

Investigation

Monthly EM&A Report for Contaminated Mud Pits to the East of Sha Chau – December 2021

January 2022

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Agreement No. CE 59/2020 (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 – December 2021

January 2022





Dredging, Management and Capping of Contaminated Sediment Disposal

Facility at Sha Chau

Environmental Certification Sheet

Environmental Permit No. EP-312/2008/A

Reference Document /Plan

Document/Plan to be Certified/ Verified:

Monthly EM&A Report for Contaminated Mud Pits to the

East of Sha Chau - December 2021

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Reference EP Condition

Environmental Permit Condition:

Condition 3.4 of EP-312/2008/A:

4 hard copies and 1 electronic copy of monthly EM&A Report shall be submitted to the Director within 10 working days 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 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.

Ir Thomas Chan,
Environmental Team Leader (ETL):

Date: 11 January 2022

IA Verification

I hereby verify that the above referenced document/plan complies with the above referenced condition of EP-312/2008/A.

Dr Wang Wen Xiong, Independent Auditor (IA): Date: 11 January 2022

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Issue and Revision Record

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1 Introduction

1.1 Background

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 East of Sha Chau (ESC) for the disposal of contaminated sediment, and various 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.

Environmental Permits (EPs) (Ref. No. EP-312/2008/A) was issued by the Environmental Protection Department (EPD) to the CEDD, the Permit Holder, on 28 November 2008 for the Project - Disposal of Contaminated Sediment – Dredging, Management and Capping of Sediment Disposal Facility at Sha Chau.

Under the requirements of the EP, 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. 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. The current programme will assess the impacts resulting from dredging, disposal and capping operations of CMP V.

A proposal on the change of number of sample replication of water quality and sediment monitoring as well as combination of routine water quality monitoring and water quality monitoring during capping operation was submitted to EPD and agreed by EPD on 3 December 2020. The proposed changes have been effective for the EM&A activities since December 2020. The latest sampling schedule is provided in **Appendix A**.

The present EM&A programme under Agreement No. CE 59/2020 (EP) covers the dredging, disposal and capping operations of the ESC CMP V (see **Appendix A** for the EM&A programme.) Detailed works schedule for ESC CMP V is shown in **Table 1.1**. In December 2021, the following works were undertaken:

- Disposal of contaminated mud at ESC CMP Vb; and
- Capping operations at ESC CMP Vd.

Table 1.1: Works Schedule for ESC CMP V



¹ ERM (2013) Final Report. Submitted under Agreement No. CE 4/2009 (EP) Environmental Monitoring and Audit for Contaminated Mud Pit at East Sha Chau. For CEDD.

² ERM (2017) Final Report. Submitted under 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). For CEDD.

1.2 Reporting Period

This Monthly EM&A Report for Contaminated Mud Pits to the East of Sha Chau – December 2021 covers the EM&A activities for the reporting period of December 2021 (from 1 to 31 December 2021).

1.3 Details of Sampling and Laboratory Testing Activities

The following monitoring activities were undertaken for ESC CMP V during the reporting period:

- Water Column Profiling of ESC CMP Vb;
- Routine Water Quality Monitoring of ESC CMPs;
- Pit Specific Sediment Chemistry of ESC CMP Vb; and
- Cumulative Impact Sediment Chemistry of ESC CMPs.

1.4 Details of Outstanding Sampling or Analysis

No outstanding sampling remained for the reporting month (December 2021).

2 Brief Discussion of Monitoring Results for ESC CMP V

2.1 Introduction

This section presents a brief discussion of the results obtained from the following monitoring activities for ESC CMP V during the reporting period:

- · Water Column Profiling of ESC CMP Vb;
- Routine Water Quality Monitoring of ESC CMPs;
- Pit Specific Sediment Chemistry of ESC CMP Vb; and
- Cumulative Impact Sediment Chemistry of ESC CMPs.

2.2 Water Column Profiling of ESC CMP Vb – in December 2021

Water Column Profiling was undertaken at a total of two sampling stations (Upstream and Downstream stations) on 6 December 2021. 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 dry season period (November to March) of 2011 – 2020 from stations in the North Western Water Control Zone (WCZ), where the ESC CMPs are located.³ 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 **Appendix B** for details).

2.2.1 In-situ Measurements

Analyses of results for December 2021 indicated that levels of Salinity, pH and DO complied with the WQOs at both Downstream and Upstream stations (**Table B2** of **Appendix B**). Levels of DO and Turbidity at all stations complied with the Action and Limit Levels (**Tables B1 and B2** of **Appendix B**).

2.2.2 Laboratory Measurements for Suspended Solids (SS)

Analyses of results for December 2021 indicated that the SS level at both Downstream and Upstream stations complied with the WQO and the Action and Limit Levels (**Tables B1 and B2** of **Appendix B**).

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

2.3 Routine Water Quality Monitoring of ESC CMPs – in December 2021

Routine Water Quality Monitoring of ESC CMPs was undertaken on 7 December 2021. The monitoring results have been assessed for compliance with the WQOs (see **Section 2.2** above for details). The monitoring results are shown in **Tables B3 and B4** of **Appendix B** and **Figures 1 to 10** of **Appendix C**. A total of ten (10) monitoring stations were sampled in December 2021 as shown in **Figure 2.1**.

³ http://epic.epd.gov.hk/EPICRIVER/marine/?lang=en

2.3.1 In-situ Measurements

Graphical presentation of the monitoring results (Temperature, DO, pH, Salinity and Turbidity) is shown in **Figures 1 to 6** of **Appendix C**. Analyses of results indicated that the levels of pH, Salinity and DO complied with the WQOs at all stations in December 2021.

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

Overall, in-situ measurement results of the Routine Water Quality Monitoring indicated that the disposal and capping operation at ESC CMPs did not appear to cause any unacceptable impacts in water quality in December 2021.

2.3.2 Laboratory Measurements

Laboratory analysis of samples obtained during the reporting period indicated that the concentrations of Arsenic, Copper, Mercury, Nickel and Zinc were detected in the samples at some/all stations and their concentrations of most metals and metalloids were generally similar across stations, except the concentration of Zinc which were lower at Ma Wan station (**Table B4** of **Appendix B**; **Figure 7** of **Appendix C**).

For nutrients, concentrations of Total Inorganic Nitrogen (TIN) at all stations complied with the WQO (0.5 mg/L) (**Table B4** of **Appendix B**; **Figure 8** of **Appendix C**). The concentration of Ammonia Nitrogen (NH₃-N) was higher at Ma Wan station (**Table B4** of **Appendix B**; **Figure 8** of **Appendix C**). The concentrations of Biochemical Oxygen Demand (BOD₅) were higher at Reference (RFF) and Ma Wan stations (**Table B4** of **Appendix B**; **Figure 9** of **Appendix C**).

Analyses of results for the reporting period indicated that the SS levels at Reference (RFF), Impact (IPF) and Ma Wan station complied with the dry season WQO (13.1 mg/L) and the Action and Limit Levels. SS level at Intermediate (INF) station was above the dry season WQO but in compliance with the Action and Limit Levels (**Tables B1 and B4** of **Appendix B**; **Figure 10** of **Appendix C**).

Overall, results of the Routine Water Quality Monitoring indicated that the disposal and capping operation at ESC CMPs did not appear to cause any unacceptable deterioration in water quality during the reporting period. Detailed statistical analysis will be presented in the Quarterly EM&A Report to investigate any spatial and temporal trends of potential concern.

2.4 Pit Specific Sediment Chemistry of ESC CMP Vb – in December 2021

Monitoring locations for Pit Specific Sediment Chemistry for ESC CMP Vb are shown in **Figure 2.2**. A total of six (6) monitoring stations were sampled on 2 December 2021.

The concentrations of all inorganic contaminants were lower than the Lower Chemical Exceedance Levels (LCELs) at all stations (**Figures 11 and 12** of **Appendix C**).

For organic contaminants, the concentration of Total Organic Carbon (TOC) was higher at Active-Pit station ESC-NPCB during the reporting period (**Figure 13** of **Appendix C**). The concentrations of Low Molecular Weight and High Molecular Weight Polycyclic Aromatic Hydrocarbons (PAHs) were lower than the LECLs at all stations (**Figure 14** of **Appendix C**). The concentration of Tributyltin (TBT) was higher at Near-Pit station ESC-NNCB (**Figure 15** of **Appendix C**). The concentrations of Total Polychlorinated Biphenyls (PCBs), Total dichloro-diphenyl-trichloroethane (DDT) and 4,4'-dichlorodiphenyldichloroethylene (DDE) were below the limit of reporting at most stations during the reporting period, except the concentrations of DDT and 4,4'-DDE were high than the limit of reporting at Active-Pit station ESC-NPCB.

Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality outside the pit area as a result of the contaminated mud disposal operations at ESC CMP

Statistical analysis will be undertaken and presented in the corresponding Quarterly EM&A Report to investigate whether there are any unacceptable impacts in the area caused by the contaminated mud disposal.

2.5 Cumulative Impact Sediment Chemistry of ESC CMPs – in December 2021

Monitoring locations for Cumulative Impact Sediment Chemistry for ESC CMPs are shown in **Figure 2.3**. A total of nine (9) monitoring stations were sampled on 2 December 2021.

Analyses of results for the Cumulative Impact Sediment Chemistry Monitoring indicated that the concentrations of all inorganic contaminants were below the LCEL at all stations during the reporting period (**Figures 16 and 17** of **Appendix C**).

For organic contaminants, the concentration of TOC was lower at Capped Pit station ESC-RCB1 (Figure 18 of Appendix C). The concentrations of High Molecular Weight PAHs were below the LCEL at all stations (Figure 19 of Appendix C). Higher concentrations of TBT were recorded at Ma Wan station (Figure 20 of Appendix C). The concentrations of Total PCBs, Total DDT, 4,4'-DDE and Low Molecular Weight PAHs were below the limit of reporting at all stations during the reporting period.

Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at ESC CMP Vb during the reporting period. Statistical analysis will be undertaken and presented in the corresponding Quarterly EM&A Report to investigate whether there are any unacceptable impacts in the area caused by the contaminated mud disposal.

Vb during the reporting period.

3 Future Key Issues

3.1 Activities Scheduled for the Next Reporting Period

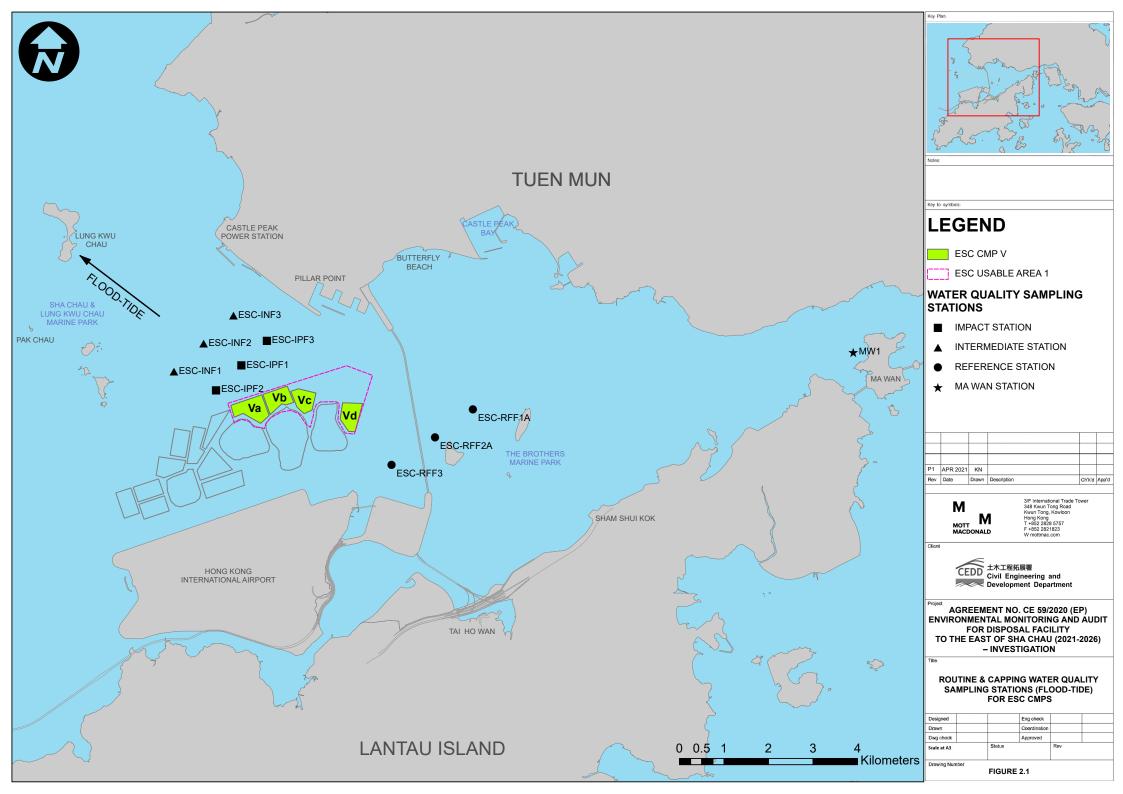
The following monitoring activities will be conducted in the next reporting period of January 2022 for ESC CMP V (see **Appendix A** for the sampling schedule):

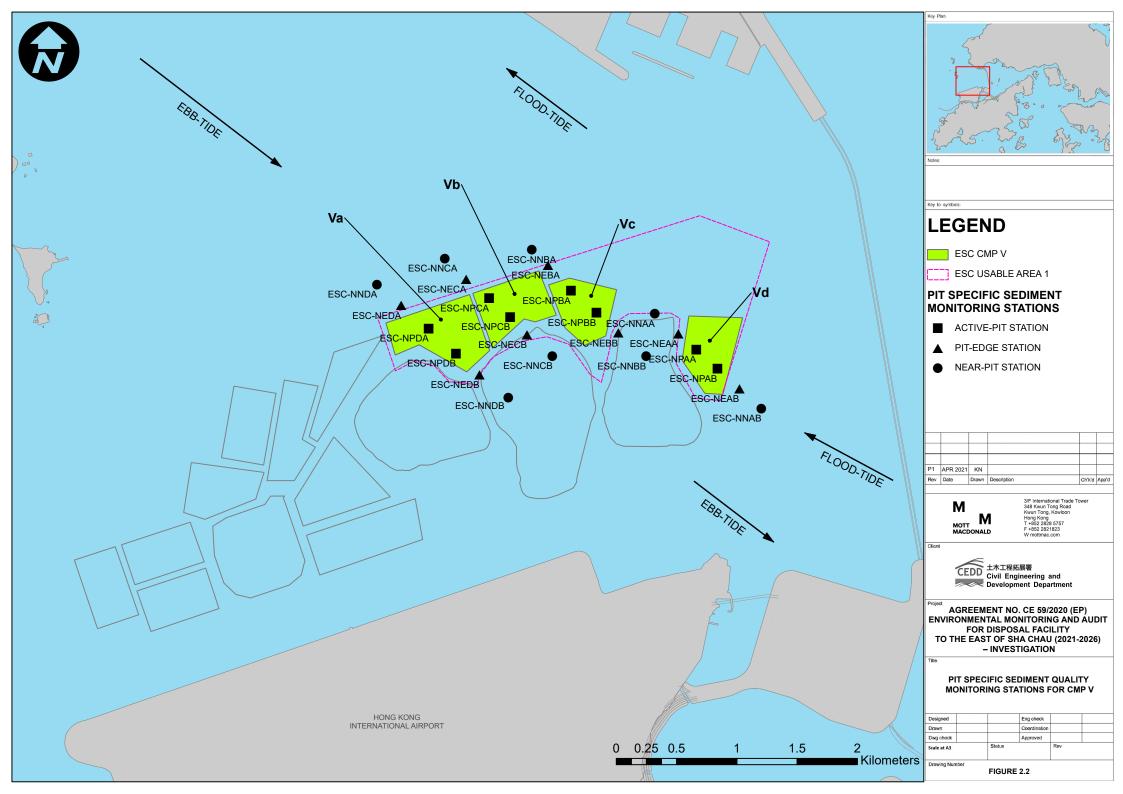
- Water Column Profiling of ESC CMP Vb;
- Routine Water Quality Monitoring of ESC CMPs;
- Pit Specific Sediment Chemistry of ESC CMP Vb; and
- Demersal Trawling for ESC CMPs.

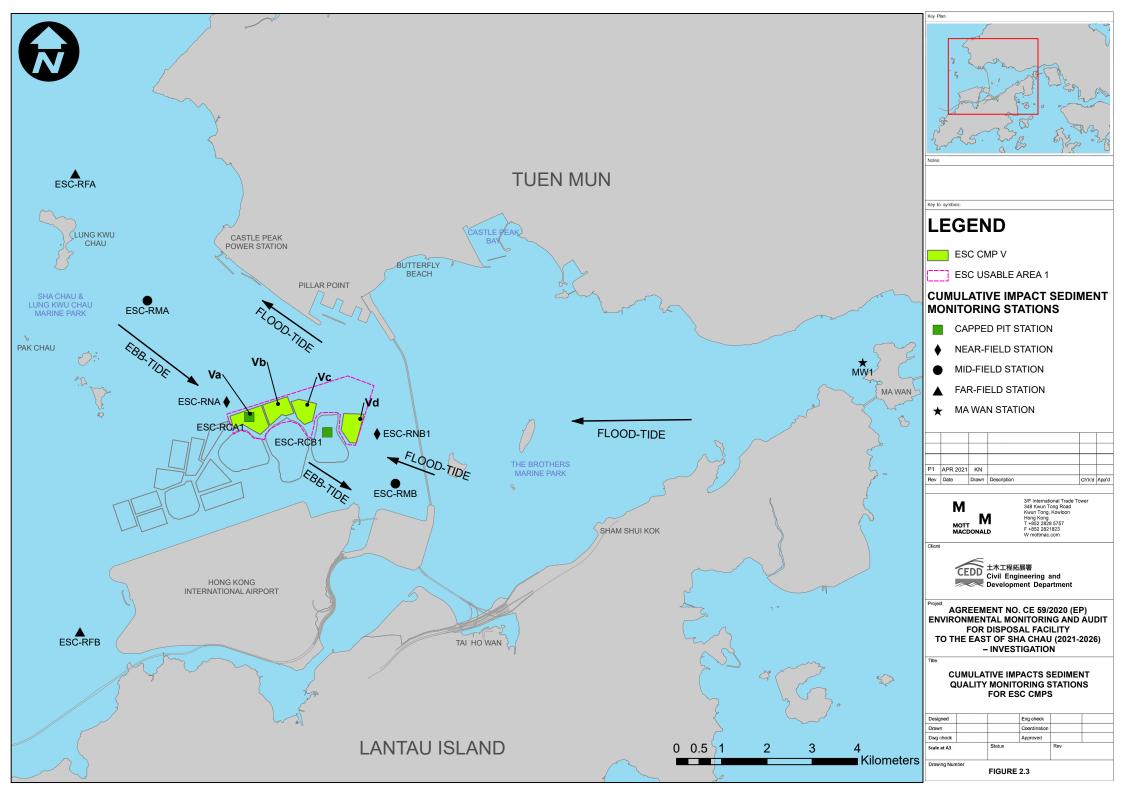
3.2 Study Programme

A summary of the Study Programme is presented in **Appendix D**.

Figures







Appendices

Appendix A Sampling Schedule

Appendix B Water Quality Monitoring Results

Appendix C Graphical Presentations

Appendix D Study Programme

Appendix A. Sampling Schedule

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

| | | | | | | | | | | | | | | | y 2021 | | , | | | | | | | | | | | | | |
|--|-------------------------------------|--|-------------------------|-------------------|----------------|-------------------|-------------------|--------------|----------|----------------|----------|----------|------------|-------------|----------------|----------------|------------|--------------|----------------|----------|--------------|----------------|------------|----------------|---------|------------|-----------------|-----------|----------------|-------------------------|
| Parameter / Station Type Pit Specific Sediment Ch Active-Pit | | Frequency | Jan Feb Ma | ar Apr Ma | y Jun J | Jul Aug Ser | Oct Nov | Dec Jar | | ar Apr Ma | y Jun Ju | ıl Aug S | Gep Oct No | | 023 Ian Feb | Mar Apr May | Jun Jul Au | g Sep Oct I | Nov Dec Jar | | Apr May J | un Jul Aug | Sep Oct N | lov Dec Ja | | Mar Apr N | May Jun Ju | I Aug Sep | Oct Nov De | 2026 C Jan Feb Ma |
| | ESC-NPAA ESC-NPAB | Monthly Monthly | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 6 6 |
| Pit-Edge | ESC-NEAA ESC-NEAB | Monthly Monthly | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 6 6 |
| Near-Pit | ESC-NNAA | Monthly | 6 6 6 | 6 6 6 | 6 6 | 6 6 6 | 6 6 | 6 6 | 6 (| 6 6 6 | 6 6 | 6 | 6 6 6 | 6 | 6 6 | 6 6 6 | 6 6 6 | 6 6 6 | 6 6 6 | 6 6 | 6 6 6 | 6 6 6 | 6 6 | 6 6 6 | 6 | 6 6 | 6 6 6 | 6 6 | 6 6 6 | 6 6 6 |
| Cumulative Impact Sedir | ESC-NNAB | Monthly /* | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 6 6 |
| Near-field Stations | ESC-RNA | 4 times per year | 6 | 〒 | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 6 | | 6 | 6 | | 6 6 | | 6 | 6 | | 6 | 6 | 6 | 6 |
| Mid-field Stations | ESC-RMA | 4 times per year 4 times per year | 6 | | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 6 | 3 | 6 | 6 | | 6 6 | | 6 | 6 | | 6 | 6 | 6 | 6 |
| Capped Pit Stations | ESC-RMB ESC-RCA1 | 4 times per year 4 times per year | 6 | + | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 6 | | 6 | 6 | | 6 6 | | 6 | 6 | | 6 | 6 | 6 | |
| Far-field Stations | ESC-RCA2 | 4 times per year | 6 | 4 | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 6 | 5 | 6 | 6 | | 6 6 | | 6 | 6 | | 6 | 6 | 6 | 6 |
| Ma Wan Station | ESC-RFA ESC-RFB | 4 times per year 4 times per year | 6 | 世 | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 | 6 | | 6 6 | | 6 | 6 | | 6 6 | | 6 | 6 | | 6 | 6 | 6 | 6 |
| Sediment Toxicity Tests | MW1 | 4 times per year | Jan Feb Ma | ar Apr Ma | 6 av Jun J | 6 Jul Aug Ser | Oct Nov | 6 Dec Jar | 6 Feb M | ar Apr Ma | 6 Jun Ju | 6 Aug S | Sep Oct No | 6 Dec J | 6 lan Feb | | | Sen Oct 1 | 6 Nov Dec Jar | 6 Feb Ma | r Apr May Ju | 6 6 | | 6 lov Dec Ja | 6 Peb N | Mar Apr N | 6 May Jun Ju | 6 Aug Sep | Oct Nov De | 6 Jan Feb Ma |
| Near-pit Stations | ESC-TDA | 2 times per year | 5 | | | 5 | | | 5 | | | 5 | | | 5 | | | 5 | | 5 | | 5 | | | 5 | | | 5 | | 5 |
| Reference Stations | ESC-TDB1 | 2 times per year 2 times per year | 5 | + | \Rightarrow | 5 | | | 5 | | | 5 | | | 5 | | 5 | | | 5 | | 5 | | | 5 | | | 5 | | 5 |
| Ma Wan Station | ESC-TRB MW1 | 2 times per year 2 times per year | 5 | # | \blacksquare | 5 | | | 5 | | | 5 | | | 5 | | 5 | | | 5 | | 5 | | | 5 | | | 5 | | 5 |
| Tissue / Whole Body San | | 2 times per year | | ar Apr Ma | ıy Jun J | , | Oct Nov | Dec Jar | | ar Apr Ma | y Jun Ju | | Sep Oct No | ov Dec J | | Mar Apr May | | | Nov Dec Jar | | r Apr May J | | | lov Dec Ja | - | Mar Apr N | May Jun Ju | | Oct Nov De | c Jan Feb Ma |
| Near-pit Stations | ESC-INA ESC-INB | 2 times per year 2 times per year | * | \mp | \blacksquare | * | | | * | | | * | | | * | | , | | | * | | * | | | * * | | | * * | | * |
| Reference North | TNA | 2 times per year | : | | 茾 | • | | | • | | | | | | • | | | | | * | | * | | | * | | | | | * |
| Reference South | TNB | 2 times per year 2 times per year | | # | # | * | | | * | | | * | | | 1.1 | | <u> </u> | | | * | | * | | | * | | | * | | * |
| Demersal Trawling | TSB | 2 times per year | Jan Feb se- | ar And Ma | ly lun | Jul Aug Sc- | Oct Nov | Dec Ir | n Feb sa | ar Apr M- | y Jun I | . Δuel e | Sen Oct N | ov Dec | lan Feb | Mar Apr May | Jun Jul A | g Sen Oot | Nov Dec Ic- | n Feb M- | Anr May | in Jul Au- | Sen Oct 1 | lov Dec 1- | n Feb M | Mar Apr 1 | May Jun 1. | * Aug Son | Oct Nov De | c Jan Feb Ma |
| Near-pit Stations | ESC-INA | 4 times per year | 5 5 | - Apr Ma) | | 5 5 | JOI HOV | 5 | 5 | r-qzr wia | 5 | 5 | J. Jot No | | 5 5 | r-qri may | 5 5 | 5 | 5 | 5 | p. may Ji | 5 5 | - Jp Out N | 5 | 5 | Chi p | 5 | 5 | De | 5 5 |
| Reference North | ESC-INB TNA | 4 times per year 4 times per year | 5 5 | + | | 5 5 5 | | | 5 | | 5 | 5 5 | | | 5 5 | | 5 5 | | | 5 | | 5 5 | | | 5 | | | 5 | | 5 5 |
| Reference South | TNB | 4 times per year | 5 5 | # | | 5 5 | | 5 | 5 | | 5 | 5 5 | | | 5 5 | | 5 5 | 5 | 5 | 5 | | 5 5 | | 5 | 5 | | 5 | 5 | | 5 5 |
| | TSA TSB | 4 times per year 4 times per year | 5 5 | <u></u> | | 5 5 | | 5 | 5 | | 5 | 5 | | | 5 5 | | 5 5 | 5 | 5 | 5 | | 5 5 | | 5 | 5 | | 5 | 5 | | 5 5 |
| Capping * Ebb Tide Impact Station Downcurr | rent | | Jan Feb Ma | r Apr May | y Jun J | Jul Aug Ser | Oct Nov | Dec Jar | n Feb M | ar Apr Ma | y Jun Ju | II Aug S | Sep Oct No | ov Dec J | lan Feb | Mar Apr May | Jun Jul Au | g Sep Oct I | Nov Dec Jar | n Feb Ma | r Apr May J | un Jul Aug | Sep Oct N | lov Dec Ja | n Feb N | Mar Apr N | May Jun Ju | Aug Sep | Oct Nov De | c Jan Feb Ma |
| | ESC-IPE1A ESC-IPE2A | 4 times per year * 4 times per year * | | H | H | | | | H | | H | | | | | | | | | | | | | | | | | | | |
| | ESC-IPE3 ESC-IPE4 ESC-IPE5 | 4 times per year * 4 times per year * 4 times per year * | | # | # | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intermediate Station Dov | vncurrent ESC-INE1A | 4 times per year * 4 times per year * | | 丰 | Ŧ | | | | Ħ | | Ī | | | | Ī | | | | | | | | | | Ħ | | | | | |
| | ESC-INE3A ESC-INE4A | 4 times per year * 4 times per year * | | # | 茸 | | | | H | | \pm | | | \parallel | | | | | | | | | | | | | | | | |
| Reference Station Upcur | | 4 times per year * 4 times per year * | | + | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ESC-RFE2 ESC-RFE3 | 4 times per year * 4 times per year * 4 times per year * | | # | # | | | | Ħ | | | | | | H | | | | | | | | | | | | | | | |
| Ma Wan Station | ESC-RFE5 | 4 times per year * | | # | # | # | | | | | | | | | | | # | | | | | | | | | | | | | |
| Flood Tide | MW1 | 4 times per year * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impact Station Downcurr | rent ESC-IPF1 ESC-IPF2 | 4 times per year * 4 times per year * | | # | T | | | | П | | П | | | | П | | | | | | | | | | | | | | | |
| Intermediate Station Dov | ESC-IPF3 vncurrent | 4 times per year * | | # | # | # | | | | # | | | | | | | # | | | | | | | | | | | | | |
| | ESC-INF1 ESC-INF2 ESC-INF3 | 4 times per year * 4 times per year * 4 times per year * | | # | # | | | | \Box | | | | | | | | | | | | | | | | | | | | | |
| Reference Station Upcur | rent ESC-RFF1A | 4 times per year * | | 茾 | 茾 | | | | Ħ | | | | | | H | | | | | | | | | | | | | | | |
| Ma Wan Station | ESC-RFF2A ESC-RFF3 | 4 times per year * 4 times per year * | | # | # | | | | \perp | | | | | | Ш | | | | | | | | | | | | | | | |
| Routine Water Quality Me | MW1 | 4 times per year * | Jan Feb Ma | ar Apr Ma | y Jun J | Jul Aug Ser | Oct Nov | Dec Jar | n Feb M | ar Apr Ma | y Jun Ju | ıl Aug S | Sep Oct No | Dec J | lan Feb | Mar Apr May | Jun Jul A | g Sep Oct | Nov Dec Jar | n Feb Ma | Apr May J | ın Jul Aug | Sep Oct N | lov Dec Ja | n Feb N | Mar Apr M | May Jun Ju | Aug Sen | Oct Nov De | c Jan Feb Ma |
| Ebb Tide Impact Station Downcurr | rent | Manufact | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| | ESC-IPE1A ESC-IPE2A ESC-IPE3 | Monthly* 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 | 1 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 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 | 4 4 4 4 4 4 4 4 4 |
| Intermediate Station Dov | ESC-IPE4 ESC-IPE5 vncurrent | Monthly* Monthly* | | 4 4 | | 4 | 4 4 | | | | | | | | | | | | | | | | | | | | | | | 4 4 4 |
| , , , , , , , , , , , , , , , , , , , | ESC-INE1A ESC-INE2A | Monthly* 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 | 1 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 | 4 4 4 | 4 4 | 4 4 4 | 4 4 4 4 4 4 4 4 4 |
| | ESC-INE3A ESC-INE4A ESC-INE5A | Monthly* Monthly* 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 | 1 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 | 4 4 4 | 4 4 | 4 4 4 | 4 4 4 4 4 4 4 4 4 |
| Reference Station Upcur | rent ESC-RFE1 ESC-RFE2 | Monthly* Monthly* | | 4 4 4 | 4 | 4 4 | 4 4 4 | 4 | 4 4 | 4 4 4 | 4 4 | 4 | 4 4 4 | 1 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 | 4 4 4 | 4 4 | 4 4 4 | 4 4 4 |
| | ESC-RFE3 ESC-RFE4 ESC-RFE5 | Monthly* Monthly* 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 | 1 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 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 4 4 4 4 |
| Ma Wan Station | MW1 | Monthly* | | 4 4 | | | 4 4 | | | | | | | | | | | | | | | | | | | | | | | 4 4 4 |
| Flood Tide Impact Station Downcurr | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ESC-IPF1 ESC-IPF2 ESC-IPF3 | Monthly* Monthly* 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 | 1 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 | 4 4 4 | 4 4 | 4 4 4 | 4 4 4 4 4 4 4 4 4 |
| Intermediate Station Dov | vncurrent ESC-INF1 | Monthly* | 4 4 4 | 1 | | 4 4 | | 4 4 | 4 4 | 4 4 4 | 4 4 | 4 | 4 4 4 | 1 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 4 | 4 4 4 | 4 4 | 4 4 4 | 4 4 4 |
| Reference Station Upcur | ESC-INF2 ESC-INF3 rent | Monthly* Monthly* | 4 4 4 | 4 | | 4 4 | | 4 4 | 4 | 4 4 4 | 4 4 | 4 | 4 4 4 | 1 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 | 4 4 4 | 4 4 | 4 4 4 | 4 4 4 |
| | ESC-RFF1A ESC-RFF2A ESC-RFF3 | Monthly* Monthly* 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 | 1 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 | 4 4 4 | 4 4 | 4 4 4 | 4 4 4 4 4 4 4 4 4 |
| Ma Wan Station | MW1 | Monthly* | 4 4 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 4 4 |
| Water Column Profiling * Plume Stations | | | | | - | | | | | | | | | | | | | | | | | | | | | | | | | c Jan Feb Ma |
| | WCP1 WCP2 | Monthly* Monthly* | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 2 2 2 2 2 |
| Benthic Recoloinisation Capped Stations at CMP | ٧ | | Jan Feb Ma | ır Apr May | y Jun J | Jul Aug Ser | Oct Nov | Dec Jar | n Feb M | ar Apr Ma | y Jun Ju | II Aug S | Sep Oct No | ov Dec J | lan Feb | Mar Apr May | Jun Jul Au | g Sep Oct I | Nov Dec Jar | n Feb Ma | r Apr May J | ın Jul Aug | Sep Oct N | lov Dec Ja | n Feb N | Mar Apr N | May Jun Ju | I Aug Sep | Oct Nov De | c Jan Feb Ma |
| | ESCV-CPA ESCV-CPB | 2 times per year 2 times per year 2 times per year | | # | ${f ar{\Box}}$ | | | | H | | H | H | | \prod | +1 | | | | | | | | | $+ \mathbb{I}$ | H | | | | | |
| Reference Stations | ESCV-CPD | 2 times per year | | # | Ħ | | | | | # | | | | | | | | | | | | | | | | # | | | | |
| | RBA RBB RBC1 | 2 times per year 2 times per year 2 times per year | | # | # | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impact Monitoring for Dr | | | Jan Feb Ma | ar Apr Ma | y Jun J | Jul Aug Sep | Oct Nov | Dec Jar | n Feb M | ar Apr Ma | y Jun Ju | I Aug S | Sep Oct No | ov Dec J | lan Feb | Mar Apr May | Jun Jul Au | ıg Sep Oct I | Nov Dec Jar | n Feb Ma | r Apr May J | un Jul Aug | Sep Oct N | lov Dec Ja | n Feb N | Mar Apr N | May Jun Ju | I Aug Sep | Oct Nov De | c Jan Feb Ma |
| Upstream Stations | US1 US2 | 3 times per week 3 times per week | | \blacksquare | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Downstream Stations | DS1 DS2 | 3 times per week 3 times per week | | 茾 | 茸 | | | | | | | Ħ | | | Ħ | | | | | | | | | | T | | | | | |
| | DS3 DS4 | 3 times per week 3 times per week | | # | \pm | | | | H | | | | | | | | | | | | | | | | | | | | | |
| Ma Wan Station | DS5 MW1 | 3 times per week | | + | + | | | | | | | | | + | | | | | | | | | | | | | | | | |
| | | | | | | | | 1 | . 1 | | 1 | . 1 | | . 1 | | | | | 1 1 | | | | | 1 1 | . 1 | | | | | |

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.

⁽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 months monitoring data at mid-ebb, and 6 months monitoring data at mid-flood.

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

⁽⁴⁾ Benthic Recolonisation Studies for CMP V will be scheduled when capping operation for CMP V is completed.

Remarks:

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 was 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. Water Quality Monitoring during Capping Operation and Routine Water Quality Monitoring are combined such that Routine Water Quality Monitoring have be conducted monthly starting in December 2020. The number of sampling replicates can be further reduced according to Sections 3 and 4, subject to the findings of the further data review.

Appendix B. Water Quality Monitoring Results



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

| Parameters | Action | Limit |
|---|--|--|
| Dissolved Oxygen (DO) | Surface and Middle Depth ⁽²⁾ | Surface and Middle Depth ⁽²⁾ |
| in mg L ⁻¹ (Surface, Middle & Bottom) ⁽¹⁾ | 5%-ile of baseline data for surface and middle layer = 3.76 | 1%-ile of baseline data for surface and middle layer = 3.11 ⁽³⁾ |
| | 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 = 2.96 | 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 ⁻¹ | 95%-ile of baseline data for depth- averaged = 37.88 | 99%-ile of baseline data for depth- averaged = 61.92 |
| (depth-averaged)(5) | 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 = 38.32 |
| in NTU | and | and |
| (depth-averaged)(4)(5) | 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 |

Notes:

- 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-1, it is proposed to set 3. the Limit Level at 3.11 mg L⁻¹ which is the first percentile of the baseline data.
- "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.

 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 December 2021

| Station | Temp. | Salinity | Turbidity | Dissolve | d Oxygen | рН | Suspended Solids |
|-----------------------|-------|----------------|-----------|----------|-----------------------|-----------|-----------------------|
| | (°C) | (ppt) | (NTU) | (%) | (mg L ⁻¹) | | (mg L ⁻¹) |
| WCP 1 (Downstream) | 20.96 | 33.96 | 7.63 | 99.04 | 7.24 | 8.07 | 7.9 |
| WCP 2 (Upstream) | 21.06 | 33.95 | 4.87 | 101.06 | 7.38 | 8.08 | 6.3 |
| WQO (Dry Season) | N/A | 30.55 - 37.34# | N/A | N/A | >4 | 6.5 - 8.5 | 13.1 |

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 B3: In-situ Monitoring Results for Routine Water Quality Monitoring of ESC CMPs in December 2021

| Station | Temp. | Salinity | Turbidity | Dissolve | рН | |
|--------------------|-------|----------------|------------------|----------|-----------------------|-----------|
| | (°C) | (ppt) | (NTU) | (%) | (mg L ⁻¹) | |
| RFF (Reference) | 20.70 | 33.77 | 8.18 | 99.68 | 7.33 | 8.18 |
| IPF (Impact) | 20.70 | 33.68 | 13.07 | 100.57 | 7.40 | 8.16 |
| INF (Intermediate) | 20.70 | 33.64 | 12.53 | 101.04 | 7.44 | 8.16 |
| Ma Wan | 21.14 | 33.93 | 13.22 | 94.47 | 6.89 | 8.04 |
| WQO (Dry Season) | N/A | 30.40 - 37.15# | 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 Routine Water Quality Monitoring of ESC CMPs in December 2021

| Station | As | Cd | Cr | Cu | Pb | Hg | Ni | Ag | Zn | NH_3 | TIN | BOD ₅ | SS |
|---------|--------|---|---|--------|--|--------|---|---|--------|--------|--------|------------------|--------|
| | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (µg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) |
| RFF | 1.81 | <lor< td=""><td><lor< td=""><td>1.51</td><td><lor< td=""><td>1.44</td><td>0.54</td><td><lor< td=""><td>12.66</td><td>0.13</td><td>0.24</td><td>2.38</td><td>10.1</td></lor<></td></lor<></td></lor<></td></lor<> | <lor< td=""><td>1.51</td><td><lor< td=""><td>1.44</td><td>0.54</td><td><lor< td=""><td>12.66</td><td>0.13</td><td>0.24</td><td>2.38</td><td>10.1</td></lor<></td></lor<></td></lor<> | 1.51 | <lor< td=""><td>1.44</td><td>0.54</td><td><lor< td=""><td>12.66</td><td>0.13</td><td>0.24</td><td>2.38</td><td>10.1</td></lor<></td></lor<> | 1.44 | 0.54 | <lor< td=""><td>12.66</td><td>0.13</td><td>0.24</td><td>2.38</td><td>10.1</td></lor<> | 12.66 | 0.13 | 0.24 | 2.38 | 10.1 |
| IPF | 1.95 | <lor< td=""><td><lor< td=""><td>1.87</td><td><lor< td=""><td>1.55</td><td><lor< td=""><td><lor< td=""><td>13.66</td><td>0.12</td><td>0.21</td><td>1.62</td><td>12.6</td></lor<></td></lor<></td></lor<></td></lor<></td></lor<> | <lor< td=""><td>1.87</td><td><lor< td=""><td>1.55</td><td><lor< td=""><td><lor< td=""><td>13.66</td><td>0.12</td><td>0.21</td><td>1.62</td><td>12.6</td></lor<></td></lor<></td></lor<></td></lor<> | 1.87 | <lor< td=""><td>1.55</td><td><lor< td=""><td><lor< td=""><td>13.66</td><td>0.12</td><td>0.21</td><td>1.62</td><td>12.6</td></lor<></td></lor<></td></lor<> | 1.55 | <lor< td=""><td><lor< td=""><td>13.66</td><td>0.12</td><td>0.21</td><td>1.62</td><td>12.6</td></lor<></td></lor<> | <lor< td=""><td>13.66</td><td>0.12</td><td>0.21</td><td>1.62</td><td>12.6</td></lor<> | 13.66 | 0.12 | 0.21 | 1.62 | 12.6 |
| INF | 1.81 | <lor< td=""><td><lor< td=""><td>1.78</td><td><lor< td=""><td>1.49</td><td><lor< td=""><td><lor< td=""><td>14.07</td><td>0.11</td><td>0.21</td><td>1.72</td><td>13.7</td></lor<></td></lor<></td></lor<></td></lor<></td></lor<> | <lor< td=""><td>1.78</td><td><lor< td=""><td>1.49</td><td><lor< td=""><td><lor< td=""><td>14.07</td><td>0.11</td><td>0.21</td><td>1.72</td><td>13.7</td></lor<></td></lor<></td></lor<></td></lor<> | 1.78 | <lor< td=""><td>1.49</td><td><lor< td=""><td><lor< td=""><td>14.07</td><td>0.11</td><td>0.21</td><td>1.72</td><td>13.7</td></lor<></td></lor<></td></lor<> | 1.49 | <lor< td=""><td><lor< td=""><td>14.07</td><td>0.11</td><td>0.21</td><td>1.72</td><td>13.7</td></lor<></td></lor<> | <lor< td=""><td>14.07</td><td>0.11</td><td>0.21</td><td>1.72</td><td>13.7</td></lor<> | 14.07 | 0.11 | 0.21 | 1.72 | 13.7 |
| Ma Wan | 1.78 | <lor< td=""><td><lor< td=""><td>1.53</td><td><lor< td=""><td>1.40</td><td><lor< td=""><td><lor< td=""><td>11.20</td><td>0.20</td><td>0.29</td><td>2.38</td><td>11.2</td></lor<></td></lor<></td></lor<></td></lor<></td></lor<> | <lor< td=""><td>1.53</td><td><lor< td=""><td>1.40</td><td><lor< td=""><td><lor< td=""><td>11.20</td><td>0.20</td><td>0.29</td><td>2.38</td><td>11.2</td></lor<></td></lor<></td></lor<></td></lor<> | 1.53 | <lor< td=""><td>1.40</td><td><lor< td=""><td><lor< td=""><td>11.20</td><td>0.20</td><td>0.29</td><td>2.38</td><td>11.2</td></lor<></td></lor<></td></lor<> | 1.40 | <lor< td=""><td><lor< td=""><td>11.20</td><td>0.20</td><td>0.29</td><td>2.38</td><td>11.2</td></lor<></td></lor<> | <lor< td=""><td>11.20</td><td>0.20</td><td>0.29</td><td>2.38</td><td>11.2</td></lor<> | 11.20 | 0.20 | 0.29 | 2.38 | 11.2 |

WQO of TIN: 0.5 mg/L Dry Season WQO of SS: 13.1 mg/L

Notes:

- 1. "<LOR" indicates the concentrations of metals and metalloids are below the limit of reporting.
- 2. Cell shaded yellow / red indicates value exceeding the Action/Limit levels.
- Cell shaded grey indicates value exceeding the WQO.

Appendix C. Graphical Presentations

Routine Water Quality Monitoring for ESC CMP V - December 2021

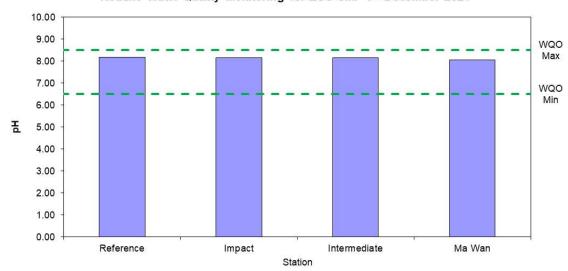


Figure 1: Level of pH recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021

Routine Water Quality Monitoring for ESC CMP V - December 2021

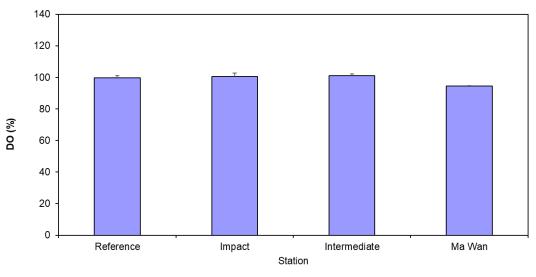


Figure 2: Level of Dissolved Oxygen (DO) (% saturation; mean + SD)¹recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021

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 - December 2021

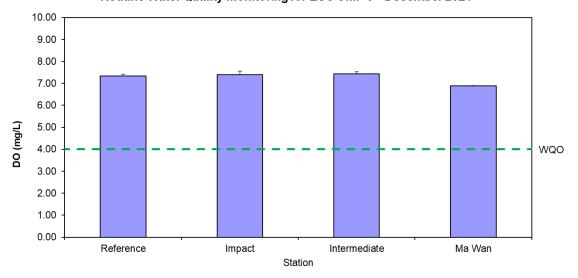


Figure 3: Concentration of Dissolved Oxygen (DO) (mg/L; mean + SD)¹recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021

Routine Water Quality Monitoring for ESC CMP V - December 2021

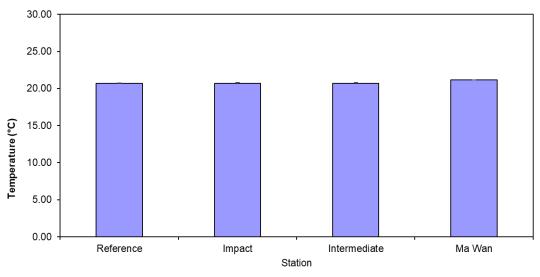
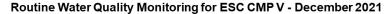
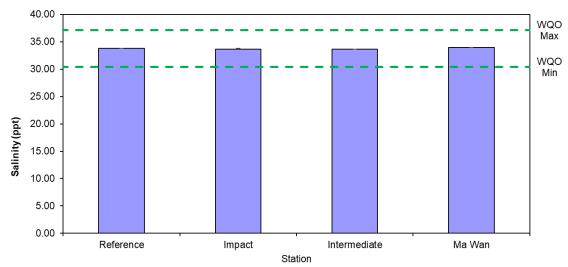


Figure 4: Level of Temperature (°C; mean + SD)¹ recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021

¹ The mean and standard deviation (SD) for in-situ data are the mean and SD for water columns within the area.

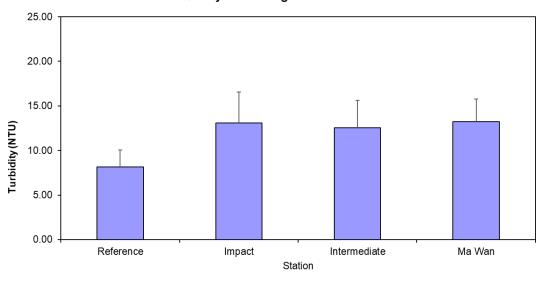






Level of Salinity (ppt; mean + SD) 1 recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021 Figure 5:

Routine Water Quality Monitoring for ESC CMP V - December 2021



Level of Turbidity (NTU; mean + $\rm SD_1^1$ recorded during Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021 Figure 6:

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 December 2021

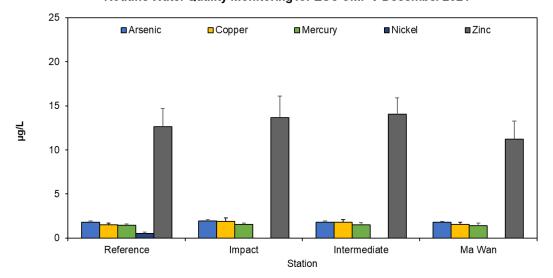


Figure 7: Concentration of Arsenic, Copper, Mercury, Nickel, and Zinc (μg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021

Routine Water Quality Monitoring for Nutrients - December 2021

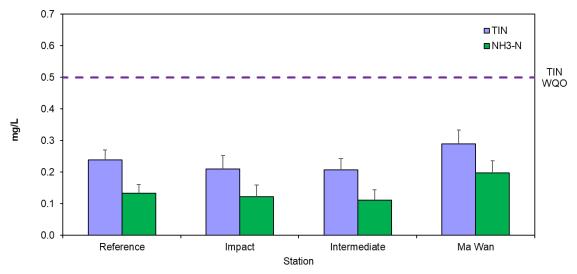


Figure 8: Concentration of Total Inorganic Nitrogen (TIN) and Ammonia Nitrogen (NH3-N) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021



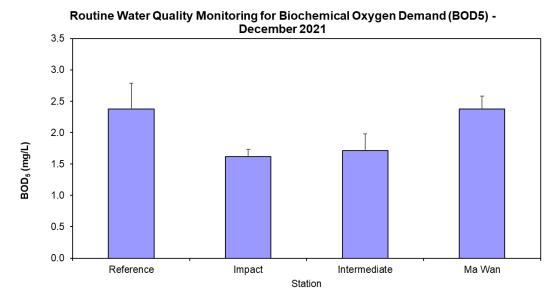
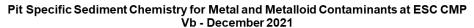


Figure 9: Level of Biochemical Oxygen Demand (BOD5) (mg/L; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at ESC CMP V in December 2021

20 18 16 14 WQO (Dry Season) 12 10 8 6 4 2 Reference Intermediate Ma Wan Impact Station

Routine Water Quality Monitoring for Suspended Solids - December 2021

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 December 2021



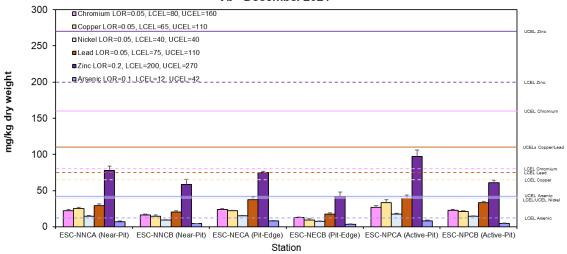


Figure 11: Concentration of Metals and Metalloid (Cr, Cu, Ni, Pb, Zn, As; mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in December 2021

Pit Specific Sediment Chemistry for Metal Contaminants at ESC CMP Vb - December 2021

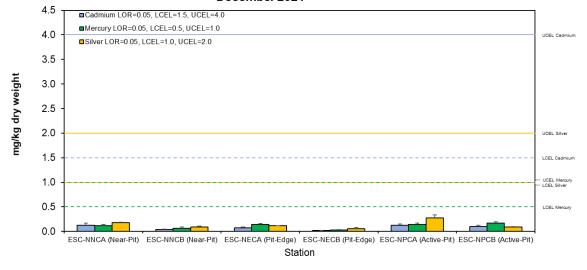


Figure 12: Concentration of Metals (Cd, Hg, Ag; mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in December 2021



Pit Specific Sediment Chemistry for Total Organic Carbon (TOC) at ESC CMP Vb - December 2021

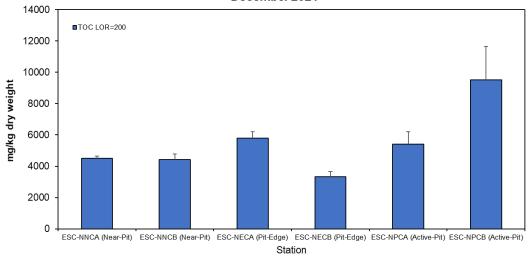


Figure 13: Concentration of Total Organic Carbon (TOC) (mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in December 2021

Pit Specific Sediment Chemistry for Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) at ESC CMP Vb - December 2021

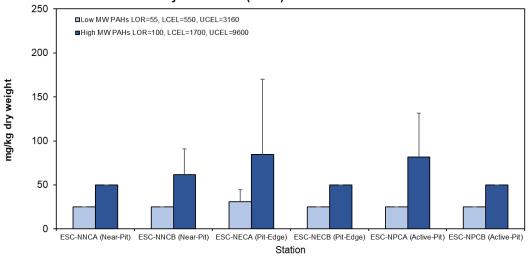


Figure 14: Concentration of Low and High Molecular Weight Polycyclic Aromatic Hydrocarbons (mg/kg dry weight; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in December 2021



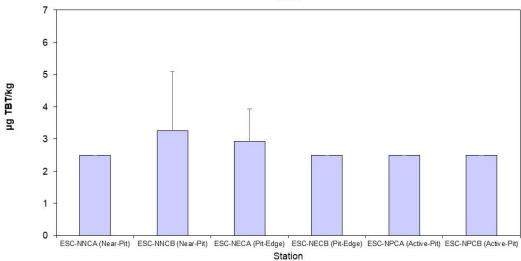


Figure 15: Concentration of Tributyltin (TBT) (μg TBT/kg; mean + SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for ESC CMP Vb in December 2021

Cumulative Impact Sediment Chemistry for Metal and Metalloid Contaminants at ESC CMPs - December 2021

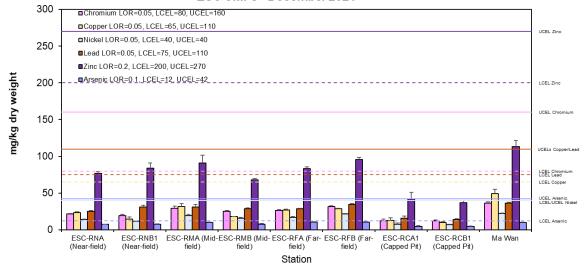


Figure 16: Concentration of Metals and Metalloid (Cr, Cu, Ni, Pb, Zn, As; mg/kg dry weight; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for ESC CMPs in December 2021



Cumulative Impact Sediment Chemistry for Metal Contaminants at ESC CMPs - December 2021

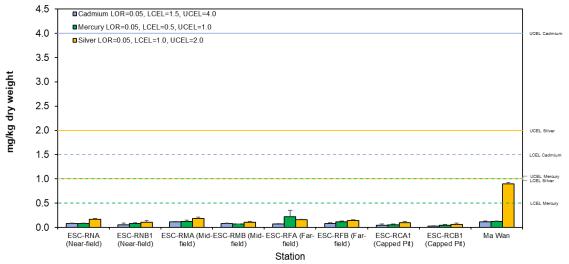


Figure 17: Concentration of Metals (Cd, Hg, Ag; mg/kg dry weight; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for ESC CMPs in December 2021

Cumulative Impact Sediment Chemistry for Total Organic Carbon (TOC) at ESC CMPs - December 2021

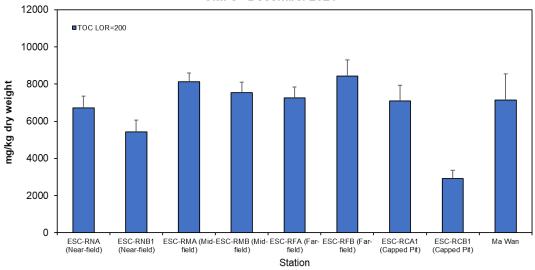


Figure 18: Concentration of Total Organic Carbon (TOC) (mg/kg dry weight; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for ESC CMPs in December 2021



Cumulative Impact Sediment Chemistry for Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) at ESC CMPs - December 2021

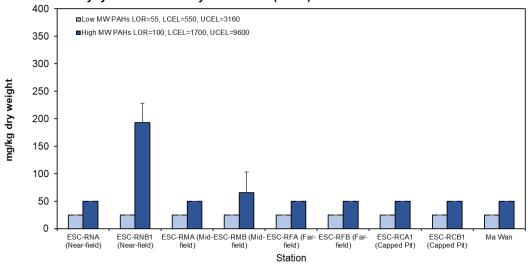


Figure 19: Concentration of Low and High Molecular Weight Polycyclic Aromatics (mg/kg dry weight; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for ESC CMPs in December 2021

Cumulative Impact Sediment Chemistry for Tributyltin (TBTs) at ESC CMPs - December 2021

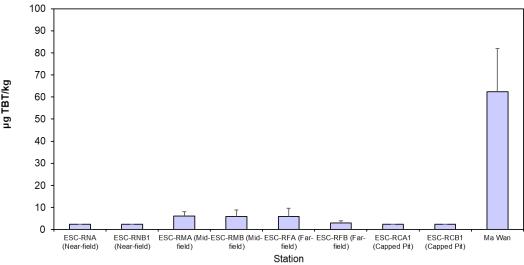


Figure 20: Concentration of Tributyltin (TBT) (μg/kg dry weight; mean + SD) in sediment samples collected from Cumulative Impact Sediment Chemistry Monitoring for ESC CMPs in December 2021

Appendix D. Study Programme

Study Programme

Agreement No. CE 59/2020 (EP) Environmental Monitoring and Audit for Disposal Facility to the East of Sha Chau (2021-2026) - Investigation

Mott MacDonald Hong Kong Limited

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|--|--|---|--|--|--|--|--|--|--|----------------|---|--------------|--|--|
| Task Name | | Start | Finish | 21 Q2 Q3 Q4 | 2022 Q1 Q2 | Q3 Q4 | 2023 Q1 Q2 | Q3 Q4 | 2024 Q1 Q2 | Q3 Q4 | 2025 | O2 O3 | 04 | 2026 01 02 |
| COMMENCEMENT OF AGREEMENT NO |). CE 59/2020 (EP) | Thu 01/04/21 | | • | D J F WIA WI | I DINIOI EINI EI | J F IVI A IVI J | J N S O IN I | D J J F WI A WI | J J A 3 0 | VIDIJ IF IVII | A IVI J J A | SOND | I P IVI A IVI J |
| EAST OF SHA CHAU CONTAMINATED N 2026 | AUD PITS (ESC CMPs) BETWEEN 2021 & | Thu 01/04/21 | Thu 25/06/26 | | | | | | | | | | | |
| Draft Report of First Review of EM&A Manual | (for ESC CMPs) | | Fri 30/04/21 | • | | | | | | | | | | |
| Final Report of First Review of EM&A Manual | (for ESC CMPs) | | Thu 20/05/21 | • | | | | | | | | | | |
| Draft Report of Subsequent Review of EM&A | Manual (for ESC CMPs) - annual basis assumed | Sat 30/04/22 | Wed 30/04/25 | | ♦ | | \$ | | ♦ | | | ♦ | | |
| Final Report of Subsequent Review of EM&A | Manual (for ESC CMPs) - annual basis assumed | Fri 20/05/22 | Tue 20/05/25 | | ♦ | | ♦ | | ♦ | | | ♦ | | |
| Regular Site Inspections of CMP Contractors | | Thu 01/04/21 | Tue 31/03/26 | | | | | | | | | | | |
| Monthly EM&A Report | | Fri 14/05/21 | Tue 14/04/26 | ************************************* | \$\$\$\$\$ \$ | > | >>>> | \\\\ | >>>> | \\\\ | >>>> | > | . | > |
| Quarterly EM&A Report | | Fri 30/07/21 | Thu 30/04/26 | ♦ ♦ | ♦ ♦ | ♦ ♦ | \$ \$ | \$ \$ | ♦ ♦ | \$ \$ | ♦ | \$ \$ | ♦ | < |
| Annual EM&A Report | | Sun 30/01/22 | Fri 30/01/26 | | ♦ | | ♦ | | ♦ | | ♦ | | | ♦ |
| Annual Risk Assessment Report | | Tue 31/05/22 | Sun 31/05/26 | | ♦ | | \Diamond | | C | > | | \Diamond | | ♦ |
| Draft Final Report | | | Thu 30/04/26 | | | | | | | | | | | • |
| Final Report | | | Thu 04/06/26 | | | | | | | | | | | • |
| Draft Executive Summary | | | Thu 04/06/26 | | | | | | | | | | | • |
| Final Executive Summary | | | Thu 25/06/26 | | | | | | | | | | | • |
| | MID-MARCH) (subject to actual disposal | Sun 14/11/21 | Fri 14/04/23 | | | | | | | | | | | |
| Monthly EM&A Report (if any new disposals of | luring reporting period) | Sun 14/11/21 | Sat 14/01/23 | . | $\diamond \diamond$ | \$ \$ | > | | | | | | | |
| Quarterly EM&A Report (if any new disposals | during reporting period) | Fri 14/01/22 | Sat 14/01/23 | | ♦ | • | > | | | | | | | |
| Annual EM&A Report (if any new disposals du | ring reporting period) | Thu 14/04/22 | Fri 14/04/23 | | ♦ | | ♦ | | | | | | | |
| amma Davidana D | Start/End of ET Services | 9 | ment | * | | | | | | | | | | |
| amme Revision: B Tue 06/07/21 | Location | Submission | | • | | | | | | | | | | |
| | COMMENCEMENT OF AGREEMENT NO EAST OF SHA CHAU CONTAMINATED N 2026 Draft Report of First Review of EM&A Manual Final Report of First Review of EM&A Manual Draft Report of Subsequent Review of EM&A N Regular Site Inspections of CMP Contractors Monthly EM&A Report Quarterly EM&A Report Annual EM&A Report Draft Final Report Draft Final Report Draft Executive Summary Final Executive Summary ETLC DISPOSAL FACILITY (OCTOBER TO programme to be confirmed by CEDD) Monthly EM&A Report (if any new disposals of Quarterly EM&A Report (if any new disposals duspassed of Annual EM&A Report (if any new disposals duspassed of EM&A EM&A Report (if any new disposals duspassed of EM&A EM | Task Name COMMENCEMENT OF AGREEMENT NO. CE 59/2020 (EP) EAST OF SHA CHAU CONTAMINATED MUD PITS (ESC CMPs) BETWEEN 2021 & 2026 Draft Report of First Review of EM&A Manual (for ESC CMPs) Final Report of First Review of EM&A Manual (for ESC CMPs) Draft Report of Subsequent Review of EM&A Manual (for ESC CMPs) - annual basis assumed Final Report of Subsequent Review of EM&A Manual (for ESC CMPs) - annual basis assumed Regular Site Inspections of CMP Contractors Monthly EM&A Report Quarterly EM&A Report Annual EM&A Report Draft Final Report Draft Final Report Final Report Draft Executive Summary Final Executive Summary ETLC DISPOSAL FACILITY (OCTOBER TO MID-MARCH) (subject to actual disposal programme to be confirmed by CEDD) Monthly EM&A Report (if any new disposals during reporting period) Quarterly EM&A Report (if any new disposals during reporting period) Annual EM&A Report (if any new disposals during reporting period) Start/End of ET Services | Task Name COMMENCEMENT OF AGREEMENT NO. CE 59/2020 (EP) EAST OF SHA CHAU CONTAMINATED MUD PITS (ESC CMPs) BETWEEN 2021 & 2026 Draft Report of First Review of EM&A Manual (for ESC CMPs) Final Report of First Review of EM&A Manual (for ESC CMPs) Draft Report of Subsequent Review of EM&A Manual (for ESC CMPs) Draft Report of Subsequent Review of EM&A Manual (for ESC CMPs) - annual basis assumed Fri 20/05/22 Final Report of Subsequent Review of EM&A Manual (for ESC CMPs) - annual basis assumed Fri 20/05/22 Regular Site Inspections of CMP Contractors Monthly EM&A Report Guarterly EM&A Report Fri 30/07/21 Annual EM&A Report Annual EM&A Report Draft Executive Summary Final Executive Summary Final Executive Summary Final Executive Summary ETLC DISPOSAL FACILITY (OCTOBER TO MID-MARCH) (subject to actual disposal programme to be confirmed by CEDD) Monthly EM&A Report (if any new disposals during reporting period) Annual EM&A Report (if any new disposals during reporting period) Fri 14/01/22 Annual EM&A Report (if any new disposals during reporting period) Thu 14/04/22 Start/End of ET Services Start of Agrees Start of Agrees Start of Agrees Summary Final Executive Summary Final EM&A Report (if any new disposals during reporting period) Start/End of ET Services Start of Agrees Start of Agrees | Tack Name Start | Teck Name Start Frish | COMMENCEMENT OF AGREEMENT NO. CE 59/2020 (EP) COMMENCEMENT OF AGREEMENT NO. CE 59/2020 (EP) Thu 01/04/21 EAST OF SHA CHAU CONTAMINATED MUD PITS (ESC CMPs) BETWEEN 2021 & Thu 01/04/21 Thu 01/04/21 Thu 25/06/26 Thu 01/04/21 Thu 25/06/26 Thu 25/06/2 | Time Number Start Final Final | Start Princip Start Pr | Thu 01/04/21 EAST OF SHA CHAU CONTAMINATED MUD PITS (ESC CMPs) BETWEEN 2021 & Thu 01/04/21 Thu 01/04/21 Thu 01/04/21 Thu 25/06/26 Thu 01/04/21 Thu 30/04/26 Thu 30/04/26 Thu 30/04/26 Thu 30/04/26 Thu 30/04/26 Thu 30/04/26 Thu 04/06/26 Thu 04/ | Sart Fruit | Set Fet Pet Pet | Set Proper | Thu 01/04/21 EAST OF SHA CHAU CONTAMINATED MUD PITS (ESC CMPs) BETWEEN 2021 & Thu 01/04/21 Thu 25/06/26 The Report of First Review of EMAA Manual (for FSC CMPs) The O1/04/21 Thu 25/06/26 The Report of Subsequent Review of EMAA Manual (for FSC CMPs) The O1/04/21 Thu 25/06/26 The Report of Subsequent Review of EMAA Manual (for FSC CMPs) The O1/04/21 The O1/04/21 Thu 25/06/26 The Report of Subsequent Review of EMAA Manual (for FSC CMPs) The O1/04/21 The O1/04/21 | Section Sect |