



**Monthly EM&A Report for Contaminated  
Mud Pits to the East of Sha Chau and the  
South of The Brothers – May 2017**

Revision 0

14 June 2017

**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](http://www.erm.com)

**Dredging, Management and Capping of Contaminated Sediment Disposal  
Facility at Sha Chau and to the South of The Brothers**

**Environmental Certification Sheet  
EP-312/2008/A & EP-427/2011/A**

**Reference Document/Plan**

Document/ <del>Plan</del> -to be Certified/ Verified:	Monthly EM&A Report for Contaminated Mud Pits to the East of Sha Chau and the South of The Brothers - May 2017
Date of Report:	14 June 2017
Date prepared by ET:	14 June 2017
Date received by IA:	14 June 2017

**Reference EP Condition**

Environmental Permit Condition:

Condition 3.4 of EP-312/2008/A and Condition 4.4 of EP-427/2011/A:  
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-312/2008/A and EP-427/2011/A

Jovy Tam,  
Environmental Team Leader:



Date: 14/6/2017

**IA Verification**

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-312/2008/A and EP-427/2011/A

Dr Wang Wen Xiong,  
Independent Auditor:



Date: 14/6/2017

**Agreement No. CE 63/2016 (EP)  
Environmental Monitoring and Audit for  
Disposal Facility to the East of Sha Chau  
(2017-2020) – Investigation**

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the East of Sha Chau and the South of The  
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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

*Document Code: 0400720\_Monthly May 2017\_v0.doc*

Client:  Civil Engineering and Development Department (CEDD)		Project No:  0400720			
Summary:  This document presents the Monthly EM&A Report for <i>Environmental Monitoring and Audit for Disposal Facility to the East of Sha Chau and the South of The Brothers.</i>		Date: 14 June 2017			
		Approved by: 			
		Craig A. Reid Partner			
v0	Monthly EM&A Report for ESC CMPs and SB CMPs	RC	JT	CAR	14/6/17
Revision	Description	By	Checked	Approved	Date
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**Agreement No. CE 63/2016 (EP)**  
**Environmental Monitoring and Audit**  
**for Disposal Facility to the East of Sha Chau (2017-2020) - Investigation**

**MONTHLY EM&A REPORT FOR MAY 2017**

**1.1 BACKGROUND**

1.1.1 The Civil Engineering and Development Department (CEDD) is managing a number of marine disposal facilities in Hong Kong waters, including the Contaminated Mud Pits (CMPs) to the South of The Brothers (SB) and to the East of Sha Chau (ESC) for the disposal of contaminated sediment, and open-sea disposal grounds located to the South of Cheung Chau (SCC), East of Tung Lung Chau (ETLC) and East of Ninepins (ENP) for the disposal of uncontaminated sediment. Two Environmental Permits (EPs), EP-312/2008/A and EP-427/2011/A, were issued by the Environmental Protection Department (EPD) to the CEDD, the Permit Holder, on 28 November 2008 and 23 December 2011 for the Dredging, Management and Capping of Contaminated Sediment Disposal Facilities at ESC CMP V and SB CMPs, respectively.

1.1.2 Under the requirements of the two EPs for ESC CMP V and SB CMPs, EM&A programmes which encompass water and sediment chemistry, fisheries assessment, tissue and whole body analysis, sediment toxicity and benthic recolonisation studies as set out in the EM&A Manuals are required to be implemented. EM&A programmes have been continuously carried out during the operation of the CMPs at ESC and SB. A review of the collection and analysis of such environmental data from the monitoring programme demonstrated that there had not been any adverse environmental impacts resulting from disposal activities <sup>(1)(2)(3)(4)(5)</sup>. The current programme will assess the impacts resulting from dredging, disposal and capping operations of CMP V as well as capping operations of SB CMPs.

- (1) ERM (2013) Environmental Monitoring and Audit for Contaminated Mud Pit V at East of Sha Chau. Final Report. For CEDD.
- (2) ERM (2014) Environmental Monitoring and Audit for Contaminated Mud Pit V at East of Sha Chau (2012 - 2017). Final First Annual Review Report. For CEDD.
- (3) ERM (2015) Environmental Monitoring and Audit for Contaminated Mud Pit V at East of Sha Chau (2012 - 2017). Final Second Annual Review Report. For CEDD.
- (4) ERM (2016) Environmental Monitoring and Audit for Contaminated Mud Pit V at East of Sha Chau (2012 - 2017). Final Third Annual Review Report. For CEDD.
- (5) ERM (2017) Environmental Monitoring and Audit for Contaminated Mud Pit V at East of Sha Chau (2012 - 2017). Final Fourth Annual Review Report. For CEDD.



#### 1.4 **DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS**

1.4.1 No outstanding sampling remained for May 2017.

1.4.2 The following laboratory analyses are in progress during the preparation of this monthly report and will be presented in the next monthly report once the data are available:

- Laboratory analyses of sediment samples collected for *Pit Specific Sediment Chemistry of ESC CMP Vd* in May 2017.

#### 1.5 **BRIEF DISCUSSION OF THE MONITORING RESULTS FOR ESC CMPs**

1.5.1 Brief discussion of the monitoring results of the following activities for ESC CMPs is presented in this *Monthly EM&A Report for May 2017*:

- *Water Column Profiling of ESC CMP Vd* in May 2017; and
- *Routine Water Quality Monitoring of ESC CMP V* in May 2017.

#### 1.5.2 ***Water Column Profiling of ESC CMP Vd – May 2017***

1.5.3 *Water Column Profiling* was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 16 May 2017. The monitoring results have been assessed for compliance with the Water Quality Objectives (WQOs) set by Environmental Protection Department (EPD). This consists of a review of the EPD routine water quality monitoring data for the wet season period (April to October) of 2006 - 2015 from stations in the Northwestern Water Control Zone (WCZ), where the ESC CMPs are located <sup>(1)</sup>. For Salinity, the averaged value obtained from the Reference (Upstream) station 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 B1 of Annex B* for details).

##### *In-situ Measurements*

1.5.4 Analyses of results for May 2017 indicated that levels of DO and pH complied with the WQOs at both Downstream and Upstream stations (*Table B2 of Annex B*). In addition, DO and Turbidity at all stations complied with the Action and Limit Levels (*Tables B1 and B2 of Annex B*).

##### *Laboratory Measurements for Suspended Solids (SS)*

1.5.5 Analyses of results for May 2017 indicated that the SS levels complied with the WQO and the Action and Limit Levels at both Upstream and Downstream stations (*Tables B1 and B2 of Annex B*).

(1) <http://epic.epd.gov.hk/EPICRIVER/marine/?lang=en>

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

1.5.7 ***Routine Water Quality Monitoring of ESC CMP V – May 2017***

1.5.8 *Routine Water Quality Monitoring of ESC CMP V* was undertaken on 18 May 2017. The monitoring results have been assessed for compliance with the WQOs (see *Section 1.5.3* for details). The monitoring results are shown in *Tables B3 and B4 of Annex B* and *Figures 1 - 10 of Annex C*. A total of ten (10) monitoring stations were sampled in May 2017 as shown in *Figure 1.2*.

*In-situ Measurements*

1.5.9 Graphical presentation of the monitoring results (Temperature, DO, pH, Salinity and Turbidity) is shown in *Figures 1 - 6 of Annex C*. Analyses of results for May 2017 indicated that the levels of pH and DO complied with the WQOs at all stations (Impact, Intermediate, Reference and Ma Wan stations) in May 2017 (*Table B3 of Annex B; Figures 1 and 3 of Annex C*). Levels of Salinity at most stations also complied with WQO, except for Ma Wan station (*Table B3 of Annex B; Figure 5 of Annex C*). The higher Salinities recorded at Ma Wan station are likely to be caused by the larger separation distance to Pearl River mouth, which release a large amount of freshwater runoff in the area during flooding, when compared to the Reference stations.

1.5.10 The levels of DO and Turbidity complied with the Action and Limit Levels at all stations (*Table B3 of Annex B; Figures 3 and 6 of Annex C*).

1.5.11 Overall, *in-situ* measurement results of the *Routine Water Quality Monitoring* indicated that the disposal operation at ESC CMP Vd did not appear to cause any unacceptable impacts in water quality in May 2017.

*Laboratory Measurements*

1.5.12 Laboratory analysis of May 2017 results indicated that concentrations of Cadmium, Silver and Mercury were below their limit of reporting at all stations. Arsenic, Chromium, Nickel, Lead, Copper and Zinc were detected in May 2017 samples and the concentrations of these metals and metalloids were similar amongst stations (*Table B4 of Annex B; Figure 7 of Annex C*).

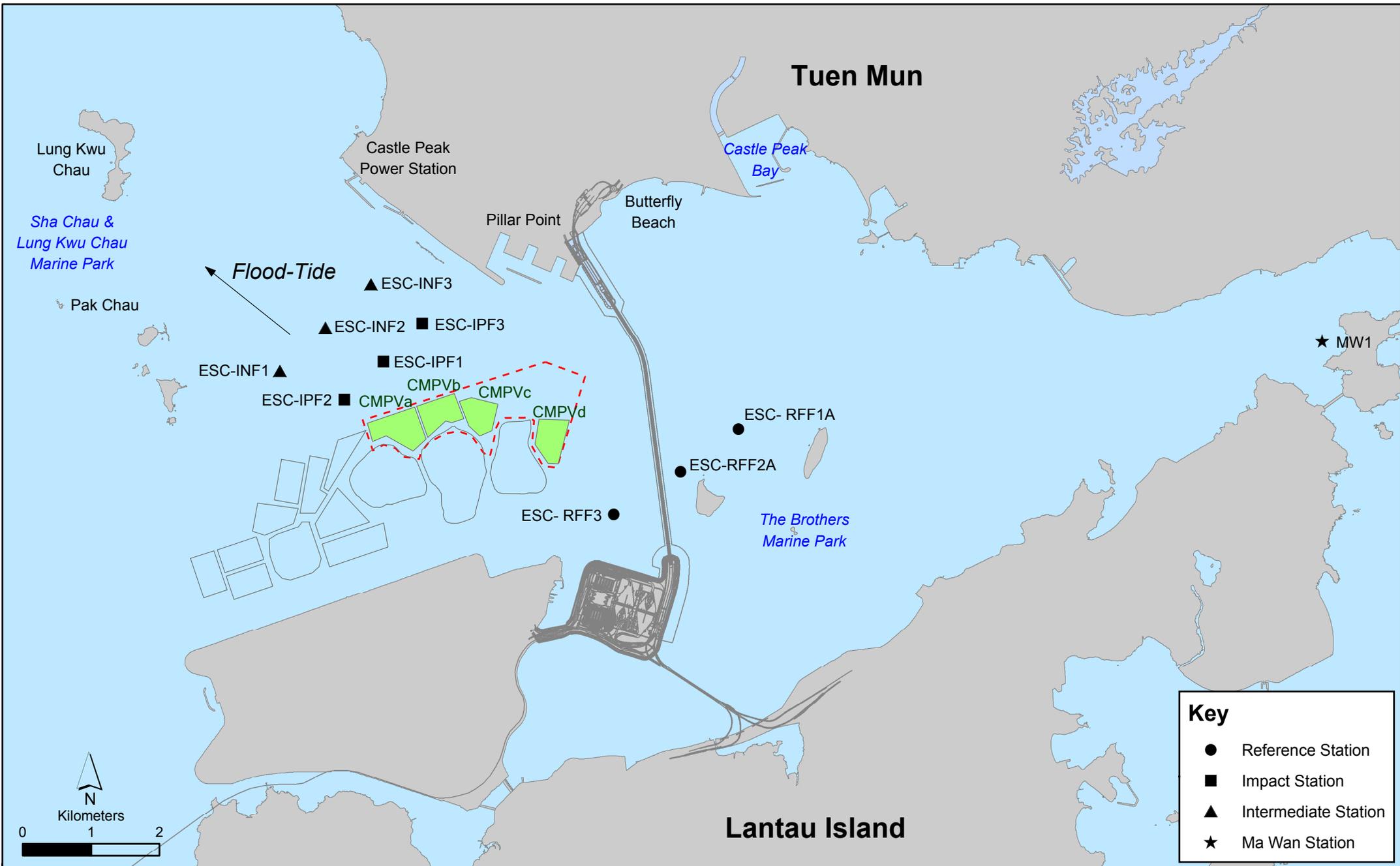


Figure 1.2

Routine & Capping Water Quality Sampling Stations (Flood-Tide) for ESC CMPs

- 1.5.13 For nutrients, concentrations of Total Inorganic Nitrogen (TIN) at all stations in May 2017 were higher than the WQO (0.5 mg/L) (*Table B4 of Annex B; Figure 8 of Annex C*). It should be noted that due to the effect of Pearl River, the North Western WCZ has historically experienced higher levels of TIN <sup>(1)</sup>. Therefore, the exceedances of TIN WQO at these stations are unlikely to be caused by the disposal operation at ESC CMP Vd. Concentrations of Ammonia Nitrogen (NH<sub>3</sub>-N) were relatively similar amongst all stations in May 2017 (*Table B4 of Annex B; Figure 8 of Annex C*). Levels of 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>) were relatively similar amongst all stations in May 2017 (*Table B4 of Annex B; Figure 9 of Annex C*).
- 1.5.14 Analyses of results for May 2017 indicated that the SS levels complied with the WQO (11.0 mg/L for wet season) and the Action and Limit Levels at all stations (*Tables B1 and B4 of Annex B; Figure 10 of Annex C*).
- 1.5.15 Overall, results of the *Routine Water Quality Monitoring* indicated that the disposal operation at ESC CMP Vd did not appear to cause any unacceptable deterioration in water quality in May 2017. Detailed statistical analysis will be presented in the Quarterly Report to investigate any spatial and temporal trends of potential concern.
- 1.6** ***BRIEF DISCUSSION OF THE MONITORING RESULTS FOR SB CMPs***
- 1.6.1 Brief discussion of the monitoring results of the following activities for SB CMPs is presented in this *Monthly EM&A Report for May 2017*:
- *Water Quality Monitoring during Capping Operations of SB CMPs in May 2017.*
- 1.6.2 ***Water Quality Monitoring during Capping of SB CMPs – May 2017***
- 1.6.3 Capping works at SB CMP 2 were conducted in May 2017 to supplement and revert the portion of consolidated capping layer to design level and is expected to be completed by December 2017. The monitoring results obtained during May 2017 sampling in the wet season have been assessed for compliance with the WQOs (see *Section 1.5.3* for details). Levels of DO and Turbidity were also assessed for compliance with the Action and Limit Levels (see *Table B5 of Annex B* for details). A total of fourteen (14) monitoring stations were sampled in May 2017 as shown in *Figure 1.3*. Graphical presentation of the monitoring results is shown in *Figures 11 - 20 of Annex C*.

<sup>(1)</sup> [http://www.epd.gov.hk/epd/misc/marine\\_quality/1986-2005/textonly/eng/index.htm](http://www.epd.gov.hk/epd/misc/marine_quality/1986-2005/textonly/eng/index.htm)

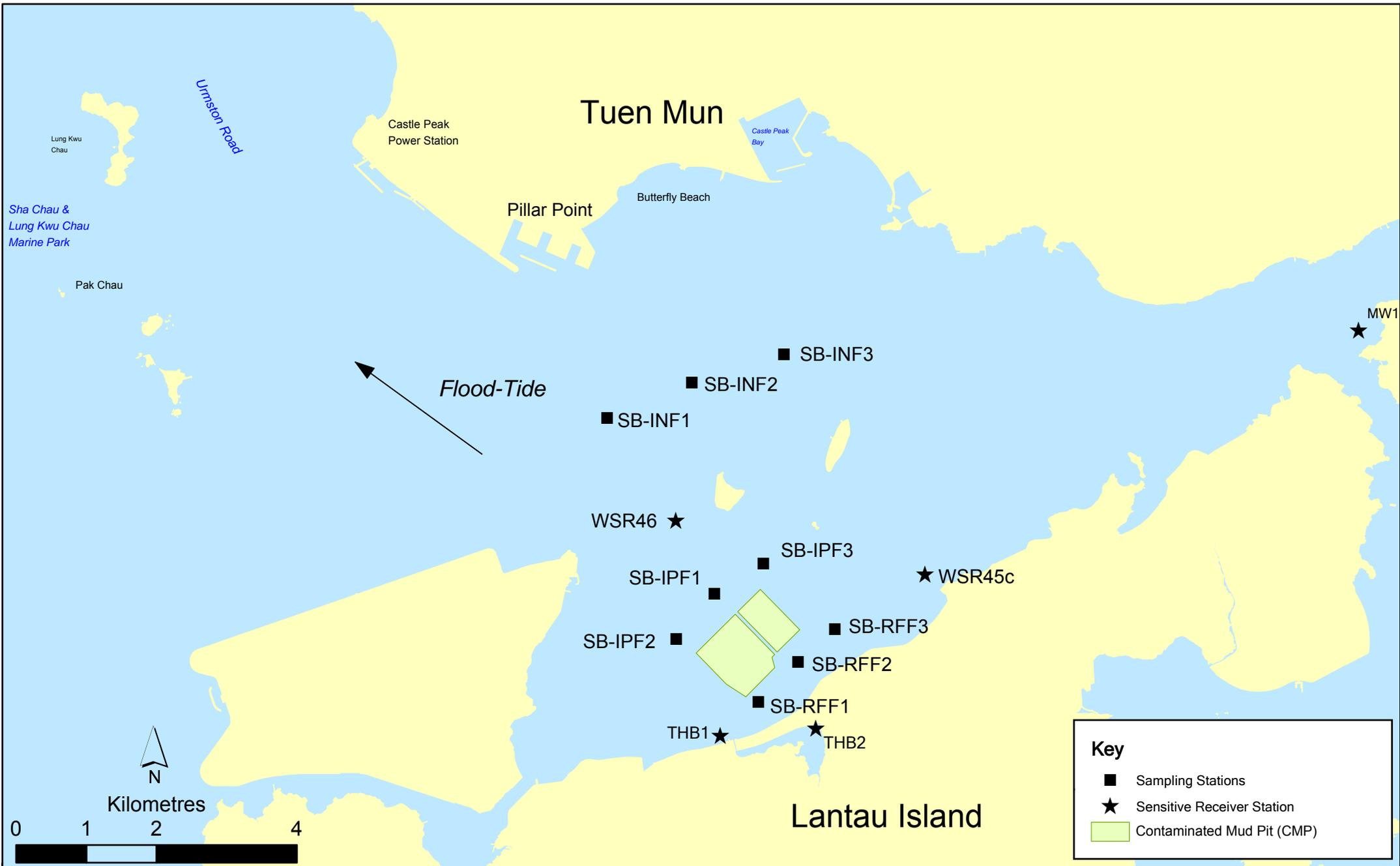


Figure 1.3

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

### *In-situ Measurements*

- 1.6.4 The levels of pH at all stations in May 2017 complied with the WQO (*Table B6 of Annex B; Figure 11 of Annex C*). The levels of Turbidity at all stations complied with the Action and Limit levels in May 2017 (*Table B6 of Annex B; Figure 12 of Annex C*). The levels of DO at all stations complied with the WQO and the Action and Limit levels in May 2017 (*Table B6 of Annex B; Figure 14 of Annex C*). The levels of Salinity at Impact, Intermediate, Ma Wan, Sham Shui Kok and Tai Mo To stations are higher than the WQO in May 2017 (*Table B6 of Annex B; Figure 16 of Annex C*). The Salinities at these stations were higher or 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 and Pearl River mouth.

### *Laboratory Measurements*

- 1.6.5 The concentrations of SS were higher than the WQO (11.0 mg/L for wet season) at Tai Mo To station in May 2017 (*Table B6 of Annex B; Figure 17 of Annex C*). However, levels of SS at all stations complied with the Action and Limit Levels (*Table B5 and B6 of Annex B*).
- 1.6.6 For nutrients, concentrations of NH<sub>3</sub>-N were relatively similar amongst all stations (*Table B6 of Annex B; Figure 18 of Annex C*). The levels of TIN at all stations were higher the WQO of 0.5 mg/L (*Table B6 of Annex B; Figure 19 of Annex C*). As discussed in *Section 1.5.13*, the North Western WCZ has historically experienced higher levels of TIN and such exceedances of TIN WQO at all stations are unlikely to be caused by the capping operation at CMP 2. Levels of BOD<sub>5</sub> were relatively similar amongst all stations (*Table B6 of Annex B; Figure 20 of Annex C*).
- 1.6.7 Overall, the monitoring results indicated that the capping operation at CMP 2 did not appear to cause any unacceptable deterioration in water quality in May 2017. Statistical analysis will be undertaken and presented in the quarterly report to investigate whether the capping operations at CMP 2 is causing any unacceptable impacts in water quality of the area.

## **1.7 ACTIVITIES SCHEDULED FOR THE NEXT MONTH**

- 1.7.1 The following monitoring activities will be conducted in the next monthly period of June 2017 for ESC CMP V (see *Annex A* for the sampling schedule):

- *Water Column Profiling of ESC CMP Vd;*
- *Cumulative Impact Sediment Chemistry of ESC CMPs; and.*
- *Pit Specific Sediment Chemistry of ESC CMP Vd.*

1.7.2 The following monitoring activities will be conducted in the next monthly period of June 2017 for SB CMPs (see *Annex A* for the sampling schedule):

- *Water Quality Monitoring During Capping of SB CMPs.*

## 1.8 ***STUDY PROGRAMME***

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

Annex A

## Sampling Schedule



Annex A2 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (April 2017 - December 2018)

			2017												2018											
			A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D			
<b>Capping Water Quality Monitoring</b>																										
<i>Ebb Tide</i>																										
Impact Stations Downcurrent	SB-IP1	4 times per year																								
	SB-IP2	4 times per year																								
	SB-IP3	4 times per year																								
	SB-IP4	4 times per year																								
	SB-IP5	4 times per year																								
Intermediate Stations Downcurrent	SB-INE1	4 times per year																								
	SB-INE2	4 times per year																								
	SB-INE3	4 times per year																								
	SB-INE4	4 times per year																								
	SB-INE5	4 times per year																								
Reference Stations Upcurrent	SB-RFE1	4 times per year																								
	SB-RFE2	4 times per year																								
	SB-RFE3	4 times per year																								
	SB-RFE4	4 times per year																								
	SB-RFE5	4 times per year																								
Sensitive Receiver Stations	MW1	4 times per year																								
	THB1	4 times per year																								
	THB2	4 times per year																								
	WSR45C	4 times per year																								
	WSR46	4 times per year																								
<i>Flood Tide</i>																										
Impact Stations Downcurrent	SB-IP1	4 times per year																								
	SB-IP2	4 times per year																								
	SB-IP3	4 times per year																								
Intermediate Stations Downcurrent	SB-INE1	4 times per year																								
	SB-INE2	4 times per year																								
	SB-INE3	4 times per year																								
Reference Stations Upcurrent	SB-RFE1	4 times per year																								
	SB-RFE2	4 times per year																								
	SB-RFE3	4 times per year																								
Sensitive Receiver Stations	MW1	4 times per year																								
	THB1	4 times per year																								
	THB2	4 times per year																								
	WSR45C	4 times per year																								
	WSR46	4 times per year																								
<b>Benthic Recolonisation Studies</b>																										
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:  
 The number shown in each cell represents the numbers of replicates per monitoring station  
 Capping works are planned to be conducted between May and December 2017.

Annex B

## Water Quality Monitoring Results

**Table B1** *Action and Limit Levels of Water Quality for Dredging, Disposal and Capping Activities at ESC CMP V*

<b>Parameter</b>	<b>Action Level</b>	<b>Limit Level</b>
Dissolved Oxygen (DO) <sup>(1)</sup>	<u>Surface and Mid-depth</u> <sup>(2)</sup> 5%-ile of baseline data for surface and middle layer = <b>3.76 mg L<sup>-1</sup></b>	<u>Surface and Mid-depth</u> <sup>(2)</sup> 1%-ile of baseline data for surface and middle layer = <b>3.11 mg L<sup>-1</sup></b> <sup>(3)</sup>
	and	and
	Significantly less than the reference stations mean DO (at the same tide of the same day)	Significantly less than the reference stations mean DO (at the same tide of the same day)
	<u>Bottom</u> 5%-ile of baseline data for bottom layers = <b>2.96 mg L<sup>-1</sup></b>	<u>Bottom</u> The average of the impact station readings are <b>&lt;2 mg/L<sup>-1</sup></b>
	and	and
	Significantly less than the reference stations mean DO (at the same tide of the same day)	Significantly less than the reference stations mean DO (at the same tide of the same day)
Depth-averaged Suspended Solids (SS) <sup>(4)(5)</sup>	95%-ile of baseline data for depth average = <b>37.88 mg L<sup>-1</sup></b>	99%-ile of baseline data for depth average = <b>61.92 mg L<sup>-1</sup></b>
	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) <sup>(4)(5)</sup>	95%-ile of baseline data = <b>28.14 NTU</b>	99%-ile of baseline data = <b>38.32 NTU</b>
	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) Given the Action Level for DO for Surface & Middle layers has already been lower than 4 mg L<sup>-1</sup>, it is proposed to set the Limit Level at 3.11 mg L<sup>-1</sup> which is the first percentile of the baseline data.
- (4) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- (5) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

**Table B2** *Water Column Profiling Results for ESC CMP Vd in May 2017*

Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen (%) (mg L <sup>-1</sup> )		pH (mg L <sup>-1</sup> )	Suspended Solids (mg L <sup>-1</sup> )
WCP 1 (Downstream)	25.90	26.31	4.82	81.39	5.70	7.88	5.35
WCP 2 (Upstream)	25.96	25.72	3.95	82.77	5.82	7.91	4.68
WQO (Wet season)	N/A	23.14 – 28.29 <sup>#</sup>	N/A	N/A	>4	6.5-8.5	11.0

**Note:**

<sup>#</sup>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 B3** *In-situ Monitoring Results for Routine Water Quality Monitoring of ESC CMPs in May 2017*

Sampling Period	Stations	Temp (°C)	Salinity (ppt)	Turbidity (NTU)	Dissolved Oxygen (%) (mg L <sup>-1</sup> )		pH (mg L <sup>-1</sup> )
May 2017	RFE (Reference)	26.09	25.87	2.78	83.14	5.82	7.95
	IPE (Impact)	26.02	25.93	2.73	81.75	5.73	7.93
	INE (Intermediate)	26.04	25.75	2.43	81.02	5.68	7.92
	Ma Wan	25.40	30.25	1.81	76.72	5.30	7.87
	WQO	N/A	23.28 – 28.46 <sup>#</sup>	N/A	N/A	>4	6.5-8.5

**Notes:**

<sup>#</sup>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 B4** *Laboratory Results for Routine Water Quality Monitoring of ESC CMPs in May 2017*

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 <sub>3</sub> (mg/L)	TIN (mg/L)	BOD <sub>5</sub> (mg/L)	SS (mg/L)
May 2017	RFE	2.32	0.25	0.64	12.96	0.90	0.25	2.02	0.50	35.90	0.16	0.84	1.37	4.81
	IPE	2.24	0.25	0.50	2.49	0.89	0.25	0.72	0.50	28.06	0.17	0.93	1.90	3.45
	INE	2.38	0.25	0.50	0.50	0.62	0.25	0.50	0.50	30.27	0.16	0.95	1.20	3.65
	Ma Wan	2.44	0.25	0.50	4.01	1.86	0.25	2.00	0.50	59.64	0.18	0.62	1.66	3.82

WQO of TIN: 0.5 mg/L

Wet Season WQO of SS : 11.0 mg/L

**Notes:**

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

Cell shaded grey indicate value exceeding the WQO.

**Table B5 Action and Limit Levels of Water Quality for Dredging, Backfilling and Capping Activities for SB CMPs**

<b>Parameter</b>	<b>Action Level</b>	<b>Limit Level</b>
Dissolved Oxygen (DO) <sup>(1)</sup>	<u>Surface and Mid-depth</u> <sup>(2)</sup> The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for surface and middle layer = <b>4.32 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)	<u>Surface and Mid-depth</u> <sup>(2)</sup> The average of the impact, WSR 45C and WSR 46 station readings are < <b>4 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)
	<u>Bottom</u> The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for bottom layers = <b>3.12 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)	<u>Bottom</u> The average of the impact station, WSR 45C and WSR 46 readings are < <b>2 mg L<sup>-1</sup></b>  and  Significantly less than the reference stations mean DO (at the same tide of the same day)
Depth-averaged Suspended Solids (SS) <sup>(3)(4)</sup>	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data for depth average = <b>21.60 mg L<sup>-1</sup></b>  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 = <b>40.10 mg L<sup>-1</sup></b>  and  130% of control station's SS at the same tide of the same day
Depth-averaged Turbidity (Tby) <sup>(3)(4)</sup>	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data = <b>25.04 NTU</b>  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 = <b>32.68 NTU</b>  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 B6** *Monitoring Results for Water Quality Monitoring during Capping of SB CMP in May 2017*

Sampling Period	Stations	Temp	Salinity	Turbidity	Dissolved Oxygen		pH	SS	NH3	TIN	BOD <sub>5</sub>
		(°C)	(ppt)	(NTU)	(%)	(mg L <sup>-1</sup> )					
May 2017	RFF (Reference)	27.13	22.87	2.95	90.83	6.35	7.85	2.75	0.13	1.07	0.77
	IPF (Impact)	26.40	28.89	7.02	83.51	5.72	7.74	5.47	0.13	0.80	0.83
	INF (Intermediate)	26.86	25.49	5.01	90.18	6.25	7.60	7.72	0.13	0.53	0.76
	Ma Wan	26.53	27.55	5.95	85.31	5.89	7.65	4.77	0.13	0.65	0.73
	Sham Shui Kok	26.64	26.56	13.72	86.47	5.97	7.82	6.73	0.13	0.68	0.70
	Tai Mo To	26.72	26.25	4.37	93.01	6.55	7.73	15.95	0.13	0.80	0.80
	Tai Ho Bay 1	27.36	20.90	3.50	93.62	6.53	7.83	5.17	0.13	1.10	0.90
	Tai Ho Bay 2	27.34	22.83	2.53	86.49	5.95	7.81	3.07	0.10	0.90	1.00
	WQO	N/A	20.59-25.16*	N/A	N/A	>4	6.5-8.5	11.0	N/A	0.50	N/A

**Notes:**

# 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.

Cell shaded grey indicate value exceeding the WQO.

Annex C

## Graphical Presentations

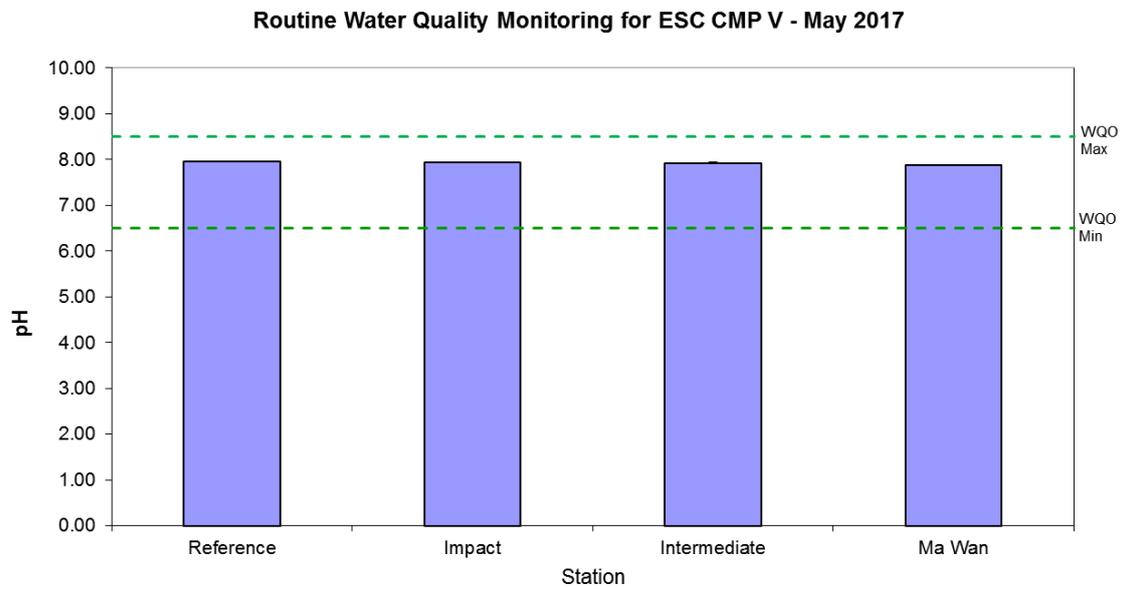


Figure 1: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

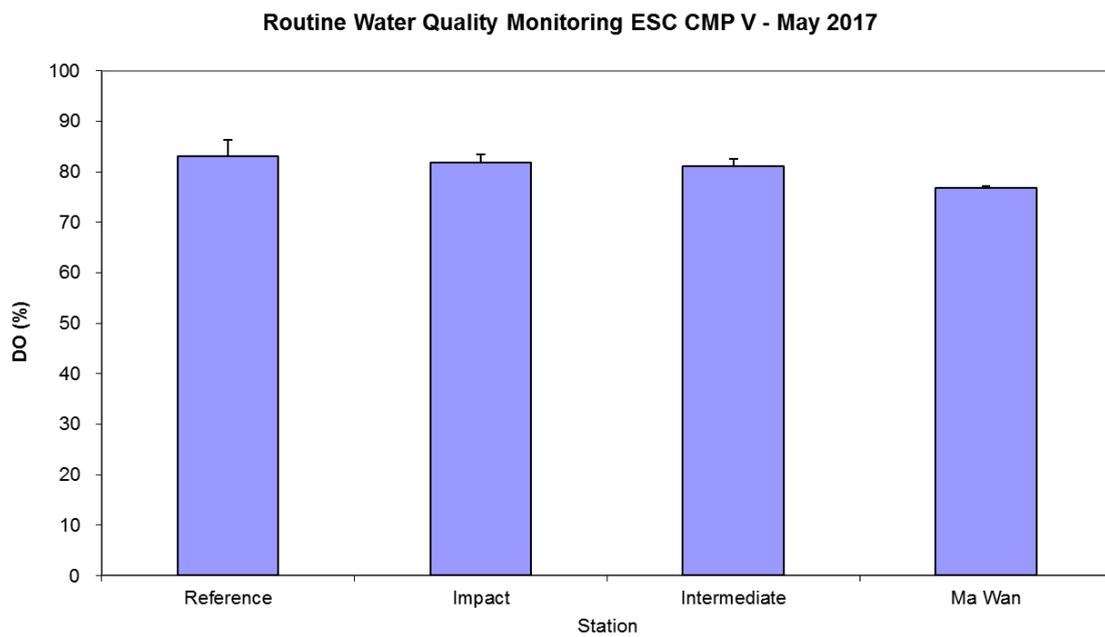


Figure 2: Level of Dissolved Oxygen (DO) (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

Source: H:\Team\EM\GMS Projects\0400720 CEDD CMP EM&A 2017-2020\02 Deliverable\05 CMP Monthly Report\2nd (May 2017)

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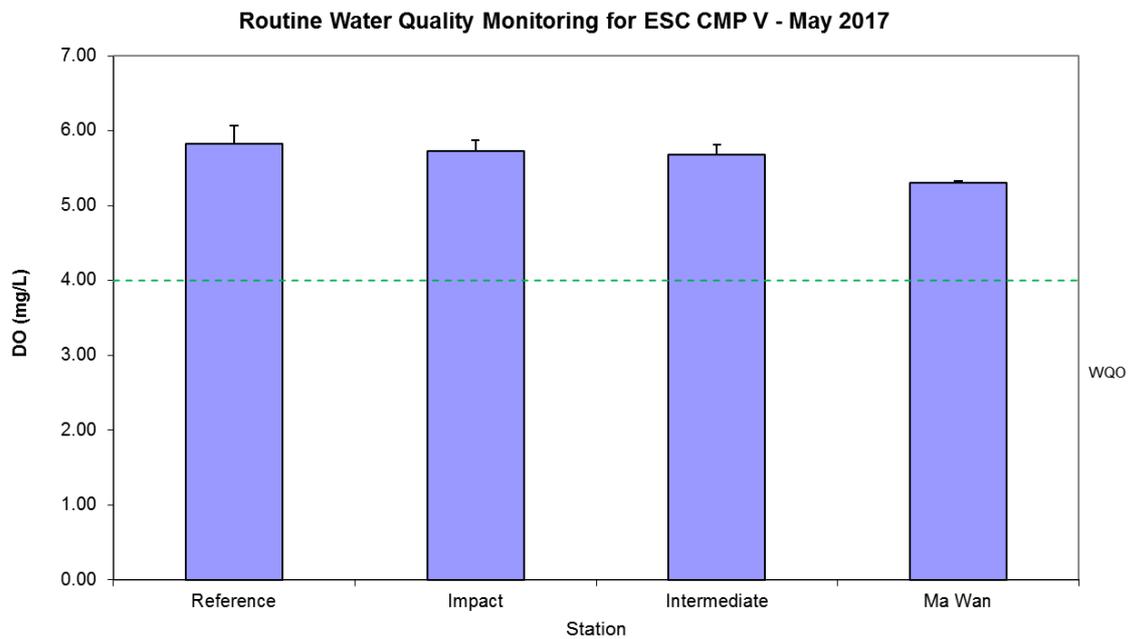


Figure 3: Concentration of Dissolved Oxygen (DO) (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

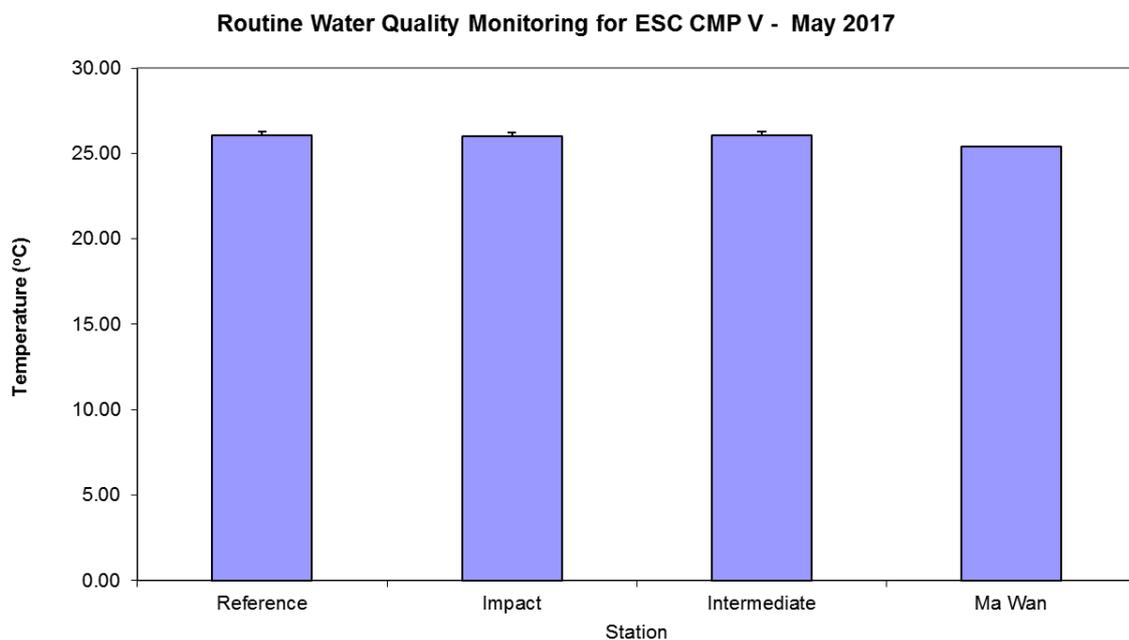


Figure 4: Level of Temperature (°C; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

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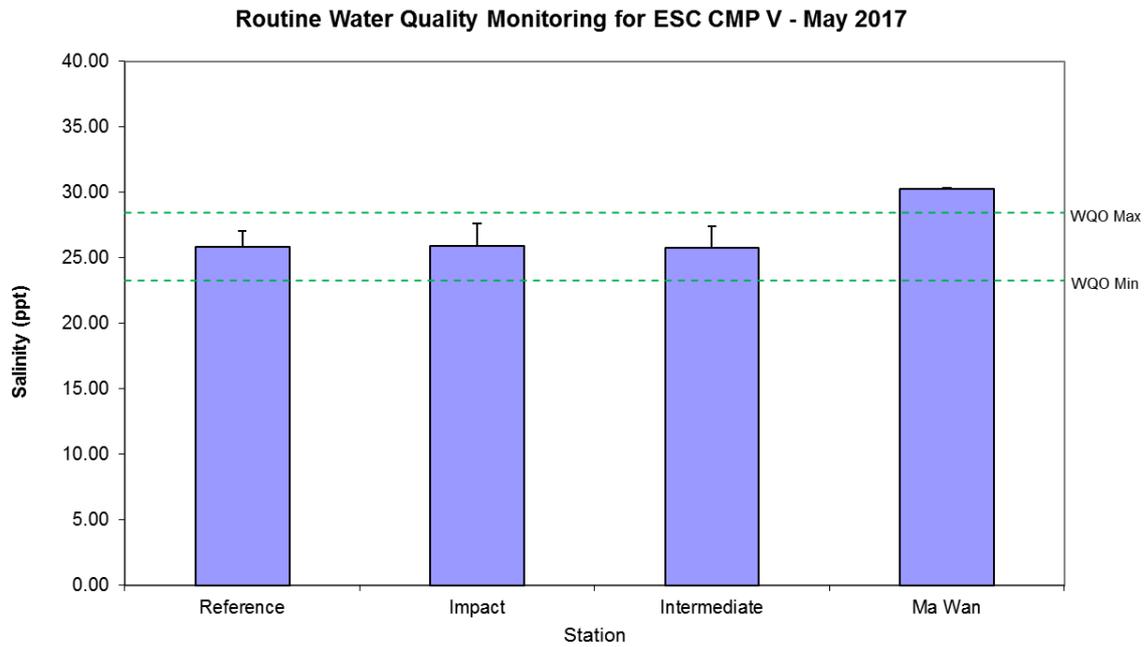


Figure 5: Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

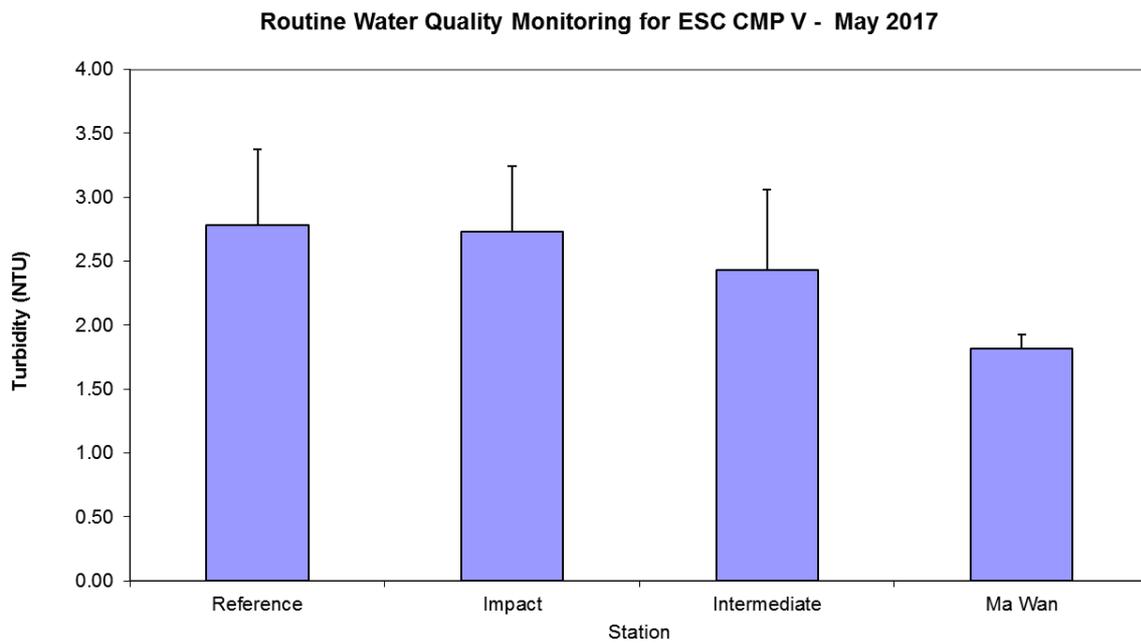


Figure 6: Levels of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

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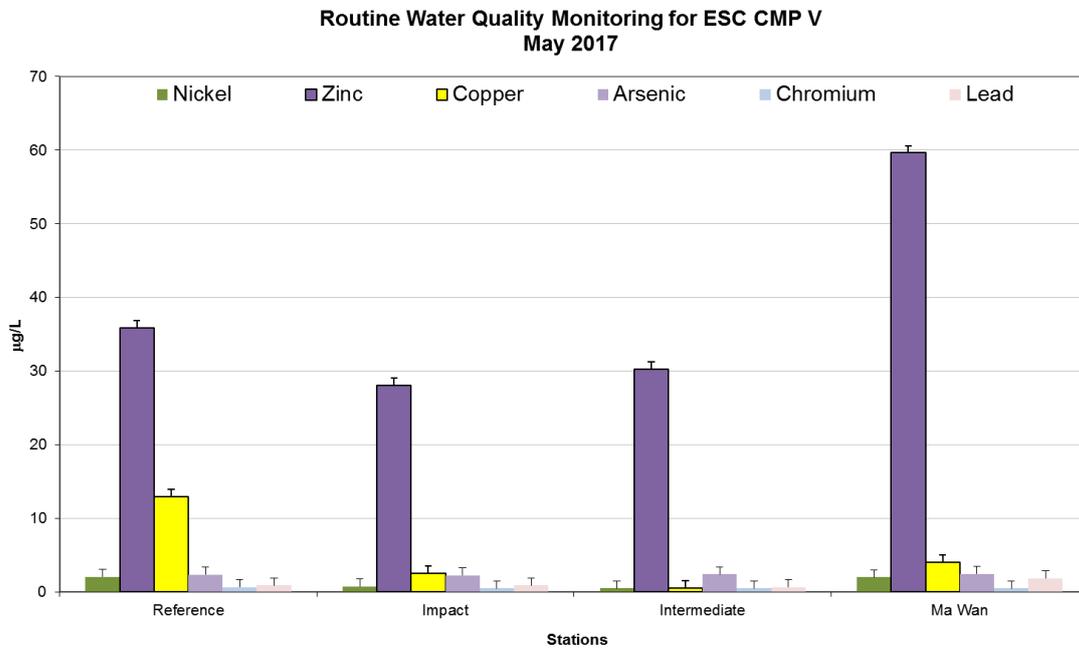


Figure 7: Concentration of Arsenic, Chromium, Nickel, Lead, Copper and Zinc ( $\mu\text{g/L}$ ; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

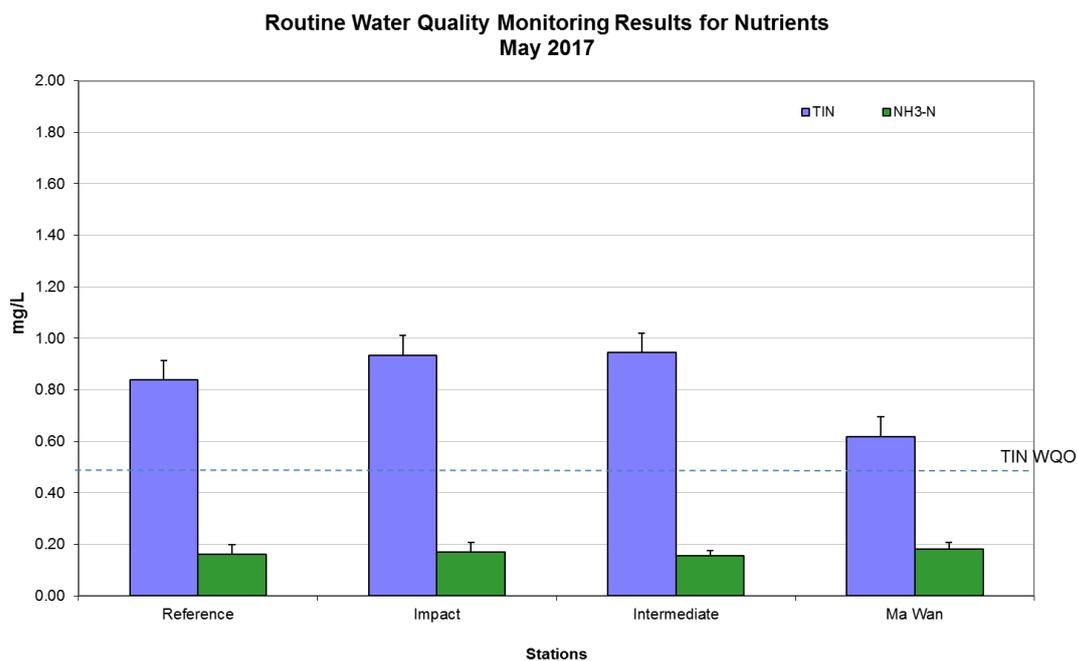


Figure 8: Concentration of Total Inorganic Nitrogen (TIN) and Ammonia Nitrogen (NH<sub>3</sub>-N) ( $\mu\text{g/L}$ ; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

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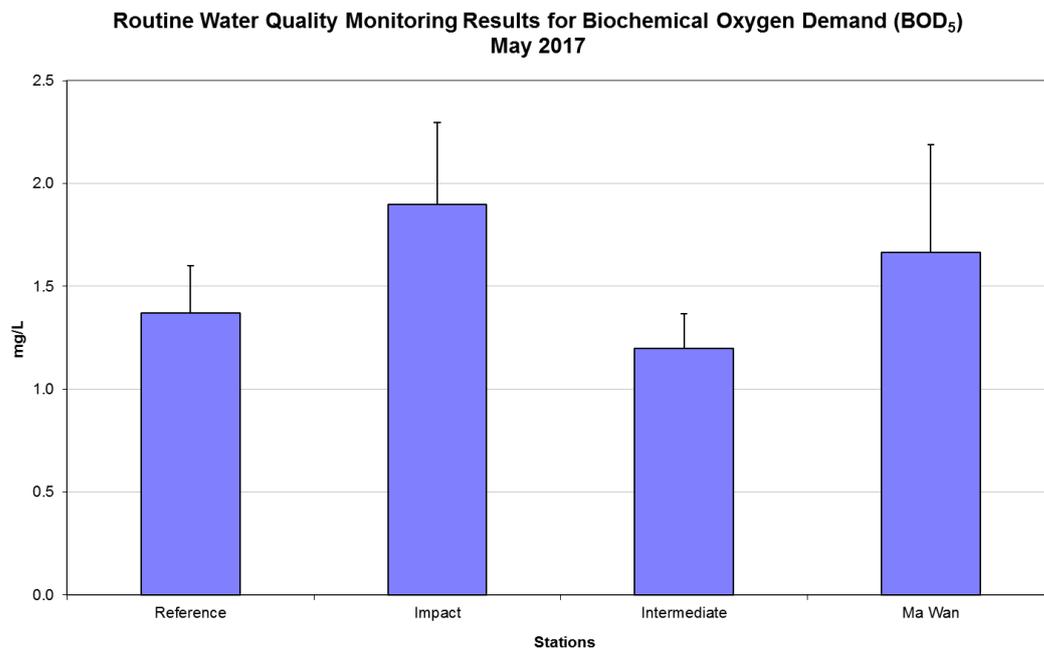


Figure 9: Level of Biochemical Oxygen Demand (BOD<sub>5</sub>) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

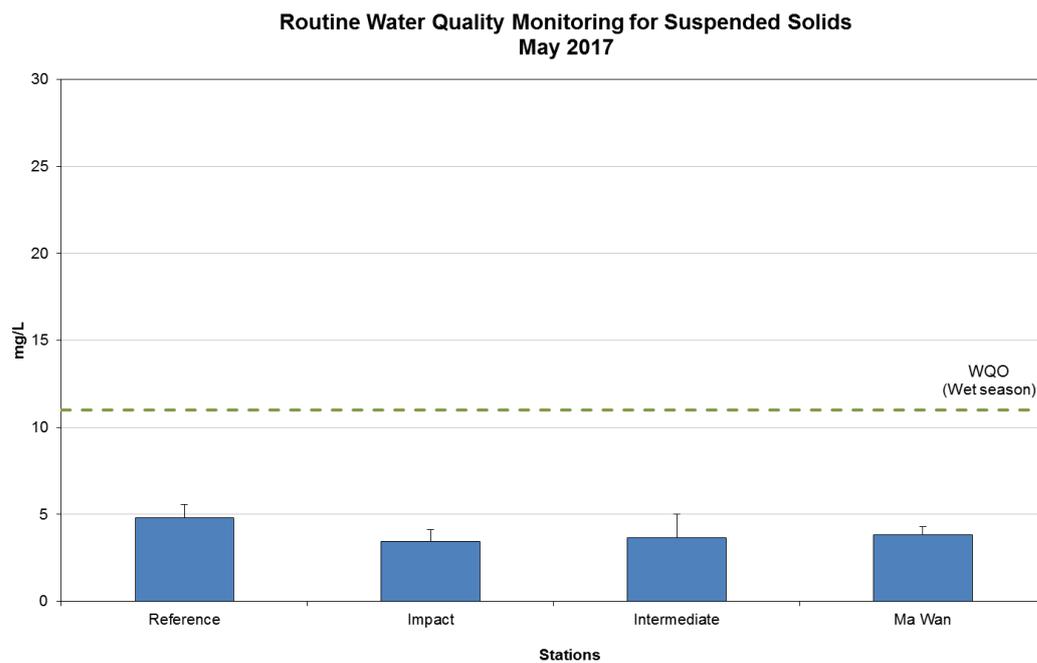


Figure 10: Concentration of Suspended Solids (SS) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in May 2017.

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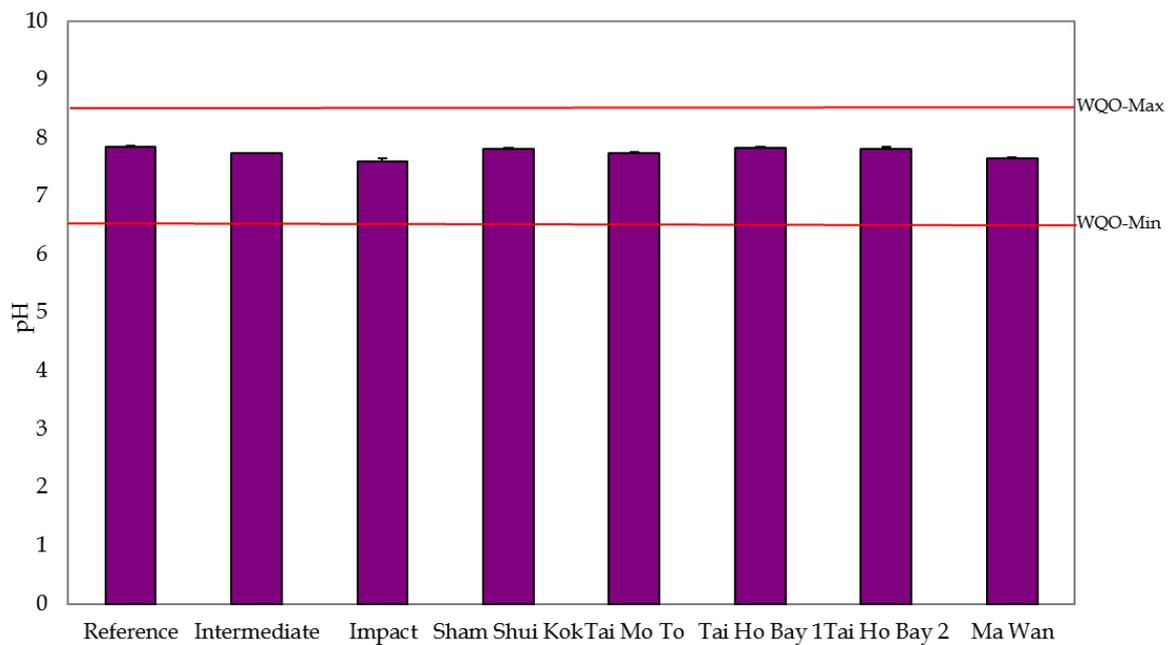


Figure 11: Levels of pH (mean +SD) recorded from Water Quality Monitoring during Capping of SB CMP 2 in May 2017.

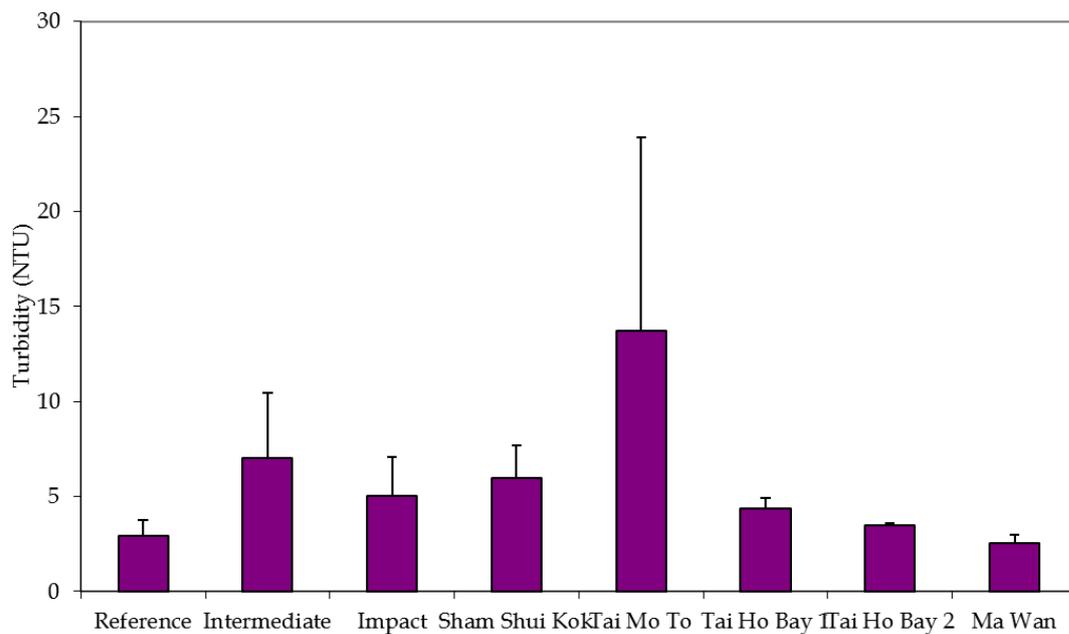


Figure 12: Levels of Turbidity (NTU; mean +SD) recorded from Water Quality Monitoring during Capping of SB CMP 2 in May 2017

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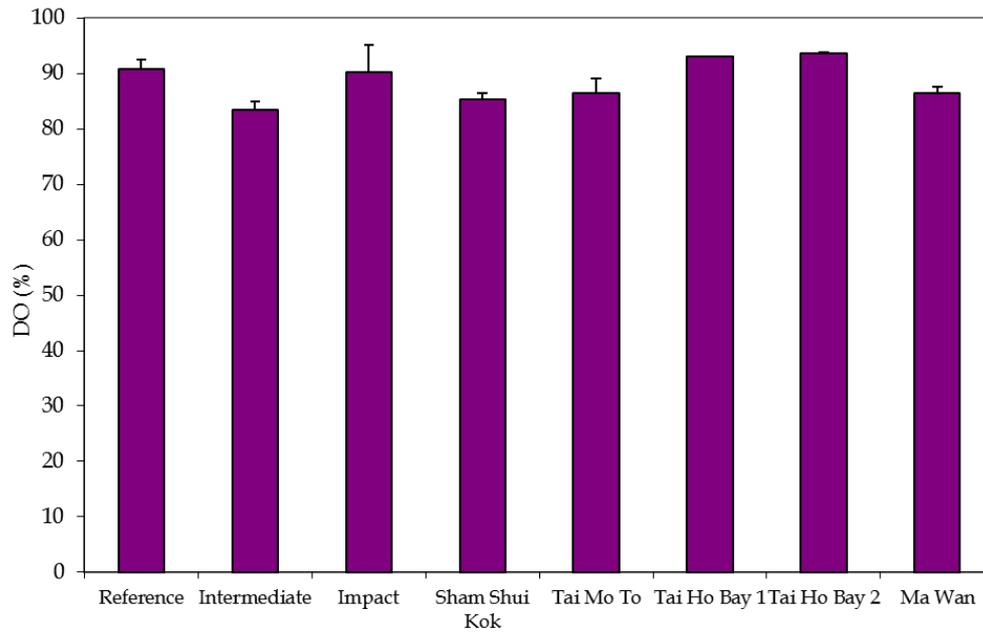


Figure 13: Levels of Dissolved Oxygen (% saturation; mean +SD) recorded from Water Quality Monitoring during Capping of SB CMP 2 in May 2017

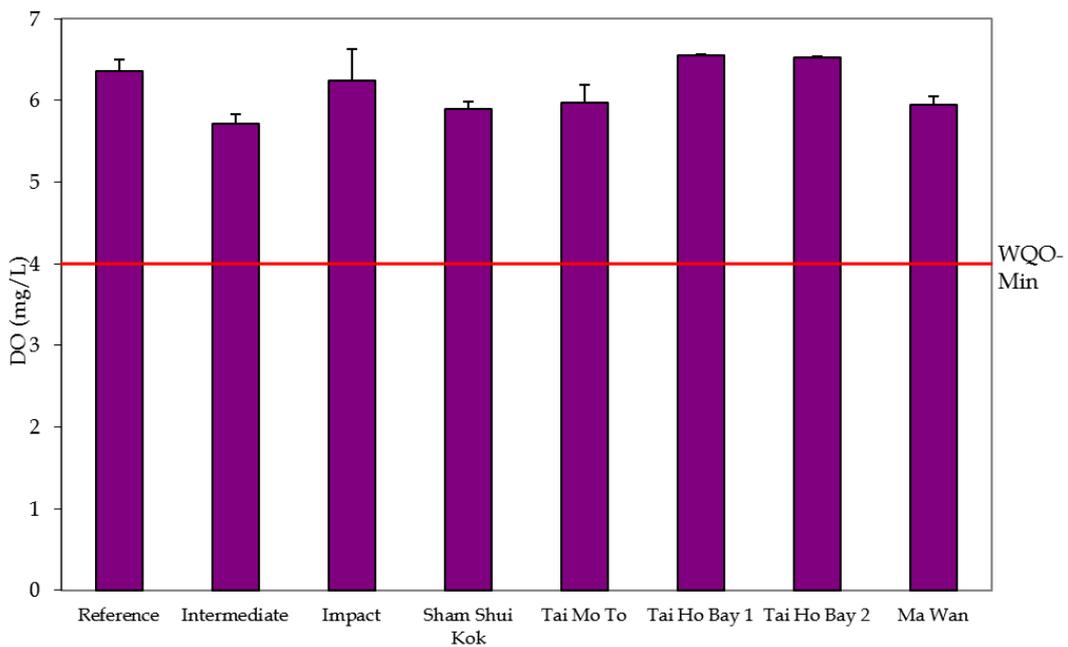


Figure 14: Levels of Dissolved Oxygen (mg/L; mean +SD) recorded from Water Quality Monitoring during Capping of SB CMP 2 in May 2017

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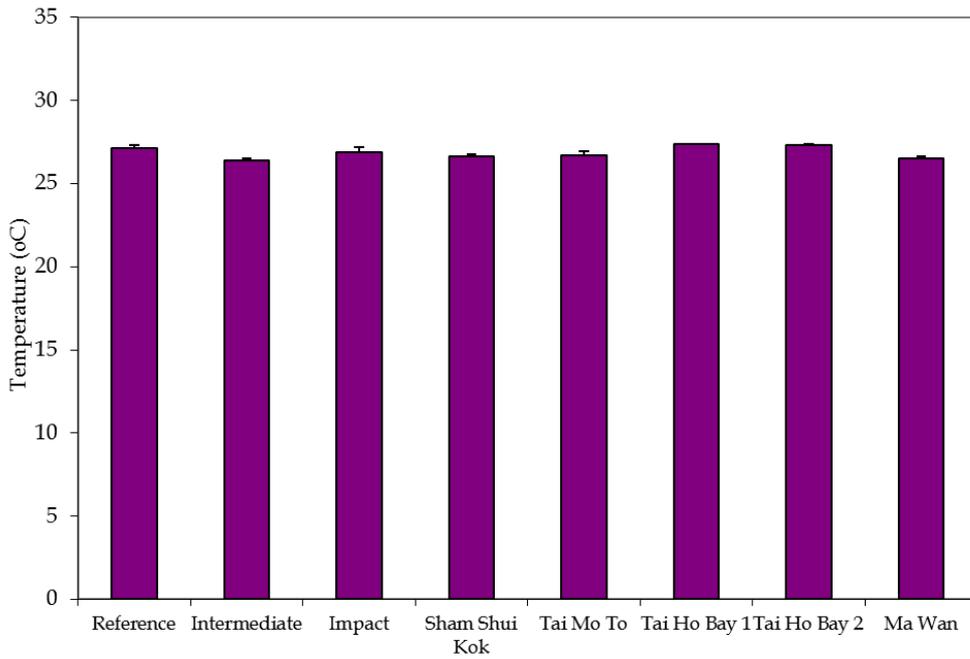


Figure 15: Levels of Temperature (°C; mean +SD) recorded from Water Quality Monitoring during Capping of SB CMP 2 in May 2017.

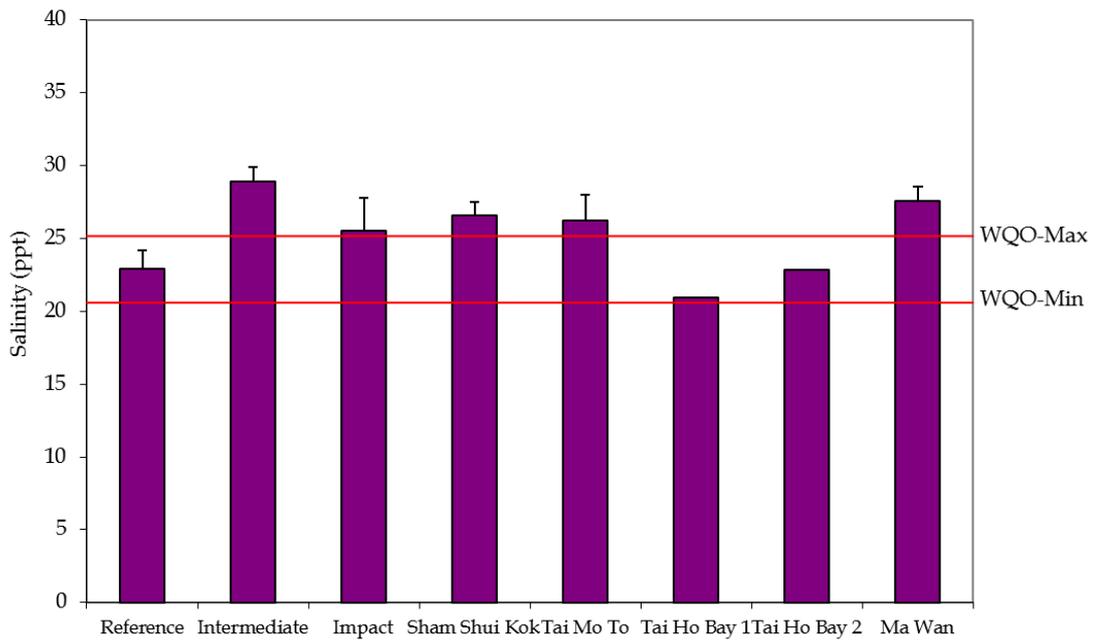


Figure 16: Levels of Salinity (ppt; mean +SD) recorded from Water Quality Monitoring during Capping of SB CMP 2 in May 2017.

Source: H:\Team\EM\GMS Projects\0400720 CEDD CMP EM&A 2017-2020\02 Deliverable\05 CMP Monthly Report\2nd (May 2017)

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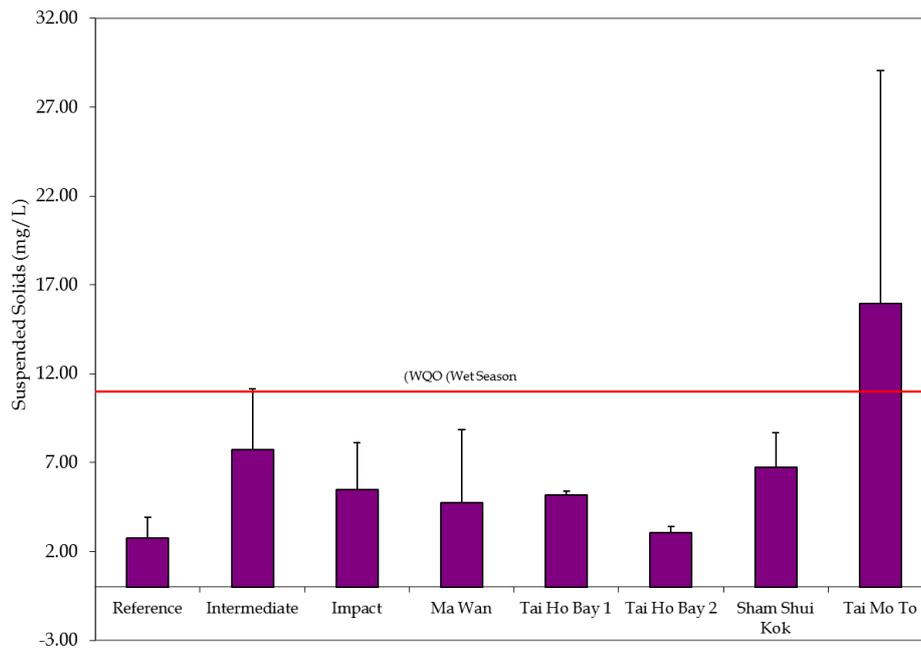


Figure 17: Levels of Suspended Solids (mg/L; mean +SD) recorded from Water Quality Monitoring during Capping of SB CMP 2 in May 2017

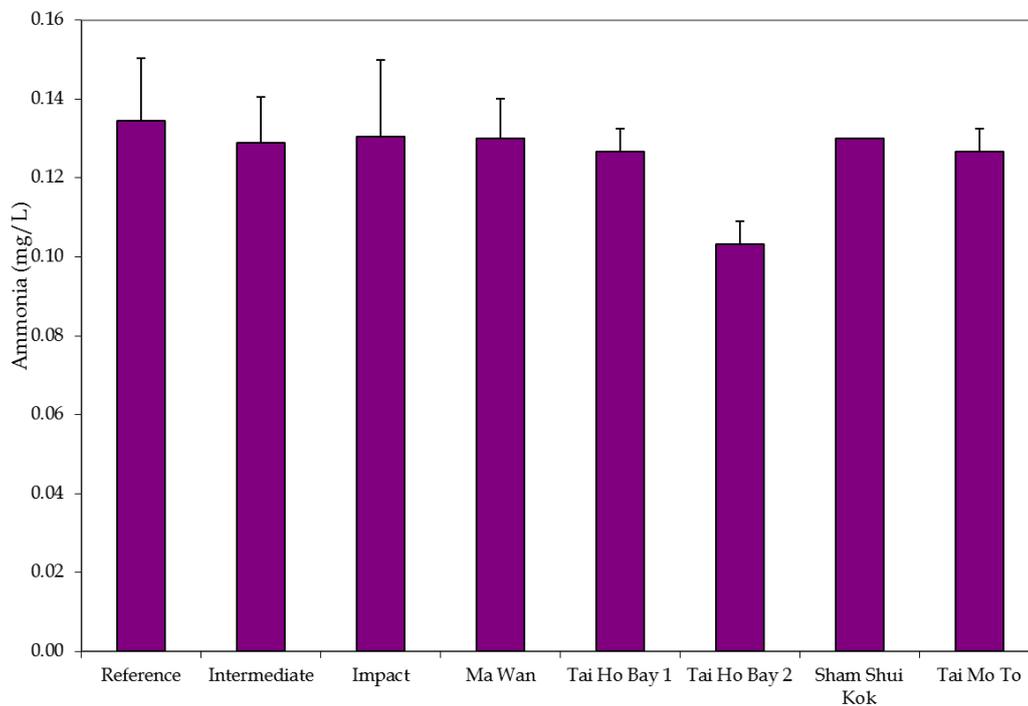


Figure 18: Level of Ammonia (mg/L; mean + SD) recorded from Water Quality Monitoring during Capping for SB CMP 2 in May 2017.

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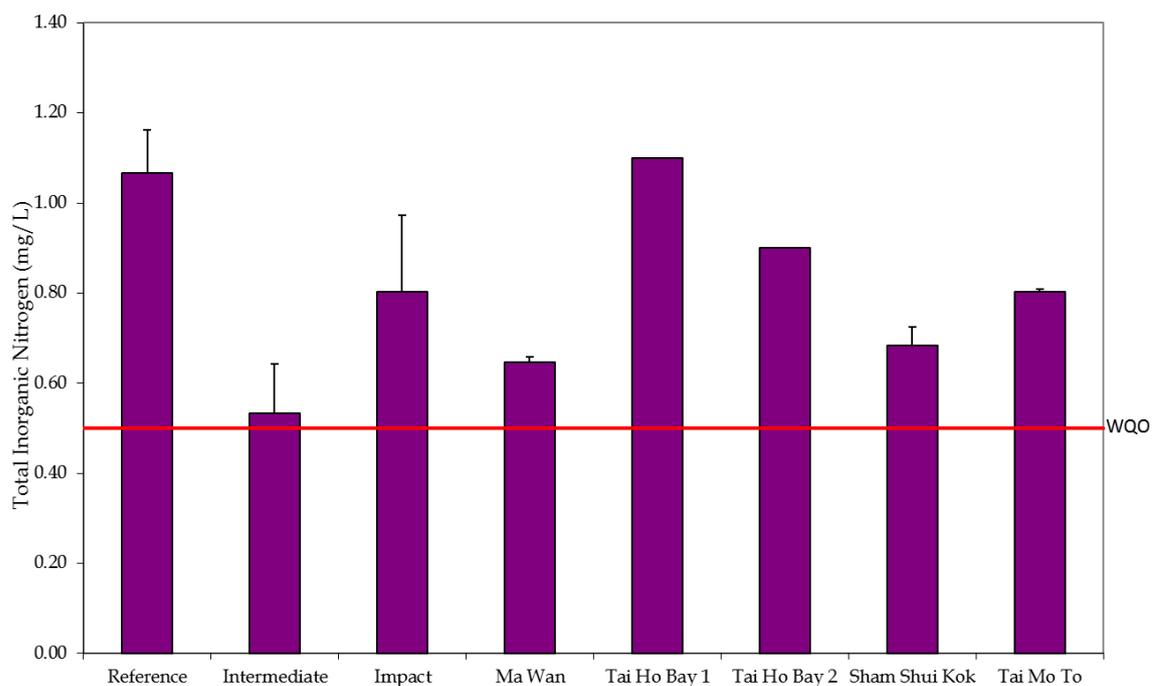


Figure 19: Level of TIN (mg/L; mean + SD) recorded from Water Quality Monitoring during Capping for SB CMP 2 in May 2017

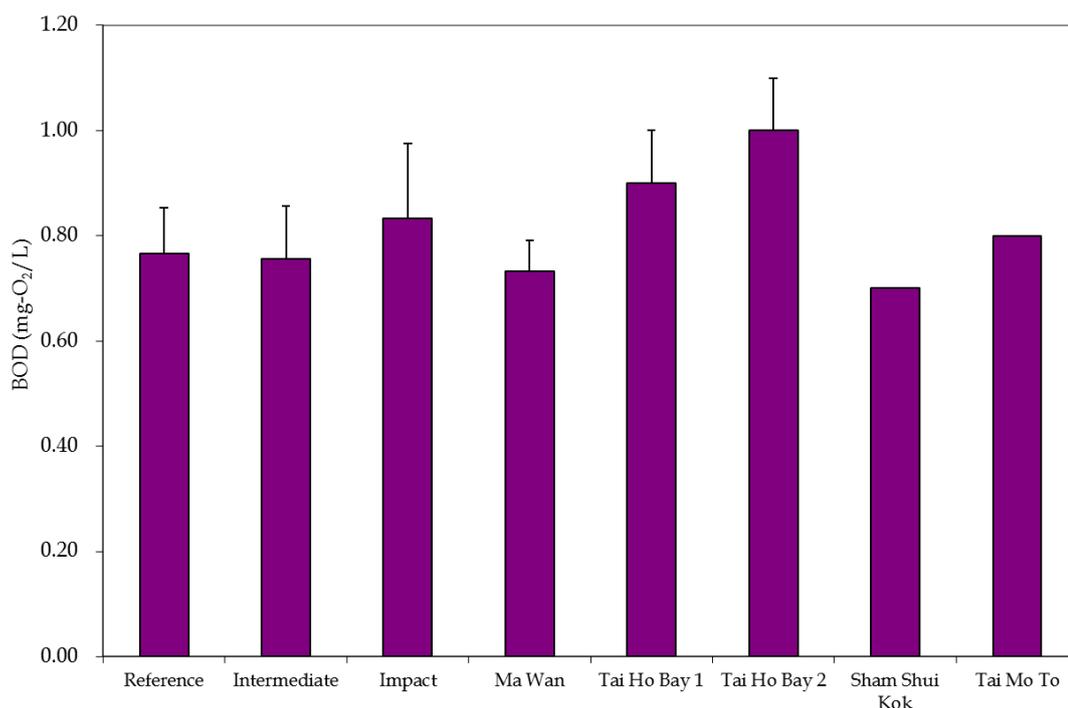


Figure 20: Level of BOD<sub>5</sub> (mg-O<sub>2</sub>/L; mean + SD) recorded from Water Quality Monitoring during Capping for SB CMP 2 in May 2017.

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Annex D

## Study Programme

