



Environmental Monitoring and Audit for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau (2012-2017) – Investigation *Agreement No. CE 23/2012(EP)*

35th Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – July 2015

Revision 0

14 August 2015

Environmental Resources Management 16/F Berkshire House 25 Westlands Road Quarry Bay, Hong Kong Telephone (852) 2271 3000 Facsimile (852) 2723 5660 www.erm.com



Environmental Monitoring and Audit for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau (2012-2017) – Investigation

35th Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – July 2015

Revision 0

Document Code: 0175086 Monthly Jul 2015_v0.doc

Environmental Resources Management

16/F
Berkshire House
25 Westlands Road
Quarry Bay
Hong Kong

Telephone: (852) 2271 3000 Facsimile: (852) 2723 5660 E-mail: post.hk@erm.com http://www.erm.com

Civil Engineering and Development Department (CEDD) Summary: Date: 14 August 2015 Approved by: Craig A. Reid Partner O 35 th Monthly Progress Report for ESC CMPs and SB CMPs Revision Description 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 Centract 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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.	Client:		Project No	0:		
This document presents the 35 th monthly progress report for Contaminated Mud Pits at the South of The Brothers and at East Sha Chau. Craig A. Reid Partner V0 35 th Monthly Progress Report for ESC CMPs and SB CMPs Revision Description Cy JT CAR 14/8/15 By Checked Approved Date 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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on Confidential Confidenti	Civil Enç	gineering and Development Department (CEDD)	017508	6		
Revision Description By Checked Approved Date This report has been prepared by Environmental Resources Management the trading name of IERM 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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on	This docu	ument presents the 35 th monthly progress report for nated Mud Pits at the South of The Brothers and at East	14 Augu Approved Craig A.	by:		
Revision Description By Checked Approved Date This report has been prepared by Environmental Resources Management the trading name of IERM 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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on						
Revision Description By Checked Approved Date This report has been prepared by Environmental Resources Management the trading name of IERM 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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on						
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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on	v0	35 th Monthly Progress Report for ESC CMPs and SB CMPs	CY	JT	CAR	14/8/15
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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on	Revision	Description	Ву	Checked	Approved	Date
	'ERM Hong- Contract with taking accounties. We disclaim scope of the This report is third parties	Kong, Limited', with all reasonable skill, care and diligence within the terms of the high the client, incorporating our General Terms and Conditions of Business and int of the resources devoted to it by agreement with the client. any responsibility to the client and others in respect of any matters outside the above. s confidential to the client and we accept no responsibility of whatsoever nature to to whom this report, or any part thereof, is made known. Any such party relies on	☐ Inte	ernal	Certificate 1	No. OHS 515956







Dredging, Management and Capping of Contaminated Sediment Disposal Facility to the South of The Brothers

Environmental Certification Sheet EP-427/2011/A

Reference Document/Plan

Document/Plan to be Certified/ Verified:

35th Monthly Progress Report for Contaminated Mud Pits to

the South of The Brothers and at East Sha Chau - July 2015

Date of Report:

14 August 2015

Date prepared by ET:

14 August 2015

Date received by IA:

14 August 2015

Reference EP Condition

Environmental Permit Condition:

Condition No.: 4.4

4 hard copies and 1 electronic copy of monthly EM&A Report shall be submitted to the Director within 2 weeks 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 certified by the ET Leader and 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/ $\frac{1}{plan}$ complies with the above referenced condition of EP-427/2011/A

Craig A. Reid,

Environmental Team Leader:

Date:

14/8/2015

IA Verification

I hereby verify that the above referenced document/plan complies with the above referenced condition of

EP-427/2011/A

Dr Wang Wen Xiong, Independent Auditor: Date:

14/8/2015

CONTENTS

1.1	BACKGROUND	1
1.2	REPORTING PERIOD	2
1.3	DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES	2
1.4	DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS	3
1.5	BRIEF DISCUSSION OF THE MONITORING RESULTS FOR SB CMPS	3
1.6	STUDY PROGRAMME	9
	ANNEXES	

ANNEX A	SAMPLING SCHEDULE
ANNEX B	GRAPHICAL PRESENTATIONS
ANNEX C	WATER QUALITY MONITORING RESULTS
ANNEY D	STUDY PROCRAMME

Agreement No. CE 23/2012 (EP) Environmental Monitoring and Audit

for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau (2012-2017) - Investigation

35TH MONTHLY PROGRESS REPORT FOR JULY 2015

1.1 BACKGROUND

- 1.1.1 Since early 1990s, contaminated sediment (1) arising from various construction works (e.g. dredging and reclamation projects) in Hong Kong has been disposed of at a series of seabed pits at East of Sha Chau (ESC). In late 2008, a review indicated that the existing and planned facilities at ESC would not be able to meet the disposal demand after 2012. In order to meet this demand, the Hong Kong Special Administrative Region Government (HKSARG) decided to implement a new contained aquatic disposal (CAD) (2) facility at the South of The Brothers (SB CMPs) which had been under consideration for a number of years.
- 1.1.2 The environmental acceptability of the construction and operation of the Project had been confirmed by findings of the associated Environmental Impact Assessment (EIA) study completed in 2005 under *Agreement No. CE 12/2002(EP)* ⁽³⁾. The Director of Environmental Protection (DEP) approved this EIA report under the *Environmental Impact Assessment Ordinance* (*Cap. 499*) (*EIAO*) in September 2005 (*EIA Register No.: AEIAR-089/2005*).
- 1.1.3 In accordance with the EIA recommendation, prior to commencement of construction works for the SB CMPs, the Civil Engineering and Development Department (CEDD) undertook a detailed review and update of the EIA findings for the SB site (4). Findings of the EIA review undertaken in 2009/2010 confirmed that the construction and operation of the SB site had been predicted to be environmentally acceptable.

According to the Management Framework of Dredged/ Excavated Sediment of ETWB TC(W) No. 34/2002, contaminated sediment in general shall mean those sediment requiring Type 2 - Confined Marine Disposal as determined according to this TC(W).

⁽²⁾ CAD options may involve use of excavated borrow pits, or may involve purpose-built excavated pits. CAD sites are those which involve filling a seabed pit with contaminated mud and capping it with uncontaminated material such that the original seabed level is restored and the contaminated material is isolated from the surrounding marine environment.7

⁽³⁾ Detailed Site Selection Study for a Proposed Contaminated Mud Disposal Facility within the Airport East/ East of Sha Chau Area (Agreement No. CE 12/2002(EP))

⁽⁴⁾ Under the CEDD study Contaminated Sediment Disposal Facility to the South of The Brothers (Agreement No. FM 2/2009)

- 1.1.4 Environmental Permits (EPs) (EP-312/2008/A and EP-427/2011A) were issued by the Environmental Protection Department (EPD) to the CEDD, the Permit Holder, on 28 November 2008 for ESC CMP V and on 23 December 2011 for SB CMPs, respectively. Under the requirements of the EPs, an Environmental Monitoring and Audit (EM&A) programme as set out in the EM&A Manuals (1) (2) is required to be implemented for the CMPs.
- 1.1.5 The present EM&A programme under *Agreement No. CE 23/2012 (EP)* covers the dredging, disposal and capping operations of the SB CMPs as well as ESC CMPs. Detailed works schedule for both CMPs is shown in *Figure 1.1*. In July 2015, the following works were being undertaken at the CMPs:
 - Capping operations at ESC CMPs;
 - Capping operations at SB CMP 1; and
 - Disposal of contaminated mud at SB CMP 2.

Figure 1.1 Works Schedule for ESC CMPs and SB CMPs

Pit	Operation	_	20	12								20	13						Ī						20	114											2	01	5								_			20	16						20)17	Ī
FIL	Operation	s	0	N	D	J	F	·	1	A I	VI	J	J	Α	s	C)	1)	J	F	M	Α	М	J	J	Α	S	0	N	D	J	F	M	Α	N	IJ	J	J	A 5	3 (וכ	N	D	J	F	M	Α	M	J	J	Α	s	0	N	D	J	F	1
	Dredging																																																										J
ESC CMP	Backfilling																																																										
	Capping															Г	Τ		I																	Т		Г	T	T																			1
	Dredging																																																										J
SB CMP 1	Backfilling																																																										J
	Capping																																																										J
	Dredging										Ī]
SB CMP 2	Backfilling																																																										J
	Capping																											Г											I	T				1]

1.2 REPORTING PERIOD

1.2.1 This 35th Monthly Progress Report covers the EM&A activities for the reporting month of July 2015.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

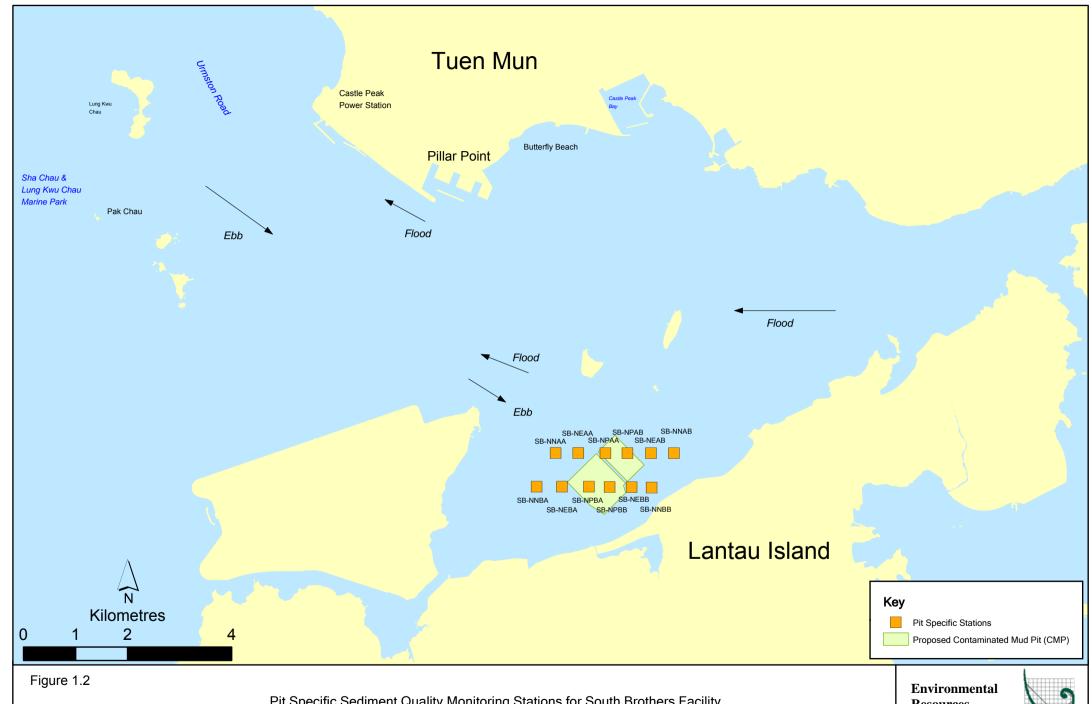
1.3.1 No monitoring activity has been undertaken for ESC CMPs in July 2015.

⁽¹⁾ ERM (2012) Environmental Monitoring and Audit (EM&A) Manual. Final First Review. Environmental Monitoring and Audit for Contaminated Mud Pits to the South of the Brothers and at East Sha Chau (2012-2017) – Investigation. Agreement No. CE 23/2012(EP). Submitted to EPD in November 2012.

⁽²⁾ ERM (2010) Environmental Monitoring and Audit (EM&A) Manual. Final Second Review. Environmental Monitoring and Audit for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation. Agreement No. CE 4/2009(EP). Submitted to EPD in November 2010.

- 1.3.2 The following monitoring activities have been undertaken for SB CMPs in July 2015:
 - Routine Water Quality Monitoring of CMP 2 was undertaken on 6 July 2015;
 - Water Column Profiling of CMP 2 was undertaken on 7 July 2015;
 - *Pit Specific Sediment Chemistry* of CMP 2 was undertaken on 8 July 2015; and
 - *Demersal Trawling* was undertaken on 27 and 28 July 2015.
- 1.4 DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS
- 1.4.1 No outstanding sampling remained for July 2015.
- 1.4.2 A summary of field activities conducted are presented in *Annex A*.
- 1.5 Brief Discussion of the Monitoring Results for SB CMPs
- 1.5.1 Brief discussion of the monitoring results of the following activities for SB CMPs is presented in this 35th Monthly Progress Report:
 - Pit Specific Sediment Chemistry of CMP 2 in June and July 2015;
 - *Cumulative Specific Sediment Chemistry* of CMP 2 in June 2015;
 - *Routine Water Quality Monitoring* of CMP 2 in July 2015;
 - Water Column Profiling of CMP 2 in July 2015; and
 - Sediment Chemistry after a Major Storm of CMP 2 in 15 July 2015.

- 1.5.2 Pit Specific Sediment Chemistry of CMP 2 June and July 2015
- 1.5.3 Monitoring locations for *Pit Specific Sediment Chemistry for CMP 2* are shown in *Figure 1.2.* A total of six (6) monitoring stations were sampled in June and July 2015.
- 1.5.4 Copper exceeded the Lower Chemical Exceedance Level (LCEL) at Active Pit station SB-NPBB in June 2015 and the Upper Chemical Exceedance Level (UCEL) at Active Pit station SB-NPBA in June and July 2015. In addition, Silver exceeded the LCEL at Active Pit stations SB-NPBA and SB-NPBB in June 2015 and the UCEL at Active Pit station SB-NPBA in July 2015. Exceedances of LCEL were also recorded for Mercury at Active Pit station SB-NPBB and Zinc at Active Pit station SB-NPBA. The concentrations of other inorganic contaminants (Cadmium, Chromium, Lead, Nickel and Arsenic in June and July 2015 & Mercury and Zinc in June 2015) were lower than the LCEL at all stations. As higher Copper, Silver, Mercury and Zinc concentrations were recorded within the Active Pit stations only which were receiving contaminated mud during the reporting month, there is no evidence indicating any dispersal of contaminants from the active pit.
- 1.5.5 For organic contaminants, the concentrations of Total Organic Carbon (TOC) were similar at all stations in June and July 2015. Tributyltin (TBT) concentrations were observed to be higher at Active Pit station SB-NPBA in June and July 2015 (*Figure 4* and 9 of *Annex B*). Low and High Molecular Weight Polycyclic Aromatic Hydrocarbons (PAHs), Total Polychlorinated Biphenyls (PCBs), 4,4'-dichlorodiphenyldichloroethylene (DDE) and Total dichlorodiphenyltrichloroethane (DDT) concentrations were below the limit of reporting at most stations in June and July 2015 (except High MW PAHs at Active Pit station SB-NPBA in June 2015 and at Active Pit stations SB-NPBA and SB-NPBB in July 2015) (*Figure 5* and 10 of *Annex B*).
- 1.5.6 Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP 2 in June and July 2015. Statistical analysis will be undertaken and presented in the quarterly report to investigate whether there are any unacceptable impacts in the area caused by the contaminated mud disposal.
- 1.5.7 Cumulative Impact Sediment Chemistry of SB CMPs June 2015
- 1.5.8 Monitoring locations for *Cumulative Impact Sediment Chemistry for SB CMPs* are shown in *Figure 1.3*. A total of eleven (11) monitoring stations were sampled in June 2015.
- 1.5.9 Analyses of results for the *Cumulative Impact Sediment Chemistry Monitoring* indicated that the concentrations of all inorganic contaminants were below the Lower Chemical Exceedance Level (LCEL) in June 2015 (*Figures 11* and 12 of *Annex B*).



Pit Specific Sediment Quality Monitoring Stations for South Brothers Facility

Resources Management



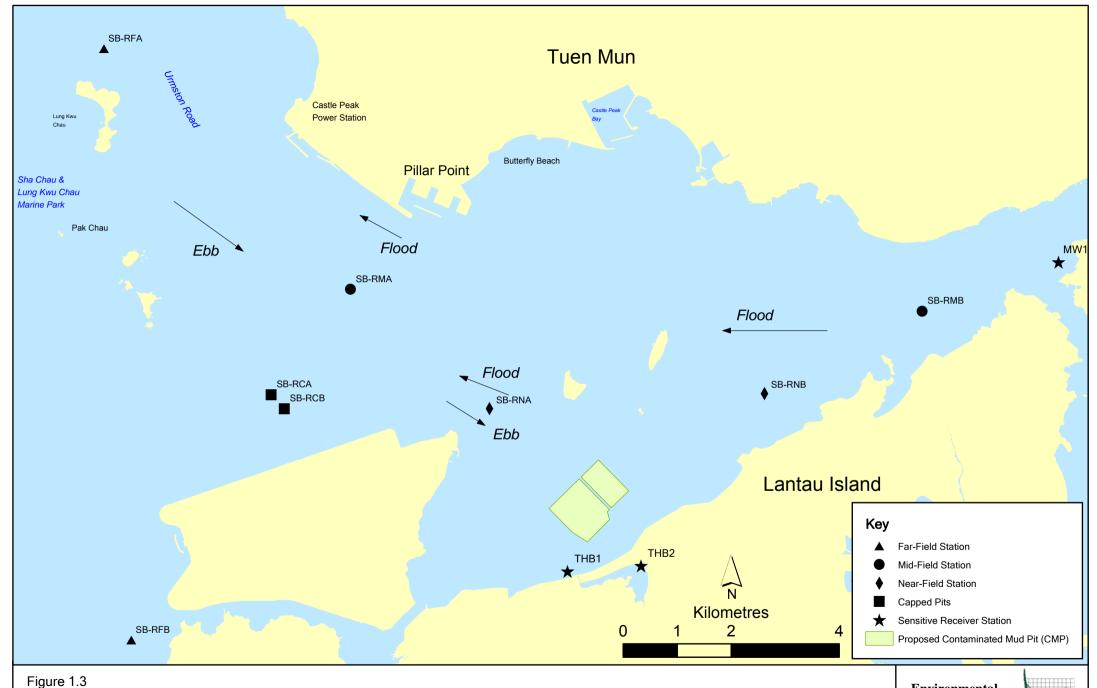


Figure 1.3

Cumulative Impacts Sediment Quality Monitoring Stations for South Brothers Facility

Environmental Resources Management



File: T:\GIS\CONTRACT\0175086\Mxd\0175086_4.2_SQMS_cum impact.mxd Date: 11/12/2012

- 1.5.10 For organic contaminants, concentration of TOC at Tai Ho Bay Station 2 (THB2) was recorded to be higher than other stations (*Figure 13* of *Annex B*). Concentrations of TBTs were recorded to be higher at Near-field station SB-RNB, Mid-field SB-RMB and Ma Wan station (*Figure 14* of *Annex B*). Total DDT, 4,4'-DDE, Total PCBs as well as Low and High Molecular Weight PAHs were recorded below the limit of reporting at most stations, except High Molecular Weight PAHs at Capped Pit station SB-RCA and Tai Ho Bay Station 1 (THB1) (*Figure 15* of *Annex B*).
- 1.5.11 Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP 2 in June 2015. Statistical analysis will be undertaken and presented in the quarterly report to investigate whether there are any unacceptable impacts in the area caused by the contaminated mud disposal.
- 1.5.12 Routine Water Quality Monitoring of SB CMP 2 July 2015
- 1.5.13 The monitoring results for the Routine Water Quality Monitoring conducted in July 2015 in the wet season have been assessed for compliance with the Water Quality Objectives (WQOs) set by EPD. This consists of a review of the EPD routine water quality monitoring data for the wet season period (April to October) of 2004 2013 from stations in the Northwestern Water Control Zone, where the CMPs are located (1). For Salinity, the averaged value obtained from the Reference stations was used for the basis as the WQO. Levels of Dissolved Oxygen (DO) and Turbidity were also assessed for compliance with the Action and Limit Levels (see *Table C1* of *Annex C* for details). The monitoring results are shown in *Figures 16-26* of *Annex B* and Tables C2 and C3 of Annex C. A total of twenty (20) monitoring stations were sampled in July 2015 as shown in *Figure 1.4*.

In-situ Measurements

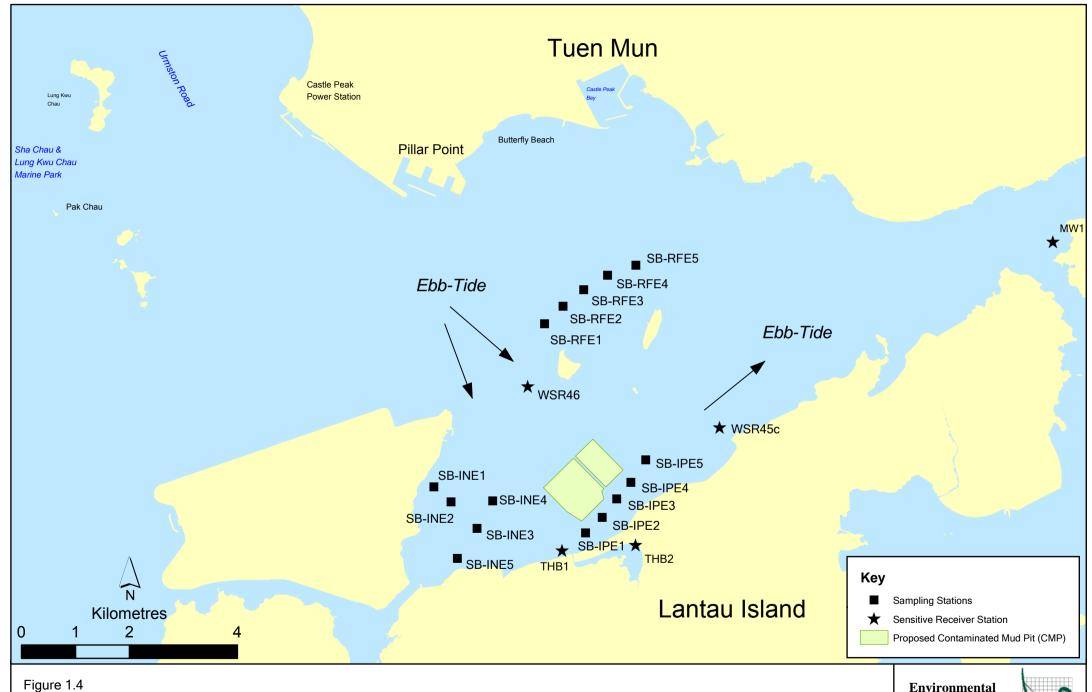


Figure 1.4
Routine Water Quality Sampling Stations (Ebb-Tide) for South Brothers Facility



- 1.5.14 Graphical presentation of the monitoring results (Temperature, DO, pH, Salinity and Turbidity) is shown in *Figures 16-21* of *Annex B*. Analyses of results for July 2015 indicated that the levels of pH complied with the WQOs at all stations (Impact, Intermediate, Reference and Water Sensitive Receiver stations) in July 2015 (*Figure 16 of Annex B*). Levels of DO complied with the WQO at most stations except at Reference and Tai Mo To stations (*Figures 17* and *18 of Annex B*). As Tai Mo To station is located further from the CMP 2 and a low DO level was also recorded at Reference station, it is considered that the WQO exceedance of DO at these stations were possibly caused by the natural background variation in water quality of the area, instead of the disposal operation at CMP 2.
- 1.5.15 The levels of Salinity at Impact, Intermediate and Water Sensitive Receiver stations exceeded the WQO in July 2015 (*Figure 20* of *Annex B*). The lower Salinities recorded at these stations, which lead to exceedance of the WQO, is likely to be caused by the freshwater discharged from the Pearl River Delta during the summer months which tend to form a surface layer of low salinity water at these stations with shallower depth when compared with the Reference stations.
- 1.5.16 The levels of DO and Turbidity complied with the Action and Limit Levels at all stations (*Figures 18* and 21 of *Annex B*; *Table C1* of *Annex C*).
- 1.5.17 Overall, *in-situ* measurement results of the *Routine Water Quality Monitoring* indicated that the disposal operation at CMP 2 did not appear to cause any unacceptable impacts in water quality in July 2015.

Laboratory Measurements

- 1.5.18 Laboratory analysis of July 2015 results indicated that concentrations of Cadmium, Chromium and Silver were below their limit of reporting at all stations. Arsenic, Copper, Lead, Mercury, Nickel and Zinc were detected in July 2015 samples and the concentrations were similar amongst stations (*Figures* 22-23 of *Annex B*). Results of laboratory analysis were shown in *Table C3* of *Annex C*.
- 1.5.19 For nutrients, concentrations of Total Inorganic Nitrogen (TIN) at all stations in July 2015 exceeded the WQO (0.5mg/L) (*Figures 24 of Annex B*). It is important to note that due to the effect of the Pearl River discharges, the North Western WCZ has historically experienced higher levels of TIN (1). Therefore, the exceedances of TIN WQO at all stations in July 2015 were unlikely to be caused by the disposal operation at CMP 2. Ammonia Nitrogen (NH3-N) concentration was relatively similar amongst all stations (*Figures 24 of Annex B*). Levels of 5-day Biochemical Oxygen Demand (BOD₅) appear to be higher at Tai Ho Bay 1 station in July 2015 (*Figures 25 of Annex B*).

⁽¹⁾ http://www.epd.gov.hk/epd/misc/marine_quality/1986-2005/textonly/eng/index.htm

- 1.5.20 Concentrations of SS exceeded the WQO (11.6 mg/L for wet season) at Impact, Intermediate and Reference stations in July 2015. Since exceedance and higher level of SS was also recorded at Reference station, exceedances at Impact and Intermediate stations were considered to be due to natural background fluctuation in this area of Hong Kong. Concentrations of SS complied with the Action and Limit Levels at all stations in July 2015 (*Figure* 26 of *Annex B*; *Table C3* of *Annex C*).
- 1.5.21 Overall, results of the *Routine Water Quality Monitoring* indicated that the disposal operation at CMP 2 did not appear to cause any unacceptable deterioration in water quality in July 2015. Detailed statistical analysis will be presented in the Quarterly Report to investigate any spatial and temporal trends of potential concern.
- 1.5.22 Water Column Profiling of CMP 2 July 2015
- 1.5.23 Water Column Profiling was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 7 July 2015. The water quality monitoring results have been assessed for compliance with the WQOs as discussed in Section 1.5.13. The monitoring results were also compared with the Action and Limit Levels set in Baseline Monitoring Report (see Table C2 of Annex C for details).

In-situ Measurements

1.5.24 Analyses of results for July 2015 indicated that levels of pH complied with the WQOs at both Downstream and Upstream stations (*Table C4* of *Annex C*). Salinity and DO at Downstream station did not comply with the WQO. The non-compliance of Salinity was possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower salinity recorded at the shallower Upstream station compared to the higher salinity recorded at the deeper Downstream station. DO and Turbidity at all stations complied with the Action and Limit Levels and the exceedance of DO WQO at the Downstream station thus did not appear to indicate any unacceptable water quality impact from the mud disposal operation (*Tables C1* and *C4* of *Annex C*).

Laboratory Measurements for SS

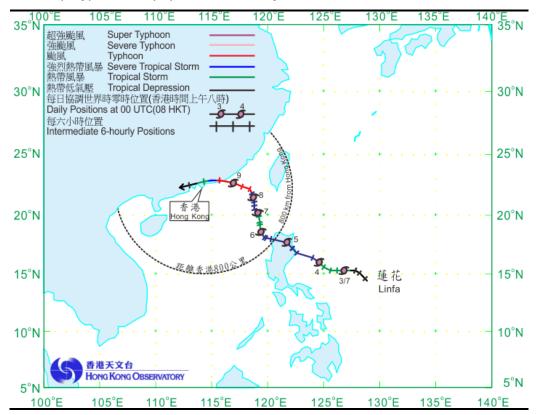
1.5.25 Analyses of results for June 2015 indicated that the SS levels at both Upstream and Downstream stations complied with the WQO. Both Upstream and Downstream stations also complied with the Action and Limit Levels (*Tables C2 and C3* of *Annex C*).

Overall, the monitoring results indicated that the mud disposal operation at CMP 2 did not appear to cause any deterioration in water quality during this reporting period.

1.5.26 Sediment Chemistry after a Major Storm of CMP 2 – July 2015

1.5.27 Sampling for Sediment Chemistry after a Major Storm Event was conducted at eleven (11) monitoring stations (*Figure 1.2*) on 15 July 2015 after the visit of Typhoon Linfa, which led to the issue of Gale or Storm Wind Signal No.8 on 9 July 2015. The track of Linfa is shown in *Figure 1.5*.

Figure 1.5 Track of Typhoon Linfa from 2 to 10 July 2015 (Source: Hong Kong Observatory)



- 1.5.28 Analyses of results for the *Sediment Chemistry after a Major Storm* indicated that the concentrations of most inorganic contaminants, except Mercury, were below the LCEL (*Figures* 27 and 28 of *Annex B*). Concentration of Mercury exceeded the LCEL at Capped Pit station SB-RCB, Near Field stations SB-RNA and RNB and Mid field station SB-RMA. As lower Mercury concentrations were recorded at the Capped Pit stations, it is considered that the exceedances of Mercury LCEL at these stations were unlikely to be caused by the failure of the cap in retaining contaminated sediment within the mud pit.
- 1.5.29 Overall, there appeared to be no evidence showing the failure of CMPs in retaining disposed mud or causing contamination of sediments after the major storm event in July 2015.

- 1.5.30 Activities Scheduled for the Next Month
- 1.5.31 The following monitoring activities will be conducted in the next monthly period of August 2015 for SB CMPs:
 - Pit Specific Sediment Chemistry of CMP 2;
 - Cumulative Impact Sediment Chemistry of CMP 2;
 - Water Quality Monitoring During Capping of CMP 1;
 - Water Column Profiling of CMP 2;
 - Routine Water Quality Monitoring of CMP 2; and
 - Demersal Trawling for SB CMPs.
- 1.5.32 The following monitoring activities will be conducted in the next monthly period of August 2015 for ESC CMPs:
 - Water Quality Monitoring During Capping of ESC CMPs; and
 - Benthic Recolonisation Studies of ESC CMPs.
- 1.5.33 The sampling schedule is presented in *Annex A*.
- 1.6 STUDY PROGRAMME
- 1.6.1 A summary of the Study programme is presented in *Annex D*.

Annex A

Sampling Schedule

Annex A1 - Environmental Monitoring and Audit Sampling Schedule for East of Sha Chau (September 2012 - February 2017) 2012 Pit Specific Sediment Chemistry Code Active-Pit ESC-NPDA ESC-NPDB Pit-Edge ESC-NEDA ESC-NEDB Near-Pit ESC-NNDA ESC-NNDB **Cumulative Impact Sediment Chemistry** S O N D 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 M A M J J A S O N D D A S O N D 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 A S O N D J F M A M J J A S O N D Near-Field Stations ESC-TDA ESC-TDB Reference Stations ESC-TRA ESC-TRB Ma Wan Station MW1 Tissue/ Whole Body Sampling S O N D 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 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 S O N D 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 M A M J J A S O N D J F M A M J J A S O N D J F mpact Stations ESC-INA ESC-INB Reference Stations ESC-TNA ESC-TNB ESC-TSA

	LOC TOD																																																			
Water Column Profiling		S	0	N	D	J	F	M	A	M	J	J .	A S	О	N	D [J I	F M	I A	M	J	J	Α	S	О	N	D	J	F	M	Α	M	J	J .	A S	О	N	D	J	F	M	Α	M	J	J	A	S	О	N	D	J	F
Plume Stations	WCP1	*	*	*	*	*	*	*	*	*	*	*	*																										*	*	*	*	*	*	*	*	*	*	*	*	*	*
	WCP2	*	*	*	*	*	*	*	*	*	*	*	*																										*	*	*	*	*	*	*	*	*	*	*	*	*	k

Annex A1 - Environmental Monitoring and Audit Sampling Schedule for East of Sha Chau (September 2012 - February 2017)

Annex A1 - Environmental Monito	oring and Audit S			for Ea	ast of Sha	Chau (Se			ruary 201	7)																								
			012				2013							2014							20								2016					20
Benthic Recolonisation Studies		S O	N D) J	F M	A M	J J	A S	O N	D	J F	M	A M J	J	A S	О	N D	J F	M	A M	J	J A S	О	N D	J F	M	A	M j	J J	A	S	O N	l D) J
Capped Contaminated Mud Pits I																																		
	ESC-CPA		*					*		*					*		*					*		*										
	ESC-CPB		*					*		*					*		*					*		*										
	ESC-CPC		*					*		*					*		*					*		*										
Reference Stations																																		
	ESC-RBA		*					*		*					*		*					*		*										
	ESC-RBB		*					*		*					*		*					*		*										
	ESC-RBC		*					*		*					*		*					*		*						+				
			<u> </u>		<u> </u>	1 1	<u> </u>				l .						l l	<u> </u>									1					<u> </u>		
Impact Monitoring for Dredging		S O	N D) I I	F M	AM	T I	AS	O N	D	I F	M	A M I	T	AS	0	N D	I F	М	A M	Ţ	I A S	0	N D	I F	M	A	М	T	A	S	0 N	1 D) I
Upstream/Reference Stations							, ,			_	,			,							,	, , , ,			,					+				
openeum, nererence suntens	US1	* *	* *	*	* *	* *				1				+					-	+ + +							+ +		-	+				-
	US2	* *				* *				 				-													1			+				
Dayungtugan /Immast Stations	032		+ +		+ + -	1 1			1	1										+ + +		++-								+			-	-
Downstream/Impact Stations	DC1	* *	* *	*	* *	* *		-	 	+				-					-	+ + +							+ +			+-+			_	-
	DS1	* *								-										+ + +							+ +			+				
	DS2						\vdash	+	++	+	-		+					_	-	+			1				+			+			-	
	DS3					* *	\vdash		+	├			-++							+		-	1			_	+		_	+			_	
	DS4	* *					$\sqcup \bot$		\bot	1										1							\perp		_	+				
	DS5	* *	* *	*	* *	* *	$\sqcup \bot$		+	lacksquare			\bot		\bot					+			1	\bot			$\downarrow \downarrow$	_		+				
Ma Wan Station			$oxed{oxed}$				$oxed{oxed}$		$\bot \bot$																		\perp			\bot			\perp	
	MW1	* *	* *	*	* *	* *																	1											
Capping		S O	N D) J	F M	A M	J J	AS	O N	D	J F	M	A M J	J	A S	О	N D	J F	M	A M	J	J A S	О	N D	J F	M	A	M j	J J	A	S	O N	l D) J
Ebb Tide																																		
Impact Station																																		
	ESC-IPE1									*	*		*		*		*	*			*	*		*										
	ESC-IPE2									*	*		*		*		*	*			*	*		*										
	ESC-IPE3									*	*		*		*		*	*			*	*		*										
	ESC-IPE4									*	*		*		*		*	*			*	*		*										
	ESC-IPE5		1							*	*		*		*		*	*	:		*	*		*						+				
Intermediate Station			1		1 1					1 1																	1 1			+				
	ESC-INE1									*	*		*		*		*	*	:		*	*		*						+-+				
	ESC-INE2		+ +		 	1 1			1 1	*	*		*	-	*		*	*	-		*	*		*			+ +			+				-
	ESC-INE3							+ +	1 1	*	*		*		*		*	*	:	+ + +	*	*		*			+ +			+			-	
	ESC-INE4		+	-	+					*	*		*		*		*	*			*	*		*			1			+				
	ESC-INE5		+ +	+	 	+ +			1	*	*		*		*		*	*	:	+ +	*	*		*			+ +			+-+				-
Defense of Chatiers	ESC-INES		-	-		+		+	 					-				-								_	+			+			_	-
Reference Station	ECC DEE1		+	-	 	+ +		+ +	 	*	*		*		*		*	*		+ + +	*	*		*			+ +			+-+			_	-
	ESC-RFE1		+	+	 	+ +	 		+ +	+ - +	*		*			-	*	*		+ + +	*	*	1	*			+		-	+			+	
	ESC-RFE2	\vdash	+	+	+	+	\vdash	+	+-	1					*					+			1			-	++		_	+			_	_
	ESC-RFE3		+	_	$\vdash \vdash$		\vdash		+	*	*		*		*		*	*		+	*	*	1	*		_	+		_	+			_	
	ESC-RFE4		+	4	+	+			+	*	*		*		*		*	*		1	*	*	1	*		_	$\perp \perp$		_	+			_	
	ESC-RFE5			_			$\sqcup \bot$		\bot	*	*		*		*		*	*			*	*		*			\perp		_	+				
Ma Wan Station			$\bot \bot$	_	igspace	$\bot \bot$	$oxed{oxed}$		$\bot \bot$						\bot							\longrightarrow	1				\bot			\bot				
	MW1									*	*		*		*		*	*			*	*		*										
Flood Tide																																		
Impact Station																																		
	ESC-IPF1									*	*		*		*		*	*			*	*		*										
	ESC-IPF2									*	*		*		*		*	*			*	*		*										
	ESC-IPF3									*	*		*		*		*	*			*	*	1	*									İ	
Intermediate Station				1					1 1																					1 1				
	ESC-INF1								1 1	*	*		*		*		*	*			*	*	1	*			1 1		1	1 1				
	ESC-INF2					1 1				*	*		*		*		*	*		1 1 1	*	*		*						+ +				
	ESC-INF3			\top	 	1			1 1	*	*		*		*		*	*	-	1 1 1	*	*	1	*		+	++		-	+++			1	+
Reference Station	100.11410		+ +	+	++	+ +	 	+ +	+ +	++	+	\vdash	+++	+				_	+			++-	1	+ + -		+	++		+	+++			+	+
reference outdoil	ESC-RFF1		1 -	+	 	+ +	 		1 1	*	*	\vdash	*		*		*	*	.	+ + +	*	*		*		+	+		-	+-+			+	
			+	+	+	+ +	 	+ +	+	*	*		*		*	1	*		_		*	*	1	*		+	++		_	+-+			-	+
	ESC-RFF2		+	-	\vdash	+ +	 	++	+	*	*		*		*		*	*	-		*	*	1	*		-	++		-	+			-	
	ESC-RFF3	\vdash	+	+	+	+	\vdash	+	+	+^+	_ ^			-	- -		_ ^	*	-	+	,		1-	^		-	+-+			+				-
Ma Wan Station	MW1		+ +	-	+ + -	+ +	 		+	+ . +	*		*		*		*				*	*		*			+		-	+			_	

Annex A1 - Environmental Monitoring and Audit Sampling Schedule for East of Sha Chau (September 2012 - February 2017)

Solition Minimize Water Cauling Manimize Water Cauling Water	Annex A1 - Environmental N	,10,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	iiiip ii	2012		or Eller	0) 0111		ш (оср	2013	1001	y 20:	11,					2014									201	5								2016				20	017
May 18 Ma	Routine Water Quality Mon	nitoring	S			Ţ	FM	1 A	M		AS	0 N	J D	I F	М	Α	M		A	S) N	D	Ţ	F	M A	M			S	O N	D	Ī	F	M A			AS	O N	D		
May Selfon SC-He				0 1	.,		111		212	, ,	11 0	0 1	, 2	<i>J</i> -	212		112	, ,			, .,			-	.,,	-112	,	,		0 11	-	<u> </u>	-	1/1 11	212)	, ,	11 0	0 11		+	_
BSCHP2 BSCHP3 BS	 					1 1		-																																+	\vdash
Recurse Station Recurse St	impact station	FSC-IPF1		*	*	*	*	*	*	*	*																					*	*	*	*	*	*	* *		*	*
BSC-813 BSC-814 BSC-815 BSC-816 BSC-816 BSC-816 BSC-816 BSC-817 BSC-817 BSC-817 BSC-817 BSC-818 BSC-81				*	*	*	*	*	*	*	*		+ +			-			+ +			1										*	*	*	*	*	*	* *		*	*
Schell S				*	*	*	*	*	*	*	*		+ +			-			+ +			1											*	*	*			* *		*	*
Figure 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				*	*	*	*	*	*	*	*		+								_											*	*	*	*	*	*	* *		*	*
BEC-NPE BEC-NPE BEC-NPE BEC-NPE BEC-NPE BEC-NPE BEC-				*	*	*	*	*	*	*	*		+								_												*	*	*	*	*	* *		*	*
SC-INF S	Intermediate Station	LOC-II LO					+	+					+								_											1								+	-
ESCANSA ESC	Intermediate Station	ESC INIE1		*	*	*	*	*	*	*	*		+								_											*	*	*	*	*	*	* *		*	*
Reference Station Reference Sta				*	*	*	*	*	*	*	*		-																				*	*	*	*		* *		*	*
FSC-NN-4 SC-NN-4 SC-NN			\vdash					*				-	+						+ +		-	1	++								1				*						
Security			\vdash									-	+						+ +		-	1	++								1										
Reference Station			\vdash					*					+		-				-		_	1	┢			-		_			1										
SEC.REFI	Defense of Chatiers	ESC-INES			_	+	_		+"	- -	+"++				-						_		\vdash								-	<u> </u>			<u> </u>		+ " + -	+		+	اـــّــا
SC-ARP2 SC-ARP3 SC-A	Reference Station	ECC DEE1		*	4				4				-		-																		4		*	4		* *		-	
ESCRED ES											-		-		-																		,		-						<u> </u>
SC-RF4 SC-RF5 S													+																												
All				*				*			*																														
May an Station My 1				*	*			*	*	*	*										_												*		*						
MW1		ESC-RFE5		*	*	*	*	*	*	*	*										_											*	*	*	*	*	*	* *		*	*
Flood Tide Impact Station ESC-IPF1	Ma Wan Station						_																									_								<u> </u>	igspace
Figure F		MW1		*	*	*	*	*	*	*	*		\perp																			*	*	*	*	*	*	* *		*	*
ESC.IPF1																																									
FSC-IPF2 FSC-IPF3	Impact Station																																								
ESC-IPF3				*	*		*	*	*	*	*																						*	*	*	*		* *			*
Intermediate Station ESC-INF1				*	*		*	*		*	*																						*	*	*			* *			*
ESC-INF1 ESC-INF2 ESC-INF3		ESC-IPF3		*	*	*	*	*	*	*	*																					*	*	*	*	*	*	* *		*	*
ESC-INF2 ESC-INF3 Reference Station ESC-RF1 ESC-RF2 ESC-RF3 ESC-RF3 ESC-RF3 ESC-RF4 ESC-RF5 ESC-RF5 ESC-RF5 ESC-RF5 ESC-RF5 ESC-RF5 ESC-RF6 ESC-RF7 ESC-	Intermediate Station																																								
ESC-INF3 ESC-INF3 ESC-INF3 ESC-INF3 ESC-RF1 ESC-RF1 ESC-RF5 ESC-RF5 ESC-RF7				*	*		*	*																											*			* *			
Reference Station ESC-RFF1 ESC-RFF2 ESC-RFF3 Ma Wan Station				*	*	*	*	*	*	*	*																						*	*	*	*	*	* *		*	*
ESC-RFF1 ESC-RFF2 ESC-RFF3 Ma Wan Station		ESC-INF3		*	*	*	*	*	*	*	*																					*	*	*	*	*	*	* *		*	*
ESC-RFF2 ESC-RFF3 Ma Wan Station	Reference Station																																								
ESC-RFF3		ESC-RFF1		*	*	*	*	*	*	*	*																					*	*	*	*	*	*	* *		*	*
Ma Wan Station		ESC-RFF2		*	*	*	*	*	*	*	*																					*	*	*	*	*	*	* *		*	*
		ESC-RFF3		*	*	*	*	*	*	*	*																					*	*	*	*	*	*	* *		*	*
MW1	Ma Wan Station																																								
		MW1		*	*	*	*	*	*	*	*																					*	*	*	*	*	*	* *		*	*

Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

				2012	2						2013										2014								201	;									2016					
Baseline Monitoring Prior to Dredging	Code	Frequency	J A	S	O N	D	J	F	M A	M	JJ	A	S	О	N I	D]	J F	M	A I	M J	J	A	S	О	N I	D	J F M	A M	J	J A	S	О	N	D	J F	M	A I	M J	J	A	S	0	N D	D
ar Field Stations				$\overline{}$																																								T
	SB-WFA	3 days per week for 4 weeks	* *																																					1				T
	SB-WFB	3 days per week for 4 weeks	* *													1										1											\top		\top	\top	†	\sqcap	\neg	\top
lid Field Stations		<i>y</i> 1		+-+																						\dashv	 									\dashv	+	+	+	+	+	-	+	十
	SB-WMA	3 days per week for 4 weeks	* *	++													-	+ -									++++				+	+			+++	+	-+	+	+	+	+-	\leftarrow	+	+
			* *	.+	_		+	\vdash				-						+ -				-			_					_		-			-	+	$-\!\!+\!\!$	+	+	+	+-	\vdash	+	+
	SB-WMB	3 days per week for 4 weeks		+													_																			\rightarrow	$-\!\!+\!\!$	_	—	┷	₩	\leftarrow	\dashv	_
ear Field Stations																																									⊥			ᆚ
	SB-WNAA	3 days per week for 4 weeks	* *																																							1		
	SB-WNAB	3 days per week for 4 weeks	* *																																									
	SB-WNBA	3 days per week for 4 weeks	* *																																1 1	\neg		+	+	+	†	ant a	\top	\neg
		3 days per week for 4 weeks	* *	++	-																						++++	-			_				+	-+	-+	+	+	+	+-	\leftarrow	+	+
-f	3D-VVIVDD	3 days per week for 4 weeks	\vdash	+	_			\vdash				-						+ -				-			_					_		-			-	+	$-\!\!+\!\!$	+	+	+	+-	\vdash	+	+
eference Stations	377.64		\vdash	+													_																			\rightarrow	$-\!\!+\!\!$	_	—	—	₩	\leftarrow	\dashv	_
	NM1	3 days per week for 4 weeks	* *																																						Ш.	ш		
	NM2	3 days per week for 4 weeks	* *																																							1		
	NM3	3 days per week for 4 weeks	* *																																									
	NM5	3 days per week for 4 weeks	* *	+++						+						_					-	+										1		_		\dashv	-	+	+	+-	+	-	+	\dashv
	NM6	3 days per week for 4 weeks	* *						_												-						++++	-		_	_	+		-+	_	+	-+	+	+	+-	+-	-+	$-\!\!\!\!\!+$	+
ir. D Cur.	1 41410	5 days per week for 4 weeks	<u> </u>	++		-	\vdash	$\vdash \vdash$		_	\vdash	_	\vdash			-	_	+	$\vdash \vdash$			╂	\vdash		+	-	\rightarrow	+	\vdash		-	+			+	+	+	+	+	+	+-	\vdash	+	+
ensitive Receiver Stations				$\bot\bot$							lacksquare		\sqcup	<u> </u>				1	$\sqcup \!\!\! \perp$		_	<u> </u>	\sqcup				\longrightarrow	_				1			\bot	\rightarrow	_	\bot	+	\bot	\bot	\vdash	—	4
	MW1	3 days per week for 4 weeks	* *	$\perp \perp \perp$							oxdot															⊥						<u> </u>									Щ.	\sqcup		丄
	THB1	3 days per week for 4 weeks	* *]										1 T												T							ا ا		
	THB2	3 days per week for 4 weeks	* *													T										T															Ī	\Box		
	WSR45C	3 days per week for 4 weeks	* *	++						1		1		-			1	\dagger			1	1			-	十	1 1 1			\dashv	1	1		一		o	\top	+	\top	+	t	\dashv	-	\top
	WSR46	3 days per week for 4 weeks	* *	++		+		\vdash	-	+		+		+	\dashv	+	-	+	$\vdash \vdash$	-	_	1	\vdash	\dashv	\dashv	+	+++		\vdash	+	+	+	\vdash	-	+	+	+	+	+	+	+-	\vdash	+	+
	1101140	5 days per week for 4 weeks	تلل			<u> </u>				<u> </u>	ı										<u> </u>	l						l l				1							—	—	Щ			
										_		_																											_		_			
npact Monitoring for Dredging			J A	S	O N	D	J	F	M A	M	JJ	Α	S	О	N I	D]	J F	M	A 1	M J	J	A	S	О	N I	D .	J F M	A M	J	J A	S	О	N	D	J F	M	A N	M J	J	A	S	0	N D	D
pstream Stations																																									<u> </u>	ш.		
	US1	3 days per week			*	*	*	*	* *	*	* *	*	*	*	*	* *	* *	*	*	* *	*	*	*	*	*																	1		
	US2	3 days per week			*	*	*	*	* *	*	* *	*	*	*	*	* 1	* *	*	*	* *	* *	*	*	*	*	T															Ī			T
ownstream Stations		, I		+																																		_	\top	\top	1		\neg	T
	DS1	3 days per week		+	*	*	*	*	* *	*	* *	*	*	*	*	* *	* *	*	*	* *	* *	*	*	*	*							1					-	\top	+	+-	1	ct	-	\dashv
	DS2	3 days per week	\vdash	++	*	*	*		* *	*	* *	*	*	*	*	* *	* *	*	*		* *		*	*	*		++++	-			_				+	-+	-+	+	+	+	+-	\leftarrow	+	+
			\vdash	+++	*				* *	*				*	*		* *	*	*		k *						+	_				+				-+	$-\!\!\!+\!\!\!\!+$	-	+	+	+	\vdash	$-\!\!\!\!+\!\!\!\!-$	+
	DS3	3 days per week	\vdash	+							^ ^					_									*	_	\rightarrow	_				-		_	_	\rightarrow		+	+	+	+	\vdash	$-\!\!\!\!+\!\!\!\!\!-$	+
	DS4	3 days per week			*	*	*		* *		* *	*	*		*		* *		*		* *		*	*	*											_			4		↓	\vdash		_
	DS5	3 days per week			*	*	*	*	* *	*	* *	*	*	*	*	* *	* *	*	*	* *	* *	*	*	*	*																⊥			
ensitive Receiver Stations																																												
	MW1	3 days per week			*	*	*	*	* *	*	* *	*	*	*	*	* *	* *	*	*	* *	*	*	*	*	*																	1		
	THB1	3 days per week			*	*	*	*	* *	*	* *	*	*	*	*	* *	* *	*	*	* *	* *	*	*	*	*															\top				
	THB2	3 days per week		+	*	*	*	*	* *	*	* *	*	*	*	*	* 1	* *	*	*	* *	* *	*	*	*	*							1		_		\dashv	-	+	+	+-	+	-	+	+
	WSR45C	3 days per week	\vdash	+	*	*	*	*	* *	*	* *	*	*	*	*	* *	* *	*	*	* *	* *	*	*	*	*	-		-	-	-	+	+		-+	+++	+	$-\!\!\!+$	+	+	+-	+-	\leftarrow	+	+
	WSR46			+	*	*	*	*	* *	*	* *	*	*	*	*	* *	* *	*	*	* *	k *	*	*	*	*	+	+++			_	-	+				+	+	+	+	+	+-	\leftarrow	+	+
	W3N40	3 days per week																																				_	—	—	—			
t Specific Sediment Chemistry			T A	S	O N	D	т	F	MIA	M	тТ	Α	c	0	NI I	ם מ	тЕ	M	A 1	MI	гТт	Ι Δ	C	0	NI I	n	J F M	A M	T	T A	e	0	N	n	J F	М	A 7	M 7	Т	Ι.Δ.	C		ND	n I
B CMP 1 Active			JA	. 3	UN	Ъ	J	F 1	IVI A	IVI	J J	A	3	U	19 1	D,	j r	IVI	A	IVI J	J	A	3	U	IN I	<i>D</i>	J F WI	A IVI	J	J P	3	U	IN	D .	J F	IVI	A	/1 J		A	- 3		N D	4
			\vdash	+				 								_										+		-			-	-		-	-	\dashv	+	+	+	+	₩	\vdash	$+\!\!\!-$	+
ear-Pit	OD ATT :		\vdash	+	_	-		$\vdash \vdash$	_	4	$\vdash \vdash$	4	\sqcup				_	+			_	4	\sqcup			_	\longrightarrow			_	4—	1			\dashv	\rightarrow	+	+	+	4	+	\vdash	$-\!$	4
	SB-NNAA	Monthly		444							oxdot	12	12	12	12 1	12 1	12 12	12	12	12 1	2 12	12	12	12	12												\perp			Щ.	Щ.	\sqcup		L
	SB-NNAB	Monthly		$\bot\bot$							oxdot	12	12	12	12 1	12 1	12 12	12	12	12 1	2 12	12	12	12	12						$oxed{oxed}$							\bot			Щ.	لل		┸
it-Edge							l I	L_ [$oxed{oxed}$	\perp	<u> </u>		[l I					L T			I ¯	<u> </u>				┸	\perp	<u> </u>	[Т		¯					_ا ل		
	SB-NEAA	Monthly										12	12	12	12 1	12 1	12 12	12	12	12 1	2 12	12	12	12	12															Ť		\Box		T
	SB-NEAB			+															12							丁		i		\top	1			T		\neg	\top	\neg	\top	\top	1	一十	$\neg \vdash$	十
ctive-Pit				++	-			H	\dashv			+=			=+	Ť	- 	+	Ħ	_	+	+	┢═╢	=+	-	十	+ + +			+	+	t		一十	+++	一十	十	+	十	+	t	一十	+	十
	SB-NPAA	Monthly		++	-		1-1	\vdash		-	 	12	12	12	12 1	12 1	2 12	12	12	12 1	2 12	12	12	12	12	+	+++	-		+	+	+	\vdash	-+	+++	+	+	+	+	+-	+	\vdash	+	+
			\vdash	++		+		\vdash		+	\vdash															+	+	+	-+		+	+		+	+	+	+	+	+	+	+-	\vdash	+	+
CI ma i di	SB-NPAB	Monthly	+	+		4	₩	\vdash		+		12	12	12	14	12 I	12 12	12	12	12 1	Z 12	12	12	12	14	+	\longrightarrow	-			+-	+		_	+	-	\dashv	+	+	+	+	ightarrow	$-\!\!\!\!\!+\!\!\!\!\!\!-$	4
CMP 2 Active				+					_ _		$oxed{oxed}$				_	_	_ _					1	Ш			_					-	1			\perp		\perp	_	\bot	\bot	₩	ightharpoonup		_[
ar-Pit													<u>L_</u> [$\bot \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$		[<u>L_</u>]		1	\mathbf{L}				$oldsymbol{ol}}}}}}}}}}}}}}}}}}}}}$				\mathbf{L}								_ل		
	SB-NNBA	Monthly														T									1	12 1	12 12 12	12 12	12	12 12	12	12	12	12							Ī	\Box		T
	SB-NNBB			\top												1											12 12 12									\neg	十	\neg	\top	\top	1	一十	\neg	寸
		,		++	-				\dashv	1	 	+				十	_	\dagger	\vdash	1		1	\dagger	\dashv	一广	Ŧ	- - - 	1.2		十	+==	Ť	Ħ	十	+ +	一十	十	+	+	+	t	一十	+	十
:-Edge				+		+	+			+-	\vdash	+					_	1	\vdash	-	+	1	++		1	10 1				_		-	1	40		\rightarrow	\rightarrow	-	+	+	+	-+	+	+
t-Edge		Monthly																									19 1 19 1 19 1	17 17	12	12 17	112	12												
t-Edge	SB-NEBA			++			1	 				-		-				+						-			12 12 12								+	+	+	+	+	+	₩	$\displaystyle igspace$	+	+
				$\pm \pm$																							12 12 12 12 12 12									\Rightarrow	\pm	\pm	\pm	\pm		\dashv	\pm	1
it-Edge ctive-Pit	SB-NEBA SB-NEBB	Monthly		\pm																					1	12 1	12 12 12	12 12	12	12 12	! 12	12	12	12		$\frac{1}{2}$	\pm	\pm	土	\pm			\pm	\pm
	SB-NEBA	Monthly Monthly																							1	12 1 12 1		12 12 12 12	12	12 12	12	12	12	12			<u>+</u>	<u>+</u>	\pm	<u> </u>				#

Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

					2012				2013						201	4					2)15							2016				201
Cumulative Impact Sediment Chemi	istry		J			J F	M A	A M			S O N	D J	F M	A M			S O N I	o J	F M	(A			S	N	D J	F	M A	M		A S	0 1	N D	
Near-field Stations	,																	1						$\overline{}$	T								\sqcap
	SB-RNA	4 times per year								12		12	12		12	12	1	2	12		12	12			12								
	SB-RNB	4 times per year								12		12	12		12	12	1	2	12		12	12			12								Ш
Mid-field Stations																																	
	SB-RMA	4 times per year								12			12		12	12	1		12		12	12			12								igspace
	SB-RMB	4 times per year								12		12	12		12	12	1	2 1	12		12	12		\perp	12								\longrightarrow
Far-Field Stations					+													_															\vdash
	SB-RFA	4 times per year			+ + +			_		12			12	-	12	12	1 1		12	-	12				12	-	_			+ +			\vdash
Course d Dit Chatiana	SB-RFB	4 times per year			+ + +	+ + +		-	 	12		12	12	+ +	12	12		.2	12		12	12	 	-	12		_	-			+ +		\vdash
Capped Pit Stations	SB-RCA	A times non mon	\vdash		+			_	-	12		12	12		12	12	1 1 1	2	12	-	12	12		+	12	-					+ +		\vdash
	SB-RCB	4 times per year 4 times per year			+ + +				 	12			12	+ +	12	12	1 1		12		12				12			+		+ +	+ +		\leftarrow
Sensitive Receiver Stations	SD RCD	1 times per year			+ + +					- 12		12	_	+++	12	12			-		12	12		+++	-			+ +					-+
Sensitive receiver stations	MW1	4 times per year			+ + +					12		12	12		12	12	1 1	2 .	12		12	12			12						1		一十
	THB1	4 times per year								12		_	12		12	12	1		12		12	12			12			1 1					\cap
	THB2	4 times per year								12		12	12		12	12	1		12		12	12			12								\Box
		1 7															L L L						11				-			1	1		
Sediment Toxicity Tests			J	A S	O N D	J F	M A	A M	J]	A	S O N	D J	F M	A M	J	J A	S O N I	D J	F M	A	M J	J A	S	N	D J	F	M A	M	JJ	A S	0 1	N D	J
SB CMP 1 Active																																	\sqcap
Reference														1	1 1		- - - 			1 1				\top		1 1	\neg						\sqcap
	SB-TRA	2 times per year								5			5			5								1 1	_1								\Box^{\dagger}
	SB-TRB	2 times per year								5			5			5																	
Near-Field																									1								ロ
	SB-TAA	2 times per year								5			5	$\perp \perp \perp$		5																	பி
	SB-TAB	2 times per year			$\bot \bot \bot$					5			5	$\perp \perp$		5				$\perp \perp$				$\perp \perp$		$\perp \perp$	_	\perp					\sqcup
Sensitive Receiver Stations																																	igspace
	MW1	2 times per year			+					5			5			5									_								\vdash
	THB1	2 times per year			+					5			5			5									_								\vdash
on or the total	THB2	2 times per year								5			5	\vdash		5					_			\perp									$oldsymbol{\sqcup}$
SB CMP 2 Active								_	<u> </u>				_					_					<u> </u>		_						<u> </u>		\vdash
Reference	SB-TRA				+				 						1				_						_						 		\vdash
	SB-TRB	2 times per year			+	+ +			 	-				++	+		-+		5		-	5		+ +	_					+ +	+ +		\dashv
Near-Field	3D-TKD	2 times per year			+ + +			-						+ +	+ +		+++	-	3			3		+ +	+					1			\vdash
Teal Teal	SB-TBA	2 times per year			+ + +				 					+ +					5			5	 	+	-			-		+ +	+ +		\leftarrow
	SB-TBB	2 times per year			+ + +								-	+++	+ +	+			5		_	5		+ +				+ +					-+
Sensitive Receiver Stations		2 times per year			+ + +																	 			_						1		一十
	MW1	2 times per year			1 1 1														5			5		+ +						 			一十
	THB1	2 times per year																	5			5											
	THB2	2 times per year																	5			5											
				•				•					•			•			•		•						•						
Tissue/ Whole Body Sampling			J	A S	O N D	J F	M A	A M	J	A	S O N	D J	F M	A M	J	J A	S O N I	D J	F M	A	M J	J A	S	N	D J	F	M A	M	JJ	A S	0 1	N D	J
Near-Pit Stations																																	
	SB-INA	2 times per year											*			*			*			*											
	SB-INB	2 times per year											*			*			*			*											ш
Reference North																																	Ш.
	TNA	2 times per year											*	\perp		*			*			*		\perp									\longrightarrow
	TNB	2 times per year											*	\perp		*			*			*		\perp									\longrightarrow
Reference South	mo .				+				 						1	*									_						 		\vdash
	TSA	2 times per year			+ + +			-					*	+ +		*			*			*		+ +			_			-	-		\vdash
	TSB	2 times per year											n						"														للسنا
D 1 T P			7	A C		T F	36 4	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	7 7	r A	CON	D I	г	LALM	- T - T	T A	CONT		г М		MIT	T .		N NT	ъГт	Г	3.7	LM	7 7	1 A C		ı D	· ·
Demersal Trawling			J	A S	O N D	J F	IVI A	ı M	J	Α	5 U N	ן ע	r M	A M	J	J A	S O N I	J	r M	A	M J	J A	5 (N	ل ل	r	ıvı A	M	J J	A S	O I	ע ט	1
Impact	CD INTA 4	- 4 ti	\vdash		+	+	\vdash	-		-		_	-	+	++		- 	5	-	+	-	-		++	+	+	-	++	_	+ +	1 +	+	\vdash
		5 4 times per year 5 4 times per year	\vdash		+++	+	$\vdash\vdash$	+		5 5		5		++		5 5 5 5	- 	5		++		5 5 5 5		++	-	++	-+	+	_	+	++		\vdash
Reference North	SD-IIND I-5	+ unies per year	\vdash		+ + +	+	\vdash	+	++	3	 	3	J	+ +	++	5 5	 	3	J	+	+	J 3		++	+	+	-+	+	-	+ + -	++	+	\vdash
INTERCLICE INOLUI	TNA 1-5	4 times per year	\vdash	_	+++	+	$\vdash \vdash$	+	\vdash	5	 	5	5	++	++	5 5	- 	5	5	++		5 5	\vdash	++	-	++	-+	+	-	++	++		\vdash
		4 times per year	\vdash		+ + +	1	\vdash	+		5	 	5		+ +		5 5	- 	5		+	_	5 5		+	+	+	\dashv	+			++		\vdash
Reference South	11,010	per , em			+ + +			+		+ -	 	 	-	 	++	- -	 	+ +	-	++		- -		+	+	++	_	+	-	 			\cap
	TSA 1-5	4 times per year			 			1		5		5	5	 	1 1	5 5	- 	5	5	\dagger		5 5		\dagger	1	\dagger							\sqcap
	TSB 1-5	4 times per year			1 1 1					5			5			5 5		5		T		5 5		1 1		1 1		1 1			1		广

Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

				2012				2013							2014						201	5							201	16			20
outine Water Quality Monitoring			J A	s	N	D J	F M	I A M J J .	A S	О	N I	D J	F N	M A M	ј ј	A S	s o	NΙ) ј	F M A M	1 J	J	A 9	s c	NI) J F	M	A M	J	J	A S	O N D	J
bb Tide						- 						1															$\overline{}$						
mpact Stations Downcurrent																					1 1						+			\sqcap			1
	SB-IPE1	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8		+			\sqcap			+
	SB-IPE2	8 times per year						 	8	8		8		8 8	8	8	8	8	8	8 8 8			8	8	8		+			一十		1 1 1	+
	SB-IPE3	8 times per year						 	3	8		8		8 8		8	8	8		8 8 8		8		8	8		+			一十		1 1 1	+
	SB-IPE4	8 times per year						 	8	8		8		8 8	8	8	8	8	8	8 8 8			8	8	8		+			一十		1 1 1	+
	SB-IPE5	8 times per year					 		2	8	8	8		8 8	8	8	8		8	8 8 8			8	8			++			\vdash		+ + +	+
termediate Stations Downcurrent	35 H 23	o unics per year					+ +			0	0	-	0	0 0		0	- 0		-	0 0	,	-	0	-	- 0		++			\vdash		+ + +	+
termediate Stations Downeartern	SB-INE1	8 times per year					 	+ + + + +	2	8	8	8	8	8 8	8	8	8	8	8	8 8 8	2	8	8	8	8		++			\vdash		+ + +	+
	SB-INE2	8 times per year	 		-	-	+ +	 	2	8	8	8		0 0	8	0	8		0	8 8 8		~	8	8	0	+ +	++			\vdash		+ + +	+
	SB-INE3	8 times per year	 				1 1	 	0	8	Ü	8		0 0		8		8	8	8 8 8			8	8	Ü		++		+ +	\vdash		+ + +	+
	SB-INE3		-				+	 	0			8		0 0	8	0	8		, i	8 8 8			8	8	U		+		-	$\vdash \vdash$		+++	+
	SB-INE5	8 times per year	-	-			-		2			8		8 8		8		8	U	0 0			0	0	0		++		-	$\vdash \vdash$		+	+
(Ct. II .	3D-IINES	8 times per year	-	-			-		5	8	8	8	8	8 8	8	8	8	8	8	8 8 8	,	8	8	8	8		++		-	$\vdash \vdash$		+	╁
eference Stations Upcurrent	SB-RFE1	0.43	⊢	+	-		++	+ + + + +			0		0			0	-				+	0	0	-	1	+	++	_	+	\vdash		+ + +	+
		8 times per year	⊢	+ +		_	++	 	5	8	8	8		8 8	8	8		8	8	8 8 8			8	8	Ü	+	$+\!+\!+$	_	+	\vdash		+	+
	SB-RFE2	8 times per year		+					8	8		8		8 8	8	8	8		8	8 8 8			8	8	Ü	\bot	+		+	\vdash		+	4
	SB-RFE3	8 times per year	\vdash	\bot	_		$\perp \perp$		3	8		8		8 8	8	8	8	8	8	8 8 8			8	8	8		+	_	$\downarrow \downarrow$	\vdash	_	+	1
	SB-RFE4	8 times per year							3	8		8		8 8	8	8	8	8	8	8 8 8		8	8	8	8		$\bot \bot$			\vdash		\bot \bot \bot	┸
	SB-RFE5	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8		$\bot \bot \downarrow$			$oldsymbol{\sqcup}$			_
nsitive Receiver Stations																											$\bot \bot$			$oldsymbol{\sqcup}$			
	MW1	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8		$\perp \! \! \perp \! \! \perp$			$oldsymbol{ol}}}}}}}}}}}}}}}}}}$			
	THB1	8 times per year							3	8	8	8		8 8	8	8	8	8	8	8 8 8	3	8	8	8	8					ш.			
	THB2	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8								
	WSR45C	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8								
	WSR46	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8								
ood Tide																																	Т
npact Stations Downcurrent																																	1
•	SB-IPF1	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8					\Box			T
	SB-IPF2	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8					\Box			1
	SB-IPF3	8 times per year							3	8	8	8		8 8	8	8	8	8	8	8 8 8		8		8	8		11			一十			1
termediate Stations Downcurrent		· F · · · , · · · ·						 		Ť		Ť	-				Ť	 						Ť			+			一十		1 1 1	+
termediate stations bownearrent	SB-INF1	8 times per year						 	3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8		+			一十		1 1 1	+
	SB-INF2	8 times per year					1 1		3			8		8 8	8	8	8	Ü	8	8 8 8		~	8	8	8		++		1 1	\vdash		+ + +	+
	SB-INF3	8 times per year					 		2	8		8		8 8	8	8		8	8	0 0		8	-	8	8		++			\vdash		+ + +	+
ference Stations Upcurrent	00 11110	o unies per year					 		,	- 0	0	0	0	0 0	- 0	0	- 0	0	0	0 0 0	,	0	0	-	0		++			\vdash		+ + +	+
referee stations operation	SB-RFF1	8 times per year	- 				1	 	2	8	8	8	Q	8 8	Q	Q	8	8	Q	8 8 8	2	8	Q	9	Q		+ + +			$\vdash \vdash$		+ + +	+
	SB-RFF2	8 times per year	 				1 1	 	0	8	8	8		0 0	8	8	8	Ŭ	0	8 8 8			8	8	0		++		+ +	\vdash		+ + +	╁
	SB-RFF3		 				1 1	 	0	8		8		0 0		8	8		0	8 8 8			8	8			++		+ +	\vdash		+ + +	╁
B C	3D-KFF3	8 times per year	-	-			-		9	0	0	0	0	0 0	0	0	0	0	0	0 0 0	<u>, </u>	0	0	0	0		++		-	$\vdash \vdash$		+	╁
nsitive Receiver Stations	3.674	0.11	<u> </u>				 		2	0	0	0	0	0 0					-		+	0	0				++		-	$\vdash \vdash$		+ + +	╀
	MW1	8 times per year	⊢	+	-		++		5	8	8	8	8	8 8	8	8	8	8	8	8 8 8	<u> </u>	8	8	- 8	8	+	++	_	+	\vdash		+ + +	+
	THB1	8 times per year		+			\vdash		5	8		8		8 8	Ŭ	8		8	Ü	8 8 8		8		8	8	\bot	++		+	\vdash		+	+
	THB2	8 times per year							8	_ ~		8		8 8	8	8	8		U	8 8 8			8	- 8	8		+		$\downarrow \downarrow$	\vdash		+	+
	WSR45C	8 times per year		\perp					3	8	_	8		8 8		8	Ť	8	8	8 8 8		-	8	8	8		+		$\downarrow \downarrow$	\vdash	_	+	┺
	WSR46	8 times per year							3	8	8	8	8	8 8	8	8	8	8	8	8 8 8	3	8	8	8	8		ш			Ш.			丄
																																	_
ter Column Profiling			J A	S	N	D J	F N	I A M J J .	A S	0	NI	D J	F N	M A M	J J	A S	SO	N	J	F M A M	1 J	J	A S	6 C	NE	JF	M	A M	J	J	A S	O N D	J
ıme Stations	WCP1	Monthly																		4 4 4 4				1 4									
	WCP2	Monthly							4	4	1 /	1 1	1 /	1 1 1	4 4	4	4 4	4 4	4	4 4 4 4	1 4	4	1 /	1 1	1 1					. —			

Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - February 2017)

				2012			2013						2014					20	15					201	16		2017
Capping Water Quality Monitoring			J A		N	D I	F M A M J J	Α	s o	N	DI	F M A		S	0	NΙ	O I F M A M			s o	N D	I F M	AN			S O N D	
Ebb Tide			7,10			- ,		-			- ,		, , ,				, , , , , , , , , , , , , , , , , , , ,	,	,			,		- ,	,		, -
Impact Stations Downcurrent								+	+ +																		+
1	SB-IPE1	4 times per year						\dashv								3	3 3	3	3		3	3		3	3	3	
	SB-IPE2	4 times per year														3	3 3	3	3		3	3		3	3	3	
	SB-IPE3	4 times per year														3	3 3	3	3		3	3		3	3	3	
	SB-IPE4	4 times per year														3	3 3	3	3		3	3		3	3	3	
	SB-IPE5	4 times per year														3	3 3	3	3		3	3		3	3	3	
Intermediate Stations Downcurrent		1 ,																									
	SB-INE1	4 times per year														3	3 3	3	3		3	3		3	3	3	
	SB-INE2	4 times per year														3	3 3	3	3		3	3		3	3	3	
	SB-INE3	4 times per year						\neg								3	3 3	3	3		3	3		3	3	3	
	SB-INE4	4 times per year						\neg								3	3 3	3	3		3	3		3	3	3	
	SB-INE5	4 times per year						\neg								3	3 3	3	3		3	3		3	3	3	
Reference Stations Upcurrent		1 ,					 	一																			
	SB-RFE1	4 times per year					 	\neg	1 1					1		3	3 3	3	3		3	3		3	3	3	\neg
	SB-RFE2	4 times per year		1 1			 	\dashv	1 1				 	1		3		3	3		3	3		3	3	3	\dashv
	SB-RFE3	4 times per year			1 1		 	\dashv	+					1	1 1	3	3 3	3	3		3	3		3	3	3	\dashv
	SB-RFE4	4 times per year		1 1			 	\dashv	1 1				 	1		3	` 	3	3		3	3		3	3	3	\neg
	SB-RFE5	4 times per year			1 1		 	\dashv	+					1	1 1	3	3 3	3	3		3	3		3	3	3	\dashv
Sensitive Receiver Stations		· r - J			+		 	+	++	$-\dagger$			 	1	+			Ť	+ +	1				+ + +		 	+
	MW1	4 times per year			1 1		 	\dashv						1	1 1	3	3 3	3	3		3	3		3	3	3	-
	THB1	4 times per year	 					-				1 1			1	3	3 3	3	3		3	3		3	3	3	
	THB2	4 times per year			1			+								2	3 3	3	3		3	3		3	3	3	-
	WSR45C	4 times per year					 	+								3	3 3	3	3		3	3		3	3	3	+
	WSR46	4 times per year	 		1		 	+	1 1						1 1	3		3	3		3	3		3	3	3	-
Flood Tide	Wortio	4 times per year	-				 	\dashv		-				+			, 3	9	3					9	3		+
Impact Stations Downcurrent				+ +			 	+				++-		+						-						- 	+
impact stations Downcurrent	SB-IPF1	4 times per year		+ +			 	+				++-		+		3	3 3	3	3	-	3	3		3	3	3	+
	SB-IPF2	4 times per year	 		+ +		 	+				+++		+		3	, 3	3	3		3	3		3	3	3	-+
	SB-IPF3	4 times per year					 	\dashv	-	-	_	- - 				2	2 2	3	3		3	3		3	3	3	-+
Intermediate Stations Downcurrent	55 H 1 5	4 tittles per year	 		+ +		 	+				+++		+			,	3	3		3			3	3		
Intermediate Stations Downcurrent	SB-INF1	4 times non year	<u> </u>		+ +		 	+	+++		-	-+-		-	+ +	.3	, ,	2	2		3	3		2	3	2	-
	SB-INF2	4 times per year					 	\dashv	-	-	_	- - 				3	` 	3	3		3	3		2	3	3	-+
	SB-INF3	4 times per year 4 times per year	<u> </u>		+ +		 	+	+++		-	-+-		-	+ +	3		3	3		3	3		2	3	3	
Pafaranca Chatiana I Inqueront	3 D-IIN 13	4 times per year	<u> </u>	-	+ +		 	+			-			-	+ +	-	, 3	3	3		3	3	 	3	3	3	
Reference Stations Upcurrent	SB-RFF1	4 times non year					 	\dashv	-	-	_	- - 				3	, ,	3	2		3	3		2	3		\dashv
	SB-RFF2	4 times per year	<u> </u>		+ +		 	+	+++		-	-+-		-	+ +	3		3	2		3	3		2	3	3	+
	SB-RFF3	4 times per year	<u> </u>	-	+ +		 	+			-			-	+ +	3	,	3	3		3	3	 	3	3	3	
Sensitive Receiver Stations	55-KI I 5	4 times per year	\vdash	1	+	-1-	 	+	+++				+ + + +	+	+	3	, 3	3	3		3	3		3	3		-+
Scholive Receiver Stations	MW1	A times per voor	\vdash	1 1	+	-1-	 	+	+		\dashv		+ + + -	+	+	3	3 3	3	2	-	3	3	++	2	3	3	-+
	THB1	4 times per year	\vdash	+ +	+	-	 	+	+		+		+ + + +	+	+	3		3	2	-	3	3	\vdash	2	3	3	+
	THB1	4 times per year	\vdash	1 1	+	-1-	 	+	+		\dashv		+ + + -	+	+	3		3	2	-	3	3	++	2	3	3	-+
	WSR45C	4 times per year	++	+	+	$ \vdash$	 	+	+		+		++++	+	+) 3	3	3	-	3	3	\vdash	3	3	3	-+
	WSR45C WSR46	4 times per year	-	+ +	+	-	 	+	+				+ + + +	-	+	3	2 2	3	3		3	3		3	3	3	-+
	VV 5IX40	4 times per year		1 1		1									j l	S	, 3	3	3	ı	3	3		3	3	3	
Ranthic Pacalonisation Studies			T A	8 0	N	рт	E M A M I I	Λ	s 0	N	D I	E M A	MIIIA	e		N T		T	T A	s I o	N D	I E M	A .	/ T	T A	SOND	Τ .
Benthic Recolonisation Studies			J A	3 0	IN	D J	F M A M J J	Α	3 0	14	D J	I IVI A	IVI J J A	3	U	IN I	J F WI A WI	J	J A	3 0	N D	J F IVI	A N	1 J	J A	J O N D	J 1
Capped Contaminated Mud Pits	CD CDA	2 1:	\vdash	1 1	+		+ + + + + + +	+	\dashv				+ + + +	+	+			+		-	10		\vdash	+	10	12	+
	SB-CPA		-	+	+		 	+					+ + + + + + + + + + + + + + + + + + + +	+	+			+			12		 	+++	12	12	-+
	SB-CPB	2 times per year	\vdash	1	+		 	+	+		+			+-	+			+	++	_	12		\vdash	+	12	12	-
D. C. C. C.			-	+	+		 	+	+		+			+-	+			+	++	_	12		\vdash	+	12	12	_
Reference Stations	DD 4	2 1:	\vdash	1 1	+		+ + + + + + +	+	\dashv				+ + + +	+	+			+		-	10		\vdash	+	10	12	$ \vdash$
	RBA	2 times per year	\vdash	+	+		 	\dashv	\dashv		-		 	_	+			+	-++	_	12		\vdash	+	12	12	
	RBB	2 times per year		+	+	_		\dashv	\dashv		-		 	_	+			+	-++		12		\vdash		12	12	$-\!\!\!\!+$
	RBC	2 times per year				1					I 1		1 1 1 1	1		1		1		1	12		1 1	1 1	12	12	

Notes:

"*" = Number of replicates depends on parameters

"" "Signs are tentative only and will be su Naming of stations are tentative only and will be subjected to changes

Annex B

Graphical Presentations

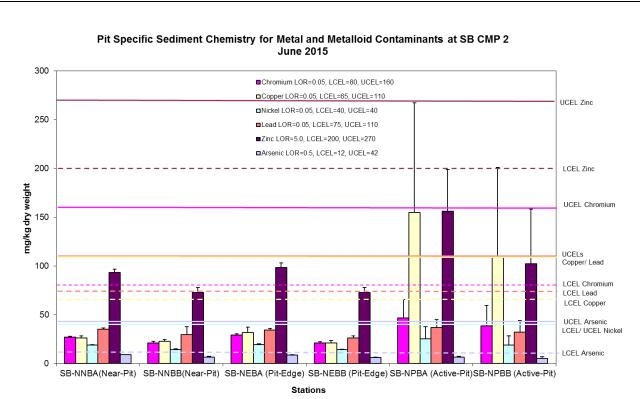


Figure 1: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in June 2015.

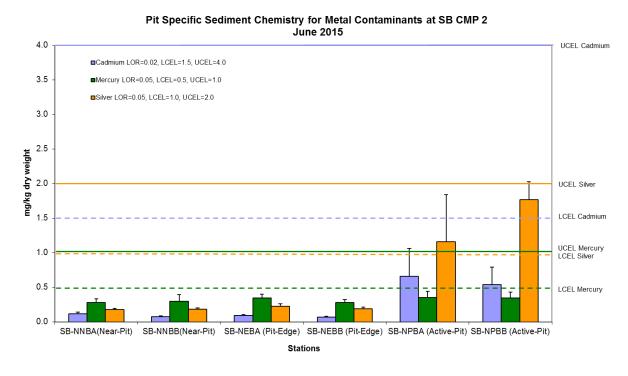


Figure 2: Concentration of Metals (Cd, Hg, Ag; mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in June 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



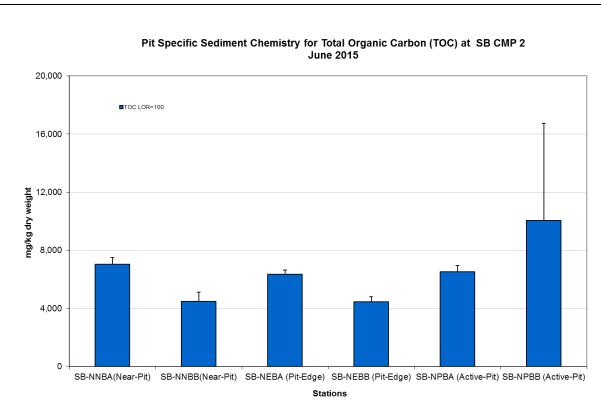
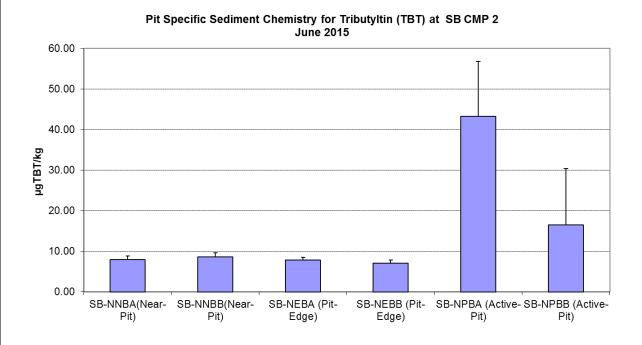


Figure 3: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in June 2015.



Concentration of Tributyltin (µg TBT/kg; mean +SD) in sediment samples collected Figure 4: from Pit Specific Sediment Chemistry Monitoring for CMP 2 in June 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



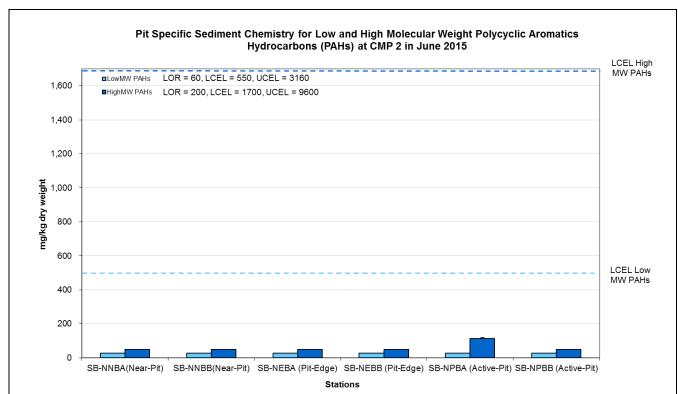
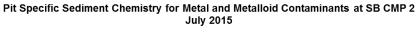


Figure 5: Concentration of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in June 2015.



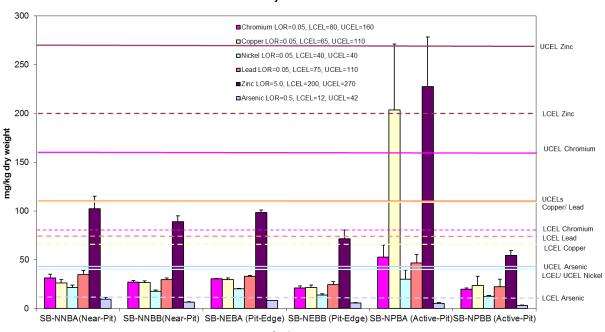


Figure 6: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



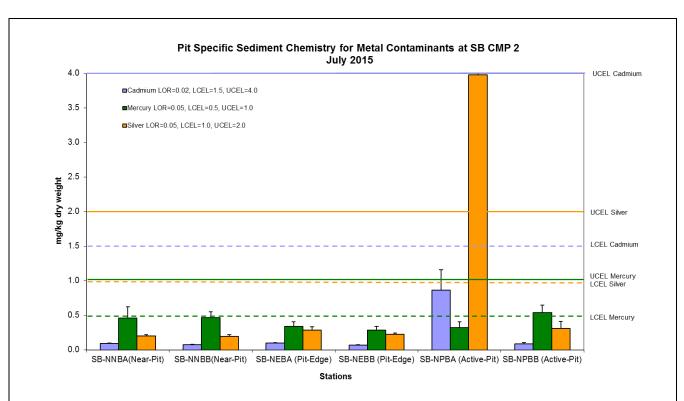


Figure 7: Concentration of Metals (Cd, Hg, Ag; mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in May 2015.

Pit Specific Sediment Chemistry for Total Organic Carbon (TOC) at SB CMP 2



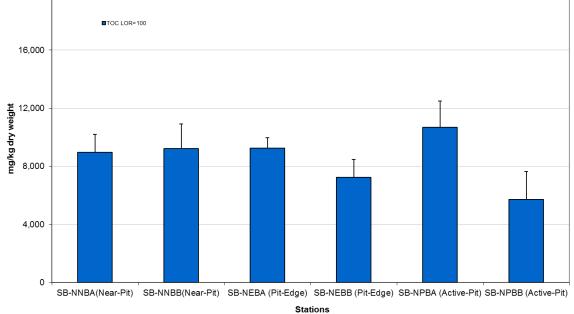


Figure 8: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in July 2015.

H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable \07 CMP Monthly Report \35th (July 2015)

Date: 14/8/2015



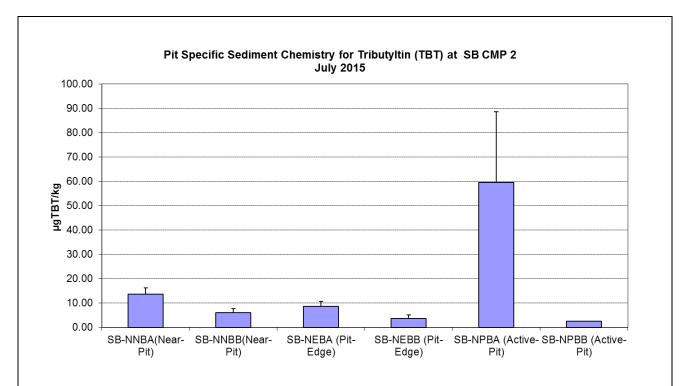


Figure 9: Concentration of Tributyltin (μg TBT/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP 2 in July 2015.

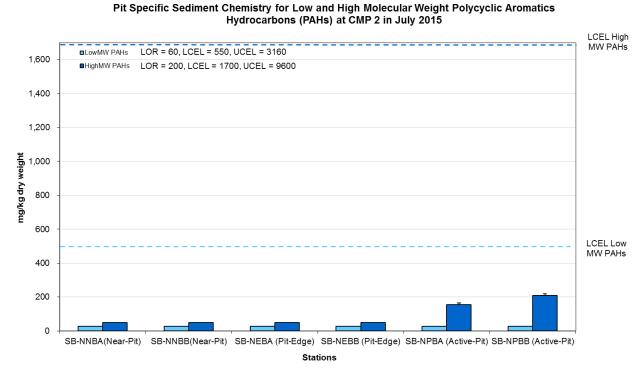


Figure 10: Concentration of Low and High Molecular Weight Polycyclic Aromatics
Hydrocarbons (mg/kg dry weight; mean +SD) in sediment samples collected from Pit
Specific Sediment Chemistry Monitoring for CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



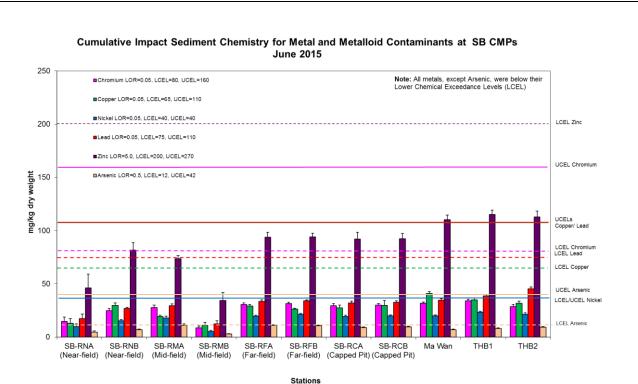


Figure 11: Concentration of Metals and Metalloid (Cr, Cu, Ni, Pb, Zn, As; mean +SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for SB CMPs in June 2015.

Cumulative Impact Sediment Chemistry for Metal Contaminants at SB CMPs June 2015 1.0 Cadmium LOR=0.02, LCEL=1.5, UCEL=4.0 Mercury LOR=0.05, LCEL=0.5, UCEL=1.0 Mercury LOR=0.05, LCEL=0.5, UCEL=1.0

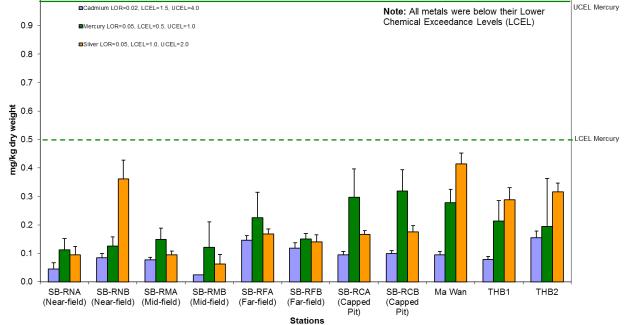


Figure 12: Concentration of Metals (Cd, Hg, Ag; mean +SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for SB CMPs in June 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\35th (July 2015)

Denverable (0) Civil Monthly Report (55th (July 2015

Date:

14/8/2015



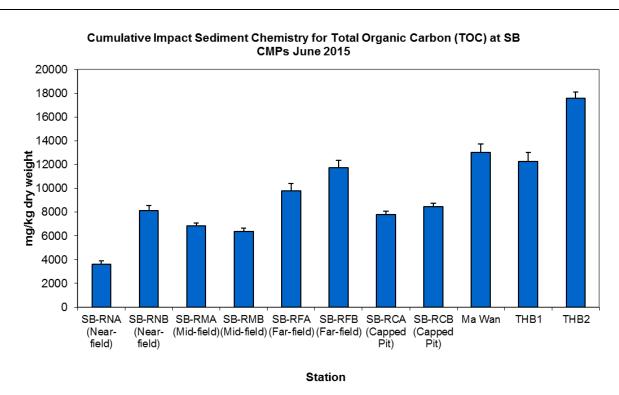


Figure 13: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for SB CMPs in June 2015.

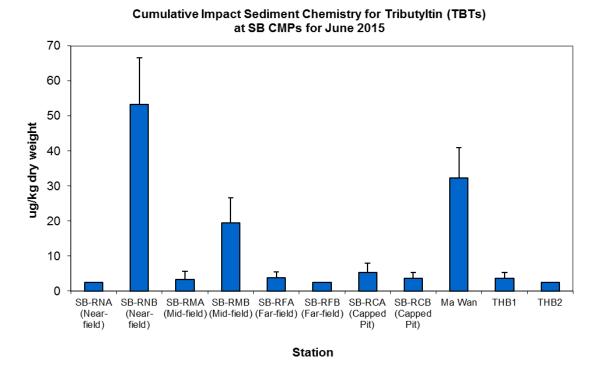


Figure 14: Concentration of Tributyltin (μg TBT/kg; mean +SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for SB CMPs in June 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable \07 CMP Monthly Report \35th (July 2015)

Date: 14/8/2015



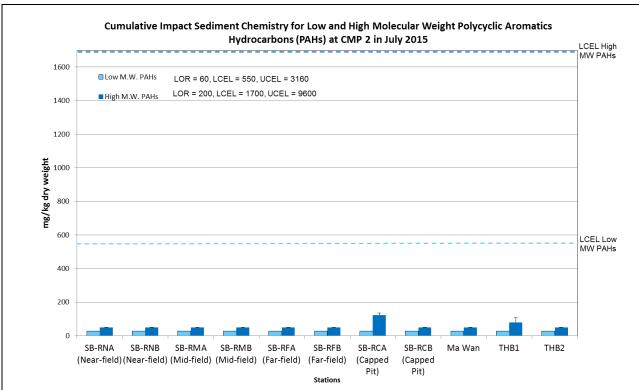


Figure 15: Concentration of Low and High Molecular Weight Polycyclic Aromatics
Hydrocarbons (mg/kg dry weight; mean +SD) in sediment samples collected from
Cumulative Impact Sediment Chemistry Monitoring for SB CMPs in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



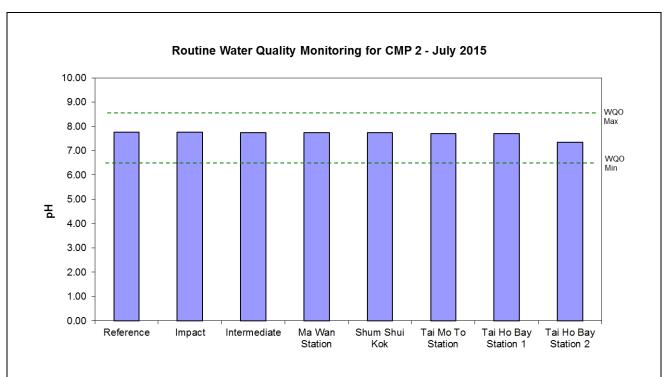


Figure 16: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

120 100 80 40 20 Reference Impact Intermediate Ma Wan Shum Shui Tai Mo To Tai Ho Bay Tai Ho Bay

Routine Water Quality Monitoring CMP 2 - July 2015

Figure 17: Level of Dissolved Oxygen (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable \07 CMP Monthly Report \35th (July 2015)

Date: 14/8/2015

Environmental Resources Management

Station 1



Station 2

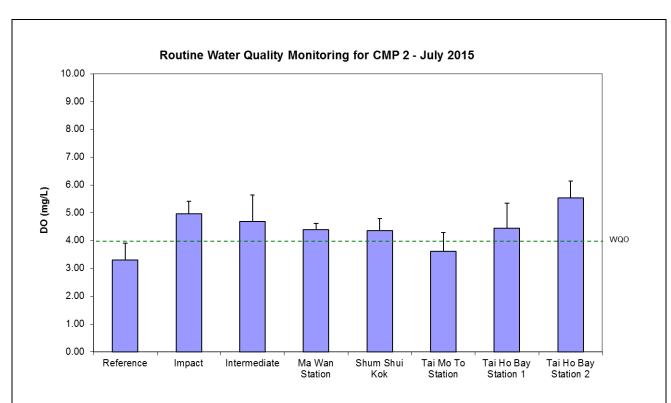


Figure 18: Concentration of Dissolved Oxygen (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

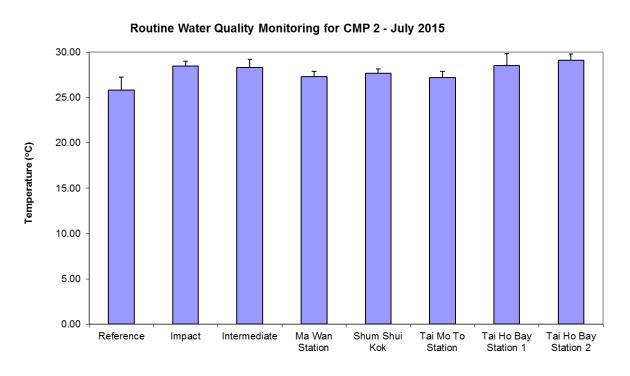


Figure 19: Level of Temperature (°C; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



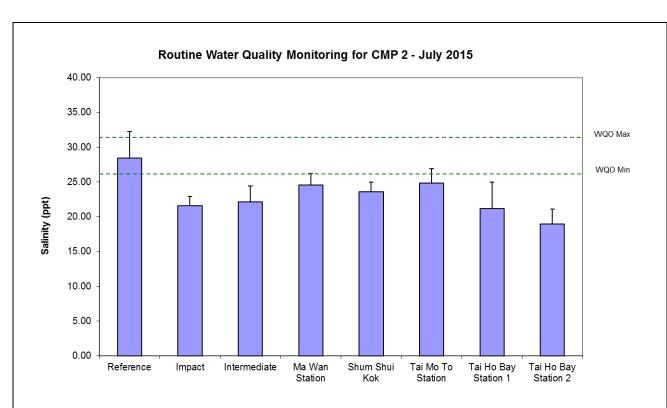


Figure 20: Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

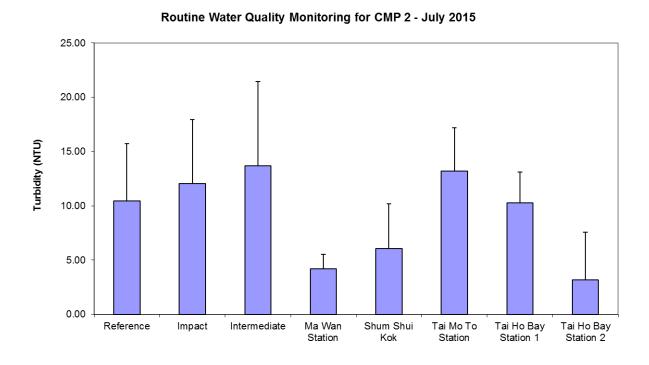


Figure 21: Levels of Turbidity (NTU; ,mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\35th (July 2015)

Date:

14/8/2015



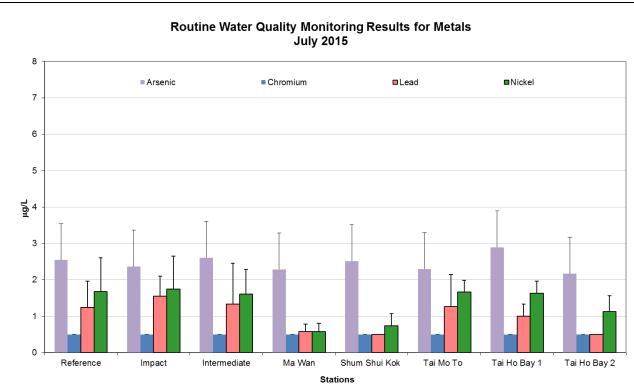


Figure 22: Concentration of Arsenic, Chromium, Lead, Nickel (μg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

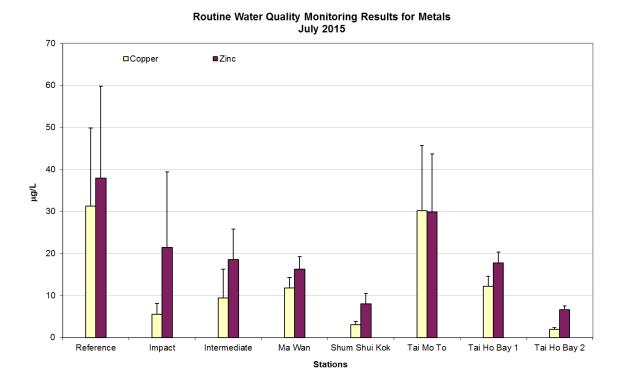


Figure 23: Concentration of Copper and Zinc (μg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



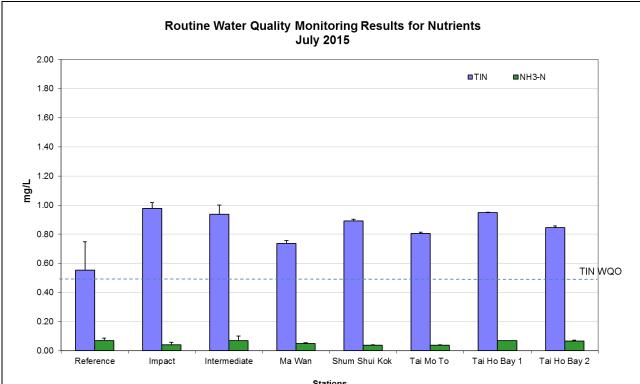


Figure 24: Concentration of Total Inorganic Nitrogen and NH3-N (μg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

Routine Water Quality Monitoring Results for Biochemical Oxygen Demand (BOD₅) July 2015

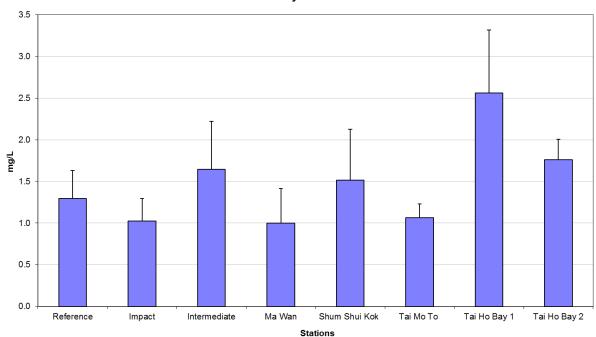


Figure 25: Level of Biochemical Oxygen Demand (BOD5) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



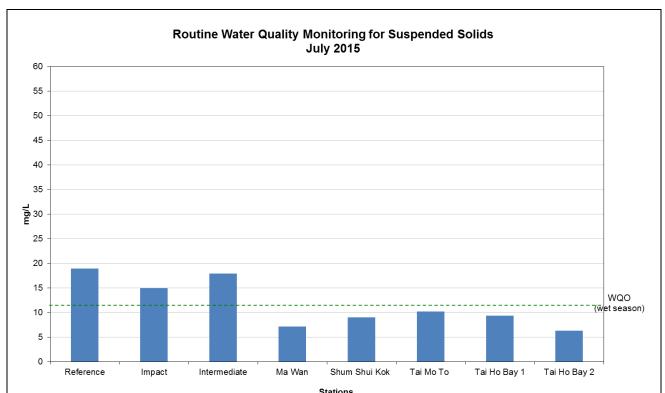


Figure 26: Concentration of Suspended Solids (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02

Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



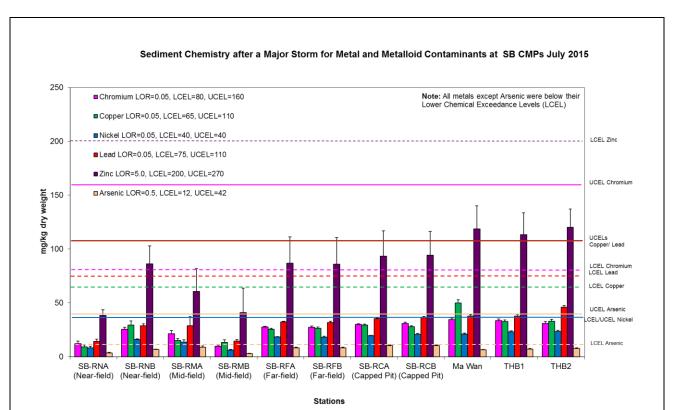


Figure 27: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean +SD) in sediment samples collected from *Sediment Chemistry after a Major Storm* for SB CMPs in July 2015.

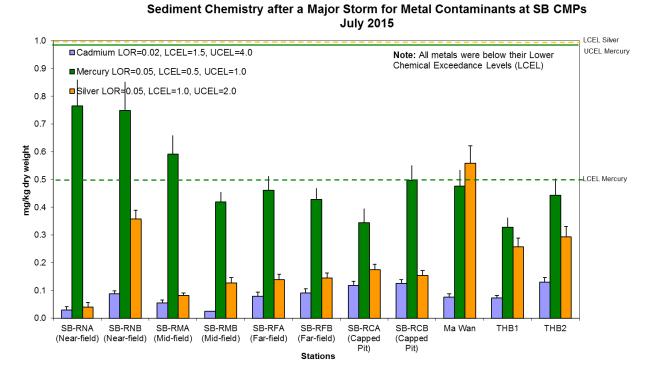


Figure 28: Concentration of Metals (Cd, Hg, Ag; mean +SD) in sediment samples collected from *Sediment Chemistry after a Major Storm* for SB CMPs in July 2015.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\35th (July 2015)

Date: 14/8/2015



Annex C

Water Quality Monitoring Results

Table C1 Action and Limit Levels of Water Quality for Dredging, Backfilling and Capping Activities for SB CMPs

Parameter	Action Level	Limit Level
Dissolved Oxygen (DO) (1)	Surface and Mid-depth (2) The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for surface and	Surface and Mid-depth (2) The average of the impact, WSR 45C and WSR 46 station readings are < 4 mg L-1
	middle layer = 4.32 mg L -1 and	and Significantly less than the reference
	Significantly less than the reference stations mean DO (at the same tide of the same day)	stations mean DO (at the same tide of the same day)
	$\frac{Bottom}{The average of the impact, WSR 45C} \\ and WSR 46 station readings are < 5%-ile of baseline data for bottom layers = 3.12 mg L^{-1}$	$\frac{\text{Bottom}}{\text{The average of the impact station,}}$ WSR 45C and WSR 46 readings are < 2 mg L^{-1}
	and Significantly less than the reference	and Significantly less than the reference stations mean DO (at the same tide of
	stations mean DO (at the same tide of the same day)	the same day)
Depth-averaged Suspended Solids (SS) (3) (4)	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data for depth average = 21.60 mg L-1	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data for depth average = 40.10 mg L-1
	and	and
	120% of control station's SS at the same tide of the same day	130% of control station's SS at the same tide of the same day
Depth-averaged Turbidity (Tby) (3) (4)	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data = 25.04 NTU	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data = 32.68 NTU
	and	and
	120% of control station's Tby at the same tide of the same day	130% of control station's Tby at the same tide of the same day

Notes:

- (1) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- (2) The Action and Limit Levels for DO for Surface & Middle layers were calculated from the combined pool of baseline surface layer data and baseline middle layer data.
- (3) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- (4) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table C2 In-situ Monitoring Results for Routine Water Quality Monitoring of CMP 2 on 6 July 2015

Sampling	Stations	Temp	Salinity Turbidity Dissolved Oxygen		d Oxygen	pН	
Period	Stations	(°C)	(ppt)	(NTU)	(%)	(mg L-1)	(mg L-1)
July	RFF (Reference)	25.82	28.46	10.44	47.58	3.30	7.76
2015	IPF (Impact)	28.48	21.55	12.03	72.08	4.96	7.77
	INF (Intermediate)	28.33	22.15	13.71	68.06	4.68	7.75
	Ma Wan	27.32	24.58	4.19	63.57	4.39	7.74
	Shum Shui Kok	27.67	23.60	6.04	63.12	4.36	7.75
	Tai Mo To	27.22	24.85	13.21	52.34	3.62	7.70
	Tai Ho Bay 1	28.51	21.15	10.25	64.60	4.45	7.71
	Tai Ho Bay 2	29.09	18.98	3.18	80.17	5.54	7.34
	WQO	N/A	25.61 - 31.30#	N/A	N/A	>4	6.5-8.5

Notes:

Cell shaded grey indicate value exceeding the WQO.

Table C3 Laboratory Results for Routine Water Quality Monitoring of CMP 2 in July 2015

Sampling Period	Stations	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Zn	NH ₃	TIN	BOD ₅	SS
		(μg/L)	(µg/L)	(μg/L)	(μg/L)	(μg/L)	(μg/L)	(µg/L)	(μg/L)	(µg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
July 2015	RFF	2.54	<lor< td=""><td><lor< td=""><td>31.29</td><td>1.24</td><td>0.89</td><td>1.68</td><td><lor< td=""><td>37.89</td><td>0.07</td><td>0.55</td><td>1.30</td><td>18.97</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>31.29</td><td>1.24</td><td>0.89</td><td>1.68</td><td><lor< td=""><td>37.89</td><td>0.07</td><td>0.55</td><td>1.30</td><td>18.97</td></lor<></td></lor<>	31.29	1.24	0.89	1.68	<lor< td=""><td>37.89</td><td>0.07</td><td>0.55</td><td>1.30</td><td>18.97</td></lor<>	37.89	0.07	0.55	1.30	18.97
	IPF	2.36	<lor< td=""><td><lor< td=""><td>5.56</td><td>1.54</td><td>1.02</td><td>1.75</td><td><lor< td=""><td>21.38</td><td>0.04</td><td>0.98</td><td>1.02</td><td>14.92</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>5.56</td><td>1.54</td><td>1.02</td><td>1.75</td><td><lor< td=""><td>21.38</td><td>0.04</td><td>0.98</td><td>1.02</td><td>14.92</td></lor<></td></lor<>	5.56	1.54	1.02	1.75	<lor< td=""><td>21.38</td><td>0.04</td><td>0.98</td><td>1.02</td><td>14.92</td></lor<>	21.38	0.04	0.98	1.02	14.92
	INF	2.61	<lor< td=""><td><lor< td=""><td>9.41</td><td>1.34</td><td>0.80</td><td>1.61</td><td><lor< td=""><td>18.58</td><td>0.07</td><td>0.94</td><td>1.65</td><td>17.92</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>9.41</td><td>1.34</td><td>0.80</td><td>1.61</td><td><lor< td=""><td>18.58</td><td>0.07</td><td>0.94</td><td>1.65</td><td>17.92</td></lor<></td></lor<>	9.41	1.34	0.80	1.61	<lor< td=""><td>18.58</td><td>0.07</td><td>0.94</td><td>1.65</td><td>17.92</td></lor<>	18.58	0.07	0.94	1.65	17.92
	Ma Wan	2.28	<lor< td=""><td><lor< td=""><td>11.77</td><td>0.57</td><td>0.71</td><td>0.58</td><td><lor< td=""><td>16.28</td><td>0.05</td><td>0.74</td><td>1.00</td><td>7.13</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>11.77</td><td>0.57</td><td>0.71</td><td>0.58</td><td><lor< td=""><td>16.28</td><td>0.05</td><td>0.74</td><td>1.00</td><td>7.13</td></lor<></td></lor<>	11.77	0.57	0.71	0.58	<lor< td=""><td>16.28</td><td>0.05</td><td>0.74</td><td>1.00</td><td>7.13</td></lor<>	16.28	0.05	0.74	1.00	7.13
	Shum Shui Kok	2.52	<lor< td=""><td><lor< td=""><td>3.08</td><td><lor< td=""><td>0.74</td><td>0.73</td><td><lor< td=""><td>8.04</td><td>0.04</td><td>0.89</td><td>1.51</td><td>9.05</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>3.08</td><td><lor< td=""><td>0.74</td><td>0.73</td><td><lor< td=""><td>8.04</td><td>0.04</td><td>0.89</td><td>1.51</td><td>9.05</td></lor<></td></lor<></td></lor<>	3.08	<lor< td=""><td>0.74</td><td>0.73</td><td><lor< td=""><td>8.04</td><td>0.04</td><td>0.89</td><td>1.51</td><td>9.05</td></lor<></td></lor<>	0.74	0.73	<lor< td=""><td>8.04</td><td>0.04</td><td>0.89</td><td>1.51</td><td>9.05</td></lor<>	8.04	0.04	0.89	1.51	9.05
	Tai Mo To	2.30	<lor< td=""><td><lor< td=""><td>30.18</td><td>1.27</td><td>0.61</td><td>1.67</td><td><lor< td=""><td>29.88</td><td>0.04</td><td>0.81</td><td>1.06</td><td>10.18</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>30.18</td><td>1.27</td><td>0.61</td><td>1.67</td><td><lor< td=""><td>29.88</td><td>0.04</td><td>0.81</td><td>1.06</td><td>10.18</td></lor<></td></lor<>	30.18	1.27	0.61	1.67	<lor< td=""><td>29.88</td><td>0.04</td><td>0.81</td><td>1.06</td><td>10.18</td></lor<>	29.88	0.04	0.81	1.06	10.18
	Tai Ho Bay 1	2.89	<lor< td=""><td><lor< td=""><td>12.14</td><td>1.00</td><td>0.48</td><td>1.63</td><td><lor< td=""><td>17.75</td><td>0.07</td><td>0.95</td><td>2.56</td><td>9.35</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>12.14</td><td>1.00</td><td>0.48</td><td>1.63</td><td><lor< td=""><td>17.75</td><td>0.07</td><td>0.95</td><td>2.56</td><td>9.35</td></lor<></td></lor<>	12.14	1.00	0.48	1.63	<lor< td=""><td>17.75</td><td>0.07</td><td>0.95</td><td>2.56</td><td>9.35</td></lor<>	17.75	0.07	0.95	2.56	9.35
	Tai Ho Bay 2	2.17	<lor< td=""><td><lor< td=""><td>1.93</td><td><lor< td=""><td>0.73</td><td>1.13</td><td><lor< td=""><td>6.61</td><td>0.07</td><td>0.85</td><td>1.76</td><td>6.29</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.93</td><td><lor< td=""><td>0.73</td><td>1.13</td><td><lor< td=""><td>6.61</td><td>0.07</td><td>0.85</td><td>1.76</td><td>6.29</td></lor<></td></lor<></td></lor<>	1.93	<lor< td=""><td>0.73</td><td>1.13</td><td><lor< td=""><td>6.61</td><td>0.07</td><td>0.85</td><td>1.76</td><td>6.29</td></lor<></td></lor<>	0.73	1.13	<lor< td=""><td>6.61</td><td>0.07</td><td>0.85</td><td>1.76</td><td>6.29</td></lor<>	6.61	0.07	0.85	1.76	6.29

WQO of TIN: 0.5 mg/L

Wet Season WQO of SS: 11.6 mg/L

Note: Cell shaded yellow / red indicate value exceeding the Action/Limit levels. Cell shaded grey indicate value exceeding the WQO.

Table C4 Water Column Profiling Results for SB CMP 2 on 7 July 2015

Stations	Temp	Salinity (ppt)	Turbidity (NTU)		solved ygen (mg L-1)	pH (mg L-1)	Suspended Solids (mg L-1)
WCP1			, ,	. ,			
(Downstream)	26.41	26.45	6.73	52.14	3.62	7.81	8.58
WCP 2 (Upstream)	27.58	23.45	12.55	66.76	4.62	7.81	9.95
WQO (wet season)	N/A	22.45- 25.79#	N/A	N/A	>4	6.5-8.5	11.6

Note: # Not exceeding 2°C of change of the results from the Reference Station.

[#] Not exceeding 2°C of change of the results from the Reference Station.

 $^{^{\#}}$ Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

Cell shaded yellow / red indicate value exceeding the Action/Limit levels.

^{*}Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station. Cell shaded grey indicate value exceeding the WQO.

Annex D

Study Programme

