



Marine (Scotland) Act 2010

Marine and Coastal Access Act 2009

Best Possible Environmental Practice Assessment

Supporting an application for a licence for sea disposal of dredgings from
Eyemouth Upper Harbour ~ Maintenance Dredging 2020-2023

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1. INTRODUCTION

1.1 Background to application

Eyemouth Harbour Trust requires maintenance dredging to be carried out in the Upper Harbour (area D). Maintenance dredging was last carried out in this area in 2014 and natural siltation has since reduced the depths to levels inconsistent with navigational safety.

This paper examines the options for disposal of dredged material to determine the Best Possible Environmental Practice in accordance with the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009.

1.2 Description and Source of Materials

The material to be dredged is an accumulation of mud, silt, sand and gravel deposited in the upper harbour by natural fluvial action.

The method of dredging affects the nature of the spoil and possible methods include mechanical digging from shore; mechanical digging from floating vessel; plough dredging (dragging); suction dredging; cut and suction and water injection systems.

Mechanical digging allows loading directly to a barge or vehicle; however, a certain amount of settling/run-off time may be required before transporting on public roads. Suction dredging produces a slurry that requires separating in settling lagoons before becoming acceptable as a landfill material. Plough dredged material may be dragged directly out of the harbour or to a point where it may be recovered by land-based plant.

The area to be dredged is marked in red on charts appended to the application.

1.3 Options for relocation/ removal of materials

Possible options which have been considered for disposal of spoils from the maintenance dredging area: -

- Land incineration
- Sacrificial Landfill
- Use on agricultural land
- Reclamation
- Beach nourishment
- Other beneficial Use
- Sea Disposal

1.4 Details of various, related options

Eyemouth Harbour Trust has carried out regular maintenance dredging programmes at intervals varying between 1 and 3 years. Amounts of material removed have varied between 5000 and 15000 tonnes as necessary. This has been undertaken by contractors using back-hoe dredger with hopper barge and by plough dredging (dragging).

Plough dredging has proved the least effective method because the material was rapidly carried back into the harbour by tidal action. Removal by hopper barge to an approved spoil ground, 3 nautical miles to the east of the harbour (Marked on Admiralty chart section attached to this report) has proved the more effective method. The most recent dredging, in the outer entrance, was carried out in March 2017 using the latter method and spoil ground.

Suction dredging has not been used as there is no suitable area to construct a settling lagoon and plough dredging with recovery from the quayside has also been discounted due to the multiple operations involved. Mechanical digging of the required areas from land is not practicable due to access issues with heavy plant.

At present it is estimated that approximately 12,400 tons of material is required to be removed from the Upper Harbour in order to restore navigational safety.

2. DISCUSSION OF DISPOSAL OPTIONS

2.1 Land incineration and subsequent disposal of residue

The material to be dredged from the upper harbour consists of incombustible and inert mineral solids with high water content and a small proportion of organic matter. Incineration would use a large amount of energy in removing the water but would not reduce the mass of mineral content or convert the spoil to a usable product, and it is therefore not considered a practicable method of disposal.

2.2 Sacrificial Landfill

Disposal by landfill would require the water content of the dredged material to be separated and removed in a settling lagoon before the spoil could be accepted at a landfill site. Eyemouth harbour does not have a suitable level site for a settling lagoon of the capacity that would be required for this operation.

At present there are no suitable landfill sites in the immediate vicinity of Eyemouth Harbour or within the region.

2.2.1 Environmental Considerations:

Landfill capacity is limited in this region and its use is considered unsustainable.

The movement of the dredged spoil by road transport would involve increased use of roads by heavy traffic with consequential increase in fuel use, exhaust emissions, noise, wear on road infrastructure and general nuisance to road users and local residents. It would also introduce a risk of spillage and road traffic accidents.

If a mechanical dredge and barge is used to recover material the transfer of spoil from a barge to settling lagoon and then to road vehicle involves two further loading operations. Material already loaded into a barge would be transported in a considerably less environmentally damaging means by sea.

2.2.2 Environmental Impacts List

Potential impacts resulting from the haulage and final disposal of spoil on land would include:-

- Danger of contamination of public roads from spillage or leakage from the loads if carried wet.
- High energy use if material is dried or compressed before transported.
- Nuisance and noise from haulage traffic using the public roads.
- Road vehicle emissions.
- Wear and damage to road infrastructure.
- Potential adverse ecological and visual impacts from landfill operations, subject to the choice of site

2.2.3 Cost considerations

The recovery to land of spoil from the harbour would require the same floating equipment whether disposal was at sea or to landfill, however the landfill operation would additionally entail transferring the spoil from barge to settling lagoon (non-available), then reloading onto road vehicles and transporting to a site (assuming that a suitable site could be found) Charges would apply for existing sites, or new landfill development and restoration costs. These extra operations would incur a considerable increase in cost, estimated to be 50 to 100% greater than sea disposal.

2.3 Agricultural use or soil conditioning on reclamation schemes.

Land use in Berwickshire is predominantly agricultural making dredge spoil spreading on farmland a possible option. There are no reclaimed land sites or reclamation schemes in the area.

The value of the spoil material for soil improvement is low. Before use as a constituent or agricultural soil it would be necessary to reduce the material's salinity by repeated washing and draining, and the high cost of such washing would render it commercially unviable compared to traditional land sourced top soil.

Use on agricultural or reclaimed land would involve the same transport operations as for landfill, with similar environmental impacts.

2.4 Reclamation

2.4.1 Strategic and Environmental Considerations

There is no reclaimed land nearby, nor are there any reclamation works planned along this part of the coast. Consideration has previously been given to depositing the spoil in shallow water in the bay, in the location of an outer breakwater which may be constructed as part of a future (Phase II) development. Whilst this may appear to offer an attractive option, it is considered not appropriate in the instance for the following reasons:-

- Its location in the Berwickshire and North Northumberland Coast Special Area of Conservation and proximity to The Burnmouth Coast SSSI.
- Contamination of the rocky subtidal zone by sediments during placement and the associated risk of smothering of marine organisms
- Presenting a potential hazard to navigation
- In order for the material to remain in place in a stable condition, a properly engineered breakwater would be required, including foundations, rock armouring etc., which would add substantially to the cost and render it uneconomic
- Loss of part of a popular area for recreational diving

2.4.2 Cost Considerations

Land reclamation is not an economically viable option due to the lack of potential reclamation areas along this rugged length of coast and the need for extensive and expensive engineering measure if a local reclamation area were to be developed.

2.5 Beach Nourishment

Eyemouth Bay is the only location considered in this case as there are no beach nourishment schemes planned in the area. The Berwickshire coast is a predominantly rocky and heavily indented coastline and not prone to beach erosion.

Dye tests have shown there to be an anti-clockwise movement of sediment in Eyemouth Bay, with sand migrating from the western end of the beach towards the harbour, and out to sea past the harbour approach channel. This circulation allows sediment to be drawn into the harbour by wave action.

Any additional material placed on the beach is likely to migrate quickly towards the harbour entrance, thereby increasing the potential for continuing siltation in the harbour, and the likely need to repeat maintenance dredging within a short time.

The fine particle size of the spoil material allows it to be washed away very easily and the poor drainage characteristics of fine silt do not permit drying out between tides. The material also has low load bearing characteristics, is muddy, unsightly and offers no leisure value as a beach. The material is therefore unsuitable for further consideration as a medium for beach nourishment.

2.6 Other Beneficial Uses

It has been suggested that deposition of the dredged spoil in shallower water (say between 0 to 10m below Chart Datum) to create a reef immediately to the east of the Hurkers would offer an attractive low cost option, which could have the beneficial effect of providing increased interest for divers, this section of coast being a popular location for scuba diving. The option would not however be appropriate for maintenance dredging arisings due to the very significant ecological impacts and other potential environmental impacts which would result in this area within the Berwickshire and North Northumberland Coast SAC and Burnmouth Coast SSSI (smothering of marine organisms and instability of the material in this very exposed location with the likelihood that the material would in time spread out to cover a larger area).

2.7 Sea Disposal

2.7.1 Strategic and Environmental Considerations

Due to the location of the dredging work at the harbour and the type of plant which would be used for the dredging, sea disposal is the favoured option. It would allow the dredging equipment to work efficiently and would avoid the need to re-handle dredged spoil within or adjacent to the harbour and the associated potential environmental problems and safety hazards inherent in such activities.

The location of the spoil ground is shown on the extract from the Admiralty Chart appended to the licence application. No complaints have been received from fishing or other marine interests and there is no evidence that the sea disposal has produced turbidity, discoloration, foaming, odour or floating matter either at the disposal site or on the adjacent shore. No objections have been received on amenity grounds and the Harbour Trust is unaware of the past disposal operations causing any interference with other legitimate users of the sea.

2.7.2 Cost Considerations

Dredging work by vessels using mechanical methods and including sea disposal of arisings has previously represented the most economic dredging and disposal option available to the trust.

4 CONCLUSIONS

4.1 Summary of Available Options

The available options are the transfer to land and disposal to landfill, spreading on agricultural land, deposition in Eyemouth bay (either for a possible future breakwater or to create a reef), beach nourishment or sea disposal.

4.2 Summary of Primary Objections to each Option

The primary objections to both land disposal and spreading on agricultural land are on environmental grounds and are:-

- The risk of spillage and dispersion during handling
- Disturbance of public amenity
- Possible disturbance of the adjacent SAC and SSSI
- The nuisance and dangers of carrying high water content materials by public roads.
- A lack of a suitable landfill site.
- Ecological, visual and noise impacts from landfill operations
- Discharge of saline leachate to inland water courses

Use of either of the land disposal options would also considerably increase the cost of disposal of the dredged spoil.

The primary objections to deposition of the spoil in shallow water in Eyemouth bay are also on environmental grounds and are:-

- Potential adverse impacts on the adjacent Burnmouth coast SSSI and Berwickshire Coast (intertidal) SSSI.
- Contamination of the rocky subtidal zone by sediments during placement
- Smothering of marine organisms
- Potential hazard to navigation
- Physical instability of the spoil in the exposed environment, requiring engineering measures to stabilise it
- Loss of part of a popular area for recreational diving

The primary objection to use of the spoil as beach nourishment are:-

- Exacerbation of sand accretion in the bay
- The sediment circulation system would in time return a large proportion of the sediments to the harbour.

4.3 Identification of BPEPA

It is thus concluded in the Best Possible Environmental Practice Assessment for disposing of the spoil from maintenance dredging works planned to be carried out in

Eyemouth Upper Harbour in 2020 to 2023 that the best option is its disposal by placement in an approved offshore sea disposal site.

EYEMOUTH HARBOUR TRUST – August 2020.