



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

20th Monthly Progress Report for Contaminated Mud Pits at Sha Chau – February 2011

Revision 0

1 April 2011

Environmental Resources Management

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contaminated mud pits at Sha Chau in February 2011 under Agreement No. CE 4/2009 (EP).	Client:		Proje	ct No):										
1 April 2011 Approved by: Image: Agreement No. CE 4/2009 (EP). Image: Agreement Nother Contract with the client, incorporating our General	Civil En	gineering and Development Department (CEDD)	0103262												
Revision Description By Checked This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client. Distribution We disclaim any responsibility to the client and others in respect of any matters outside the —	This doc contamir	ument presents progress of monitoring works on lated mud pits at Sha Chau in February 2011 under	1 April 2011 Approved by: Release Research Dr Robin Kennish												
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Agreement No. CE 4/2009 (EP) Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) - Investigation

20th MONTHLY PROGRESS REPORT FOR CONTAMINATED MUD PITS AT SHA CHAU - February 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 February 2011.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

The following monitoring activities have been undertaken for CMP IV and CMP V in February 2011:

CMP IV

- Water Column Profiling was conducted on 9 February;
- *Routine Water Quality Monitoring* was conducted on 10 February;
- *Water Quality Monitoring during Capping* was conducted on 11 February; and
- *Demersal Trawling* was conducted on 16-17 February.

CMP V

• *Impact Water Quality Monitoring during Dredging Operations* was conducted on 15 February.

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 February 2011.

1.5 BRIEF DISCUSSION OF THE MONITORING RESULTS

Results of *Impact Water Quality Monitoring during Dredging Operations* for February 2011 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 – February 2011

Impact Water Quality Monitoring during Dredging Operations of CMP V was conducted on 15 February 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

Impact Water Quality Monitoring during Dredging will be undertaken for CMP V in the next monitoring month.

The sampling schedule is presented in *Annex A*.

1.7 STUDY PROGRAMME

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

 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

Annex A1 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP IVc (July 2009 - April 2011)

Pit Specific Sediment Chemistry	Code	Frequency	J	09 A	S	0	Ν	D	J	F	Μ	A	М	20 J	J	Α	S	0	Ν	D	J	201 F	М	A
Active-Pit	NCA 1 - 8	3 times per year		*				*				*				*			\square	*		\neg		*
N: T.J.,	NCB 1 - 8	3 times per year		*				*				*				*			\square	*				×
it-Edge	CPA 1-8	3 times per year		*				*				*				*				*				3
Jear-Pit	CPB 1-8	3 times per year		*				*				*				*			\vdash	*				×
	CNA 1-8 CNB 1-8	3 times per year 3 times per year		*				*				*				*			\square	*		_		X
	CIAPIO	5 times per year	_																					
umulative Impact Sediment Chemistry lear-field Stations			J	Α	S	0	N	D	J	F	Μ	Α	Μ	J	J	Α	S	0	N	D	J	F	Μ	ł
	RNA 1-9 RNB 1-9	2 times per year		*				*								*			\square	*				F
Aid-field Stations		2 times per year																						t
	RMA 1-9 RMB 1-9	2 times per year 2 times per year	-	*				*								*				*		_		┢
apped Pit Stations	RCA 1-9			*				*								*			\square	*		\dashv		F
	RCB 1-9	2 times per year 2 times per year		*				*								*				*				t
ar-Field Stations	RFA 1-9	2 times per year	-	*				*								*				*		_		┢
	RFB 1-9	2 times per year		*				*								*				*				
ediment Toxicity Tests			J	Α	S	0	N	D	J	F	Μ	Α	М	J	J	Α	S	0	Ν	D	J	F	Μ	4
Jear-Field Stations	TCA	2 times per year		3				3								3			\vdash	3				╞
	TCB	2 times per year		3				3								3				3				Ĺ
Reference Stations	TRA	2 times per year		3				3					_			3			\vdash	3		_		┢
	TRB	2 times per year		3				3								3				3		-		F
issue/ Whole Body Sampling			J	Δ	c	0	N	D	Τ	F	Μ	Δ	М	I	T	٨	c	0	N	D	T	F	М	
Jear-Pit Stations				A	S	0	N	0)	r	171	A		- J	J	Α	S	0	14	0		F	IVI	1
	INA INB	2 times per year 2 times per year	\vdash	*	<u> </u>				\vdash	*	\vdash	\neg	\neg	\neg		*	H		H	4	\neg	*		F
eference North																								Ļ
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Reference South	TSA			*						*						*			P	コ		*		F
	TSB	2 times per year 2 times per year		*						*						*						*		t
emersal Trawling	_		J	Α	S	0	N	D	J	F	Μ	Α	Μ	J	J	Α	S	0	Ν	D	J	F	Μ	I
Jear Pit Stations									_					-	-	_								F
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eference North	TNA 1-5		5	5					5	5					5	5			\square		5	5		F
	TNB 1-5	4 times per year 4 times per year	5	5					5	5					5 5	5					5	5		L
eference South	TSA 1-5	4 times per year	5	5					5	5					5	5				_	5	5		╞
	TSB 1-5	4 times per year	5	5					5	5					5	5					5	5		L
Capping			J	Α	S	0	N	D	J	F	Μ	Α	Μ	J	J	Α	S	0	N	D	J	F	Μ	A
bb Tide																								F
npact Station Downcurrent	IPE1	4 times per year	3	3				3		3				3		3				3		3		-
	IPE2 IPE3	4 times per year 4 times per year	3	3				3		3			_	3		3				3		3 3		╞
	IPE4	4 times per year	3	3				3		3				3		3				3		3		Ĺ
ntermediate Station Downcurrent	PFC1	4 times per year	3	3				3		3				3		3				3		3		┢
	INE1	4 times per year	3	3	_			3		3				3		3				3		3		F
	INE2 INE3	4 times per year 4 times per year	3 3	3 3				3		3 3				3 3		3				3		3 3		┢
	INE4 INE5	4 times per year	3	3				3		3 3				3		3				3		3 3		L
eference Station Upcurrent		4 times per year	5	3				3		3				3		3				5		5		
	RFE1 RFE2	4 times per year 4 times per year	3	3				3		3				3		3				3		3		╞
	RFE3	4 times per year	3	3				3		3				3		3				3		3		L
	RFE4 RFE5	4 times per year 4 times per year	3	3				3		3				3		3			\vdash	3		3		┢
lood Tide									ĺ												I			
npact Station Downcurrent	INF1	4 times per year	3	3			L	3	L	3				3		3				3		3		Γ
	PFC2 INF3	4 times per year 4 times per year	3	3	_			3		3	F			3		3			F	3		3	-	F
ntermediate Station Downcurrent																- 3				- 3				t
	IPF1 IPF2	4 times per year 4 times per year	3	3				3		3 3	⊢	_	-	3 3		3			\vdash	3	\square	3		Ļ
-former Challer II	IPF3	4 times per year	3	3				3		3				3		3			\square	3		3		L
eference Station Upcurrent	RFF1	4 times per year	3	3	┢	L	L	3	\vdash	3	⊢∣	_		3	_	3			\square	3	[-]	3		┢
	RFF2 RFF3	4 times per year 4 times per year	3	3	_			3	P	3 3	Р			3	_	3			P	3		3		F
	N10	- unico per year																						<u> </u>
outine Water Quality Monitoring			J	Α	S	0	N	D	J	F	Μ	Α	Μ	J	J	Α	S	0	N	D	J	F	Μ	A
npact Station Downcurrent																				_				t
	IPE1 IPE2	2 times per year 2 times per year		*	_					* *						*			⊢		\square	*		┢
	IPE3 IPE4	2 times per year	_	*					\square	*	P				_	*			P	\neg		*		F
	IPE4 IPE5	2 times per year 2 times per year		*						*						*						*		t
ntermediate Station Downcurrent	INE1	2 times per year	\vdash	*	<u> </u>				\vdash	*	НĪ	_	\neg	-		*	\square		Н	4	\neg	*		F
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in in the station bown current	INE2 INE3 INE4	2 times per year 2 times per year	-	*						*		ļ				*			┝─┤	┪		*		1
	INE3	2 times per year 2 times per year 2 times per year		*						* *						*						*		L
	INE3 INE4	2 times per year								* * *						* *						* * *		
	INE3 INE4 INE5 RFE1 RFE2	2 times per year 2 times per year 2 times per year 2 times per year								* * * *						* * * *						* * * * * * *		
Reference Station Upcurrent	INE3 INE4 INE5 RFE1 RFE2 RFE3 RFE4	2 times per year 2 times per year		*						* * * *						* * * * *						*		
	INE3 INE4 INE5 RFE1 RFE2 RFE3	2 times per year 2 times per year 2 times per year 2 times per year 2 times per year		* * * *						* * * *						* * * * *						* * * *		

	RFE4	2 times per year		*						*						*						*		
	RFE5	2 times per year		*						*						*						*		
Flood Tide																								
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		*						*						*						*		
Water Column Profiling			J	Α	S	0	Ν	D	J	F	Μ	Α	Μ	J	J	Α	S	0	Ν	D	J	F	Μ	Α
Plume Stations	WCP1	6 times per year	2	2				2	2	2				2	2	2				2	2	2		
	WCP2	6 times per year	2	2				2	2	2				2	2	2				2	2	2		
Benthic Recolonisation Studies			J	Α	S	0	Ν	D	J	F	Μ	Α	Μ	J	J	Α	S	0	Ν	D	J	F	Μ	Α
Capped Contaminated Mud Pits																								
	CPA 1-3	2 times per year		3				3								3				3				
	CPB 1-3	2 times per year		3				3								3				3				
	CPC 1-3	2 times per year		3				3								3				3				
	CI C I-5	2 unico per yeur																						_
Reference Stations	cre 15	2 unico per yeu																						
Reference Stations	RBA 1-3	2 times per year		3				3								3				3				
Reference Stations		1 2		3 3				3 3								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 (July 2009 - April 2011)

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Baseline Water Quality Monitoring			J	Α	S	0	Ν	D	J	F N	A A	Μ	IJ	J	Α	S	1 0	I D	J	F	Μ	Ā
Near Field	ESC-WNAA		*	*					-													-
	ESC-WNAB		*	*																		_
	ESC-WNAC		*	*																		
	ESC-WNAD	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of	*	*																		
	ESC-WNBA	each day) in the month prior to commencement of marine works	*	*																		
	ESC-WNBB		*	*																		
	ESC-WNBC		*	*																		
	ESC-WNBD		*	*																\square		
Mid Field	ESC-WMB	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of	*	*				_				_	_				_		-	\vdash	\rightarrow	-
	ESC-WMA	each day) in the month prior to commencement of marine works	*	*									_								-+	
Far Field	ESC-WFA		*	*																		
	ESC-WFB	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	*	*																		
	MW1	each day) in the month prior to commencement of marine works	*	*																		
Reference Stations	NM1		*	*																		
	NM2		*	*																		
	NM3	To be surveyed 24 times (3 days per week during mid-flood and mid-ebb tide of	*	*																		_
	NM5	each day) in the month prior to commencement of marine works	*	*																		
	NM6		*	*																		
																				Ш		
Water Column Profiling			Ιī	A	S	0	Ν	D	T	FN	/ A	M	T I	I	Α	S	0	I D	I	F	M	~
Plume Stations	Upstream		,		2				~	2			- ,	,		-			,			_
	Downstream				2			2		2												-
			1.					-	•							6	0 1	. 5	1.			_
Water Quality Impact Monitoring for Dredging			J	A	S	_	N	D	J	_	_	M	IJ	J	A	S	1 0	I D	j	F	M /	1
Downcurrent Impact Stations	1			_	*		- -	-	*		+ * + *	*	*		*	*	*	*	*			*
	2			_	*	_	*	*			+ * + *	1		*	я -	- -	*	1				*
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	4 5			-	*		*	*	*	*	• •	*	*	*	*	*	*	×	*	*		*
	3		-	+																F -		F
Upcurrent Stations	1		\vdash	\vdash	*	*	*	*	*	*	+ *	*	*	*	*	*	*	*	*	*	*	*
1	2				*	*	*	*	*	*	+ *	*	*	*	*	*	*	*	*	*	*	*
																						Ē
	MW1				*	*	*	*	*	*	+ *	*	*	*	*	*	*	*	*	*	*	ŧ

Sampling completed Sampling to be completed Annex B

Monitoring Results

Sampling Date	Tidal Period	Station	-	e DO Levels mg/L)	Average Turbidity	Average TSS Level
			Bottom	Surface and Mid Depth	Level (NTU)	(mg/L)
2011/02/15	ME	DS1	8.25	8.12	5.11	6.50
		DS2	8.34	8.14	3.89	3.83
		DS3	8.31	8.14	4.15	4.33
		DS4	8.20	8.12	7.56	8.33
		DS5	8.51	8.12	4.05	3.83
		MW1	8.12	8.14	4.07	4.00
		US1	8.23	8.20	4.66	5.67
		US2	8.31	8.28	4.82	4.83
	MF	DS1	8.18	8.14	6.43	7.83
		DS2	8.42	8.37	4.22	3.50
		DS3	8.62	8.47	7.72	10.00
		DS4	8.50	8.40	8.16	10.00
		DS5	8.49	8.41	11.12	14.33
		MW1	8.07	8.08	3.00	5.83
		US1	8.27	8.08	6.15	7.33
		US2	8.33	8.11	4.81	4.83

Table B1Summary Table of DO, Turbidity and TSS Levels recorded in February 2011

Annex C

Study Programme



