

APPENDIX 4F CALCULATIONS ON RELEASE OF CONTAMINANTS FROM DREDGING

The potential heavy metal release arising from contaminated pore water released from sediment during dredging is estimated based on the equation adopted from the "Water Quality Prevention, Identification and Management of Diffuse Pollution" by Vladimir Novotny & Harvey Olem, Van Nostrand Reinhold, New York, 1994.

$$C_T = \theta C_d + C_p$$

where

C_T	=	Total contaminant concentration ($\mu\text{g l}^{-1}$)
θ	=	Water content of the sediment as a fraction of the volume (for water $\theta = 1$)
C_d	=	Desorbed concentration of the contaminant ($\mu\text{g l}^{-1}$)
C_p	=	Adsorbed concentration of the contaminant ($\mu\text{g l}^{-1}$)

$$C_p = M_{ss} \times r$$

where M_{ss}	=	Concentration of solids in g l^{-1}
r	=	Adsorbed contaminant concentration in $\mu\text{g g}^{-1}$

	r	=	$K_d \times C_d$
where K_d	=	Particulate coefficient of the contaminant (l g^{-1})	

Therefore

$$C_d = C_T / (\theta + K_d \times M_{ss}) \quad (1)$$

Apply Equation (1), where input data/assumptions are detailed as follows in Table F1:

1. Total contaminant concentration in sediment (C_T)

= Contaminant concentration in sediment. The heavy metal concentration used in the calculation is the highest concentration from vibrocore V4 so as to represent the worst-case scenario. (Source: *Test Report on Chemical Analysis of Sediment – Reclamation of Yau Tong Bay Stage 1 Site Investigation (Marine)*, Reported by Materialab, February 1999)

2. Partitioning coefficient (l kg^{-1}) (K_d)

The partitioning coefficient of the heavy metal is obtained from values quoted in *Environmental Impact Assessment Study for Disposal of Contaminated Mud in the East Sha Chau Marine Borrow Pit*, by ERM, January 1997.

3. Concentration of suspended solid in Sediment disposed at the Mud Pit (g l^{-1}) (M_{ss})

$$= 1750 \text{ g/l}^{-1}$$

(Source: This is the value used in the sediment plume modelling undertaken in the EIA Report)

4. Water content of the sediment as a fraction of the volume ($\theta = 0.42$)

(Source: *Test Report on Chemical Analysis of Sediment – Reclamation of Yau Tong Bay Stage 1 Site Investigation (Marine)*, Reported by Materialab, February 1999)

