

 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)

23rd Monthly Progress Report for Contaminated Mud Pits at Sha Chau – May 2011

Revision 0

17 June 2011

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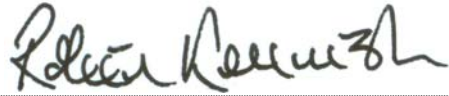



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Revision 0

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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 May 2011 under Agreement No. CE 4/2009 (EP).		Date: 17 June 2011			
		Approved by:  Dr Robin Kennish Director			
0	23 rd Monthly Progress Report for CMP – Draft	NZ	CAR	RK	17/06/11
Revision	Description	By	Checked	Approved	Date
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Agreement No. CE 4/2009 (EP)
Environmental Monitoring and Audit
for Contaminated Mud Pit at Sha Chau (2009-2013) - Investigation

23rd MONTHLY PROGRESS REPORT
FOR CONTAMINATED MUD PITS AT SHA CHAU
(for May 2011)

June 2011

1.1 BACKGROUND

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. CMP IVc is presently in operation for backfilling by contaminated mud and is anticipated to reach its capacity in 2011. A series of four newly constructed seabed pits at the East of Sha Chau area, CMP Va-d, will be provided for the disposal of contaminated mud after CMP IVc is full. Dredging operations were completed for the construction of CMP Va and are now taking place to construct CMP Vb. The environmental monitoring and audit (EM&A) programme for the CMPs at the East of Sha Chau area presently covers disposal and capping operations at CMP IV and dredging operations at CMP Vb.

1.2 REPORTING PERIOD

This *Monthly Progress Report* covers the monitoring period of May 2011.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

No sampling activity was conducted for CMP IVc during the reporting period. For CMP V, sampling for *Impact Water Quality Monitoring during Dredging Operations* was conducted on 24 May 2011. A summary of field activities are presented in *Annex A*.

A summary of laboratory analysis results submitted by the Contractor in this reporting month is presented in *Table 1.1*.

Table 1.1 *Summary of laboratory analysis results submitted by the Contractor during the reporting month*

Key Task	Monitoring Component	Results Received from the Contractor
CMP IV		
Pit-Specific Sediment Chemistry	Sediment Quality	February 2011 sampling: 5 May 2011
CMP V		
Impact Monitoring during Dredging Operations	Water Quality	March 2011 sampling: 31 May 2011

1.4 *DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS*

No outstanding sampling and laboratory analysis remained from May 2011.

1.5 *BRIEF DISCUSSION OF THE MONITORING RESULTS*

Results of *Pit Specific Sediment Chemistry* for April 2011 are presented for CMP IV and results of *Impact Water Quality Monitoring during Dredging Operations* for May 2011 are presented for CMP V. Detailed results will be discussed in the 8th *Quarterly Report*.

1.5.1 *CMP IV*

Pit Specific Sediment Chemistry for CMP IV during April 2011

Cadmium, Chromium, Lead, Mercury and Nickel, were all below their *Lower Chemical Exceedance Levels (LCEs; Figures B1 and B2 of Annex B)* at all stations. Arsenic, concentrations exceeded the LCEL at both Near-Pit and both Pit-Edge stations but at none of the Active-Pit stations.

Three exceedances occurred at Active-Pit station NCA. These were an LCEL exceedance for Copper (123 mg/kg) and UCEL exceedances for Zinc and Silver (323 mg/kg and 5 mg/kg respectively).

Concentrations of Total DDT and 4,4" DDE (DDE) were only detectable at Pit-Edge station CPB (*Figure B3 of Annex B*). Sediment concentrations of Total Organic Carbon (TOC) were relatively consistent amongst all stations (*Figure B4 of Annex B*) with the exception of Active-Pit station NCA where approximately twice the levels measured at other Impact, as well as Reference and Intermediate stations. With the exception of stations CPA and NCB which had higher sand contents, sediment samples were mainly composed of silt and clay materials (72 – 92 %; *Figure B5 of Annex B*).

1.5.2

CMP V

Impact Water Quality Monitoring during Dredging Operations of CMP V – May 2011

Impact Water Quality Monitoring during Dredging Operations of CMP V was conducted on 24 May 2011. 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 V. 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).

Monitoring results are presented in *Table B1* of *Annex B*. 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⁾. Therefore, there appears to be no evidence of any unacceptable adverse water quality impacts arising from the dredging operations of CMP V at ESC.

1.6

ACTIVITIES SCHEDULED FOR THE NEXT MONTH

The following monitoring activities will be conducted in the next monthly period of June 2011:

- *Water Column Profiling* for CMP IV;
- *Water Quality Monitoring during Capping* for CMP IV; and,
- *Impact Water Quality Monitoring during Dredging Operations* for CMP V.

The sampling schedule is presented in *Annex A*.

1.7

STUDY PROGRAMME

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

(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.

Annex A

Sampling Schedule



Water Column Profiling				A	M	J	J	A	S	O	N	D
Plume Stations	WCP1	6 times per year			2	2	2					2
	WCP2	6 times per year			2	2	2					2
Routine Water Quality Monitoring				A	M	J	J	A	S	O	N	D
<i>Ebb Tide</i>								*				
Impact Station Downcurrent	IPE1	2 times per year						*				
	IPE2	2 times per year						*				
	IPE3	2 times per year						*				
	IPE4	2 times per year						*				
	IPE5	2 times per year						*				
Intermediate Station Downcurrent	INE1	2 times per year						*				
	INE2	2 times per year						*				
	INE3	2 times per year						*				
	INE4	2 times per year						*				
	INE5	2 times per year						*				
Reference Station Upcurrent	RFE1	2 times per year						*				
	RFE2	2 times per year						*				
	RFE3	2 times per year						*				
	RFE4	2 times per year						*				
	RFE5	2 times per year						*				
<i>Flood Tide</i>								*				
Impact Station Downcurrent	INF1	2 times per year						*				
	INF2	2 times per year						*				
	INF3	2 times per year						*				
Intermediate Station Downcurrent	IPF1	2 times per year						*				
	IPF2	2 times per year						*				
	IPF3	2 times per year						*				
Reference Station Upcurrent	RFF1	2 times per year						*				
	RFF2	2 times per year						*				
	RFF3	2 times per year						*				
Pit Specific Sediment Chemistry				A	M	J	J	A	S	O	N	D
Active-Pit	NCA 1-8	3 times per year	*					*				*
	NCB 1-8	3 times per year	*					*				*
Pit-Edge	CPA 1-8	3 times per year	*					*				*
	CPB 1-8	3 times per year	*					*				*
Near-Pit	CNA 1-8	3 times per year	*					*				*
	CNB 1-8	3 times per year	*					*				*
Cumulative Impact Sediment Chemistry				A	M	J	J	A	S	O	N	D
Near-field Stations	RNA 1-9	2 times per year						*				*
	RNB 1-9	2 times per year						*				*
Mid-field Stations	RMA 1-9	2 times per year						*				*
	RMB 1-9	2 times per year						*				*
Capped Pit Stations	RCA 1-9	2 times per year						*				*
	RCB 1-9	2 times per year						*				*
Far-Field Stations	RFA 1-9	2 times per year						*				*
	RFB 1-9	2 times per year						*				*
Sediment Toxicity Tests				A	M	J	J	A	S	O	N	D
Near-Field Stations	TCA	2 times per year						3				3
	TCB	2 times per year						3				3
Reference Stations	TRA	2 times per year						3				3
	TRB	2 times per year						3				3
Benthic Recolonisation Studies				A	M	J	J	A	S	O	N	D
Capped Contaminated Mud Pits	CPA 1-3	2 times per year						3				3
	CPB 1-3	2 times per year						3				3
	CPC 1-3	2 times per year						3				3
Reference Stations	RBA 1-3	2 times per year						3				3
	RBB 1-3	2 times per year						3				3
	RBC 1-3	2 times per year						3				3
Demersal Trawling				A	M	J	J	A	S	O	N	D
Near Pit Stations	INA 1-5	4 times per year					5	5				
	INB 1-5	4 times per year					5	5				
Reference North	TNA 1-5	4 times per year					5	5				
	TNB 1-5	4 times per year					5	5				
Reference South	TSA 1-5	4 times per year					5	5				
	TSB 1-5	4 times per year					5	5				
Tissue/ Whole Body Sampling				A	M	J	J	A	S	O	N	D
Near-Pit Stations	INA	2 times per year						*				
	INB	2 times per year						*				
Reference North	TNA	2 times per year						*				
	TNB	2 times per year						*				
Reference South	TSA	2 times per year						*				
	TSB	2 times per year						*				
Capping				A	M	J	J	A	S	O	N	D
<i>Ebb Tide</i>												
Impact Station Downcurrent	IPE1	4 times per year			3			3				3
	IPE2	4 times per year			3			3				3
	IPE3	4 times per year			3			3				3
	IPE4	4 times per year			3			3				3
	PFC1	4 times per year			3			3				3
Intermediate Station Downcurrent	INE1	4 times per year			3			3				3
	INE2	4 times per year			3			3				3
	INE3	4 times per year			3			3				3
	INE4	4 times per year			3			3				3
	INE5	4 times per year			3			3				3
Reference Station Upcurrent	RFE1	4 times per year			3			3				3
	RFE2	4 times per year			3			3				3
	RFE3	4 times per year			3			3				3
	RFE4	4 times per year			3			3				3
	RFE5	4 times per year			3			3				3
<i>Flood Tide</i>												
Impact Station Downcurrent	INF1	4 times per year			3			3				3
	PFC2	4 times per year			3			3				3
	INF3	4 times per year			3			3				3
Intermediate Station Downcurrent	IPF1	4 times per year			3			3				3
	IPF2	4 times per year			3			3				3
	IPF3	4 times per year			3			3				3
Reference Station Upcurrent	RFF1	4 times per year			3			3				3
	RFF2	4 times per year			3			3				3
	RFF3	4 times per year			3			3				3

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

 Sampling completed

Annex A2 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP V until the end of 2

Water Quality Impact Monitoring for Dredging		A	M	J	J	A	S	O	N	D
Downcurrent Impact Stations	DS1	*	*	*	*	*	*	*	*	*
	DS2	*	*	*	*	*	*	*	*	*
	DS3	*	*	*	*	*	*	*	*	*
	DS4	*	*	*	*	*	*	*	*	*
	DS5	*	*	*	*	*	*	*	*	*
Upcurrent Stations	US1	*	*	*	*	*	*	*	*	*
	US2	*	*	*	*	*	*	*	*	*
Ma Wan Station	MW1	*	*	*	*	*	*	*	*	*

 Sampling completed
 Scheduled sampling

Annex B

Monitoring Results

**Pit Specific Sediment Chemistry for Metal Contaminants at CMP IV
April 2011**

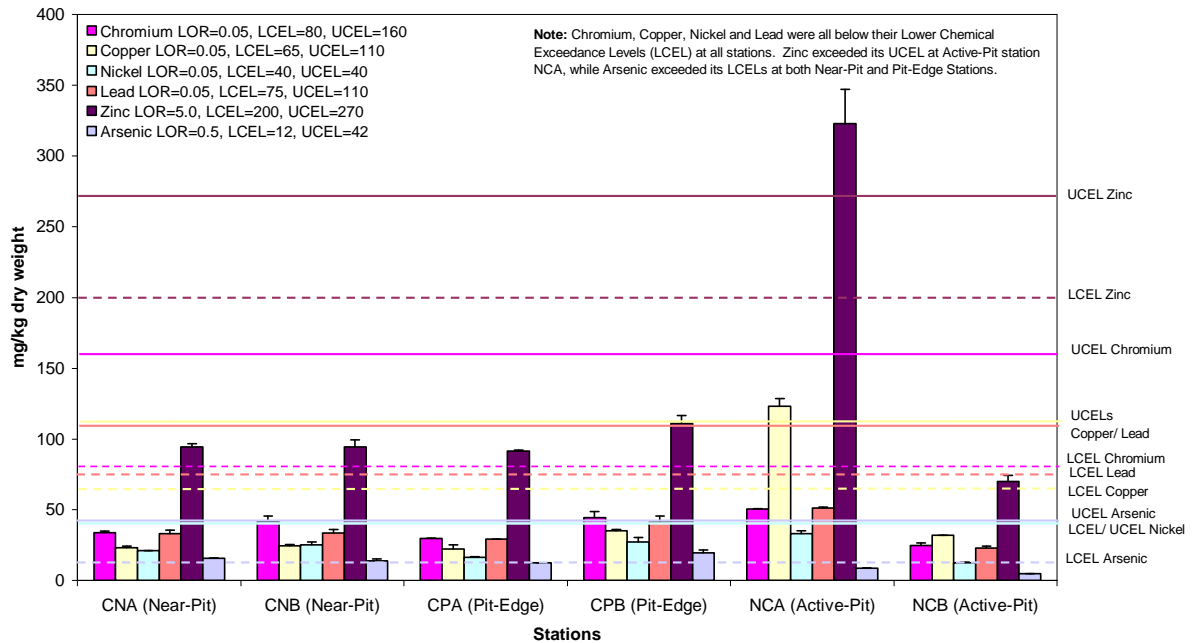


Figure B1: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean + SD) in sediment samples for Pit Specific Sediment Chemistry for CMP IV during April 2011.

**Pit Specific Sediment Chemistry for Metal Contaminants at CMP IV
April 2011**

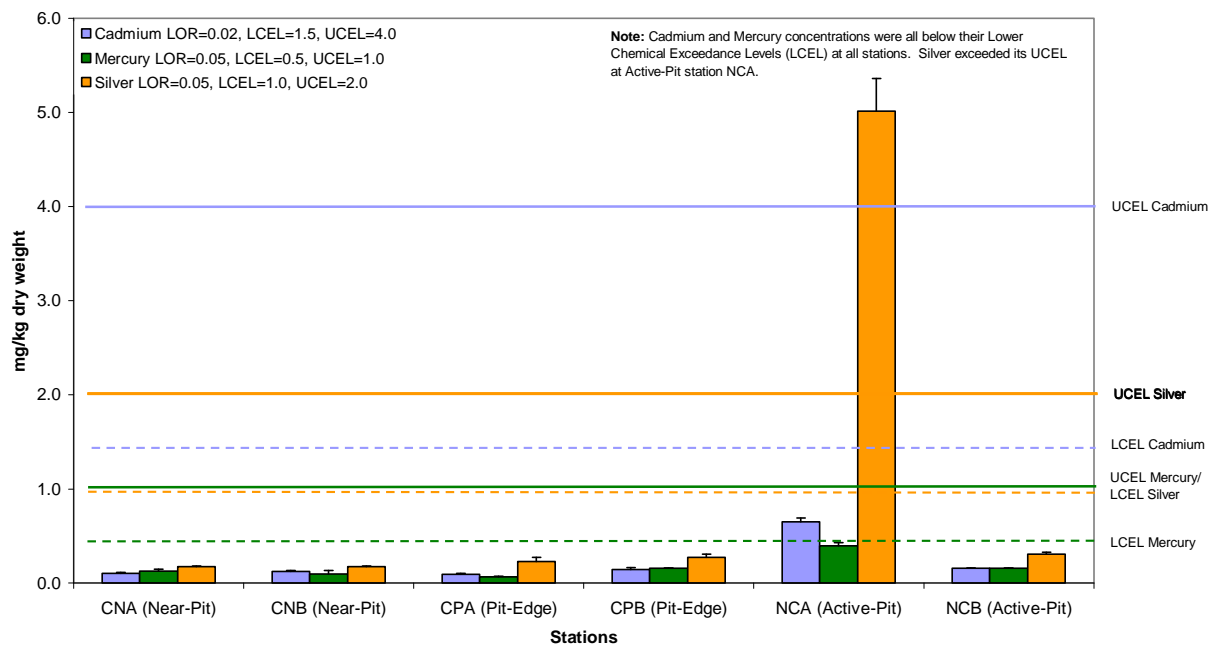


Figure B2: Concentration of Metals (Cd, Hg, Ag; mean + SD) in sediment samples for Pit Specific Sediment Chemistry for CMP IV during April 2011.

**Pit Specific Sediment Chemistry for Organic Contaminants (DDT & DDE) at CMP IV
April 2011**

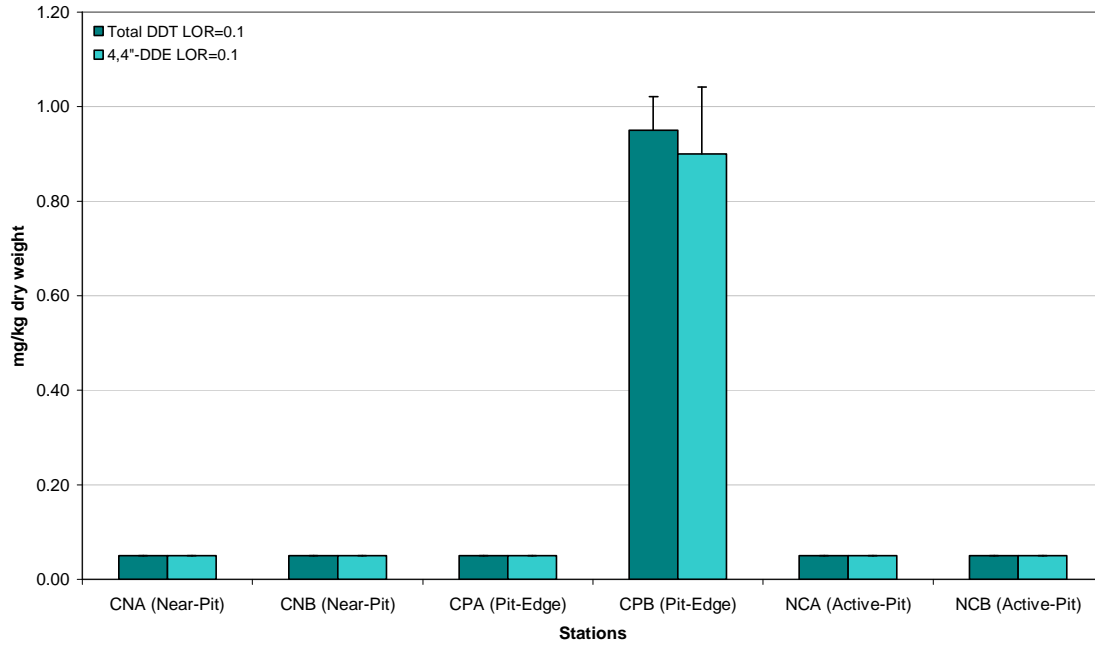


Figure B3: Concentration of Total DDT and DDE (mean + SD) in sediment samples for Pit Specific Sediment Chemistry for CMP IV during April 2011.

**Pit Specific Sediment Chemistry for Total Organic Carbon (TOC) at CMP IV
April 2011**

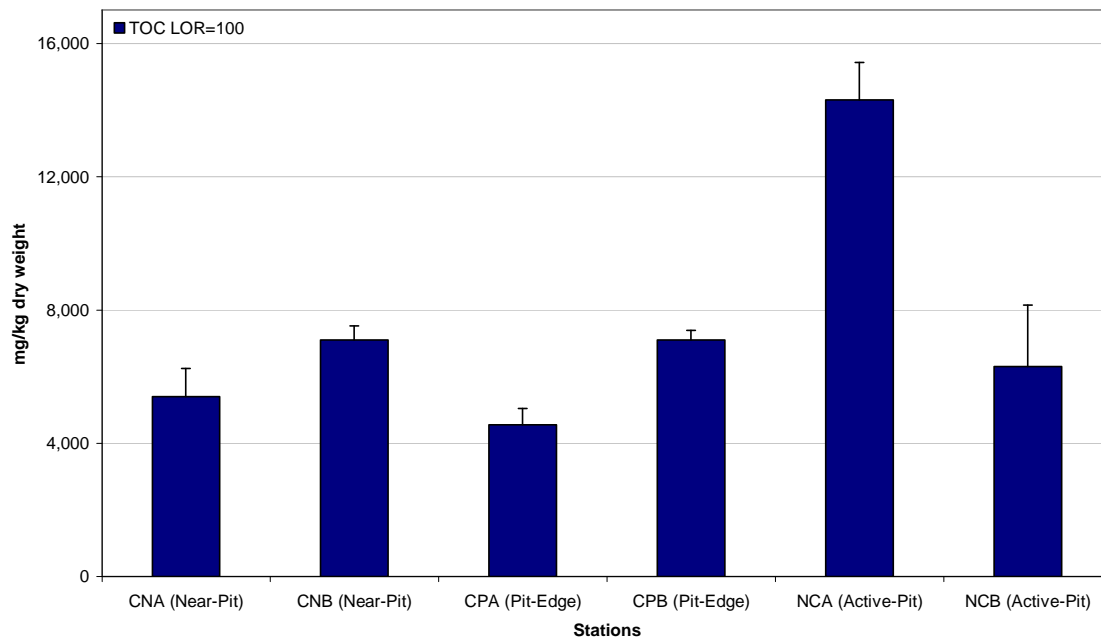


Figure B4: Concentration of Total Organic Carbon (TOC; mean +SD) in sediment samples for Pit Specific Sediment Chemistry during April 2011

Source: H:\Team\EM\GMS Projects\0103262 CEDD EM&A for CMP at Sha Chau\06 Contractor Submission (LAM)\CMP 4 - 03 Pit Specific Sediment Chemistry

Date: 09/06/2011

**Environmental
Resources
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**Pit Specific Sediment Chemistry for Particle Size Distribution at CMP IV
April 2011**

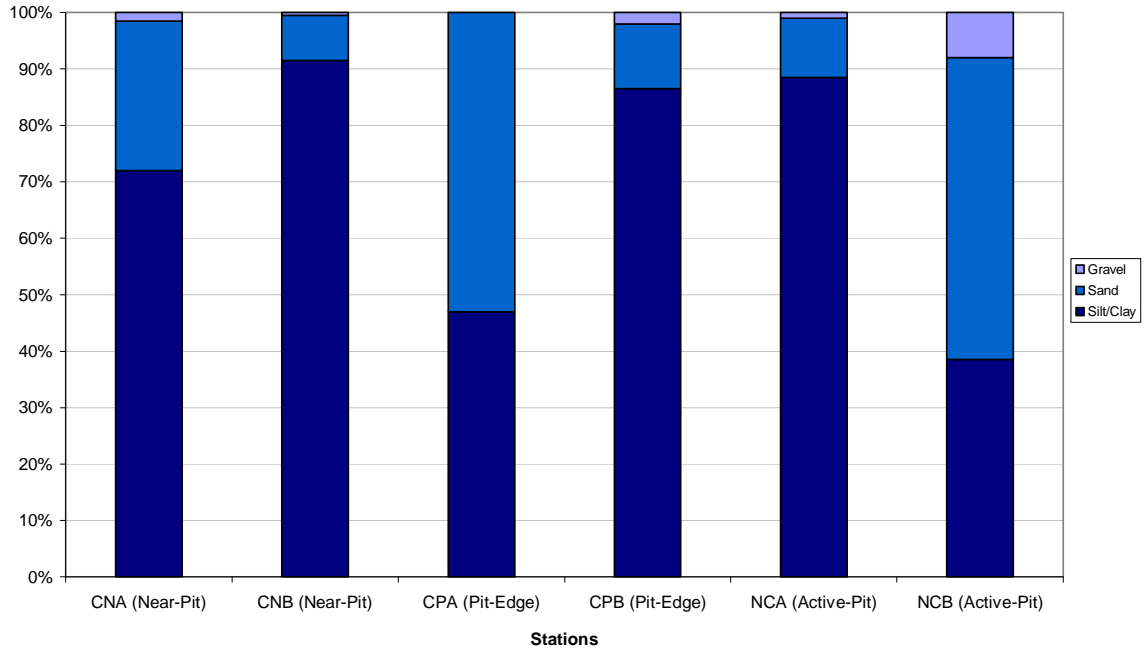


Figure B5: Particle Size Distribution (% mean) of sediment samples for Pit Specific Sediment Chemistry during April 2011.

Table B1 *Summary Table of DO, Turbidity and TSS Levels recorded in May 2011*

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average TSS Level (mg/L)
			Bottom	Surface and Mid Depth		
2011/05/24	ME	DS1	5.62	5.57	7.45	10.50
		DS2	5.54	5.77	5.76	6.50
		DS3	5.55	5.83	7.19	8.33
		DS4	5.85	5.73	6.46	8.50
		DS5	5.59	5.93	4.89	7.83
		MW1	5.99	6.57	2.10	2.33
	MF	US1	5.57	5.53	5.58	7.50
		US2	6.02	5.72	4.12	5.83
		DS1	5.58	5.60	7.45	8.33
		DS2	5.33	5.70	5.53	6.33
		DS3	5.39	5.57	5.41	5.67
		DS4	5.52	5.51	7.34	8.33
		DS5	5.66	5.56	7.74	6.50
		MW1	5.80	5.86	2.76	4.00
		US1	5.67	5.88	3.56	3.67
		US2	5.66	5.76	7.22	9.17

Annex C

Study Programme

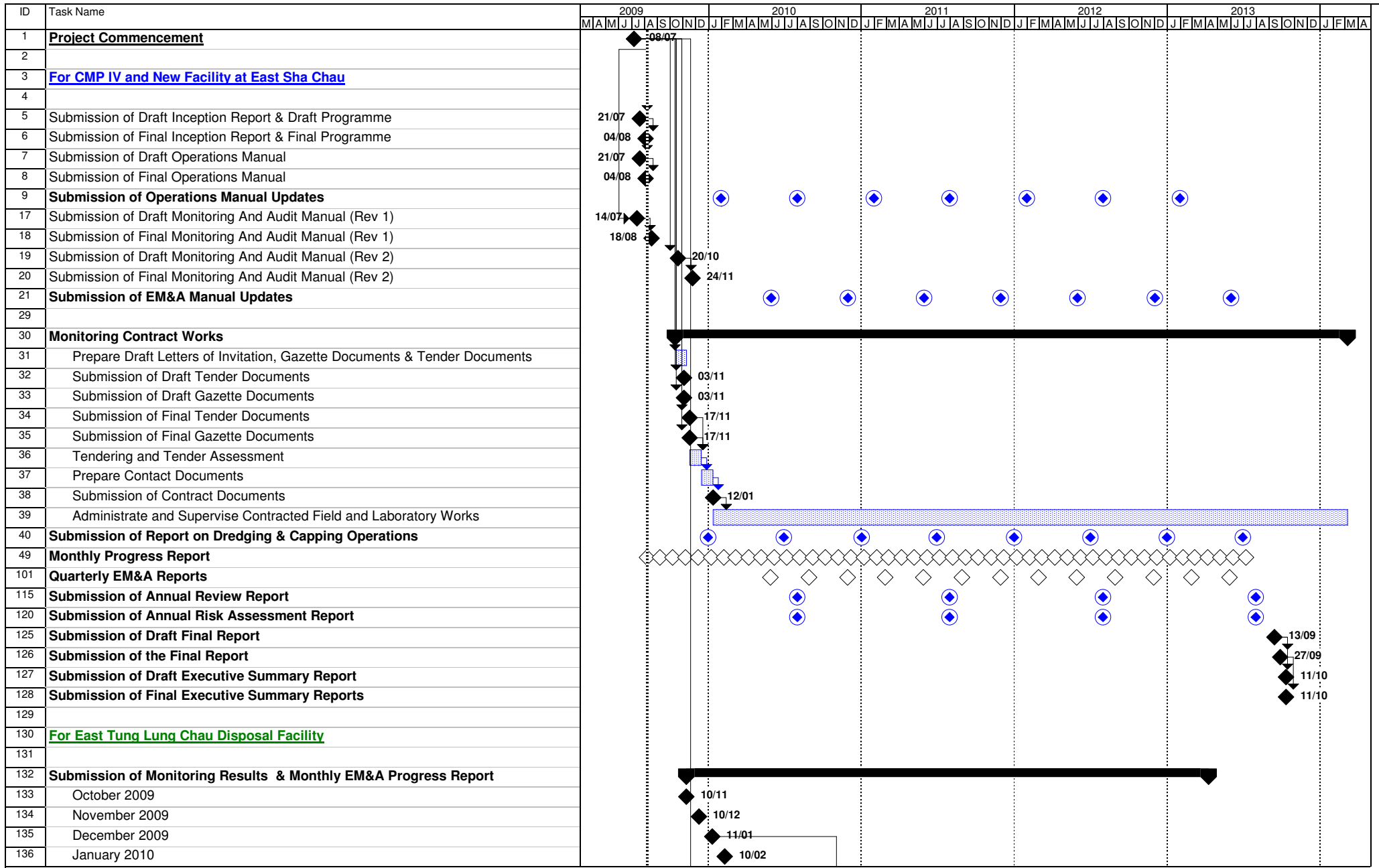
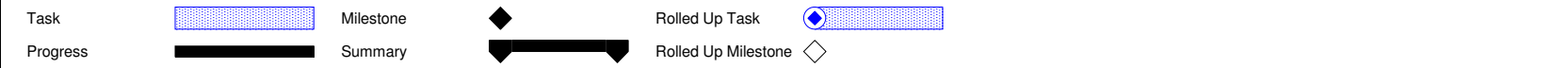


Figure 4.1 - Study Programme



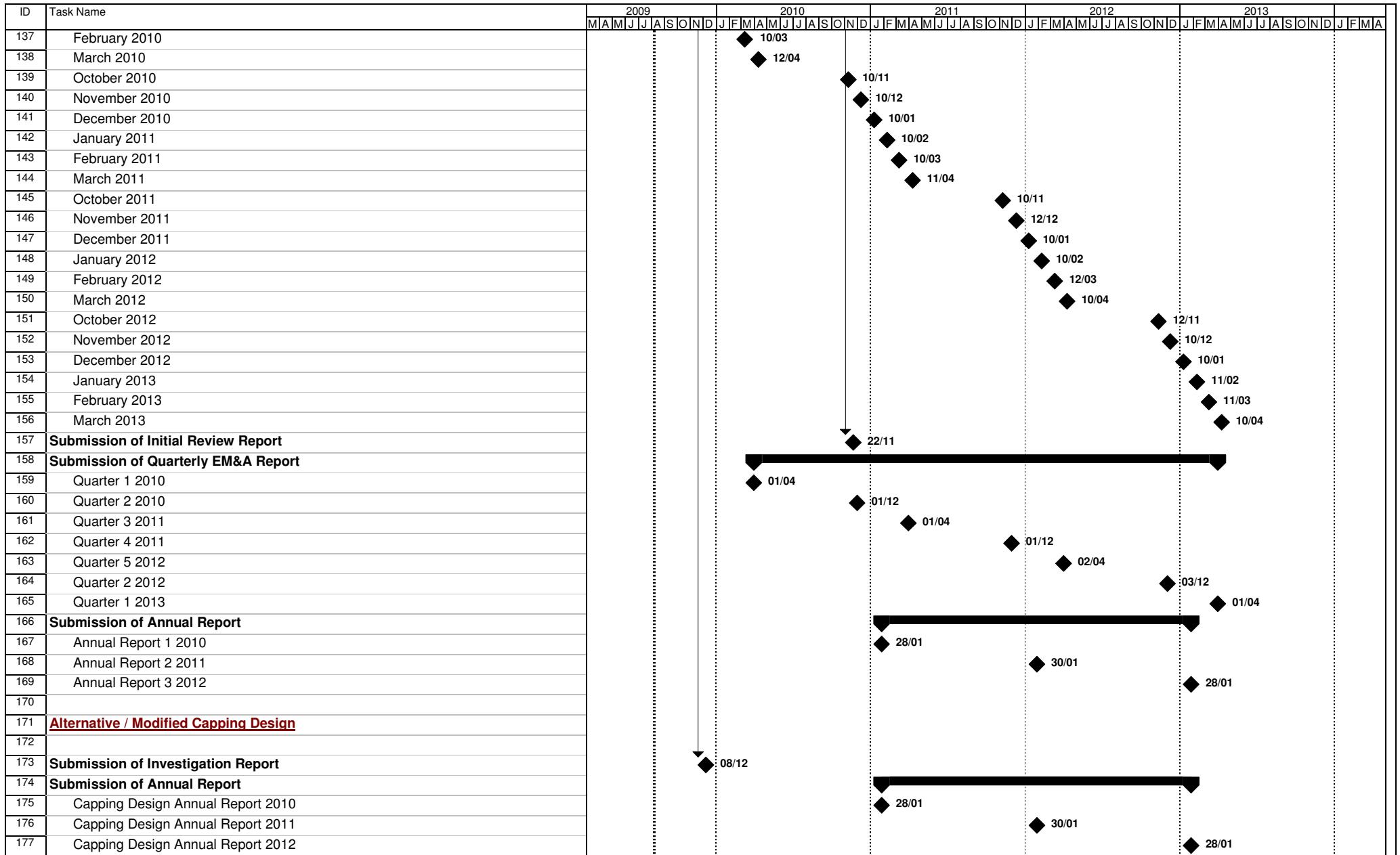


Figure 4.1 - Study Programme

