illegible]

[illegible]

[illegible]

[illegible]

PR Details

Total amount to be dredged (wet tonnes)	295,500 in-situ
---	-----------------

Explanatory Notes:
The values entered for each determinand should be an average wet weight concentration from all the samples representing the material to be disposed to sea. They should be entered in the units stated in the Unit of measurement column in the table below.
Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

Average for the total dredge area:

Sample ID	Unit of measurement	
Total Solids	%	40.5
Gravel	%	0.3
Sand	%	37.9
Silt	%	61.8
Arsenic (As)	mg/kg	4.6
Cadmium (Cd)		0.04
Chromium (Cr)		15.4
Copper (Cu)		16.2
Mercury (Hg)		0.05
Nickel (Ni)		9.2
Lead (Pb)		9.2
Zinc (Zn)		33.8
Dibutyltin (DBT)		<0.005
Tributyltin (TBT)		0.009
Acenapth		3.82
Acenaphthylene		3.66
Anthracn		10.8
BAA	µg/kg	27.3
BAP		32
BBF		33.2
BEP		
Benzghip		30.4
BKF		18.4
C1N		
C1PHEN		
C2N		
C3N		
Chrysene		32.7
Debenzah		5.36
Flurant		54.1
Fluorene		4.71
Indypr		30
naph		8.67
perylene		
phenant		32.9
pyrene		56.1
THC		74080
PCB28		<0.08
PCB52		<0.08
PCB101		<0.08
PCB118		<0.08
PCB138		0.08
PCB153		<0.08
PCB18		
PCB105		
PCB110		
PCB128		
PCB141		
PCB149		
PCB151		
PCB156		
PCB158		
PCB170		
PCB180		<0.08
PCB183		
PCB187		
PCB194		
PCB31		
PCB44		
PCB47		
PCB49		
PCB66		
ICES7		0.43
AHCH		<0.1
BHCH		<0.1
GHCH		<0.1
DIELDRIN		0.11
HCB		<0.1
DDE		0.17
DDT		0.52
TDE		0.15
BDE100		
BDE138		
BDE153		
BDE154		
BDE17		
BDE183		
BDE209		
BDE28		
BDE47		
BDE66		
BDE85		
BDE99		

Comments:

Laboratory Details

Explanatory Notes:

Please complete a separate worksheet for each laboratory (e.g. complete 'Laboartory_1' worksheet for 1 laboratory and complete 'Laboartory_2' worksheet for a second laboratory). If there are more than 3 laboratories then please contact MS-LOT.

Laboratory 1 Details:

Laboratory name:	SOCOTEC
Year:	2022

LabRefMat	Q1	Does the laboratory carrying out the analyses undertake the analysis of blank samples and laboratory reference materials with each batch of samples of waste and other material dumped in the maritime area that is analysed by that laboratory?	Yes
CompAnal	Q2	Does the laboratory carrying out the analyses undertake periodic comparative analysis of laboratory reference materials and certified reference materials?	Yes
QAQC	Q3	Does the laboratory carrying out the analyses undertake the compilation of quality control charts based upon the data resulting from the analyses of the laboratory reference materials and certified reference materials, and the use of those quality control charts to monitor analytical performance in relation to all samples of dumped wastes or other materials?	Yes
InterlabCaleb	Q4	Does the laboratory carrying out the analyses undertake periodic participation in interlaboratory comparison exercises, including, where possible, international comparison exercises?	Yes
InternatCaleb	Q5	Does the laboratory carrying out the analyses undertake periodic participation in national and, where possible, international laboratory proficiency schemes?	Yes
SpikedSamples	Q6	If the answer to questions 4 or 5 is 'Yes' then does the laboratory analyse samples of substances which are provided by the organisers of the scheme?	Yes
BlindSamples	Q7	If the answer to questions 4 or 5 is 'Yes' then does the laboratory confirm that the composition of those samples is not disclosed in advance?	Yes
Ranking	Q8	If the answer to questions 4 or 5 is 'Yes' then does the laboratory confirm that the results of the scheme for each participating laboratory are made available to all participating laboratories?	Yes
FracAnal	Q9	Enter the size fraction that is analysed i.e. Whole or less than 63µm etc.	<63um(metals)
GranMeth	Q10	PSA method	NMBAQC
OCMeth	Q11	Organic Carbon method	carbonate removal and sulfurous acid/combustion at 1600°C/NDIR,
MetExtrType	Q12	Method of extraction used for metal analysis	Aquaregia
MethOfDetMetals	Q13	Method of detection used for metal analysis	ICP-MS
PAHExtrType	Q14	Method of extraction used for poly aromatic hydrocarbon analysis	Methanol/DCM solvent extraction with silica clean up and copper clean up stages
MethOfDetPAH	Q15	Method of detection used for poly aromatic hydrocarbons analysis	GCMS
OHExtrType	Q16	Method of extraction used for organohalogens inc PCBs, pesticides, flame retardants etc analysis	Ultrasonic acetone/hexane solvent extraction
MethOfDetOH	Q17	Method of detection used for organohalogens inc PCBs, pesticides, flame retardants etc analysis	GCMSMS

OTExtrType	Q18	Method of extraction used for organotin analysis	derivatisation and solvent extraction
MethOfDetOT	Q19	Method of detection used for organotin analysis	GCMS

		LOD/LOQ	Precision (%)	Recovery (%)
mg/kg	Hg	0.01	4.2	96
	As	0.5	2.7	93
	Cd	0.04	3.6	90
	Cu	0.5	2.9	97
	Pb	0.5	3	90
	Zn	2	2.6	92
	Cr	0.5	3.1	96
	Ni	0.5	3.6	95
	TBT	0.001	12.62	55
	DBT	0.001	12.62	63
µg/kg	PCB28	0.08	12.56	69
	PCB31			
	PCB44			
	PCB47			
	PCB49			
	PCB52	0.08	6.999	87
	PCB66			
	PCB101	0.08	8.43	77
	PCB105			
	PCB110			
	PCB118	0.08	14.61	113
	PCB128			
	PCB138+163	0.08	12.93	116
	PCB141			
	PCB149			
	PCB151			
	PCB153	0.08	7.41	94
	PCB156			
	PCB158			
	PCB170			
	PCB180	0.08	9.85	82
	PCB183			
	PCB187			
	PCB194			
	DDE	0.1	8.2	84
	DDT	0.1	10.6	70
	DDD	0.1	11	76
	Dieldrin	0.1	10.8	129
	Lindane	0.1	8.5	160
	HCB	0.1	2.8	104
	BDE17			
	BDE28			
	BDE47			
	BDE66			
	BDE85			
	BDE99			
	BDE100			
	BDE138			
	BDE153			
	BDE154			

BDE183			
BDE209			
ACENAPTH	1	6.68	79
ACENAPHY	1	7.74	116
ANTHRACN	1	4.95	83
BAA	1	9.8	73
BAP	1	9.07	74
BBF	1	8.44	69
BENZGHIP	1	13.46	82
BEP			
BKF	1	8.9	81
C1N			
C1PHEN			
C2N			
C3N			
CHRYSENE	1	7.87	78
DBENZA	1	19.23	70
FLUORENE	1	5.25	75
FLUORANT	1	4.36	81
INDPYR	1	17.1	74
NAPTH	1	3.02	80
PERYLENE			
PHENANT	1	5.41	77
PYRENE	1	4.29	84
THC	100	N/A	93

Appendix B

South Harbour 2022 sediment sampling results

Applicant Information

Applicant:	Aberdeen Harbour Board
Description of dredging:	Maintenance dredging South Harbour 2022
Total amount to be dredged (wet tonnes)	61000

Sample Details & Physical Properties

Explanatory Notes:

An example of a 'Dredge area' is: 'Dock A, Harbour X'
Provide description of the dredge area and the latitude and longitude co-ordinates (WGS84) for each sample location. Co-ordinates taken from GPS equipment should be set to WGS84.
Note for sample depth that the seabed is 0 metres.
Gravel is defined as >2mm, **Sand** is defined as >63um<2mm, **Silt** is defined as <63um).

Sample information:

	Sample ID	Dredge area	Latitude								Longitude								Type of sample	Sample depth (m)	Total solids (%)	Gravel (%)	Sand (%)	Silt (%)	TOC (%)	Specific gravity	Asbestos					
	AR01376.001 - A	South Harbour	5	7	°	0	8	.	0	9	7	'N	0	0	2	°	0	3	.	4	6	0	'W	Grab	0	91.9	68.1	24.7	7.2			No
	AR01376.002 - A	South Harbour	5	7	°	0	8	.	0	9	7	'N	0	0	2	°	0	3	.	0	1	5	'W	Grab	0	41.2	1.2	18.3	80.5		2.55	No
	AR01376.003 - A	South Harbour	5	7	°	0	8	.	0	4	1	'N	0	0	2	°	0	2	.	9	9	9	'W	Grab	0	40.9	0	10.4	89.6		2.43	No
	AR01376.004 - A	South Harbour	5	7	°	0	7	.	9	1	Ha	'N	0	0	2	°	0	2	.	8	1	5	'W	Grab	0	50.2	0	28.8	71.2		2.42	No
	AR01376.005 - A	South Harbour	5	7	°	0	7	.	9	4	4	'N	0	0	2	°	0	2	.	7	7	7	'W	Grab	0	67.9	0.2	87.1	12.7		2.66	No
	AR01376.006 - A	South Harbour	5	7	°	0	7	.	8	6	6	'N	0	0	2	°	0	2	.	7	6	3	'W	Grab	0	38.6	0	18.3	81.7		2.32	No
					°		.					'N				°		.				'W										
					°		.					'N				°		.				'W										
					°		.					'N				°		.				'W										
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					°		.																									

Trace Metals & Organotins

Explanatory Notes:

Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

Sample information:

[illegible]

Polyaromatic Hydrocarbons (PAH)

Explanatory Notes:

Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

Definitions:

ACENAPTH	Acenaphthene
ACENAPHY	Acenaphthylene
ANTHRACN	Anthracene
BAA	Benz(a)anthracene
BAP	Benzo(a)pyrene
BBF	Benzo(b)fluoranthene
BEP	Benzo(e)pyrene
BENZGHIP	Benzo(ghi)perylene
BKF	Benzo(K)fluoranthene
C1N	C1-naphthalenes
C1PHEN	C1-phenanthrene
C2N	C2-naphthalenes
C3N	C3-naphthalenes
CHRYSENE	Chrysene
DBENZAH	Diben(ah)anthracene
FLUORANT	Fluoranthene
FLUORENE	Fluorene
INDPYR	Indeno(1,2,3-cd)pyrene
NAPTH	Naphthalene
PERYLENE	Perylene
PHENANT	Phenanthrene
PYRENE	Pyrene
THC	Total Hydrocarbon Content

Sample information:

[illegible]

[illegible]

[illegible]

Organohalogens

Explanatory Notes:

Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red. ICES7 is the sum of PCB 28,52,101,138,153,180 and 118.

Definitions:

AHCH	alpha-Hexachlorcyclohexane
BHCH	beta-Hexachlorcyclohexane
GHCH	gamma-Hexachlorcyclohexane
DIELDRIN	Dieldrin
HCB	Hexachlorobenzene
PPDDE	p,p'-Dichlorodiphenyldichloroethylene
PPDDT	p,p'-Dichlorodiphenyltrichloroethane
PPTDE	p,p'-Dichlorodiphenyldichloroethane

Sample information:

[illegible]

[illegible]

[illegible]

[illegible]

PR Details

Total amount to be dredged (wet tonnes)	61000
---	-------

Explanatory Notes:
The values entered for each determinand should be an average wet weight concentration from all the samples representing the material to be disposed to sea. They should be entered in the units stated in the Unit of measurement column in the table below.
Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

Average for the total dredge area:

Sample ID	Unit of measurement	
Total Solids	%	55.1
Gravel	%	11.6
Sand	%	31.3
Silt	%	57.2
Arsenic (As)	mg/kg	3.8
Cadmium (Cd)		0.11
Chromium (Cr)		11.3
Copper (Cu)		9.5
Mercury (Hg)		0.02
Nickel (Ni)		7.3
Lead (Pb)		7.9
Zinc (Zn)		27.1
Dibutyltin (DBT)		<0.005
Tributyltin (TBT)		<0.005
Acenapth		2.29
Acenapthylene	µg/kg	3.19
Anthracn		6.84
BAA		17
BAP		21.6
BBF		23.5
BEP		
Benzghip		24.2
BKF		13.5
C1N		
C1PHEN		
C2N		
C3N		
Chrysene		18.7
Debenzah		4.19
Flurant		32.1
Fluorene		2.77
Indypr		24.6
naph		4.7
perylene		
phenant		17.7
pyrene		33.7
THC		104517
PCB28		<0.08
PCB52		0.09
PCB101		0.1
PCB118		0.09
PCB138		0.1
PCB153		0.1
PCB18		
PCB105		
PCB110		
PCB128		
PCB141		
PCB149		
PCB151		
PCB156		
PCB158		
PCB170		
PCB180		<0.08
PCB183		
PCB187		
PCB194		
PCB31		
PCB44		
PCB47		
PCB49		
PCB66		
ICES7		0.57
AHCH		<0.1
BHCH		<0.1
GHCH		<0.1
DIELDRIN		<0.1
HCB		<0.1
DDE		0.12
DDT		<0.1
TDE		<0.1
BDE100		
BDE138		
BDE153		
BDE154		
BDE17		
BDE183		
BDE209		
BDE28		
BDE47		
BDE66		
BDE85		
BDE99		

Comments:

Appendix C

Correspondence with ACC and Aberdeenshire Council regarding beach recharge

From: [Lee Watson](#)
To: [Katherine Holmes](#)
Cc: [Jonathan Duncan](#); [Gavin Penman](#)
Subject: RE: Aberdeen Harbour Board - dredged material
Date: 21 July 2022 09:42:17
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image007.png](#)
[image008.png](#)

Dear Katherine,

Thank you again for this offer.
However, I would confirm that we currently have no planned use for any dredged material.

Regards,
Lee Watson

Principal Engineer
Flood Risk & Coast Protection
Environment & Infrastructure Services
Aberdeenshire Council
Telephone – <REDACTED>

www.aberdeenshire.gov.uk

Follow us at:



From: Katherine Holmes <k-holmes@aberdeen-harbour.co.uk>
Sent: 19 July 2022 12:48
To: Lee Watson <<REDACTED>>
Cc: Jonathan Duncan <<REDACTED>>; Gavin Penman <<REDACTED>>
Subject: RE: Aberdeen Harbour Board - dredged material

Dear Lee,

We're preparing the application documents for a 3-year marine licence to deposit maintenance dredged material at the licensed sea deposit site that we've used for many years.

As in previous years (see below), could you please confirm whether Aberdeenshire Council has any use for dredged material over this timescale?

Many thanks,
Katherine

Katherine Holmes
Environmental Advisor
M: <REDACTED>

From: Lee Watson <<REDACTED>>
Sent: 19 August 2021 18:13
To: Katherine Holmes <K-Holmes@aberdeen-harbour.co.uk>
Cc: Scott Buchan <S-Buchan@aberdeen-harbour.co.uk>; Jonathan Duncan <<REDACTED>>; Gavin Penman <<REDACTED>> **Subject:** RE: Aberdeen Harbour Board - dredged material

Hello Katherine,

Hope you are keeping well.
I would confirm that our position has not changed and we currently have no use for any dredged material.

Thank you.

Regards,
Lee Watson

Principal Engineer
Flood Risk & Coast Protection
Infrastructure Services
Aberdeenshire Council
Telephone – <REDACTED>

www.aberdeenshire.gov.uk

Follow us at:



From: Katherine Holmes <K-Holmes@aberdeen-harbour.co.uk>
Sent: 19 August 2021 15:12
To: Lee Watson <<REDACTED>>
Cc: Scott Buchan <S-Buchan@aberdeen-harbour.co.uk>; Jonathan Duncan <<REDACTED>>; Gavin Penman <<REDACTED>>

Subject: RE: Aberdeen Harbour Board - dredged material

Dear Lee,

I hope you're well. It's that time of year again when we're applying to renew our marine licence application for depositing dredged material at sea.

Could you please let me know whether your position below remains the same regarding potential uses of the dredged material?

Many thanks,
Katherine

Katherine Holmes
Environmental Advisor

T: 01224 597000
M: <REDACTED>

From: Lee Watson <<REDACTED>>
Sent: 11 November 2020 11:48
To: Katherine Holmes <K-Holmes@aberdeen-harbour.co.uk>
Cc: Scott Buchan <S-Buchan@aberdeen-harbour.co.uk>; Jonathan Duncan <<REDACTED>>; Gavin Penman <<REDACTED>> **Subject:** RE: Aberdeen Harbour Board - dredged material

Dear Katherine,

Thank you for contacting me again. I would confirm that our position has not changed and we currently have no use for any dredged material. As below, we will contract you if we see a use emerge for this material.

Regards,
Lee Watson

Principal Engineer
Flood Risk & Coast Protection
Infrastructure Services
Aberdeenshire Council
Telephone – <REDACTED>

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From: Katherine Holmes <K-Holmes@aberdeen-harbour.co.uk>
Sent: 11 November 2020 10:43
To: Lee Watson <<REDACTED>>
Cc: Scott Buchan <S-Buchan@aberdeen-harbour.co.uk>
Subject: RE: Aberdeen Harbour Board - dredged material

Dear Lee,

You may recall we spoke back in 2018 about the potential use of dredged material from Aberdeen Harbour's annual maintenance dredging campaign for Aberdeenshire Council projects, for example coastal protection, beach recharge, construction projects etc. See email trail below for reference.

We are seeking to renew our marine licence with Marine Scotland and I would be grateful if you could please confirm whether your position below remains the same. If you do see a potential need for material within the next 18 months perhaps you could give me a call on <REDACTED> to discuss.

Many thanks in advance,
Katherine

Katherine (Harris) Holmes
Environmental Advisor

T: 01224 597000
M: <REDACTED>

From: Katherine Harris
Sent: 01 February 2018 23:37
To: Lee Watson <<REDACTED>> **Subject:** RE: Aberdeen Harbour Board - dredged material

Many thanks Lee, much appreciated.

Regards,
Katherine

From: Lee Watson [<mailto:lee.watson@aberdeenshire.gov.uk>]
Sent: 01 February 2018 13:58
To: Katherine Harris <K-Harris@aberdeen-harbour.co.uk>
Subject: FW: Aberdeen Harbour Board - dredged material

Dear Katherine,

Further to our telephone conversation earlier today, I would confirm that we have no change in opinion from that stated in our previous letter dated 15 July 2015. We currently have no use for any dredged material.

Thank you for contacting us again regarding this matter.

Regards,
Lee Watson

Principal Engineer
Flood Risk & Coast Protection
Infrastructure Services
Aberdeenshire Council
Telephone – <REDACTED>

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From: Katherine Harris [<mailto:K-Harris@aberdeen-harbour.co.uk>]
Sent: 01 February 2018 09:44
To: Lee Watson <<REDACTED>>
Subject: Aberdeen Harbour Board - dredged material

Dear Lee,

Good to talk to you just now. As discussed, I'd be grateful if you could confirm by return of email that Aberdeenshire Council's position has not changed since Joanna's attached letter dated 15 July 2015 – i.e. you do not have any current plans that would make use of dredged material.

Many thanks,
Katherine

Katherine Harris
Aberdeen Harbour Board
16 Regent Quay
Aberdeen, AB11 5SS
Tel: 01224 597000
Mob: <REDACTED>



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From: Katherine Holmes
To: James Howden
Subject: RE: AHB 2020 Dredging Docs
Date: 26 July 2022 11:55:00

Dear James,

Many thanks for taking my call just now. To summarise:

- HaskoningDHV continue to investigate options to combat lowering of sand levels on Aberdeen Beach, but no definitive schemes have been put forward at this time.
- It's unlikely that ACC will have a use for dredge material to recharge the beach within the next 12 months, possibly longer.
- If any beach recharge schemes are taken forward, ACC would need to assess any proposals to use dredged material for its suitability and cost-effectiveness, compared to other sources of material.

Let's stay in touch and if the situation changes, we'd welcome further discussions on ACC's potential use of dredged material.

Best wishes,
Katherine

From: Katherine Holmes
Sent: 19 July 2022 13:02
To: 'James Howden' <<REDACTED>>
Subject: RE: AHB 2020 Dredging Docs

Dear James,

We last spoke on 12 October following our email exchange below about the potential use of dredged material for recharge at Aberdeen Beach. To summarise our discussion at that time:

- ACC had observed an overall lowering of sand levels on Aberdeen Beach around the rock groynes and had commissioned HaskoningDHV to examine all options to combat this, including hard engineering defences on and offshore, beach recharge and a 'sand engine' approach.
- We discussed your suggestion below to deposit dredged material in the nearshore area off the beach (as near as the dredger could achieve through bottom-dumping) where it could (theoretically) move up onto the beach through natural coastal processes. This would require a new sea deposit site to be designated.
- Port of Aberdeen would support beneficial uses of dredged material, although we would consider the designation of a new sea deposit site to fall under ACC's responsibility as the coastal defence authority.

We were due to catch up after you'd had another meeting with HaskoningDHV, but I don't think we took it any further.

We're currently preparing the application documents for a 3-year marine licence to deposit maintenance dredged material at the sea deposit site we've used for many years, so it'd be useful to understand your current position/plans. I'd be grateful if you could give me an update please, either by email or we can arrange a call if you prefer.

Many thanks,
Katherine

Katherine Holmes
Environmental Advisor
M: <REDACTED>

From: James Howden <<REDACTED>>
Sent: 12 October 2021 12:00
To: Katherine Holmes <K-Holmes@aberdeen-harbour.co.uk>
Subject: RE: AHB 2020 Dredging Docs

Thanks Katherine

I have arranged a teams meeting with HaskoningDHV for Friday.

If you'd like to have a quick chat in the meantime please feel free to call on phone or MS teams.

It might be useful for us also to discuss what AHB would like to see happening with the dredgings and how you see this being taken forward. For example, would AHB be open to the idea of the clean dredgings being deposited at a point off the city coastal frontage, north of the harbour? As stated in your 2021 BPEO doc, its unlikely that delivery to the shore (as would normally be the case for a beach nourishment) would be justifiable in terms of cost. However it may be practicable to bottom-dump the cleaner dredgings at a location/s where tidal action is likely to transport these in a manner favourable to beach levels.

It would also be useful to understand your timeframe for licencing and dredging.

Kind regards,



James Howden | Engineer
Aberdeen City Council | Operations
| Structures, Flooding & Coastal Engineering | Projects
2nd Floor West Marischal College | Broad Street | Aberdeen | AB10 1AB

Direct dial: <REDACTED>

<REDACTED>
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From: Katherine Holmes <K-Holmes@aberdeen-harbour.co.uk>
Sent: 12 October 2021 11:32
To: James Howden <<REDACTED>>
Cc: Scott Buchan <S-Buchan@aberdeen-harbour.co.uk>; Ian Taylor <I-Taylor@aberdeen-harbour.co.uk>

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