

 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)**

**16th Monthly Progress Report for
Contaminated Mud Pits at Sha Chau –
October 2010**

Revision 0

22 November 2010

Environmental Resources Management
21/F Lincoln House
Taikoo Place, 979 King's Road
Island East, Hong Kong
Telephone 2271 3000
Facsimile 2722 5660





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Environmental Resources Management

21/F Lincoln House
 979 King's Road
 Taikoo Place
 Island East
 Hong Kong
 Telephone: (852) 2271 3000
 Facsimile: (852) 2723 5660
 E-mail: post.hk@erm.com
 http://www.erm.com

16th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – October 2010

Revision 0

Document Code: 0103262 Oct 10 Monthly Report.doc

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 2010 under Agreement No. CE 4/2009 (EP).		Date: 22 November 2010			
		Approved by:  Dr Robin Kennish Director			
0	16 th Monthly Progress Report for CMP – Revision 0	JT	CAR	RK	19/11/10
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

16th MONTHLY PROGRESS REPORT FOR CONTAMINATED MUD PITS
AT SHA CHAU - October 2010

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 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 October 2010.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

No field sampling activities were scheduled in this monthly period for CMP IVc. For CMP V, sampling for *Impact Water Quality Monitoring during Dredging Operations* was conducted on 2, 5, 7, 9, 11, 13, 15, 18, 20 and 25 October 2010. A summary of field activities are presented in *Annex A*.

1.4 DETAILS OF OUTSTANDING SAMPLING AND / OR ANALYSIS

No outstanding sampling and laboratory analysis remained from October 2010.

1.5 BRIEF DISCUSSION OF THE MONITORING RESULTS

Results of *Impact Water Quality Monitoring during Dredging Operations* for October 2010 are presented for CMP V. Detailed results will be discussed in the relevant *Quarterly Reports*.

1.5.1

CMP V

Impact Water Quality Monitoring during Dredging Operations of CMP V – October 2010

Impact Water Quality Monitoring during Dredging Operations of CMP V was conducted for three times per week in October 2010. 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 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*. Generally, 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⁾. However, occasional exceedances of these levels are recorded for Turbidity and TSS (*Table B1 of Annex B*). Student's t-tests were then employed to investigate any significant differences in levels of Turbidity and/or TSS between Reference (US1 and US2) and Impacts stations where exceedances of Action and Limit Levels were reported (*p-value = 0.05*).

With the exception of TSS levels recorded at impact station DS5 during the mid-ebb tide on 7 October and at station DS1 during the mid-flood tide on 25 October 2010, results of the statistical analysis did not show any significant differences in levels of Turbidity and TSS between Reference (US1 and US2) and Impact stations (*p-value > 0.05*; *Table B1 of Annex B*). It is thus considered that these exceedances are more likely to be caused by background fluctuation in water quality rather than indicating any adverse impacts from the dredging operations of CMP V. Although recordings of TSS were recorded at DS5 and DS1 above the levels recorded at the reference stations, these were isolated events and were tracked with future monitoring.

Overall, 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

Impact Water Quality Monitoring during Dredging will be undertaken for CMP V in the next monitoring month. No monitoring will be conducted for the disposal operations of CMP IV in November 2010.

⁽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.

The sampling schedule is presented in *Annex A*.

1.7

STUDY PROGRAMME

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

Annex A



Sampling Schedule

Annex A2 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP V (July 2009 - December 2010)

			2009					2010												
Baseline Water Quality Monitoring			J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Near Field	ESC-WNAA	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																
	ESC-WNAB		*	*																
	ESC-WNAC		*	*																
	ESC-WNAD		*	*																
	ESC-WNBA		*	*																
	ESC-WNBB		*	*																
	ESC-WNBC		*	*																
ESC-WNBD	*	*																		
Mid Field	ESC-WMB	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																
	ESC-WMA		*	*																
Far Field	ESC-WFA	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																
	ESC-WFB		*	*																
	MW1		*	*																
Reference Stations	NM1	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of each day) in the month prior to commencement of marine works	*	*																
	NM2		*	*																
	NM3		*	*																
	NM5		*	*																
	NM6		*	*																

Water Column Profiling			J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Plume Stations	Upstream				2	2	2	2	2	2											
	Downstream				2	2	2	2	2	2											

Water Quality Impact Monitoring for Dredging			J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Downcurrent Impact Stations	1				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	2				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	3				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	4				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	5				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Upcurrent Stations	1				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	2				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW1				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

 Sampling completed
 Sampling to be completed

Annex B

Monitoring Results

Table B1

Summary Table of DO, Turbidity and TSS Levels recorded in October 2010

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average TSS Level (mg/L)		
			Bottom	Surface and Mid Depth				
2010/10/02	ME	DS1	5.87	6.33	6.02	8.00		
		DS2	5.83	6.19	6.72	8.00		
		DS3	6.08	6.05	7.62	10.33		
		DS4	6.00	5.96	8.48	16.17		
		DS5	5.87	6.09	6.57	13.00		
		MW1	5.09	5.36	2.58	4.67		
	MF	US1	5.70	6.35	4.25	6.67		
		US2	5.70	6.37	4.32	7.33		
		DS1	5.91	7.51	9.46	15.50		
		DS2	6.06	7.79	7.52	11.67		
		DS3	6.26	7.73	8.01	15.17		
		DS4	6.07	6.89	10.09	19.83		
	MF	DS5	6.15	7.09	9.86	14.17		
		MW1	4.90	5.07	5.02	8.50		
		US1	5.71	7.53	8.38	12.00		
		US2	5.37	7.39	7.16	11.83		
		2010/10/05	ME	DS1	6.13	6.23	15.02	20.00
				DS2	6.12	6.25	12.86	15.50
DS3	6.08			6.24	15.70	21.50		
DS4	6.15			6.26	12.68	20.00		
DS5	6.04			6.26	16.17	20.50		
MW1	5.16			5.18	5.89	8.83		
MF	US1		6.11	6.24	9.20	17.33		
	US2		6.10	6.28	8.58	12.00		
	DS1		5.84	5.63	12.50	13.67		
	DS2		5.85	5.72	17.47	25.67		
	DS3		5.52	5.48	19.61	25.83		
	DS4		5.51	5.52	10.95	13.67		
MF	DS5	5.41	5.52	10.28	14.67			
	MW1	5.13	5.14	6.22	9.00			
	US1	5.81	5.68	12.46	15.33			
	US2	5.90	5.84	14.00	16.17			
	2010/10/07	ME	DS1	6.10	6.01	23.38	29.83	
			DS2	6.04	5.97	24.36	27.83	
DS3			5.97	5.90	21.74	26.33		
DS4			5.92	5.84	20.21	27.00		
DS5			6.03	5.92	26.50	38.33		
MW1			5.22	5.20	13.96	17.83		
MF		US1	6.26	6.11	17.43	22.83		
		US2	6.08	5.97	19.91	19.50		
		DS1	5.65	5.58	23.00	28.17		
		DS2	5.89	5.57	29.10*	35.00		
		DS3	5.61	5.57	17.95	19.33		
		DS4	5.57	5.59	17.63	22.17		
MF	DS5	5.60	5.60	13.16	13.67			
	MW1	4.89	4.91	27.62	32.17			
	US1	5.71	5.57	21.27	24.67			
	US2	5.65	5.56	31.65	30.83			
	2010/10/09	ME	DS1	5.66	5.49	37.35*	64.00*	
			DS2	5.48	5.46	51.39*	47.67*	
DS3			5.38	5.41	20.20	31.33		
DS4			5.42	5.47	14.48	20.67		
DS5			5.63	5.55	13.27	18.83		

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average TSS Level (mg/L)	
			Bottom	Surface and Mid Depth			
2010/10/11	MF	MW1	4.88	5.02	16.63	20.00	
		US1	5.62	5.50	15.52	38.00	
		US2	5.55	5.51	36.52	45.00	
		DS1	5.61	5.52	47.46*	62.83*	
		DS2	5.55	5.53	21.80	30.67	
		DS3	5.63	5.55	20.33	28.33	
		DS4	5.54	5.53	26.41	32.50	
		DS5	5.42	5.39	26.38	35.33	
		MW1	5.18	5.16	18.54	28.00	
		US1	5.60	5.53	29.88	41.00	
	ME	US2	5.59	5.53	48.20	67.83	
		DS1	5.85	5.82	10.82	11.50	
		DS2	5.68	5.89	9.76	10.67	
		DS3	5.73	5.92	9.92	13.17	
		DS4	5.85	5.97	7.66	9.83	
		DS5	5.74	6.04	7.61	8.17	
		MW1	5.32	5.37	7.41	8.00	
		US1	5.83	5.83	11.94	13.17	
		US2	5.79	5.81	14.49	15.83	
		MF	DS1	5.74	5.71	28.87*	28.67
DS2	5.73		5.70	16.45	20.67		
DS3	5.72		5.70	16.22	19.17		
DS4	5.56		5.64	18.48	25.00		
DS5	5.44		5.48	16.48	19.50		
MW1	5.37		5.42	15.29	18.17		
US1	5.73		5.67	26.74	35.00		
US2	5.71		5.65	32.67	45.17		
2010/10/13	ME		DS1	5.81	5.76	7.23	11.00
			DS2	5.86	5.82	6.03	6.17
		DS3	5.49	5.70	8.57	7.67	
		DS4	5.71	6.00	5.49	4.83	
		DS5	5.90	5.96	6.21	5.17	
	MF	MW1	5.60	5.76	7.53	8.50	
		US1	5.79	5.78	7.92	9.83	
		US2	5.75	5.63	7.98	11.17	
		DS1	5.78	5.68	27.08	31.50	
		DS2	5.72	5.68	17.02	19.33	
2010/10/15	ME	DS3	5.70	5.92	11.58	11.17	
		DS4	5.54	5.62	12.99	18.17	
		DS5	5.46	5.58	16.43	22.33	
		MW1	5.61	5.72	8.70	8.00	
		US1	5.74	5.73	19.41	26.00	
	MF	US2	5.75	5.88	10.98	10.83	
		DS1	5.33	5.49	7.31	10.00	
		DS2	5.43	5.51	7.06	8.50	
		DS3	5.48	5.59	9.86	13.17	
		DS4	5.42	5.50	5.89	8.17	
2010/10/15	ME	DS5	5.44	5.49	4.88	6.50	
		MW1	5.35	5.80	2.70	3.67	
		US1	5.26	5.53	5.95	7.50	
		US2	5.22	5.51	5.11	8.17	
		DS1	5.69	5.73	4.85	7.67	
	MF	DS2	5.33	5.71	6.49	10.17	
		DS3	5.38	5.58	7.14	9.33	
		DS4	5.41	5.73	6.96	9.50	
		DS5	5.84	5.95	5.44	8.83	

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average TSS Level (mg/L)
			Bottom	Surface and Mid Depth		
2010/10/18	ME	MW1	5.24	5.20	4.53	6.50
		US1	5.64	5.88	4.23	6.83
		US2	5.31	5.78	5.86	8.50
		DS1	5.92	6.05	4.11	5.17
		DS2	5.91	6.05	4.08	5.50
		DS3	5.74	6.02	5.32	8.17
		DS4	5.85	6.17	5.43	10.17
		DS5	5.83	6.26	5.30	9.83
		MW1	5.18	5.20	3.11	6.83
	MF	US1	5.90	6.14	3.62	5.17
		US2	5.90	6.18	3.77	5.33
		DS1	6.20	6.27	9.00	12.83
		DS2	6.36	6.45	6.32	9.00
		DS3	6.32	6.56	5.78	9.50
		DS4	6.04	6.50	5.24	9.00
2010/10/20	ME	DS5	6.03	6.63	6.95	12.00
		MW1	5.38	5.40	7.09	9.00
		US1	6.01	6.32	9.62	13.33
		US2	5.78	5.97	14.93	22.67
		DS1	6.79	6.80	11.69	18.33
		DS2	6.57	6.62	14.20	19.67
		DS3	6.37	6.43	13.77	21.17
		DS4	6.40	6.42	13.12	23.67
		DS5	6.42	6.43	13.22	22.83
	MF	MW1	5.71	5.69	5.54	8.50
		US1	6.71	6.71	11.11	17.50
		US2	6.57	6.50	10.52	17.50
		DS1	6.68	6.65	16.37	20.83
		DS2	6.77	6.71	16.62	28.50
		DS3	6.97	6.93	11.50	16.33
2010/10/25	ME	DS4	6.93	6.90	7.19	12.17
		DS5	6.60	6.60	8.02	12.67
		MW1	5.79	5.76	9.91	16.17
		US1	6.71	6.59	17.97	27.00
		US2	6.37	6.41	14.84	24.67
		DS1	6.61	6.78	8.81	13.17
		DS2	6.57	6.67	9.97	15.67
		DS3	6.50	6.68	10.24	15.17
		DS4	6.51	6.61	9.34	13.33
	MF	DS5	6.49	6.55	10.31	13.00
		MW1	5.96	5.91	11.62	15.83
		US1	6.68	6.71	8.66	10.83
		US2	6.51	6.60	10.14	14.00
		DS1	6.31	6.29	24.61	38.17
		DS2	6.28	6.29	18.41	28.67
	DS3	6.35	6.28	18.70	25.17	
	DS4	6.36	6.29	17.62	24.00	
	DS5	6.25	6.26	19.68	26.50	
	MW1	5.91	5.91	17.68	26.17	
	US1	6.32	6.28	21.93	30.50	
	US2	6.38	6.35	16.53	23.67	

Notes:

1. Cell shaded yellow indicates value exceeding the Action Level criteria.
2. Cell shaded red indicates value exceeding the Limit Level criteria.
3. Asterisk indicates no significant difference between Reference station value (US1 and US2) and Impact station value where exceedance(s) is/are recorded.

4. Cell shaded grey indicates high TSS and Turbidity values recorded at Reference station (ie comparing with the Action and Limit Level criteria).

Annex C

Study Programme

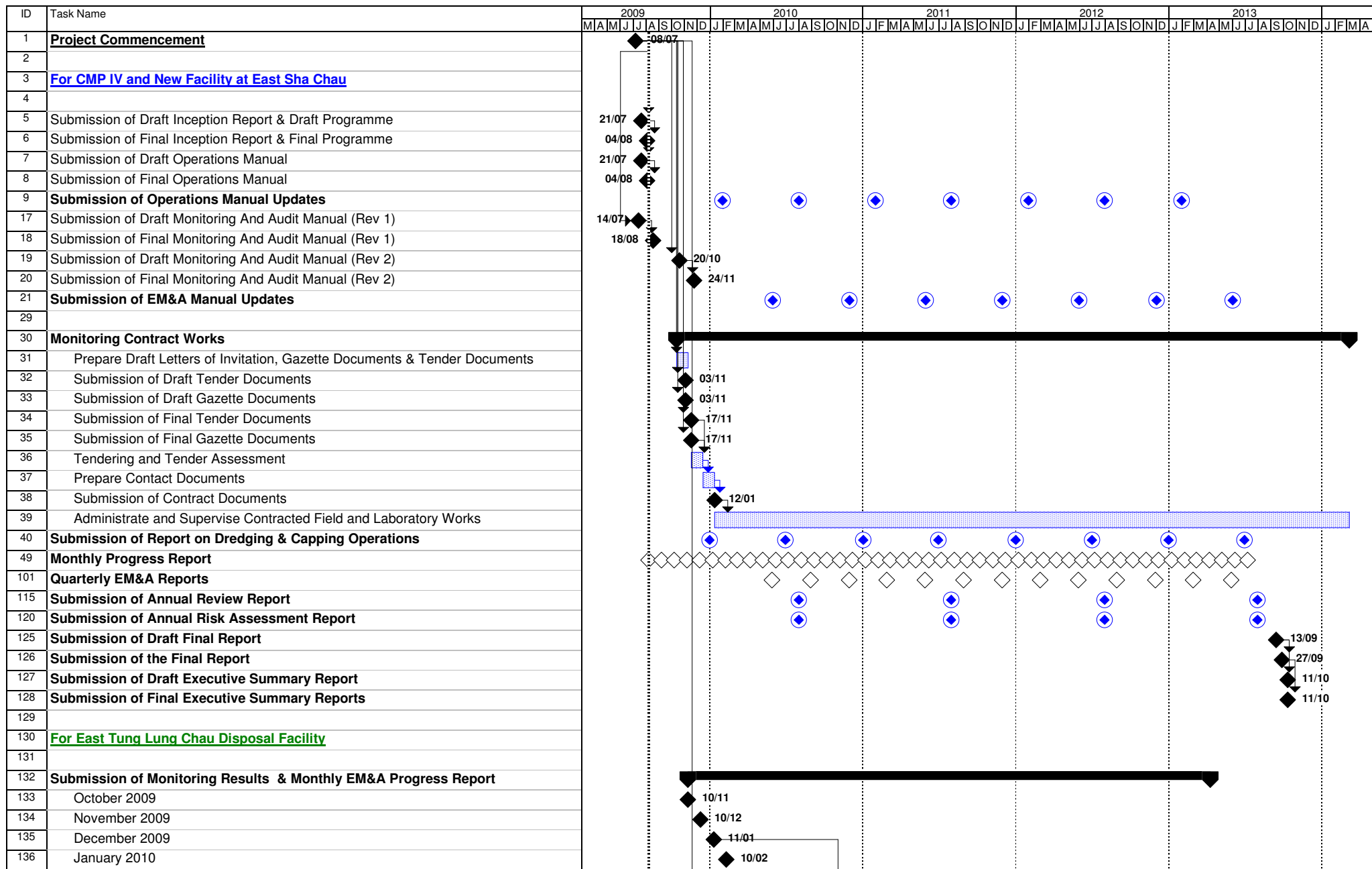


Figure 4.1 - Study Programme



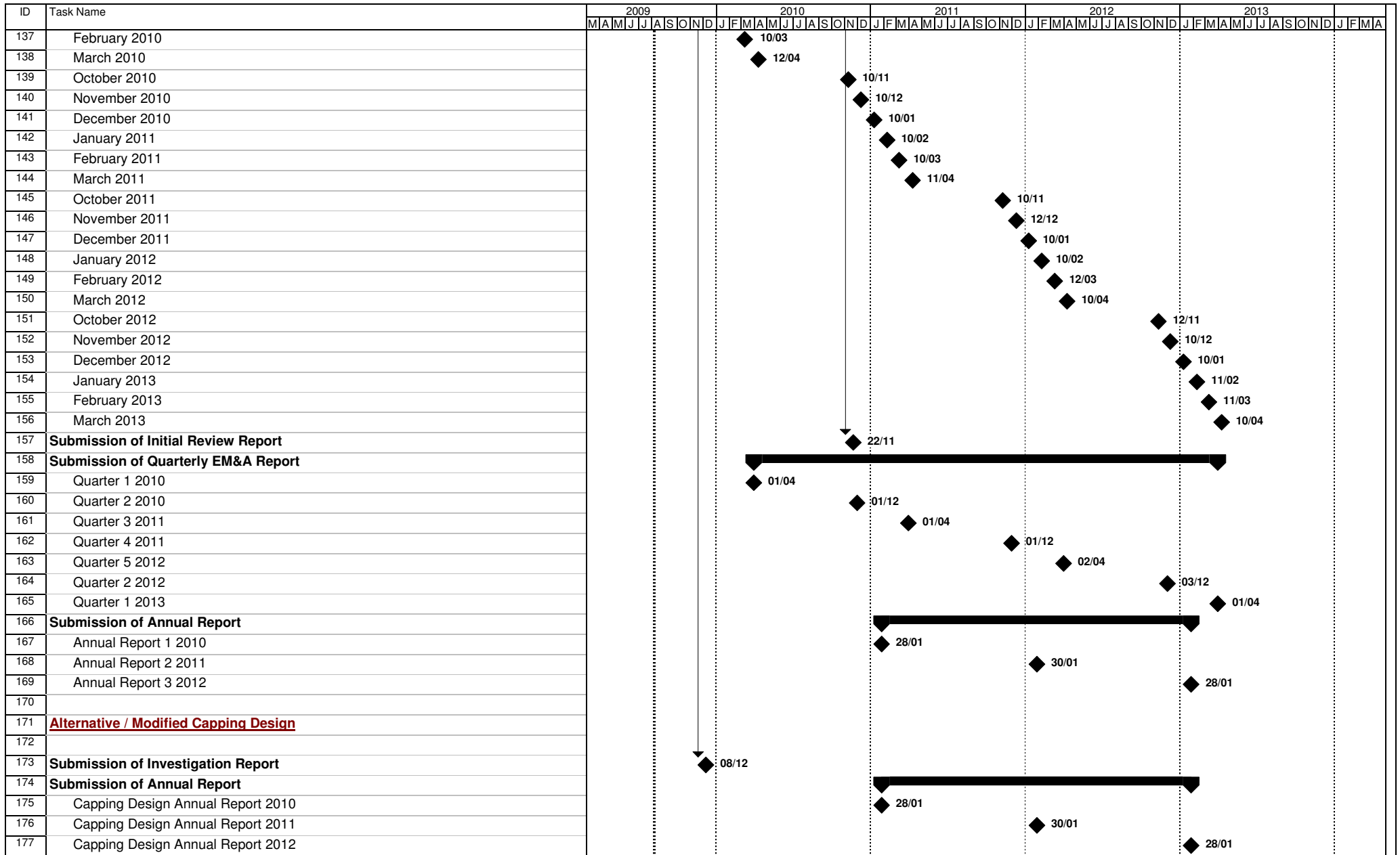


Figure 4.1 - Study Programme

