4. WATER QUALITY

4.1 Water Quality Parameters

4.1.1 Water quality impacts would be a key environmental concern during the construction phase of the development. The ENPOs should ensure that any deterioration of water quality could be readily detected and suitable action can be taken to rectify the situation.

4.1.2 To check compliance with relevant Water Quality Objectives (WQOs), monitoring of turbidity, pH, dissolved oxygen (DO), suspended solids (SS), total inorganic nitrogen (TIN) and unionised ammonia (NH_3-N) should be included. The first three parameters can be measured in-situ whilst the others are determined in laboratory. The EIA concluded that release of heavy metals from the heavily contaminated sediments would be generally low but the concentrations of zinc (Zn) measured from elutriate test at sampling points AC1 and KB1 were well above the assessment criteria. In addition, the organic micro-pollutants, including polychlorinated biphenyls (PCBs), tributyltin (TBT), and polyaromatic hydrocarbons (PAHs), were found much higher than the assessment criteria. These parameters should be included in the water quality monitoring.

4.1.3 In association with the water quality parameters, some relevant data should also be measured/recorded, such as monitoring location/position, sampling time, water depth, water temperature, salinity, dissolved oxygen saturation, weather conditions, sea conditions, tidal stage, and any special phenomena and work being carried out at the construction site. A sample monitoring record sheet is shown in **Appendix B** for reference.

4.1.4 The EIA concluded that the release of heavy metals would not be a concern except for zine at KB1. It is therefore recommended to measure the zinc concentration in the ambient water when dredging is to be carried out in Dredge Zones 8 and 10 at Hoi Sham. The TBT levels were found to be high in the KTTS area. Special attention should be taken to detect the increase in TBT concentration when monitoring the water quality during dredging at KTTS. The parameters of PCBs, PAHs and TBT should be monitored when dredging is to be carried out in the KTAC, KTTS and Hoi Sham areas. However, the need for monitoring of these parameters should be reviewed every three months based on the monitoring results. If the levels of these parameters measured during dredging are consistently low, the inclusion of these paremeters in the subsequent monitoring programme may not be required.

4.1.5 The following gives a list of the parameters to be measured and analysed:

<u>In-situ Measurement</u>

- pH
- Dissolved oxygen (mg/l and % saturation)
- Temperature (^oC)
- Turbidity (NTU)
- Salinity (mg/l)
- Water depth (m)

<u>Laboratory Analysis</u>

- Suspended solids (mg/l)
- Total inorganic nitrogen (mg/l)
- Unionised ammonia (mg/l)
- Zinc (mg/l)
- Polychlorinated biphenyls (µg/L)
- Tributyltin (µg/L)

- Polyaromatic hydrocarbons (μg/L)

4.2 Monitoring Equipment

4.2.1 *Dissolved Oxygen and Temperature Measuring Equipment*

4.2.1.1 The instrument should be a portable, weatherproof dissolved oxygen-measuring instrument equipped with cable, sensor, comprehensive operation manuals, and use a DC power source. It should be capable of measuring:

- dissolved oxygen level in the range of 0-20 mg/l and 0-200% saturation; and
- temperature of 0-45 ^{o}C.

4.2.1.2 It should have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables should be available for replacement where necessary (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

4.2.2 *Turbidity Measurement Instrument*

4.2.2.1 The instrument should be a portable, weatherproof turbidity-measuring instrument complete with comprehensive operation manual. The equipment should use a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU and be complete with a cable (e.g. Hach model 2100P or an approved similar instrument).

4.2.3 *Suspended Solids*

4.2.3.1 A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres, and can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).

4.2.3.2 Water samples for suspended solids measurement should be collected in high density polythene bottles, packed in ice (cooled to 4? C without being frozen), and delivered to the laboratory as soon as possible after collection.

4.2.4 *Salinity*

4.2.4.1 A portable salinometer capable of measuring salinity in the range of 0-40 mg/l should be provided for measuring salinity of the water at each monitoring location.

4.2.5 *Positioning Device*

4.2.5.1 The locations of water monitoring points should be located using a hand-held or boat-fixed digital Global Positioning System (GPS) or other equivalent instrument of similar accuracy. This is to ensure that the water sampling locations are correct during the water quality monitoring work.

4.2.6 *Water Depth Detector*

4.2.6.1 A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. This unit can either be handheld or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.