環境保護署
Environmental Protection Department

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
6th Quarterly EM&A Report

Keppel Seghers
吉寶西格斯－振華聯營公司
KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

Quarterly EM&A Report No.6
(Period from 1 October to 31 December 2019)

(Clause 3.3, Further Environmental Permit FEP-01/429/2012/A)

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	Prepared by:	Certified by:	Verified by:
Name	Joe Ho	F.C Tsang	Mandy To
Position	Environmental Team Member	Environmental Team Leader	Independent Environmental Checker
Signature			
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Revision History

Rev.	DESCRIPTION OF MODIFICATION	DATE
C	Updated Appendix C&D	8 March 2024
B	Revision based on EPD & AFCD's comment	15 May 2020
A	First Submission	20 Jan 2020

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EXECUTIVE SUMMARY

A1. The Project, Integrated Waste Management Facility (IWMF), is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO) and is currently governed by a Further Environmental Permit (FEP No. FEP-01/429/2012/A) for the construction and operation of the Project.

A2. In accordance with the Updated Environmental Monitoring and Audit (EM&A) Manual for the Project, EM&A works for marine water quality, noise, waste management and ecology should be carried out by Environmental Team (ET), Acuity Sustainability Consulting Limited (ASCL), during the construction phase of the Project.

A3. This is the 6th Quarterly EM&A Report, prepared by ASCL, for the Project summarizing and concluding the monitoring results and audit findings of the EM&A programme at and around Shek Kwu Chau (SKC) during the reporting period from 1 October 2019 to 31 December 2019.

A4. The EM&A works for construction noise, water quality, construction waste, coral, marine mammal and White-Bellied Sea Eagle (WBSE) were conducted during the reporting period in accordance with the Updated EM&A Manual.

A5. Weekly site inspections of the construction works were carried out by ET to audit the mitigation measures implementation status. Monthly joint site inspections were carried out by ET and IEC.

1. BASIC PROJECT INFORMATION

1.1. The Reporting Scope

1.1.1 This is the 6th Quarterly EM&A Report for the Project which summarizes the key findings of the EM&A programme during the reporting period from 1 October 2019 to 31 December 2019.

1.2. Project Organization

1.1.2 The Project Organization structure for Construction Phase is presented in **Figure 1.1**.

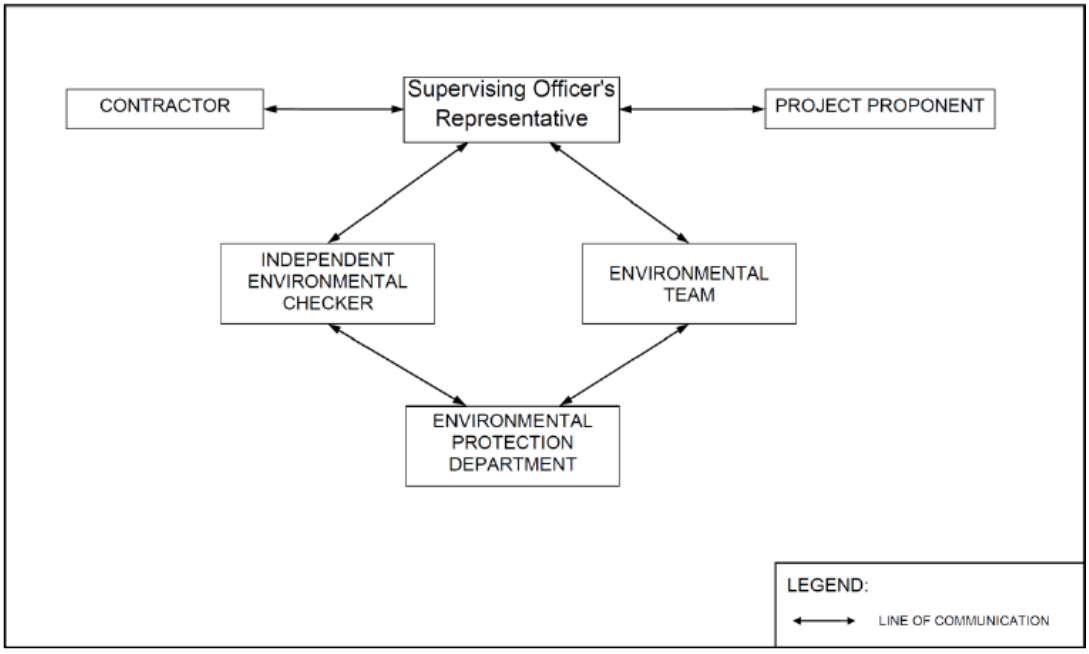


Figure 1.1 Project Organization Chart

1.1.3 Contact details of the key personnel are presented in **Table 1.1** below:

Table 1.1 Contact Details of Key Personnel

Party	Position	Name	Telephone no.
Environmental Protection Department	Project Proponent	Cheng Tak-Kuen	2594-6111
Keppel Seghers – Zhen Hua Joint Venture	Project Manager	Kenny Yu	2192-0606
Acuity Sustainability Consulting Limited	Environmental Team Leader	Robin Ho	2698-6833
		Jacky Leung	
ERM-Hong Kong, Limited	Independent Environmental Checker	Mandy To	2271-3000

1.3. Summary of Construction Works

1.1.4 Details of the major construction activities undertaken in this reporting period are shown in **Table 1.2** below. The construction programme is presented in **Appendix A**.

Table 1.2 Summary of the Construction Activities Undertaken during the Reporting Period

Location of works	Construction activities undertaken	Remarks on progress
Breakwater	• Sand blanket laying • DCM installation	• On-going • On-going
Reclamation area	• Sand blanket laying	• On-going
Seawall portion	• DCM installation • Coring for DCM cluster • Dredging • Cone penetration test • Installation of caisson	• Completed • On-going • 39,172.8842 m^3 of dredged sediment in bulk quantity was dumped at relevant dumping site in total up to 31 December 2019. • On-going • On-going

1.1.5 The status for all environmental aspects is presented in **Table 1.3**.

Table 1.3 Summary of Status for Key Environmental Aspects under the Updated EM&A Manual

Parameters	Status
Water Quality	
Baseline Monitoring under Updated EM&A Manual and Detailed Plan on DCM	The baseline water quality monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4
Impact Monitoring	On-going
Regular DCM Monitoring	On-going
Initial Intensive DCM Monitoring	Completed over 11 February 2019 to 10 March 2019, to be resumed whenever DCM related parameter exceeded the AL/LL
Baseline Water Quality of wet season	Completed over 13 August 2018 to 7 September 2018
Noise	
Baseline Monitoring	The baseline noise monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4
Impact Monitoring	On-going
Waste Management	

Parameters	Status
Mitigation Measures in Waste Monitoring Plan	On-going
Coral	
Pre-translocation Survey and Coral Mapping	The Coral Translocation Plan was submitted and approved by EPD under EP Condition 2.12
Coral Translocation	Completed on 28 March 2018
Post-Translocation Coral Monitoring	Survey obstructed due to missing of translocated and tagged coral colonies after typhoons in September 2018; the last post-translocation coral monitoring completed on 28 Mar 2019
Pre-construction Coral Survey and Tagging	Completed on 26 June 2018
Tagged Coral Monitoring	Survey obstructed due to missing of tagged coral colonies after typhoons in September 2018
Coral Survey and Re-tagging	Re-tagging at Indirect Impact Site was conducted on 23 November and Re-tagging at Control Site was conducted on 3 December 2018
Post Re-tagging Coral Monthly Monitoring	On-going
Marine Mammal	
Baseline Monitoring	The baseline marine mammal monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4
Impact Monitoring	On-going
Land-based Theodolite Tracking	30 days of theodolite surveys were started at 21 Feb 2019 and completed in May 2019
Passive Acoustic Monitoring	30 days of PAM surveys were started at 1 May 2019 and completed until the end of May 2019
White-bellied Sea Eagle	
Baseline Monitoring	The baseline WBSE monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under FEP Condition 3.4
Impact Monitoring	On-going
Environmental Audit	
Site Inspection covering Measures of Air Quality, Noise Impact, Water Quality, Waste, Ecological Quality, Fisheries, Landscape and Visual	On-going
Mitigation Measures in Marine Mammal Watching Plan (MMWP)	On-going
Mitigation Measures in Detailed Monitoring Programme on Finless Porpoise (DMPFP)	On-going
Mitigation Measures in Vessel Travel Details	On-going
Daily Site Audit and Monitoring for Dredging Work	On-going

1.1.6 Other than the EM&A works by ET, environmental briefings, trainings and regular environmental management meetings were conducted, in order to enhance environmental awareness and closely monitor the environmental performance of the contractors.

1.1.7 The EM&A programme has been implemented in accordance with the recommendations presented in the approved EIA Report and the Updated EM&A Manual. A summary of updated implementation status of the environmental mitigation measures for the construction phase of the Project during the reporting period is provided in **Appendix B**.

2. MARINE WATER QUALITY MONITORING

2.1 Water Quality Parameters

2.1.1 Measurement of Dissolved Oxygen (DO), Turbidity, Suspended Solids (SS), Salinity and pH have been undertaken at the eleven monitoring stations during general water quality monitoring. Besides the above parameters, monitoring of Total Alkalinity, Current Velocity and Current Direction have been undertaken at all fourteen monitoring stations (including S1, S2A and S3) during regular DCM monitoring.

2.1.2 Current velocity and direction, DO, temperature, salinity, turbidity and pH were measured in-situ and the SS, Total Alkalinity were assayed in a HOKLAS laboratory.

2.1.3 In associate with the water quality parameters, other relevant data were also measured, such as monitoring location/position, time, water depth, sampling depth, tidal stages, weather conditions and any special phenomena or work underway nearby were also recorded.

2.1.4 Impact water quality monitoring was conducted 3 days per week in the reporting period. All parameters were monitored during mid-flood and mid-ebb tides at three water depths for general water quality monitoring. The interval between two sets of monitoring has not been less than 36 hours.

2.1.5 **Table 2.1** summarizes the monitoring parameters, frequency and duration of the impact water quality monitoring.

Table 2.1 Water Quality Monitoring Parameters, Frequency and Duration

Parameter, unit	Frequency	No. of Depths
• Water Depth(m) • Temperature(°C) • Salinity(ppt) • pH (pH unit) • Dissolved Oxygen (DO)(mg/L and % of saturation) • Turbidity(NTU) • Suspended Solids (SS), mg/L • Total alkalinity (mg/L) • Current velocity (m/s) • Direction (in NESW)	General water quality monitoring and Regular DCM monitoring: 3 days per week, at mid-flood and mid-ebb tides	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. If the water depth is less than 3m, mid-depth sampling only. If water depth is less than 6m, mid-depth may be omitted.

2.2 Water Quality Monitoring Locations

2.2.1 Impact water quality monitoring was conducted at eleven monitoring locations during general water quality monitoring and fourteen water monitoring locations during regular DCM monitoring, as shown in **Figure 2.1**.

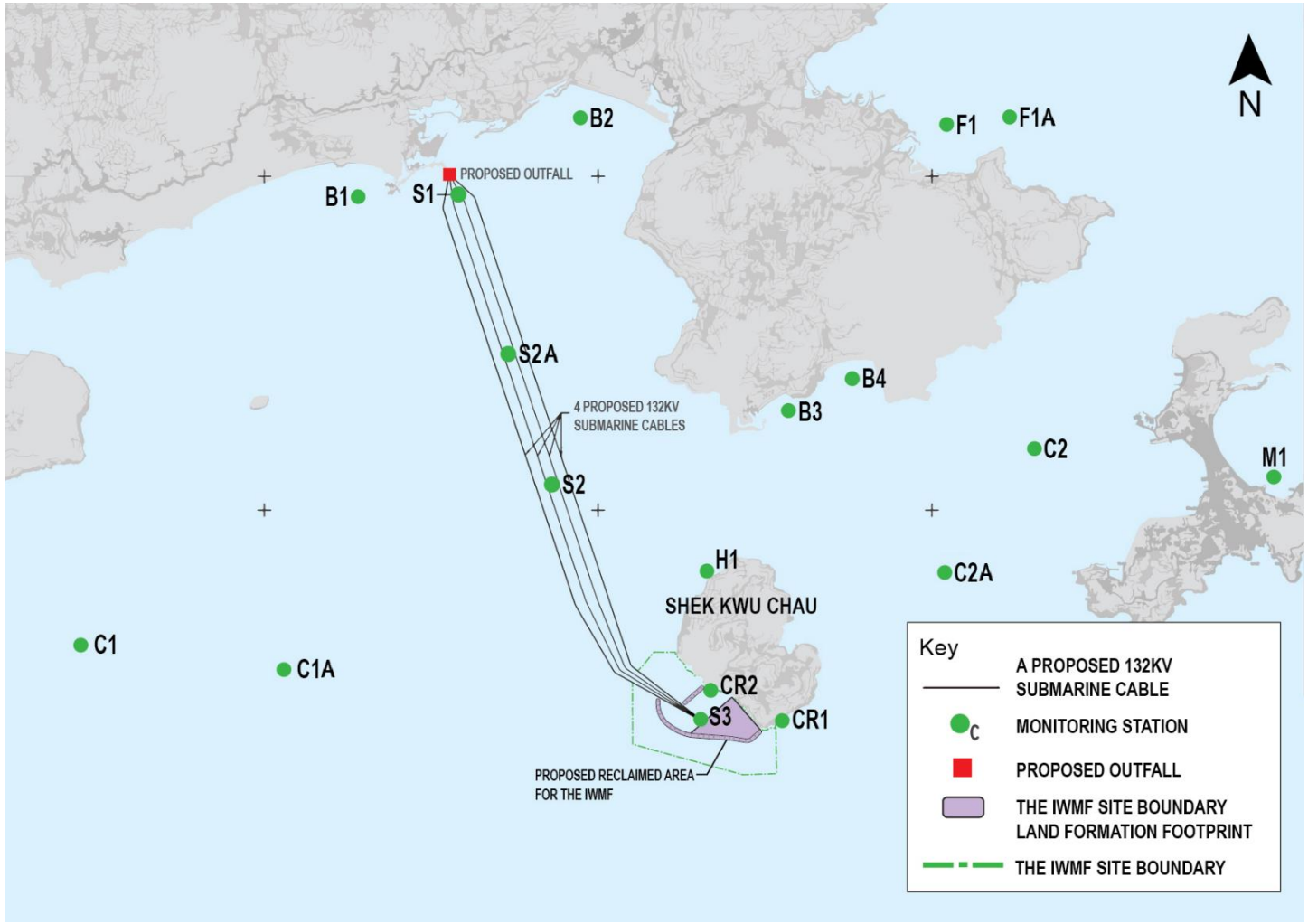


Figure 2.1 Water monitoring locations at Artificial Island near SKC

2.3 Action and Limit Levels

2.3.1 Based on the baseline monitoring data and the derivation criteria presented in the Baseline Monitoring Report, the Action/Limit Levels have been derived and are presented in **Table 2.2** and **Table 2.3** for both dry seasons (October – March) and wet seasons (April – September).

Table 2.2 Derived Action and Limit Levels for Water Quality Monitoring (Dry Season)

Parameters	Action	Limit
Construction Phase Impact Monitoring		
DO in mg/L	≤ 7.13	≤ 4
SS in mg/L	≥ 8 or 120% of control station's SS at the same tide of the same day of measurement, whichever is higher	≥ 10 or 130% of control station's SS at the same tide of the same day of measurement, whichever is higher
Turbidity in NTU	≥ 5.6 or 120% of control station's turbidity at the same tide of the same day of measurement, whichever is higher	≥ 12.81 or 130% of control station's turbidity at the same tide of the same day of measurement, whichever is higher
Temperature in°C	1.8°C above the temperature recorded at representative control station at the same tide of the same day	2°C above the temperature recorded at representative control station at the same tide of the same day
Total Alkalinity in mg/L	≥116 or 120% of control station's Total Alkalinity at the same tide of the same day of measurement, whichever is higher	≥ 118 or 130% of control station's Total Alkalinity at the same tide of the same day of measurement, whichever is higher

Notes:
i. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
ii. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
iii. For turbidity, SS and Salinity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table 2.3 Derived Action and Limit Levels for Water Quality (Wet Season)

Parameters	Action	Limit
Construction Phase Impact Monitoring		
DO in mg/L	≤ 5.28	≤ 4
SS in mg/L	≥ 12 or 120% of control station's SS at the same tide of the same day of measurement, whichever is higher	≥ 14 or 130% of control station's SS at the same tide of the same day of measurement, whichever is higher
Turbidity in NTU	≥ 4.0 or 120% of control station's turbidity at the same tide of the same	≥ 4.3 or 130% of control station's turbidity at the same tide of the same

Parameters	Action	Limit
	day of measurement, whichever is higher	day of measurement, whichever is higher
Temperature in°C	1.8°C above the temperature recorded at representative control station at the same tide of the same day	2°C above the temperature recorded at representative control station at the same tide of the same day
Total Alkalinity in mg/L	≥ 116 mg/L or 120% of representative control station at the same tide of the same day, whichever is higher	≥ 118 mg/L or 130% of representative control station at the same tide of the same day, whichever is higher

Notes:
i. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
ii. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
iii. For turbidity, SS and Salinity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

2.4 Monitoring Results and Observations

2.4.1 DCM injection works and sand blanket laying works were conducted during the reporting period, thus both general water quality monitoring at the eleven monitoring stations and general DCM monitoring including monitoring stations S1, S2A and S3 were conducted. Monitoring results of 7 key parameters: Salinity, DO, turbidity, SS, pH, temperature and total alkalinity in each month of this reporting period, are summarized in **Table 2.5**, and results trending are presented graphically in **Appendix C.**

Table 2.5 Summary of Regular DCM Impact Water Quality Monitoring Results

Locations		Parameters																							
		Salinity (ppt)			Dissolved Oxygen (mg/L)						pH			Turbidity (NTU)			Suspended Solids (mg/L)			Temp. (°C)			Total Alkalinity (mg/L) note ii		
					Surface & Middle			Bottom																		
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
B1	Avg.	28.29	30.25	30.03	6.62	7.16	7.79	6.62	7.19	7.70	8.09	7.98	8.18	3.5	3.0	3.0	8.50	7.37	7.07	28.6	26.1	22.4	112.0	113.4	113.4
	Min.	24.29	27.97	29.00	5.92	6.43	6.86	5.83	6.34	6.67	7.82	7.74	7.85	2.4	1.9	2.3	2.00	2.00	2.00	26.9	21.4	20.6	110.0	110.0	112.0
	Max.	30.40	31.88	31.64	7.45	7.96	8.63	7.45	7.96	8.55	8.38	8.42	8.73	5.2	4.0	4.2	22.00	21.00	17.00	30.5	28.4	24.7	114.0	117.0	116.0
B2	Avg.	28.28	30.21	30.04	6.62	7.12	7.76	6.56	7.15	7.77	8.08	7.98	8.17	3.5	3.0	3.0	8.76	7.27	7.66	28.6	26.1	22.4	111.9	113.4	113.4
	Min.	24.20	28.06	29.07	5.66	6.28	6.78	5.75	6.45	6.68	7.83	7.71	7.95	2.4	2.1	2.4	3.00	2.00	2.00	26.9	21.5	20.8	110.0	109.0	112.0
	Max.	30.61	31.87	31.71	7.26	7.85	8.56	7.21	7.98	8.58	8.37	8.49	8.65	5.0	4.2	4.2	28.00	19.00	19.00	30.4	28.5	24.8	114.0	117.0	116.0
B3	Avg.	28.28	30.25	30.06	6.63	7.19	7.78	6.64	7.18	7.72	8.06	7.99	8.17	3.6	3.1	3.1	9.43	7.26	8.35	28.6	26.2	22.4	111.8	113.3	113.3
	Min.	24.21	28.13	29.13	5.93	6.26	6.59	5.87	6.52	6.66	7.79	7.73	7.89	2.4	2.0	2.4	3.00	2.00	2.00	26.8	21.2	20.8	109.0	110.0	111.0
	Max.	30.47	31.94	31.93	7.45	7.97	8.79	7.42	7.95	8.60	8.35	8.47	8.71	5.5	4.2	4.1	32.00	17.00	26.00	30.0	28.4	24.6	114.0	117.0	116.0
B4	Avg.	28.28	30.26	30.05	6.63	7.18	7.74	6.63	7.16	7.78	8.09	8.00	8.18	3.5	3.1	3.0	9.54	7.37	7.68	28.6	26.2	22.4	111.9	113.3	113.5
	Min.	24.27	27.95	29.05	5.90	6.69	6.65	6.00	6.41	6.65	7.79	7.75	7.89	2.4	1.9	2.4	2.00	2.00	2.00	26.7	21.6	20.8	109.0	109.0	112.0
	Max.	30.44	31.89	31.91	7.21	8.01	8.54	7.34	7.84	8.76	8.46	8.47	8.72	5.4	4.0	4.1	36.00	19.00	18.00	30.1	28.4	24.5	114.0	117.0	116.0
C1A	Avg.	28.28	30.24	30.08	6.63	7.14	7.74	6.63	7.13	7.76	8.08	8.00	8.16	3.4	2.9	3.0	8.81	7.35	7.98	28.6	26.0	22.3	111.8	113.4	113.5
	Min.	24.35	27.82	29.02	5.82	6.22	6.63	5.95	6.40	6.83	7.75	7.71	7.88	2.4	2.0	2.3	2.00	2.00	2.00	26.0	21.1	20.5	109.0	108.0	112.0
	Max.	30.55	32.04	31.92	7.46	8.00	8.58	7.28	7.86	8.61	8.41	8.50	8.74	5.1	3.9	4.0	25.00	21.00	25.00	30.7	28.5	24.6	114.0	117.0	116.0
C2A	Avg.	28.26	30.26	30.05	6.62	7.15	7.73	6.62	7.20	7.71	8.08	7.99	8.17	3.5	2.9	3.0	8.73	7.24	7.78	28.5	26.1	22.4	111.9	113.4	113.6
	Min.	24.34	27.81	29.01	5.74	6.38	6.62	5.82	6.54	6.77	7.84	7.75	7.86	2.4	2.0	2.3	3.00	2.00	2.00	26.7	21.1	20.5	108.0	110.0	111.0
	Max.	30.57	32.05	31.91	7.39	7.88	8.59	7.49	7.92	8.52	8.37	8.54	8.69	5.6	4.2	4.1	28.00	22.00	23.00	30.7	28.4	24.6	114.0	117.0	116.0
CR1	Avg.	28.25	30.24	30.04	6.63	7.18	7.75	6.60	7.16	7.75	8.08	7.98	8.16	3.6	2.9	2.9	8.97	7.45	7.70	28.5	26.1	22.3	112.1	113.5	113.7
	Min.	24.22	27.83	29.08	5.68	6.58	6.61	5.94	6.46	6.77	7.75	7.72	7.95	2.4	1.9	2.3	2.00	2.00	2.00	26.9	21.2	20.8	108.0	110.0	112.0
	Max.	30.61	32.03	31.92	7.35	7.89	8.60	7.49	7.89	8.57	8.46	8.53	8.73	6.0	4.0	4.2	28.00	19.00	16.00	30.5	28.4	25.0	115.0	117.0	116.0
CR2	Avg.	28.26	30.25	30.06	6.61	7.12	7.77	6.62	7.14	7.69	8.09	7.99	8.15	3.8	2.9	3.0	8.97	7.42	7.47	28.6	26.2	22.4	111.9	113.5	113.9
	Min.	24.30	27.84	29.12	5.83	6.45	6.61	5.84	6.38	6.60	7.75	7.75	7.85	2.4	1.9	2.3	2.00	2.00	2.00	26.9	21.6	20.8	109.0	110.0	112.0
	Max.	30.55	32.01	31.78	7.41	7.91	8.60	7.38	7.88	8.54	8.47	8.48	8.71	6.6	4.1	4.5	25.00	22.00	18.00	30.2	28.4	25.0	114.0	117.0	120.0
F1A	Avg.	28.26	30.22	30.07	6.62	7.16	7.78	6.59	7.15	7.76	8.08	8.00	8.17	3.4	3.0	3.0	8.97	7.46	8.35	28.6	26.2	22.4	112.0	113.4	113.5
	Min.	24.20	27.79	29.02	5.68	6.35	6.73	5.72	6.31	6.66	7.77	7.73	7.90	2.3	2.1	2.3	3.00	2.00	2.00	26.9	21.6	20.8	108.0	110.0	111.0
	Max.	30.63	32.03	31.87	7.48	7.92	8.50	7.38	7.88	8.59	8.35	8.53	8.70	5.3	4.2	4.2	23.00	20.00	22.00	30.5	28.3	24.8	114.0	117.0	116.0
H1	Avg.	28.29	30.24	30.07	6.63	7.17	7.77	6.61	7.14	7.77	8.07	7.98	8.16	3.4	3.0	3.0	8.95	7.71	7.85	28.5	26.1	22.4	111.8	113.3	113.4
	Min.	24.37	27.83	29.19	5.77	6.42	6.76	5.76	6.34	6.60	7.81	7.72	7.91	2.4	2.1	2.3	2.00	2.00	2.00	26.9	21.2	20.6	109.0	110.0	111.0
	Max.	30.61	32.02	31.71	7.39	7.98	8.74	7.39	7.92	8.78	8.36	8.43	8.61	5.1	4.2	4.3	23.00	22.00	23.00	30.4	28.5	24.5	114.0	116.0	116.0

Locations		Parameters																							
		Salinity (ppt)			Dissolved Oxygen (mg/L)						pH			Turbidity (NTU)			Suspended Solids (mg/L)			Temp. (°C)			Total Alkalinity (mg/L) note ii		
					Surface & Middle			Bottom																	
		Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
M1	Avg.	28.32	30.23	30.08	6.58	7.15	7.74	6.57	7.17	7.74	8.07	8.01	8.18	3.4	2.9	2.9	9.46	7.58	7.41	28.6	26.2	22.4	111.8	113.5	113.7
	Min.	24.52	27.84	29.01	5.74	6.42	6.69	5.91	6.50	6.78	7.75	7.74	7.85	2.4	1.9	2.3	2.00	2.00	2.00	26.6	21.8	20.9	109.0	109.0	112.0
	Max.	30.63	31.94	31.84	7.32	7.91	8.51	7.37	7.73	8.43	8.46	8.50	8.73	5.3	4.1	4.1	24.00	16.00	18.00	30.5	28.4	24.9	114.0	117.0	116.0
S1	Avg.	28.28	30.27	30.09	6.66	7.17	7.70	6.71	7.14	7.71	8.09	8.00	8.19	3.4	3.0	3.0	8.56	7.26	8.35	28.6	26.1	22.4	112.0	113.3	113.6
	Min.	24.31	27.87	29.12	5.78	6.46	6.71	5.89	6.46	6.75	7.77	7.72	7.89	2.4	2.0	2.3	2.00	2.00	2.00	27.0	21.3	20.8	107.0	109.0	112.0
	Max.	30.61	31.97	31.95	7.48	7.99	8.57	7.48	7.80	8.46	8.37	8.41	8.68	5.2	4.1	4.2	22.00	18.00	22.00	30.4	28.4	24.8	114.0	117.0	116.0
S2A	Avg.	28.29	30.24	30.07	6.58	7.17	7.73	6.62	7.12	7.72	8.07	7.99	8.16	3.4	2.9	3.0	9.24	7.28	8.14	28.6	26.2	22.4	111.9	113.4	113.5
	Min.	24.21	27.80	29.02	5.76	6.44	6.64	5.91	6.35	6.72	7.80	7.73	7.86	2.3	2.0	2.3	2.00	2.00	2.00	26.9	21.4	20.8	105.0	110.0	112.0
	Max.	30.61	31.93	31.91	7.35	7.90	8.54	7.39	7.74	8.35	8.36	8.41	8.64	5.2	4.0	4.2	26.00	20.00	23.00	30.0	28.4	24.8	114.0	118.0	116.0
S3	Avg.	28.28	30.26	30.09	6.62	7.16	7.78	6.61	7.15	7.74	8.06	8.01	8.16	4.0	3.0	3.0	9.18	7.22	7.63	28.6	26.2	22.4	112.1	113.5	113.5
	Min.	24.24	27.92	29.20	5.66	6.40	6.71	5.93	6.71	6.71	7.77	7.74	7.89	2.6	1.9	2.4	2.00	2.00	2.00	26.9	21.7	20.8	108.0	110.0	111.0
	Max.	30.48	32.01	31.90	7.39	7.92	8.74	7.38	7.92	8.65	8.49	8.49	8.67	7.0	4.3	4.5	26.00	17.00	22.00	30.5	28.4	24.9	115.0	117.0	116.0

Notes:

i. "Avg", "Min" and "Max" is the average, minimum and maximum respectively of the data from measurements conducted under mid-flood and mid-ebb tides at three water depths, except that of DO where the data for "Surface & Middle" and "Bottom" are calculated separately.

ii. Total alkalinity test is only conducted on DCM working day with reference to master programme in **Appendix A**.

iii. Monitoring at S1, S2A and S3 shall only be conducted during DCM work period referring to master programme in **Appendix A**.

2.4.2 All of the monitoring results for temperature and total alkalinity obtained in the reporting period complied with their corresponding Action and Limit levels, while numbers of result for DO, turbidity and SS triggered their corresponding Action or Limit Levels, and investigations were conducted accordingly. For the salinity, pH, DO, turbidity, temperature, SS and total alkalinity, their trends were fluctuated independent to the site activities and presented in **Appendix C**.

2.4.3 No major pollution source and extreme weather which might affect the results were observed during the impact monitoring.

2.4.4 During the regular DCM impact monitoring period for October to December 2019, eighty-one (81) exceedances of the Action Level for SS were recorded and fifty-eight (58) of the monitoring results for SS obtained during the reporting period had exceeded the relevant Limit Level. Four hundreds & eighty-three (483) of the General & Regular DCM water quality monitoring results of dissolved oxygen (DO) obtained during the reporting period had exceeded Action Level. None (0) of monitoring results had exceeded the relevant Limit Level of dissolved oxygen (DO) during the reporting period. Two (2) of the General & Regular DCM water quality monitoring results of turbidity obtained during the reporting period had exceeded Action Level. None (0) of monitoring results had exceeded the relevant Limit Level of turbidity during the reporting period. Investigations were conducted, and results indicated the SS, DO and turbidity exceedances were not attributable to the Project works. Details of the exceedance are presented in **Section 8**.

2.4.5 Implemented mitigation measures minimizing the adverse impacts on water are listed in the implementation schedule given in **Appendix B**.

3. NOISE MONITORING

3.1 Noise Monitoring Parameters

3.1.1 Impact noise monitoring was conducted weekly in the reporting period between 0700-1900 hours on normal weekdays. Additional impact noise monitoring was conducted weekly in the reporting period between 1900-0700 hours on all days as well as public holidays and Sundays.

3.1.2 Construction noise level measured in terms of the A-weighted equivalent continuous sound pressure level (LAeq). Leq 30min was used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. Leq 5mins was used as the monitoring parameter for the time period between 1900 and 0700 hours as well as public holidays and Sundays. **Table 3.1** summarizes the monitoring parameters, frequency and duration of the impact noise monitoring and additional impact noise monitoring.

Table 3.1 Noise Monitoring Parameters, Time, Frequency and Duration

Monitoring Station	Time	Duration	Parameters
M1/ N_S1, M2/ N_S2, M3/ N_S3	Day time: 0700-1900 hrs (during normal weekdays)	Once per week $L_{eq\ 5min}$/$L_{eq\ 30min}$ (average of 6 consecutive $L_{eq\ 5min}$)	L_{eq}, L_{10} & L_{90}
M1/ N_S1, M2/ N_S2, M3/ N_S3	Evening time: 1900-2300 hrs (including normal weekdays, also public holidays and Sundays)	Once per week $L_{eq\ 5min}$ (3 sets of $L_{eq\ 5min}$)	L_{eq}, L_{10} & L_{90}
M1/ N_S1, M2/ N_S2, M3/ N_S3	Night time: 2300-0700 hrs (including normal weekdays, also public holidays and Sundays)	Once per week $L_{eq\ 5min}$ (3 sets of $L_{eq\ 5min}$)	L_{eq}, L_{10} & L_{90}

3.2 Noise Monitoring Locations

3.2.1 Three noise monitoring locations for impact monitoring and additional impact monitoring at the nearby sensitive receivers are shown in **Figure 3.1**

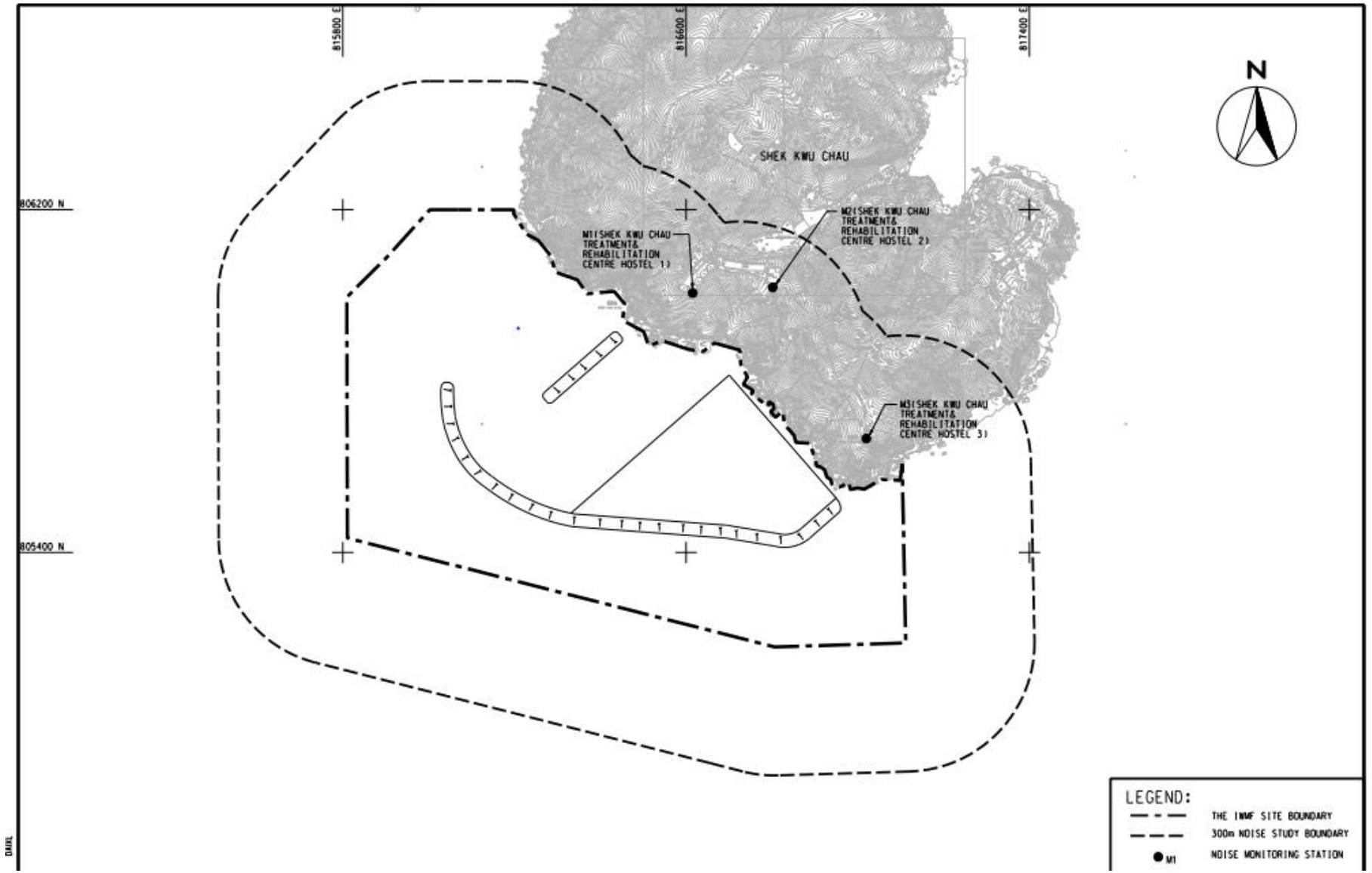


Figure 3.1 Noise monitoring locations at SKC

3.2.2 M1, M2 and M3 are Shek Kwu Chau Treatment and Rehabilitation Centre Hostel 1, 2 and 3 respectively of The Society for the Aid and Rehabilitation of Drug Abusers (SARDA) located at southern part of Shek Kwu Chau.

3.2.3 Measurements at M1 & M3 were conducted at a point 1m from the exterior of the sensitive receivers building façade and at a position 1.2m above the ground. Measurement setup at M3 has been varying with minor adjustment to minimize the disturbance to the users of Treatment Centre. Measurement at M2 was conducted at a point 1m from building façade of the ceiling of 1st floor level for avoidance of mutual disturbance with users of Treatment Centre. The minor adjustment of monitoring locations, which were in favour to mutual convenience with the users of Treatment Centre, were found with no effect on monitoring result based on on-site observation and experience from the Baseline monitoring of the Project. The noise monitoring stations are summarized in **Table 3.2** below.

Table 3.2 Noise Monitoring Location

Station	NSR ID in EIA Report	Noise Monitoring Location	Type of sensitive receiver(s)	Measurement Type
M1	N_S1	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 1	Residential	Façade
M2	N_S2	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 2	Residential	Façade
M3	N_S3	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 3	Residential	Façade

3.3 Action and Limit Levels

3.3.1 The Action/Limit Levels in line with the criteria of Practice Note for Professional Persons (ProPECC PN 2/93) "Noise from Construction Activities – Non-statutory Controls" and Technical Memorandum on Environmental Impact Assessment Process issued by HKSAR Environmental Protection Department ["EPD"] under the Environmental Impact Assessment Ordinance, Cap 499, S.16 is presented in **Table 3.3.**

Table 3.3 Action and Limit Levels for Noise per Updated EM&A Manual

Time Period	Action	Limit (dB(A))
0700-1900 hrs on normal weekdays	When one documented complaint is received	75 dB(A)

Notes: If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

3.4 Monitoring Results and Observations

3.4.1 Impact monitoring for noise impact was conducted in the reporting period. The impact noise levels at Noise Monitoring Stations at SKC (i.e. M1/ N_S1 to M3/ N_S3) are summarized in **Table 3.5**. Additional impact monitoring during restricted hours was conducted in the reporting period. The additional impact noise levels at Noise Monitoring Stations at SKC (i.e. M1/ N_S1 to M3/ N_S3) are summarized in **Table 3.6** and **Table 3.7** respectively. Trending of the noise monitoring results is presented graphically in **Appendix D**.

3.4.2 Major construction activity, major noise source and extreme weather which might affect the results were recorded during the impact monitoring.

3.4.3 According to our field observations, the major noise source identified at the designated noise monitoring station in the reporting month are summarised in **Table 3.4**. No noticeable noise source was found near the monitoring station M2.

Table 3.4 Summary of Field Observation

Monitoring Station	Major Noise Source
M1	Air-conditioning units nearby
M2	Nil
M3	Air-conditioning units nearby, dog barking

3.4.4 No data from impact monitoring during daytime has exceeded the stipulated limit level at 75 dB(A).

Table 3.5 Summary of Impact Noise Monitoring Results during Daytime (0700 – 1900 hrs)

Location	Noise in dB(A)								
	Range of $L_{eq\ 30min}$			Range of $L_{10\ 5min}$			Range of $L_{90\ 5min}$		
	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
M1	45.0 – 63.1	42.8 – 59.7	55.4 – 59.5	46.1 – 64.5	43.5 – 64.0	55.9 – 63.8	42.5 – 56.5	38.0 – 59.0	50.4 – 55.5
M2	49.8 – 62.2	41.7 – 61.8	53.4 – 58.8	49.9 – 68.0	42.5 – 64.9	53.9 – 62.8	47.1 – 57.5	37.6 – 58.8	49.8 – 57.5
M3	50.6 – 58.9	51.4 – 55.5	51.6 – 58.0	51.7 – 71.1	52.5 – 61.2	52.2 – 62.2	46.1 – 54.7	48.1 – 53.1	49.1 – 55.3

3.4.5 Applicable mitigation measures for construction works are fully implemented as shown in **Appendix B**, where double-glazed windows and air conditioning system were also installed and confirmed operable for the NSRs (N_S1, N_S2 & N_S3).

3.4.6 During the noise monitoring event, frontline staff of ET have inquired the treatment centre users on any noise disturbance from the construction activities at evening and night time, where no complaint and adverse opinions was received.

3.4.7 Data from impact monitoring during evening time and night time were compared with the NCO criteria. Where site inspection and auditing on Contractor's record have shown that the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority for construction works during restricted hours were followed. No inappropriate practice were spotted during evening time and night time construction works, thus the stipulated requirement on noise impact control during night time and evening time was achieved.

Table 3.6 Summary of the Additional Impact Noise Monitoring Results during Evening Time (1900-2300 hrs)

Location	Noise in dB(A)								
	Range of $L_{eq\ 5min}$			Range of $L_{10\ 5min}$			Range of $L_{90\ 5min}$		
	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
M1	46.0 – 58.7	38.5 – 58.9	51.1 – 59.6	47.4 – 61.1	39.2 – 62.2	51.8 – 61.2	44.7 – 55.1	37.5 – 57.7	50.4 – 57.7
M2	47.5 – 59.9	40.9 – 65.1	51.4 – 58.1	48.7 – 63.8	43.8 – 69.2	52.5 – 58.6	45.8 – 55.9	36.9 – 59.9	50.4 – 56.5
M3	47.4 – 57.0	48.5 – 55.4	50.9 – 59.6	48.9 – 59.2	50.1 – 57.5	52.6 – 61.7	44.7 – 53.3	46.4 – 52.2	48.9 – 57.7

Table 3.7 Summary of Additional Impact Noise Monitoring Results during Night Time (2300 – 0700 hrs)

Location	Noise in dB(A)								
	Range of $L_{eq\ 5min}$			Range of $L_{10\ 5min}$			Range of $L_{90\ 5min}$		
	Oct	Nov	Dec	Oct	Nov	Dec	Oct	Nov	Dec
M1	43.9 – 57.5	39.5 – 49.2	47.3 – 57.3	44.4 – 59.2	40.7 – 50.7	48.2 – 58.5	43.1 – 54.2	37.0 – 47.8	46.5 – 56.4
M2	47.9 – 60.1	39.0 – 60.9	49.1 – 60.1	48.8 – 62.9	40.1 – 69.0	50.0 – 61.1	45.4 – 56.6	37.8 – 54.9	47.3 – 59.4
M3	44.2 – 55.9	46.8 – 53.0	45.6 – 54.2	44.9 – 57.8	47.9 – 54.9	46.5 – 55.7	43.1 – 53.2	45.1 – 51.0	45.0 – 52.6

4. WASTE

4.1 The waste generated from this Project includes inert construction and demolition (C&D) materials, and non-inert C&D materials. Non-inert C&D materials are made up of general refuse, vegetative wastes and recyclable wastes such as plastics and paper/cardboard packaging waste. Steel materials generated from the project are also grouped into non-inert C&D materials as the materials were not disposed of with other inert C&D materials.

4.2 As advised by the Contractor, for C&D waste, no metals were generated and collected by registered recycling collector. 0 tonnes of paper was generated on site and collected by registered recycling collector. No plastic waste was collected by registered recycling collector. 0 L of chemical waste was collected by licensed chemical waste collector. 110.5 m^3 of other types of wastes (e.g. general refuse) were generated on site and disposed of at Landfill. 102,543.2 m^3 of fill sand and 53,481.2 m^3 of fill rock were imported during the reporting period.

4.3 3,132 m3 of dredged sediment in bulk quantity was dumped according to its dumping permit (EP/MD/20-051) during the reporting period.

4.4 Chemical waste generated from the cleaning of oil stain and leakage on deck of barges was stored in the chemical waste storage area on the barges.

4.5 With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting period are summarised in **Table 4.1**. Details of cumulative waste management data are presented as a waste flow table in **Appendix E**.

Table 4.1 Quantities of Waste Generated from the Project

Reporting Month	**Actual Quantities of Inert C&D Materials Generated Monthly**								**Actual Quantities of C&D Wastes Generated Monthly**					
	Total Quantity Generated	Hard Rock and Large Broken Concrete (see Note 1)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill			Metals	Paper / cardboard packaging	Plastics (see Note 2)	Chemical Waste		Others, e.g. general refuse (see Note 3)
						Sand	Public Fill	Rock						
	(in ,000m^3)	(in ,000m^3)	(in ,000m^3)	(in ,000m^3)	(in ,000m^3)	(in ,000m^3)			(in ,000kg)	(in ,000kg)	(in ,000kg)	(in ,000kg)	(in ,000L)	(in ,000m^3)
Oct 2019	0	0	0	0	0	9.8875	0	7.19	0	0	0	0	0	0
Nov 2019	0	0	0	0	0	38.3088	0	19.3105	0	0	0	0	0	0.0195
Dec 2019	0	0	0	0	0	54.3469	0	26.9807	0	0	0	0	0	0.091

Notes:

1. Broken concrete for recycling into aggregates.
2. Plastic refer to plastic bottles / containers, plastic sheets / foam from packaging materials.
3. Use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m^3 by volume.

4.6 Although there is not much waste generation in the reporting period from the Project, the Contractor is reminded to sort and store any solid and liquid waste on-site properly prior to disposal.

5. CORAL

5.1 Coral Monitoring Parameters

5.1.1 Ten (10) tagged coral colonies at each site of suggested control site and indirect impact site are being monitored weekly for the first month and followed by monthly monitoring for three months. The selected Control Site is located at Yuen Kong Chau of Soko Islands about 7 km away from the project area. After the hitting of super typhoon Mangkhut in mid-September 2018, the coral re-tagging activities at indirect impact site and control site were conducted in November and December 2018 respectively. Tagged coral colonies at the proposed recipient site are being monitored quarterly for one year and the last post-translocation coral monitoring was completed on 28 Mar 2019. The selected recipient site R3 is located the opposite side of the Project area at about 2 km away.

5.1.2 Monitoring recorded the following parameters (using the same methodology adopted during the pre-translocation survey); the size, presence, health conditions (percentage of mortality/bleaching) and percentage of sediment of each trans-located coral colony. The general environmental conditions including weather, sea, and tidal conditions of survey sites were monitored.

5.1.3 Health status of coral was assessed by the following criteria:
Hard coral: Percentage of surface area exhibiting partial mortality and blanched/bleached area of each coral colony and degree of sedimentation.

5.2 Coral Monitoring Locations

Location of the ten tagged coral colonies at each of the proposed indirect impact site, control site, the recipient site R3 and REA transect at proposed indirect impact site are shown in **Figure 5.1**, **Figure 5.2** and **Figure 5.3** respectively:

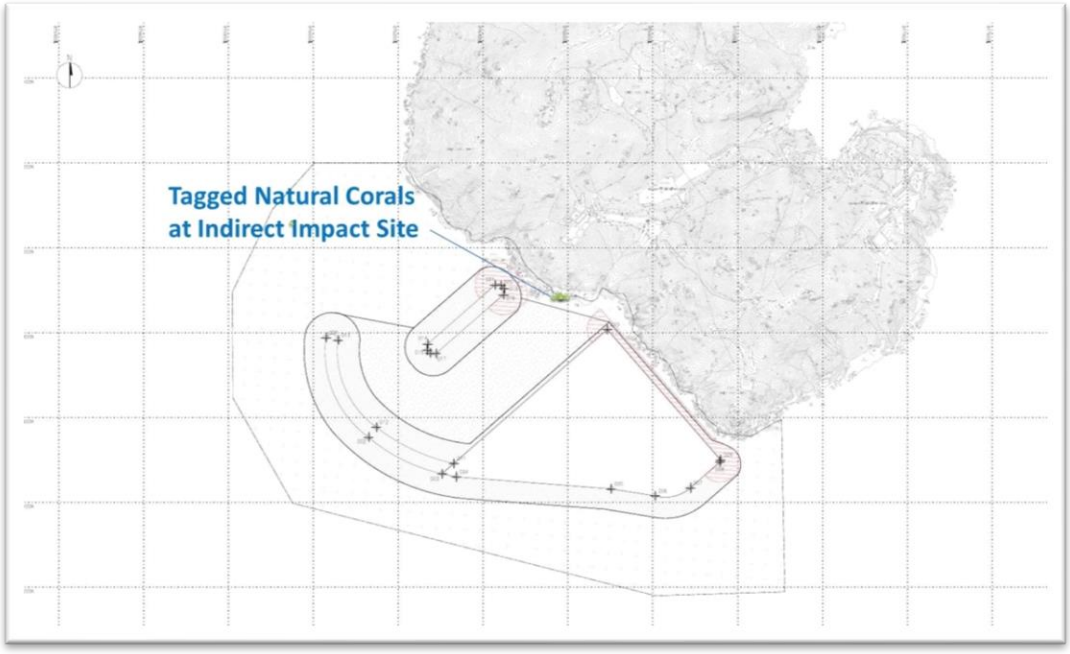


Figure 5.1 Tagged Natural Corals at Indirect Impact Site Near SKC for re-tagging after typhoon Mangkhut

Figure 5.2 Tagged Natural Corals at Control Site Near Yuen Kong Chau for re-tagging after typhoon Mangkhut

Figure 5.3 Tagged Translocation Corals at Recipient Site R3 near SKC

5.2.1 The GPS coordinates of the tagged coral colonies and retagged coral colonies at both indirect impact site, control site and recipient site R3 were shown in **Table 5.1**, **Table 5.2** and **Table 5.3** respectively.

Table 5.1 Tagged Natural Corals during Baseline and Re-tagged Natural Corals after Typhoon Manghkut at Control Site near Yuen Long Chau

Coral # note i	GPS Coordinates	
1	N22°09'45.96"	E113°54'57.81"
2R	N22°11'29.12"	E113°59'09.01"
3	N22°09'45.81"	E113°54'57.78"
4	N22°09'45.70"	E113°54'57.95"
5R	N22°11'29.10"	E113°59'09.18"
6	N22°09'45.75"	E113°54'58.02"
7R	N22°11'29.17"	E113°59'08.86"
7	N22°09'45.65"	E113°54'57.94"
8	N22°09'45.53"	E113°54'57.90"
9	N22°09'46.23"	E113°54'54.70"
10R	N22°11'29.18"	E113°59'08.91"

Notes:

i. The re-tagged corals were marked as ##**R**.

Table 5.2 Re-tagged Natural Corals after Typhoon Manghkut at Indirect Impact Site near SKC

Coral # note i	GPS Coordinates	
11R	N22°11'29.14"	E113°59'08.92"
12R	N22°11'29.12"	E113°59'09.01"
13R	N22°11'29.11"	E113°59'09.07"
14R	N22°11'29.13"	E113°59'09.12"
15R	N22°11'29.10"	E113°59'09.18"
16R	N22°11'29.07"	E113°59'09.23"
17R	N22°11'29.17"	E113°59'08.86"
18R	N22°11'29.14"	E113°59'08.94"
19R	N22°11'29.20"	E113°59'08.81"
20R	N22°11'29.18"	E113°59'08.91"

Notes:

i. The re-tagged corals were marked as ##**R**.

Table 5.3 GPS Coordinates of Recipient Site R3

Site	GPS Coordinates	
R3	N22°11'43.69"	E113°28.99"

5.3 Action and Limit Levels

5.3.1 Monitoring result was reviewed and compared against the below Action Level and Limit Level (AL/LL) as set with the below **Table 5.4** and **Table 5.5**.

Table 5.4 Action and Limit Levels for Construction Phase Coral Monitoring

Parameter	Action Level	Limit Level
Mortality	If during Impact Monitoring a 15% increase in the percentage of partial mortality on the corals occurs at more than 20% of the tagged indirect impact site coral colonies that is not recorded on the tagged corals at the control site, then the Action Level is exceeded.	If during Impact Monitoring a 25% increase in the percentage of partial mortality on the corals occurs at more than 20% of the tagged indirect impact site coral colonies that is not recorded on the tagged corals at the control site, then the Limit Level is exceeded.

Table 5.5 Action and Limit Levels for Post-Translocation Coral Monitoring

Parameter	Action Level	Limit Level
Mortality	If during Post-Translocation Monitoring a 15% increase in the percentage of partial mortality on the corals occurs at more than 20% of the translocated coral colonies that is not recorded on the original corals in the recipient site, then the Action Level is exceeded.	If during Post-Translocation Monitoring a 25% increase in the percentage of partial mortality on the corals occurs at more than 20% of the translocated coral colonies that is not recorded on the original corals in the recipient site, then the Limit Level is exceeded.

5.4 Monitoring Results and Observations

5.4.1 Ten (10) hard coral colonies were monitored at each site of Control and Indirect Impact sites as suggested in the Construction Phase Monitoring Plan. The general health conditions (size, mortality, bleaching and sediment) were recorded and summarized in **Table 5.7** and **Table 5.8**. Photos of each tagged coral colonies were taken during the monitoring activities and shown in **Appendix F.**

5.4.2 The 4th quarterly coral monitoring during construction phase at both Indirect Impact Site and Control Site was conducted on 04 Dec 2019 and the weather condition was summarized in **Table 5.6**.

Table 5.6 Weather Condition for the 4th Quarterly Coral Monitoring during Construction Phase at both Indirect Impact Site and Control Site

Date	Condition	Average Underwater Visibility
04 Dec 2019	- North wind force 3 - Sunny period	Less than 0.5m

Table 5.7 Sizes, Condition, Mortality, Bleaching and Sediment of 10 Natural Coral Colonies at Control Site of 4th Quarterly Coral Monitoring (04 Dec 2019) during 16th to 18th Months Construction Phase Monitoring

Coral #	Species	Size (cm) – Max. Diameter	Condition	Mortality (%)		Bleaching (%)		Sediment (%)	
				Baseline (26 Jun 2018 & 3 Dec 2018)	04 Dec 2019	Baseline (26 Jun 2018 & 3 Dec 2018)	04 Dec 2019	Baseline (26 Jun 2018 & 3 Dec 2018)	04 Dec 2019
1	*Goniopora stutchburyi*	25	Fair	0	0	0	0	0	0
2R	*Goniopora stutchburyi*	10	Good	0	0	0	0	0	0
3	*Psammocora superficialis*	18	Fair	0	0	0	0	0	0
4	*Turbinaria peltata*	13	Good	0	0	0	0	0	0
5R	*Goniopora stutchburyi*	18	Good	0	0	0	0	0	0
6	*Cyphastrea serailia*	43	Fair	0	0	0	0	0	0
7R	*Coscinaraea* sp.	15	Good	0	0	0	0	0	0
8	*Goniopora stutchburyi*	21	Good	0	0	0	0	0	0
9	*Goniopora stutchburyi*	11	Fair	0	0	0	0	0	0
10R	*Goniopora stutchburyi*	20	Good	0	0	0	0	0	0

Notes:

i. The re-tagged corals were marked as ##R.

Table 5.8 Sizes, Condition, Mortality, Bleaching and Sediment of 10 Natural Coral Colonies at Indirect Impact Site of 4th Quarterly Coral Monitoring (04 Dec 2019) during 16th to 18th Months Construction Phase Monitoring

Coral #	Species	Size (cm) – Max. Diameter	Condition	Mortality (%)		Bleaching (%)		Sediment (%)	
				Baseline (23 Nov 2018)	04 Dec 2019	Baseline (23 Nov 2018)	04 Dec 2019	Baseline (23 Nov 2018)	04 Dec 2019
11R	*Cyphastrea serailia*	48	Good	0	0	0	0	0	0
12R	*Favites chinensis*	27	Good	0	0	0	0	0	0
13R	*Turbinaria peltata*	21	Good	0	0	0	0	0	0
14R	*Favites chinensis*	8	Good	0	0	0	0	0	0
15R	*Goniopora stutchburyi*	11	Good	0	0	0	0	0	0
16R	*Psammocora superficialis*	27	Good	0	0	0	0	0	0
17R	*Favites chinensis*	15	Good	0	0	0	0	0	0
18R	*Psammocora superficialis*	39	Good	0	0	0	0	0	0
19R	*Psammocora superficialis*	42	Good	0	0	0	0	0	0
20R	*Psammocora superficialis*	29	Good	0	0	0	0	0	0

Notes:

i. The re-tagged corals were marked as ##R.

5.4.3 The re-tagging activity had been done at both Indirect Impact Site and Control Site on November 2018 and December 2018 respectively. A total of 20 tagged coral colonies (10 at control site and 10 at indirect impact site including the re-tagged coral colonies) were monitored. Similar to the baseline results performed in June, November and December 2018 and the results of the previous three quarterly coral monitoring during construction phase, the health condition of all tagged and re-tagged coral colonies at Indirect Impact Site and Control site were good in general. No increased mortality was recorded during the survey in December 2019.

5.4.4 No sediment, bleaching or increased mortality in the general condition of coral colonies were observed during the 4th quarterly coral monitoring period. No deterioration of the coral community was observed in the ecological monitoring results when compared with the baseline ecological monitoring results. There is no AL/LL exceedance during the monitoring period. Photos of each tagged corals colonies were taken and shown in **Appendix F**.

6. MARINE MAMMAL

6.1 Survey Methods

6.1.1 Vessel-based Line-transect Survey

For the vessel-based marine mammal surveys, the monitoring team adopted the standard line-transect method (Buckland et al. 2001) as same as that adopted during the EIA study and pre-construction phase monitoring to allow fair comparison of marine mammal monitoring results.

Eight transect lines are set at Southeast Lantau survey area, including Shek Kwu Chau, waters between Shek Kwu Chau and the Soko Islands, inshore waters of Lantau Island (e.g. Pui O Wan) as well as southwest corner of Cheung Chau as shown in **Figure 6.1** below:

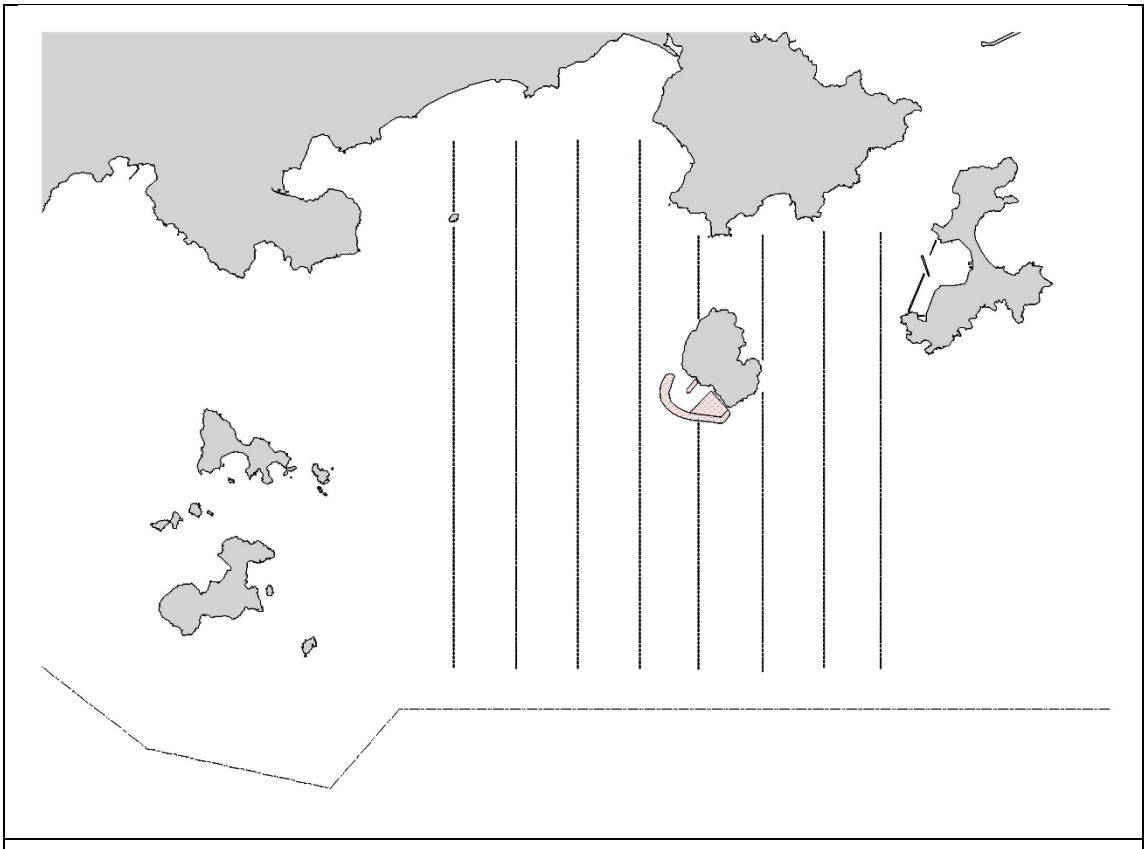


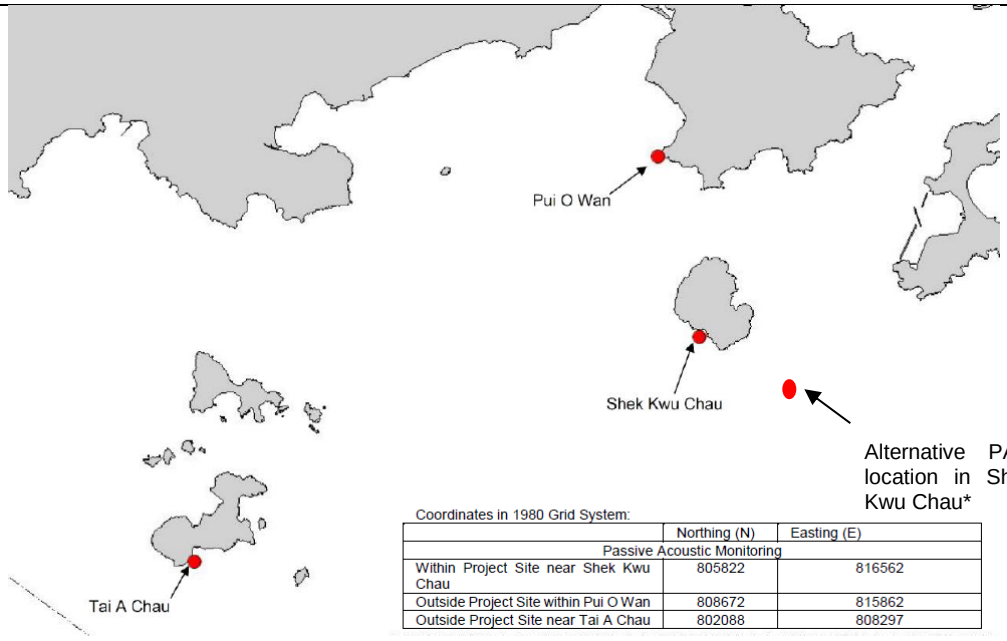
Figure 6.1 Line Transects for Marine Mammal Surveys

In comparison to the baseline monitoring results, results from the analyzed construction phase monitoring data would allow the detection of any changes of their usage of habitat, in response to the scheduled construction works.

6.1.2 Passive Acoustic Monitoring (PAM)

The PAM aims to study the usage of an area by Finless Porpoise by using an array of automated static porpoise detectors (e.g. C-POD) which would be deployed at different locations to detect the unique ultra-high frequency sounds produced by Finless Porpoise. During the construction period, the PAM survey will be conducted including placement of two passive porpoise detectors outside the Project Area as control site (i.e.

within Pui O Wan and to the south of Tai A Chau) and one porpoise detector within the Project Area (i.e. near Shek Kwu Chau) as shown in **Figure 6.2** below.



Coordinates in 1980 Grid System:

	Northing (N)	Easting (E)
Passive Acoustic Monitoring		
Within Project Site near Shek Kwu Chau	805822	816562
Outside Project Site within Pui O Wan	808672	815862
Outside Project Site near Tai A Chau	802088	808297

Note*: The alternative PAM device adjacent to the Project site was deployed from 5 Mar to 11 Apr 2019, which contained a full 37 days acoustic monitoring data set. After the confirmation of loss of the original PAM within the Project site, this data set was proposed to replace that of the original one, as consulted with AFCD accordingly.

Figure 6.2 Locations of Passive Acoustic Monitoring

These three detectors will be deployed on-site to carry out 24-hours monitoring for a period listed as **Table 6.2** below during the construction phase.

Table 6.2 PAM Deployment Period

Season	Months	Deployment Period
Peak Season	December, January, February, March, April or May	At least 30 days during the peak months of porpoise occurrence in South Lantau waters

6.1.2.1 The automated static porpoise detectors shall detect the presence and number of finless porpoise and Chinese White Dolphins respectively over the deployment period, with the false signal such as boat sonar and sediment transport noise distinguished and filtered out. The detectors shall be deployed and retrieved by professional dive team on the seabed of the three selected location shown in **Figure 6.2**. During each deployment, the C-POD unit serial numbers as well as the time and date of deployments shall be recorded. Information including the GPS positions and water depth at each of the deployment locations shall also be obtained.

6.1.2.2 The diel patterns (i.e. 24-hour activity pattern) of finless porpoise occurrence among the three sites at Shek Kwu Chau, Tai A Chau and Pui O Wan shall be analyzed. Peaks and troughs of finless porpoise occurrence per hour of day would be identified and compared with the results obtained from pre-construction monitoring.

6.1.3 Land-based Theodolite Tracking

6.1.3.1 The Land-based Theodolite Tracking study would use the same station as in the AFCD monitoring study(same as the baseline monitoring location), which is situated

at the southwest side of Shek Kwu Chau (GPS position: 22°11.47' N and 113°59.33' E) as shown in below **Figure 6.3**. The station was selected based on its height above sea level (at least 20 metres), close proximity to shore, and relatively unobstructed views of the entire Project Area to the southwest of Shek Kwu Chau. The height of the Shek Kwu Chau Station established by the HKCRP team is 74.6 m high at mean low water, and only a few hundred metres to the IWMF reclamation site, which is ideal for the purpose for the present behavioural and movement monitoring of finless porpoises as well during construction phase considering there as an un-obstructed vantage point at a height above the Project Site.

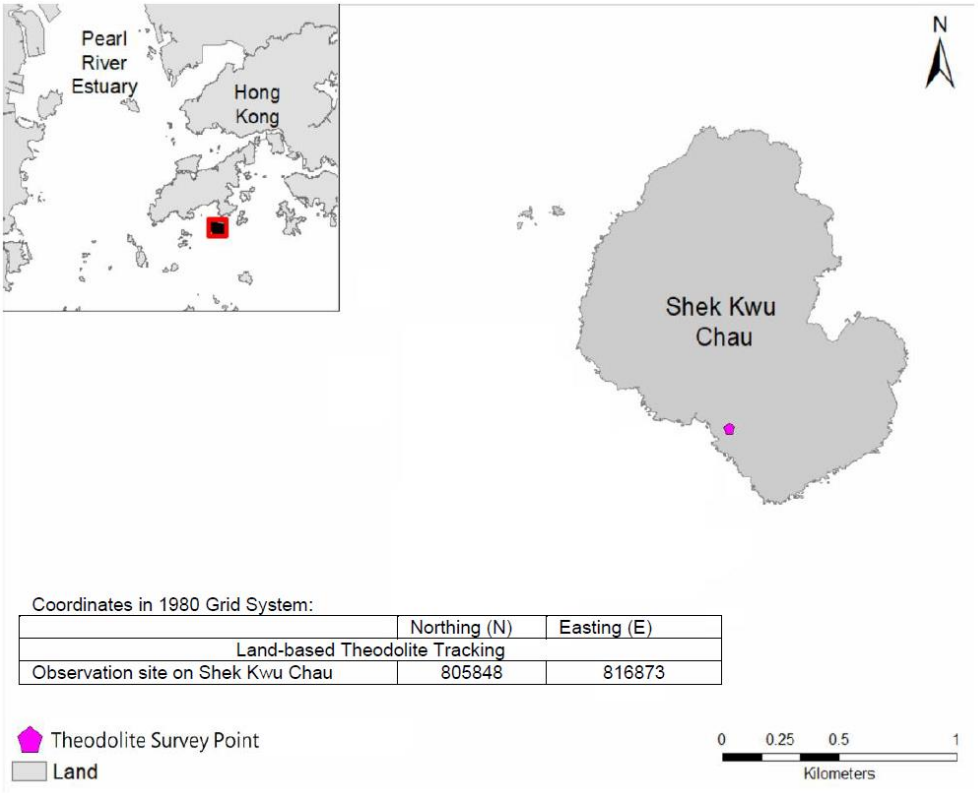


Figure 6.3 Locations of Land-based Theodolite Tracking

6.1.3.2 During the construction phase, Land-based Theodolite Tracking will be carried out for approximately six hours of tracking for each day of field work for a period listed as Table 6.3 below, preferably at the initial stage of the construction period (i.e. December 2018 to May 2019).

Table 6.3 Land-based Theodolite Tracking Survey Period

Season	Months	Survey Period
Peak Season	December, January, February, March, April or May	30 days during the peak months of porpoise occurrence in South Lantau waters

6.1.3.3 The monitoring period for land-based theodolite tracking will be proposed to be overlapped with the PAM. The monitoring team consists of one experienced theodolite operator and at least two field observers for assistance. To conduct theodolite tracking, the observers will search systematically for Finless Porpoise using the unaided eye and 7 x 50 handheld binoculars on each survey day throughout the study area. When an individual or group of porpoises is located, a theodolite

tracking session will be initiated and focal follow methods will be used to track the porpoise(s). Behavioural state data (i.e. resting, milling, travelling, feeding and socializing) shall also be recorded every 5 minutes for the focal individual or group. Positions of porpoises and boats shall be measured using a digital theodolite connected to a laptop computer. This tracking survey will be conducted during the peak season between December 2018 and May 2019 for 30 surveys spanning across 15-16 weeks during the peak season to provide good temporal coverage during the initial stage of the construction period.

6.2 Specific Mitigation Measures

6.2.1 Monitored exclusion zones

During the installation/re-installation/relocation process of floating type silt curtains, in order to avoid the accidental entrance and entrapment of marine mammals within the silt curtains, a monitored exclusion zone of 250 m radius from silt curtain should be implemented and monitored by competent Marine Mammal Observers (MMOs). Marine Mammal Exclusion Zone (MMEZ) would also be implemented for precautionary purpose for DCM works.

6.2.2 Marine mammal watching plan

Upon the completion of silt curtain installation/re-installation/relocation, marine mammal watching plan would be implemented to observe the presence of any marine mammal around the localized silt curtain or being trapped by the localized silt curtain.

6.3 Results and Observations

6.3.1 Vessel-based Line-transect Survey

6.3.1.1 Four monthly surveys were conducted during the reporting period. As this is covering designated off-peak season (June – November) and designated peak season (December – May), one survey was completed in October 2019 and November 2019 while two surveys were completed in December 2019. A total on effort (transects only) survey length of 164.5 km was completed, 98.1 km at Beaufort Sea State 2 or better (**Table 6.4**). Two sightings were recorded during the reporting period.

Table 6.4 Summary of Vessel-based Line-transect Survey Effort

Date	Area*	Beaufort	Effort (km)	Season	Vessel	Effort Type**
10 Oct 2019	SEL	1	5.0	AUTUMN	SMRUHK	P
		2	22.3			
		3	12.3			
07 Nov 2019	SEL	2	30.7	WINTER	SMRUHK	P
		3	11.0			
05 Dec 2019	SEL	1	2.6	WINTER	SMRUHK	P
		2	12.0			
		3	24.1			
		4	2.9			
23 Dec 2019	SEL	1	7.6	WINTER	SMRUHK	P
		2	17.9			
		3	16.1			

* As shown in **Figure. 6.1**
** P (from AFCD) denotes the ON EFFORT survey on the transect line, not the adjoining passages

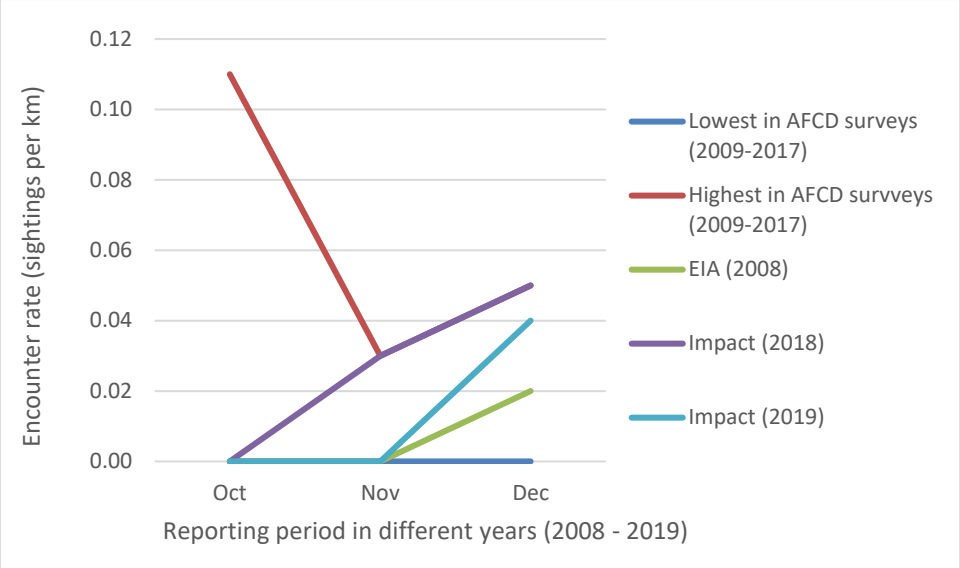


Figure 6.4 Plot of encounter rate during October to December in 2008 – 2019 from different surveys

6.3.1.2 A review of the long term AFCD marine mammal monitoring programme, the EIA and the pre-construction baseline monitoring report for this project was conducted. Both the EIA and the pre-construction baseline monitoring were conducted during the peak porpoise months Dec 2008 to May 2009 and Feb to April 2018, respectively. The AFCD long term monitoring data and impact monitoring in 2018 should be compared directly to Impact Survey results of the reporting periods.

6.3.1.3 A review of the Beaufort Sea state survey conditions between 2009 and 2018 (only data available from AFCD at time of writing; (AFCD 2018; 2017; 2016; 2015; 2014; 2013; 2012; 2011; 2010)) shows that survey conditions in October to December 2019 were within the % limits of previous AFCD surveys, similar to impact monitoring surveys conducted in 2018.

6.3.1.4 A review of all the porpoise sightings in the survey area for October to December between 2009-2018 indicates that there is few sightings usually recorded in October to December. Given the similar survey conditions and the encounter rate recorded for porpoise in the project area during the reporting period, the encounter rate for October to December 2019 was 0, 0, 0.04 km^{-1} respectively (see **Figure 6.4**), it is noted that the encounter rate of impact survey is low when compared to other years. It is noted that the reporting period was covering between both non-peak and peak season and that works at IWMF are increasing, both which may impact encounter rates. It is also noted that the impact survey focuses on a relatively small populations of highly mobile individuals and the survey area conducted for this monitoring is very small. For October to December 2019, there was only recorded sightings in December 2019, as was similar to the case in 2018 impact monitoring conducted by ET and some of long-term monitoring data conducted by AFCD.

6.3.1.5 Data and records of the implemented mitigation measures, including construction vessel routing and speed control, marine mammal watching plan and avoidance of noisy work during the peak season, are collected form the Contractor and now under detail review. As surveys continue for this project, data shall be constantly re-evaluated across survey months to discern trends and impacts, if any.

6.3.2 PAM and Land-based Theodolite Tracking

6.3.2.1 30 days of PAM surveys were started at 1 May 2019 and completed until the end of May 2019. Multiple PAM systems were deployed at three sites. The PAM system located at the IWMF was lost, however, an alternative data set has been identified. The PAM systems at the two control sites Tai A Chau and Pui O were recovered on 3 August 2019. A summary of marine mammal detections (see **Table 6.5**) shows that porpoise were recorded every day of deployment at each site, but at varying frequencies. A summary of marine mammal detections shows that porpoise were recorded every day of deployment at each site, but at varying frequencies. The detailed theodolite result was presented in 5th Quarterly EM&A report and 17th Monthly EM&A report while detailed PAM report was presented in **Appendix J**.

6.3.2.2 For the baseline study, the DPM for each site was 11,160 (Shek Kwu Chau), 16,089 (Tai A Chau) and 3645 (Pui O Wan), totalling 30,894 DPM across all three sites, compared to DPMs of 4740 (Shek Kwu Chau), 7725 (Tai A Chau) and 23,986 (Pui O Wan), totalling 36,451 DPM, for the impact phase study. As the impact phase study was longer than the baseline study, it is not appropriate to directly compare total counts of DPM, however, the DPM rate (the average number of detections per day) for each site can be more directly compared. During the baseline study, Shek Kwu Chau averaged 338.2 DPM per day compared to 124.8 DPM per day, during the impact phase study. This showed a decrease in the daily average of porpoise detection at Shek Kwu Chau. During the baseline study, Tai A Chau averaged 487.6 DPM per day compared to 179.7 DPM per day, during the impact phase study. This showed a decrease in the daily average of porpoise detection at Tai A Chau. During the baseline study, Pui O Wan averaged 98.5 DPM per day compared to 557.8 DPM per day, during the impact phase study. This showed a significant increase in the daily average of porpoise detections at Pui O Wan (**Table 6.5**).

6.3.2.3 Overall, the PAM study showed that porpoise continue to consistently utilise the Shek Kwu Chau habitat immediately adjacent to the IWMF construction activities, although to a lesser degree than that prior to construction activities. In addition, the Pui O Wan site, which is 2.5 km away from the IWMF construction area, was also consistently utilised during the impact phase PAM study. A continued assessment of fine scale habitat use, particularly through PAM which yields large quantities of data, would allow a more comprehensive assessment of the EIA predictions.

Table 6.5 Summary Statistic Comparison of Baseline (2018) and Impact Phase (2019) Passive Acoustic Monitoring

Baseline data									
Site	**Unit ID**	**Start**	**End**	**Days**	**DPD % Days**	**Total DPM**	**DPM /Day**	**% False Positive DPM**	**Time Lost %**
Shek Kwu Chau	2891	2018/02/09	2018/03/13	32.11	100	11160	338.2	0.0	1.00
Tai A Chau	2868	2018/02/09	2018/03/13	32.5	100	16089	487.6	1.0	2.00
Pui O Wan	2891	2018/03/13	2018/04/17	34.85	97.3	3645	98.5	2.0	31.87
Total				99.01		30894	312.0		
Impact Phase									
Site	**Unit ID**	**Start**	**End**	**Days**	**DPD % Days**	**Total DPM**	**DPM /Day**	**% False Positive DPM**	**Time Lost %**
Shek Kwu Chau	IWMF_BU_20190305_01	2019/03/05	2019/04/11	37.91	100	4740	124.8	0.0	0
Tai A Chau	IWMF_20190411_02	2019/04/11	2019/05/23	41.94	100	7725	179.7	0.0	0
Pui O Wan	IWMF_20190411_01	2019/04/11	2019/05/23	42.02	100	23986	557.8	0.0	0
Total				121.9		36451	299.1		

6.3.2.4 Theodolite surveys were completed in May 2019. In total, thirty four days of theodolite tracking were completed between February - May 2019, comprising 167 hours and 49 minutes of observation. No Chinese white dolphin was observed and

only one finless was recorded. The finless porpoise encounter rate was calculated as 0.006 finless porpoise per hour, in all weather conditions.

6.3.2.5 A total of 2620 vessels of ten different types were observed and tracked within or in the proximity of the IWMF construction site. These comprised fishing boats (236), speed boats (29), container boats (155), government boats (22), high speed ferries (53), others (13) and IWMF-Related construction platforms (974), tug boats(240), transportation boats (363), construction boats (531 and approximately 8 buoys were present marking the site boundary. The detailed Land-based Theodolite Tracking Report was presented in 5th Quarterly EM&A report and 17th Monthly EM&A report.

6.3.2.6 The baseline theodolite tracking was conducted immediately prior to and during the site preparation activities of the site. The baseline data records a decrease in porpoise sightings as site preparation activities commenced and notes that the decrease was most likely due to the onset of site preparation activities. The impact theodolite tracking conducted for this study records a marked increase in the number of Project related vessels and platforms and, in agreement with baseline conclusions, shows a concomitant decrease in finless porpoise sightings.

6.3.2.7 Photo records of the marine mammal monitoring taken during the reporting period are presented in **Appendix G**.

6.3.3 Specific Mitigation Measures

6.3.4 Silt curtains were deployed for sand blanket laying works and DCM trial during the reporting period. At least two MMO were on duty for continuous monitoring of the Marine Mammal Exclusion Zone (MMEZ) for DCM trial works and installation/re-installation/relocation process of silt curtains, and the marine mammal trapping checking and silt curtains inspection in accordance with the Detailed Monitoring Programme of Finless Porpoise and Marine Mammal Watching Plan respectively. Trainings for the MMO were provided by the ET prior to the aforementioned works, with a cumulative total of 98 individuals being trained and the training records kept by the ET. From the Marine Mammal Watching observation records and MMEZ monitoring log records, no Finless Porpoise or other marine mammals were observed within or around the MMEZ and silt curtains in the reporting month.

7. WHITE-BELLIED SEA EAGLE

7.1 WBSE Monitoring Parameters

7.1.1 The objective of the construction phase monitoring should be to verify the utilisation of the area by WBSE, their responses to construction disturbance, as well as the effectiveness of the proposed mitigation measures. Throughout the construction phase, field surveys should be conducted twice per month during their core breeding season (from December to May), and once per month outside their core breeding season (from June to November). The monitoring frequency should be increased to weekly during the incubation period of each year. In order to confirm their foraging ground near the construction site, it is necessary to conduct daily monitoring during the first week of nestling period in each year.

7.1.2 Since the location of the WBSE nest was located at the southwest of SKC within the hillside shrubland, it is impossible to observe the eggs during incubation period. Therefore, monitoring with increased frequency during incubation period could not be carried out. Daily monitoring will be carried out once any chick is recorded during the monitoring day.

7.2 Results and Observations

7.2.1 Six monitoring for monthly construction phase were conducted during the reporting period. Since there is no landing point along the western part of SKC, boat survey was used for the monitoring survey. In order to increase the chance of finding the WBSEs, monitoring survey was carried out either early in the morning or later in the afternoon. The weather conditions of monitoring survey were shown in **Table 7.1**.

Table 7.1 Weather Conditions during the WBSE Monitoring (Monthly)

Date	Condition	Temperature (℃)
25 Oct 2019	- Northeast wind force 3 to 4 - Sunny	29
27 Nov 2019	- North wind force 4 to 5 - Sunny	16
04 Dec 2019	- North wind force 4 to 5 - Sunny	23
13 Dec 2019	- East wind force 4 to 5 - Sunny	22
18 Dec 2019	- Light wind force 2 to 3 - Sunny	24
27 Dec 2019	- East wind force 4 to 5 - Sunny	20

7.2.2 Two WBSE adults were recorded during each survey and appeared flying over SKC Island, next to the nest area on SKC Island during the survey in October & November 2019. Two adults of WBSE were recorded having incubation in the nest during the survey in December 2019. No abnormal behaviour of the chick and adults were recorded during the reporting period.

7.2.3 No disturbances from anthropogenic activities on the island were recorded during the monitoring surveys. However, fishing boats moving close to the shore were recorded. Since the nest is about 160m away from the shore and it is not accessible, fishing boat activities did not show any direct disturbance to the WBSE nest.

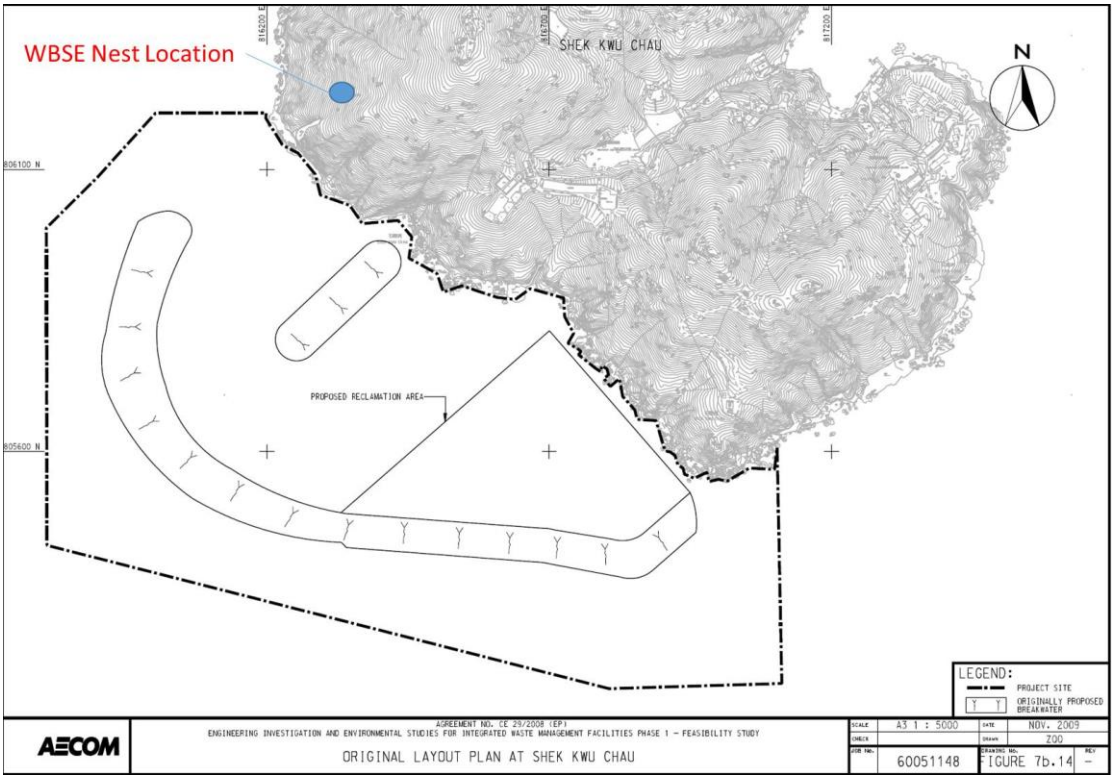


Figure 7.1 Location of WBSE Nest on SKC

7.2.4 No invasion of other fauna species was recorded and no sign of using the construction site as a foraging ground was recorded as well.

7.2.5 During the reporting period, no abnormal behaviour of the recorded adults and chick was shown. All marine works during 16th to 18th month construction period did not show any influence on the WBSE.

7.2.6 Photo records of the WBSE taken during the reporting period are presented in **Appendix H**.

8. SUMMARY OF MONITORING EXCEEDANCE, COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTIONS

8.1 No exceedance of the Action and Limit Levels of the regular construction noise, coral and WBSE monitoring was recorded during the reporting period.

8.2 For general & regular DCM water monitoring, eighty-one (81) of the water quality monitoring results for Suspended Solid (SS) recorded during the reporting period had exceeded the relevant Action Level and fifty-eight (58) of it had exceeded the relevant Limit Level. Thirty-four (34) & thirty-five (35) of the water quality monitoring results for SS reported had exceeded the Action and Limit Level during October 2019 respectively, twenty-nine (29) & one (1) of the water quality monitoring results for SS reported had exceeded the Action & Limit Level during November 2019 respectively and eighteen (18) & twenty-two (22) of the water quality monitoring results for SS reported had exceeded the Action & Limit Level during December 2019 respectively.

8.3 For general & regular DCM water monitoring, four hundred & eighty-three (483) of the water quality monitoring results for Dissolved Oxygen (DO) recorded during the reporting period had exceeded the relevant Action Level and none (0) of it had exceeded the relevant Limit Level. Three hundred & five (305) and zero (0) of the water quality monitoring results for DO reported had exceeded the Action and Limit Level during October 2019 respectively, one hundred & fifty-four (154) and zero (0) of the water quality monitoring results for DO reported had exceeded the Action a& Limit Level during November 2019 respectively and twenty-four (24) & zero (0) of the water quality monitoring results for DO reported had exceeded the Action & Limit Level during December 2019 respectively.

8.4 For general & regular DCM water monitoring, two (2) of the water quality monitoring results for turbidity recorded during the reporting period had exceeded the relevant Action Level and none (0) of it had exceeded the relevant Limit Level. Two (2) & zero (0) of the water quality monitoring results for turbidity reported had exceeded the Action and Limit Level during October 2019 respectively.

8.5 Investigations carried out immediately for each of the exceedance cases during the reporting period had shown that these exceedances were unrelated to the Project, however, environmental deficiencies of the Contractor on the implementation of silt curtain deployment system were spotted.

8.6 Further investigation was made with the Contractor on the silt curtain design and checking procedure as stated in the deposited Silt Curtain Deployment Plan. Rectification actions regarding to the improper implementation of silt curtain system shall be carried out immediately.

8.7 The Contractor has been reminded that all measures recommended in the deposited Silt Curtain Deployment Plan shall be fully and properly implemented for the Project as per Clause 2.6A of the FEP.

8.8 No notification of summons and prosecution was received in the reporting period.

8.9 Statistics on complaints, notifications of summons and successful prosecutions are summarized in **Appendix I**.

9. EM&A SITE INSPECTION

9.1 Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Site inspections were carried out at the Site Portions 1, 1A & 1B during the reporting period. Portions 1, 1A & 1B were the sites near SKC within the Site boundary.

9.2 Joint site inspection with IEC was carried out on a monthly basis.

9.3 Minor deficiencies were observed during weekly site inspection. Key observations during the site inspections are summarized below:

- Site tidiness were not maintained properly
- Prevention actions for oil/chemical spillage were not carried out properly
- Silt curtains were not deployed properly
- Damage of deployed silt curtains was found
- Good housekeeping practice were not well-maintained

9.4 The Contractor has rectified all of the observations identified during environmental site inspections in the reporting period.

9.5 During site inspection, installed silt curtains were found damaged for some idling works. The contractor was reminded to properly fix and maintain the deployed silt curtains prior to the operation of concerned construction works during the site walk by ET and IEC. The Contractor conducted the maintenance of deployed silt curtain immediately before resuming any construction works.

9.6 According to the EIA Study Report, Environmental Permit, contract documents and Updated EM&A Manual, the mitigation measures detailed in the documents, except the silt curtain system, are implemented as much as practical during the reporting period. An updated Implementation Status of Environmental Mitigation Measures (EMIS) is provided in **Appendix B**.

10. CONCLUSION AND RECOMMENDATIONS

10.1 This 6th Quarterly Environmental Monitoring and Audit (EM&A) Report summarizes the EM&A works undertaken during the period from 1 October 2019 to 31 December 2019 in accordance with the Updated EM&A Manual and the requirement under EP-429/2012/A and FEP-01/429/2012/A.

10.2 Construction noise, water quality, construction waste, coral, marine mammal and White-Bellied Sea Eagle (WBSE) monitoring were carried out in the reporting period. No project-related exceedance of the Action and Limit Level was recorded during the reporting period, however, environmental deficiencies of the Contractor on the implementation of silt curtain deployment system were spotted.

10.3 Weekly environmental site inspections were conducted during the reporting period. Environmental deficiencies were observed during site inspection and were rectified.

10.4 According to the environmental site inspections performed in the reporting period, the Contractor was reminded to pay attention on on-site housekeeping, and the proper storage of the chemicals and construction waste.

10.5 According to the field observation by MMO during the reporting period, temporary silt plume floating was observed at close proximity of the outside of silt curtains, dumping sand material above water surface instead of bottom of the sea were observed moving out from the sand laying working area. The Contractor has ceased the malpractice and no silt plume was observed at the working area within 30 minutes upon discovery. The Contractor is reminded to ensure the proper implementation of mitigation measures as specified in the Updated EM&A Manual and Silt Curtain Deployment Plan.

10.6 Regarding to the deployment of silt curtains as a principal water quality impact mitigation measures on various marine works, the Contractor has been reminded to follow strictly to the design and checking procedure as specified in the Silt Curtain Deployment Plan. As the scale of DCM works will be stepped up in the coming months, the Contractor has been reminded to pay extra attention on the status of deployed silt curtain. The Contractor is reminded that all measures recommended in the deposited silt curtain deployment plan shall be fully and properly implemented for the Project as per EP condition 2.6 of the FEP.

10.7 As dredging works was conducted in the reporting month, the Contractor had been reminded to follow strictly to the design and checking procedure as specified in the Silt Curtain Deployment Plan for the dredging works. The Contractor had been reminded to follow the regulation on rate and means for dredging works as stipulated in FEP Clause 2.17 – 2.21 or the approved Supporting Document for Reviewing Dredging Rate and Filling Rate, whichever is applicable. The Contractor is reminded to follow Dumping At Sea Ordinance (DASO) for the storage, handling and disposal of dredged materials.

10.8 No environmental complaint was received in the reporting period.

10.9 No notification of summons or prosecution was received since commencement of the Contract.

10.10 The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A Master Programme

Activity ID	Activity Name	Remaining Duration	Start	Finish
EP_SP_66_12-WP-2-M0	Programme for Design and Construction Works	2835	22-Nov-17 A	26-Aug-25
EP_SP_66_12-WP-2-M0.01	Key Dates	2496	22-Nov-17	21-Sep-24
EP_SP_66_12-WP-2-M0.02	Contract Preliminaries	2807	19-Dec-17	26-Aug-25
EP_SP_66_12-WP-2-M0.03	Licence/Permit Applications	2252	15-Dec-17	13-Feb-24
EP_SP_66_12-WP-2-M0.04	General Submissions	1320	22-Nov-17	03-Jul-21
EP_SP_66_12-WP-2-M0.05	Design Submissions	1724	22-Nov-17 A	11-Aug-22
EP_SP_66_12-WP-2-M0.06	Procurement of Major Equipment	1903	13-Sep-18	28-Nov-23
EP_SP_66_12-WP-2-M0.07	Environmental Works	1708	05-Jan-18	09-Sep-22
EP_SP_66_12-WP-2-M0.08	Maritime Works	1277	29-Dec-17	27-Jun-21
EP_SP_66_12-WP-2-M0.08.3	Submissions	196	29-Dec-17	12-Jul-18
EP_SP_66_12-WP-2-M0.08.1	Marine Construction	1265	10-Jan-18	27-Jun-21
EP_SP_66_12-WP-2-M0.08.1.1	Phase I - Construction of Perimeter Seawalls	740	10-Jan-18	19-Jan-20
EP_SP_66_12-WP-2-M0.08.1.1.3	Marine Works Preparations	274	10-Jan-18	10-Oct-18
08-0900	Carry out hydrographic survey	14	10-Jan-18	23-Jan-18
08-1005	Ground Investigation for DCM Design	180	13-Feb-18	11-Aug-18
08-1010	Mobilization of DCM Barge for Load Test	30	14-May-18	12-Jun-18
08-1020	Mobilization of Remaining DCM Barge for Construction	30	11-Sep-18	10-Oct-18
08-1340(2)	Sediment Sample collection and testing Dumping Permit Application	21	05-Sep-18*	25-Sep-18
EP_SP_66_12-WP-2-M0.08.1.1.1	Seawall and Berth at DCM Area	676	15-Mar-18	19-Jan-20
08-1030	DCM Mix Trial (incl. Bench-scale testing and Lab Tests)	106	15-Mar-18	28-Jun-18
08-1040	DCM Pre-construction Site Trial and testing	43	29-Jun-18	10-Aug-18
08-1050	Static Load Test Preparation	31	11-Aug-18	10-Sep-18
08-1060	Carry out static loading test	22	11-Sep-18	02-Oct-18
08-1065(2)	Static load test report submission	8	03-Oct-18	10-Oct-18
08-1070	Geotextile Laying	60	11-Aug-18	09-Oct-18
08-1075(2)	Sand Blanket Laying	60	11-Aug-18	09-Oct-18
08-1080	DCM Injection Works (575,000m3, approx 6300 nr.)	120	11-Oct-18	07-Feb-19
08-1090	DCM Final Completion Tests	180	10-Nov-18	08-May-19
08-1100	Rubble Mound Laying (100,000m3 approx, @550m3/d)	180	09-Jan-19	07-Jul-19
08-1105(1)	Prefabrication for Caission	282	24-Nov-18	01-Sep-19
08-1110	Caisson Laying (Total 50nrs, @2 nrs/week)	182	24-Mar-19	21-Sep-19
08-1120	Wave Wall Construction	120	22-Sep-19	19-Jan-20
EP_SP_66_12-WP-2-M0.08.1.1.2	Seawall at Dredging Area	295	25-Dec-18	15-Oct-19
08-1130	Dredging Works (26,000m3 @ 285m3/d avg. to comply EP Conditions 2.18)	110	25-Dec-18	13-Apr-19
08-1140	Lay Rock & Sand Fill	50	15-Mar-19	03-May-19
08-1150	Place Rubble Mound (35,000m3 approx., @550m3/d)	88	30-Mar-19	25-Jun-19
08-1155(2)	Fabrication and delivery of Precast Seawall Blocks (12,000nr. approx)	90	15-Mar-19	12-Jun-19
08-1160	Lay Concrete Block Walls (300m length approx. @4m/d)	80	29-Apr-19	17-Jul-19
08-1170	Insitu Concrete Wall Construction	90	18-Jul-19	15-Oct-19
EP_SP_66_12-WP-2-M0.08.1.2	Phase II - Reclamation, Breakwater and Berth Construction	999	03-Oct-18	27-Jun-21
EP_SP_66_12-WP-2-M0.08.1.2.1	Reclamation	999	03-Oct-18	27-Jun-21
08-1180	Geotextile Laying	100	03-Oct-18	10-Jan-19
08-1185(2)	Sand Blanket Laying	100	03-Oct-18	10-Jan-19
08-1190	Install Vertical Band Drain by Barge	160	10-Feb-19	19-Jul-19
08-1200	Reclamation fill up to +2.5mPD	375	22-Sep-19	30-Sep-20
08-1210	Reclamation fill from +2.5 to Formation Level	120	03-Jul-20	30-Oct-20
08-1220	Lay Surcharge	80	11-Sep-20	29-Nov-20
08-1230	Surcharge Period	180	30-Nov-20	28-May-21
08-1240	Remove Surcharge	85	04-Apr-21	27-Jun-21
EP_SP_66_12-WP-2-M0.08.1.2.2	Breakwater	583	02-Sep-19	06-Apr-21
08-1250	Geotextile and Sand Blanket Laying	45	22-Sep-19	05-Nov-19
08-1260	DCM Injection Works (290,000m3, approx 3200 nr.)	65	06-Nov-19	09-Jan-20
08-1270	DCM Final Completion Test	71	05-Jan-20	15-Mar-20
08-1280	Rubble Mound Laying (100,000m3 approx, @550m3/d)	188	05-Mar-20	08-Sep-20
08-1285(1)	Prefabrication for Caission	411	02-Sep-19	16-Oct-20
08-1290	Caisson Laying (Total 43nrs, @2 nrs/week)	150	11-Jul-20	07-Dec-20
08-1300	Wave Wall Construction	120	08-Dec-20	06-Apr-21
EP_SP_66_12-WP-2-M0.08.1.2.3	Seawall and Berth at Marine Access	150	03-Jul-20	29-Nov-20
08-1310(2)	Prefabrication for Caission (4nrs)	90	03-Jul-20	30-Sep-20
08-1320(2)	Caisson Laying (4nrs)	30	01-Oct-20	30-Oct-20
08-1330(2)	Wave Wall Construction	30	31-Oct-20	29-Nov-20
EP_SP_66_12-WP-2-M0.09	Foundation Works	397	12-Apr-21	13-May-22
EP_SP_66_12-WP-2-M0.09.0	Site Investigation and Preliminary Pile	46	12-Apr-21	27-May-21
EP_SP_66_12-WP-2-M0.09.1	Administration Bld Foundation	138	25-Nov-21	11-Apr-22
EP_SP_66_12-WP-2-M0.09.2	Waste Bunker & Tipping Hall Bld Foundation	203	13-May-21	01-Dec-21
EP_SP_66_12-WP-2-M0.09.3	Boiler & Flue Gas Bld Foundation	331	12-Apr-21	08-Mar-22
EP_SP_66_12-WP-2-M0.09.4	ACC Area Foundation	129	20-Sep-21	26-Jan-22
EP_SP_66_12-WP-2-M0.09.5	Turbine Hall Bld Foundation	142	28-Jun-21	16-Nov-21
EP_SP_66_12-WP-2-M0.09.6	Air Compressor Bld Foundation	28	17-Nov-21	14-Dec-21

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04-Dec-17	Rev. 0 - 1st Issue		
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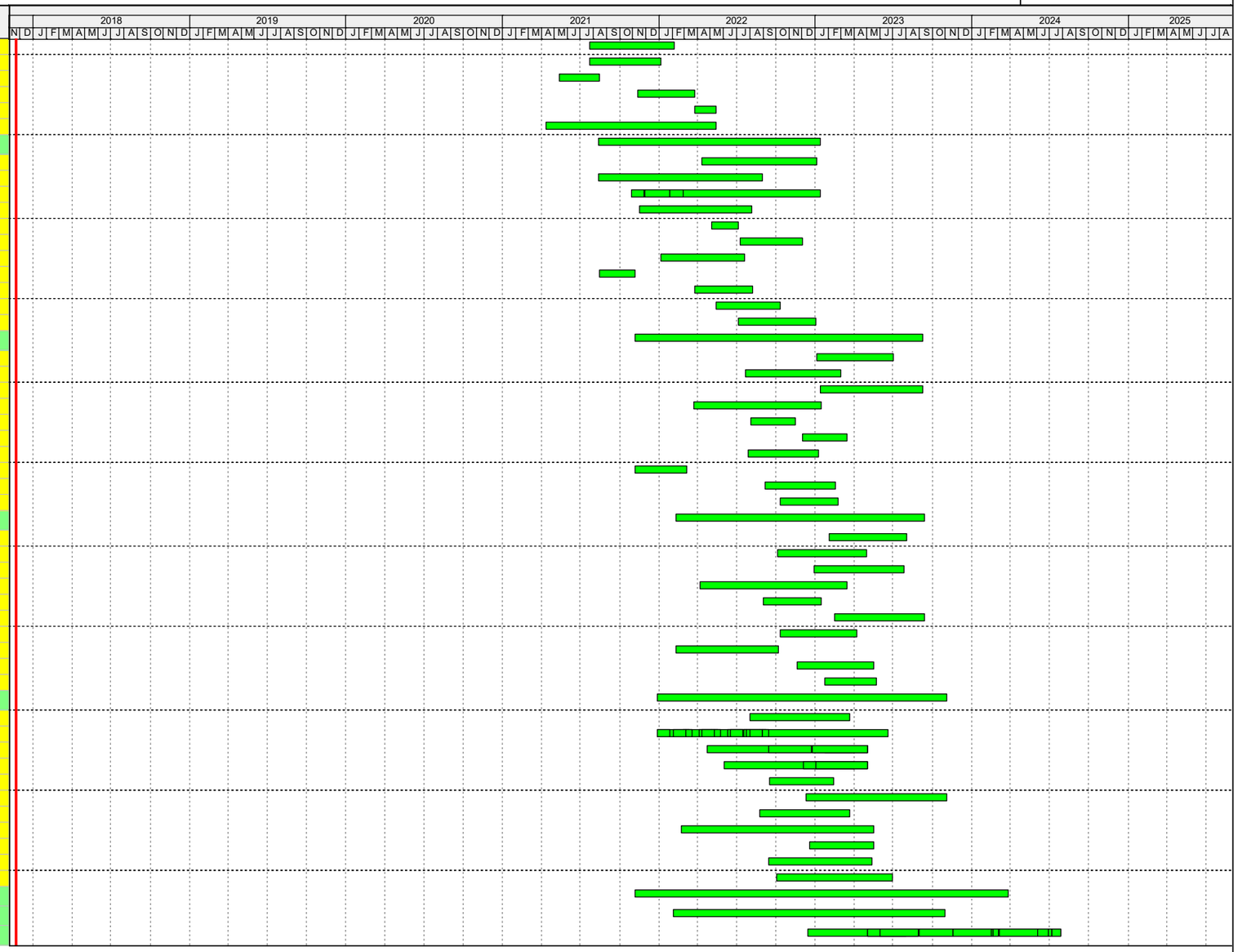
Activity ID	Activity Name	Remaining Duration	Start	Finish
EP_SP_66_12-WP-2-M0.09.7	Chimney Foundation	198	23-Jul-21	05-Feb-22
EP_SP_66_12-WP-2-M0.09.8	MT Plant & Desalination Bld Foundation	168	22-Jul-21	05-Jan-22
EP_SP_66_12-WP-2-M0.09.9	IWMF Substation Building Foundation	94	13-May-21	14-Aug-21
EP_SP_66_12-WP-2-M0.09.10	Access Ramp Bld Foundation	133	13-Nov-21	25-Mar-22
EP_SP_66_12-WP-2-M0.09.11	Reception Bld Foundation	49	26-Mar-22	13-May-22
EP_SP_66_12-WP-2-M0.09.12	Pipe Bridge Foundation	397	12-Apr-21	13-May-22
EP_SP_66_12-WP-2-M0.10	**Superstructural Works**	519	12-Aug-21	12-Jan-23
EP_SP_66_12-WP-2-M0.10.1	Administration Bld Structure	267	12-Apr-22	03-Jan-23
EP_SP_66_12-WP-2-M0.10.2	Waste Bunker & Tipping Hall Bld Sturcture	384	12-Aug-21	30-Aug-22
EP_SP_66_12-WP-2-M0.10.3	Boiler & Flue Gas Treatment Bld Structure	441	29-Oct-21	12-Jan-23
EP_SP_66_12-WP-2-M0.10.5	Turbine Hall Bld Structure	262	17-Nov-21	05-Aug-22
EP_SP_66_12-WP-2-M0.10.6	Air Compressor Bld Structure	63	04-May-22	05-Jul-22
EP_SP_66_12-WP-2-M0.10.7	Chimney Structure	145	10-Jul-22	01-Dec-22
EP_SP_66_12-WP-2-M0.10.8	MT Plant & Desalination Bld Structure	196	06-Jan-22	20-Jul-22
EP_SP_66_12-WP-2-M0.10.9	IWMF Substation Structure	84	15-Aug-21	06-Nov-21
EP_SP_66_12-WP-2-M0.10.10	Access Ramp Bld Structure	135	26-Mar-22	07-Aug-22
EP_SP_66_12-WP-2-M0.10.11	Reception Bld Structure	150	14-May-22	10-Oct-22
EP_SP_66_12-WP-2-M0.10.13	Pipe Bridge Structure	180	06-Jul-22	01-Jan-23
EP_SP_66_12-WP-2-M0.11	**Architectual Builders Works & Finishes**	672	07-Nov-21	09-Sep-23
EP_SP_66_12-WP-2-M0.11.1	Administration Bld ABWF Works	180	04-Jan-23	02-Jul-23
EP_SP_66_12-WP-2-M0.11.2	Weste Bunker & Tipping Hall Bld ABWF Works	225	21-Jul-22	02-Mar-23
EP_SP_66_12-WP-2-M0.11.3	Boiler & Flue Gas Bld ABWF Works	240	13-Jan-23	09-Sep-23
EP_SP_66_12-WP-2-M0.11.5	Turbine Hall Bld ABWF Works	299	23-Mar-22	15-Jan-23
EP_SP_66_12-WP-2-M0.11.6	Air Compress Bld ABWF Works	105	03-Aug-22	15-Nov-22
EP_SP_66_12-WP-2-M0.11.7	Chimney ABWF Works	105	02-Dec-22	16-Mar-23
EP_SP_66_12-WP-2-M0.11.8	MT Plant & Desalination Bld ABWF Works	165	28-Jul-22	08-Jan-23
EP_SP_66_12-WP-2-M0.11.9	IWMF Substation ABWF Works	120	07-Nov-21	06-Mar-22
EP_SP_66_12-WP-2-M0.11.10	Access Ramp Bld ABWF Works	165	05-Sep-22	16-Feb-23
EP_SP_66_12-WP-2-M0.11.11	Reception Bld ABWF Works	135	11-Oct-22	22-Feb-23
EP_SP_66_12-WP-2-M0.12	**Building Services Installation**	581	09-Feb-22	12-Sep-23
EP_SP_66_12-WP-2-M0.12.1	Administration Bld BS Works	180	03-Feb-23	01-Aug-23
EP_SP_66_12-WP-2-M0.12.2	Weste Bunker & Tipping Hall Bld BS Works	210	04-Oct-22	01-May-23
EP_SP_66_12-WP-2-M0.12.3	Boiler & Flue Gas Bld BS Works	210	29-Dec-22	26-Jul-23
EP_SP_66_12-WP-2-M0.12.5	Turbine Hall Bld BS Works	344	07-Apr-22	16-Mar-23
EP_SP_66_12-WP-2-M0.12.6	Air Compressor Bld BS Works	135	02-Sep-22	14-Jan-23
EP_SP_66_12-WP-2-M0.12.4	Chimney BS Works	210	15-Feb-23	12-Sep-23
EP_SP_66_12-WP-2-M0.12.8	MT Plant & Desalination Bld BS Works	180	11-Oct-22	08-Apr-23
EP_SP_66_12-WP-2-M0.12.9	IWMF Substation BS Works	241	09-Feb-22	07-Oct-22
EP_SP_66_12-WP-2-M0.12.10	Access Ramp Bld BS Works	180	19-Nov-22	17-May-23
EP_SP_66_12-WP-2-M0.12.11	Reception Bld BS Works	120	24-Jan-23	23-May-23
EP_SP_66_12-WP-2-M0.13	**Process Equipment Installation**	677	28-Dec-21	04-Nov-23
EP_SP_66_12-WP-2-M0.13.2	Waste Bunker & Tipping Hall Bld Process Equipment Installation	233	01-Aug-22	21-Mar-23
EP_SP_66_12-WP-2-M0.13.3	Boiler House & Flue Gas Treatment Bld Process Equipment Installation	539	28-Dec-21	19-Jun-23
EP_SP_66_12-WP-2-M0.13.4	ACC Area Equipment Installation	375	23-Apr-22	02-May-23
EP_SP_66_12-WP-2-M0.13.5	Turbine Hall Bld Equipment Installation	335	02-Jun-22	02-May-23
EP_SP_66_12-WP-2-M0.13.6	Air Compressor Bld Equipment Installation	150	17-Sep-22	13-Feb-23
EP_SP_66_12-WP-2-M0.13.8a	MT Process Bld Process Equipment Installation	330	10-Dec-22	04-Nov-23
EP_SP_66_12-WP-2-M0.13.8b	Desalination Bld Process Equipment Installation	210	24-Aug-22	21-Mar-23
EP_SP_66_12-WP-2-M0.13.09	IWMF Substation Bld Equipment Installation	450	22-Feb-22	17-May-23
EP_SP_66_12-WP-2-M0.13.10	Ramp & Storage Bld Process Equipment Installation	150	19-Dec-22	17-May-23
EP_SP_66_12-WP-2-M0.13.12	Equipment Installaion at External Area	240	15-Sep-22	12-May-23
EP_SP_66_12-WP-2-M0.13.13	External Process Pipe Works	271	03-Oct-22	30-Jun-23
EP_SP_66_12-WP-2-M0.14	**Landscape, External Road and Drains Works**	872	07-Nov-21	27-Mar-24
EP_SP_66_12-WP-2-M0.15	**Works By CLP**	633	04-Feb-22	30-Oct-23
EP_SP_66_12-WP-2-M0.16	**Testing & Commissioning**	591	15-Dec-22	27-Jul-24



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Appendix B Summary of Implementation Status of Environmental Mitigation

Appendix B

Table B.1 Implementation Schedule for Air Quality Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S3b.8.1	Air Pollution Control (Construction Dust) Regulation & Good Site Practices • Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. • Use of frequent watering for particularly dusty construction areas and areas close to ASRs. • Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines. • Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs. • Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. • Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. • Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading	Work site / During the construction period	Contractor		✓			Air Pollution Control (Construction Dust) Regulation	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	points, and use of water sprinklers at the loading area where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods. • Imposition of speed controls for vehicles on unpaved site roads. Ten kilometers per hour is the recommended limit. • Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs • Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.								
S3b.6.3	<u>Odour Removal by Deodorizers</u> • Deodorizers with 95% odour removal efficiency would be installed for the air ventilated from the mechanical treatment plant before discharge to the atmosphere	Waste reception halls, the waste storage area, the mechanical treatment plant / During design & operation phase	IWMF Operator	✓		✓		EIAO-TM	N/A
S3b.8.2	<u>Air Pollution Control and Stack Monitoring</u>	IWMF stack emissions / During	IWMF Operator	✓		✓		EIAO-TM, Supporting Document for	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• Air pollution control and stack monitoring system will be installed for the IWMF to ensure that the emissions from the IWMF stack will meet the proposed target emission limits. • Voluntary Enhancement Measures in Flue Gas Cleaning and Emission Monitoring: 1. Two-stage bag filter system with reagent recirculation; 2. In addition to SCR, provide SNCR for removal of NO_x; tighten emission limit for half-hourly and daily NO_x to 160 mg/m^3 and 80 mg/m_3 respectively; 3. Well-mixed feed waste: to minimize the fluctuation of pollutant loading on the flue gas treatment system; 4. Two more AQMSs would be set up at South Lantau and Shek Kwu Chau respectively; 5. Limit levels will be set under the IWMF DBO contract to require that waste feed shall cease if any of the air pollutant has exceeded 95% of the emission concentration limit as stipulated in the Special Process license; and 6. Each incineration chamber shall be fitted with auxiliary burners to ensure complete burn out of the combustion gases.	design & operation phase						Application for Variation of Environmental Permit (EP-429/2012)	

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
-	Treated Fly Ash and Air Pollution Control Residues: • During testing and commissioning, the Contractor shall sample and test every container of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit. If a test result confirms that any one of the samples does not conform to the limits and the criteria, the Contractor shall be required to sample and test every container of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria for the next six months. • During the first six months of operation, if the requirements in (a) could be fully conformed with, the Contractor shall sample and test every shipload of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit. The Contractor shall take two samples from each shipload for testing and the Contractor shall not dispose of any of that shipload of treated fly ash and air	IWMF stack emissions / During design & operation phase	IWMF Operator	✓		✓		Supporting Document for Application for Variation of Environmental Permit (EP-429/2012)	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	pollution control residues until the test results confirm that the two samples conform to the limits and the criteria. If a test result confirms that any one of the two samples does not conform to the limits and the criteria, the Contractor shall be required to sample and test every shipload of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria for the next six months. The Contractor shall make due allowance in the Design and the Operation for the time to sample and test treated fly ash and air pollution control residues before disposal. • Provided that there is no non-conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit throughout a continuous sixmonth period in the Operation Period, the testing frequency shall be reduced to monthly interval.Two samples from one shipload of treated fly ash and air pollution control residues shall be collected and tested for conformance to the Incineration Residue Pollution Control Limits and leachability criteria. The Contractor shall not dispose of any of the treated fly ash and air pollution								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	control residues in the shipload which the samples are taken until the test results confirm that the samples conform to the limits and the criteria. If the test result confirm that any one of the samples does not conform to the limits and the criteria, the Contractor shall be required to sample and test every shipload of treated fly ash and air pollution control residues for conformance to the Incineration Residue Pollution Control Limits and leachability criteria shown in Table 2 of the Environmental Permit for the next six months.								
-	<u>Bottom Ash:</u> • During testing and commissioning, the Contractor shall sample and test every container of bottom ash for conformance to the leachability criteria shown in Table 2 of the Environmental Permit. If a test result confirms that any one of the samples does not conform to the criteria, the Contractor shall be required to sample and test every container of bottom ash for conformance to the leachability criteria for the next six months. • During the first six months of operation, if the requirements in (d) could be fully conformed with, the Contractor shall sample and test one shipload of bottom ash each month for	IWMF stack emissions / During design & operation phase	IWMF Operator	✓		✓		Supporting Document for Application for Variation of Environmental Permit (EP-429/2012)	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	conformance to the leachability criteria shown in Table 2 of the Environmental Permit. The Contractor shall take two samples from the shipload for testing and the Contractor shall not dispose of any of that shipload of bottom ash until the test results confirm that the two samples conform to the criteria. If a test result confirms that any one of the two samples does not conform to the criteria, the Contractor shall be required to sample and test each shipload of bottom ash for conformance to the leachability criteria for the next six months. The Contractor shall make due allowance in the Design and the Operation for the time to sample and test bottom ash before disposal. • Provided that there is no non-conformance to the leachability criteria shown in Table 2 of the Environmental Permit throughout a continuous sixmonth period in the Operation Period, the Contractor shall be allowed to take two samples from any one shipload of bottom ash once every six months for conformance to the leachability criteria. The Contractor shall not dispose of any of the bottom ash in the shipload which the samples are taken until the test								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	results confirm that the samples conform to the criteria. If the test result confirm that any one of the samples does not conform to the criteria, the Contractor shall be required to sample and test one shipload of bottom ash each month for conformance to the leachability criteria shown in Table 2 of the Environmental Permit for the next six months as stipulated above.								

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.2 Implementation Schedule for Noise Impact Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S4b.8	Good site practices to limit noise emissions at source and use of quiet plant and working methods, whenever practicable.	Work Sites / Construction Period	EPD and its contractors		✓			EIAO-TM	Implemented
S4b.6 & S4b.8	All the ventilation fans installed in the below will be provided with silencers or acoustics treatment. (i) Stack of the incinerator (ii) Ventilation systems within the IWMF Enclosure and discharge silencer or other acoustic treatment equipment should be installed in the air-cooled chillers Other than provision of silencer or other acoustic treatment equipment for the stack of the incinerator and ventilation system, the detailed design should incorporate the following good practice in order to minimize the nuisance on the neighboring NSRs. (i) The exhaust of the ventilation system and any opening of the building should be located facing away from any NSRs; and (ii) Louver or other acoustic treatment equipment could also be applied to the exhaust of the ventilation system.	Within IWMF area / Construction Period	EPD and its contractors	✓		✓		EIAO-TM	N/A

-	<u>Voluntary Enhancement Measure</u> • Provision of air-conditioner and double glazed windows to nearby NSR at Shek Kwu Chau (i.e. SARDA) as precautionary measures.	IWMF site	Design team, contractor, IWMF operator	✓	✓			Supporting Document for Application for Variation of Environmental Permit (EP-429/2012)	Implemented

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.3 Implementation Schedule for Water Quality Measures for the Artificial Island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S5b.8.1.1	<u>Drainage and Construction Site Runoff</u> The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. These practices include the following items: • At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the contractor prior to the commencement of construction. • Boundaries of earthworks should be surrounded by dykes or embankments for flood protection, as necessary. • Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM-DSS. The design of efficient silt removal facilities	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/sand traps should be 5 minutes under maximum flow conditions. The detailed design of the sand/silt traps shall be undertaken by the contractor prior to the commencement of construction. • Water pumped out from foundation piles must be discharged into silt removal facilities. • Measures should be taken to minimize the ingress of site runoff and drainage into excavations. Drainage water pumped out from excavations should be discharged into storm drains via silt removal facilities. • During rainstorms, exposed slope/soil surfaces should be covered by a tarpaulin or other means, as far as practicable. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC PN 1/94. • Exposed soil areas should be minimized to reduce potential for increased siltation and contamination of runoff. • Earthwork final surfaces should be well compacted and subsequent permanent work or surface protection should be immediately performed.								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.								
S5b.8.1.2	General Construction Activities Construction solid waste should be collected, handled and disposed of properly to avoid entering to the nearby watercourses and public drainage system. Rubbish and litter from construction sites should also be collected to prevent spreading of rubbish and litter from the site area. It is recommended to clean the construction sites on a regular basis.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	Reminders provided to the Contractor

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S5b.8.1.3	There is a need to apply to EPD for a discharge license for discharge of effluent from the construction site under the WPCO. The discharge quality must meet the requirements specified in the discharge license. All the run-off and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the TM-DSS. The beneficial uses of the treated effluent for other on-site activities such as dust suppression and general cleaning etc., can minimize water consumption and reduce the effluent discharge volume. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the relevant WPCO license which is under the ambit of regional office of EPD.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	Discharge License was issued on 22/08/2019
resumption resumption S5b.8.1.4	<u>Accidental Spillage</u> Contractor must register as a chemical waste producer if chemical wastes would be produced from construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Implemented
S5b.8.1.5	Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas which	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Deficiency of Mitigation Measures but rectified by the Contractor

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	appropriately equipped to control these discharges.								
S5b.8.1.6	Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be sited on sealed areas in order to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels should be collected in designated tanks prior to disposal.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Implemented
S5b.8.1.7	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: • Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. • Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. • Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO; WDO	Deficiency of Mitigation Measures but rectified by the Contractor
S5b.8.1.8	<u>Sewage Effluent</u> Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to	Work site / During the construction period	Contractor		✓			EIAO-TM; ProPECC PN 1/94; WPCO	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	handle sewage from the workforce. A licensed contractor would be responsible. for appropriate disposal and maintenance of these facilities.								
S5b.8.1.9	<u>Reclamation and Construction of Breakwaters</u> • The proposed dredging and reclamation should be commenced in phases. The breakwaters and seawalls should be constructed and the reclamation should be started within the enclosed breakwaters after the completion of the breakwater. Silt curtain should be applied around caissons / blockwork during the filling of the cell to prevent the loss of fine in the filling material. • The maximum production rate for dredging for the anti-scouring protection layer shall not exceed the permitted maximum daily dredging rate and carried out within its respective distance from the nearest non-translocatable coral community by the dredging contractor as specified in S.2.18 of the Further Environmental Permit (no.:FEP-01/429/2012/A). It is recommended to employ closed grab with small capacity of 2 m^3 to control the dredging rate. • Any gap that may need to be provided for marine access will be located at the middle of the North Western seawall, away from the identified coral communities and will be shielded by silt curtains systems to control sediment plume dispersion. • The silt curtain system at marine access opening should be closed as soon as the	Work site / During the marine construction period	Contractor		✓			EIAO-TM; WPCO, Supporting Document for Application for Variation of Environmental Permit (EP-429/2012) Further Environmental Permit No. FEP-01/429/2012/A	Deficiency of Mitigation Measures but rectified by the Contractor

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	barges passes through the marine access opening in order to minimize the period of curtain opening. Filling should only be carried out behind the silt curtain when the silt curtain is completely closed. • To enhance the effectiveness of the silt curtain at the marine access, the northern breakwater would be built before the commencement of the reclamation to reduce the current velocity towards the marine access opening. • The silt curtain system at marine access opening should be regularly checked and maintained to ensure proper functioning. • Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25% which is in line with the CEDD's General Specification; • The filling for reclamation should be carried out behind the seawall. The filling material should only consist of public fill, rock and sand. The filling composition and filling rates at each filling area should follow those delineated in Table 1 of the FEP-01/429/2012/. The filling above high watermark is not restricted; • No dredging should be carried out within 16m to the nearest non-translocatable coral community; • Daily site audit including full-time on-site monitoring by the ET is recommended during the dredging for anti-scouring protection layer								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	for checking the compliance with the permitted no. of grab; • Closed grab dredger should be used to minimize the loss of sediment during the raising of the loaded grabs through the water column; • Frame-type silt curtains should be deployed around the dredging operations; • Floating-type silt curtains should be used to surround the circular cell during the sheetpiling work; • The descent speed of grabs should be controlled to minimize the seabed impact speed; • Barges should be loaded carefully to avoid splashing of material; • All barges used for the transport of dredged materials should be fitted with tight bottom seals in order to prevent leakage of material during loading and transport; • No concurrence works between laying of submarine cables and dredging/reclamation works within the same location is allowed. For works close to each other, the construction program should be arranged so that the dredging/reclamation works within area bounded by the breakwaters and the laying of cables would not operate within a distance of 80m from each other to avoid any accumulative impact on the environment (in case if such tight schedule is necessary).								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• All barges should be filled to a level which ensures that material does not spill over during loading and transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action. • No DCM works should be carried out within 100m to the nearest non-translocatable coral colony / colonies. • Silt curtains should be employed to enclose DCM field trial and any full scale DCM work to minimize the potential impacts on water aspect. • A sand blanket is to be placed on top of the marine deposit using tremie pipes prior to the DCM ground treatment to avoid seabed sediment disturbance.								
S5b.8.2.3	Operational Phase Discharges A pipeline drainage system will serve the development area collecting surface runoff from paved areas, roof, etc. Sustainable drainage principle would be adopted in the drainage system design to minimize peak surface runoff, maximize permeable surface and maximize beneficial use of rainwater.	Within IWMF site / During the operational phase	IWMF Operator	✓		✓		WPCO	N/A
S5b.8.2.4	Oil interceptors should be provided in the drainage system of any potentially contaminated areas (such as truck parking area and maintenance workshop) and regularly cleaned to prevent the release of oil products into the storm water drainage system in case of accidental spillages.	Within IWMF site / During the operational phase	IWMF Operator	✓		✓		WPCO; WDO	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	Accidental spillage should be cleaned up as soon as practicable and all waste oils and fuels should be collected and handled in compliance with the Waste Disposal Ordinance.								
S5b.8.2.5	Refuse Entrapment Collection and removal of floating refuse should be performed at regular intervals for keeping the water within the Project site boundary and the neighboring water free from rubbish.	Within the Project site / During the operational phase	IWMF Operator			✓		WPCO	N/A
S5b.8.2.6	Transportation of bottom ash, fly ash and APC residues to WENT Landfill for disposal Covered container should be used in the shipping of the incineration waste to limit the contact between the incineration waste and the marine water. A comprehensive emergency response plan for any accidental spillage should be submitted by the operation contractor to the EPD for agreement before the operation of the facilities. Salvage and cleanup action to recover the spilled incineration waste containers following the spillage should be carried out according to the emergency response plan to mitigate the environmental impact in case of spillage.	Transportation of Incineration Ash / During the operational phase	IWMF Operator			✓			N/A

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.4 Implementation Schedule for Waste Management Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
6b.5.1.2	Good Site Practices Adverse environmental impacts in relation to waste management are not expected, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities would include: • Obtain relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); • Provide staff training for proper waste management and chemical handling procedures; • Provide sufficient waste disposal points and regular waste collection; • Provide appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; and • Carry out regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Separate chemical wastes for special handling and disposed of to licensed facility for treatment; and • Employ licensed waste collector to collect waste.	Work Site/ During Construction Period	Contractor		✓			WDO; LDO; ETWB TCW No. 19/2005; EIAO-TM	Deficiency of Mitigation Measures but rectified by the Contractor

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
6b.5.1.3	<u>Waste Reduction Measures</u> Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: • Design foundation works that could minimize the amount of excavated material to be generated. • Provide training to workers on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; • Sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); • Segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage the collection of aluminum cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force; • Proper storage and site practices to minimize the potential for damage or contamination of construction materials; and	Work Site/ During Design & Construction Period	Contractor	✓	✓				Implemented; N/A for foundation and demolition items

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• Plan and stock construction materials carefully to minimize amount of waste to be generated and to avoid unnecessary generation of waste.								
6b.5.1.7	<u>Dredged Sediment – Application of Dumping Permit</u> The project proponent should agree in advance with MFC of CEDD on the site allocation. The project proponent or contractor for the dredging works shall then apply for the site allocations of marine sediment disposal based on the prior agreement with MFC/CEDD. The project proponent or contractor should also be responsible for the application of all necessary permits from relevant authorities, including the dumping permit as required under DASO from EPD, for the disposal of dredged sediment prior to the commencement of the dredging works.	Seawall and Reclamation site / Construction Period	EPD and its contractor	✓	✓			DASO ETWB TCW 34/2002	Implemented.
6b.5.1.8	<u>Dredged Sediment – Sediment Quality Report</u> The project proponent or contractor will need to satisfy the appropriate authorities that the quality of the marine sediment to be dredged has been identified according to the requirements of ETWB TCW 34/2002. This should be completed well before the dredging works and would include at least the submission of a formal Sediment Quality Report under Tier I of ETWB TCW No. 34/2002 to DEP for approval. Subject to advice from DEP, it is possible that further marine SI in accordance with ETWB TCW 34/2002 might be necessary for the	Seawall and Reclamation site / Construction Period	EPD and its contractor	✓				DASO ETWB TCW 34/2002	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	application of dumping permit under DASO. In such case, a sediment sampling and testing proposal shall be submitted to and approved by DEP before the additional marine SI works.								
6b.5.1.9	<u>Dredged Sediment – Sediment Transportation</u> The barge transporting the sediments to the designated disposal sites should be equipped with tight fitting seals to prevent leakage and should not be filled to a level that would cause overflow of materials or laden water during loading or transportation. In addition, monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the DEP.	Seawall and Reclamation site / Construction Period	EPD and its contractor		✓			DASO ETWB TCW 34/2002	Implemented
6b.5.1.10	<u>Construction and Demolition Materials</u> In order to minimize the impact resulting from collection and transportation of C&D materials for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below: • A Waste Management Plan (WMP), which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW No.19/2005;	Work Site/ During Design & Construction Period	Contractor	✓	✓			ETWB TCW No. 19/2005	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be adopted for easy tracking; and • In order to monitor the disposal of C&D materials at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to *ETWB TCW No. 31/2004*).								
6b.5.1.11 – 6b.5.1.12	The Contactor should prepare and implement an EMP in accordance with ETWB TCW No.19/2005, which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Engineer for approval. The Contractor should implement waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor, preferably on a monthly basis. All surplus C&D materials arising from or in connection with construction works should become the property of the Contractor when it is removed unless otherwise stated. The Contractor would be responsible for devising a	Work Site/ During Design & Construction Period	Contractor	✓	✓			ETWB TCW No. 19/2005	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	system to work for on-site sorting of C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimize temporary stockpiling on-site. The system should be included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site.								
6b.5.1.13	Chemical Wastes Should chemical wastes be produced at the construction site, the Contractor would be required to register with EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste (such as explosive, flammable, oxidizing, irritant, toxic, harmful, or corrosive). The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the Chemical Waste Treatment Centre at Tsing Yi, or another licensed facility, in accordance with	Work Site/ During Construction Period	Contractor		✓			Waste Disposal (Chemical Waste) (General) Regulation	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	the Waste Disposal (Chemical Waste) (General) Regulation.								
6b.5.1.14	<u>General Refuse</u> General refuse should be stored in enclosed bins or compaction units separate from C&D materials. A licensed waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.	Work Site/ During Construction Period	Contractor		✓			Public Health and Municipal Services Ordinance	Deficiency of Mitigation Measures but rectified by the Contractor
6b.5.1.16 – 6b.5.1.33	<u>Biogas Generation</u> The Contractor shall review the data and analysis results, and the data from further Site Investigation, if any. Subject to the review findings, the following gas protection measures may be considered if necessary: - gas monitoring after reclamation; - passive ventilation; - gas impermeable membrane; - ventilation with "at risk" rooms; - protection of utilities or below ground services; - precautions during construction works; - precautions prior to entry of belowground services	Reclamation site (if dredging at the reclamation site is not required) / Design & Construction Period	Designer and/or contractor	✓	✓			EPD/TR8/97	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
6b.5.2.1	<u>Good Site Practices</u> It is recommended that the following good operational practices should be adopted to minimise waste management impacts: • Obtain the necessary waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and Waste Disposal (Chemical Waste) (General) Regulation; • Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site; • Use of a waste haulier licensed to collect specific category of waste; • A trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team to monitor the disposal of solid wastes at landfills, and to control fly tipping. Reference should be made to ETWB TCW No. 31/2004. • Training of site personnel in proper waste management and chemical waste handling procedures; • Separation of chemical wastes for special handling and appropriate treatment at a licensed facility;	IWMF Site/During Operation Period	IWMF Operator			✓		Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Waste) (General) Regulation; ETWB TCW No. 1/2004	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• Routine cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Provision of sufficient waste disposal points and regular collection for disposal; • Adoption of appropriate measures to minimize windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containers; and • Implementation of a recording system for the amount of wastes generated, and disposed of (including recycled the disposal sites).								
6b.5.2.2	<u>Waste Reduction Measures</u> Good management and control can prevent the generation of significant amounts of waste. It is recommended that the following good operational practices should be adopted to ensure waste reduction: • Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage collection of aluminum cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors. Separate labelled bins should be provided to help segregate this waste from other general refuse generated by the work force; and	IWMF Site/ During Operation Period	IWMF Operator			✓			Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• Any unused chemicals or those with remaining functional capacity should be reused as far as practicable.								
6b.5.2.3	Storage, Handling, Treatment, Collection and Disposal of Incineration By-Products The following measures are recommended for the storage, handling and collection of the incineration by-products: • Ash should be stored in storage silos; • Ash should be handled and conveyed in closed systems fully segregatedfrom the ambient environment; • Ash should be wetted with water to control fugitive dust, where necessary; • All fly ash and APC residues should be treated, e.g. by cement solidification or chemical stabilization, for compliance with the proposed Incineration Residue Pollution Control Limits and leachability criteria prior to disposal; • The ash should be transported in covered trucks or containers to the designated landfill site. The Contractor should provide EPD with chemical analysis results of the bottom ash, and treated fly ash and APC residues to confirm that the ash/residue	IWMF Site/ During Operation Period	IWMF Operator			✓		Incineration Residue Pollution Control Limits	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	can comply with the proposed Incineration Residue Pollution Control Limits before disposal.								
6b.6.3.1	<u>Fuel Oil Tank Construction and Test</u> • The fuel tank to be installed should be of specified durability. • Double skin tanks are preferred. • Underground fuel storage tank should be placed within a concrete pit. • The concrete pit shall be accessible to allow regular tank integrity tests to be carried out at regular intervals. • Tank integrity tests should be conducted by an independent qualified surveyor or structural engineer. • Any potential problems identified in the test should be rectified as soon as possible.	Fuel Oil Storage Tank/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓			N/A
6b.6.3.1	<u>Fuel Oil Pipeline Construction and Test</u> • Installation of aboveground fuel oil pipelines is preferable; if underground pipelines are unavoidable, concrete lined trenches should be constructed to contain the pipelines. • Double skin pipelines are preferred.	Fuel Oil Pipelines/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• Distance between the fuel oil refuelling points and the fuel oil storage tank shall be minimized. • Integrity tests for the pipelines should be conducted by an independent qualified surveyor or structural engineer at regular intervals. • Any potential problems identified in the test should be rectified as soon as possible.								
6b.6.3.1	<u>Fuel Oil Leakage Detection</u> • Installation of leak detection device at storage tank and pipelines. • Installation and use of pressure gauges (e.g. at the two ends of a filling line) in fuel filling, which allows unexpected pressure drop or difference and sign of leakage to be detected.	Fuel Oil Storage Tank and Pipelines/ During Design, Construction and Operation Periods	IWMF Contractor	✓	✓	✓			N/A
6b.6.3.1	<u>Fuel Oil Storage Tank Refuelling</u> • Storage tank refuelling (from road tanker) should only be conducted by authorized staff of the oil company using the company's standard procedures.	Fuel Oil Refuelling Point/ During Operation Period	IWMF Operator			✓			N/A
6b.6.3.1	<u>Fuel Oil Spillage Response</u> An Oil Spill Response Plan should be prepared by the operator to document the appropriate response procedures for oil spillage incidents in detail. General	IWMF Site/ During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	procedures to be taken in case of fuel oil spillage are presented below. • Training - Training on oil spill response actions should be given to relevant staff. The training shall cover the followings: ➢Tools & resources to combat oil spillage and fire, e.g. locations of oil spill handling equipment and fire fighting equipment; ➢General methods to deal with oil spillage and fire incidents; ➢Procedures for emergency drills in the event of oil spills and fire; and ➢Regular drills shall be carried out. • Communication -Establish communication channel with the Fire Services Department (FSD) and EPD to report any oil spillage incident so that necessary assistance from relevant department can be quickly sought. • Response Procedures -Any fuel oil spillage within the IWMF site should be immediately reported to the Plant Manager with necessary details including location, source, possible cause and extent of the spillage.								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	-Plant Manager should immediately attend to the spillage and initiate any appropriate action to confine and clean up the spillage. The response procedures shall include the following: ➢Identify and isolate the source of spillage as soon as possible. ➢Contain the oil spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels. ➢Remove the oil spillage. ➢Clean up the contaminated area. ➢If the oil spillage occurs during storage tank refuelling, the refueling operation should immediately be stopped. ➢Recovered contaminated fuel oil and the associated material to remove the spilled oil should be considered as chemical waste. The handling and disposal procedures for chemical wastes are discussed in the following paragraphs.								
6b.6.3.2	<u>Chemicals and Chemical Wastes Handling & Storage</u> • Chemicals and chemical wastes should only be stored in suitable containers in purpose-built areas. • The storage of chemical wastes should comply with the requirements of the Code of Practice on the	Chemicals and Chemical Wastes Storage Area / During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	Packaging, Labelling and Storage of Chemical Wastes. • The storage areas for chemicals and chemical wastes shall have an impermeable floor or surface. The impermeable floor/ surface shall possess the following properties: - Not liable to chemically react with the materials and their containers to be stored. - Able to withstand normal loading and physical damage caused by container handling - The integrity and condition of the impermeable floor or surface should be inspected at regular intervals to ensure that it is satisfactorily maintained ➢ For liquid chemicals and chemical wastes storage, the storage area should be bunded to contain at least 110% of the storage capacity of the largest containers or 20% of the total quantity of the chemicals/chemical wastes stored, whichever is the greater. ➢ Storage containers shall be checked at regular intervals for their structural integrity and to ensure that the caps or fill points are tightly closed.								

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				Des	C	O	Dec		
	➢ Chemical handling shall be conducted by trained workers under supervision.								
6b.6.3.2	<u>Chemicals and Chemical Wastes Spillage Response</u> A Chemicals and/ or Chemical Wastes Spillage Response Plan shall be prepared by the operator to document in detail the appropriate response procedures for chemicals or chemical wastes spillage incidents. General procedures to be undertaken in case of chemicals/ chemical waste spillages are presented below. • Training - Training on spill response actions should be given to relevant staff. The training shall cover the followings: ➢ Tools & resources to handle spillage, e.g. locations of spill handling equipment; ➢ General methods to deal with spillage; and ➢ Procedures for emergency drills in the event of spills. • Communication - Establish communication channel with FSD and EPD to report the spillage incident so that necessary	IWMF Site/ During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	assistance from relevant department can be quickly sought. • Response Procedures - Any spillage within the IWMF site should be reported to the Plant Manager. - Plant Manager shall attend to the spillage and initiate any appropriate actions needed to confine and clean up the spillage. The response procedures shall include the followings: ➢ Identify and isolate the source of spillage as soon as possible; ➢ Contain the spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels (in case the spillage occurs at locations out of the designated storage areas); ➢ Remove the spillage; the removal method/ procedures documented in the Material Safety Data Sheet (MSDS) of the chemicals spilled should be observed; ➢ Clean up the contaminated area (in case the spillage occurs at locationsout of								

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	the designated storage areas); and ➢ The waste arising from the cleanup operation should be considered as chemical wastes.								
6b.6.3.3	<u>Preventive Measures for Incineration By-products Handling</u> The recommended measures listed below can minimize the potential contamination to the surrounding environment due to the incineration by-products: • Ash should be stored in storage silos; • Ash should be handled and conveyed in closed systems fully segregated from the ambient environment; • Ash should be wetted with water to control fugitive dust, where necessary; • All fly ash and APC residues should be treated, e.g. by cement solidification or chemical stabilization, for compliance with the proposed Incineration Residue Pollution Control Limits and leachability criteria prior to disposal; • The ash should be transported in covered trucks or containers to the designated landfill site.	Storage, Handling & Collection of Incineration Ash at IWMF/ During Operation Period	IWMF Operator			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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6b.6.3.4 - 6b.6.3.6	<u>Incident Record</u> After any spillage, an incident report should be prepared by the Plant Manager. The incident report should contain details of the incident including the cause of the incident, the material spilled and estimated spillage amount, and also the response actions undertaken. The incident record should be kept carefully and able to be retrieved when necessary. The incident report should provide sufficient details for the evaluation of any environmental impacts due to the spillage and assessment of the effectiveness of measures taken. In case any spillage or accidents results in significant land contamination, EPD should be informed immediately and the IWMF operator should be responsible for the cleanup of the affected area. The responses procedures described in **Section 6b.6.3.1** and **Section 6b.6.3.2** of EIA report should be followed accordingly together with the land contamination assessment and remediation guidelines stipulated in the *Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the Guidance Note for Contaminated Land and Remediation.*	IWMF Site/ During Operation Period	IWMF Operator			✓		Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the Guidance Note for Contaminated Land and Remediation.	N/A

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table B.5 Implementation Schedule for Ecological Quality Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
7b.8.2.1	<u>Measures to avoid direct loss of intertidal habitat</u> • The site boundary has been proposed to avoid direct contact with the intertidal natural rocky shore of Shek Kwu Chau. It avoids direct loss of intertidal communities and the existing natural rocky shore habitat, where Reef Egret and White-bellied Sea Eagle have been recorded within and in the vicinity of this habitat.	IWMF site	Design team	✓				EIAO-TM	N/A
7b.8.2.2	<u>Measures to minimise loss of coastal subtidal habitat</u> • Extensive coral colonies were recorded at the coastal hard bottom habitat at Shek Kwu Chau. To avoid and minimise the extensive direct impact on the coral colonies, the proposed reclamation area has been moved further offshore to minimise loss of subtial habitat near shore.	IWMF site	Design team	✓				EIAO-TM	N/A
7b.8.2.3	<u>Zero Discharge Scheme</u> • The design scheme of the Project has avoided discharge of wastewater into the marine environment. A zero discharge scheme would be adopted during the operation of the Project. An on-site wastewater treatment plant would be provided to treat the wastewater generated from the IWMF (mainly human sewage). The treated effluent would be re-used in the incineration	IWMF site	Design team, IWMF operator	✓		✓		WPCO	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	plant and mechanical treatment plant, or for onsite washdown and landscape.								
7b.8.2.4	<u>Measures to avoid loss of plant species of conservation importance</u> • Landing portal construction works would not cause direct lost to the recorded individual of protected plant species, • *Aquilaria sinensis*, at the coastal shrubland habitat at Cheung Sha. As a precautionary measure, the plant should be tagged with eye-catching tape and fenced off prior to works, in order to avoid any damage by workers.	Cheung Sha landing portal	Design team, Contractor	✓	✓		✓	EIAO-TM	N/A
7b.8.3.1-7b.8.3.15	<u>Measures to minimise water quality impact</u> • Measures for water quality as recommended in **Section 5b** of the EIA Report should be implemented.	Work site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM; ProPECC PN 1/94; WPCO	Implemented
7b.8.3.16 - 7b.8.3.30	<u>Measures to minimise disturbance on Finless Porpoise</u> *Minimisation of Habitat Loss for Finless Porpoise* • Substantial revision has been made on the layout plan and form of the breakwater, in order to minimise the potential loss of important habitat for Finless Porpoise. The revision has greatly reduced the size of the embayment area, as well as the Project footprint. As a result, the size of habitat loss for Finless Porpoise has	IWMF site, work site, marine traffic route	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM, Supporting Document for Application for Variation of the Environmental Permit (EP-429/2012)	Implemented for avoidance of construction works that may produce underwater acoustic disturbance, Vessel Travel Route implementation, training of staff, MMEZ and marine mammal watching works during deployment of silt curtain; N/A for others

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	reduced from the original ~50 ha, down to ~31 ha. *Avoidance of peak season for finless porpoise occurrence* • To minimise potential acoustic disturbance from construction activities on Finless Porpoise, construction works that may produce underwater acoustic disturbance should be scheduled outside the months with peak Finless Porpoise occurrence (December to May), including: - sheet piling works for construction of cofferdam surrounding the reclamation area (Phase 1); - sheet piling works for construction of the shorter section of breakwater (Phase 1); - sheet piling works for construction of the remaining section of breakwater (Phase 3); - bored piling works for berth area (Phase 3); and - submarine cable installation works between Shek Kwu Chau and Cheung Sha. Such works should be restricted within June to November. This approach would not only avoid the peak season for Finless Porpoise occurrence, the magnitude of impacts arise								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	from acoustic disturbance would also be minimised. • Submarine cable installation works are also recommended to be scheduled within June to November, when sightings of Finless Porpoise is scarce in the area of the proposed alignment of the submarine cable. • Since the DCM ground treatment and the installation of precast seawalls and breakwaters should generate no underwater acoustic disturbance to Finless Porpoise, no specific mitigation measures are required. *Opt for quieter construction methods and plants* • Considering the sensitivity of marine mammals to underwater acoustic disturbance, instead of the previously proposed conventional breakwater and reclamation peripheral structure, which requires noisy piling works, the current circular cells structure for breakwater and reclamation peripheral structure is proposed. A quieter sheet piling method using vibratory hammer or hydraulic impact hammer, should be adopted for the installation of circular cells for cellular cofferdam and northern breakwater during								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	Phase 1, and southern breakwater Phase 3; • Non-percussive bore piling method would be adopted for the installation of tubular piles for the berth construction during Phase 3. *Monitored exclusion zones* • During the installation/re-installation/relocation process of floating type silt curtains, in order to avoid the accidental entrance and entrapment of marine mammals within the silt curtains, a monitored exclusion zone of 250 m radius from silt curtain should be implemented. The exclusion zone should be closely monitored by an experienced marine mammal observer at least 30 minutes before the start of installation/re-installation/relocation process. If a marine mammal is noted within the exclusion zone, all marine works should stop immediately and remain idle for 30 minutes, or until the exclusion zone is free from marine mammals. • The experienced marine mammal observer should be well trained to detect marine mammals. Binoculars should be used to search the exclusion zone from an elevated platform with unobstructed visibility. The observer should also be independent								

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				Des	C	O	Dec		
	from the project proponent and has the power to call-off construction activities. • In addition, as marine mammals cannot be effectively monitored within the proposed monitored exclusion zone at night, or during adverse weather conditions (i.e. Beaufort 5 or above, visibility of 300 meters or below), marine works should be avoided under weather conditions with low visibility. *Marine mammal watching plan* • Upon the completion of the installation/re-installation/relocation of floating type silt curtain, all marine works would be conducted within a fully enclosed environment within the silt curtain, hence exclusion zone monitoring would no longer be required. Subsequently, a marine mammal watching plan should be implemented. The plan should include regular inspection of silt curtains, and visual inspection of the waters surrounded by the curtains. Special attention should be paid to Phase 2 (reclamation) where the floating type still curtain would be opened occasionally for vessel access, leaving a temporary 50 m opening. An action plan should be devised to cope with any unpredicted incidents such as the case when								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	marine mammals are found within the waters surrounded by the silt curtains. *Small openings at silt curtains* • The openings for vessel access at the silt curtains should be as small as possible to minimise the risk of accidental entrance. *Adoption of regular travel route* • During construction and operation, captains of all vessels should adopt regular travel route, in order to minimize the chance of vessel collision with marine mammals, which may otherwise result in damage to health or mortality. The regular travel route should avoid areas with high sighting density of Finless Porpoise as much as possible. *Vessel speed limit* • The frequent vessel traffic in the vicinity of works area may increase the chance of mammal mammals being killed or seriously injured by vessel collision. A speed limit of ten knots should be strictly enforced within areas with high density of Finless Porpoise. • Passive acoustic monitoring and land-based theodolite monitoring surveys should be								

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	adopted to verify the predicted impacts and effectiveness of the proposed mitigation measures. *Training of Staff* • Staff, including captains of vessels, should be aware of the guidelines for safe vessel operations in the presence of cetaceans during construction and operation phases. Adequate trainings should be provided								
7b.8.3.31 - 7b.8.3.34	<u>Measures to minimise impact on corals</u> *Coral translocation* • Coral communities within and in proximity to the proposed dredging sites would be disturbed by the Project due to the dredging operations. In order to minimise direct loss of coral communities, translocation of corals that are attached to movable rocks with diameter less than 50 cm are recommended. In order to avoid disturbance to corals during the spawning period, the spawning season of corals (June to August) should be avoided; and that translocation should be carried out during the winter season (November-March).	IWMF site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented, tagged coral found missing after hitting by typhoons Re-tagging of 10 coral colonies at indirect impact site and control site were conducted in November and December 2018 respectively.

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• The REA survey results suggest that the 198 directly affected coral colonies were attached to movable rocks (less than 50 cm in diameter). It is technically feasible to translocate them to avoid direct loss. • Prior to coral translocation, a more detailed baseline survey, including a coral mapping survey, is recommended to further confirm the exact number and location of coral colonies within the potentially affected area. A more detailed coral translocation plan, including selection of suitable recipient site, plan for coral translocation, and event / action plan for coral monitoring should be submitted upon approval of this Project, prior to commencement of construction works. Advice from relevant governmental departments (i.e. AFCD) and professionals would be sought after, in order to identify a desirable location for the relocation of coral communities. Post-translocation monitoring on the translocated corals should also be considered. *Coral monitoring programme* • A coral monitoring programme is recommended to assess any adverse and unacceptable impacts to the coral								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	communities at the coasts of Shek Kwu Chau during construction of the Project. *Phasing of Works* • To minimize environmental impacts, the proposed phasing of construction works has been carefully designed to reduce the amount of concurrent works, hence minimize SS elevation and the associated impacts on corals.								
7b.8.3.35 - 7b.8.3.41	<u>Specific measures to minimize disturbance on breeding White-bellied Sea Eagle</u> *Avoidance of noisy works during the breeding season of White-bellied Sea Eagle* • To minimize potential noise disturbance from construction activities on WBSE, noisy construction works should be scheduled outside their breeding season (December to May) to minimise potential degradation in breeding ground quality and breeding activities, including: - sheet piling works for construction of cofferdam surrounding the reclamation area (Phase 1); - sheet piling works for construction of the shorter section of breakwater (Phase 1);	IWMF site, marine traffic route	Design Team, Contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	- sheet piling works for construction of the remaining section of breakwater (Phase 3); and - bored piling works for berth area (Phase 3). *Opt for quieter construction methods and plants* • To minimise potential construction noise disturbance on WBSE, quieter construction methods and plants should be adopted. The recommended noise mitigation measures in the **Noise** chapter (**Section 4b.8** of the EIA Report) should be implemented to minimise potential noise disturbance to acceptable levels. *Restriction on vessel access near the nest of White-bellied Sea Eagle* • During construction and operation, in order to minimize disturbance on the existing WBSE nest, a pre-defined practical route to restrict vessel access near the nest should be adopted to keep vessels and boats as far away from the nest as possible. *White-bellied Sea Eagle monitoring programme* • A WBSE monitoring programme is recommended to assess any adverse and unacceptable impacts to the breeding								

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	activities of WBSE during construction and operation of the Project. Monitoring surveys for WBSE would include pre-construction phase (twice per month for duration of three months during their breeding season -between December and May, immediately before the commencement of works), construction phase, and operation phase (two years after the completion of construction works). • Surveys should be conducted twice per month during their breeding season (from December to May); and once per month outside breeding season (June to November). More details on monitoring for WBSE are presented in the EM&A Manual. *Education of staff* • Staff, including captains of all vessels during construction and operation phases, should be aware of the ecological importance of WBSE. Awareness should be raised among staff to minimise any intentional or unintentional disturbance to the nest. *Minimisation of Glare Disturbance* • To minimise glare disturbance on WBSE, which may cause disorientation of birds								

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	by interfering with their magnetic compass, and disruption in behavioural patterns such as reproduction, fat storage and foraging pattern, any un-necessary outdoor lighting should be avoided, and in-ward and down-ward pointing of lights should be adopted.								
-	Construction of Seawall/Breakwaters • To widen the open channel between the Artificial Island and Shek Kwu Chau. • To design the precast concrete seawall with environmental friendly features.	IWMF site	Design team, contractor, IWMF operator	✓	✓			Supporting Document for Application for Variation of Environmental Permit (EP-429/2012)	N/A
7b.8.3.42	Opt for Quieter Construction Methods and Plants • Quieter construction methods and plants should be used to minimise disturbance to the nearby terrestrial habitat and the associated wildlife.	Work site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented
7b.8.3.43	Measures to minimize impacts from artificial lighting • Unnecessary lighting should be avoided, and shielding of lights should be provided to minimize disturbance from light pollution on fauna groups.	IWMF site	Design team, contractor, IWMF operator	✓	✓	✓		EIAO-TM	Implemented
7b.8.3.44 - 7b.8.3.45	Measures to minimize accidental spillage • Regular maintenance of vessels, vehicles and equipment that may cause leakage and spillage should only be undertaken within	Work site	Contractor, IWMF operator		✓	✓	✓	EIAO-TM	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	pre-designated areas, which are appropriately equipped to control the associated discharges. • Oils, fuels and chemicals should be contained in suitable containers, and only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be sited on sealed areas in order to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels should be collected in designated tanks prior to disposal.								
7b.8.3.46	<u>Measures to minimise sewage effluent</u> • Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce.	Work site	Contractor		✓			EIAO-TM	N/A
7b.8.3.47	<u>Measures to minimise drainage and construction runoff</u> • Potential ecological impacts resulted from potential degradation of water quality due to unmitigated surface runoff could be minimised via the detailed mitigation measures in **Section 5b.8** of the EIA Report. The following presents some of the mitigation measures:	Work site	Contractor		✓		✓	EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	- On-site drainage system with implemented sedimentation control facilities. - Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. - Provision of embankment at boundaries of earthworks for flood protection. - Water pumped out from foundation piles must be discharged into silt removal facilities. - During rainstorms, exposed slope/soil surfaces should be covered by tarpaulin or other means, as far as practicable. - Exposed soil surface should be minimized to reduce siltation and runoff. - Earthwork final surfaces should be well compacted. Subsequent permanent surface protection should be immediately performed. - Open stockpiles of construction materials, and construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.								
7b.8.3.48	<u>Measures to minimise impacts from general construction activities</u> • To avoid the entering of construction solid waste into the nearby habitats, construction solid waste should be collected, handled	Work site	Contractor		✓			EIAO-TM	Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	and disposed of properly to avoid entering to the nearby habitats. It is recommended to clean the construction sites on a regular basis.								
7b.8.3.49	<u>Pest Control</u> Good waste management practices should be adopted at the IWMF in order to minimise the risk of introduction of pest to the island: - Transportation of wastes in enclosed containers - Waste storage area should be well maintained and cleaned - Waste should only be disposed of at designated areas - Timely removal of the newly arrived waste - Removal of items that are capable of retaining water - Rapid clean up of any waste spillages - Maintenance of a tidy and clean site environment - Regular application of pest control - Education of staff the importance of site cleanliness	IWMF site	IWMF operator			✓			N/A
7b.8.3.50	<u>Control of Marine Habitat Quality during Operation Phase</u> • Depending on the seabed condition of the approach channel for marine vessels during operation phase of the IWMF, maintenance dredging may be required to	IWMF site	IWMF operator			✓		EIAO-TM; WPCO	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
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	ensure safe access. In order to avoid degradation in water quality due to elevation in SS and dispersion of sediment plume due to dredging works, it is recommended that any future maintenance dredging works should not be carried out within 100 m from the shore, similar to that of the dredging for anti-scouring protection layer during construction phase. All maintenance dredging works should be carried out with the implementation of silt curtain to control the dispersion of SS. The production rate should comply with the permit dredging rate and number of grab per hour.								
7b.8.4.1 – 7b.8.4.8	<u>Compensation of loss of important habitat of Finless Porpoise</u> *Designation of Marine Park* • The Project Proponent has made a firm commitment to seek to designate a marine park of approximately 700 ha in the waters between Soko Islands and Shek Kwu Chau, in accordance with the statutory process stipulated in the Marine Parks Ordinance, as a compensation measure for the habitat loss arising from the construction of the IWMF at the artificial island near SKC. • The Project Proponent shall seek to complete the designation by 2018 to tie in	Waters between Shek Kwu Chau and Soko Islands	Project Proponent	✓		✓		EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	with the operation of the IWMF at the artificial island near SKC. • A further study should be carried out to review relevant previous studies and collate available information on the ecological characters of the proposed area for marine park designation; and review available survey data for Finless Porpoise, water quality, fisheries, marine traffic and planned development projects in the vicinity. Based on the findings, ecological profiles of the proposed area for marine park designation should be established, and the extent and location of the proposed marine park be determined. The adequacy of enhancement measures should also be reviewed. • In addition, a management plan for the proposed marine park should be proposed, covering information on the responsible departments for operation and management (O&M) of the marine park, as well as the O&M duties of each of the departments involved. Consultation with relevant government departments and stakeholders should be conducted under the study. The study should be submitted to Director of Environmental Protection (DEP) for approval before the commencement of construction works.								

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	• The Project Proponent should provide assistance to AFCD during the process of the marine park designation. .								
7b.8.5.1 – 7b.8.5.4	Additional Enhancement or Precautionary Measures *Deployment of Artificial Reefs* • Deployment of artificial reefs (ARs) is an enhancement measure for the marine habitats. ARs are proposed to be deployed within the proposed marine park under this Project. The exact location, dimension and type of ARs to be deployed are to be further investigated along with the further study of the proposed marine park under this Project. The proposed ARs would be deployed at the same time as the complete designation of marine park. *Release of Fish Fry at Artificial Reefs and Marine Park* • Release of fish fry at the proposed ARs, as well as the proposed marine park under this study, should enhance the fish resources in the nearby waters, and subsequently food sources for Finless Porpoise. The proposed ARs with various micro-habitats would have the potential to provide shelter and nursery ground for the released fish fry.	Within the proposed marine park under this study	Project Proponent	✓		✓		EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
	The frequency and quantity of fry to be released should be agreed by AFCD.								

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Table B.6 Implementation Schedule for Fisheries Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
8b.8.1.2	Measure to minimize loss of and disturbance on fisheries resources • Alteration to the phasing of works, construction method, and layout plan of the IWMF at the artificial island near SKC has been made. The total fishing ground to be permanently lost due to the project has been significantly reduced from ~50 ha to ~31 ha. By adopting the current circular cells instead of the conventional seawall construction method, SS elevation would be greatly reduced, minimizing adverse impact on the health of fisheries resources.	IWMF site	Design team, contractor	✓	✓		✓	EIAO-TM	N/A
8b.8.1.3	Measure to minimize impingement and entrainment • Provision of a screen at the water intake point for desalination plant would be essential to minimize the risk of impingement and entrainment of fisheries resources (including fish, larvae and egg) through the intake point.	IWMF site	Design team, contractor, IWMF operator	✓	✓	✓		EIAO-TM	N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
8b.8.1.4-8b.8.1.6	<u>Measures to control water quality</u> • No wastewater effluent, anti-fouling agent, heavy metals and other contaminants would be released during operation phase of the Project. • Mitigation measures recommended in the water quality impact assessment during construction and operation would serve to protect fisheries resources from indirect impacts resulted from the Project	Work site, IWMF site	Design team, contractor, IWMF operator	✓	✓	✓	✓	EIAO-TM	Implemented
8b.8.1.7 – 8b.8.1.8	<u>Additional Enhancement / Precautionary Measures</u> • Artificial Reefs (ARs) are proposed to be deployed within the proposed marine park under this Project as an enhancement measure for the marine habitats. This enhancement feature would bring positive impacts to the previously identified important spawning and nursery ground for fisheries resources. *Release of Fish Fry at Artificial Reefs* • Release of fish fry has been proposed under this Project. The proposed deployment of ARs within the proposed marine park would provide shelter and nursery ground for the released fish fry. The frequency and quantity of fry to be released should be agreed by AFCD.	Within the proposed marine park in the waters between Soko Islands and Shek Kwu Chau	Project Proponent	✓		✓		EIAO-TM	N/A

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Table B.7 Implementation Schedule for Landscape and Visual Measures for the IWMF at the artificial island near SKC

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S10b.10 MLVC- 01	Grass-hydroseeded bare soil surface and stock pile area	Work site / During construction phase	Contractor		✓				N/A
S10b.10 MLVC-02	<u>Landscape Design</u> 1) Early planting using fast grow trees and tall shrubs at strategic locations within site as buffer to block view corridors to the site from the VSRs, and to locally screen haul roads, excavation works and site preparation works. 2) Use of tree species of dense tree crown to serve as visual barrier. 3) Hard and soft landscape treatment (e.g. trees and shrubs) of open areas within development to provide a background for the outdoor containers from open view, shade and shelter, and a green appearance from surrounding viewpoints. 4) Planting strip along the periphery of the project site. 5) Selected tree species suitable for the coastal condition.	Work site / During design & construction phases	Contractor	✓	✓				N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S10b.10 MLVC-03	<u>Adoption of Natural Features of the Existing Shoreline</u> 1) Use of boulders in different sizes and with the similar textures of the existing rocky shores for the construction of breakwater and artificial shoreline in order to blend into the existing natural shoreline. 2) Use of cellular cofferdam together with the natural boulders to form a curvature shoreline for the reclamation area to echo with the natural shoreline of SKC.	Work site / During construction phase	Contractor		✓				N/A
S10b.10 MLVC-04	<u>Greening Design (Rooftop & Vertical Greening)</u> 1) Implementation of rooftop and vertical greening (vertical building envelope) along the periphery of each building block to increase the amenity value of the work, moderate temperature extremes and enhance building energy performance. The greening appearance of the building shall enhance its visual harmony with the natural surroundings as well as reduce the apparent visual mass of the structure. 2) Sufficient space between concrete enclosure and stack to minimize heat transfer. 3) Introduction of landscape decks at the stack to further enhance the overall natural and green concept unique for this site.	Work site / During design & construction phases	Contractor	✓	✓				N/A

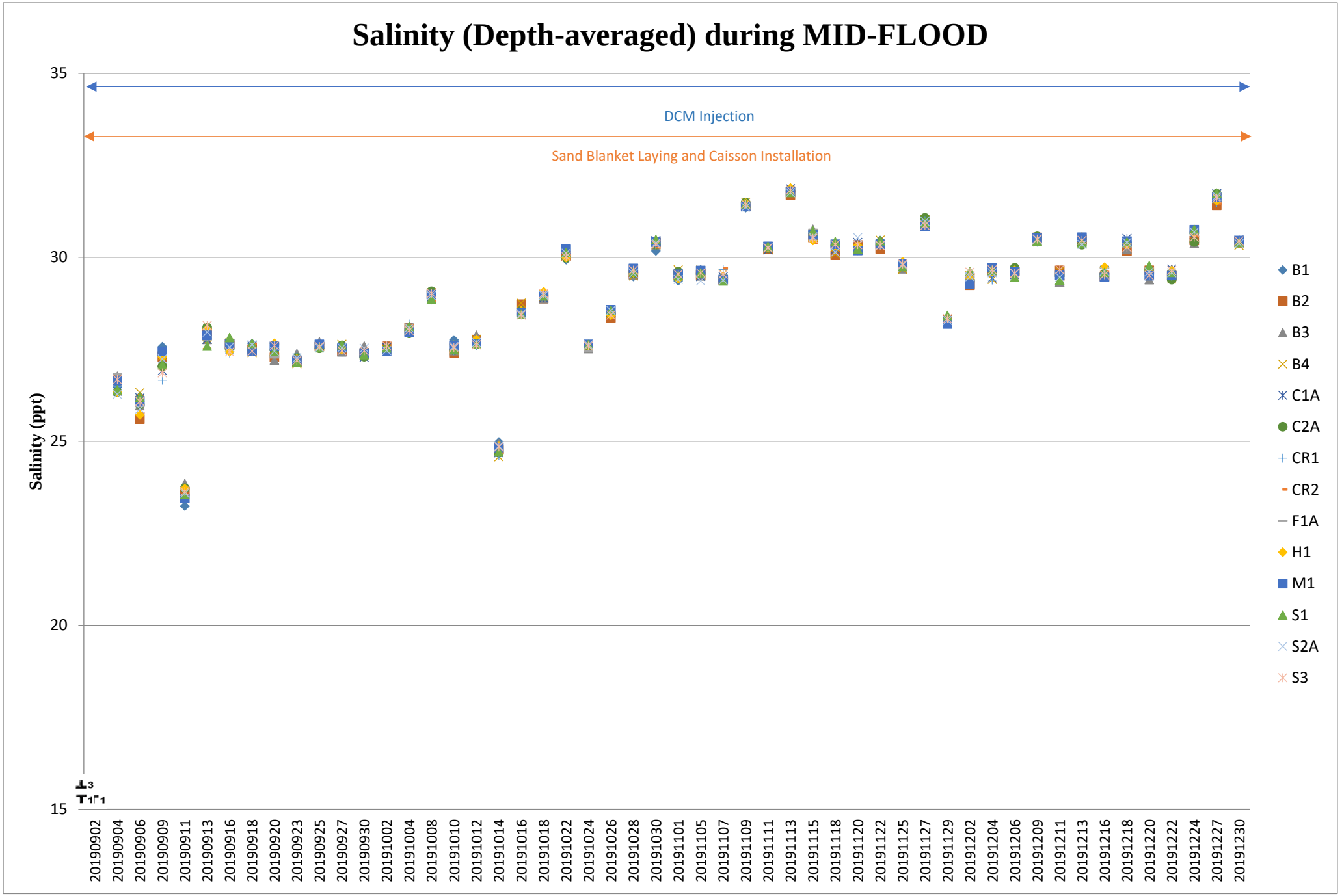
EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S10b.10 MVC-01	<u>Visual Mitigation and Aesthetic Design</u> 1) Use of natural materials with recessive color to minimize the bulkiness of the building. 2) Adoption of innovative aesthetic design to the chimney to minimize or visually mitigate the massing of the chimney so as to reduce its visual impact to the surroundings. 3) Color of the chimney in a gradual changing manner to match with the color of the sky. 4) Provision of observation deck for public enjoyment at the top of the chimney to diminish the feeling of chimney. 5) Provision of sky gardens between the two stacks to allow additional greening for enhancing the aesthetic quality. Maintenance access (elevator and staircase) from the ground floor to the sky gardens will be provided to allow maintenance of the sky gardens. 6) Integration of the visitor's walkway with different material façade design of incinerator plant to enhance the aesthetic quality.	Structures in IWMF / During design & constructio n phases	Contractor	✓	✓				N/A
S10b.10 MVC-02	Control of the security floodlight for construction areas at night to avoid excessive glare to the surrounding receiver.	Work site / During construction phase	Contractor		✓				Implemented

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S10b.10 MVC-03	Optimization of the construction sequence and construction programme to minimize the duration of impact.	Work site / During design & construction phases	Contractor	✓	✓				Implemented
S10b.10 MVC-04	Storage of the backfilling materials for site formation & construction materials / wastes on site at a maximum height of 2m, covered with an impermeable material of visually un-obtrusive material (in earth tone).	Work site / During construction phase	Contractor		✓				N/A
S10b.10 MVC-05	Reduction of the number of construction traffic at the site to practical minimum.	Work site / During construction phase	Contractor		✓				Implemented
S10b.10 MLVO-01	<u>Planting Maintenance</u> Provision of proper planting maintenance and replacement of defective plant species on the new planting areas to enhance aesthetic and landscape quality.	Project site / During Operation phase	Contractor			✓			N/A
S10b.10 MVO-01	<u>Environmental Education Centre</u> Development of an Environmental Education Center, in which regular exhibitions and lectures to promote environmental awareness and waste reduction concept would be provided, as a part of the IWMF for the general public to alleviate negative public perceptions of the development.	Project site / During Operation phase	Contractor			✓			N/A
S10b.10 MVO-02	<u>Control of Light</u> Control the numbers of lights and their intensity to a level that is good enough to meet the safety requirements at night but not excessive.	Project site / During Operation phase	Contractor			✓			N/A

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines	Implementation Status and Remarks
				Des	C	O	Dec		
S10b.10 MVO-03	Control of Operation Time Minimization of the frequency of waste transportation to practical minimum (e.g. limit the reception of MSW from 8 am to 8 pm)	Project site / During Operation phase	Contractor			✓			N/A

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Appendix C Water Quality Monitoring Data Trending


Salinity (Depth-averaged) during MID-FLOOD
Salinity (ppt)
35
30
25
20
15
DCM Injection
Sand Blanket Laying and Caisson Installation
B1
B2
B3
B4
C1A
C2A
CR1
CR2
F1A
H1
M1
S1
S2A
S3
20190902
20190904
20190906
20190909
20190911
20190913
20190916
20190918
20190920
20190923
20190925
20190927
20190930
20191002
20191004
20191008
20191010
20191012
20191014
20191016
20191018
20191022
20191024
20191026
20191028
20191030
20191101
20191105
20191107
20191109
20191111
20191113
20191115
20191118
20191120
20191122
20191125
20191127
20191129
20191202
20191204
20191206
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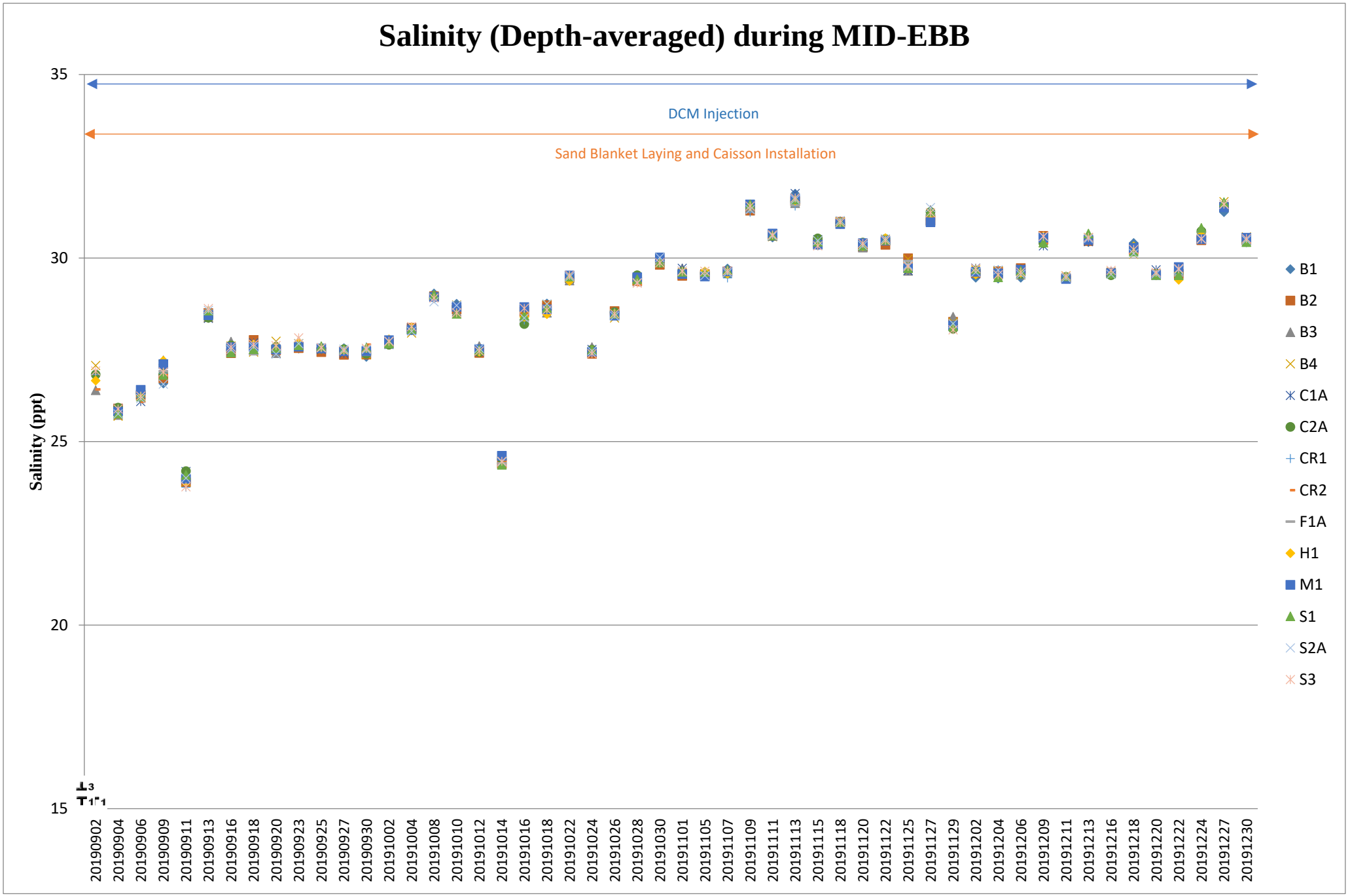
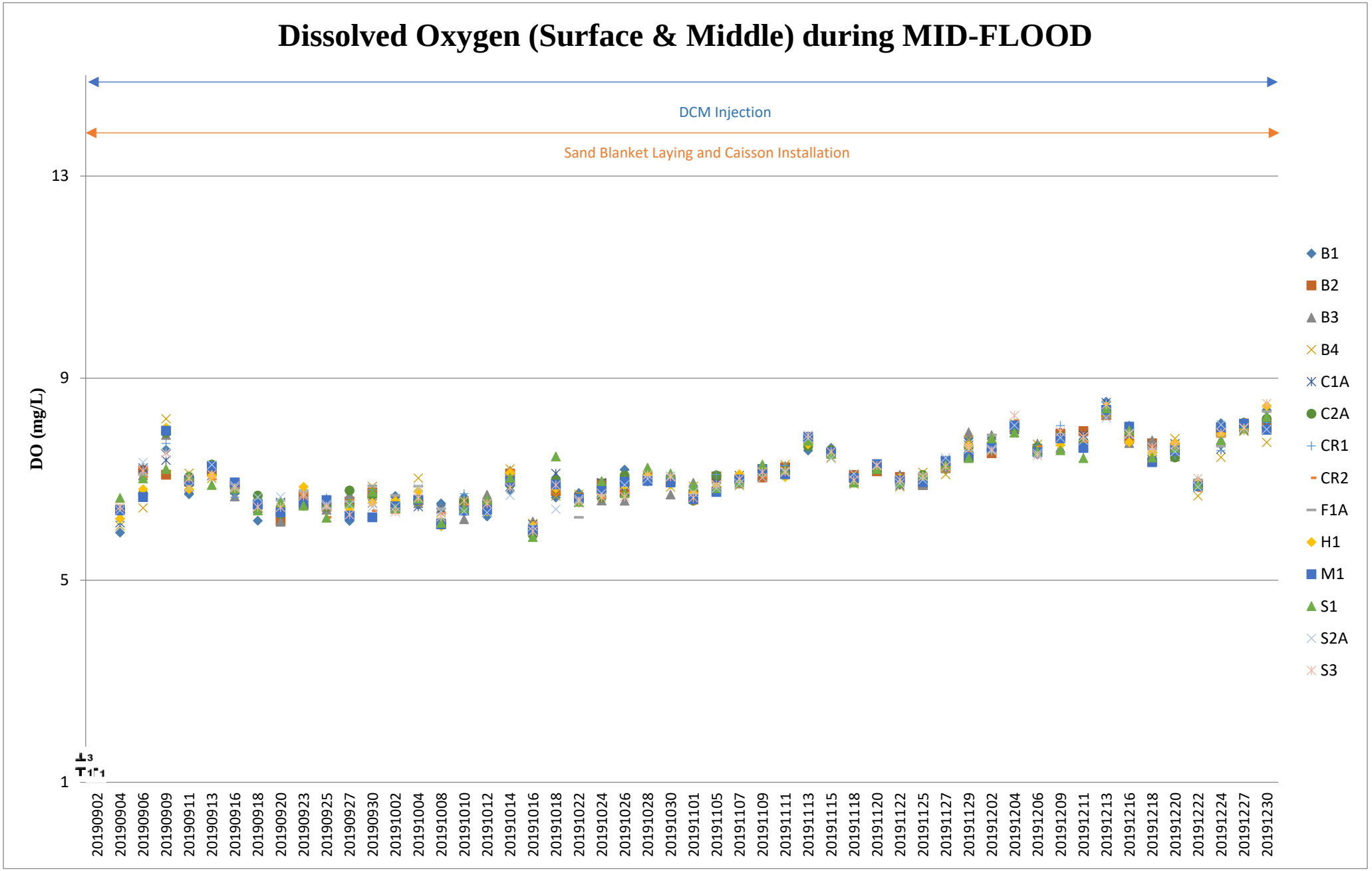
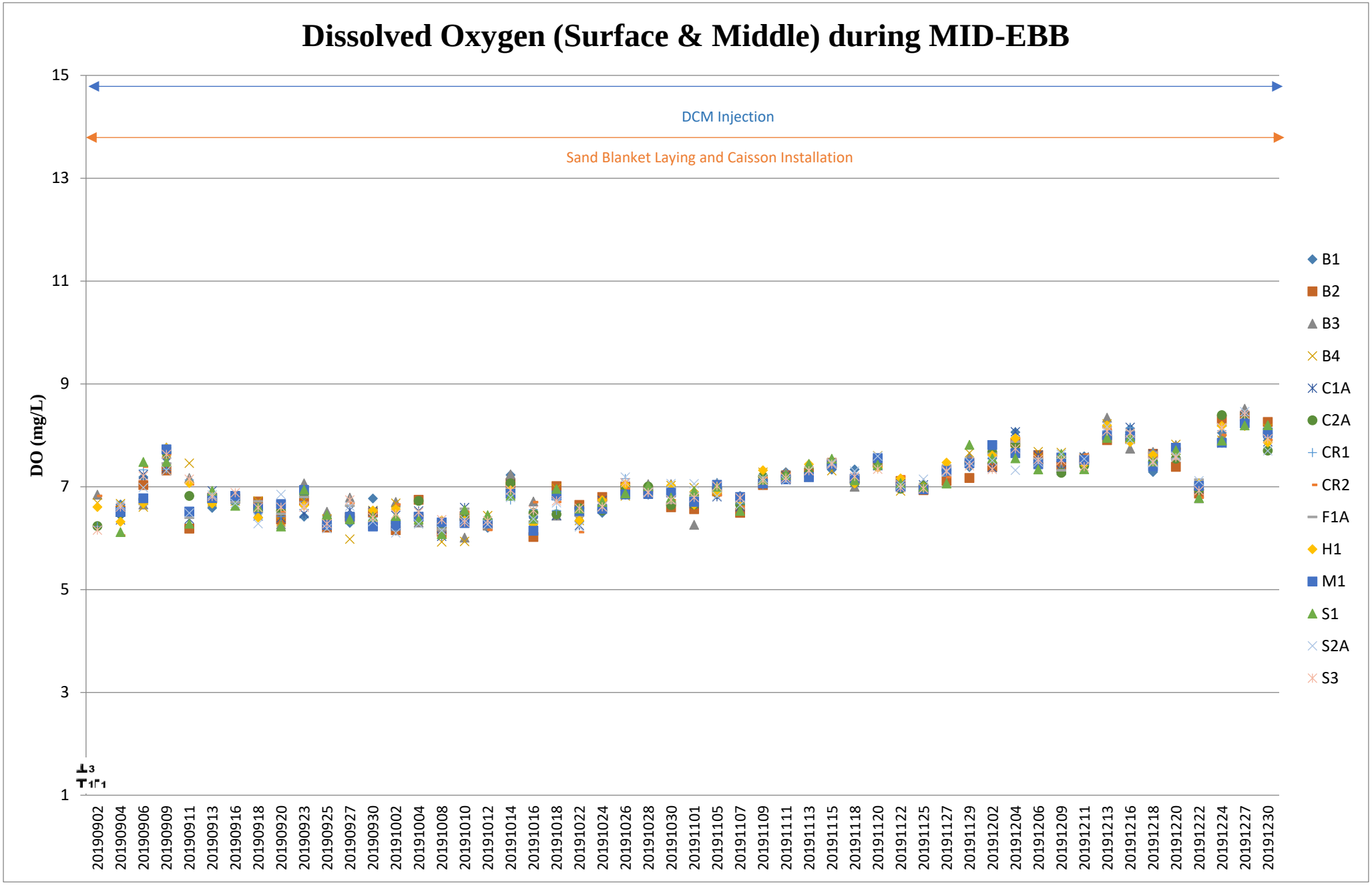
20191211
20191213
20191216
20191218
20191220
20191222
20191224
20191227
20191230

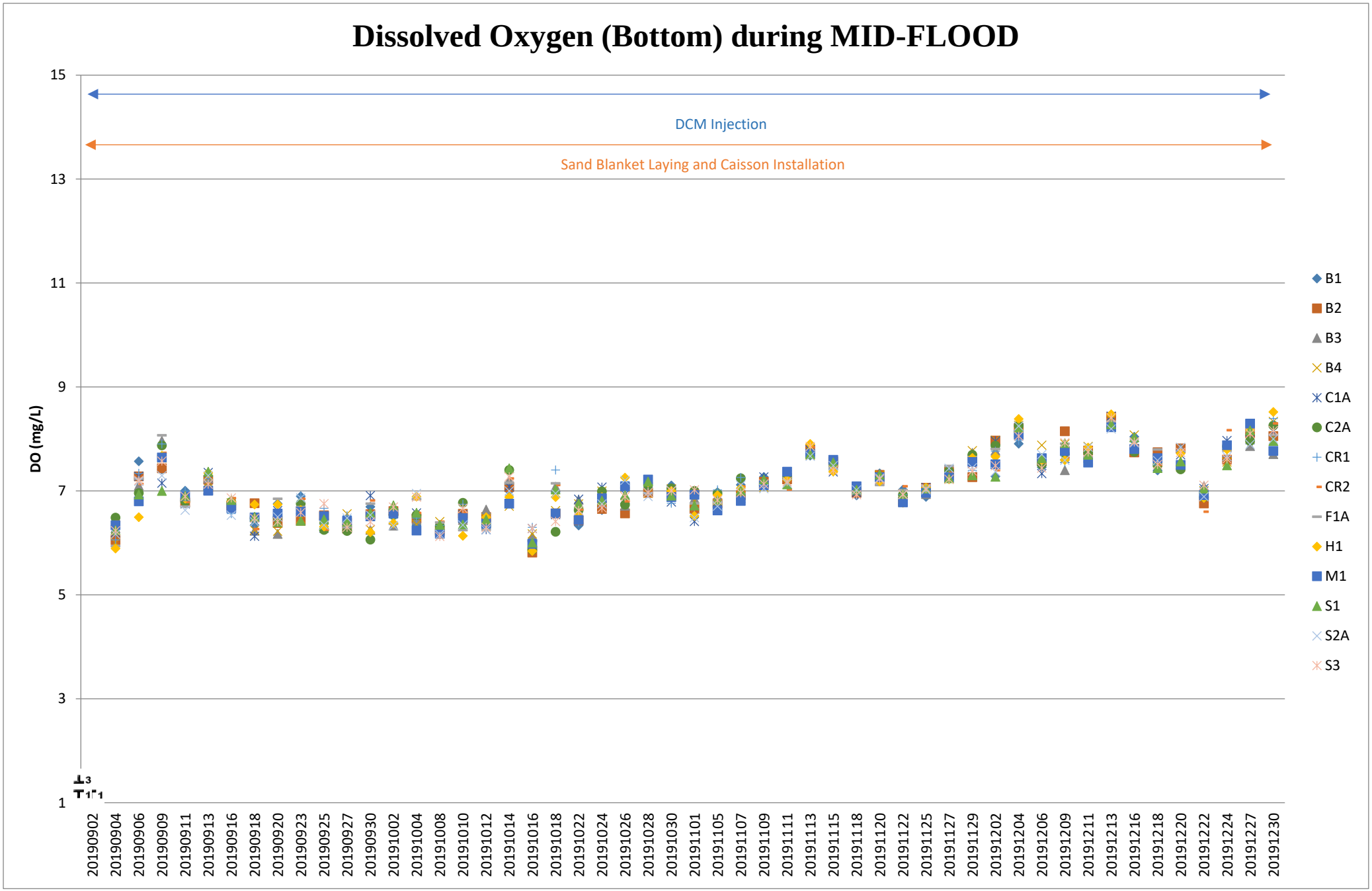

Salinity (Depth-averaged) during MID-EBB
DCM Injection
Sand Blanket Laying and Caisson Installation
Salinity (ppt)
35
30
25
20
15
B1
B2
B3
B4
C1A
C2A
CR1
CR2
F1A
H1
M1
S1
S2A
S3
20190902
20190904
20190906
20190909
20190911
20190913
20190916
20190918
20190920
20190923
20190925
20190927
20190930
20191002
20191004
20191008
20191010
20191012
20191014
20191016
20191018
20191022
20191024
20191026
20191028
20191030
20191101
20191105
20191107
20191109
20191111
20191113
20191115
20191118
20191120
20191122
20191125
20191127
20191129
20191202
20191204
20191206
20191209
20191211
20191213
20191216
20191218
20191220
20191222
20191224
20191227
20191230



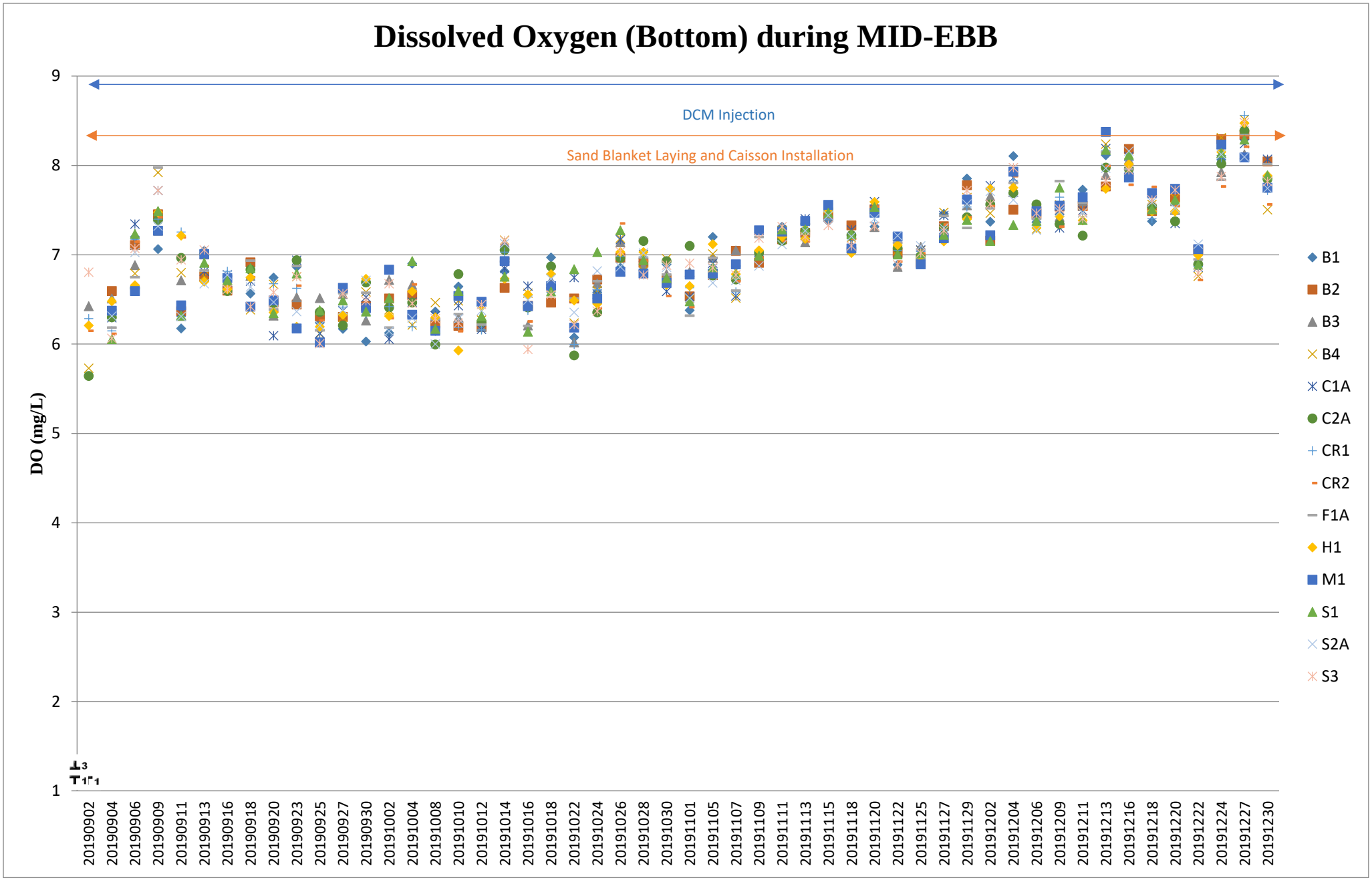
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.



Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.

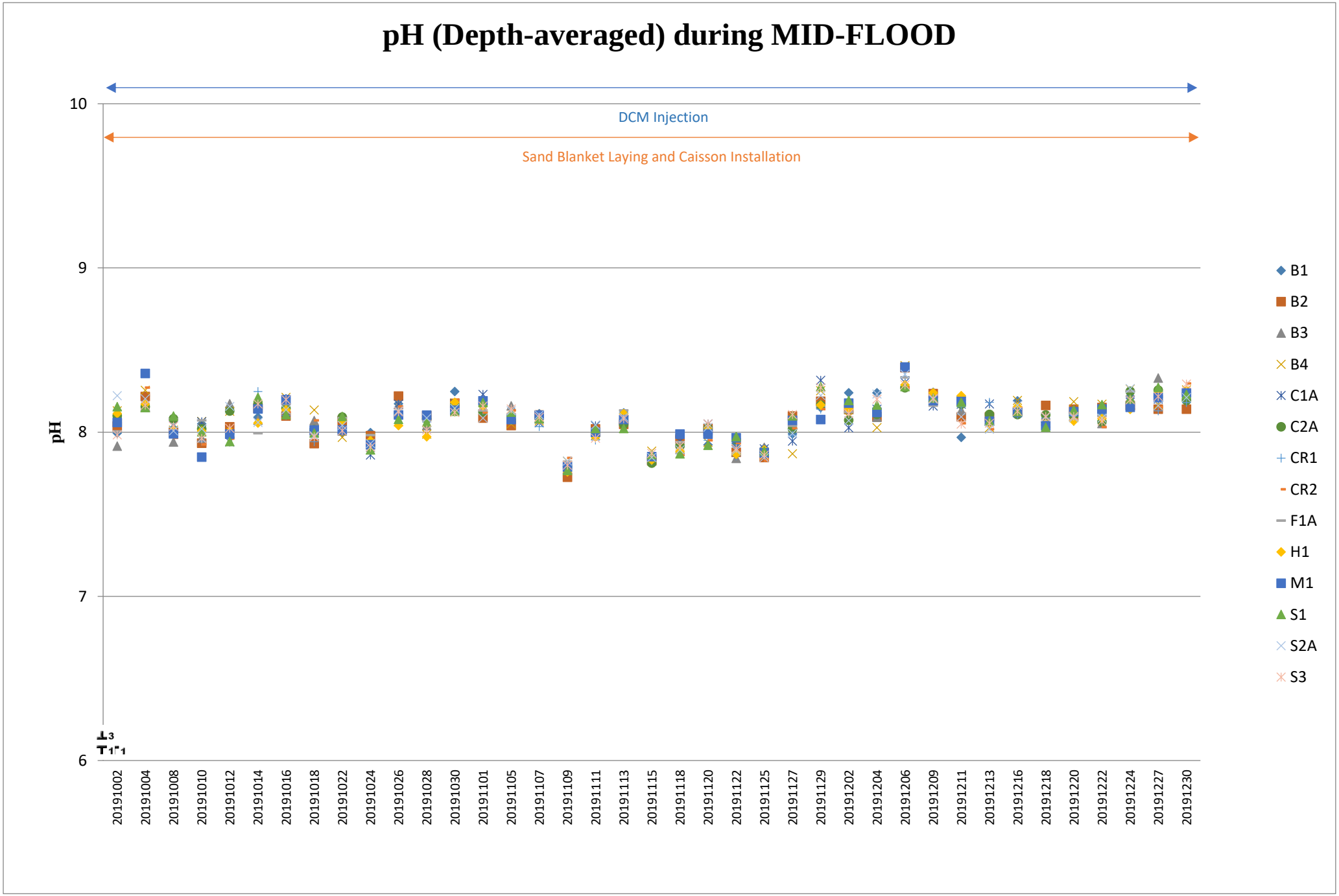


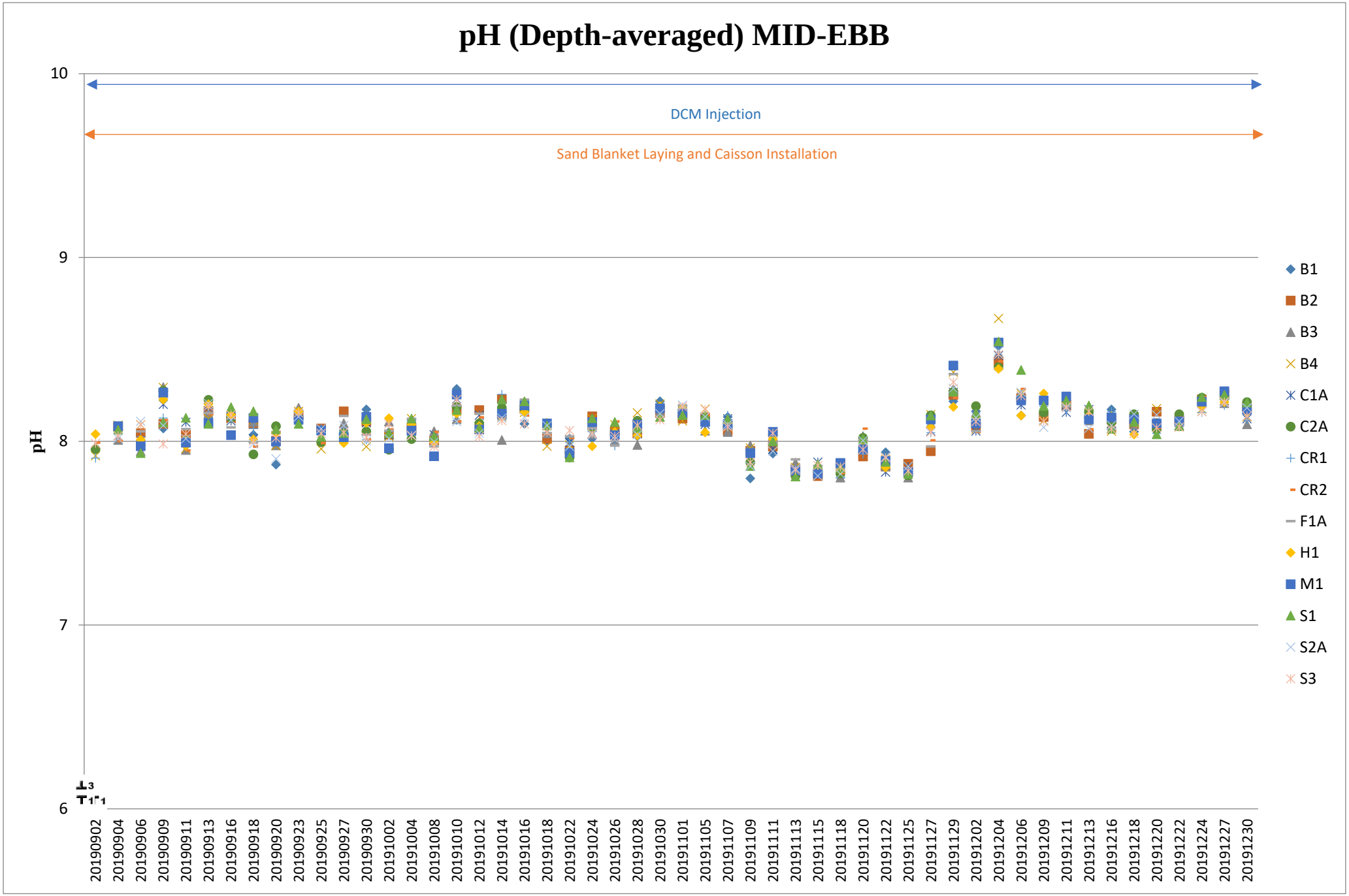
Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.



Note: The Action and Limit Level of dissolved oxygen can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.

pH (Depth-averaged) during MID-FLOOD




pH (Depth-averaged) MID-EBB
10
9
8
7
6
pH
DCM Injection
Sand Blanket Laying and Caisson Installation
B1
B2
B3
B4
C1A
C2A
CR1
CR2
F1A
H1
M1
S1
S2A
S3
20190902
20190904
20190906
20190909
20190911
20190913
20190916
20190918
20190920
20190923
20190925
20190927
20190930
20191002
20191004
20191008
20191010
20191012
20191014
20191016
20191018
20191022
20191024
20191026
20191028
20191030
20191101
20191105
20191107
20191109
20191111
20191113
20191115
20191118
20191120
20191122
20191125
20191127
20191129
20191202
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20191206
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20191211
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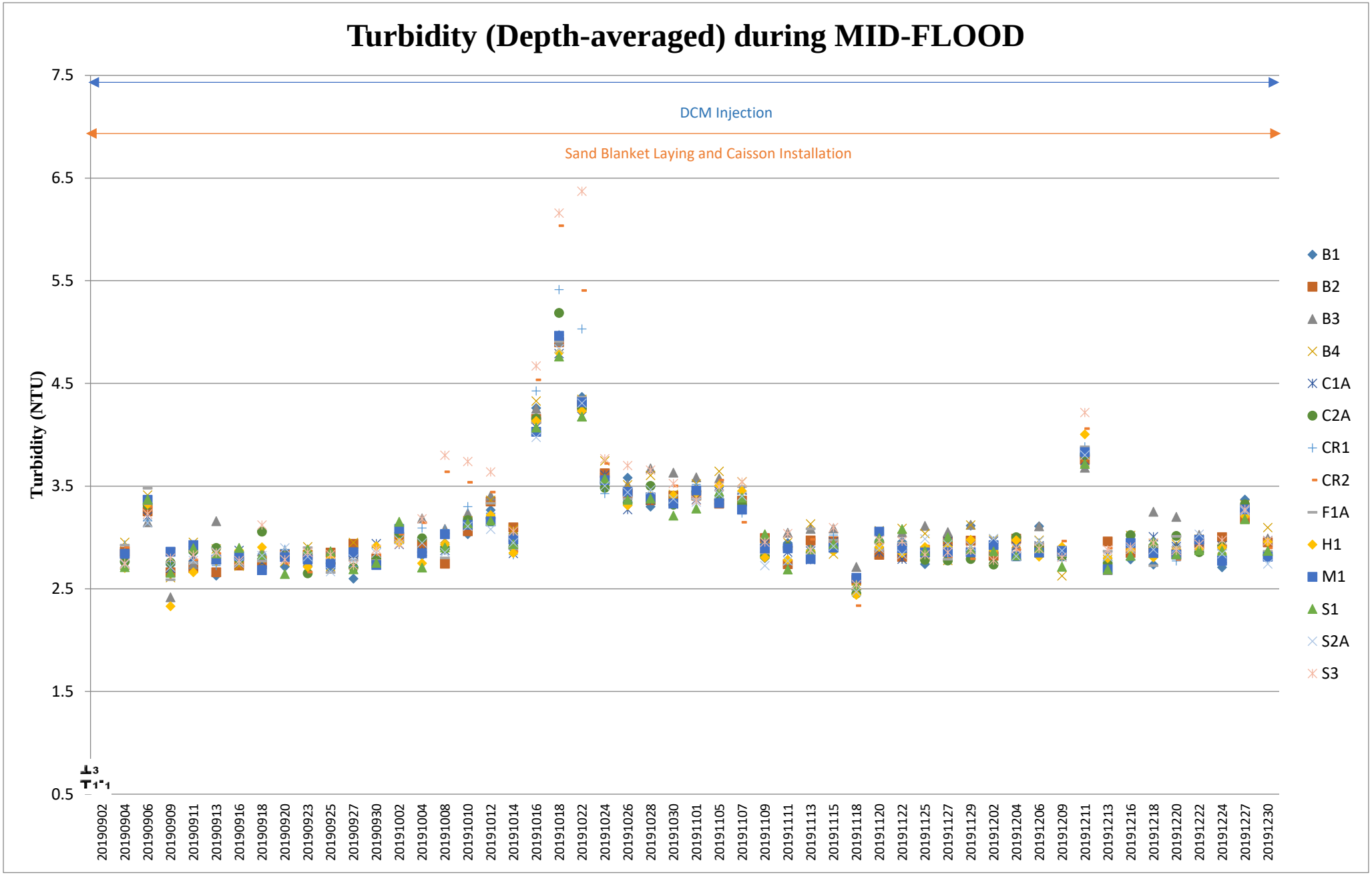
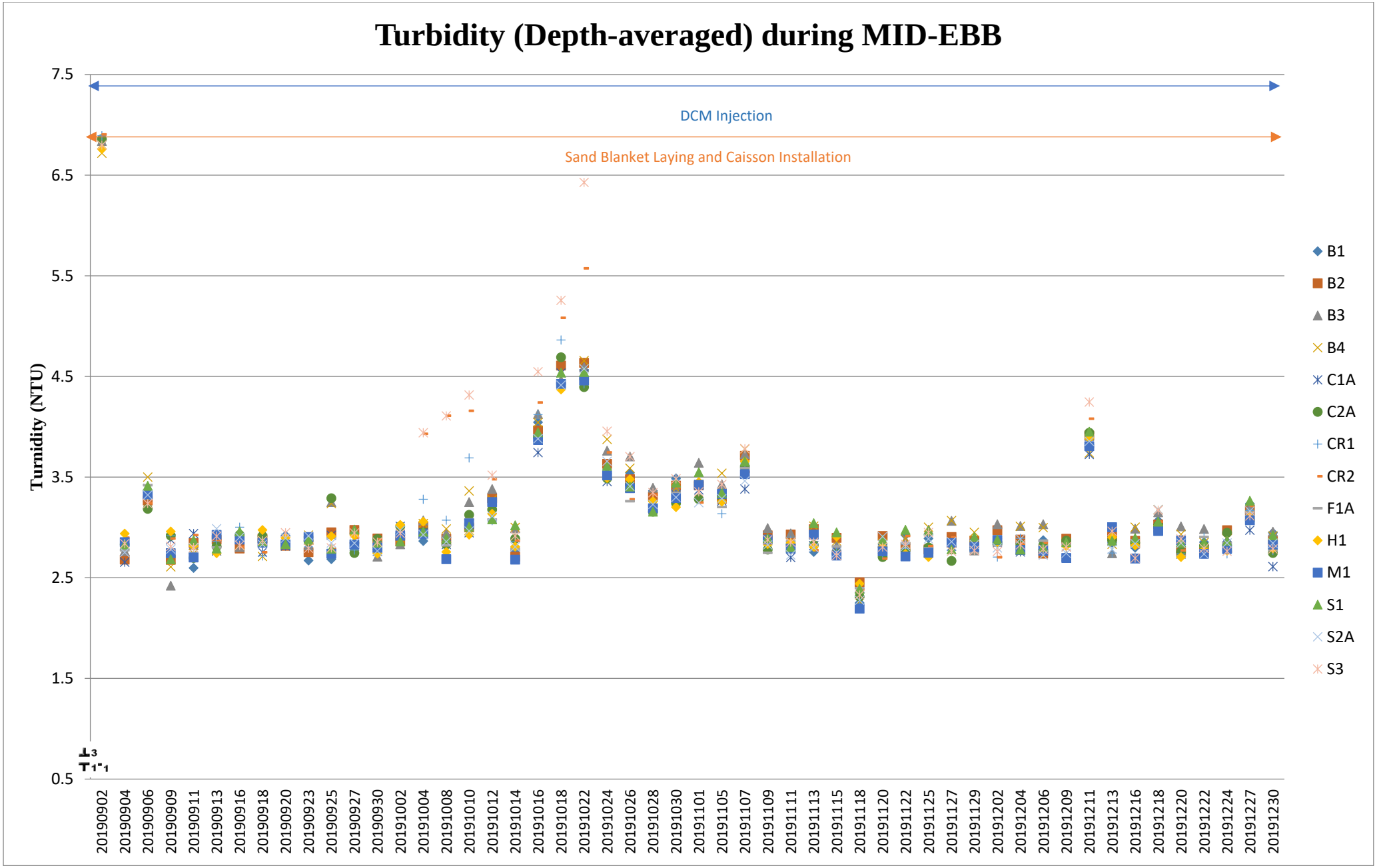
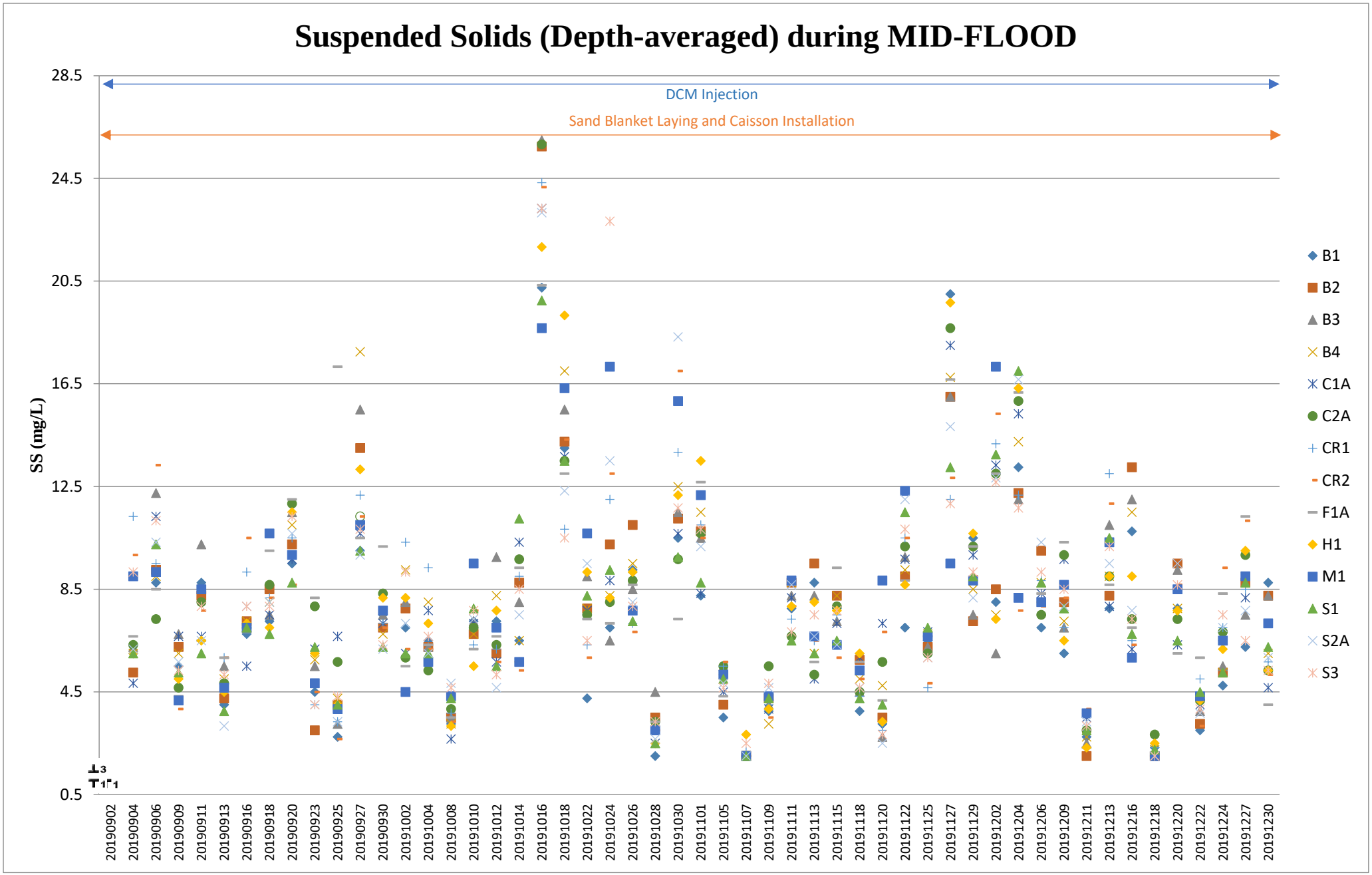
20191222
20191224
20191227
20191230



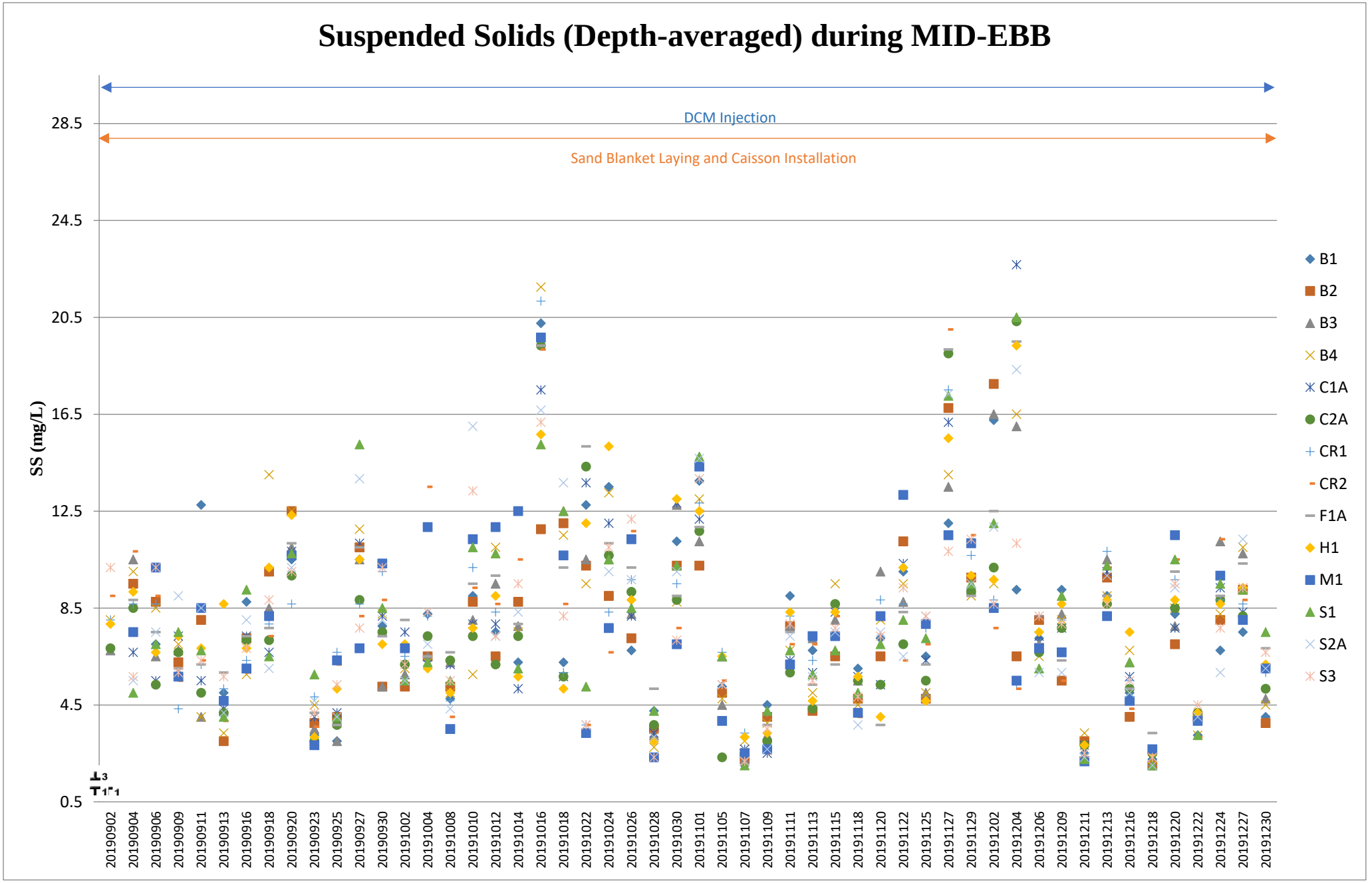
Note: The Action and Limit Level of turbidity can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.



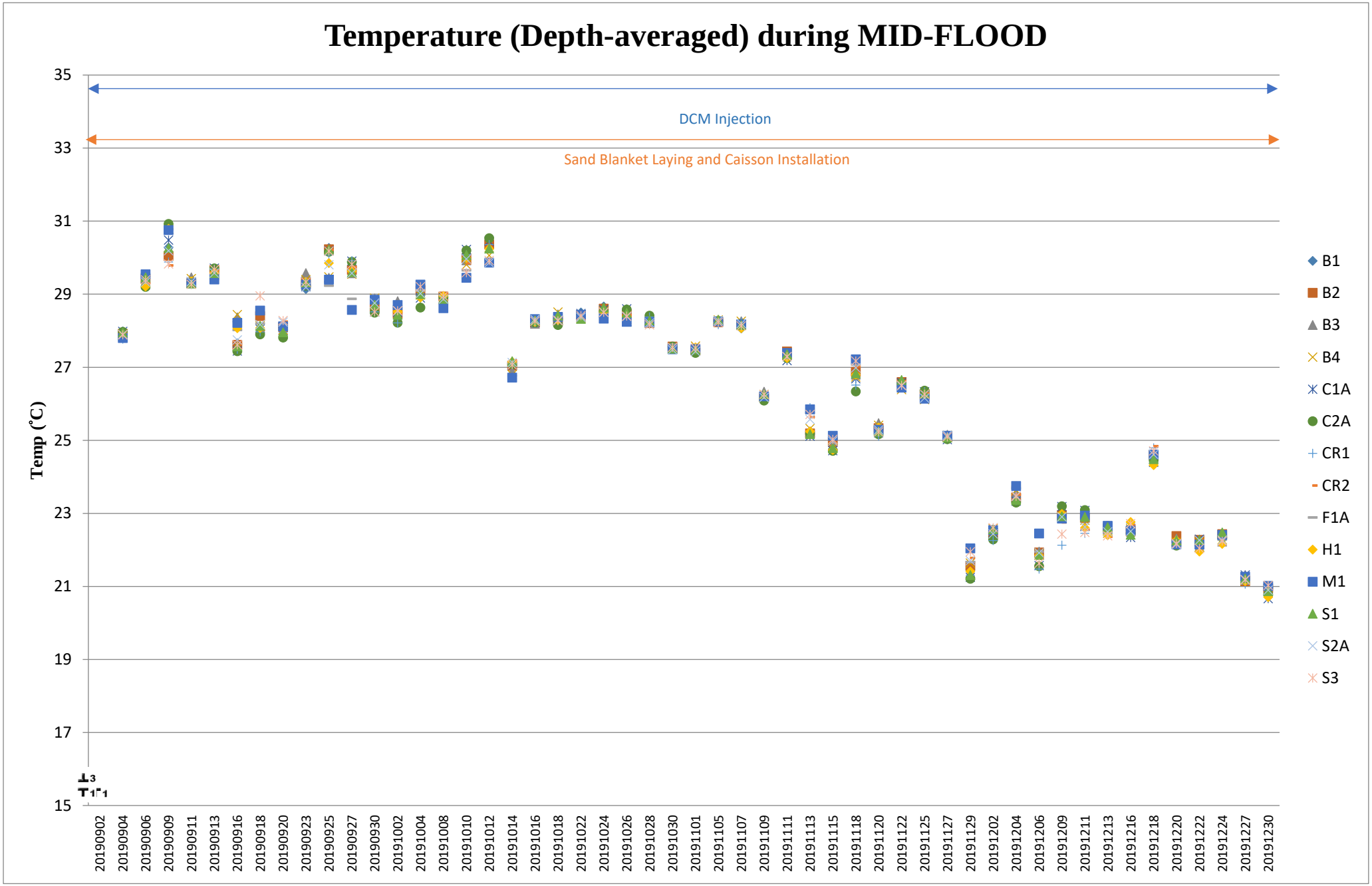
Note: The Action and Limit Level of turbidity can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.



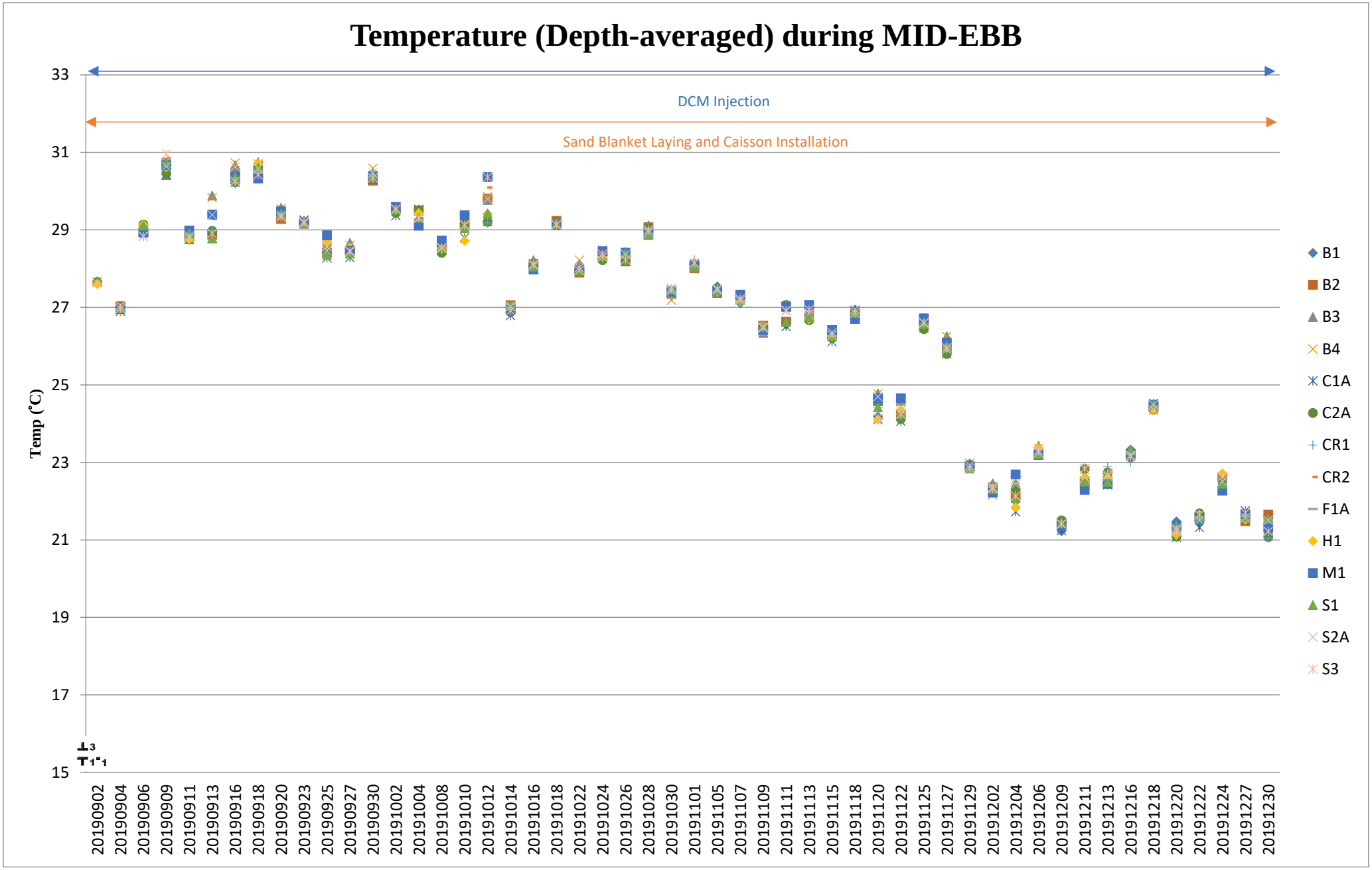
Note: The Action and Limit Level of suspended solids can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.



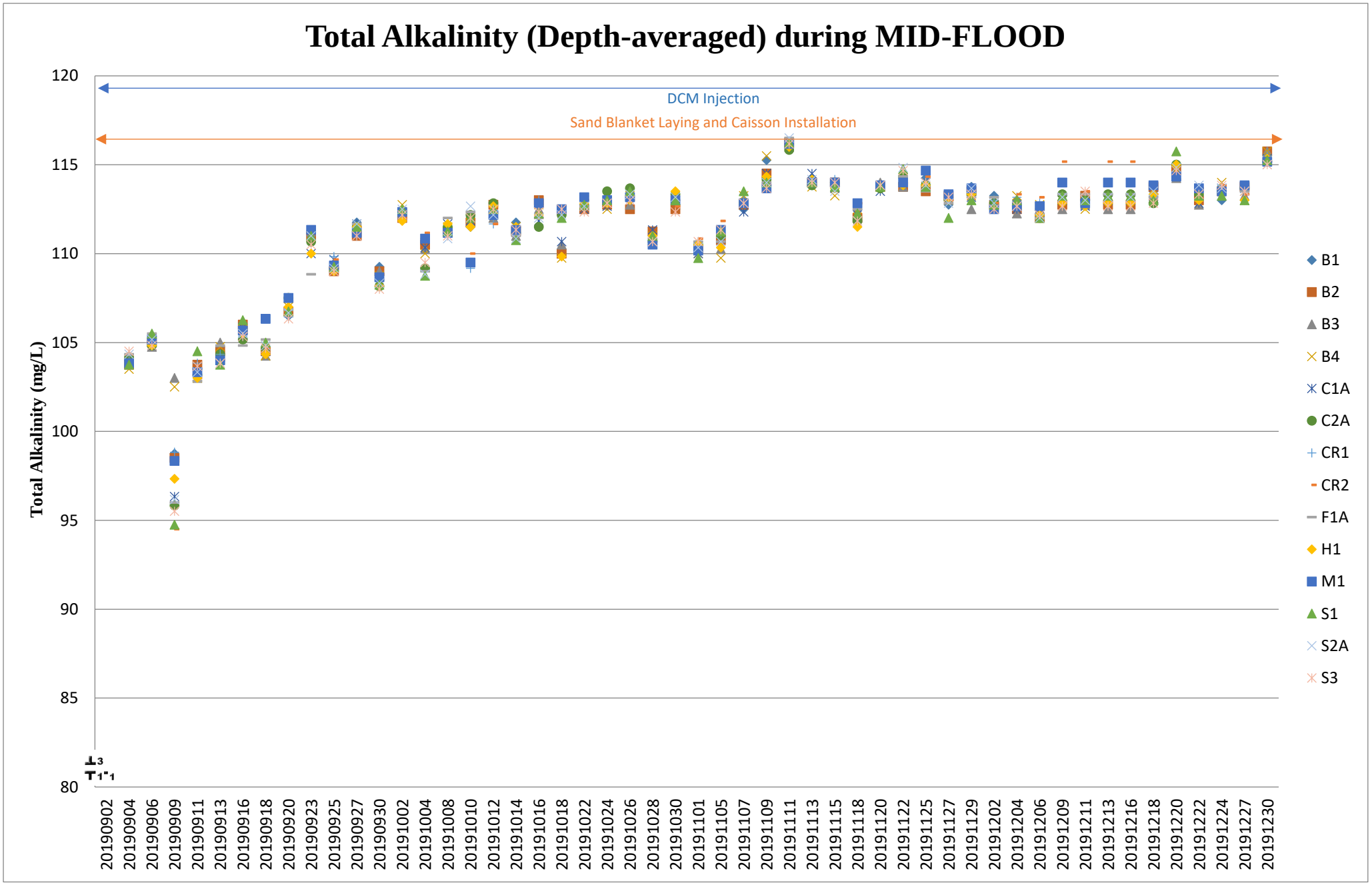
Note: The Action and Limit Level of suspended solids can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.



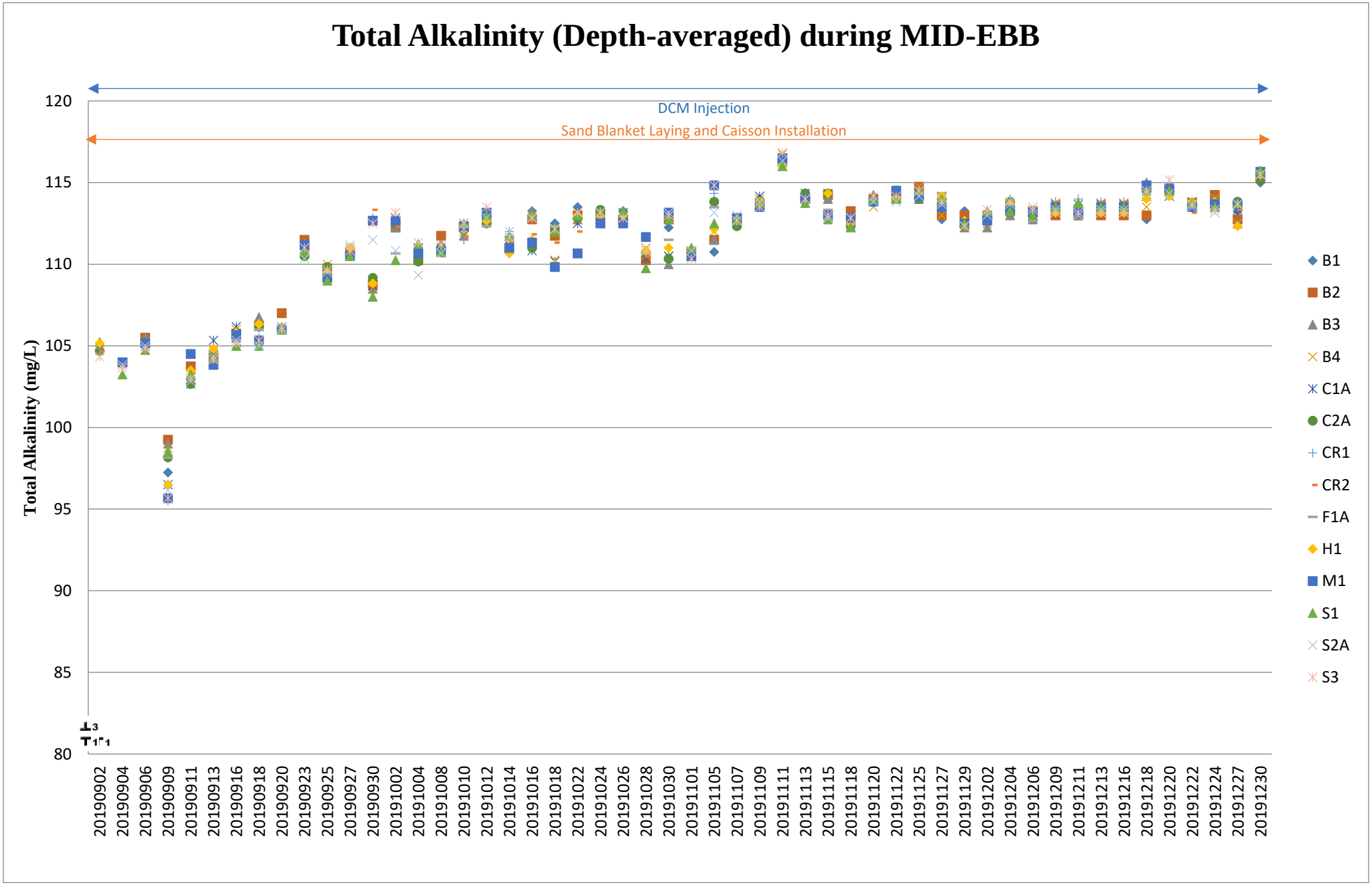
Note: The Action and Limit Level of temperature can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.



Note: The Action and Limit Level of temperature can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.

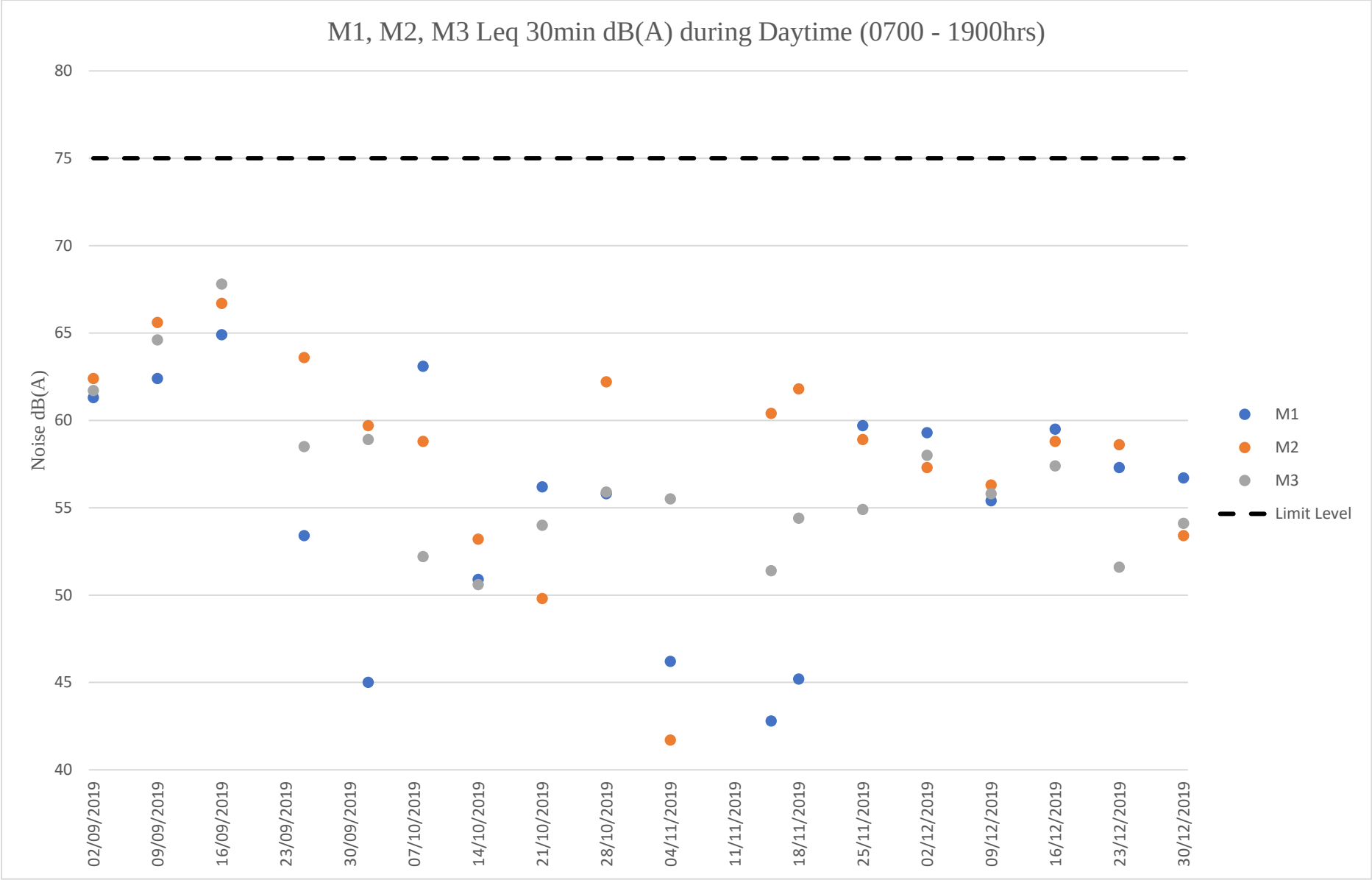


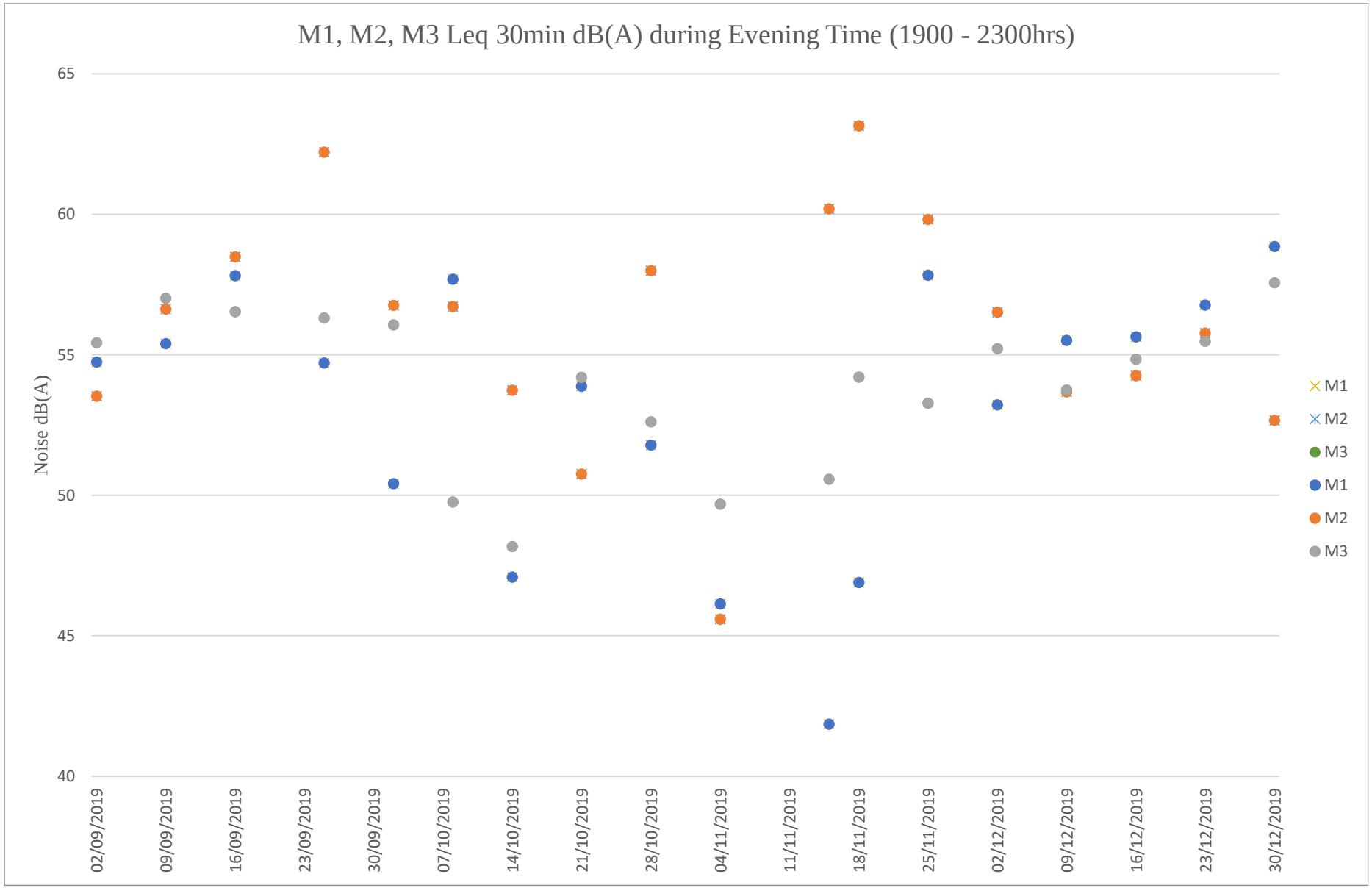
Note: The Action and Limit Level of total alkalinity can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.

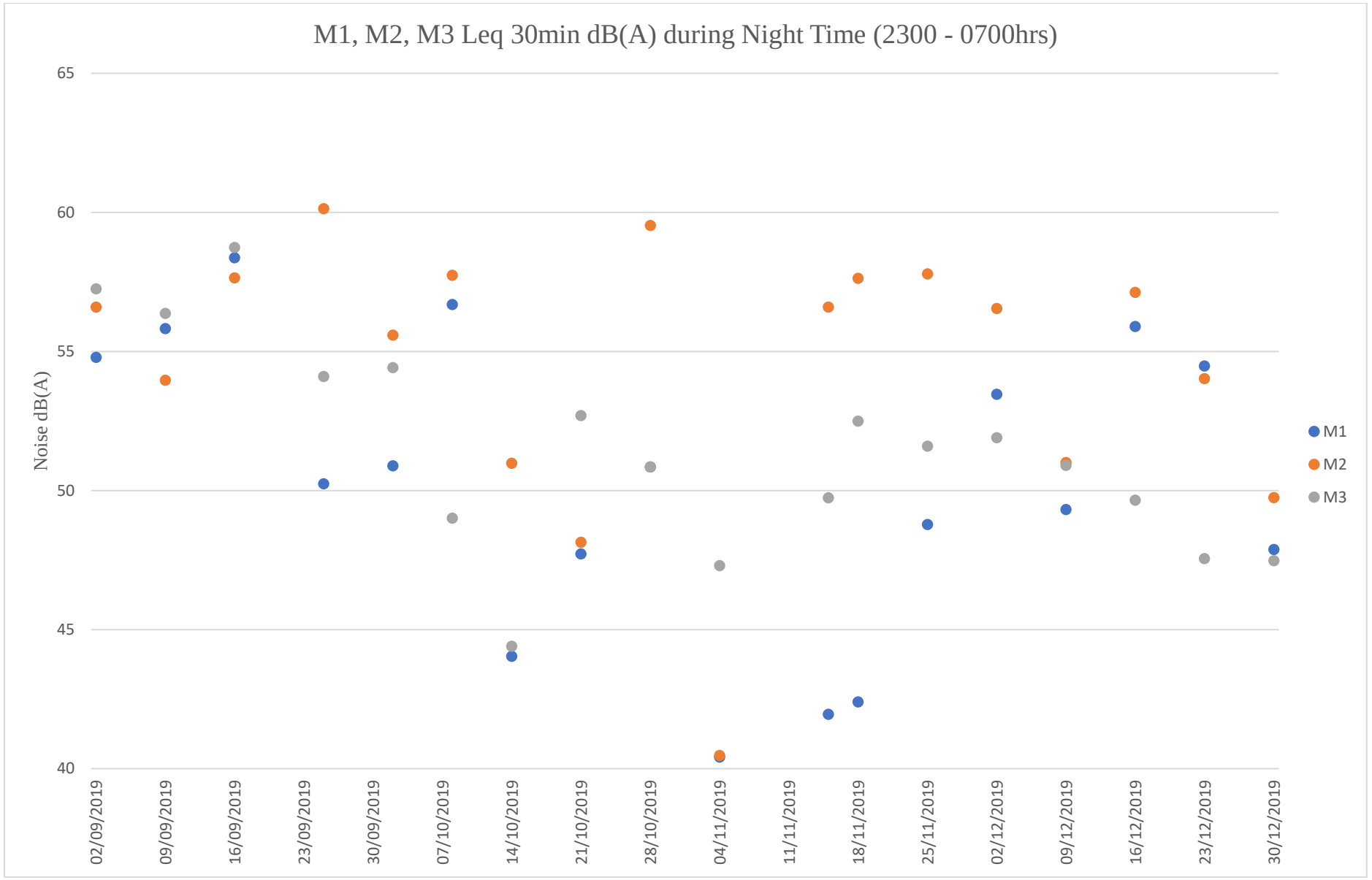


Note: The Action and Limit Level of total alkalinity can be referred to **Table 2.2 & 2.3** of the quarterly EM&A report.

Appendix D Noise Monitoring Data Trending


M1, M2, M3 Leq 30min dB(A) during Daytime (0700 - 1900hrs)
Noise dB(A)
80
75
70
65
60
55
50
45
40
02/09/2019
09/09/2019
16/09/2019
23/09/2019
30/09/2019
07/10/2019
14/10/2019
21/10/2019
28/10/2019
04/11/2019
11/11/2019
18/11/2019
25/11/2019
02/12/2019
09/12/2019
16/12/2019
23/12/2019
30/12/2019
M1
M2
M3
Limit Level


M1, M2, M3 Leq 30min dB(A) during Evening Time (1900 - 2300hrs)
Noise dB(A)
65
60
55
50
45
40
02/09/2019
09/09/2019
16/09/2019
23/09/2019
30/09/2019
07/10/2019
14/10/2019
21/10/2019
28/10/2019
04/11/2019
11/11/2019
18/11/2019
25/11/2019
02/12/2019
09/12/2019
16/12/2019
23/12/2019
30/12/2019
M1
M2
M3
M1
M2
M3


M1, M2, M3 Leq 30min dB(A) during Night Time (2300 - 0700hrs)
Noise dB(A)
65
60
55
50
45
40
02/09/2019
09/09/2019
16/09/2019
23/09/2019
30/09/2019
07/10/2019
14/10/2019
21/10/2019
28/10/2019
04/11/2019
11/11/2019
18/11/2019
25/11/2019
02/12/2019
09/12/2019
16/12/2019
23/12/2019
30/12/2019
M1
M2
M3

Summary of the Construction Activities Undertaken during the Reporting Period

Location of works	Construction activities undertaken	Remarks on progress
Breakwater	• Sand blanket laying • DCM installation	• On-going • On-going
Reclamation area	• Sand blanket laying	• On-going
Seawall portion	• DCM installation • Coring for DCM cluster • Dredging • Cone penetration test • Installation of caisson	• Completed • On-going • 39,172.8842 m^3 of dredged sediment in bulk quantity was dumped at relevant dumping site in total up to 31 December 2019. • On-going • On-going

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 1 (M1 / N_S1)
Monitoring date:	2, 8, 14, 21, 28 October 2019 (Daytime)
	2&3, 8&9, 14&15, 21&22, 28&29 October 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Air-conditioning units nearby

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
2 Oct 2019	16:01	-	16:31	Sunny	45.0	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
2 Oct 2019	19:51	-	19:56	Fine	46.0	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	21:51	-	21:56		52.3		
	22:51	-	22:56		50.8		
3 Oct 2019	00:51	-	00:56	Fine	51.7	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	02:51	-	02:56		52.0		
	03:51	-	03:56		47.9		
8 Oct 2019	16:33	-	17:03	Sunny	63.1	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
8 Oct 2019	19:33	-	19:38	Fine	58.0	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	21:33	-	21:38		58.7		
	22:33	-	22:38		55.9		
9 Oct 2019	00:33	-	00:38	Fine	57.5	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	01:33	-	01:38		56.6		
	03:33	-	03:38		55.8		
14 Oct 2019	16:26	-	16:56	Sunny	50.9	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
14 Oct 2019	19:26	-	19:31	Fine	46.6	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	21:26	-	21:31		46.5		
	22:26	-	22:31		48.0		
15 Oct 2019	00:26	-	00:31	Fine	44.2	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	02:26	-	02:31		43.9		
	03:26	-	03:31		44.0		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
21 Oct 2019	16:32	-	17:02	Sunny	56.2	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
21 Oct 2019	19:32	-	19:37	Fine	53.6	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	21:32	-	21:37		54.7		
	22:32	-	22:37		53.2		
22 Oct 2019	00:32	-	00:37	Fine	49.2	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	02:32	-	02:37		47.5		
	03:32	-	03:37		45.8		
28 Oct 2019	16:33	-	17:03	Sunny	55.8	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
28 Oct 2019	19:33	-	19:38	Fine	52.0	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	21:33	-	21:38		50.8		
	22:33	-	22:38		52.4		
29 Oct 2019	00:33	-	00:38	Fine	51.3	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	02:33	-	02:38		51.6		
	03:33	-	03:38		49.3		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 1 (M1 / N_S1)
Monitoring date:	4, 15, 18, 25 November 2019 (Daytime)
	4&5, 15&16, 18&19, 25&26 November 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
4 Nov 2019	16:01	-	16:31	Sunny	46.2	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
4 Nov 2019	19:31	-	19:36	Fine	38.5	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:31	-	20:36		46.7		
	21:31	-	21:36		48.4		
5 Nov 2019	1:31	-	01:36	Fine	41.2	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	2:31	-	02:36		39.7		
	4:31	-	04:36		40.2		
15 Nov 2019	16:08	-	16:38	Sunny	42.8	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
15 Nov 2019	19:38	-	19:43	Fine	44.4	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:38	-	20:43		39.8		
	21:38	-	21:43		39.9		
16 Nov 2019	1:38	-	01:43	Fine	44.6	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	2:38	-	02:43		39.7		
	4:38	-	04:43		39.5		
18 Nov 2019	16:03	-	16:33	Sunny	45.2	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
18 Nov 2019	19:33	-	19:38	Fine	45.8	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:33	-	20:38		47.4		
	21:33	-	21:38		47.3		
19 Nov 2019	1:33	-	01:38	Fine	44.9	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	2:33	-	02:38		40.9		
	4:33	-	04:38		39.5		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
25 Nov 2019	16:03	-	16:33	Sunny	59.7	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
25 Nov 2019	19:08	-	19:13	Fine	58.9	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:08	-	20:13		56.7		
	21:08	-	21:13		57.6		
26 Nov 2019	1:08	-	01:13	Fine	48.4	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	3:08	-	03:13		48.7		
	5:08	-	05:13		49.2		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 1 (M1 / N_S1)
Monitoring date:	2, 9, 16, 23 & 30 December 2019 (Daytime)
	2&3, 9&10, 16&17, 23&24, 30&31 December 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
2 Dec 2019	16:07	-	16:37	Sunny	59.3	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
2 Dec 2019	19:12	-	19:17	Fine	52.3	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:12	-	20:17		55.2		
	21:12	-	21:17		51.1		
3 Dec 2019	1:12	-	01:17	Fine	47.3	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	3:12	-	03:17		51.6		
	5:12	-	05:17		56.1		
9 Dec 2019	16:04	-	16:34	Sunny	55.4	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
9 Dec 2019	19:14	-	19:19	Fine	53.4	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:14	-	20:19		53.9		
	21:14	-	21:19		57.8		
10 Dec 2019	1:14	-	01:19	Fine	50.4	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	3:14	-	03:19		47.9		
	5:14	-	05:19		49.3		
16 Dec 2019	16:15	-	16:45	Sunny	59.5	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
16 Dec 2019	19:15	-	19:20	Fine	53.5	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:15	-	20:20		56.1		
	21:15	-	21:20		56.7		
17 Dec 2019	1:15	-	01:20	Fine	56.7	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	3:15	-	03:20		56.2		
	5:15	-	05:20		54.5		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
23 Dec 2019	16:14	-	16:44	Sunny	57.3	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
23 Dec 2019	19:14	-	19:19	Fine	57.5	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:14	-	20:19		56.4		
	21:14	-	21:19		56.3		
24 Dec 2019	1:14	-	01:19	Fine	57.3	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	3:14	-	03:19		52.7		
	5:14	-	05:19		50.7		
30 Dec 2019	16:10	-	16:40	Sunny	56.7	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
30 Dec 2019	19:10	-	19:15	Fine	58.0	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	20:10	-	20:15		59.6		
	21:10	-	21:15		58.8		
31 Dec 2019	1:10	-	01:15	Fine	47.5	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	3:10	-	03:15		47.9		
	5:10	-	05:15		48.2		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 2 (M2 / N_S2)
Monitoring date:	2, 8, 14, 21, 28 October 2019 (Daytime)
	2&3, 8&9, 14&15, 21&22, 28&29 October 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
2 Oct 2019	16:36	-	17:06	Sunny	59.7	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
2 Oct 2019	19:56	-	20:01	Fine	57.3	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	21:56	-	22:01		56.1		
	22:36	-	22:41		56.8		
3 Oct 2019	00:36	-	00:41	Fine	55.4	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	01:36	-	01:41		54.8		
	03:36	-	03:41		56.4		
8 Oct 2019	16:26	-	16:56	Sunny	58.8	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
8 Oct 2019	19:26	-	19:31	Fine	55.9	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	21:26	-	21:31		57.5		
	22:26	-	22:31		56.6		
9 Oct 2019	00:26	-	00:31	Fine	55.8	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	01:26	-	01:31		58.2		
	03:26	-	03:31		58.7		
14 Oct 2019	16:25	-	16:55	Sunny	53.2	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
14 Oct 2019	19:25	-	19:30	Fine	54.7	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	21:25	-	21:30		51.4		
	22:25	-	22:30		54.4		
15 Oct 2019	00:25	-	00:30	Fine	50.8	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	02:25	-	02:30		50.2		
	03:25	-	03:30		51.8		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
21 Oct 2019	16:32	-	17:02	Sunny	49.8	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
21 Oct 2019	19:32	-	19:37	Fine	52.2	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	21:32	-	21:37		51.3		
	22:32	-	22:37		47.5		
22 Oct 2019	00:32	-	00:37	Fine	48.0	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	02:32	-	02:37		47.9		
	03:32	-	03:37		48.5		
28 Oct 2019	16:32	-	17:02	Sunny	62.2	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
28 Oct 2019	19:32	-	19:37	Fine	59.1	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	21:32	-	21:37		49.9		
	22:32	-	22:37		59.9		
29 Oct 2019	00:32	-	00:37	Fine	49.5	XL2 (Serial No. A2A-13548-E0)	SV33B (No. 83042)
	02:32	-	02:37		58.9		
	03:32	-	03:37		60.1		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 2 (M2 / N_S2)
Monitoring date:	4, 15, 18, 25 November 2019 (Daytime)
	4&5, 15&16, 18&19, 25&26 November 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
4 Nov 2019	16:06	-	16:36	Sunny	41.7	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
4 Nov 2019	19:36	-	19:41	Fine	40.9	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	20:36	-	20:41		46.3		
	21:36	-	21:41		47.3		
5 Nov 2019	1:36	-	01:41	Fine	41.3	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	2:36	-	02:41		39.0		
	4:36	-	04:41		40.8		
15 Nov 2019	16:07	-	16:37	Sunny	60.4	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
15 Nov 2019	19:32	-	19:37	Fine	60.8	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	20:32	-	20:37		59.7		
	21:32	-	21:37		60.0		
16 Nov 2019	1:32	-	01:37	Fine	58.5	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	2:32	-	02:37		55.2		
	4:32	-	04:37		55.2		
18 Nov 2019	16:09	-	16:39	Sunny	61.8	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
18 Nov 2019	19:39	-	19:44	Fine	65.1	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	20:39	-	20:44		61.8		
	21:39	-	21:44		61.6		
19 Nov 2019	1:39	-	01:44	Fine	59.7	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	2:39	-	02:44		57.0		
	4:39	-	04:44		54.8		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
25 Nov 2019	16:03	-	16:33	Sunny	58.9	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
25 Nov 2019	19:08	-	19:13	Fine	59.3	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
	20:08	-	20:13		59.8		
	21:08	-	21:13		60.3		
26 Nov 2019	1:08	-	01:13	Fine	60.9	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
	3:08	-	03:13		55.0		
	5:08	-	05:13		54.1		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 2 (M2 / N_S2)
Monitoring date:	2, 9, 16, 23 & 30 December 2019 (Daytime)
	2&3, 9&10, 16&17, 23&24, 30&31 December 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
2 Dec 2019	16:02	-	16:32	Sunny	57.3	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
2 Dec 2019	19:12	-	19:17	Fine	54.8	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
	20:12	-	20:17		56.0		
	21:12	-	21:17		58.1		
3 Dec 2019	1:12	-	01:17	Fine	51.0	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
	3:12	-	03:17		53.1		
	5:12	-	05:17		60.1		
9 Dec 2019	16:06	-	16:36	Sunny	56.3	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
9 Dec 2019	19:16	-	19:21	Fine	53.3	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	20:16	-	20:21		54.0		
	21:16	-	21:21		53.7		
10 Dec 2019	1:16	-	01:21	Fine	50.2	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	3:16	-	03:21		49.8		
	5:16	-	05:21		52.5		
16 Dec 2019	16:15	-	16:45	Sunny	58.8	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
16 Dec 2019	19:15	-	19:20	Fine	53.5	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
	20:15	-	20:20		55.1		
	21:15	-	21:20		54.0		
17 Dec 2019	1:15	-	01:20	Fine	56.1	XL2 (Serial No. A2A-13663-E0)	SV33B (No. 83042)
	3:15	-	03:20		58.9		
	5:15	-	05:20		55.6		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
23 Dec 2019	16:19	-	16:49	Sunny	58.6	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
23 Dec 2019	19:19	-	19:24	Fine	56.7	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	20:19	-	20:24		55.6		
	21:19	-	21:24		54.8		
24 Dec 2019	1:19	-	01:24	Fine	56.6	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	3:19	-	03:24		52.8		
	5:19	-	05:24		50.4		
30 Dec 2019	16:07	-	16:37	Sunny	53.4	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
30 Dec 2019	19:07	-	19:12	Fine	51.4	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	20:07	-	20:12		53.7		
	21:07	-	21:12		52.6		
31 Dec 2019	1:07	-	01:12	Fine	49.5	XL2 (Serial No. A2A-13661-E0)	SV33B (No. 83042)
	3:07	-	03:12		50.5		
	5:07	-	05:12		49.1		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 3 (M3 / N_S3)
Monitoring date:	2, 8, 14, 21, 28 October 2019 (Daytime)
	2&3, 8&9, 14&15, 21&22, 28&29 October 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Air-conditioning units nearby, dog barking

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
2 Oct 2019	16:33	-	17:03	Sunny	58.9	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
2 Oct 2019	19:33	-	19:38	Fine	55.4	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	21:33	-	21:38		55.6		
	22:33	-	22:38		57.0		
3 Oct 2019	00:33	-	00:38	Fine	55.9	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	02:33	-	02:38		52.9		
	03:33	-	03:38		53.9		
8 Oct 2019	16:36	-	17:06	Sunny	52.2	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
8 Oct 2019	19:36	-	19:41	Fine	51.6	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	21:36	-	21:41		48.9		
	22:36	-	22:41		47.9		
9 Oct 2019	00:36	-	00:41	Fine	47.6	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	01:36	-	01:41		51.0		
	03:36	-	03:41		47.4		
14 Oct 2019	16:29	-	17:59	Sunny	50.6	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
14 Oct 2019	19:29	-	19:34	Fine	48.9	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	21:29	-	21:34		48.1		
	22:29	-	22:34		47.4		
15 Oct 2019	00:29	-	00:34	Fine	44.5	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	02:29	-	02:34		44.2		
	03:29	-	03:34		44.5		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
21 Oct 2019	16:30	-	17:00	Sunny	54.0	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
21 Oct 2019	19:30	-	19:35	Fine	52.1	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	21:30	-	21:35		55.2		
	22:30	-	22:35		54.7		
22 Oct 2019	00:30	-	00:35	Fine	52.3	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	02:30	-	02:35		52.3		
	03:30	-	03:35		53.4		
28 Oct 2019	16:34	-	17:04	Sunny	55.9	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
28 Oct 2019	19:34	-	19:39	Fine	52.3	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	21:34	-	21:39		52.4		
	22:34	-	22:39		53.1		
29 Oct 2019	00:34	-	00:39	Fine	52.3	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	02:34	-	02:39		50.4		
	03:34	-	03:39		49.3		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 3 (M3 / N_S3)
Monitoring date:	4, 15, 18, 25 November 2019 (Daytime)
	4&5, 15&16, 18&19, 25&26 November 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Air-conditioning units nearby, dog barking

Noise Monitoring data:

Date	**Start time**		**End time**	**Weather**	**$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)**	**Sound Level Meter Used**	**Calibrator Used**
4 Nov 2019	16:05	-	16:35	Sunny	55.5	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
4 Nov 2019	19:35	-	19:40	Fine	49.7	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:35	-	20:40		50.6		
	21:35	-	21:40		48.5		
5 Nov 2019	1:35	-	01:40	Fine	46.8	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	2:35	-	02:40		48.0		
	4:35	-	04:40		47.0		
15 Nov 2019	16:06	-	16:36	Sunny	51.4	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
15 Nov 2019	19:36	-	19:41	Fine	50.9	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:36	-	20:41		50.3		
	21:36	-	21:41		50.5		
16 Nov 2019	1:36	-	01:41	Fine	49.5	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	2:36	-	02:41		50.7		
	4:36	-	04:41		48.8		
18 Nov 2019	16:09	-	16:39	Sunny	54.4	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
18 Nov 2019	19:39	-	19:44	Fine	53.4	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:39	-	20:44		53.5		
	21:39	-	21:44		55.4		
19 Nov 2019	1:39	-	01:44	Fine	52.5	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	2:39	-	02:44		53.0		
	4:39	-	04:44		51.9		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
25 Nov 2019	16:04	-	16:34	Sunny	54.9	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
25 Nov 2019	19:09	-	19:14	Fine	54.0	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:09	-	20:14		52.1		
	21:09	-	21:14		53.5		
26 Nov 2019	1:09	-	01:14	Fine	52.5	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	3:09	-	03:14		51.4		
	5:09	-	05:14		50.7		

Location:	Shek Kwu Chau Treatment & Rehabilitation Centre Hostel 3 (M3 / N_S3)
Monitoring date:	2, 9, 16, 23 & 30 December 2019 (Daytime)
	2&3, 9&10, 16&17, 23&24, 30&31 December 2019 (Evening & Night time)
Parameter :	$L_{eq\ 30min}$ (Daytime), $L_{eq\ 5min}$ (Evening & Night time)
Noise source other than construction activities from the Project:	Nil

Noise Monitoring data:

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
2 Dec 2019	16:04	-	16:34	Sunny	58.0	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
2 Dec 2019	19:14	-	19:19	Fine	52.2	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:14	-	20:19		54.1		
	21:14	-	21:19		57.6		
3 Dec 2019	1:14	-	01:19	Fine	54.2	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	3:14	-	03:19		48.6		
	5:14	-	05:19		51.1		
9 Dec 2019	16:07	-	16:37	Sunny	55.8	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
9 Dec 2019	19:17	-	19:22	Fine	51.2	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:17	-	20:22		54.9		
	21:17	-	21:22		54.3		
10 Dec 2019	1:17	-	01:22	Fine	48.8	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	3:17	-	03:22		51.3		
	5:17	-	05:22		52.0		
16 Dec 2019	16:14	-	16:44	Sunny	57.4	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
16 Dec 2019	19:14	-	19:19	Fine	55.1	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:14	-	20:19		56.7		
	21:14	-	21:19		50.9		
17 Dec 2019	1:14	-	01:19	Fine	47.4	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	3:14	-	03:19		51.8		
	5:14	-	05:19		48.5		

Date	Start time		End time	Weather	$L_{eq\ 30min}$ dB(A) / $L_{eq\ 5min}$ dB(A)	Sound Level Meter Used	Calibrator Used
23 Dec 2019	16:07	-	16:37	Sunny	51.6	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
23 Dec 2019	19:07	-	19:12	Fine	56.3	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	20:07	-	20:12		57.0		
	21:07	-	21:12		51.2		
24 Dec 2019	1:07	-	01:12	Fine	49.0	SVAN 971 (Serial No. 77731)	SV33B (No. 83042)
	3:07	-	03:12		47.4		
	5:07	-	05:12		45.6		

Appendix E Waste Flow Table

吉寶西格斯 - 振華聯營公司
Keppel Seghers - Zhen Hua Joint Venture

14Monthly Summary Waste Flow Table for 2018 (year)

Project : Integrated Waste Management Facilities, Phase I

Contract No.: EP/SP/66/12

Month	Actual Quantities of Inert C&D Materials Generated Monthly								Actual Quantities of C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rock and Large Broken Concrete (see Note 1)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill Sand	Imported Fill Public fill	Imported Fill Rock	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste		Others, e.g. general refuse (see Note 3)
	(in ,000m^3)	(in ,000m^3)	(in ,000m^3)	(in ,000m^3	(in ,000m^3)	(in ,000m^3)			(in ,000 kg)	(in ,000kg)	(in ,000kg)	(in ,000kg)	(in ,000L)	(in ,000 m^3)
Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0065
Sep	0	0	0	0	0	2.9619	0	0	0	0	0	0	0	0
Oct	0	0	0	0	0	3.0771	0	0	0	0	0	0	0	0.013
Nov	0	0	0	0	0	6.7871	0	0	0	0	0	0	0	0
Dec	0	0	0	0	0	59.0709	0	0	0	0	0	0.2	0.87	0
Total	0	0	0	0	0	71.8970	0	0	0	0	0	0.2	0.87	0.0195

Notes:
(1) Broken concrete for recycling into aggregates.
(2) Plastics refer to plastic bottles/ containers, plastic sheets/ foam from packaging materials.
(3) Use the conversion factor : 1 full load of dumping truck being equivalent to 6.5m^3 by volume.

吉寶西格斯 - 振華聯營公司
Keppel Seghers - Zhen Hua Joint Venture

Monthly Summary Waste Flow Table for 2019 (year)

Project : Integrated Waste Management Facilities, Phase I

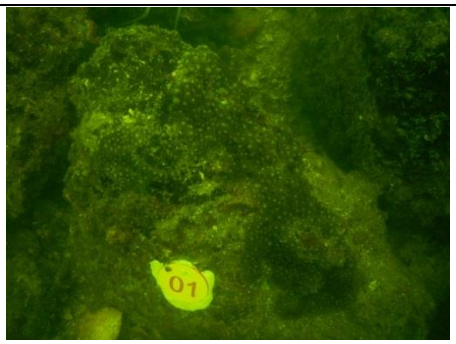
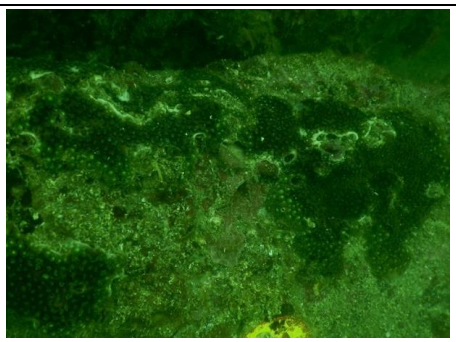
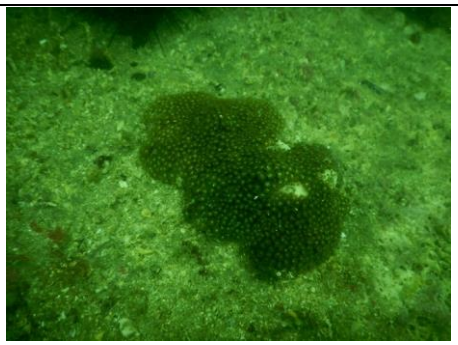
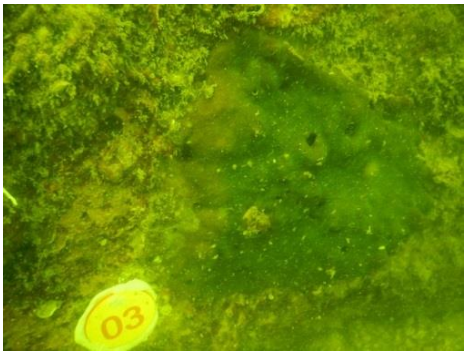
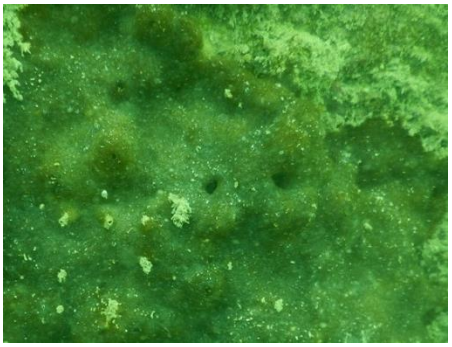
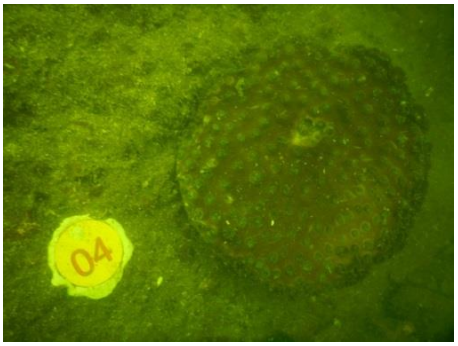
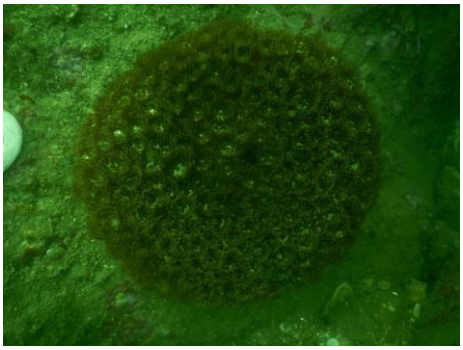
Contract No.: EP/SP/66/12

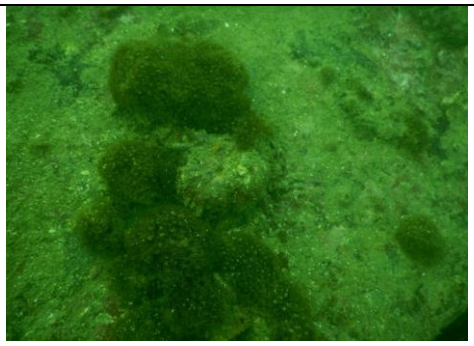
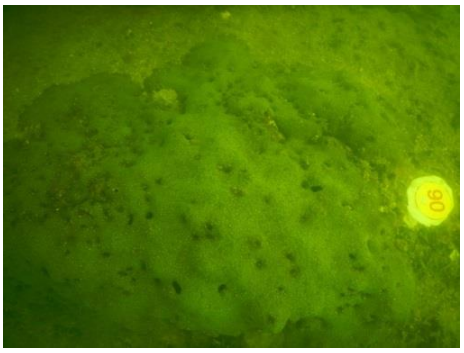
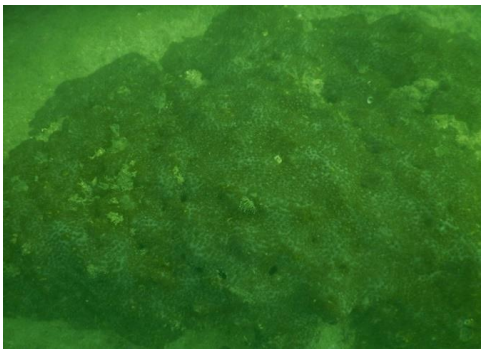
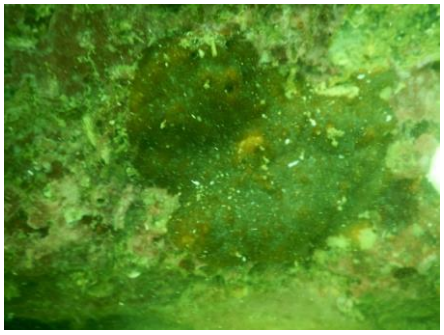
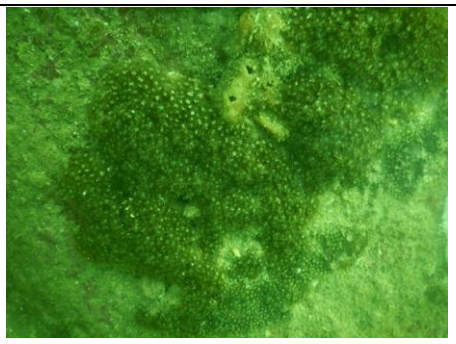
Month	Actual Quantities of Inert C&D Materials Generated Monthly								Actual Quantities of C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rock and Large Broken Concrete (see Note 1)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill Sand	Imported Fill Public fill	Imported Fill Rock	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste		Others, e.g. general refuse (see Note 3)
	(in ,000m^3)	(in ,000m^3)	(in ,000m^3)	(in ,000m^3	(in ,000m^3)	(in ,000m^3)			(in ,000 kg)	(in ,000kg)	(in ,000kg)	(in ,000kg)	(in ,000L)	(in ,000 m^3)
Jan	0	0	0	0	0	82.6139	0	0	0	0	0	0	0	0.0065
Feb	0	0	0	0	0	46.7821	0	0	0	0	0	0	0	0
Mar	0	0	0	0	0	97.1	0	0.7552	0	0.256	0	0	0	0
Apr	0	0	0	0	0	58.0413	0	0	0	0	0	0	0	0
May	0	0	0	0	0	14.5625	0	1.4648	0	0	0	0	0	0.0065
Jun	0	0	0	0	0	0	0	6.8421	0	0	0	0	0	0
Sub-total	0	0	0	0	0	299.0998	0	9.0621	0	0.256	0	0	0	0.013
Jul	0	0	0	0	0	0	0	0.4289	0	0	0	0	8.4	0.013
Aug	0	0	0	0	0	2.5775	0	10.56	0	0	0	0	0	0
Sep	0	0	0	0	0	6.1081	0	8.4704	0	0.353	0	0	0	0.0065
Oct	0	0	0	0	0	9.8875	0	7.19	0	0	0	0	0	0
Nov	0	0	0	0	0	38.3088	0	19.3105	0	0	0	0	0	0.0195
Dec	0	0	0	0	0	54.3469	0	26.9807	0	0	0	0	0	0.091
Total	0	0	0	0	0	410.3286	0	82.0026	0	0.609	0	0	8.4	0.143

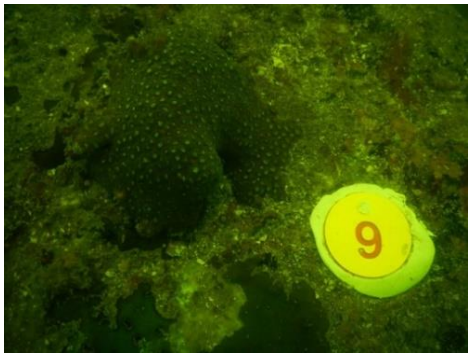
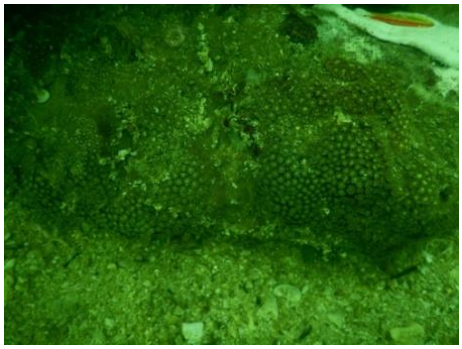
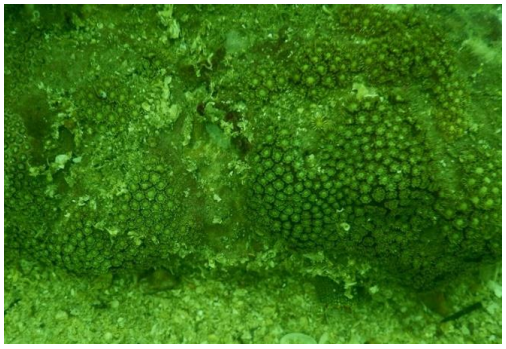
Notes:
(1) Broken concrete for recycling into aggregates.
(2) Plastics refer to plastic bottles/ containers, plastic sheets/ foam from packaging materials.
(3) Use the conversion factor : 1 full load of dumping truck being equivalent to 6.5m^3 by volume.

Appendix F Photo Records for Coral Monitoring

Photo Plate for Tagged and Re-tagged Corals at Control Site during the 4th Quarterly Coral Monitoring during Construction Phase on 04 December 2019

Tag #	Baseline (26 June 2018 & 3 December 2018)	04 December 2019
#1	 *Goniopora stutchburyi*	 *Goniopora stutchburyi*
#2R	 *Goniopora stutchburyi*	 *Goniopora stutchburyi*
#3	 *Psammocora superficialis*	 *Psammocora superficialis*
#4	 *Turbinaria peltata*	 *Turbinaria peltata*

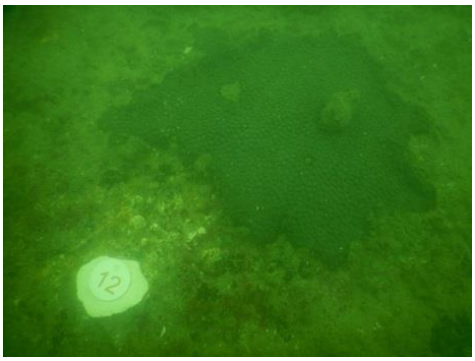
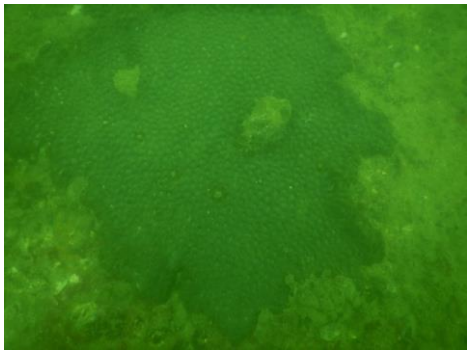
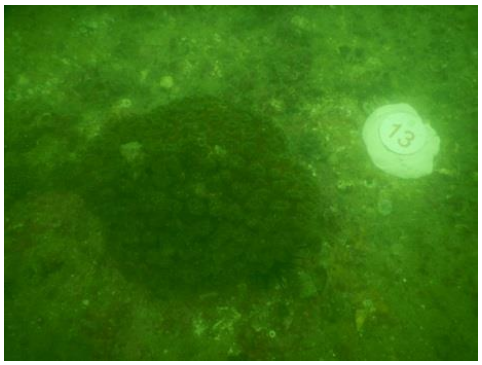
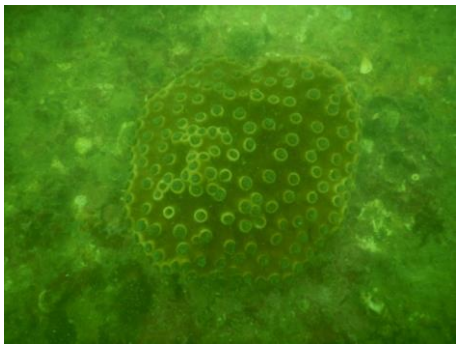
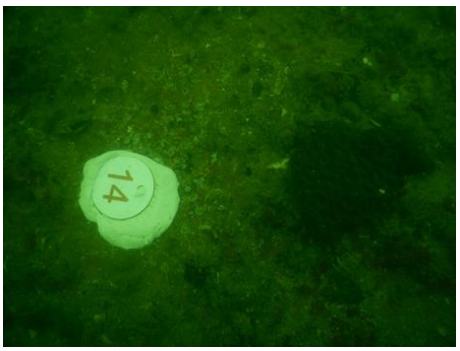
Tag #	Baseline (26 June 2018 & 3 December 2018)	04 December 2019
#5R	 *Goniopora stutchburyi*	 *Goniopora stutchburyi*
#6	 *Cyphastrea serailia*	 *Cyphastrea serailia*
#7R	 *Coscinaraea* sp.	 *Coscinaraea* sp.
#8	 *Goniopora stutchburyi*	 *Goniopora stutchburyi*

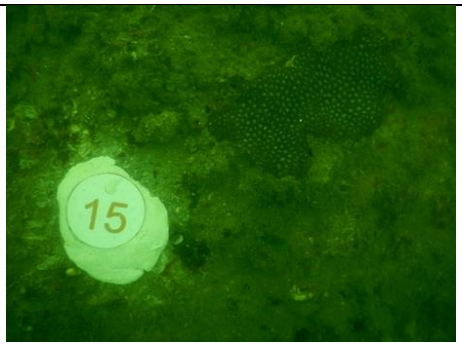
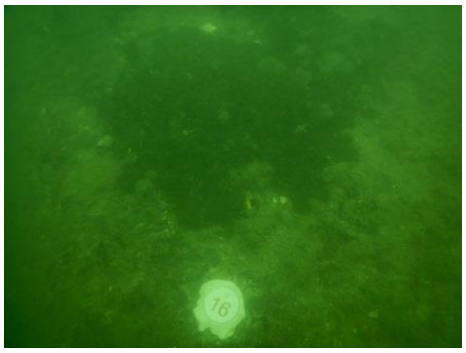
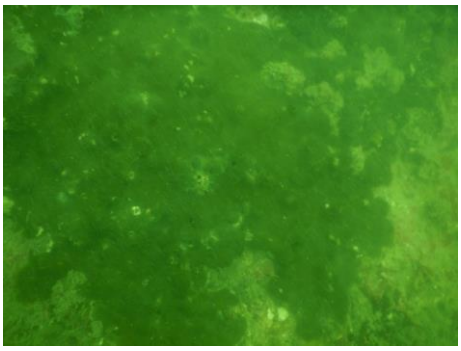
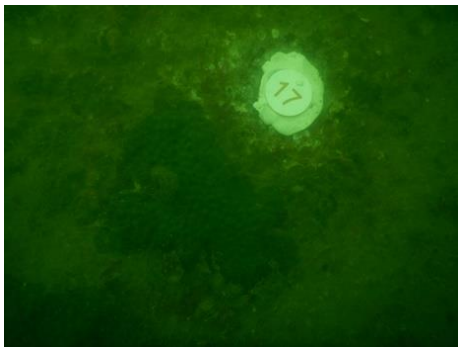
Tag #	Baseline (26 June 2018 & 3 December 2018)	04 December 2019
#9	 *Goniopora stutchburyi*	 *Goniopora stutchburyi*
#10R	 *Goniopora stutchburyi*	 *Goniopora stutchburyi*

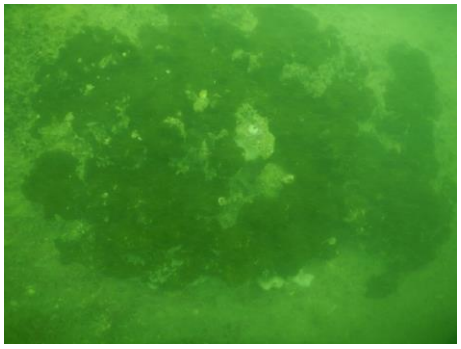
Notes:

i. The re-tagged corals were marked as ##**R**.

Photo Plate for Re-tagged Corals at Indirect Impact during the 4th Quarterly Coral Monitoring during Construction Phase on 04 December 2019

Tag #	Baseline (23 November 2018)	04 December 2019
#11R	 *Cyphastrea serailia*	 *Cyphastrea serailia*
#12R	 *Favites chinensis*	 *Favites chinensis*
#13R	 *Turbinaria peltata*	 *Turbinaria peltata*
#14R	 *Favites chinensis*	 *Favites chinensis*

Tag #	Baseline (23 November 2018)	04 December 2019
#15R	 *Goniopora stutchburyi*	 *Goniopora stutchburyi*
#16R	 *Psammocora superficialis*	 *Psammocora superficialis*
#17R	 *Favites chinensis*	 *Favites chinensis*
#18R	 *Psammocora superficialis*	 *Psammocora superficialis*

Tag #	Baseline (23 November 2018)	04 December 2019
#19R	 *Psammocora superficialis*	 *Psammocora superficialis*
#20R	 *Psammocora superficialis*	 *Psammocora superficialis*

Notes:

i. The re-tagged corals were marked as ##**R**.

Appendix G Photo Records for Marine Mammal Monitoring

Photo records of Vessel-based Line-Transect Survey Effort during the reporting period

Appendix H Photo Records for White-bellied Sea Eagle Monitoring

Photo Plate for 16th Monthly WBSE monitoring

Adult WBSE recorded in SKC

Photo Plate for 17th Monthly WBSE monitoring

Adult WBSEs staying in the nest

Photo Plate for 18th Monthly WBSE monitoring

Adult WBSE flying over the nest area

Adult WBSEs staying in the nest

Appendix I Complaint Log

Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 Oct 2019-31 Oct 2019	0	0	N/A
1 Nov 2019-30 Nov 2019	0	0	N/A
1 Dec 2019-31 Dec 2019	0	0	N/A

Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Details
1 Oct 2019-31 Oct 2019	0	0	N/A
1 Nov 2019-30 Nov 2019	0	0	N/A
1 Dec 2019-31 Dec 2019	0	0	N/A

Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Details
1 Oct 2019-31 Oct 2019	0	0	N/A
1 Nov 2019-30 Nov 2019	0	0	N/A
1 Dec 2019-31 Dec 2019	0	0	N/A

Appendix J Passive Acoustic Monitoring Report

環境保護署
Environmental Protection Department

Contract No. EP/SP/66/12
Integrated Waste Management Facilities, Phase 1
Passive Acoustic Monitoring Report

吉寶西格斯－振華聯營公司
KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

Passive Acoustic Monitoring Report

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Revision History

B	Revision based on IEC's comments	19 February 2020
A	First Submission	10 January 2020
Rev.	**DESCRIPTION OF MODIFICATION**	**DATE**

CONTENTS

1. INTRODUCTION

1.1 Under the EM&A Manuel for the Integrated Waste Management Facility (IWMF) [EP/SP/66/12], there is a requirement for various monitoring for marine mammals in south Lantau waters. The marine mammal monitoring programme focuses on finless porpoise (Neophocaena phocaenoides) as the Project Site has been identified as a hotspot for this species. The Chinese white dolphin (Sousa chinensis) rarely occurs in this area, however, all detections of this species are also recorded. The general aim of all marine mammal monitoring is to assess impacts to marine mammals as predicted in the Environmental Impact Assessment (EIA). The marine mammal monitoring programme will be conducted during all phases of the project. The data for this report was gathered during the construction period (Phase I). This report details the collection and analyses of a passive acoustic monitoring (PAM) study. The Environmental Monitoring and Audit (EM&A) Manual for this project details the PAM studies to be conducted, at three (3) sites, during peak porpoise period (December to May) and for a duration of no less than 30 days during all phases of the project. It was noted prior to the start of this study that it was not possible to deploy a PAM system in the exact location used in the baseline study for one site, Shek Kwu Chau, as the ongoing IWMF construction meant that seabed modifications were ongoing in that area. A new PAM site, adjacent to the original PAM site at Shek Kwu Chau was identified. Acoustic data analyses methods are described in the EM&A Manual and in more detail in the baseline PAM study report. The results from this study, impact phase monitoring, were compared to the baseline study and, in addition, reference was made to the AFCD long-term marine mammal monitoring programme reports and other published information on finless porpoise.

2. METHODOLOGY

2.1 Three PAM systems were deployed for thirty (30) plus days during peak porpoise season. The purpose of the deployment was to gain an insight of fine scale habitat use by finless porpoise. An autonomous acoustic recorder (archival data) was selected that was able to record the distinctive high frequency sounds produced by finless porpoise, as well as other marine mammal vocalisations. Acoustic data analyss were conducted using PAMGuard software (Gillespie et al, 2008). High frequency finless porpoise clicks are easily distinguished from other marine mammal species that may occur, e.g., Chinese white dolphin or other delphinids, as well as manmade high frequency sound sources, such as boat sonar emissions. Two PAM systems were deployed at controls sites, at different distances from the IWMF construction area (Pui O Wan and Tai A Chau) and a third system was deployed within the IWMF construction area (Shek Kwu Chau). Multiple PAM systems were deployed at each site to minimise the risk of PAM units being lost/malfunctioning. One system was lost, at Shek Kwu Chau, however, data gathered from the back up unit was approved and has been included in these analyses. As such, the EM&A remit was fulfilled, as more than 30 days of PAM data was gathered from each of three sites during peak porpoise season during the construction phase of IWMF (**Figure 1**).

2.2 "Soundtraps" were archival acoustic devices chosen as the best option for this study, as they can record 24-hour underwater activity of all marine mammal species, and underwater noise levels, via an omnidirectional hydrophone with a frequency range of 20Hz to 150kHz (Appendix I). These specifications are comparable to the CPOD, which was used during the PAM baseline study. Therefore, the Soundtrap can collect the same type of data the CPOD does, as well as additional parameters. There are differences between the two devices, the CPOD is large (80cm) and floats within the water column whereas the Soundtrap is much smaller and lighter (20cm and less than 500g) and is not required to float, allowing it to be safely secured in a fixed position, either on the seabed or other solid structures, without the risk of it 'floating' into fishing gear (moving and static) or boat propellers. With regards to analyses, Soundtraps collect comprehensive and complete acoustic files (wav format) whereas CPODs are restricted to brand specific file formats that can only be analysed in one way. The complete files collected by Soundtraps can be analysed to produce the same "Detection Positive Minute (DPM)" parameters that CPODs can, as well as myriad other measurements. The more compact size and secure mooring system, in addition to being able to conduct the same analyses as that presented in the PAM baseline study, made this the most convenient PAM archival device to deploy for this study.

2.3 Once each Soundtrap was retrieved, the data, in compressed wav file format, was downloaded and inflated. The data was then processed using PAMGuard software, which was configured to detect "clicks" with energy in the 2kHz to 150kHz band. Two different click classifiers were used, one with very strict criteria which has a high confidence of identifying a click correctly, and a second which has slightly more flexible criteria, to assess clicks that may have been distant or not directed towards the device. These classifiers were designed specifically for Hong Kong finless porpoise. In addition, a dolphin click classifier and a dolphin whistle detector were also used to process the data, so that the presence of Chinses white dolphin could be determined. Similar to the CPOD inbuilt classifier, these are automated analyses and the resultant positively identified detections must be visually checked by expert acoustic technicians. Periods of high ambient noise or corrupted data segments were also determined at this stage in the process and, if present, were eliminated from the dataset. Acoustic detections identified by the software were confirmed by viewing the first identified 'click' in each one minute slot, to ensure that peak frequency, inter-click intervals (ICI) and duration characteristics conformed to what has been established for finless porpoise clicks. These characteristics

were analysed via varies graphs that are displayed in PAMguard when a particular click is selected (**Figure 2**). Once the first identified click in every minute was visually confirmed, this became a 'detection positive minute' (DPM). If there were no clicks recorded in any given minute, this was classified as detection negative. This analysis was conducted twice, using the highly accurate classifier as well as the more flexible classifier. The full dataset for each recorder was analysed by two experienced analysts. The first performed confirmation checking of the automatically identified clicks for the entire dataset. The second analyst then reviewed the dataset for any potential discrepancies and assessed any ambiguous detections. If any discrepancies were noted, both analysts reviewed the original sound file and resolved any issue. The resultant dataset was thus an analysis of every recorded minute of data, with the date and time of all detection positive minutes were tabulated. This dataset was also subject to independent review. This dataset was then sub-sampled to graph DPM per calendar day for each site. The data were then further sampled to graph DPM for each hour, to investigate the presence of diurnal vocalisation patterns. These graphs could then be directly compared to the baseline data of the same parameters for each site.

3. RESULTS

3.1 Summary of data collection, including errors and data loss, and comparison to the baseline study.

3.1.1 A total of 121.9 days of recordings were obtained, combining the data from the three deployment sites. This is slightly more than the baseline study, which obtained 99.01 days of useable data. This difference in study duration must be accounted for when comparing results. This study had 0% false positive DPM, compared to the baseline study which had 0%, 1% and 2% at Shek Kwu Chau, Tai A Chau and Pui O Wan, respectively. As such, false positives were deemed to be negligible in both studies. Time lost due to device malfunction, corrupted data, high levels of underwater noise (that may mask marine mammal vocalisations) or "truncated recordings"[1] was 0% for all sites for this study, compared to the baseline study which noted time lost as 1%, 2% and 31.87% for Shek Kwu Chau, Tai A Chau and Pui O Wan, respectively. For sites Shek Kwu Chau and Tai A Chau, the loss noted during the baseline study is negligible, however, the considerable time lost during the baseline study at Pui O Wan (more than 30% of each minute recorded) is significant and must be considered when comparing this site across the two studies.

Note 1: In CPODs, acoustic recordings stop when predefined "click limits" are reached, as occurred in the baseline study. This is not a feature of Soundtrap recorders, so no data was lost in this way.

3.1.2 For the baseline study, the DPM for each site was 11,160 (Shek Kwu Chau), 16,089 (Tai A Chau) and 3645 (Pui O Wan), totalling 30,894 DPM across all three sites, compared to DPMs of 4740 (Shek Kwu Chau), 7725 (Tai A Chau) and 23,986 (Pui O Wan), totalling **36,451 DPM**, for the impact phase study. As the impact phase study was longer than the baseline study, it is not appropriate to directly compare total counts of DPM, however, the DPM rate (the average number of detections per day) for each site can be more directly compared. During the baseline study, Shek Kwu Chau averaged **338.2 DPM** per day compared to **124.8 DPM** per day, during the cimpact phase study. This shows a decrease in the daily average of porpoise detection at Shek Kwu Chau. During the baseline study, Tai A Chau averaged **487.6** DPM per day compared to **179.7 DPM** per day, during the impact phase study. This shows a decrease in the daily average of porpoise detection at Tai A Chau. During the baseline study, Pui O Wan averaged **98.5 DPM** per day compared to **557.8 DPM** per day, during the impact phase study. This shows a significant increase in the daily average of porpoise detections at Pui O Wan (**Table 1**).

3.1.3 During the baseline study, Chinese white dolphins were detected for 8 DPM at Shek Kwu Chau, 21 DPM at Tai A Chau and not at all at Pui O Wan. During this study, Chinese white dolphin were recorded on one day at Pui O Wan (13/05/2019) and only for 1 DPM. As Chinese white dolphin are not the focal species of these studies and did not occur often in the area, no more reference will be made to Chinese white dolphin in this report.

3.2 Daily Patterns of Porpoise Occurrence

3.2.1 For Shek Kwu Chau, the baseline study noted an "astonishing decline in porpoise activity" (from 150 DPM to 4 DPM over 4 days) concomitant with the start of site preparation activities for IWMF. The impact phase study recorded a relatively low level of porpoise activity, with an average daily occupancy of 8.7%, which fluctuated between 1.0% and 26.3%. The peaks in occurrence did not appear to be related to site activities, e.g., did not occur over weekends, although an in-depth assessment of

specific site activities was not made. When it is considered that a 97% decrease in DPM was recorded during the baseline study as site preparation activities started, the overall decline in the daily average of DPM between the baseline and this study is not unexpected. The overall trend, although weak, is of decreasing use of the Shek Kwu Chau study site as the study progressed, again this is not unexpected as the PAM monitoring took place between March and April, when the peak season for porpoise in Hong Kong is more than half way through and porpoise occurrence, in general, is slowly declining (**Figure 3**).

3.2.2 For Tai A Chau, the baseline study noted a consistently high occurrence of porpoise at this site, compared to the two other sites. Fluctuations of between <200 DPM total per day to 1000 total DPM per day were noted during the baseline study, with no particular trend. For the impact phase study, there was a higher occupancy of this site, compared to Shek Kwu Chau, with an average daily occupancy of 12.5%, which fluctuated between 2.1% and 26.3%. Although the daily average DPM between the two studies was different, both showed large fluctuations in daily occurrence. The peaks in occurrence did not appear to be related to environmental changes for either study, although an in-depth assessment of influencing parameters, such as tide or salinity, was not made. When it is considered that the PAM deployment for this study occurred later in the peak porpoise season compared to the baseline study (April cf. February), this may account for the overall fewer detections. In addition, it must also be considered that the AFCD long term marine mammal monitoring programme for Hong Kong has suggested that porpoise have been in decline in Hong Kong waters for some time and these data may be a reflection of an overall general population decline. The overall trend, although weak, is of decreasing use of the Tai A Chau study site as the study progressed. This is not unexpected as the PAM monitoring took place between March and April, when the peak season for porpoise in Hong Kong is more than half way through and porpoise occurrence in general is slowly declining (**Figure 4**).

3.2.3 The most marked difference between baseline and impact phase monitoring is noted at the Pui O Wan PAM site. During the baseline study, the Pui O Wan site was initially highly used (during the first 13 days of the study) but then occurrence dropped dramatically (>400 DPM total per day to ~50 total DPM per day). This trend was not consistent across the baseline study and, as noted previously, the data derived from this deployment was compromised due to significant data loss (>30% of each minute's data was lost). It is therefore difficult to draw direct comparisons between a full and a partial dataset, however, the trends between the two studies are quite different. During baseline, the Pui O Site showed a sudden decline in detections, whereas the impact phase monitoring showed a gradual decline in detection rate, consistent with the other two sites monitored during this study. There was a higher finless porpoise occupancy of this site, compared to both other sites, during the impact phase, with an average daily occupancy of 38.7%, which fluctuated between 6.3% and 75.0%. This site is close to the IWMF construction site and perhaps the apparent increase in this site's use, compared to the baseline study, is an indication that porpoise that may have used the Shek Kwu Chau site were displaced to the waters of Pui O Wan. It is noted that the seasonal timing of the baseline (Feb-March) and the impact phase (March-April) PAM study overlapped, so the comparatively lower use of Pui O Wan during the baseline monitoring cannot be attributed to the generally accepted seasonal decline in porpoise as the peak period progresses. Much of the comparison between the baseline study and the impact phase study at this specific site, is confounded by the data loss issue during the baseline, however, what is clear is that during the impact phase study period, finless porpoise occupied the Pui O Wan site considerably more than the other two sites. It is noted that Pui O Wan is closer to the IWMF construction area than Tai A Chau. The overall

occupancy trend at Pui O Wan is of a marked decrease in use as the monitoring progressed. This is not unexpected as the PAM monitoring took place between March and April, when the peak season for porpoise in Hong Kong is nearing an end and, as is shown in the AFCD long term marine mammal monitoring, seasonal declines in porpoise do occur (**Figure 5**).

3.3 Diurnal Patterns of Porpoise Occurrence

3.3.1 During the baseline study, all three sites showed diurnal occurrence of finless porpoise, that is, porpoise were more likely to be detected during night-time hours. At Shek Kwu Chau, occurrence during the baseline study peaked between 2am and 5am, whereas, the peak in occurrence at Tai A Chau and Pui O Wan was at midnight.

3.3.2 During the impact phase study, both Shek Kwu Chau and Pui O Wan showed significant diurnal activity, as was also noted in the baseline study. At Shek Kwu Chau, detections peaked between 9pm and 4am (**Figure 6**) and, at Pui O Wan, detections peaked between 8pm and 3am (**Figure 7**). There was very weak evidence of diurnal activity patterns at Tai A Chau, with only a suggestion of a possible peak in detections at 11pm, compared to the midnight peak noted during the baseline study (**Figure 8**). This lack of a pattern may be due to a difference in environmental parameters between the two study years, e.g., it has been noted that salinity significantly impacts finless porpoise occurrence and increased freshwater outflow from the Pearl River Estuary directly effects the Tai A Chau area. In addition, the limited number of detections from this site during impact phase monitoring may be insufficient to show clear patterns.

4. DISCUSSION

4.1 The EIA for the IWMF construction work predicted that marine mammals, in particular finless porpoise, would be displaced from the area immediately adjacent to construction activities. There has not been strong evidence for this during the impact phase vessel-based line-transect monitoring, however, comparisons between baseline and impact phase studies for both theodolite tracking and PAM do show, overall, fewer porpoise detections. As the area in which the line transect monitoring is conducted results in very few visual encounters (both historical and current data clearly show this) there is low power to detect any significant changes in porpoise occurrence, making it difficult to assess EIA predictions with certainty. Both theodolite tracking and PAM studies involve considerably more survey effort and therefore, more data is recorded and trends can be more easily discerned. The theodolite tracking (both baseline and impact phase monitoring) at Shek Kwu Chau showed a decline in porpoise detections concomitant with site activities. A comparison of the PAM data obtained during baseline and impact monitoring is not as clear cut. The PAM site immediately adjacent to IWMF construction activities, Shek Kwu Chau, was utilised by finless porpoise every day of the study and diurnal behaviour, typical of this species, was clearly detected. The Shek Kwu Chau area did appear to be used less often when compared to the baseline study, thus going some way to support the EIA predictions. Pui O Wan, the control site closest to the IWMF (~2.5km) recorded the greatest rate of daily porpoise detections during impact phase monitoring and distinct diurnal activity patterns were recorded, suggesting that porpoise were behaving as normal. There was considerably more activity at Pui O Wan during impact phase monitoring when compared to baseline monitoring, suggesting, perhaps, porpoise were displaced from the adjacent Shek Kwu Chau site. This difference, however, may also be due to different environmental or other anthropogenic factors between the two study periods. Further, the significant data loss from the Pui O Wan site during the baseline study may be confounding data comparison. Tai A Chau, some 9km distant from the IWMF site, showed no difference in porpoise detections related to start up site preparation activities at IWMF during the baseline study. There were, however, considerably less detections at Tai A Chau during impact phase monitoring, when compared to baseline monitoring, even though the area is most likely outside the impact zone of IWMF construction activities. In addition, there was no clear indication of diurnal behavioural patterns at Tai A Chau. The reduction in finless porpoise detections at Tai A Chau is contrary to EIA predictions and further analyses should be conducted to assess what other factors might be driving this apparent decline.

4.2 The PAM archival system survey could be used to study habitat use by finless porpoise (Neophocaena phocaenoides). Serveral such automated static porpoise detectors (e.g. CPODs, Soundtraps) could be deployed on the seabed (mounted on blocks / frameworks) and would archive any porpoise acoustic clicks. During baseline surveys, CPOD was installed on a high profile “A” frame seabed mount. Theses frames are not suitable for use in exposed areas and CPODs are also tethered “free floating” devices which, again, may be problematic to use in exposed areas as the tether may tangle or break and excessive motion may disrupt the collection of data as CPODs only record when vertical – not when horizontal as they might be in a current. Soundtraps will be used instead of CPODs, as these devices are smaller, more robust and can be fixed directly onto a frame, thus nothing is free floating in the water column. Soundtraps archive sound, like CPODs do, and the data can be analysed in the same way as CPODs. The soundtraps would be mounted on small storm proof seabed frames, which can be deployed quickly by divers using lift bags.

4.3 Overall, the PAM study showed that porpoise continue to consistently utilise the Shek Kwu Chau habitat immediately adjacent to the IWMF construction activities, although to a

lesser degree than that prior to construction activities. In addition, the Pui O Wan site, which is 2.5km away from the IWMF construction area, was also consistently utilised during the impact phase PAM study. A continued assessment of fine scale habitat use, particularly through PAM which yields large quantities of data, would allow a more comprehensive assessment of the EIA predictions.

5. REFERENCES

5.1 Agriculture, Fisheries and Conservation Department (AFCD) 2018. Annual Marne Mammal Monitoring Programme April 2017-March 2018) The Agriculture, Fisheries and Conservation Department, Government ofthe Hong Kong SAR.

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5.2 Agriculture, Fisheries and Conservation Department (AFCD) 2017. Annual Marne Mammal Monitoring Programme April 2016-March 2017) The Agriculture, Fisheries and Conservation Department, Government of the Hong Kong SAR.

http://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/con_mar_chi_chi.html

5.3 Agriculture, Fisheries and Conservation Department (AFCD) 2016. Annual Marne Mammal Monitoring Programme April 2015-March 2016) The Agriculture, Fisheries and Conservation Department, Government of the Hong Kong SAR.

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5.6 Agriculture, Fisheries and Conservation Department (AFCD) 2013. Annual Marne Mammal Monitoring Programme April 2012-March 2013) The Agriculture, Fisheries and Conservation Department, Government of the Hong Kong SAR.

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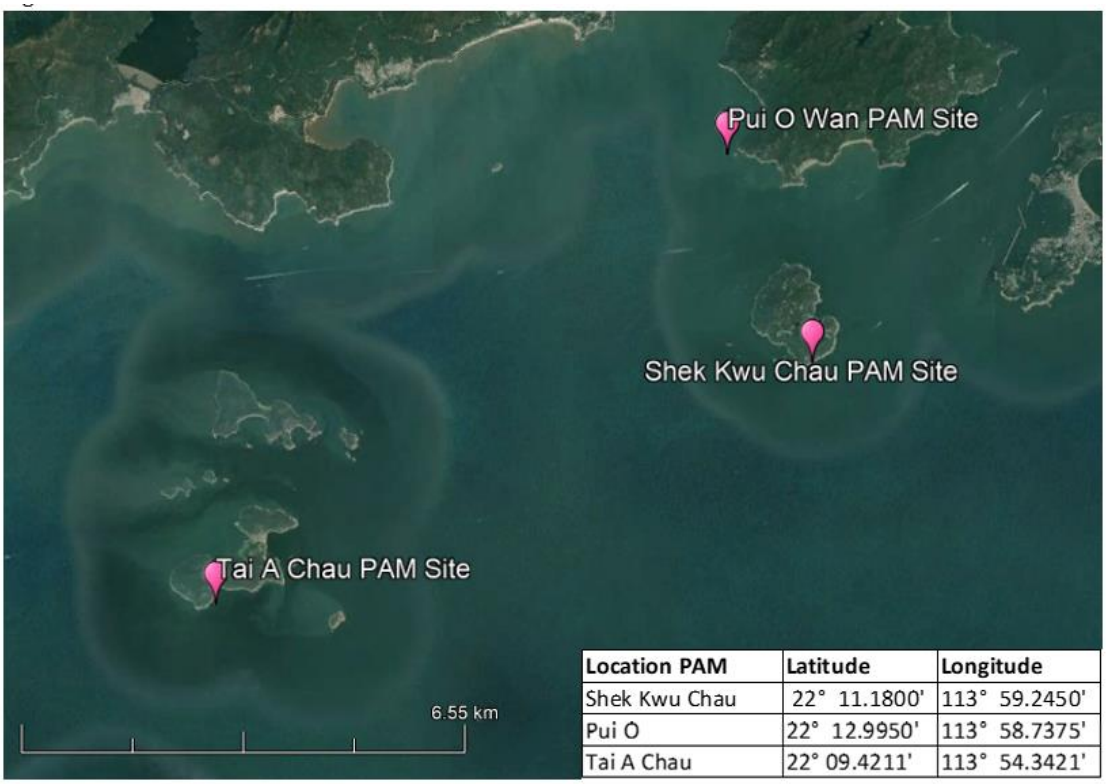
6. FIGURES AND TABLES

Figure 1 The Location of the PAM Sites during Impact Phase Monitoring (March - May 2019)



Location PAM	Latitude	Longitude
Shek Kwu Chau	22° 11.1800'	113° 59.2450'
Pui O	22° 12.9950'	113° 58.7375'
Tai A Chau	22° 09.4211'	113° 54.3421'

Figure 2 Using PAMGuard software, marine mammal vocalisations can be automatically detected by using inbuilt or bespoke classifiers. Here is an example of a finless porpoise click train, with corresponding click waveform and click spectrum graphs and a Wigner Plot, confirming the typical charcteristics of porpoise clicks

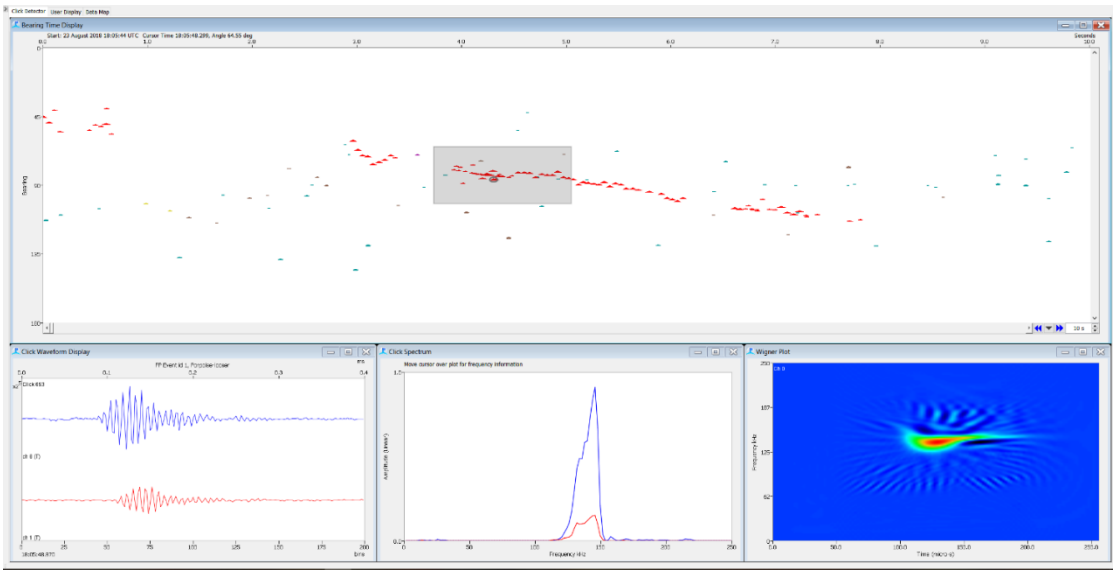


Figure 3 The Daily Rate of Detection Positive Minutes (DPM) for Finless Porpoise (Neophocaena phocaenoides) at Shek Kwu Chau, 5th March - 11th April 2019

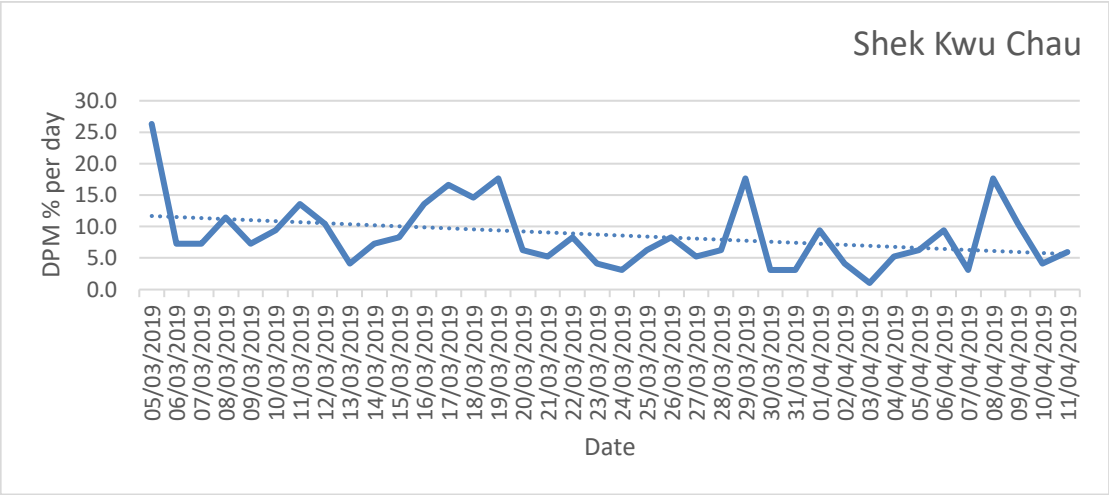


Figure 4 The Daily Rate of Detection Positive Minutes (DPM) for Finless Porpoise (Neophocaena phocaenoides) at Tai A Chau, 11th April – 23rd May 2019

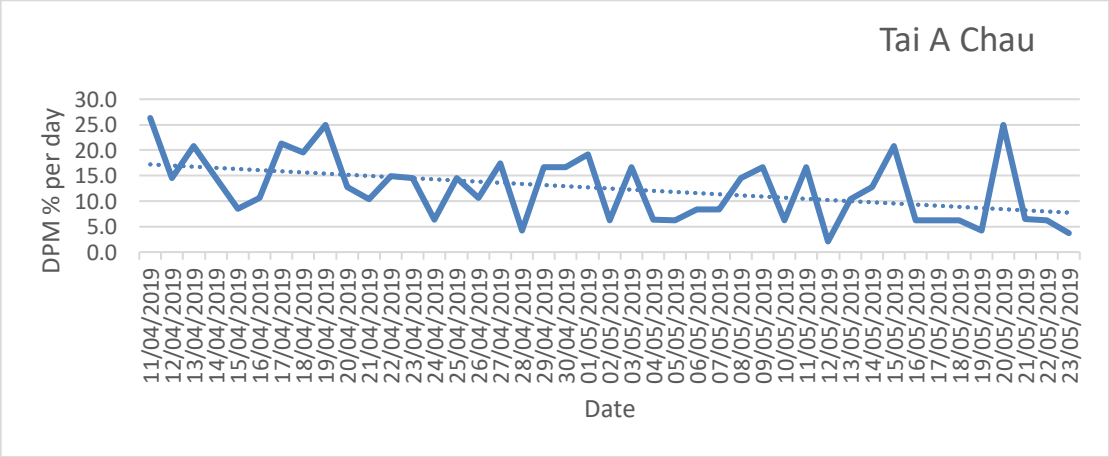


Figure 5 The Daily Rate of Detection Positive Minutes (DPM) for Finless Porpoise (Neophocaena phocaenoides) at Pui O Wan, 11th April - 23rd May 2019

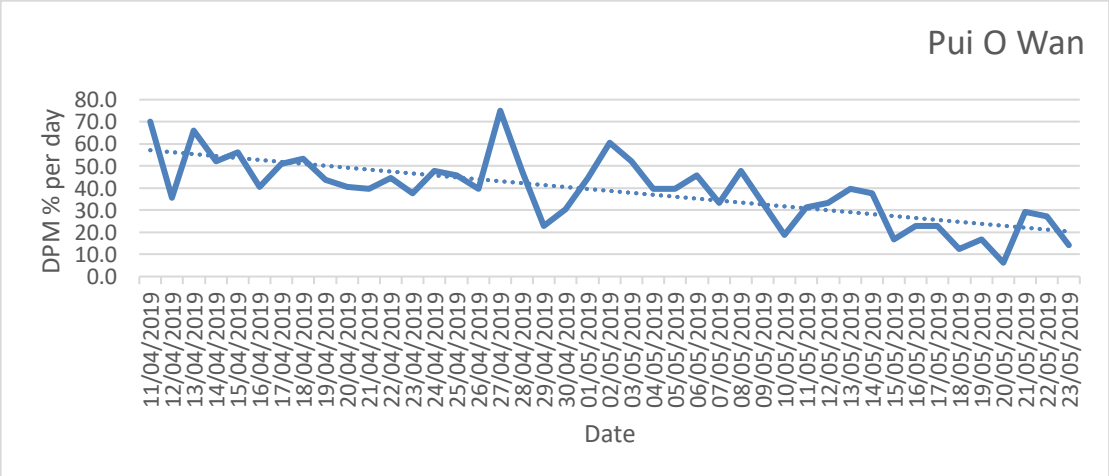


Figure 6 Finless Porpoise (Neophocaena phocaenoides) Diurnal Detection Patterns at Pui O Wan, 11th April - 23rd May 2019

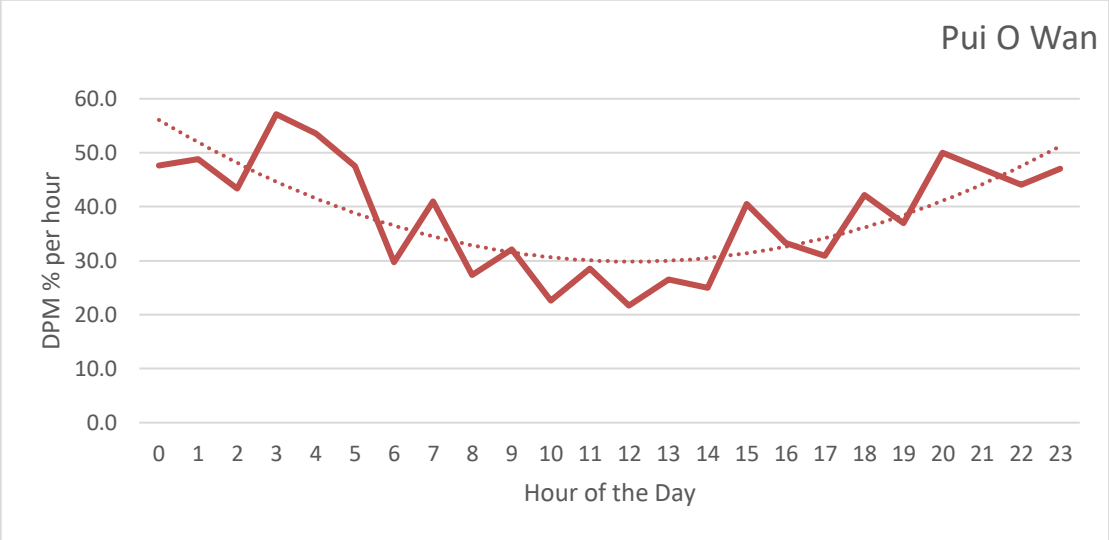
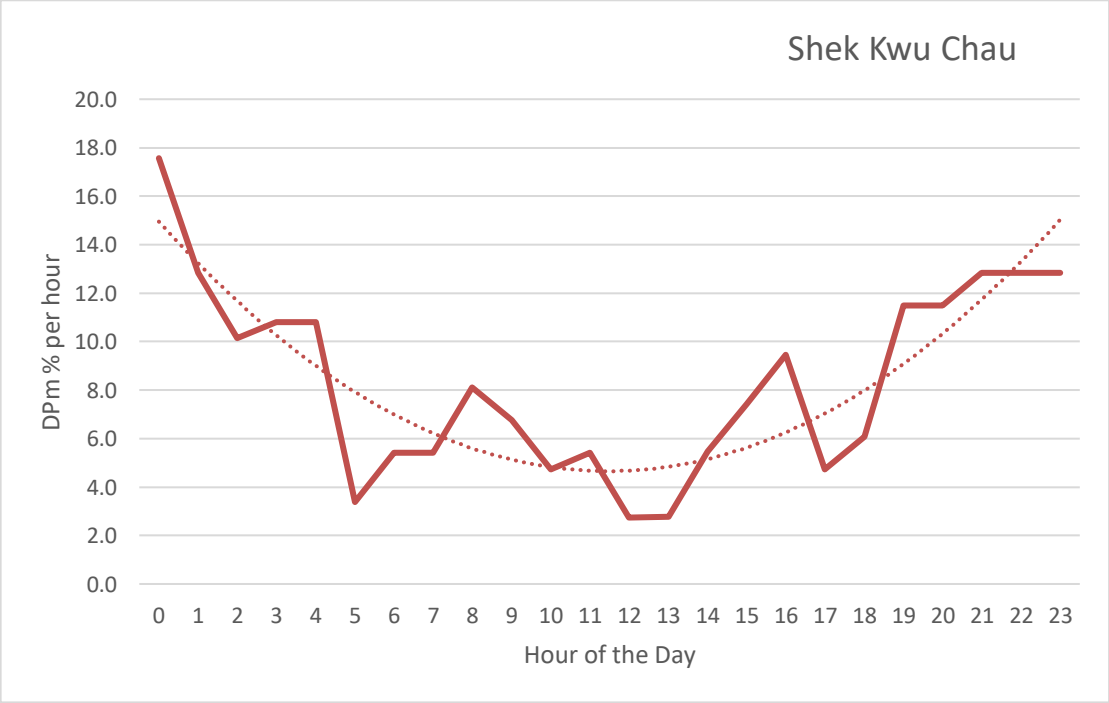


Figure 7 Finless Porpoise (Neophocaena phocaenoides) Diurnal Detection Patterns at Shek Kwu Chau, 5th March - 11th April 2019



Date	Time	Weather	Beaufort Sea State	Visibility	Fix Type	Group Number	Group Size	Behaviour	Horizontal	Vertical	Latitude	Longitude
01/03/2019	12:45:25	Fair	1	Good > 5KM	Finless Porpoise	1	1	Traveling	170.0541	267.3245	N 22° 11.1	113° 59.4

Figure 8 Finless Porpoise (Neophocaena phocaenoides) Diurnal Detection Patterns at Tai A Chau, 11th April - 23rd May 2019

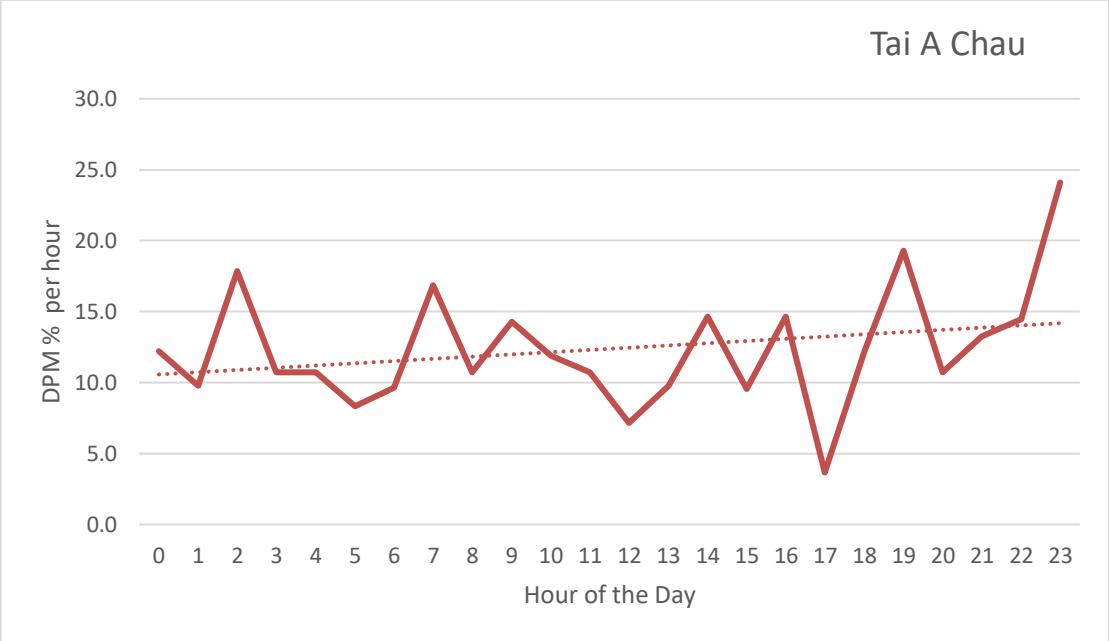


Table 1 Summary Statistic Comparison of Baseline (2018) and Impact Phase (2019) Passive Acoustic Monitoring, South Lantau, Hong Kong SAR

Baseline data									
Site	**Unit ID**	**Start**	**End**	**Days**	**DPD % Days**	**Total DPM**	**DPM /Day**	**% False Positive DPM**	**Time Lost %**
Shek Kwu Chau	2891	2018/02/09	2018/03/13	32.11	100	11160	338.2	0.0	1.00
Tai A Chau	2868	2018/02/09	2018/03/13	32.5	100	16089	487.6	1.0	2.00
Pui O Wan	2891	2018/03/13	2018/04/17	34.85	97.3	3645	98.5	2.0	31.87
Total				99.01		30894	312.0		
Impact Phase									
Site	**Unit ID**	**Start**	**End**	**Days**	**DPD % Days**	**Total DPM**	**DPM /Day**	**% False Positive DPM**	**Time Lost %**
Shek Kwu Chau	IWMF_BU_20190305_01	2019/03/05	2019/04/11	37.91	100	4740	124.8	0.0	0
Tai A Chau	IWMF_20190411_02	2019/04/11	2019/05/23	41.94	100	7725	179.7	0.0	0
Pui O Wan	IWMF_20190411_01	2019/04/11	2019/05/23	42.02	100	23986	557.8	0.0	0
Total				121.9		36451	299.1		

APPENDIX 1

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ENGINEERING SERVICES FOR MARINE SCIENCE

SoundTrap 300 Digital Sound Recorders

STD & HF models

Key features:

- **Industry leading audio fidelity**
- **Very low self-noise**
- **60 kHz and 150 kHz bandwidth models**
- **Up to 13 days continuous recording on internal battery**
- **Up to 70 days continuous with optional external battery (3 x D cell)**
- **Simple operation with IR remote control**
- **Sealed, low maintenance, flood proof housing**
- **Selectable high pass filter for high energy sites or towing**
- **Sensors for temperature and acceleration**
- **Fast USB offload**

The SoundTrap 300 series are compact self-contained underwater sound recorders for ocean acoustic research. The STD model is intended for general aquatic noise measurements with a working frequency range of 20 Hz to 60 kHz. While the HF model offers 20 Hz to 150 kHz bandwidth for high frequency bioacoustic measurements. Both feature very low self-noise, ensuring beautiful recordings in even the quietest places.

Their internal battery enables continuous recording for up to 13 days, or 56 days on a 10 minute per hour duty cycle. For longer deployments simply plug in the optional external battery pack for up to 70 days continuous recording. 128 GB of internal memory coupled with lossless audio compression provide storage for up to 65 days continuous recording at 36 kHz.

Data offload and battery recharge are done via a high quality wet plug. The housing therefore never needs opening, thereby eliminating the usual worries about o'ring maintenance and moisture ingress. Weighing less than 500 g in air, hydrophone deployment has never before been so easy.

Output files are in the industry standard WAV format. Ancillary sensors are included for logging temperature and tri-axial acceleration. The included software offers flexible deployment options for sample rate, gain control, filtering, delayed start and duty cycle. Plus the included water proof IR remote control makes for convenient in-the-field ad hoc measurements. Each instrument is supplied with a calibration certificate and features self-calibration checks for confirmation of performance in the field.