




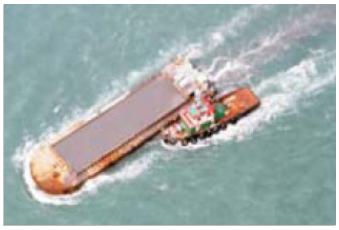
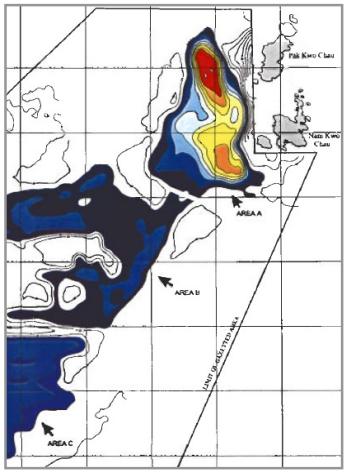

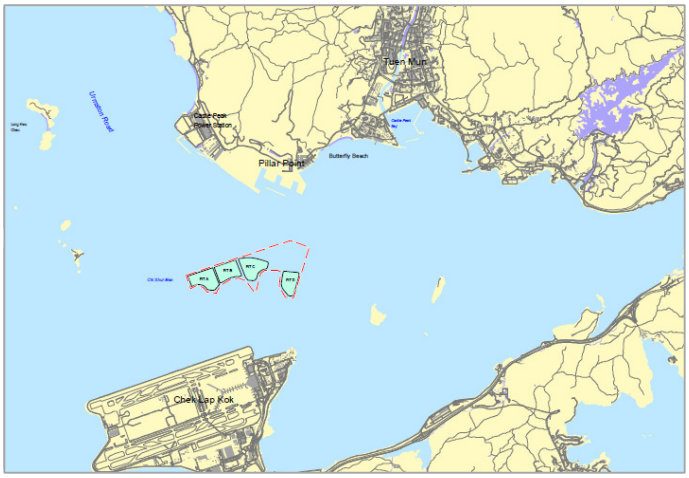

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Civil Engineering and Development Department

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

Agreement No. CE 4/2009(EP)

40th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – October 2012

Revision 0

10 December 2012

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

40th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – October 2012

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Document Code: 0103262 Monthly Progress Oct 12_v0.doc

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Client: Civil Engineering and Development Department (CEDD)	Project No: 0103262
Summary: This document presents progress of monitoring works on contaminated mud pits at Sha Chau in October 2012 under Agreement No. CE 4/2009 (EP).	Date: 10 December 2012 Approved by:  *Dr Robin Kennish* *Director*

Revision	Description	By	Checked	Approved	Date
0	40th Monthly Progress Report for CMP	RC	JT	RK	10/12/12

Distribution

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CEDD Civil Engineering and Development Department

New Contaminated Mud Marine Disposal Facility at Airport East/East Sha Chau Area

Environmental Certification Sheet
EP-312/2008/A

Reference Document/Plan

Document/~~Plan~~ to be ~~Certified~~/ Verified:	40th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – October 2012
Date of Report: 10/12/2012	
Date received by ET: 10/12/2012	
Date received by IA: 10/12/2012	

Reference EP Condition

Environmental Permit Condition:	Condition No.: 3.4

Content:

Four hard copies and one electronic copy of monthly EM&A Report shall be submitted to the Director within 10 working days 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 verified by the Independent Auditor. Additional copies of the submission shall be provided to the Director upon request by the Director.

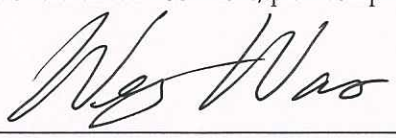
ET Certification

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-312/2008/A

Dr Robin Kennish,
Environmental Team Leader:  Date: 10/12/2012

IA Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-312/2008/A

Dr Wang Wen Xiong,
Independent Auditor:  Date: 10/12/2012

Notes:

CONTENTS

ANNEXES

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

40th MONTHLY PROGRESS REPORT FOR CONTAMINATED MUD PITS AT SHA CHAU October 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 October 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 Vd 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

This *Monthly Progress Report* covers the monitoring period of October 2012.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

1.3.1 The following monitoring activities have been undertaken for CMP V in October 2012:

- *Water Column Profiling* was conducted for CMP Va on 8 October 2012;
- *Pit Specific Sediment Chemistry* was conducted for CMP Va on 24 October 2012;
- *Impact Water Quality Monitoring during Dredging Operations* was conducted for CMP Vd on 25 October 2012; and
- *Routine Water Quality Monitoring* was conducted for CMP Va on 26 October 2012.

1.3.2 A summary of field activities are presented in Annex A.

1.4 DETAILS OF OUTSTANDING SAMPLING AND / OR ANALYSIS

1.4.1 No outstanding sampling and laboratory analysis remained from October 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 October 2012 will be presented in this monthly report.

Table 1.1 Monitoring activities in October 2012

Monitoring activities	Date of Monitoring	Monitoring results presented in this report?
Water Column Profiling for CMP Va	8 October 2012	Yes
Pit Specific Sediment Chemistry Monitoring for CMP Va	24 October 2012	Yes
Impact Water Quality Monitoring during Dredging Operations of CMP Vd	25 October 2012	Yes
Routine Water Quality Monitoring for CMP Va	26 October 2012	Yes

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 – October 2012

1.5.4 Monitoring locations for Pit Specific Sediment Chemistry for CMP Va are shown in *Figure 1.1*. A total of six monitoring stations were being sampled. Concentrations of metals at all stations in October 2012 were below the Lower Chemistry Exceedance Level (*LCEL*), with the exception of Arsenic, Copper and Silver (*Figures 1 and 2 of Annex B*). Concentrations of Arsenic exceeded the LCEL at Pit-Edge (NEDA, NEDB) and Near-Pit (NNDA) stations while concentrations of Copper and Silver exceeded the LCEL at Active Pit (NPDB) station. 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. In addition, the Active Pit station is located within CMP Va which was receiving contaminated mud during the reporting period. Therefore, the exceedances of LCEL for Copper and Silver which were recorded at the Active Pit station alone is not considered as indicating any dispersal of contaminated mud from CMP Va.

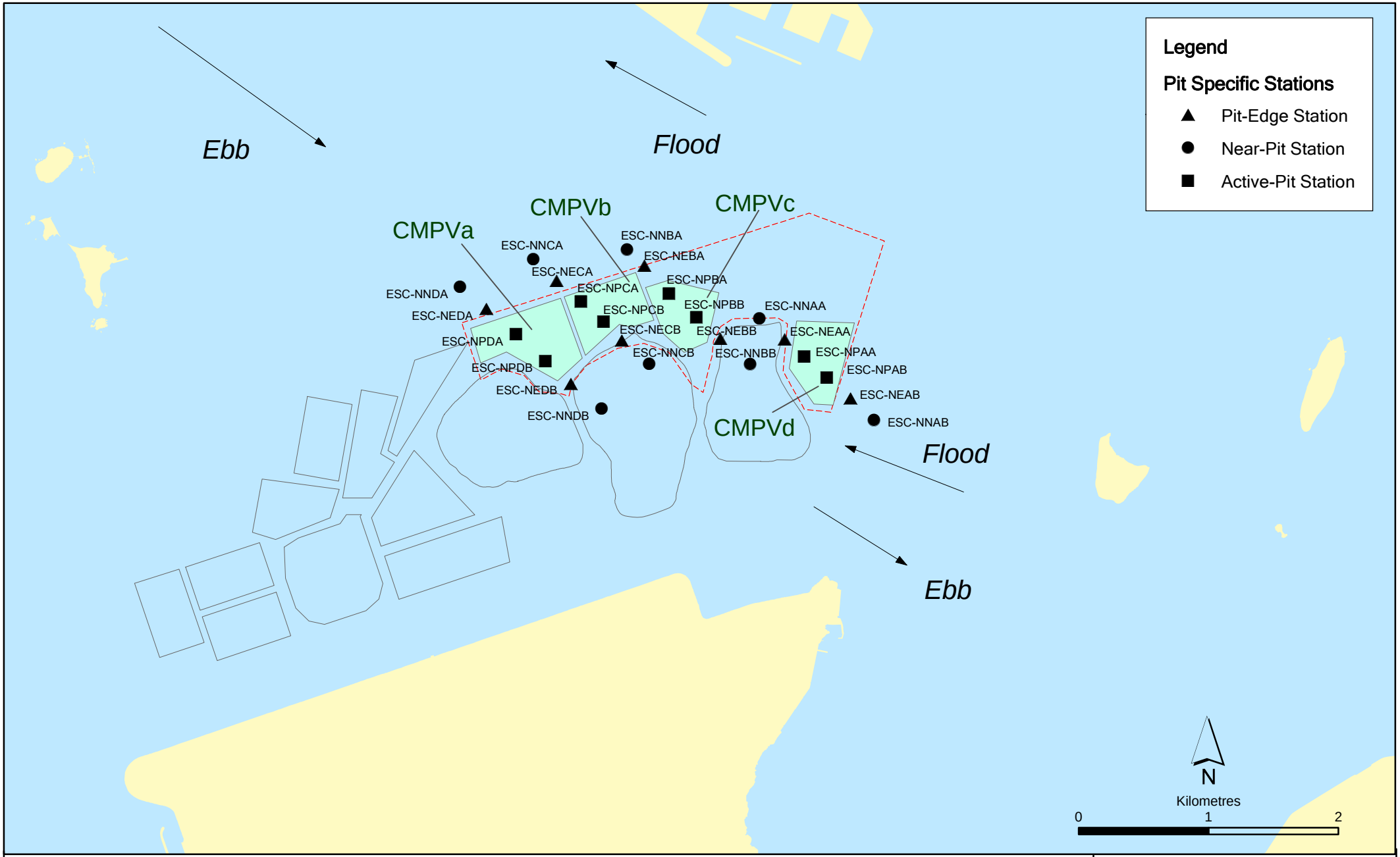


Figure 1.1

Pit Specific Sediment Quality Monitoring Stations for CMPV

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Date: 29/10/2009

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1.5.5 For organic contaminants, Total Polychlorinated Biphenyls (PCBs), Low Molecular Weight Polycyclic Aromatics Hydrocarbons (Low M.W. PAHs), Total DDT and 4,4'-DDE were below the limit of reporting at all stations in October 2012. Total Organic Carbon (TOC) concentration was similar amongst all stations (*Figure 3* of *Annex B*). TBT concentration was the highest at Active Pit station NPDB in October 2012 when compared to other stations (*Figure 4* of *Annex B*). High Molecular Weight Polycyclic Aromatics Hydrocarbons (High M.W. PAHs) were higher than the limit of reporting at the Active Pit stations NPDA and NPDB for October 2012.

1.5.6 As described in *Section 1.5.4*, 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 not considered as indicating any unacceptable environmental impacts from the mud disposal operations. Nevertheless, detailed analysis will be presented in the *Quarterly Report* to reveal any trend of increasing sediment contaminant concentrations towards CMP Va.

1.5.7 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.

1.5.8 Impact Water Quality Monitoring during Dredging Operations of CMP Vd – October 2012

1.5.9 *Impact Water Quality Monitoring during Dredging Operations of CMP Vd* was conducted on 25 October 2012. 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 Vd (*Figure 1.2*). 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).

1.5.10 Monitoring results are presented in *Table C1* of *Annex C*. Levels of Dissolved Oxygen (DO), Turbidity and Total Suspended Solids (TSS) complied with the Action and Limit Levels set in the Baseline Monitoring Report (1).

1.5.11 Overall, there appears to be no unacceptable water quality impacts causing by the dredging operations at CMP Vd and no additional measures are thus considered required except for those stated in the Environmental Permit (*EP-312/2008*).

(1) 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.

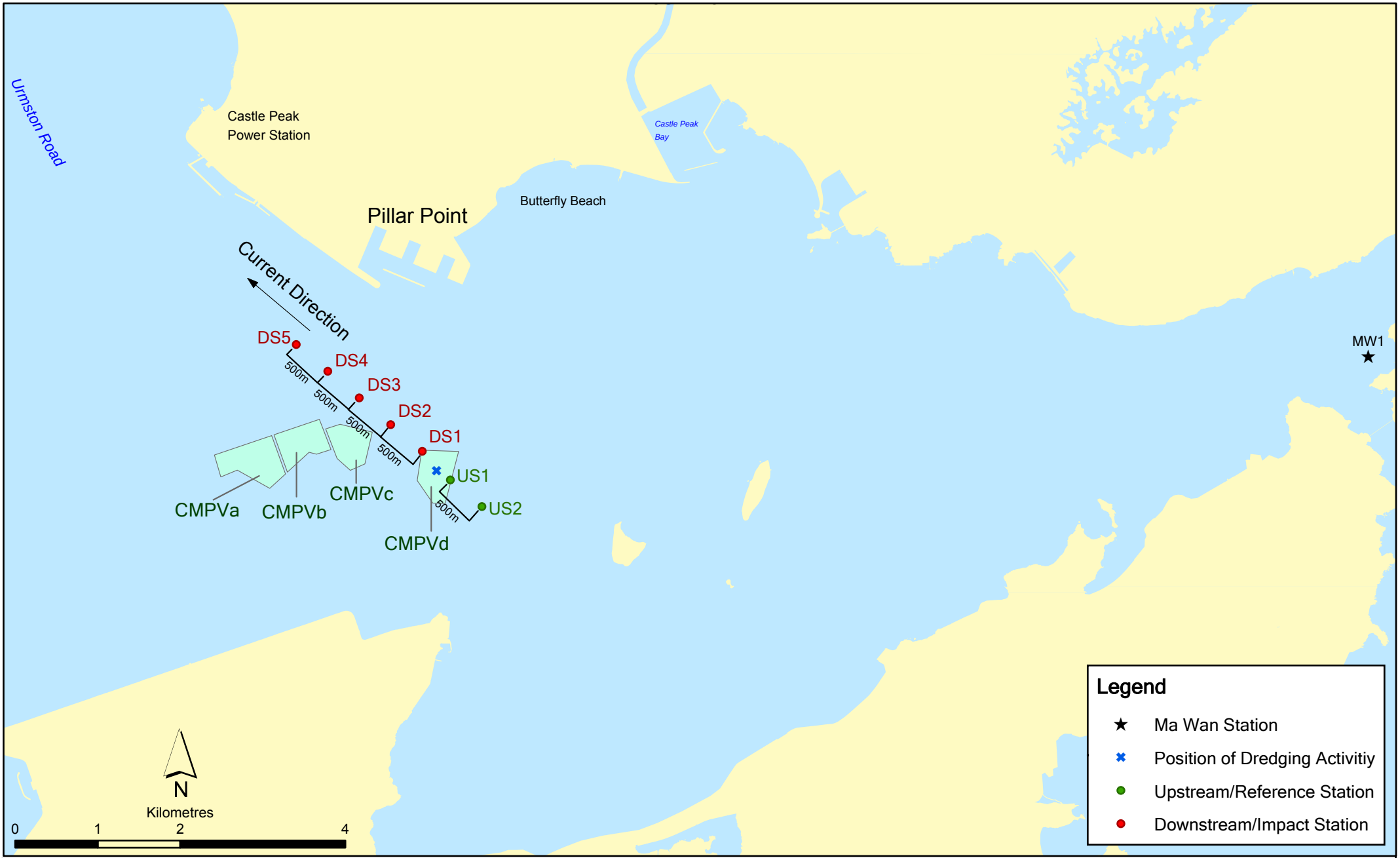

Figure 1.2

Indicative Dredging Impact Sampling Stations for CMPVd

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: 28/11/2012

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1.5.12 Water Column Profiling for CMP Va – October 2012

In-situ Measurements

1.5.13 Water Column Profiling was undertaken at a total of two sampling stations in October 2012. The water quality monitoring results for October 2012 have been assessed for compliance with the Water Quality Objectives (WQOs) set by Environmental Protection Department (EPD). This consists of a review of the 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*.

1.5.14 Analyses of results for October 2012 indicated that levels of Salinity, pH and DO all complied with the WQOs at both Upstream and Downstream stations (*Figures 5 – 7 of 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 October 2012 indicated that the TSS levels at Upstream station exceeded the WQO (*Figure 8 of Annex B*). However, TSS levels at all stations measured in October 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 Routine Water Quality Monitoring for CMP Va – October 2012

1.5.18 The results for the *Routine Water Quality Monitoring* conducted during October 2012 in the wet season have been assessed for compliance with the WQOs set by EPD as presented in *Section 1.5.13* above (please see *Figure 1.3* for the monitoring locations). *In-situ* monitoring and laboratory results are shown in *Table 1.2* and *1.3* respectively, with graphical presentation provided in *Annex B*. Monitoring was undertaken at a total of sixteen stations in the reporting month.

(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).

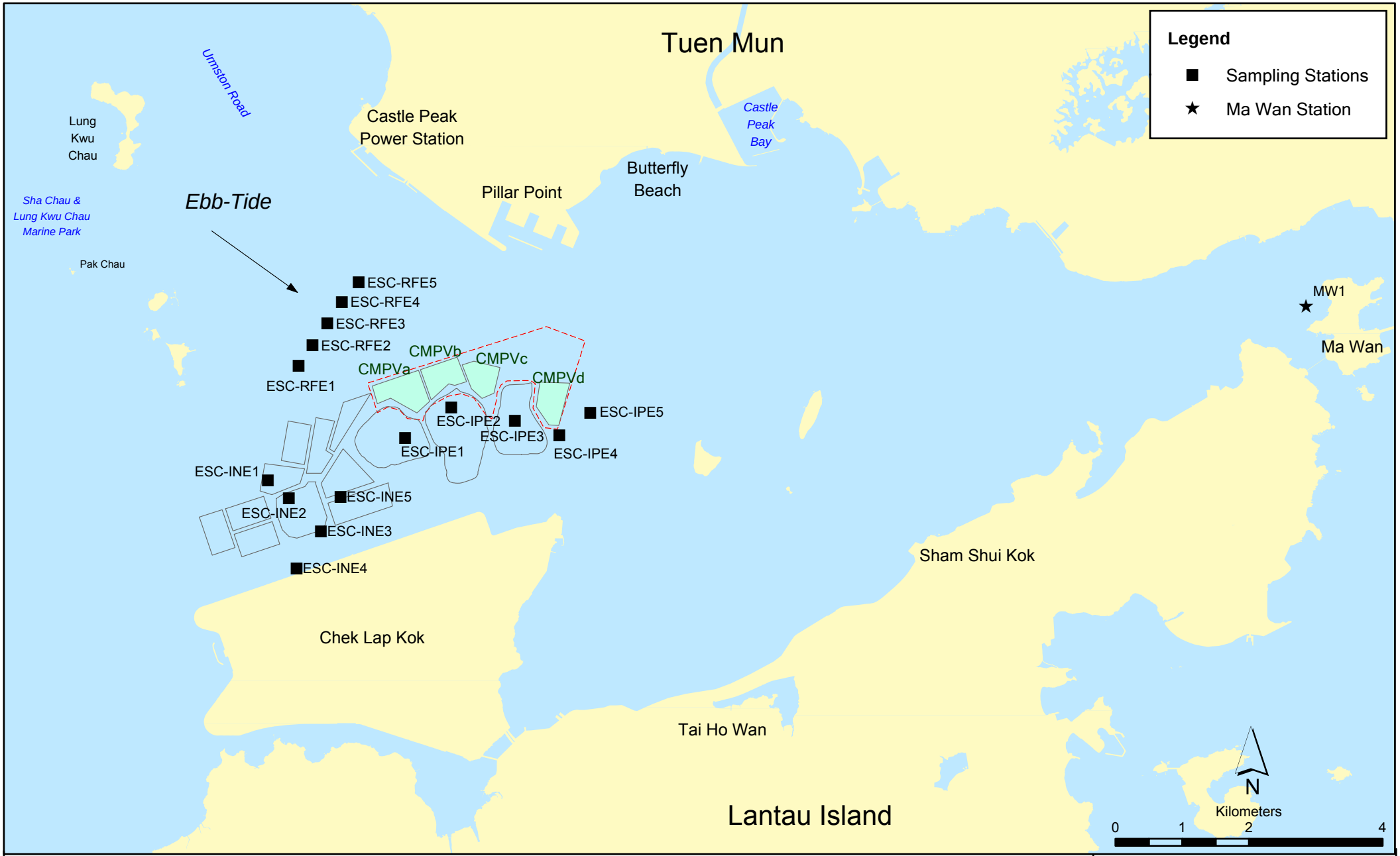

Figure 1.3

Routine & Capping Water Quality Sampling Stations (Ebb-Tide) for CMPV

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Date: 3/12/2012

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In-situ Measurements

1.5.19 Analyses of results for October 2012 indicated that for all stations (Impact, Intermediate and Reference), levels of pH and DO complied with the WQOs (*Figures 9-11 of Annex B*). Levels of Salinity complied with WQO at all stations, except at Ma Wan station (*Figure 12 of Annex B*). Levels of DO and Turbidity within the reporting month complied with the Action and Limit Levels set in the *EM&A Manual* (1) (*Figures 10 and 13 of Annex B*). All *in-situ* water quality measurements showed relatively minor variations between Impact, Intermediate and Reference stations (*Figures 9 to 13* of *Annex B*).

Laboratory Measurements

1.5.20 Analyses of October 2012 results indicate that concentrations of Cadmium, Mercury and Silver were below their limit of reporting at all stations. Arsenic, Copper, Lead, Nickel and Zinc were detected in samples from all stations while Chromium levels were below the limits of reporting at Ma Wan Station (*Figures 14 and 15 of Annex B*). Concentrations of Arsenic, Copper, Lead and Nickel appeared to be similar amongst all stations while concentration of Zinc was highest at Ma Wan station. Levels of 5-day Biochemical Oxygen Demand (BOD_5), Total Inorganic Nitrogen (TIN) and NH_3-N were similar among all stations (*Figures 16 and 17 of Annex B*). Concentrations of TSS exceed WQO (12.74 mg/L for wet season) at Intermediate Stations while all of them complied with the Action and Limit Levels at all stations within the reporting month (*Figure 18 of Annex B*).

Table 1.2 In-situ Monitoring Results for Routine Water Quality Monitoring during October 2012

Stations	Temp (°C)	Salinity	Turbidity (NTU)	pH	Dissolved Oxygen (%)	Dissolved Oxygen (mg L^{-1})
RFE (Reference)	26.83	27.78	6.15	7.85	83.11	5.68
IPE (Impact)	26.73	28.49	4.60	7.92	87.59	5.98
INE (Intermediate)	26.68	28.48	4.62	7.88	89.42	6.11
Ma Wan Station	26.71	31.14	3.75	7.95	88.26	5.94
WQO	*N/A*	25.00-30.55	*N/A*	*6.5-8.5*	*N/A*	>4

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

Table 1.3 Laboratory Results for Routine Water Quality Monitoring during October 2012

Stations	As (µg/L)	Ag (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Hg (µg/L)	Pb (µg/L)	Ni (µg/L)	Zn (µg/L)	NH_3-N (mg/L)	TIN (mg/L)	BOD_5 (mg/L)	TSS (mg/L)
RFE	1.88	<LOR	<LOR	0.81	4.98	<LOR	0.59	2.98	8.40	0.07	0.73	0.82	8.93
IPE	1.95	<LOR	<LOR	0.65	4.43	<LOR	0.93	2.88	10.30	0.05	0.60	1.29	10.68
INE	1.98	<LOR	<LOR	0.64	4.55	<LOR	0.51	2.08	7.38	0.04	0.58	0.94	13.03
Ma Wan Station	1.75	<LOR	<LOR	<LOR	6.25	<LOR	1.44	2.63	15.50	0.04	0.38	0.93	11.75
											WQO of TSS		12.74

(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).

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

1.6 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

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

- *Pit Specific Sediment Chemistry* 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 Vd.

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

1.7 STUDY PROGRAMME

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 2013)

		2012												2013											
Tissue/ Whole Body Sampling		J	F	M	A	M	J	J	A	S	O	N	D	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	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	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	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
Capped Contaminated Mud Pits III																									
CPA	1 grab per station								*				*								*				*
CPB	1 grab per station								*				*								*				*
CPC	1 grab per station								*				*								*				*
Reference Stations																									
RBA	1 grab per station								*				*								*				*
RBB	1 grab per station								*				*								*				*
RBC	1 grab per station								*				*								*				*

"*" = 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		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		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		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		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		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																				*				*		*

		2012												2013												2014	
Routine Water Quality Monitoring		**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		**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		**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		**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

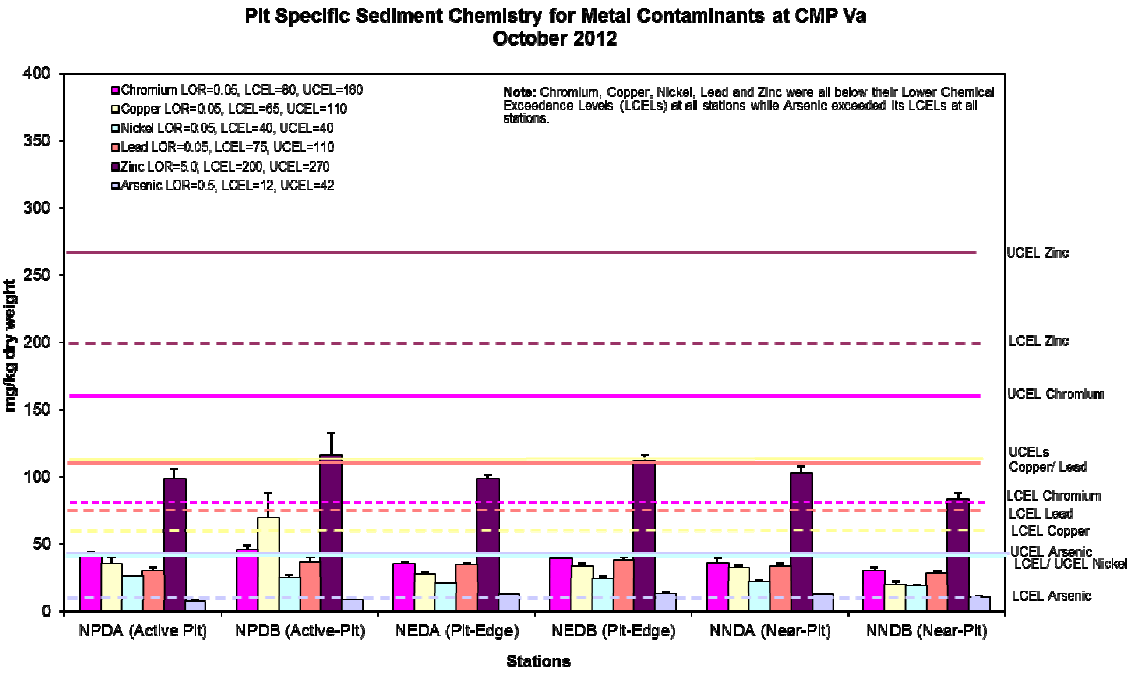

Figure 1: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry of CMP Va in October 2012.

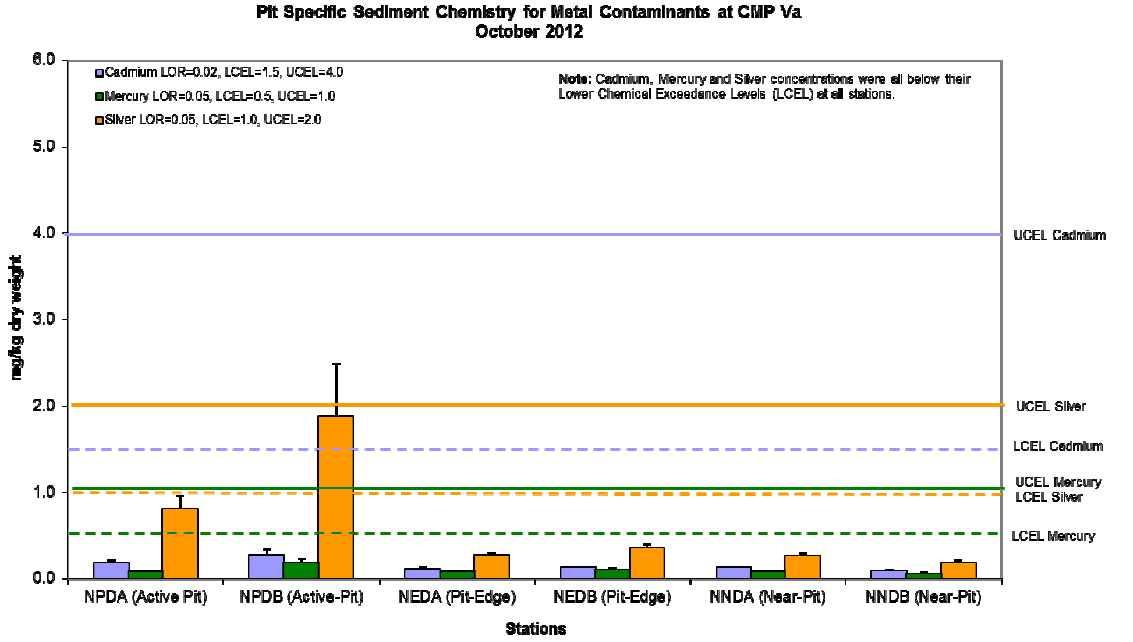

Figure 2: Concentration of Metals (Cd, Hg, Ag; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry of CMP Va in October 2012.

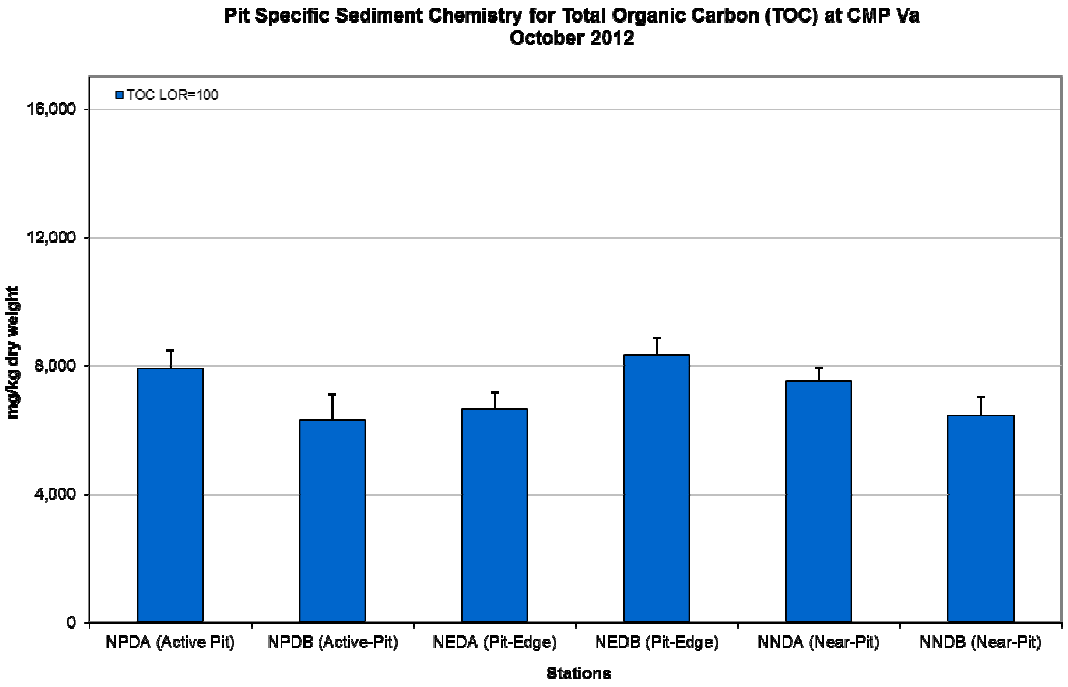

Figure 3: Concentration of Total Organic Carbon (mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry of CMP Va in October 2012.

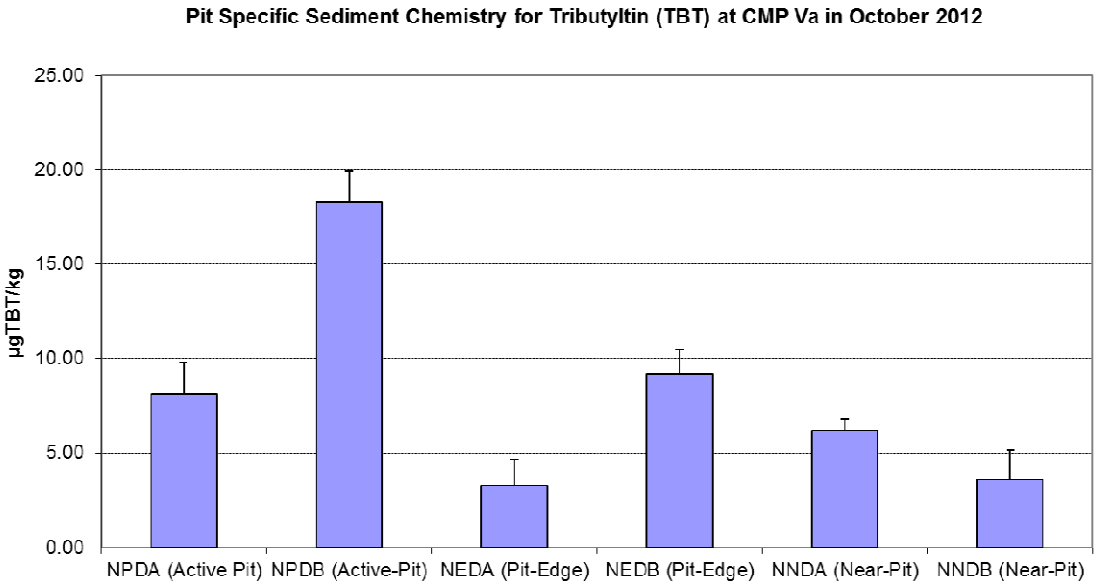

Figure 4: Concentration of Tributyltin (µg TBT/kg; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry of CMP Va in October 2012.

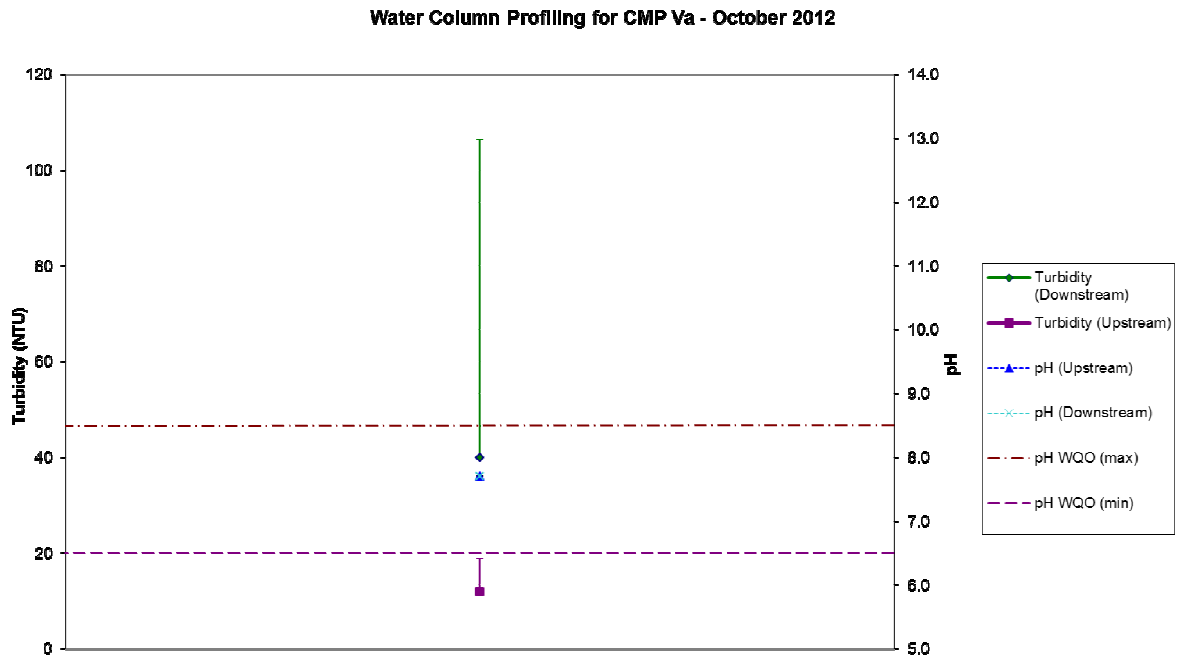

Figure 5: Turbidity and pH (mean + SD) recorded during Water Column Profiling for disposal operations at CMP Va in October 2012.

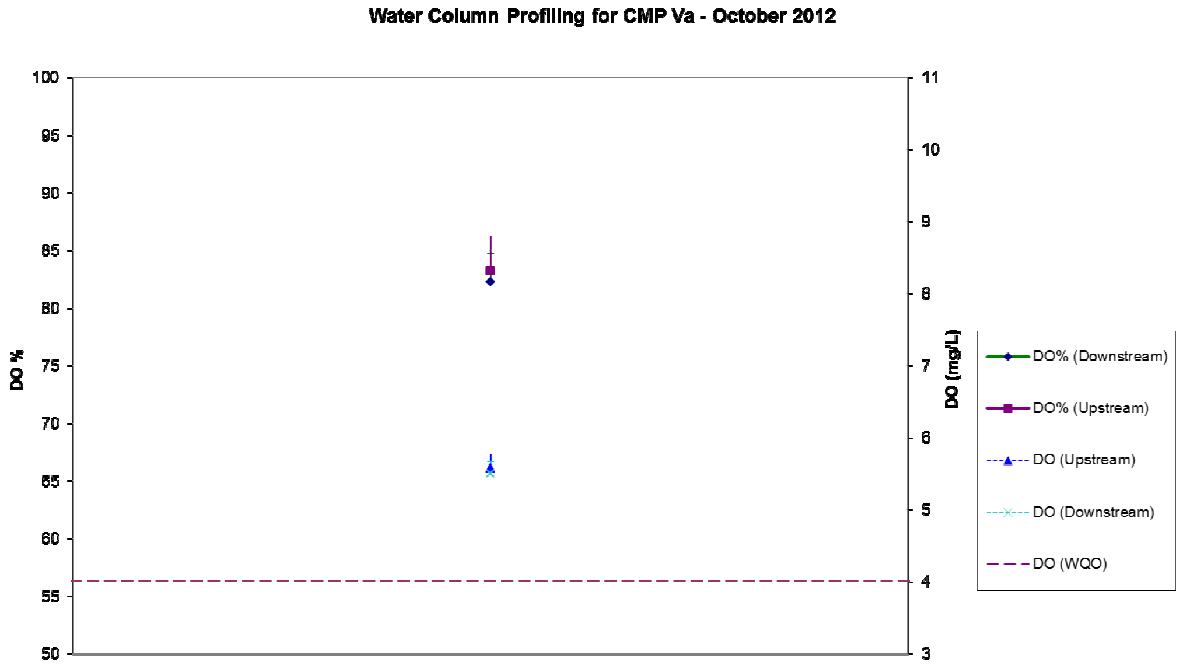

Figure 6: Dissolved Oxygen (mean + SD) recorded during Water Column Profiling for disposal operations at CMP Va in October 2012.

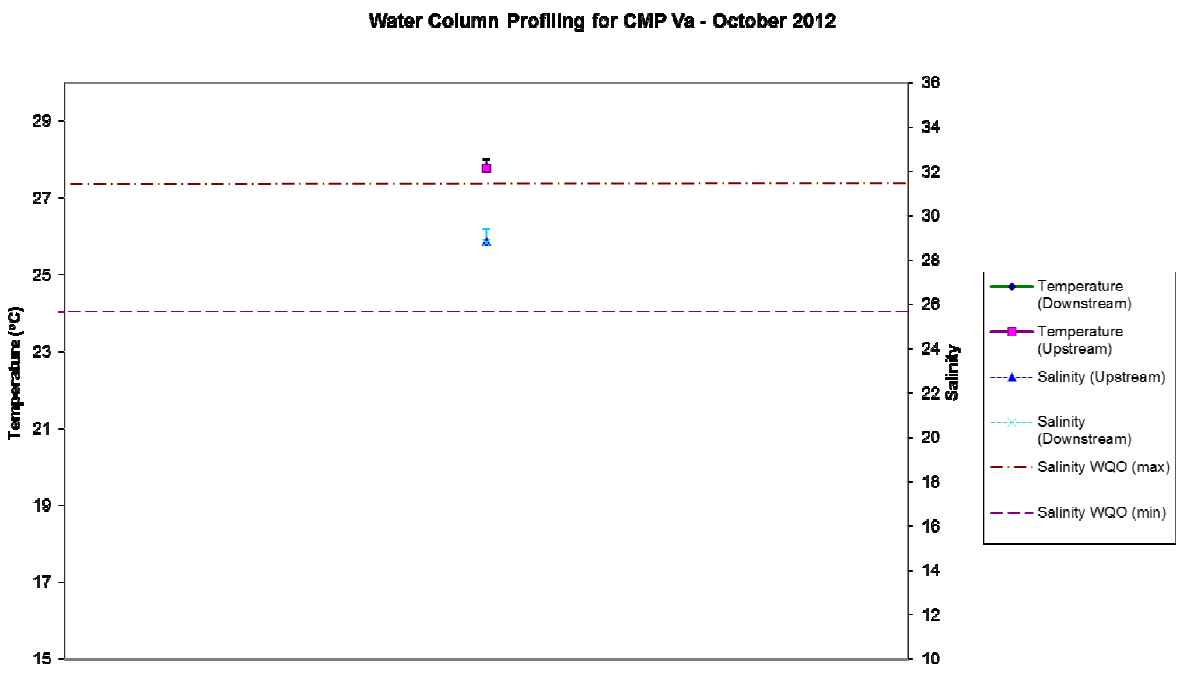

Figure 7: Salinity and Temperature (mean + SD) recorded during Water Column Profiling for disposal operations at CMP Va in October 2012.

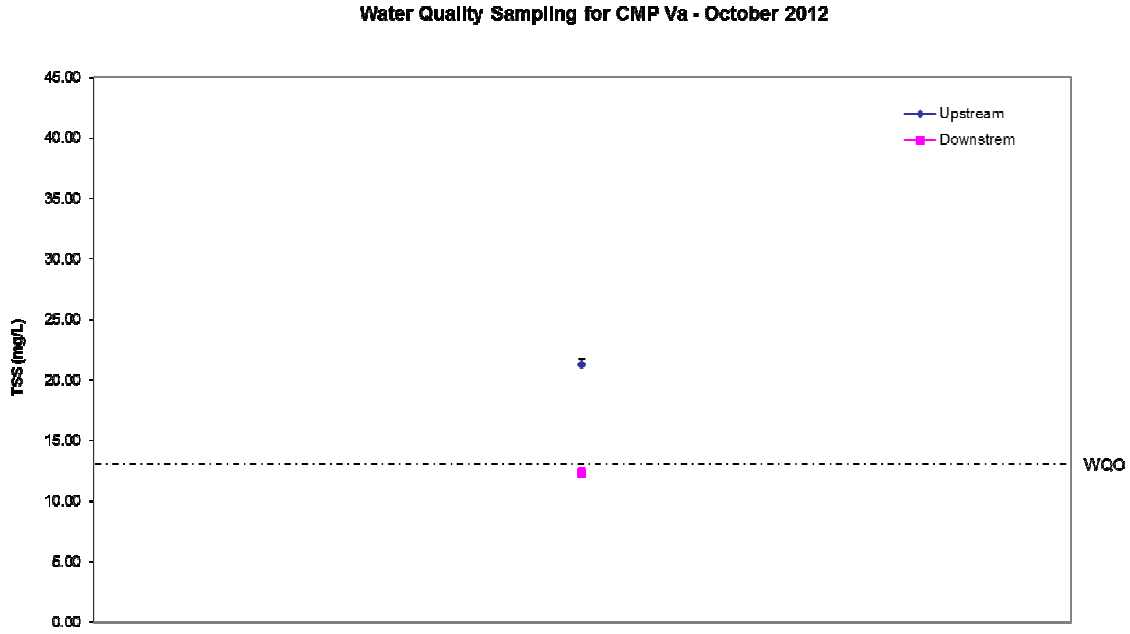

Figure 8: Total Suspended Solids (mean + SD) recorded during Water Column Profiling for disposal operations at CMP Va in October 2012.

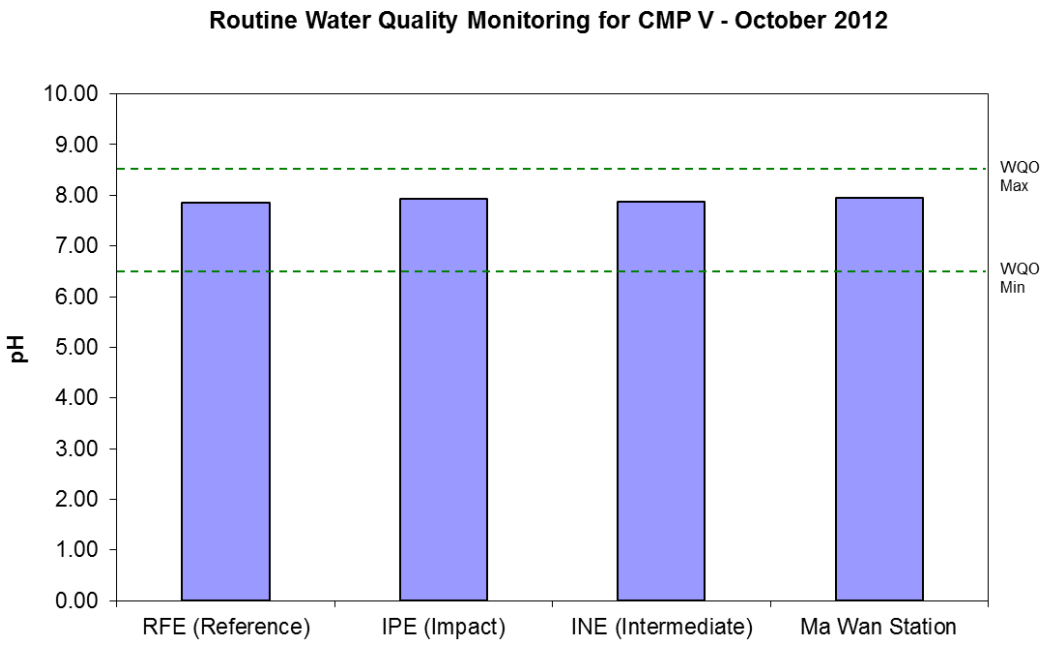

Figure 9: Level of pH (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

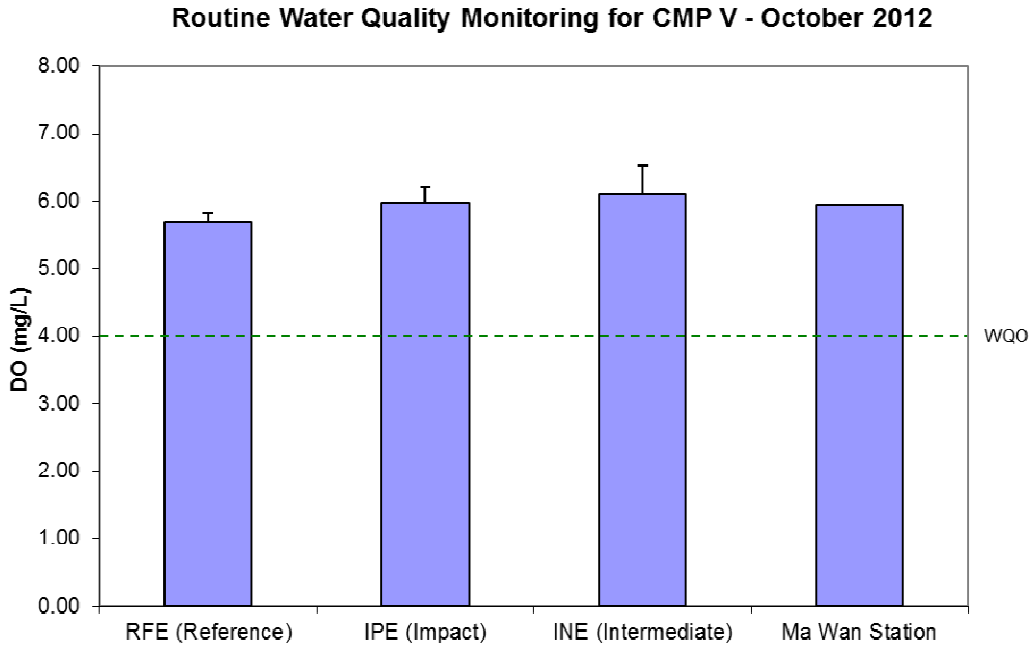

Figure 10: Concentration of Dissolved Oxygen (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

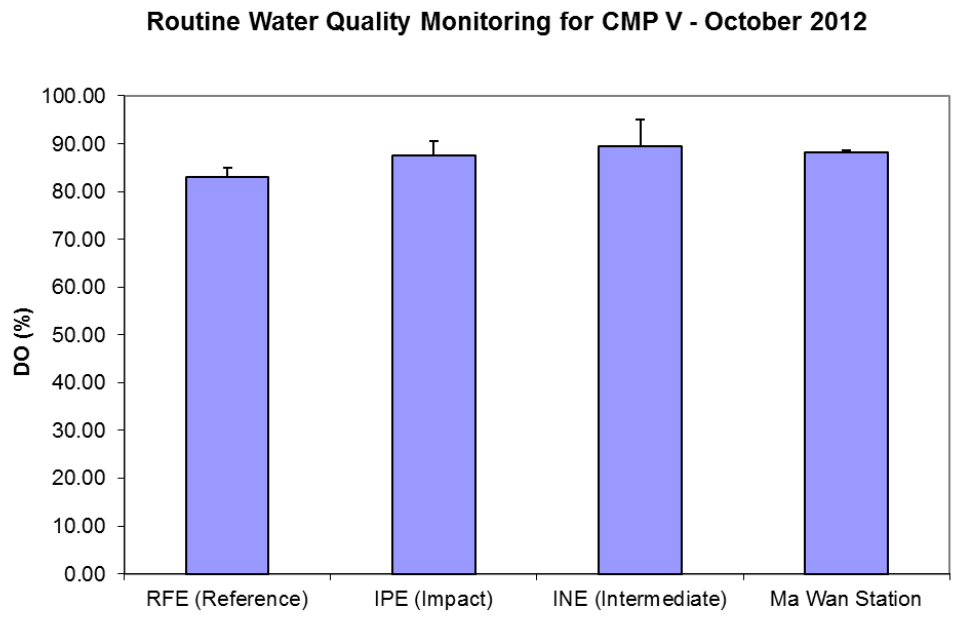

Figure 11: Level of Dissolved Oxygen (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

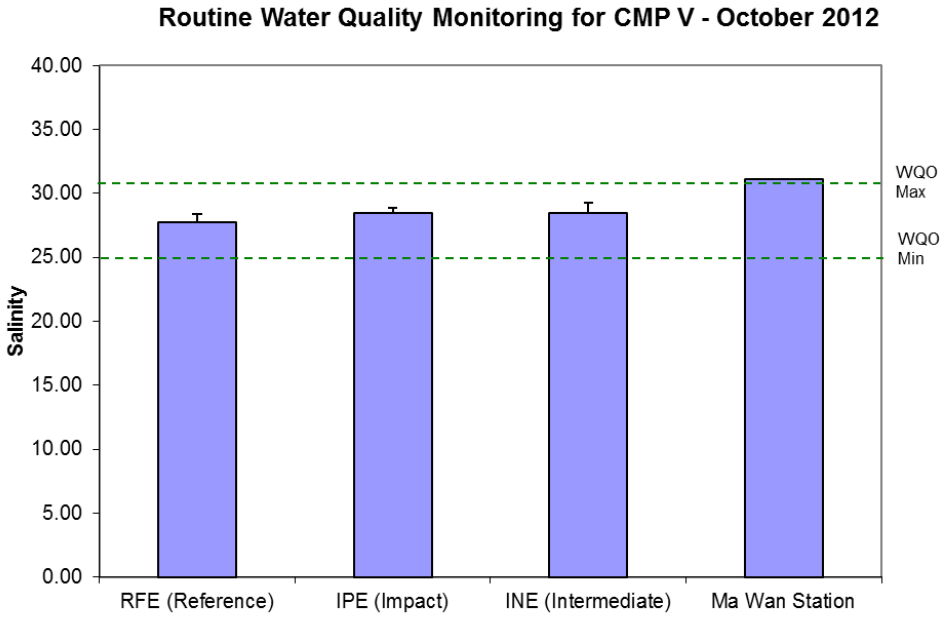

Figure 12: Level of Salinity (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

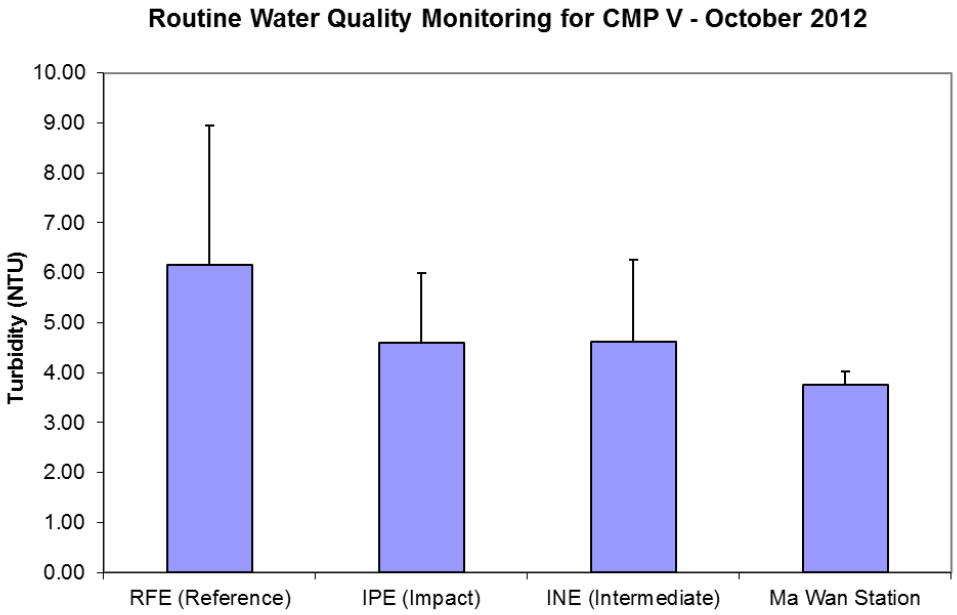

Figure 13: Level of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

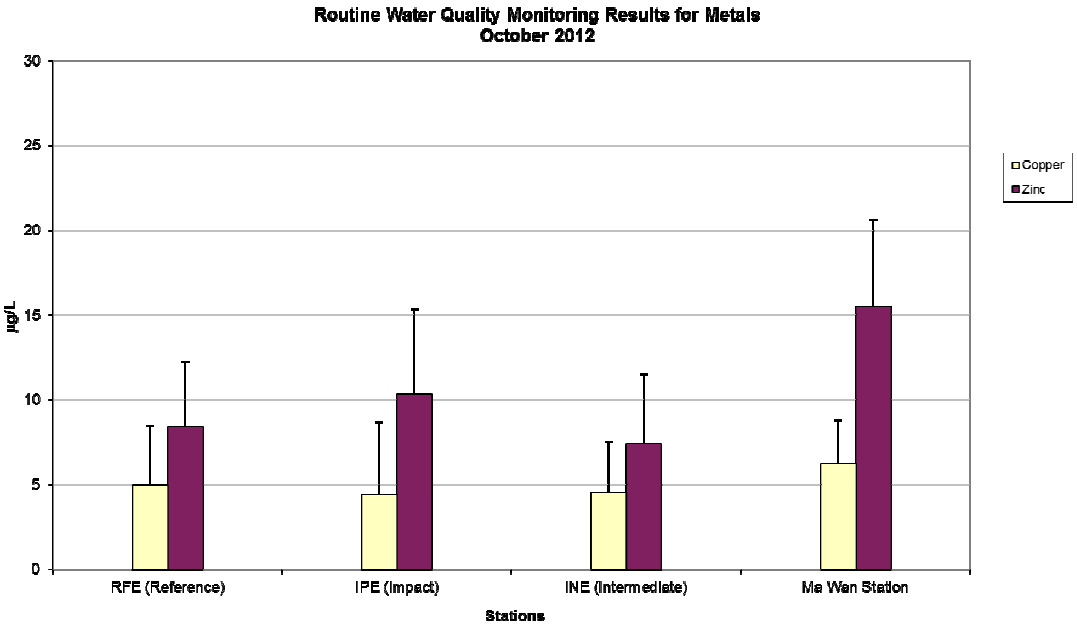

Figure 14: Concentration of Copper and Zinc (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

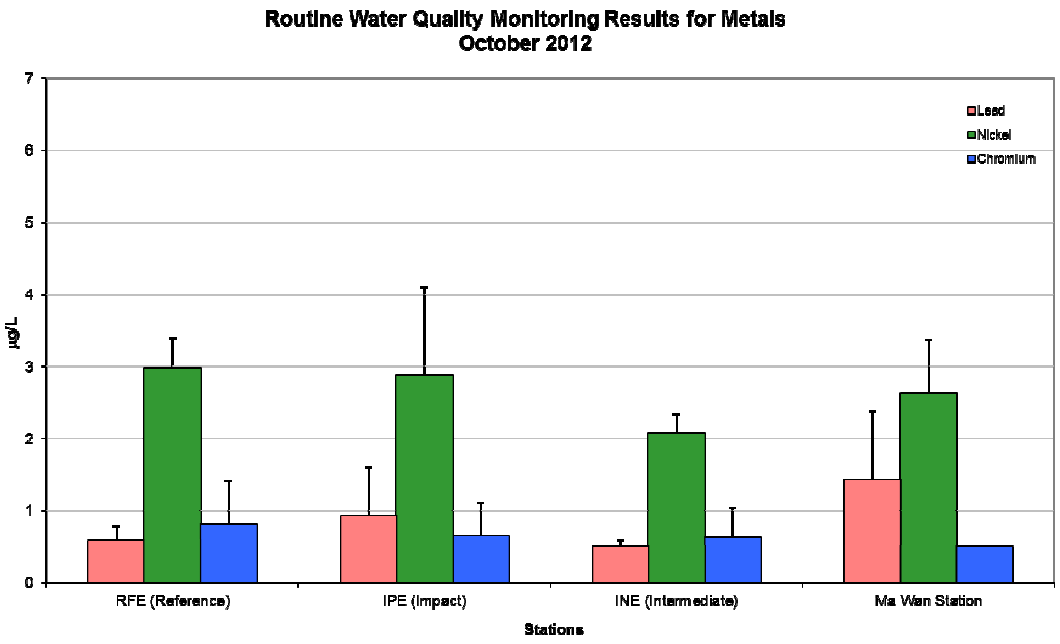

Figure 15: Concentration of Lead, Nickel and Chromium (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

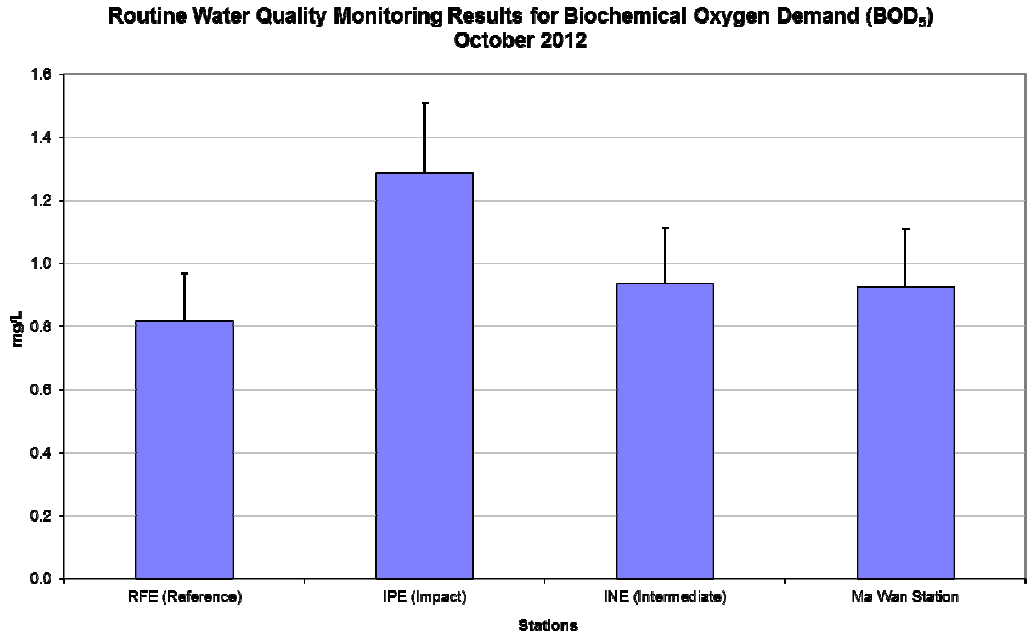

Figure 16: Level of Biochemical Oxygen Demand (BOD_5; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

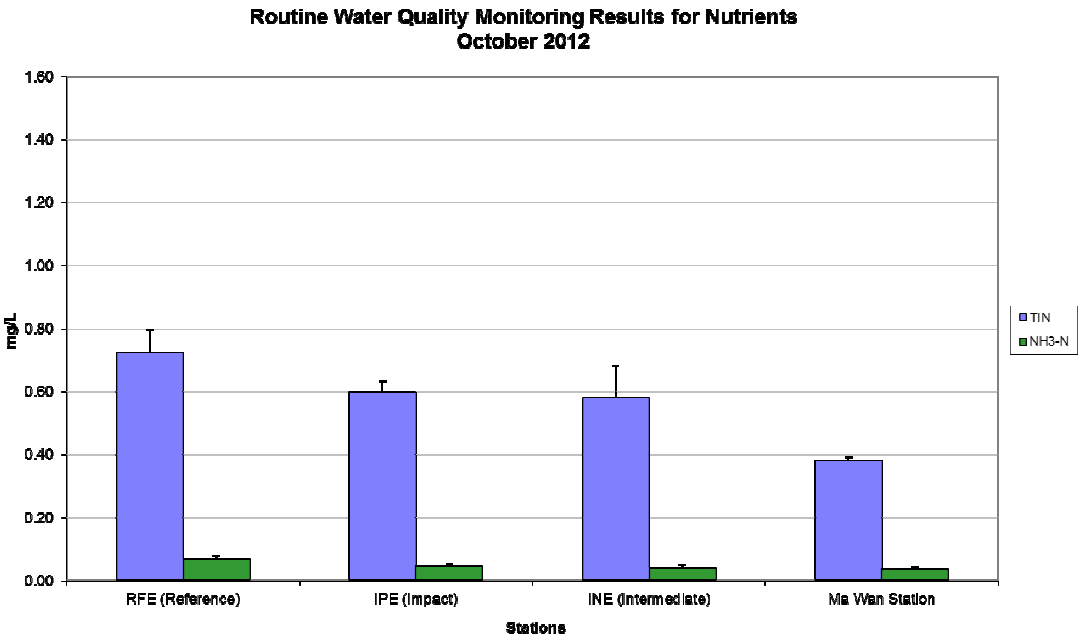

Figure 17: Concentration of Total Inorganic Nitrogen and NH_3-N (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

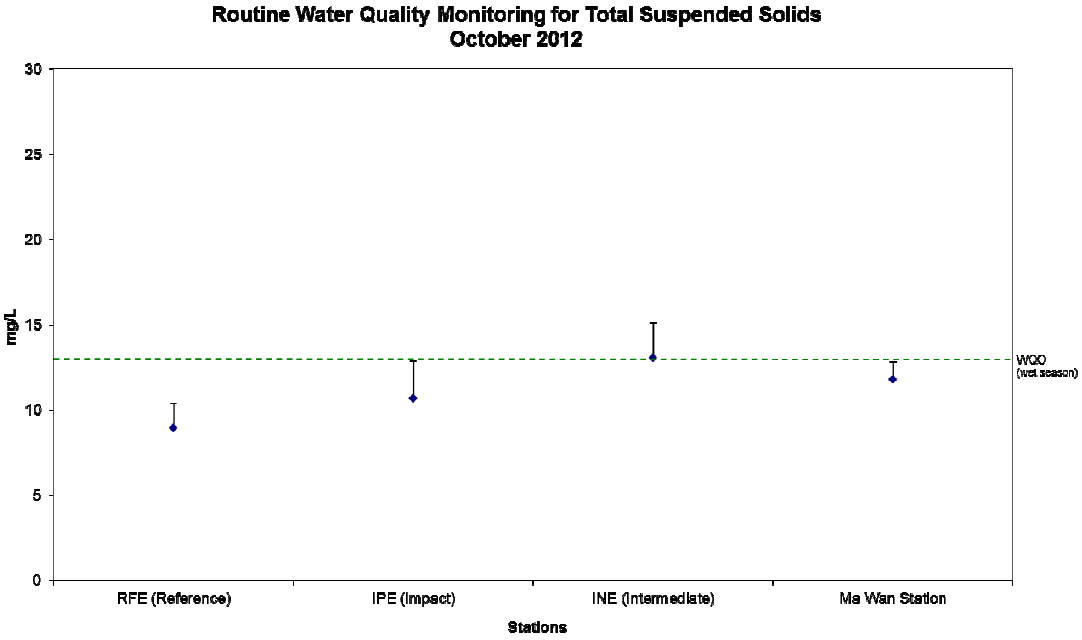

Figure 18: Concentration of Total Suspended Solids (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in October 2012.

Annex C

Results of Impact Monitoring during CMP Vd Dredging Operations for October 2012

Table C1 Summary Table of DO, Turbidity and TSS Levels Recorded in October 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		
2012/10/25	ME	DS1	5.91	6.61	5.05	8.83
		DS2	5.86	6.60	6.53	9.67
		DS3	5.88	6.91	5.08	8.33
		DS4	6.21	7.28	3.53	6.00
		DS5	6.23	7.27	3.85	7.67
		MW1	5.90	5.95	2.87	8.00
		US1	5.85	6.58	4.63	7.17
		US2	6.37	6.39	3.67	7.67
	MF	DS1	5.63	5.93	9.98	16.00
		DS2	5.54	6.26	10.72	14.67
		DS3	5.59	6.08	7.32	9.33
		DS4	5.70	6.01	7.32	11.00
		DS5	5.63	6.07	6.33	9.67
		MW1	6.05	6.27	6.88	11.50
		US1	5.84	6.71	7.73	10.67
		US2	6.14	6.98	7.67	10.50

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

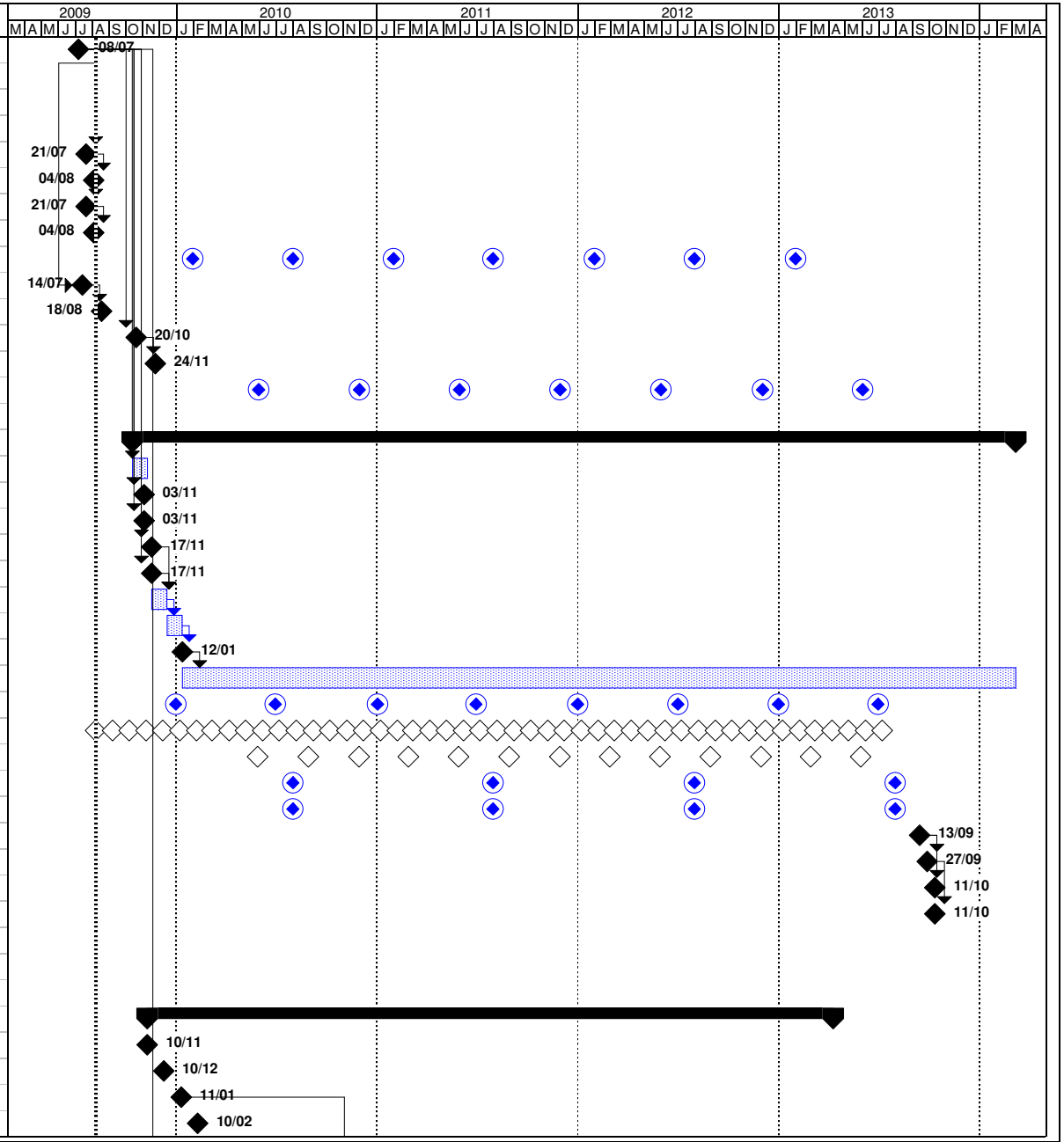

Figure 4.1 - Study Programme

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

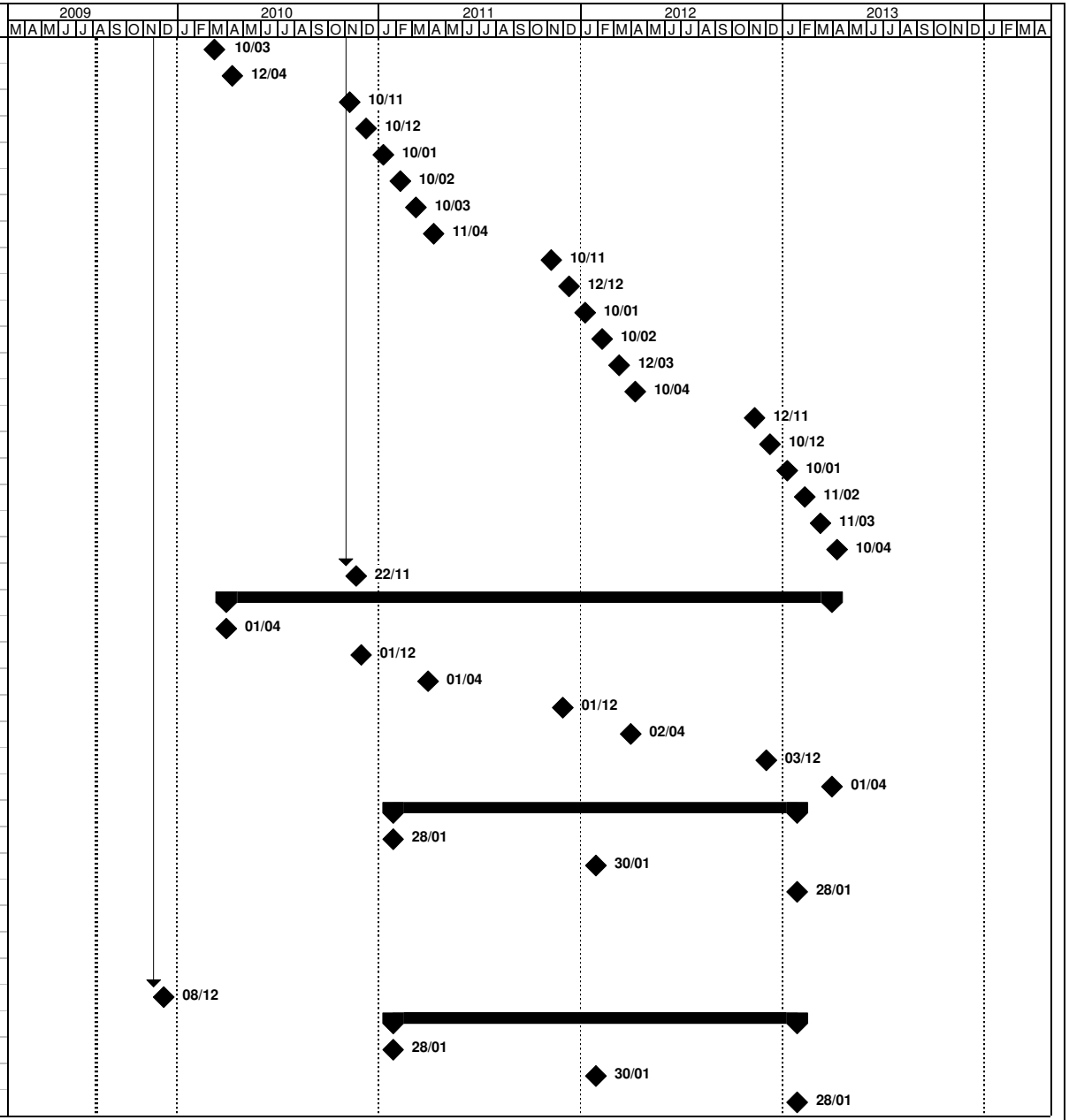

Figure 4.1 - Study Programme

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