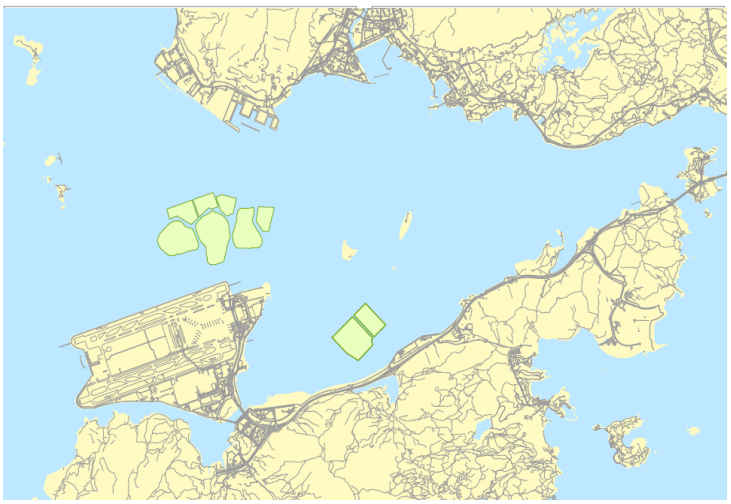


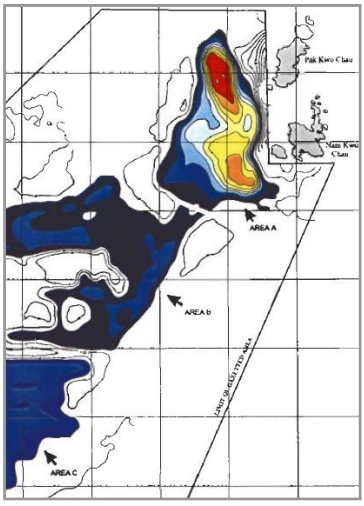




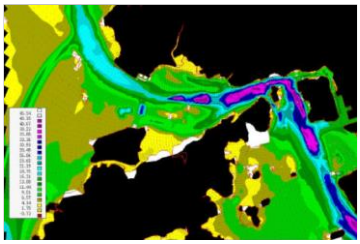

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Civil Engineering and Development Department

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)

33rd Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – May 2015

Final (Revision 1)

3 July 2015

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Revision 1

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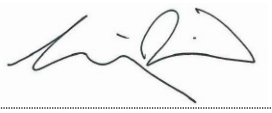
Client:	Project No:
Civil Engineering and Development Department (CEDD)	0175086
Summary: This document presents the 33rd monthly progress report for Contaminated Mud Pits at the South of The Brothers and at East Sha Chau.	Date: 3 July 2015 Approved by:  Craig A. Reid *Partner*

Revision	Description	By	Checked	Approved	Date
v1	33rd Monthly Progress Report for ESC CMPs and SB CMPs	CY	JT	CAR	3/7/15
v0	33rd Monthly Progress Report for ESC CMPs and SB CMPs	CY	JT	CAR	15/6/15

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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:	33rd Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – May 2015
Date of Report:	15 June 2015
Date prepared by ET:	15 June 2015
Date received by IA:	15 June 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/~~plan~~ complies with the above referenced condition of EP-427/2011/A

Craig A. Reid,
Environmental Team Leader:  Date: 15/6/2015

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: 15/6/2015

CONTENTS

ANNEXES

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

33RD MONTHLY PROGRESS REPORT FOR MAY 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.

(1) 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))

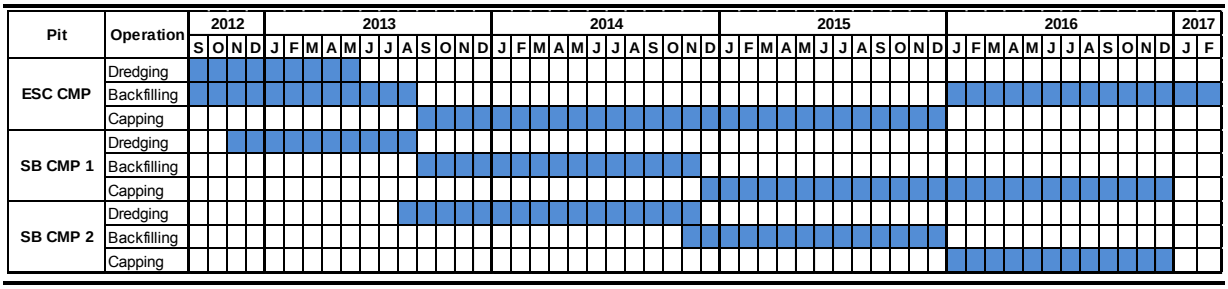
(4) Under the CEDD study *Contaminated Sediment Disposal Facility to the South of The Brothers (Agreement No. FM 2/2009)*

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 May 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



1.2 REPORTING PERIOD

1.2.1 This *33rd Monthly Progress Report* covers the EM&A activities for the reporting month of May 2015.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

1.3.1 No monitoring activities have been undertaken for ESC CMPs in May 2015.

1.3.2 The following monitoring activities have been undertaken for SB CMPs in May 2015:

- *Routine Water Quality Monitoring* of CMP 2 was undertaken on 11 May 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.

- *Pit Specific Sediment Chemistry* of CMP 2 was undertaken on 12 May 2015; and
- *Water Column Profiling* of CMP 2 was undertaken on 13 May 2015.

1.4 DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS

1.4.1 No outstanding sampling remained for May 2015. The following laboratory analyses were still in progress during the preparation of this monthly report and hence are not presented in this monthly report:

- Laboratory analyses of sediment samples collected for *Pit Specific Sediment Chemistry* of CMP 2 in May 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 *33rd Monthly Progress Report*:

- *Routine Water Quality Monitoring* of CMP 2 conducted in April (laboratory measurements) and May 2015;
- Laboratory analyses of sediment samples collected for *Pit Specific Sediment Chemistry* of CMP 2 in April 2015; and
- *Water Column Profiling* of CMP 2 undertaken on 13 May 2015.

1.5.2 *Routine Water Quality Monitoring of SB CMP 2 – April and May 2015*

1.5.3 The monitoring results for the *Routine Water Quality Monitoring* conducted in April and May 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. 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 1-15* of *Annex B* and *Table C2* of *Annex C*. A total of fourteen (14) monitoring stations were sampled in April 2015 and May 2015 as shown in *Figure 1.2.* The *in-situ* data for April 2015 has been discussed in *32nd Monthly Progress Report*.

In-situ Measurements

1.5.4 Analyses of results for May 2015 indicated that the levels of pH and DO complied with the WQOs at all stations (Impact, Intermediate, Reference and Water Sensitive Receiver stations) in May 2015 (*Figures 1-5 of Annex B*). However, the levels of Salinity at all stations (Impact, Intermediate and Water Sensitive Receiver stations) were out of the range of WQO. Salinities at Impact, Intermediate, Ma Wan, Shum Shui Kok and Tai Mo To stations exceeded the WQO while salinities at Tai Ho Bay stations were lower than the WQO. The lower salinities recorded at Tai Ho Bay and Reference stations are likely due to the close proximity of the nearby streams, which release large amount of freshwater runoff in the area during flooding. The Salinities at other stations were above the WQO as they were located further away from the Tai Ho Bay and Reference stations which experienced less freshwater runoff from the nearby streams.

1.5.5 The levels of DO and Turbidity complied with the Action and Limit Levels at all stations (*Figures 3* and 5 of *Annex B*; *Table C1* of *Annex C*).

1.5.6 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 May 2015.

Laboratory Measurements

Laboratory analysis of April and May 2015 results indicated that concentrations of Cadmium, Mercury and Silver were below their limit of reporting at all stations. Arsenic, Chromium, Copper, Lead, Nickel and Zinc were detected in April and May 2015 samples and the concentrations were similar amongst stations (*Figures 6-7* and *11-12* of *Annex B*). Results of laboratory analysis were shown in *Table C3* of *Annex C*.

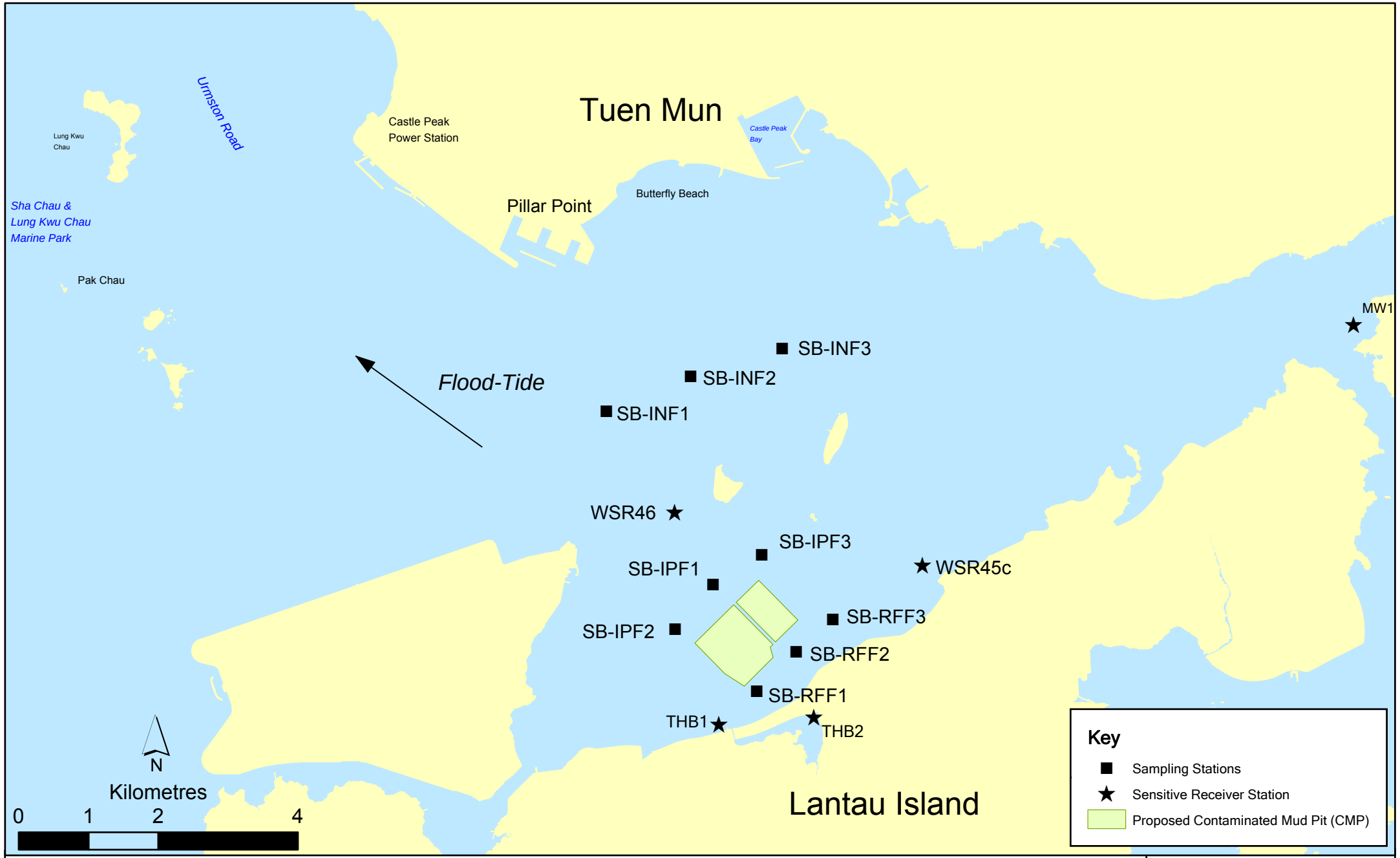


Figure 1.2

Routine & Capping Water Quality Sampling Stations (Flood-Tide) for South Brothers Facility

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Date: 11/12/2012

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1.5.7 For nutrients, concentrations of Total Inorganic Nitrogen (TIN) at all stations in April 2015 complied the WQO (0.5mg/L) while all station in May 2015 exceeded the WQO (*Figures 8* and *13 of Annex B*). It is important to note that due to the effect of the Pearl River, the North Western WCZ has historically experienced higher levels of TIN (1) . In addition, a higher TIN concentration was recorded at Reference stations than Impact station. Therefore, the exceedances of TIN WQO at all stations in May were unlikely to be caused by the disposal operation at CMP 2. Ammonia Nitrogen (NH3-N) concentration was relatively similar amongst all stations (*Figures 8* and *13 of Annex B*). Levels of 5-day Biochemical Oxygen Demand (BOD_5) appear to be higher at Shum Shui Kok, Tai Mo To and Tai Ho Bay 2 stations in April 2015 and at Impact stations in May 2015 (*Figures 9* and *14 of Annex B*).

1.5.8 Concentrations of SS exceeded the WQO (11.6 mg/L for wet season) at Tai Mo To and Tai Ho Bay 1 stations in April 2015 and at Impact and Shum Shui Kok stations in May 2015. However, concentrations of SS complied with the Action and Limit Levels at all stations in April and May 2015 (Figures *10* and *15* of *Annex B*; *Table C3* of *Annex C*).

1.5.9 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 April and May 2015. Detailed statistical analysis will be presented in the Quarterly Report to observe any spatial and temporal trends.

1.5.10 ***Pit Specific Sediment Chemistry of CMP 2 – April 2015***

1.5.11 Monitoring locations for *Pit Specific Sediment Chemistry for CMP 2* are shown in *Figure 1.3*. A total of six (6) monitoring stations were sampled in April 2015.

1.5.12 The concentrations of most inorganic contaminants were lower than the Lower Chemical Exceedance Level (LCEL) at most stations except for Chromium, Copper, Nickel, Silver and Zinc at Active Pit station SB-NPBB and Mercury at Near-Pit stations SB-NNBA and SB-NNBB in April 2015 (*Figures 16-17* of *Annex B*). Chromium, Nickel and Zinc exceeded the LCEL at Active Pit station SB-NPBB while Copper and Silver exceeded the Upper Chemical Exceedance Level (UCEL) at Active Pit station SB-NPBB in April 2015. Mercury exceeded the LCEL at Near-Pit stations SB-NNBA and SB-NNBB in April 2015. As higher Chromium, Copper, Nickel, Silver and Zinc concentrations were recorded within the Active Pit station only which were receiving contaminated mud during the reporting month while higher mercury concentrations were recorded at the Near-Pit stations only, there is no evidence indicating any dispersal of contaminants from the active pit.

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

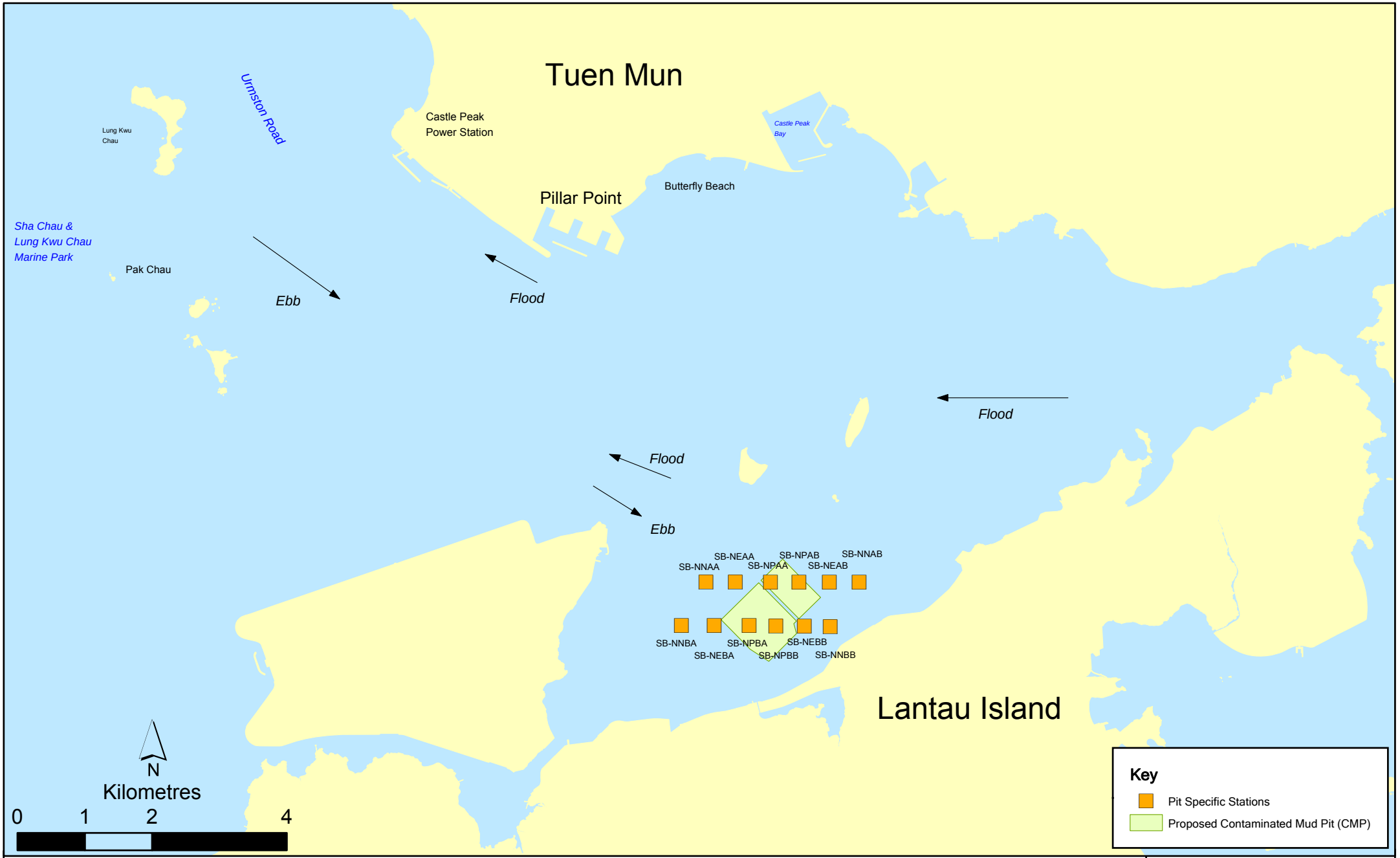

Figure 1.3

Pit Specific Sediment Quality Monitoring Stations for South Brothers Facility

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Date: 12/12/2012

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1.5.13 For organic contaminants, the concentrations of Total Organic Carbon (TOC) were observed to be slightly higher in Active-Pit station SB-NPBB, Pit-Edge SB-NEBA and Near-Pit SB-NNBA (*Figure 18* of *Annex B*). Tributyltin (TBT), total dichlorodiphenyltrichloroethane (DDT), 4,4'-dichlorodiphenyldichloroethylene (DDE), Total Polychlorinated Biphenyls (PCBs), Low and High Molecular Weight Polycyclic Aromatic Hydrocarbons (MW PAHs) were below the limit of reporting at most stations (except for High MW PAHs at Impact station SB-NPBB) in April 2015 (*Figure 19* of *Annex B*).

1.5.14 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 April 2015. Statistical analysis will be undertaken in the quarterly report to investigate whether there are any unacceptable impacts in the area caused by the contaminated mud disposal.

1.5.15 ***Water Column Profiling of CMP 2 – May 2015***

1.5.16 *Water Column Profiling* was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 13 May 2015. The water quality monitoring results have been assessed for compliance with the WQOs as discussed in *Section 1.5.3*. The monitoring results were also compared with the Action and Limit Levels set in *Baseline Monitoring Report* (see *Table C1* of *Annex C* for details).

In-situ Measurements

1.5.17 Analyses of results for May 2015 indicated that levels of Salinity, DO and pH complied with the WQOs at both Downstream and Upstream stations (*Table C4* of *Annex C*). DO and Turbidity at all stations complied with the Action and Limit Levels (*Tables C1* and *C4* of *Annex C*).

Laboratory Measurements for SS

1.5.18 Analyses of results for May 2015 indicated that the Suspended Solid (SS) levels at both Upstream and Downstream stations exceeded the WQO. It is considered that the exceedance of SS was possibly caused by natural background variation of water quality in the area. However, both Upstream and Downstream stations complied with the Action and Limit Levels (*Tables C1 and C4* of *Annex C*).

1.5.19 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.

1.6 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

1.6.1 The following monitoring activities will be conducted in the next monthly period of June 2015 for SB CMPs:

- *Pit Specific Sediment Chemistry of CMP 2;*
- *Cumulative Impact Specific Chemistry of CMP 2;*
- *Water Column Profiling of CMP 2;* and
- *Water Quality Monitoring during Capping Operations of CMP 1.*

1.6.2 The following monitoring activity will be conducted in the next monthly period of June 2015 for ESC CMPs.

- *Water Quality Monitoring during Capping of ESC CMP.*

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

1.7 STUDY PROGRAMME

1.7.1 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				2013											2014												2015												2016												2017	
Pit Specific Sediment Chemistry	**Code**	**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**
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**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
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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	**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**
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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**
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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**
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ESC-TSA					*	*					*	*																													*	*					*	*				*	*
ESC-TSB					*	*					*	*																													*	*					*	*				*	*

Water Column Profiling		**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**
Plume Stations	WCP1	*	*	*	*	*	*	*	*	*	*	*	*																													*	*	*	*	*	*	*	*	*	*	*	*	*	*
	WCP2	*	*	*	*	*	*	*	*	*	*	*	*																													*	*	*	*	*	*	*	*	*	*	*	*	*	*

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

	2012				2013												2014												2015												2016												2017	
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	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
Capped Contaminated Mud Pits IVa-c																																																		
ESC-CPA				*								*				*								*				*								*				*								*				*		
ESC-CPB				*								*				*								*				*								*				*								*				*		
ESC-CPC				*								*				*								*				*								*				*								*				*		
Reference Stations																																																								
ESC-RBA				*								*				*								*				*								*				*								*				*		
ESC-RBB				*								*				*								*				*								*				*								*				*		
ESC-RBC				*								*				*								*				*								*				*								*				*		

Impact Monitoring for Dredging	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
Upstream/Reference Stations																																																						
US1	*	*	*	*	*	*	*	*	*																																												
US2	*	*	*	*	*	*	*	*	*																																												
Downstream/Impact Stations																																																						
DS1	*	*	*	*	*	*	*	*	*																																											
DS2	*	*	*	*	*	*	*	*	*																																											
DS3	*	*	*	*	*	*	*	*	*																																											
DS4	*	*	*	*	*	*	*	*	*																																											
DS5	*	*	*	*	*	*	*	*	*																																											
Ma Wan Station																																																						
MW1	*	*	*	*	*	*	*	*	*																																											

Capping	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
Ebb Tide																																																					
Impact Station																																																						
ESC-IPE1																*		*				*		*				*		*				*																					
ESC-IPE2																*		*				*		*				*		*				*																					
ESC-IPE3																*		*				*		*				*		*				*																					
ESC-IPE4																*		*				*		*				*		*				*																					
ESC-IPE5																*		*				*		*				*		*				*																					
Intermediate Station																																																						
ESC-INE1																*		*				*		*				*		*				*																					
ESC-INE2																*		*				*		*				*		*				*																					
ESC-INE3																*		*				*		*				*		*				*																					
ESC-INE4																*		*				*		*				*		*				*																					
ESC-INE5																*		*				*		*				*		*				*																					
Reference Station																																																						
ESC-RFE1																*		*				*		*				*		*				*																					
ESC-RFE2																*		*				*		*				*		*				*																					
ESC-RFE3																*		*				*		*				*		*				*																					
ESC-RFE4																*		*				*		*				*		*				*																					
ESC-RFE5																*		*				*		*				*		*				*																					
Ma Wan Station																																																						
MW1																*		*				*		*				*		*				*																					
Flood Tide																																																					
Impact Station																																																						
ESC-IPF1																*		*				*		*				*		*				*																					
ESC-IPF2																*		*				*		*				*		*				*																					
ESC-IPF3																*		*				*		*				*		*				*																					
Intermediate Station																																																						
ESC-INF1																*		*				*		*				*		*				*																					
ESC-INF2																*		*				*		*				*		*				*																					
ESC-INF3																*		*				*		*				*		*				*																					
Reference Station																																																						
ESC-RFF1																*		*				*		*				*		*				*																					
ESC-RFF2																*		*				*		*				*		*				*																					
ESC-RFF3																*		*				*		*				*		*				*																					
Ma Wan Station																																																						
MW1																*		*				*		*				*		*				*																					

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

Routine Water Quality Monitoring		2012 S	2012 O	2012 N	2012 D	2013 J	2013 F	2013 M	2013 A	2013 M	2013 J	2013 J	2013 A	2013 S	2013 O	2013 N	2013 D	2014 J	2014 F	2014 M	2014 A	2014 M	2014 J	2014 J	2014 A	2014 S	2014 O	2014 N	2014 D	2015 J	2015 F	2015 M	2015 A	2015 M	2015 J	2015 J	2015 A	2015 S	2015 O	2015 N	2015 D	2016 J	2016 F	2016 M	2016 A	2016 M	2016 J	2016 J	2016 A	2016 S	2016 O	2016 N	2016 D	2017 J	2017 F
Ebb Tide																																																					
Impact Station																																																						
	ESC-IPE1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-IPE2		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-IPE3		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-IPE4		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-IPE5		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
Intermediate Station																																																						
	ESC-INE1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-INE2		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-INE3		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-INE4		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-INE5		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
Reference Station																																																						
	ESC-RFE1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-RFE2		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-RFE3		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-RFE4		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-RFE5		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
Ma Wan Station																																																						
	MW1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
Flood Tide																																																					
Impact Station																																																						
	ESC-IPF1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-IPF2		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-IPF3		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
Intermediate Station																																																						
	ESC-INF1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-INF2		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-INF3		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
Reference Station																																																						
	ESC-RFF1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-RFF2		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
	ESC-RFF3		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*
Ma Wan Station																																																						
	MW1		*	*		*	*		*	*		*	*																													*	*		*	*		*	*		*	*		*	*

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

			2012						2013												2014												2015												2016												2017	
Baseline Monitoring Prior to Dredging	**Code**	**Frequency**	**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**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Far Field Stations																																																							
	SB-WFA	3 days per week for 4 weeks	*	*																																																		
	SB-WFB	3 days per week for 4 weeks	*	*																																																	
Mid Field Stations																																																						
	SB-WMA	3 days per week for 4 weeks	*	*																																																	
	SB-WMB	3 days per week for 4 weeks	*	*																																																	
Near Field Stations																																																						
	SB-WNAA	3 days per week for 4 weeks	*	*																																																	
	SB-WNAB	3 days per week for 4 weeks	*	*																																																	
	SB-WNBA	3 days per week for 4 weeks	*	*																																																	
	SB-WNBB	3 days per week for 4 weeks	*	*																																																	
Reference Stations																																																						
	NM1	3 days per week for 4 weeks	*	*																																																	
	NM2	3 days per week for 4 weeks	*	*																																																	
	NM3	3 days per week for 4 weeks	*	*																																																	
	NM5	3 days per week for 4 weeks	*	*																																																	
	NM6	3 days per week for 4 weeks	*	*																																																	
Sensitive Receiver Stations																																																						
	MW1	3 days per week for 4 weeks	*	*																																																	
	THB1	3 days per week for 4 weeks	*	*																																																	
	THB2	3 days per week for 4 weeks	*	*																																																	
	WSR45C	3 days per week for 4 weeks	*	*																																																	
	WSR46	3 days per week for 4 weeks	*	*																																																	

Impact Monitoring for Dredging			**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**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Upstream Stations																																																								
	US1	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	US2	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
Downstream Stations																																																							
	DS1	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	DS2	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	DS3	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	DS4	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	DS5	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
Sensitive Receiver Stations																																																							
	MW1	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	THB1	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	THB2	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	WSR45C	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									
	WSR46	3 days per week					*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*																									

Pit Specific Sediment Chemistry			**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**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
SB CMP 1 Active																																																						
Near-Pit																																																						
	SB-NNAA	Monthly														12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12																									
	SB-NNAB	Monthly														12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12																									
Pit-Edge																																																						
	SB-NEAA	Monthly														12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12																									
	SB-NEAB	Monthly														12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12																									
Active-Pit																																																					
	SB-NPAA	Monthly														12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12																									
	SB-NPAB	Monthly														12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12																									
SB CMP 2 Active																																																						
Near-Pit																																																						
	SB-NNBA	Monthly																														12	12	12	12	12	12	12	12	12	12	12	12													
	SB-NNBB	Monthly																														12	12	12	12	12	12	12	12	12	12	12	12													
Pit-Edge																																																						
	SB-NEBA	Monthly																														12	12	12	12	12	12	12	12	12	12	12	12													
	SB-NEBB	Monthly																														12	12	12	12	12	12	12	12	12	12	12	12													
Active-Pit																																																						
	SB-NPBA	Monthly																														12	12	12	12	12	12	12	12	12	12	12	12													
	SB-NPBB	Monthly																														12	12	12	12	12	12	12	12	12	12	12	12													

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

			2012						2013												2014												2015												2016												2017	
Cumulative Impact Sediment Chemistry			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	M	A	M	J	J	A	S	O	N	D	J	F
Near-field Stations																																																							
	SB-RNA	4 times per year														12				12		12				12		12				12		12				12		12				12														
	SB-RNB	4 times per year														12				12		12				12		12				12		12				12		12				12														
Mid-field Stations																																																								
	SB-RMA	4 times per year														12				12		12				12		12				12		12				12		12				12														
	SB-RMB	4 times per year														12				12		12				12		12				12		12				12		12				12														
Far-Field Stations																																																							
	SB-RFA	4 times per year														12				12		12				12		12				12		12				12		12				12														
	SB-RFB	4 times per year														12				12		12				12		12				12		12				12		12				12														
Capped Pit Stations																																																						
	SB-RCA	4 times per year														12				12		12				12		12				12		12				12		12				12														
	SB-RCB	4 times per year														12				12		12				12		12				12		12				12		12				12														
Sensitive Receiver Stations																																																						
	MW1	4 times per year														12				12		12				12		12				12		12				12		12				12														
	THB1	4 times per year														12				12		12				12		12				12		12				12		12				12														
	THB2	4 times per year														12				12		12				12		12				12		12				12		12				12														

			2012						2013												2014												2015												2016												2017	
Sediment Toxicity Tests			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	M	A	M	J	J	A	S	O	N	D	J	F
SB CMP 1 Active																																																					
Reference																																																							
	SB-TRA	2 times per year														5						5				5																														
	SB-TRB	2 times per year														5						5				5																														
Near-Field																																																						
	SB-TAA	2 times per year														5						5				5																														
	SB-TAB	2 times per year														5						5				5																														
Sensitive Receiver Stations																																																					
	MW1	2 times per year														5						5				5																														
	THB1	2 times per year														5						5				5																														
	THB2	2 times per year														5						5				5																														
SB CMP 2 Active																																																					
Reference																																																						
	SB-TRA	2 times per year																																5						5																
	SB-TRB	2 times per year																																5						5																
Near-Field																																																					
	SB-TBA	2 times per year																																5						5																
	SB-TBB	2 times per year																																5						5																
Sensitive Receiver Stations																																																					
	MW1	2 times per year																																5						5																
	THB1	2 times per year																																5						5																
	THB2	2 times per year																																5						5																

			2012						2013												2014												2015												2016												2017	
Tissue/ Whole Body Sampling			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	M	A	M	J	J	A	S	O	N	D	J	F
Near-Pit Stations																																																						
	SB-INA	2 times per year																				*						*						*						*																
	SB-INB	2 times per year																				*						*						*						*																
Reference North																																																						
	TNA	2 times per year																				*						*						*						*																
	TNB	2 times per year																				*						*						*						*																
Reference South																																																						
	TSA	2 times per year																				*						*						*						*																
	TSB	2 times per year																				*						*						*						*																

			2012						2013												2014												2015												2016												2017	
Demersal Trawling			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	M	A	M	J	J	A	S	O	N	D	J	F
Impact																																																						
	SB-INA 1-5	4 times per year														5					5	5				5	5					5	5					5	5																
	SB-INB 1-5	4 times per year														5					5	5				5	5					5	5					5	5																
Reference North																																																					
	TNA 1-5	4 times per year														5					5	5				5	5					5	5					5	5																
	TNB 1-5	4 times per year														5					5	5				5	5					5	5					5	5																
Reference South																																																					
	TSA 1-5	4 times per year														5					5	5				5	5					5	5					5	5																
	TSB 1-5	4 times per year														5					5	5				5	5					5	5					5	5																

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

			2012						2013												2014												2015												2016												2017	
Routine Water Quality Monitoring			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	M	A	M	J	J	A	S	O	N	D	J	F
Ebb Tide																																																										
Impact Stations Downcurrent																																																										
	SB-IPE1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-IPE2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-IPE3	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-IPE4	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-IPE5	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
Intermediate Stations Downcurrent																																																										
	SB-INE1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-INE2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-INE3	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-INE4	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-INE5	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
Reference Stations Upcurrent																																																										
	SB-RFE1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-RFE2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-RFE3	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-RFE4	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-RFE5	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
Sensitive Receiver Stations																																																										
	MW1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	THB1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	THB2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	WSR45C	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	WSR46	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
Flood Tide																																																										
Impact Stations Downcurrent																																																										
	SB-IPF1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-IPF2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-IPF3	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
Intermediate Stations Downcurrent																																																										
	SB-INF1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-INF2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-INF3	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
Reference Stations Upcurrent																																																										
	SB-RFF1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-RFF2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	SB-RFF3	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
Sensitive Receiver Stations																																																										
	MW1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	THB1	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	THB2	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	WSR45C	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															
	WSR46	8 times per year														8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8		8	8															

Water Column Profiling			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	M	A	M	J	J	A	S	O	N	D	J	F
Plume Stations	WCP1	Monthly														4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4														
	WCP2	Monthly														4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4														

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

			2012						2013												2014												2015												2016												2017	
Capping Water Quality Monitoring			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	M	A	M	J	J	A	S	O	N	D	J	F
Ebb Tide																																																				
Impact Stations Downcurrent																																																				
	SB-IPE1	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-IPE2	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-IPE3	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-IPE4	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-IPE5	4 times per year																												3		3				3		3				3		3				3		3				3	
Intermediate Stations Downcurrent																																																					
	SB-INE1	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-INE2	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-INE3	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-INE4	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-INE5	4 times per year																												3		3				3		3				3		3				3		3				3	
Reference Stations Upcurrent																																																					
	SB-RFE1	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-RFE2	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-RFE3	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-RFE4	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-RFE5	4 times per year																												3		3				3		3				3		3				3		3				3	
Sensitive Receiver Stations																																																					
	MW1	4 times per year																												3		3				3		3				3		3				3		3				3	
	THB1	4 times per year																												3		3				3		3				3		3				3		3				3	
	THB2	4 times per year																												3		3				3		3				3		3				3		3				3	
	WSR45C	4 times per year																												3		3				3		3				3		3				3		3				3	
	WSR46	4 times per year																												3		3				3		3				3		3				3		3				3	
Flood Tide																																																				
Impact Stations Downcurrent																																																				
	SB-IPF1	4 times per year																												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																												3		3				3		3				3		3				3		3				3	
Intermediate Stations Downcurrent																																																					
	SB-INF1	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-INF2	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-INF3	4 times per year																												3		3				3		3				3		3				3		3				3	
Reference Stations Upcurrent																																																					
	SB-RFF1	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-RFF2	4 times per year																												3		3				3		3				3		3				3		3				3	
	SB-RFF3	4 times per year																												3		3				3		3				3		3				3		3				3	
Sensitive Receiver Stations																																																					
	MW1	4 times per year																												3		3				3		3				3		3				3		3				3	
	THB1	4 times per year																												3		3				3		3				3		3				3		3				3	
	THB2	4 times per year																												3		3				3		3				3		3				3		3				3	
	WSR45C	4 times per year																												3		3				3		3				3		3				3		3				3	
	WSR46	4 times per year																												3		3				3		3				3		3				3		3				3	

Benthic Recolonisation Studies			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	M	A	M	J	J	A	S	O	N	D	J	F
Capped Contaminated Mud Pits																																																							
	SB-CPA	2 times per year																																																								
	SB-CPB	2 times per year																																																							
Reference Stations																																																								
	RBA	2 times per year																																																								
	RBB	2 times per year																																																							
	RBC	2 times per year																																																							

Notes:
"*" = Number of replicates depends on parameters
Naming of stations are tentative only and will be subjected to changes

Annex B

Graphical Presentations

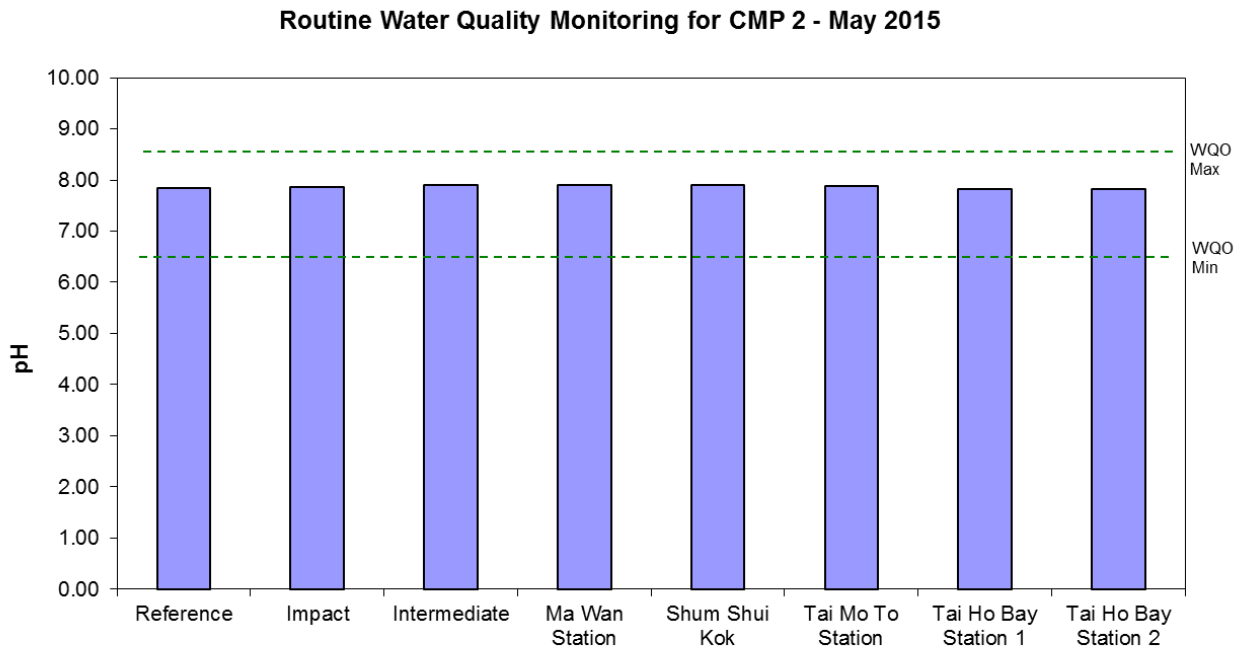


Figure 1: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

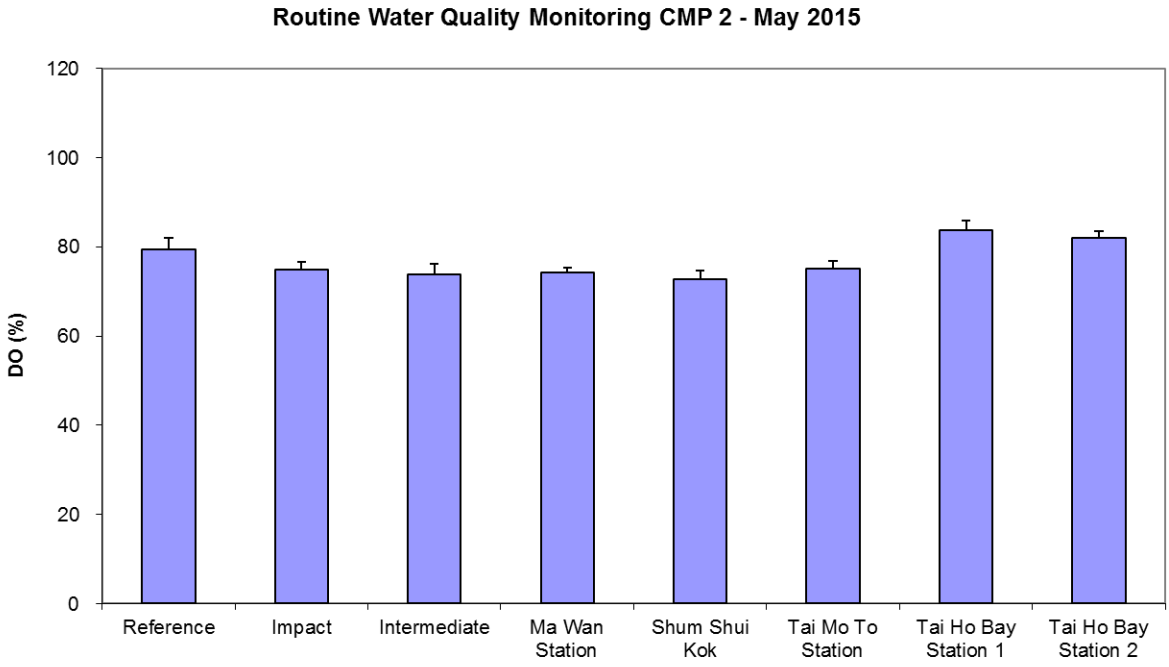


Figure 2: Level of Dissolved Oxygen (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

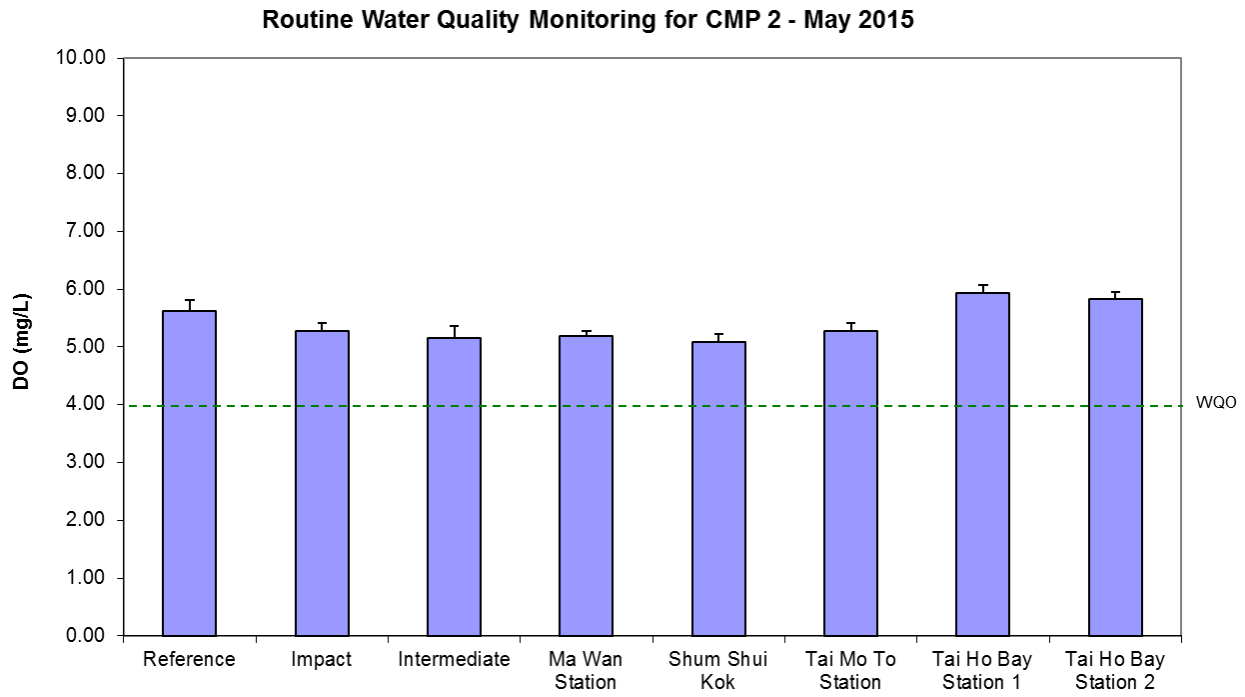


Figure 3: Concentration of Dissolved Oxygen (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

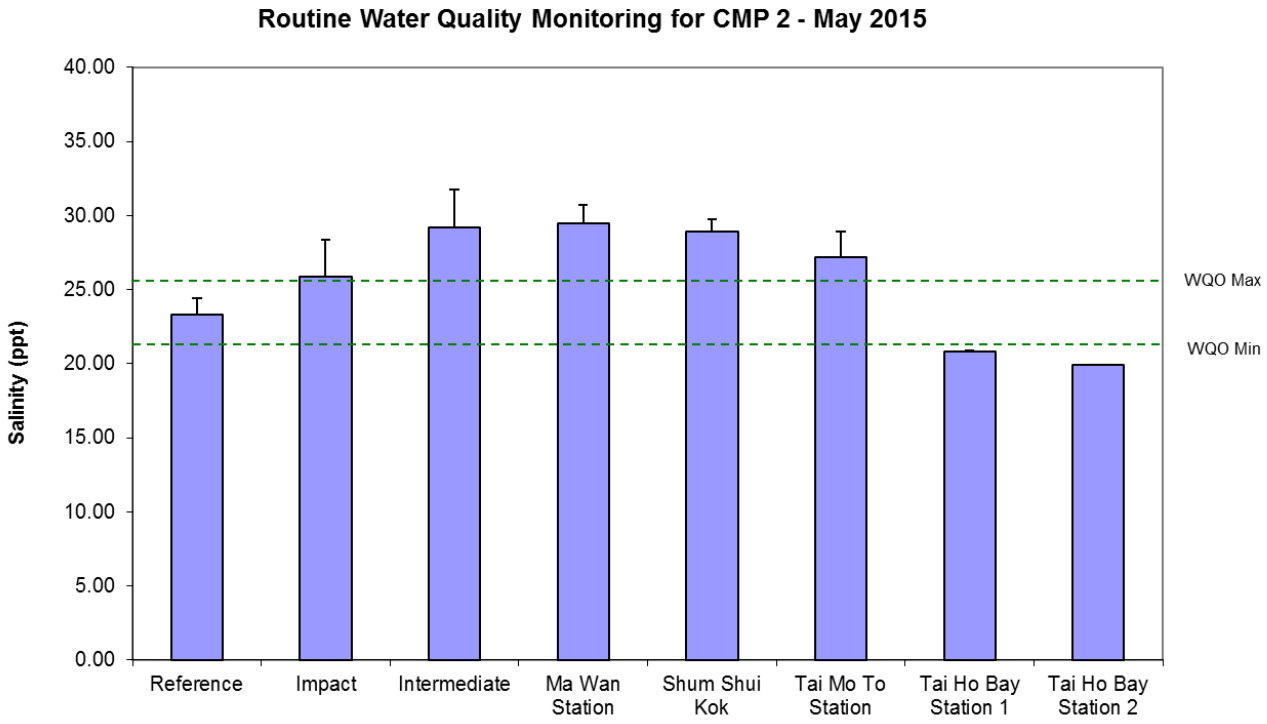


Figure 4: Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

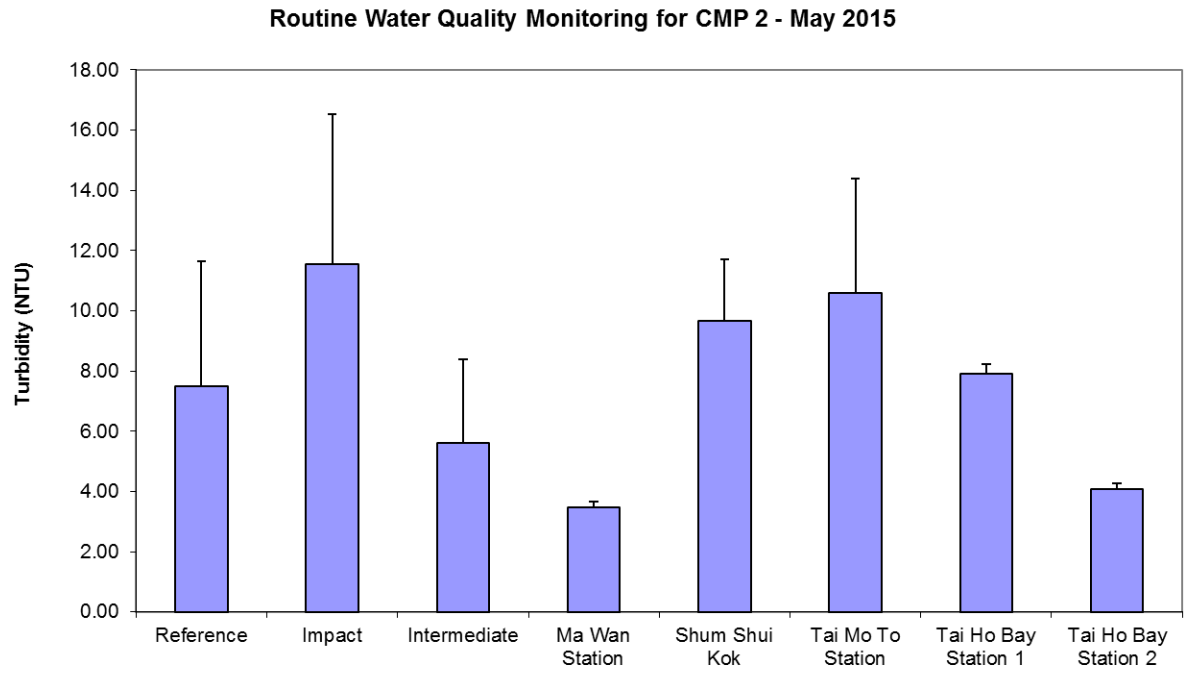


Figure 5: Levels of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

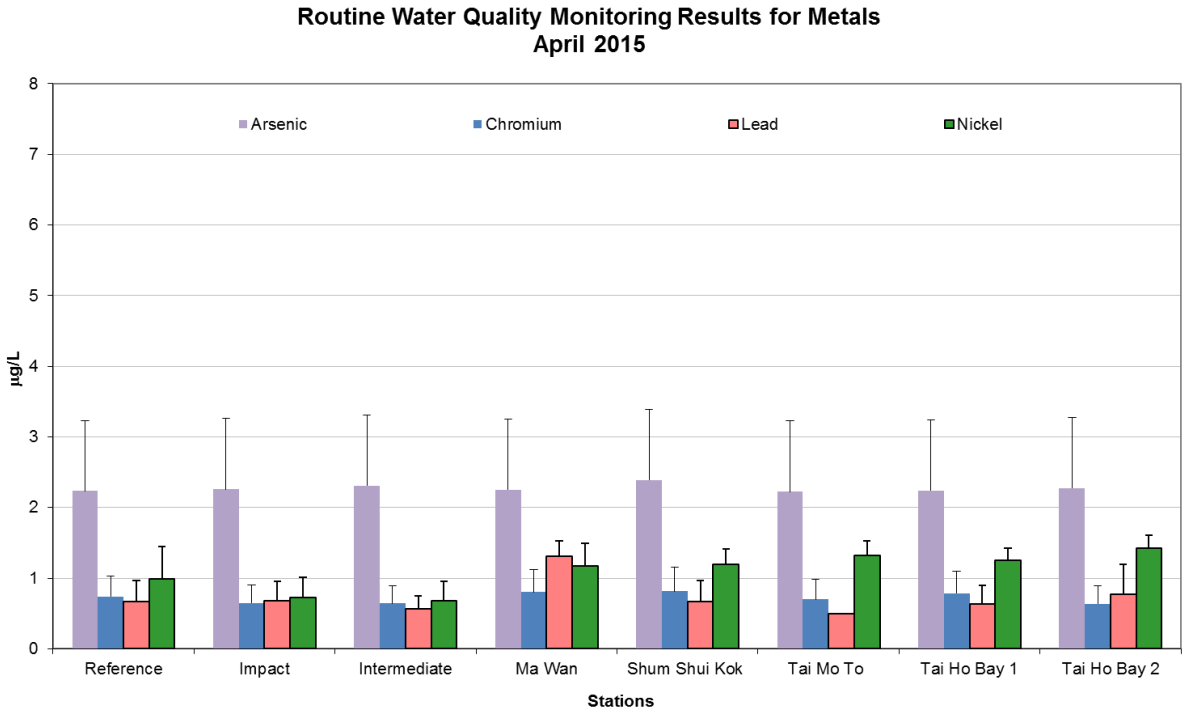


Figure 6: Concentration of Arsenic, Chromium, Lead, Nickel (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in April 2015.

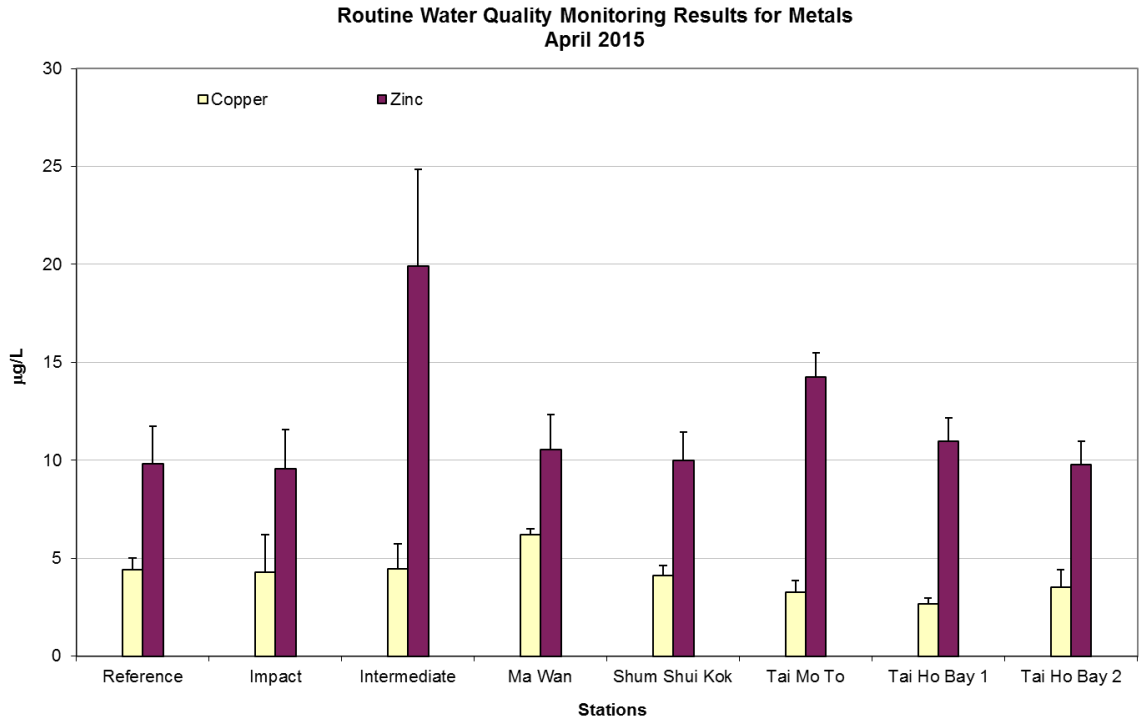


Figure 7: Concentration of Copper and Zinc (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in April 2015.

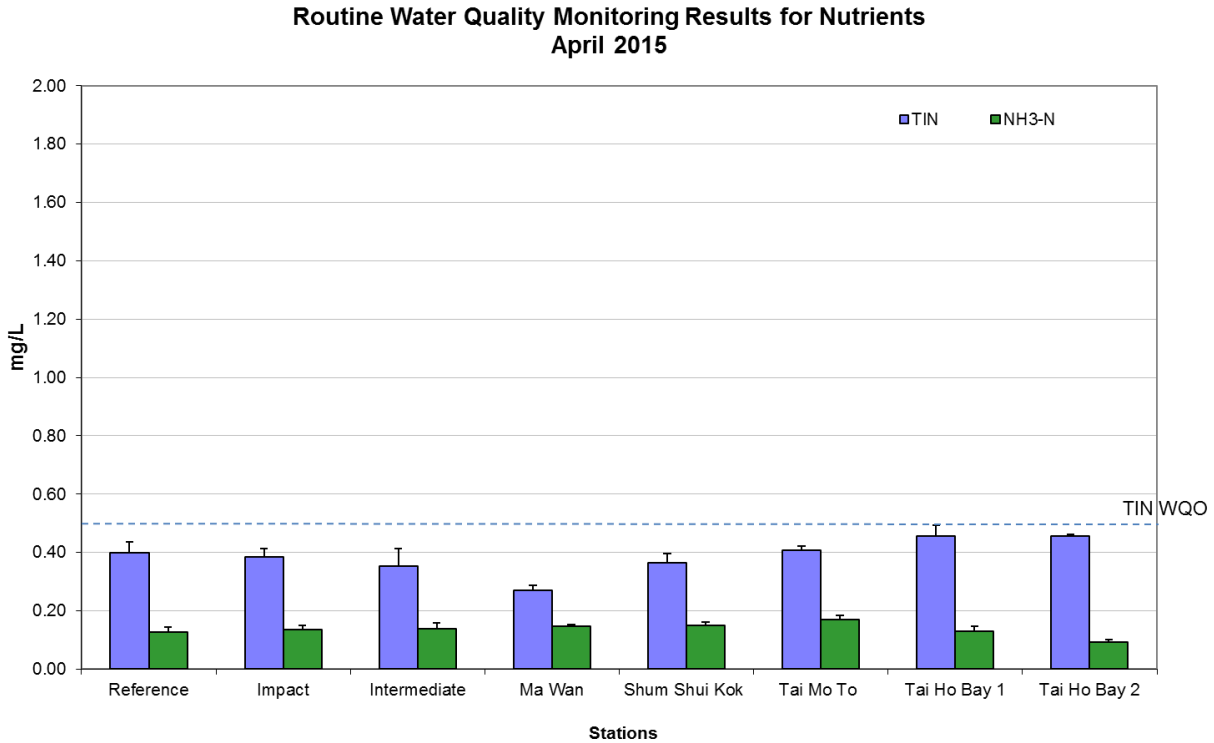


Figure 8: Concentration of Total Inorganic Nitrogen and NH_3-N (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in April 2015.

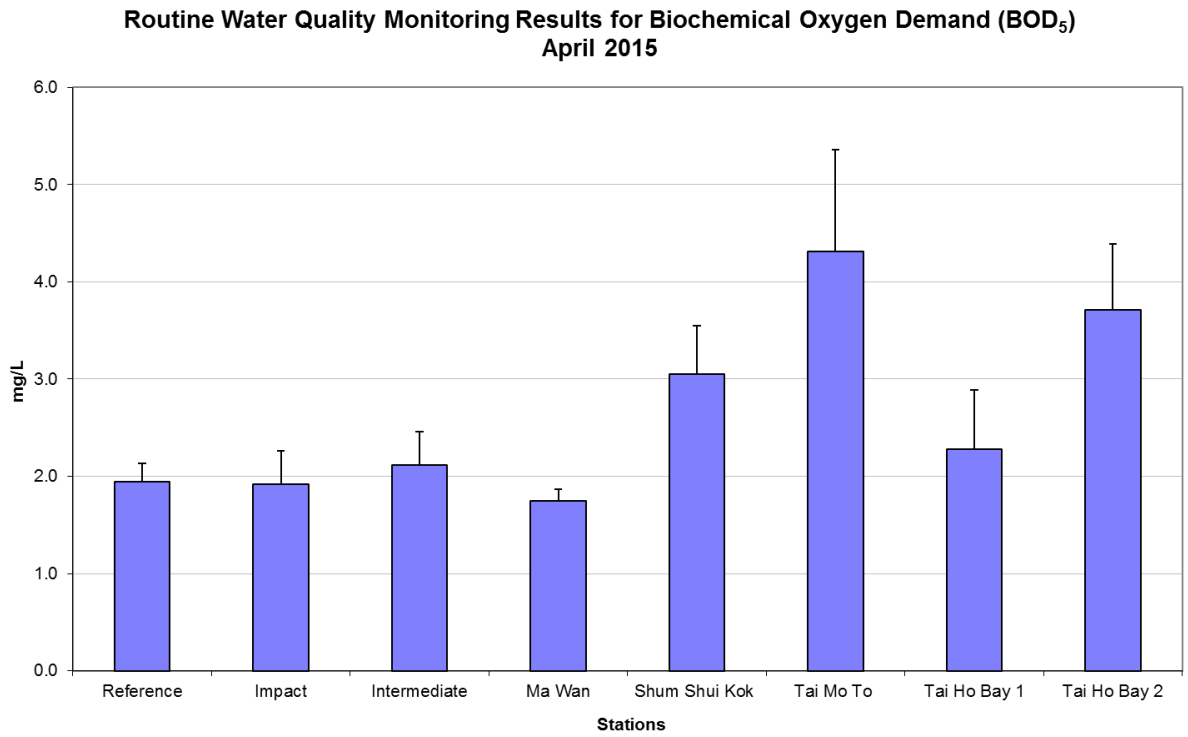


Figure 9: Level of Biochemical Oxygen Demand (BOD_5) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in April 2015.

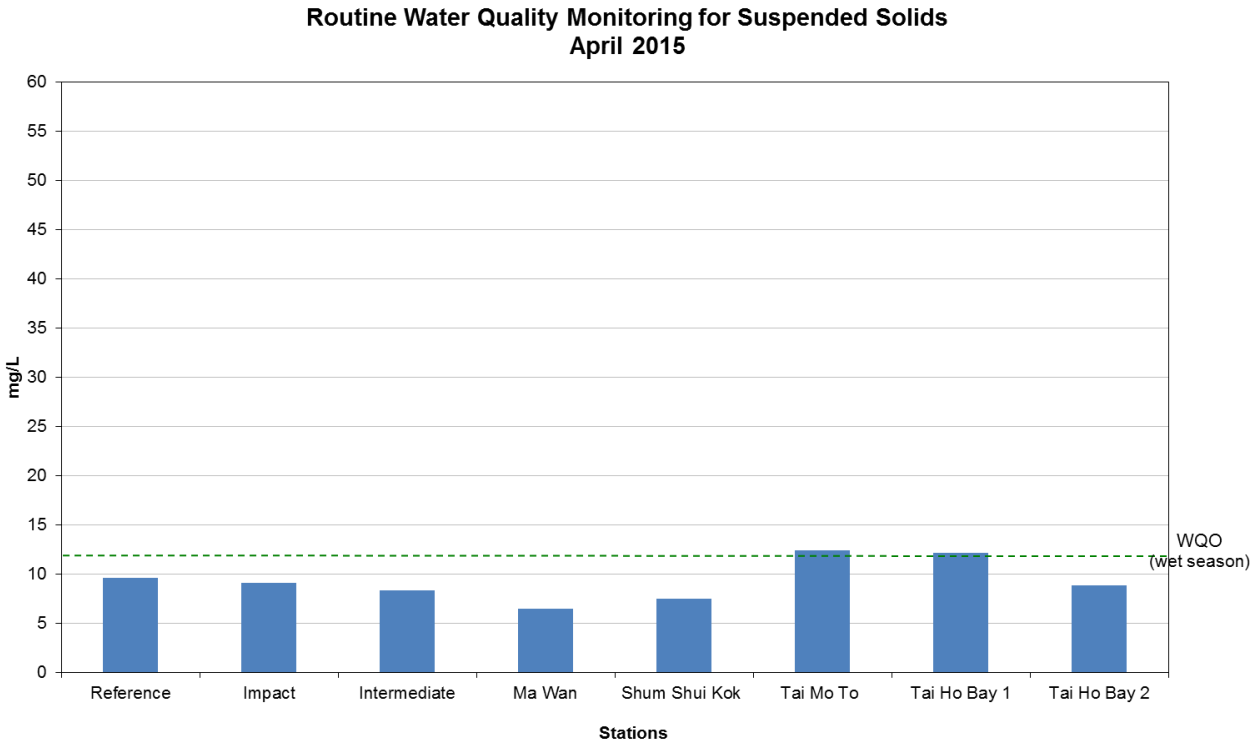


Figure 10: Concentration of Suspended Solids (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in April 2015.

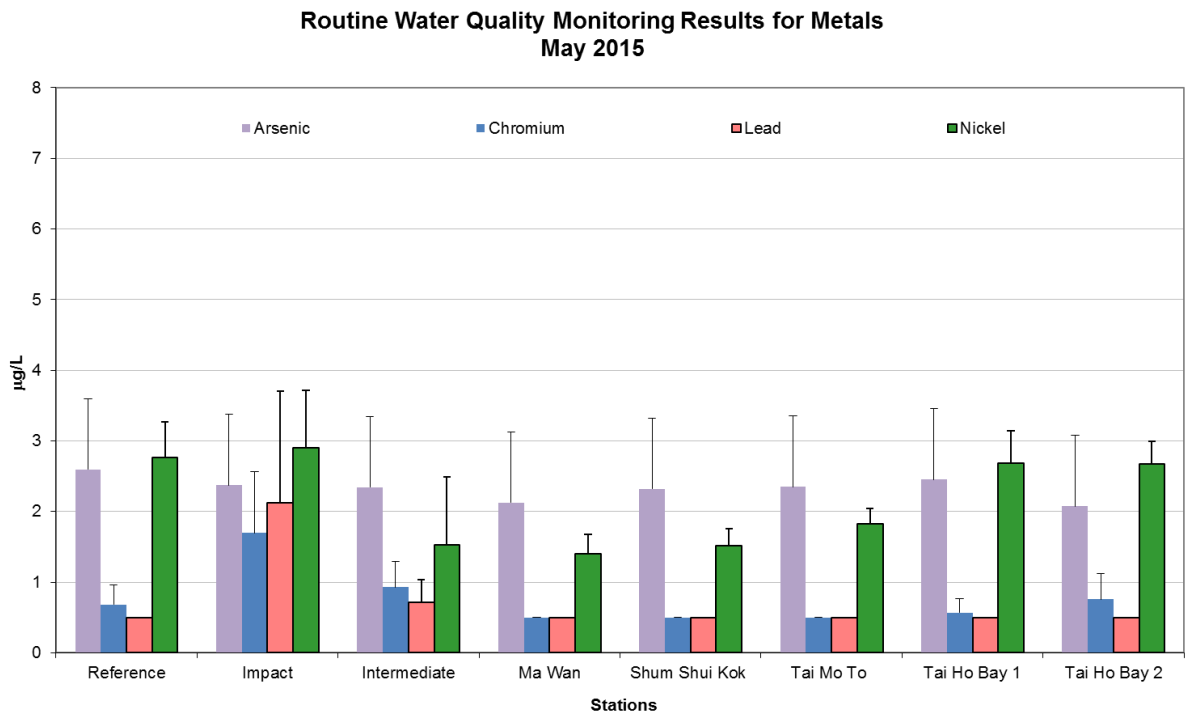


Figure 11: Concentration of Arsenic, Chromium, Lead, Nickel (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

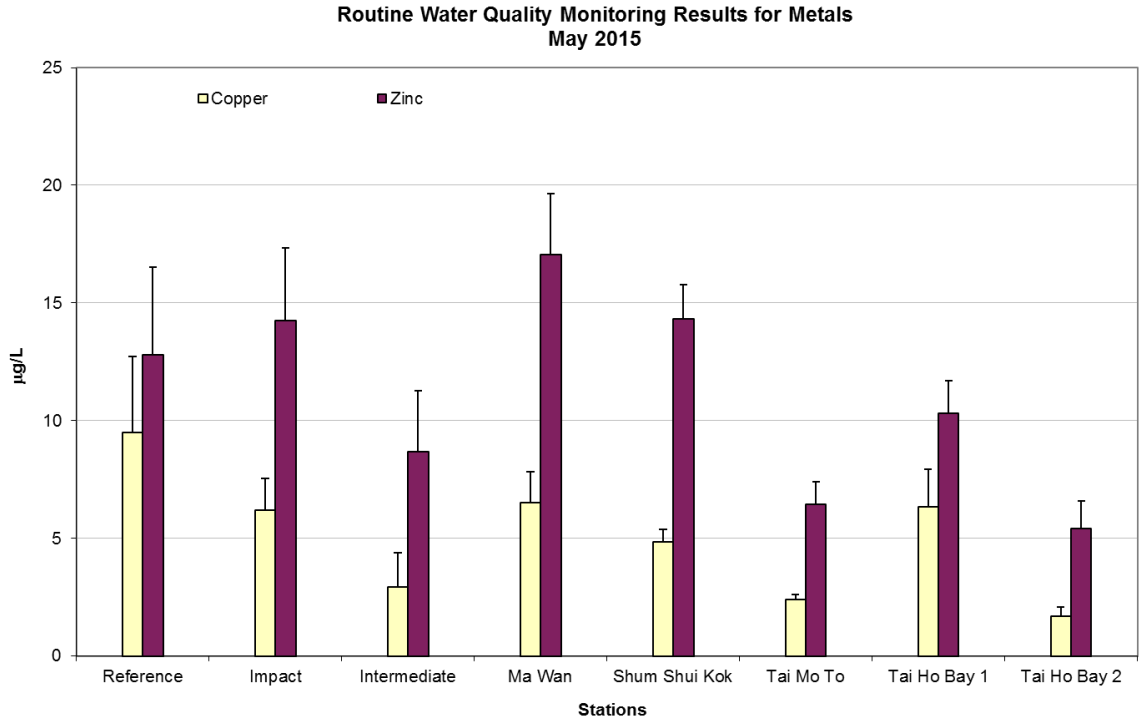


Figure 12: Concentration of Copper and Zinc (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

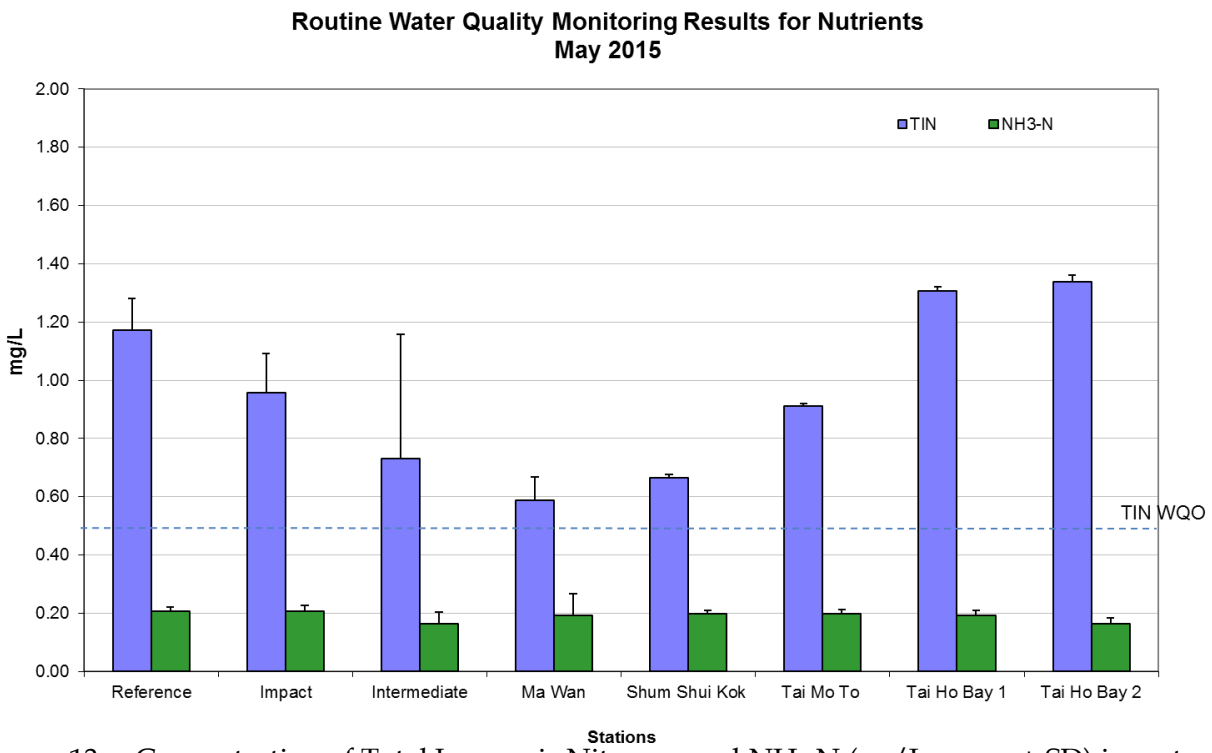


Figure 13: Concentration of Total Inorganic Nitrogen and NH_3-N (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in February 2015.

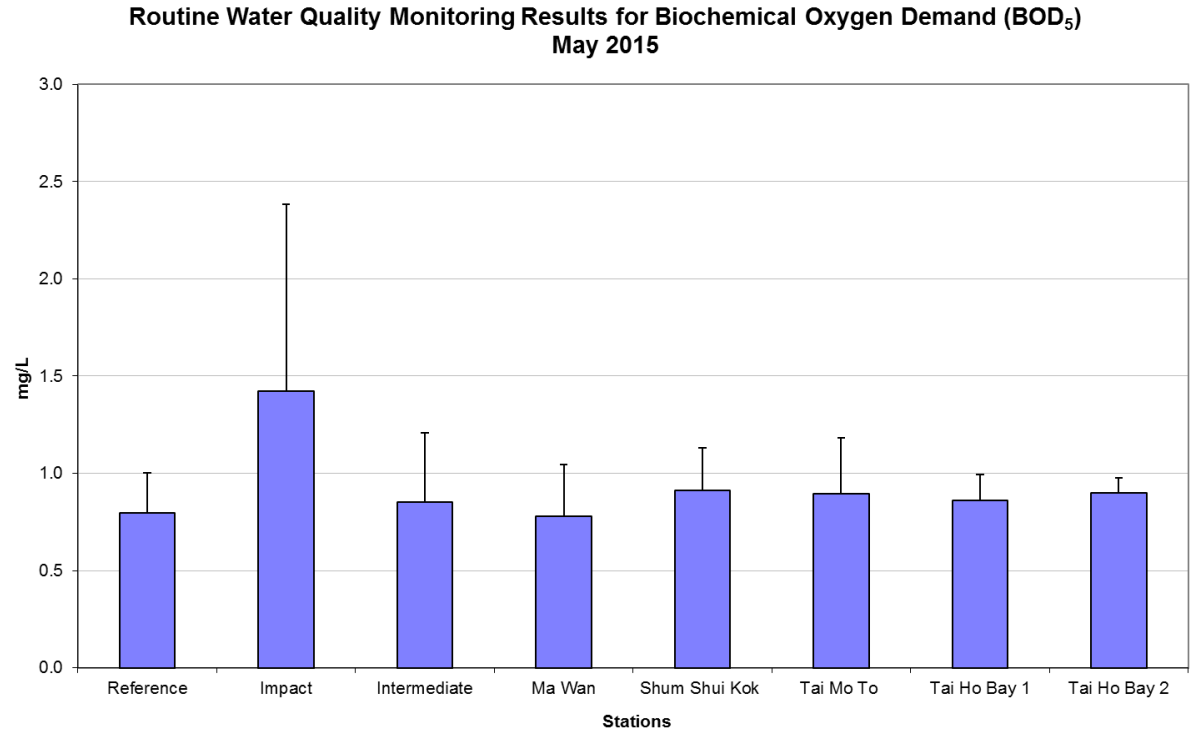


Figure 14: Level of Biochemical Oxygen Demand (BOD_5) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

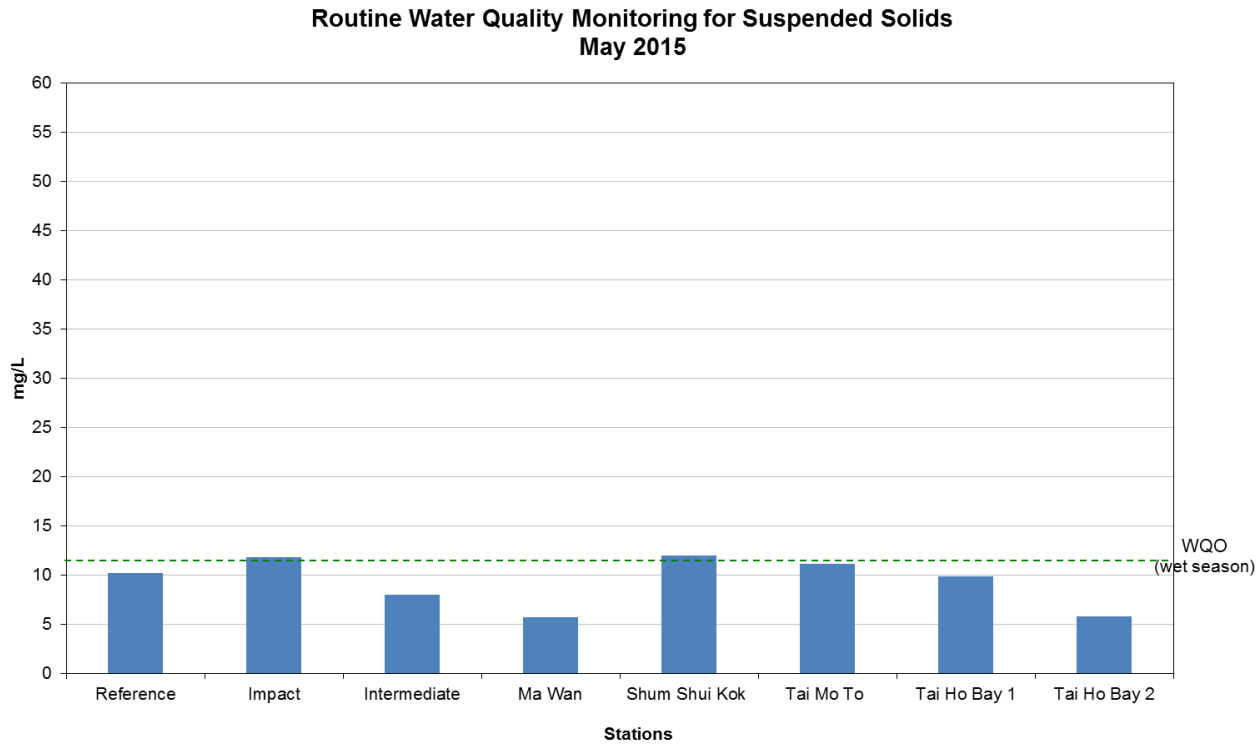


Figure 15: Concentration of Suspended Solids (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP 2 in May 2015.

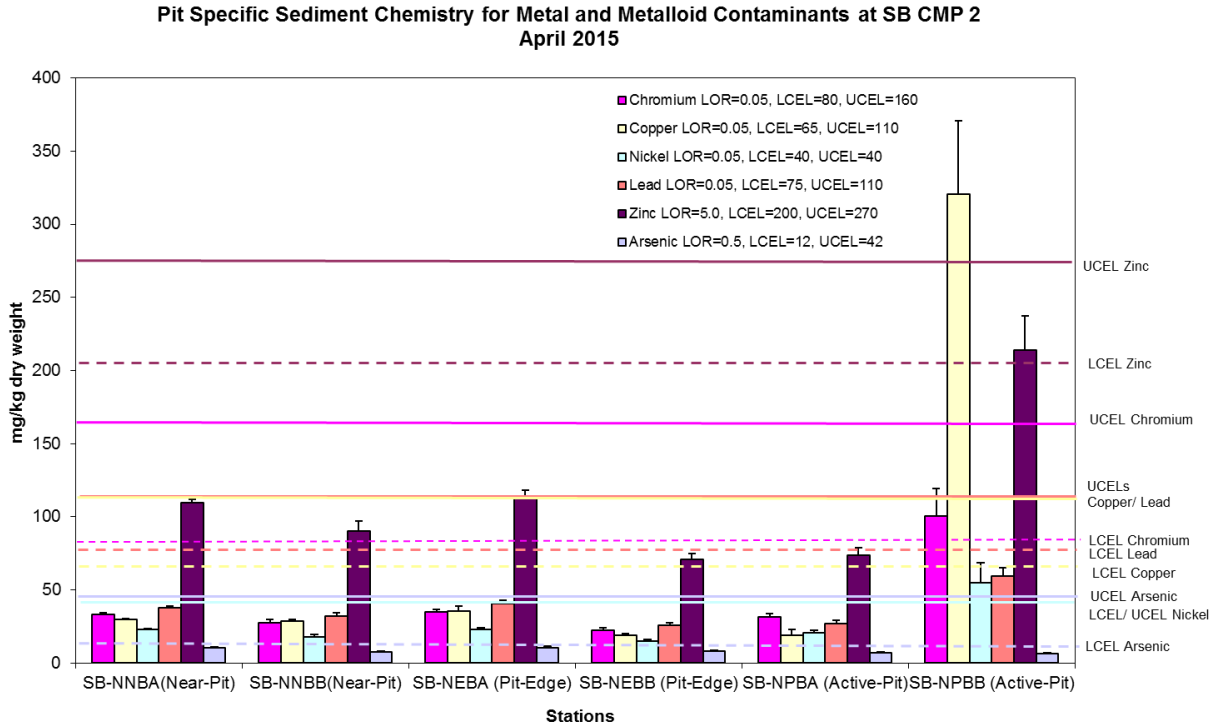


Figure 16: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As) (mg/kg dry weight; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 2 in April 2015.

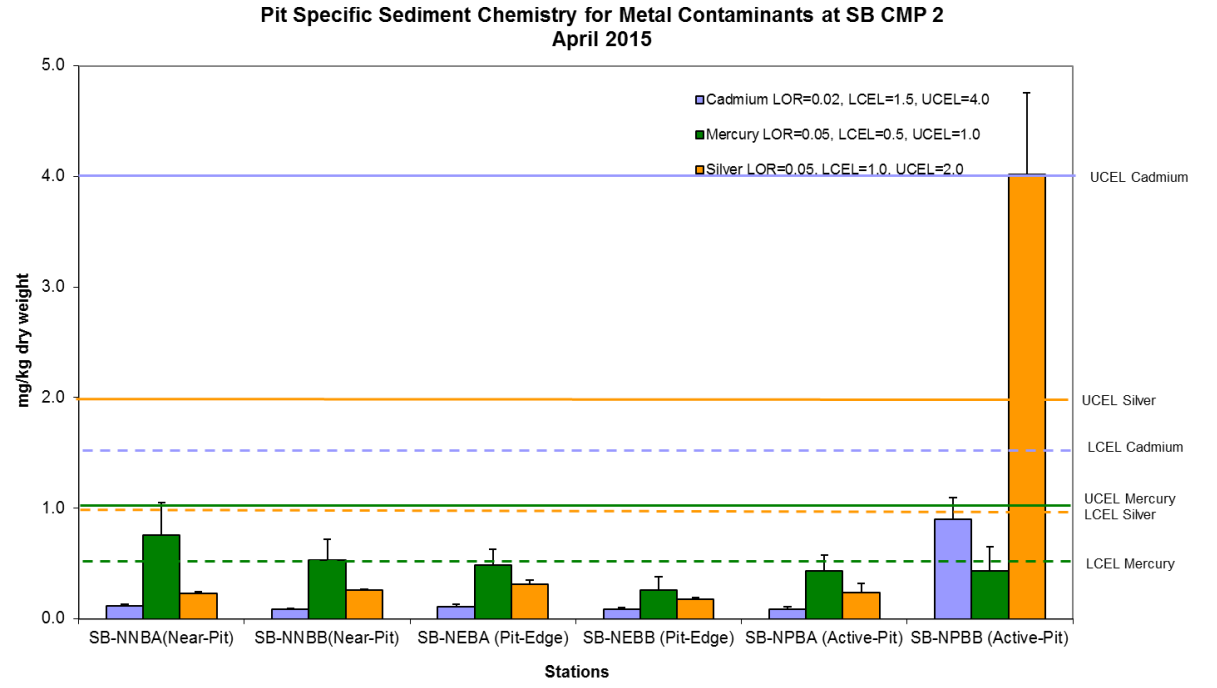


Figure 17: Concentration of Metals (Cd, Hg, Ag) (mg/kg dry weight; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 2 in April 2015.

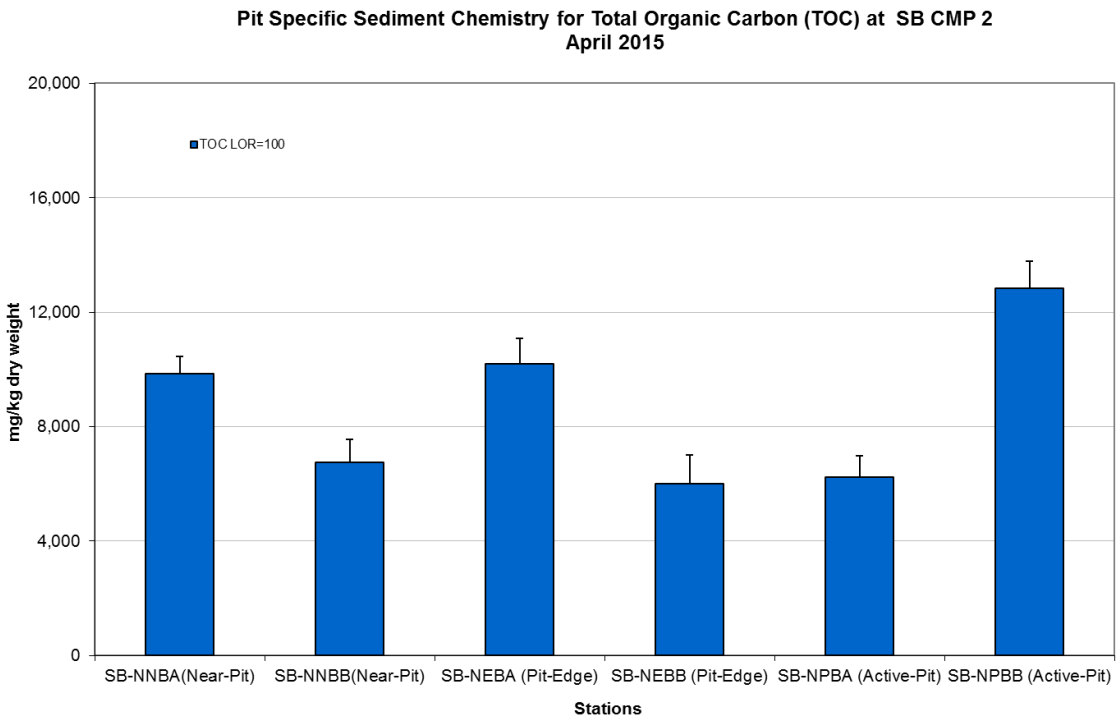


Figure 18: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 2 in April 2015.

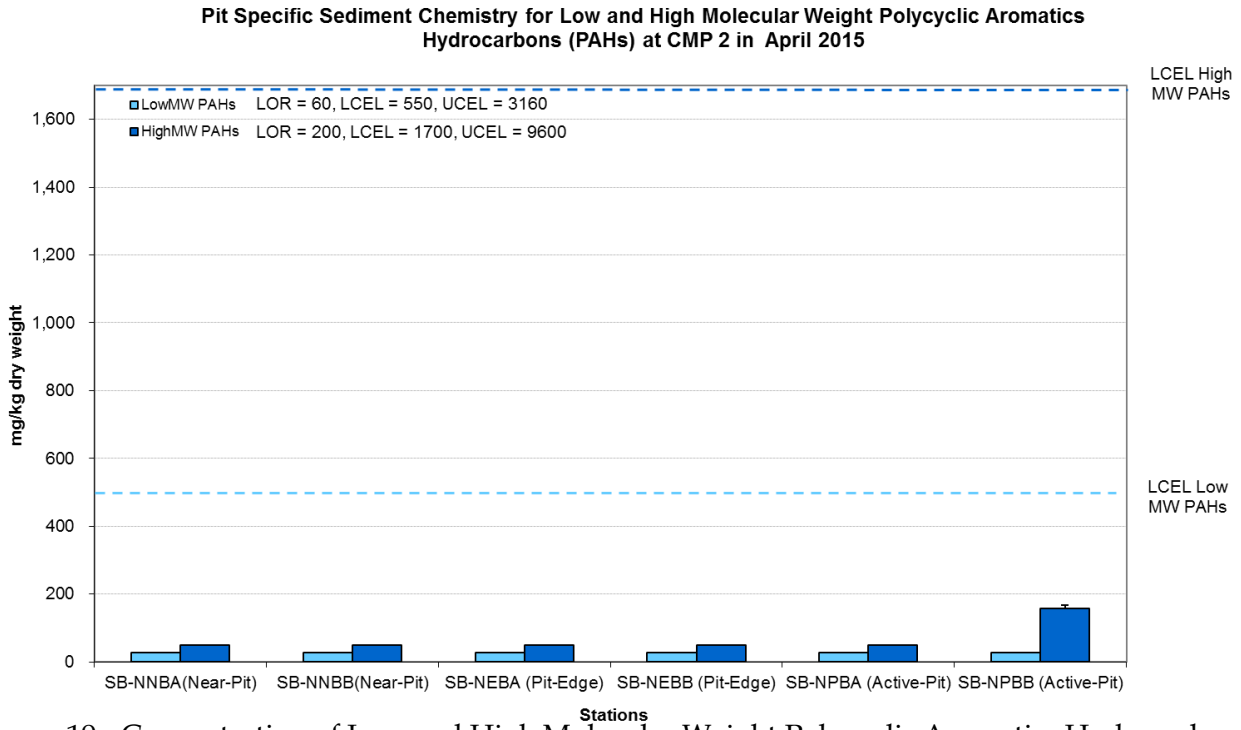


Figure 19: Concentration of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (mg/kg dry weight; mean +SD) in sediment samples collected from *Pit Specific Sediment Chemistry Monitoring* for CMP 2 in April 2015.

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 middle layer = **4.32 mg L^{-1}** and Significantly less than the reference stations mean DO (at the same tide of the same day)	Surface and Mid-depth (2) The average of the impact, WSR 45C and WSR 46 station readings are **< 4 mg L^{-1}** and Significantly less than the reference stations mean DO (at the same tide of the same day)
	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}** and Significantly less than the reference stations mean DO (at the same tide of the same day)	Bottom The average of the impact station, WSR 45C and WSR 46 readings are **< 2 mg L^{-1}** and Significantly less than the reference stations mean DO (at the same tide of 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}** and 120% of control station's SS at the same tide of the same day	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 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** and 120% of control station's Tby at the same tide of the same day	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data = **32.68 NTU** and 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 11 May 2015

Sampling Period	Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen (%)	Dissolved Oxygen (mg L^{-1})	pH (mg L^{-1})
May 2015	RFF (Reference)	26.29	23.29	7.49	79.47	5.63	7.85
	IPF (Impact)	25.77	25.90	11.54	74.85	5.27	7.86
	INF (Intermediate)	25.01	29.22	5.62	73.71	5.16	7.89
	Ma Wan	24.96	29.46	3.46	74.32	5.20	7.89
	Shum Shui Kok	25.12	28.88	9.65	72.80	5.09	7.89
	Tai Mo To	25.49	27.17	10.59	75.05	5.27	7.88
	Tai Ho Bay 1	27.04	20.84	7.92	83.67	5.93	7.83
	Tai Ho Bay 2	27.10	19.90	4.08	81.91	5.83	7.82
	WQO	N/A	20.96 - 25.62#	N/A	N/A	>4	6.5-8.5

Notes:
#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.
Cell shaded grey indicate value exceeding the WQO.

Table C3 Laboratory Results for Routine Water Quality Monitoring of CMP 2 in April and May 2015

Sampling Period	Stations	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Pb (µg/L)	Hg (µg/L)	Ni (µg/L)	Ag (µg/L)	Zn (µg/L)	NH_3 (mg/L)	TIN (mg/L)	BOD_5 (mg/L)	SS (mg/L)
April 2015	RFF	2.23	<LOR	0.74	4.41	0.67	<LOR	0.99	<LOR	9.83	0.13	0.40	1.94	9.64
	IPF	2.26	<LOR	0.65	4.30	0.68	<LOR	0.72	<LOR	9.55	0.13	0.38	1.92	9.14
	INF	2.31	<LOR	0.64	4.45	0.57	<LOR	0.68	<LOR	19.93	0.14	0.35	2.11	8.34
	Ma Wan	2.25	<LOR	0.80	6.21	1.31	<LOR	1.18	<LOR	10.54	0.15	0.27	1.75	6.50
	Shum Shui Kok	2.39	<LOR	0.81	4.13	0.66	<LOR	1.20	<LOR	9.99	0.15	0.37	3.05	7.50
	Tai Mo To	2.23	<LOR	0.70	3.25	<LOR	<LOR	1.33	<LOR	14.25	0.17	0.41	4.31	12.44
	Tai Ho Bay 1	2.24	<LOR	0.79	2.69	0.64	<LOR	1.25	<LOR	10.98	0.13	0.46	2.28	12.16
	Tai Ho Bay 2	2.28	<LOR	0.64	3.50	0.78	<LOR	1.43	<LOR	9.78	0.09	0.46	3.71	8.90
May 2015	RFF	2.60	<LOR	0.68	9.49	<LOR	<LOR	2.77	<LOR	12.81	0.21	1.17	0.80	10.18
	IPF	2.37	<LOR	1.70	6.18	2.13	<LOR	2.91	<LOR	14.25	0.21	0.96	1.42	11.82
	INF	2.34	<LOR	0.93	2.94	0.71	<LOR	1.53	<LOR	8.66	0.16	0.73	0.85	8.04
	Ma Wan	2.12	<LOR	<LOR	6.51	<LOR	<LOR	1.40	<LOR	17.04	0.19	0.59	0.78	5.69
	Shum Shui Kok	2.32	<LOR	<LOR	4.85	<LOR	<LOR	1.52	<LOR	14.32	0.20	0.67	0.91	11.99
	Tai Mo To	2.35	<LOR	<LOR	2.40	<LOR	<LOR	1.83	<LOR	6.46	0.20	0.91	0.89	11.14
	Tai Ho Bay 1	2.45	<LOR	0.57	6.34	<LOR	<LOR	2.68	<LOR	10.31	0.19	1.31	0.86	9.91
	Tai Ho Bay 2	2.07	<LOR	0.76	1.68	<LOR	<LOR	2.68	<LOR	5.43	0.16	1.34	0.90	5.78

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 13 May 2015

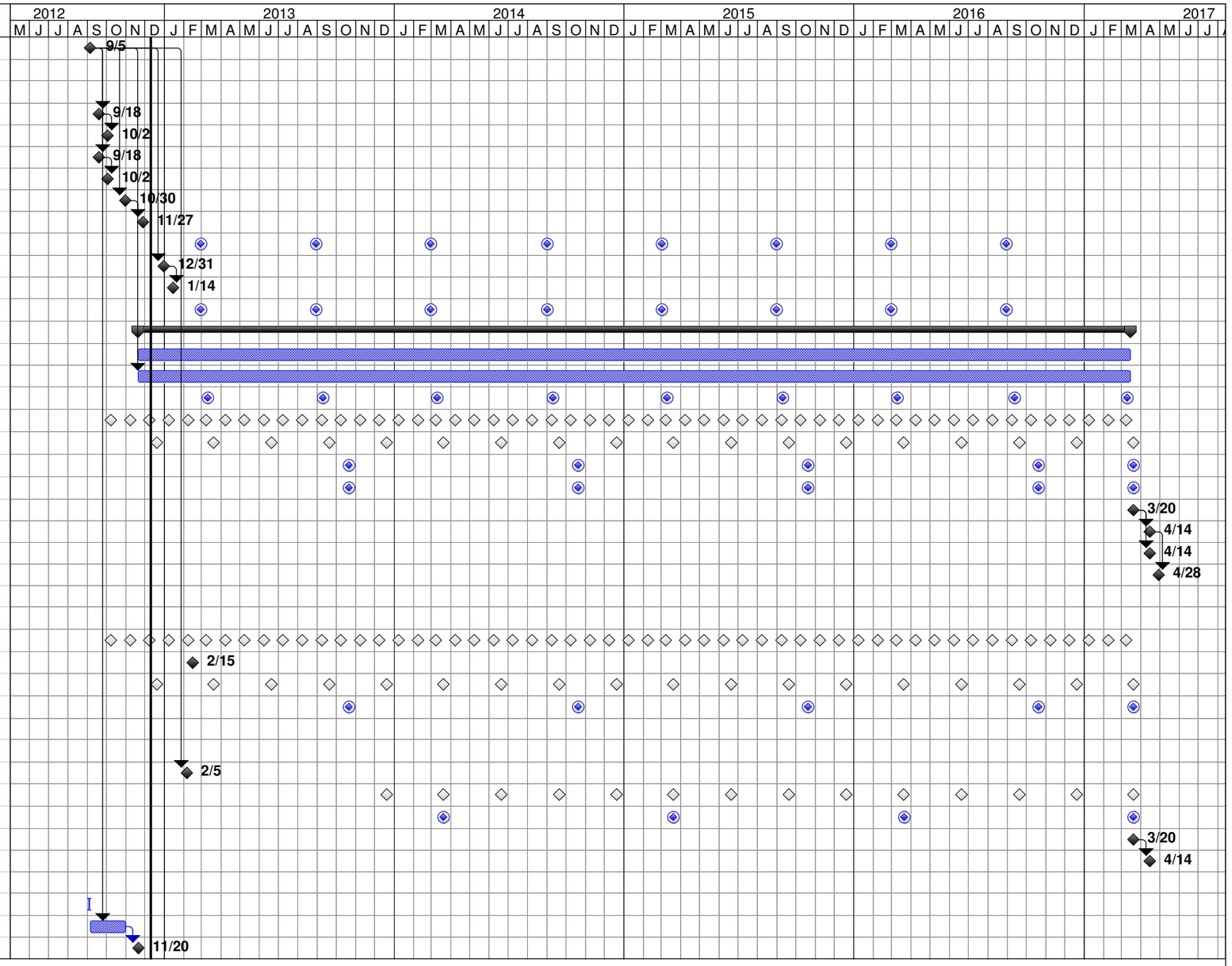
Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen (%)	Dissolved Oxygen (mg L^{-1})	pH (mg L^{-1})	Suspended Solids (mg L^{-1})
WCP 1 (Downstream)	25.71	25.44	20.41	75.76	5.35	7.87	19.98
WCP 2 (Upstream)	25.71	25.65	16.97	74.87	5.28	7.86	13.63
WQO (wet season)	N/A	22.99-28.21#	N/A	N/A	>4	6.5-8.5	11.6

Note: #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

Task Name
Project Commencement
For South Brothers CMPs and East of Sha Chau CMPs
Submission of Draft Inception Report & Draft Programme
Submission of Final Inception Report & Final Programme
Submission of Draft EM&A Manual (First Review)
Submission of Final EM&A Manual (First Review)
Submission of Draft EM&A Manual (Second Review)
Submission of Final EM&A Manual (Second Review)
Submission of Subsequent EM&A Manual Updates
Submission of Draft Operations Manual
Submission of Final Operations Manual
Submission of Operations Manual Updates
Monitoring Contracts
Regular Site Inspections of CMP Contractors
Participate in Liaison Group Meetings/ Consultations as required by CEDD
Submission of Report on Dredging & Capping Operations
Submission of Monthly Progress Report
Submission of Quarterly EM&A Report
Submission of Annual Review Report
Submission of Annual Risk Assessment Report
Submission of Draft Final Report
Submission of the Final Report
Submission of Draft Executive Summary Report
Submission of Final Executive Summary Report
For East Tung Lung Chau Disposal Facility
Submission of Monitoring Results & Monthly EM&A Progress Report
Submission of Initial Review Report (assume disposal commences in November 2012)
Submission of Quarterly EM&A Report
Submission of Annual Report
Alternative / Modified Capping Design
Submission of Investigation Report
Submission of Quarterly Report
Submission of Annual Report
Submission of Draft Final Report
Submission of the Final Report
Baseline Pelagic and Demersal Fisheries Survey
Baseline Shrimp Trawl & Hang Trawl Surveys, twice before SB CMPs dredging
Submission of Baseline Pelagic and Demersal Fisheries Survey Report



Study Programme	Task	Milestone	Summary	Rolled Up Task	Rolled Up Milestone

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