

25 PROPOSALS FOR MONITORING

25.1 CHANGES TO SUSPENDED SEDIMENT AND CONTAMINANT CONCENTRATIONS IN THE FAL ESTUARY DURING CAPITAL DREDGING

It is anticipated that water quality monitoring will need to take place during the capital dredging to record the changes to suspended sediment (as TSS) and a range of chemical contaminants. This will allow the changes to be compared to the water quality requirements of the relevant EC Directives.

A monitoring plan will need to be agreed with the Environment Agency. It is anticipated that a baseline will not need to be established prior to the capital dredging works since the Environment Agency already monitor water quality in the estuary. Sampling sites will have to be agreed with the Environment Agency, and it may be most suitable to use the sites already used to monitor water quality (e.g. for shellfish waters in Carrick Roads, Penryn River and Percuil River).

It is anticipated that monitoring may have to take place on a real time basis. Therefore, it may be appropriate to install turbidity metres that record and send data at regular intervals (e.g. 15 or 30 minutes). In order to provide real time results for TSS and chemical contaminants, the turbidity data would need to be calibrated against measured TSS concentrations and translated into chemical contaminant concentrations using the TSS concentrations and partition coefficients.

25.2 CHANGES TO BATHYMETRY AND MARINE ECOLOGY IN FALMOUTH BAY DUE TO DISPOSAL OF DREDGED MATERIAL

It is anticipated that bathymetry and marine ecology monitoring will need to take place after the disposal of dredged material to record the changes to bathymetry and benthic communities in and around the Falmouth Bay disposal site.

A monitoring plan will need to be agreed with the MFA and Cefas. It is anticipated that a baseline may need to be established prior to the disposal activities. It is anticipated that monitoring will include a pre- and post-disposal bathymetric survey, and at least a post-disposal survey of benthic communities.

25.3 RECOVERY OF MAERL HABITAT AND COMMUNITIES DUE TO SEABED HABITAT MITIGATION

The suggested mitigation measures and recovery potential for the habitats in the SAC affected by the capital dredging will require monitoring to record the habitat distribution and the recolonisation patterns. The monitoring will have the objective of checking that the site does recolonise as expected. The detailed monitoring plan will need to be agreed with Natural England in advance of any works.

A monitoring plan will need to be agreed with Natural England. It is anticipated that a baseline will need to be established prior to the capital dredging works, with sampling sites selected based on the previous surveys and the proposed mitigation works.

25.3.1 Habitat Monitoring

It is anticipated that monitoring of habitat types will need to be undertaken immediately after dredging to record the effectiveness of the habitat mitigation. This should be undertaken by suction pipe sampling and analysis to record the depths of sediment present within the new navigation channel.

It is anticipated that monitoring will need to be undertaken in the areas surrounding the new navigation channel to ensure that the sediment plume created during dredging does not deposit and hereby affect any sensitive habitats. Computational modelling predicts that the plume should remain to the west of the channel area and should therefore not affect the live maerl bed and the seagrass beds to the east and north of the channel area. However, it is recommended that these habitats are monitored following the dredging activity to ensure that no impacts have occurred due to sediment deposition. This monitoring would include the seagrass beds on the shallow sandbanks between Trefusis and Penarrow Points.

25.3.2 Community Monitoring

Sampling will follow the methodology used for the previous surveys, namely diver core samples and transects across the channel areas. The monitoring will be quantitative to enable statistical analysis to be undertaken to determine changes in community types over time. The monitoring will be undertaken at annual intervals at the same time as the baseline is established (ideally this will be undertaken in summer) for a duration of at least five years. Annual reports will be produced which would be discussed at a regulators meeting where any actions necessary will be agreed.

25.4 MARINE MAMMAL OBSERVATION

It may be necessary to employ a MMO to reduce the risk of piling related noise impacts on marine mammals. Consultation with the relevant bodies (notably Natural England) will establish if it may also be necessary to employ a MMO to ensure that marine mammals are not present in the near vicinity of the piling.

If necessary, it is expected that the MMO will undertake a search for marine mammals 30 minutes prior to the start of pile driving, as recommended by JNCC (2008). A safety zone around piling activity would be implemented by the MMO, with the distance based on consultation with Natural England. The MMO must be confident that no marine mammals are present within the safety zone before the initial piling works commence. If a marine mammal is sighted within the safety zone, then pile driving activities should be delayed by at least 30 minutes, until it has left the safety zone.

25.5 ARCHAEOLOGICAL WATCHING BRIEF AND RECORDING OF FINDS DURING CAPITAL DREDGING

Mitigation for a number of potential impacts on archaeology includes monitoring activities to be undertaken according to an Archaeological Protocol and Written Scheme of Investigation (WSI).

The Archaeological Protocol will include monitoring in the form of an archaeological watching brief during capital dredging of the new navigation channel, with provision for

intervention if archaeological material of maritime interest is identified during this process. It would not be practicable or productive for an archaeologist to be on site constantly during the dredging and a pragmatic approach to the watching brief should be adopted. For example, the project archaeologist could visit the site on the first day of dredging to inspect the method of working and the potential for archaeological screening and to liaise with the appointed contractor's staff with regard to the identification of artefactual material. Subsequently, the watching brief would operate on a call out basis, with the appointed contractor contacting the project archaeologist in the event of anything out of the ordinary being dredged up and the archaeologist making a weekly visit to inspect the work in progress.

A system for reporting finds of archaeological interest could be adopted, closely following the British Marine Aggregate Producers Association and English Heritage Protocol (Wessex Archaeology, 2005). The appointed contractor would nominate one of their staff as a Site Champion for archaeology that would be issued with a flow chart setting out the actions to be taken when they are told about a discovery. The Site Champion would fill in a pro forma Preliminary Record sheet for each find, and would inform the Project Archaeologist. The Project Archaeologist should be present when the areas of selected targets such as GT 31 and GT 40/41 are dredged with a view to recovering at least one of these objects to enable a positive identification to be made.

The monitoring will allow for any features or wreckage to be preserved by record, and could potentially add additional information to our knowledge and understanding of the site and the historical development of Falmouth.

25.6 GAS MONITORING FOR DETAILED RISK ASSESSMENT

As already stated, a site investigation has been carried out on the site. It is considered that the number of window samples provided a sufficient spatial coverage for a preliminary assessment. However, of the boreholes constructed only two dual monitoring wells were installed for ground gas and groundwater sampling. Since ground gases have been identified at the site, it is recommended that further gas monitoring wells are installed to fully assess the risks associated with the presence of ground gas at the site and delineate the areas affected by the ground gases. These further boreholes may also provide additional information on groundwater quality and flow regime.