



Maintenance Dredging - Spring 2023

Marine Scotland Act 2010

Application for a Licence for Sea Disposal of Dredging from The Port of Berwick

Assessment of Best Practical Environment Option (B.P.E.O.)

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Best Practical Environmental Option (B.P.E.O.)

1.0 Introduction

1.1 Background to Application

Berwick is a small commercial port situated on the border between England and Scotland. Cargo vessels visit Tweed Dock in Tweedmouth where cargo operations have taken place since the opening since 1876. In 1993 Berwick Harbour Commissioners had to widen the dock entrance and remove the dock gates to accommodate larger vessels. This work ensured the continuation of commercial vessels to operate to Tweed Dock and provide essential income for the harbour. Berwick Harbour Commissioners require to carry out maintenance dredging within Tweed Dock and its entrance. The requirement for this occurs every two or three years and the last dredging works have taken place there in 2018. The proposed maintenance dredging should take two or three weeks (weather permitting), commencing in Feb/March 2023. The dredged material must be disposed of and this paper assesses the options available and considers the Best Practical Environmental Option in accordance with the requirements of current legislation.

1.2 Description and Source of Materials

All the material to be dredged from the Tweed Dock is silt. Tweed Dock entrance consists of a mixture of silt and small gravel. Both materials emanate from the River Tweed's down flow which comes across the dock's entrance, back eddies into the dock and settles. The river's navigation channel rarely requires dredging as occasional spates flush any sediment out to sea. The quantity of material dredged by mechanical means and deposited to sea is miniscule in comparison to the same deposited to sea by natural processes. This application is for approximately 6722 M³. 9,500 Tonnes.

When the dock was constructed in 1872, a groyne, some 100M in length was put in place slightly upriver from the dock entrance. This deflected the silt and gravel carried downstream, away from the dock and out to sea in the river's natural course. Over the intervening years the outer section of the groyne had worn away, so reducing its effect. The Harbour Commissioners have concluded that, although costs involved in reconstructing the groyne will be considerable, these may will lead to saving of expenditure in future years should, as a consequence, requirement to dredge Tweed Dock be reduced. The Groyne has only recently been repaired and is expected to work efficiently once our dredging campaign is complete in 2023.



1.3 Disposal Options List

Possible options which have been considered for disposal of spoils from Maintenance Dredging are:-

- A. Land Incineration and subsequent disposal of residue
- B. Sacrificial landfill
- C. Use on agricultural land or for soil conditioning of reclaimed land
- D. Reclamation
- E. Beach nourishment
- F. Other beneficial uses e.g. onshore construction works or concrete manufacture
- G. Sea disposal

2.0 Aspects to be taken into Consideration

2.1 Strategic Considerations

Before consideration is given to the available disposal options, the strategic factors require assessment. The areas for dredging are inaccessible to land based machinery and therefore dredging will be carried out by floating plant, as it has done on numerous previous occasions. The quays at Tweed Dock are reserved for cargo operations and no other suitable sites are available with adequate capacity to enable transfer of spoil to vehicles or containers for onward removal. It would therefore be necessary to transfer spoil from the dredger to land based equipment outside the harbour, where similarly, no sea to land facilities exist. Insufficient access to any sites locally would prevent any water borne craft from depositing spoil materials above the high water mark, even if it were possible to then remove it. The nearest suitable port to land would be Blyth which is approximately 55 miles by sea. The nearest landfill site to there is Brenkley Quarry Dinnington near Newcastle which is a further 25 miles by road. Recent enquiries with Port of Blyth no longer handle this type of material. Even if it were possible, following transfer to shore, the spoil would require transfer by road to its final destination. This would involve further costs and could cause considerable disturbance to the public. The distance to Eyemouth Spoil Ground is approximately a 15 mile round trip from Tweed Dock, and in favourable weather can be accomplished in less than 2 hours.

2.2 Environmental Considerations

Maintenance dredging at Tweed Dock involves the use of a dredger being positioned where dredging is required. The excavator grab then digs the material and deposits into the hopper. This is the point when the environmental considerations can be divided, land based disposal versus sea disposal. We have already established that any land based disposal is not an option at



Berwick, but if it were, dredged materials would have to be transferred by road. Potential impacts resulting from the haulage and final disposal of spoil on land could include:-

(D) Reclamation

This is not a realistic option. The dredged material is not suitable for this purpose. The opportunities for land reclamation are non-existent in the vicinity of the port.

(E) Beach Nourishment

The beach area at the mouth of the river Tweed, the location of the town of Spittal, is of a sand and small shingle make up. This area is much resorted to by holiday makers and Leisure users. Laying down of silt dredging's would have a very detrimental effect on these amenities. The material is considered unsuitable for this purpose. In any case the dredging equipment engaged at Tweed Dock is not so equipped to transfer the spoil to the beach.

(F) Other Beneficial Uses

The dredged material is unsuitable for most applications because of the salt content.

(G) Sea Disposal

Disposal of dredged material at sea has historically always been the preferred option for works at Berwick upon Tweed. The confines of the dredging area determine the type of plant which could be used for the operation. Controlled relocation in the sea is the only alternative to all the other options which involve some form of land disposal. Sea disposal allows the dredging plant to work efficiently and avoids the need to 'double handle' dredged materials. It eliminates any potential environmental and safety hazards inherent with other disposal options. The majority of the material to be disposed is silt from Tweed Dock, together with a small quantity of gravel which has accumulated at the dock entrance. Samples collected from the 3 locations during previous dredging operations have not revealed any evidence of toxic deposits in the spoil. The dredged material was not deemed to be harmful and in particular the heavy metal and chemicals within the dredged material are within acceptable levels. It is believed that the past system of spoil disposal at the Eyemouth spoil ground (FO 080) has not been demonstrated to have had any significant diverse impact on the receiving environment. To our knowledge no objections have been received re: Berwick's disposal at FO 080.

(H) Do nothing approach

Having fully considered the "do nothing approach" the implications for the Port of Berwick of not dredging and disposing of spoil are stark. The following immediate and obvious results of such an approach will be:

1. The maximum size of cargo vessel able to enter the Tweed Dock would significantly reduce, most likely immediately from 3,500 DWAT to around 2,000 DWAT but ultimately, as silt continues to build up, to ALL shipping.



The port will then have no alternative but to close. It is in fact likely that any restriction in vessel size from 3,500 DWAT will result in our local Customers having to seek an alternative port, as economy of scale requires them to have the option of 3,500 DWAT vessels.

2. To opt not to dredge WILL cause undoubted navigational concerns and most probably result in vessel grounding incidents as silt “high spots” begin to develop. Any vessel grounding immediately raises environmental concerns, not least the increased risk of oil pollution. The river Tweed estuary is a designated SSSI and RAMSAR site and, as such, is considered an environmentally important river. A vessel grounding due to the build-up of silt is unlikely to be able to be re-floated which could lead to vessel effectively closing the river to all shipping, Fishing and Leisure. The worst case scenario would be a vessel having to be de-commissioned and broken up “in situ” which would be an environmental disaster.

Dredging in 2023 is considered essential and urgent to allow the port to continue trading at current levels. A “do nothing approach” is simply not an option.

2.3 Chemical analysis

The Majority of sample results were found to be below AL1 threshold. The average of BAA,BAP,BENZIGHIP,BKF,CHRYSENE,DBENZA,H,FLOURANT,INDPYR,PHENANT,PYRENE,T HC did highlight in blue but only minimal above the AL1 threshold. These natural minerals appear in coal which was an exported commodity from Berwick and ceased over 60 years ago. The likelihood that these levels are slightly over the threshold would be a result of an extended period without dredging. As a natural mineral it is in its natural environment and disposal at sea at spoil ground FO80 which has been used by the Port of Berwick for over 20 years would expect little or no effect.

2.4 Cost Considerations

Berwick is a very small commercial port – most of the income it has coming from shipping. It is essential that dredging takes place to avoid the loss of depth in the approach channel and Tweed Dock. Maintenance dredging is an expensive overhead costing around £3000-£4000 per day plus mobilisation costs. The most efficient way to use the type of dredging system employed, is to place the dredging material on the spoil ground location. Further handling means further costs and to transfer to land could increase costs by as much as 100%. Landfill tax is currently £3.10 per tonne on top if that were the chosen option.

3.0 Conclusions

(A) Land incineration and subsequent disposal of residue

This option cannot be considered viable because the dredged spoil will be non-combustible inert material. Therefore this option will not be considered any further in this BPEO assessment.



(B) Sacrificial Landfill

This is not a realistic option. There is no local site even if it is possible to land the material. Transport costs and landfill taxes would cause cost to escalate and make the operation unaffordable.

(C) Use on agricultural land, or for soil conditioning of reclaimed land

This is not a realistic option. It is not possible to land dredged material locally. The dredge spoil material is not suitable for these purposes and so will not be considered any further in this BPEO assessment.

(ii) To transfer to a suitable location the transfer to shore for land based disposal would not be viable.

(iii) The excavated spoil material is not suitable for land incineration, use on agricultural land, reclamation, beach nourishment and no other beneficial uses have been identified for this type of material. There are no other viable alternatives for the disposal of this type of material.

It is believed the sea disposal represents the most efficient and economic dredging and disposal option available to the Berwick Harbour Commissioners. Because of the unfortunate de-characterisation of Berwick's disposal ground (FO 100) in 2000, we must again request permission and licence to make our disposal at Eyemouth spoil ground, the position of which is shown on the chart extract appended to the application. The modest volume and infrequent nature of maintenance dredging at Tweed Dock is likely to have a minimal impact on the disposal site compared to Eyemouth harbour trusts recent disposal of 50,000t the extra mileage engendered by the 14 mile round trip from Berwick to the spoil ground has obliged us to limit our dredging operation to extraction of approximately 6722 m³ which equates to 9,500 tonnes spoil. To our knowledge no objections have been received re: Berwick's disposals at the Eyemouth ground and we are unaware of any problems arising from such disposals.

4.0 Summary

Land based options for disposal of dredged materials at Berwick have been eliminated because:-

- No suitable quay nearby to transfer from dredging equipment to shore.
- Danger of contamination of public roads from spillage or leakage due to possible high water content in load
- Danger to the public and other road users due to increased traffic volume and adverse effects of spillages on traffic safety. Also danger posed by potential instability of haulage vehicles with 'wet' loads during turning and breaking.
- Nuisance and noise pollution from haulage traffic using public roads.
- Increase in carbon emissions and others which could be detrimental to public health and the environment.



The dredging programme could produce around 9500 tonnes of spoil material, to transfer to the final destination would equate to 380 loads and 380 return journeys. By comparison to dump at sea, assuming the split hopper barge loads to 300 tonnes, this equates to 31 trips. Also there is no 'ship to shore' transfer which further reduces the use of machinery and hence emissions. Sea disposal does not have any of the aforementioned potential impacts.

5.0

It is thus concluded that following assessment of the B.P.E.O. for disposing of spoil from Berwick Harbour's planned maintenance dredging works, expected to be effected in Feb/Mar 2023 the best option is disposal by placement in an approved offshore sea disposal site, in this case FO80 Eyemouth.

Signed:



Scott Ferguson
Harbour Master

On behalf of the Berwick Harbour Commissioners