

Mersea Harbour and Tollesbury Wick Climate change adaptation recharge project: Water Framework Directive compliance assessment

The Water Framework Directive (WFD) requires that environmental objectives are set for all surface and ground waters in each EU Member State to enable them to achieve either 'good status', for natural water bodies, or 'good ecological potential', for heavily modified water bodies (HMWB) and artificial water bodies (AWB). HMWBs are defined as bodies of water that have undergone significant changes in their natural character due to human intervention, and AWBs are surface water bodies which have been created where there were no pre-existing water bodies. As such, neither of these water bodies would be able to achieve the natural conditions required to meet 'good ecological status', but instead would be expected to reach 'good ecological potential' within the specified timeframes.

The environmental objectives of the WFD are summarised below:

- Promote sustainable use of water as a natural resource.
- Aim to achieve at least good status for all waters by 2015. Where this is not possible good status should be achieved by 2027.
- Prevent deterioration and enhance status of aquatic ecosystems and associated wetlands.
- Conserve habitats and species which directly depend on water.
- Reduce pollution from priority substances.
- Prevent deterioration / reduce pollution of groundwater.
- Contribute to mitigating the effects of floods and droughts.

The ecological status of a water body is determined by assessments of biological, physico-chemical, and hydromorphological 'quality elements', as indicated in Table 1 below.

Quality element	Description
Biological	Presence or absence of algae, plants, invertebrates, fish
Physico-chemical	Quantifying the elements which support the biology: pH, dissolved oxygen, nutrient levels
Hydromorphological	Assessing the quality of physical aspects supporting biological quality of the water body: quantity and dynamics of water flow, sediment composition and transport, channel width

The Water Framework Directive categorises water bodies under five status classes: high, good, moderate, poor or bad depending on the assessment of the quality elements outlined above. High status would require that the biological, chemical and hydromorphological conditions were subject to no or minimal human impacts and is the 'reference condition' against which all other status categories are measured. Good status would indicate a slight deviation from the reference condition, so the further a water body deviates from the reference condition, the poorer its quality. The overall status of a water body is determined by the lowest 'quality element' assessment.

Screening

The project proposal is located within the Blackwater transitional water body, GB520503714000, and is adjacent to the Blackwater Outer coastal water body, GB650503200000.

No disposal activity was carried out at the Mersea Harbour location during the period 2006 – 2008 when the EA were classifying the Blackwater transitional water body and Blackwater Outer water body. The recharge proposal is therefore classed as a new project.

New project scoping and assessment process

An activity which has the potential to have an impact on ecology, as defined by the biological, physico-chemical and hydromorphological quality elements listed in Annex V of the WFD, will need consideration in terms of whether it could cause deterioration in the ecological status or potential of a water body. Table 2 (below) sets out WFD quality elements for the Blackwater transitional water body and the Outer Blackwater water body and their current classification status and status objectives. It also lists the protected area characteristics. The current proposal has subsequently been assessed against the WFD parameters and protected area characteristics, using the EA trigger criteria (EA, 2012), and the results recorded in the table. Aspects of the proposal identified as exceeding the EA trigger criteria are then assessed to consider whether they could cause deterioration in the ecological status or potential of the water bodies.

Table 2. Scoping of recharge proposal against current (Cycle 2, 2015) WFD parameters and objectives for ecological and chemical status (adapted from Table 4, Environment Agency, 2012) for Blackwater transitional water body and Blackwater Outer coastal water body.

Step	1	2		
	Identify issues	Record current status & 2015 objective		
	Identify all potentially-affected quality elements and all potentially-affected protected area characteristics	Record current status of quality element	Record 2015 objective	Record 2027 objective
WFD parameter (quality elements, specific pollutant, priority substance, protected area)	1	2a	2b	2c
	Referring to the Trigger Table, tick quality elements where a potential causal link exists	High/good/moderate/poor/bad for ecological elements or High/Fail for chemical elements or protected area status or not assessed		
Biological elements	Assessment considers effects on biology in the water body.	Moderate	Moderate	Good
Phytoplankton	Screened out			
Other aquatic flora (e.g. saltmarsh, seagrass, seaweed).	Disposal activity will not affect > 5% of water body.			
Benthic invertebrate fauna.	Disposal activity will not affect > 5% of water body.			
Fish fauna (transitional only).	Disposal activity will not affect > 5% of water body.			
Hydromorphological elements supporting biological elements	Assessment required - see below	Does not support good	Does not support good	Supports good
Morphological conditions				
Depth variation.	Disposal activity will not affect > 5% of water body.			
Bed.	Disposal activity will not affect > 5% of water body.			
Inter-tidal zone structure.	Disposal will be placed on intertidal - assessment required			
Tidal regime				

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WFD parameter (quality elements, specific pollutant, priority substance, protected area)	1	2a	2b	2c
	Referring to the Trigger Table, tick quality elements where a potential causal link exists	High/good/moderate/poor/bad for ecological elements or High/Fail for chemical elements or protected area status or not assessed		
Dominant currents (coastal water bodies only).	Activity will not take place in coastal water body (adjacent)			
Freshwater flow (transitional water bodies only).	Screened out			
Wave exposure.	Will take place in shallow water body - assessment required			
Chemical and physico-chemical elements supporting biological elements	Assessment required - see below	Moderate	Moderate	Moderate
Transparency.	Non-dispersive.			
Thermal conditions.	Screened out			
Oxygenation conditions.	Screened out			
Salinity.	Screened out			
Nutrient conditions (e.g. nitrogen).	Screened out			
Specific pollutants	Assessment required - see sediment analysis results below	High	High	High
Arsenic.	3.56mg/kg above CEFAS Action Level 1			
Chromium.	22.61mg/kg above CEFAS Action Level 1			
Copper.	Below CEFAS AL1			
Zinc.	Below CEFAS AL2			

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PCBs (congeners to be determined by EA & CEFAS).	Not required to be tested (CEFAS)			
Selected priority substances	Assessment required - see sediment analysis results below	Good	Good	Good
Anthracene (PHS).	N/A			
Hexachlorobenzene, hexachlorobutadiene and hexachlorocyclohexane.	N/A			
Penta bromodiphenyl ethers.	N/A			
Cadmium and its compounds (PHS).	Below CEFAS AL1			
Fluoranthene.	0.108 mg/kg above CEFAS AL1			
Lead and its compounds.	Below CEFAS AL1			
Mercury and its compounds (PHS).	Below CEFAS AL2			
Napthalene.	0.131 mg/kg above CEFAS A/L1			
Nickel and its compounds.	17.63mg/kg above CEFAS A/L 1			

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WFD parameter (quality elements, specific pollutant, priority substance, protected area)	1	2a	2b	2c
	Referring to the Trigger Table, tick quality elements where a potential causal link exists	High/good/moderate/poor/bad for ecological elements or High/Fail for chemical elements or protected area status or not assessed		
Polyaromatic hydrocarbons (PHS): • Benzo (a)pyrene (PHS). • Benzo (b) fluoranthene (PHS). • Benzo (g, h, i) perylene (PHS). • Benzo (k) fluoranthene. • Indeno (1, 2, 3-cd) pyrene and benzo (g, h, i) perylene (PHS).	N/A			
Tributyltin compounds (PHS).	Not required to be tested (CEFAS)			
Protected areas	Assessment required - see below			
Areas designated for the protection of economically significant aquatic species (for example shellfish waters).	Yes - assessment required .			
Bodies of water designated as recreational waters (for example bathing waters).	Yes - assessment required .			
Nutrient-sensitive areas including Nitrate Vulnerable Zones, polluted waters and Sensitive Areas.	N/A			
Areas designated for the protection of habitats or species where maintenance or improvement of the status of water is an important factor in their protection, including Natura 2000 sites (for example Special Areas of Conservation or Special Protection Areas	Yes - assessment required .			

Water Framework Directive assessment of current proposal

Table 2 indicates that the recharge proposal has exceeded trigger thresholds outlined in the Environment Agency's trigger table (2012). This suggests that there is the potential for the proposal to impact the ecological status parameters - hydromorphological and physico-chemical elements supporting biological elements and characteristics of protected areas. It should be noted that where WFD quality elements are failing to reach good ecological status in the Blackwater water bodies, the disposal of dredged material has not been identified as the cause (Environment Agency, 2015).

Table 2 has identified the following issues:

- due to the recharge being placed on the intertidal there is the potential to impact the intertidal zone structure.
- there are some exceedances of specific pollutants and selected priority substances above CEFAS Action Level 1.
- the proposal also has the potential to impact protected areas where the maintenance or improvement of water quality is an important factor in their protection.

The Environment Agency has assessed the chemical status of the Blackwater transitional and Blackwater Outer coastal water bodies as good quality. Sediment testing by CEFAS of the trial pits in the Harwich Approaches has established that the silt constituent is low and levels of pollutants are below CEFAS Action Level 1, so there would be no importation of contaminants likely to cause concern. There are elevated levels of pollutants, above the lower CEFAS Action Level, in a few of the sediment samples at the receptor sites, as described in the Environmental Statement. The ES has indicated that mobilisation and suspension of sediment and sediment-bound pollutants is likely to occur during the disposal operation and this could result in a localised increase in concentrations of toxic substances in the water column. However, these would undergo significant dilution in the Mersea Quarters. The impact would also be minimised by the following: surface silts are shallow, due to erosion, limiting the volume that could be suspended in the water column; the first few loads will cover the mud flats preventing the further release of silts from the sea bed; and, at two of the sites, the new recharge will be deposited onto a pre-existing recharge base. The short discharge time (forty minutes per load) and the time interval between deliveries will also modify any impact.

The quality of the physical aspects supporting the biological quality of the water body – hydromorphological elements – do not currently meet objectives. The Environment Agency cites the overall reason for failure of the hydrological regime as 'abstraction and flow'. Table 2 has highlighted two potential risks to morphology from the current proposal. These relate to: morphological condition, with reference to intertidal zone structure, and the tidal regime, with regard to wave exposure. The Environmental Statement has considered that there would be no detectable impact on the tidal regime leading to harmful effects on the biological quality of the water body. The recharge is designed to protect biological features of the water body from wave exposure. The form and structure of the intertidal zone will change at the recharge placement sites. The recharge configuration will emulate natural wave-built beach structures which are a feature of the outer estuary. As a result the foreshore and saltmarsh will be protected from high wave energy.

Protected areas have been fully considered in the Environmental Statement taking into account water quality status with regard to safeguarding the protected interests. The ES has

determined that, with the inclusion of mitigatory measures, where applicable, there will be no significant risks to protected areas.

Conclusion

Overall, based on existing knowledge presented in the Environmental Assessment, it is considered that the proposal to place recharge material in the Mersea Harbour area would not affect status at the water body level or impact protected area objectives.

References

Environment Agency (2012). Clearing the waters – a user guide for marine dredging activities. New projects process
<https://www.gov.uk/government/publications/complying-with-the-water-framework-directive-marine-dredging>

Environment Agency (2015).
<https://www.gov.uk/government/collections/river-basin-management-plans-2015>