Mott MacDonald | Agreement No. CE59/2020(EP) Environmental Monitoring and Audit for Disposal Facility to the East of Sha Chau (2021-2026) – Investigation Monthly EM&A Report for Contaminated Mud Pits to the East of Sha Chau – March 2024

### Appendix A. Sampling Schedule

## East of Sha Chau CMPs Environmental Monitoring and Audit Sampling Schedule (January 2021 - March 2026)

Parameter / Station Typ Pit Specific Sediment C Active-Pit		Frequency	2021 2026 2026 2026 2026 2026 2026 2026
Pit-Edge	ESC-NPAA ESC-NPAB	Monthly Monthly	6       6
Near-Pit	ESC-NEAA ESC-NEAB	Monthly Monthly	6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       2
	ESC-NNAA ESC-NNAB	Monthly Monthly	6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       2
Cumulative Impact Sedi Near-field Stations	ESC-RNA	4 times per year	Jan         Feb         Mar         Apr         May         Sep         Oct         Nov         Dec         Jan         Jan
Mid-field Stations	ESC-RNB1 ESC-RMA	4 times per year 4 times per year	6       6       6       6       6       2
Capped Pit Stations		4 times per year 4 times per year	6       6       6       6       6       2 <th2< th=""> <th2< th=""> <th2< th=""></th2<></th2<></th2<>
Far-field Stations	ESC-RCB1 ESC-RFA ESC-RFB	4 times per year 4 times per year 4 times per year	6       6       6       6       6       2 <th2< th=""> <th2< th=""></th2<></th2<>
Ma Wan Station	MW1	4 times per year 4 times per year	6       6       6       6       6       2
Sediment Toxicity Tests Near-pit Stations		0.1	
Reference Stations	ESC-TDA ESC-TDB1	2 times per year 2 times per year	
Ma Wan Station	ESC-TRA ESC-TRB	2 times per year 2 times per year	6         6         6         8 <sup>s</sup> 5         5
Tissue / Whole Body Sa	MW1	2 times per year	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Near-pit Stations	ESC-INA ESC-INB	2 times per year 2 times per year	
Reference North	TNA TNB	2 times per year 2 times per year	
Reference South	TSA TSB	2 times per year 2 times per year	
Demersal Trawling Near-pit Stations	ESC-INA	4 times per voor	
Reference North	ESC-INA ESC-INB	4 times per year 4 times per year 4 times per year	0     0
Reference South	TNB	4 times per year 4 times per year	
Capping *	TSB	4 times per year	S         S
Ebb Tide Impact Station Downcu	ESC-IPE1A	4 times per year *	
	ESC-IPE2A ESC-IPE3 ESC-IPE4	4 times per year * 4 times per year * 4 times per year *	
Intermediate Station Do	ESC-INE1A	4 times per year * 4 times per year *	
	ESC-INE2A ESC-INE3A ESC-INE4A		
Reference Station Upcu	ESC-RFE1	4 times per year * 4 times per year * 4 times per year *	
	ESC-RFE3 ESC-RFE4	4 times per year * 4 times per year * 4 times per year * 4 times per year *	
Ma Wan Station	MW1	4 times per year *	
Flood Tide Impact Station Downcu	ESC-IPF1	4 times per year *	
Intermediate Station Do		4 times per year * 4 times per year *	
	ESC-INF1 ESC-INF2 ESC-INF3	4 times per year * 4 times per year * 4 times per year *	
Reference Station Upcu	ESC-RFF1A ESC-RFF2A	4 times per year * 4 times per year *	
Ma Wan Station	ESC-RFF3 MW1	4 times per year * 4 times per year *	
Routine Water Quality M Ebb Tide Impact Station Downcu			Jan Feb Mar Apri May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apri May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apri May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apri May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apri May Jun Jul Aug Sep Oct Nov Dec Jan Feb
	ESC-IPE1A ESC-IPE2A ESC-IPE3	Monthly* Monthly* Monthly*	4       4       4       4       4       4       4       2
Intermediate Station Do	ESC-IPE4 ESC-IPE5 wncurrent	Monthly* Monthly*	4       4       4       4       4       4       4       4       2
	ESC-INE1A ESC-INE2A ESC-INE3A	Monthly* Monthly* Monthly*	4       4       4       4       4       4       4       2
Reference Station Upcu		Monthly* Monthly*	
	ESC-RFE1 ESC-RFE2 ESC-RFE3 ESC-RFE4	Monthly* Monthly* Monthly* Monthly*	4       4       4       4       4       4       4       4       4       4       2
Ma Wan Station	ESC-RFE5	Monthly*	4       4
Flood Tide Impact Station Downcur		monting	
	ESC-IPF1 ESC-IPF2 ESC-IPF3	Monthly* Monthly* Monthly*	4       4       4       4       4       2
Intermediate Station Do	ESC-INF1 ESC-INF2	Monthly* Monthly*	4       4       4       4       4       2
Reference Station Upcu	ESC-RFF1A		4       2       2
Ma Wan Station	ESC-RFF2A ESC-RFF3	Monthly*	4       4       4       4       4       4       4       2
Water Column Profiling	MW1	Monthly*	4       4       4       4       4       4       4       4       2
Plume Stations	WCP1 WCP2	Monthly* Monthly*	2       2
Benthic Recoloinisation Capped Stations at CMF	ΡV	2 times per year	
	ESCV-CPA ESCV-CPB ESCV-CPC ESCV-CPD	2 times per year 2 times per year 2 times per year 2 times per year	
Reference Stations	RBA RBB	2 times per year 2 times per year 2 times per year	
	RBC1	2 times per year 2 times per year	

RBB	2 times per year			
RBC1	2 times per year			

Impact Monitoring for Dredging		Ja	Feb I	Mar A	pr M	ay Ju	n Jul	Au	g Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	ay .	Jun	Jul	Aug	j Se	ep O	ct N	Vov	Dec	Jan	Feb	Ма	r Ap	r Ma	/ Ju	n Ju	ΙΑι	ıg S	p O	ct N	ov D	ec J	an F	eb I	Mar /	Apr	May	Jun	Jul	Aug	Sep	Oct	No	v De	c Jai	n Feb	Mar	Apr	Ma	y Ji	un J	Jul	Aug	j Se	p O	ct N	ov I	Dec .	Jan	eb
Upstream Stations																																																																			
US1	3 times per week	(												2	2	2	2		2																																																
US2	3 times per week	(												2	2	2	2		2																																																
Downstream Stations																																																																			
DS1	3 times per week	(												2	2	2	2		2																																																
DS2	3 times per week	(												2	2	2	2		2																																																
DS3	3 times per week	( [ [	$\square$											2	2	2	2		2																																																
DS4	3 times per week													2	2	2	2		2																																																
DS5	3 times per week													2	2	2	2		2																																																
Ma Wan Station			_														_																													-	-										_										
MW1	3 times per week	(					T	T						2	2	2	2		2															T						T	T	T																			T						

Notes: (1) The number shown in each cell represents the numbers of replicates per monitoring station. The number shown in green bolded text represented monitoring works have been conducted before/ during the reporting period of this Monthly EM&A Report, while the number shown in black represent planned monitoring works after the reporting period of this Monthly EM&A Report. EM&A Report.

(2) For the planned Routine Water Quality Monitoring (i.e. the numbers of replicates per monitoring station shown in black), the monitoring will be conducted at mid-ebb OR mid-flood tide. The yearly tidal selection of this monitoring will be based on a principle to obtain 6 moniths monitoring data at mid-ebb, and 6 moniths monitoring data at mid-flood.

(3) Impact Monitoring for Dredging will be scheduled when dredging operations commence.

(3) Impact Monitoring for Dredging will be scheduled when dredging operations commence.
 (4) Benthic Recolonisation Studies for CMP V will be scheduled when dredging operations commence.
 (4) Benthic Recolonisation Studies for CMP V will be scheduled when dredging operations for CMP V is completed.
 \* A proposal on the change of number of sample replication of water quality & sediment monitoring and combination of routine water quality monitoring and water quality monitoring during capping operation as submitted to EPD and agreed by EPD on 3 December 2020. The proposed changes have been implemented for the EM&A activities since December 2020. Vater Quality Monitoring third graphing perplication of sample replication of water quality and sediment monitoring are combined such that Routine Water Quality Monitoring have been conducted monthly starting in December 2020. A technical note presenting the data review results served as a supplementary information was submitted to EPD and presented that Phase 2 optimization of sample replication of water quality and deversely affecting the supply of international species adopted in testing programme of Sediment Toxicity Tests, as such, Sediment Toxicity Tests, as such sedimet 2022.
 \* To enable the required Research Fishing Permit could be granted by the time undertaking the Demensal Traving, trawing originally scheduled in July and August 2022 was postponed to August and September 2022.

# Appendix B. Water Quality Monitoring Results



Parameters	Action	Limit					
Dissolved Oxygen (DO)	Surface and Middle Depth <sup>(2)</sup>	Surface and Middle Depth <sup>(2)</sup>					
in mg L <sup>-1</sup> (Surface, Middle & Bottom) <sup>(1)</sup>	5%-ile of baseline data for surface and middle layer = <b>3.76</b>	1%-ile of baseline data for surface and middle layer = <b>3.11</b> <sup>(3)</sup>					
	and	and					
	Significantly less than the reference station's mean DO (at the same tide of the same day)	Significantly less than the reference station's mean DO (at the same tide of the same day)					
	Bottom	Bottom					
	5%-ile of baseline data for surface and middle layer = <b>2.96</b>	The average of the impact station readings are $< 2$					
	and	and					
	Significantly less than the reference station's mean DO (at the same tide of the same day)	Significantly less than the reference station's mean DO (at the same tide of the same day)					
Suspended Solids (SS) in mg L <sup>-1</sup>	95%-ile of baseline data for depth- averaged = <b>37.88</b>	99%-ile of baseline data for depth- averaged = <b>61.92</b>					
(depth-averaged) <sup>(5)</sup>	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					
Turbidity	95%-ile of baseline data = 28.14	99%-ile of baseline data = <b>38.32</b>					
in NTU	and	and					
(depth-averaged) <sup>(4)(5)</sup>	120% of control station's Turbidity at the same tide of the same day	130% of control station's Turbidity at the same tide of the same day					

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

Notes:

1. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.

2. Action and Limit Levels for DO for Surface and Middle layers were calculated from the combined pool of baseline surface layer data and baseline middle layer data.

 Given the Action Level for DO for Surface and 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 Vb in March 2024

Station	Temp.	Salinity	Turbidity	Dissolve	ed Oxygen	рН	Suspended Solids
	(°C)	(ppt)	(NTU)	(%)	(mg L <sup>-1</sup> )		(mg L <sup>-1</sup> )
WCP 1 (Downstream)	19.22	32.35	1.51	98.36	7.50	8.19	2.5
WCP 2 (Upstream)	19.46	32.64	1.45	98.98	7.50	8.16	1.0
WQO (Dry Season)	N/A	29.37-35.90#	N/A	N/A	>4	6.5-8.5	13.2

Notes:

1. <sup>#</sup> Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

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

3. Cell shaded grey indicates value exceeding the WQO.

#### Table B3: In-situ Monitoring Results for Routine Water Quality Monitoring of ESC CMPs in March 2024

Station	Temp.	Salinity	Turbidity	Dissolve	рН	
	(°C)	(ppt)	(NTU)	(%)	(mg L <sup>-1</sup> )	
RFE (Reference)	19.81	32.25	2.11	96.14	7.25	8.19
IPE (Impact)	19.89	32.26	1.85	96.25	7.25	8.18
INE (Intermediate)	20.00	32.66	1.40	94.52	7.09	8.14
Ma Wan	20.13	33.42	0.94	92.06	6.86	8.10
WQO (Dry Season)	N/A	29.02-35.47#	N/A	N/A	>4	6.5-8.5

Notes:

1. \* Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

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

3. Cell shaded grey indicates value exceeding the WQO.



### Table B4: Laboratory Results for Dissolved Metals and Metalloid in Routine Water Quality Monitoring of ESC CMPs in March 2024

Station	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Zn
	(µg/L)								
RFE	1.66	0.02	0.14	0.62	ND	0.001	0.61	ND	0.50
IPE	1.51	0.03	0.15	0.41	ND	0.001	0.58	ND	0.53
INE	1.51	0.02	0.15	0.38	ND	0.001	0.55	ND	0.54
Ma Wan	1.53	0.01	0.13	0.91	0.03	0.001	0.39	ND	0.96

Note:

1. "ND" indicates the concentrations of metals and metalloids are not detected.

### Table B5: Laboratory Results for Nutrients and Suspended Solid in Routine Water Quality Monitoring of ESC CMPs in March 2024

Station	NH <sub>3</sub>	TIN	<b>BOD</b> ₅	SS
	(mg/L)	(mg/L)	(mg/L)	(mg/L)
RFE	0.08	0.32	0.45	3.1
IPE	0.08	0.32	0.65	2.8
INE	0.10	0.31	0.63	2.2
Ma Wan	0.15	0.29	<lor< td=""><td>3.0</td></lor<>	3.0
			5.0	WQO of TIN: 0.5 mg/L

Dry Season WQO of SS: 13.2 mg/L

Notes:

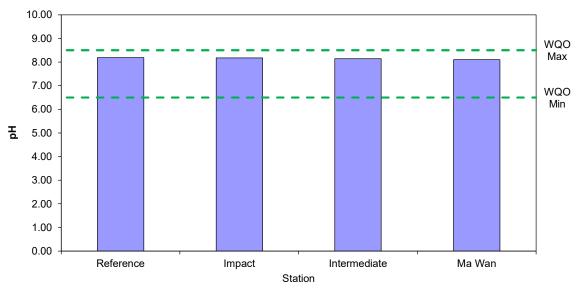
1. "<LOR" indicates the concentrations of contaminants are below the limit of reporting.

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

3. Cell shaded grey indicates value exceeding the WQO.

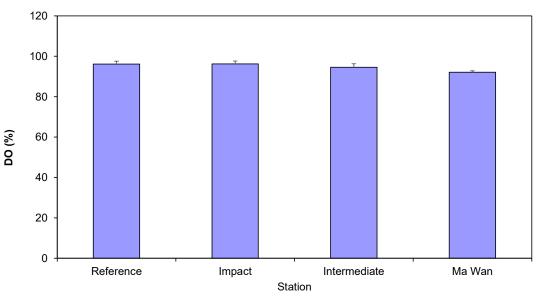
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### **Appendix C. Graphical Presentations**

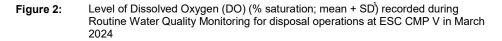


#### Routine Water Quality Monitoring for ESC CMP V - March 2024

Figure 1: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024



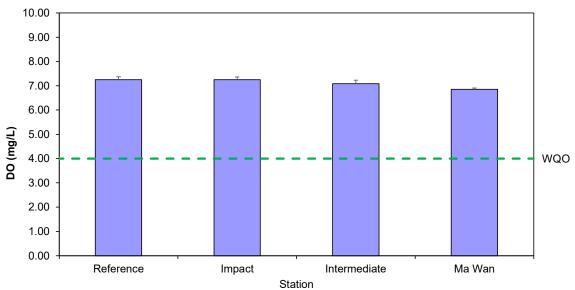
Routine Water Quality Monitoring for ESC CMP V - March 2024



1

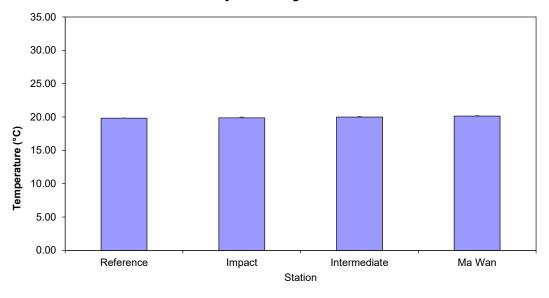
Μ

The mean and standard deviation (SD) for in-situ data are the mean and SD for water columns within the area.



Routine Water Quality Monitoring for ESC CMP V - March 2024

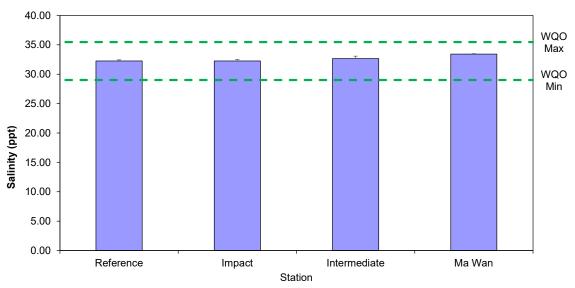
Figure 3: Concentration of Dissolved Oxygen (DO) (mg/L; mean + SD<sup>1</sup>) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024



Routine Water Quality Monitoring for ESC CMP V - March 2024

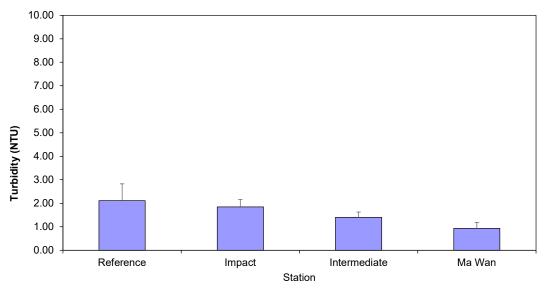
Figure 4: Level of Temperature (°C; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024

<sup>&</sup>lt;sup>1</sup> The mean and standard deviation (SD) for in-situ data are the mean and SD for water columns within the area.



#### Routine Water Quality Monitoring for ESC CMP V - March 2024

 
 Figure 5:
 Level of Salinity (ppt; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024

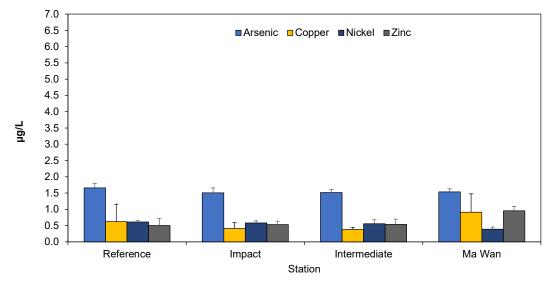


Routine Water Quality Monitoring for ESC CMP V - March 2024

Figure 6: Level of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024

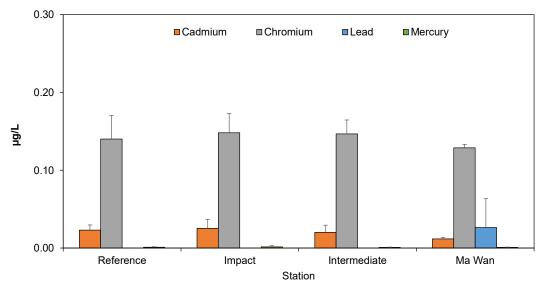
1

The mean and standard deviation (SD) for in-situ data are the mean and SD for water columns within the area.



#### Routine Water Quality Monitoring for ESC CMP V March 2024

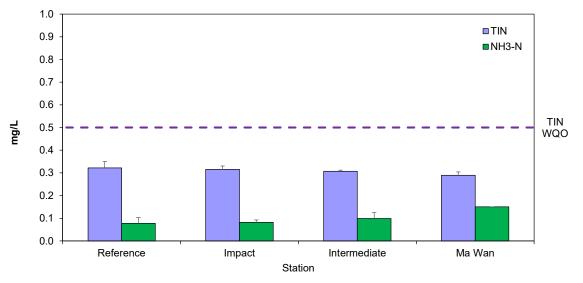
**Figure 7:** Concentration of Arsenic, Copper, Nickel, and Zinc (μg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024



#### Routine Water Quality Monitoring for ESC CMP V March 2024

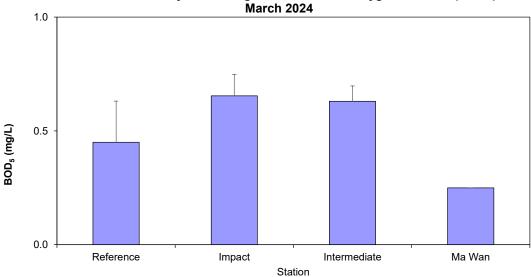
**Figure 8:** Concentration of Cadmium, Chromium, Lead and Mercury, (µg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024

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### Routine Water Quality Monitoring for Nutrients - March 2024

Figure 9: Concentration of Total Inorganic Nitrogen (TIN) and Ammonia Nitrogen (NH3-N) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024



Routine Water Quality Monitoring for Biochemical Oxygen Demand (BOD5) -March 2024

Figure 10: Level of Biochemical Oxygen Demand (BOD5) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in March 2024