

chapters of the “Standard Methods for the Examination of Water and Wastewater” updated edition and any other relevant document for his reference.

- 4.3.4** For the testing methods of other parameters as recommended by EIA or required by DEP, detailed method procedures should be submitted to DEP for approval prior to the commencement of monitoring programme. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to DEP. In any circumstance, the sample testing should have comprehensive quality assurance and quality control programmes. The laboratory should prepare to demonstrate the programmes to DEP or his representatives when requested.

4.4 Monitoring Locations

- 4.4.1** The water quality monitoring locations are shown in **Drawing No. 22936/EN/186**. There are in total 8 water quality monitoring stations (M1 to M8) and 2 control stations (C1 and C2). The sensitive receivers located in the close proximity to the development area have been selected as the water quality monitoring stations. Based on the sediment plume modelling results, these sensitive receivers are likely to be affected during dredging and filling. The two control stations have been selected in areas not to be affected by the dredging and filling operations. **Table 4.2** presents the co-ordinates of the stations.

Table 4.2 Co-ordinates of the Water Quality Monitoring Stations

Station	Easting	Northing
M1	836681.70	817703.65
M2	838065.57	818425.84
M3	841853.58	817546.18
M4	842635.06	816243.00
M5	836513.46	816210.42
M6	838391.19	817296.41
M7	840214.61	816948.89
M8	841300.03	816427.61
C1	832377.65	818236.04
C2	844176.87	815209.56

- 4.4.2** The status and locations of water quality sensitive receivers and the marine activity sites may change after issuing this Manual. If such cases exist, the EMT Leader should propose updated monitoring locations and seek approval from DEP. When alternative monitoring locations are proposed, they should be chosen based on the following criteria:

- at locations close to and preferably outside the affected area of the sediment plume generated by dredging and filling works;
- close to the sensitive receivers, which are directly or likely to be affected;
- for monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance during monitoring; and
- at two or more control stations which should be at locations representative of the project site in its undisturbed condition. Control stations should be located both upstream and down stream of the working area, wherever practicable.

- 4.4.3** Competent staff should be deployed to carry out the water quality monitoring. Measurements should be taken at 3 water depths, namely, 1m below water surface, mid-depth and 1m above seabed, except where the water depth less than 6m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station should be monitored. The EMT Leader should seek approval from DEP on all the monitoring stations.

- 4.4.4** It is also proposed to perform water quality monitoring to determine the need for maintenance

dredging. Two control stations with one at the upstream location of the box culvert and one at the open water near the box culvert outlet would be selected. One monitoring station would be located within the section of the box culvert. Biweekly monitoring of the DO levels at the control and monitoring stations would be carried out. When the measured DO level at the monitoring station is below 2mg/L, additional measurement should be carried out on the next day. It is recommended that the action plan should be triggered to implement maintenance dredging under the following conditions:

- The DO levels at the monitoring station are below 2 mg/L for three consecutive measurements on three monitoring days; and
- The DO levels at the monitoring station are lower than the DO levels measured at the two control stations on the same events.

4.4.5 The monitoring programme would be reviewed after 2 years of monitoring. If there is no exceedance of the action level, the monitoring programme could be discontinued. If not, the information collected through the two-year monitoring and experience gained from the maintenance dredging should be used to reschedule the monitoring programme.

4.5 Baseline Monitoring

4.5.1 Baseline conditions for water quality should be established and agreed with DEP prior to the commencement of works. The purposes of the baseline monitoring are to establish ambient conditions prior to the commencement of the works and to demonstrate the suitability of the proposed impact, control and reference monitoring stations. The baseline conditions should normally be established by measuring the water quality parameters specified in Section 4.1. **Table 4.3** summarises the water quality parameters and programme for baseline monitoring.

4.5.2 The measurements should be taken at all designated monitoring stations including control stations, 3 days per week, at mid-flood and mid-ebb tides, for four weeks prior to the commencement of marine works. There should not be any marine construction activities in the vicinity of the stations during the baseline monitoring.

4.5.3 In exceptional case when insufficient baseline monitoring data or questionable results are obtained, the EMT Leader should seek approval from DEP on an appropriate set of data to be used as baseline reference.

Table 4.3 Water Quality Parameters and Programme for Baseline Monitoring

Parameter	Stations	Monitoring Frequency	Total Sampling Days
PH	All	3 days per week	12 days
DO	All	3 days per week	12 days
Temperature	All	3 days per week	12 days
Turbidity	All	3 days per week	12 days
Salinity	All	3 days per week	12 days
Water depth	All	3 days per week	12 days
SS	All	3 days per week	12 days
TIN	All	3 days per week	12 days
Unionised ammonia	All	3 days per week	12 days
Zn	All	3 days per week	12 days
PCBs	All	3 days per week	12 days
TBT	All	3 days per week	12 days
PAHs	All	3 days per week	12 days