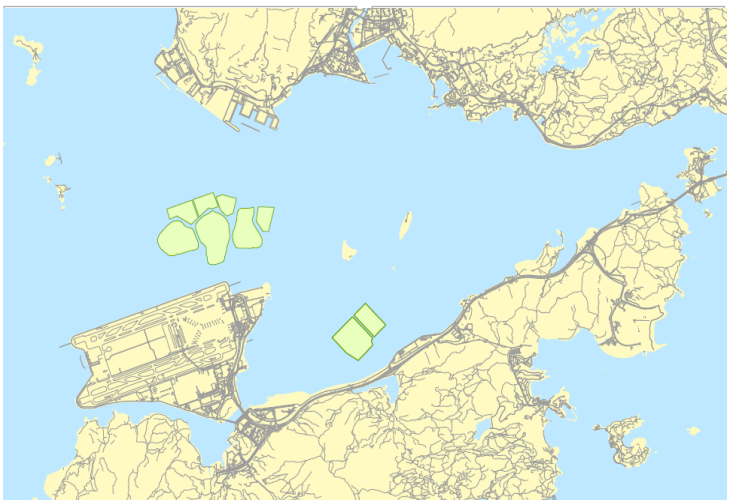


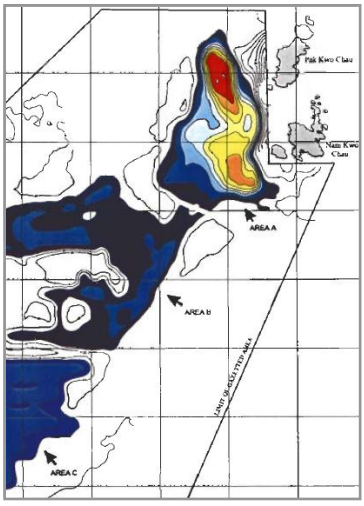




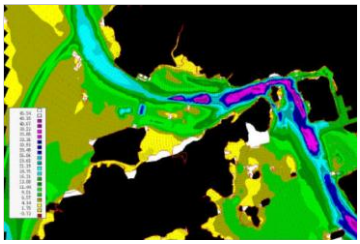

CEDD 土木工程拓展署
Civil Engineering and Development Department

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

Agreement No. CE 23/2012(EP)

12th Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – August 2013

Revision 0

16 September 2013

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

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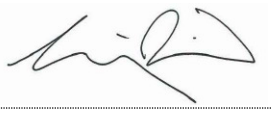
Client:	Project No:
Civil Engineering and Development Department (CEDD)	0175086
Summary: This document presents the 12th monthly progress report for Contaminated Mud Pits at the South of The Brothers and at East Sha Chau.	Date: 16 September 2013 Approved by:  Craig A. Reid *Partner*

Revision	Description	By	Checked	Approved	Date
v0	12th Monthly Progress Report for CMP V and SB CMPs	YL	JT	CAR	16/09/13

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ANNEXES

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

Environmental Certification Sheet
EP-427/2011/A

Reference Document/Plan

Document/~~Plan~~ to be ~~Certified~~/ Verified:	12th Monthly Progress Report for Contaminated Mud Pits to the South of The Brothers and at East Sha Chau – August 2013
Date of Report:	16 September 2013
Date prepared by ET:	16 September 2013
Date received by IA:	16 September 2013

Reference EP Condition

Environmental Permit Condition: Condition No.: 4.4

4 hard copies and 1 electronic copy of monthly EM&A Report shall be submitted to the Director within 2 weeks after the end of the reporting month. The EM&A Reports shall include a summary of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels). The submissions shall be certified by the ET Leader and verified by the Independent Auditor. Additional copies of the submission shall be provided to the Director upon request by the Director.

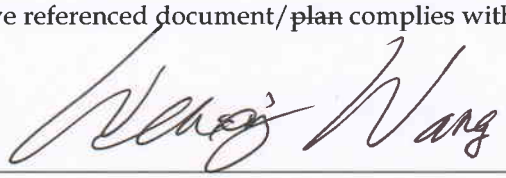
ET Certification

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-427/2011/A

Craig A. Reid,
Environmental Team Leader:  Date: 16/9/2013

IA Verification

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

Dr Wang Wen Xiong,
Independent Auditor:  Date: 16/9/2013

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

12TH MONTHLY PROGRESS REPORT FOR AUGUST 2013

1.1 BACKGROUND

1.1.1 Since early 1990s, contaminated sediment (1) arising from various construction works (e.g. dredging and reclamation projects) in Hong Kong has been disposed of at a series of seabed pits at East of Sha Chau (ESC). In late 2008, a review indicated that the existing and planned facilities at ESC would not be able to meet the disposal demand after 2012. In order to meet this demand, the Hong Kong Special Administrative Region Government (HKSARG) decided to implement a new contained aquatic disposal (CAD) (2) facility at the South of The Brothers (SB CMPs) (hereafter referred to as "the Project") which had been under consideration for a number of years.

1.1.2 The environmental acceptability of the construction and operation of the Project had been confirmed by findings of the associated Environmental Impact Assessment (EIA) study completed in 2005 under *Agreement No. CE 12/2002(EP)* (3). The Director of Environmental Protection (DEP) approved this EIA report under the *Environmental Impact Assessment Ordinance* (*Cap. 499*) (*EIAO*) in September 2005 (*EIA Register No.: AEIAR-089/2005*).

1.1.3 In accordance with the EIA recommendation, prior to commencement of construction works for the SB CMPs, the Civil Engineering and Development Department (CEDD) undertook a detailed review and update of the EIA findings for the SB site (4). Findings of the EIA review undertaken in 2009/ 2010 confirmed that the construction and operation of the SB site had been predicted to be environmentally acceptable.

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

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

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

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

1.1.4 *Environmental Permits (EPs)* (*EP-312/2008/A* and *EP-427/2011A*) were issued by the Environmental Protection Department (EPD) to the CEDD, the Permit Holder, on 28 November 2008 for ESC CMP V and on 23 December 2011 for SB CMPs respectively. Under the requirements of the *EPs*, an Environmental Monitoring and Audit (EM&A) programme as set out in the EM&A Manuals [1][2] is required to be implemented for the CMPs.

1.1.5 The present EM&A programme undertaken under *Agreement No. CE 23/2012 (EP)* covers the dredging, disposal and capping operations of the SB CMPs as well as CMPs at East of Sha Chau (ESC). In August 2013, the following works were being undertaken at the CMPs:

- Capping was being undertaken at CMP IVc;
- Disposal of contaminated mud was taking place at CMP Va until 26 August 2013;
- Disposal of contaminated mud was taking place at SB CMP 1 since 27August 2013;
- Dredging operations were taking place at SB CMP 1 until 13 August 2013; and
- Dredging operations were taking place at SB CMP 2 since 15 August 2013.

1.2 REPORTING PERIOD

1.2.1 This Monthly Progress Report covers the EM&A activities for the reporting month of August 2013.

1.3 DETAILS OF SAMPLING AND LABORATORY TESTING ACTIVITIES

1.3.1 The following monitoring activities have been undertaken for CMP V in August 2013:

- *Pit Specific Sediment Chemistry* was conducted for CMP Va on 22 August 2013;
- *Water Column Profiling* was scheduled to be undertaken on 1 August 2013. However, there was no dumping activity at CMP Va while the monitoring team was on-site. As such, *in-situ* measurements and water sampling were not undertaken for *Water Column Profiling* in August 2013;

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

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

- *Routine Water Quality Monitoring* was conducted for CMP Va on 24 August 2013;
- Demersal Trawling was conducted for CMP Va on 19 and 20 August 2013;
- Sediment Toxicity Test was conducted for CMP Va on 20 August 2013; and
- Cumulative Impact Sediment Chemistry was conducted for CMP Va on 29 August 2013;

1.3.2 *Impact Water Quality Monitoring during Dredging Operations* was conducted three times per week (ie 31 July; 3, 5, 7, 9, and 12 August 2013 for CMP 1 and 16, 19, 21, 23, 26, 28 and 30 August 2013 for CMP 2) in this reporting month in accordance with the EM&A Manual. It should be noted that the *Impact Water Quality Monitoring during Dredging Operations* was not conducted on 1 and 14 August 2013 due to adverse weather during which Typhoon signal No. 3 and Typhoon signal No. 8 were hoisted, respectively. Demersal Trawling for CMP 1 was conducted on 21 and 22 August 2013.

1.4 DETAILS OF OUTSTANDING SAMPLING AND/OR ANALYSIS

1.4.1 No outstanding sampling remained for August 2013. Laboratory analyses of *Pit Specific Sediment Chemistry* of CMP Va conducted in August 2013 were yet to be completed. A summary of field activities conducted are presented in *Annex A*.

1.5 BRIEF DISCUSSION OF THE MONITORING RESULTS FOR CMP V

1.5.1 *Table 1.1* summarises the monitoring results that are presented in the current monthly report. Brief discussion of the monitoring results is presented in this section. Detailed discussion will be presented in the corresponding *Quarterly Report*.

Table 1.1 Monitoring activities from June to August 2013 for CMP V

Monitoring activities	Date of Monitoring	Monitoring results presented in this report?
Pit Specific Sediment Chemistry Monitoring for CMP Va	6 June 2013	Yes.
	3 July 2013	Yes.
	22 August 2013	No. Laboratory analysis yet to be completed during preparation of this monthly report.
Cumulative Impact Sediment Chemistry Monitoring for CMP Va	18 June 2013	Yes.
	29 August 2013	No. Laboratory analysis yet to be completed during preparation of this monthly report.
Sediment Toxicity Test	20 August 2013	No. It will be presented in the Quarterly Report.
Routine Water Quality Monitoring for CMP Va	24 August 2013	Yes.
Water Column Profiling for CMP Va	1 August 2013	No. *In-situ* measurements and water sampling were not undertaken as there was no dumping activity on the monitoring day.
Demersal Trawling	19 and 20 August 2013	No. It will be presented in the Quarterly Report.

1.5.2 Pit Specific Sediment Chemistry of CMP Va – June and July 2013

1.5.3 Monitoring locations for Pit Specific Sediment Chemistry for CMP Va are shown in *Figure 1.1*. A total of six monitoring stations were sampled in June and July 2013. It is observed that the variations of metal concentrations at Active Pit Stations NPDA and NPDB were much larger (ie greater standard deviation) when compared to other stations (*Figures 1, 2, 6, and 7* of *Annex B*).

1.5.4 Cadmium, Chromium, Copper, Lead, Zinc and Nickel complied with the Lower Chemical Exceedance Level (LCEL) at all stations in June and July 2013 (*Figures 1, 2, 6, and 7* of *Annex B*). Concentrations of Arsenic exceeded the LCEL at Active Pit station NPDB, Pit Edge station NEDB and Near Pit stations NNDA and NNDB (*Figures 1* of *Annex B*) in June and exceeded the LCEL at Active Pit station NPDB, Pit Edge stations NEDA and NEDB and Near Pit station NNDA in July 2013 (*Figures 6* of *Annex B*). Concentrations of Mercury exceeded LCEL at Active Pit station NPDA and concentrations of Silver exceeded LCEL at Active Pit station NPDB in June 2013 (*Figures 2* of *Annex B*).

1.5.5 Whilst the average concentration of Arsenic in the Earth's crust is generally ~2mg/kg, significantly higher Arsenic concentrations (median = 14 mg/kg) have been recorded in Hong Kong's onshore sediments [1]. It is presumed that the natural concentrations of Arsenic are similar in onshore and offshore sediments [2], and relatively high Arsenic levels may thus occur throughout Hong Kong. Therefore, the exceedances of the LCEL for Arsenic are unlikely to be caused by the disposal operations at CMP Va but rather as a result of naturally occurring deposits.

1.5.6 In addition, the Active Pit stations NPDA and NPDB are located within CMP Va which was receiving contaminated mud during the reporting period. As such, the exceedances of LCEL for Mercury and Silver which were recorded at the two stations only are not considered as indicating any dispersal of contaminated mud from CMP Va.

1.5.7 Total Organic Carbon (TOC) concentration was similar amongst all stations in June and July 2013 (*Figure 3* and 8 of *Annex B*). Tributyltin (TBT) concentration was found to be higher at Active Pit stations NPDA and NPDB (*Figure 4* of *Annex B*) in June 2013 and at Active Pit station NPDA in July 2013 (*Figure 9* of *Annex B*).

1.5.8 Low Molecular Weigh Polycyclic Aromatics Hydrocarbons (Low MW PAHs) and High Molecular Weight Polycyclic Aromatics Hydrocarbons (High MW PAHs) concentrations were recorded above the limit of reporting at Active Pit stations NPDA and NPDB in June and July 2013 (*Figure 5 and 10 of Annex B*). Low and Hight MW PAHs were also observed to exceed LCEL at Active Pit station NPDA in June 2013.

(1) Sewell RJ (1999) Geochemical Atlas of Hong Kong. Geotechnical Engineering Office, Government of the Hong Kong Special Administrative Region

(2) Whiteside PGD (2000) Natural geochemistry and contamination of marine sediments in Hong Kong. In: The Urban Geology of Hong Kong (ed Page A & Reels SJ). Geological Society of Hong Kong Bulletin No. 6, p109-121

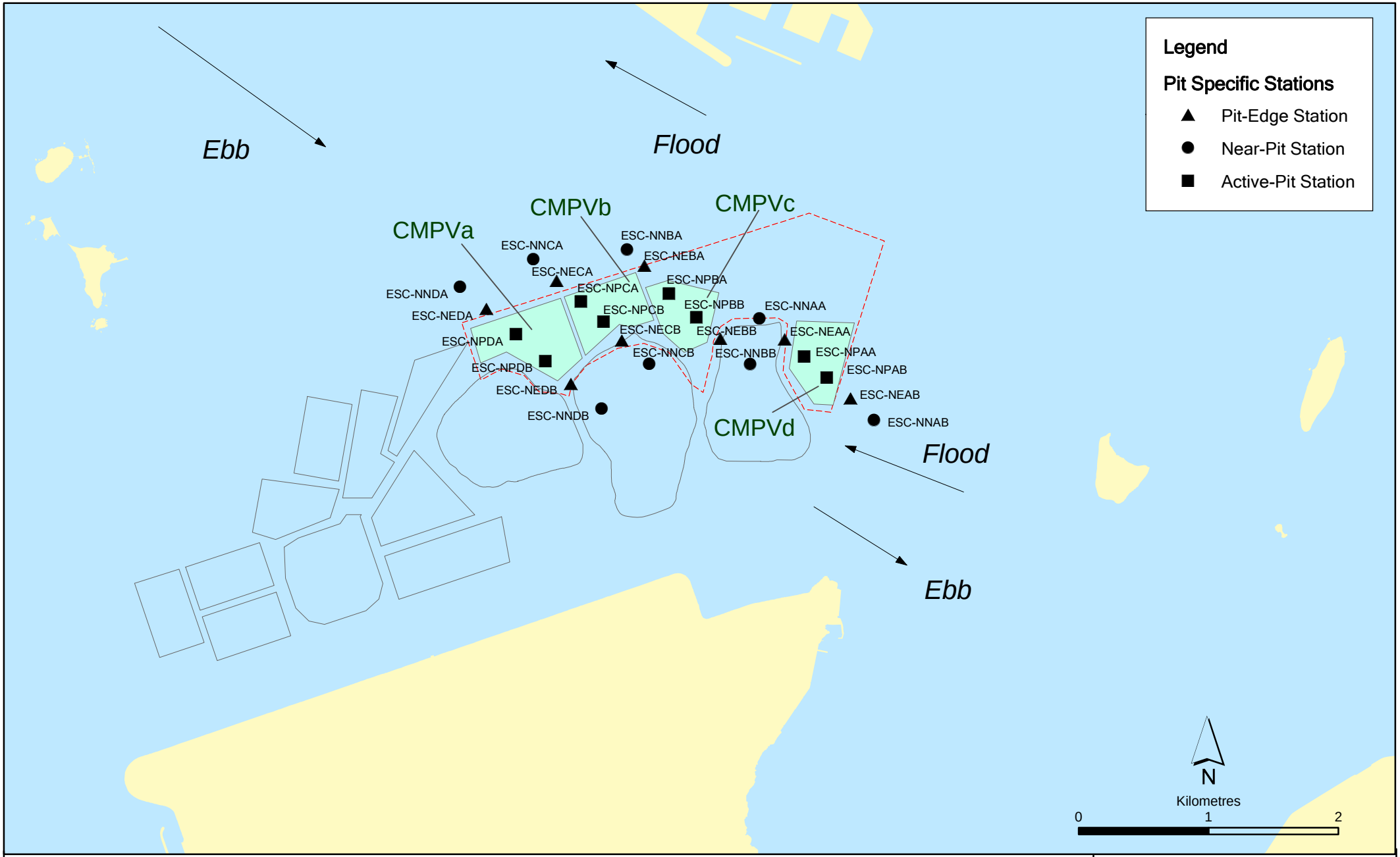


Figure 1.1

Pit Specific Sediment Quality Monitoring Stations for CMPV

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Date: 29/10/2009

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1.5.9 Total Dichloro-diphenyl-trichloroethane (DDT) and 4,4'-Dichloro-diphenyl-dichloroethylene (4,4'-DDE) were below the limit of reporting at all stations in June and July except for the 4,4'-DDE level at Active Pit station NPDB in July 2013. Total Polychlorinated Biphenyls (PCBs) were recorded above the limit of reporting in July at Active Pit Station NPDA, but well below LCEL.

1.5.10 As explained in *Section 1.5.6*, Active Pit stations NPDA and NPDB are located within CMP Va which was receiving contaminated mud during the reporting period. Therefore, the higher concentrations of contaminants (including metals and organic contaminants) recorded at the two stations only are not considered as indicating any dispersal of contaminated mud from CMP Va. Nevertheless, detailed analysis will be presented in the *Quarterly Report* to reveal any trend of increasing sediment contaminant concentrations towards CMP Va.

1.5.11 Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP Va during this monthly period.

1.5.12 Routine Water Quality Monitoring for CMP Va – August 2013

1.5.13 The results for the Routine Water Quality Monitoring conducted during August 2013 in the wet season 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 1999-2010 from stations in the Northwestern Water Control Zone, where the CMPs are located. For Salinity, the average value obtained from the Upstream Station was used for the basis as the WQO. *In-situ* monitoring and laboratory results are shown in *Tables 1.2* and *1.3*, respectively, with graphical presentation provided in *Annex B.* Monitoring was undertaken at a total of 10 stations in the reporting month (see *Figure 1.2*).

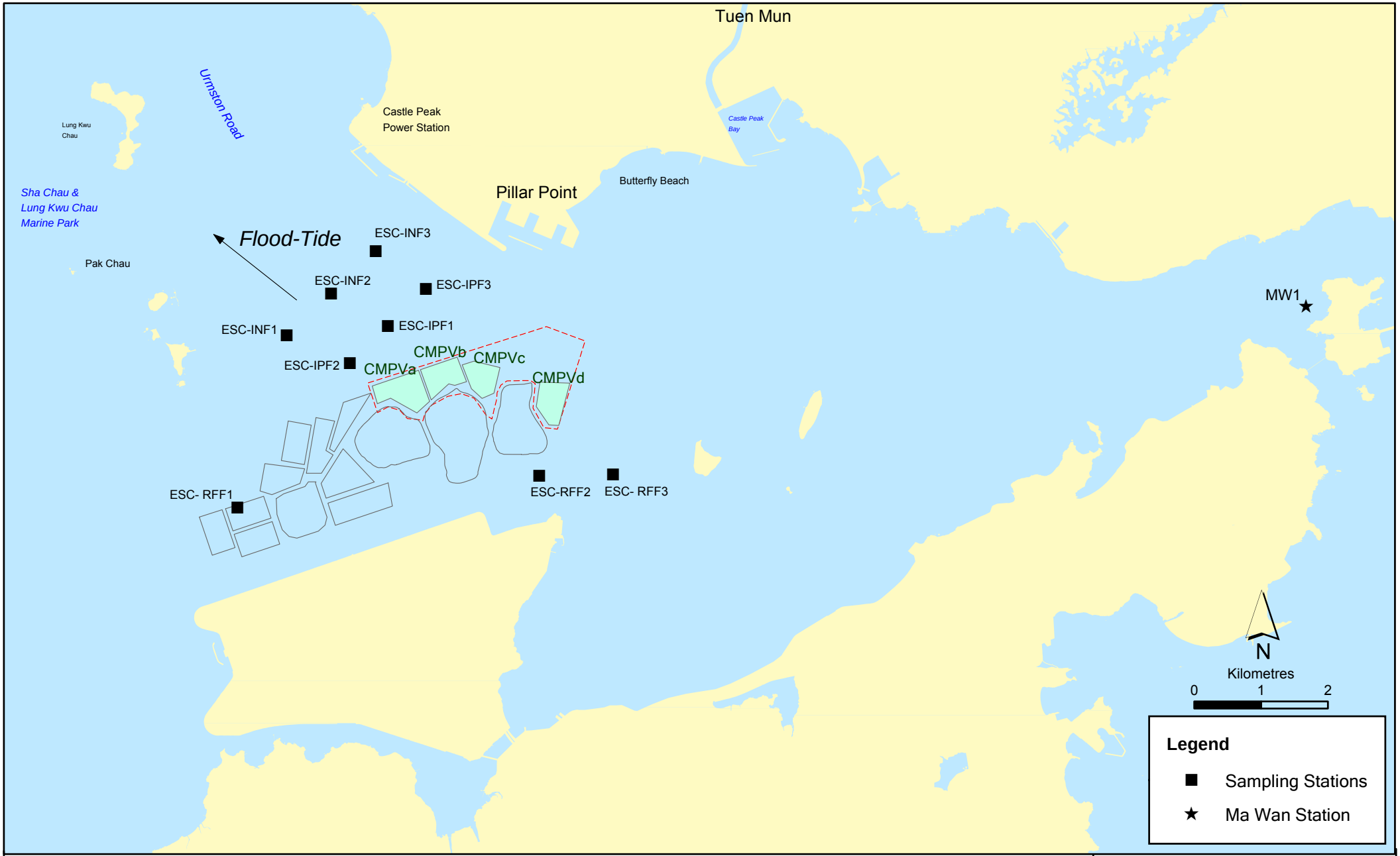

Figure 1.2

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

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Date: 3/12/2012

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In-situ Measurements

1.5.14 Analysis of results for August 2013 indicated that for all the stations (Impact, Intermediate, Reference and Ma Wan), levels of pH and DO complied with the WQOs (*Figures 11 and 12* of *Annex B*). Levels of Salinity were recorded exceeding the WQO at Impact Stations and Ma Wan Station (*Figure 14* of *Annex B*). The higher salinity recorded at Ma Wan station is likely to be caused by its greater separation distance from the Pearl River mouth, which is a key source of freshwater inputs in the area, when compared to the Reference stations. The Salinity levels exceeding WQO was only recorded at the Impact Stations which are located close to the working area for mud disposal and the exceedance is rather marginal. There is no evidence indicating any unacceptable environmental impacts to water quality as a result of the contaminated mud disposal operations at CMP Va during this monthly period.

1.5.15 Levels of Turbidity within the reporting month complied with the Action and Limit Levels set in the *EM&A Manual* (1) (*Figures 15 of Annex B*). All *in-situ* water quality measurements showed relatively minor variations amongst Impact, Intermediate and Reference stations (*Figures 11-15* of *Annex B*).

Laboratory Measurements

1.5.16 Analyses of August 2013 results indicate that concentrations of Mercury and Silver were below their limit of reporting at all stations. Arsenic was recorded at Intermediate Station INF1 and Cadmium was detected at Ma Wan station. Chromium, Copper, Lead, Nickel and Zinc were detected in samples from all stations. Concentrations of Chromium, Copper, Lead, Nickel and Zinc were slightly higher at Ma Wan station while the concentrations of Arsenic were similar amongst stations (*Figures 16 and 17 of Annex B*). Levels of 5-day Biochemical Oxygen Demand (BOD_5), Total Inorganic Nitrogen (TIN) and Ammoniacal-Nitrogen (NH_3-N) were similar amongst all stations (*Figures 18 and 19 of Annex B*).

1.5.17 Exceedances of Suspended Solids (SS) WQO (12.74 mg/L for wet season) were recorded (*Figure 20 of Annex B*). However, the exceedance of WQO was recorded at Reference stations and Intermediate stations rather than the Impact stations. Hence, it is considered that the exceedance of WQO at Reference and Intermediate stations are unlikely to be caused by mud disposal operations. Concentrations of SS complied with the Action and Limit Levels at all stations during the reporting month.

(1) ERM (2009). Draft Second Review of the EM&A Manual. Prepared for CEDD for EM&A for Contaminated Mud Pit at Sha Chau (2009-2013) – Investigation Agreement No. CE 4/2009 (EP).

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

Table 1.2 ***In-situ Monitoring Results for Routine Water Quality Monitoring of CMP Va in August 2013***

Stations	Temp (°C)	Salinity	Turbidity (NTU)	pH	Dissolved Oxygen (%)	Dissolved Oxygen (mg L^{-1})
RFF (Reference)	27.53	13.40	14.74	7.52	68.83	5.05
IPF (Impact)	27.46	15.03	9.35	7.55	67.22	4.89
INF (Intermediate)	27.55	14.34	14.96	7.53	67.95	4.95
Ma Wan Station	26.96	22.39	8.23	7.59	64.22	4.52
WQO	N/A	12.06-14.73#	N/A	6.5-8.5	N/A	>4

Note: #Not exceeding 10% of natural ambient level which is the result obtained from the Reference Station.

Table 1.3 ***Laboratory Results for Routine Water Quality Monitoring of CMP Va in August 2013***

Stations	As (µg/L)	Ag (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Hg (µg/L)	Pb (µg/L)	Ni (µg/L)	Zn (µg/L)	NH_3-N (mg/L)	TIN (mg/L)	BOD_5 (mg/L)	SS (mg/L)
RFF	<LOR	<LOR	<LOR	1.65	18.13	<LOR	3.58	4.50	15.63	0.05	1.39	0.61	13.75
IPF	<LOR	<LOR	<LOR	0.85	19.42	<LOR	2.31	4.00	11.38	0.05	1.33	0.59	8.33
INF	1.29	<LOR	<LOR	1.19	21.92	<LOR	2.71	4.33	12.96	0.05	1.37	0.58	16.50
Ma Wan Station	<LOR	<LOR	0.19	2.38	23.88	<LOR	3.75	6.13	34.88	0.05	0.98	0.56	10.50
												WQO of SS: 12.74 mg/L	

Note: LOR = Limit Of Reporting

1.5.19 ***Cumulative Impact Sediment Chemistry for CMP Va – June 2013***

1.5.20 Monitoring locations for Cumulative Impact Sediment Chemistry for CMP Va are shown in *Figure 1.3*. A total of nine monitoring stations were being sampled.

1.5.21 Analyses of results for the Cumulative Impact Sediment Chemistry Monitoring indicated that the concentrations of all metals, except Arsenic, were below the LCEL in June 2013 (*Figures 21 and 22* of *Annex B*). Concentrations of Arsenic in sediments from all stations, except for Near Field station RNB, exceeded the LCEL. As discussed in *Section 1.5.5* above, relatively high natural levels of Arsenic are present in Hong Kong's marine sediments and hence the slight exceedances of the LCEL for the Arsenic do not necessarily indicate any adverse impacts to sediment quality caused by disposal operation at CMP Va.

Figure 1.3

Cumulative Impacts Sediment Quality Monitoring Stations for CMPV

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1.5.22 The concentration of TOC shows variation amongst stations (*Figure 23* of *Annex B*). TBTs were recorded in sediment samples from all stations and Capped Pit station RCA and Ma Wan station were recorded with a higher concentration (*Figure 24* of *Annex B*). Concentrations of Total PCBs, Low and High MW PAHs were below the limit of detection at all the stations. Concentrations of total DDT were recorded below the limit of detection at all the staions except Near Field station RNA, Mid-field station RMB, and Far Field station RFA. Concentrations of 4-4' DDE were recorded below the limit of detection at all the staions except Near Field stations RNA and RNB, Mid-field station RMB and Ma Wan station .

1.5.23 Overall, there is no evidence indicating any unacceptable environmental impacts to sediment quality as a result of the contaminated mud disposal operations at CMP Va during this monthly period.

1.6 BRIEF DISCUSSION OF THE MONITORING RESULTS FOR SB CMPS

1.6.1 Monitoring data collected for SB CMPs from 31 July to 30 August 2013 are presented in this monthly report. Detailed discussion will be presented in the corresponding *Quarterly Report*.

1.6.2 Impact Water Quality Monitoring during Dredging Operations of CMP 1 and CMP 2 – 31 July to 30 August 2013

1.6.3 *Impact Water Quality Monitoring during Dredging Operations* of CMP 1 (ie from 31 July to 12 August 2013) and CMP2 (ie from 16 to 30 August 2013) was conducted three times per week for a total of thirteen (13) sampling days. On each survey day, sampling was conducted during both mid-ebb and mid-flood tides at two Reference (Upstream) stations upstream and five Impact (Downstream) stations downstream of the dredging operations at CMP 1 and CMP 2. Monitoring was also conducted at five Sensitive Receiver Stations (Ma Wan, Shum Shui Kok, Tai Mo To and Tai Ho Bay). A total of twelve stations were monitored and locations of the sampling stations are shown in *Figure 1.4*.

1.6.4 Monitoring results from 31 July to 30 August 2013 are presented in *Table C1* of *Annex C*. It should be noted that samplings during mid-ebb tide of 3 August 2013 and during both mid-ebb and mid-flood tides of 1 and 14 August 2013 were not carried out due to adverse weather. Sampling at THB2 was also cancelled during mid-ebb tide on 30 August 2013 due to adverse weather. Levels of DO, Turbidity and SS generally complied with the Action and Limit Levels (see *Table C2* for details) set in the Baseline Monitoring Report (1), except for the following occasions of exceedances shown in *Table 1.4* and *Table 1.5* below.

(1) ERM (2012) Baseline Monitoring Report. Environmental Monitoring and Audit for Contaminated Mud Pits to the South of the Brothers and at East Sha Chau (2012-2017) – Investigation. Agreement No. CE 23/2012(EP). Submitted to EPD in October 2012.

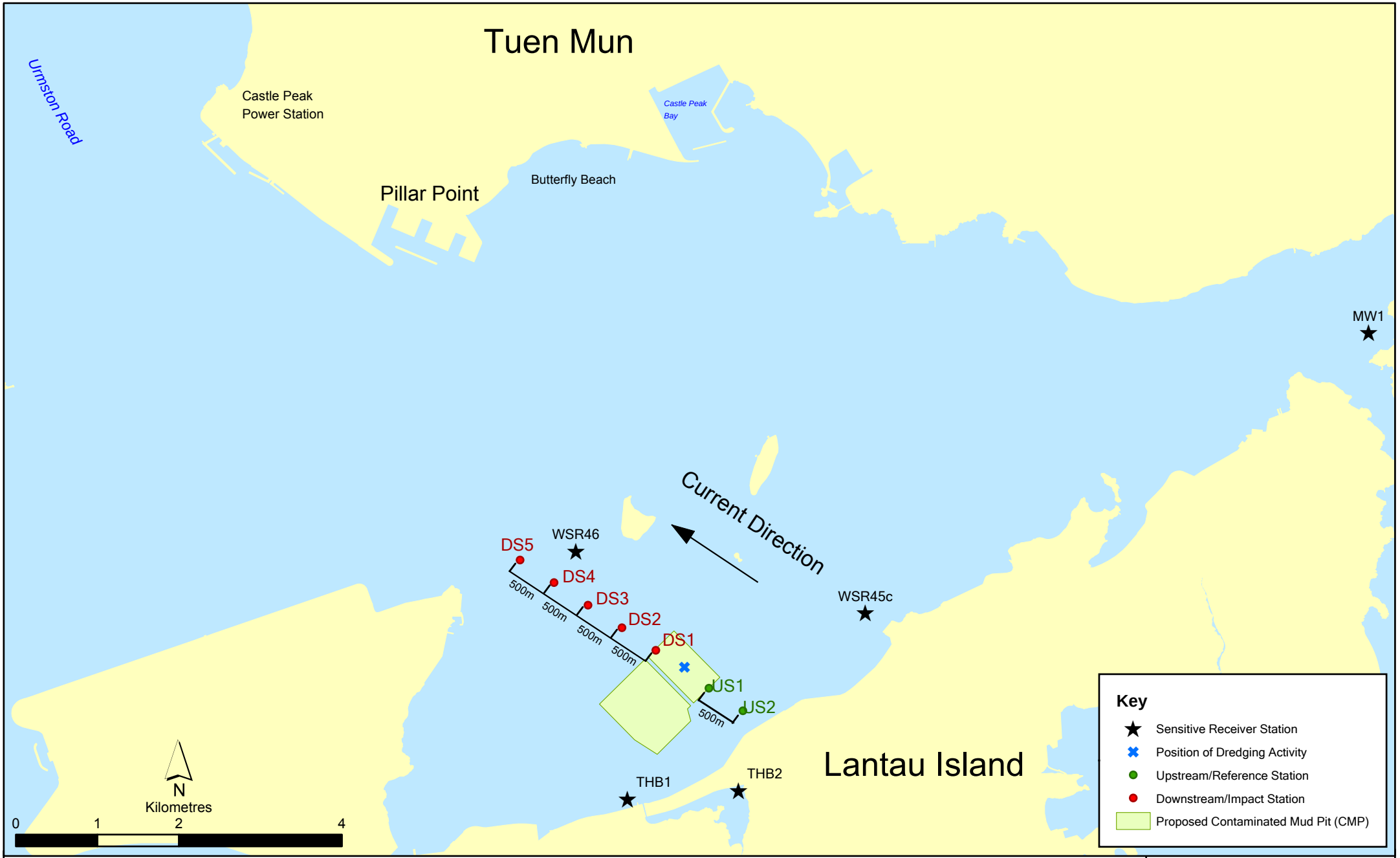

Figure 1.4

Indicative Dredging Impact Sampling Stations for South Brothers Facility

Note: The locations of sampling stations will be determined on site based on current direction and position of dredging activities

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Date: 10/09/2013

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Table 1.4 Details of exceedances recorded at CMP 1 in August 2013

Date	Tide	Parameter	Station	Type
3 August 2013	Mid-Flood	SS	DS2	Action
3 August 2013	Mid-Flood	SS	DS3	Action
5 August 2013	Mid-Flood	SS	WSR46	Action
7 August 2013	Mid-Ebb	Turbidity	WSR46	Action
7 August 2013	Mid-Ebb	SS	WSR46	Action
7 August 2013	Mid-Flood	Turbidity	DS3	Action
7 August 2013	Mid-Flood	Turbidity	WSR46	Action
7 August 2013	Mid-Flood	SS	DS2	Action
7 August 2013	Mid-Flood	SS	DS3	Limit
7 August 2013	Mid-Flood	SS	WSR46	Action

Table 1.5 Details of exceedances recorded at CMP 2 in August 2013

Date	Tide	Parameter	Station	Type
19 August 2013	Mid-Flood	SS	WSR45C	Action
19 August 2013	Mid-Flood	SS	WSR46	Action
19 August 2013	Mid-Flood	Turbidity	WSR46	Action
21 August 2013	Mid-Ebb	DO (Surface + Mid-depth)	DS3	Limit
21 August 2013	Mid-Ebb	DO (Surface + Mid-depth)	DS4	Limit
21 August 2013	Mid-Flood	Turbidity	WSR46	Action
21 August 2013	Mid-Flood	SS	WSR45C	Action
23 August 2013	Mid-Flood	Turbidity	WSR45C	Action
23 August 2013	Mid-Flood	Turbidity	WSR46	Action
23 August 2013	Mid-Flood	SS	WSR46	Action
26 August 2013	Mid-Flood	SS	WSR45C	Action
26 August 2013	Mid-Flood	SS	WSR46	Action
31 August 2013	Mid-Flood	SS	DS3	Action

1.6.5 It should be noted that all exceedances were recorded at stations which are located further away from the works area when compared to station DS1 at which the levels of SS, Turbidity and DO (Surface and Mid-depth) did not exceed the Action and Limit Levels during the same tidal period on the same day. As such, these recorded exceedances are not likely to be caused by the dredging works at CMP 1 and CMP 2. Instead, high levels of Turbidity and SS and low levels of DO were occasionally recorded during baseline monitoring which are considered to be sporadic events and characteristic of water quality in this area of Hong Kong. Therefore, the Action and Limit Level exceedances may be caused by natural background variation in water quality of the area.

1.6.6 Overall, the results indicated that the dredging operations at CMP 1 and CMP 2 of SB did not appear to cause any unacceptable deterioration in water quality during this reporting period. Therefore, no further mitigation measures, except for those recommended in the Environmental Permit (*EP-427/2011/A*), are considered necessary for the dredging operations.

1.7 ACTIVITIES SCHEDULED FOR THE NEXT MONTH

1.7.1 *Pit Specific Sediment Chemistry* and *Water Column Profiling* for CMP 1 will be conducted in the next monthly period of September 2013.

1.7.2 *Impact Water Quality Monitoring during Dredging Operations* for CMP 2 will be conducted three times per week in the next monthly period of September 2013.

1.7.3 No monitoring activities will be conducted for CMP IV and CMP V in the next monthly period of September 2013.

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

1.8 STUDY PROGRAMME

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

Annex A

Sampling Schedule

Annex A1 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP IV (January 2012 - December 2013)

		2012												2013											
Tissue/ Whole Body Sampling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Near-Pit Stations																									
	INA		*																						
	INB		*																						
Reference North																									
	TNA		*																						
	TNB		*																						
Reference South																									
	TSA		*																						
	TSB		*																						
Demersal Trawling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Near Pit Stations																									
	INA 1-5	*	*																						
	INB 1-5	*	*																						
Reference North																									
	TNA 1-5	*	*																						
	TNB 1-5	*	*																						
Reference South																									
	TSA 1-5	*	*																						
	TSB 1-5	*	*																						
Capping		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Ebb Tide																									
Impact Station Downcurrent																									
	IPE1		*				*		*				*		*				*		*				*
	IPE2		*				*		*				*		*				*		*				*
	IPE3		*				*		*				*		*				*		*				*
	IPE4		*				*		*				*		*				*		*				*
	PFC1		*				*		*				*		*				*		*				*
Intermediate Station Downcurrent																									
	INE1		*				*		*				*		*				*		*				*
	INE2		*				*		*				*		*				*		*				*
	INE3		*				*		*				*		*				*		*				*
	INE4		*				*		*				*		*				*		*				*
	INE5		*				*		*				*		*				*		*				*
Reference Station Upcurrent																									
	RFE1		*				*		*				*		*				*		*				*
	RFE2		*				*		*				*		*				*		*				*
	RFE3		*				*		*				*		*				*		*				*
	RFE4		*				*		*				*		*				*		*				*
	RFE5		*				*		*				*		*				*		*				*
Flood Tide																									
Impact Station Downcurrent																									
	INF1		*				*		*				*		*				*		*				*
	PFC2		*				*		*				*		*				*		*				*
	INF3		*				*		*				*		*				*		*				*
Intermediate Station Downcurrent																									
	IPF1		*				*		*				*		*				*		*				*
	IPF2		*				*		*				*		*				*		*				*
	IPF3		*				*		*				*		*				*		*				*
Reference Station Upcurrent																									
	RFF1		*				*		*				*		*				*		*				*
	RFF2		*				*		*				*		*				*		*				*
	RFF3		*				*		*				*		*				*		*				*
Water Column Profiling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Plume Stations	WCP1	*																							
	WCP2	*																							
Benthic Recolonisation Studies		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Capped Contaminated Mud Pits III																									
CPA	1 grab per station								*																
CPB	1 grab per station								*																
CPC	1 grab per station								*																
Reference Stations																									
RBA	1 grab per station								*																
RBB	1 grab per station								*																
RBC	1 grab per station								*																

"*" = Number of replicates depends on field catch or parameters

Sampling completed

Sampling to be completed

Annex A2 - East of Sha Chau Environmental Monitoring and Audit Sampling Schedule for CMP V (January 2012 - February 2014)

		2012												2013												2014	
Pit Specific Sediment Chemistry	**Code**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Active-Pit																											
	ESC-NPDA		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*						
	ESC-NPDB		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*						
Pit-Edge																											
	ESC-NEDA		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*						
	ESC-NEDB		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*						
Near-Pit																											
	ESC-NNDA		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*						
	ESC-NNDB		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*						

Cumulative Impact Sediment Chemistry		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Near-field Stations																											
	ESC-RNA		*				*		*				*		*				*		*						
	ESC-RNB		*				*		*				*		*				*		*						
Mid-field Stations																											
	ESC-RMA		*				*		*				*		*				*		*						
	ESC-RMB		*				*		*				*		*				*		*						
Capped Pit Stations																											
	ESC-RCA		*				*		*				*		*				*		*						
	ESC-RCB		*				*		*				*		*				*		*						
Far-Field Stations																											
	ESC-RFA		*				*		*				*		*				*		*						
	ESC-RFB		*				*		*				*		*				*		*						
Ma Wan Station																											
	MW1		*				*		*				*		*				*		*						

Sediment Toxicity Tests		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Near-Field Stations																											
	ESC-TDA		*						*						*						*						
	ESC-TDB		*						*						*						*						
Reference Stations																											
	ESC-TRA		*						*						*						*						
	ESC-TRB		*						*						*						*						
Ma Wan Station																											
	MW1		*						*						*						*						

Tissue/ Whole Body Sampling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Impact Stations																											
	ESC-INA								*						*						*						
	ESC-INB								*						*						*						
Reference																											
	ESC-TNA								*						*						*						
	ESC-TNB								*						*						*						
	ESC-TSA								*						*						*						
	ESC-TSB								*						*						*						

Demersal Trawling		**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Impact Stations																											
	ESC-INA							*	*					*	*					*	*						
	ESC-INB							*	*					*	*					*	*						
Reference Stations																											
	ESC-TNA							*	*					*	*					*	*						
	ESC-TNB							*	*					*	*					*	*						
	ESC-TSA							*	*					*	*					*	*						
	ESC-TSB							*	*					*	*					*	*						

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

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

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

Benthic Recolonisation Studies	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Capped Contaminated Mud Pits IVa-c																										
ESC-CPA								*				*								*				*		
ESC-CPB								*				*								*				*		
ESC-CPC								*				*								*				*		
Reference Stations																										
ESC-RBA								*				*								*				*		
ESC-RBB								*				*								*				*		
ESC-RBC								*				*								*				*		

Impact Monitoring for Dredging	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**
Upstream/Reference Stations																										
US1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
US2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
Downstream/Impact Stations																										
DS1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
DS2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
DS3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
DS4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
DS5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
Ma Wan Station																										
MW1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									

Sampling completed

Sampling to be completed

Annex A3 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - December 2017)

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

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

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

Annex A3 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - December 2017)

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

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

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

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

Annex A3 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - December 2017)

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

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

Annex A3 - Environmental Monitoring and Audit Sampling Schedule for South of The Brothers (July 2012 - December 2017)

			2012						2013												2014												2015												2016												2017											
Capping Water Quality Monitoring			J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Ebb Tide																																																																		
Impact Stations Downcurrent																																																																		
	SB-IPE1	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-IPE2	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-IPE3	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-IPE4	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-IPE5	8 times per year																																									3	3		3	3		3	3		3	3													
Intermediate Stations Downcurrent																																																																		
	SB-INE1	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-INE2	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-INE3	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-INE4	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-INE5	8 times per year																																									3	3		3	3		3	3		3	3													
Reference Stations Upcurrent																																																																		
	SB-RFE1	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-RFE2	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-RFE3	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-RFE4	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-RFE5	8 times per year																																									3	3		3	3		3	3		3	3													
Sensitive Receiver Stations																																																																		
	MW1	8 times per year																																									3	3		3	3		3	3		3	3													
	THB1	8 times per year																																																																
	THB2	8 times per year																																																																	
	WSR45C	8 times per year																																									3	3		3	3		3	3		3	3													
	WSR46	8 times per year																																									3	3		3	3		3	3		3	3													
Flood Tide																																																																		
Impact Stations Downcurrent																																																																		
	SB-IPF1	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-IPF2	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-IPF3	8 times per year																																									3	3		3	3		3	3		3	3													
Intermediate Stations Downcurrent																																																																		
	SB-INF1	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-INF2	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-INF3	8 times per year																																									3	3		3	3		3	3		3	3													
Reference Stations Upcurrent																																																																		
	SB-RFF1	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-RFF2	8 times per year																																									3	3		3	3		3	3		3	3													
	SB-RFF3	8 times per year																																									3	3		3	3		3	3		3	3													
Sensitive Receiver Stations																																																																		
	MW1	8 times per year																																									3	3		3	3		3	3		3	3													
	THB1	8 times per year																																																																
	THB2	8 times per year																																																																	
	WSR45C	8 times per year																																									3	3		3	3		3	3		3	3													
	WSR46	8 times per year																																									3	3		3	3		3	3		3	3													

Benthic Recolonisation Studies			J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Capped Contaminated Mud Pits																																																																		
	SB-CPA	2 times per year																																																12				12								12				12
	SB-CPB	2 times per year																																																12				12								12				12
																																																		12				12								12				12
Reference Stations																																																																		
	RBA	2 times per year																																																12				12								12				12
	RBB	2 times per year																																																12				12								12				12
	RBC	2 times per year																																																12				12								12				12

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

Annex B

Monitoring Results

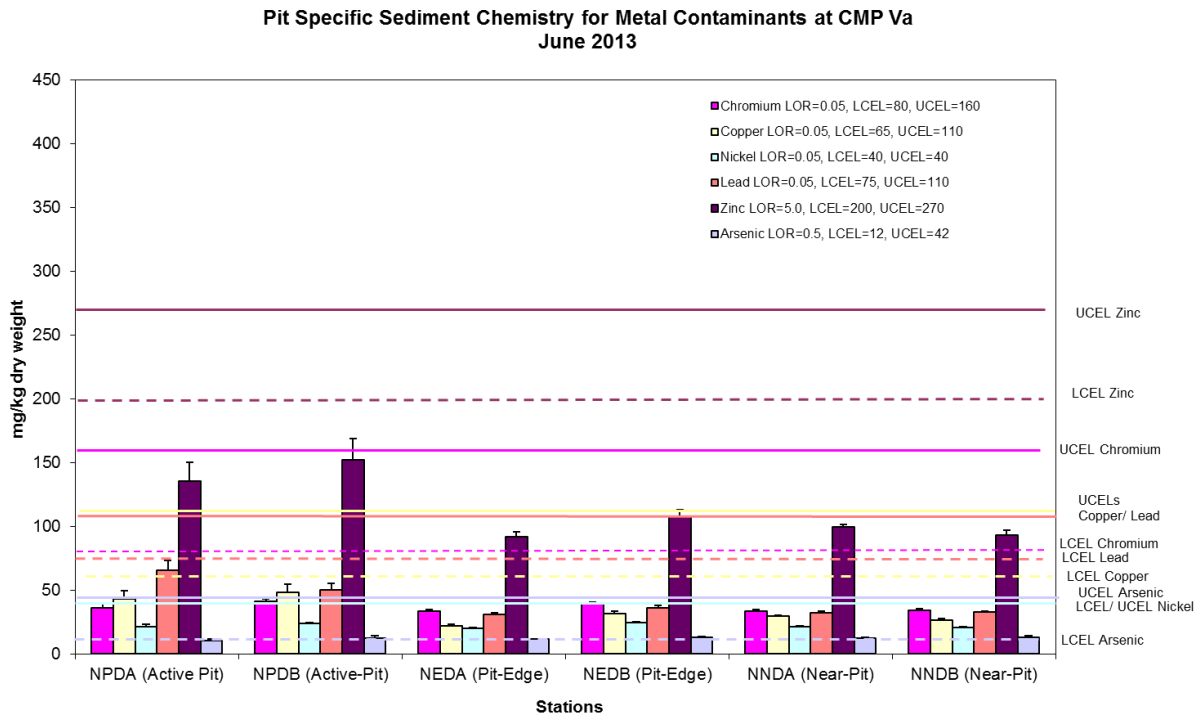


Figure 1: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2013.

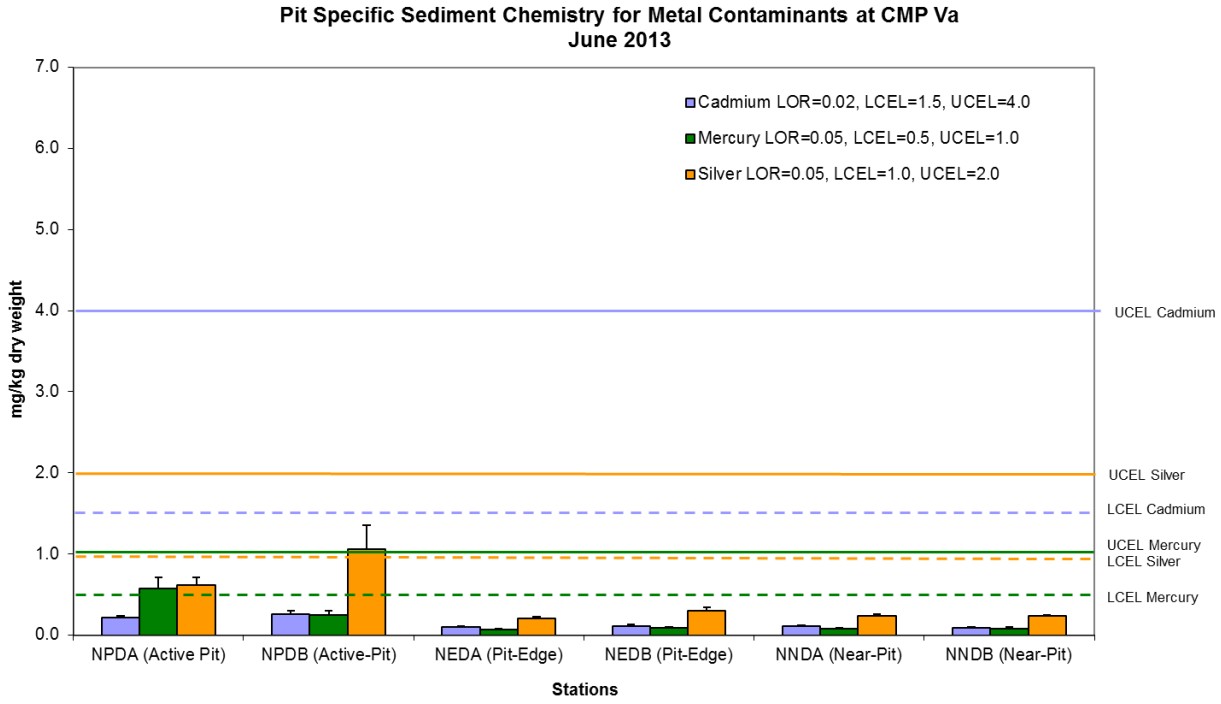


Figure 2: Concentration of Metals (Cd, Hg, Ag; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2013.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\12th (August 2013)

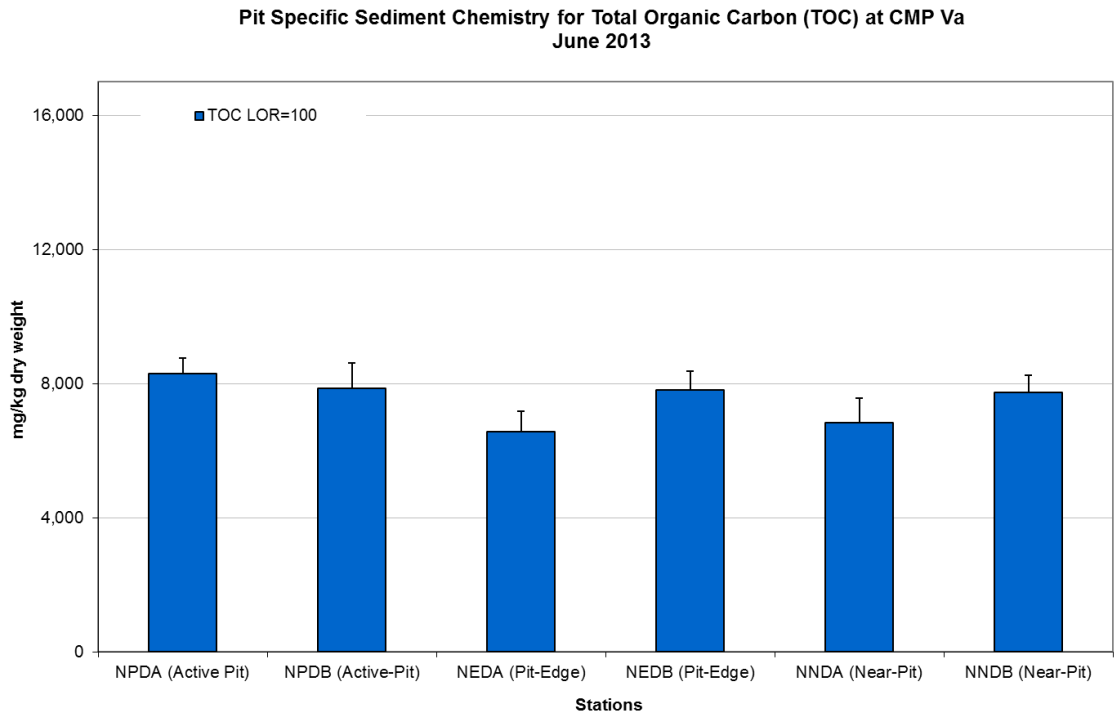


Figure 3: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2013.

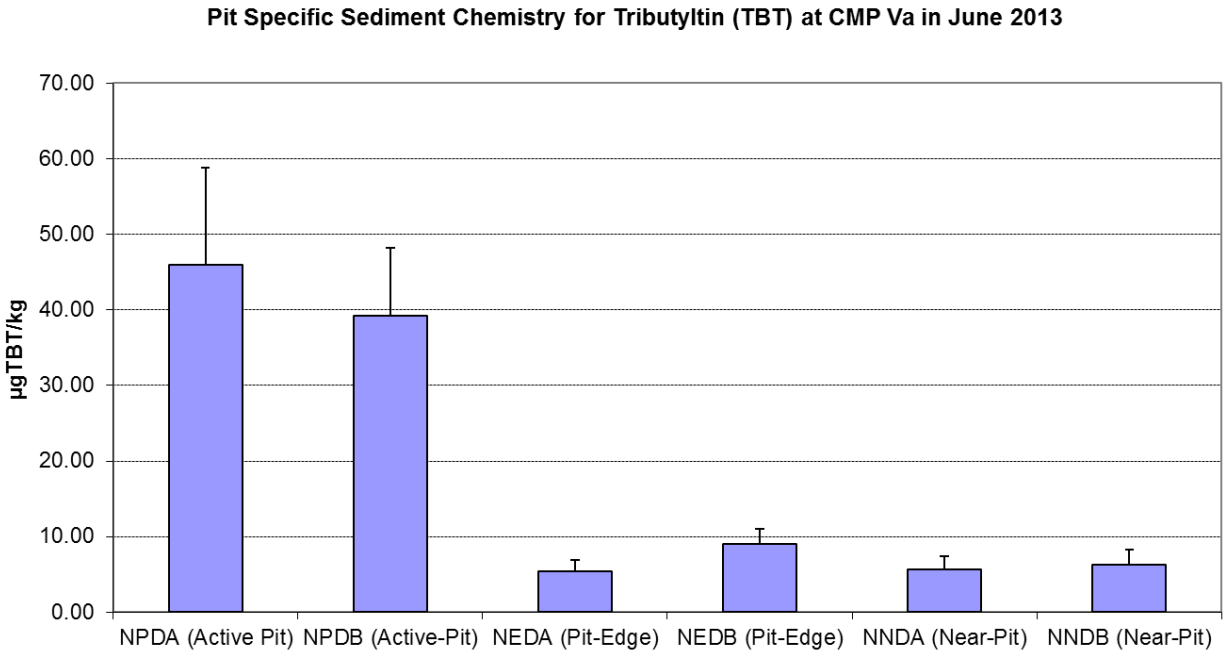


Figure 4: Concentration of Tributyltin (µg TBT/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring of CMP Va in June 2013.

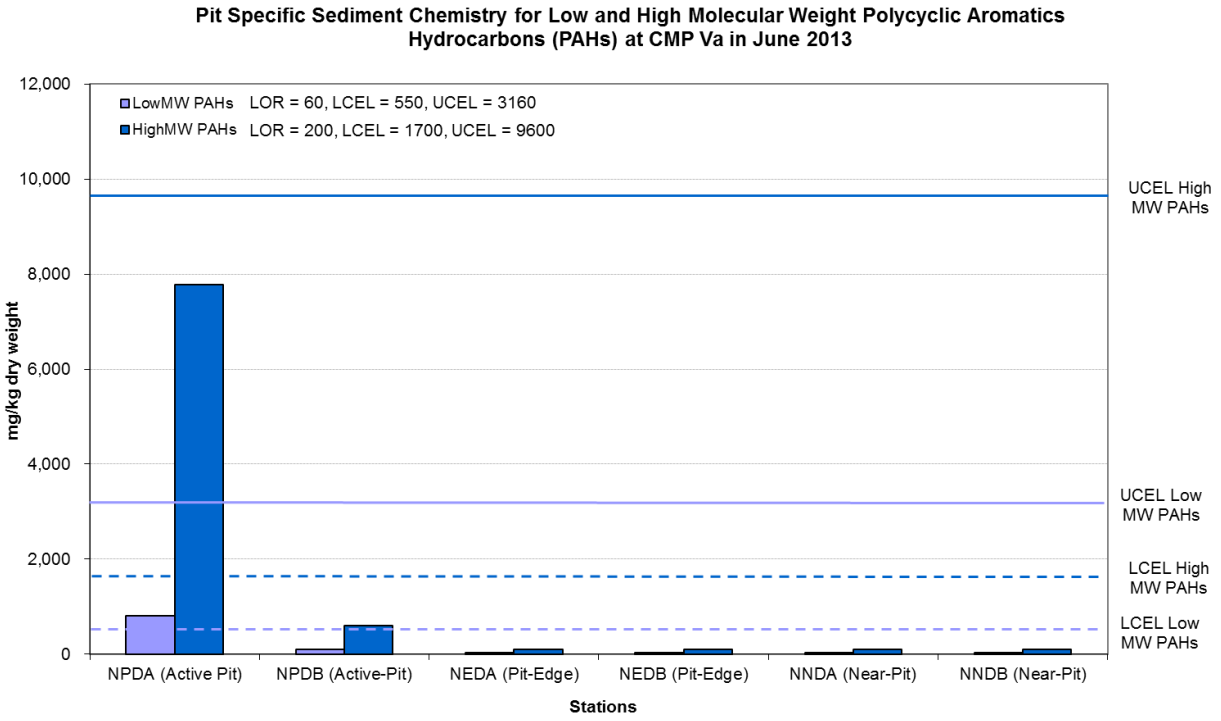


Figure 5: Concentration of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) (µg/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in June 2013.

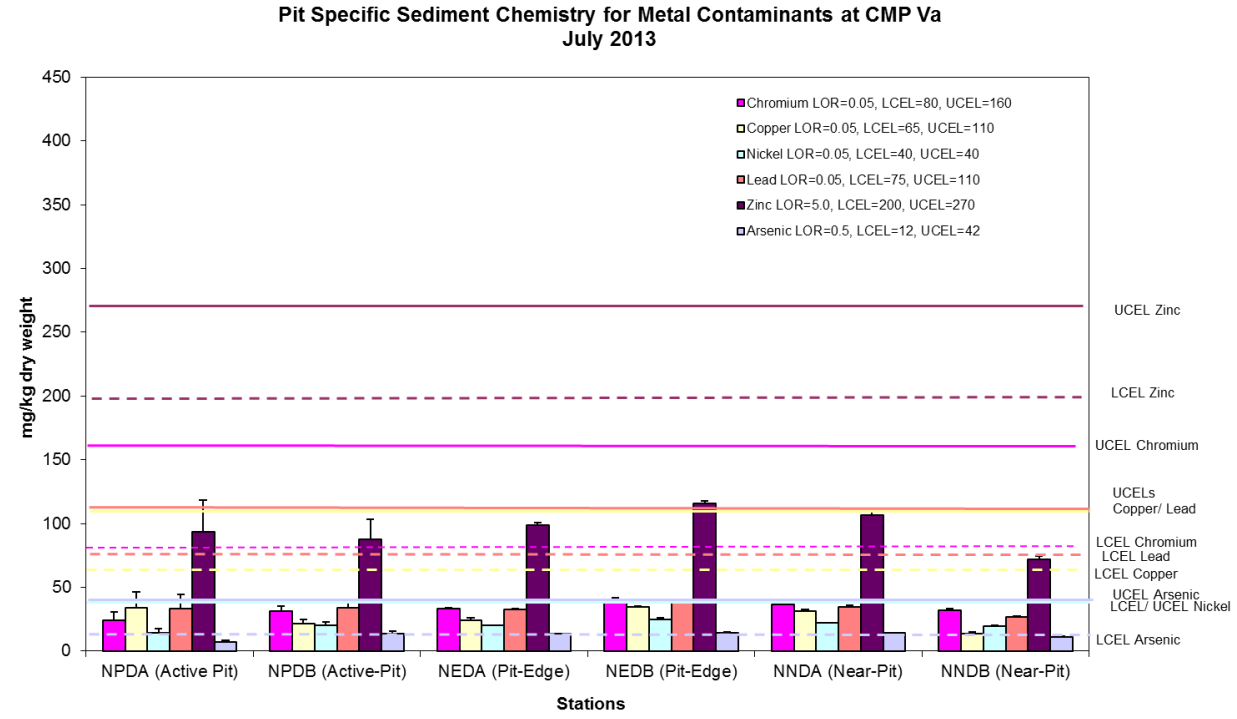


Figure 6: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in July 2013.

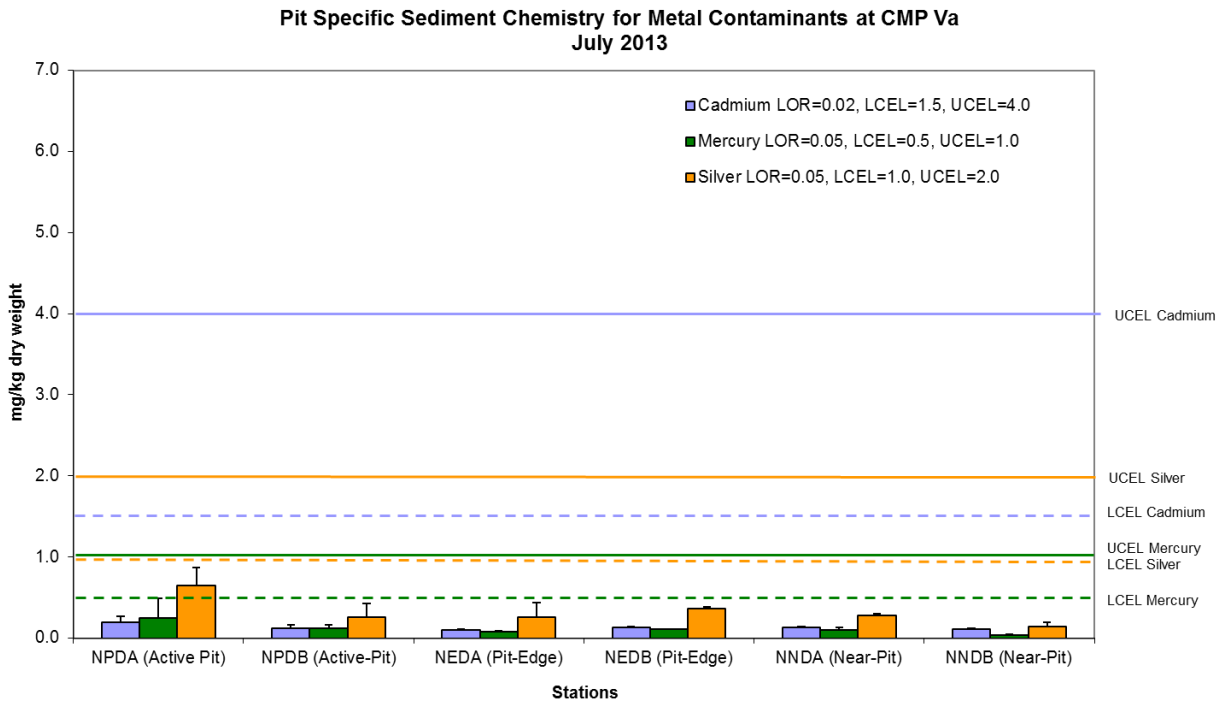


Figure 7: Concentration of Metals (Cd, Hg, Ag; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in July 2013.

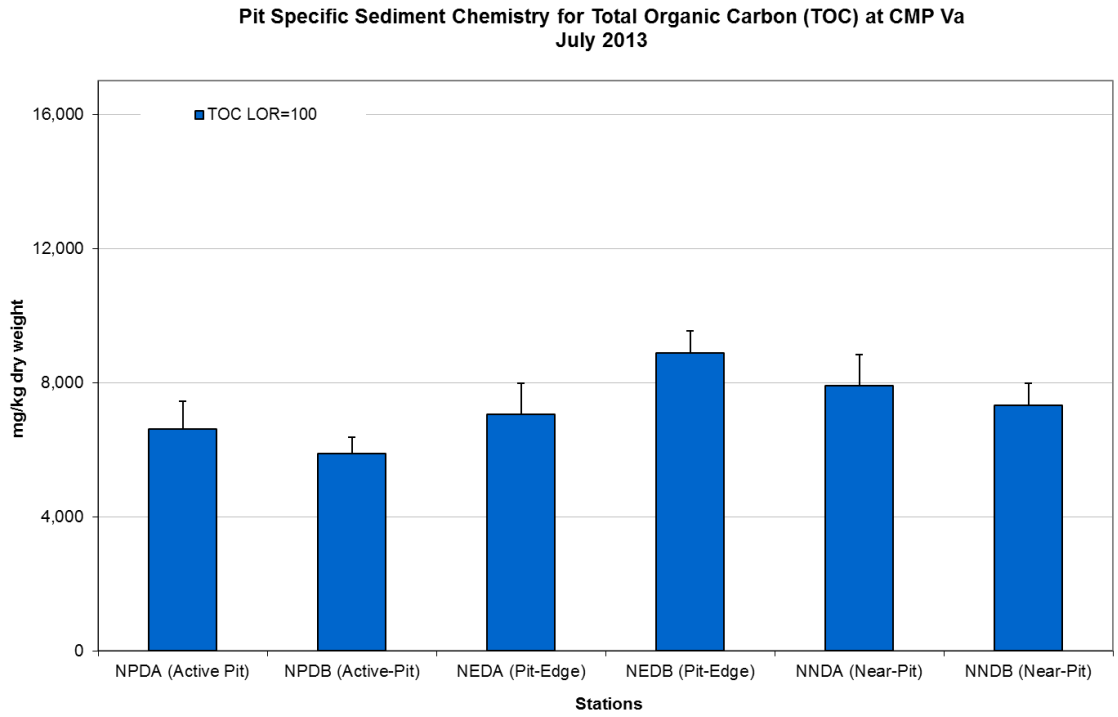


Figure 8: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in July 2013.

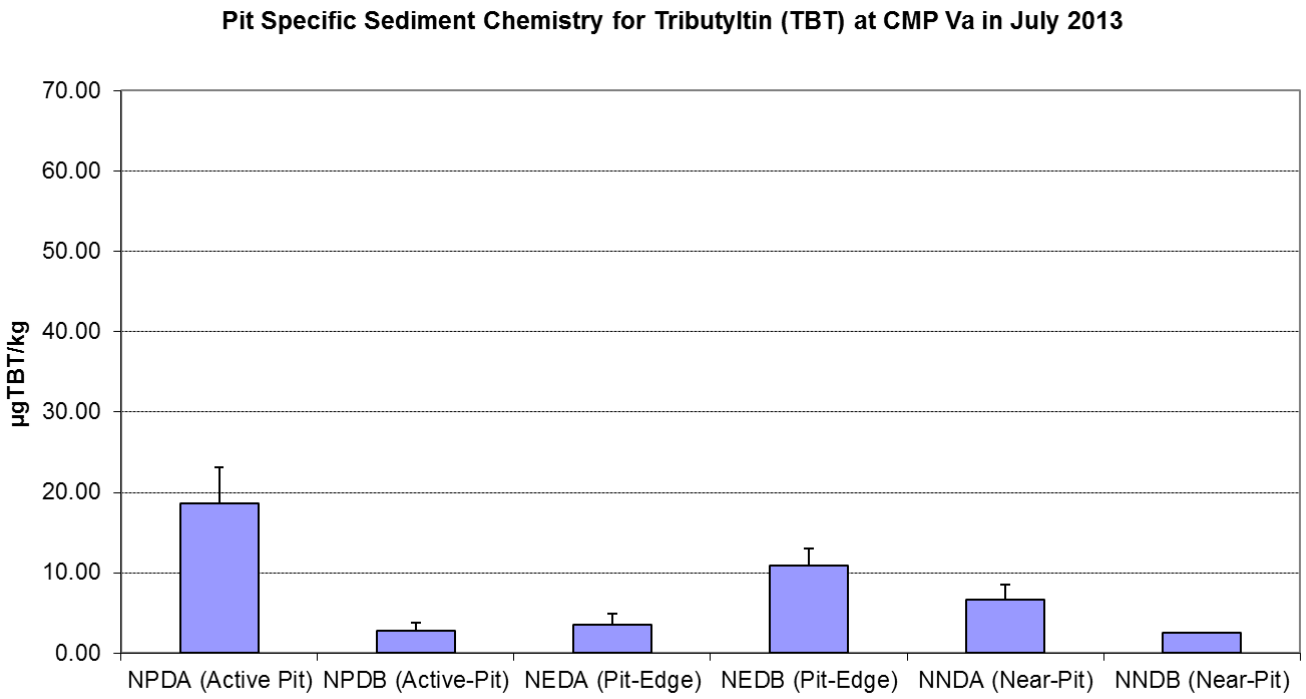


Figure 9: Concentration of Tributyltin (µg TBT/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring of CMP Va in July 2013.

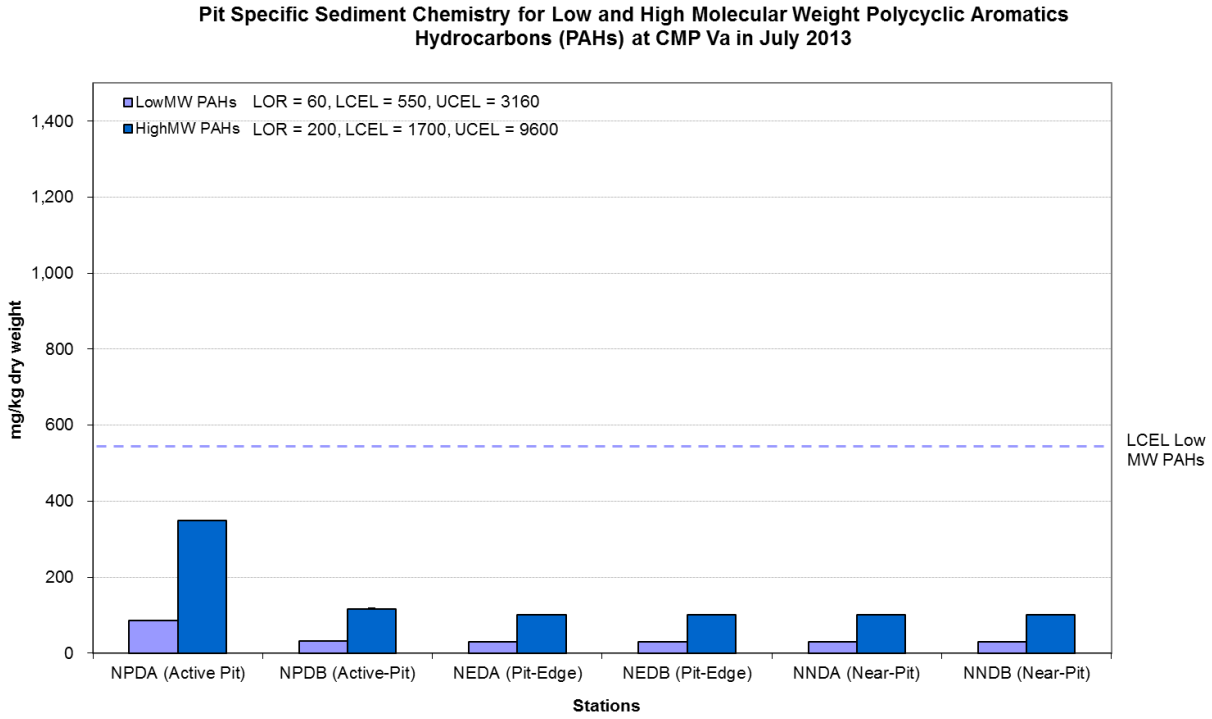


Figure 10: Concentration of Low and High Molecular Weight Polycyclic Aromatics Hydrocarbons (PAHs) (µg/kg; mean +SD) in sediment samples collected from Pit Specific Sediment Chemistry Monitoring for CMP Va in July 2013.

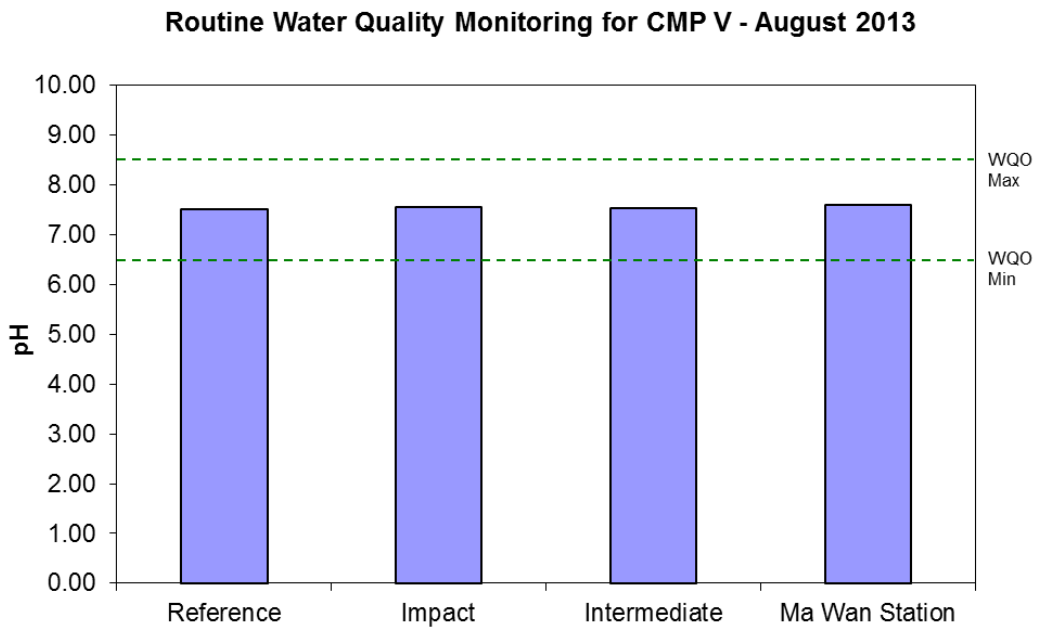


Figure 11: Level of pH (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

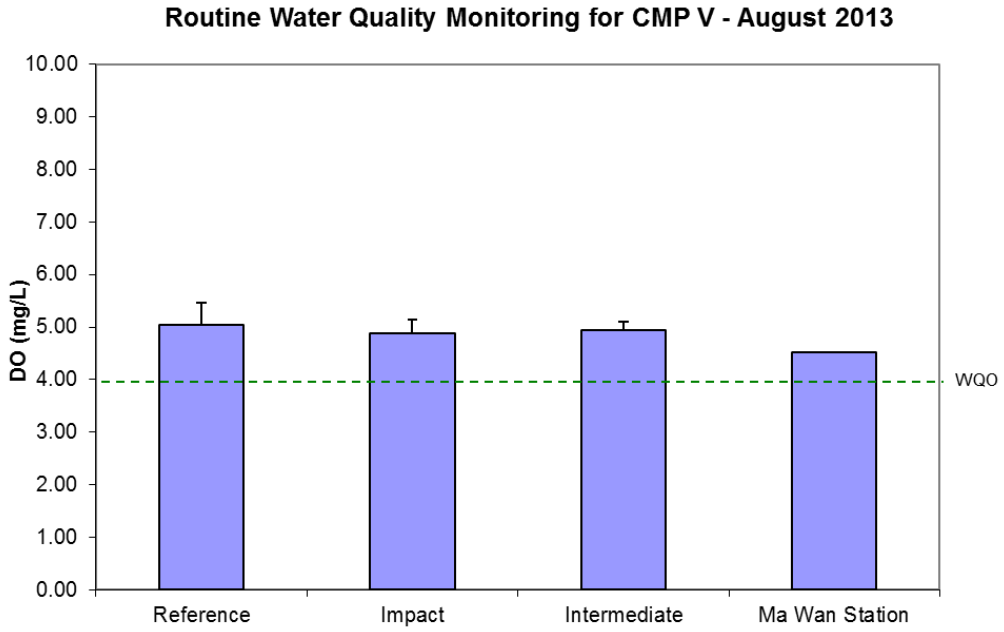


Figure 12: Concentration of Dissolved Oxygen (mg/L; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\12th (August 2013)

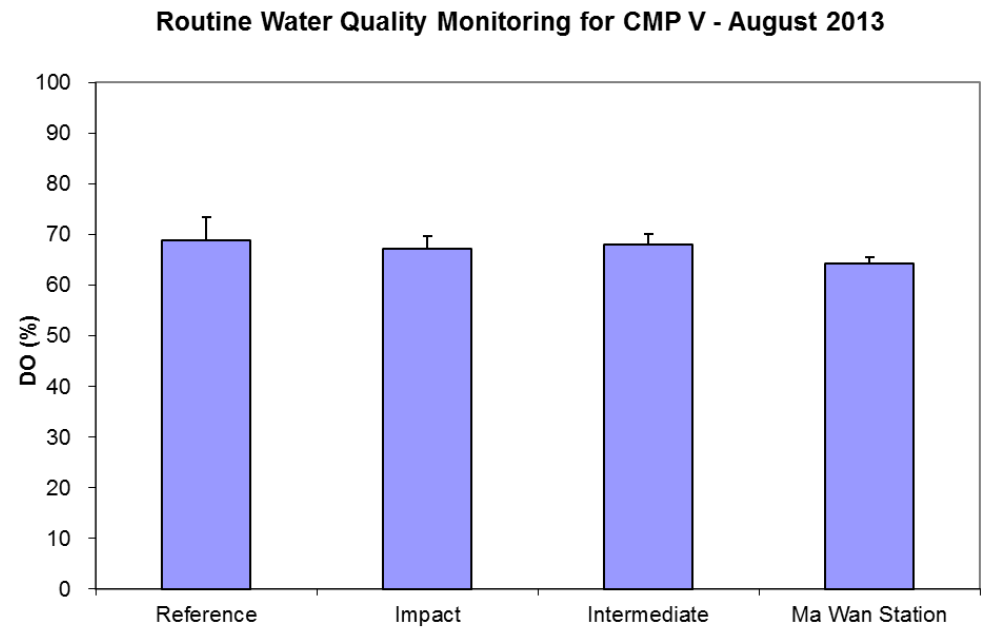


Figure 13: Level of Dissolved Oxygen (% saturation; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

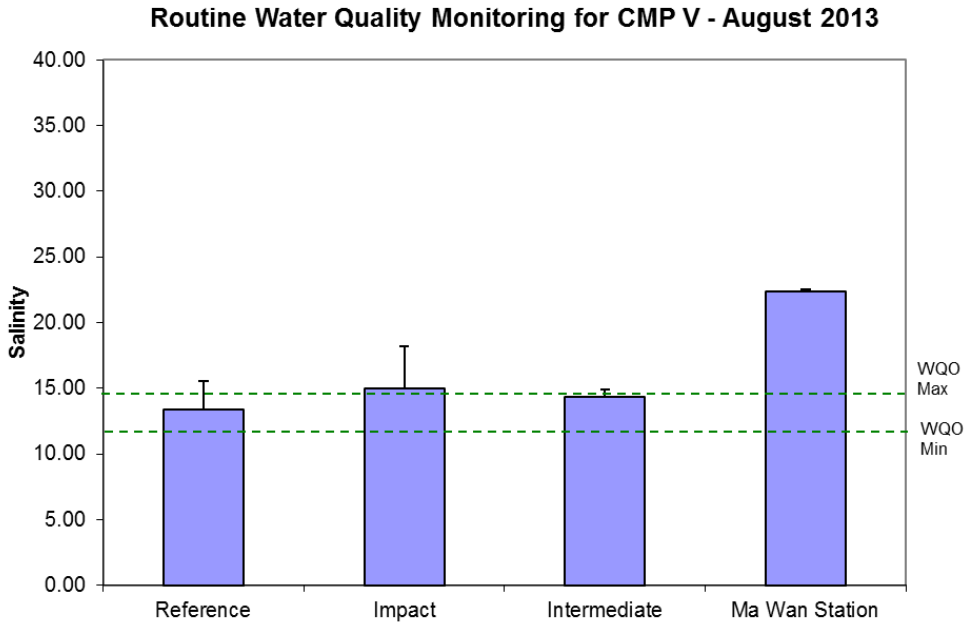


Figure 14: Level of Salinity (mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

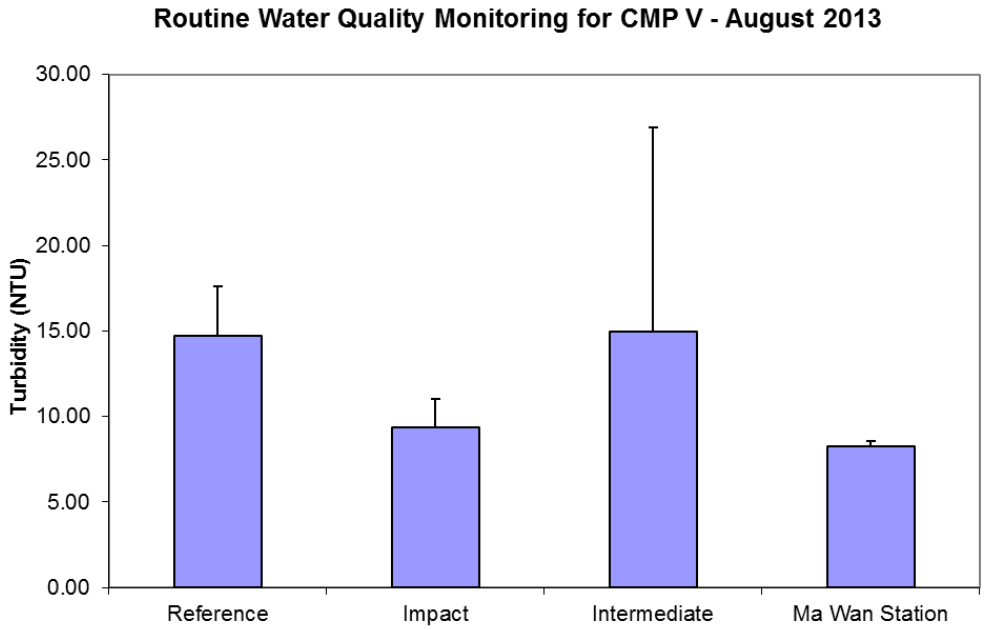


Figure 15: Level of Turbidity (NTU; mean + SD) recorded during Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

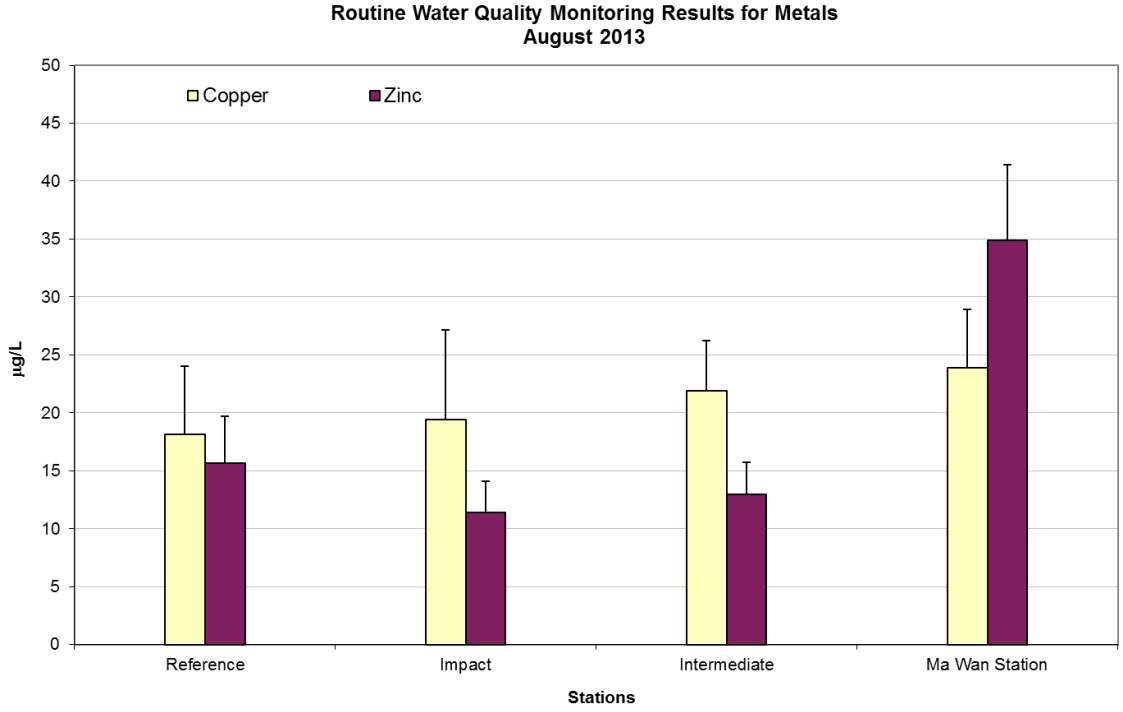


Figure 16: Concentration of Copper and Zinc (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

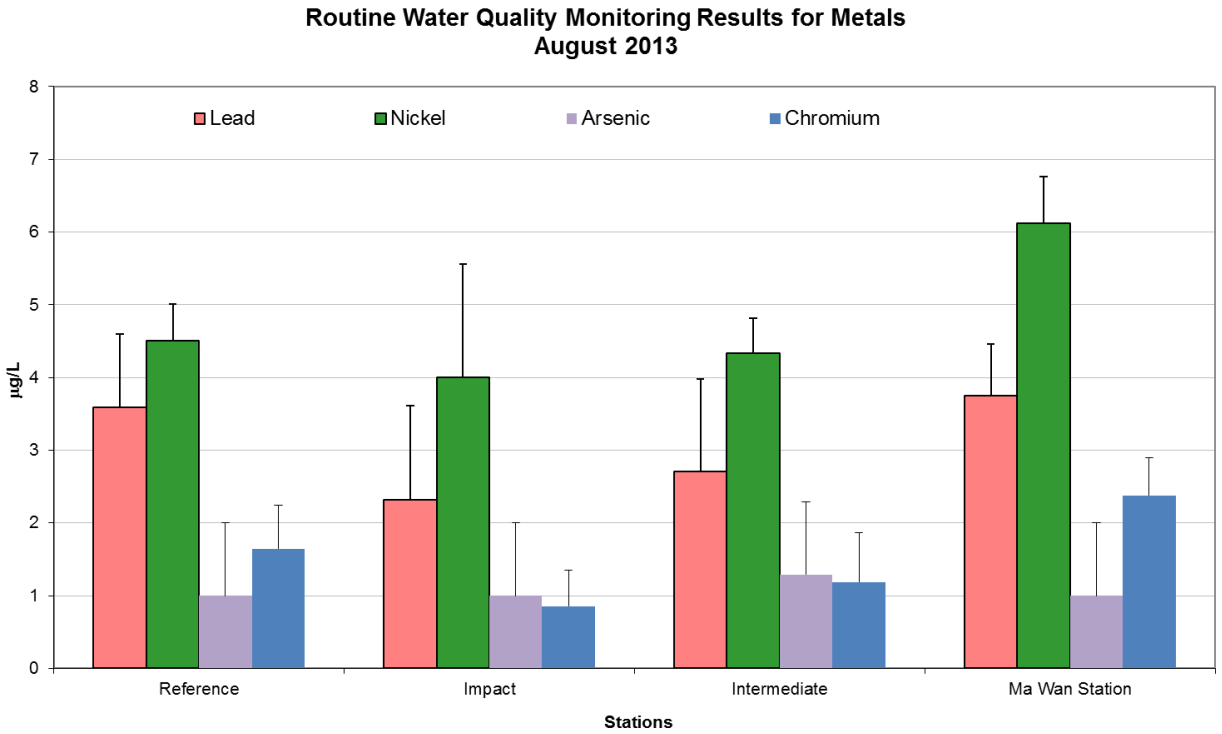


Figure 17: Concentration of Lead, Nickel, Arsenic and Chromium (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

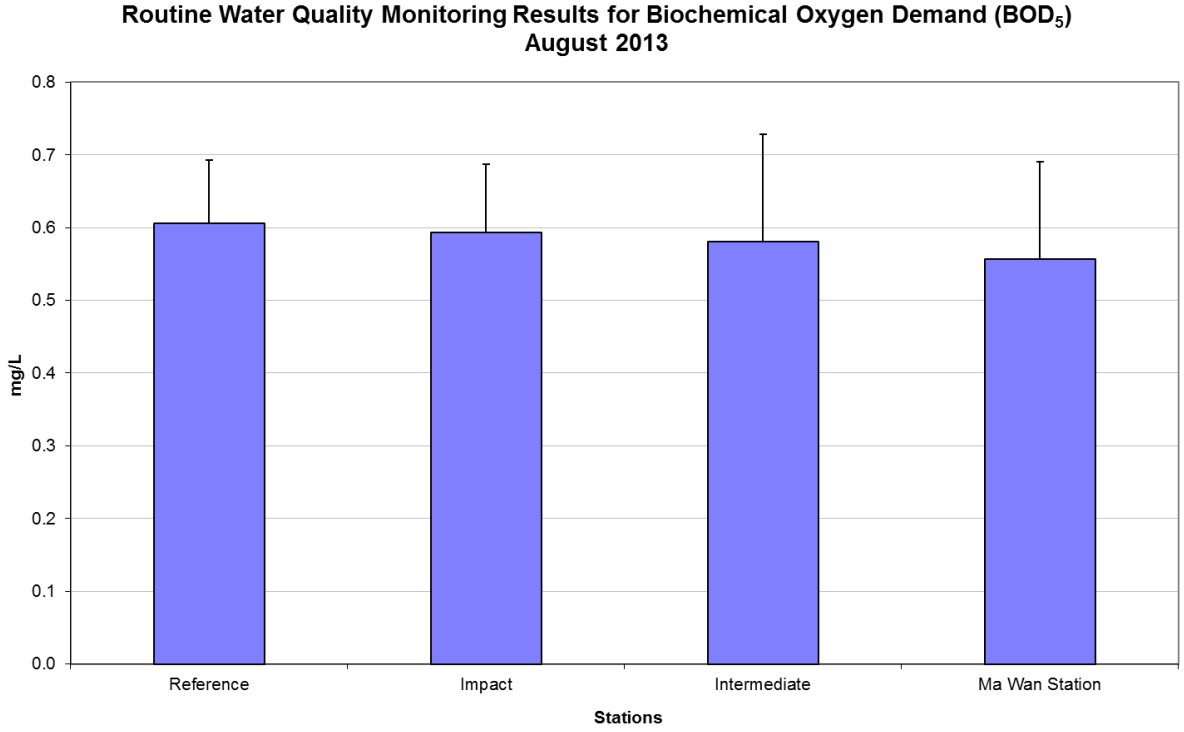


Figure 18: Level of Biochemical Oxygen Demand (BOD_5; mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

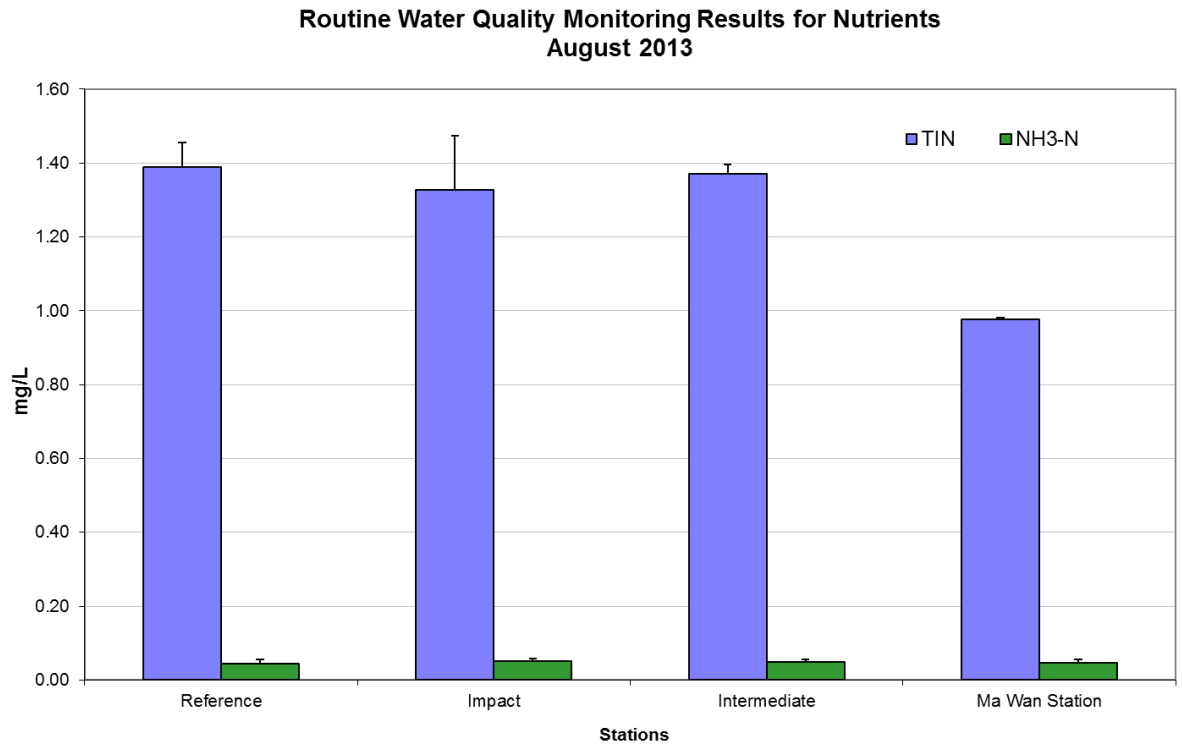


Figure 19: Concentration of Total Inorganic Nitrogen and NH_3-N (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

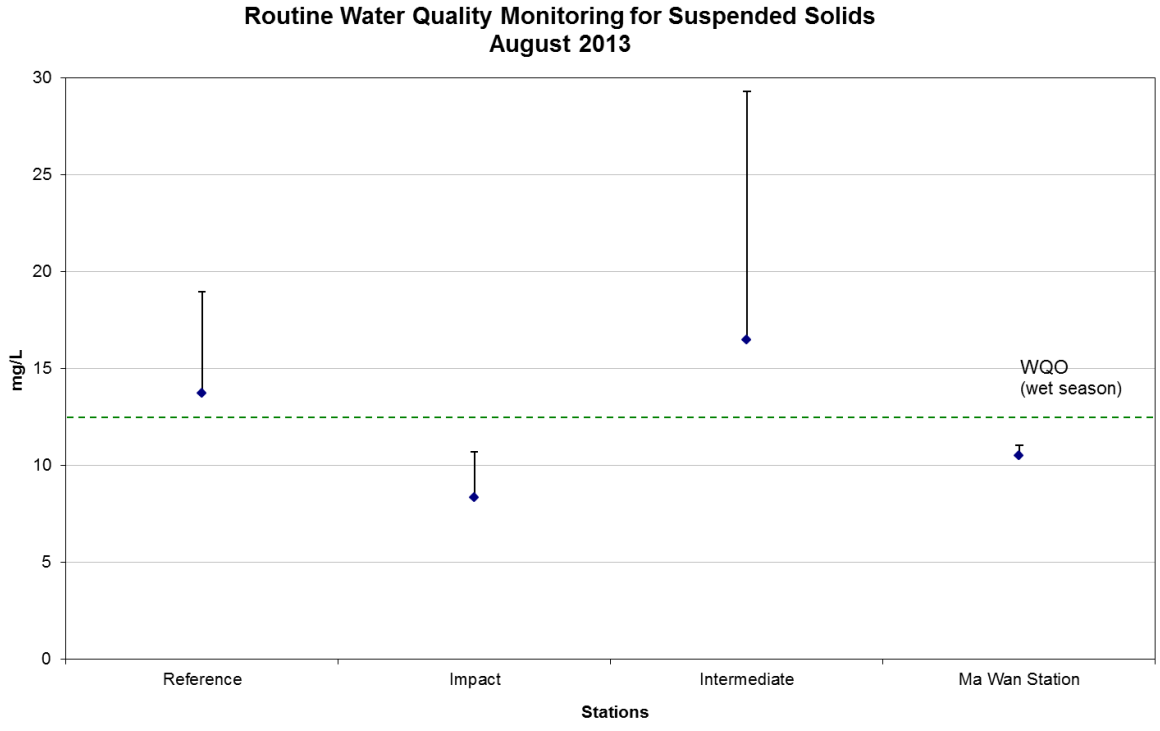


Figure 20: Concentration of Suspended Solids (mean + SD) in water samples collected from Routine Water Quality Monitoring for disposal operations at CMP Va in August 2013.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\12th (August 2013)

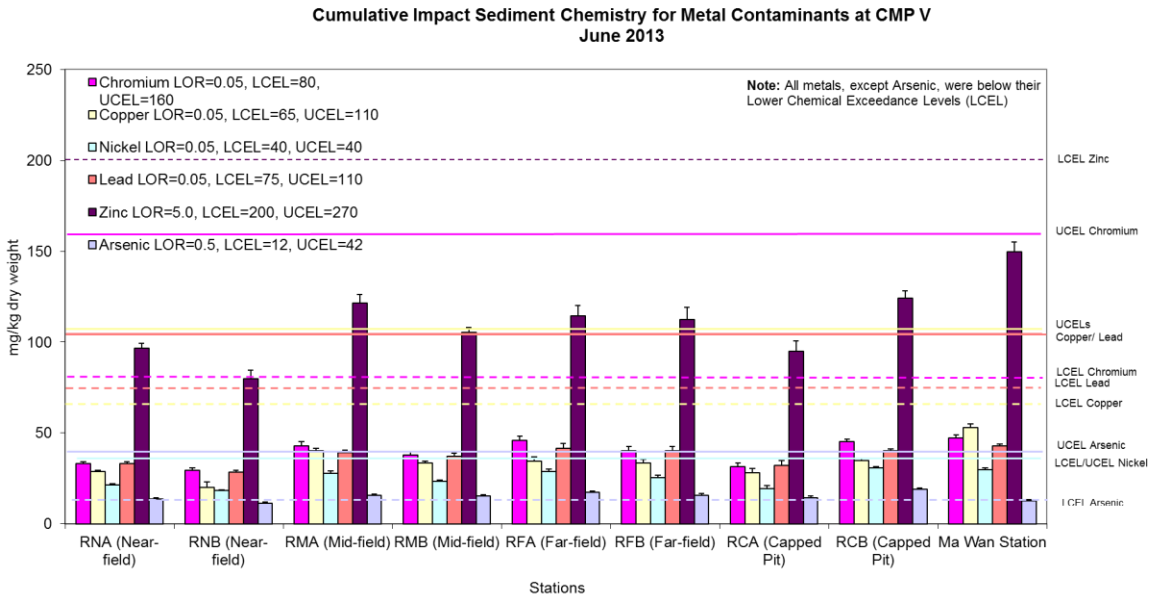


Figure 21: Concentration of Metals (Cr, Cu, Ni, Pb, Zn, As; mean +SD) in sediment samples collected for Cumulative Impact Sediment Chemistry Monitoring for CMP V in June 2013

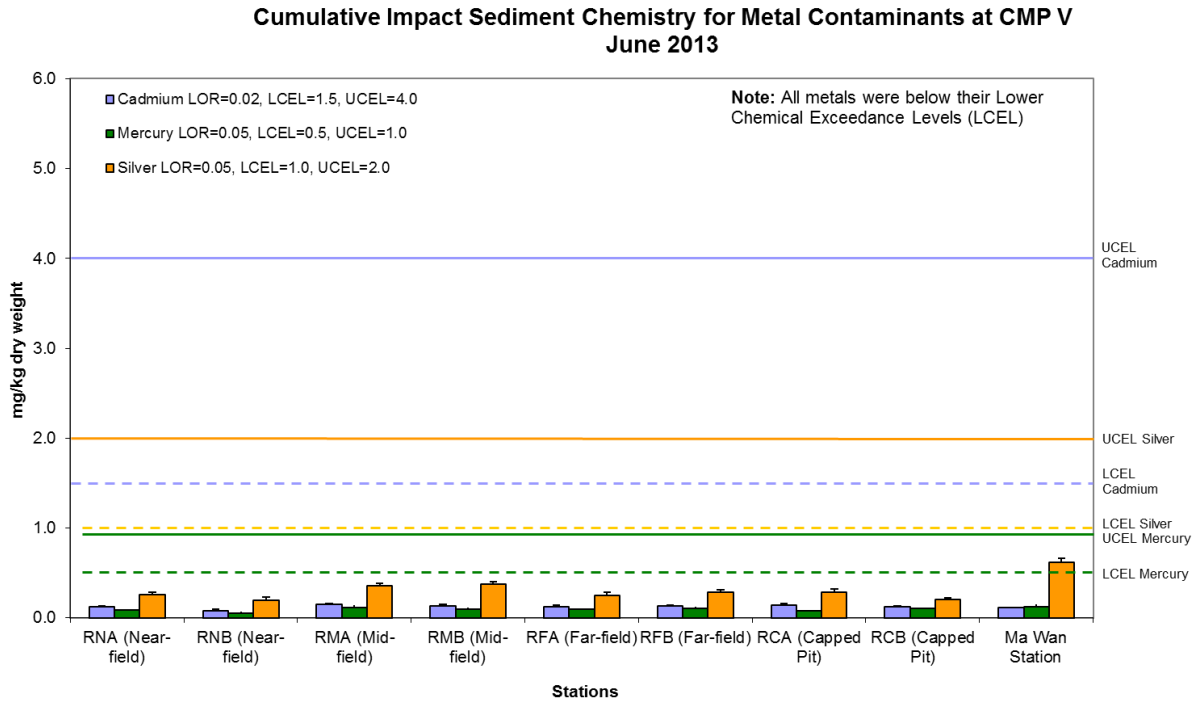


Figure 22: Concentration of Metals (Cd, Hg, Ag; mean +SD) in sediment samples collected for Cumulative Impact Sediment Chemistry Monitoring for CMP V in June 2013.

Source: H:\Team\EM\GMS Projects\0175086 CEDD EM&A for South Brothers\02 Deliverable\07 CMP Monthly Report\12th (August 2013)

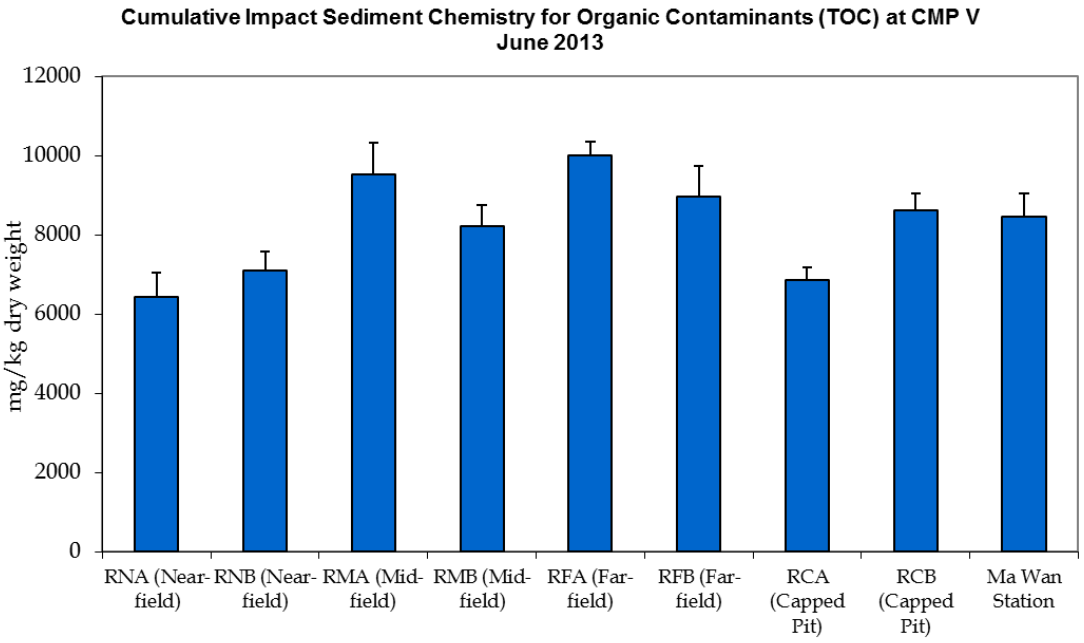


Figure 23: Concentration of Total Organic Carbon (mg/kg dry weight; mean +SD) in sediment samples collected for Cumulative Impact Sediment Chemistry Monitoring for CMP V in June 2013.

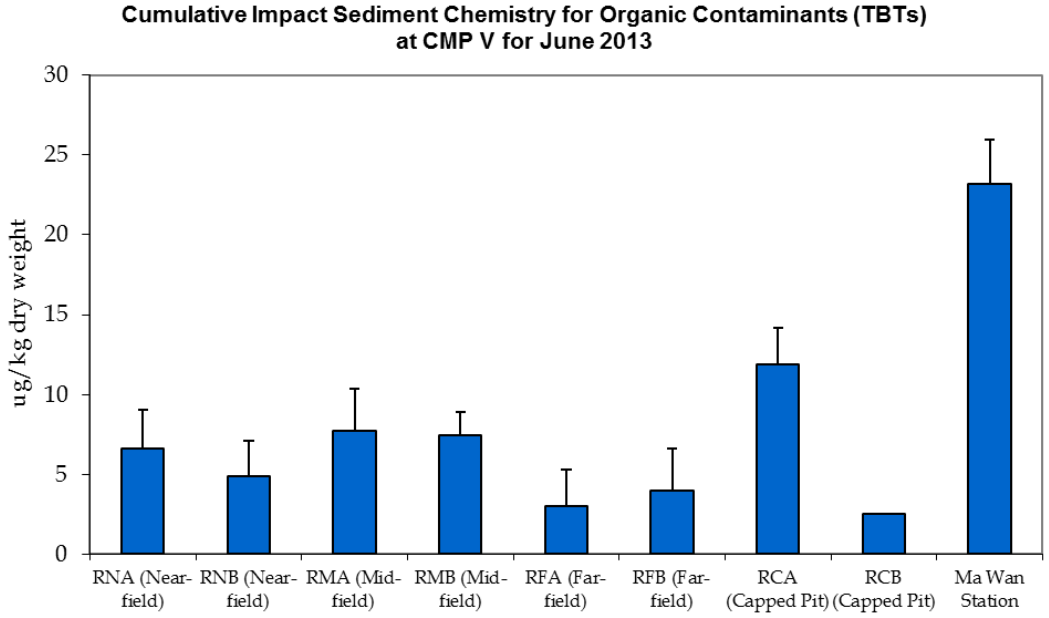


Figure 24: Concentration of Tributyltin (μg TBT/kg; mean +SD) in sediment samples collected for Cumulative Impact Sediment Chemistry Monitoring for CMP V in June 2013.

Annex C

Results of Impact Monitoring during Dredging Operations of CMP 1 and 2 in August 2013

Table C1 Summary Table of DO, Turbidity and SS Levels Recorded in July 2013

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/7/31	Mid-Ebb	DS1	4.76	5.79	8.78	12.56
		DS2	5.42	6.18	8.58	15.33
		DS3	4.57	6.30	2.36	3.22
		DS4	5.09	6.51	2.01	4.22
		DS5	7.10	7.23	2.06	3.67
		US1	5.64	6.49	8.08	9.00
		US2	4.62	6.59	9.72	10.89
		MW1	3.77	5.74	1.30	5.67
		THB1	6.54	7.45	5.17	7.00
		THB2	-	5.66	9.41	4.33
		WSR45C	3.92	5.94	3.75	7.78
		WSR46	4.70	5.83	2.82	7.44
	Mid-Flood	DS1	5.71	9.15	6.06	9.33
		DS2	6.58	8.78	5.89	10.00
		DS3	7.49	8.79	5.99	9.17
		DS4	9.76	10.28	4.60	7.17
		DS5	4.72	9.22	8.01	13.56
		US1	5.07	7.42	3.08	5.22
		US2	4.46	7.19	7.07	7.89
		MW1	3.97	5.61	2.08	7.22
		THB1	6.18	9.44	5.42	7.33
		THB2	-	10.65	5.57	5.00
		WSR45C	3.79	6.28	5.57	6.89
		WSR46	4.33	7.76	3.90	9.00
2013/8/3	Mid-Ebb	DS1	-	-	-	-
		DS2	-	-	-	-
		DS3	-	-	-	-
		DS4	-	-	-	-
		DS5	-	-	-	-
		US1	-	-	-	-
		US2	-	-	-	-
		MW1	-	-	-	-
		THB1	-	-	-	-
		THB2	-	-	-	-
		WSR45C	-	-	-	-
		WSR46	-	-	-	-
	Mid-Flood	DS1	6.23	6.32	3.76	6.67
		DS2	6.01	6.18	14.58	25.83
		DS3	6.20	6.25	14.95	21.83
		DS4	6.49	6.49	8.40	12.67
		DS5	6.24	6.27	14.84	17.22
		US1	5.39	6.22	4.51	5.44
		US2	5.19	6.04	4.83	5.56
		MW1	4.86	5.33	3.70	6.33
		THB1	5.93	6.30	6.71	9.67
		THB2	-	5.14	5.97	9.33
		WSR45C	4.78	5.76	4.19	6.78
		WSR46	5.31	5.84	11.10	15.00

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/8/5	Mid-Ebb	DS1	4.72	5.27	13.30	16.89
		DS2	5.39	5.47	8.53	10.56
		DS3	4.06	5.29	11.48	13.33
		DS4	5.60	5.83	4.62	4.83
		DS5	5.75	5.77	4.60	5.17
		US1	5.92	5.95	7.47	7.17
		US2	5.60	5.86	6.50	7.83
		MW1	4.34	5.43	3.84	8.11
		THB1	4.74	5.56	11.33	21.83
		THB2	-	5.72	20.30	11.67
		WSR45C	3.84	5.33	12.46	18.56
		WSR46	4.32	5.17	12.09	17.00
	Mid-Flood	DS1	4.85	5.51	10.68	13.50
		DS2	5.85	5.91	5.67	6.50
		DS3	5.68	5.95	6.40	8.33
		DS4	5.97	6.04	5.45	7.33
		DS5	5.09	5.65	13.28	18.89
		US1	4.49	4.98	9.62	15.56
		US2	4.14	4.87	14.57	18.33
		MW1	4.33	4.48	7.47	8.89
		THB1	5.46	6.04	10.07	9.17
		THB2	-	6.40	16.87	5.33
		WSR45C	4.19	4.65	13.89	14.33
		WSR46	4.42	5.33	22.44	34.22
2013/8/7	Mid-Ebb	DS1	4.24	4.92	10.06	16.22
		DS2	4.49	5.08	8.38	12.78
		DS3	4.45	4.82	9.08	11.56
		DS4	4.13	4.52	10.89	14.11
		DS5	4.43	4.44	10.53	17.17
		US1	4.94	5.61	10.60	13.17
		US2	4.94	5.49	9.48	13.17
		MW1	4.43	4.91	4.07	9.44
		THB1	4.79	5.74	12.82	15.50
		THB2	-	5.46	6.33	6.33
		WSR45C	4.37	4.93	8.87	14.44
		WSR46	4.32	5.13	27.87	39.56
	Mid-Flood	DS1	5.22	5.45	8.52	13.50
		DS2	5.27	5.35	17.05	23.17
		DS3	5.10	5.18	42.53	67.00
		DS4	5.27	5.50	10.93	16.83
		DS5	4.88	5.47	13.90	18.44
		US1	4.60	4.99	9.11	10.89
		US2	4.15	4.81	13.92	23.56
		MW1	4.28	4.52	8.48	14.44
		THB1	4.29	4.59	11.72	16.33
		THB2	-	4.93	16.57	14.33
		WSR45C	4.55	5.09	9.97	17.44
		WSR46	4.77	5.25	26.86	27.56
2013/8/9	Mid-Ebb	DS1	5.04	5.40	11.47	14.78
		DS2	5.46	5.66	5.73	7.11
		DS3	5.01	5.69	5.89	8.33

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		DS4	5.35	5.69	5.46	6.89
		DS5	5.97	6.00	4.12	6.50
		US1	5.30	5.51	8.73	10.17
		US2	5.04	5.40	12.13	13.33
		MW1	5.21	5.60	4.14	9.11
		THB1	5.60	6.04	3.98	11.17
		THB2	-	6.61	6.73	10.33
		WSR45C	5.03	5.75	6.01	11.56
		WSR46	4.35	4.96	7.98	13.22
	Mid-Flood	DS1	5.05	5.07	6.45	10.33
		DS2	5.08	5.12	7.27	10.17
		DS3	5.11	5.08	6.65	8.17
		DS4	5.17	5.19	5.10	7.50
		DS5	5.00	5.14	7.21	7.89
		US1	4.52	4.83	7.39	9.56
		US2	4.00	4.61	12.12	20.22
		MW1	4.24	4.75	4.06	7.11
		THB1	5.19	5.29	5.07	7.33
		THB2	-	4.59	6.80	6.33
		WSR45C	4.43	4.88	5.78	7.33
		WSR46	4.41	4.87	11.01	12.56
2013/8/12	Mid-Ebb	DS1	4.94	4.87	7.25	14.00
		DS2	4.58	5.18	5.83	11.22
		DS3	4.83	5.40	4.03	7.11
		DS4	4.36	5.15	7.20	9.56
		DS5	5.71	5.73	2.63	4.83
		US1	5.30	5.29	6.48	9.00
		US2	4.86	5.30	11.02	13.00
		MW1	4.60	5.21	2.06	3.89
		THB1	5.59	5.93	4.50	9.50
		THB2	-	6.21	6.43	4.67
		WSR45C	4.37	5.44	10.79	10.33
		WSR46	4.21	4.88	8.50	12.11
	Mid-Flood	DS1	5.00	5.20	5.93	7.00
		DS2	4.85	5.36	7.18	11.00
		DS3	5.07	5.51	4.95	8.33
		DS4	5.28	5.51	4.12	6.50
		DS5	4.57	5.34	6.47	11.89
		US1	4.70	5.01	4.09	5.89
		US2	3.85	4.27	11.54	13.56
		MW1	4.00	4.60	3.72	8.00
		THB1	5.36	5.55	3.55	7.67
		THB2	-	4.56	10.57	13.67
		WSR45C	4.26	4.88	8.28	13.22
		WSR46	4.16	4.76	15.70	18.56
2013/8/16	Mid-Ebb	DS1	5.32	6.25	10.24	14.67
		DS2	3.62	5.87	8.14	12.33
		DS3	5.99	6.27	8.14	10.78
		DS4	6.40	6.29	6.79	7.11
		DS5	6.32	6.39	5.81	8.00
		US1	6.22	6.29	12.52	10.11

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		US2	5.91	6.32	9.81	12.56
		MW1	4.45	6.12	3.83	7.56
		THB1	6.15	6.25	6.63	10.83
		THB2	-	6.48	7.97	11.33
		WSR45C	4.61	6.44	5.22	9.11
		WSR46	5.44	6.34	6.62	9.56
	Mid-Flood	DS1	6.34	6.49	7.49	6.89
		DS2	5.86	6.37	10.23	11.67
		DS3	6.07	6.40	8.66	11.67
		DS4	6.28	6.41	6.77	8.33
		DS5	6.24	6.23	6.17	8.17
		US1	6.00	6.22	7.94	11.00
		US2	5.67	6.04	7.59	11.89
		MW1	4.62	5.82	5.38	7.78
		THB1	5.82	6.28	9.35	12.67
		THB2	-	6.02	12.77	20.00
		WSR45C	5.37	6.02	7.48	8.44
		WSR46	5.71	6.56	6.86	8.00
2013/8/19	Mid-Ebb	DS1	5.45	5.40	9.98	8.44
		DS2	3.71	5.02	10.04	6.78
		DS3	5.13	5.01	8.02	5.22
		DS4	5.10	5.04	9.22	6.89
		DS5	5.00	5.04	9.03	8.56
		US1	5.23	5.79	8.40	7.89
		US2	5.13	5.78	9.33	7.33
		MW1	4.99	5.63	5.11	3.78
		THB1	5.20	6.12	5.83	3.17
		THB2	-	5.93	7.63	3.00
		WSR45C	4.61	5.18	9.46	8.78
		WSR46	4.75	4.90	14.08	10.44
	Mid-Flood	DS1	5.44	5.30	11.82	19.33
		DS2	4.86	5.44	12.67	11.33
		DS3	5.50	5.52	11.16	9.22
		DS4	5.49	5.44	8.88	7.50
		DS5	5.61	5.48	8.37	5.67
		US1	4.79	4.86	8.71	7.00
		US2	4.54	4.71	12.58	12.78
		MW1	4.57	4.81	9.79	9.56
		THB1	5.32	5.45	14.08	14.33
		THB2	-	5.53	14.33	16.67
		WSR45C	4.58	4.91	18.88	22.33
		WSR46	4.60	4.58	26.03	22.11
2013/8/21	Mid-Ebb	DS1	3.67	3.68	9.54	7.33
		DS2	3.85	3.67	11.52	9.44
		DS3	3.64	3.58	12.16	10.22
		DS4	3.63	3.60	13.37	16.33
		DS5	3.61	3.67	11.12	9.11
		US1	3.63	3.96	10.64	8.00
		US2	3.67	3.94	11.49	9.56
		MW1	4.18	4.40	5.79	6.56
		THB1	4.05	5.07	5.92	4.67

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		THB2	-	3.55	7.40	5.33
		WSR45C	3.99	3.87	15.67	14.44
		WSR46	4.04	3.76	16.64	15.00
	Mid-Flood	DS1	3.76	4.11	9.00	6.50
		DS2	3.58	3.99	11.83	14.11
		DS3	3.71	3.93	12.54	14.67
		DS4	3.96	4.01	10.39	8.44
		DS5	4.01	4.14	8.82	7.00
		US1	3.58	3.65	7.86	6.89
		US2	3.59	3.59	13.62	20.00
		MW1	4.23	4.08	11.18	12.56
		THB1	3.86	4.07	11.37	12.67
		THB2	-	3.73	21.10	7.67
		WSR45C	3.96	4.08	13.27	26.44
		WSR46	3.83	3.75	50.04	20.00
2013/8/23	Mid-Ebb	DS1	4.62	5.06	10.30	13.22
		DS2	3.49	4.49	10.54	12.67
		DS3	4.48	4.86	11.50	8.44
		DS4	4.47	4.93	14.10	13.56
		DS5	4.53	5.16	8.77	9.89
		US1	4.39	4.86	14.37	20.33
		US2	4.16	4.61	13.94	14.89
		MW1	5.05	5.23	7.23	6.44
		THB1	4.08	4.41	13.55	15.67
		THB2	-	4.17	8.47	6.33
		WSR45C	5.03	5.28	9.54	9.00
		WSR46	4.27	5.04	9.21	10.78
	Mid-Flood	DS1	4.98	4.99	14.60	15.83
		DS2	5.13	5.05	6.09	6.11
		DS3	4.99	5.18	6.99	6.33
		DS4	4.10	5.22	9.70	7.89
		DS5	3.96	4.92	10.13	11.56
		US1	3.93	4.24	11.67	14.00
		US2	4.03	4.53	7.17	9.00
		MW1	3.97	4.43	7.43	10.11
		THB1	4.65	4.87	14.70	22.83
		THB2	-	5.01	10.33	11.33
		WSR45C	3.90	4.38	31.12	15.89
		WSR46	3.86	4.28	33.67	23.56
2013/8/26	Mid-Ebb	DS1	4.78	4.91	11.39	11.44
		DS2	3.89	4.29	9.96	13.00
		DS3	4.12	4.69	8.00	7.56
		DS4	4.41	4.76	6.38	6.11
		DS5	4.09	4.79	7.13	7.78
		US1	4.60	5.04	8.31	5.78
		US2	4.44	4.91	7.71	6.78
		MW1	4.25	5.24	4.84	3.89
		THB1	5.35	5.53	5.87	20.17
		THB2	-	5.12	6.20	6.33
		WSR45C	3.96	4.86	13.00	9.00
		WSR46	4.36	4.67	6.64	4.89

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
	Mid-Flood	DS1	4.74	4.77	7.79	4.44
		DS2	4.24	4.86	7.32	6.56
		DS3	4.69	4.92	8.23	7.78
		DS4	4.96	4.96	6.28	5.44
		DS5	5.04	4.99	4.52	3.17
		US1	4.25	4.61	7.53	7.44
		US2	3.94	4.60	8.11	5.83
		MW1	3.96	4.58	7.76	5.89
		THB1	5.03	5.08	10.42	5.83
		THB2	-	4.16	4.60	4.67
		WSR45C	4.13	4.60	23.31	25.44
		WSR46	4.19	4.61	23.00	22.00
2013/8/28	Mid-Ebb	DS1	6.02	7.87	4.33	5.33
		DS2	3.46	5.64	7.46	7.56
		DS3	4.32	6.33	3.99	3.56
		DS4	4.49	6.57	3.72	4.78
		DS5	4.48	6.82	3.63	4.44
		US1	5.19	7.42	42.14	54.78
		US2	4.38	6.91	20.20	21.00
		MW1	4.13	6.11	5.29	6.33
		THB1	6.99	8.46	7.10	5.33
		THB2	-	11.13	8.23	6.33
		WSR45C	4.07	6.40	8.71	7.89
		WSR46	4.36	5.02	8.09	9.22
	Mid-Flood	DS1	6.60	6.00	4.92	4.67
		DS2	4.95	6.68	7.76	8.00
		DS3	4.42	6.51	6.91	6.00
		DS4	5.96	7.10	5.43	6.11
		DS5	7.35	7.14	4.58	4.33
		US1	5.34	6.16	3.67	3.67
		US2	4.17	5.26	7.73	13.78
		MW1	3.80	4.80	6.09	6.56
		THB1	5.77	6.64	6.88	3.17
		THB2	-	8.98	4.07	2.67
		WSR45C	3.60	5.03	17.26	14.33
		WSR46	4.02	5.12	8.13	5.22
2013/8/30	Mid-Ebb	DS1	7.02	6.63	6.25	4.50
		DS2	6.57	7.61	6.06	5.89
		DS3	3.92	6.92	4.08	6.33
		DS4	6.08	7.98	5.12	5.78
		DS5	7.53	7.63	4.55	4.67
		US1	6.96	7.01	7.88	7.83
		US2	5.75	7.07	8.22	7.50
		MW1	3.80	5.74	3.92	4.78
		THB1	8.07	8.54	12.20	8.67
		THB2	-	-	-	-
		WSR45C	3.64	6.10	5.47	7.89
		WSR46	3.86	5.94	5.30	5.56
	Mid-Flood	DS1	6.52	6.63	7.08	7.67
		DS2	7.47	7.42	7.25	7.83
		DS3	7.19	7.35	19.52	22.67

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
		DS4	6.36	7.26	7.85	8.67
		DS5	6.80	7.67	6.22	5.67
		US1	6.72	6.75	7.10	6.33
		US2	5.52	6.55	3.40	4.44
		MW1	3.36	4.83	6.72	8.33
		THB1	6.18	6.75	11.15	9.33
		THB2	-	8.02	5.83	6.67
		WSR45C	3.54	5.33	7.54	10.00
		WSR46	4.56	5.12	6.08	7.56

Notes:

1. Please refer to Table B2 below for the Action and Limit Levels for dredging activities.
2. Cell shaded yellow indicated value exceeding the Action Level criteria.
3. Cell shaded red indicated value exceeding the Limit Level criteria.
4. Only mid-depth water was sampled at Station THB2 because water depth was less than 3m.
5. Samplings during mid-ebb tide of 3 August 2013 and both mid-ebb and mid-flood tides of 1 and 14 August 2013 were not carried out due to adverse weather.
6. Sampling at THB2 was cancelled at mid-ebb tide due to adverse weather condition on 30 August 2013.

Table B2 ***Action and Limit Levels of Water Quality for Dredging, Backfilling and Capping Activities***

Parameter	Action Level	Limit Level
Dissolved Oxygen (DO) (1)	Surface and Mid-depth (2) The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for surface and middle layer = **4.32 mg L^{-1}** and Significantly less than the reference stations mean DO (at the same tide of the same day)	Surface and Mid-depth (2) The average of the impact, WSR 45C and WSR 46 station readings are **< 4 mg L^{-1}** and Significantly less than the reference stations mean DO (at the same tide of the same day)
	Bottom The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for bottom layers = **3.12 mg L^{-1}** and Significantly less than the reference stations mean DO (at the same tide of the same day)	Bottom The average of the impact station, WSR 45C and WSR 46 readings are **< 2 mg L^{-1}** and Significantly less than the reference stations mean DO (at the same tide of the same day)
Depth-averaged Suspended Solids (SS) (3) (4)	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data for depth average = **21.60 mg L^{-1}** and 120% of control station's SS at the same tide of the same day	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data for depth average = **40.10 mg L^{-1}** and 130% of control station's SS at the same tide of the same day
Depth-averaged Turbidity (Tby) (3) (4)	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data = **25.04 NTU** and 120% of control station's Tby at the same tide of the same day	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data = **56.30 NTU** and 130% of control station's Tby at the same tide of the same day

Notes:

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

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

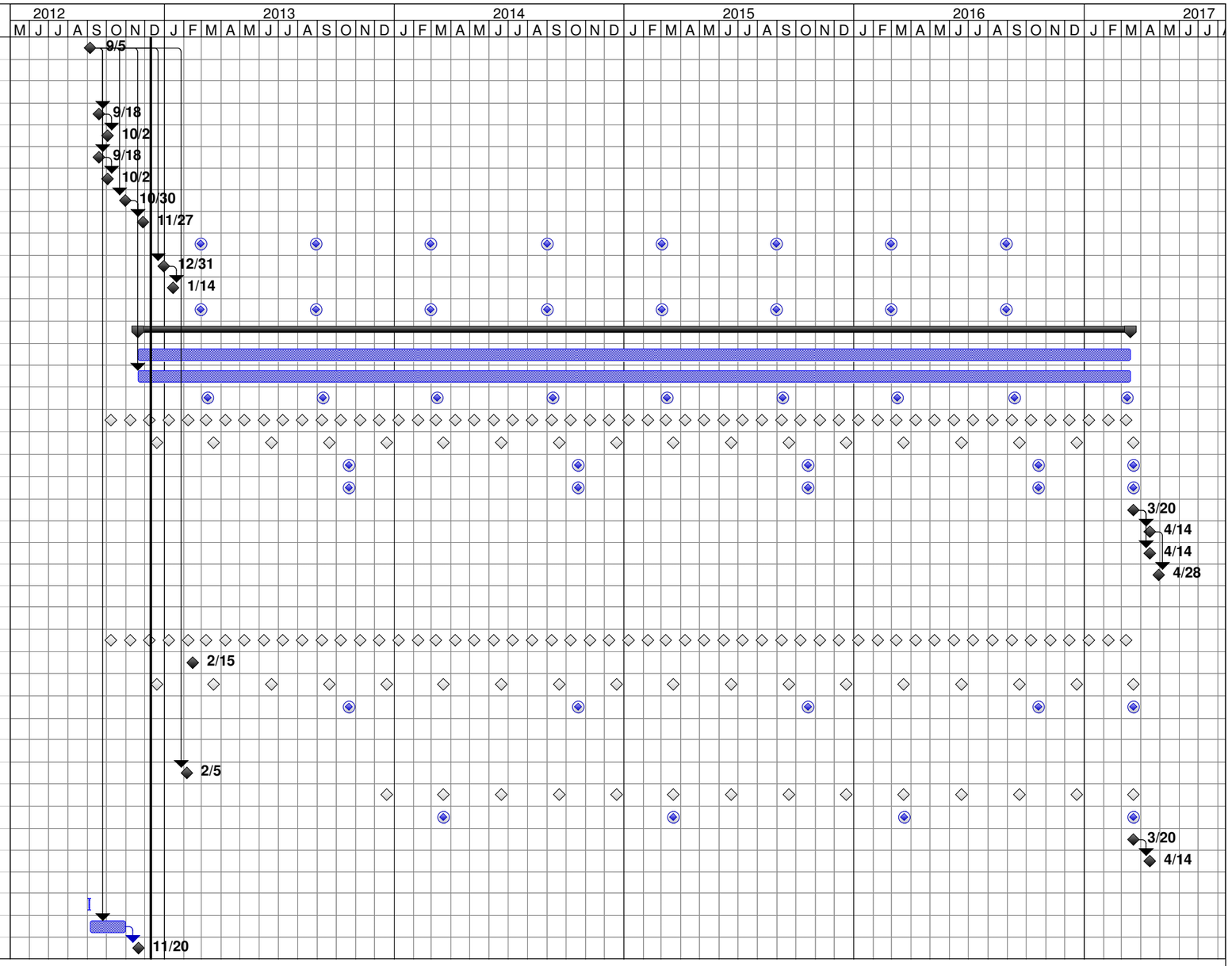
(3) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.

(4) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Annex D

Study Programme

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



Study Programme	Task	Milestone	Summary	Rolled Up Task	Rolled Up Milestone

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