Annex 1: Standard Terms of Reference for PA/03125/18

Kindly note that normal dredging procedure shall apply as per the following:

Prior the below is executed a sampling plan* must be submitted for ERA's approval.

The fate of dredged material depends on the level of contaminants present in the sediment. In this context, a compositional analysis of the material is to be carried out according to Section 1 below. Should the contamination levels suggest that the material is not fit for disposal at sea, than an alternative disposal route is to be sought. Should the material be destined to a landfill, than it would have to be treated prior to landfilling and leachate tests according to Section 2 below would have to be carried out.

Section 1 – Compositional analysis

In order for ERA to assess whether the material to be dredged can be disposed of into the marine environment and what effect it will potentially have on the marine environment, a compositional analysis of the material to be dredged is to be carried out by the operator. The chemical characterisation will be the first step towards assessing the contamination level of the material.

The parameters to be analysed and the sampling procedures to be adopted during such sampling and analyses are indicated in the sections below.

1.1 Parameters to be analysed

Chemical analyses should be carried out on the fine fraction sample (<2mm) since this is the fraction in which contaminants tend to concentrate.

The sediment chemical analyses are to be carried out at a laboratory accredited to EN ISO/IEC 17025 or equivalent standard methods. The results are to fulfil the minimum analytical performance criteria in Article 4 of Directive 2009/90/EC, as transposed in Legal Notice 345 of 2015 (Water Policy Framework Regulations, 2015).

With the project proposal, the consultant is requested to indicate for each parameter, the proposed limits of detection. For all parameters, the limits of detection for the sediment analyses should meet 0.1mg/kg or lower. The results are to be presented as concentrations on dry sediment weight basis. The concentration levels of the chemicals parameters recorded for the individual replicate samples are to be reported to the Authority, in addition to the presentation of mean concentrations and standard deviation. In selecting the appropriate analytical methods, the consultant shall clearly indicate where the required criteria cannot be achieved and propose feasible alternatives with justifications.

Chemical analyses in sediments are to be carried out in replicate sediment samples for the parameters indicated in the table below:

Table 1: Chemical parameters to be analysed.

Parameter	**CAS number**
Load of Organic Matter (as Total Organic Carbon).	-
Arsenic (As)	7440-38-2
Cadmium (Cd)	7440-43-9
Copper (Cu)	7440-50-8
Mercury (Hg)	7439-97-6
Zinc (Zn)	7440-66-6
Chromium (Cr)	7440-47-3
Lead (Pb)	7439-92-1
Nickel (Ni)	7440-02-0
Polyaromatic Hydrocarbons (PAHs):	
Benzo(a)pyrene	50-32-8
Benzo(b)fluor-anthene	205-99-2
Benzo(k)fluor-anthene	207-08-9
Benzo(g,h,i)-perylene	191-24-2
Indeno(1,2,3-cd)-pyrene	193-39-5
Fluoranthene	206-44-0
Tributyl tin compounds (TBT)	36643-28-4
Polychlorinated Biphenyl (PCB – IUPAC numbers (Sum of 7 PCB congeners: 28, 52, 101, 118, 138, 153 and 180.)	-

If data from the same site has been previously collected, new measurements may not be required subject to the following criteria:

- The data is in line with these provisions;
- The sampling and analyses has been carried out within the last 5 years and
- There have been no new events of pollution, which indicate the quality of the material may have deteriorated.

Nonetheless, further sediment sampling may be required in areas where there is a tendency for sediments to show high levels of contamination (e.g. harbour areas) and in areas of sediment chemical heterogeneity. Such analyses will be required prior to the permit renewal procedure.

1.2 **Sampling and Analytical Requirements*** (Sampling plan to be submitted to ERA before commencement of works)

The applicant shall carry out an *in situ* survey of the area, which is to be dredged. Sampling of sediments from the proposed dredging site should be representative of the vertical and horizontal distribution.

Due to the high variability in the physical, chemical and biological properties of sediments, an evaluation of sediment quality in a given area must be based on a sufficient number of samples. In this regard, Table 2 below provides an indication of the number of sampling stations to be analysed in relation to the amount of material to be dredged. Sampling of a sediment-depth profile is recommended, where at least two replicate samples should be collected from two different sampling depths, including the superficial sediments and at depth.

When applying the following sampling protocol, it shall be assumed that there is reasonably uniform sediment in the area to be dredged. ERA may require more samples to be taken especially in enclosed and semi-enclosed areas. The environmental consultant to be appointed by the applicant shall provide to the Authority a description detailing the sampling rational adopted in the proposed method statement.

Table 2: Number of sampling stations to be analysed in relation to the amount of material to be dredged.

Amount dredged (m^3)	Number of stations
Up to 5000	1-3
Up to 25 000	3-6
25 000 – 100 000	6-13
100 000 – 500 000	13-28
500 000 – 2 000 000	28-57
> 2 000 000	extra 10 per million m3

Core samples should be taken in cases where the depth of dredging and expected vertical distribution of contaminants indicates that this is warranted. If this is not the case, grab samples will be sufficient. Sampling from the dumping vessel or barges is not allowed.

The original samples should be retained until the permitting process has been completed.

Section 2 – Leachate tests prior to landfilling

You are to analyse the parameters listed in Council Decision 2003/33/EC as per section as per section 2. Limit Values for non-hazardous waste using sampling standard EN 12457 Leaching - Compliance test for leaching of granular waste materials and sludges.

On a general note, In order for ERA to be able to conclude, the analyses are to be accompanied by a concluding remark on the level of contamination and decision.