



ASSETS, TRANSPORTATION & ENVIRONMENT

Marine (Scotland) Act 2010

Disposal of Dredgings from Anstruther Harbour

Best Practical Environmental Option (BPEO) Assessment

[Redacted]

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CONTENTS

1 **INTRODUCTION**

- 1.1 Background to Application
- 1.2 Source of Materials
- 1.3 Description of Materials
- 1.4 Options for Relocation/Removal of Materials
- 1.5 Details of Previous, Related Operations

2 **DISCUSSION OF AVAILABLE DISPOSAL OPTIONS**

- 2.1 Introduction
- 2.2 Land Incineration & Subsequent Disposal of Residue
- 2.3 Sacrificial Landfill
- 2.4 Spreading on Agricultural Land, or for Soil Conditioning of Reclaimed Land
- 2.5 Reclamation
- 2.6 Beach Nourishment
- 2.7 Other Beneficial Uses, eg for Onshore Construction Works or Concrete
- 2.8 Sea Disposal
- 2.9 Do Nothing Approach

3 **ASPECTS TO BE TAKEN INTO CONSIDERATION**

- 3.1 Introduction
- 3.2 Strategic Considerations
- 3.3 Environmental Considerations
- 3.4 Cost Considerations
- 3.5 National Marine Plan

4 **CONCLUSIONS**

- 4.1 Summary of Available Options
- 4.2 Summary of Primary Objections to Each Option
- 4.3 Identification of BPEO

2 **INTRODUCTION**

1.1 **Background to Application**

Fife Council is the harbour authority for the East Neuk harbours of Anstruther, St Monans, Cellardyke, Pittenweem and Crail. They are classified as fisheries harbours with Anstruther being predominantly populated by leisure boats with some licensed small independent creel boats.

In order to maintain depths in the harbour basins and the approach channel dredging has to be undertaken at regular intervals to maintain efficient use of the basins. The accumulation of sand and silt varies from year to year but, in general, maintenance dredging is required approximately every six years.

Dredging is now required at Anstruther harbour and is programmed to be undertaken during the February/March 2019. Accompanying this report is a plan showing the areas to be dredged.

This report assesses the options available for such disposal and examines the Best Practicable Environment Option (BPEO) in accordance with the requirement of the Marine (Scotland) Act 2010.

1.2 **Source of Materials**

The dredge material is a mixture of sand and silt. These sediments enter the harbours as a result of wave action. At each harbour, the coarser sandy material accumulates in the approach channel and around the heads of the breakwaters. The finer sand and silt placed in suspension by the waves is carried into the harbour basins by tidal currents. The relatively still conditions then allow settlement and deposition. Apart from the discharge from local surface water drains, it is believed that no other material enters the basins or channels and this is supported by data obtained in previous dredging works.

1.3 **Description of Materials**

As described in 1.2, the dredge material is a mixture of sand and silt. It is estimated that approximately 14,475 cum of material requires to be removed from Anstruther harbour.

1.4 **Options for Relocation/Removal of Materials**

In order to maintain depths within the Council's harbours acceptable to the harbour users it is believed that the Council will continue to have a requirement for dredging and, therefore, for disposal of the material removed. It would appear that two options for disposal then exist:-

- (i) Relocation of the material in the sea; or
- (ii) Disposal on land.

1.5 **Details of Previous Related Operations**

A self-propelled water injection dredger has been used since 2010 for the removal of silt from Fife Council's harbours allowing least disruption to their operations but, most recently in 2017, a grab dredger was employed at St Monans due to the higher sand content in the material. The material dredged from St Monans was disposed of at the prescribed Anstruther FO101 dump site in the Firth of Forth.

The estimated quantity of material dredged (cu m) by these processes from each of the three main harbours in the past seven years is as follows:-

	2010	2011	2012	2013	2015	2016	2017
Anstruther	11000				662		
St Monans					610		9885
Pittenweem		6550					

2 **DISCUSSION OF AVAILABLE DISPOSAL OPTIONS**

2.1 **Introduction**

This section of the report discusses all available disposal options for the dredge spoil. Where an option is considered to be impracticable, the reason is given and the option discounted from further consideration. Those options which are considered to be practicable are considered in Section 3 of this report.

2.2 **Land Incineration & Subsequent Disposal of Residue**

Incineration of the material is not possible. This option for disposal can therefore be discounted.

2.3 **Sacrificial Landfill**

No landfill sites are located within easy reach of any of the Council's harbours and the Environmental Health Service of Fife Council was approached to identify suitable sites elsewhere. The nearest dump site to Anstruther is located north west of Ladybank, a distance of 22 miles from the harbour. This option is considered in detail in Section 3.

2.4 **Spreading on Agricultural Land or for Soil Conditioning of Reclaimed Land**

Spreading on agricultural land has been investigated and no demand from farmers found. The material is not suitable, being non-alluvial and the sand has no nutritional properties. The chloride salts would leach out from the spoil over a period of years rendering the land unusable and the discharge of saline water and solids in suspension into the local watercourses would need to be controlled. No projects have been identified where soil conditioning of reclaimed land is required. This option for disposal can therefore be discounted.

2.5 **Reclamation**

It has not been possible to identify any local current sites of land reclamation and this option for disposal can therefore be discounted.

2.6 **Beach Nourishment**

Due to the grading of the dredge material, it is not suitable for beach nourishment. No local sites where beach nourishment is required have been identified. This option can therefore be discounted.

2.7 **Other Beneficial Uses**

The finely graded sands and silt content of the dredged material make it unsuitable as a building material. Extensive pre-treatment of the spoil would be required to remove the contamination by fine sediments in order to utilise the coarser sand fractions and therefore render this option unviable. No local current projects could be identified where the dredged material could be used either as a building material (after treatment on site) or in reclamation work.

2.8 **Sea Disposal**

Although the nature of the dredge spoil does exceed some of the lower action levels of some of the contaminants and polyaromatic hydrocarbons prescribed by Marine Scotland, it does not exceed any of the contamination action levels which would make it unsuitable for sea disposal. Therefore disposal of this relatively small volume of material at the designated site Anstruther FO101 at sea is still considered to be a viable option environmentally.

2.9 **Do Nothing Approach**

This approach is not a viable option as, if left un-dredged, the harbour would become inaccessible for considerable periods of the tidal range.

3 **ASPECTS TO BE TAKEN INTO CONSIDERATION**

3.1 **Introduction**

This section of the report considers the strategic, environmental and cost implications associated with each of the disposal options judged to be practicable in Section 2.

3.2 **Strategic Considerations**

3.2.1 **Land Disposal**

Operational Aspects

The present dredging requirements at Anstruther harbour necessitates the use of floating plant as only a small proportion of the locations to be dredged are directly accessible from the shore. This makes the use of a small grab, backhoe or suction dredger the most

practical and economic methods of dredging the harbour to land disposal.

For the grab, backhoe or suction dredger to transfer material ashore after completion of loading its hold/barge, the material would have to be either discharged directly from the hold/barge by the dredger's own grab or backhoe or by a shore based grab or suction device. Dredged material would have to be stored on shore to drain off excess water prior to being loaded onto lorries due to the disposal site requirements.

Depending on the method employed, disposal to landfill could therefore be achieved by a three stage material handling operation as follows:-

- ◆ dredging and transfer to shore
- ◆ loading to lorries
- ◆ transport and disposal

Transport to shore would require the identification of an available jetty facility which would be suitable for accommodating the loading to lorries. Grab/suction plant could be required to unload the material and a suitable area would require to be identified for positioning of the plant and lorries and temporary stockpiling of the material. This activity could have time/cost implications for the vessel hire due to the unpredictable access to, and berth time in, the harbour due to it being inaccessible during low tide. The lorries could be loaded by mobile plant from the stockpile. The type of vehicle suitable for transporting the material is a rigid bodied tipper with an 18-tonne load capacity. It is estimated that around 1448 lorry loads would be needed to complete this task.

Availability of Suitable Sites/Facilities

As reported in 2.3, the nearest dump site is located some 22 miles from the harbour to the north west of Ladybank. This is a landfill site owned by Fife Council. Subject to the results of a Waste Management 3 Assessment (WM3) confirming that the dredge material can be deposited at the site, a handling charge would be applicable and the material must be free of excess water.

General Public Acceptability

The disposal of the spoil to landfill would be undertaken in a similar manner to the disposal of municipal waste. However, the significant increase in lorry movements in this small community would undoubtedly give rise to public concern because of danger to pedestrians and other road users, impact on the environment and interruption to traffic flow on the access road and around the harbour.

Local Acceptability

The road infrastructure of North East Fife, in particular, is not suited

to several hundred heavy lorry loads of spoil being transported. The road accessing the harbour is narrow and on a steep gradient, significant traffic congestion could be caused and the unavoidable smell and spillage would no doubt prove unacceptable to the local population.

Legislative Implications

The spoil would be a controlled waste material for the purpose of transport, storage and disposal. As such Part II (34) of the Environmental Protection Act 1990, Part I of The Control of Pollution Act 1974 and Part III (43) of the Finance Act 1996 will apply.

Consultations

The following have been consulted on the disposal to land option:-

Fife Resource Solutions, Resource Recovery (Waste Management)

3.2.2 **Disposal to Sea**

Operational Aspects

The deposition of material would involve excavation/suction of the dredge spoil into a vessel(s) and removal from the harbour to the designated disposal site Anstruther FO101 in the Firth of Forth. Details on the type of vessel(s) will be confirmed once the contractor has been appointed.

Availability of Suitable Sites/Facility

The sea disposal option does require a designated site in the Firth of Forth to be available for the acceptance of dredge spoil and agitation dredging has previously been used for the disposal of similar material into the Firth of Forth to that which will be recovered from Anstruther harbour.

General Public Acceptability

Since the sea disposal occurs in a designated site in the Firth of Forth and has been employed successfully several times in the past then use of this method is therefore likely to be generally acceptable.

Local Acceptability

Due to either process causing minimal disruption to the harbour users and no negative affect to the local fishing grounds, it is expected that it will be locally acceptable.

Summary of Consultations With Third Parties

With respect to the application process for a license to dispose of dredged material at sea, approvals are expected to be required from

Crown Estates Office and consultation with various interested parties including SEPA, SNH, Forth Ports Authority and Fife Fishermen's Association will be conducted by Marine Scotland to determine any adverse comments. Licence applications for similar operations have been previously submitted many times over the years with no adverse comments having been received.

3.3 **Environmental Considerations**

3.3.1 **Land Disposal**

The transport of the spoil would require an estimated 1448 return lorry trips on public roads. The impact to other road users including cyclists and pedestrians will include increased noise and dust levels.

Safety Implications

As described in 3.2.1, the rural roads of North East Fife and the narrow steep gradient residential street accessing the harbour are not suitable for the transport by large, heavy lorries of several thousand tons of spoil. Such lorry movements would pose an increase in risk to other road users and pedestrians.

Public Health Implications

The increase in lorry movements on the public roads and, in particular, the narrow steep gradient residential street accessing the harbour would pose an increase in health risk to the public from exhaust emissions and dust.

Pollution/Contamination Implications

Acceptance of the WM3 sample testing results by Fife Resource Solutions that the material is suitable, would mean there would be little or no risk of pollution or contamination from disposal of the material to landfill.

General Ecological Implications

There would be little or no risk of ecological impact arising from disposal to an existing landfill.

Interference With Other Legitimate Activities

There would be no amenity or aesthetic implications arising from disposal to landfill.

3.3.2 **Disposal to Sea**

The transportation of the spoil to the Anstruther FO101 disposal site would require an estimated 75-85 return trips in open water, but not within shipping lanes. The impact to other vessels in the Firth of Forth will be minimal to non-existent. Both excavation and suction dredging

will of course affect the harbour users but any disruption will be managed to a minimum by the Harbour Master.

Safety Implications

Disposal at sea would have negligible implications for safety providing that normal navigational and maritime procedures are observed.

Public Health Implications

There are no known threats to public health associated with disposal at the designated site in the Firth of Forth.

Pollution/Contamination Implications

As there are only some sources of low level contamination in the samples tested by TerraTek in July, 2018, the relatively small amount of dredged material is considered unlikely to pose a pollution risk. In accordance with the Dredging and Deposit of Solid Waste Marine (Scotland) Act 2010, representative samples of spoil have been taken for analysis by FRS Marine Laboratory, Aberdeen during the periodic dredging of all the East Neuk harbours from 1984 to 2011 and by ESG in 2012 and 2015. No significant contamination from heavy metals or PCB's was reported.

General Ecological Implications

The deposition of excavated spoil in the designated area Anstruther FO101 in the Firth of Forth will only directly impact the seabed in one vicinity and therefore should restrict any noticeable burying of the benthic fauna. The loss of benthic habitat and species due to the deposition of spoil would have an impact on the food sources for species feeding in this location. Certainly, no objections or complaints have previously been received from local fishermen regarding the effects of this method of disposal at sea on their catches.

Interference With Other Legitimate Activities

The disposal method does not affect the commercial shipping lanes or disrupt any fishing grounds. Slight disturbance might be caused to vessels using the harbour during dredging operations. In this case, liaison between the vessel owners and Harbour Master to make whatever arrangements are necessary to avoid disruption will be required.

Amenity/Aesthetic Implications

It is considered unlikely that disposal will cause any disturbance to local recreational boating and angling activities.

3.4 **Cost Considerations**

3.4.1 **Land Disposal**

Capital Costs

There would be no capital costs associated with disposal to landfill.

Operating Costs

The operating costs associated with disposal to landfill are tabulated below.

Activity Description	Volume (m ³)	Unit Cost (£)	Cost (£)
Excavate by dredger	14,475	9.40	136,065
Transfer to lorries	14,475	4.00	57,900
Transport by lorries	14,475	10.00	144,750
Disposal to landfill	14,475	40.60	587,685
Total	14,475	64.00	926,400

3.4.2 **Sea Disposal**

Capital Costs

There would be no capital costs associated with disposal to sea.

Operating Costs

The cost, utilising both tides per day, is estimated between £240,000 and £250,000.

3.5 **National Marine Plan**

The planned dredging of Anstruther Harbour has been considered in conjunction with the National Marine Plan. It is to be carried out in order to maintain safe access/egress of the harbour with disposal of the dredged material in the designated location of Anstruther FO101 in the Firth of Forth.

4 **CONCLUSIONS**

4.1 **Summary of Available Options**

Seven options have been considered for the disposal of dredge spoil material from Anstruther harbour. The options of beach nourishment, incineration, disposal to agricultural land, reclamation and use in construction are discounted due to the unsuitability of the material. As previously explained, the “do nothing” option is not a viable consideration. The two remaining options, disposal to land and disposal to sea are reviewed in the summary below.

Acceptability descriptors: Low = significant effect

Moderate = slight effect
High = insignificant effect

Aspect	Disposal to Land	Disposal to Sea
<u>Strategic Acceptability</u>		
Strategic acceptability	Low	High
Operational acceptability (including transport, availability of sites handling etc)	Low	High
General public and local acceptability	Low	High
<u>Environmental Acceptability</u>		
Health & Safety	Moderate	High
Public Health	Moderate	High
Pollution	Low	Moderate
Ecological Implications	Moderate	Moderate
Interference	Low	Moderate
Amenity	High	High
<u>Costs</u>		
Cost per cubic metre	£64.00	£15.80 - £16.50

4.2 **Summary of Primary Objections to Each Option**

4.2.1 **Disposal to Land**

This is the least preferred of the two options on each of strategic, environmental and cost considerations.

Strategically this option is not favoured due to the rapidly increasing pressures on available landfill space. It is the view of local authorities and landfill operators that, where possible, current facilities should be conserved for municipal waste.

In environmental terms, the additional lorry movements are likely to give rise to increases in noise, dust and exhaust emission levels and interference for other road users.

In cost terms, this option is estimated to be about 4 times more expensive than the sea disposal option. The significant element of the cost of this option is attributable to landfill costs.

4.2.2 **Disposal to Sea**

This is the preferred option on overall strategic terms and is also preferable to the land disposal option on environmental terms given

that there will be no disruption to fishing grounds or shipping lanes and disruption to the Anstruther harbour users will be managed to a minimum by the Harbour Master. The low levels of contaminants, being within the limits stipulated as acceptable for sea disposal, and the relatively small volume of dredge material are not expected to pose an ecological concern to the Firth of Forth. The increase in airborne emissions from the process will be short lived, minimalistic in nature and insignificant in comparison to the lorry movements of the land disposal option. In cost terms this is easily the preferred option.

4.3 **Identification of BPEO**

It is concluded that the assessment of the BPEO, for disposing of the dredged material from Anstruther harbour, is the controlled excavation of the material and disposal at the appropriate site Anstruther FO101 in the Firth of Forth is considered an acceptable option under the terms of the Marine Scotland Act 2010.