

**Environmental Monitoring and Audit  
 for Contaminated Mud Pits to the  
 South of The Brothers and at East  
 Sha Chau (2012-2017) – Investigation  
 Agreement No. CE 23/2012(EP)**

**19<sup>th</sup> Monthly Progress Report for Contaminated  
 Mud Pits to the South of The Brothers and at  
 East Sha Chau – March 2014**

Revision 0

7 May 2014

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# Environmental Monitoring and Audit for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau (2012-2017) – Investigation




## 19<sup>th</sup> Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – March 2014

Revision 0

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Client: Civil Engineering and Development Department (CEDD)		Project No: 0175086			
Summary:  This document presents the 19 <sup>th</sup> monthly progress report for Contaminated Mud Pits at the South of The Brothers and at East Sha Chau.		Date: 7 May 2014			
		Approved by:   Craig A. Reid Partner			
v0	19 <sup>th</sup> Monthly Progress Report for ESC CMPs and SB CMPs	YL	JT	CAR	7/5/14
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p>			
		 			

**Dredging, Management and Capping of Contaminated Sediment Disposal  
Facility to the South of The Brothers**

**Environmental Certification Sheet  
EP-427/2011/A**

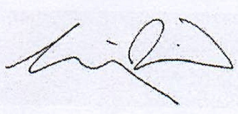
**Reference Document/Plan**

Document/ <del>Plan to be Certified</del> / Verified:	19 <sup>th</sup> Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – March 2014
Date of Report:	7 May 2014
Date prepared by ET:	7 May 2014
Date received by IA:	7 May 2014

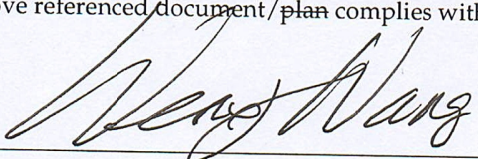
**Reference EP Condition**

Environmental Permit Condition:	Condition No.: 4.4
4 hard copies and 1 electronic copy of monthly EM&A Report shall be submitted to the Director within 2 weeks after the end of the reporting month. The EM&A Reports shall include a summary of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels). The submissions shall be certified by the ET Leader and verified by the Independent Auditor. Additional copies of the submission shall be provided to the Director upon request by the Director.	

**ET Certification**

I hereby certify that the above referenced document/ <del>plan</del> complies with the above referenced condition of EP-427/2011/A	
Craig A. Reid, Environmental Team Leader:	 Date: 7/5/2014

**IA Verification**

I hereby verify that the above referenced document/ <del>plan</del> complies with the above referenced condition of EP-427/2011/A	
Dr Wang Wen Xiong, Independent Auditor:	 Date: 7/5/2014

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Agreement No. CE 23/2012 (EP)  
Environmental Monitoring and Audit  
for Contaminated Mud Pits to the South of The Brothers and at East Sha  
Chau (2012-2017) - Investigation

19<sup>TH</sup> MONTHLY PROGRESS REPORT FOR MARCH 2014

**1.1 BACKGROUND**

1.1.1 Since early 1990s, contaminated sediment <sup>(1)</sup> arising from various construction works (e.g. dredging and reclamation projects) in Hong Kong has been disposed of at a series of seabed pits at East of Sha Chau (ESC). In late 2008, a review indicated that the existing and planned facilities at ESC would not be able to meet the disposal demand after 2012. In order to meet this demand, the Hong Kong Special Administrative Region Government (HKSARG) decided to implement a new contained aquatic disposal (CAD) <sup>(2)</sup> facility at the South of The Brothers (SB CMPs) which had been under consideration for a number of years.

1.1.2 The environmental acceptability of the construction and operation of the Project had been confirmed by findings of the associated Environmental Impact Assessment (EIA) study completed in 2005 under *Agreement No. CE 12/2002(EP)* <sup>(3)</sup>. The Director of Environmental Protection (DEP) approved this EIA report under the *Environmental Impact Assessment Ordinance (Cap. 499) (EIAO)* in September 2005 (*EIA Register No.: AEIAR-089/2005*).

1.1.3 In accordance with the EIA recommendation, prior to commencement of construction works for the SB CMPs, the Civil Engineering and Development Department (CEDD) undertook a detailed review and update of the EIA findings for the SB site <sup>(4)</sup>. Findings of the EIA review undertaken in 2009/2010 confirmed that the construction and operation of the SB site had been predicted to be environmentally acceptable.

- (1) According to the Management Framework of Dredged/ Excavated Sediment of ETWB TC(W) No. 34/2002, contaminated sediment in general shall mean those sediment requiring Type 2 – Confined Marine Disposal as determined according to this TC(W).
- (2) CAD options may involve use of excavated borrow pits, or may involve purpose-built excavated pits. CAD sites are those which involve filling a seabed pit with contaminated mud and capping it with uncontaminated material such that the original seabed level is restored and the contaminated material is isolated from the surrounding marine environment.
- (3) Detailed Site Selection Study for a Proposed Contaminated Mud Disposal Facility within the Airport East/ East of Sha Chau Area (*Agreement No. CE 12/2002(EP)*)
- (4) Under the CEDD study *Contaminated Sediment Disposal Facility to the South of The Brothers (Agreement No. FM 2/2009)*

1.1.4 *Environmental Permits (EPs) (EP-312/2008/A and EP-427/2011A)* were issued by the Environmental Protection Department (EPD) to the CEDD, the Permit Holder, on 28 November 2008 for East of Sha Chau (ESC) CMP V and on 23 December 2011 for SB CMPs, respectively. Under the requirements of the *EPs*, an Environmental Monitoring and Audit (EM&A) programme as set out in the EM&A Manuals <sup>(1) (2)</sup> is required to be implemented for the CMPs.

1.1.5 The present EM&A programme undertaken under *Agreement No. CE 23/2012 (EP)* covers the dredging, disposal and capping operations of the SB CMPs as well as CMPs at East of Sha Chau (ESC). In March 2014, the following works were being undertaken at the CMPs:

- Capping was being undertaken at ESC CMP IVc and CMP Va;
- Disposal of contaminated mud was taking place at SB CMP 1; and
- Dredging operations were taking place at SB CMP 2.

## 1.2 **REPORTING PERIOD**

1.2.1 This 19<sup>th</sup> *Monthly Progress Report* covers the EM&A activities for the reporting month of March 2014.

## 1.3 **DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES**

1.3.1 The following monitoring activities have been undertaken for SB CMPs in March 2014:

- *Impact Water Quality Monitoring during Dredging Operations* was undertaken for CMP 2 three times per week on 1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 24, 26, 28 and 31 March 2014;
- *Water Column Profiling* for CMP 1 was undertaken on 8 March 2014; and
- *Pit Specific Sediment Chemistry* was undertaken for CMP 1 on 12 March 2014.

(1) ERM (2012) Environmental Monitoring and Audit (EM&A) Manual. Final First Review. Environmental Monitoring and Audit for Contaminated Mud Pits to the South of the Brothers and at East Sha Chau (2012-2017) – Investigation. Agreement No. CE 23/2012(EP). Submitted to EPD in November 2012.

(2) ERM (2010) Environmental Monitoring and Audit (EM&A) Manual. Final Second Review. Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation. Agreement No. CE 4/2009(EP). Submitted to EPD in November 2010.

#### 1.4 **DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS**

1.4.1 No outstanding sampling remained for March 2014. The following laboratory analyses were still in progress during the preparation of this monthly report and hence were not presented in this monthly report:

- Laboratory analyses of sediment samples collected for *Pit Specific Sediment Chemistry of CMP 1* in January, February and March 2014; and
- Laboratory analyses of sediment samples collected for *Cumulative Impact Sediment Chemistry of CMP 1* in February 2014.

1.4.2 A summary of field activities conducted are presented in *Annex A*.

#### 1.5 **BRIEF DISCUSSION OF THE MONITORING RESULTS FOR SB CMPs**

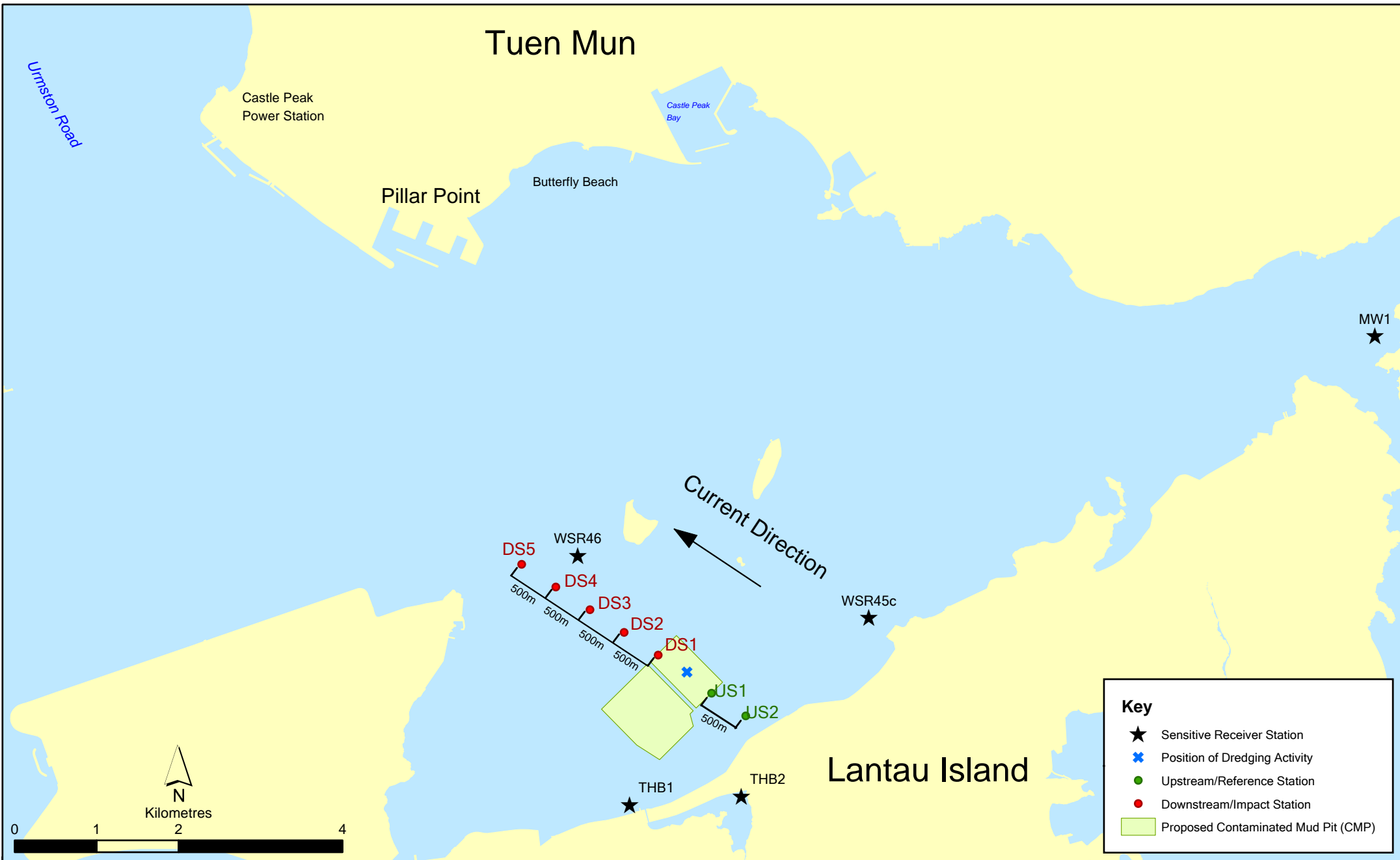
1.5.1 Brief discussion of the monitoring results of the following activities is presented in this *19<sup>th</sup> Monthly Progress Report*:

- *Pit Specific Sediment Chemistry of CMP 1* conducted in December 2013.
- *Routine Water Quality Monitoring of CMP 1* undertaken from 5 to 28 February 2014;
- *Impact Water Quality Monitoring during Dredging Operations of CMP 2* conducted from 27 February to 31 March 2014; and
- *Water Column Profiling of CMP 1* conducted on 8 March 2014.

#### 1.5.2 ***Impact Water Quality Monitoring during Dredging Operations of CMP 2 – 27 February to 31 March 2014***

1.5.3 Monitoring data collected for CMP 2 from 27 February to 31 March 2014 are presented in this monthly report. Detailed discussion will be presented in the corresponding *Quarterly Report*.

1.5.4 *Impact Water Quality Monitoring during Dredging Operations of CMP 2* was conducted three times per week from 27 February to 31 March 2014. On each survey day, sampling was conducted during both mid-ebb and mid-flood tides at two Reference (Upstream) stations upstream and five Impact (Downstream) stations downstream of the dredging operations at CMP 2. Monitoring was also conducted at five Sensitive Receiver Stations situated in Ma Wan, Shum Shui Kok, Tai Mo To and Tai Ho Bay. A total of twelve stations were monitored and locations of the sampling stations are shown in *Figure 1.1*.





1.5.5 Monitoring results from 27 February to 31 March 2014 are presented in *Table C1 of Annex C*. Daily dredging volume in March 2014 is reported in *Annex D*. Levels of Dissolved Oxygen (DO), Turbidity and SS generally complied with the Action and Limit Levels (see *Table C2 of Annex C* for details) set in the *Baseline Monitoring Report* <sup>(1)</sup>, except for the following occasions of exceedance shown in *Table 1.1* below.

**Table 1.1** *Details of Exceedances Recorded at CMP 2 in February and March 2014*

Date	Tide	Parameter	Station	Type
15 March 2014	Mid-Ebb	SS	DS2	Action
		SS	DS3	Action
17 March 2014	Mid-Ebb	SS	WSR45C	Action
19 March 2014	Mid-Ebb	SS	DS2	Action
		SS	DS3	Action
		SS	DS5	Action
	Mid-Flood	Turbidity	DS5	Action
		SS	WSR45C	Action
		SS	WSR46	Action
		Turbidity	WSR46	Action
21 March 2014	Mid-Ebb	SS	WSR45C	Action
	Mid-Flood	SS	DS1	Action
31 March 2014	Mid-Ebb	Turbidity	WSR46	Limit
		SS	DS4	Action
		SS	DS5	Action
		SS	WSR46	Action
	Mid-Flood	SS	DS3	Action
		SS	DS5	Action
		SS	WSR45C	Action
		SS	WSR46	Action

1.5.6 Except for the exceedances recorded during the mid-flood period on 21 March 2014, the other SS and Turbidity were recorded at stations which were located further away from the works area when compared to Impact station DS1 at which the levels of SS and Turbidity did not exceed the Action and Limit Levels during the same tidal period on the same day. As such, these recorded exceedances are not likely to be caused by the dredging works at CMP 2.

1.5.7 SS exceedance was recorded at station DS1 only on 21 March 2014 (mid-flood). Since station DS1 was located at the boundary of the works area, the sole exceedance at DS1 station did not appear to indicate any unacceptable water quality impacts outside the works area of the Project. Overall, it did not appear that the SS exceedance was caused by the dredging operations at CMP 2.

(1) ERM (2012) Baseline Monitoring Report. Environmental Monitoring and Audit for Contaminated Mud Pits to the South of the Brothers and at East Sha Chau (2012-2017) – Investigation. Agreement No. CE 23/2012(EP). Submitted to EPD in October 2012.

- 1.5.8 It should be noted that high levels of Turbidity and SS were occasionally recorded during baseline monitoring which are considered to be sporadic events and characteristic of water quality in this area of Hong Kong (baseline monitoring data are summarised in *Table C3 of Annex C*). Therefore, the Action and Limit Level exceedances may be caused by natural background variation in water quality of the area.
- 1.5.9 Overall, the results indicated that the dredging operations at CMP 2 did not appear to cause any unacceptable deterioration in water quality during this reporting period. Therefore, no further mitigation measures, except for those recommended in the Environmental Permit (*EP-427/2011/A*), are considered necessary for the dredging operations.
- 1.5.10 *Routine Water Quality Monitoring of SB CMP 1 – February 2014***
- 1.5.11 Monitoring results for February 2014 are shown in Tables C4-C7 of Annex C. Monthly averaged and daily monitoring results for February 2014 are presented with graphical presentation in *Figure 1-Figure 27 of Annex B*.
- 1.5.12 The monitoring results for the *Routine Water Quality Monitoring* conducted for February 2014 in the dry season have been assessed for compliance with the Water Quality Objectives (WQOs) set by EPD. This consists of a review of the EPD routine water quality monitoring data for the dry season period (November to March) of 2003-2012 from stations in the Northwestern Water Control Zone, where the CMPs are located. For Salinity, the averaged value obtained from the Reference stations was used for the basis as the WQO. Levels of DO, Turbidity and SS were also assessed for compliance with the Action and Limit Levels (see *Table C2 of Annex C* for details).
- 1.5.13 Locations of monitoring stations are presented in *Figure 1.2* and *Figure 1.3*.
- In-situ Measurements*
- 1.5.14 Analyses of results indicated that for all the stations (Impact, Intermediate, Reference and Water Sensitive Receiver stations), both daily and monthly average levels of pH, DO and Salinity complied with the WQOs in February 2014 (*Figure 1, 2, 4, 12, 15, and 16 of Annex B*).
- 1.5.15 In February 2014, daily and monthly average levels of DO and Turbidity at all the stations complied with the Action and Limit Levels (*Tables C4 and C6 of Annex C*).

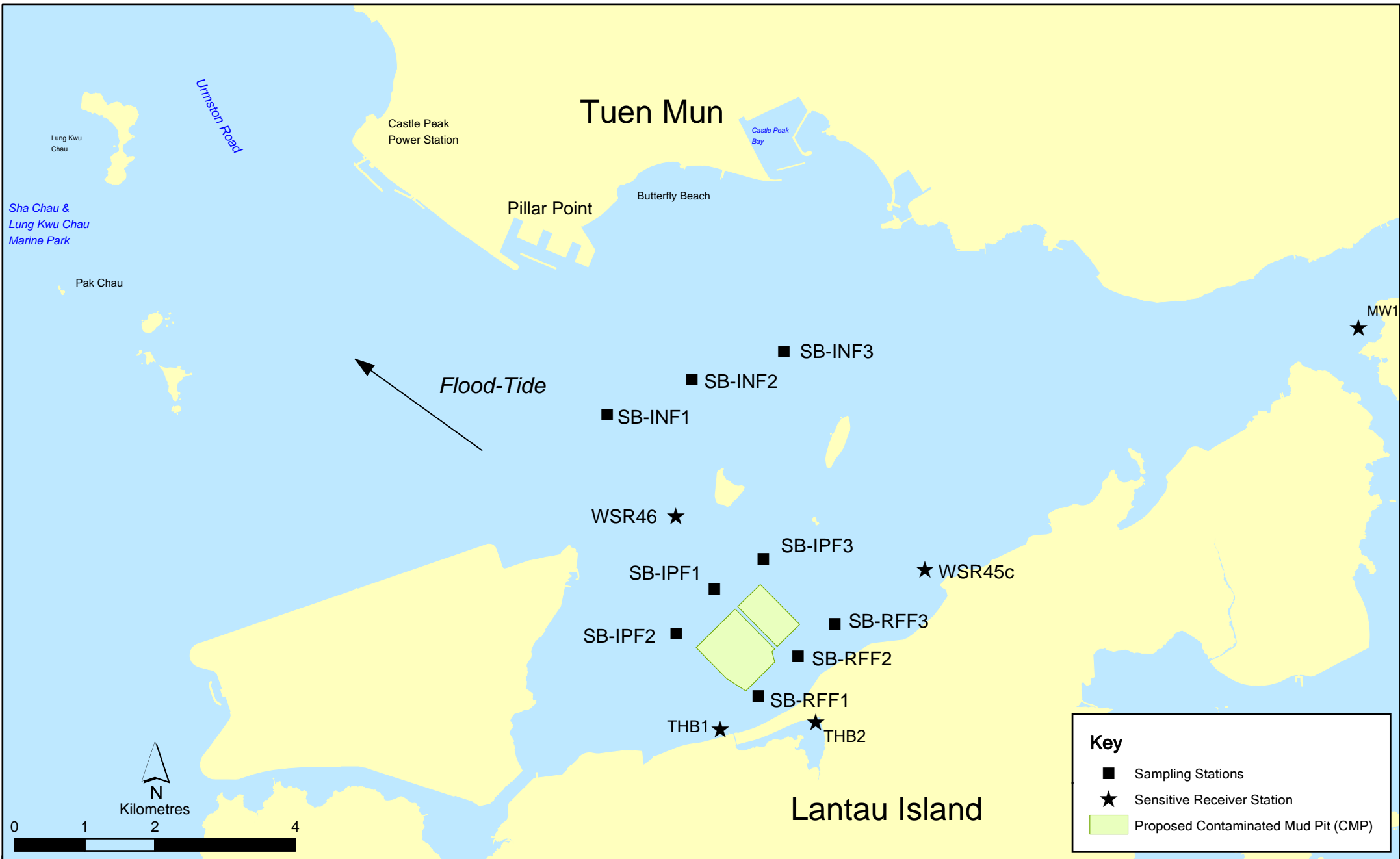


Figure 1.2

Routine Water Quality Sampling Stations (Flood-Tide) for South Brothers Facility

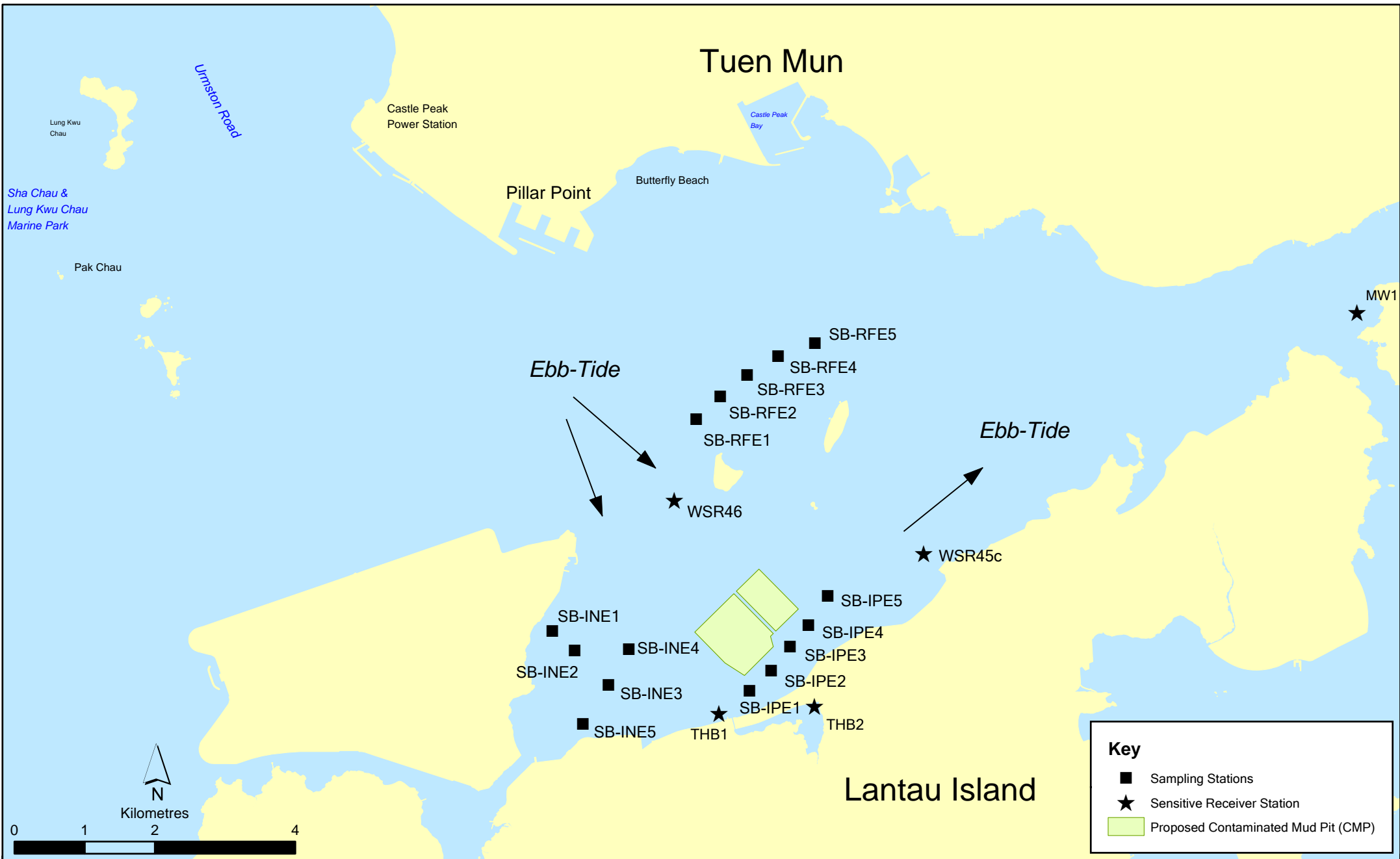


Figure 1.3

Routine Water Quality Sampling Stations (Ebb-Tide) for South Brothers Facility

### *Laboratory Measurements*

- 1.5.16 Analyses of February 2014 results indicated that concentrations of Mercury and Silver were below their limit of reporting at all the stations. Concentrations of Cadmium and Chromium were mostly below their limit of reporting except for a few occasions. The daily concentrations of Arsenic, Copper, Lead, Nickel and Zinc indicated variations over time at all the stations throughout February 2014. Daily recorded levels of 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Ammoniacal-Nitrogen (NH<sub>3</sub>-N) and Total Inorganic Nitrogen (TIN) were observed to fluctuate over time throughout February 2014 (*Figure 24-26 of Annex B*). Compliance with TIN WQO (0.50 mg/L) was observed at all the stations in the monitoring period.
- 1.5.17 In February 2014, monthly averaged concentrations of Copper and Zinc were slightly higher at Ma Wan station (*Figure 6 of Annex B*). Monthly average concentrations of the other metals were similar amongst stations (*Figure 7 of Annex B*). Monthly average levels of BOD<sub>5</sub>, NH<sub>3</sub>-N and TIN were similar amongst stations (*Figures 8 and 9 of Annex B*). The monthly average concentration of TIN did not show any exceedance of the WQO in February 2014 (*Figure 9 of Annex B*).
- 1.5.18 Daily levels of SS complied with the Action and Limit Levels set in the *EM&A Manual* and occasionally exceeded SS WQO (14.4 mg/L for dry season) in February 2014 (*Figure 27 of Annex B*). The monthly average level of SS complied with the WQO at all stations (*Figure 10 of Annex B*). These occasional exceedances recorded for daily SS levels are thus not likely to be caused by mud disposal works, but sporadic events and characteristic of water quality in this area of Hong Kong.
- 1.5.19 Overall, results of the *Routine Water Quality Monitoring* indicated that the disposal operation at CMP 1 did not appear to cause any unacceptable deterioration in water quality in February 2014.

### *Recommendations*

- 1.5.20 From the results of the *Routine Water Quality Monitoring* conducted in October 2013, November 2013, January 2014 and February 2014 for CMP 1, there did not appear to be any unacceptable deterioration in water quality in all of the sampling events which were conducted three times a week during the monitoring period. In accordance with the *EM&A Manual*, it is recommended to adjust the sampling frequency to eight (8) times per year which is the same as the frequency of *Routine Water Quality Monitoring* for CMP V. It is anticipated that this adjusted sampling frequency is adequate for tracking the potential change in contaminant concentrations in seawater which may take a long time to appear while at the same time address the potential seasonal difference in seawater quality.

**1.5.21 Water Column Profiling of CMP 1 – March 2014**

1.5.22 *Water Column Profiling* was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 8 March 2014. The water quality monitoring results have been assessed for compliance with the WQOs (*Table C8 of Annex C*). The monitoring results were also compared with the Action and Limit Levels set in *Baseline Monitoring Report*.

*In-situ Measurements*

1.5.23 Analyses of results for March 2014 indicated that levels of Salinity, pH and DO complied with the WQOs at both Upstream and Downstream stations (*Table C8 of Annex C*). DO and Turbidity complied with the Action and Limit Levels.

*Laboratory Measurements for Suspended Solids (SS)*

1.5.24 Analyses of data obtained on 8 March 2014 indicated that the SS levels at Downstream and Upstream stations complied with the WQO (*Table C8 of Annex C*). In addition, SS levels at all the stations complied with the Action and Limit Levels.

1.5.25 Overall, the monitoring results indicated that the mud disposal operation at CMP 1 did not appear to cause any deterioration in water quality during this reporting period.

**1.5.26 Pit Specific Sediment Chemistry of CMP 1 – December 2013**

1.5.27 Monitoring locations for *Pit Specific Sediment Chemistry for CMP 1* are shown in *Figure 1.4*. A total of six (6) monitoring stations were sampled in December 2013.

1.5.28 The concentrations of all the metals except Arsenic were lower than the Lower Chemical Exceedance Level (LCEL) at all stations in December 2013 (*Figures 28 and 29 of Annex B*). Concentrations of Arsenic exceeded the LCEL at all stations except Active Pit station SB-NPAB and Near Pit station SB-NNAB.

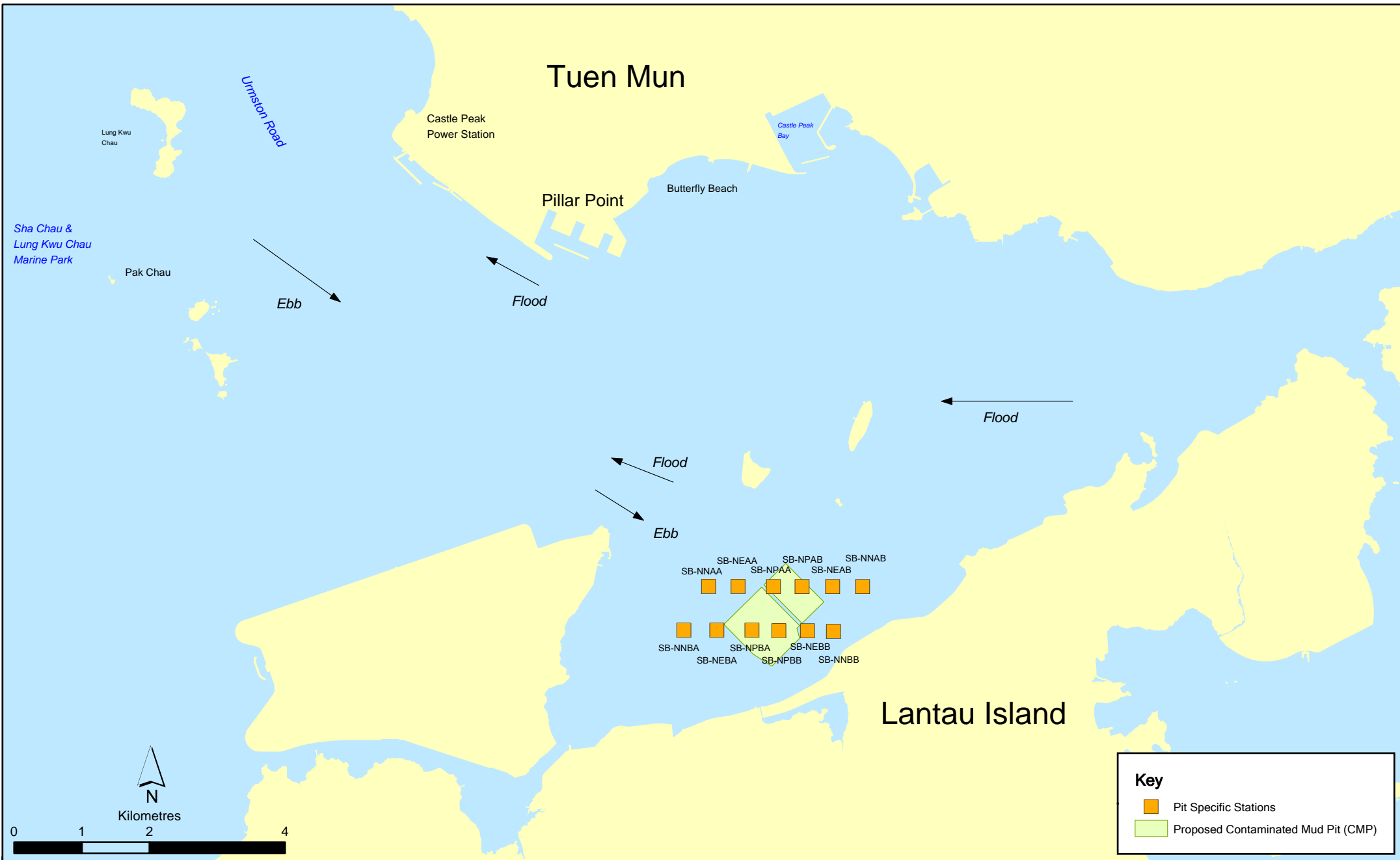


Figure 1.4

Pit Specific Sediment Quality Monitoring Stations for South Brothers Facility

- 1.5.29 Whilst the average concentration of Arsenic in the Earth's crust is generally ~2mg/kg, significantly higher Arsenic concentrations (median = 14 mg/kg) have been recorded in Hong Kong's onshore sediments <sup>(1)</sup>. It is presumed that the natural concentrations of Arsenic are similar in onshore and offshore sediments <sup>(2)</sup>, and relatively high Arsenic levels may thus occur throughout Hong Kong. Therefore, the LECL exceedances of Arsenic are unlikely to be caused by the disposal operations at CMP 1 but rather as a result of naturally occurring deposits.
- 1.5.30 For organic contaminants, the concentration of Total Organic Carbon (TOC) concentration was similar amongst stations in December 2013 (Figure 30 of Annex B). Concentrations of Tributyltin (TBTs) were observed to be higher at Active Pit station SB-NPAA and SB-NPAB in December 2013 (Figure 31 of Annex B). Low and High Molecular Weight Polycyclic Aromatic Hydrocarbons (Low and High MW PAHs) concentrations were recorded below the limit of reporting at all stations except Active Pit station SB-NPAB (Figure 32 of Annex B). Total Dichloro-Diphenyl-Trichloroethane (DDT), 4,4'-Dichloro-Diphenyl-Dichloroethylene (4,4'-DDE) and Total Polychlorinated Biphenyls (PCBs) were recorded below the limit of reporting at all the stations in December 2013.
- 1.5.31 Active Pit stations SB-NPAA and SB-NPAB are located within CMP 1 which was receiving contaminated mud during the reporting period. Therefore, the higher concentrations of contaminants (including metals and organic contaminants) recorded at the Active Pit stations only are not considered as indicating any dispersal of contaminated mud from CMP 1. Nevertheless, detailed analyses will be presented in the *Quarterly Report* to reveal any trend of increasing sediment contaminant concentrations towards CMP 1.
- 1.5.32 Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP 1 during this monthly period.

## 1.6 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

1.6.1 The following monitoring activities will be conducted in the next monthly period of April 2014 for SB CMPs:

- *Impact Water Quality Monitoring during Dredging Operations of CMP 2;*
- *Pit Specific Sediment Chemistry of CMP 1;*
- *Routine Water Quality Monitoring of CMP 1; and*
- *Water Column Profiling of CMP 1.*

(1) Sewell RJ (1999) Geochemical Atlas of Hong Kong. Geotechnical Engineering Office, Government of the Hong Kong Special Administrative Region

(2) Whiteside PGD (2000) Natural geochemistry and contamination of marine sediments in Hong Kong. In: The Urban Geology of Hong Kong (ed Page A & Reels SJ). Geological Society of Hong Kong Bulletin No. 6, p109-121



1.6.2 The sampling schedule is presented in *Annex A*.

**1.7** ***STUDY PROGRAMME***

1.7.1 A summary of the Study programme is presented in *Annex E*.

Annex A

## Sampling Schedule



Annex A1 - Environmental Monitoring and Audit Sampling Schedule for East of Sha Chau (January 2012 - December 2014)

Demersal Trawling		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Impact Stations	ESC-INA						*	*						*	*																						
	ESC-INB						*	*						*	*																						
Reference Stations	ESC-TNA						*	*						*	*																						
	ESC-TNB						*	*						*	*																						
	ESC-TSA						*	*						*	*																						
	ESC-TSB						*	*						*	*																						
								*	*					*	*																						

		2012												2013												2014																			
Capping		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D								
<b>Ebb Tide</b>																																													
Impact Station	ESC-IPE1																																					*	*						
	ESC-IPE2																																					*	*						
	ESC-IPE3																																					*	*						
	ESC-IPE4																																					*	*						
	ESC-IPE5																																					*	*						
Intermediate Station	ESC-INE1																																				*	*							
	ESC-INE2																																				*	*							
	ESC-INE3																																				*	*							
	ESC-INE4																																				*	*							
	ESC-INE5																																				*	*							
Reference Station	ESC-RFE1																																			*	*								
	ESC-RFE2																																			*	*								
	ESC-RFE3																																			*	*								
	ESC-RFE4																																			*	*								
	ESC-RFE5																																			*	*								
Ma Wan Station	MW1																																		*	*									
<b>Flood Tide</b>																																													
Impact Station	ESC-IPF1																																				*	*							
	ESC-IPF2																																			*	*								
	ESC-IPF3																																			*	*								
Intermediate Station	ESC-INF1																																		*	*									
	ESC-INF2																																		*	*									
	ESC-INF3																																		*	*									
Reference Station	ESC-RFF1																																		*	*									
	ESC-RFF2																																		*	*									
	ESC-RFF3																																		*	*									
Ma Wan Station	MW1																																	*	*										



Annex A1 - Environmental Monitoring and Audit Sampling Schedule for East of Sha Chau (January 2012 - December 2014)

Water Column Profiling		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Plume Stations	WCP1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
	WCP2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												

Benthic Recolonisation Studies		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Capped Contaminated Mud Pits IVa-c																																					
Reference Stations	ESC-CPA							*				*									*			*													
	ESC-CPB							*				*									*			*													
	ESC-CPC							*				*									*			*													
	ESC-RBA							*				*									*			*													
	ESC-RBB							*				*									*			*													
	ESC-RBC							*				*									*			*													

Impact Monitoring for Dredging		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Upstream/Reference Stations																																					
US1	US1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
	US2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
Downstream/Impact Stations																																					
DS1	DS1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
	DS2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
	DS3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
	DS4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
	DS5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												
Ma Wan Station	MW1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*												

Sampling completed  
 Sampling to be completed











Annex B

## Graphs of Monitoring Results

**Routine Water Quality Monitoring for CMP 1 - Monthly Average in February 2014**

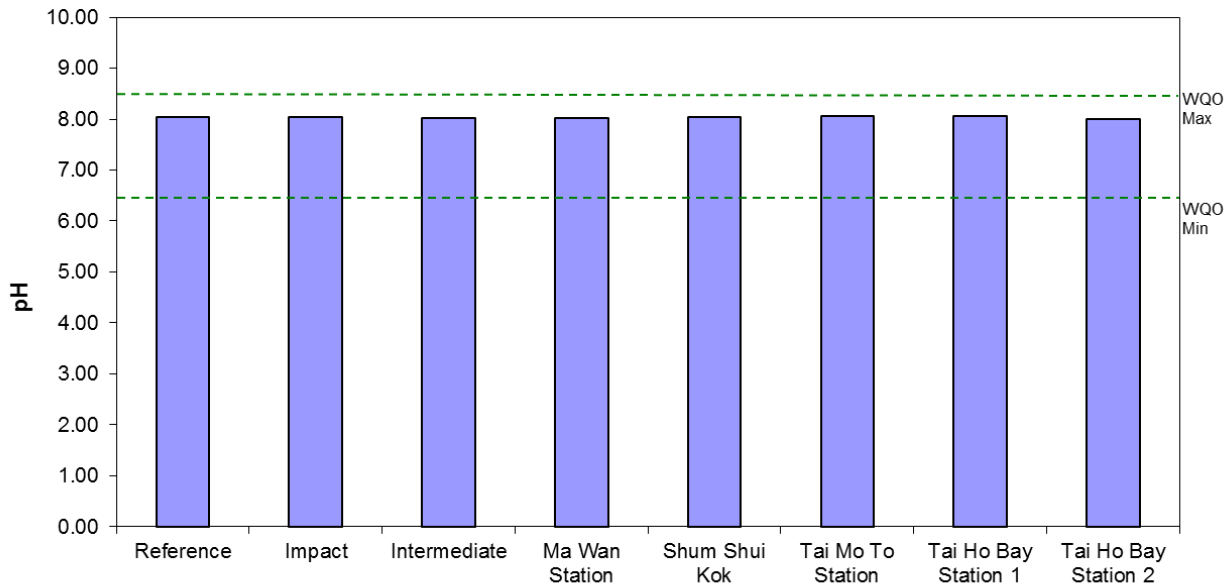


Figure 1: Monthly averaged level of pH (mean + SD) recorded during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Routine Water Quality Monitoring for CMP 1 - Monthly Average in February 2014**

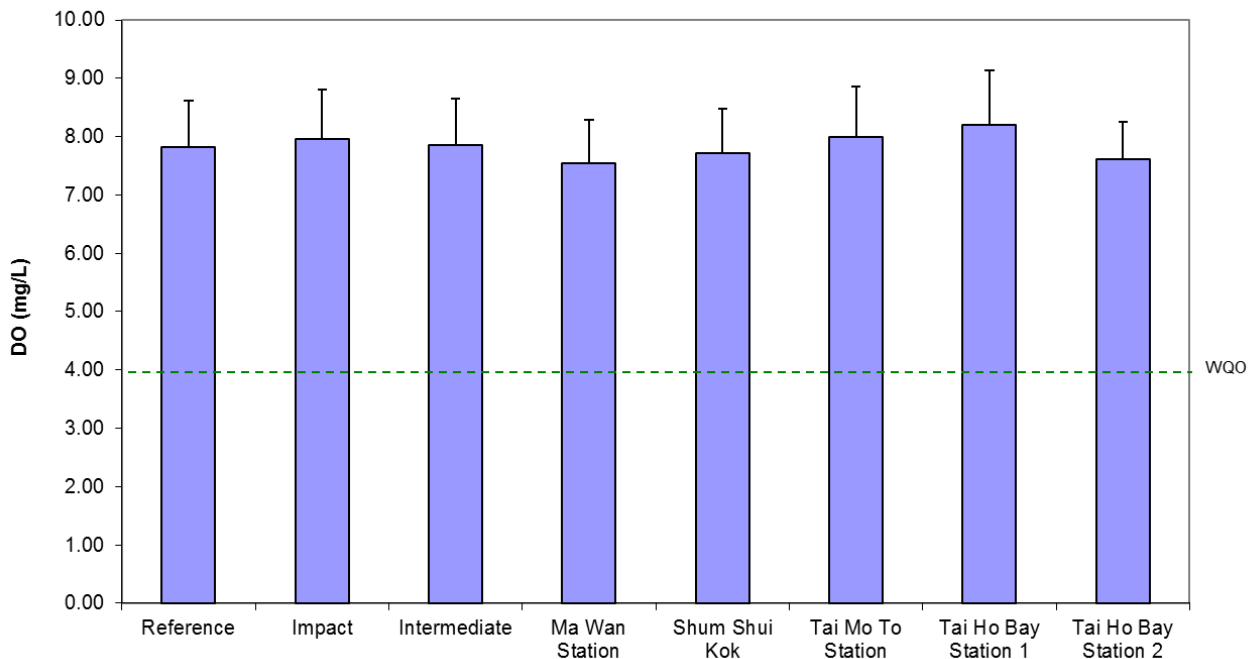


Figure 2: Monthly averaged concentration of Dissolved Oxygen (mg/L; mean + SD) recorded during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

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**Routine Water Quality Monitoring for CMP 1 - Monthly Average in February 2014**

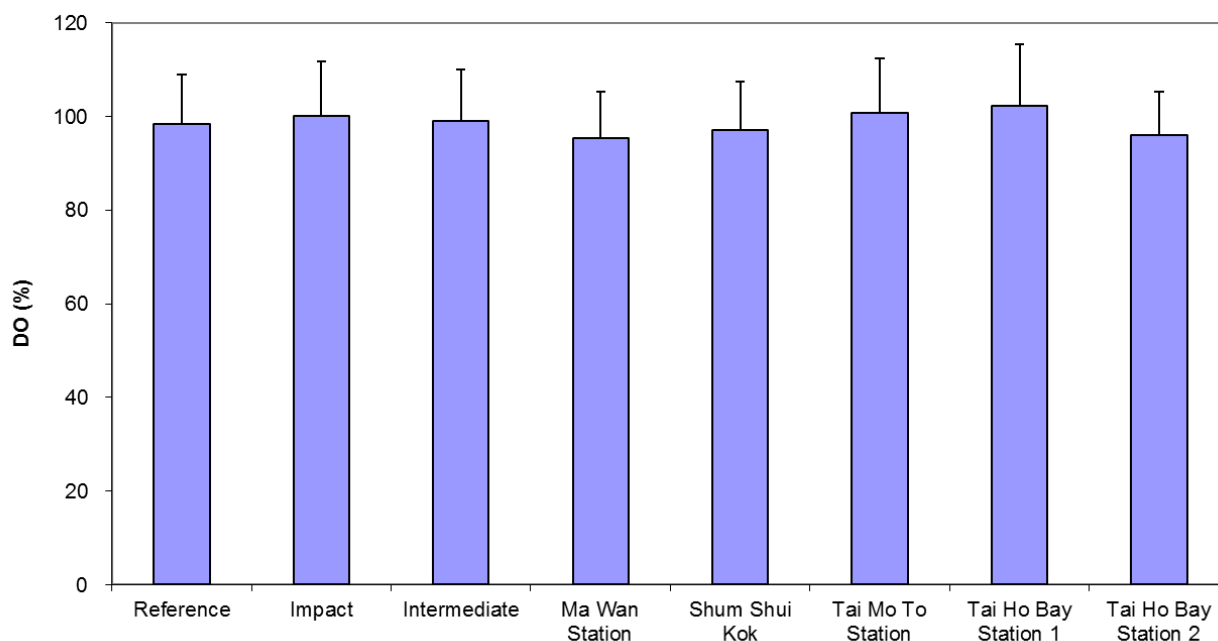


Figure 3: Monthly averaged level of Dissolved Oxygen (% saturation; mean + SD) recorded during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Routine Water Quality Monitoring for CMP 1 - Monthly Average in February 2014**

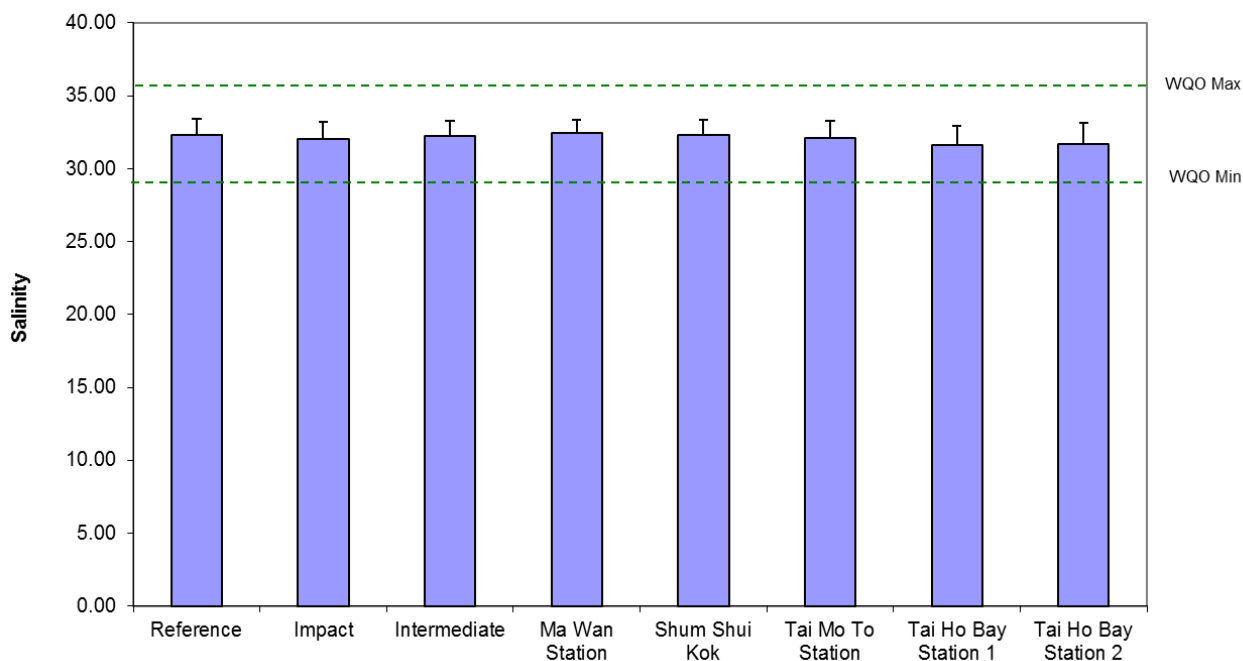


Figure 4: Monthly averaged level of Salinity (mean + SD) recorded during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Routine Water Quality Monitoring for CMP 1 - Monthly Average in February 2014**

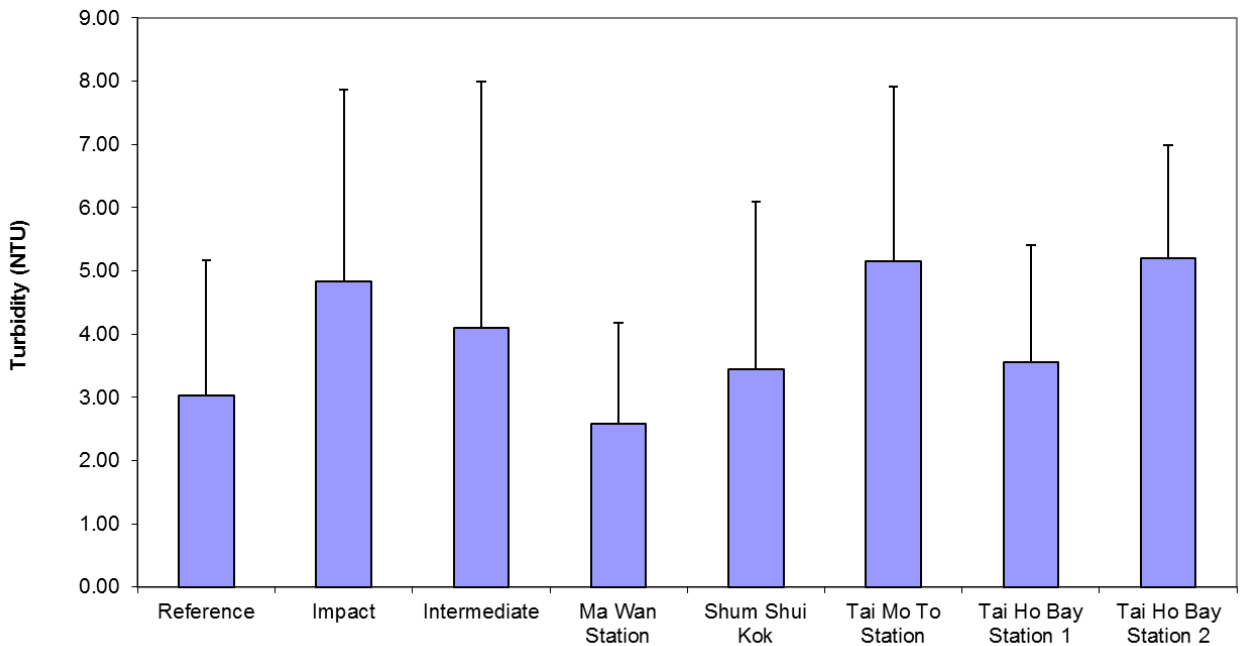


Figure 5: Monthly averaged level of Turbidity (NTU; mean + SD) recorded during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Routine Water Quality Monitoring Results for Metals  
Monthly Average in February 2014**

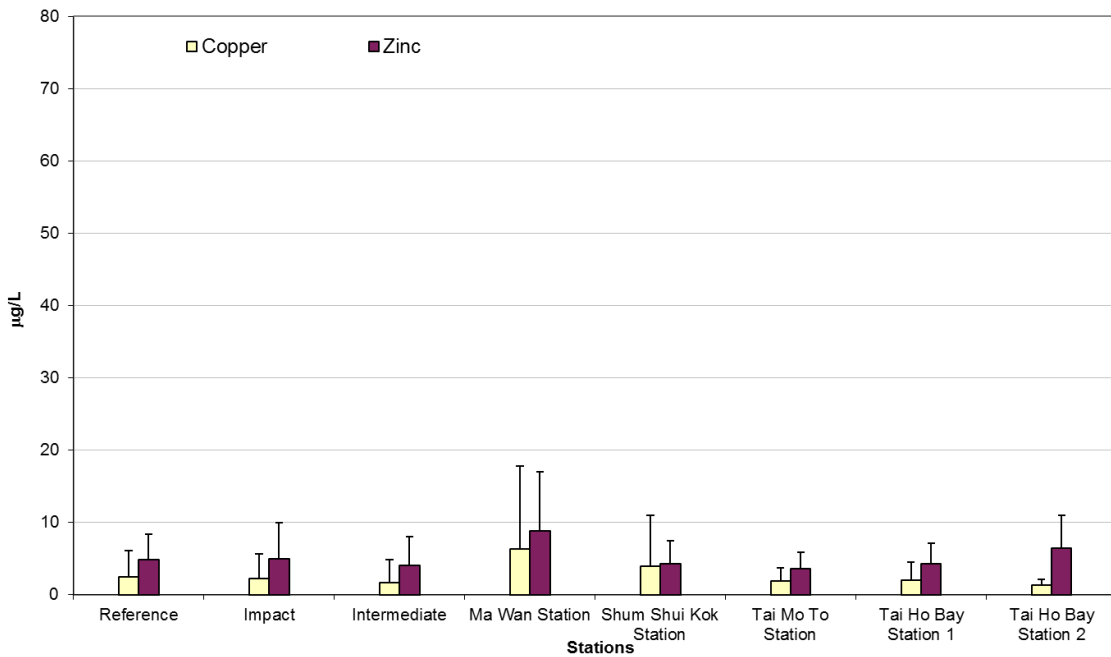


Figure 6: Monthly averaged concentration of Copper and Zinc (mean + SD) in water samples collected from *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Routine Water Quality Monitoring Results for Metals  
Monthly Average in February 2014**

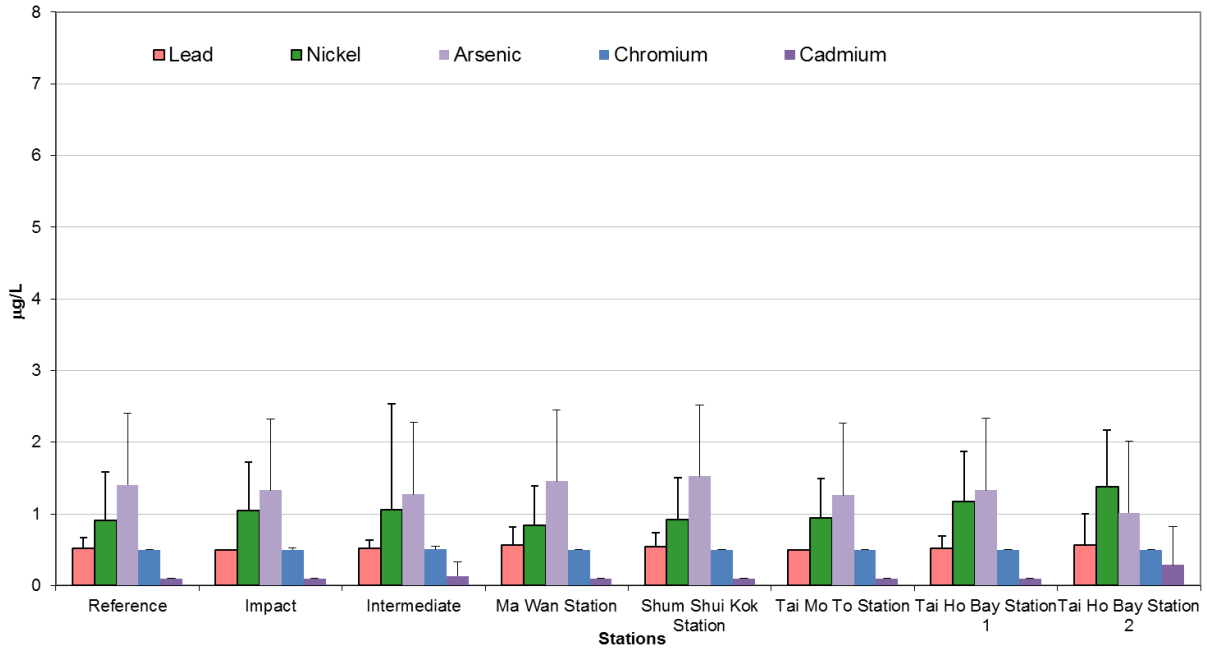


Figure 7: Monthly averaged concentration of Lead, Nickel, Arsenic, Chromium and Cadmium (mean + SD) in water samples collected from *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Routine Water Quality Monitoring Results for Biochemical Oxygen Demand (BOD<sub>5</sub>)  
Monthly Average in February 2014**

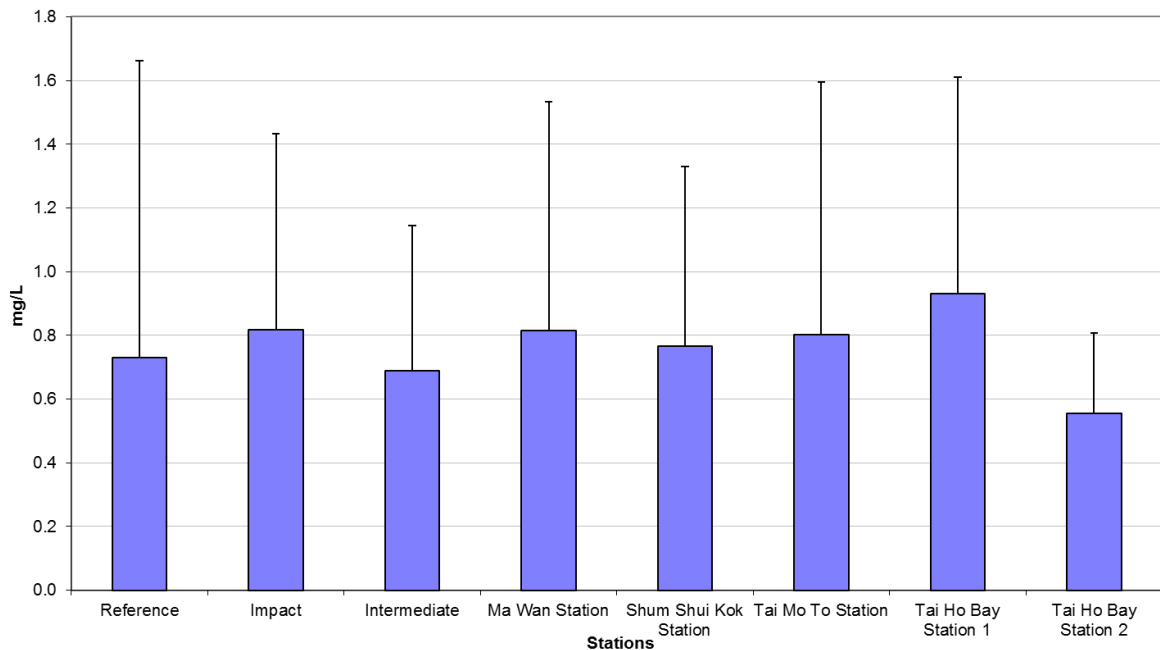


Figure 8: Monthly averaged level of Biochemical Oxygen Demand (BOD<sub>5</sub>; mean + SD) in water samples collected from *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

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**Routine Water Quality Monitoring Results for Nutrients  
Monthly Average in February 2014**

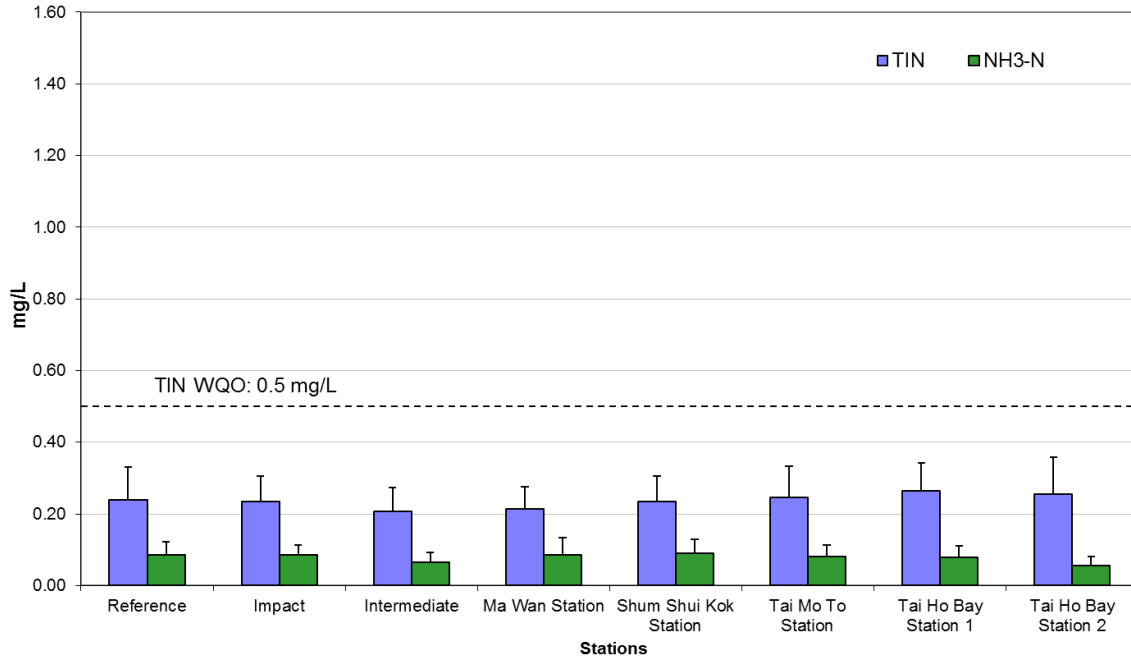


Figure 9: Monthly averaged concentration of Total Inorganic Nitrogen and NH<sub>3</sub>-N (mean + SD) in water samples collected from *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Routine Water Quality Monitoring for Suspended Solids  
Monthly Average in February 2014**

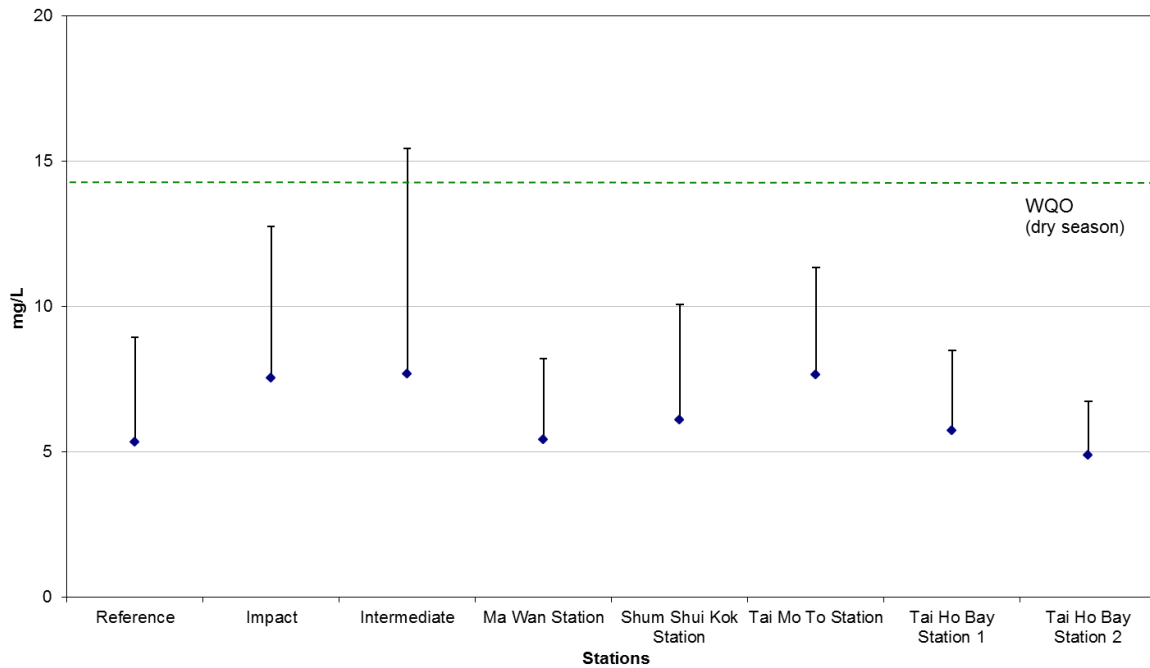


Figure 10: Monthly averaged concentration of Suspended Solids (mean + SD) in water samples collected from *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.



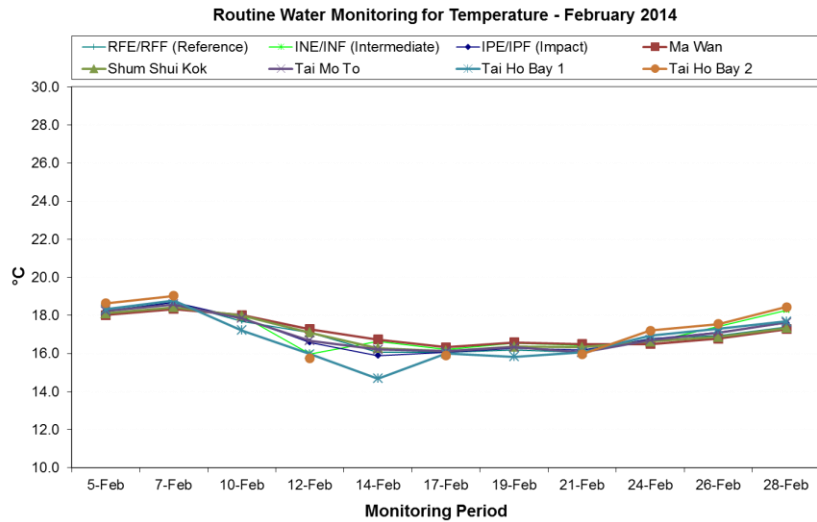


Figure 11: Daily levels of Temperature during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

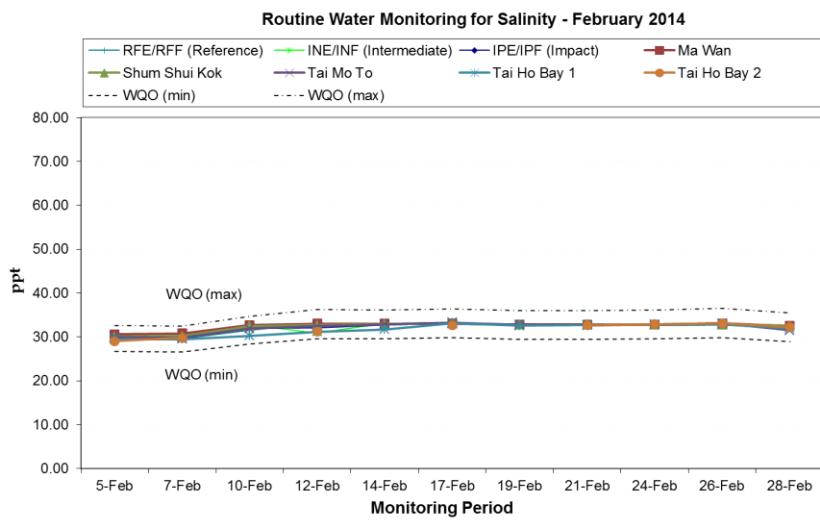


Figure 12: Daily levels of Salinity during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

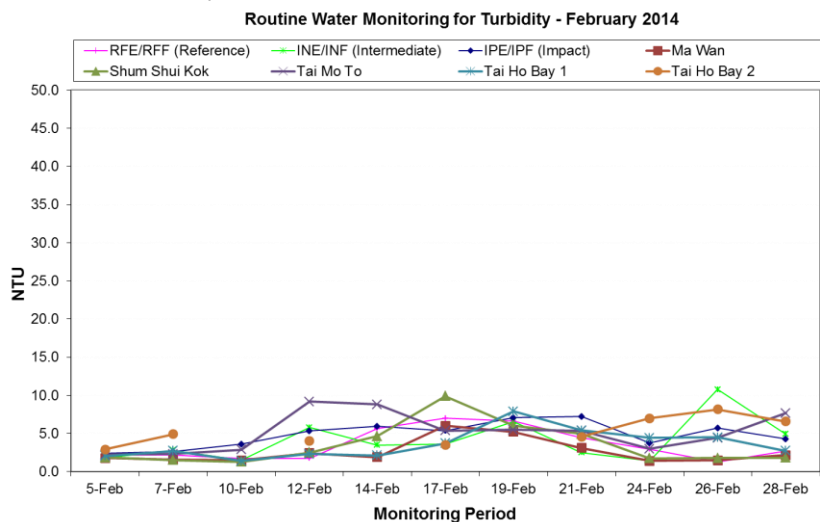


Figure 13: Daily levels of Turbidity during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

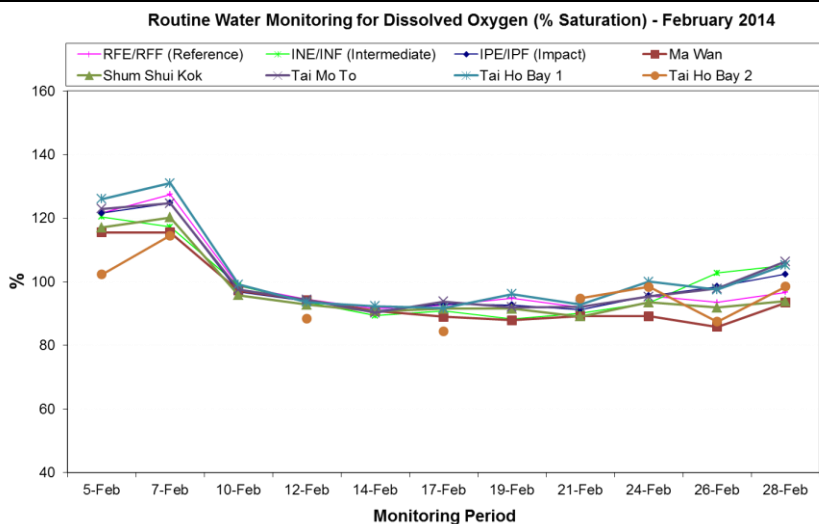


Figure 14: Daily levels of Dissolved Oxygen (%) during Routine Water Quality Monitoring for disposal operations at CMP 1 in February 2014.

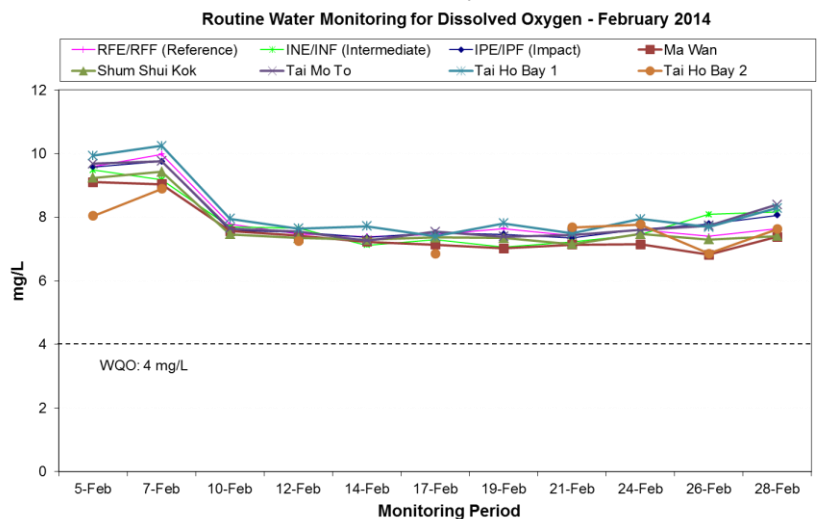


Figure 15: Daily levels of Dissolved Oxygen (mg/L) during Routine Water Quality Monitoring for disposal operations at CMP 1 in February 2014.

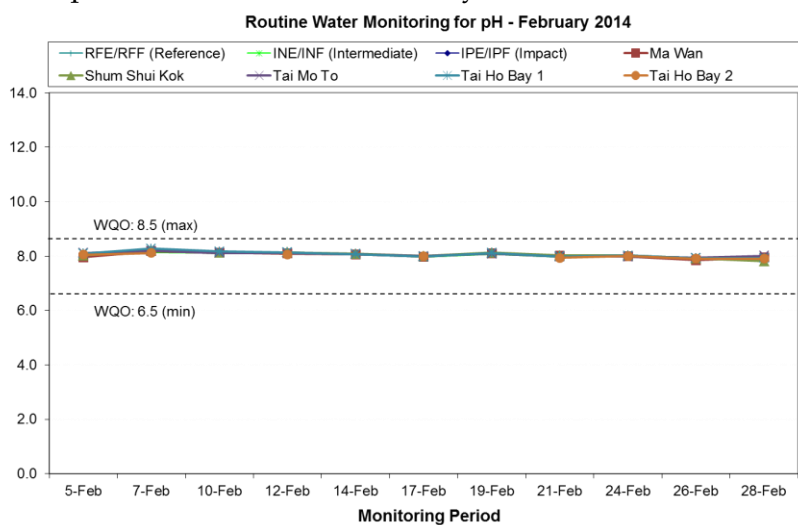


Figure 16: Daily levels of pH during Routine Water Quality Monitoring for disposal operations at CMP 1 in February 2014.

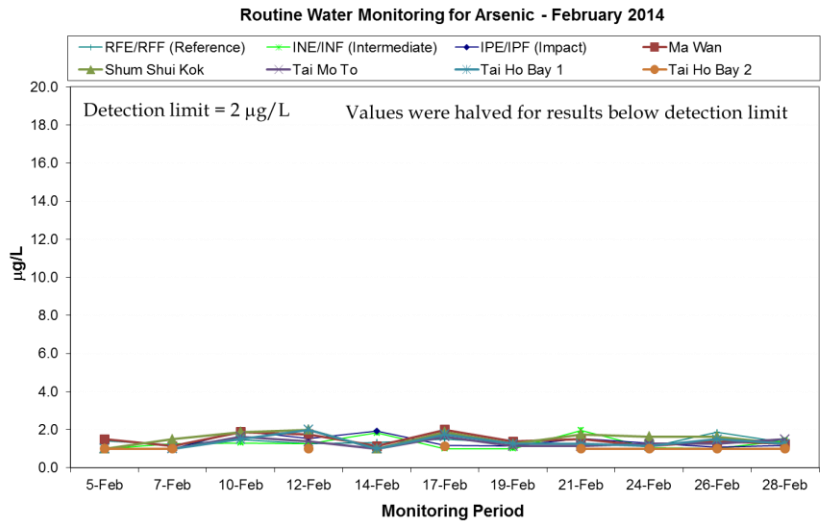


Figure 17: Daily levels of Arsenic during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

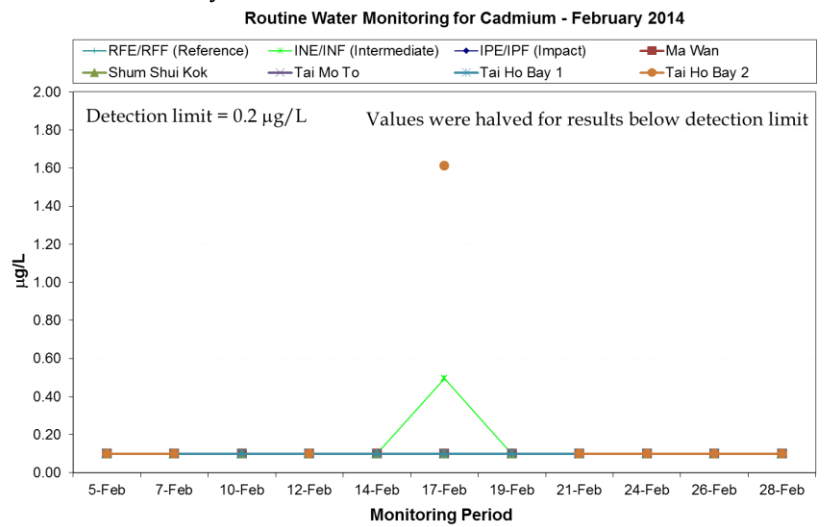


Figure 18: Daily levels of Cadmium during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

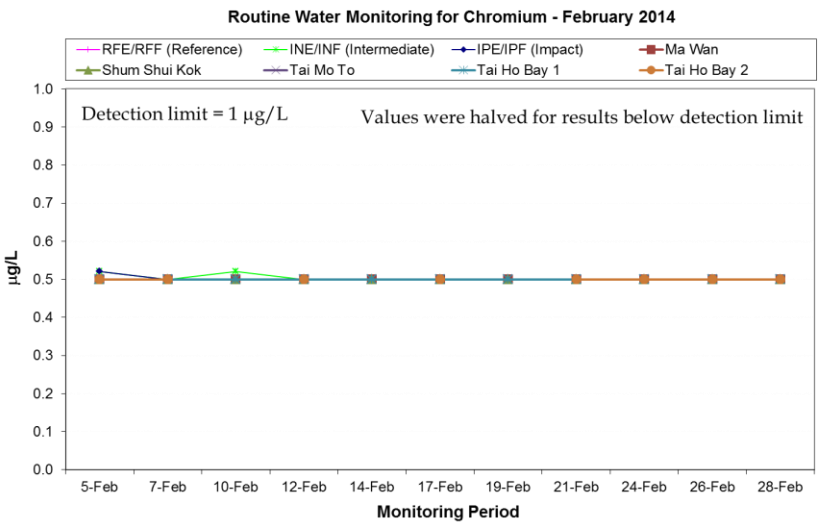


Figure 19: Daily levels of Chromium during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

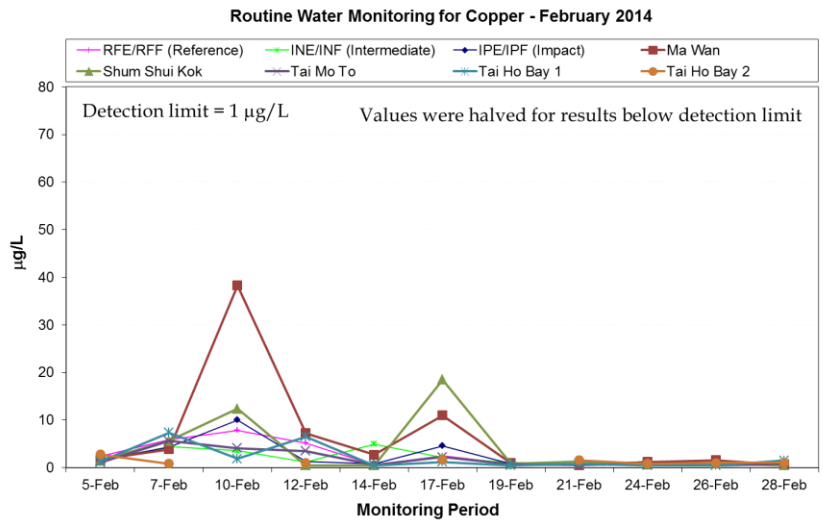


Figure 20: Daily levels of Copper during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

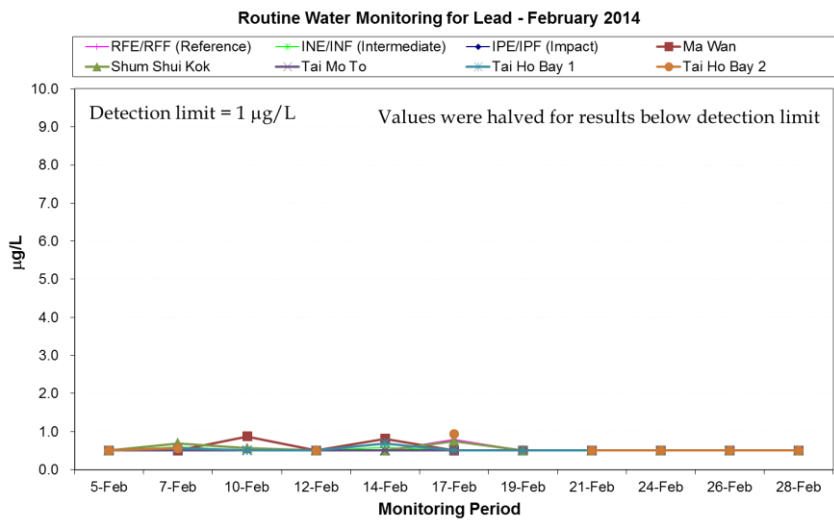


Figure 21: Daily levels of Lead during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

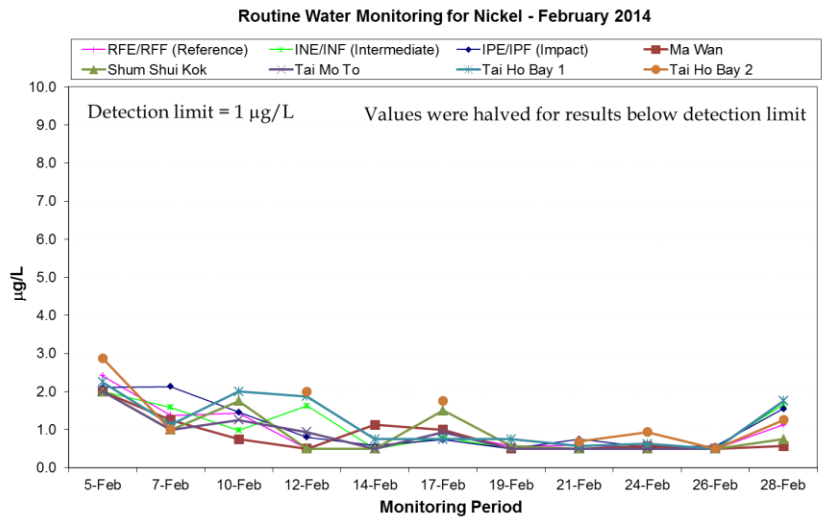


Figure 22: Daily levels of Nickel during *Routine Water Monitoring* for disposal operations at CMP 1 in February 2014.

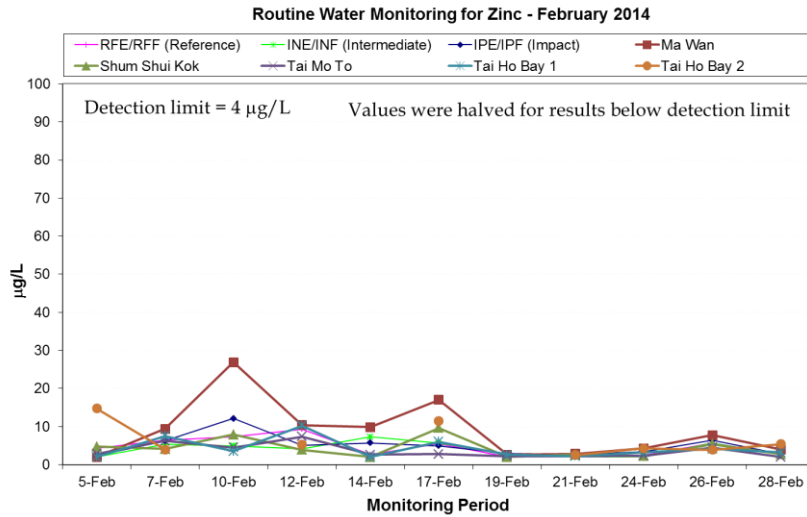


Figure 23: Daily levels of Zinc during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

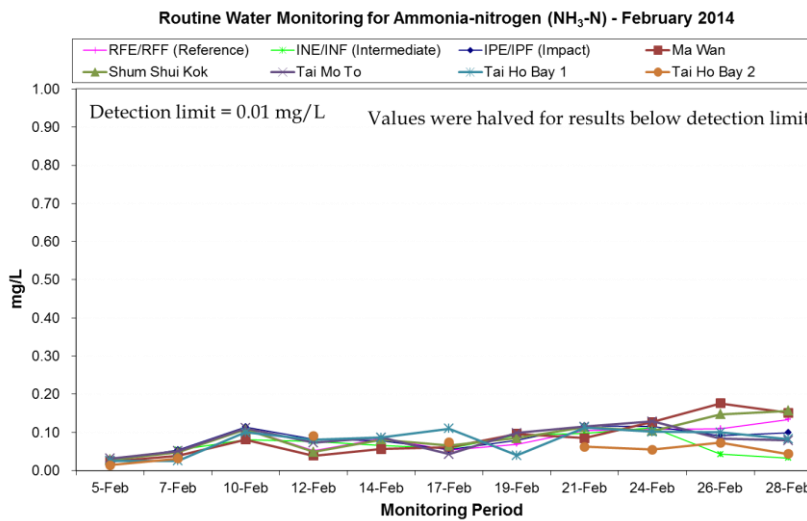


Figure 24: Daily levels of Ammonia-Nitrogen during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

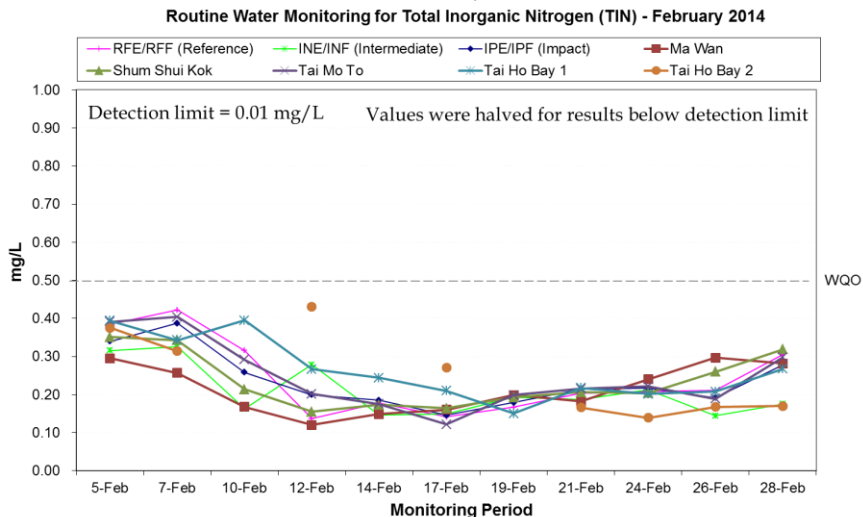


Figure 25: Daily levels of Total Inorganic Nitrogen during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

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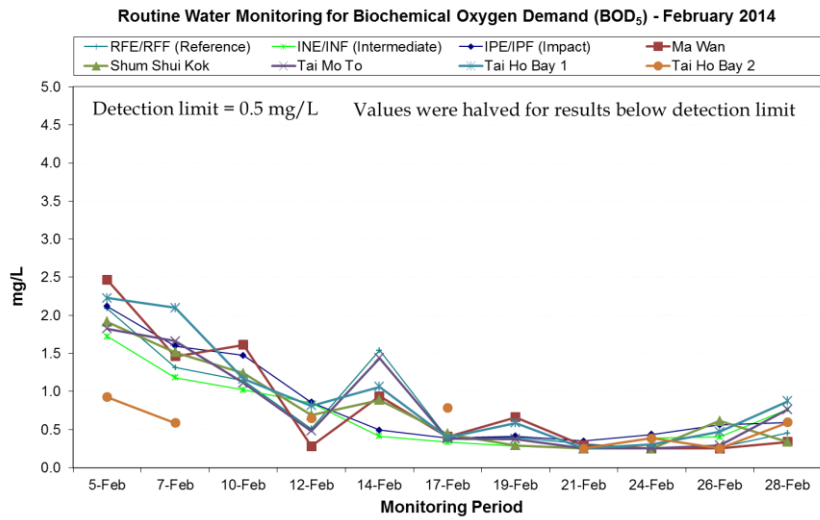


Figure 26: Daily levels of Biochemical Oxygen Demand during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

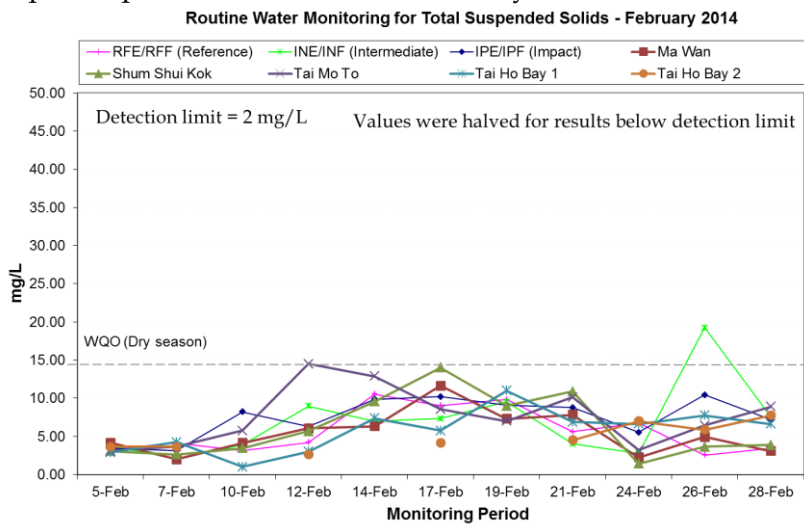


Figure 27: Daily levels of Total Suspended Solids during *Routine Water Quality Monitoring* for disposal operations at CMP 1 in February 2014.

**Pit Specific Sediment Chemistry for Metal Contaminants at CMP 1  
December 2013**

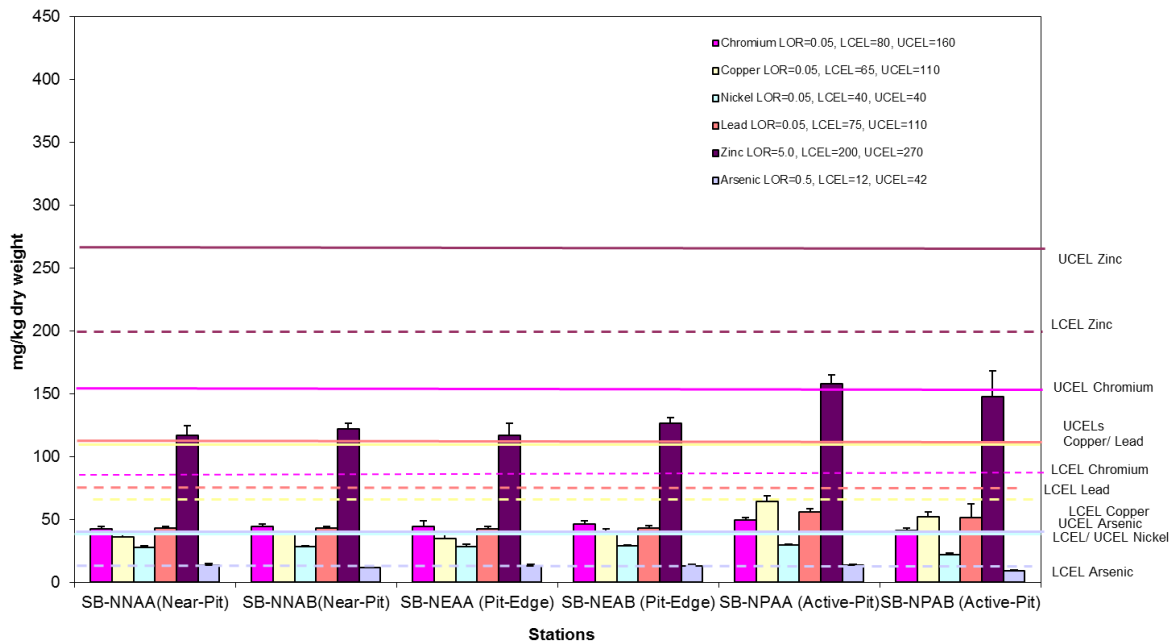


Figure 28: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 1 in December 2013.

**Pit Specific Sediment Chemistry for Metal Contaminants at CMP 1  
December 2013**

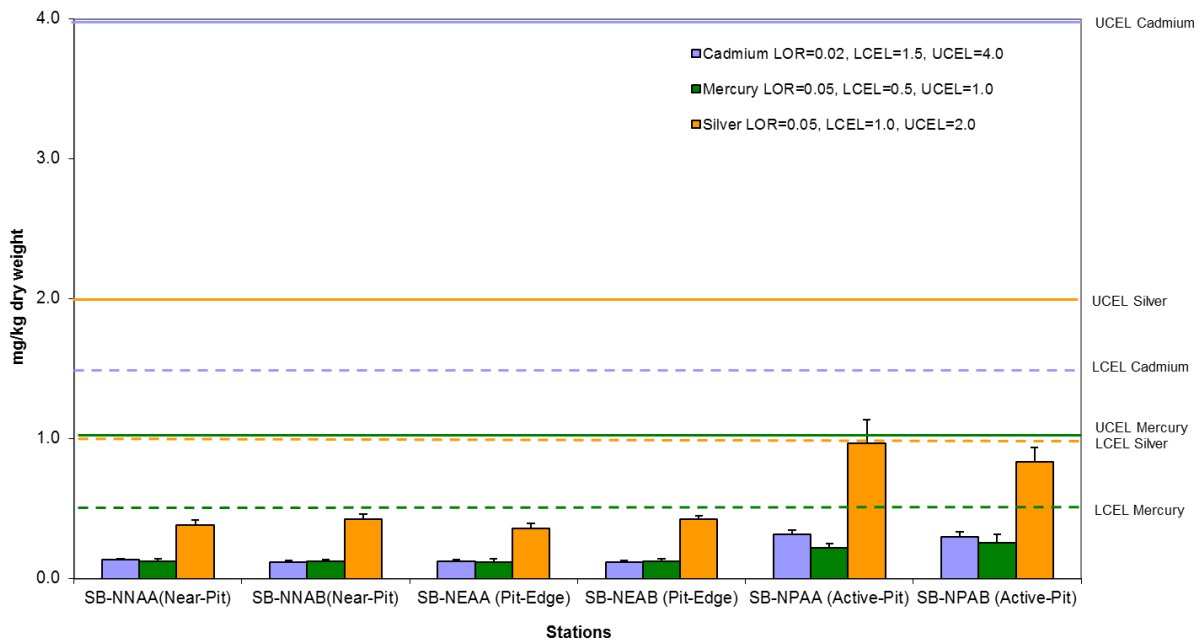


Figure 29: Concentration of Metals (Cd, Hg, Ag; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 1 in December 2013.

**Pit Specific Sediment Chemistry for Total Organic Carbon (TOC) at CMP 1  
December 2013**

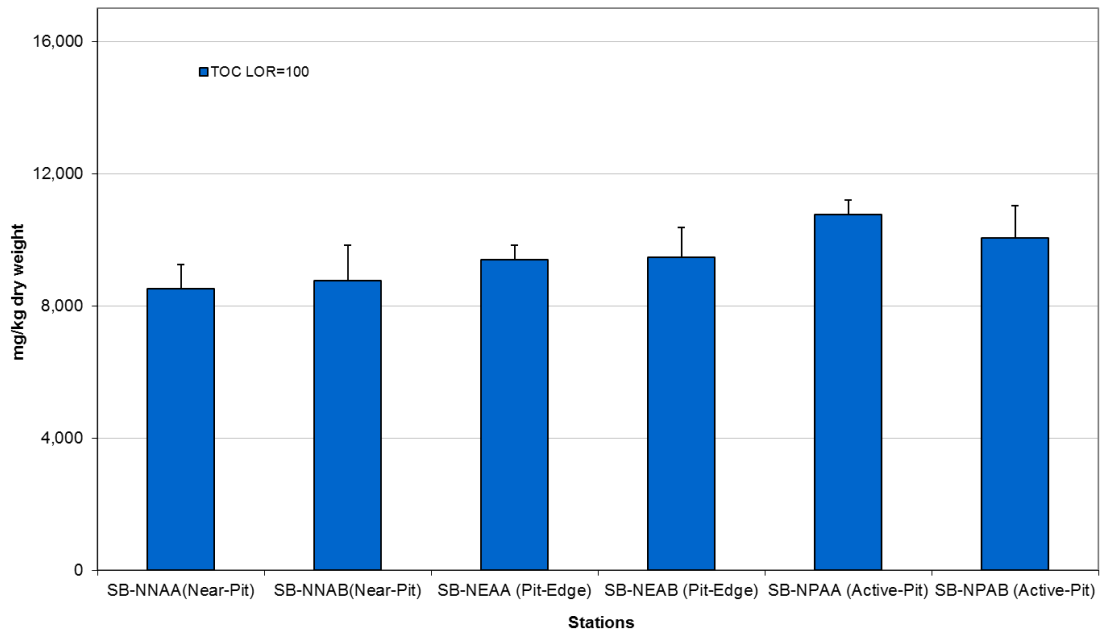


Figure 30: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 1 in December 2013.

**Pit Specific Sediment Chemistry for Tributyltin (TBT) at CMP 1 in December 2013**

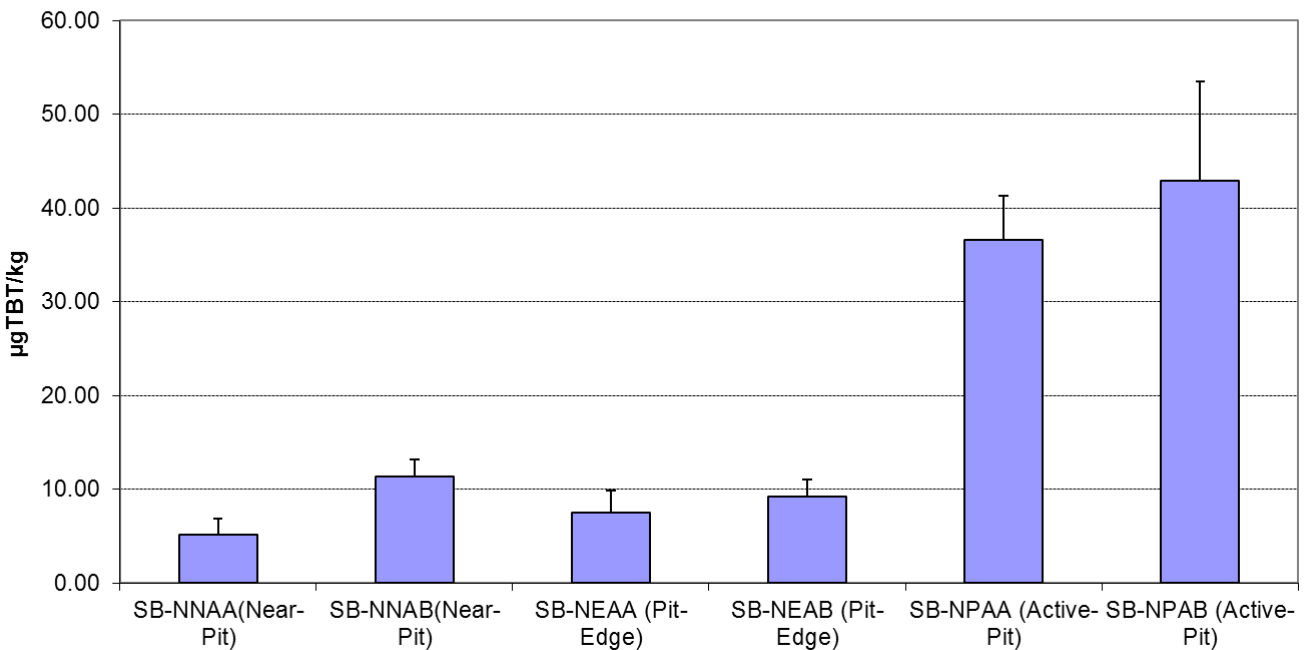


Figure 31: Concentration of Tributyltin ( $\mu\text{g TBT/kg}$ ; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* of CMP 1 in December 2013.



**Pit Specific Sediment Chemistry for Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) at CMP 1 in December 2013**

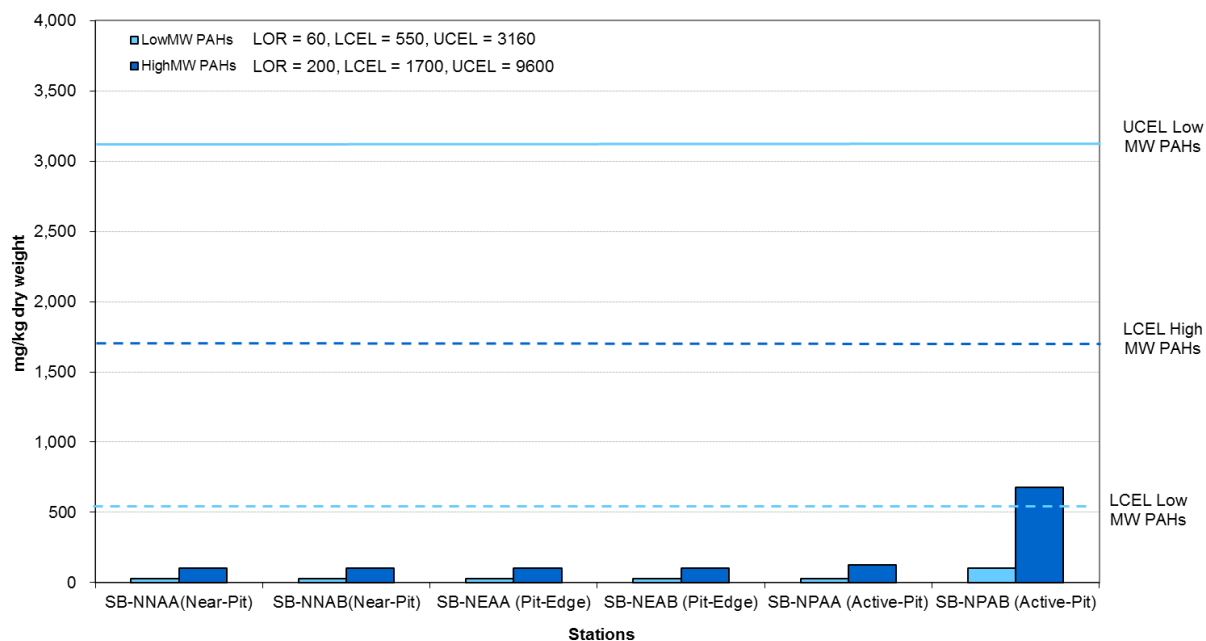


Figure 32: Concentration of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (mg/kg dry weight; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 1 in December 2013.

Annex C

## Water Quality Monitoring Results

**Table C1** *Summary Table of DO, Turbidity and SS Levels Recorded in February and March 2014*

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2014/02/27	Mid-Ebb	DS1	8.25	8.47	7.05	6.67
		DS2	8.40	8.48	4.73	5.83
		DS3	8.19	8.57	2.43	3.89
		DS4	8.36	8.53	2.38	4.11
		DS5	8.21	8.55	2.38	4.22
		US1	8.64	8.70	3.46	4.00
		US2	8.64	8.71	2.57	3.83
		MW1	6.94	7.18	1.26	3.33
		THB1	8.41	8.47	2.97	4.83
		THB2	-	8.12	4.63	3.00
		WSR45C	7.46	8.08	1.41	3.22
		WSR46	8.27	8.69	2.31	2.89
	Mid-Flood	DS1	8.53	8.67	3.04	3.67
		DS2	8.70	8.74	4.07	5.17
		DS3	8.89	8.91	3.29	4.67
		DS4	8.92	9.00	4.27	4.83
		DS5	8.92	9.04	4.20	4.44
		US1	8.61	8.67	2.84	3.67
		US2	8.45	8.56	2.28	2.67
		MW1	7.17	7.29	1.39	3.33
		THB1	8.75	8.83	4.44	4.83
		THB2	-	8.29	11.89	9.00
		WSR45C	7.86	8.09	2.26	3.89
		WSR46	8.21	8.56	5.44	4.89
2014/03/01	Mid-Ebb	DS1	8.19	8.34	4.87	6.50
		DS2	8.21	8.29	4.50	5.50
		DS3	8.22	8.31	3.10	5.11
		DS4	8.09	8.15	6.61	7.00
		DS5	8.12	8.38	5.41	8.56
		US1	8.46	8.50	3.03	5.00
		US2	8.17	8.29	4.53	5.33
		MW1	7.23	7.32	1.92	3.89
		THB1	8.33	8.48	2.85	4.83
		THB2	-	7.93	5.16	7.00
		WSR45C	7.45	7.92	2.55	5.89
		WSR46	8.17	8.52	5.86	6.89
	Mid-Flood	DS1	8.47	8.46	6.67	9.33
		DS2	8.49	8.52	6.25	9.67
		DS3	8.59	8.62	8.18	12.67
		DS4	8.59	8.66	7.11	8.50
		DS5	8.35	8.43	6.52	7.67
		US1	8.56	8.60	4.67	8.00
		US2	8.51	8.56	5.16	7.67
		MW1	7.44	7.54	3.25	5.89
		THB1	8.66	8.70	24.15	17.50
		THB2	-	9.17	11.92	6.67
		WSR45C	7.84	8.17	9.68	8.00

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		WSR46	8.31	8.54	6.05	6.33
2014/01/15	Mid-Ebb	DS1	7.59	7.61	6.48	8.67
		DS2	7.59	7.61	3.86	4.78
		DS3	7.58	7.60	3.37	4.78
		DS4	7.75	7.73	2.31	3.89
		DS5	7.74	7.78	2.26	3.56
		US1	8.03	8.07	5.90	7.00
		US2	8.00	8.19	5.53	6.00
		MW1	7.54	7.59	2.14	3.44
		THB1	7.78	7.70	7.03	8.00
		THB2	-	7.69	8.80	7.67
	WSR45C	7.60	7.60	2.56	3.44	
	Mid-Flood	WSR46	7.43	7.49	7.82	9.67
		DS1	7.74	7.74	7.98	10.50
		DS2	7.83	7.83	9.63	11.50
		DS3	7.83	7.83	5.97	6.33
		DS4	7.91	7.90	5.70	7.50
		DS5	7.76	7.84	5.99	7.11
		US1	7.62	7.60	6.63	8.17
		US2	7.55	7.55	8.87	11.00
		MW1	7.33	7.40	3.04	4.44
THB1		7.70	7.66	5.98	6.83	
THB2	-	7.16	2.10	4.33		
WSR45C	7.49	7.48	7.24	8.89		
WSR46	7.74	7.61	12.23	14.33		
2014/03/03	Mid-Ebb	DS1	7.98	8.00	12.41	14.00
		DS2	7.84	7.97	6.12	9.22
		DS3	7.74	7.90	7.57	7.00
		DS4	7.81	7.98	7.10	6.89
		DS5	7.65	8.05	4.84	4.56
		US1	8.20	8.22	6.00	5.83
		US2	8.07	8.15	5.73	5.50
		MW1	7.39	7.48	2.50	3.56
		THB1	8.23	8.28	2.83	4.50
		THB2	-	7.73	5.42	5.67
	WSR45C	7.47	7.82	4.01	5.44	
	Mid-Flood	WSR46	7.76	8.01	3.62	5.78
		DS1	7.91	7.92	5.15	6.33
		DS2	8.00	7.95	7.00	7.83
		DS3	7.97	7.97	5.37	5.83
		DS4	7.88	7.90	6.03	6.89
		DS5	7.76	7.74	6.11	5.67
		US1	7.94	7.94	5.92	6.67
		US2	7.88	7.89	6.63	6.56
		MW1	7.40	7.51	2.81	4.67
THB1		7.85	7.87	4.57	6.17	
THB2	-	7.34	7.79	8.00		
WSR45C	7.80	7.89	5.25	6.11		
WSR46	7.87	7.91	5.27	5.78		
2014/03/05	Mid-Ebb	DS1	7.55	7.63	12.63	15.44
		DS2	7.47	7.61	8.17	7.33

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		DS3	7.51	7.65	4.96	5.67
		DS4	7.49	7.61	4.72	4.78
		DS5	7.23	7.59	4.92	3.89
		US1	7.82	7.86	4.27	4.33
		US2	7.55	7.83	5.75	7.00
		MW1	7.05	7.18	2.57	4.89
		THB1	7.40	7.70	5.04	7.00
		THB2	-	7.48	5.50	3.67
		WSR45C	7.26	7.50	5.22	8.78
		WSR46	7.35	7.62	4.20	5.89
	Mid-Flood	DS1	7.75	7.64	4.87	5.67
		DS2	7.66	7.65	5.28	6.33
		DS3	7.69	7.67	5.68	5.17
		DS4	7.59	7.59	8.14	7.56
		DS5	7.52	7.50	8.87	9.22
		US1	7.70	7.65	4.88	4.33
		US2	7.63	7.62	6.41	7.33
		MW1	7.05	7.18	2.69	3.22
		THB1	7.45	7.51	4.00	4.67
		THB2	-	7.13	7.52	7.33
		WSR45C	7.18	7.38	6.29	5.89
		WSR46	7.36	7.40	8.42	9.11
2014/03/07	Mid-Ebb	DS1	7.31	7.32	7.02	8.44
		DS2	7.27	7.33	2.96	2.56
		DS3	7.14	7.27	3.28	3.67
		DS4	7.08	7.22	3.61	3.89
		DS5	7.09	7.17	3.68	6.22
		US1	7.47	7.48	9.29	9.78
		US2	7.55	7.53	7.77	9.83
		MW1	6.92	7.00	1.75	4.56
		THB1	7.30	7.30	6.09	8.83
		THB2	-	7.81	4.73	5.67
		WSR45C	6.92	7.08	3.25	4.44
		WSR46	7.01	7.17	5.11	5.89
	Mid-Flood	DS1	7.30	7.27	7.28	6.17
		DS2	7.32	7.31	8.88	8.33
		DS3	7.50	7.51	6.53	7.83
		DS4	7.47	7.47	6.80	7.44
		DS5	7.38	7.41	7.77	7.56
		US1	7.33	7.30	4.77	8.11
		US2	7.19	7.16	3.92	3.89
		MW1	6.81	6.88	2.10	6.56
		THB1	7.19	7.19	4.36	7.50
		THB2	-	7.64	4.60	5.67
		WSR45C	6.88	6.97	4.28	5.33
		WSR46	7.04	7.06	5.20	5.78
2014/03/11	Mid-Ebb	DS1	6.89	6.92	9.19	18.89
		DS2	7.04	7.01	3.59	3.78
		DS3	7.11	7.04	3.42	3.33
		DS4	7.02	7.03	3.39	3.67
		DS5	6.93	6.96	3.37	3.22

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		US1	7.09	7.04	8.27	9.83
		US2	7.16	7.13	18.12	19.17
		MW1	6.81	6.85	1.51	3.00
		THB1	6.90	6.88	4.70	6.83
		THB2	-	7.13	5.96	8.33
		WSR45C	6.86	6.93	2.30	4.33
		WSR46	7.02	7.06	7.44	7.78
	Mid-Flood	DS1	7.18	7.16	11.23	11.50
		DS2	7.40	7.41	10.93	10.67
		DS3	7.49	7.48	9.18	9.33
		DS4	7.49	7.51	9.01	9.67
		DS5	7.67	7.57	10.04	9.89
		US1	7.03	7.06	7.50	7.67
		US2	7.14	7.11	6.41	7.33
		MW1	6.83	6.87	1.17	2.44
		THB1	7.01	7.02	8.13	11.17
		THB2	-	7.63	5.13	7.00
		WSR45C	6.89	6.92	2.71	5.78
		WSR46	6.84	6.95	6.12	8.11
2014/03/13	Mid-Ebb	DS1	7.41	7.46	11.77	8.67
		DS2	7.43	7.47	5.68	6.67
		DS3	7.31	7.40	6.24	9.67
		DS4	7.12	7.23	6.26	6.78
		DS5	7.18	7.26	4.81	5.22
		US1	7.50	7.53	5.28	5.83
		US2	7.60	7.64	5.82	7.00
		MW1	6.72	6.81	2.29	3.44
		THB1	7.09	7.32	6.44	9.17
		THB2	-	6.44	8.70	5.00
		WSR45C	6.91	7.16	3.92	5.89
		WSR46	7.05	7.16	6.95	7.44
	Mid-Flood	DS1	7.44	7.57	10.22	10.83
		DS2	7.54	7.65	7.03	9.00
		DS3	7.72	7.73	8.25	11.83
		DS4	7.53	7.57	9.16	8.67
		DS5	7.45	7.55	12.51	13.78
		US1	7.40	7.46	6.17	8.00
		US2	7.34	7.43	6.12	6.33
		MW1	6.77	6.82	2.36	6.00
		THB1	7.06	7.30	7.86	7.17
		THB2	-	6.76	11.60	14.00
		WSR45C	6.98	7.24	5.82	9.56
		WSR46	7.13	7.24	3.91	4.33
2014/03/15	Mid-Ebb	DS1	7.13	7.12	9.42	15.00
		DS2	7.09	7.13	20.63	35.44
		DS3	6.95	7.08	10.96	21.89
		DS4	6.91	7.12	7.39	11.11
		DS5	6.97	7.14	9.33	14.78
		US1	7.09	7.10	13.87	18.33
		US2	7.17	7.20	7.76	12.50
		MW1	6.74	6.83	3.80	6.22

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		THB1	7.03	7.09	6.14	8.33
		THB2	-	6.82	6.82	7.67
		WSR45C	6.81	7.15	8.49	15.44
		WSR46	7.12	7.15	12.90	16.67
	Mid-Flood	DS1	7.01	7.02	5.99	9.50
		DS2	7.07	7.07	6.78	9.50
		DS3	7.16	7.15	6.98	10.17
		DS4	7.24	7.20	7.75	10.83
		DS5	7.24	7.25	7.87	10.33
		US1	7.18	7.17	11.21	16.83
		US2	7.16	7.14	8.13	11.11
		MW1	6.63	6.81	5.03	7.78
		THB1	7.02	6.96	5.52	6.50
		THB2	-	6.77	4.77	7.67
		WSR45C	6.91	7.02	10.99	13.33
		WSR46	7.13	7.15	11.19	17.00
2014/03/17	Mid-Ebb	DS1	7.17	7.17	7.27	10.67
		DS2	7.13	7.14	12.28	17.44
		DS3	7.15	7.18	6.54	8.67
		DS4	7.08	7.11	21.86	19.00
		DS5	7.06	7.11	22.85	18.11
		US1	7.21	7.27	7.98	8.17
		US2	7.07	7.09	15.54	19.50
		MW1	6.82	6.94	5.48	8.78
		THB1	6.97	7.01	9.94	12.00
		THB2	-	6.54	7.92	7.33
		WSR45C	7.00	7.06	23.23	23.22
		WSR46	7.06	7.12	12.00	12.78
	Mid-Flood	DS1	7.16	7.18	9.34	12.17
		DS2	7.14	7.16	9.63	10.33
		DS3	7.08	7.08	11.55	17.67
		DS4	7.06	7.07	9.44	11.67
		DS5	7.18	7.11	7.60	10.33
		US1	7.11	7.11	11.24	12.00
		US2	7.03	7.05	12.05	17.33
		MW1	6.72	6.82	7.42	9.11
		THB1	7.08	7.10	8.65	10.83
		THB2	-	6.76	6.49	5.33
		WSR45C	7.04	7.10	13.64	18.11
		WSR46	7.14	7.18	23.27	16.44
2014/03/19	Mid-Ebb	DS1	7.09	7.13	13.91	15.56
		DS2	6.89	6.99	19.21	26.78
		DS3	7.00	7.05	20.99	22.56
		DS4	6.97	7.05	22.18	14.33
		DS5	6.98	7.03	28.90	26.33
		US1	7.40	7.46	9.70	10.00
		US2	7.34	7.40	17.36	20.67
		MW1	6.69	6.79	5.58	7.22
		THB1	6.92	7.06	9.69	11.00
		THB2	-	6.80	4.77	4.00
		WSR45C	6.81	6.87	17.67	18.78

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
	Mid-Flood	WSR46	6.80	6.88	14.43	18.33
		DS1	7.20	7.16	7.98	12.50
		DS2	7.28	7.23	9.73	23.22
		DS3	7.24	7.24	8.82	6.11
		DS4	7.29	7.30	11.27	11.78
		DS5	7.37	7.37	10.52	13.50
		US1	7.13	7.10	17.13	19.22
		US2	7.12	7.14	17.59	23.44
		MW1	6.70	6.81	7.87	9.00
		THB1	6.89	6.91	11.15	12.67
		THB2	-	6.43	7.16	9.00
		WSR45C	6.79	6.85	16.51	32.22
		WSR46	6.89	6.92	31.68	39.78
2014/03/21	Mid-Ebb	DS1	6.87	6.93	23.82	28.33
		DS2	6.57	6.69	11.78	19.89
		DS3	6.74	6.80	11.42	15.89
		DS4	6.77	6.76	15.91	24.00
		DS5	6.69	6.76	15.51	22.78
		US1	7.20	7.00	13.53	21.56
		US2	7.01	6.97	13.93	22.56
		MW1	6.67	6.75	8.17	19.00
		THB1	7.17	7.04	6.83	15.17
		THB2	-	6.58	10.72	14.67
	WSR45C	6.65	6.70	21.12	37.00	
	WSR46	6.76	6.80	13.67	22.11	
	Mid-Flood	DS1	6.92	6.91	15.10	25.83
		DS2	6.93	6.91	12.66	17.00
		DS3	6.98	6.96	15.56	17.67
		DS4	6.98	6.95	11.02	16.78
		DS5	6.99	7.00	15.39	18.78
		US1	6.77	6.81	9.74	21.78
		US2	6.77	6.84	8.13	15.56
		MW1	6.64	6.69	6.99	16.11
THB1		6.99	7.00	8.88	18.17	
THB2		-	6.38	12.12	17.33	
WSR45C	6.73	6.93	8.80	20.22		
WSR46	6.72	6.83	19.64	18.22		
2014/03/24	Mid-Ebb	DS1	7.23	7.26	4.88	11.67
		DS2	6.86	7.04	4.23	11.56
		DS3	6.91	7.18	3.94	10.33
		DS4	7.02	7.22	3.41	10.89
		DS5	6.92	7.14	3.10	6.56
		US1	7.27	7.33	12.59	19.67
		US2	7.53	7.63	9.35	17.56
		MW1	6.93	7.03	2.73	8.56
		THB1	7.52	7.66	6.18	9.33
		THB2	-	8.02	7.06	8.33
	WSR45C	6.89	7.16	5.02	8.67	
	WSR46	7.31	7.42	5.78	8.33	
	Mid-Flood	DS1	7.27	7.41	9.55	14.33
		DS2	7.48	7.50	10.77	13.67



Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		DS3	7.42	7.54	6.33	8.67
		DS4	7.47	7.47	6.83	11.00
		DS5	7.60	7.61	6.22	9.22
		US1	7.27	7.28	3.91	7.00
		US2	6.95	7.14	4.36	11.67
		MW1	6.84	6.96	2.54	3.78
		THB1	7.30	7.32	5.43	7.83
		THB2	-	7.08	7.49	8.33
		WSR45C	6.97	7.14	3.62	6.00
		WSR46	7.03	7.17	11.94	14.22
2014/03/26	Mid-Ebb	DS1	7.20	7.27	6.16	11.50
		DS2	6.99	7.19	2.85	5.11
		DS3	6.96	7.19	3.23	6.00
		DS4	6.99	7.24	2.34	6.22
		DS5	6.90	7.16	3.17	6.00
		US1	7.37	7.50	6.82	11.17
		US2	7.36	7.48	10.04	14.89
		MW1	6.90	7.00	2.07	2.67
		THB1	7.15	7.40	6.47	8.33
		THB2	-	7.35	13.29	4.67
		WSR45C	6.99	7.21	4.28	7.11
		WSR46	7.08	7.44	5.58	5.78
	Mid-Flood	DS1	7.56	7.83	6.52	10.33
		DS2	7.60	7.80	5.64	10.33
		DS3	7.39	7.73	5.61	6.89
		DS4	7.43	7.71	4.48	8.00
		DS5	7.42	7.59	5.38	10.56
		US1	7.48	7.66	4.55	7.33
		US2	6.96	7.26	7.60	10.67
		MW1	6.89	7.00	2.34	4.67
		THB1	7.27	7.67	5.98	8.33
		THB2	-	7.88	9.96	5.00
		WSR45C	6.91	7.34	5.26	7.78
		WSR46	6.95	7.28	6.76	8.67
2014/03/28	Mid-Ebb	DS1	7.56	7.70	7.67	12.67
		DS2	7.00	7.32	6.30	12.11
		DS3	7.44	7.84	5.08	13.11
		DS4	7.32	7.67	5.78	9.11
		DS5	7.22	7.57	7.13	16.78
		US1	8.27	8.43	8.90	11.83
		US2	8.07	8.11	8.68	16.67
		MW1	6.95	7.03	2.96	16.11
		THB1	7.96	8.37	8.62	13.67
		THB2	-	7.89	7.69	15.00
		WSR45C	6.93	7.19	5.62	11.00
		WSR46	7.09	7.50	11.39	19.44
	Mid-Flood	DS1	7.87	8.18	8.55	13.33
		DS2	7.92	8.05	15.80	16.17
		DS3	8.27	8.42	11.19	19.00
		DS4	8.60	8.78	11.60	15.44
		DS5	8.61	8.82	8.73	11.44

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		US1	7.41	7.60	14.11	15.33
		US2	7.23	7.85	10.39	17.89
		MW1	7.29	7.32	4.28	6.67
		THB1	7.71	7.92	12.73	24.00
		THB2	-	9.28	12.09	12.33
		WSR45C	7.19	7.57	14.16	17.22
		WSR46	7.46	7.92	13.86	17.56
2014/03/31	Mid-Ebb	DS1	7.14	7.19	11.65	14.89
		DS2	7.02	7.17	7.20	13.11
		DS3	7.12	7.21	8.07	13.00
		DS4	7.08	7.12	15.71	24.00
		DS5	7.04	7.10	16.35	25.56
		US1	7.08	7.26	10.22	14.17
		US2	7.15	7.27	8.83	13.44
		MW1	6.79	6.85	6.27	10.67
		THB1	6.90	7.03	8.72	11.33
		THB2	-	-	-	-
	Mid-Flood	WSR45C	6.83	6.97	13.90	15.89
		WSR46	6.99	6.87	35.03	38.11
		DS1	6.95	7.06	13.41	20.50
		DS2	6.91	6.98	13.25	21.17
		DS3	6.84	7.06	15.89	25.33
		DS4	6.85	6.93	17.27	18.67
		DS5	6.95	7.06	17.81	25.22
		US1	6.93	6.93	12.44	15.83
		US2	6.93	6.99	21.39	20.44
		MW1	6.86	6.90	11.27	10.11
THB1	6.70	6.76	10.02	11.50		
THB2	-	-	-	-		
WSR45C	6.75	6.83	20.08	22.67		
WSR46	6.77	6.76	24.06	26.11		

Notes:

1. Please refer to Table C2 below for the Action and Limit Levels for dredging activities.
2. Cell shaded yellow indicated value exceeding the Action Level criteria.
3. Cell shaded red indicated value exceeding the Limit Level criteria.
4. Only mid-depth water was sampled at Station THB2 because water depth was less than 3m.
5. Sampling at Station THB2 on 31 March 2014 was cancelled due to adverse weather condition.
- 6.

**Table C2 Action and Limit Levels of Water Quality for Dredging, Backfilling and Capping Activities**

<b>Parameter</b>	<b>Action Level</b>	<b>Limit Level</b>
Dissolved Oxygen (DO) <sup>(1)</sup>	<u>Surface and Mid-depth</u> <sup>(2)</sup> The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for surface and middle layer = <b>4.32 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)	<u>Surface and Mid-depth</u> <sup>(2)</sup> The average of the impact, WSR 45C and WSR 46 station readings are < <b>4 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)
	<u>Bottom</u> The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for bottom layers = <b>3.12 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)	<u>Bottom</u> The average of the impact station, WSR 45C and WSR 46 readings are < <b>2 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)
	Depth-averaged Suspended Solids (SS) <sup>(3) (4)</sup>	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data for depth average = <b>21.60 mg L<sup>-1</sup></b>  and  120% of control station's SS at the same tide of the same day
Depth-averaged Turbidity (Tby) <sup>(3) (4)</sup>	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data = <b>25.04 NTU</b>  and  120% of control station's Tby at the same tide of the same day	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data = <b>32.68 NTU</b>  and  130% of control station's Tby at the same tide of the same day

**Notes:**

- (1) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- (2) The Action and Limit Levels for DO for Surface & Middle layers were calculated from the combined pool of baseline surface layer data and baseline middle layer data.
- (3) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- (4) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

**Table C3 Results of Baseline Monitoring conducted for SB CMPs in July and August 2012**

Parameter	Detection Limit	Stations around SB CMP			EPD Stations (NM1, NM2, NM3, NM5 and NM6)		
		Average	Min	Max	Average	Min	Max
DO (mg/L)	0.1	5.6	2.5	12.2	5.1	2.3	10.7
Turbidity (NTU)	0.1	9.5	1.5	74.9	9.6	1.9	120.1
SS (mg/L)	2	9.9	3.1	130.7	8.8	0.8	49.3
Arsenic ( $\mu\text{g/L}$ )	10	<10	<10	<10	<10	<10	<10
Cadmium ( $\mu\text{g/L}$ )	0.2	0.2	0.2	0.4	0.2	0.2	0.2
Chromium ( $\mu\text{g/L}$ )	1	1.5	1.0	2.0	2.0	1.0	3.0
Copper ( $\mu\text{g/L}$ )	1	2.3	1.0	13.0	1.2	1.0	11.0
Lead ( $\mu\text{g/L}$ )	1	1.3	1.0	2.0	5.0	1.0	9.0
Mercury ( $\mu\text{g/L}$ )	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel ( $\mu\text{g/L}$ )	1	2.2	1.0	7.0	2.1	1.0	5.0
Silver ( $\mu\text{g/L}$ )	1	<1	<1	<1	<1	<1	<1
Zinc ( $\mu\text{g/L}$ )	10	18.9	10.0	173.0	23.7	10.0	224.0
NH <sub>3</sub> -N (mg/L)	0.01	0.1	0.0	0.4	0.1	0.0	0.4
TIN (mg/L)	0.1	0.8	0.3	1.7	0.8	0.2	1.8
BOD <sub>5</sub> (mg/L)	2	<2	<2	<2	<2	<2	<2

**Table C4 In-situ Monitoring Results for Routine Water Quality Monitoring of CMP 1 in February 2014**

Sampling Date	Stations	Temp (°C)	Salinity <sup>(1)</sup> (ppt)	Turbidity (NTU)	Dissolved Oxygen		pH (mg L <sup>-1</sup> )
					(%)	(mg L <sup>-1</sup> )	
2014/2/5	RFF (Reference)	18.24	29.66	2.16	121.68	9.60	8.06
	IPF (Impact)	18.21	29.94	2.41	121.63	9.58	8.00
	INF (Intermediate)	18.10	30.47	1.81	120.41	9.48	8.10
	Ma Wan Station	18.01	30.57	1.78	115.53	9.10	7.96
	Shum Shui Kok Station	18.10	30.06	1.86	117.10	9.24	8.02
	Tai Mo To Station	18.22	29.92	2.23	122.93	9.68	8.12
	Tai Ho Bay Station 1	18.32	29.50	2.05	126.01	9.93	8.09
	Tai Ho Bay Station 2	18.63	29.01	2.89	102.34	8.05	8.05
	WQO	N/A	26.69-32.62	N/A	N/A	>4	6.5-8.5
	2014/2/7	RFF (Reference)	18.70	29.51	2.19	127.46	9.98
IPF (Impact)		18.70	29.68	2.59	124.75	9.76	8.21
INF (Intermediate)		18.36	30.64	2.79	117.22	9.17	8.14
Ma Wan Station		18.34	30.76	1.56	115.57	9.04	8.18
Shum Shui Kok Station		18.42	30.17	1.49	120.27	9.43	8.20
Tai Mo To Station		18.57	29.84	2.29	124.66	9.77	8.19
Tai Ho Bay Station 1		18.79	29.48	2.71	131.01	10.24	8.27
Tai Ho Bay Station 2		19.02	29.82	4.92	114.51	8.89	8.11
WQO		N/A	26.56-32.47	N/A	N/A	>4	6.5-8.5
2014/2/10		RFF (Reference)	17.70	31.51	1.69	98.69	7.78
	IPF (Impact)	17.87	31.97	3.58	96.88	7.59	8.12
	INF (Intermediate)	17.98	32.71	1.48	98.77	7.69	8.12
	Ma Wan Station	18.02	32.72	1.46	97.26	7.57	8.13
	Shum Shui Kok Station	17.99	32.50	1.28	95.76	7.46	8.11
	Tai Mo To Station	17.85	31.92	2.86	97.54	7.65	8.11

Sampling Date	Stations	Temp	Salinity <sup>(1)</sup>	Turbidity	Dissolved Oxygen		pH
		(°C)	(ppt)	(NTU)	(%)	(mg L <sup>-1</sup> )	(mg L <sup>-1</sup> )
	Tai Ho Bay Station 1	17.21	30.29	1.39	99.18	7.95	8.16
	Tai Ho Bay Station 2	-	-	-	-	-	-
	WQO	N/A	28.36-34.66	N/A	N/A	>4	6.5-8.5
2014/2/12	RFF (Reference)	17.08	32.92	1.72	94.45	7.47	8.12
	IPF (Impact)	16.58	32.12	5.34	93.89	7.53	8.15
	INF (Intermediate)	15.98	30.95	5.76	93.60	7.66	8.12
	Ma Wan Station	17.28	33.01	2.40	94.22	7.42	8.09
	Shum Shui Kok Station	17.09	32.69	2.48	92.80	7.35	8.14
	Tai Mo To Station	16.67	32.43	9.17	94.34	7.54	8.12
	Tai Ho Bay Station 1	15.96	31.18	2.29	93.58	7.65	8.14
	Tai Ho Bay Station 2	15.74	31.19	4.03	88.41	7.26	8.06
	WQO	N/A	29.63-36.21	N/A	N/A	>4	6.5-8.5
2014/2/14	RFF (Reference)	16.06	32.80	5.62	91.49	7.39	8.08
	IPF (Impact)	15.89	32.67	5.94	90.82	7.37	8.08
	INF (Intermediate)	16.63	33.12	3.49	89.37	7.12	8.07
	Ma Wan Station	16.73	33.02	1.87	90.83	7.23	8.07
	Shum Shui Kok Station	16.27	32.93	4.65	90.74	7.29	8.08
	Tai Mo To Station	16.21	32.91	8.78	90.28	7.26	8.07
	Tai Ho Bay Station 1	14.68	31.70	2.13	92.38	7.72	8.07
	Tai Ho Bay Station 2	-	-	-	-	-	-
	WQO	N/A	29.52-36.08	N/A	N/A	>4	6.5-8.5
2014/2/17	RFF (Reference)	16.07	33.14	6.99	92.60	7.46	8.00
	IPF (Impact)	16.05	33.15	5.34	93.12	7.51	7.99
	INF (Intermediate)	16.22	33.19	3.59	90.80	7.29	7.97
	Ma Wan Station	16.32	33.03	5.98	88.98	7.14	7.97
	Shum Shui Kok Station	16.13	33.14	9.87	91.53	7.37	8.00
	Tai Mo To Station	16.11	33.26	5.37	93.80	7.55	8.00
	Tai Ho Bay Station 1	16.00	33.06	3.69	91.69	7.40	7.98
	Tai Ho Bay Station 2	15.89	32.61	3.46	84.51	6.85	7.99
	WQO	N/A	29.82-36.45	N/A	N/A	>4	6.5-8.5
2014/2/19	RFF (Reference)	16.19	32.71	6.65	94.89	7.65	8.13
	IPF (Impact)	16.27	32.74	7.07	92.74	7.46	8.11
	INF (Intermediate)	16.54	32.84	6.55	88.27	7.06	8.07
	Ma Wan Station	16.58	32.84	5.23	87.87	7.02	8.10
	Shum Shui Kok Station	16.36	32.77	6.05	91.52	7.35	8.13
	Tai Mo To Station	16.33	32.75	5.46	91.97	7.39	8.09
	Tai Ho Bay Station 1	15.83	32.59	7.88	96.13	7.81	8.12
	Tai Ho Bay Station 2	-	-	-	-	-	-
	WQO	N/A	29.44-35.98	N/A	N/A	>4	6.5-8.5
2014/2/21	RFF (Reference)	16.07	32.68	4.41	91.87	7.42	8.01
	IPF (Impact)	16.18	32.72	7.22	91.25	7.35	7.99
	INF (Intermediate)	16.42	32.83	2.49	90.10	7.22	7.96
	Ma Wan Station	16.48	32.85	3.11	89.18	7.14	8.01
	Shum Shui Kok Station	16.33	32.76	4.93	89.07	7.16	8.02
	Tai Mo To Station	16.06	32.67	5.36	92.07	7.44	7.98
	Tai Ho Bay Station 1	16.06	32.66	5.40	92.77	7.50	7.99
	Tai Ho Bay Station 2	15.96	32.59	4.58	94.80	7.68	7.94
	WQO	N/A	29.41-35.94	N/A	N/A	>4	6.5-8.5
2014/2/24	RFF (Reference)	16.78	32.80	2.94	95.54	7.61	8.01
	IPF (Impact)	16.76	32.81	3.72	95.58	7.61	7.99
	INF (Intermediate)	16.58	32.84	1.43	93.39	7.46	7.96

Sampling Date	Stations	Temp	Salinity <sup>(1)</sup>	Turbidity	Dissolved Oxygen		pH
		(°C)	(ppt)	(NTU)	(%)	(mg L <sup>-1</sup> )	(mg L <sup>-1</sup> )
	Ma Wan Station	16.49	32.75	1.39	89.18	7.14	7.99
	Shum Shui Kok Station	16.63	32.78	1.73	93.53	7.47	8.02
	Tai Mo To Station	16.70	32.81	2.98	95.34	7.60	7.98
	Tai Ho Bay Station 1	16.95	32.78	4.43	100.07	7.94	8.02
	Tai Ho Bay Station 2	17.20	32.89	6.99	98.38	7.77	8.00
	WQO	N/A	29.52-36.08	N/A	N/A	>4	6.5-8.5
2014/2/26	RFF (Reference)	16.94	33.20	1.30	93.49	7.40	7.90
	IPF (Impact)	17.11	32.78	5.68	98.48	7.79	7.96
	INF (Intermediate)	17.43	32.74	10.74	102.77	8.08	7.92
	Ma Wan Station	16.78	33.07	1.47	85.83	6.82	7.85
	Shum Shui Kok Station	16.87	32.82	1.79	91.89	7.30	7.91
	Tai Mo To Station	17.09	33.09	4.42	97.85	7.73	7.94
	Tai Ho Bay Station 1	17.29	32.79	4.48	97.48	7.69	7.92
	Tai Ho Bay Station 2	17.55	33.10	8.14	87.49	6.85	7.90
	WQO	N/A	29.88-36.52	N/A	N/A	>4	6.5-8.5
2014/2/28	RFF (Reference)	17.38	32.20	2.67	96.71	7.64	7.96
	IPF (Impact)	17.59	32.06	4.27	102.36	8.06	7.90
	INF (Intermediate)	18.27	32.39	4.91	105.19	8.16	7.90
	Ma Wan Station	17.28	32.51	2.16	93.47	7.38	7.95
	Shum Shui Kok Station	17.34	32.58	1.80	93.89	7.41	7.81
	Tai Mo To Station	17.63	31.53	7.65	106.39	8.40	8.01
	Tai Ho Bay Station 1	17.69	31.97	2.74	105.34	8.28	7.92
	Tai Ho Bay Station 2	18.43	32.21	6.57	98.50	7.63	7.91
	WQO	N/A	28.98-35.42	N/A	N/A	>4	6.5-8.5

**Note:**

1 #Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

2 Cell shaded yellow indicate value exceeding the Action Level/Limit Level.

Note: Sampling at Tai Ho Bay station 2 was cancelled on 10, 14 and 19 February 2014 due to adverse weather conditions.

**Table C5 Laboratory Results for Routine Water Quality Monitoring of CMP 1 in February 2014**

Date	Stations	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Pb (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	NH <sub>3</sub> (mg/L)	TIN (mg/L)	BOD <sub>5</sub> (mg/L)	SS (mg/L)
2/5	RFF	1.42	<LOR	<LOR	2.33	<LOR	<LOR	2.42	<LOR	4.29	0.03	0.38	2.09	3.38
	IPF	<LOR	<LOR	0.52	1.63	<LOR	<LOR	2.10	<LOR	2.38	0.03	0.34	2.12	3.44
	INF	<LOR	<LOR	0.52	1.33	<LOR	<LOR	2.00	<LOR	<LOR	0.02	0.32	1.72	3.75
	Ma Wan Station	1.50	<LOR	<LOR	1.75	<LOR	<LOR	2.00	<LOR	<LOR	0.02	0.30	2.46	4.19
	Shum Shui Kok Station	<LOR	<LOR	<LOR	1.50	<LOR	<LOR	2.00	<LOR	4.75	0.03	0.35	1.91	3.06
	Tai Mo To Station	<LOR	<LOR	<LOR	1.06	<LOR	<LOR	2.00	<LOR	2.88	0.03	0.39	1.83	3.13
	Tai Ho Bay Station 1	<LOR	<LOR	<LOR	1.25	<LOR	<LOR	2.25	<LOR	<LOR	0.03	0.39	2.23	2.88
	Tai Ho Bay Station 2	<LOR	<LOR	<LOR	2.75	<LOR	<LOR	2.88	<LOR	14.75	0.01	0.38	0.93	3.63
2/7	RFF	1.21	<LOR	<LOR	5.88	<LOR	<LOR	1.38	<LOR	6.42	0.05	0.42	1.31	4.10
	IPF	<LOR	<LOR	<LOR	4.29	<LOR	<LOR	2.13	<LOR	6.25	0.05	0.39	1.60	3.13
	INF	1.25	<LOR	<LOR	4.42	0.60	<LOR	1.58	<LOR	5.33	0.05	0.33	1.18	2.10
	Ma Wan Station	1.13	<LOR	<LOR	3.88	<LOR	<LOR	1.25	<LOR	9.38	0.04	0.26	1.46	2.00

Date	Stations	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Pb (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	NH <sub>3</sub> (mg/L)	TIN (mg/L)	BOD <sub>5</sub> (mg/L)	SS (mg/L)
	Shum Shui Kok Station	1.50	<LOR	<LOR	5.63	0.69	<LOR	1.00	<LOR	4.13	0.05	0.34	1.51	2.63
	Tai Mo To Station	<LOR	<LOR	<LOR	5.63	<LOR	<LOR	1.00	<LOR	6.25	0.05	0.40	1.66	3.63
	Tai Ho Bay Station 1	<LOR	<LOR	<LOR	7.38	0.56	<LOR	1.13	<LOR	7.50	0.03	0.34	2.10	4.25
	Tai Ho Bay Station 2	<LOR	<LOR	<LOR	0.88	0.56	<LOR	1.00	<LOR	4.00	0.03	0.31	0.59	3.63
2/10	RFF	1.46	<LOR	<LOR	7.88	<LOR	<LOR	1.44	<LOR	7.25	0.11	0.32	1.14	3.17
	IPF	1.92	<LOR	<LOR	10.00	<LOR	<LOR	1.46	<LOR	12.13	0.11	0.26	1.47	8.19
	INF	1.29	<LOR	0.52	3.54	<LOR	<LOR	0.98	<LOR	4.96	0.08	0.16	1.02	3.85
	Ma Wan Station	1.88	<LOR	<LOR	38.25	0.88	<LOR	0.75	<LOR	26.88	0.08	0.17	1.61	4.13
	Shum Shui Kok Station	1.88	<LOR	<LOR	12.38	0.56	<LOR	1.75	<LOR	7.88	0.11	0.21	1.24	3.44
	Tai Mo To Station	1.63	<LOR	<LOR	4.13	<LOR	<LOR	1.25	<LOR	4.50	0.11	0.29	1.11	5.75
	Tai Ho Bay Station 1	1.50	<LOR	<LOR	1.88	<LOR	<LOR	2.00	<LOR	3.50	0.10	0.40	1.16	1.00
	Tai Ho Bay Station 2	-	-	-	-	-	-	-	-	-	-	-	-	-
2/12	RFF	1.28	<LOR	<LOR	5.18	<LOR	<LOR	<LOR	<LOR	9.33	0.05	0.14	0.51	4.20
	IPF	1.53	<LOR	<LOR	1.29	<LOR	<LOR	0.80	<LOR	5.00	0.08	0.20	0.86	6.30
	INF	1.25	<LOR	<LOR	1.13	<LOR	<LOR	1.63	<LOR	4.15	0.08	0.28	0.85	8.95
	Ma Wan Station	1.75	<LOR	<LOR	7.25	<LOR	<LOR	<LOR	<LOR	10.38	0.04	0.12	0.28	6.06
	Shum Shui Kok Station	2.00	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	3.88	0.05	0.16	0.69	5.69
	Tai Mo To Station	1.38	<LOR	<LOR	3.50	<LOR	<LOR	0.94	<LOR	7.38	0.07	0.20	0.48	14.50
	Tai Ho Bay Station 1	2.00	<LOR	<LOR	6.50	<LOR	<LOR	1.88	<LOR	10.25	0.08	0.27	0.81	3.00
	Tai Ho Bay Station 2	<LOR	<LOR	<LOR	0.94	<LOR	<LOR	2.00	<LOR	5.25	0.09	0.43	0.65	2.63
2/14	RFF	1.33	<LOR	<LOR	0.56	<LOR	<LOR	<LOR	<LOR	2.63	0.08	0.18	1.54	10.54
	IPF	1.92	<LOR	<LOR	0.88	<LOR	<LOR	0.58	<LOR	5.67	0.08	0.18	0.49	9.88
	INF	1.83	<LOR	<LOR	4.98	0.58	<LOR	<LOR	<LOR	7.29	0.07	0.15	0.41	6.98
	Ma Wan Station	1.13	<LOR	<LOR	2.69	0.81	<LOR	1.13	<LOR	9.88	0.06	0.15	0.94	6.31
	Shum Shui Kok Station	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.08	0.17	0.89	9.56
	Tai Mo To Station	<LOR	<LOR	<LOR	0.63	<LOR	<LOR	<LOR	<LOR	2.63	0.09	0.18	1.44	12.88
	Tai Ho Bay Station 1	<LOR	<LOR	<LOR	<LOR	0.69	<LOR	0.75	<LOR	<LOR	0.09	0.24	1.06	7.38
	Tai Ho Bay Station 2	-	-	-	-	-	-	-	-	-	-	-	-	-
2/17	RFF	1.50	<LOR	<LOR	2.46	0.79	<LOR	0.92	<LOR	5.54	0.05	0.14	0.39	9.04
	IPF	1.17	<LOR	<LOR	4.56	<LOR	<LOR	0.73	<LOR	4.96	0.06	0.15	0.39	10.21
	INF	<LOR	0.50	<LOR	2.17	<LOR	<LOR	0.79	<LOR	5.63	0.06	0.15	0.33	7.33
	Ma Wan Station	2.00	<LOR	<LOR	11.00	<LOR	<LOR	1.00	<LOR	17.00	0.06	0.16	0.41	11.63
	Shum Shui Kok Station	1.88	<LOR	<LOR	18.50	0.75	<LOR	1.50	<LOR	9.63	0.07	0.16	0.44	14.00
	Tai Mo To Station	1.63	<LOR	<LOR	2.25	<LOR	<LOR	0.94	<LOR	2.75	0.04	0.12	0.38	8.56
	Tai Ho Bay Station 1	1.75	<LOR	<LOR	1.19	<LOR	<LOR	0.75	<LOR	6.00	0.11	0.21	0.39	5.75
	Tai Ho Bay Station 2	1.13	1.61	<LOR	1.75	0.94	<LOR	1.75	<LOR	11.50	0.07	0.27	0.79	4.13
2/19	RFF	1.29	<LOR	<LOR	0.77	<LOR	<LOR	0.56	<LOR	<LOR	0.07	0.17	0.40	9.83

Date	Stations	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Pb (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	NH <sub>3</sub> (mg/L)	TIN (mg/L)	BOD <sub>5</sub> (mg/L)	SS (mg/L)
	IPF	1.13	<LOR	<LOR	0.88	<LOR	<LOR	<LOR	<LOR	2.92	0.08	0.18	0.41	9.06
	INF	<LOR	<LOR	<LOR	1.04	<LOR	<LOR	<LOR	<LOR	2.88	0.09	0.19	0.28	9.54
	Ma Wan Station	1.38	<LOR	<LOR	0.94	<LOR	<LOR	<LOR	<LOR	2.63	0.10	0.20	0.66	7.31
	Shum Shui Kok Station	1.25	<LOR	<LOR	0.81	<LOR	<LOR	0.56	<LOR	<LOR	0.09	0.19	0.29	9.00
	Tai Mo To Station	1.13	<LOR	<LOR	0.75	<LOR	<LOR	<LOR	<LOR	2.25	0.10	0.20	0.38	7.00
	Tai Ho Bay Station 1	1.25	<LOR	<LOR	<LOR	<LOR	<LOR	0.75	<LOR	2.63	0.04	0.15	0.59	11.00
	Tai Ho Bay Station 2	-	-	-	-	-	-	-	-	-	-	-	-	-
2/21	RFF	1.54	<LOR	<LOR	0.65	<LOR	<LOR	0.58	<LOR	2.42	0.11	0.20	0.31	5.60
	IPF	1.54	<LOR	<LOR	0.56	<LOR	<LOR	0.75	<LOR	2.63	0.12	0.21	0.35	8.77
	INF	1.96	<LOR	<LOR	0.56	<LOR	<LOR	<LOR	<LOR	2.08	0.10	0.19	0.25	4.02
	Ma Wan Station	1.50	<LOR	<LOR	0.56	<LOR	<LOR	<LOR	<LOR	2.88	0.09	0.18	0.29	7.81
	Shum Shui Kok Station	1.75	<LOR	<LOR	1.25	<LOR	<LOR	<LOR	<LOR	2.63	0.11	0.21	0.25	10.88
	Tai Mo To Station	1.13	<LOR	<LOR	0.56	<LOR	<LOR	<LOR	<LOR	2.25	0.12	0.22	0.25	10.13
	Tai Ho Bay Station 1	1.25	<LOR	<LOR	0.81	<LOR	<LOR	0.56	<LOR	2.25	0.11	0.22	0.25	6.88
	Tai Ho Bay Station 2	<LOR	<LOR	<LOR	1.56	<LOR	<LOR	0.69	<LOR	2.50	0.06	0.17	0.25	4.50
2/24	RFF	1.08	<LOR	<LOR	0.69	<LOR	<LOR	0.52	<LOR	2.50	0.11	0.21	0.25	6.77
	IPF	1.29	<LOR	<LOR	1.27	<LOR	<LOR	0.54	<LOR	3.38	0.12	0.22	0.44	5.54
	INF	1.04	<LOR	<LOR	0.60	<LOR	<LOR	<LOR	<LOR	2.08	0.11	0.21	0.39	2.77
	Ma Wan Station	1.13	<LOR	<LOR	1.19	<LOR	<LOR	0.56	<LOR	4.25	0.13	0.24	0.25	2.25
	Shum Shui Kok Station	1.63	<LOR	<LOR	0.69	<LOR	<LOR	<LOR	<LOR	2.25	0.10	0.20	0.25	1.44
	Tai Mo To Station	1.25	<LOR	<LOR	0.81	<LOR	<LOR	<LOR	<LOR	2.38	0.13	0.22	0.25	3.19
	Tai Ho Bay Station 1	1.13	<LOR	<LOR	<LOR	<LOR	<LOR	0.63	<LOR	3.25	0.10	0.20	0.31	6.63
	Tai Ho Bay Station 2	<LOR	<LOR	<LOR	0.88	<LOR	<LOR	0.94	<LOR	4.25	0.06	0.14	0.39	7.00
2/26	RFF	1.85	<LOR	<LOR	0.51	<LOR	<LOR	<LOR	<LOR	5.65	0.11	0.21	0.27	2.54
	IPF	1.08	<LOR	<LOR	0.69	<LOR	<LOR	0.56	<LOR	6.40	0.09	0.19	0.56	10.43
	INF	1.03	<LOR	<LOR	0.54	0.51	<LOR	0.54	<LOR	5.60	0.04	0.14	0.40	19.25
	Ma Wan Station	1.38	<LOR	<LOR	1.56	<LOR	<LOR	<LOR	<LOR	7.75	0.18	0.30	0.25	4.94
	Shum Shui Kok Station	1.63	<LOR	<LOR	0.88	<LOR	<LOR	<LOR	<LOR	5.38	0.15	0.26	0.61	3.63
	Tai Mo To Station	1.25	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	4.50	0.08	0.19	0.29	6.44
	Tai Ho Bay Station 1	1.50	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	4.13	0.10	0.21	0.47	7.75
	Tai Ho Bay Station 2	<LOR	<LOR	<LOR	1.00	<LOR	<LOR	<LOR	<LOR	3.88	0.07	0.17	0.25	5.88
2/28	RFF	1.33	<LOR	<LOR	1.14	<LOR	<LOR	1.13	<LOR	2.78	0.13	0.30	0.46	3.41
	IPF	1.18	<LOR	<LOR	0.88	<LOR	<LOR	1.55	<LOR	2.75	0.10	0.28	0.59	7.24
	INF	1.43	<LOR	<LOR	0.55	<LOR	<LOR	1.65	<LOR	2.58	0.03	0.18	0.77	7.58
	Ma Wan Station	1.25	<LOR	<LOR	0.63	<LOR	<LOR	0.56	<LOR	4.00	0.15	0.28	0.34	3.06
	Shum Shui Kok Station	1.25	<LOR	<LOR	<LOR	<LOR	<LOR	0.75	<LOR	2.75	0.16	0.32	0.34	3.88
	Tai Mo To Station	1.50	<LOR	<LOR	0.81	<LOR	<LOR	1.75	<LOR	<LOR	0.08	0.30	0.76	8.88



Date	Stations	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Pb (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	NH <sub>3</sub> (mg/L)	TIN (mg/L)	BOD <sub>5</sub> (mg/L)	SS (mg/L)
	Tai Ho Bay Station 1	1.25	<LOR	<LOR	1.50	<LOR	<LOR	1.75	<LOR	3.25	0.08	0.27	0.88	6.63
	Tai Ho Bay Station 2	<LOR	<LOR	<LOR	1.00	<LOR	<LOR	1.25	<LOR	5.38	0.04	0.17	0.59	7.75
WQO of TIN: 0.5 µg/L														
Dry Season WQO of SS: 14.4 mg/L														

Note:

1. Cell shaded grey indicated value exceeding WQO.
2. Sampling at Tai Ho Bay station 2 was cancelled on 10, 14 and 19 February 2014 due to adverse weather conditions.

**Table C6** *Monthly Averaged In-situ Monitoring Results for Routine Water Quality Monitoring of CMP 1 in February 2014*

Sampling Period	Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen		pH (mg L <sup>-1</sup> )
					(%)	(mg L <sup>-1</sup> )	
2014/2	RFF (Reference)	17.05	32.30	3.02	98.44	7.82	8.04
	IPF (Impact)	17.02	32.06	4.83	100.14	7.97	8.05
	INF (Intermediate)	17.14	32.25	4.09	99.08	7.85	8.03
	Ma Wan Station	17.12	32.47	2.58	95.27	7.55	8.03
	Shum Shui Kok Station	17.05	32.29	3.45	97.10	7.71	8.04
	Tai Mo To Station	17.04	32.10	5.14	100.65	8.00	8.05
	Tai Ho Bay Station 1	16.80	31.64	3.56	102.33	8.19	8.06
	Tai Ho Bay Station 2	17.30	31.68	5.20	96.12	7.62	7.99
	WQO	N/A	29.07-35.53#	N/A	N/A	>4	6.5-8.5

**Note:** #Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

**Table C7** *Monthly Averaged Laboratory Results for Routine Water Quality Monitoring of CMP 1 in February 2014*

Sampling Period	Stations	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Pb (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	NH <sub>3</sub> (mg/L)	TIN (mg/L)	BOD <sub>5</sub> (mg/L)	SS (mg/L)
2014/01	RFF	1.40	<LOR	<LOR	2.51	0.52	<LOR	0.91	<LOR	4.82	0.08	0.24	0.73	5.33
	IPF	1.33	<LOR	0.50	2.22	<LOR	<LOR	1.05	<LOR	4.91	0.08	0.23	0.82	7.55
	INF	1.27	0.13	0.50	1.72	0.52	<LOR	1.05	<LOR	4.06	0.06	0.21	0.69	7.69
	Ma Wan Station	1.45	<LOR	<LOR	6.34	0.56	<LOR	0.84	<LOR	8.82	0.09	0.21	0.81	5.43
	Shum Shui Kok Station	1.52	<LOR	<LOR	3.92	0.55	<LOR	0.91	<LOR	4.30	0.09	0.23	0.77	6.11
	Tai Mo To Station	1.26	<LOR	<LOR	1.88	<LOR	<LOR	0.94	<LOR	3.61	0.08	0.25	0.80	7.64
	Tai Ho Bay Station 1	1.33	<LOR	<LOR	2.05	0.52	<LOR	1.18	<LOR	4.25	0.08	0.26	0.93	5.74
	Tai Ho Bay Station 2	1.02	0.29	<LOR	1.34	0.56	<LOR	1.38	<LOR	6.44	0.06	0.25	0.55	4.89
	WQO of TIN: 0.5 mg/L													
Dry Season WQO of SS: 14.4 mg/L														

**Table C8** *Water Column Profiling Results for CMP 1 on 8 March 2014*

Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen		pH (mg L <sup>-1</sup> )	Suspended Solids (mg L <sup>-1</sup> )
				(%)	(mg L <sup>-1</sup> )		
WCP 1 (Downstream)	17.34	31.57	9.42	90.68	7.20	7.95	13.75
WCP 2 (Upstream)	17.50	32.00	3.40	88.20	7.00	7.90	3.25
WQO	N/A	28.63- 35.24 <sup>#</sup>	N/A	N/A	>4	6.5-8.5	14.40

**Note:** <sup>#</sup>Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

Annex D

## Dredging Record for CMP 2 in March 2014

Table D1 Dredging Record at SB CMP 2

Date	Daily Dredging Volume (m <sup>3</sup> )	Weekly Dredging Volume (m <sup>3</sup> ) (From Sunday to Saturday)
23-Feb-2014	6,500	50,050
24-Feb-2014	6,500	
25-Feb-2014	7,150	
26-Feb-2014	8,450	
27-Feb-2014	7,150	
28-Feb-2014	7,800	
01-Mar-2014	6,500	
02-Mar-2014	6,500	46,150
03-Mar-2014	6,500	
04-Mar-2014	7,150	
05-Mar-2014	5,850	
06-Mar-2014	8,450	
07-Mar-2014	6,500	
08-Mar-2014	5,200	
09-Mar-2014	5,850	48,100
10-Mar-2014	7,150	
11-Mar-2014	5,850	
12-Mar-2014	8,450	
13-Mar-2014	6,500	
14-Mar-2014	7,800	
15-Mar-2014	6,500	
16-Mar-2014	10,400	39,000
17-Mar-2014	6,500	
18-Mar-2014	5,200	
19-Mar-2014	4,550	
20-Mar-2014	3,900	
21-Mar-2014	5,200	
22-Mar-2014	3,250	
23-Mar-2014	9,100	58,500
24-Mar-2014	9,750	
25-Mar-2014	9,750	
26-Mar-2014	8,450	
27-Mar-2014	6,500	
28-Mar-2014	7,800	
29-Mar-2014	7,150	
30-Mar-2014	8,450	16,900
31-Mar-2014	8,450	

Annex E

## Study Programme

