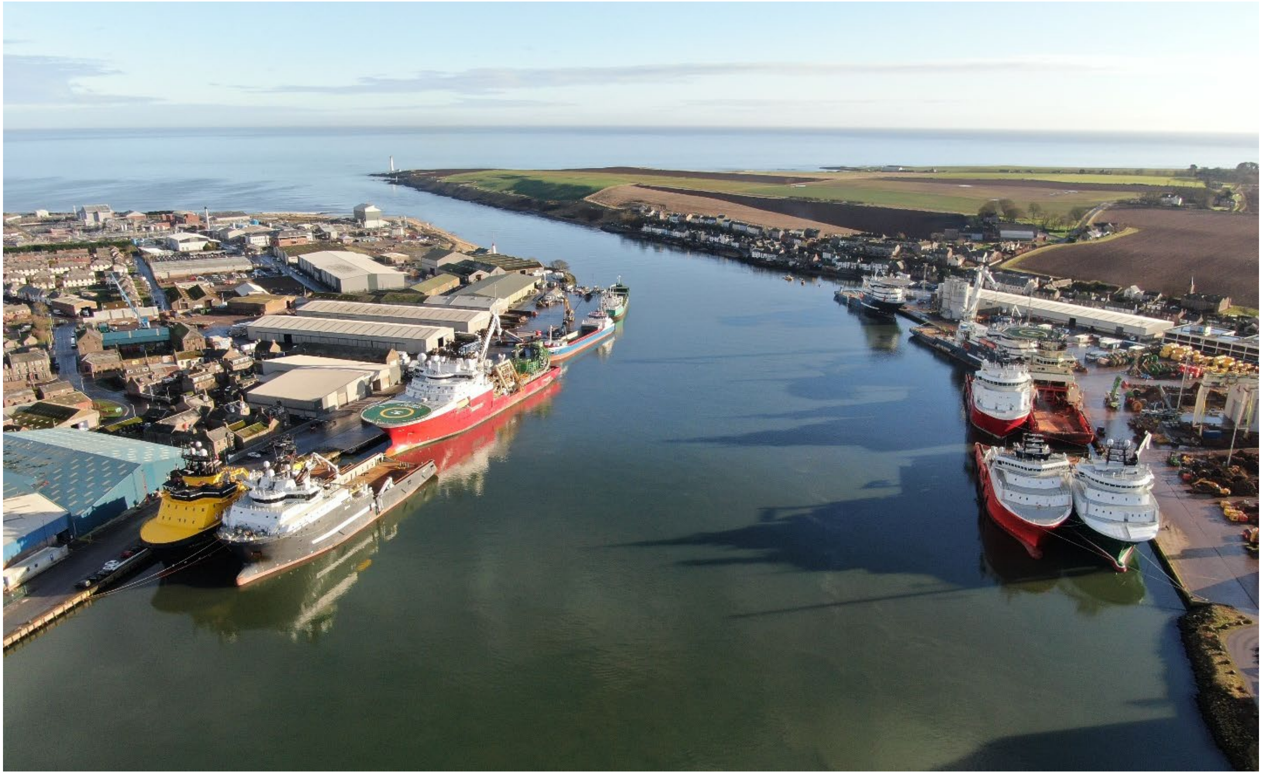


# Best Practicable Environmental Option Assessment

## Montrose Port Authority Maintenance Dredging

## September 2024

HARRIS HOLDEN

# Contents



# Appendices



# Document history

| Version | Date | Notes |
|---|---|---|
| P2018-18-BPEO-R1 | 27 July 2021 | Draft issued for review |
| P2018-18-BPEO-R2 | 4 August 2021 | Final issue |
| P2018-18-BPEO-R3 | 12 October 2021 | Updated following discussions with Angus Council |
| P2018-18-BPEO-R4 | 11 July 2022 | Updated for 2022 marine licence application |
| P2018-18-BPEO-R5 | 11 Sept 2024 | Updated for 2024 marine licence application |

# 1. Introduction

Montrose Port is a leading support, logistics and service hub for the North Sea energy industry and the general cargo market.

As a statutory harbour authority of a Trust Port, Montrose Port Authority (MPA) undertakes regular maintenance dredging of the navigation channels and berths (shown on Figure 1) to maintain safe navigable depths and support customers' business needs. MPA has powers to dredge under the Montrose Harbour Acts and Orders 1837 to 2003, subject to consent from Scottish Ministers. For over 30 years, dredged material has been deposited at the sea disposal site Montrose FO 010 (Lunan Bay) as authorised by a marine licence from Marine Directorate – Licensing Operations Team (MD-LOT). Since 2020, trial deposits have also taken place at a new site in Montrose Bay.

This report presents the Best Practicable Environmental Option (BPEO) assessment for material arising from maintenance dredging activity within MPA's port limits. 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.

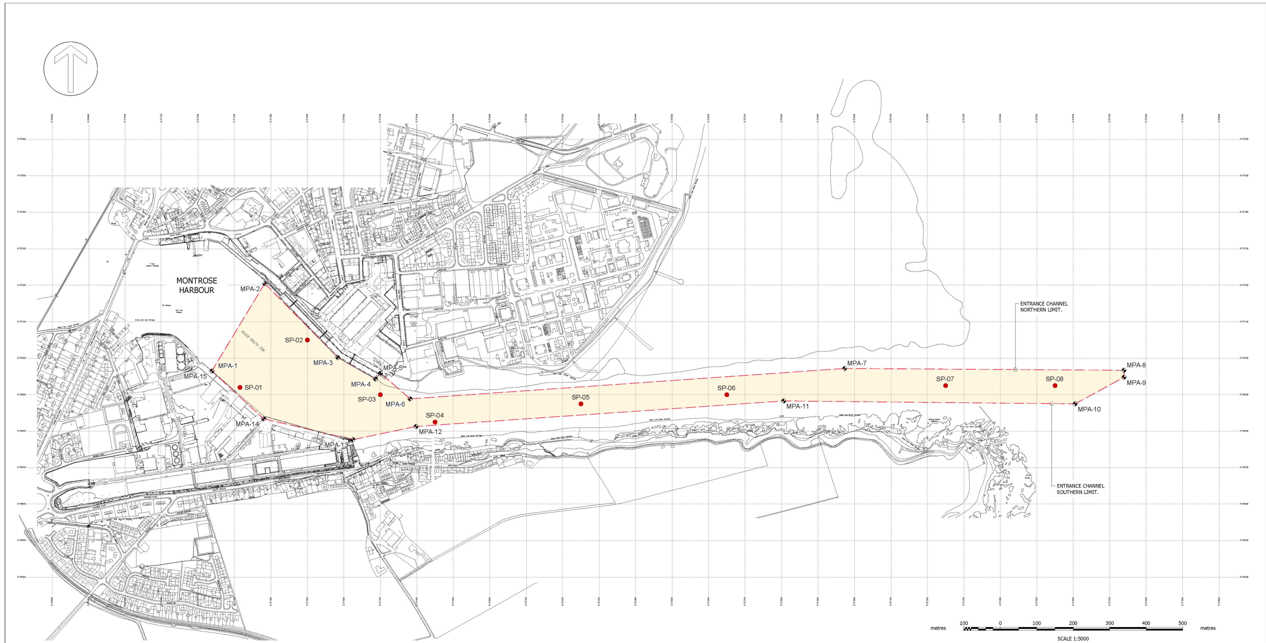
# 2. Description of dredging activity and dredged material

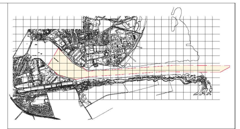
## 2.1. Dredging activity

Maintenance dredging is carried out to remove fluvial silt and fine sand from the inner harbour, and sand from the navigation channel which is typically transported into the harbour during easterly storms. Dredging occurs for approximately 15 days per year, split between up to three campaigns per annum. Dredging is responsive depending on the rate of accretion, as measured by regular bathymetric surveys. During a severe easterly storm, navigational depth can be lost very quickly: for example, in 2014 2.2 m of depth was lost in 4 days.

Dredging is typically undertaken using a trailer suction hopper dredger (TSHD) with a hopper capacity of approximately 2,500 $m^3$. Each dredging campaign usually takes place over 4 to 7 days of neap tides when current speeds are lower: the South Esk is one of the fastest flowing rivers in the UK, making it challenging to dredge effectively or safely during flood tides.

Since 2014 the average annual maintenance dredging volume has been approximately 117,000 wet tonnes, varying from no dredging in 2013 to approximately 195,000 wet tonnes in both 2016 and 2023.



KEY PLAN
(scale 1:20,000)

LEGEND :-

DEPTHS RELATIVE TO CHART DATUM.
EXISTING SEA-BED CONTOUR BETWEEN 7.5m to 5.5m RELATIVE TO CHART DATUM.
ENTRANCE CHANNEL LIMITS : 50 metres WIDE
SP-01 ● SAMPLING POINT LOCATION. REFERENCE - SP-01 to SP-08

Heights in metres above Chart Datum (Montrose)

| MHWS | MHWN | MLWN | MLWS |
|---|---|---|---|
| 4.9 | 3.8 | 1.9 | 0.8 |



NOTES :-

1. All dimensions are in metres unless noted otherwise.
2. All levels are given in metres above admiralty chart datum unless noted otherwise.

## HARBOUR ENTRANCE CHANNEL SAMPLING PLAN - 2024

(SCALE 1:5000)

DREDGE BOUNDARY AREA COORDINATES

| Boundary Point | Easting / Northing | | Latitude/Longitude | | Remarks |
|---|---|---|---|---|---|
| | Easting | Northing | Latitude | Longitude | |
| MPA-01 | 371238 | 756965 | 56 42.21 N | 2 28.28W | |
| MPA-02 | 371383 | 757205 | 56 42.34 N | 2 28.14 W | |
| MPA-03 | 371583 | 757002 | 56 42.23N | 2 27.94W | |
| MPA-04 | 371687 | 756943 | 56 42.20N | 2 27.84W | |
| MPA-05 | 371700 | 756959 | 56 42.21N | 2 27.83W | |
| MPA-06 | 371782 | 756889 | 56 42.17N | 2 27.75W | |
| MPA-07 | 372973 | 756972 | 56 42.22 N | 2 26.58 N | |
| MPA-08 | 373739 | 756967 | 56 42.22 N | 2 25.83 N | |
| MPA-09 | 373739 | 756948 | 56 42.21 N | 2 25.83 N | |
| MPA-10 | 373605 | 756875 | 56 42.17 N | 2 25.96 N | |
| MPA-11 | 372901 | 756898 | 56 42.18 N | 2 26.65 N | |
| MPA-12 | 371798 | 756813 | 56 42.13 N | 2 27.73 W | |
| MPA-13 | 371625 | 756777 | 56 42.11 N | 2 27.90 W | |
| MPA-14 | 371380 | 756834 | 56 42.14 N | 2 28.14 W | |
| MPA-15 | 371238 | 756965 | 56 42.21 N | 2 28.28 W | |

ENTRANCE CHANNEL SAMPLING POINT COORDINATES

| Sampling Point | Easting / Northing | | Latitude/Longitude | | Remarks |
|---|---|---|---|---|---|
| | Easting | Northing | Latitude | Longitude | |
| SP-01 | 371315 | 756920 | 56 42.19 N | 2 28.21 W | |
| SP-02 | 371500 | 757050 | 56 42.26 N | 2 28.00 W | |
| SP-03 | 371700 | 756900 | 56 42.18 N | 2 27.83 W | |
| SP-04 | 371850 | 756825 | 56 42.14 N | 2 27.68 W | |
| SP-05 | 372250 | 756875 | 56 42.17 N | 2 27.29 W | |
| SP-06 | 372650 | 756900 | 56 42.18 N | 2 26.90 W | |
| SP-07 | 373250 | 756925 | 56 42.20 N | 2 26.31 W | |
| SP-08 | 373550 | 756925 | 56 42.20 N | 2 26.02 W | |

| REV | DATE | REVISION | DRN | CHK |
|---|---|---|---|---|



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PROJECT :
MONTROSE PORT AUTHORITY
Maintenance Dredging Application 2024

TITLE :
HARBOUR ENTRANCE CHANNEL
SAMPLING PLAN - 2024

| DRAWN : | DATE : | CHECKED : | APPROVED : |
|---|---|---|---|
| K.M. | 19.06.24 | C.S. | 19.06.24 |

SCALE : (A1) 1:5000
DRAWING STATUS : INFORMATION
DRAWING No : 244009 - 001
REV : -

Figure 1 Dredge area and 2024 sampling plan

## 2.2. *Material to be dredged*

### 2.2.1. Physical characteristics

Sediment sampling has been undertaken periodically for many years to support marine licence applications to deposit dredged material at sea. Analysis of sediment samples collected between 2012 and 2024 reveals that in the navigation channel the dredged material is predominantly sand (up to 99%) whereas within the inner harbour the material is more mixed, comprising approximately 38% silt/clay, 54% sand and 8% gravel.

### 2.2.2. Chemical characteristics

The chemical analysis results of sediment samples collected between 2012 and 2024 have been compared to the Marine Directorate Revised Action Levels, which are used to determine the contaminant loading of the material and its suitability for deposition at sea. The results from samples taken in 2012, 2013 and 2014 are briefly summarised below, and the results from samples taken post-2018 are described in greater detail as they are considered more representative of the material to be dredged.

**2012, 2013 and 2014 samples**

Sediment samples from 2012 revealed no contaminant concentrations greater than Revised Action Level 1 for heavy metals, tributyltin (TBT), polychlorinated biphenyls (PCBs) or polycyclic aromatic hydrocarbons (PAHs). In 2013, a small amount of TBT was recorded within a berth sample along with the PAH Anthracene, but these only marginally exceeded Revised Action Level 1. The samples from 2014 indicated a small elevation in concentrations of PAHs and heavy metals (mainly lead and zinc), but again only marginally exceeding Revised Action Level 1, with no other contaminant elevations of concern.

**2018 samples**

Ten sediment samples collected in January 2018 revealed no elevations above Revised Action Level 1 for TBT, PAHs and PCBs. Some heavy metals marginally exceeded Revised Action Level 1 at Berth 1 (chromium (61.5 µg/kg); copper (47.3 µg/kg); and nickel (57.8 µg/kg) but the results were well below Revised Action Level 2.

**2021 samples**

Four sediment samples collected in March 2021 revealed no elevations above Revised Action Level 1 for heavy metals, organotins, PAHs or PCBs.

**2024 samples**

Eight sediment samples collected in July 2024 (results in Appendix A) revealed levels of chromium, copper and nickel elevated above Revised Action Level 1 in samples SP01 (within the harbour basin), but well below Revised Action Level 2. Sample SP03 (within the harbour basin) revealed levels of Dibenzo[a,h]anthracene and total hydrocarbons above Revised Action Level 1.

All other contaminants were below Revised Action Level 1. [Note that there are some glitches in the MD-LOT spreadsheet that flag some results as being over Revised Action Level 2 when they are not.]

# 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 Section 4.

## 3.1. Option 1: Landfill

Disposal of dredged material within landfill sites is unusual; if it does occur, it is typically used as capping or restoration material. Material would need to be brought ashore within the port estate and dewatered before being transferred 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 sites in the immediate vicinity of Montrose Port that could cope with a large volume of material on an annual basis. The closest operational landfill site to the port is the Prettycur Landfill, approximately 7.5 km to the north by road (Scottish Environment Protection Agency (SEPA), 2021).

Existing landfill sites must cope with large volumes of domestic and industrial waste, 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 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 is considered chemically suitable for deposition at sea (see Section 2.2.2).

Deposit sites in the marine environment are designated by MD-LOT. The closest licensed sea deposit site to Montrose Port is Montrose FO 010 (Lunan Bay). Dredged material from Montrose Port has been deposited at this site using a split hopper barge for over 30 years. A new deposit site has been proposed within Montrose Bay and trial deposits have been taking place at the site since 2020.

This option is considered feasible and 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 dredged material within the navigation channel may be suitable for land reclamation due to its high sand content (see Section 2.2.1) but the material in the inner harbour has a higher clay/silt content and so is unlikely to be suitable.

No land reclamation projects have been identified within the Port of Montrose or the local area which require dredged material for land reclamation purposes. This option is therefore discounted for the 2024 marine licence application; however, the sand and gravels dredged from the navigation channel may be suitable for future land reclamation projects 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 dewatering and storage challenges previously identified makes this option uneconomical and impractical.

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 is typically deposited direct from a 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.

## 3.7. 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 for strategic, environmental and financial considerations.

## 4.1. Assessment methodology

MD-LOT's general licensing guidance (MD-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**

The closest licensed sea deposit site to Montrose Port is Montrose FO 010 (Lunan Bay). Dredged material from Montrose Port has been deposited at this site for over 30 years.

MPA is working in collaboration with MD-LOT, NatureScot and Angus Council to characterise a new deposit site within Montrose Bay. The aspiration is that deposition at the new site would retain material in the nearshore area so that it may contribute to protecting the beach and dune system, although the processes influencing coastal erosion are wide-ranging and complex, and it is not universally accepted that maintenance dredging within Montrose Port is a significant contributing factor (ABPmer, 2019a).

Following trial deposits at the Montrose Bay site since 2020, increased accretion has been observed in the Montrose Port navigation channel which has required additional dredging and/or management of reduced depths in the channel. As it is unusual for the channel to accrete rapidly after maintenance dredging, when there have not been significant northerly/easterly storms, MPA has agreed with MD-LOT that trial deposits will continue at the Montrose Bay site whilst additional data is gathered on accretion rates in the navigation channel.

**Legislative implications**

MPA has powers to dredge under the Montrose Harbour Acts and Orders 1837 to 2003, provided that the activity is approved by the Scottish Ministers. A marine licence is required from MD-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.

**Pollution/contamination implications**

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

**Interference with other legitimate interests**

The Lunan Bay and Montrose Bay sea deposit sites are 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, MPA 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 the site. The Lunan Bay site has been in use for many years and is subject to regular deposition of material, so 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 drop-down video (DDV) survey of the Montrose Bay deposit site was carried out in January 2022 (Clydeside Surveys, 2022). The visibility was poor so the outputs of the DDV were limited. The grab sample results were consistent across all six locations, being fine-medium sand with shell fragments. No features of ecological interest were identified that would be adversely affected by deposition of dredged material.

A dedicated Marine Mammal Observer (MMO) watch is kept by a nominated crew member on the dredging vessel, following the general guidance for and acting in the role of MMO, to ensure that there are no marine mammals within 500 m prior to deposit operations. If marine mammals are observed, deposit operations are stopped until the area is clear for at least 20 minutes.

## 4.3. *Beach recharge*

### 4.3.1. Strategic considerations

**Operational considerations**

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 the 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. This could not be achieved using the current dredging equipment (see Section 2.1); a smaller dredger would be required.

Both the pipeline and rainbowing methods take significantly longer to discharge than the open water bottom-dumping method. Due to the tidal restrictions on the dredging operation (as described in Section 2.1), for a typical dredging campaign it would not be possible to complete the dredging and beach discharge operation over a single neap tidal cycle. As such, dredging would need to be split over two neap tidal cycles, which would require the dredger to demobilise and return to Montrose Port on a future neap tidal cycle. Operationally, this is considerably less efficient than the existing dredging regime. As dredging equipment is usually in high demand in Scotland, it may be challenging to secure the return of a dredging vessel two weeks after its departure.

Maintenance dredging at Montrose Port is typically reactive: bathymetric surveys identify when navigable depths are reduced, which triggers a dredging campaign. If the dredging is split over two neap tidal cycles as described above, navigable depths may be compromised in the intervening period, which may restrict MPA’s operations and ultimately cause a hazard to navigation.

As described in Section 2.2.1, the material dredged from the navigation channel is predominantly sand, which is suitable for beach recharge. Material dredged from the inner harbour is less likely to be suitable for beach recharge due to the higher silt/clay content (average 38%).

**Availability of suitable sites**

Montrose Beach, immediately north of Montrose Port, is a potentially suitable reception site for a beach recharge operation. Coastal erosion, beach and sand dune recession has occurred throughout Montrose Bay in common with much of Eastern Scotland. Shoreline change analysis back to 1903 has identified morphological variability across Montrose Bay through time, with both phases of erosion and accretion (ABPmer, 2019a). The overall trend across the Bay is erosion. Erosion (represented by recession of the dune front) has dominated during the last 30 years in the area of the Montrose Golf Links.

Angus Council are planning to import 100,000m$^3$ of sand to replenish the dune system at Montrose Beach in 2025. It is highly unlikely that this volume of material would be available from MPA's maintenance dredging, in a timescale that meets the requirements of the replenishment project. MPA is liaising with Angus Council to explore the potential to use MPA's dredged material for future 'topping-up' replenishment, which MPA supports provided it can be managed to meet the operational dredging requirements.

No other suitable beach recharge schemes/sites have been identified within the timeframe of the proposed marine licence.

**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 separate 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 for use of 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, 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, so the risk of pollution/contamination of the beach environment is very low.

**Interference with other legitimate interests**

As described above, during the beach recharge operation it would be necessary to restrict access to areas of Montrose Beach and the inshore waters around the dredger. This is unlikely to be a significant concern due to the short-term nature of the operation and the wider perceived benefit to the local community of recharging an eroding beach.

**Amenity/aesthetic implications**

The beach provides a valuable local amenity. As described above, it would be necessary to cordon off areas of the beach during the recharge operation. This is unlikely to be a significant concern due to the short-term nature of the operation and the wider perceived benefit to beach users of recharging an eroding beach.

**Ecological Implications**

There are no significant ecological issues associated with using dredged material for beach recharge. It is preferable for the source material to match the existing beach material, so material from the inner harbour is less likely to be suitable due to the higher silt/clay content (average 38%).

## *4.4. Operational cost evaluation*

Table 1 is reproduced from the 2019 BPEO Assessment (ABPmer, 2019b), and provides an estimate of the relative operating costs of deposition at sea and beach recharge. For beach recharge, two sub-options are presented: material pumped ashore by pipeline attached to the dredging vessel; and material 'rainbowed' ashore from the dredging vessel.

Dredging costs can vary considerably year-to-year depending on dredger availability, fuel prices and other factors, so Table 1 presents a range of estimated operating costs based on ABPmer's knowledge of the UK dredging industry.

The comparison in Table 1 does not capture the increased mobilisation/demobilisation costs if the dredger were required to carry out the dredging campaign over two separate neap tidal cycles during beach recharge, as described in Section 4.3.1. It excludes the Crown Estate royalties payable by the end user (likely to be Angus Council) for use of dredged material for beach recharge. For deposition at sea, it excludes the capital costs of characterising a new sea deposition site within Montrose Bay (see Section 4.2.1).

Table 1 Comparison of dredging operating costs

| Activity | Cost per m³ | | |
|---|---|---|---|
| | Deposition at sea | Beach recharge | |
| | | Material pumped ashore | Material rainbowed ashore |
| Dredging | £2 - £4 | £2.50 - £5 | £3 - £6 |
| Pumping ashore | n/a | £5 - £8 | £12 - £14 |
| Mooring and floating pipe infrastructure: deployment and removal | n/a | £5 - £10 | n/a |
| Beach profiling | n/a | £2 | £2 |
| ***TOTAL*** | ***£2 - £4*** | ***£14.50 - £25*** | ***£17 - £22*** |

# 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 allows the dredging to be completed within a single neap tidal cycle, maintains the maximum flexibility in terms of dredging equipment that can be used, and utilises existing sea deposit sites. Recent discussions with Angus Council have confirmed that they are not likely to use maintenance dredged material for recharging the Montrose beach/dune system in the foreseeable future.

Environmentally, beach recharge is the preferred option according to the waste hierarchy as it uses a material that would otherwise be disposed. No significant adverse environmental impacts are predicted from either option. Neither option would be likely to cause significant safety, public health, amenity or pollution/contamination issues.

Financially, the costs are in the region of 6-7 times greater for beach recharge than for deposition at sea.

Considering all three aspects, sea deposition of dredged material is the BPEO.

# 6. References

ABPmer (2019a). Coastal Process Assessment – Montrose and Surrounding Coastline - 2019. ABPmer Report R2848a.

ABPmer (2019b). Maintenance Dredging Best Practicable Environmental Option Assessment. ABPmer Report R2919a.

Clydeside Surveys (2022) Montrose Bay drop down video and grab sampling survey. T4590.

MD-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 (2021) https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/ [accessed 20 July 2021].

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
# 2024 sediment sampling results

a b

# Pre-disposal Sampling Results Form

Version 2 - June 2017

This form should be used to submit the results from your pre-disposal sampling plan.
Full information must be provided in all relevant sheets of this workbook. The blue cells in each worksheet indicate where information can be entered.
Where information cannot be provided, or where there are more than 30 samples required, please contact the Marine Scotland - Licensing Operations Team (MS-LOT) using the contact details below.

Once you have completed this form, send it (including any reference number for the dredging and sea disposal marine licence application in the subject header of your email) to the following email address:
ms.marinelicensing@gov.scot

If you have any questions in relation to this form contact MS-LOT:

Marine Scotland - Licensing Operations Team
Marine Laboratory
375 Victoria Road
Aberdeen, AB11 9DB

01224 295579
ms.marinelicensing@gov.scot

## Applicant Information

| | |
|---|---|
| Applicant: | Montrose Port Authority |
| Description of dredging: | Maintenance |
| Total amount to be dredged (wet tonnes) | 246000 |

## 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-oridnates (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 deinfed 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP01 | Entrance Channel | 56 ° 42 . 185 'N | - 02 ° 28 . 205 'W | Grab | 0.0 - 0.15 | 66.8 | 7.31 | 2.37 | 90.32 | 0.18 | | No |
| SP02 | Entrance Channel | 56 ° 42 . 256 'N | - 02 ° 28 . 024 'W | Grab | 0.0 - 0.15 | 73.4 | 3.12 | 86.73 | 10.16 | 0.08 | | No |
| SP03 | Entrance Channel | 56 ° 42 . 193 'N | - 02 ° 27 . 819 'W | Grab | 0.0 - 0.15 | 45.1 | 0.26 | 32.88 | 66.86 | 1.86 | | No |
| SP04 | Entrance Channel | 56 ° 42 . 136 'N | - 02 ° 27 . 680 'W | Grab | 0.0 - 0.15 | 72.6 | 0.61 | 94.07 | 5.32 | 0.14 | | No |
| SP05 | Entrance Channel | 56 ° 42 . 165 'N | - 02 ° 27 . 288 'W | Grab | 0.0 - 0.15 | 74.9 | 0 | 97.16 | 2.84 | 0.09 | | No |
| SP06 | Entrance Channel | 56 ° 42 . 195 'N | - 02 ° 26 . 900 'W | Grab | 0.0 - 0.15 | 79.6 | 0.12 | 97.23 | 2.65 | 0.09 | | No |
| SP07 | Entrance Channel | 56 ° 42 . 195 'N | - 02 ° 26 . 309 'W | Grab | 0.0 - 0.15 | 75.6 | 1.94 | 95.14 | 2.92 | 0.08 | | No |
| SP08 | Entrance Channel | 56 ° 42 . 196 'N | - 02 ° 26 . 015 'W | Grab | 0.0 - 0.15 | 82.7 | 1.96 | 93.27 | 4.77 | 0.15 | | No |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |
| | | ° . 'N | ° . 'W | | | | | | | | | |

**Trace Metals & Organotins**

**Explanatory Notes:**
Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

**Sample information:**

| | | Type of | Sample depth | mg/kg dry weight | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | Dredge area | sample | (m) | Arsenic (As) | Cadmium (Cd) | Chromium (Cr) | Copper (Cu) | Mercury (Hg) | Nickel (Ni) | Lead (Pb) | Zinc (Zn) | Dibutyltin (DBT) | Tributyltin (TBT) |
| SP01 | Entrance Channel | Grab | 0.0 - 0.15 | 16.6 | 0.15 | 68.1 | 55.1 | 0.03 | 59.2 | 14.4 | 116 | <0.005 | <0.005 |
| SP02 | Entrance Channel | Grab | 0.0 - 0.15 | 5 | <0.04 | 12.1 | 5.5 | 0.01 | 1.7 | 4.4 | 21.2 | <0.001 | <0.001 |
| SP03 | Entrance Channel | Grab | 0.0 - 0.15 | 9.9 | 0.2 | 36.7 | 18.5 | 0.08 | 26.5 | 22.1 | 80.8 | <0.005 | <0.005 |
| SP04 | Entrance Channel | Grab | 0.0 - 0.15 | 9.2 | 0.3 | 31.6 | 12.1 | 0.02 | 25.6 | 13.2 | 55.8 | <0.001 | <0.001 |
| SP05 | Entrance Channel | Grab | 0.0 - 0.15 | 8.5 | <0.04 | 18.6 | 9.9 | 0.1 | 16.9 | 7 | 29.1 | <0.001 | <0.001 |
| SP06 | Entrance Channel | Grab | 0.0 - 0.15 | 9.9 | <0.04 | 24 | 9.3 | 0.02 | 21.6 | 9.5 | 40.2 | <0.001 | <0.001 |
| SP07 | Entrance Channel | Grab | 0.0 - 0.15 | 9.2 | 0.05 | 21.6 | 8.8 | 0.02 | 19.4 | 7.7 | 38.8 | <0.001 | <0.001 |
| SP08 | Entrance Channel | Grab | 0.0 - 0.15 | 9.3 | <0.04 | 21.1 | 9.5 | 0.03 | 18.3 | 7.3 | 30.8 | <0.001 | <0.001 |
| 0 | 0 | 0 | 0 | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | |

**Polyaromatic Hydrocarbons (PAH)**

**Explanatory Notes:**
Results above Action Level 1 will be highlighted in blue

**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:**

| | | Type of | Sample depth | μg/kg | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | Dredge area | sample | (m) | ACENAPTH | ACENAPHY | ANTHRACN | BAA | BAP | BBF | BEP | BENZGHIP | BKF | C1N | C1PHEN | C2N | C3N | CHRYSENE | DBENZAH | FLUORANT | FLUORENE | INDPYR | NAPTH | PERYLENE | PHENANT | PYRENE | THC |
| SP01 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | | | | | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | 9610 |
| SP02 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | | | | | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | 3710 |
| SP03 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | 18.3 | 14.1 | 30.9 | 39.5 | 55.8 | | 58.1 | 49.7 | | | | | 36.9 | 12.8 | 67.4 | 20.3 | 60.5 | 39.4 | | 43.3 | 65.4 | 119000 |
| SP04 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | | | | | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | 5420 |
| SP05 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | | | | | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | 2420 |
| SP06 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | | | | | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | 5610 |
| SP07 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | | | | | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | 2020 |
| SP08 | Entrance Channel | Grab | 0.0 - 0.15 | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | | | | | <5 | <5 | <5 | <5 | <5 | <5 | | <5 | <5 | 4520 |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
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| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | |

## 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'-Dichorodiphenyldicloroethylene |
| PPDDT | p,p'-Dichorodiphenyltrichloroethane |
| PPTDE | p,p'-Dichorodiphenyldicloroethane |

**Sample information:**

µg/kg

| Sample ID | Dredge area | Type of sample | Sample depth (m) | PCB28 | PCB52 | PCB101 | PCB118 | PCB138 | PCB153 | PCB18 | PCB105 | PCB110 | PCB128 | PCB141 | PCB149 | PCB151 | PCB156 | PCB158 | PCB170 | PCB180 | PCB183 | PCB187 | PCB194 | PCB31 | PCB44 | PCB47 | PCB49 | PCB66 | ICES7 | AHCH | BHCH | GHCH | DIELDRIN | HCB | DDE | DDT | TDE | BDE100 | BDE138 | BDE153 | BDE154 | BDE17 | BDE183 | BDE209 | BDE28 | BDE47 | BDE66 | BDE85 | BDE99 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP01 | Entrance Channel | Grab | 0.0 - 0.15 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | | | | | | | | | | | <0.08 | | | | | | | | | <0.56 | | | | | | | | | | | | | | | | | | | | |
| SP02 | Entrance Channel | Grab | 0.0 - 0.15 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | | | | | | | | | | | <0.08 | | | | | | | | | <0.56 | | | | | | | | | | | | | | | | | | | | |
| SP03 | Entrance Channel | Grab | 0.0 - 0.15 | 0.33 | 0.34 | 0.68 | 0.91 | 0.79 | 0.74 | | | | | | | | | | | 0.56 | | | | | | | | | 4.35 | | | | | | | | | | | | | | | | | | | | |
| SP04 | Entrance Channel | Grab | 0.0 - 0.15 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | | | | | | | | | | | <0.08 | | | | | | | | | <0.56 | | | | | | | | | | | | | | | | | | | | |
| SP05 | Entrance Channel | Grab | 0.0 - 0.15 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | | | | | | | | | | | <0.08 | | | | | | | | | <0.56 | | | | | | | | | | | | | | | | | | | | |
| SP06 | Entrance Channel | Grab | 0.0 - 0.15 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | | | | | | | | | | | <0.08 | | | | | | | | | <0.56 | | | | | | | | | | | | | | | | | | | | |
| SP07 | Entrance Channel | Grab | 0.0 - 0.15 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | | | | | | | | | | | <0.08 | | | | | | | | | <0.56 | | | | | | | | | | | | | | | | | | | | |
| SP08 | Entrance Channel | Grab | 0.0 - 0.15 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | <0.08 | | | | | | | | | | | <0.08 | | | | | | | | | <0.56 | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## PR Details

| Total amount to be dredged (wet tonnes) | 246000 |
|---|---|

**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 | % | 71.3 |
| Gravel | % | 1.92 |
| Sand | % | 74.86 |
| Silt | % | 23.23 |
| Arsenic (As) | mg/kg | 7.3 |
| Cadmium (Cd) | | 0.08 |
| Chromium (Cr) | | 21.3 |
| Copper (Cu) | | 11.5 |
| Mercury (Hg) | | 0.03 |
| Nickel (Ni) | | 17.3 |
| Lead (Pb) | | 7.6 |
| Zinc (Zn) | | 37.1 |
| Dibutyltin (DBT) | | <0.005 |
| Tributyltin (TBT) | | <0.005 |
| Acenapth | µg/kg | 5 |
| Acenapthylene | | 5.41 |
| Anthracn | | 5.17 |
| BAA | | 6.12 |
| BAP | | 6.6 |
| BBF | | 7.53 |
| BEP | | |
| Benzghip | | 7.66 |
| BKF | | 7.18 |
| C1N | | |
| C1PHEN | | |
| C2N | | |
| C3N | | |
| Chrysene | | 6.46 |
| Debenzah | | 5.1 |
| Flurant | | 8.18 |
| Fluorene | | 5.52 |
| Indypr | | 7.79 |
| napth | | 6.6 |
| perylene | | |
| phenant | | 6.82 |
| pyrene | | 8.07 |
| THC | | 9780 |
| PCB28 | | 0.08 |
| PCB52 | | 0.08 |
| PCB101 | | 0.1 |
| PCB118 | | 0.11 |
| PCB138 | | 0.11 |
| PCB153 | | 0.1 |
| PCB18 | | |
| PCB105 | | |
| PCB110 | | |
| PCB128 | | |
| PCB141 | | |
| PCB149 | | |
| PCB151 | | |
| PCB156 | | |
| PCB158 | | |
| PCB170 | | |
| PCB180 | | 0.09 |
| PCB183 | | |
| PCB187 | | |
| PCB194 | | |
| PCB31 | | |
| PCB44 | | |
| PCB47 | | |
| PCB49 | | |
| PCB66 | | |
| ICES7 | | 0.66 |
| AHCH | | |
| BHCH | | |
| GHCH | | |
| DIELDRIN | | |
| HCB | | |
| DDE | | |
| DDT | | |
| TDE | | |
| 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: | 2024 |

| | | | |
|---|---|---|---|
| **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 | Distribution by wet & dry sieving and laser detraction |
| **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 | 86 |
| | As | 0.5 | 2.7 | 92 |
| | Cd | 0.04 | 3.6 | 117 |
| | Cu | 0.5 | 2.9 | 102 |
| | Pb | 0.5 | 3 | 93 |
| | Zn | 2 | 2.6 | 106 |
| | Cr | 0.5 | 3.1 | 96 |
| | Ni | 0.5 | 3.6 | 99 |
| | TBT | 0.001 | 12.62 | 84 |
| | DBT | 0.001 | 12.62 | 70 |
| µg/kg | PCB28 | 0.08 | 12.56 | 80 |
| | PCB31 | | | |
| | PCB44 | | | |
| | PCB47 | | | |
| | PCB49 | | | |
| | PCB52 | 0.08 | 6.999 | 85 |
| | PCB66 | | | |
| | PCB101 | 0.08 | 8.43 | 102 |
| | PCB105 | | | |
| | PCB110 | | | |
| | PCB118 | 0.08 | 14.61 | 95 |
| | PCB128 | | | |
| | PCB138+163 | 0.08 | 12.93 | 104 |
| | PCB141 | | | |
| | PCB149 | | | |
| | PCB151 | | | |
| | PCB153 | 0.08 | 7.41 | 96 |
| | PCB156 | | | |
| | PCB158 | | | |
| | PCB170 | | | |
| | PCB180 | 0.08 | 9.85 | 80 |
| | PCB183 | | | |
| | PCB187 | | | |
| | PCB194 | | | |
| | DDE | | | |
| | DDT | | | |
| | DDD | | | |
| | Dieldrin | | | |
| | Lindane | | | |
| | HCB | | | |
| | BDE17 | | | |
| | BDE28 | | | |
| | BDE47 | | | |
| | BDE66 | | | |
| | BDE85 | | | |
| | BDE99 | | | |
| | BDE100 | | | |
| | BDE138 | | | |
| | BDE153 | | | |
| | BDE154 | | | |
| | BDE183 | | | |
| | BDE209 | | | |
| | ACENAPTH | 1 | 6.68 | 90 |
| | ACENAPHY | 1 | 7.74 | 113 |
| | ANTHRACN | 1 | 4.95 | 68 |
| | BAA | 1 | 9.8 | 71 |
| | BAP | 1 | 9.07 | 68 |
| | BBF | 1 | 8.44 | 93 |
| | BENZGHIP | 1 | 13.46 | 89 |
| | BEP | | | |
| | BKF | 1 | 8.9 | 86 |
| | C1N | | | |
| | C1PHEN | | | |
| | C2N | | | |
| | C3N | | | |
| | CHRYSENE | 1 | 7.87 | 90 |
| | DBENZAH | 1 | 19.23 | 142 |

| | | | |
|---|---|---|---|
| FLUORENE | 1 | 5.25 | 52 |
| FLUORANT | 1 | 4.36 | 78 |
| INDPYR | 1 | 17.1 | 96 |
| NAPTH | 1 | 3.02 | 59 |
| PERYLENE | | | |
| PHENANT | 1 | 5.41 | 73 |
| PYRENE | 1 | 4.29 | 65 |
| THC | 100 | N/A | 1036 |

**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 2 Details:**

| | |
|---|---|
| Laboratory name: | |
| Year: | |

| | | | |
|---|---|---|---|
| **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? | |
| **CompAnal** | **Q2** | Does the laboratory carrying out the analyses undertake periodic comparative analysis of laboratory reference materials and certified reference materials? | |
| **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? | |
| **InterlabCaleb** | **Q4** | Does the laboratory carrying out the analyses undertake periodic participation in interlaboratory comparison exercises, including, where possible, international comparison exercises? | |
| **InternatCaleb** | **Q5** | Does the laboratory carrying out the analyses undertake periodic participation in national and, where possible, international laboratory proficiency schemes? | |
| **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? | |
| **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? | |
| **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? | |
| **FracAnal** | **Q9** | Enter the size fraction that is analysed i.e. Whole or less than 63µm etc. | |
| **GranMeth** | **Q10** | PSA method | |
| **OCMeth** | **Q11** | Organic Carbon method | |
| **MetExtrType** | **Q12** | Method of extraction used for metal analysis | |
| **MethOfDetMetals** | **Q13** | Method of detection used for metal analysis | |
| **PAHExtrType** | **Q14** | Method of extraction used for poly aromatic hydrocarbon analysis | |
| **MethOfDetPAH** | **Q15** | Method of detection used for poly aromatic hydrocarbons analysis | |
| **OHExtrType** | **Q16** | Method of extraction used for organohalogens inc PCBs, pesticides, flame retardants etc analysis | |
| **MethOfDetOH** | **Q17** | Method of detection used for organohalogens inc PCBs, pesticides, flame retardants etc analysis | |
| **OTExtrType** | **Q18** | Method of extraction used for organotin analysis | |
| **MethOfDetOT** | **Q19** | Method of detection used for organotin analysis | |

| | | LOD/LOQ | Precision (%) | Recovery (%) |
|---|---|---|---|---|
| mg/kg | Hg | | | |
| | As | | | |
| | Cd | | | |
| | Cu | | | |
| | Pb | | | |
| | Zn | | | |
| | Cr | | | |
| | Ni | | | |
| | TBT | | | |
| | DBT | | | |
| µg/kg | PCB28 | | | |
| | PCB31 | | | |
| | PCB44 | | | |
| | PCB47 | | | |
| | PCB49 | | | |
| | PCB52 | | | |
| | PCB66 | | | |
| | PCB101 | | | |
| | PCB105 | | | |
| | PCB110 | | | |
| | PCB118 | | | |
| | PCB128 | | | |
| | PCB138+163 | | | |
| | PCB141 | | | |
| | PCB149 | | | |
| | PCB151 | | | |
| | PCB153 | | | |
| | PCB156 | | | |
| | PCB158 | | | |
| | PCB170 | | | |
| | PCB180 | | | |
| | PCB183 | | | |
| | PCB187 | | | |
| | PCB194 | | | |
| | DDE | | | |
| | DDT | | | |
| | DDD | | | |
| | Dieldrin | | | |
| | Lindane | | | |
| | HCB | | | |
| | BDE17 | | | |
| | BDE28 | | | |
| | BDE47 | | | |
| | BDE66 | | | |
| | BDE85 | | | |
| | BDE99 | | | |
| | BDE100 | | | |
| | BDE138 | | | |
| | BDE153 | | | |
| | BDE154 | | | |
| | BDE183 | | | |
| | BDE209 | | | |
| | ACENAPTH | | | |
| | ACENAPHY | | | |
| | ANTHRACN | | | |
| | BAA | | | |
| | BAP | | | |
| | BBF | | | |
| | BENZGHIP | | | |
| | BEP | | | |
| | BKF | | | |
| | C1N | | | |
| | C1PHEN | | | |
| | C2N | | | |
| | C3N | | | |
| | CHRYSENE | | | |
| | DBENZAH | | | |

| | | | | |
|---|---|---|---|---|
| | FLUORENE | | | |
| | FLUORANT | | | |
| | INDPYR | | | |
| | NAPTH | | | |
| | PERYLENE | | | |
| | PHENANT | | | |
| | PYRENE | | | |
| | THC | | | |

**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 3 Details:**

| | |
|---|---|
| Laboratory name: | |
| Year: | |

| | | | |
|---|---|---|---|
| **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? | |
| **CompAnal** | **Q2** | Does the laboratory carrying out the analyses undertake periodic comparative analysis of laboratory reference materials and certified reference materials? | |
| **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? | |
| **InterlabCaleb** | **Q4** | Does the laboratory carrying out the analyses undertake periodic participation in interlaboratory comparison exercises, including, where possible, international comparison exercises? | |
| **InternatCaleb** | **Q5** | Does the laboratory carrying out the analyses undertake periodic participation in national and, where possible, international laboratory proficiency schemes? | |
| **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? | |
| **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? | |
| **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? | |
| **FracAnal** | **Q9** | Enter the size fraction that is analysed i.e. Whole or less than 63µm etc. | |
| **GranMeth** | **Q10** | PSA method | |
| **OCMeth** | **Q11** | Organic Carbon method | |
| **MetExtrType** | **Q12** | Method of extraction used for metal analysis | |
| **MethOfDetMetals** | **Q13** | Method of detection used for metal analysis | |
| **PAHExtrType** | **Q14** | Method of extraction used for poly aromatic hydrocarbon analysis | |
| **MethOfDetPAH** | **Q15** | Method of detection used for poly aromatic hydrocarbons analysis | |
| **OHExtrType** | **Q16** | Method of extraction used for organohalogens inc PCBs, pesticides, flame retardants etc analysis | |
| **MethOfDetOH** | **Q17** | Method of detection used for organohalogens inc PCBs, pesticides, flame retardants etc analysis | |
| **OTExtrType** | **Q18** | Method of extraction used for organotin analysis | |
| **MethOfDetOT** | **Q19** | Method of detection used for organotin analysis | |

| | | LOD/LOQ | Precision (%) | Recovery (%) |
|---|---|---|---|---|
| mg/kg | Hg | | | |
| | As | | | |
| | Cd | | | |
| | Cu | | | |
| | Pb | | | |
| | Zn | | | |
| | Cr | | | |
| | Ni | | | |
| | TBT | | | |
| | DBT | | | |
| µg/kg | PCB28 | | | |
| | PCB31 | | | |
| | PCB44 | | | |
| | PCB47 | | | |
| | PCB49 | | | |
| | PCB52 | | | |
| | PCB66 | | | |
| | PCB101 | | | |
| | PCB105 | | | |
| | PCB110 | | | |
| | PCB118 | | | |
| | PCB128 | | | |
| | PCB138+163 | | | |
| | PCB141 | | | |
| | PCB149 | | | |
| | PCB151 | | | |
| | PCB153 | | | |
| | PCB156 | | | |
| | PCB158 | | | |
| | PCB170 | | | |
| | PCB180 | | | |
| | PCB183 | | | |
| | PCB187 | | | |
| | PCB194 | | | |
| | DDE | | | |
| | DDT | | | |
| | DDD | | | |
| | Dieldrin | | | |
| | Lindane | | | |
| | HCB | | | |
| | BDE17 | | | |
| | BDE28 | | | |
| | BDE47 | | | |
| | BDE66 | | | |
| | BDE85 | | | |
| | BDE99 | | | |
| | BDE100 | | | |
| | BDE138 | | | |
| | BDE153 | | | |
| | BDE154 | | | |
| | BDE183 | | | |
| | BDE209 | | | |
| | ACENAPTH | | | |
| | ACENAPHY | | | |
| | ANTHRACN | | | |
| | BAA | | | |
| | BAP | | | |
| | BBF | | | |
| | BENZGHIP | | | |
| | BEP | | | |
| | BKF | | | |
| | C1N | | | |
| | C1PHEN | | | |
| | C2N | | | |
| | C3N | | | |
| | CHRYSENE | | | |
| | DBENZAH | | | |

| | | | | |
|---|---|---|---|---|
| | FLUORENE | | | |
| | FLUORANT | | | |
| | INDPYR | | | |
| | NAPTH | | | |
| | PERYLENE | | | |
| | PHENANT | | | |
| | PYRENE | | | |
| | THC | | | |

| | |
|---|---|
| Grab | Yes |
| Core | No |