




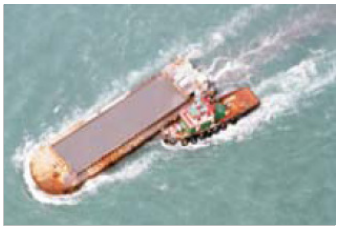
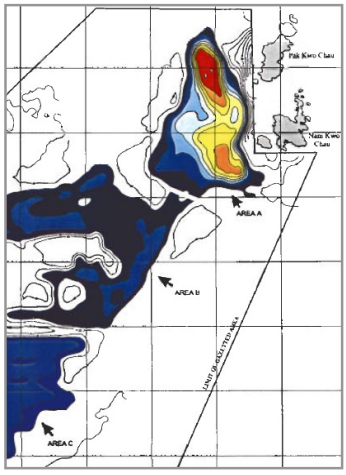

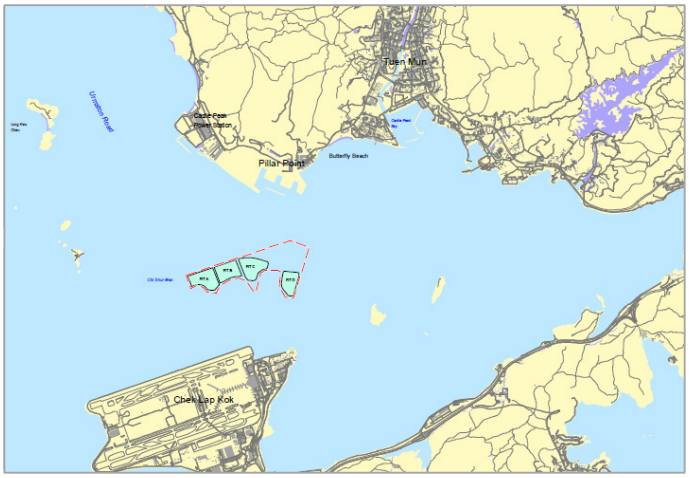

土木工程拓展署
Civil Engineering and Development Department

Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation

Agreement No. CE 4/2009(EP)

36th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – June 2012

Revision 0

5 October 2012

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Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation

36th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – June 2012

Revision 0

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Client:	Project No:
Civil Engineering and Development Department (CEDD)	0103262
Summary: This document presents progress of monitoring works on contaminated mud pits at Sha Chau in June 2012 under Agreement No. CE 4/2009 (EP).	Date: 5 October 2012 Approved by:  *Dr Robin Kennish* *Director*

Revision	Description	By	Checked	Approved	Date
0	36th Monthly Progress Report for CMP	CL	JT	RK	05/10/12

Distribution

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CONTENTS

ANNEXES

Agreement No. CE 4/2009 (EP)
Environmental Monitoring and Audit
for Contaminated Mud Pit at Sha Chau (2009-2013) - Investigation

36th MONTHLY PROGRESS REPORT FOR CONTAMINATED MUD PITS AT SHA CHAU June 2012

1.1 BACKGROUND

1.1.1 Since 1992, the East of Sha Chau area has been the site of a series of dredged Contaminated Mud Pits (CMPs) designed to provide confined marine disposal capacity for contaminated mud arising from the HKSAR's dredging and reclamation projects. In June 2012, the following works were being undertaken at the CMPs:

- Capping was being undertaken at CMP IVc;
- Disposal of contaminated mud was taking place at CMP Va; and
- The dredging of CMP Vc was in progress.

1.1.2 The Environmental Monitoring and Audit (EM&A) programme for the CMPs at the East of Sha Chau area (ESC) presently covers the above operations.

1.2 REPORTING PERIOD

1.2.1 This *Monthly Progress Report* covers the reporting month of June 2012.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

1.3.1 The following monitoring activities have been undertaken for CMP IVc in June 2012:

- *Water Quality Monitoring during Capping* was conducted on 7 June 2012.

1.3.2 The following monitoring activities have been undertaken for CMP V in June 2012:

- *Pit Specific Sediment Chemistry Monitoring* was conducted for CMP Va on 4 June 2012;
- *Cumulative Impact Sediment Chemistry Monitoring* was conducted for CMP Va on 5 and 6 June 2012;
- *Impact Water Quality Monitoring during Dredging Operations* was conducted for CMP Vc on 8 June 2012; and

- *Water Column Profiling* was conducted for CMP Va on 11 June 2012.

1.3.3 A summary of field activities is presented in *Annex A*.

1.4 DETAILS OF OUTSTANDING SAMPLING AND / OR ANALYSIS

1.4.1 No outstanding sampling and laboratory analysis remained from June 2012.

1.5 BRIEF DISCUSSION OF THE MONITORING RESULTS FOR CMP V

1.5.1 *Table 1.1* summarises the monitoring results that are presented in the current monthly report. All monitoring data collected for CMP V in June 2012 will be presented in this monthly report.

Table 1.1 Monitoring results presented in the June 2012 Monthly Report

Date of Monitoring	Monitoring Component
4 June 2012	Pit Specific Sediment Chemistry Monitoring for CMP Va
5 and 6 June 2012	Cumulative Impact Sediment Chemistry Monitoring for CMP Va
8 June 2012	Impact Water Quality Monitoring during Dredging Operations for CMP Vc
11 June 2012	Water Column Profiling for CMP Va

1.5.2 Brief discussion of the monitoring results is presented in this section. Detailed discussion will be presented in the corresponding *Quarterly Report*.

1.5.3 Pit Specific Sediment Chemistry of CMP Va – June 2012

1.5.4 Monitoring locations for Pit Specific Sediment Chemistry for CMP Va are shown in *Figure 1.1*. Concentrations of metals at all stations in June 2012 were below the Lower Chemistry Exceedance Level (LCEL), with the exception of Lead and Arsenic (*Figure 1* of *Annex B*). Concentrations of Lead exceeded the LCEL at Active Pit station NPDB. Concentrations of Arsenic exceeded the LCEL at all stations except Active Pit station NPDB and Near Pit station NNDB in June 2012. It is important to note that relatively high natural levels of Arsenic are present in Hong Kong's marine sediments. Therefore, the slight exceedances of the LCEL for Arsenic are unlikely to be caused by the disposal operations at CMP Va but rather as a result of naturally occurring deposits.

1.5.5 For organic contaminants, PCBs were below the limit of reporting at all stations in June 2012. Levels of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (Low and High M.W. PAHs) were higher than the limit of reporting at Active Pit stations only (ie NPDA and NPDB). Total Organic Carbon (TOC) concentrations were similar amongst all stations (*Figure 3* of *Annex B*). Tributyltins (TBTs) concentration was the highest at Active Pit station NPDB when compared to other stations (*Figure 4* of *Annex B*). Concentrations of 4,4"-DDE were higher than the limit of reporting at Active

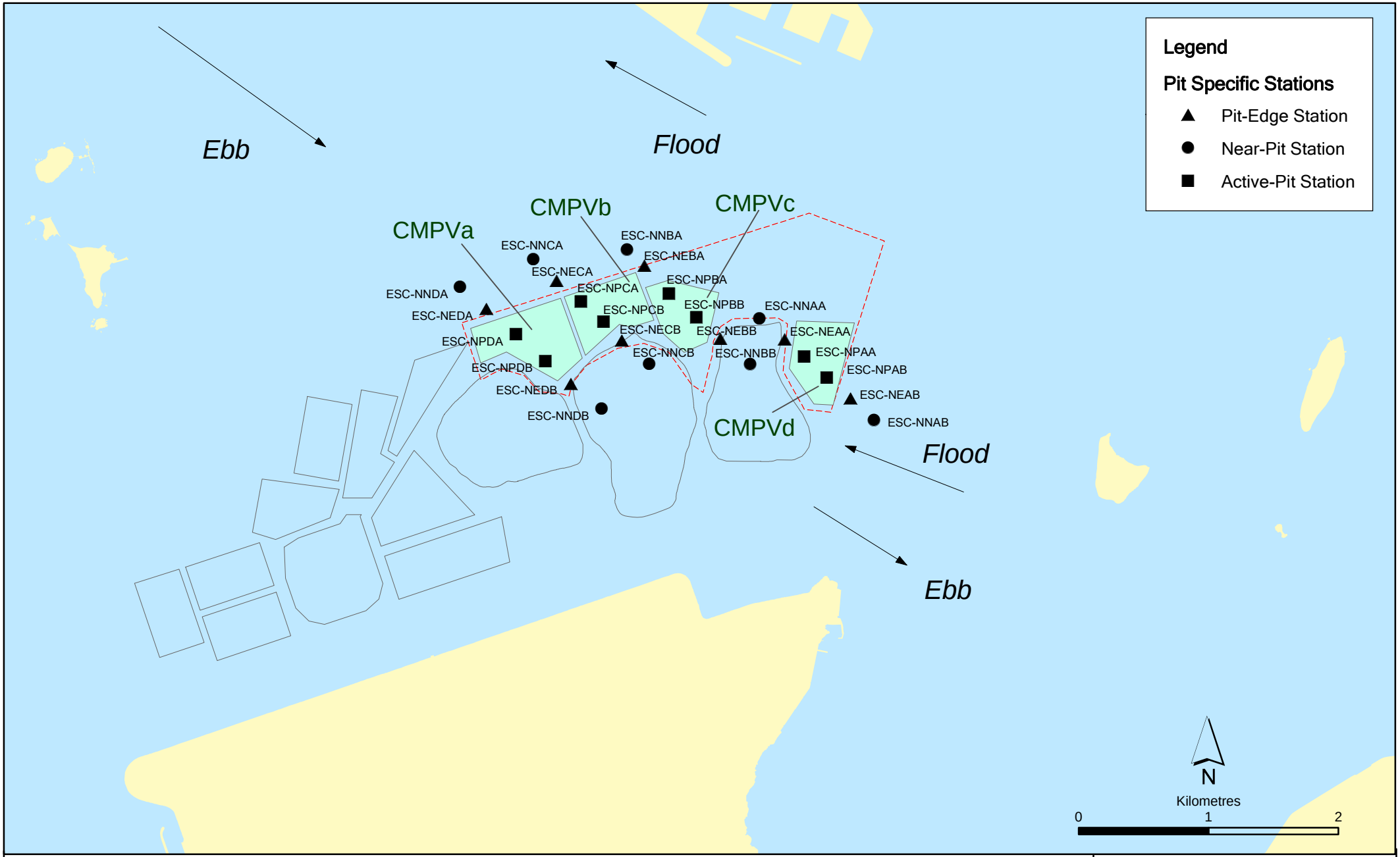

Figure 1.1

Pit Specific Sediment Quality Monitoring Stations for CMPV

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Date: 29/10/2009

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Pit station NPDB only, whereas concentrations of DDT were lower than the limit of reporting at all stations (*Figure 5* of *Annex B*).

1.5.6 It should be noted that the Action Pit stations are located within CMP Va which were receiving contaminated mud during the reporting month. Therefore, the higher concentrations of contaminants recorded at the Action Pit stations alone are not considered as indicating any dispersal of contaminated mud from CMP Va and thus also not appeared to indicate any unacceptable environmental impacts from the mud disposal operations. Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP Va during this monthly period.

1.5.7 Cumulative Impact Sediment Chemistry for CMP Va – June 2012

1.5.8 Monitoring locations for Cumulative Impact Sediment Chemistry for CMP Va are shown in *Figure 1.2*.

1.5.9 Analyses of results for the Cumulative Impact Sediment Chemistry Monitoring indicated that the concentrations of all metals, except Arsenic, were below the LCEL (*Figures 6 and 7*). Concentrations of Arsenic in sediments from all stations, except Near Field (RNB) and Ma Wan Station (MW), exceeded the LCEL. As presented in *Section 1.5.4* above, the slight exceedances of LCEL for Arsenic do not necessarily indicate any adverse impacts to sediment quality caused by disposal operations at CMP Va. Generally, there were only minor differences in metal concentrations amongst the stations.

1.5.10 The concentration of TOC was higher at the Mid Field station RMA than at other stations (*Figure 8* of *Annex B*). TBTs were recorded in sediment samples at Near Field (RNA), Mid Field (RMA and RMB) and Far Field (RFA) stations (*Figure 9* of *Annex B*). Total DDT, DDE, Total PCBs, Low and High Molecular Weight PAHs were below the limit of detection at all stations.

1.5.11 Overall, the contaminated mud disposal operations at CMP Va did not appear to cause any deterioration in sediment quality of the area.

1.5.12 Water Column Profiling for CMP Va – June 2012

In-situ Measurements

1.5.13 The water quality monitoring results for June 2012 have been assessed for compliance with the WQOs set by EPD. This consists of a review of the Environmental Protection Department (EPD) routine water quality monitoring data for the wet season period (April to October) of 1999-2010 from stations in the Northwestern Water Control Zone, where CMPs are located. For Salinity, the average value obtained from the upstream station was used for the basis as the WQO. Graphical presentation of the monitoring results is provided in *Annex B*.

Figure 1.2

Cumulative Impacts Sediment Quality Monitoring Stations for CMPV

File: 0103262_SQMS_cum impact.mxd
Date: 29/10/2009

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1.5.14 Analyses of results for June 2012 indicated that levels of Salinity, pH and Dissolved Oxygen (DO) complied with the WQOs at both Upstream and Downstream stations (*Figures 10, 11* and *12* in *Annex B*). DO and Turbidity complied with the Action and Limit Levels set in the EM&A Manual [(1)].

Laboratory Measurements for Total Suspended Solids (TSS)

1.5.15 Analyses of data obtained in June 2012 indicated that the TSS levels at both Upstream and Downstream stations complied with the WQO (*Figure 13* in *Annex B*). TSS levels measured in June 2012 complied with the Action and Limit Levels set in the EM&A Manual.

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

1.5.17 Impact Water Quality Monitoring during Dredging Operations of CMP Vc – June 2012

1.5.18 *Impact Water Quality Monitoring during Dredging Operations of CMP V* was conducted on 8 June 2012 for CMP Vc. On the 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 Vc (*Figure 1.3*). Monitoring was also conducted at the Ma Wan station. At each station, *in-situ* measurements of water quality parameters as well as water samples were taken from three depths in the water column (ie surface: 1 m below sea surface, mid-depth and bottom: 1 m above the seabed).

1.5.19 Monitoring results are presented in *Table C1* of *Annex C*. Levels of DO, Turbidity and TSS complied with the Action and Limit Levels set in the *Baseline Monitoring Report* [(2)].

1.5.20 Overall, the results indicated that the dredging operations at CMP Vc 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-312/2008*), are considered required for the dredging operations of CMP Vc.

1.6 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

1.6.1 The following monitoring programmes will be conducted in the next monthly period of July 2012:

(1) ERM (2009). Draft Second Review of the EM&A Manual. Prepared for CEDD for EM&A for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation Agreement No. CE 4/2009 (EP).

(2) ERM (2009) Baseline Monitoring Report. Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation. Agreement No. CE 4/2009(EP). Submitted to EPD in September 2009.

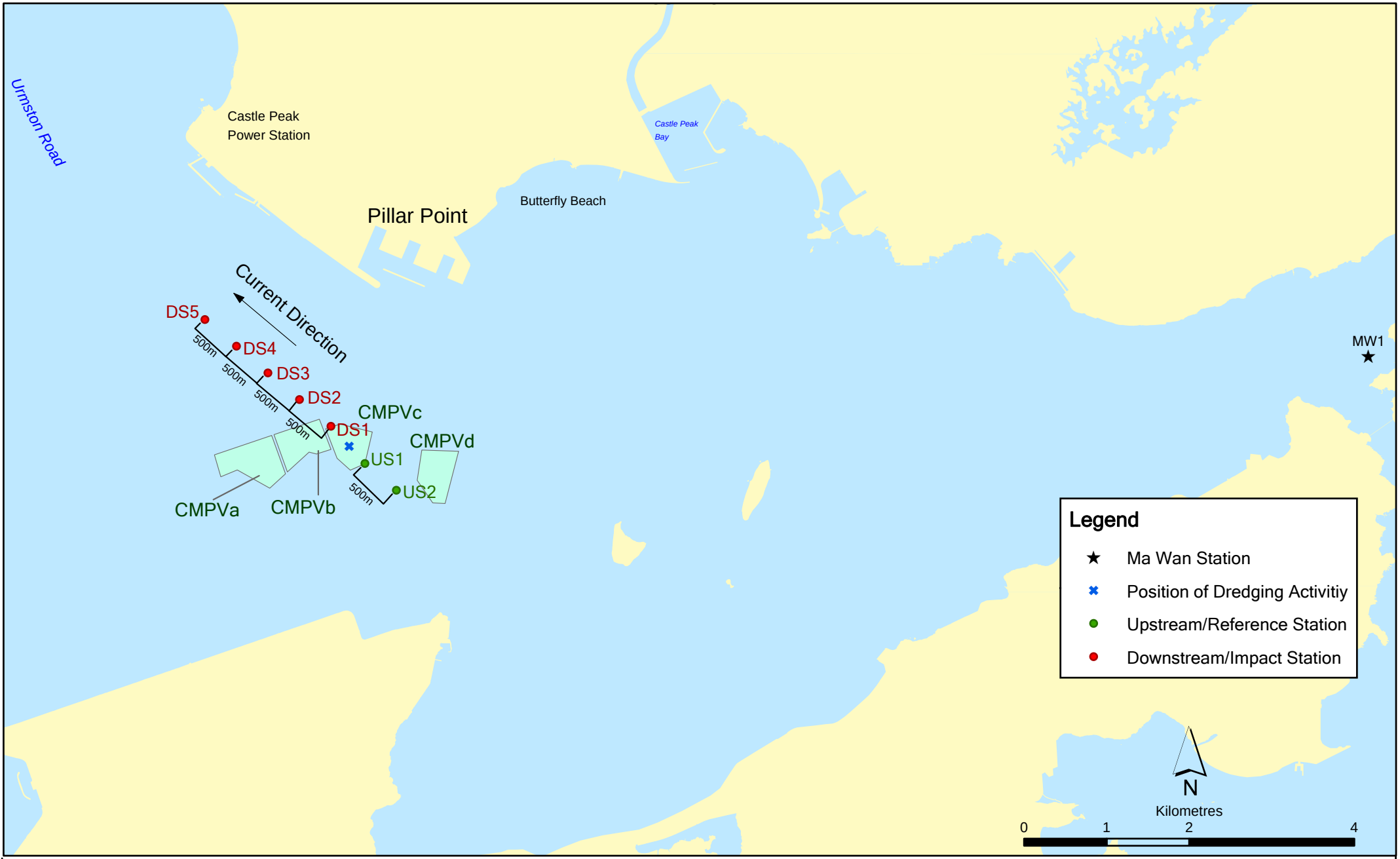

Figure 1.3

Indicative Dredging Impact Sampling Stations for CMPVc

Note: The locations of sampling stations will be determined on site based on current direction and position of dredging activities.

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Date: 27/03/2012

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CMP V

- *Pit Specific Sediment Chemistry* for CMP Va;
- *Demersal Trawling* for CMP Va;
- *Routine Water Quality Monitoring* for CMP Va;
- *Water Column Profiling* for CMP Va; and
- *Impact Water Quality Monitoring during Dredging Operations* for CMP Vc.

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 D*.

Annex A

Sampling Schedule

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

		2012											
Tissue/ Whole Body Sampling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Near-Pit Stations													
	INA		*										
	INB		*										
Reference North													
	TNA		*										
	TNB		*										
Reference South													
	TSA		*										
	TSB		*										
Demersal Trawling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Near Pit Stations													
	INA 1-5	*	*										
	INB 1-5	*	*										
Reference North													
	TNA 1-5	*	*										
	TNB 1-5	*	*										
Reference South													
	TSA 1-5	*	*										
	TSB 1-5	*	*										
Capping		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Ebb Tide													
Impact Station Downcurrent													
	IPE1		*				*		*				*
	IPE2		*				*		*				*
	IPE3		*				*		*				*
	IPE4		*				*		*				*
	PFC1		*				*		*				*
Intermediate Station Downcurrent													
	INE1		*				*		*				*
	INE2		*				*		*				*
	INE3		*				*		*				*
	INE4		*				*		*				*
	INE5		*				*		*				*
Reference Station Upcurrent													
	RFE1		*				*		*				*
	RFE2		*				*		*				*
	RFE3		*				*		*				*
	RFE4		*				*		*				*
	RFE5		*				*		*				*
Flood Tide													
Impact Station Downcurrent													
	INF1		*				*		*				*
	PFC2		*				*		*				*
	INF3		*				*		*				*
Intermediate Station Downcurrent													
	IPF1		*				*		*				*
	IPF2		*				*		*				*
	IPF3		*				*		*				*
Reference Station Upcurrent													
	RFF1		*				*		*				*
	RFF2		*				*		*				*
	RFF3		*				*		*				*
Water Column Profiling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Plume Stations	WCP1	*											
	WCP2	*											

"*" = Number of replicates depends on field catch or parameters

Sampling completed

Sampling to be completed

Annex A2 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP V (January 2012 - February 2014)

Pit Specific Sediment Chemistry	Code	2012 J	F	M	A	M	J	J	A	S	O	N	D	2013 J	F	M	A	M	J	J	A	S	O	N	D	2014 J	F
Active-Pit																											
	ESC-NPDA		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	ESC-NPDB		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Pit-Edge																											
	ESC-NEDA		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	ESC-NEDB		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Near-Pit																											
	ESC-NNDA		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	ESC-NNDB		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Cumulative Impact Sediment Chemistry	Code	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
Near-field Stations																											
	ESC-RNA		*				*		*				*		*				*		*				*		*
	ESC-RNB		*				*		*				*		*				*		*				*		*
Mid-field Stations																											
	ESC-RMA		*				*		*				*		*				*		*				*		*
	ESC-RMB		*				*		*				*		*				*		*				*		*
Capped Pit Stations																											
	ESC-RCA		*				*		*				*		*				*		*				*		*
	ESC-RCB		*				*		*				*		*				*		*				*		*
Far-Field Stations																											
	ESC-RFA		*				*		*				*		*				*		*				*		*
	ESC-RFB		*				*		*				*		*				*		*				*		*
Ma Wan Station																											
	MW1		*				*		*				*		*				*		*				*		*

Sediment Toxicity Tests	Code	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
Near-Field Stations																											
	ESC-TDA		*						*						*						*						*
	ESC-TDB		*						*						*						*						*
Reference Stations																											
	ESC-TRA		*						*						*						*						*
	ESC-TRB		*						*						*						*						*
Ma Wan Station																											
	MW1		*						*						*						*						*

Tissue/ Whole Body Sampling	Code	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
Impact Stations																											
	ESC-INA								*						*						*						*
	ESC-INB								*						*						*						*
Reference																											
	ESC-TNA								*						*						*						*
	ESC-TNB								*						*						*						*
	ESC-TSA								*						*						*						*
	ESC-TSB								*						*						*						*

Demersal Trawling	Code	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
Impact Stations																											
	ESC-INA							*	*					*	*					*	*					*	*
	ESC-INB							*	*					*	*					*	*					*	*
Reference Stations																											
	ESC-TNA							*	*					*	*					*	*					*	*
	ESC-TNB							*	*					*	*					*	*					*	*
	ESC-TSA							*	*					*	*					*	*					*	*
	ESC-TSB							*	*					*	*					*	*					*	*

Capping	Code	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
Ebb Tide																											
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														*				*		*				*		*
Flood Tide																											
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														*				*		*				*		*

Routine Water Quality Monitoring	Code	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
Ebb Tide																											
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		*		*	*		*	*		*	*		*	*		*	*		*	*		*	*		*	*
Flood Tide																											
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		*		*	*		*	*		*	*		*	*		*	*		*	*		*	*		*	*

Water Column Profiling	Code	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
Plume Stations	WCP1		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	WCP2		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Benthic Recolonisation Studies	Code	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
Capped Contaminated Mud Pits IVa-c																											
	ESC-CPA								*				*								*				*		
	ESC-CPB								*				*								*				*		
	ESC-CPC								*				*								*				*		
Reference Stations																											
	ESC-RBA								*				*								*				*		
	ESC-RBB								*				*								*				*		
	ESC-RBC								*				*								*				*		

Impact Monitoring for Dredging	Code	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
Upstream/Reference Stations																											
	US1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										
	US2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										
Downstream/Impact Stations																											
	DS1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										
	DS2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										
	DS3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										
	DS4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										
	DS5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										
Ma Wan Station																											
	MW1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*										

Sampling completed

Sampling to be completed

Annex B

Monitoring Results

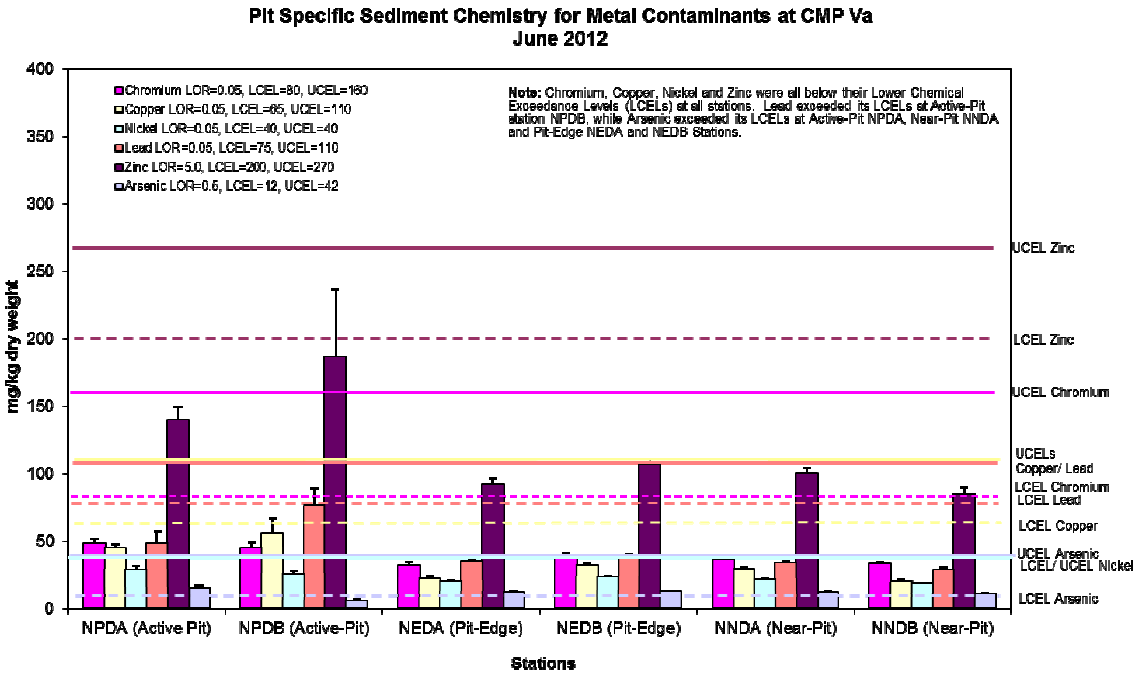

Figure 1: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2012.

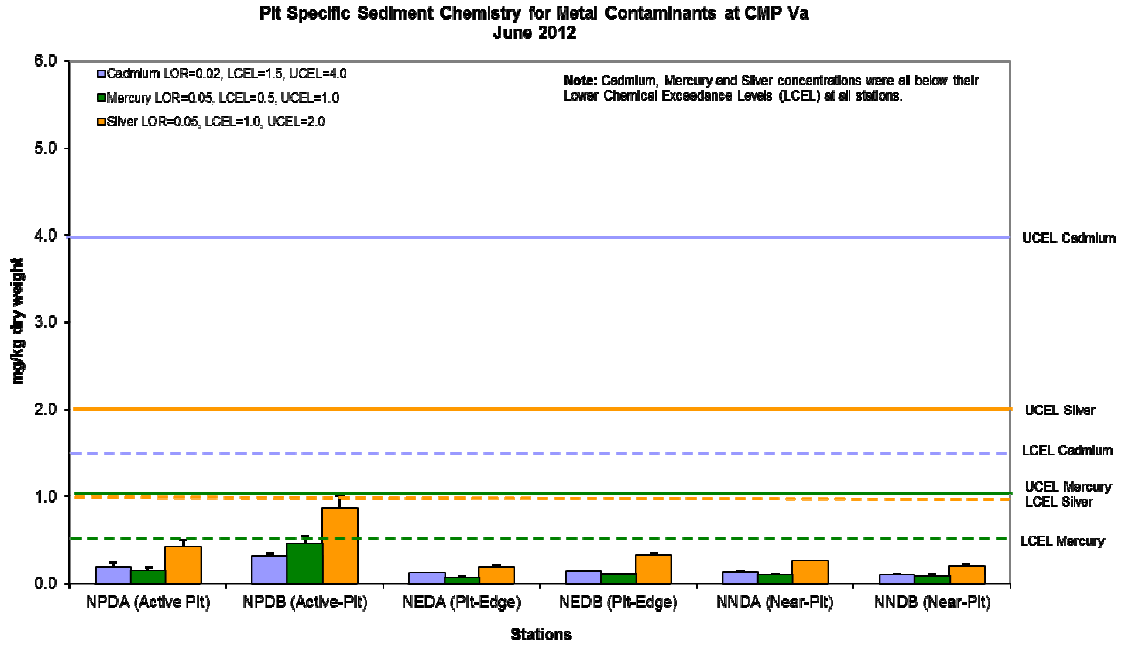

Figure 2: Concentration of Metals (Cd, Hg, Ag; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2012.

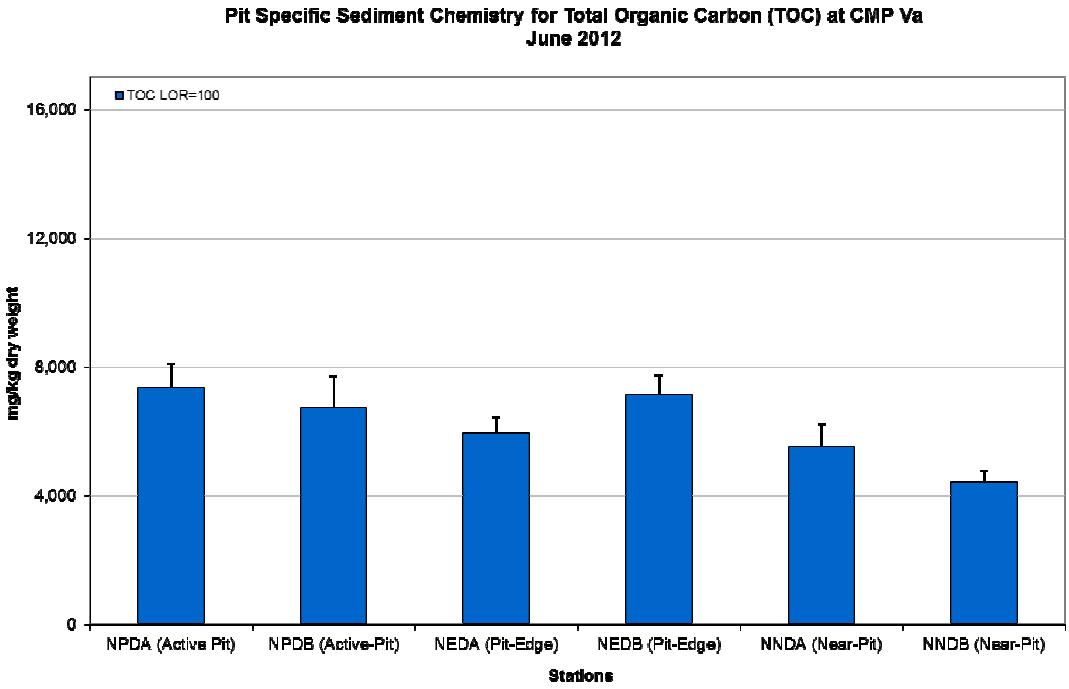

Figure 3: Concentration of Total Organic Carbon (TOC; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2012.

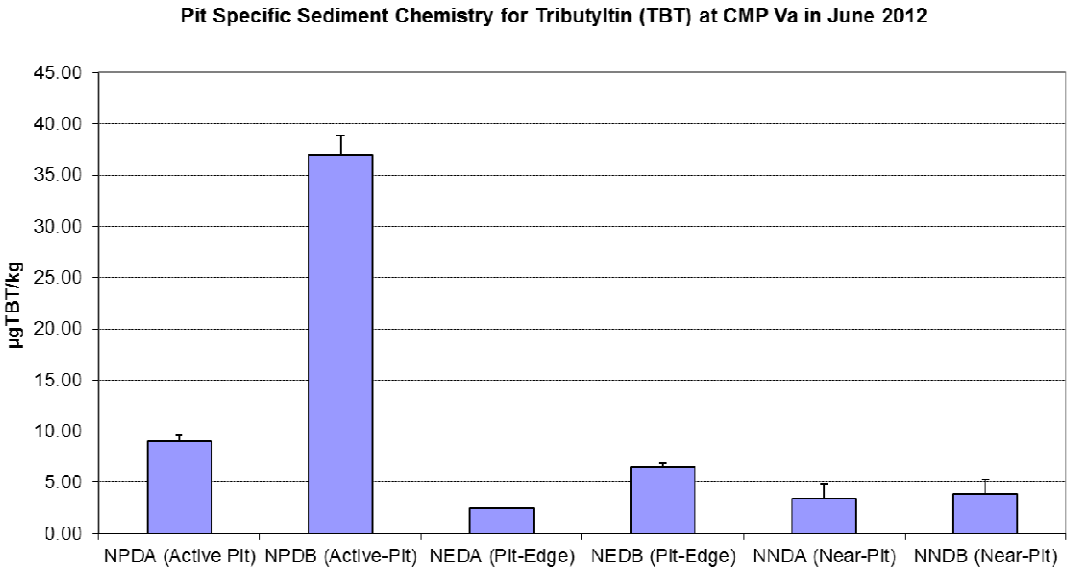

Figure 4: Concentration of Tributyltin (TBT; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2012.

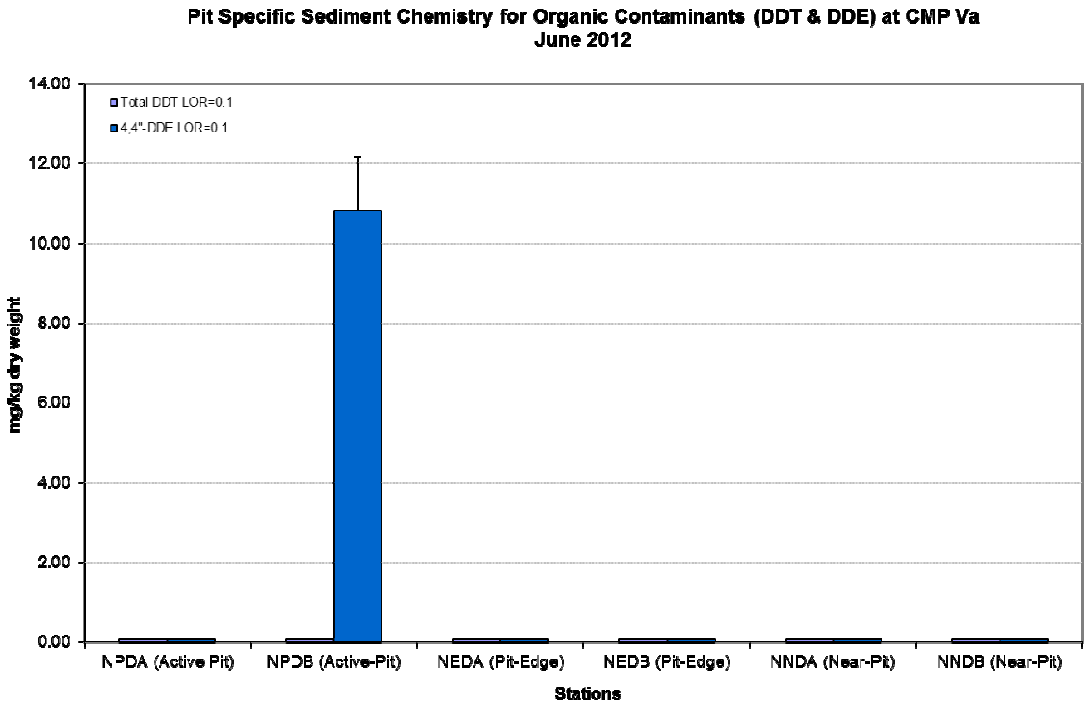

Figure 5: Concentration of Total DDT and 4,4″-DDE (mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2012.

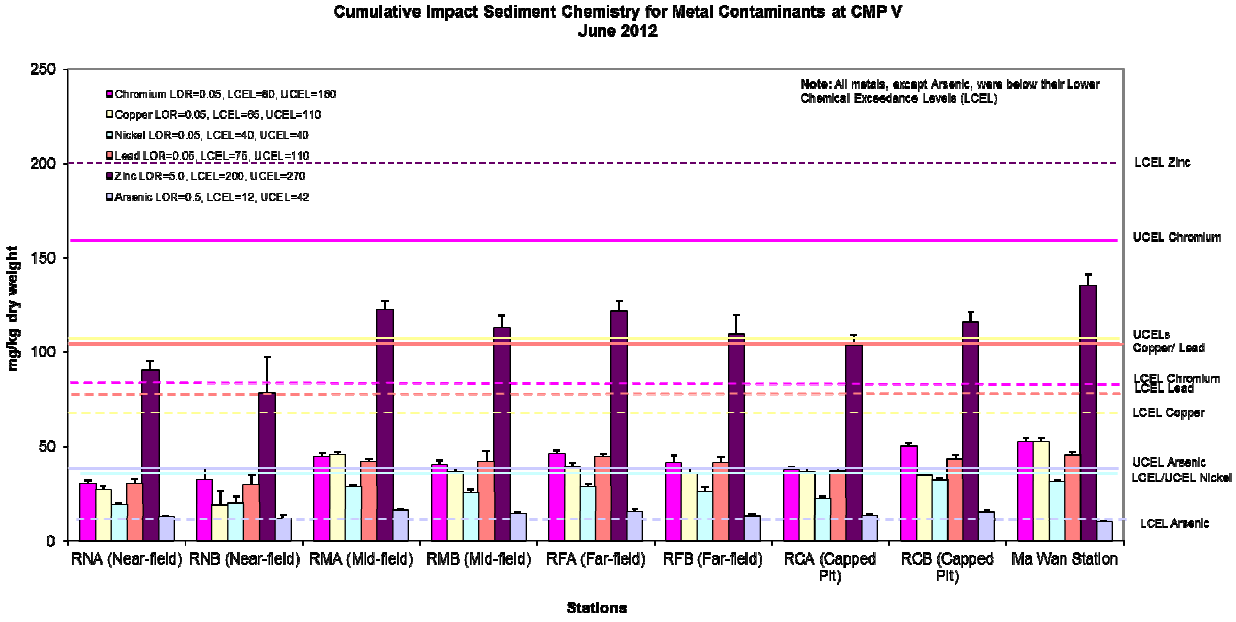

Figure 6: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for CMP Va in June 2012.

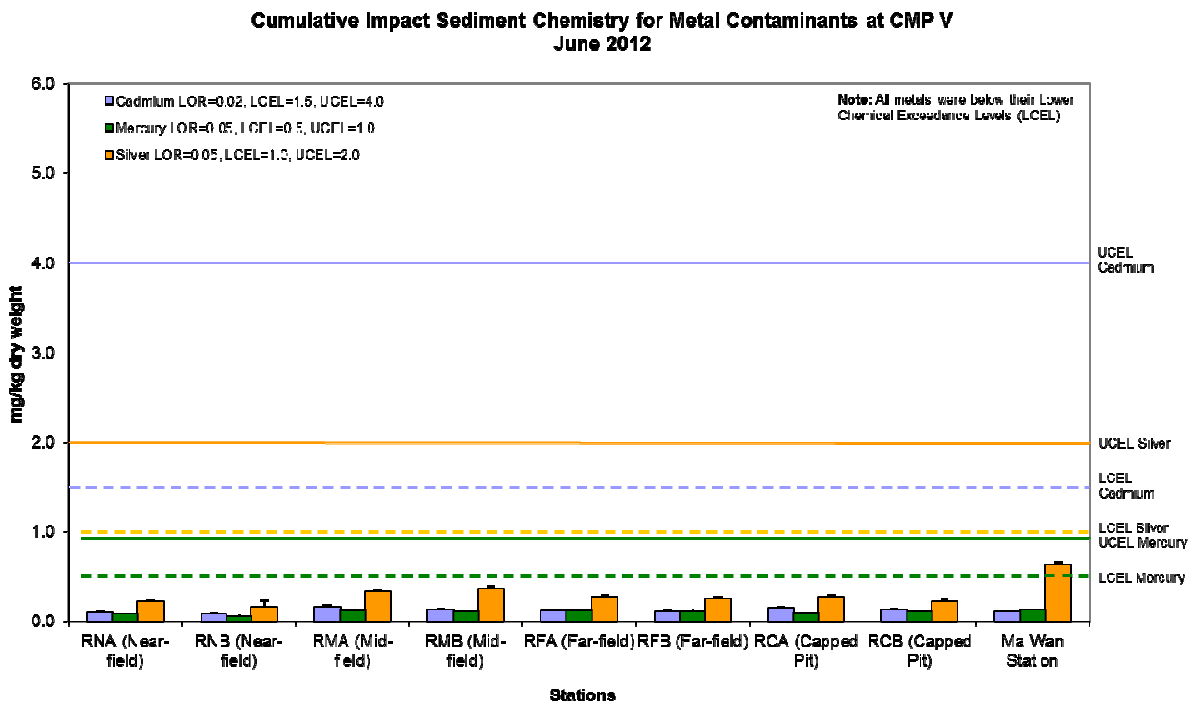

Figure 7: Concentrations of metals (Cd, Hg, Ag; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for CMP Va in June 2012.

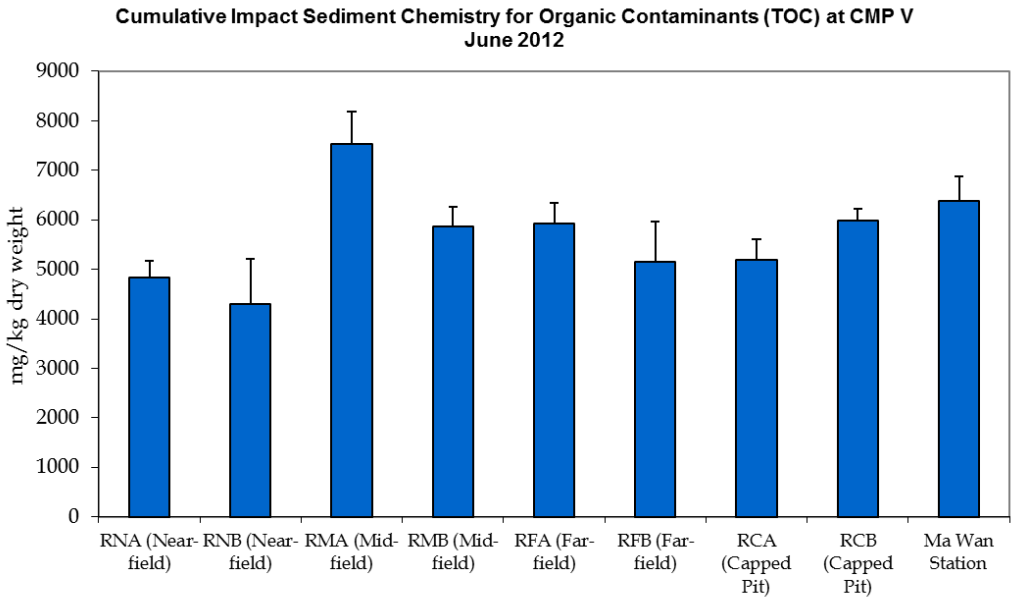

Figure 8: Concentration of Total Organic Carbon (TOC; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for CMP Va in June 2012.

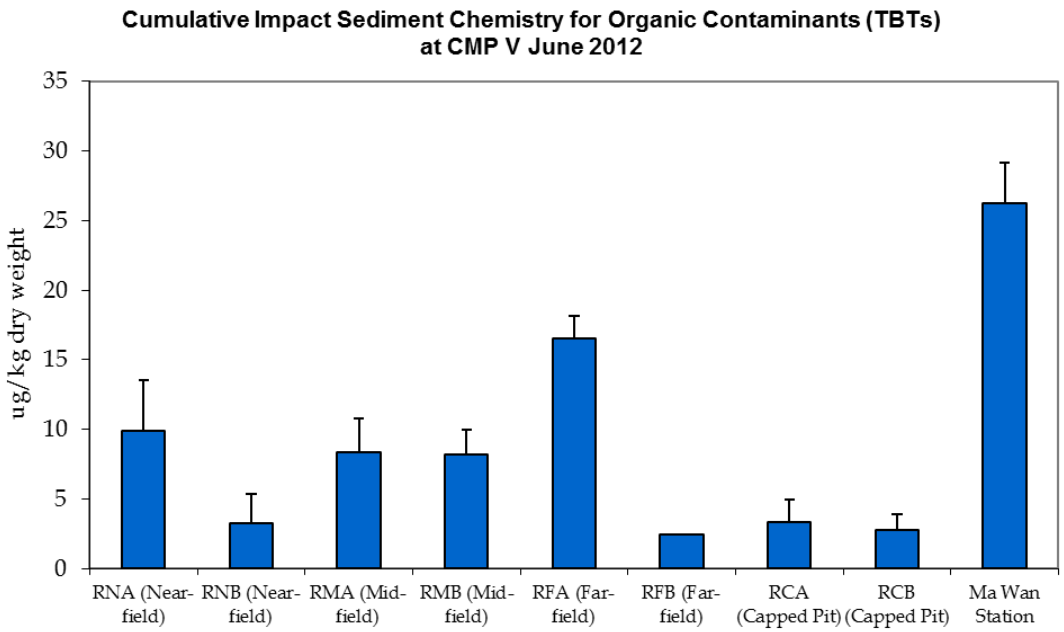

Figure 9: Concentration of Tributyltin (TBT; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for CMP Va in June 2012.

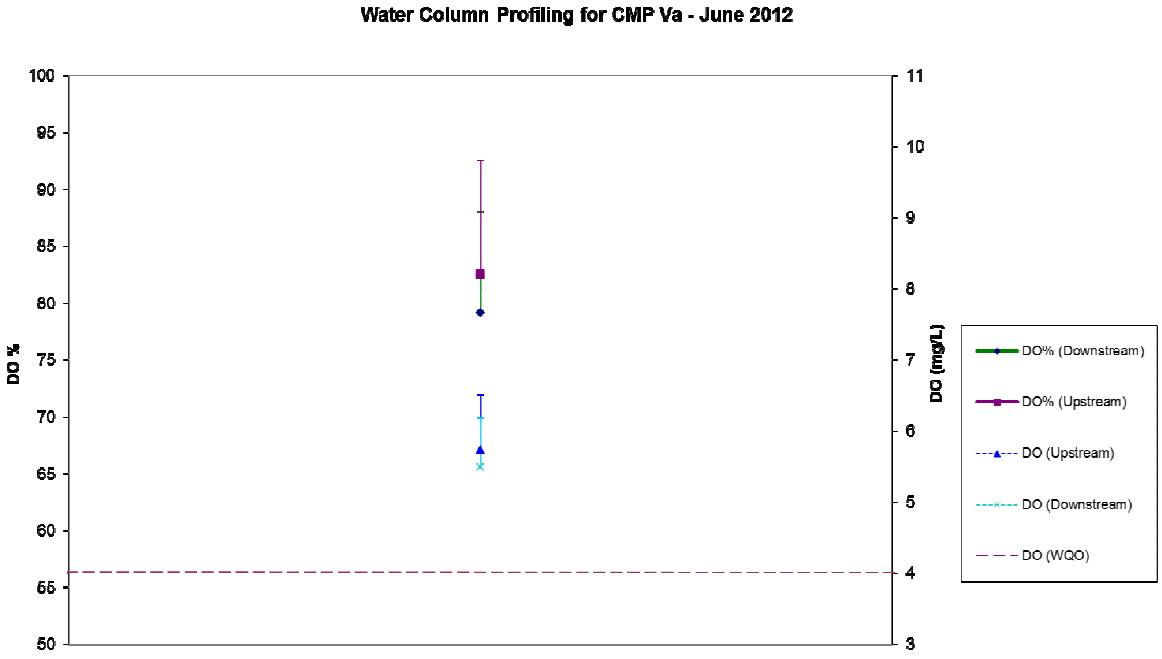

Figure 10: Dissolved Oxygen (mean + SD) recorded during Water Column Profiling for disposal operations at CMP Va in June 2012.

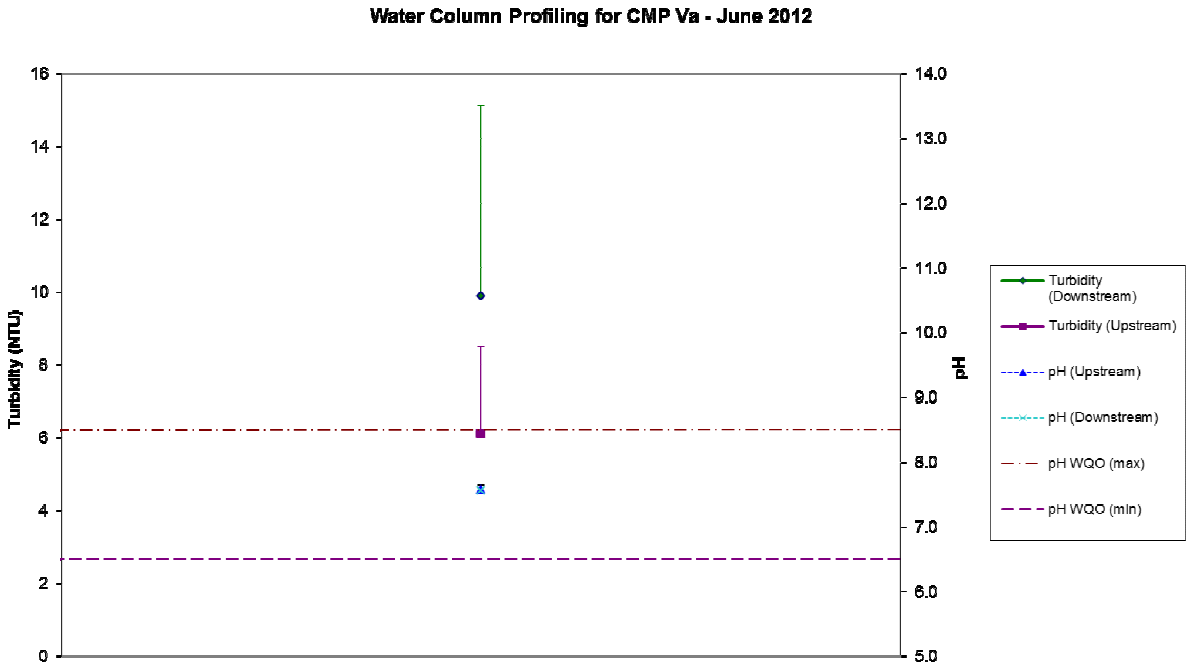

Figure 11: Turbidity and pH (mean + SD) recorded during Water Column Profiling for disposal operations at CMP Va in June 2012.

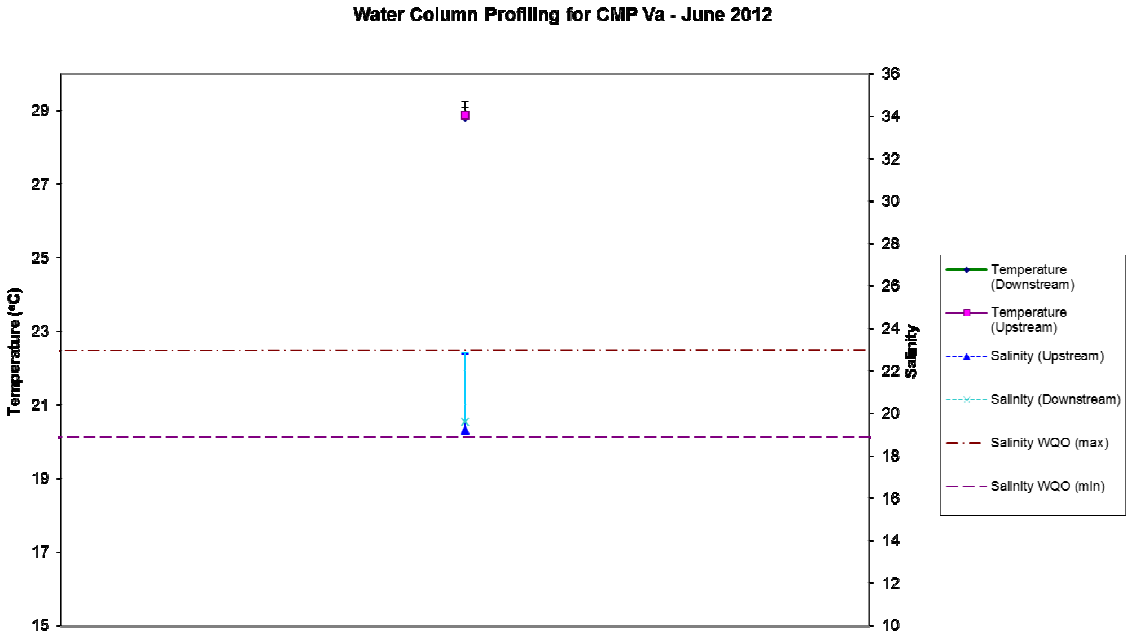

Figure 12: Salinity and Temperature (mean + SD) recorded during Water Column Profiling for disposal operations at CMP Va in June 2012.

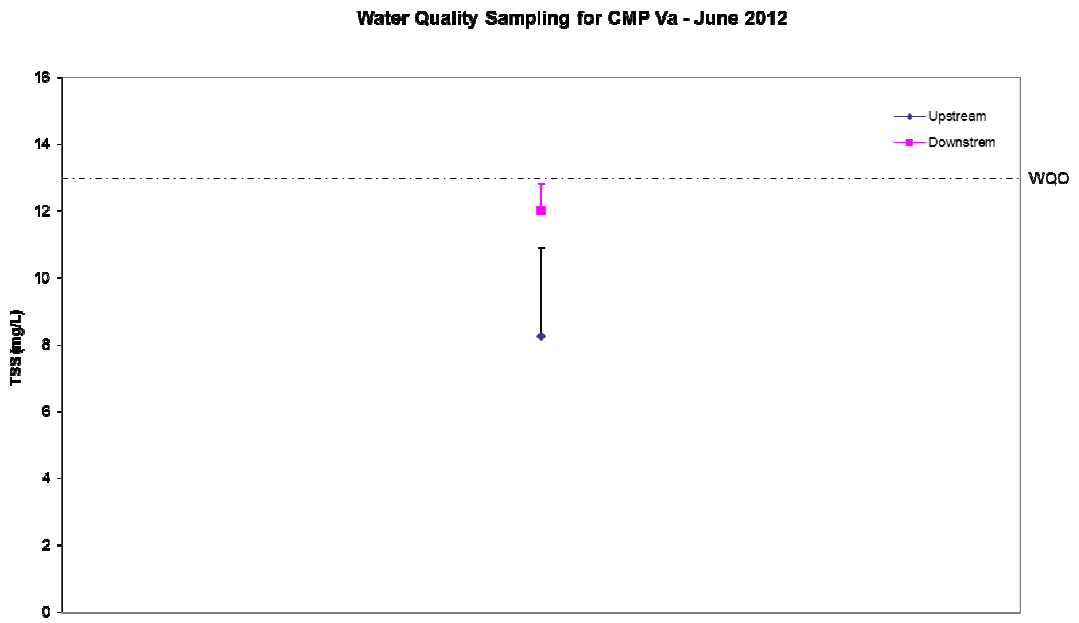

Figure 13: Total Suspended Solid Levels (mean + SD) in water samples collected from Water Column Profiling for disposal operations at CMP Va in June 2012.

Annex C

Results of Impact Monitoring during CMP V Dredging Operations for June 2012

Table C1 Summary Table of DO, Turbidity and TSS Levels Recorded in June 2012

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average TSS Level (mg/L)
			Bottom	Surface and Mid Depth		
2012/06/08	ME	DS1	5.5	5.9	11.7	13.5
		DS2	5.8	5.8	24.9	35.3
		DS3	6.0	5.9	16.8	22.0
		DS4	6.0	5.9	7.4	10.3
		DS5	6.0	6.0	19.5	16.8
		MW1	5.9	6.2	4.9	6.5
		US1	5.8	5.8	10.1	15.5
		US2	5.7	6.0	8.9	14.5
	MF	DS1	5.3	5.4	10.1	12.0
		DS2	5.3	5.6	9.5	11.8
		DS3	5.3	5.7	10.4	12.5
		DS4	5.2	5.7	8.6	12.3
		DS5	5.2	5.7	7.5	13.5
		MW1	5.4	5.8	3.1	6.3
		US1	5.5	5.5	12.0	20.0
		US2	5.5	5.8	10.4	14.7

Notes:

1. Cell shaded yellow indicated value exceeding the Action Level criteria.
2. Cell shaded red indicated value exceeding the Limit Level criteria.
3. DO for Surface and Mid-depth: less than 3.76 mg L^{-1} (Action Level); less than 3.11 mg L^{-1} (Limit Level)
   DO for Bottom: less than 2.96 mg L^{-1} (Action Level); less than 2 mg L^{-1} (Limit Level)
   Depth-average Turbidity: greater than 28.14 NTU(Action Level); greater than 38.32 NTU(Limit Level)
   Depth-average SS: greater than 37.88 mg L^{-1} (Action Level); greater than 61.92 mg L^{-1} (Limit Level)

Annex D

Study Programme

ID	Task Name
1	**Project Commencement**
2	
3	**For CMP IV and New Facility at East Sha Chau**
4	
5	Submission of Draft Inception Report & Draft Programme
6	Submission of Final Inception Report & Final Programme
7	Submission of Draft Operations Manual
8	Submission of Final Operations Manual
9	**Submission of Operations Manual Updates**
17	Submission of Draft Monitoring And Audit Manual (Rev 1)
18	Submission of Final Monitoring And Audit Manual (Rev 1)
19	Submission of Draft Monitoring And Audit Manual (Rev 2)
20	Submission of Final Monitoring And Audit Manual (Rev 2)
21	**Submission of EM&A Manual Updates**
29	
30	**Monitoring Contract Works**
31	Prepare Draft Letters of Invitation, Gazette Documents & Tender Documents
32	Submission of Draft Tender Documents
33	Submission of Draft Gazette Documents
34	Submission of Final Tender Documents
35	Submission of Final Gazette Documents
36	Tendering and Tender Assessment
37	Prepare Contact Documents
38	Submission of Contract Documents
39	Administrate and Supervise Contracted Field and Laboratory Works
40	**Submission of Report on Dredging & Capping Operations**
49	**Monthly Progress Report**
101	**Quarterly EM&A Reports**
115	**Submission of Annual Review Report**
120	**Submission of Annual Risk Assessment Report**
125	**Submission of Draft Final Report**
126	**Submission of the Final Report**
127	**Submission of Draft Executive Summary Report**
128	**Submission of Final Executive Summary Reports**
129	
130	**For East Tung Lung Chau Disposal Facility**
131	
132	**Submission of Monitoring Results & Monthly EM&A Progress Report**
133	October 2009
134	November 2009
135	December 2009
136	January 2010

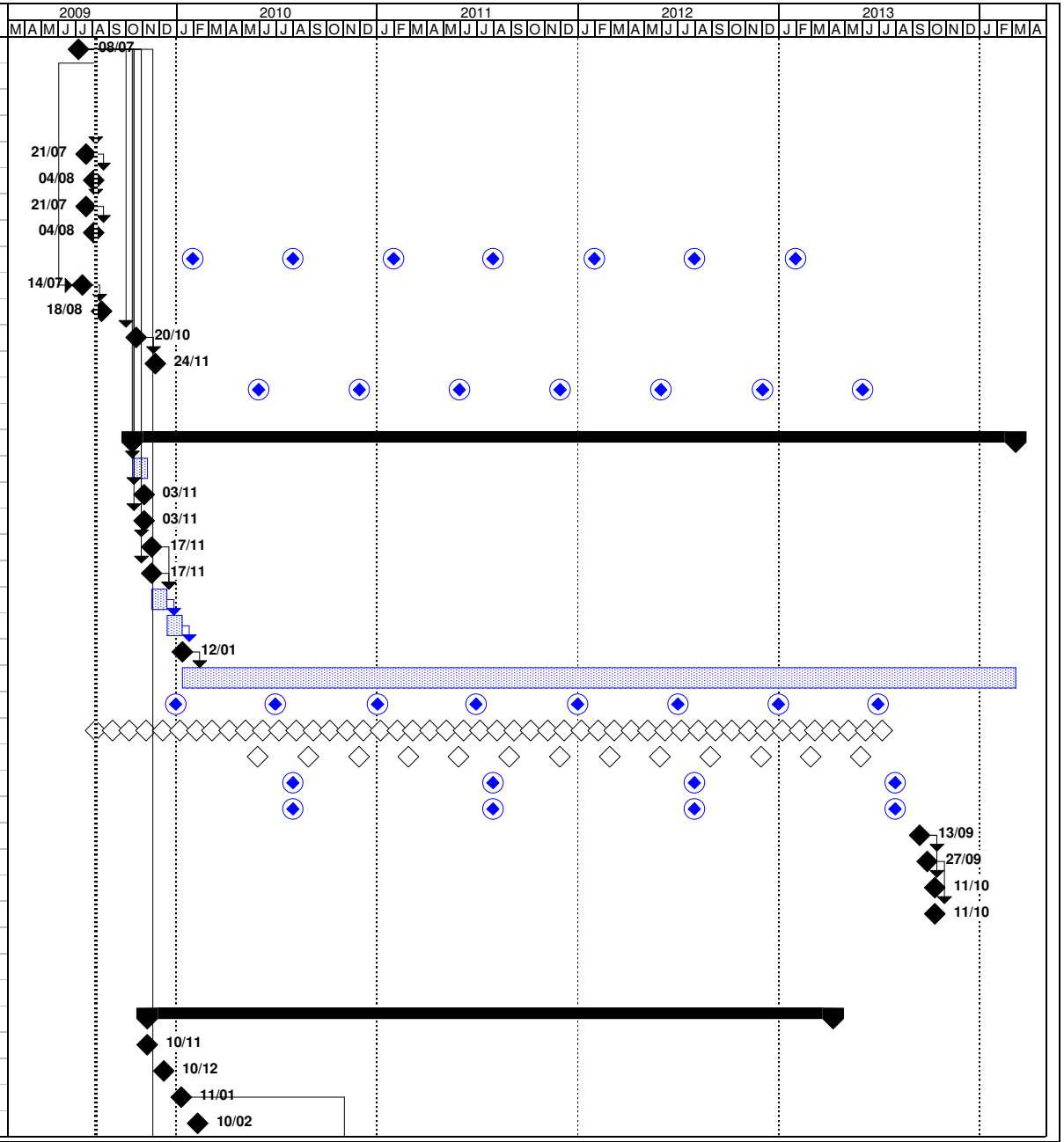

Figure 4.1 - Study Programme

Task | Milestone | Rolled Up Task
Progress | Summary | Rolled Up Milestone

Project: Agreement No. CE 4/2009 (EP) Environmental Monitoring and Audit for Contaminated Mud Pits at Sha Chau (2009-2013) - Investigation

ID	Task Name
137	February 2010
138	March 2010
139	October 2010
140	November 2010
141	December 2010
142	January 2011
143	February 2011
144	March 2011
145	October 2011
146	November 2011
147	December 2011
148	January 2012
149	February 2012
150	March 2012
151	October 2012
152	November 2012
153	December 2012
154	January 2013
155	February 2013
156	March 2013
157	**Submission of Initial Review Report**
158	**Submission of Quarterly EM&A Report**
159	Quarter 1 2010
160	Quarter 2 2010
161	Quarter 3 2011
162	Quarter 4 2011
163	Quarter 5 2012
164	Quarter 2 2012
165	Quarter 1 2013
166	**Submission of Annual Report**
167	Annual Report 1 2010
168	Annual Report 2 2011
169	Annual Report 3 2012
170	
171	**Alternative / Modified Capping Design**
172	
173	**Submission of Investigation Report**
174	**Submission of Annual Report**
175	Capping Design Annual Report 2010
176	Capping Design Annual Report 2011
177	Capping Design Annual Report 2012

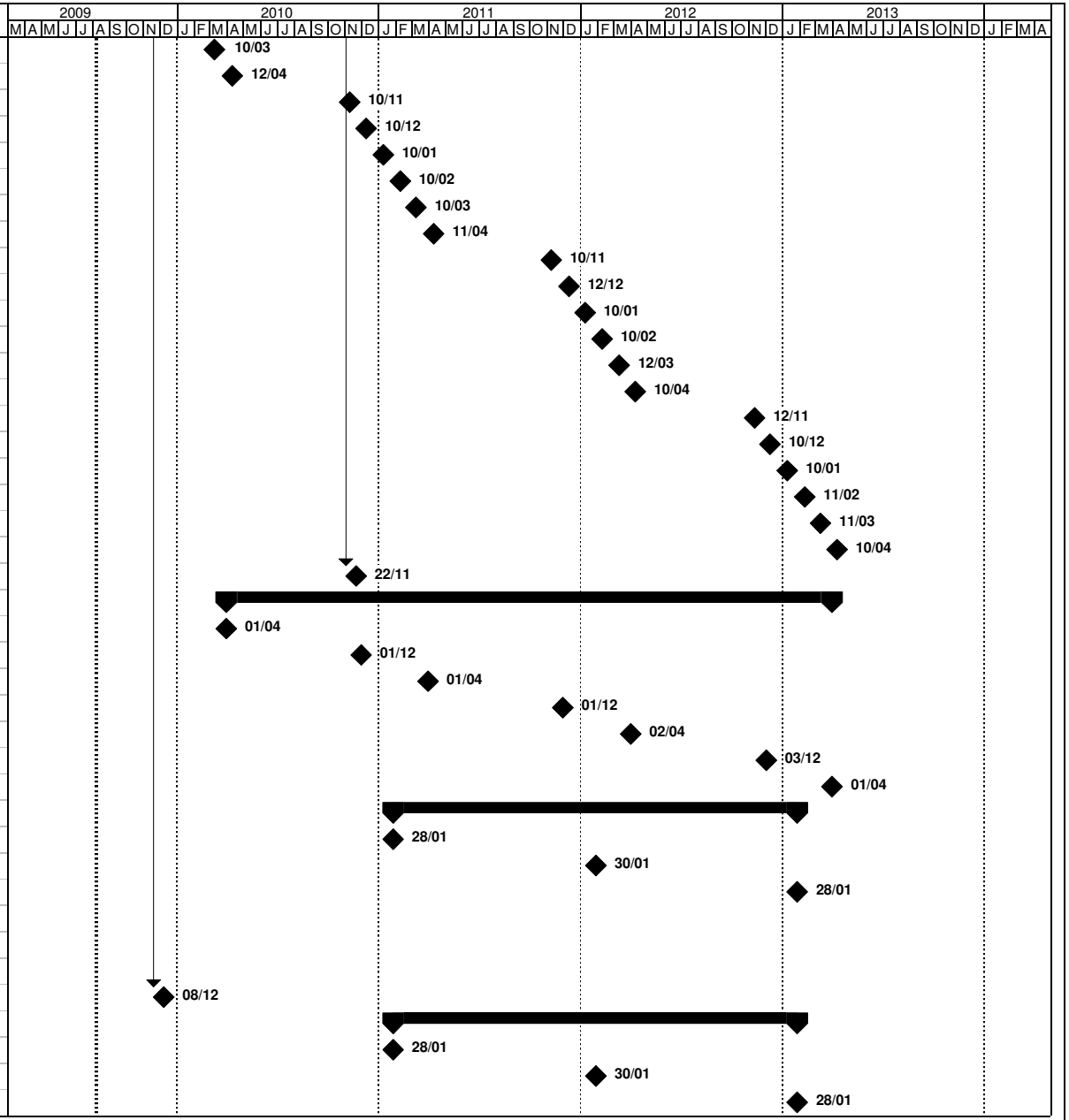

Figure 4.1 - Study Programme

Task | Milestone | Rolled Up Task
Progress | Summary | Rolled Up Milestone

Project: Agreement No. CE 4/2009 (EP) Environmental Monitoring and Audit for Contaminated Mud Pits at Sha Chau (2009-2013) - Investigation