

**Contract HK 12/02**  
**Central Reclamation Phase III – Engineering Works**  
**Environmental Permit No.: EP-01/122/2003/A**

**Certification and Verification**  
**for EP Condition 3.3 –**  
**Additional Water Quality Monitoring Programme**

**ET Leader Certification**

This certification references the Contractor's submissions dated Friday, 25 January 2008 (via email) providing the Water Quality Monitoring Programme for Baseline Monitoring (Rev.1) and Impact Monitoring Programme (Rev. 2) to monitor the effectiveness of the mitigation measures for marine filling works using "Type A Fill" at FRAW as per Condition 3.3 of the EP (No. EP-01/122/2003/A).

Last paragraph of Condition 3.3 in the project Environmental Permit (EP-01/122/2003/A) states:

"To ensure that the use of 'Type A Fill' will not result in unacceptable water quality impact, an additional water quality monitoring programme shall be implemented to monitor the effectiveness of the control and mitigation measures. The additional water quality monitoring programme plan shall be certified by the ET Leader and verified by the IEC as adequate to monitor the effectiveness of the measures and allow triggering of follow up actions to avoid unacceptable impacts. The monitoring programme plan shall be deposited with the Director at least 1 week before the commencement of the filling works using 'Type A Fill'. The supplementary water quality programme shall form part of the EM&A programme stated in Condition 4.1 of this Permit. "

As specified in the Contractor's submission, additional water quality monitoring stations have been identified for monitoring of the Suspended Solids (SS, in mg/L) concentration prior to and during the course of the filling works using "Type A Fill" at FRAW.

All sampling shall be undertaken as referenced in the submissions.

The water samples collected shall be delivered to a local HOKLAS accredited laboratory for analyses of SS.

All monitoring data shall be submitted as referenced in the submissions to the ET Leader, IEC and Engineer for review.

The SS concentration (mg/L) for the cooling water intake stations and marine based stations shall be below the Action and Limit Levels specified in the referenced submissions and as identified from the baseline monitoring results.

No visible sediment plume leaving works site boundary is allowed.

In case of exceedance of the Action or Limit Levels the Event and Action Plan for Water Quality stipulated in the Project's EM&A Manual shall be followed.

The ET Leader and the IEC agree that the proposed additional water quality monitoring programme is adequate for monitoring the effectiveness of the mitigation measures during the marine filling works using "Type A Fill" at FRAW.

Susana Bezy, Environmental Team Leader:



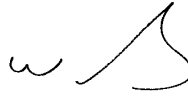
Date: 25 January 2008

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**IC(E) Verification**

I hereby verify the above information.

Bill Douglas, Independent Checker (Environment):



Date: 25 January 2008

**Additional Water Quality Monitoring Programme  
for EP No. EP-01/122/2003/A Condition 3.3  
(Baseline Monitoring)**

**Objective**

To establish ambient conditions of water quality around the seawall gap prior to commencement of underwater filling works using Type A Fill at FRAW.

**Monitoring Stations**

There are totally 9 monitoring stations, the monitoring stations consist of 5 marine based stations, 2 control stations and 2 cooling water intake monitoring stations (the nearest Water Quality Sensitive Receiver to the seawall gap).

The marine based monitoring stations are:

AM1 – about 50 m away from the seawall gap between caisson units C15 and C16;

AM2 – about 50 m away from AM1 towards M7;

AM3 – about 50 m away from AM1 towards M9;

AM4 – at the seawall gap (inside the silt curtain) between caisson units C15 and C16;  
and

AM5 – located inside FRAW and about 75 m away from AM4.

The control stations are:

M7 and M9 which are monitoring stations of the existing EM&A programme conducting by the Environmental Team, these 2 stations act as control stations of the impact water quality monitoring programme.

The cooling water intake monitoring stations are:

M4B – cooling water intake for PLA; and

M2A – cooling water intake for HSBC.

Since there is extensive water quality monitoring data for the control stations M9 & M7 and cooling water intake monitoring stations (M4B & M2A), the existing data can be referenced with regard to baseline conditions. As such, this baseline monitoring shall only be carried out at the 5 marine based monitoring stations (AM1 to AM5), their positions are shown in Figure 1.

The coordinates of the baseline monitoring stations are tabulated below:

Station	Easting	Northing
AM1	834921	816194
AM2	834970	816198
AM3	834906	816242
AM4	834894	816139
AM5	834828	816104

### **Monitoring Programme**

The monitoring programme shall last for 9 successive days (including Sundays, starting from 12 Jan 2007). Monitoring shall be undertaken at mid-ebb and mid-flood tides at the designated monitoring stations.

Water samples shall be collected in duplicate at 3 water depths, namely, 1m below water surface, mid-depth and 1m above seabed, except where the water depth is less than 6m, the mid-depth shall be omitted. Should the water depth less than 3m, only the mid-depth level shall be monitored.

The water samples collected shall be delivered to a local HOKLAS accredited laboratory for analyses of Suspended Solids (SS).

Site observations shall be recorded by the sampling team.

In situ measurement for dissolved oxygen, temperature, salinity, water depth and turbidity shall also be reported.

### **Reporting**

Interim Baseline Report for the first four days baseline monitoring data shall be submitted to EPD, ER, ET Leader and IEC for review in the course of the baseline monitoring. Full Baseline Report shall be submitted after completion of the baseline monitoring.

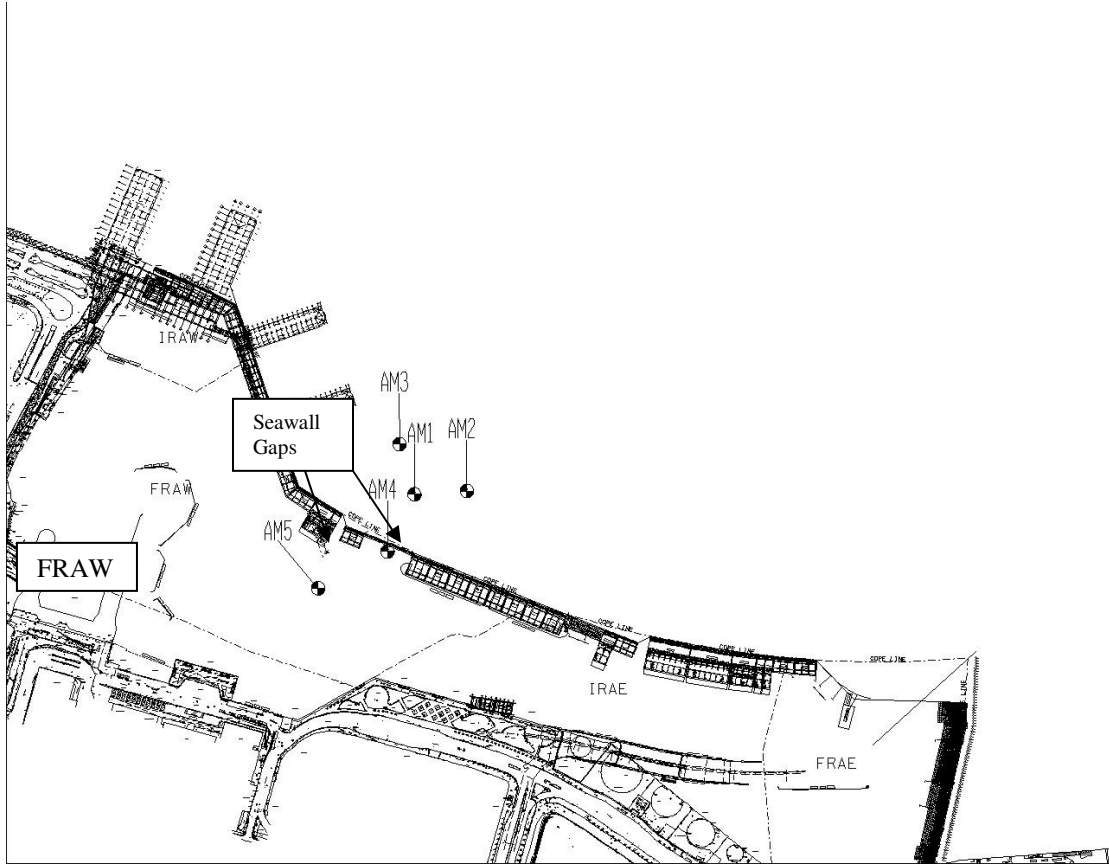


Figure 1. Locations of Baseline Water Quality Monitoring Stations.

**Additional Water Quality Monitoring Programme  
for EP No. EP-01/122/2003/A Condition 3.3  
(Impact Monitoring)**

**Purpose**

To monitor the effectiveness of the mitigation measures for marine filling works using “Type A Fill” at FRAW.

**Monitoring Stations**

There are totally 9 monitoring stations, the monitoring stations consist of 5 marine based stations, 2 control stations and 2 cooling water intake monitoring stations (the nearest Water Quality Sensitive Receiver to the seawall gap).

The marine based monitoring stations are:

AM1 – about 50 m away from the seawall gap between caisson units C15 and C16;

AM2 – about 50 m away from AM1 towards M7;

AM3 – about 50 m away from AM1 towards M9;

AM4 – at the seawall gap (inside the silt curtain) between caisson units C15 and C16;  
and

AM5 – located inside FRAW and about 75 m away from AM4.

The control stations are:

M7 and M9 which are monitoring stations of the existing EM&A programme conducting by the Environmental Team, these 2 stations act as control stations of the impact water quality monitoring programme.

The cooling water intake monitoring stations are:

M4B – cooling water intake for PLA; and

M2A – cooling water intake for HSBC.

The coordinates of the monitoring stations are tabulated below and their positions are shown in Figure 1.:

Station	Easting	Northing
AM1	834921	816194
AM2	834970	816198
AM3	834906	816242
AM4	834894	816139
AM5	834828	816104
M2A	835108	816063
M4B	835068	816078
M9	834815	816546
M7	835497	816234

## **Monitoring Programme**

### **First Phase Water Quality Monitoring**

During the course of the underwater filling works using “Type A Fill” at FRAW, monitoring shall be undertaken just after the release of barge load once in the morning and once in the afternoon, at mid-ebb and mid-flood tides, (ie 4 sampling events per day) at the designated monitoring stations daily for the first two weeks of works. Should there be no project related exceedances of the Limit Level, the Second Phase Water Quality Monitoring shall be proceeded.

### **Second Phase Water Quality Monitoring**

During the course of the underwater filling works using “Type A Fill” at FRAW, the subsequent water quality monitoring shall be carried out on mid-ebb and mid-flood tides on the same days as the normal EM&A monitoring schedule.

### **The Water Quality Monitoring**

For both the First and Second Phase Water Quality Monitoring, all the marine based monitoring stations (AM1,AM2, AM3, AM4, AM5, M9 and M7), water samples shall be collected in duplicate at 3 water depths, namely, 1m below water surface, mid-depth and 1m above seabed, except where the water depth is less than 6m, the mid-depth shall be omitted. Should the water depth less than 3m, only the mid-depth level shall be monitored. For cooling water intake monitoring station (M4B and M2A), duplicate samples shall only be collected at the intake level.

The water samples collected shall be delivered to a local HOKLAS accredited laboratory for analyses of Suspended Solids (SS). The details of the filling activities including the time, location and amount of filling, the weather conditions including the wind direction, site observations including any visible sediment plume, any defects of the silt curtain system and any other marine works concurrently conducting should be recorded and reported by the sampling team to support the analysis of the water quality monitoring results.

Further to SS, in situ measurements for dissolved oxygen, temperature, turbidity and salinity shall also be conducted. As turbidity has not been used in the past for the routine EM&A as an action or limit level, it is preferred to base the results on SS data. However, turbidity will be reviewed each day as an indication of potential exceedances of the Action and Limit Levels.

### **Stepwise Increase in Filling Rate**

In order to take a more conservative approach on the underwater filling works using Type A Fill material, the filling rate shall be started at 3500m<sup>3</sup> per day for the first week, should there be no project related exceedances of the Limit Level, the rate shall

be increased to 5000m<sup>3</sup> per day for the second week, again should there be no project related exceedances of the Limit Level, the filling rate shall be increased to the maximum rate at 7000m<sup>3</sup> per day for the subsequent underwater filling works using Type A Fill.

### **Acceptance Criteria for Monitoring Data**

The Suspended Solids concentration for the cooling water intake station (M4B, M2A) should be below the criteria of the routine monitoring presently being undertaken and agreed with the intake operators as described below:

The Action and Limit Levels for the marine based station (AM1, AM2, AM3) and (M7 and M9) should be determined based on the Baseline Monitoring results.

Monitoring Station	Action Level	Limit Level
M4B	30	40
M2A	23	27
Marine Stations	To be based on the Baseline Monitoring Data	

No visible sediment plume shall leave the works site boundary. Should a visible sediment plume be detected leaving the works site boundary, works shall cease until the plume is dissipated.

### **Corrective Measures**

In case of exceedance of the Action or Limit Level of the cooling water intake monitoring station (M4B, M2A) or the marine based stations. The Event and Action Plan for Water Quality stipulated in the EM&A Manual of CR III shall be followed.

### **Reporting**

The monitoring results will all be included in the Monthly Monitoring Report. Daily reports will be provided on the in situ findings (include water depth, DO, turbidity, salinity, water temperature and site observations) to the RE, CEDD, EPD, ET and IEC. SS data shall be reported within 48 hours after the sampling and submitted to EPD.

However, in case of visible sediment plume dispersing outside the seawall boundary or there is a trend of high turbidity levels, CEDD, ET Leader, IEC, the Engineer and EPD should be informed as soon as practicable, and the monitoring frequency particularly for Suspended Solids (SS) should be increased and additional site investigation(s) should be undertaken to review the situation and propose additional measures if necessary to tackle the problem following the general EM&A programme provision. If the monitoring results show that the filling using "Type A Fill" would unlikely cause adverse water quality impact, the interim requirements of reporting SS levels within 48 hours could be relaxed subject to agreement with EPD.



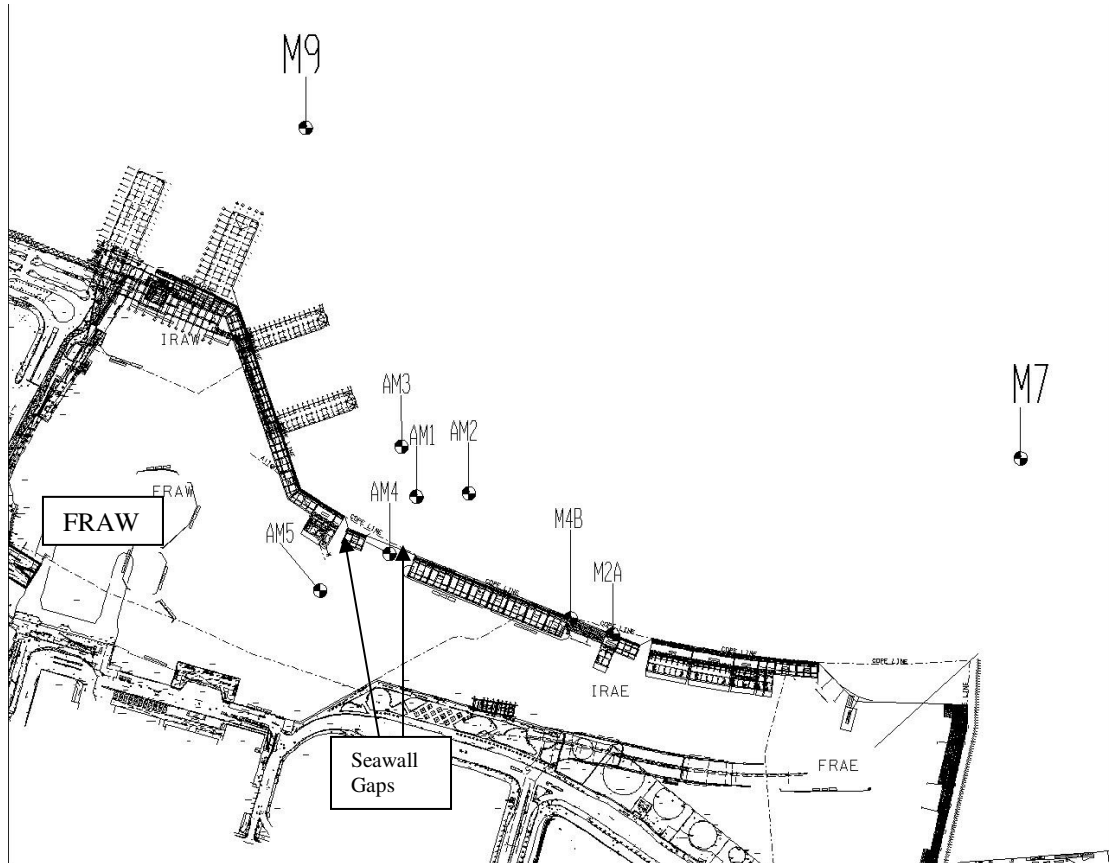


Figure 1. Locations of Impact Water Quality Monitoring Stations.

**Contract HK 12/02**  
**Central Reclamation Phase III – Engineering Works**  
**Environmental Permit No.: EP-01/122/2003/A**

**Certification and Verification**  
**for EP Condition 3.3 –**  
**Additional Water Quality Monitoring Programme (Silt Curtain Efficiency)**

**ET Leader Certification**

This certification references the Contractor's submissions dated 28 January 2008 (Ref : H2189/C1/28386/MP/EY/GL/SS/WI) providing the Water Quality Monitoring Programme for Silt Curtain Efficiency during placement of "Type A Fill" at FRAW.

This monitor programme is verified as meeting the requirements of condition 4.1 of the project Environmental Permit (EP-01/122/2003/A).

Susana Bezy, Environmental Team Leader:




Date: 29 January 2008

**IC(E) Verification**

I hereby verify the above information.

Bill Douglas, Independent Checker (Environment):



Date: 29 January 2008

## **Additional Water Quality Monitoring Programme for Silt Curtain Efficiency**

### **Purpose**

To review the effectiveness of the SS reduction associated with the use of a silt curtain during underwater filling works using “Type A Fill” at FRAW.

### **Monitoring Stations**

There are 2 monitoring stations, one inside the active filling works area (AM6, enclosed by the silt curtain) and one outside the silt curtain (AM5, monitoring station used in the impact monitoring).

The coordinates of AM5 are 834828 (Easting) and 816104 (Northing). Since AM6 is located inside the active filling works area, due to safety consideration and progress of the filling works, its location may varies. The exact location of AM6 for each monitoring should be recorded and reported in the report to be submitted to EPD among others.

### **Monitoring Programme**

During the course of the underwater filling works using “Type A Fill” at FRAW using maximum filling rate (ie 7000 m<sup>3</sup> / day), the monitoring shall be conducted twice per day, 3 days per week for two weeks. Sampling will be undertaken upon full release of the barge load.

Water samples shall be collected in duplicate at 3 water depths, namely, 1m below water surface, mid-depth and 1m above seabed, except where the water depth is less than 6m, the mid-depth shall be omitted. Should the water depth be less than 3m, only the mid-depth level shall be monitored. For cooling water intake monitoring stations (M4B and M2A), duplicate samples will only be collected at the intake level.

The water samples collected shall be delivered to a local HOKLAS accredited laboratory for analyses of Suspended Solids (SS). The details of the filling activities including the time, location and amount of filling, the weather conditions including the wind direction, site observations including any visible sediment plume, any defects of the silt curtain system and any other marine works concurrently conducting should be recorded and reported by the sampling team to support the analysis of the water quality monitoring results. Site observations (including tidal status) shall be recorded by the sampling team.

Safety will be the highest priority during sampling works and sampling will cease should conditions warrant ensuring the safety of the staff. Prior to sampling the team will undergo safety training.

### **Timing for collecting Water Samples**

The samples should be collected just after the full release of the barge load of Type A Fill inside the active filling area.

### **Reporting**

A separate report on the sampling results (SS reduction factor) will be submitted to ER, EPD, E T Leader and IEC after completion of the monitoring programme.

Along with the sampling results, information such as weather conditions, observations, dumping location compared with the sampling locations and related distances shall be provided along with information on the tidal state at the time of sampling.

The report for the silt curtain efficiency should also take into account of the data of other monitoring stations so as to cover the efficiency of the 3 sets of silt curtains.

### **Contingency Plan**

Should the silt curtain be found not to be performing to a sufficient level of SS reduction and there is exceedance of the Action and /or Limit Levels, the Event and Action Plan for Water Quality (Table 4.3) stipulated in the EM&A Manual for Central Reclamation Phase III shall be followed, which shall include:

1. Check all plant and equipment;
2. Consider changes of working methods;
3. Discuss with ET, IC(E) and ER and propose mitigation measures to IC(E) and ER within 48 hours;
4. Implement the agreed mitigation measures;
5. As directed by Engineer, slow down or stop all or part of the Type A Filling works.

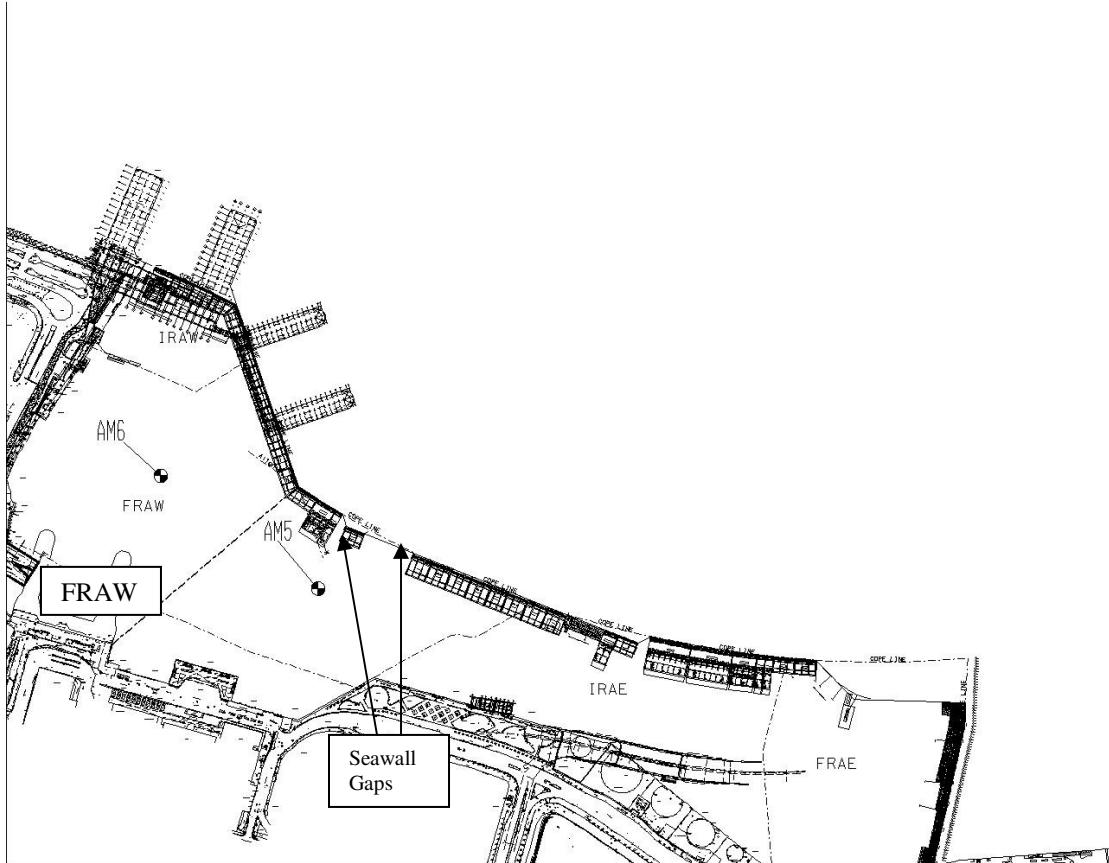


Figure 1. Locations of Water Quality Monitoring Stations for Curtain Efficiency.