

6 WATER QUALITY

This section considers the impacts of the placement operation on water quality.

6.1 Existing Environment

The outer Thames Estuary is designated as Shellfish Waters under the SWD. The SWD sets water quality standards for a range of parameters including metals, microbiological contaminants and chemico-physical parameters such as List I and List II substances, dissolved oxygen (DO) and suspended solids (SS). The EA monitors the quality of the Shellfish Waters at one or more fixed monitoring points. Nowhere in the vicinity of the North Edinburgh Channel has been selected for monitoring. The levels of the majority of List I and List II substances are below their relevant EQS levels, but the EA monitoring at inner estuary sites has found exceedences for some parameters including TBT, copper and zinc. These exceedences are likely to be due to the proximity of the sampling point to a fixed source, for example, an outfall.

To some extent, the quality of the surface sediments is an indication of the quality of the overlying waters as these waters are the main pathway of contaminants into the sediment. The sediment quality analysis in both the area to be dredged and the North Edinburgh Channel did not identify significant levels of contamination in the sediment (with the exception of arsenic) and thus it would be reasonable to assume that the water quality in the outer Thames Estuary is similarly acceptable.

Water sampling was undertaken prior to and during the Phase I dredge in Princes Channel and suggested that background suspended solids levels (1m above the bed) vary between approximately 30mg l^{-1} to approximately 100mg l^{-1} . These levels were representative of background conditions during a quiet period with little or no storm activity. Dissolved oxygen levels were generally above 10mg l^{-1} . Given that the North Edinburgh Channel is relatively close to Princes Channel, this data is likely to be representative of the general area, although, with the addition of the mobile sand and the channel movements recorded on the hydrographic survey it is likely that the lower water column in the North Edinburgh Channel may be subject to periods with significantly greater concentrations of suspended solids.

6.2 Increase in Suspended Sediment in the Water Column

The Dredging Process model developed by DRL has shown that the fines content of the material in the hopper will be in the region of 5.5 to 8.5%, depending on dredger size. This material will be mixed with the coarser sediment and will fall through the water column as part of the dynamic plume. It is estimated that approximately 3% of the hopper total load of dredged material is released into the water column as the material falls to the seabed. This material will be a mixture of both coarser and fine sediment. However, the material will enter the water column at a depth of between 6-10m below the

water surface thus limiting the potential for any effects in the first 10m of the water column. The material lost to the water column will spread laterally and move in the direction of the tide as it continues to fall. Assuming an average hopper capacity of 6,000m³, approximately 10 to 15m³ of fines would move into the surrounding water. This quantity can be compared with the figure of around 8,000m³ of residual movement in the North Edinburgh Channel on each tide and a considerably larger figure for absolute movement. With the three hour round trip between the placement site and the dredged area, it is predicted that any temporary increase in suspended sediment at depth in the water column will be well within background levels before the next placement operation. As a result, **no impacts** on water quality from increases in suspended solids are predicted.

6.3 Input of Contaminants to the Water Column

The sediment quality survey found that levels of all contaminants in the material to be dredged are below guideline values for disposal at sea. These values are established to consider effects on the water column as a result of the disposal process. Given the low levels of contaminants, the limited fines content of the dredged material and the wide dilution of the Outer Thames Estuary there is **no risk** of input contaminants to the water column. Mobilisation of the existing bed material, with its higher levels of certain trace metals, during each tidal cycle has more potential to input contaminants into the water column. It is therefore not considered necessary to undertake any further investigation into losses of contaminants.

6.4 Input of Microbiological Parameters to the Water Column

There are no microbiological contaminants in the material to be placed in the North Edinburgh Channel site and there is, therefore, **no risk** of such contaminants being lost to the water column.

6.5 Decrease in Dissolved Oxygen Levels

Monitoring of a number of different types of dredging operations on the Thames (including Phase I of the Princes Channel Development) has indicated that there is no effect on dissolved oxygen levels as a result of dredging. The material to be deposited has low organic content and, therefore, a low biochemical oxygen demand. There will be no measurable lateral plume from the placement operation. **No impact** on dissolved oxygen levels is predicted.

6.6 Summary of Impacts

No impacts are predicted on water quality as a result of the proposed placement operation.

6.7 Monitoring

As no impacts are predicted, no monitoring is proposed in this offshore area.