

Annex C

Results of Impact  
Monitoring during  
Dredging Operations of  
CMP 1 in July 2013

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

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/7/4	Mid-Ebb	DS1	4.07	5.88	6.74	6.67
		DS2	5.00	6.46	4.98	3.89
		DS3	4.91	6.75	5.08	3.67
		DS4	4.72	5.98	5.38	4.22
		DS5	4.79	5.97	5.61	5.11
		US1	4.42	6.11	11.21	13.78
		US2	5.75	6.78	8.92	7.78
		MW1	3.71	6.20	3.71	4.00
		THB1	7.96	8.02	6.77	7.33
		THB2	-	9.11	4.58	10.67
	WSR45C	4.63	5.94	5.41	5.56	
	WSR46	4.24	5.63	7.33	6.11	
	Mid-Flood	DS1	5.10	6.77	6.99	4.78
		DS2	5.96	7.90	12.38	12.33
		DS3	6.75	8.29	10.94	14.00
		DS4	8.83	8.74	11.86	9.83
		DS5	9.49	9.02	8.90	10.17
		US1	4.51	6.07	8.55	8.89
		US2	4.03	6.23	6.91	5.78
		MW1	3.89	5.16	4.48	4.22
THB1		7.64	8.53	9.06	8.17	
THB2		-	9.66	9.84	10.00	
2013/7/6	Mid-Ebb	WSR45C	3.59	6.22	10.47	9.11
		WSR46	3.86	6.32	13.16	11.78
		DS1	4.27	6.16	9.69	11.89
		DS2	3.84	6.43	9.39	10.22
		DS3	4.41	6.83	8.02	7.22
		DS4	4.12	6.63	8.89	7.56
		DS5	4.35	6.85	7.95	7.56
		US1	3.63	5.75	13.34	13.11
		US2	4.67	7.11	12.14	11.33
		MW1	3.67	6.41	3.66	4.56
	THB1	4.60	8.05	10.91	12.83	
	THB2	-	8.01	6.01	8.00	
	Mid-Flood	WSR45C	3.11	6.81	10.07	12.22
		WSR46	4.10	6.49	7.66	10.33
		DS1	5.98	7.73	11.02	9.33
		DS2	5.81	7.81	9.83	7.22
		DS3	6.02	8.40	12.60	12.89
		DS4	6.36	10.12	12.43	13.33
		DS5	8.72	10.00	9.06	11.00
		US1	4.23	6.68	12.05	12.11
US2		3.86	6.63	10.51	10.11	
MW1		3.66	4.74	6.76	8.22	
THB1	5.79	9.51	17.17	13.33		
THB2	-	8.26	12.74	15.67		
WSR45C	3.57	6.37	10.68	8.22		
WSR46	4.08	8.11	17.46	7.44		

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/7/8	Mid-Ebb	DS1	4.76	6.23	14.70	12.11
		DS2	5.28	6.41	7.13	6.78
		DS3	5.28	6.28	9.27	12.44
		DS4	5.85	6.34	6.82	6.67
		DS5	6.89	7.01	6.70	6.22
		US1	6.43	7.31	7.01	5.56
		US2	6.68	7.19	8.10	6.67
		MW1	5.23	6.97	5.10	4.89
		THB1	6.26	7.08	8.39	12.33
		THB2	-	7.24	6.44	8.00
		WSR45C	3.58	6.84	12.08	14.56
		WSR46	4.73	6.40	7.45	8.00
	Mid-Flood	DS1	5.46	5.63	8.96	8.78
		DS2	5.05	5.81	11.50	13.11
		DS3	5.41	6.08	10.62	8.89
		DS4	6.66	6.55	7.10	5.67
		DS5	6.68	6.70	7.75	7.17
		US1	4.86	5.57	8.83	8.67
		US2	3.53	5.69	20.95	21.33
		MW1	3.86	5.52	4.16	7.22
		THB1	5.91	6.10	9.37	11.17
		THB2	-	5.90	9.64	7.67
		WSR45C	3.87	5.83	8.10	12.00
		WSR46	4.71	6.08	6.37	7.22
2013/7/10	Mid-Ebb	DS1	4.35	5.84	4.87	5.22
		DS2	4.64	5.79	4.86	5.00
		DS3	4.78	5.99	5.61	5.89
		DS4	4.96	6.10	5.21	3.89
		DS5	6.48	6.80	3.74	3.89
		US1	5.93	6.35	9.42	8.44
		US2	4.87	6.25	7.70	6.56
		MW1	5.35	6.54	3.19	3.33
		THB1	6.35	7.31	4.87	4.17
		THB2	-	6.43	4.78	4.33
		WSR45C	5.42	6.64	5.85	8.33
		WSR46	4.56	5.89	5.40	7.56
	Mid-Flood	DS1	4.96	5.41	10.53	13.44
		DS2	5.44	5.72	9.33	10.00
		DS3	5.68	5.67	8.44	8.33
		DS4	5.61	6.05	6.97	5.22
		DS5	6.13	6.18	6.28	6.17
		US1	4.28	5.47	8.07	10.56
		US2	3.74	5.12	14.37	21.78
		MW1	3.83	5.28	3.10	6.11
		THB1	5.51	5.95	9.86	8.33
		THB2	-	5.79	8.77	6.67
		WSR45C	3.97	4.90	12.22	5.67
		WSR46	4.29	5.45	9.12	8.44
2013/7/12	Mid-Ebb	DS1	4.61	6.14	4.62	4.78
		DS2	3.85	6.10	6.67	7.67
		DS3	4.14	6.27	7.03	8.44

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/7/15	Mid-Flood	DS4	5.83	6.65	3.22	4.11
		DS5	6.99	7.07	3.25	2.89
		US1	5.64	6.32	5.59	5.56
		US2	6.30	6.66	4.90	5.33
		MW1	4.67	6.48	2.10	8.56
		THB1	5.71	7.30	4.57	4.17
		THB2	-	6.91	5.34	4.00
		WSR45C	3.80	6.57	8.78	9.33
		WSR46	4.17	5.32	4.32	5.00
		DS1	4.61	5.22	5.09	6.44
		DS2	4.81	5.22	5.03	5.78
		DS3	5.10	5.44	4.61	4.56
		DS4	4.55	5.61	6.29	5.67
		DS5	5.87	5.79	3.66	3.83
		US1	4.56	5.53	3.15	3.56
	US2	3.85	4.97	11.02	13.00	
	MW1	3.79	4.84	1.57	2.44	
	THB1	5.50	5.76	5.96	4.50	
	THB2	-	4.60	6.51	7.67	
	WSR45C	4.07	4.98	3.33	5.00	
	WSR46	4.09	5.12	6.51	7.56	
	DS1	4.06	5.92	7.59	12.67	
	DS2	4.08	5.87	8.85	12.00	
	DS3	4.14	6.27	7.81	9.78	
	DS4	5.10	6.39	3.51	4.11	
	DS5	5.47	6.23	2.94	3.11	
	US1	4.95	5.90	14.09	13.78	
	US2	6.02	6.37	6.30	6.50	
	MW1	4.33	6.24	1.03	2.00	
	THB1	5.82	7.79	3.97	9.83	
THB2	-	5.54	5.87	6.33		
WSR45C	3.79	6.01	5.56	8.44		
WSR46	4.73	5.79	5.45	6.33		
DS1	5.77	6.27	3.10	3.50		
DS2	6.46	6.48	1.95	3.83		
DS3	5.51	6.34	5.87	5.67		
DS4	6.48	6.70	2.56	4.67		
DS5	6.73	7.12	2.35	5.83		
US1	4.75	5.62	3.23	3.89		
US2	4.39	5.66	5.35	7.67		
MW1	4.18	5.47	0.99	11.33		
THB1	5.66	5.97	5.74	3.83		
THB2	-	5.99	3.72	3.67		
WSR45C	4.22	5.51	2.53	5.67		
WSR46	4.65	6.04	3.76	3.11		
DS1	3.98	5.22	7.74	14.56		
DS2	3.74	5.29	4.92	7.00		
DS3	4.18	5.25	3.46	4.78		
DS4	4.73	5.52	1.78	3.67		
DS5	4.77	5.41	1.60	3.44		
US1	4.98	5.29	7.22	8.78		

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/7/19	Mid-Flood	US2	5.70	5.69	3.80	6.00
		MW1	3.62	4.34	1.30	3.33
		THB1	5.08	5.54	3.42	9.67
		THB2	-	4.73	6.97	4.67
		WSR45C	3.85	5.16	3.18	5.89
		WSR46	3.98	4.50	4.15	7.44
		DS1	4.66	5.88	2.80	4.00
		DS2	5.28	5.84	3.04	5.44
		DS3	4.93	6.34	3.24	4.89
		DS4	6.82	6.72	2.15	3.33
		DS5	7.10	7.06	2.37	4.50
		US1	4.19	5.15	2.94	6.33
		US2	4.04	5.04	3.14	6.44
		MW1	3.71	4.79	1.92	5.56
		THB1	5.78	7.14	5.16	7.83
		THB2	-	6.62	5.08	4.33
	WSR45C	3.92	5.16	5.83	8.44	
	WSR46	4.08	5.62	3.70	7.44	
	DS1	4.27	5.47	4.84	14.11	
	DS2	4.32	5.46	4.89	6.33	
	DS3	4.84	5.61	3.93	5.11	
	DS4	4.97	5.89	3.52	4.89	
	DS5	5.29	6.38	2.93	4.22	
	US1	4.55	5.76	4.81	6.00	
	US2	4.81	5.86	3.15	4.78	
	MW1	4.33	4.99	1.27	5.22	
	THB1	5.90	6.93	3.37	4.67	
	THB2	-	5.40	4.98	4.33	
	WSR45C	5.14	5.95	3.31	5.56	
	WSR46	4.16	5.47	6.09	10.56	
	DS1	4.50	5.45	6.50	9.33	
	DS2	5.67	6.18	5.04	9.56	
DS3	6.16	6.60	12.14	19.22		
DS4	5.33	6.33	11.30	12.33		
DS5	7.06	7.24	7.74	9.17		
US1	4.57	6.25	3.13	6.56		
US2	3.96	5.16	13.97	16.67		
MW1	4.45	4.66	3.40	5.44		
THB1	7.51	7.76	4.91	13.50		
THB2	-	7.16	9.77	13.67		
WSR45C	4.08	5.27	5.69	10.00		
WSR46	5.07	5.98	13.67	16.00		
DS1	4.54	5.01	6.36	7.67		
DS2	4.78	5.29	4.59	5.56		
DS3	4.71	5.19	5.60	7.89		
DS4	4.58	5.12	8.21	11.78		
DS5	4.52	4.80	8.75	14.67		
US1	5.10	5.84	8.73	6.67		
US2	5.02	5.52	6.74	7.33		
MW1	4.53	4.77	3.95	6.89		
THB1	5.57	6.11	3.57	6.17		

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)	
			Bottom	Surface and Mid Depth			
2013/7/24	Mid-Flood	THB2	-	5.24	4.98	5.33	
		WSR45C	4.44	5.05	11.40	14.67	
		WSR46	4.92	5.10	37.29	21.89	
		DS1	5.39	5.53	5.11	7.50	
		DS2	5.42	5.46	6.38	10.33	
		DS3	5.43	5.48	6.01	9.33	
		DS4	5.44	5.53	7.46	9.00	
		DS5	5.67	5.64	7.83	10.50	
		US1	5.34	5.61	4.90	8.33	
		US2	4.77	4.88	6.80	9.44	
		MW1	4.24	4.34	8.92	11.33	
		THB1	5.45	5.68	8.62	12.50	
		THB2	-	6.38	9.37	9.33	
		WSR45C	4.64	5.06	9.69	14.33	
		WSR46	4.84	5.28	13.99	19.78	
	Mid-Ebb	DS1	4.55	4.89	5.76	8.33	
		DS2	4.67	5.23	4.88	6.78	
		DS3	4.86	5.08	6.26	10.33	
		DS4	4.80	4.91	7.71	8.33	
		DS5	4.88	4.94	7.98	8.50	
		US1	5.11	5.59	7.77	9.00	
		US2	5.09	5.34	9.00	10.33	
		MW1	4.91	5.05	4.32	5.56	
		THB1	5.46	5.66	3.92	4.83	
		THB2	-	-	-	-	
		WSR45C	4.68	4.99	11.33	13.33	
		WSR46	5.22	5.33	19.31	21.22	
		Mid-Flood	DS1	5.12	5.18	5.12	9.00
			DS2	5.11	5.15	6.72	12.00
			DS3	5.07	5.26	6.77	13.00
DS4	5.02		5.35	6.63	13.33		
DS5	5.35		5.32	5.30	7.89		
US1	4.48		4.87	16.67	23.33		
US2	4.32		4.74	15.43	24.56		
MW1	4.42		4.73	4.87	6.67		
THB1	5.36		5.36	4.43	7.83		
THB2	-		4.67	6.80	6.67		
WSR45C	4.65		5.18	6.47	8.33		
WSR46	4.59		5.02	23.99	27.67		
2013/7/26	Mid-Ebb		DS1	4.97	5.35	12.22	15.44
			DS2	5.08	5.51	9.97	17.11
			DS3	5.09	5.46	9.14	12.22
		DS4	5.05	5.29	9.58	12.11	
		DS5	5.35	5.36	8.73	10.83	
		US1	5.37	5.88	10.73	14.50	
		US2	5.35	5.79	9.58	10.00	
		MW1	4.98	5.09	5.43	6.78	
		THB1	5.44	5.49	7.12	9.17	
		THB2	-	-	-	-	
		WSR45C	4.72	4.95	13.71	15.33	
		WSR46	4.70	5.11	35.61	49.33	

Sampling Date	Tidal Period	Station	Average DO Levels (mg/L)		Average Turbidity Level (NTU)	Average SS Level (mg/L)
			Bottom	Surface and Mid Depth		
2013/7/29	Mid-Flood	DS1	5.49	5.47	6.98	8.83
		DS2	5.55	5.61	5.37	6.00
		DS3	5.64	5.71	6.07	9.17
		DS4	5.74	5.83	5.63	7.33
		DS5	5.47	5.71	8.34	10.67
		US1	5.17	5.40	8.19	8.44
		US2	4.77	5.09	13.27	16.89
		MW1	4.90	5.28	4.49	5.44
		THB1	5.24	5.34	9.97	11.33
		THB2	-	-	-	-
		WSR45C	5.16	5.40	11.27	14.89
		WSR46	5.03	5.36	20.00	29.56
	Mid-Ebb	DS1	5.02	5.91	6.60	7.56
		DS2	5.14	5.79	7.32	10.78
		DS3	5.18	5.84	5.11	8.00
		DS4	5.03	5.76	5.27	6.11
		DS5	5.48	5.73	4.29	6.17
		US1	6.28	6.45	6.40	5.33
		US2	6.35	6.48	13.93	16.67
		MW1	4.44	6.32	2.36	3.56
		THB1	5.48	6.21	8.14	10.17
		THB2	-	6.17	7.54	5.00
		WSR45C	4.30	5.75	4.90	6.22
		WSR46	4.76	5.80	6.83	10.67
	Mid-Flood	DS1	5.74	5.81	5.47	4.50
		DS2	5.78	5.83	5.05	5.17
		DS3	5.90	5.92	4.68	7.83
		DS4	6.19	6.08	4.25	3.50
DS5		5.65	6.12	9.22	7.22	
US1		5.27	5.90	4.07	6.00	
US2		4.77	5.38	8.12	8.67	
MW1		4.66	5.72	3.53	4.89	
THB1		6.16	6.28	3.99	5.50	
THB2		-	5.41	10.11	5.00	
WSR45C		4.78	5.61	5.27	6.33	
WSR46		4.65	5.59	10.53	12.44	

Notes:

1. Please refer to Table B2 below for the Action and Limit Levels for dredging activities.
2. Cell shaded yellow indicated value exceeding the Action Level criteria.
3. Cell shaded red indicated value exceeding the Limit Level criteria.
4. Only mid-depth water was sampled at Station THB2 because water depth was less than 3m.
5. Sampling at Station THB2 during mid-ebb tide of 24 July 2013 and both mid-ebb and mid-flood tides of 26 July 2013 were not carried out due to adverse weather.

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

<b>Parameter</b>	<b>Action Level</b>	<b>Limit Level</b>
Dissolved Oxygen (DO) <sup>(1)</sup>	<u>Surface and Mid-depth</u> <sup>(2)</sup> The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for surface and middle layer = <b>4.32 mg L<sup>-1</sup></b>	<u>Surface and Mid-depth</u> <sup>(2)</sup> The average of the impact, WSR 45C and WSR 46 station readings are < <b>4 mg L<sup>-1</sup></b>
	and	and
	Significantly less than the reference stations mean DO (at the same tide of the same day)	Significantly less than the reference stations mean DO (at the same tide of the same day)
	<u>Bottom</u> The average of the impact, WSR 45C and WSR 46 station readings are < 5%-ile of baseline data for bottom layers = <b>3.12 mg L<sup>-1</sup></b>	<u>Bottom</u> The average of the impact station, WSR 45C and WSR 46 readings are < <b>2 mg L<sup>-1</sup></b>
	and	and
	Significantly less than the reference stations mean DO (at the same tide of the same day)	Significantly less than the reference stations mean DO (at the same tide of the same day)
Depth-averaged Suspended Solids (SS) <sup>(3)(4)</sup>	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data for depth average = <b>21.60 mg L<sup>-1</sup></b>	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data for depth average = <b>40.10 mg L<sup>-1</sup></b>
	and	and
	120% of control station's SS at the same tide of the same day	130% of control station's SS at the same tide of the same day
Depth-averaged Turbidity (Tby) <sup>(3)(4)</sup>	The average of the impact, WSR 45C and WSR 46 station readings are > 95%-ile of baseline data = <b>25.04 NTU</b>	The average of the impact, WSR 45C and WSR 46 station readings are > 99%-ile of baseline data = <b>56.30 NTU</b>
	and	and
	120% of control station's Tby at the same tide of the same day	130% of control station's Tby at the same tide of the same day
<b>Notes:</b>		
(1) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.		
(2) The Action and Limit Levels for DO for Surface & Middle layers were calculated from the combined pool of baseline surface layer data and baseline middle layer data.		
(3) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.		
(4) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.		



