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Report No.: 0394/13/ED/0359A

Quarterly EM&A Report

February 2017 - April 2017

Client : China International Water & Electric Corporation

Project: Providing Sufficient Water Depth for Kwai Tsing Container Basin
and its Approach Channel – CV/2013/04

Report No.: 0394/13/ED/0359A

Project Proponent:

Civil Engineering & Development Department
101 Princess Margaret Road,
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Prepared by: Andy Choi

Reviewed by: Cyrus Lai

Certified by: _____


Colin Yung
Environmental Team Leader for
Materialab Consultants Limited

Ref.: CEDDWKTBEM00_0_0326L.17

19 June 2017
By Post and Fax (2419 6218)

Mott MacDonald Hong Kong Ltd.
20/F, AIA Kowloon Tower,
Landmark East,
100 How Ming Street,
Kwun Tong, Kowloon

Attention: Mr Chan T P, Pan, Engineer's Representative

Dear Mr Chan,

**Re: Agreement No. CE 63/2008 (CE)
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
– Investigation, Design and Construction)**

**Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Verification of Quarterly EM&A Report for February 2017 to April 2017**

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for February 2017 to April 2017 (ET's Report. No. 0394/13/ED/0359A) received by e-mail on 17 June 2017.

We write to verify the captioned report in accordance with Section 12.4 iii of EM&A Manual (AEIAR-156/2010).

Thank you very much for your kind attention and please do not hesitate to contact our Mr Andy Wong or the undersigned should you have any queries.

Yours faithfully,
For and on behalf of
Ramboll Environ Hong Kong Limited



Y H Hui
Independent Environmental Checker

Cc:	MMHK	Mr. C M Howley	2827 1823 (by fax)
	MateriaLab	Mr. Colin Yung	2450 6138 (by fax)
	CIWE	Mr. K.O. Leung and Mr. Lam Wai-hung	2419 6028 (by fax)

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EXECUTIVE SUMMARY

- i. This is the Twelfth Quarterly Environmental Monitoring Audit (EM&A) Report – February 2017 – April 2017 for Contract No. CV/2013/04 – Dredging Works in Kwai Tsing and its Approach Channel (CE63/2008 – Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel). The dredging works commenced on 23 April 2014. This report presents the environmental monitoring and audit works conducted from 23 January 2017 to 22 April 2017.
- ii. Construction Activities for the Reporting Period
During this reporting period, the principal work activities included:

February 2017	March 2017	April 2017
<ul style="list-style-type: none"> Preparation works of dredging at Portion A / Zone 2B1 and 2B2 in EP. 		<ul style="list-style-type: none"> Preparation works of dredging at Portion A / Zone 2B1 and 2B2 in EP Dredging at Portion A / Zone 1A, Zone 2B1 and 2B2 in EP

Note: Hotspot area was completed excepted hard materials and buffer zone was almost completed except known hotspot and hard materials

iii. Water Quality Monitoring

Referring to the *Proposal on Removal of Some Water Quality Monitoring Stations After Resumption of Marine Construction Works (Dredging Works and Marine Works of the Northern Part of Kwai Tsing Container Basin Only)* (0394_13_ED_0332I) which has been submitted to EPD and relevant parties in December 2016 with no objection, removal of routine water quality monitoring stations at SR6, SR7, SR8, SR9, SR10 and SR11 and 24 hour monitoring stations at SR9, SR10 and SR11 was effective from 23 January 2017. The setups of 24 hour monitoring stations at SR9, SR10 and SR11 were removed on 7 February 2017. Due to removal of some sensitive receivers in routine water quality monitoring, gradient stations G3, G5 and G6 were also be removed and gradient stations G1 and G4 replaced the previous control stations C1, C2 and C3 as C1A and C2A with reference to the approved proposal (0394_13_ED_0332I) which was effective from 23 January 2017.

Routine impact water quality monitoring at 9 designated monitoring stations namely C1A, C2A, G2, SR2, SR3, SR4, SR5, SR12, SR13 were conducted during the reporting period. Exceedances of NH₃-N (in-situ & Lab), TIN (in-situ & lab) and SS were recorded at various monitoring stations, detail of exceedance are summarized in **Table I and II**. However, investigation indicated these exceedances were not related to the Project works.

Table I Summary of Water Quality Exceedances – Routine Impact Monitoring (In-situ)

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR3	Action	0	0	0	0	0	0	1	1	0	0	-	-	1	1
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	4	2	4	2
	Limit	0	0	0	0	0	0	-	-	-	-	27	29	27	29
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	1	1	0	0	4	2	8	
	Limit	0	0	0	0	0	0	0	0	0	0	27	29	56	

Table II Summary of Water Quality Exceedances – Routine Impact Monitoring (Laboratory Analysis)

Station	Exceedance Level	Suspended Solids		BOD ₅		<i>E. coli</i>		NH ₃ -N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR3	Action	0	0	-	-	-	-	1	1	0	0	-	-	-	-	1	1
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	3	4	0	0	0	0	0	0	0	0	0	0	-	-	3	4
SR5	Action	0	0	-	-	-	-	-	-	-	-	-	-	4	2	4	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	27	29	27	29
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	2	2	0	0	0	0	0	0	0	0	0	0	-	-	2	2
SR13	Action	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	1	1	0	0	0	0	4	2	8	
	Limit	5	6	0	0	0	0	0	0	0	0	0	0	27	29	67	

Among the 9 monitoring stations, supplementary 24-hr water quality monitoring was also conducted at 4 of the stations, which are SR4, SR5, SR12 and SR13. No exceedance was recorded in the reporting month. Number of exceedances recorded in the reporting month at each impact station is summarized in **Table III**.

Table III Summary of the Exceedances Recorded in Reporting Quarter – 24-hr Monitoring

Station	Exceedance Level	Turbidity	DO	NH ₃ -N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	0	0	0
	Limit	0	0	0	0

iv. Waste Management

There was marine sediment Type 2 sediment (Confined Marine Disposal) disposed to East of Sha Chau Contaminated Mud Pit and a small amount of general refuse and chemical waste were disposed off site in the reporting month.

v. Non-Compliance, Complaints, Notifications of Summons and Successful Prosecutions

No complaint, notification of prosecutions or summons was received in the reporting period.

vi. Site Inspections and Audit

The Environmental Team conducted 13 site inspections in the reporting period. No particular observation was recorded in the reporting month except contractor was reminded to close the door of engine room to reduce the noise emission if the engine is operating.

According to Contractor, no archaeological deposit was found during reporting period.

vii. Compliance with Specific EP conditions

Implementation of contractor's mitigation for dredging work and the associated dredging records were checked. It was concluded that the dredging is conducted orderly in compliance with the EP requirements on site mitigation measures in general.

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viii. Construction Activities for the Coming Reporting Period

During the coming reporting period, the principal work activities included:

- Preparation Works of Dredging at Portion A / Zone 2B1 and 2B2 in EP
- Dredging at Portion A / Zone 2B1, 2B2 and Zone 2C1 in EP

Future Key Issues include:

- Regular inspection on silt curtain deployment
- Regular inspection on silt screen deployment
- Implementation of EM&A Programme
- Maintain dredging below allowable dredging rate in EP.
- Cleaning of excess material from the decks and exposed fittings of barges and dredgers before the vessel is moved.
- Barge loading shall be monitored to ensure material is not lost during transportation.
- Conditions in dumping permit shall be followed strictly.

1. INTRODUCTION

1.1 Background

- 1.1.1 The Project objective is to dredge approximately 4.0 million cubic metres of sediment from the seabed of Kwai Tsing Container Basin, as well as portions of Northern Fairway and Western Fairway, to provide sufficient depth of container basin and approach channel to Kwai Tsing Container Terminal (KTCT) for the safe navigation of Ultra Large Container Ships (ULCS).
- 1.1.2 The environmental monitoring and audit works of this Project is governed by Environmental Permit (EP) No. EP-426/2011/A, EM&A Manual (AEIAR-156/2010) and EM&A TIN (EPD Letter Ref: (34) in Ax(1) to EP2/N3/C/57Pt.7)).
- 1.1.3 The project proponent was the Civil Engineering & Development Department, HKSAR (CEDD). The Project General Layout is shown in **Figure 1**.
- 1.1.4 Mott MacDonald Hong Kong Ltd. (MMHK) was commissioned by CEDD as the Engineer for the Project. Ramboll Environ Hong Kong Limited (REHK) was employed as the Independent Environmental Checker (IEC) in the Project.
- 1.1.5 China International Water & Electric Corporation Limited (CIWE) was appointed as the main contractor for the dredging works.
- 1.1.6 Materialab Consultants Limited (MCL) was appointed as the Environmental Team (ET) to implement the Environmental Monitoring and Audit (EM&A) programme for the Project.
- 1.1.7 The construction phase of the Project under the EP was commenced on 23 April 2014. The impact EM&A programme of the Project commenced on 23 April 2014.

1.2 Purpose of the Report

- 1.2.1 This Twelfth Quarterly EM&A Report is prepared by MCL. This report presents a summary of the environmental monitoring and audit works, list of activities and mitigation measures proposed by the ET for the Project in 23 January 2017 to 22 April 2017.

1.3 Structure of the Report

- 1.3.1 The structure of this report is as follows:

- Section 1: Introduction, including background, purpose and structure of the report
- Section 2: Basic Project Information – summaries background and scope of the Contract, site description, project organization and contract details, construction programme, the construction works undertaken and the status of Environmental Permits/Licenses during the reporting period.
- Section 3: Routine Impact Water Quality Monitoring – summaries the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency,

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monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 4: 24-hr Water Quality Monitoring – summaries the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 5: Environmental Site Inspection – summaries the audit findings of the weekly site inspections undertaken within the reporting period.

Section 7: Non-Compliance, Complaints, notifications of summons and Prosecution – summaries any environmental complaints, environmental summons and successful prosecutions within the reporting period.

Section 8: Conclusions and Recommendation

2. BASIC PROJECT INFORMATION

2.1 Project Organizations

2.1.1 The Project Organization structure is shown in **Appendix A**. The key personnel contact names and numbers are summarized in **Table 2.1**.

Table 2-1 Key Personnel Contact of the Contract

Party	Position	Name	Telephone	Fax
Engineer's Representative (MMHK)	Resident Engineer	*Mr. Pan Chan	2419 6008	2419 6218
Independent Environmental Checker (REHK)	Independent Environmental Checker	Mr. YH Hui	3465 2888	3465 2899
Contractor (CIWE)	Site Agent	Mr. KO Leung	2419 6008	2419 6218
	Environmental Officer	Mr. WH Lam	2419 6008	2419 6218
Environmental Team (MCL)	Environmental Team Leader	Mr. Colin Yung	3565 4114	3565 4160

Remark:

*Ir Felix Chau left his position for this Contract since 1 March 2017. His role was replaced by Mr. Pan Chan with effective from 1 March 2017.

2.2 Construction Programme and Synopsis of Work

2.2.1 The construction phase of the Project under the EP commenced on 23 April 2014.

2.2.2 The construction programme of the Project is shown in **Appendix B**.

2.2.3 The environmental mitigation measures implementation schedule is presented in **Appendix F**.

2.3 Works undertaken during the quarter

During the reporting period, according to the Contractor, the principal work activities include:

February 2017	March 2017	April 2017
<ul style="list-style-type: none"> Preparation works of dredging at Portion A / Zone 2B1 and 2B2 in EP. 		<ul style="list-style-type: none"> Preparation works of dredging at Portion A / Zone 2B1 and 2B2 in EP Dredging at Portion A / Zone 1A, Zone 2B1 and 2B2 in EP

Note: Hotspot area was completed excepted hard materials and buffer zone was almost completed except known hotspot and hard materials

3. EM&A REQUIREMENTS – ROUTINE IMPACT MONITORING

3.1 Monitoring Parameters

3.1.1 The monitoring parameters and frequency for both in-situ measurement and laboratory analysis are summarised in **Table 3.1**. Parameters for each monitoring station are specified in **Table 3.2**.

Table 3-1 Monitoring Parameters and Frequency

Parameters	Monitoring Frequency
<u>In-situ Measurement</u> Turbidity (in NTU), pH, Dissolved Oxygen (in mg/L and %), Temperature (in °C), Salinity (in ppt), ¹ Ammonia-N (in mg/L-N and UIA); ² TIN: Ammonia-N (in mg/L), Nitrite (in mg/L), Nitrate (in mg/L)	3 days per week, at mid-flood and mid-ebb tides (except ³ detergent which shall be taken one day per month, at mid-flood and mid-ebb)
<u>Laboratory Analysis</u> ¹ Ammonia-N (in mg/L-N and UIA), Suspended Solids (SS), ³ BOD ₅ , ³ <i>E.coli</i> , ³ Synthetic Detergent; ² TIN: Ammonia-N (in mg/L), Nitrite (in mg/L), Nitrate (in mg/L)	36 hours interval was allowed between subsequent sets of measurement.

Notes:

- Ammonia measurements and samples were taken at SR2, SR3, SR4, SR12, C1A, C2A only;
 UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH₃-N, temperature, pH and salinity; Laboratory determined unionized ammonia was calculated from analysed NH₃-N from water samples and in-situ measurement of temperature, pH and salinity;
- Total Inorganic Nitrogen (TIN) measurements and samples were taken at SR5, G2, C1A and C2A only;
- BOD₅, *E.coli* and Synthetic Detergent samples were taken at SR4, SR12, C1A, C2A only.

Table 3-2 Water Quality Monitoring Parameters

ID	In-situ Measurement							Laboratory Analysis					
	pH	Temperature	Salinity	Turbidity	Dissolved Oxygen / Dissolved Oxygen%	NH ₃ -N / UIA	TIN (NH ₃ -N, NO ₂ & NO ₃)	Suspended Solids	BOD ₅	E. coli	NH ₃ -N / UIA	Synthetic Detergent	TIN (NH ₃ -N, NO ₂ & NO ₃)
SR2	○	○	○	○	○	○		○			○		
SR3	○	○	○	○	○	○		○			○		
SR4	○	○	○	○	○	○		○	○	○	○	○	
SR5	○	○	○	○	○		○	○					○
SR12	○	○	○	○	○	○		○	○	○	○	○	
SR13	○	○	○	○	○			○					
G2	○	○	○	○	○		○	○					○
C1A	○	○	○	○	○	○	○	○	○	○	○	○	○
C2A	○	○	○	○	○	○	○	○	○	○	○	○	○

Note:

1. UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH₃-N, temperature, pH and salinity; laboratory determined unionized ammonia was calculated from analysed NH₃-N from water samples taken and in-situ measurement of temperature, pH and salinity.

3.2 Monitoring Locations

- 3.2.1 Referring to the Proposal for Temporary Suspension of Impact Water Quality Monitoring (0394_13_ED_0326F) which was submitted to EPD in August 2016 with no objection was received from EPD; removal of routine water quality monitoring stations at SR1 was effective on 24 December 2016.
- 3.2.2 Referring to the *Proposal on Removal of Some Water Quality Monitoring Stations After Resumption of Marine Construction Works (Dredging Works and Marine Works of the Northern Part of Kwai Tsing Container Basin Only)* (0394_13_ED_0332I) which has been submitted to EPD and relevant parties in December 2016 with no objection, removal of routine water quality monitoring stations at SR6, SR7, SR8, SR9, SR10 and SR11 was effective from 23 January 2017. Due to removal of some sensitive receivers in routine water quality monitoring, gradient stations G3, G5 and G6 were also be removed and gradient stations G1 and G4 replaced the previous control stations C1, C2 and C3 as C1A and C2A with reference to the approved proposal (0394_13_ED_0332I) which was effective from 23 January 2017.
- 3.2.3 Impact water quality monitoring was conducted at 9 locations, including 6 sensitive receivers (SR2, SR3, SR4, SR5, SR12, SR13), 1 gradient station (G2) and 2 control stations (C1A, C2A). The locations of the stations are shown in **Figure 2**.

3.3 Results and Observations

3.3.1 Impact water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. Impact water quality monitoring results graphical presentations are provided in **Appendix D**.

3.3.2 During the monitoring period, red tide occurrences were reported in Hong Kong waters. In addition, some adverse weather conditions, including Strong Monsoon Signal, Rainstorm Warning signal and Thunderstorm Warning signals were reported. Heavy marine traffic (not associated with the Project) was commonly observed nearby the Project site and its vicinity, that the propeller wash from vessels could lead to potential disturbance of seabed sediment and affect the water quality. The above conditions may affect monitoring results. Furthermore, the fish culturing or other activities occurring on the fish rack may cause adverse impact on the receiving water.

3.3.3 Exceedances were recorded for NH3-N (in-situ & Lab), TIN (in-situ & lab) and Suspended Solids. Number of exceedances recorded in the reporting quarter at each impact station is summarized in **Table 3-3 and 3-4**.

Table 3-3 Summary of Water Quality Exceedance (In-situ Measurement)

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR3	Action	0	0	0	0	0	0	1	1	0	0	-	-	1	1
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	4	2	4	2
	Limit	0	0	0	0	0	0	-	-	-	-	27	29	27	29
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	1	1	0	0	4	2	8	
	Limit	0	0	0	0	0	0	0	0	0	0	27	29	56	

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Table 3-4 Summary of Water Quality Exceedance (Laboratory Analysis)

Station	Exceedance Level	Suspended Solids		BOD ₅		<i>E. coli</i>		NH ₃ -N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR2	Action	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR3	Action	0	0	-	-	-	-	1	1	0	0	-	-	-	-	1	1
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	3	4	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	-	-	-	-	-	-	-	-	-	-	4	2	4	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	27	29	27	29
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	2	2	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	1	1	0	0	0	0	4	2	8	
	Limit	5	6	0	0	0	0	0	0	0	0	0	0	27	29	67	

- 3.3.4 During the reporting period, 2 AL exceedances for NH₃-N (in-situ), 6 AL and 56 LL exceedances for TIN (in-situ), 11 LL exceedances for Total Suspended Solids, 2 AL exceedances for NH₃-N (lab), and 6 AL and 56 LL exceedances for TIN (lab) were recorded.
- 3.3.5 According to the investigations, the exceedances were considered caused by influences in the vicinity of the station or changes in ambient conditions and not related to the Project.

4. EM&A REQUIREMENTS – 24-HR WATER QUALITY MONITORING

4.1 Monitoring Parameters

4.1.1 Dissolved oxygen, temperature and turbidity are recorded every 5 minutes, 24 hours a day 7 days a week during dredging works.

4.1.2 In-situ NH₃-N at WSD Flushing Water Intake is measured every 20 minutes, 24 hours a day 7 days a week during works.

4.1.3 The water quality parameters measured at particular locations are shown in **Table 4.1**.

Table 4-1 24-hr Water Quality Monitoring Parameters

ID	Description	Parameters				
		Temperature	Turbidity	DO (mg/L)	DO%	NH ₃ -N
SR4	Tsuen Wan, WSD Flushing Water Intake	○	○	○	○	○
SR5	Ma Wan, Fish Culture Zone	○	○	○	○	
SR12	Tsing Yi, WSD Flushing Water Intake	○	○	○	○	○
SR13	EMSD Cooling Water Intake for Kwai Chung Hospital	○	○	○	○	

4.2 Monitoring Locations

4.2.1 Referring to the *Proposal on Removal of Some Water Quality Monitoring Stations After Resumption of Marine Construction Works (Dredging Works and Marine Works of the Northern Part of Kwai Tsing Container Basin Only)* (0394_13_ED_0332I) which has been submitted to EPD and relevant parties in December 2016 with no objection, removal of 24 hour monitoring stations at SR9, SR10 and SR11 was effective from 23 January 2017. The setups of 24 hour monitoring stations at SR9, SR10 and SR11 were removed on 7 February 2017.

4.2.2 As shown in Table 4.1, the 24 hours water quality monitoring works are performed at SR4, SR5, SR12 and SR13.

4.2.3 Revisions on monitoring locations were proposed in previous submission (MaterialLab Report No. Ref: 0394/13/ED/0103 – WATER QUALITY MONITORING LOCATION) and were agreed among AFCD, EMSD, WSD and EPD.

4.3 Results and Observations

4.3.1 24-hr water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. Monitoring result graphical presentations are provided in **Appendix E**.

4.3.2 During the reporting period, red tide occurrences were reported in Hong Kong waters. In addition, some adverse weather conditions, including Strong Monsoon Signal, Rainstorm Warning signal and Thunderstorm Warning signals were reported. Heavy marine traffic (not associated with the Project) was commonly observed nearby the Project site and its vicinity, that the propeller wash from vessels could lead to potential disturbance of seabed sediment and affect the water quality. The above conditions may affect monitoring results. Furthermore, the fish culturing or other activities occurring on the fish rack may cause adverse impact on the receiving water.

4.3.3 Number of exceedances recorded in the reporting period at each impact station is summarized in Table 4.2.

Table 4-2 Summary of Water Quality Exceedance (24-hr Monitoring)

Station	Exceedance Level	Turbidity	DO	NH ₃ -N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	0	0	0
	Limit	0	0	0	0

4.3.4 No exceedance was recorded in the reporting quarter.

5. ENVIRONMENTAL SITE INSPECTION AND AUDIT

5.1 Site Inspections

5.1.1 The Environmental Team conducted 13 site inspections in the reporting period. No particular observation was recorded in the reporting month except contractor was reminded to close the door of engine room to reduce the noise emission if the engine is operating.

5.1.2 According to Contractor, no archaeological deposit was found during reporting period.

5.2 Implementation Status of Environmental Mitigation Measures

5.2.1 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in **Appendix F**. Most of the necessary mitigation measures were implemented properly.

5.2.2 The mitigation measures recommended in the EIA report and required by the EP are considered effective in minimizing environmental impacts. The Contractor has implemented the recommended mitigation measures except those mitigation measures not applicable at this stage.

5.3 Summary of Action taken

5.3.1 The exceedances recorded were considered not related to the Project, follow-up actions are not required.

5.4 Advice on the Solid and Liquid Waste Management Status

5.4.1 According to the Contractor, 30m³ general refuse and 4.8 tonnes chemical waste were generated and disposed of in the reporting period. Summary of waste flow table is detailed in **Appendix G**.

5.4.2 There was marine sediment Type 2 sediment (Confined Marine Disposal) disposed to East of Sha Chau Contaminated Mud Pit and a small amount of general refuse and chemical waste were disposed off site in the reporting quarter. The details can be referred to the **Table 5-1**.

Table 5-1 Waste Quantities of Dredging Works

Month	Marine Sediment Type	Quantity Generated in Reporting Period (m ³)	Cumulative-to Reporting Period (m ³)	Disposal / Dumping Ground
February 2017	Type 1 – Open Sea Disposal	0	1683850	NA
	Type 2 – Confined Marine Disposal	0	625280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA
March 2017	Type 1 – Open Sea Disposal	0	1683850	NA
	Type 2 – Confined Marine Disposal	0	625280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA
April 2017	Type 1 – Open Sea Disposal	0	1683850	NA
	Type 2 – Confined Marine Disposal	3000	628280	NA
	Type 3 – Special Treatment / Disposal	0	1260	NA

Note: Note: All the Type 3 (Cat. Hf) sediment dredging and disposal was completed on 18 May 2016

5.5 Review of Action and Limit Level

5.5.1 Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015. The Action and Limit Level is given in **Appendix C**.

5.6 Quarterly Review of Constructional Impacts on Water Quality

- 5.6.1 The construction impact on water quality was assessed by comparing the quarterly mean values with the relevant ambient or baseline mean values. Results showed that the mean values of Ammonia (in-situ & lab), TIN (in-situ) and TSS at all clusters of monitoring stations were below the 1.3 x baseline value. Cluster stations with higher impact data are statistically compared to 1.3 x baseline levels or other relevant levels to assess the constructional impacts.
- 5.6.2 Quarterly means of cluster 1 station (i.e. SR5) of TIN (lab) (at mid flood) are compared to their 1.3 x baseline data while data from ebb tide are not analysed (data analysed for relative tide where clustered monitoring stations situate at downstream position and may be subject to project impact, reference made to Figure 2). Result shows the quarterly mean of cluster 1 (i.e. SR5) TIN (lab) (at mid flood) is significantly larger than 1.3 x baseline level ($p < 0.05$). They are further compared to the quarterly upstream control level at C2A (at mid flood), and the impact level in cluster 1 (i.e. SR5) is significantly smaller than that of control station, C2A ($p < 0.05$), indicating the background TIN level is high and the contribution from the project is not significant.
- 5.6.3 Comparison between quarterly mean and 1.3 x baseline mean is given in Table 5.2, while the summary of key statistical analysis is provided in Table 5.3. Details of key statistical analysis results are provided in **Appendix H**.
- 5.6.4 As 24-hr monitoring is to supplement the routine WQM activities (EM&A Manual Section 2.1.10) and there is no baseline value and/or control / gradient value for a meaningful statistical analysis. Thus no statistical analysis was done for 24-hr monitoring. Also, statistical analysis was not performed for some parameters without exceedances (Turbidity, DO (S&M), DO (B), UIA for both in-situ and lab results, *E.coli*, BOD₅ and Synthetic Detergent) in the reporting quarter.

Table 5-2 Comparison of Quarterly Mean to Baseline Mean

		Ammonia - Insitu						TIN - Insitu					
		Baseline	Baseline x 1.3	Average	Feb - Apr 2017	Average	Larger than Baseline x 1.3	Dry Season Baseline	Baseline x 1.3	Average	Feb - Apr 2017	Average	Larger than Baseline x 1.3
Control (Flood)	C1A	NA	NA	NA	0.14	NA	NA	0.42	0.55	NA	0.50	NA	NA
	C2A				0.34			0.56	0.73		0.60		
Control (Ebb)	C1A	NA	NA	NA	0.14	NA	NA	0.40	0.52	NA	0.49	NA	NA
	C2A				0.34			0.53	0.69		0.59		
Gradient (Flood)	G2	NA	NA	NA	NA	NA	NA	0.44	0.57	NA	0.45	NA	yes
Gradient (Ebb)	G2	NA	NA	NA	NA	NA	NA	0.38	0.49	NA	0.45	NA	yes
Cluster 1 (Flood)	SR2	0.22	0.29	0.33	0.13	0.15	no	NA	NA	0.51	NA	0.46	no
	SR3	0.24	0.31		0.14			NA	NA		NA		
	SR4	0.26	0.34		0.16			NA	NA		NA		
	SR5	NA	NA		NA			0.39	0.51		0.46		
	SR12	0.28	0.36		0.17			NA	NA		NA		
Cluster 1 (Ebb)	SR2	0.22	0.29	0.32	0.13	0.15	no	NA	NA	0.53	NA	0.46	no
	SR3	0.22	0.29		0.14			NA	NA		NA		
	SR4	0.25	0.33		0.16			NA	NA		NA		
	SR5	NA	NA		NA			0.41	0.53		0.46		
	SR12	0.27	0.35		0.17			NA	NA		NA		
Cluster 3 (Flood)	SR13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA: Not Applicable

- Control and Gradient stations are compared on individual stations for reference, no clustering analysis was performed. Impact stations are compared in clusters of stations, or
- Parameter is not monitored at the station.

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		TSS						Ammonia - lab						TIN - lab					
		Baseline	1.3 x Baseline	Average	Feb 2017 - Apr 2017	Average	Larger than Baseline x 1.3	Baseline	1.3 x Baseline	Average	Feb 2017 - Apr 2017	Average	Larger than Baseline x 1.3	Dry Season Baseline	1.3 x Baseline	Average	Feb 2017 - Apr 2017	Average	Larger than Baseline x 1.3
Control (Flood)	C1A	7	10	NA	6	NA	no	NA	NA	NA	0.14	NA	NA	0.30	0.39	NA	0.50	NA	yes
	C2A	8	10		7		no	NA	NA		0.34		NA	NA	0.35		0.46		0.60
Control (Ebb)	C1A	5	7	NA	6	NA	no	NA	NA	NA	0.14	NA	NA	0.28	0.36	NA	0.49	NA	yes
	C2A	7	9		7		no	NA	NA		0.34		NA	NA	0.34		0.44		0.59
Gradient (Flood)	G2	5	7	NA	5	NA	no	NA	NA	NA	NA	NA	NA	0.31	0.40	NA	0.45	NA	yes
Gradient (Ebb)	G2	5	7	NA	5	NA	no	NA	NA	NA	NA	NA	NA	0.28	0.36	NA	0.45	NA	yes
Cluster 1 (Flood)	SR2	5	7	8.60	5	6.00	no	0.12	0.16	0.17	0.13	0.15	no	NA	NA	0.38	NA	0.46	yes
	SR3	5	7		6			0.12	0.16		0.14			NA	NA		NA		
	SR4	7	9		6			0.13	0.17		0.16			NA	NA		NA		
	SR5	6	8		6			NA	NA		NA			0.29	0.38		NA		
	SR12	9	12		7			0.15	0.20		0.17			NA	NA		NA		
Cluster 1 (Ebb)	SR2	5	7	7.00	5	5.80	no	0.12	0.16	0.18	0.13	0.15	no	NA	NA	0.36	NA	0.46	yes
	SR3	5	6		6			0.12	0.16		0.14			NA	NA		NA		
	SR4	5	7		6			0.14	0.18		0.16			NA	NA		NA		
	SR5	5	6		6			NA	NA		NA			0.28	0.36		NA		
	SR12	7	9		6			0.15	0.20		0.17			NA	NA		NA		
Cluster 3 (Flood)	SR13	16	21	21.00	7	7.00	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	10	14	14.00	7	7.00	no	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA: Not Applicable

- Control and Gradient stations are compared on individual stations for reference, no clustering analysis was performed. Impact stations are compared in clusters of stations, or
- Parameter is not monitored at the station.

Table 5-3 Summary of Statistical Analysis

Parameter	Cluster	Compared against	Results and Conclusions
TIN (Lab)	Cluster 1	Quarterly Mean at Impact Stations (flood tide) against 1.3 x Baseline Level (flood tide) Quarterly Mean at Impact Station (flood tide) against Upstream Control (C2A) Mean (flood tide)	Quarterly mean at Impact Station (flood tide) is significantly higher than 1.3 x Baseline mean (flood tide) ($p < 0.05$). Impact Mean (flood tide) is significantly smaller than Upstream Control (C2A) Mean (flood tide) ($p < 0.05$), indicating the background TIN level is high and the project impact is not significant.

5.6.5 Exceedance are considered to be due to change in ambient conditions or influences in the vicinity of the stations. Mitigation measures for dredging works were implemented in accordance with EP and EIA requirements.

6. NON-COMPLIANCE, COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTION

6.1.1 In this reporting period, no complaint, inspection notice, notification of summons or prosecution was received. Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Tables 6.1, 6.2 and 6.3.**

Table 6-1 Environmental Complaints Log

Complaint Log No.	Date of Receipt	Received From and Received By	Nature of Complaint	Date Investigated	Outcome	Date of Reply
Nil	-	-	-	-	-	-

Table 6-2 Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Period	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

Table 6-3 Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Prosecutions This Period	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

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7. CONCLUSIONS

- 7.1.1 The dredging works was commenced on 23 April 2014. The EM&A programme was carried out in accordance with the EM&A Manual requirements. As per the EM&A Manual, water quality impact monitoring was conducted during the dredging works.
- 7.1.2 During the reporting period, exceedances were recorded for NH₃-N (in-situ & Lab), TIN (in-situ & lab) and SS in the routine impact monitoring. No exceedance was recorded in 24-hr monitoring. Investigation found that the exceedances were not project related and were considered caused by influences in the vicinity of the stations or change in ambient conditions.
- 7.1.3 13 environmental site inspections were carried out weekly in the reporting period.
- 7.1.4 No environmental complaint was received and followed up by Environmental Team in the reporting period.
- 7.1.5 No notification of summons and prosecution was received in the reporting period.

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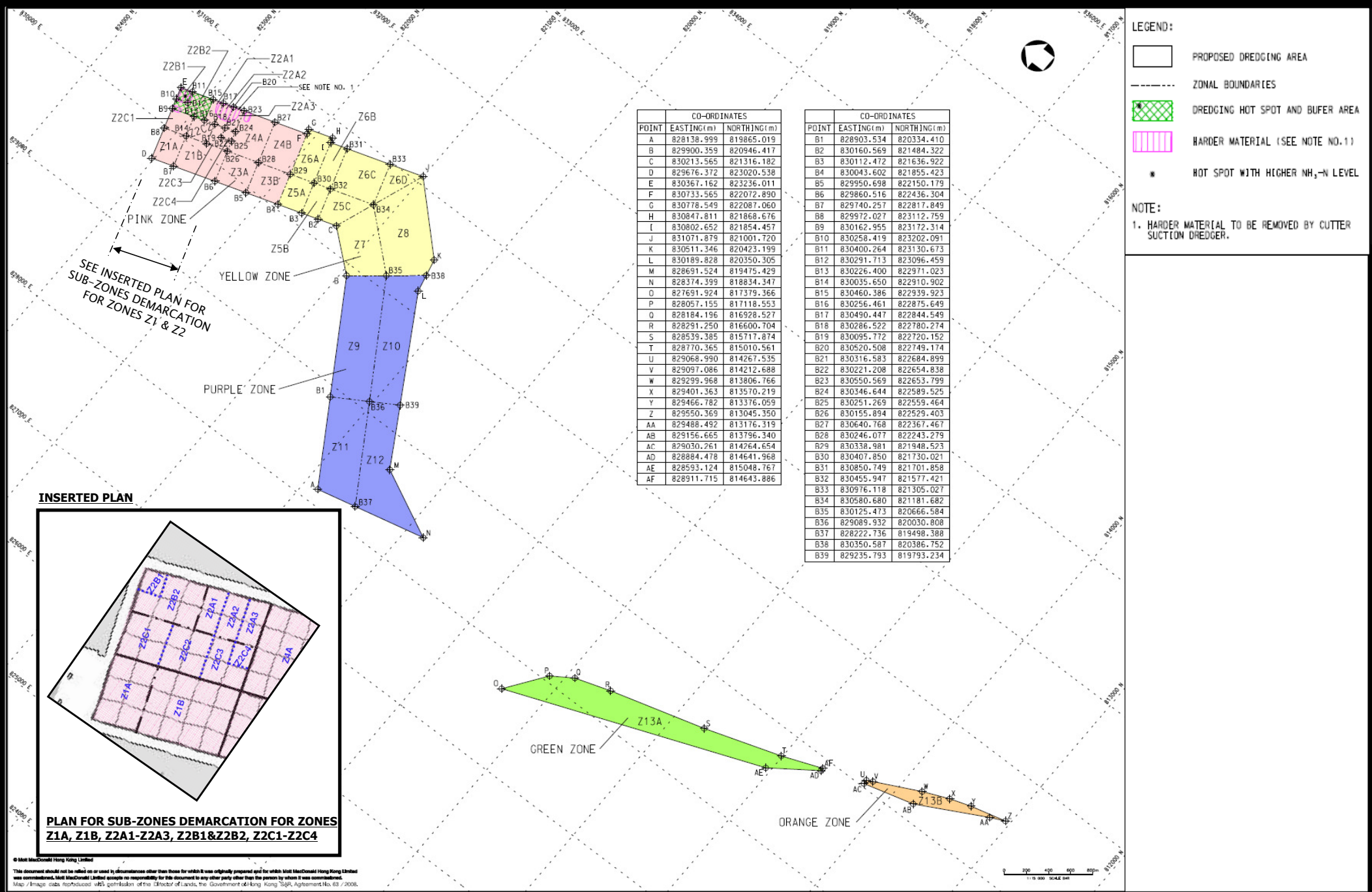
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Figure 1

Project General Layout



Project Title: Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

Figure 2: Zones and Sub-zone of Dredging Plan Layout (Extracted from Figure 2 of Justification for the Proposed Demarcation of the Dredging Zones)

Environmental Permit No.:

EP-426/2011/A



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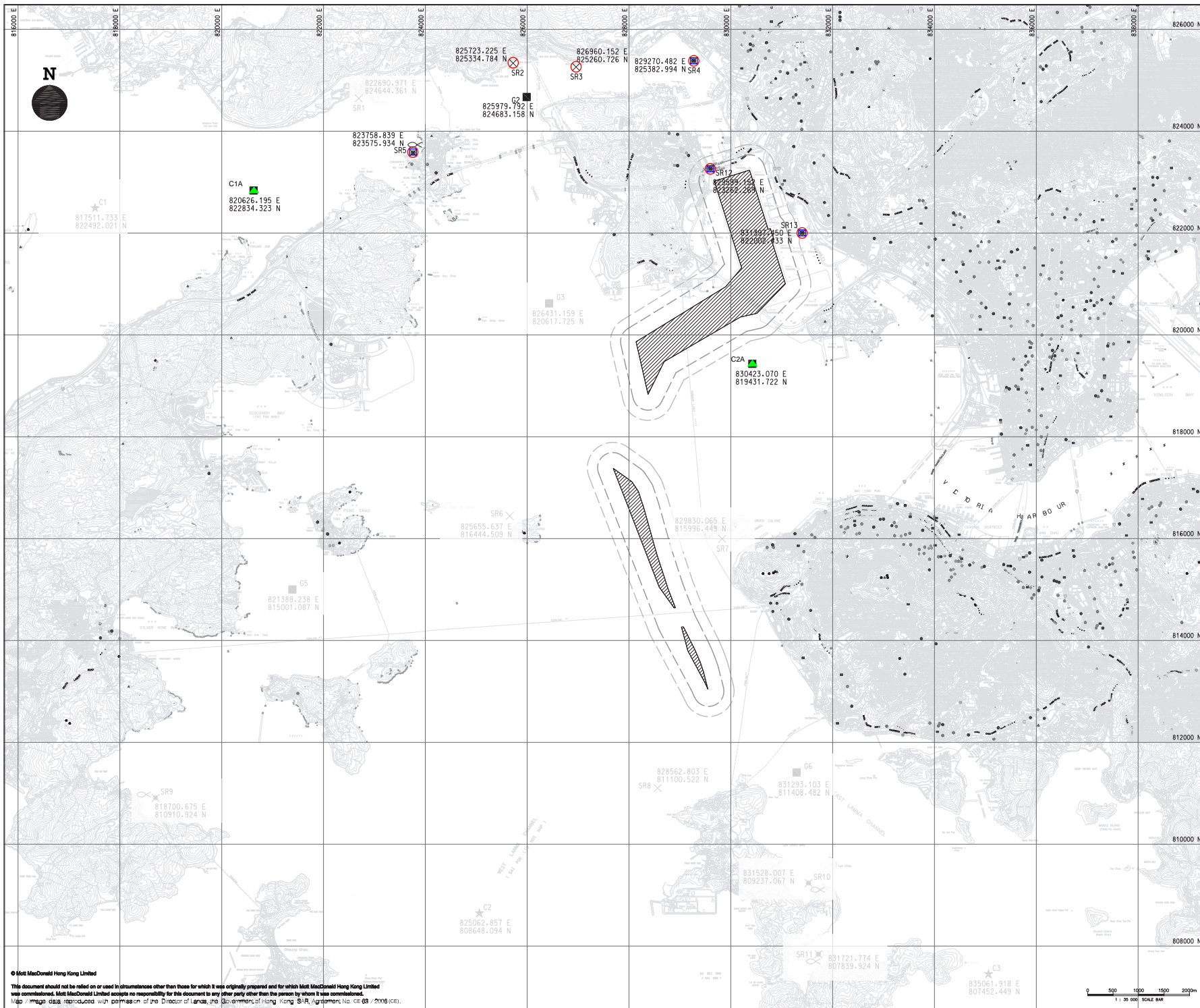
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Figure 2

Locations of Water Quality Monitoring Stations



NOTES:
 1. ALL COORDINATES ARE IN HONG KONG METRIC GRID (1980).
 2. THE CONTRACTOR SHALL REFER TO RELEVANT SECTION(S) AND APPENDICES OF THE PARTICULAR SPECIFICATION REGARDING THE WATER QUALITY MONITORING.

- LEGEND:
-  SITE BOUNDARY
 -  MONITORING STATION
 -  24 HOUR STATION
 -  CONTROL STATION
 -  GRADIENT STATION

Client
 THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION
 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project
 CONTRACT NO. : CV/2013/04
 DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL

Title
 PROVISIONAL LOCATION OF WATER QUALITY MONITORING STATIONS

Scale at A1	Status	Rev
1:35000	TEN	2

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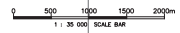


Figure 2 - Location of Monitoring Stations

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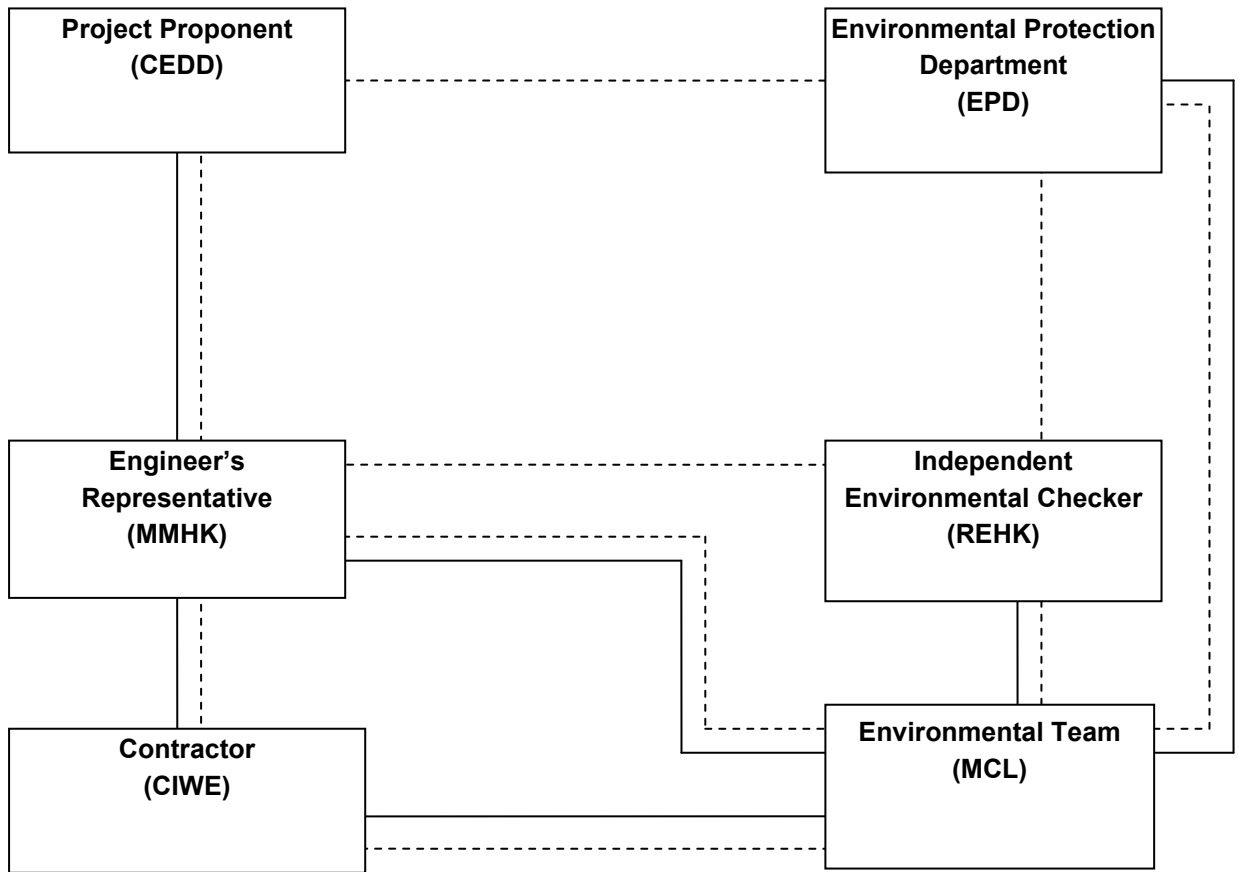
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Appendix A
Project Organization Chart



Legend:
 — Line of Reporting
 - - - Line of Communication

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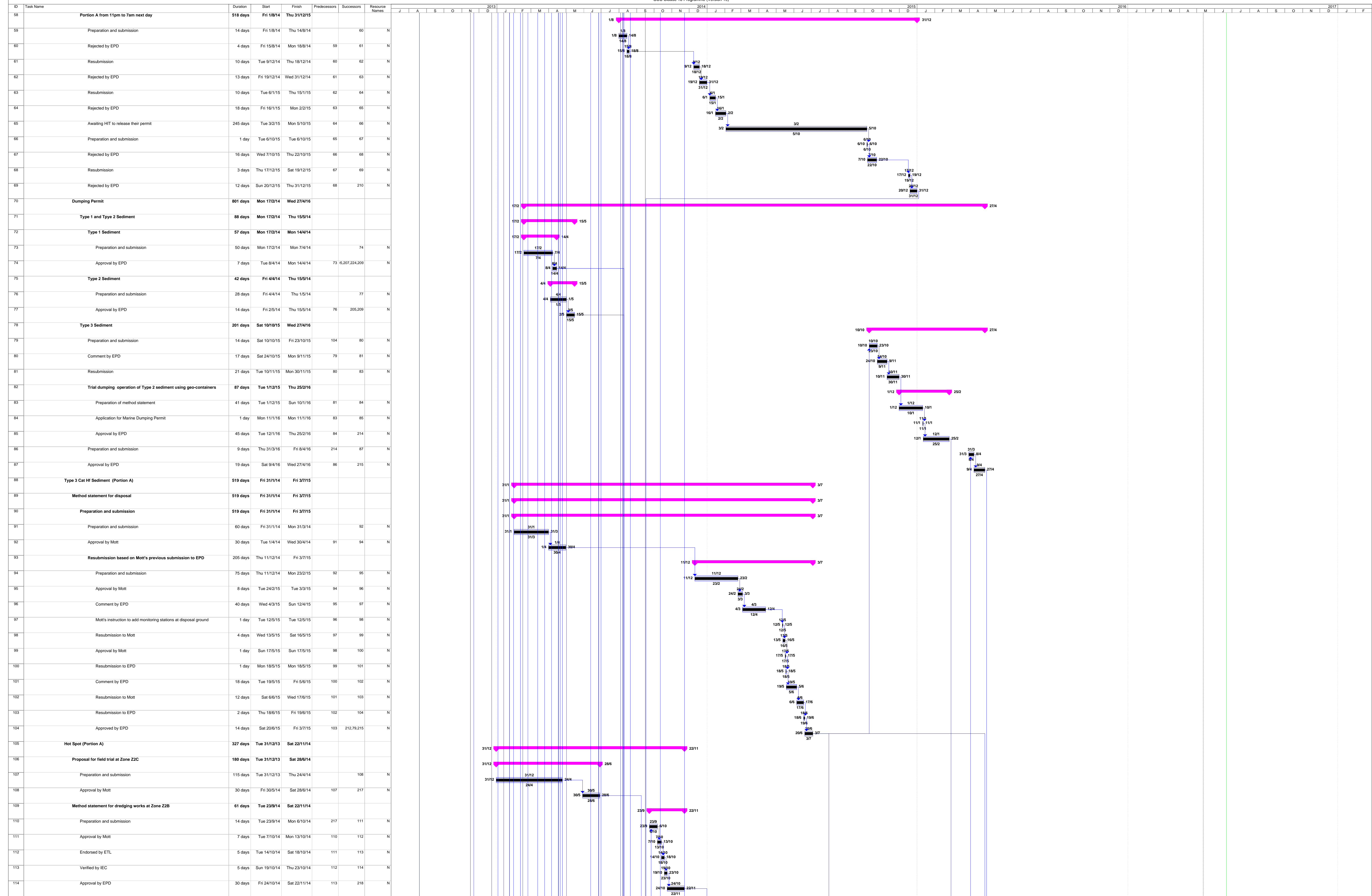
Appendix B
Construction Programme

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
1	Contract Period	1587 days	Fri 30/8/13	Tue 2/1/18			
2	Contract Commencement Date	0 days	Fri 30/8/13	Fri 30/8/13		4SS	
3	Extended Contract Completion Date	0 days	Sat 10/6/17	Sat 10/6/17		338FF	
4	Possession of Site				SS,31SS,41SE		N
5	Section 1	1587 days	Fri 30/8/13	Tue 2/1/18			
6	Submission	1210 days	Fri 30/8/13	Wed 21/12/16			
7	Routine Monitoring / Temporary Marine Traffic Management	484 days	Fri 30/8/13	Fri 26/12/14			
8	Environmental Management	484 days	Fri 30/8/13	Fri 26/12/14			
9	Baseline monitoring	231 days	Fri 30/8/13	Thu 17/4/14			
10	ETL and relevant site personal	30 days	Fri 30/8/13	Sat 28/9/13		4SS,13	N
11	Lab Test	30 days	Fri 30/8/13	Sat 28/9/13		4SS,13	N
12	Monitoring (Location see Drg No. EM/401)	201 days	Sun 29/9/13	Thu 17/4/14			
13	Plan	93 days	Sun 29/9/13	Mon 30/12/13	10,11	154	N
14	Sediment Report	88 days	Mon 20/1/14	Thu 17/4/14			
15	Preliminary report	19 days	Mon 20/1/14	Fri 7/2/14	158	159	N
16	Final report	27 days	Sat 22/3/14	Thu 17/4/14	159, 205,207,224		N
17	Grab sample (Portions A, B & C)	321 days	Fri 30/8/13	Wed 16/7/14			
18	Grab sample specialist	30 days	Fri 30/8/13	Sat 28/9/13		4SS,19	N
19	Sediment testing and sampling plan	162 days	Sun 29/9/13	Sun 9/3/14	18	162	N
20	Sediment report	105 days	Thu 3/4/14	Wed 16/7/14			
21	Preliminary report	26 days	Thu 3/4/14	Mon 28/4/14	166	167	N
22	Final report	37 days	Tue 10/6/14	Wed 16/7/14	167	209	N
23	Vibro-coring (Portions A, B & C)	159 days	Mon 21/7/14	Fri 26/12/14			
24	Sediment testing and sampling plan	28 days	Mon 21/7/14	Sun 17/8/14		170	N
25	Sediment report	105 days	Sat 13/9/14	Fri 26/12/14			
26	Preliminary report	26 days	Sat 13/9/14	Wed 8/10/14	174	175	N
27	Final report	37 days	Thu 20/11/14	Fri 26/12/14	175, 209FS-139 days		N
28	24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)	79 days	Mon 25/11/13	Tue 11/2/14			
29	Instrumentation	79 days	Mon 25/11/13	Tue 11/2/14		177	N
30	Survey	179 days	Fri 30/8/13	Mon 24/2/14			
31	Surveyor	35 days	Fri 30/8/13	Thu 3/10/13		4SS,35,38	N
32	Geophysicist	35 days	Sun 3/11/13	Sat 7/12/13		224	N
33	Land Survey (Container Basin & DSD Tsing Yi Plant)	67 days	Tue 26/11/13	Fri 31/1/14			
34	Settlement markers	67 days	Tue 26/11/13	Fri 31/1/14			
35	Method Statement for Installation and Monitoring	24 days	Tue 26/11/13	Thu 19/12/13	31	185	N
36	Initial report	12 days	Mon 20/1/14	Fri 31/1/14	186	187	N
37	Hydrographic Survey (Portions A to E)	144 days	Fri 4/10/13	Mon 24/2/14			
38	Method Statement	36 days	Fri 4/10/13	Fri 8/11/13	31	190	N
39	Initial survey Report	29 days	Mon 27/1/14	Mon 24/2/14	190	191	N
40	Temporary Marine Traffic Management (Portions A to E)	144 days	Fri 30/8/13	Mon 20/1/14			
41	Consultant, Risk Manager and Marine Traffic Engineer	28 days	Fri 30/8/13	Thu 26/9/13		4SS,43	N
42	Independent Checking Engineer (ICE)	25 days	Fri 27/12/13	Mon 20/1/14		196FS-60 days	N
43	Webbase software and Trial Run	50 days	Fri 27/9/13	Fri 15/11/13	41	196	N
44	Dredging Works (Portions A to E)	896 days	Thu 14/11/13	Wed 27/4/16			
45	Independent Checking Engineer (ICE)	21 days	Thu 14/11/13	Wed 4/12/13		51	N
46	Silt screen deployment plan and report (Location see Drg No. EM/401)	77 days	Fri 6/12/13	Thu 20/2/14			
47	Method statement	77 days	Fri 6/12/13	Thu 20/2/14		207,201	N
48	Dredging method statement and silt curtain deployment plan	118 days	Thu 28/11/13	Tue 25/3/14			
49	Method statement for dredging works	104 days	Thu 28/11/13	Tue 11/3/14		224	N
50	Silt curtain deployment plan	118 days	Thu 28/11/13	Tue 25/3/14			
51	Design	70 days	Tue 17/12/13	Mon 24/2/14	45	52FS-89 days	N
52	Deployment plan	118 days	Thu 28/11/13	Tue 25/3/14	51FS-89 days	224	N
53	Dredging Works at Portions A and B	891 days	Tue 19/11/13	Wed 27/4/16			
54	General seabed	891 days	Tue 19/11/13	Wed 27/4/16			
55	Marine Notice approval by Marine Department	247 days	Tue 19/11/13	Wed 23/7/14		207	N
56	Noise Permit	739 days	Mon 23/12/13	Thu 31/12/15			
57	General	101 days	Mon 23/12/13	Wed 2/4/14		205,207	N



China International Water & Electric Corp.	Task	Critical Task	Milestone	Summary
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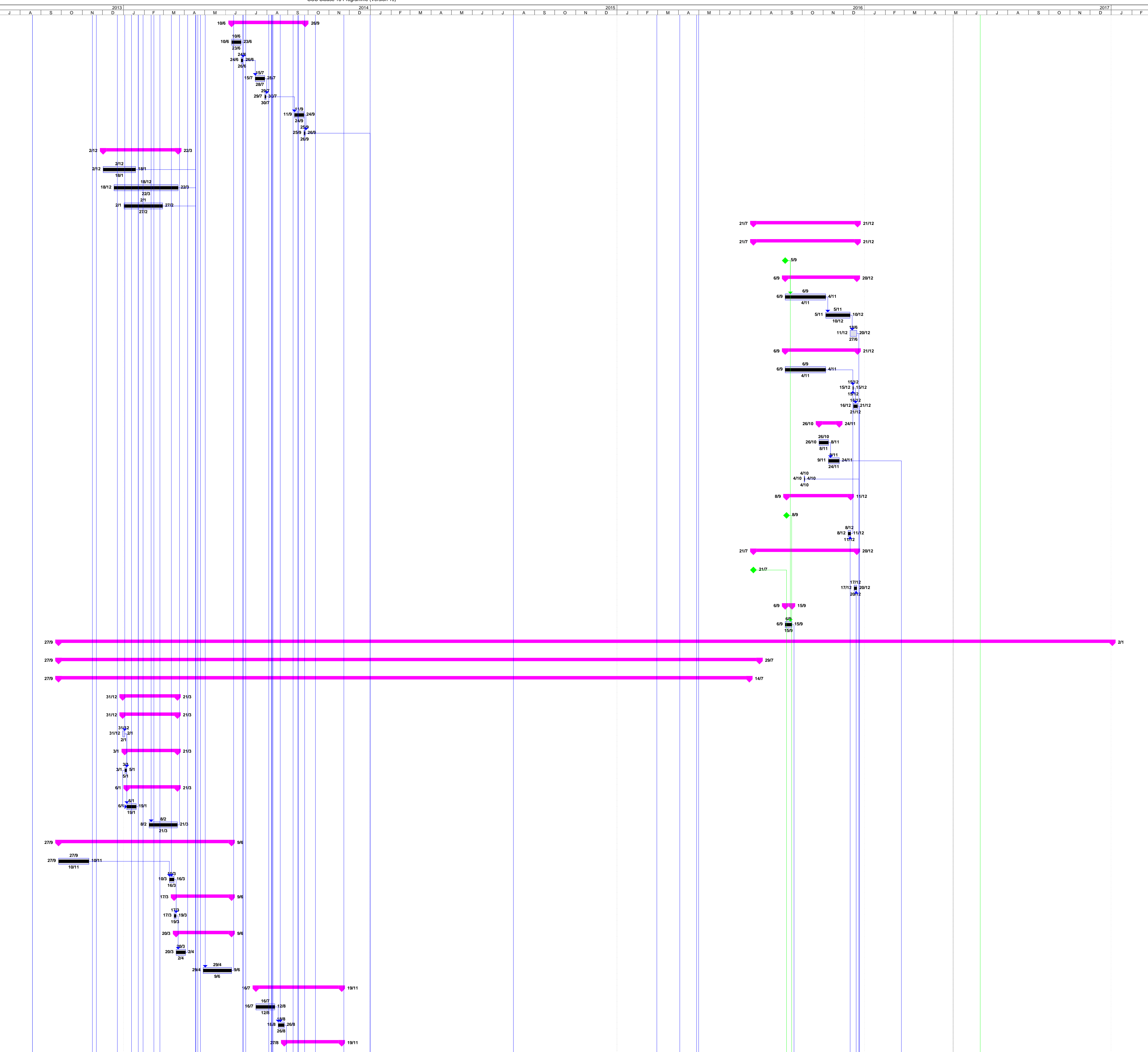
* Subject to availability of working windows
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China International Water & Electric Corp. Task Critical Task Milestone Summary

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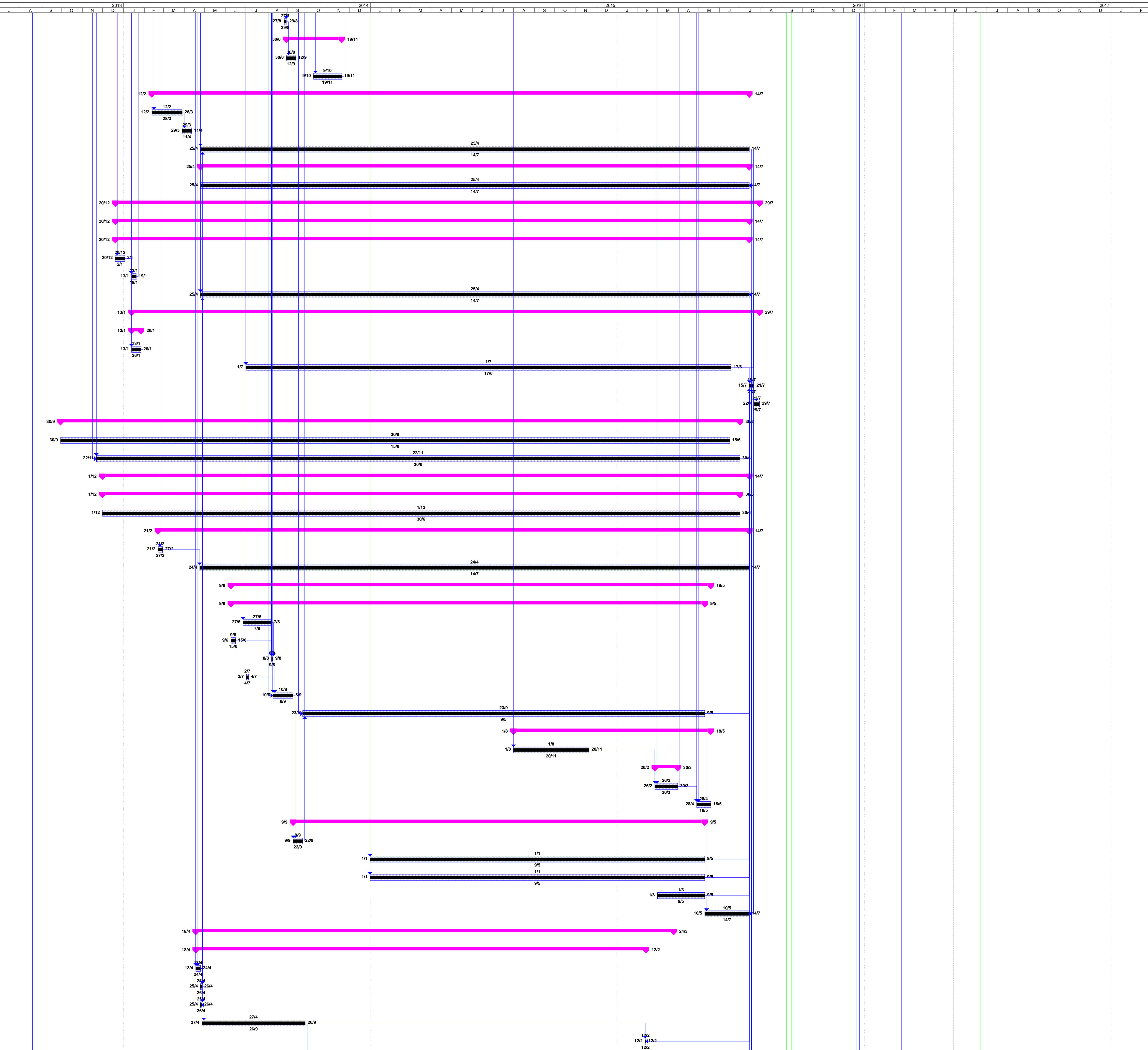
ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
115	Method statement for dredging hard material	109 days	Tue 10/6/14	Fri 26/9/14			
116	Preparation and submission	14 days	Tue 10/6/14	Mon 23/6/14		117	N
117	Comment	3 days	Tue 24/6/14	Thu 26/6/14	116	118	N
118	Resubmission	14 days	Tue 15/7/14	Mon 28/7/14	117	119	N
119	Further comment	2 days	Tue 29/7/14	Wed 30/7/14	118	120	N
120	Resubmission	14 days	Thu 11/8/14	Wed 24/8/14	119	121	N
121	Approval by Mott	2 days	Thu 25/8/14	Fri 26/8/14	120	219	N
122	Dredging Works at Portions C, D and E	111 days	Mon 21/12/13	Sat 22/3/14			
123	Marine Notice approval by Marine Department	48 days	Mon 21/12/13	Sat 18/1/14		224	N
124	Noise Permit	95 days	Wed 18/12/13	Sat 22/3/14		224	N
125	Dumping Permit	57 days	Thu 21/1/14	Thu 27/2/14		224	N
126	Remaining Works (Portion A)	154 days	Thu 21/7/16	Wed 21/12/16			
127	Rock excavation works outside berth KCS	154 days	Thu 21/7/16	Wed 21/12/16			
128	Works reviewed and agreed among CEDD and CIWE	0 days	Mon 5/9/16	Mon 5/9/16		130,148	N
129	Method Statement	106 days	Tue 6/9/16	Tue 20/12/16			
130	Preparation and submission	60 days	Tue 6/9/16	Fri 4/11/16	128	131	N
131	Resubmission	36 days	Sat 5/11/16	Sat 10/12/16	130	132	N
132	Approval	10 days	Sun 11/12/16	Tue 20/12/16	131	259	N
133	Marine Department Notice	107 days	Tue 6/9/16	Wed 21/12/16			
134	Preparation and submission	60 days	Tue 6/9/16	Fri 4/11/16		135	N
135	Resubmission	1 day	Thu 15/12/16	Thu 15/12/16	134,143	136	N
136	Approval	6 days	Fri 16/12/16	Wed 21/12/16	135	259	N
137	Marine Dumping Permit	30 days	Wed 26/10/16	Thu 24/11/16			
138	Preparation and submission	14 days	Wed 26/10/16	Tue 8/11/16		139	N
139	Approval	16 days	Wed 9/11/16	Thu 24/11/16	138	261	N
140	Pre-meeting with MTL	1 day	Tue 4/10/16	Tue 4/10/16		259	N
141	Drilling Barge	95 days	Thu 8/9/16	Sun 11/12/16			
142	AIP for Drilling Barge	0 days	Thu 8/9/16	Thu 8/9/16		249	N
143	Operating Licence for Drilling Barge	4 days	Thu 8/12/16	Sun 11/12/16	250	135	N
144	Backhoe Dredger	153 days	Thu 21/7/16	Tue 20/12/16			
145	AIP for Backhoe Dredger	0 days	Thu 21/7/16	Thu 21/7/16		252	N
146	Operating Licence for Backhoe Dredger	4 days	Sat 17/12/16	Tue 20/12/16	253		N
147	Hydraulic Breaker	10 days	Tue 6/9/16	Thu 15/9/16			
148	Purchase Order	10 days	Tue 6/9/16	Thu 15/9/16	128	255	N
149	Works	1559 days	Fri 27/9/13	Tue 2/1/18			
150	Routine Monitoring / Temporary Marine Traffic Management	1037 days	Fri 27/9/13	Fri 29/7/16			
151	Environmental Management	1022 days	Fri 27/9/13	Thu 14/7/16			
152	Baseline monitoring	81 days	Tue 31/12/13	Fri 21/3/14			
153	Monitoring (Location see Drg No. EM401)	81 days	Tue 31/12/13	Fri 21/3/14			
154	Mobilization	3 days	Tue 31/12/13	Thu 2/1/14	13	156,158	1
155	Field works and Lab Test	78 days	Fri 3/1/14	Fri 21/3/14			
156	Field works	3 days	Fri 3/1/14	Sun 5/1/14	154	158SS+3 days,154	1
157	Lab test	75 days	Mon 6/1/14	Fri 21/3/14			
158	Chemical test	14 days	Mon 6/1/14	Sun 19/1/14	156SS+3 days,154	15	N
159	Biological test	42 days	Sat 8/2/14	Fri 21/3/14	15	16	N
160	Grab sample (Portions A, B & C)	256 days	Fri 27/9/13	Mon 9/6/14			
161	Marine Department Notice	45 days	Fri 27/9/13	Sun 10/11/13		162	N
162	Grab sample specialist mobilization	7 days	Mon 10/3/14	Sun 16/3/14	19,161	164	2
163	Grab sample (field works) and Lab Test	85 days	Mon 17/3/14	Mon 9/6/14			
164	Field works	3 days	Mon 17/3/14	Wed 19/3/14	162	166	2
165	Lab test	82 days	Thu 20/3/14	Mon 9/6/14			
166	Chemical test	14 days	Thu 20/3/14	Wed 2/4/14	164	21	N
167	Biological test	42 days	Tue 29/4/14	Mon 9/6/14	21	22	N
168	Vibro-coring (Portions A, B & C)	127 days	Wed 16/7/14	Wed 19/11/14			
169	Marine Department Notice	28 days	Wed 16/7/14	Tue 12/8/14		170	N
170	Vibro-coring specialist mobilization	9 days	Mon 18/8/14	Tue 26/8/14	24,169	172	3
171	Vibro-coring (field works) and Lab Test	85 days	Wed 27/8/14	Wed 19/11/14			



China International Water & Electric Corp. Task Critical Task Milestone Summary

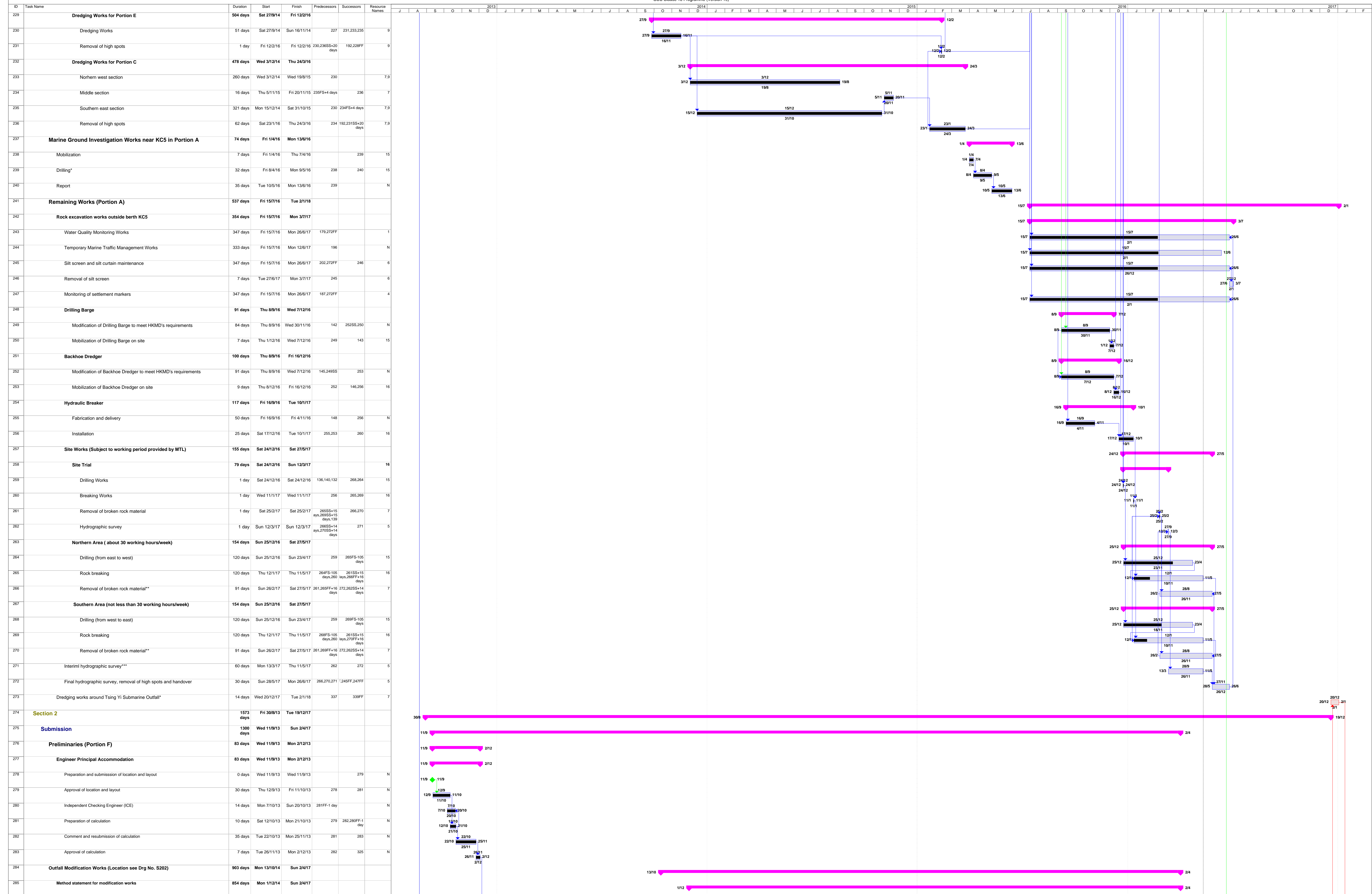
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ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names
172	Field works	3 days	Wed 27/8/14	Fri 29/8/14	170	174	3
173	Lab test	82 days	Sat 30/8/14	Wed 19/11/14			
174	Chemical test	14 days	Sat 30/8/14	Fri 12/9/14	172	26	N
175	Biological test	42 days	Thu 9/10/14	Wed 19/11/14	26	27	N
176	24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)	884 days	Wed 12/2/14	Thu 14/7/16			
177	Procurement and delivery	45 days	Wed 12/2/14	Fri 28/3/14	29	178	N
178	Installation	14 days	Sat 29/3/14	Fri 11/4/14	177	179	1
179	Monitoring	812 days	Fri 25/4/14	Thu 14/7/16	178,224, FF,221FF,243		1
180	Impact monitoring (Location see Drg No. EM/401)	812 days	Fri 25/4/14	Thu 14/7/16			
181	Impact monitoring and report submission	812 days	Fri 25/4/14	Thu 14/7/16	179FF, 221FF		1
182	Survey	953 days	Fri 20/12/13	Fri 29/7/16			
183	Land Survey (Container Basin & DSD Tsing Yi Plant)	938 days	Fri 20/12/13	Thu 14/7/16			
184	Settlement markers	938 days	Fri 20/12/13	Thu 14/7/16			
185	Installation	14 days	Fri 20/12/13	Thu 2/1/14	35	186	4
186	Initial survey	7 days	Mon 13/1/14	Sun 19/1/14	185	36	4
187	Interim monitoring	812 days	Fri 25/4/14	Thu 14/7/16	191FF,224,36, 221FF,247		4
188	Hydrographic Survey (Portions A to E)	929 days	Mon 13/1/14	Fri 29/7/16			
189	Initial survey	14 days	Mon 13/1/14	Sun 26/1/14			
190	Field works	14 days	Mon 13/1/14	Sun 26/1/14	38	39	5
191	Interim survey	718 days	Tue 1/7/14	Fri 17/6/16	39, 192,187FF		5
192	Final survey	7 days	Fri 15/7		8,231,228,221	193	5
193	Final survey report	8 days	Fri 22/7/16	Fri 29/7/16	192		N
194	Temporary Marine Traffic Management (Portions A to E)	1005 days	Mon 30/9/13	Thu 30/6/16			
195	Organizing meeting for information collection	990 days	Mon 30/9/13	Wed 15/6/16			N
196	Temporary marine traffic management and TMTM meeting	952 days	Fri 22/11/13	Thu 30/6/16	42FS-60 days,43	244	N
197	Dredging Works (Portions A to E)	957 days	Sun 1/12/13	Thu 14/7/16			
198	Interface with other contractors or utility undertakings	943 days	Sun 1/12/13	Thu 30/6/16			N
199	Organizing coordination meeting	943 days	Sun 1/12/13	Thu 30/6/16			N
200	Silt screen (Location see Drg No. EM/401)	875 days	Fri 21/2/14	Thu 14/7/16			
201	Installation of silt screen	7 days	Fri 21/2/14	Thu 27/2/14	47	202,224	6
202	Maintenance of silt screen	813 days	Thu 24/4/14	Thu 14/7/16	201	221FF,245	6
203	Dredging Works at Portions A and B	710 days	Mon 9/6/14	Wed 18/5/16			
204	General seabed	701 days	Mon 9/6/14	Mon 9/5/16			
205	Mobilization	42 days	Fri 27/6/14	Thu 7/8/14	74,77,16,57	207	7
206	Fabrication of silt curtain	7 days	Mon 9/6/14	Sun 15/6/14		207	8
207	Pilot test for silt curtain	2 days	Fri 8/6/14	Sat	74,16,47,55,57	209	7
208	Monitoring brief for unidentified sonar contacts & masked areas	3 days	Wed 2/7/14	Fri 4/7/14		209	N
209	Dredging works 1 (subject to availability of working windows)	30 days	Sun 10/8/14		7,22,27FS-130 days	217	7
210	Dredging works 2 (subject to availability of working windows)	595 days	Tue 23/9/14	Mon 9/5/16	217,69	192,221	7
211	Type 3 Cat H/ Sediment (Portion A)	292 days	Sat 1/8/15	Wed 18/5/16			
212	Procurement and delivery of Geo-container	112 days	Sat 1/8/15	Fri 20/11/15	104	214	N
213	Trial dumping operation of Type 2 sediment using geo-containers	34 days	Fri 26/2/16	Wed 30/3/16			
214	Trial dumping	34 days	Fri 26/2/16	Wed 30/3/16	85,212	215,86	7
215	Dredging works	21 days	Thu 28/4/16	Wed 18/5/16	104,214,87		7
216	Hot Spot (Portion A)	609 days	Tue 9/9/14	Mon 9/5/16			
217	Field trial at Zone Z2C	14 days	Tue 9/9/14	Mon 22/9/14	209,108	210,110	7
218	Dredging works at Z2B*	493 days	Thu 1/11/15	Mon 9/5/16	114	192	7
219	Dredging of hard material*	493 days	Thu 1/11/15	Mon 9/5/16	121	192	7
220	Outfall demolition works*	70 days	Tue 1/3/16	Mon 9/5/16		192,221	7
221	Removal of high spots*	66 days	Tue 10/5/1		*.187FF,202FF	192	7
222	Dredging Works for Portions C, D and E	707 days	Fri 18/4/14	Thu 24/3/16			
223	Dredging Works for Portion D	666 days	Fri 18/4/14	Fri 12/2/16			
224	Mobilization	7 days	Fri 18/4/14		12,123,124,125, 5,226,179,187	9	
225	Pilot test of silt curtain	2 days	Fri 25/4/14	Sat 26/4/14	224	226FF	9
226	Trial dredging	2 days	Fri 25/4/14	Sat 26/4/14	224,225FF	227	9
227	Dredging works	153 days	Sun 27/4/14	Fri 26/9/14	226	230,228	9
228	Removal of high spots	1 day	Fri 12/2/16	Fri 12/2/16	227,231FF	192	9



China International Water & Electric Corp. Task Critical Task Milestone Summary

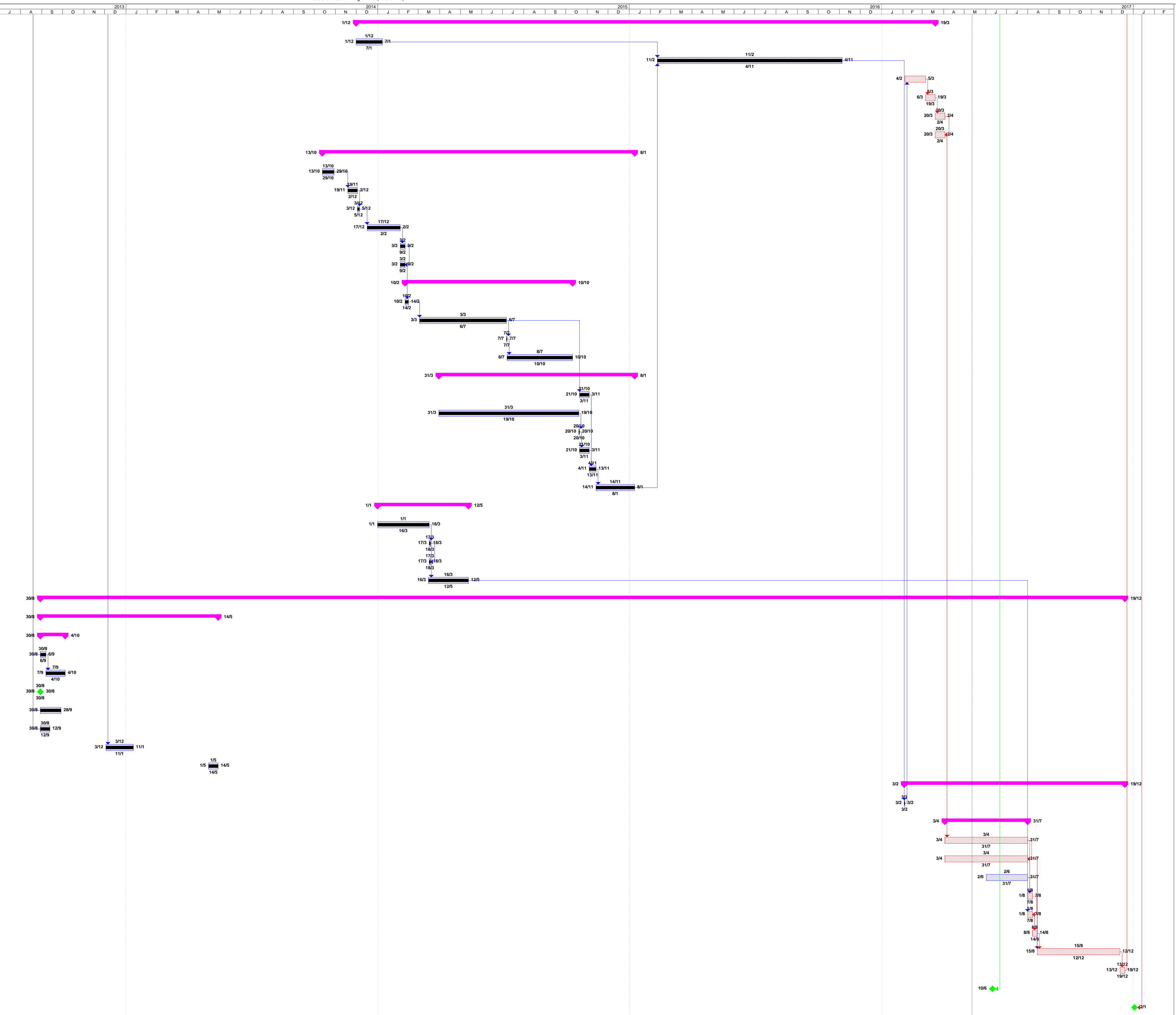
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China International Water & Electric Corp. Task Critical Task Milestone Summary

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 *** The frequency of interim survey is once a month

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names	
286	Preparation and submission	840 days	Mon 11/2/14	Sun 19/3/17				
287	Preparation and submission	38 days	Mon 1/12/14	Wed 7/1/15		288	N	
288	Awaiting resolving TMFA constraints	268 days	Thu 11/2/16	Fri 4/11/16	287,311	328	N	
289	Further review diving safety zone with MD and HKPA	30 days	Sat 4/2/17	Sun 5/3/17	328	290	N	
290	Resubmission	14 days	Mon 6/3/17	Sun 19/3/17	289	291	N	
291	Approval by Mott	14 days	Mon 20/3/17	Sun 2/4/17	290	292FF	N	
292	Approval by DSD	14 days	Mon 20/3/17	Sun 2/4/17	291FF	330	N	
293	Flow Measurement Survey	453 days	Mon 13/10/14	Fri 8/1/16				
294	Preparation and submission	17 days	Mon 13/10/14	Wed 29/10/14		295	N	
295	Resubmission	14 days	Wed 19/11/14	Tue 2/12/14	294	296	N	
296	Further comment by Mott	3 days	Wed 3/12/14	Fri 5/12/14	295	297	N	
297	Resubmission	48 days	Wed 17/12/14	Mon 2/2/15	296	298	N	
298	Approval by Mott	7 days	Tue 3/2/15	Mon 9/2/15	297	298FF	N	
299	Approval by DSD	7 days	Tue 3/2/15	Mon 9/2/15	298FF	301	N	
300	Flow Survey Measurement report	243 days	Tue 10/2/15	Sat 10/10/15				
301	Analyzing survey data	5 days	Tue 10/2/15	Sat 14/2/15	299	302	N	
302	Preparation and submission	126 days	Tue 3/3/15	Mon 6/7/15	301	306,303	N	
303	Approval by Mott	1 day	Tue 7/7/15	Tue 7/7/15	302	304	N	
304	Approval by DSD	95 days	Wed 8/7/15	Sat 10/10/15	303		N	
305	Engineer's Assessment Report on Flow Measurement Survey	284 days	Tue 31/3/15	Fri 8/1/16				
306	Assessment calculations	14 days	Wed 21/10/15	Tue 3/11/15	302	310	N	
307	Preparation and submission	203 days	Tue 31/3/15	Mon 19/10/15		308	N	
308	Further comment by Mott	1 day	Tue 20/10/15	Tue 20/10/15	307	309	N	
309	Resubmission	14 days	Wed 21/10/15	Tue 3/11/15	308	310	N	
310	Approval by Mott	10 days	Wed 4/11/15	Fri 13/11/15	309,306	311	N	
311	Approval by DSD	56 days	Sat 14/11/15	Fri 8/1/16	310	288	N	
312	Video Filming and Dye Test	132 days	Thu 1/1/15	Tue 12/5/15				
313	Preparation and submission	75 days	Thu 1/1/15	Mon 16/3/15		314,316FS-1 day	N	
314	Approval by Mott	2 days	Tue 17/3/15	Wed 18/3/15	313	315FF	N	
315	Approval by DSD	2 days	Tue 17/3/15	Wed 18/3/15	314FF		N	
316	Using digital camera in lieu of CCTV	58 days	Mon 16/3/15	Tue 12/5/15		313FS-1 day	N	
317	Works	1573 days	Fri 30/8/13	Tue 19/12/17				
318	Preliminaries (Portion F)	258 days	Fri 30/8/13	Wed 14/5/14				
319	Contractor's mobilization	36 days	Fri 30/8/13	Fri 4/10/13				
320	Site clearance	8 days	Fri 30/8/13	Fri 6/9/13		4SS,321	10	
321	Contractor's site office	28 days	Sat 7/9/13	Fri 4/10/13		320	10	
322	Security Guard	0 days	Fri 30/8/13	Fri 30/8/13		4SS	11	
323	Temporary electricity power supply	30 days	Fri 30/8/13	Sat 28/9/13		4SS	10	
324	Engineer's Initial Temporary Accommodation	14 days	Fri 30/8/13	Thu 12/9/13		4SS	10	
325	Engineer's Principal Accommodation	40 days	Tue 3/12/13	Sat 11/1/14		283	12	
326	Engineer's Car Park	14 days	Thu 1/5/14	Wed 14/5/14			12	
327	Outfall Modification Works (Location see Drg No. S202)	320 days	Fri 3/2/17	Tue 19/12/17				
328	Underwater inspection and underwater filming	1 day	Fri 3/2/17	Fri 3/2/17		288	289	14
329	Procurement of material	120 days	Mon 3/4/17	Mon 31/7/17				
330	Non return valves	120 days	Mon 3/4/17	Mon 31/7/17		292	331FF,333	N
331	Flange adaptors	120 days	Mon 3/4/17	Mon 31/7/17		330FF	336,333	N
332	1200mm diameter concrete pipes	60 days	Fri 2/6/17	Mon 31/7/17			336,333	N
333	Dye test	7 days	Tue 1/8/17	Mon 7/8/17		332,330,331	334FF	13
334	Video filming	7 days	Tue 1/8/17	Mon 7/8/17		333FF,316	335	14
335	Dredging works	7 days	Tue 8/8/17	Mon 14/8/17		334	336	7
336	Modification works	120 days	Tue 15/8/17	Tue 12/12/17		331,332,335	337	14
337	As-built video submission	7 days	Wed 13/12/17	Tue 19/12/17		336	273	N
338	Extended Contract Completion Date	0 days	Sat 10/6/17	Sat 10/6/17			3FF	
339	Revised Contract Completion Date	0 days	Tue 2/1/18	Tue 2/1/18			273FF	



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Materialab

Report No.: 0394/13/ED/0359A

Appendix C
Action and Limit Levels

Action and Limit Levels for Routine Water Quality Monitoring (Dry Season)

Monitoring Station	DO (mg/L) Surface & Middle		DO (mg/L) Bottom		Turbidity (NTU) Depth-Averaged		Suspended Solids (mg/L) Depth-averaged		BOD5(mg/L) Depth- averaged		E.coli (CFU /100mL) Depth-averaged		NH3-N (mg/L) Depth-averaged		UIA (mg/L) Depth-averaged		Synthetic Detergent as MBAS (mg/L) Depth- averaged		TIN (mg/L) Depth Averaged	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
Seawater Intake																				
SR4	2	2	2	2	<10	<10	<10	<10	<10	<10	<20,000	<20,000	<1	<1	0.021	0.021	<5	<5	NA	NA
SR12																				
Fish Culture Zone																				
SR5	5.45	5.39 [#]	5.43	5.27 ⁺	6.7 or 120% ^{C*}	10.1 or 130% ^{C^}	12 or 120% ^{C*}	19 or 130% ^{C^}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.36	0.39
Gazetted Beach																				
SR2	5.45	5.39 [#]	5.43	5.27 ⁺	6.7 or 120% ^{C*}	10.1 or 130% ^{C^}	12 or 120% ^{C*}	19 or 130% ^{C^}	NA	NA	NA	NA	0.21 or 120% ^{C*}	0.24 or 130% ^{C^}	0.021	0.021	NA	NA	NA	NA
SR3																				
EMSD Cooling Water Intake																				
SR13	5.31	5.22 [#]	5.29	5.12 ⁺	13.1 or 120% ^{C*}	15.7 or 130% ^{C^}	23 or 120% ^{C*}	38 or 130% ^{C^}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note:

* Or 120% of upstream control station at the same tide of the day

^ Or 130% of upstream control station at the same tide of the day

According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations.

+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data

For DO measurement, non-compliance occurs when monitoring result is lower than the limits;

For TIN, UIA, NH₃-N, SS, BOD₅, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;

AL/LL of TIN and NH₃-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.

Dry Season: November to March

Action and Limit Levels for Routine Water Quality Monitoring (Wet Season)

Monitoring Station	DO (mg/L) Surface & Middle		DO (mg/L) Bottom		Turbidity (NTU) Depth-Averaged		Suspended Solids (mg/L) Depth-averaged		BOD5 (mg/L) Depth- averaged		E.coli (CFU /100mL) Depth-averaged		NH3-N (mg/L) Depth-averaged		UIA (mg/L) Depth-averaged		Synthetic Detergent as MBAS (mg/L) Depth-averaged		TIN (mg/L) Depth Averaged	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
Seawater Intake																				
SR4	2	2	2	2	<10	<10	<10	<10	<10	<10	<20,000	<20,000	<1	<1	0.021	0.021	<5	<5	NA	NA
SR12																				
Fish Culture Zone																				
SR5	5.00#	5.00#	4.11	4.04+	10.8 or 120%C*	15.0 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.45	0.50
Gazetted Beach																				
SR2	4.68	4.62#	4.11	4.04+	10.8 or 120%C*	15.0 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	0.21 or 120%C*	0.24 or 130%C^	0.021	0.021	NA	NA	NA	NA
SR3																				
EMSD Cooling Water Intake																				
SR13	4.24	4.17#	3.70	3.58+	13.1 or 120%C*	15.7 or 130%C^	23 or 120%C*	38 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note:

* Or 120% of upstream control station at the same tide of the day

^ Or 130% of upstream control station at the same tide of the day

According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations. (5%ile & 1 %ile determined from wet season baseline data for cluster 1 (4.68mg/L & 4.62mg/L) and cluster 2 (5.00mg/L & 4.82mg/L) are 5mg/L or below, thus 5mg/L was adopted as the AL & LL for the SR in FCZ)

+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data

Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015.

For DO measurement, non-compliance occurs when monitoring result is lower than the limits;

For TIN, UIA, NH₃-N, SS, BOD₅, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;

AL/LL of TIN and NH₃-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.

Wet season: April to October

Action and Limit Levels for 24-hr Water Quality Monitoring (Dry Season)

Monitoring Station	DO (mg/L) Surface		Turbidity (NTU) Surface		Ammonia-N (mg/L) Surface	
	AL	LL	AL	LL	AL	LL
WSD Seawater Intake						
SR4	2	2	<10	<10	<1	<1
SR12						
Fish Culture Zone						
SR5	5.46	5.39	6.0	7.9	NA	NA
EMSD Cooling Water Intake						
SR13	5.28	5.22	11.9	13.3	NA	NA

Note: According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations.

Dry Season: November to March.

Action and Limit Levels for 24-hr Water Quality Monitoring (Wet Season)

Monitoring Station	DO (mg/L) Surface		Turbidity (NTU) Surface		Ammonia-N (mg/L) Surface	
	AL	LL	AL	LL	AL	LL
WSD Seawater Intake						
SR4	2	2	<10	<10	<1	<1
SR12						
Fish Culture Zone						
SR5	5.24	5.13	9.7	14.4	NA	NA
EMSD Cooling Water Intake						
SR13	4.23	4.17	11.9	13.3	NA	NA

Note: # According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations. (1 %ile determined from wet season baseline data for cluster 2 (4.78mg/L) is below 5mg/L, thus 5mg/L was adopted as the DO (surface) LL for the SR in FCZ in cluster 2 stations)

Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015.

Wet Season: April to October

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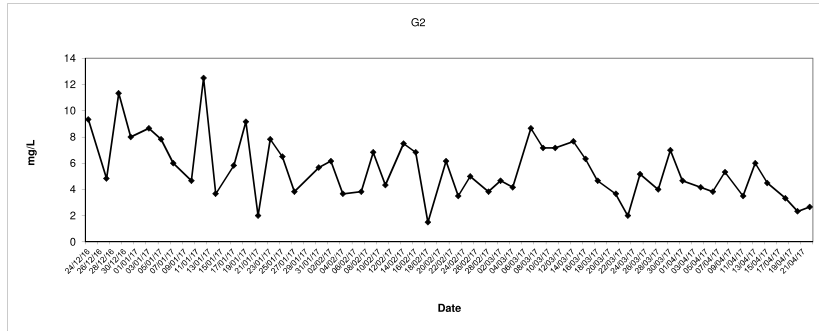
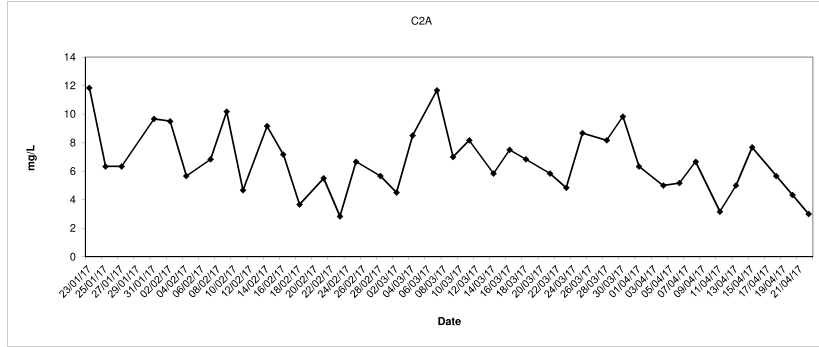
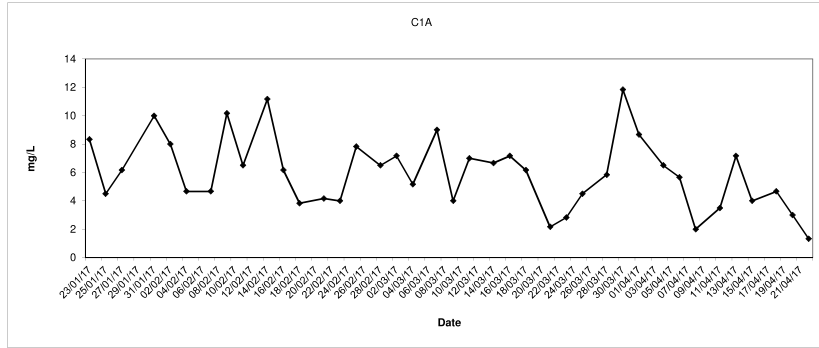
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Report No.: 0394/13/ED/0359A

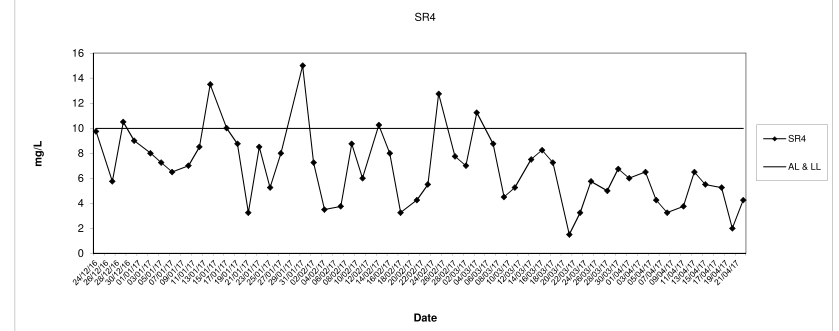
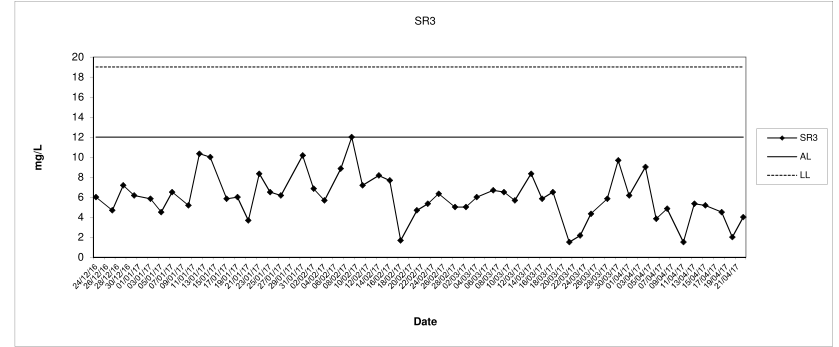
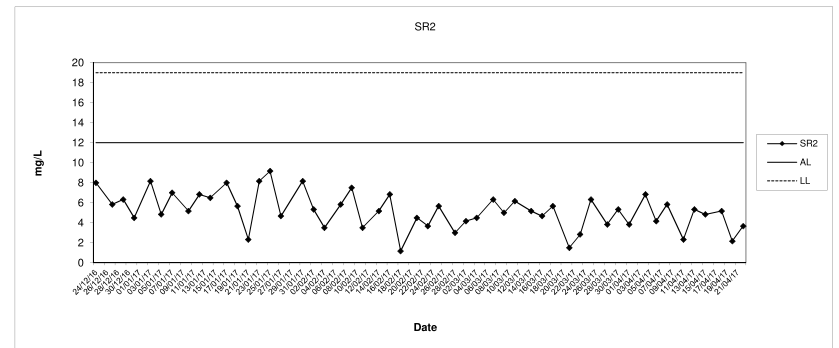
Appendix D

Graphical Presentation – Routine Impact Monitoring Results

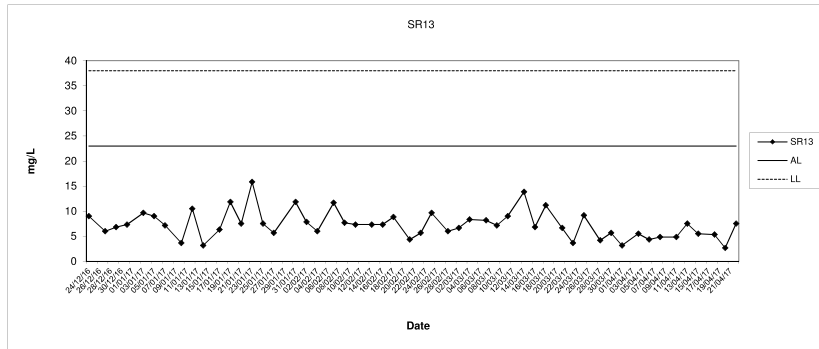
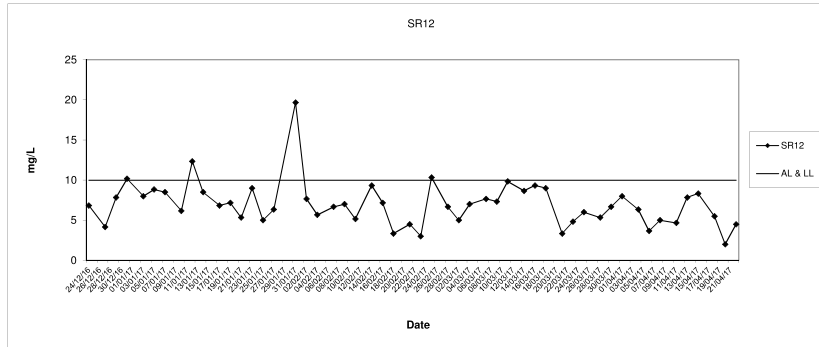
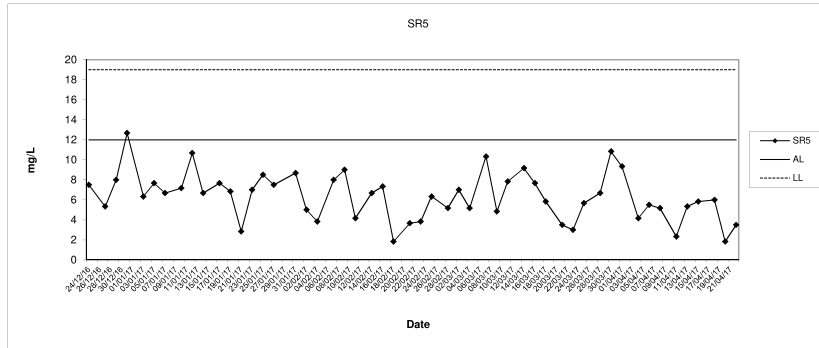
Total Suspended Solids (Depth average) at Mid-Flood Tide



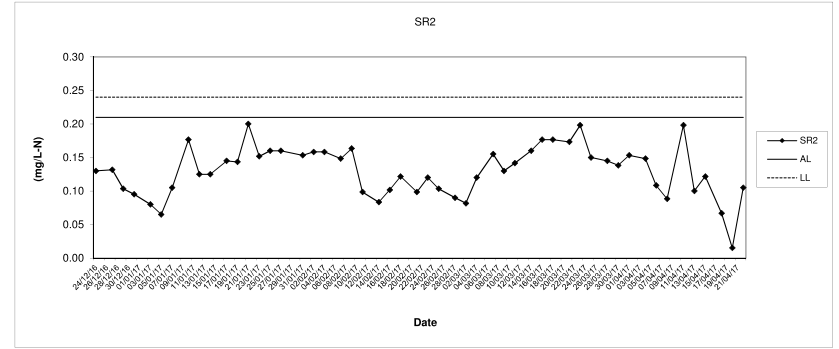
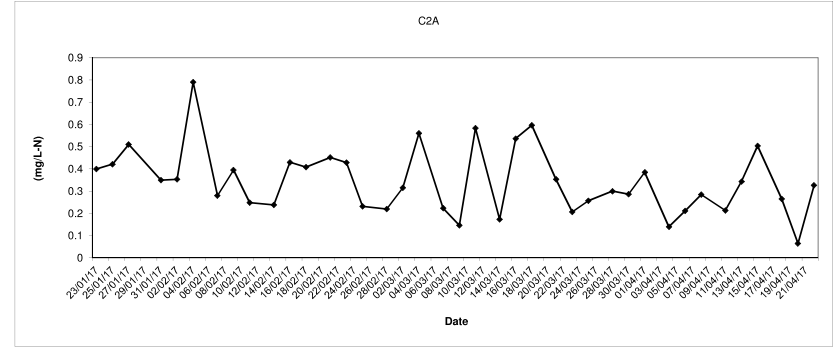
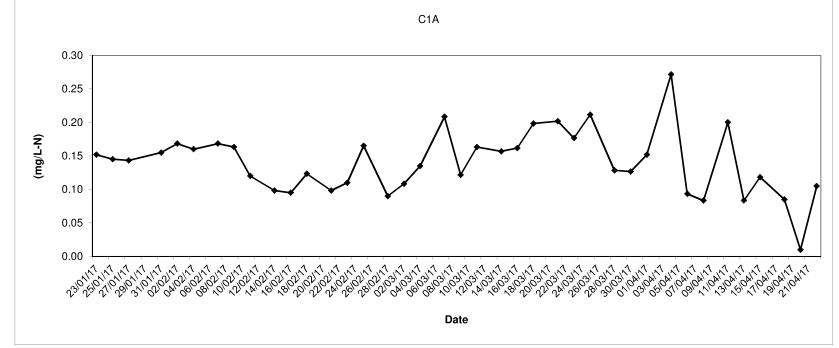
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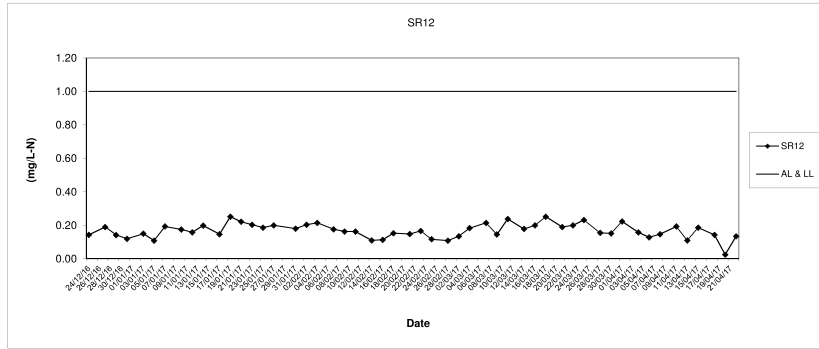
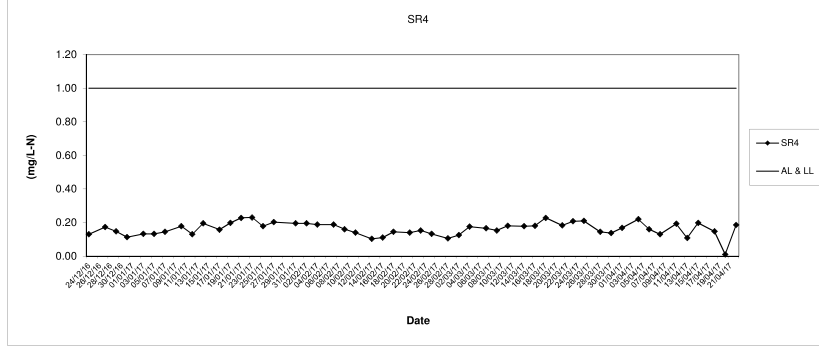
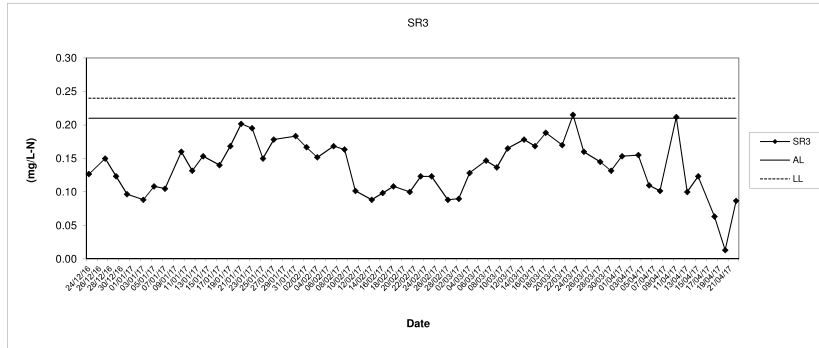
Total Suspended Solids (Depth average) at Mid-Flood Tide



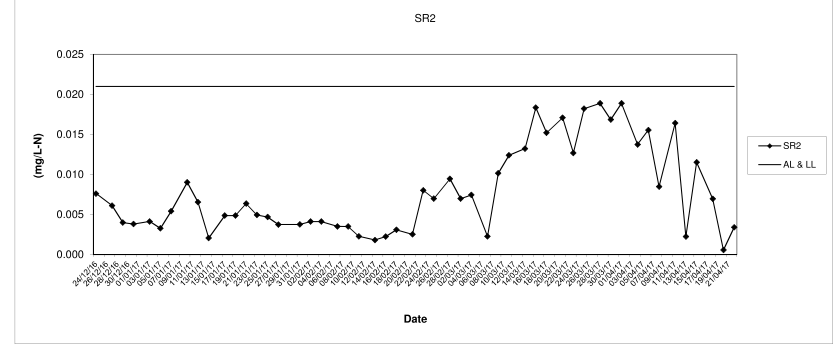
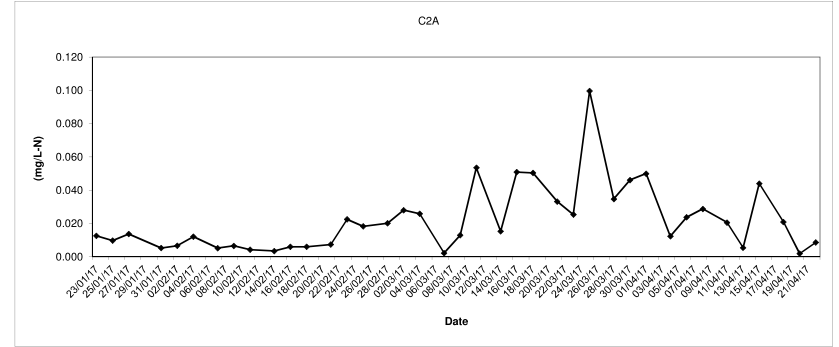
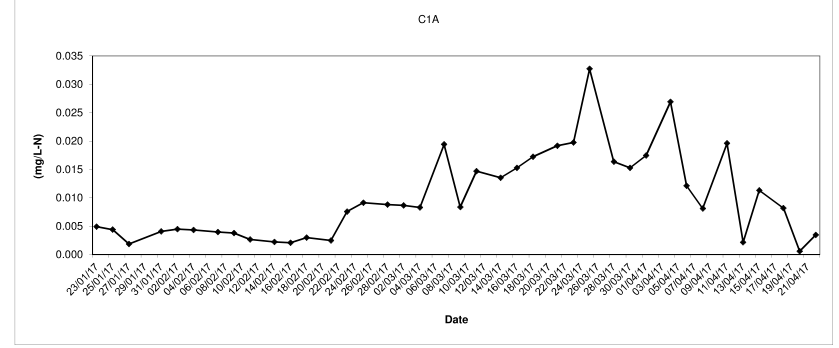
Ammonia Nitrogen (Depth average) at Mid-Flood Tide



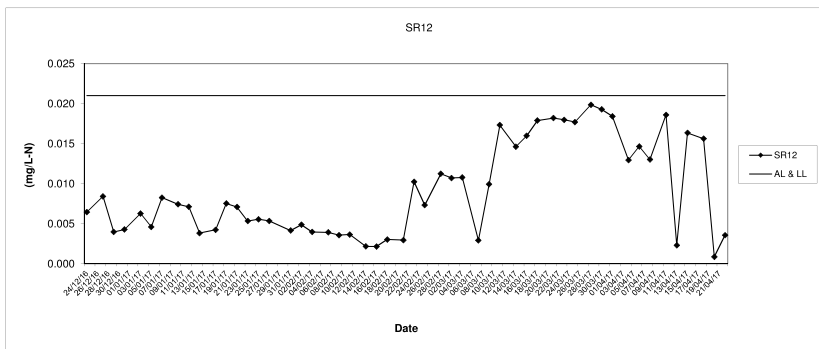
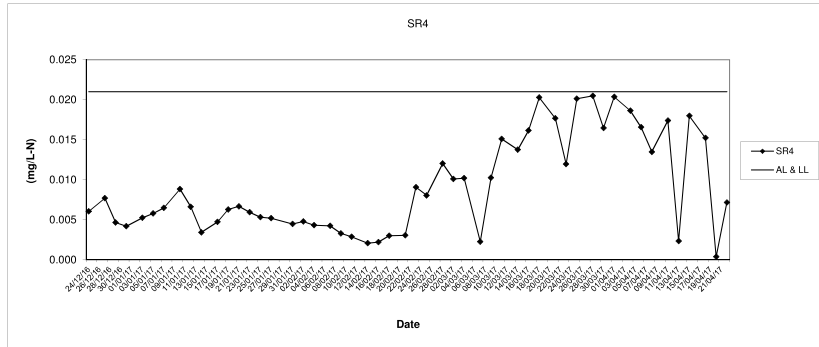
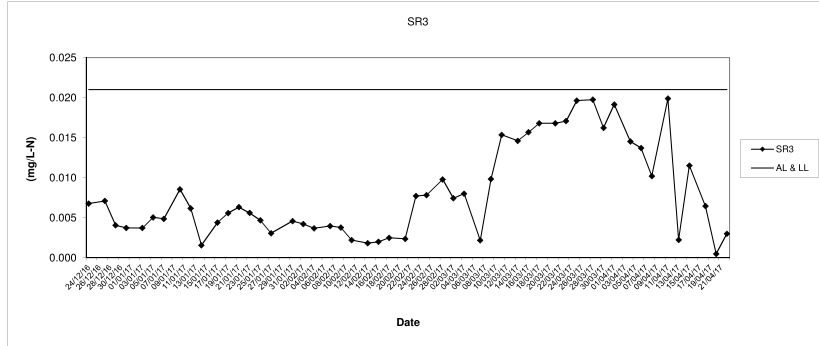
Ammonia Nitrogen (Depth average) at Mid-Flood Tide



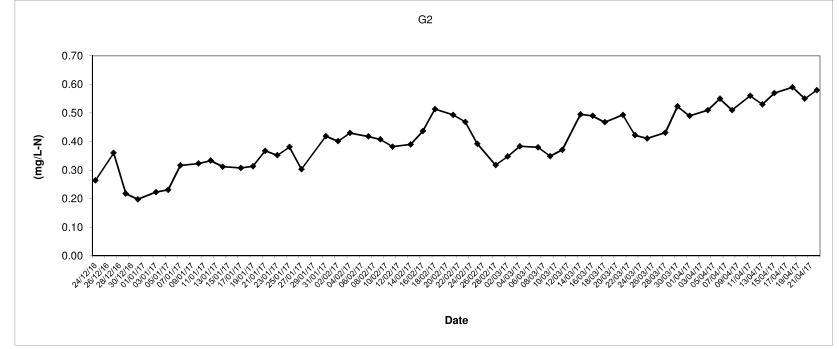
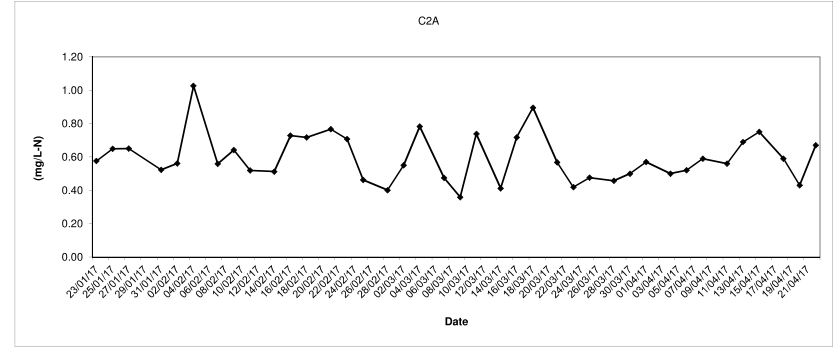
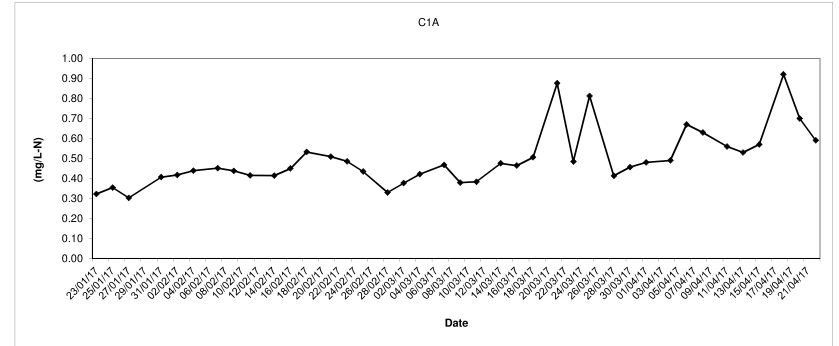
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide



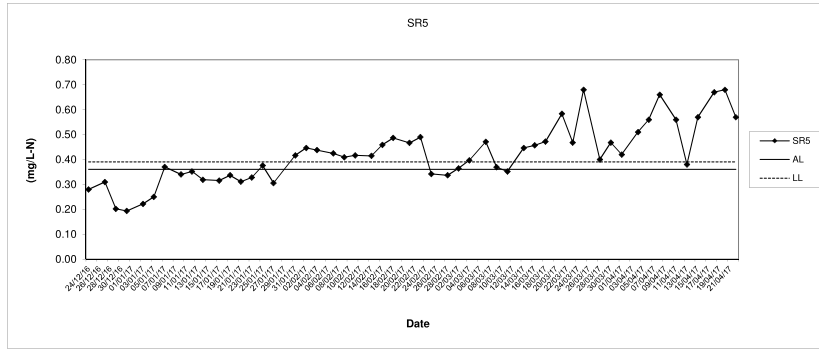
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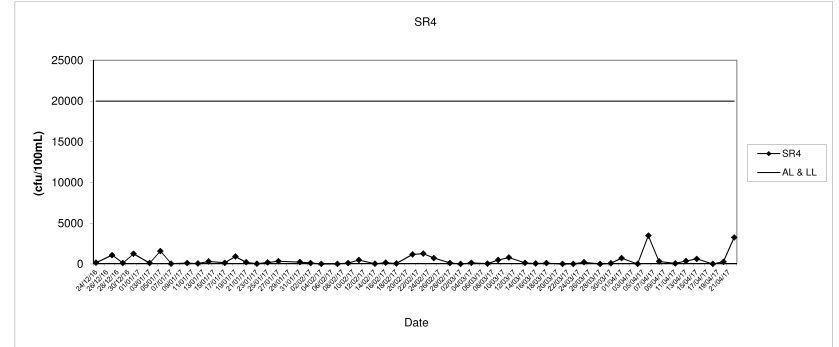
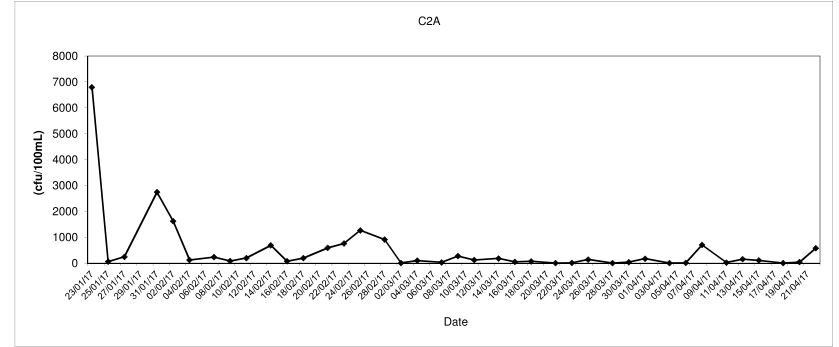
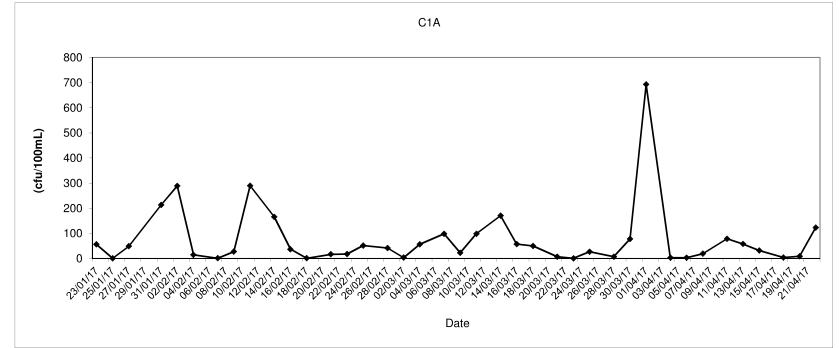
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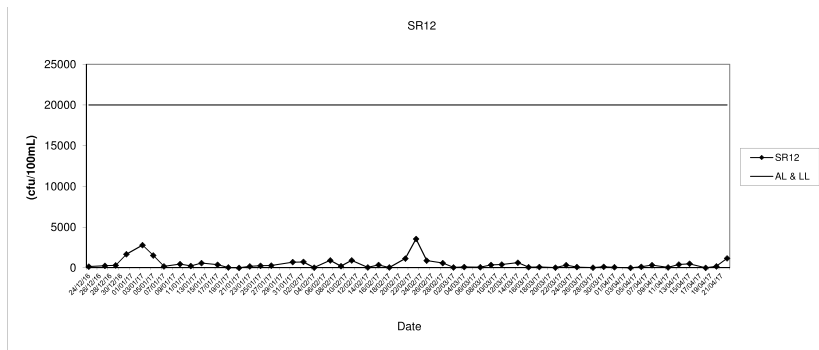
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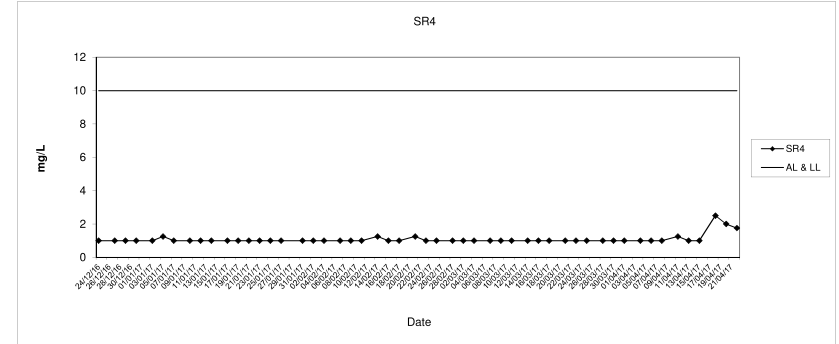
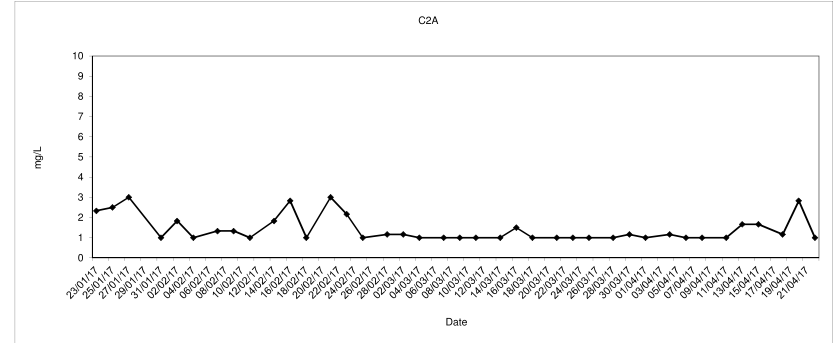
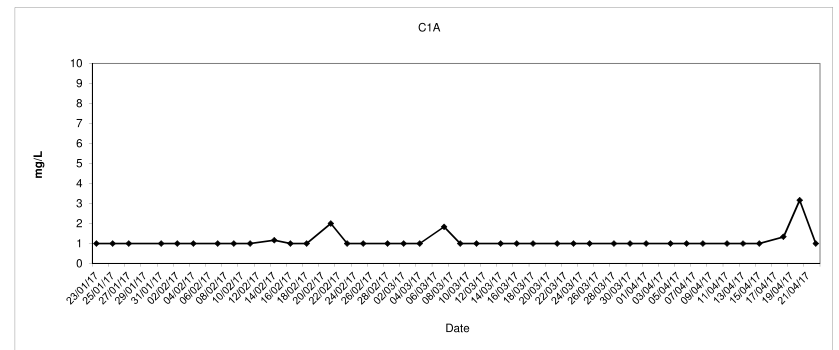
E. coli (Depth average) at Mid-Flood Tide



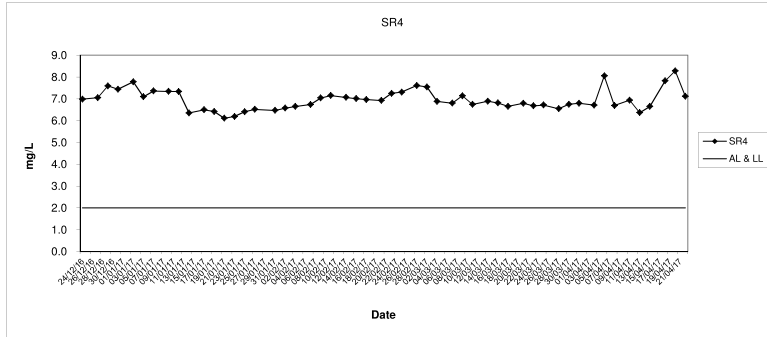
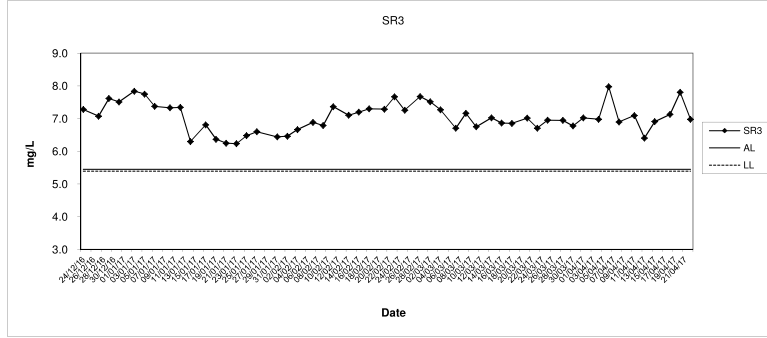
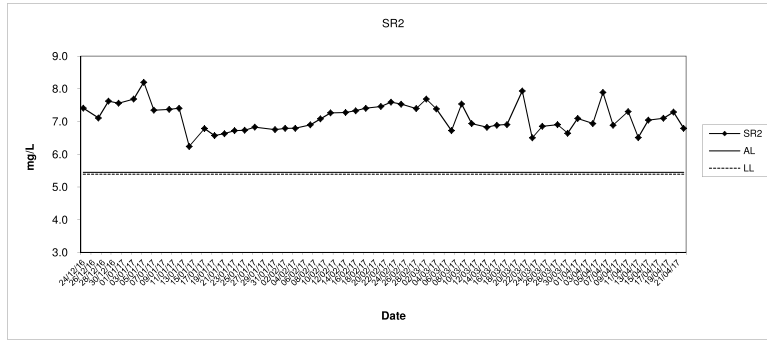
E.coli (Depth average) at Mid-Flood Tide



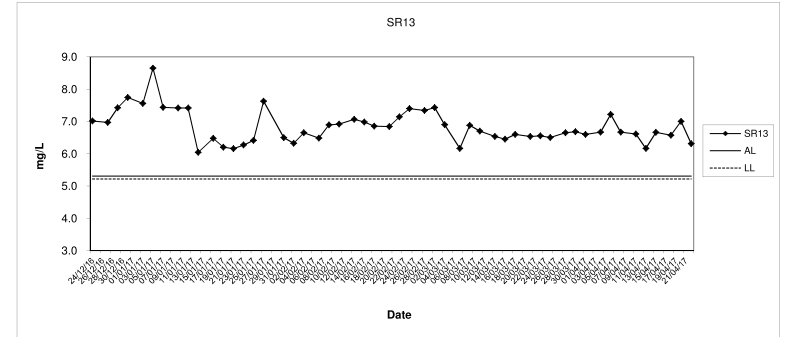
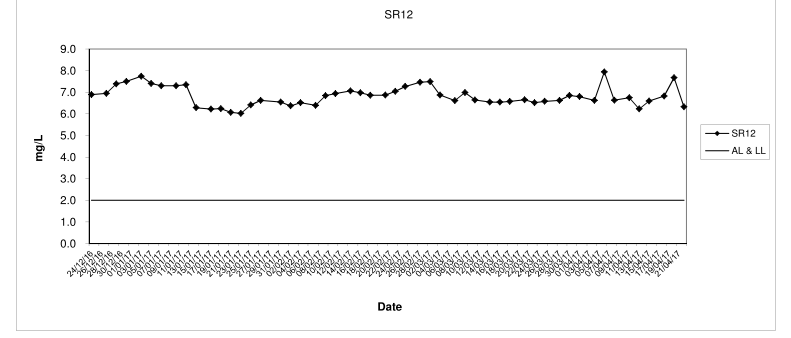
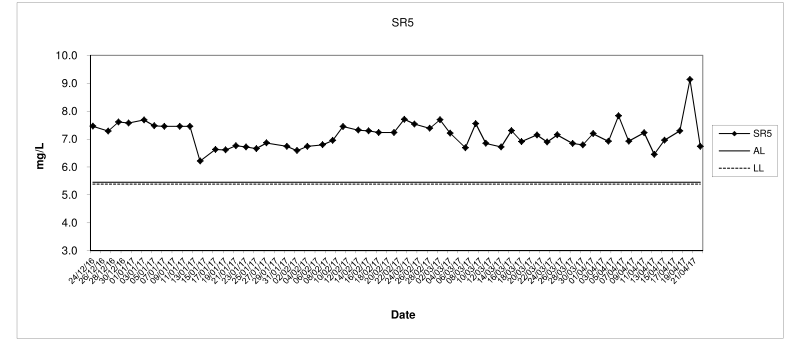
BOD₅ (Depth average) at Mid-Flood Tide



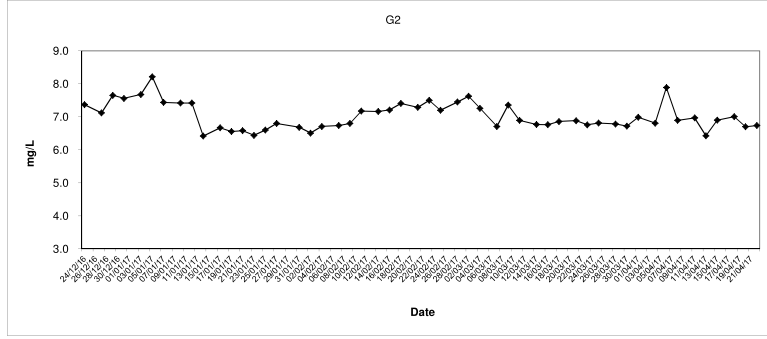
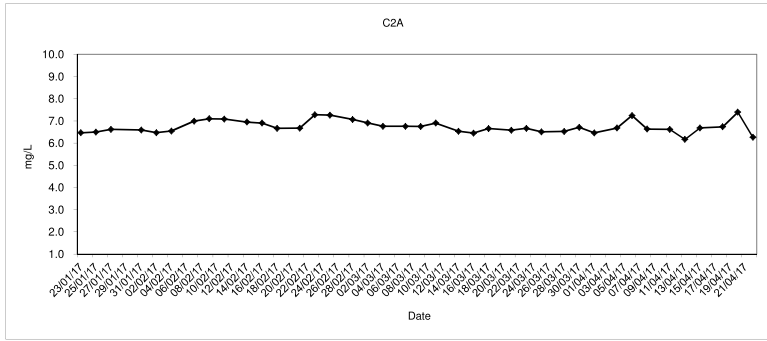
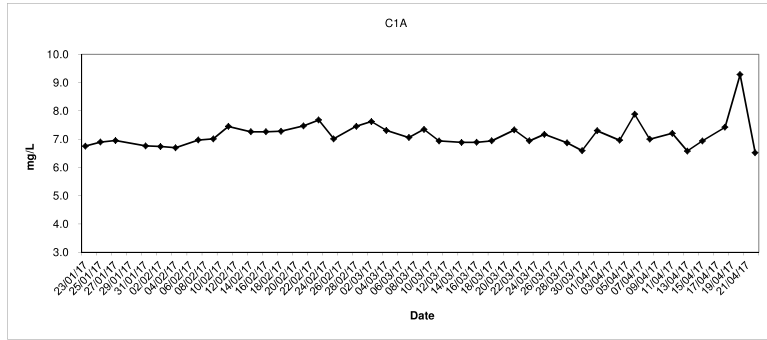
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



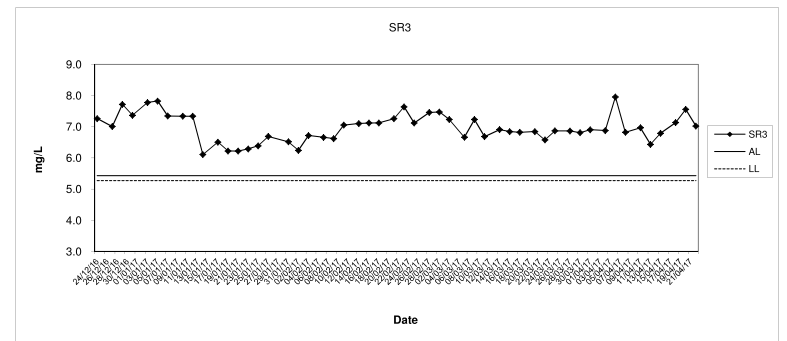
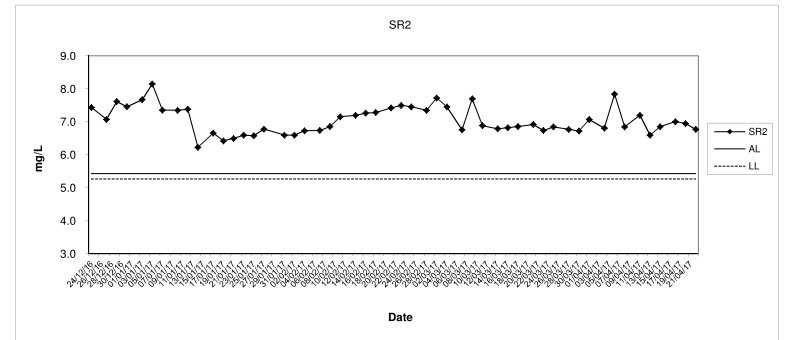
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



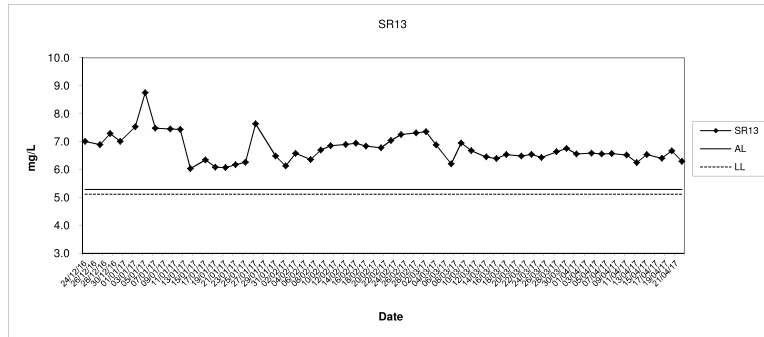
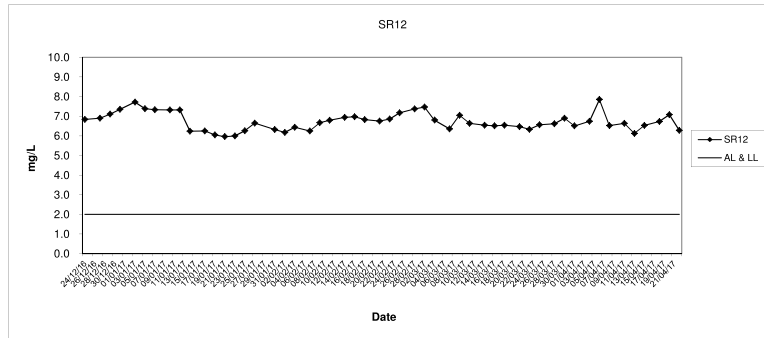
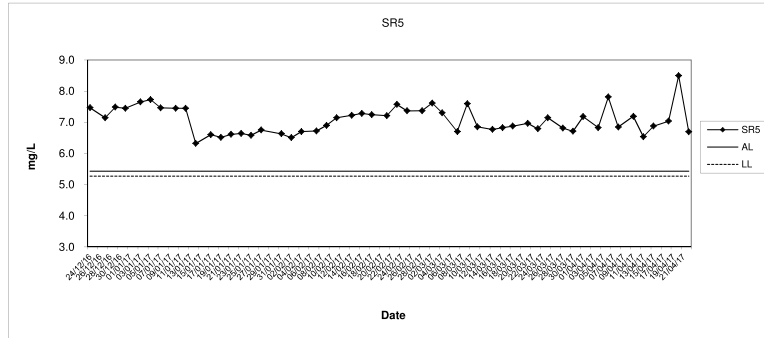
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



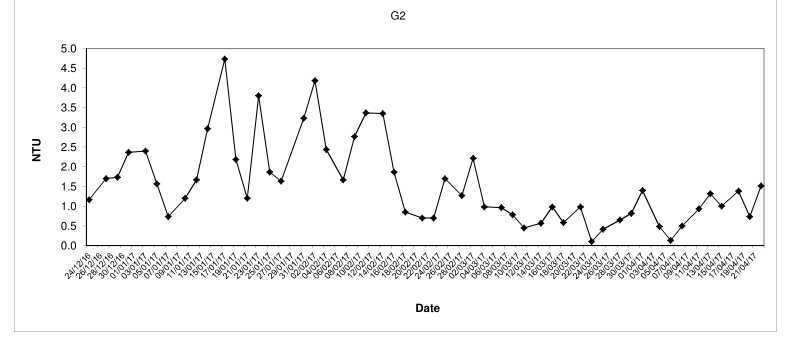
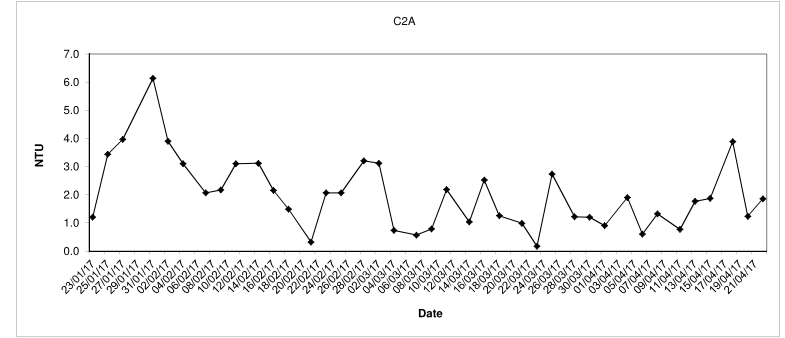
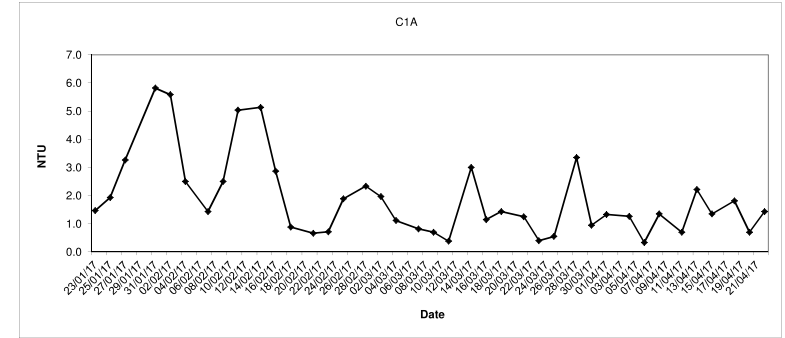
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



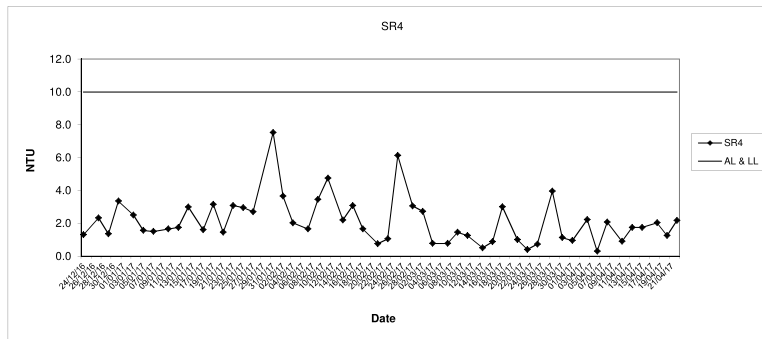
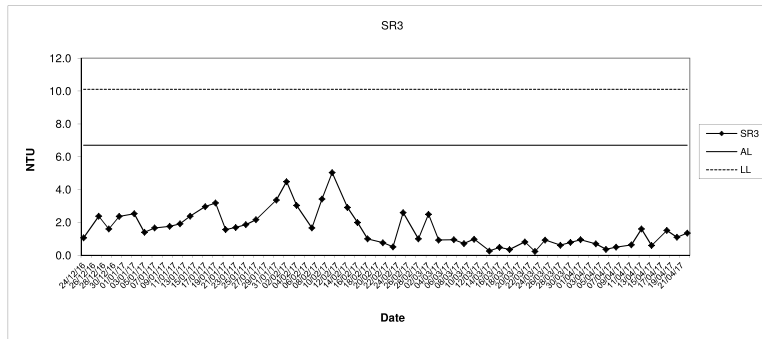
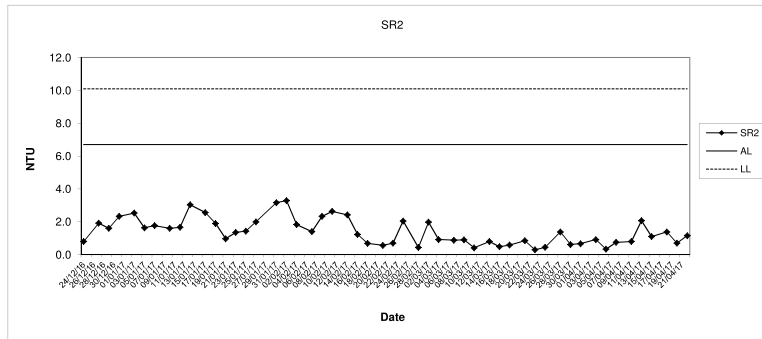
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



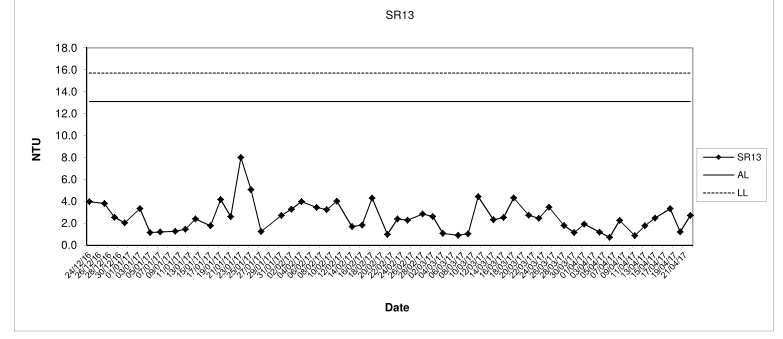
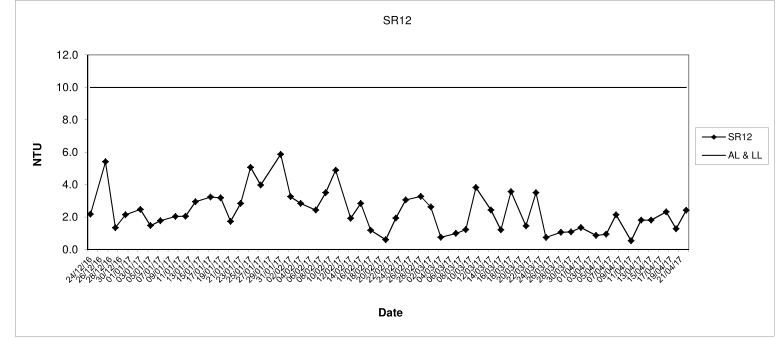
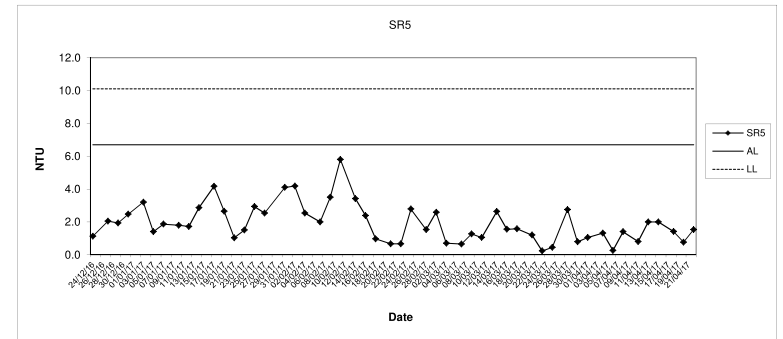
Turbidity (Depth average) at Mid-Ebb Tide



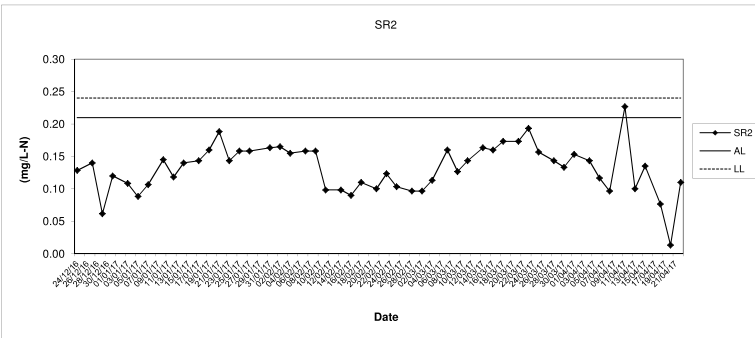
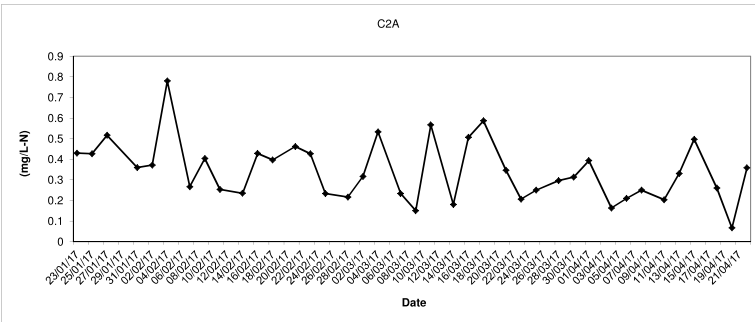
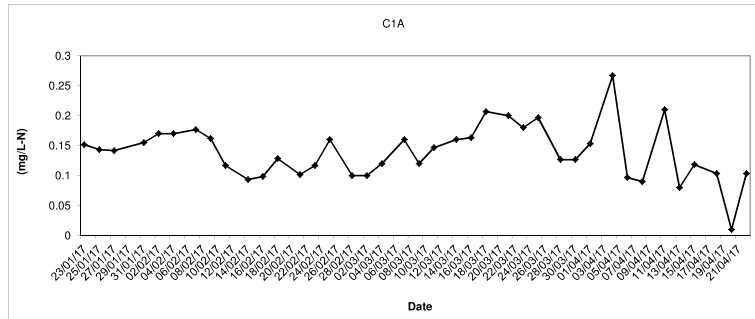
Turbidity (Depth average) at Mid-Ebb Tide



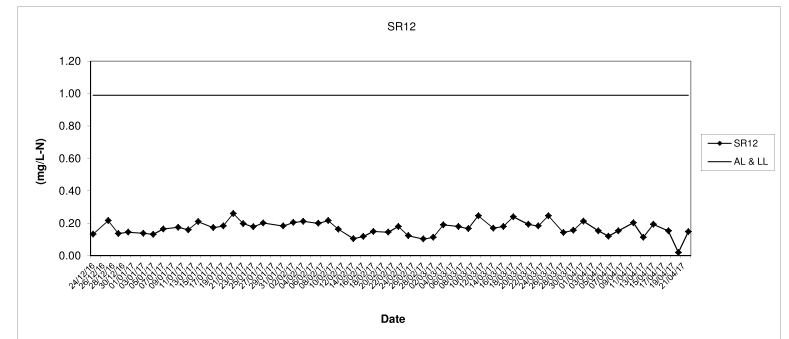
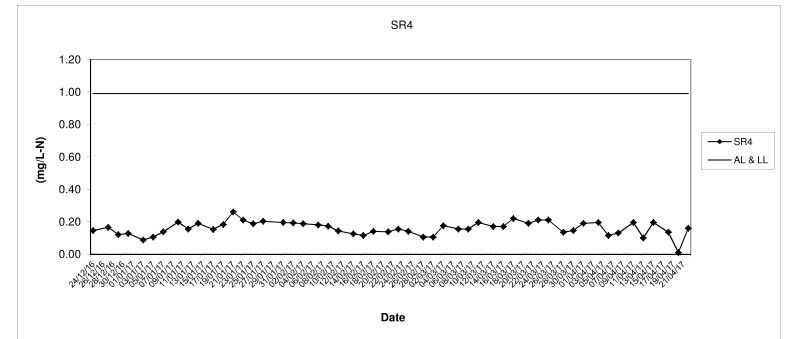
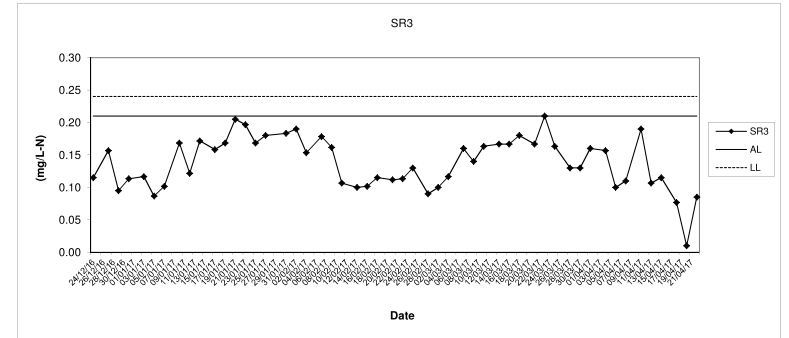
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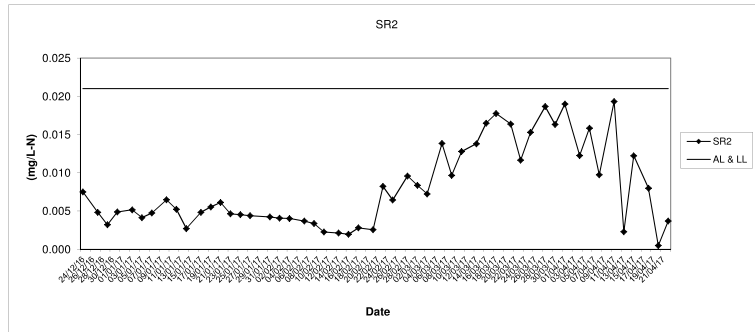
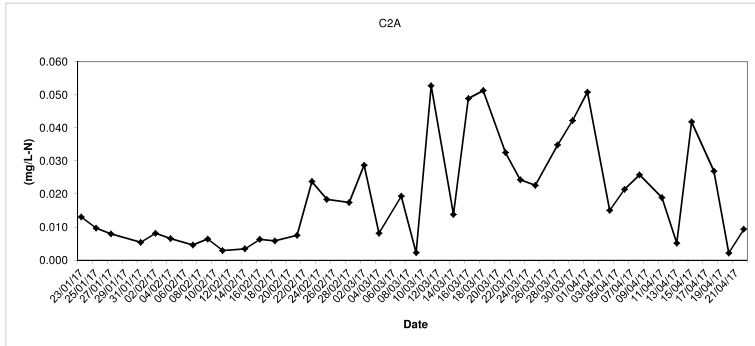
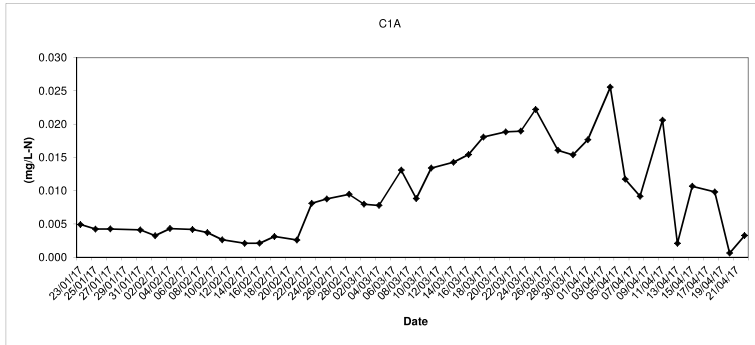
In-situ Ammonia (Depth average) at Mid-Ebb Tide



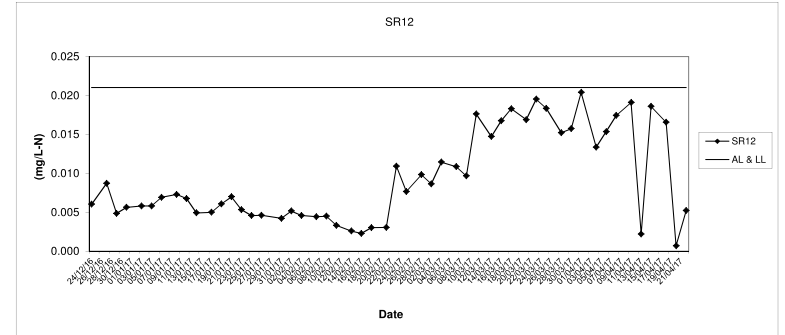
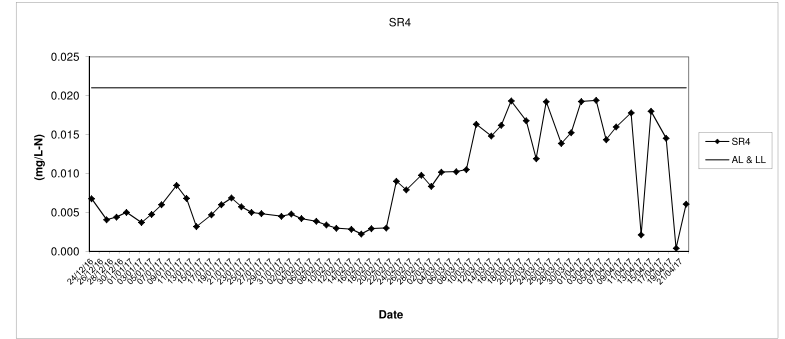
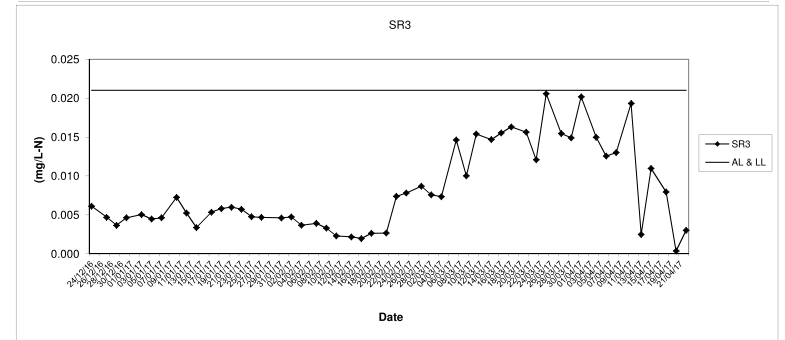
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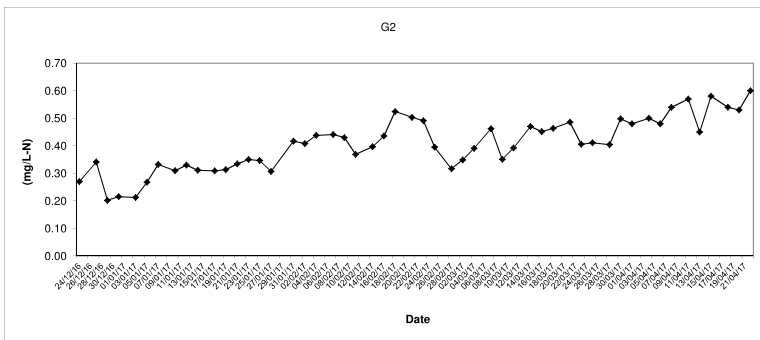
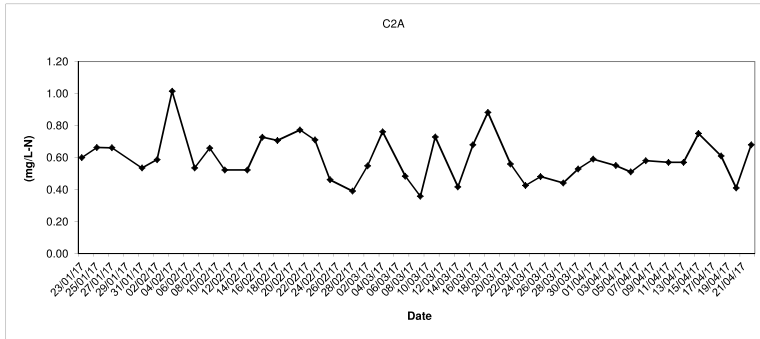
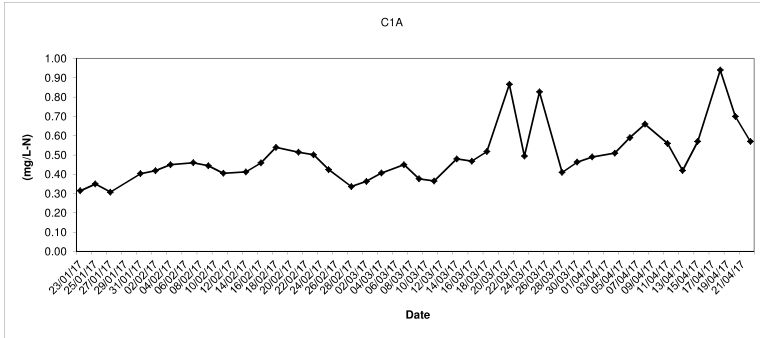
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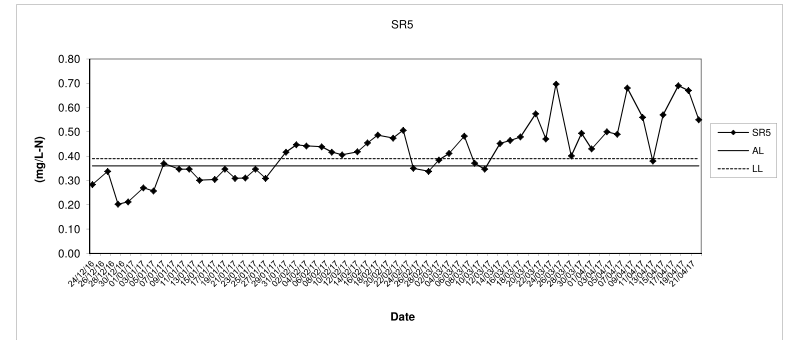
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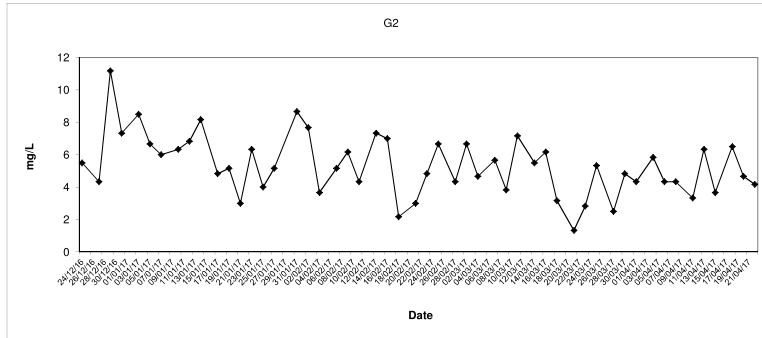
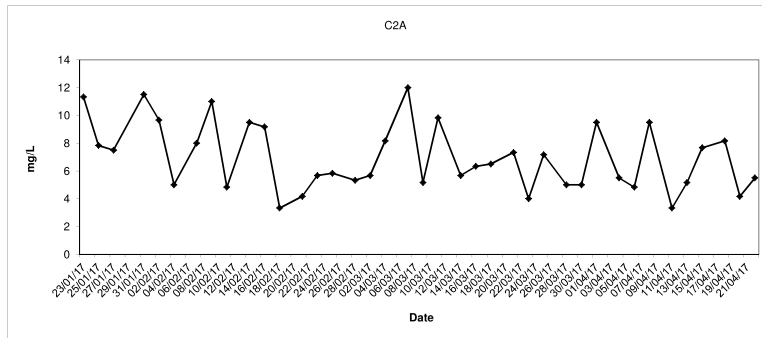
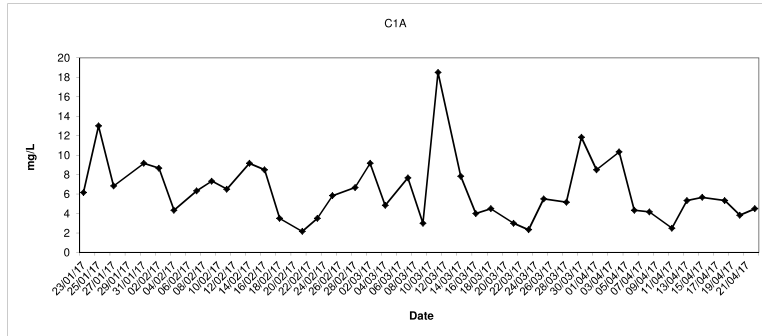
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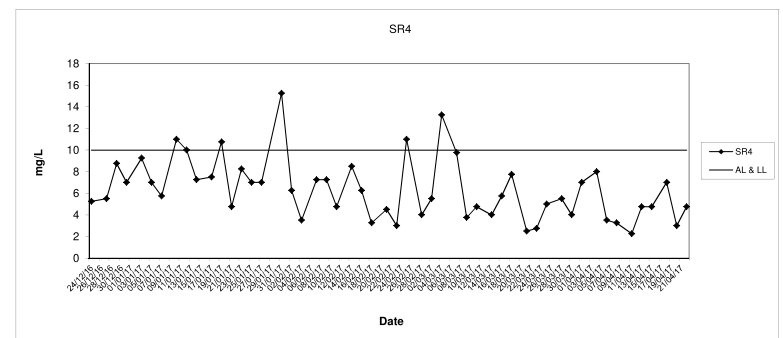
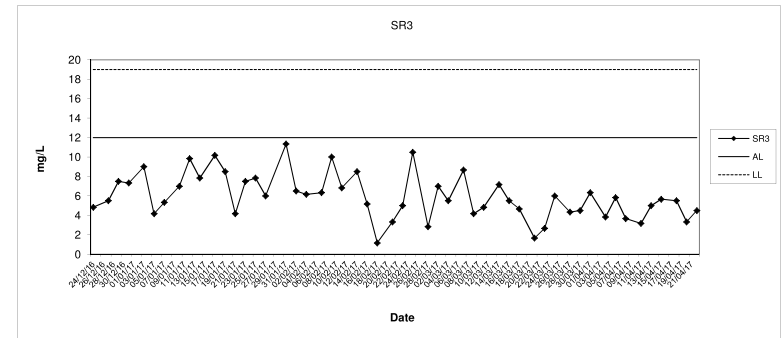
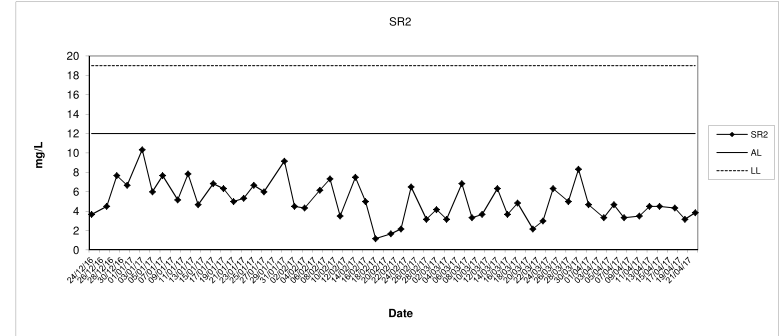
In-situ TIN (Depth average) at Mid-Ebb Tide



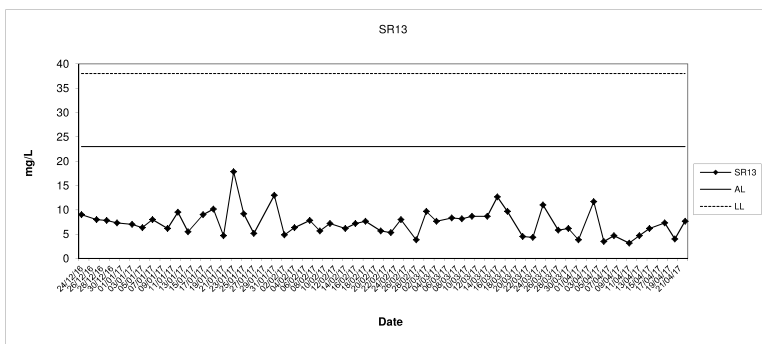
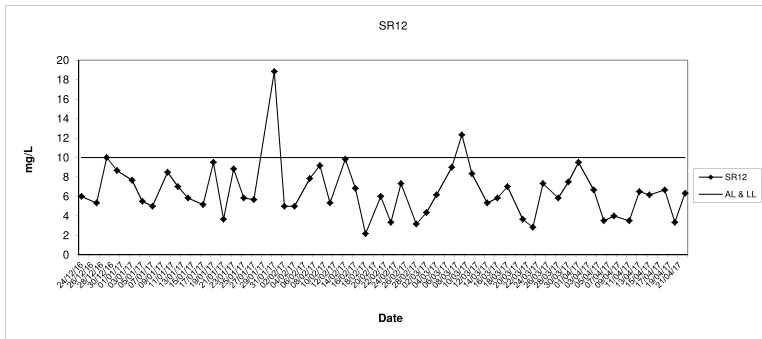
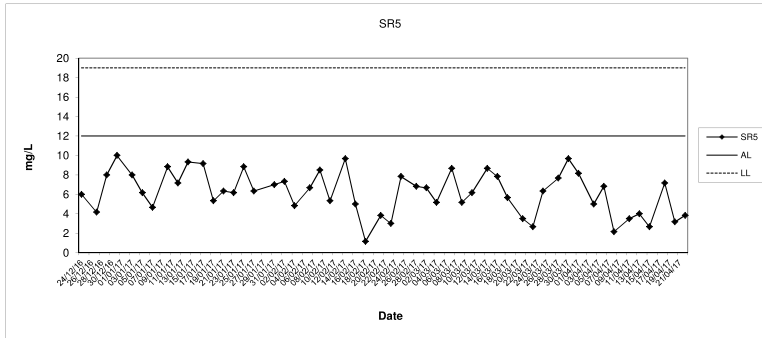
Total Suspended Solids (Depth average) at Mid-Ebb Tide



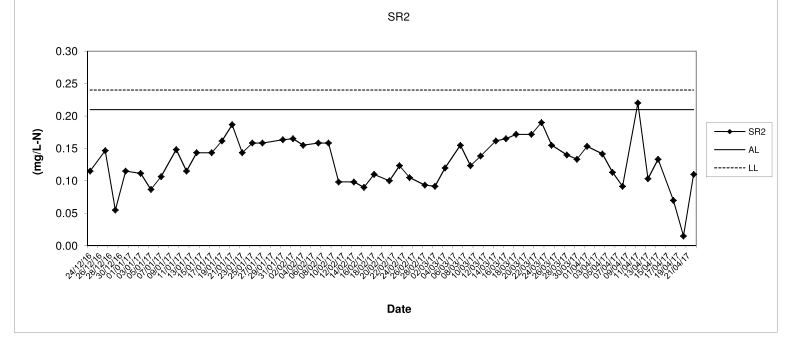
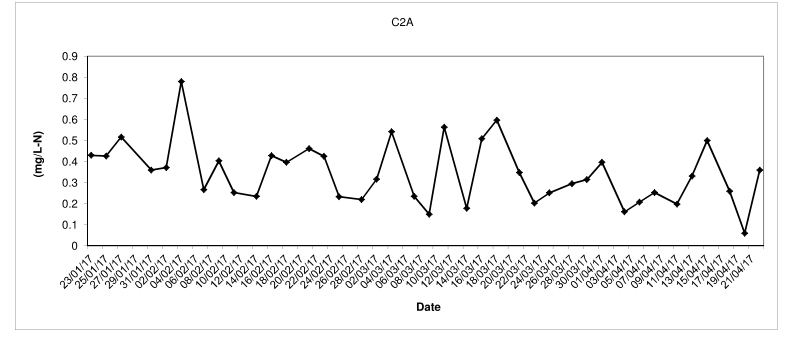
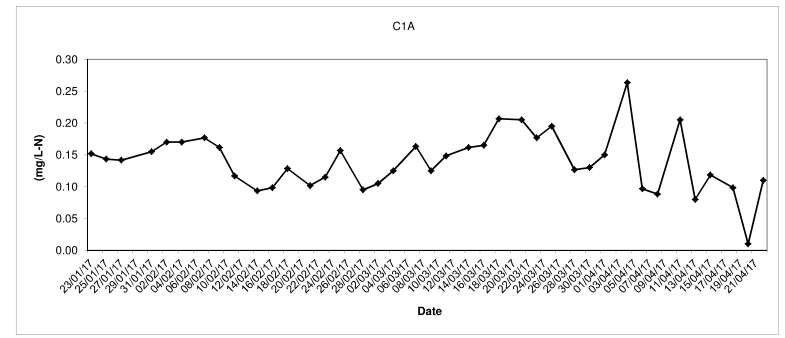
Total Suspended Solids (Depth average) at Mid-Ebb Tide



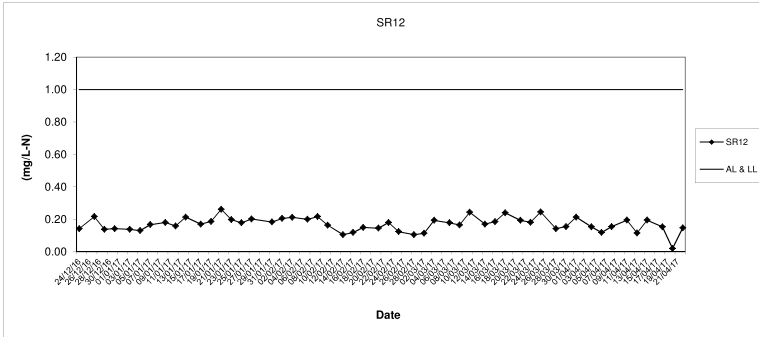
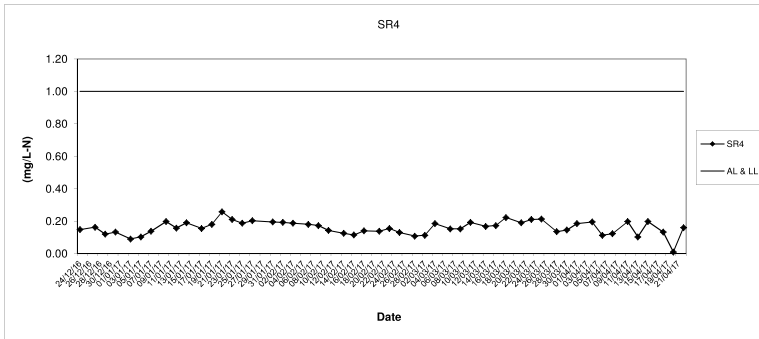
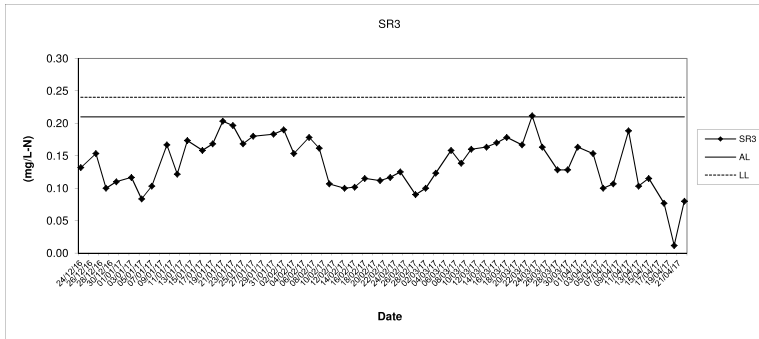
Total Suspended Solids (Depth average) at Mid-Ebb Tide



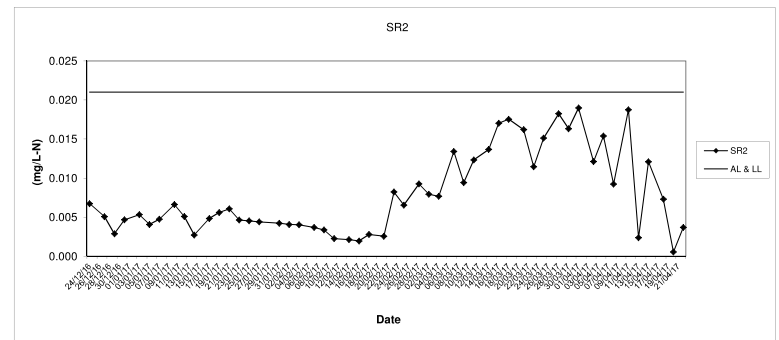
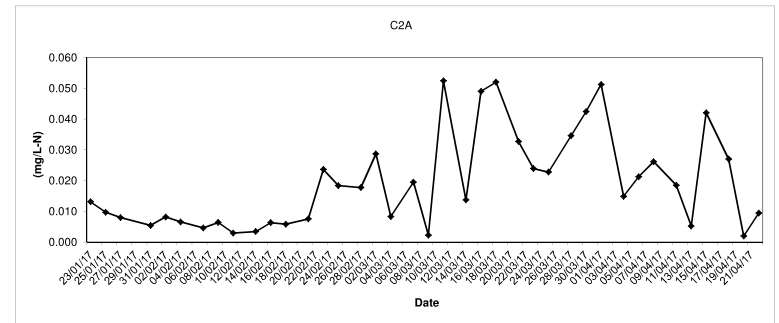
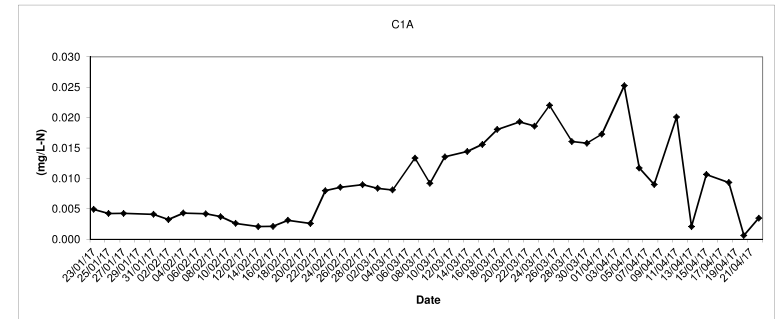
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide



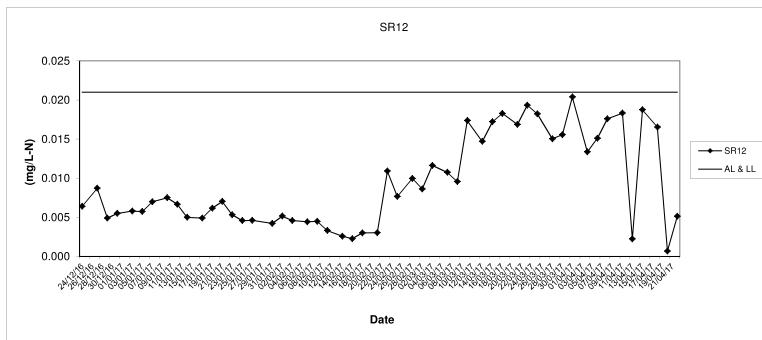
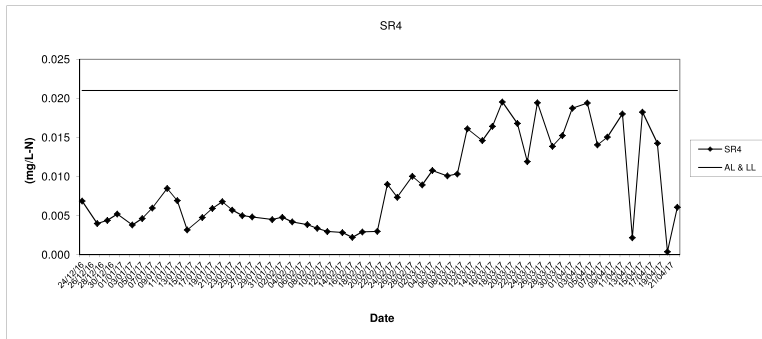
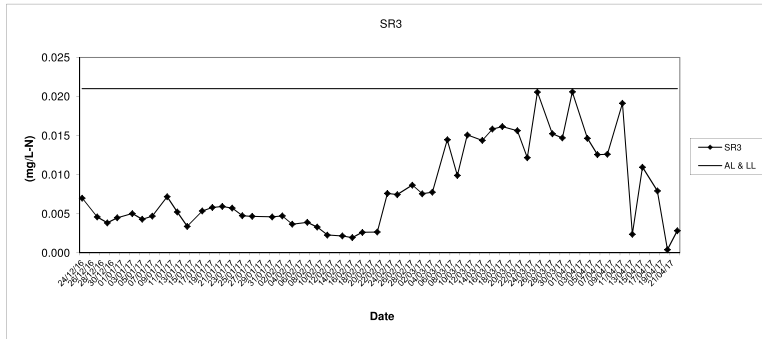
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide



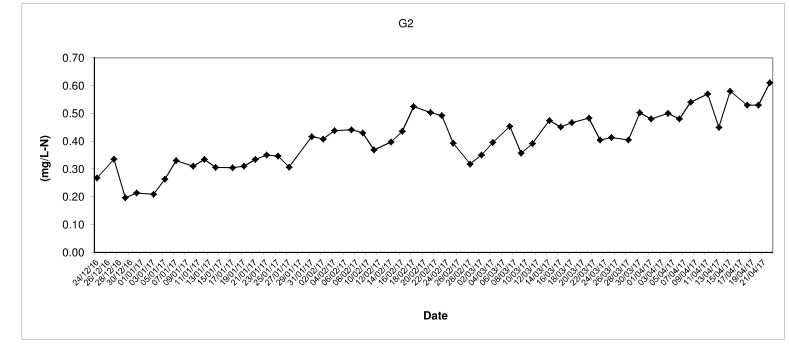
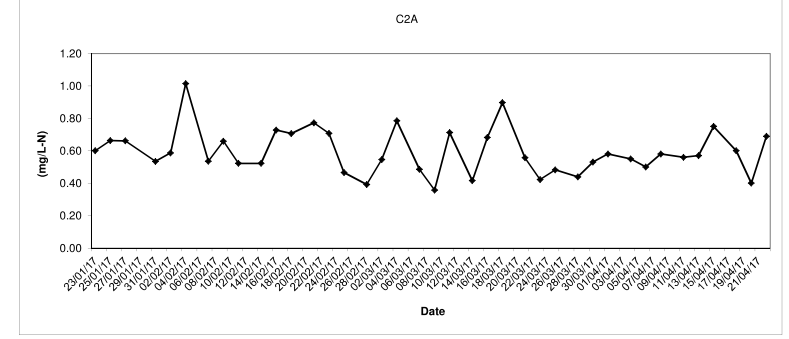
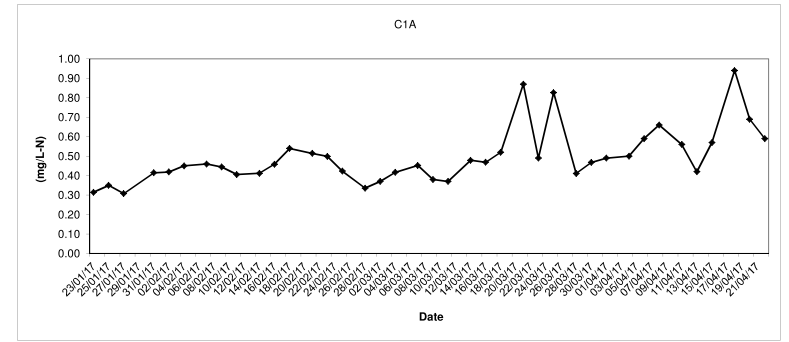
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide



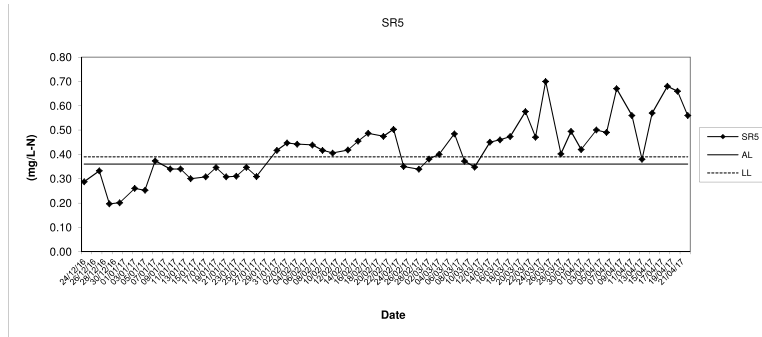
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide



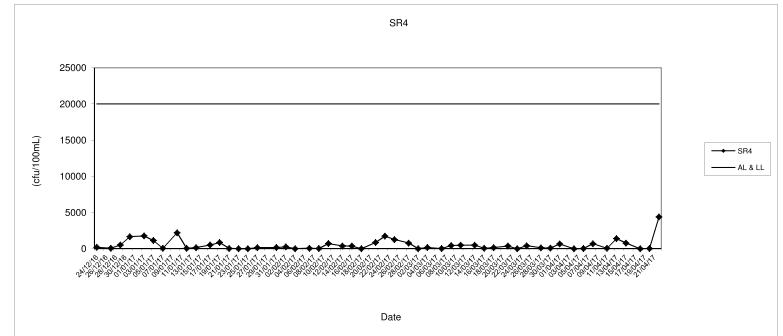
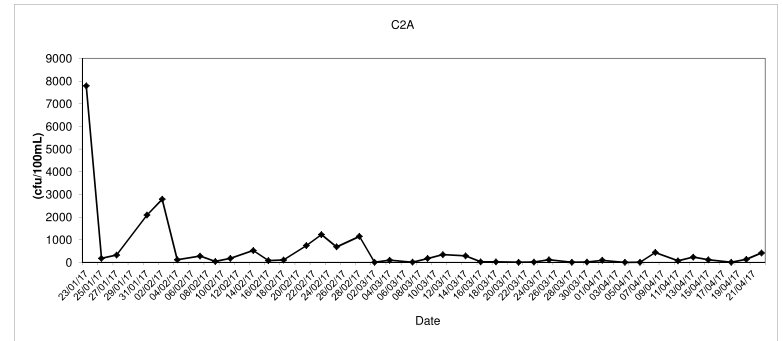
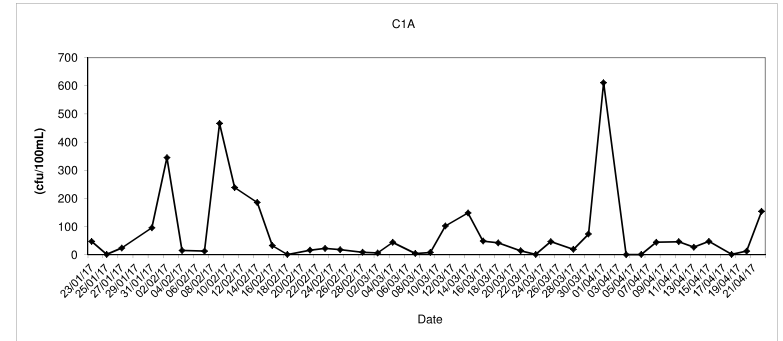
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



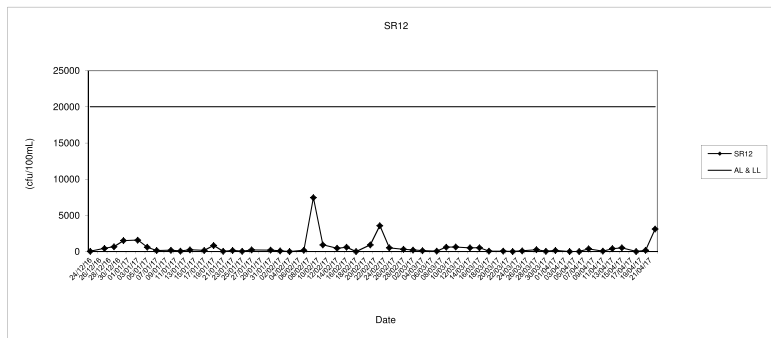
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



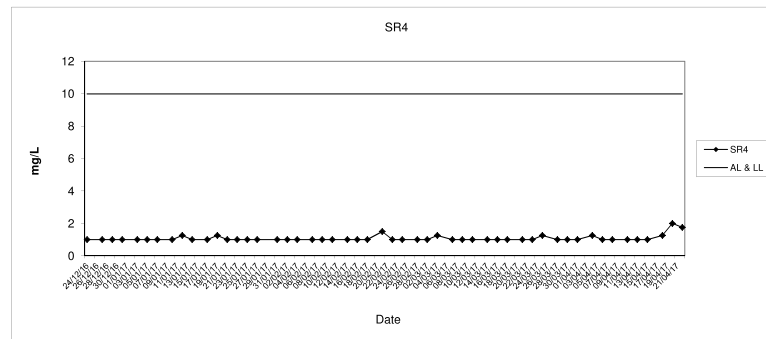
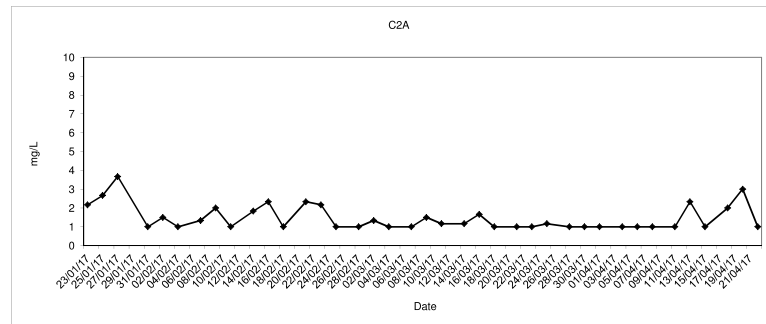
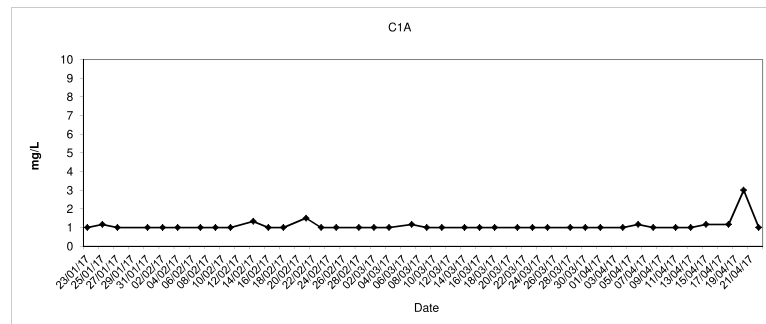
E.coli (Depth average) at Mid-Ebb Tide



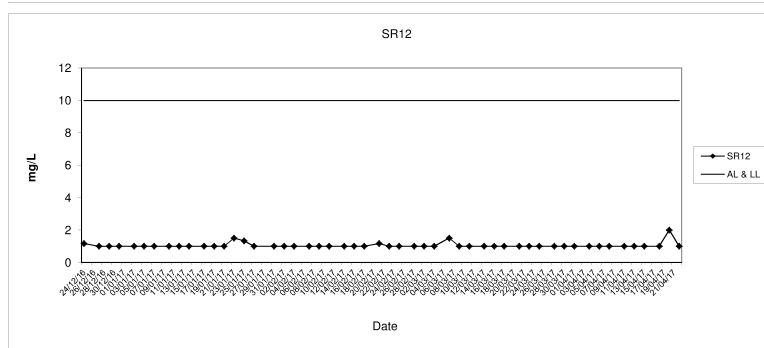
E.coli (Depth average) at Mid-Ebb Tide



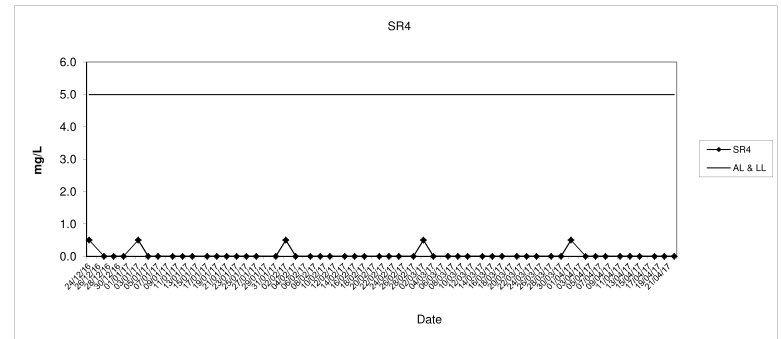
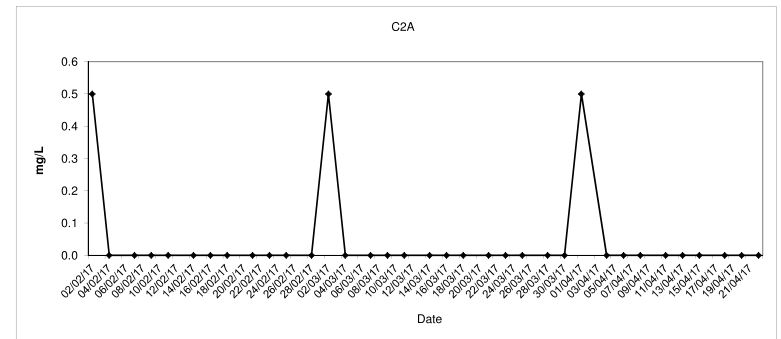
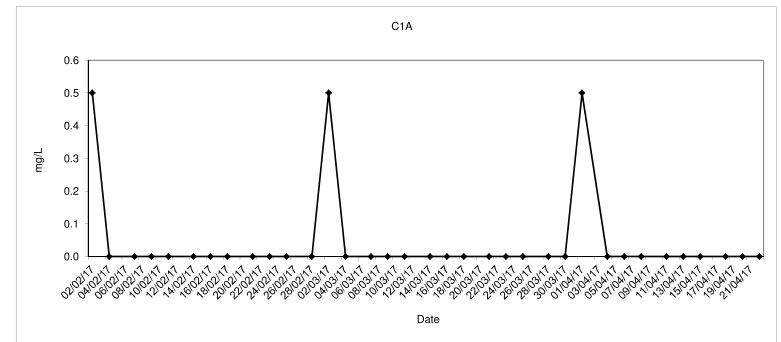
BOD₅ (Depth average) at Mid-Ebb Tide



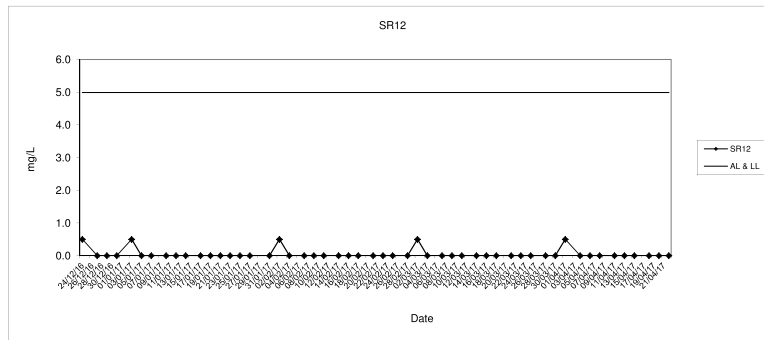
BOD₅ (Depth average) at Mid-Ebb Tide



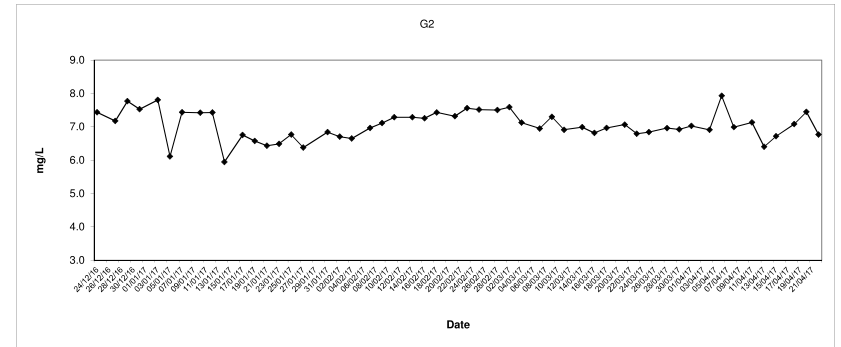
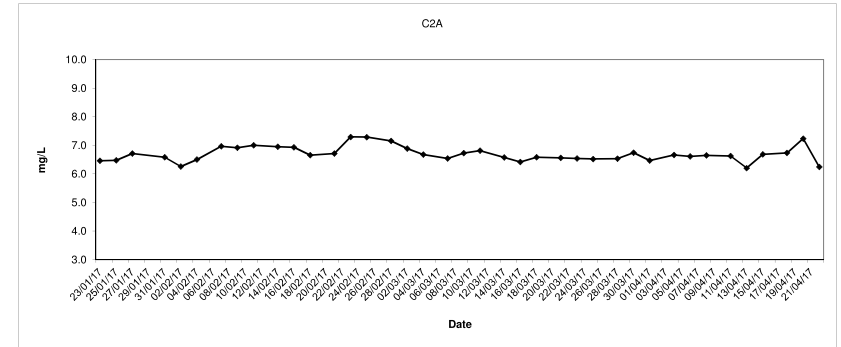
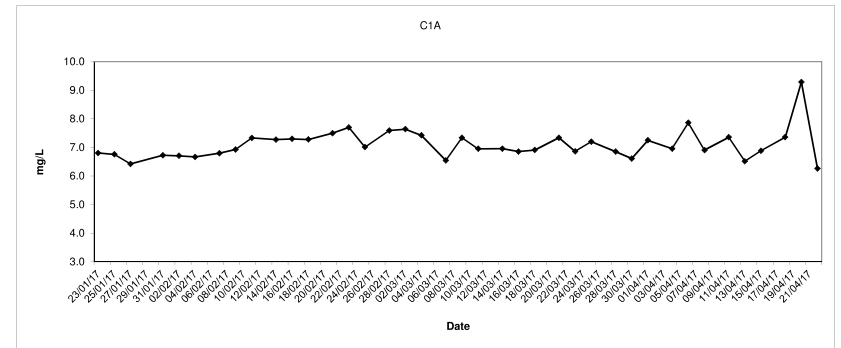
Synthetic Detergent (Depth average) at Mid-Ebb Tide



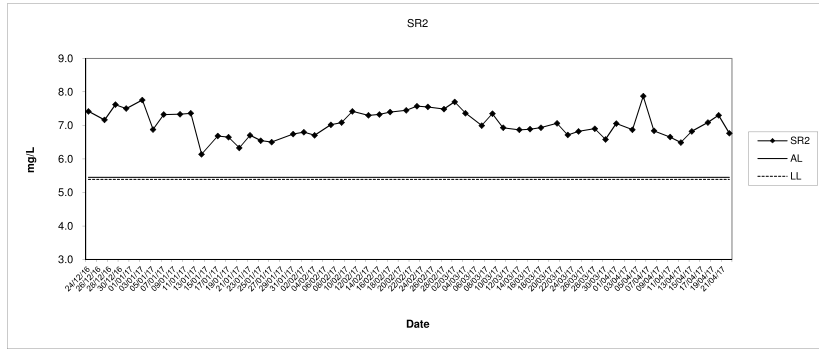
Synthetic Detergent (Depth average) at Mid-Ebb Tide



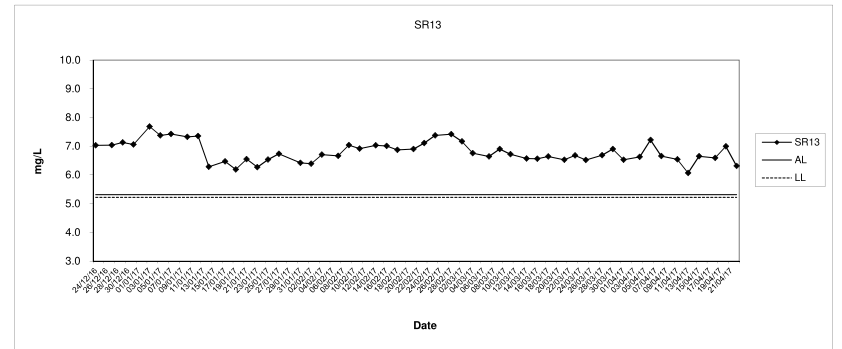
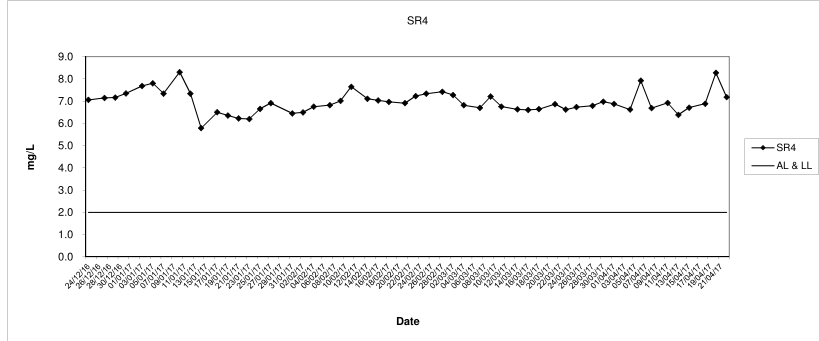
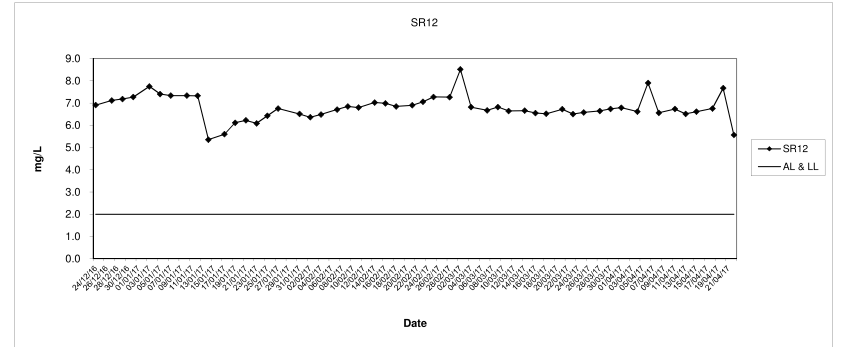
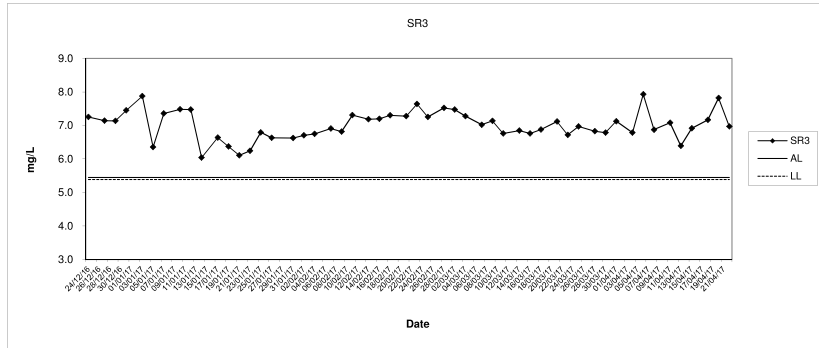
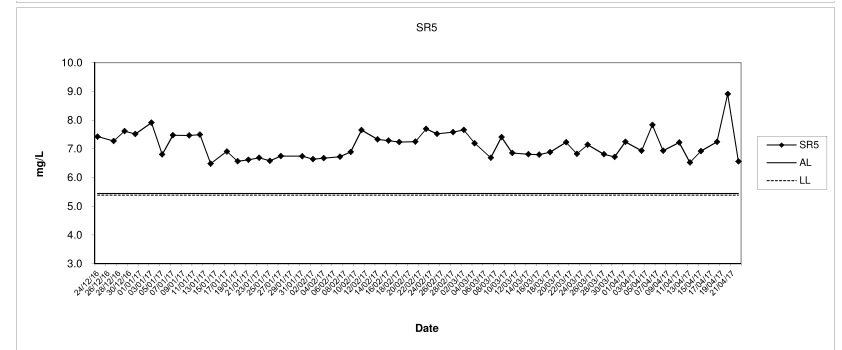
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



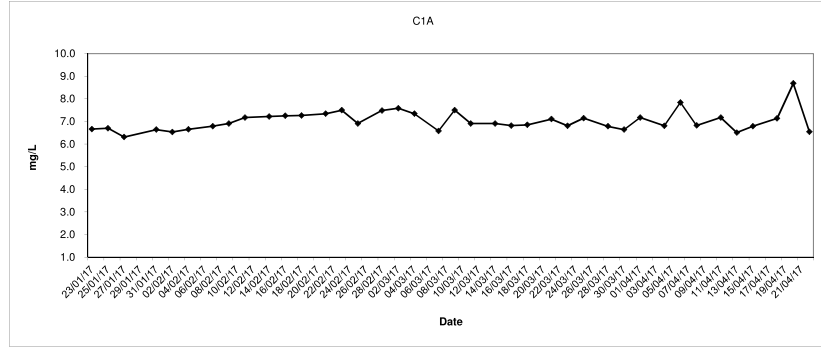
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



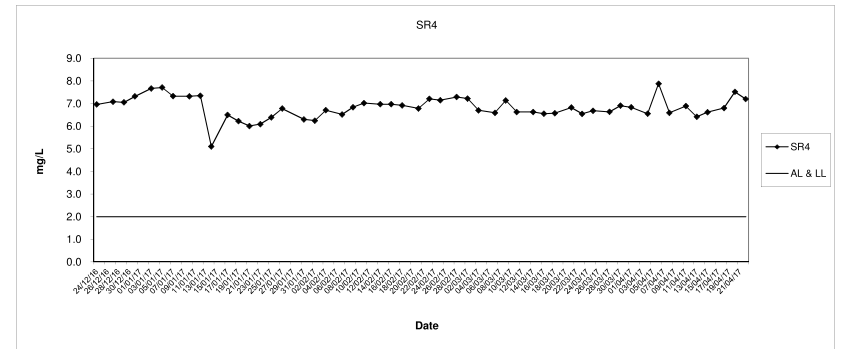
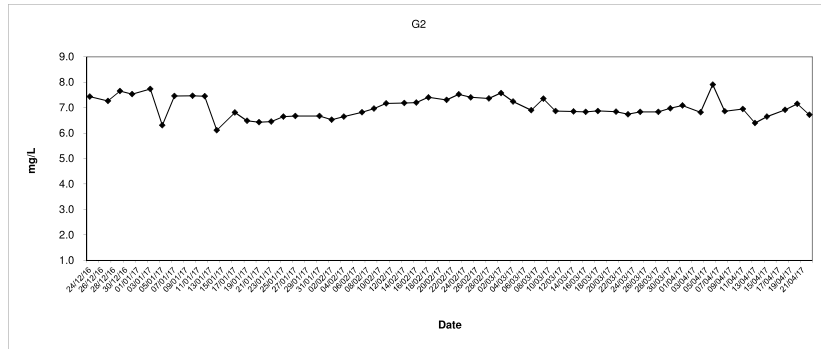
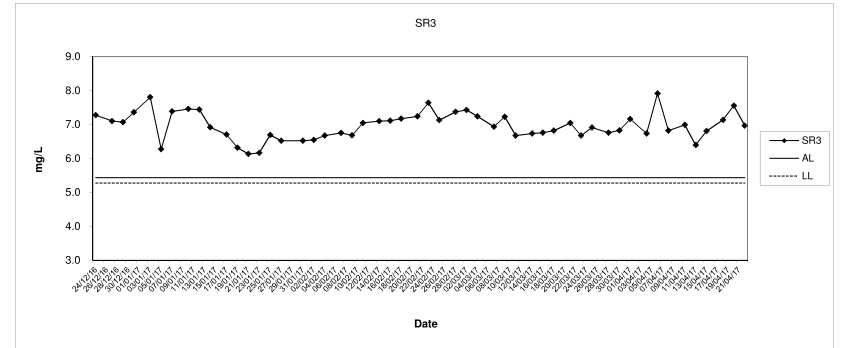
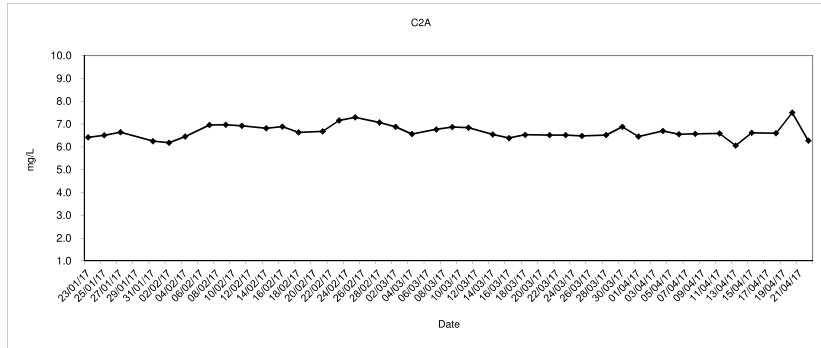
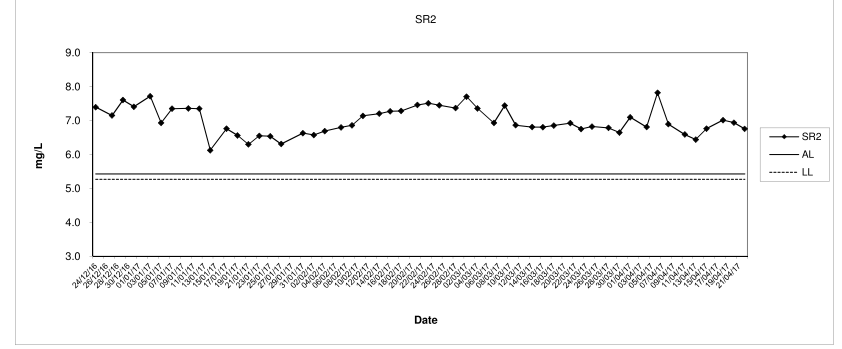
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



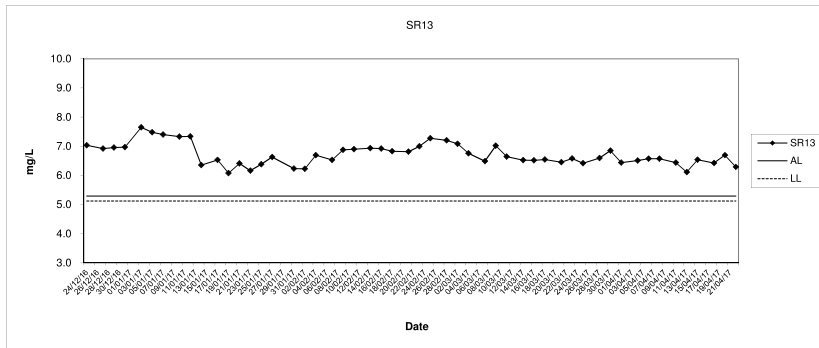
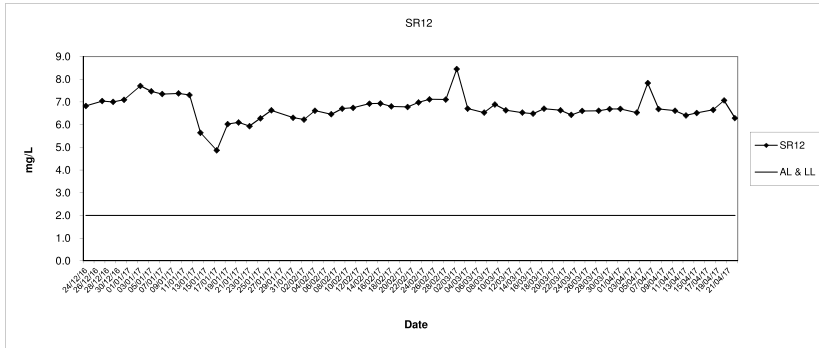
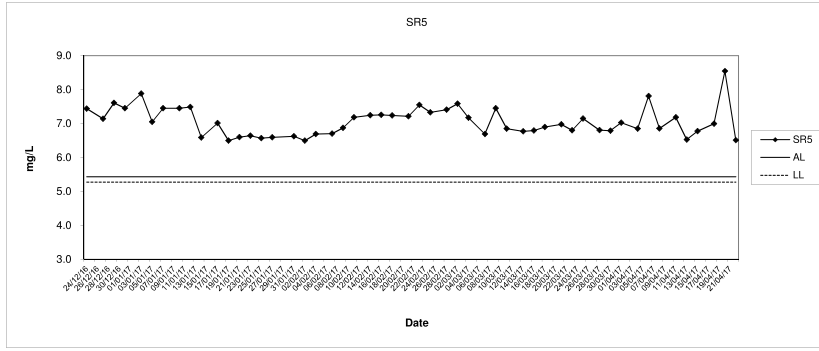
Dissolved Oxygen (Bottom) at Mid-Flood Tide



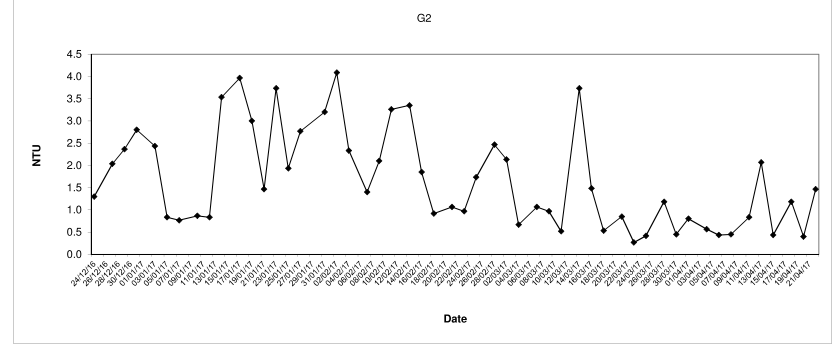
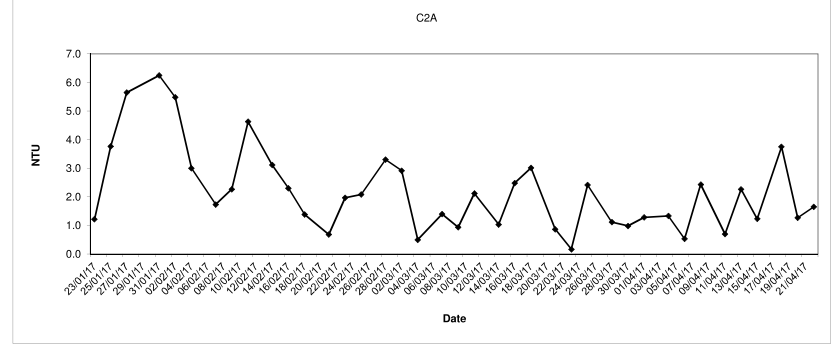
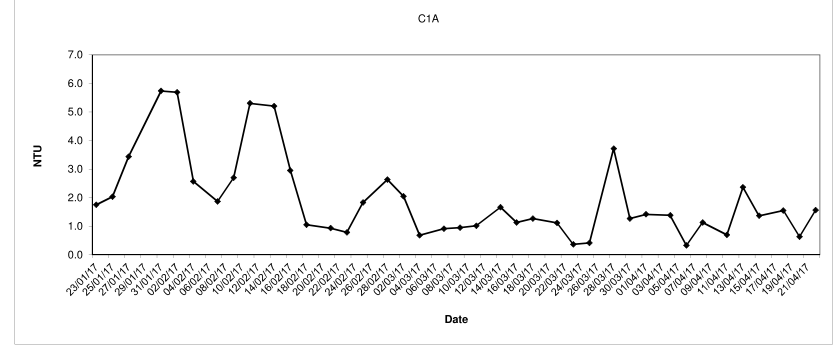
Dissolved Oxygen (Bottom) at Mid-Flood Tide



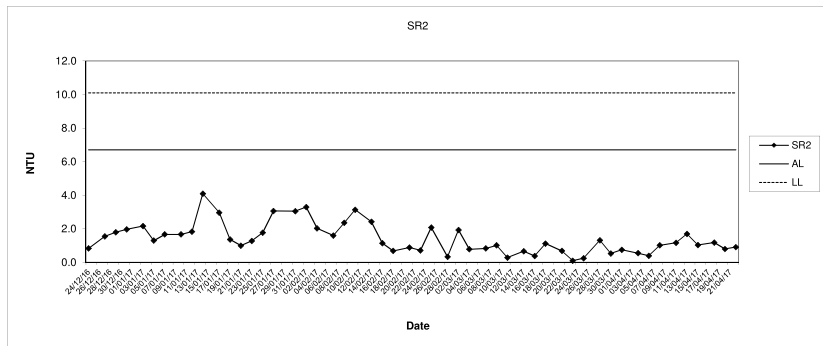
Dissolved Oxygen (Bottom) at Mid-Flood Tide



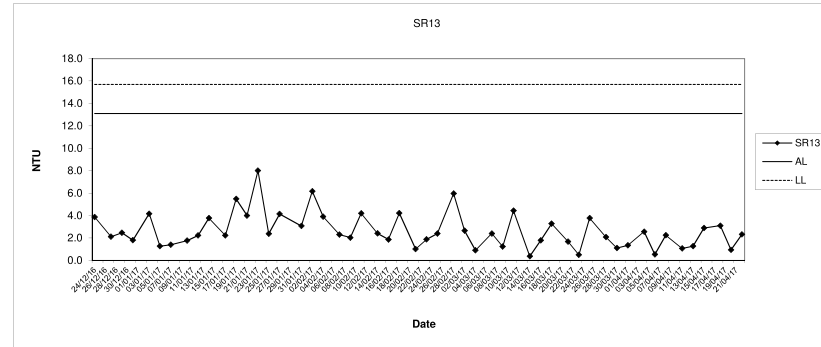
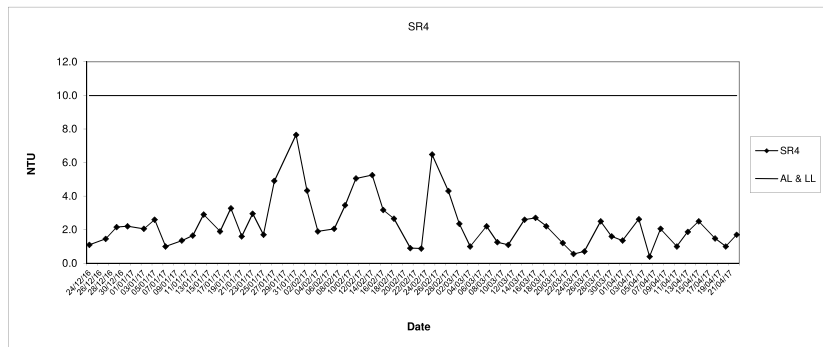
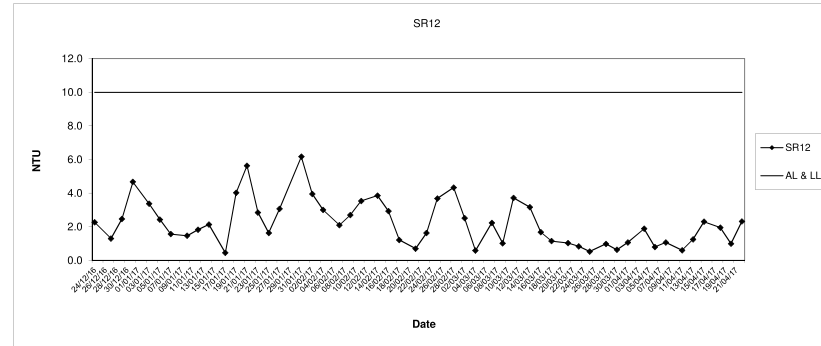
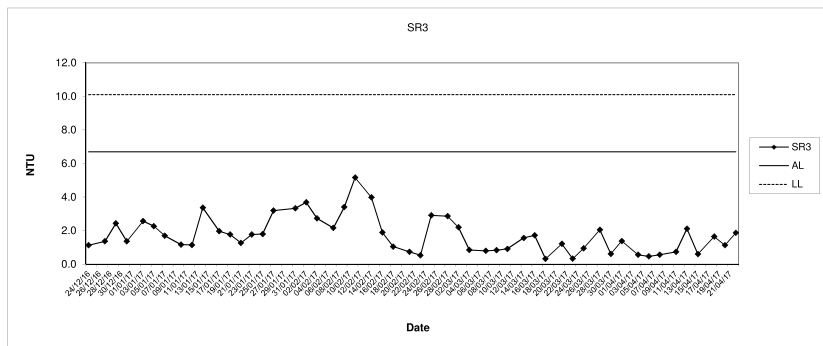
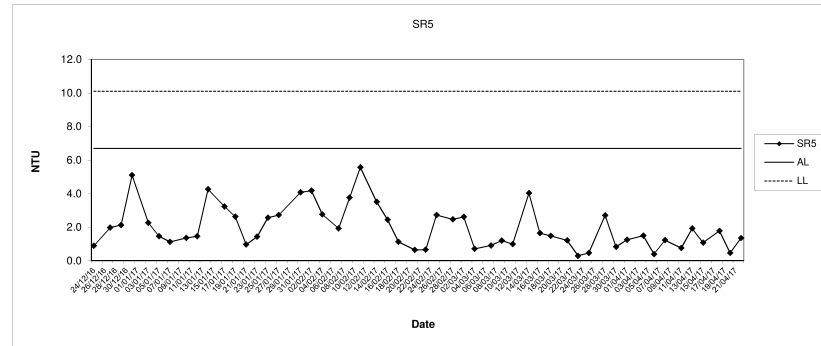
Turbidity (Depth average) at Mid-Flood Tide



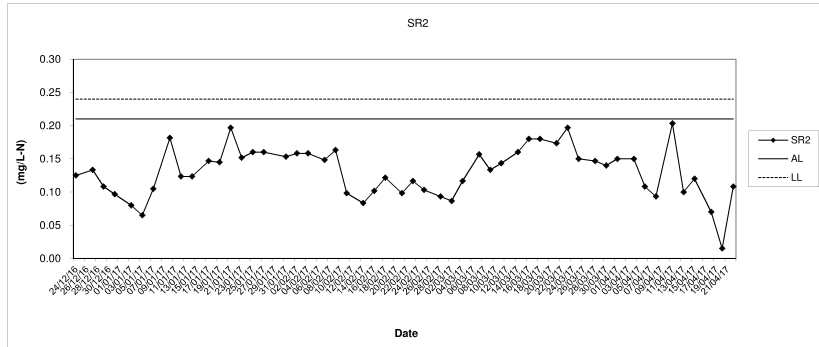
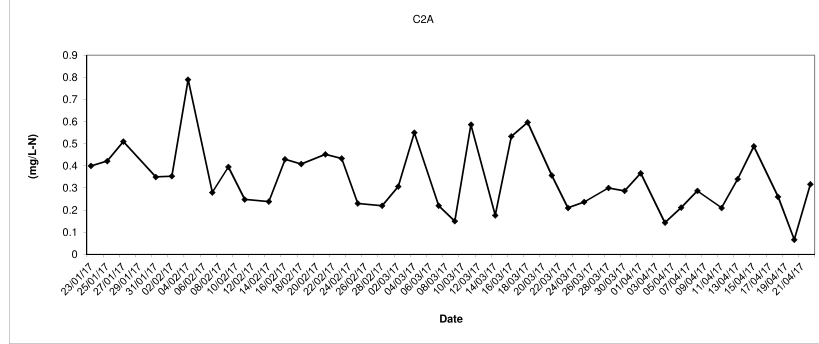
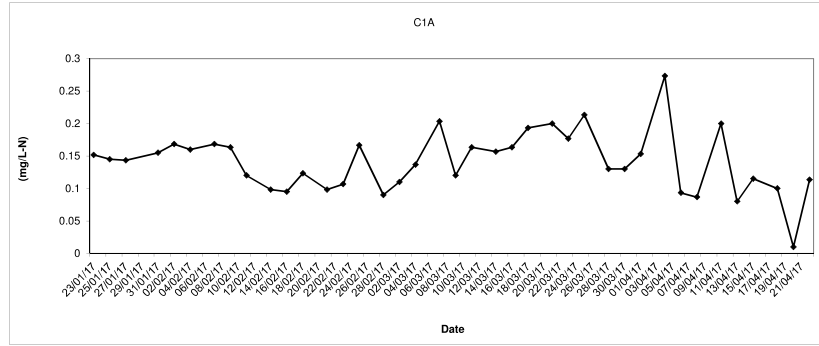
Turbidity (Depth average) at Mid-Flood Tide



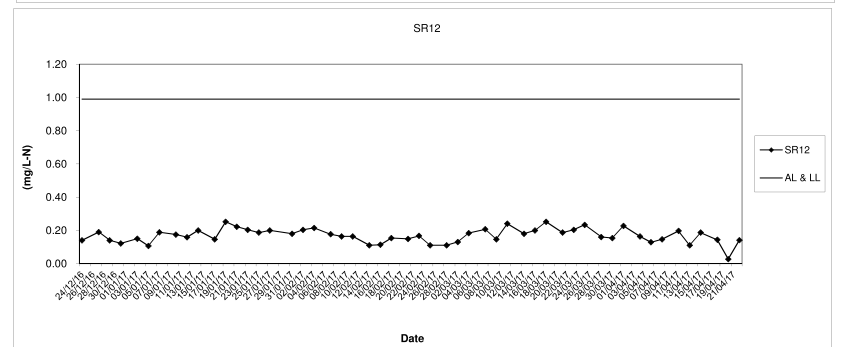
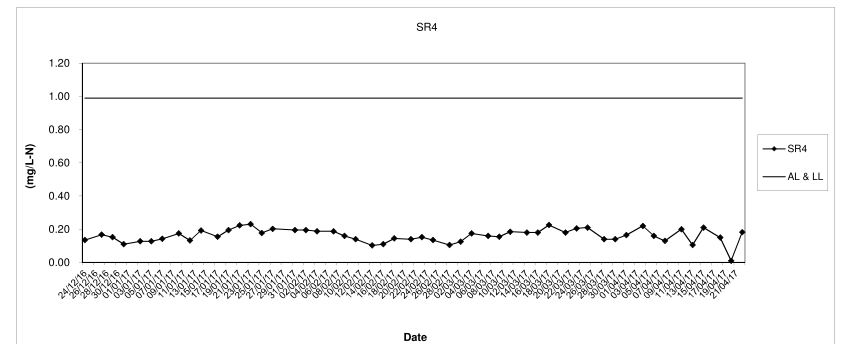
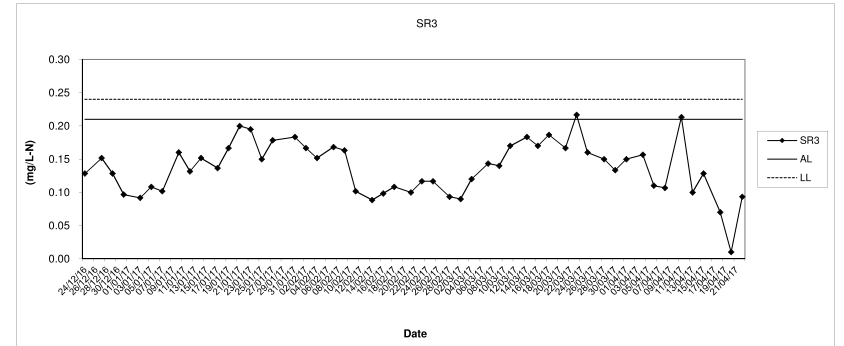
Turbidity (Depth average) at Mid-Flood Tide



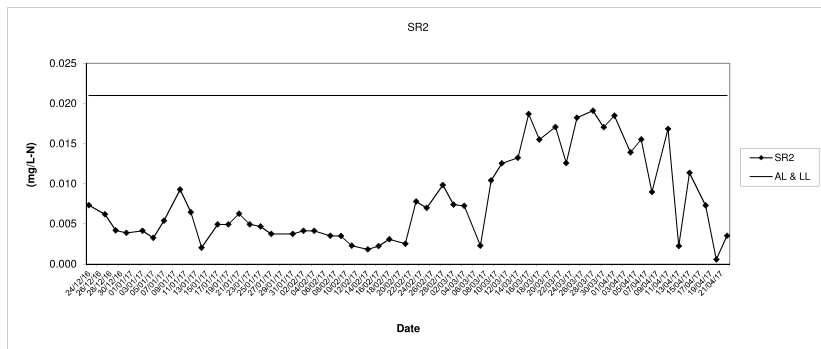
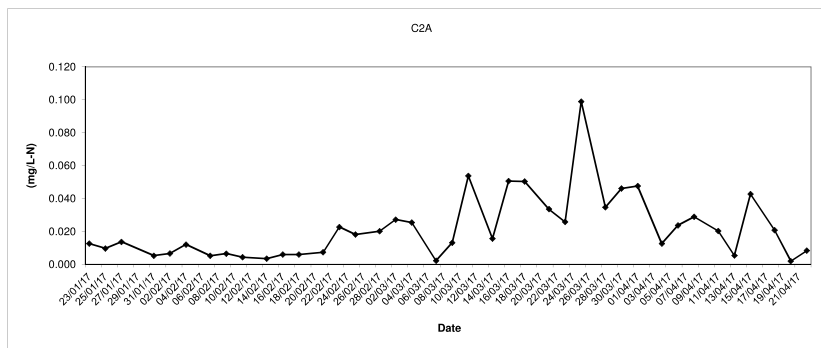
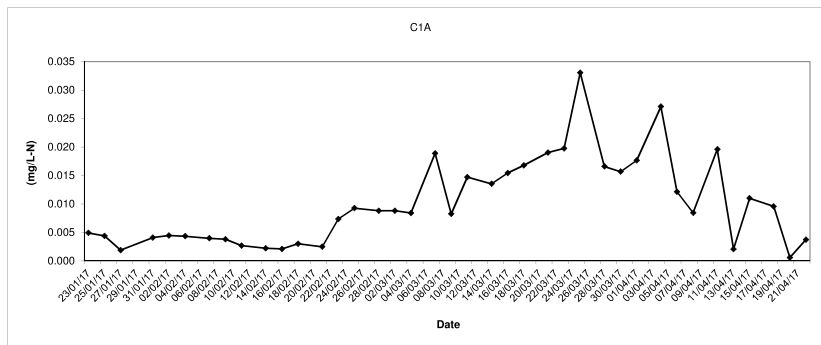
In-situ Ammonia (Depth average) at Mid-Flood Tide



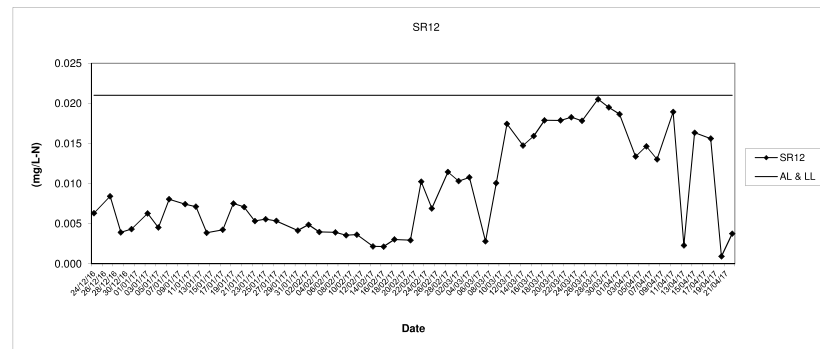
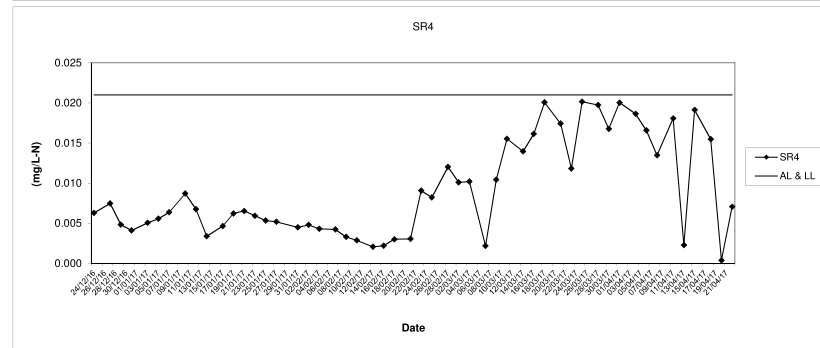
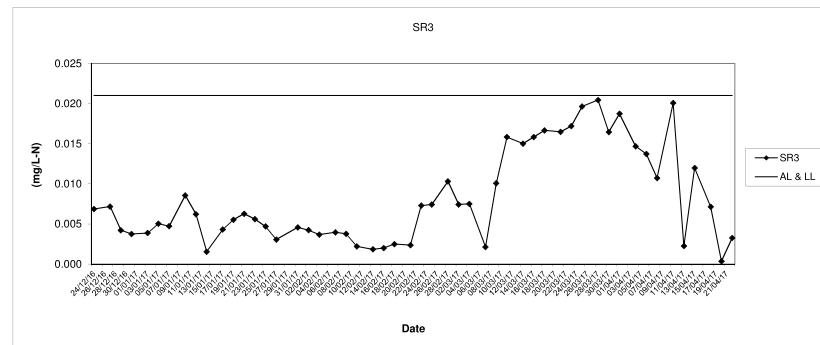
In-situ Ammonia (Depth average) at Mid-Flood Tide



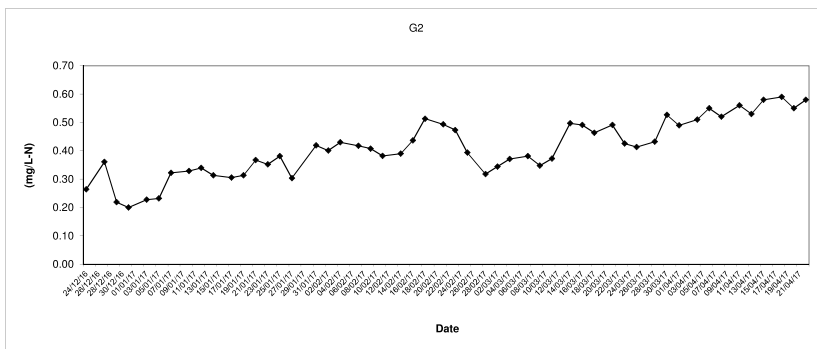
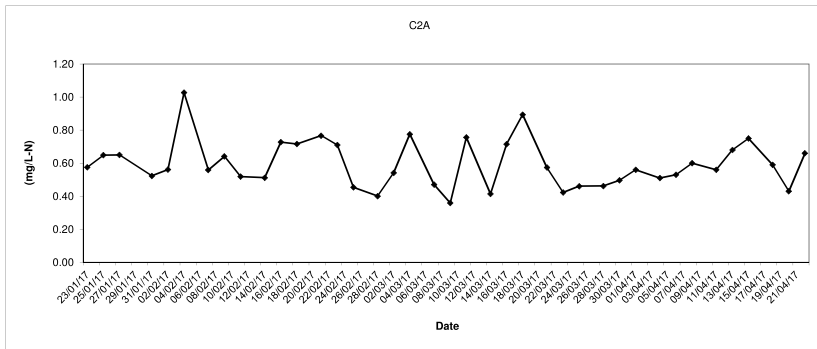
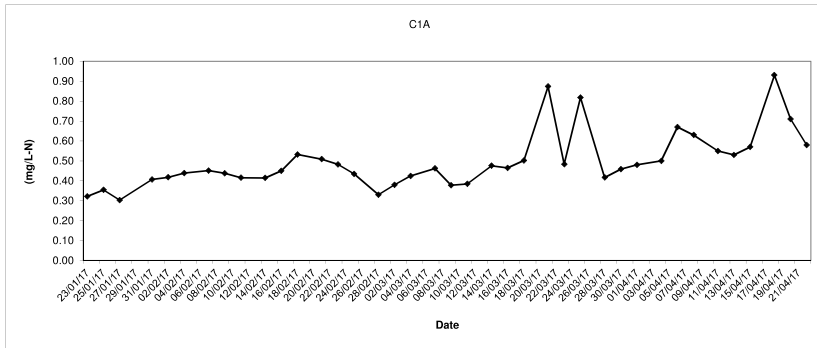
In-situ UIA (Depth average) at Mid-Flood Tide



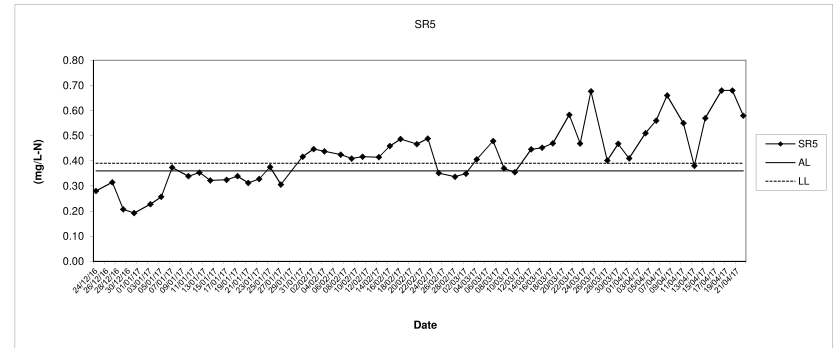
In-situ UIA (Depth average) at Mid-Flood Tide



In-situ TIN (Depth average) at Mid-Flood Tide



In-situ TIN (Depth average) at Mid-Flood Tide



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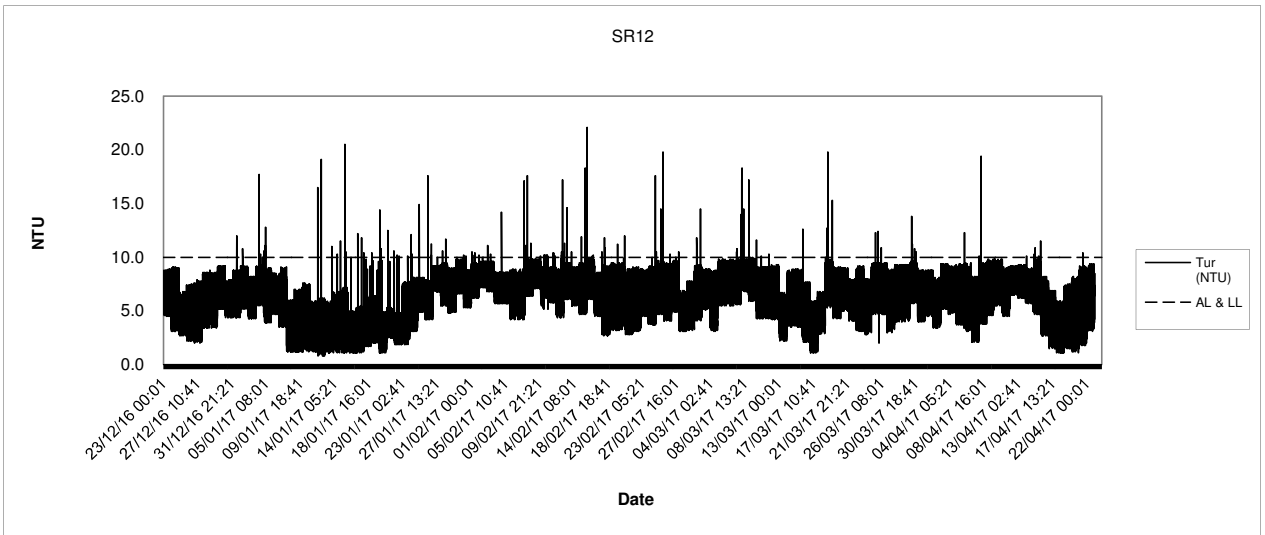
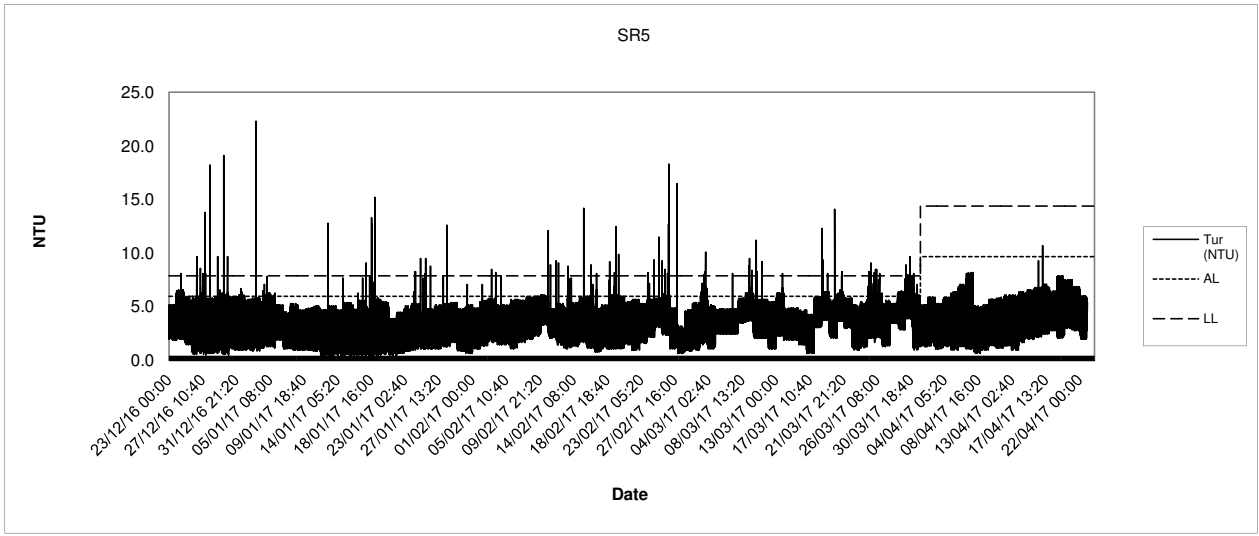
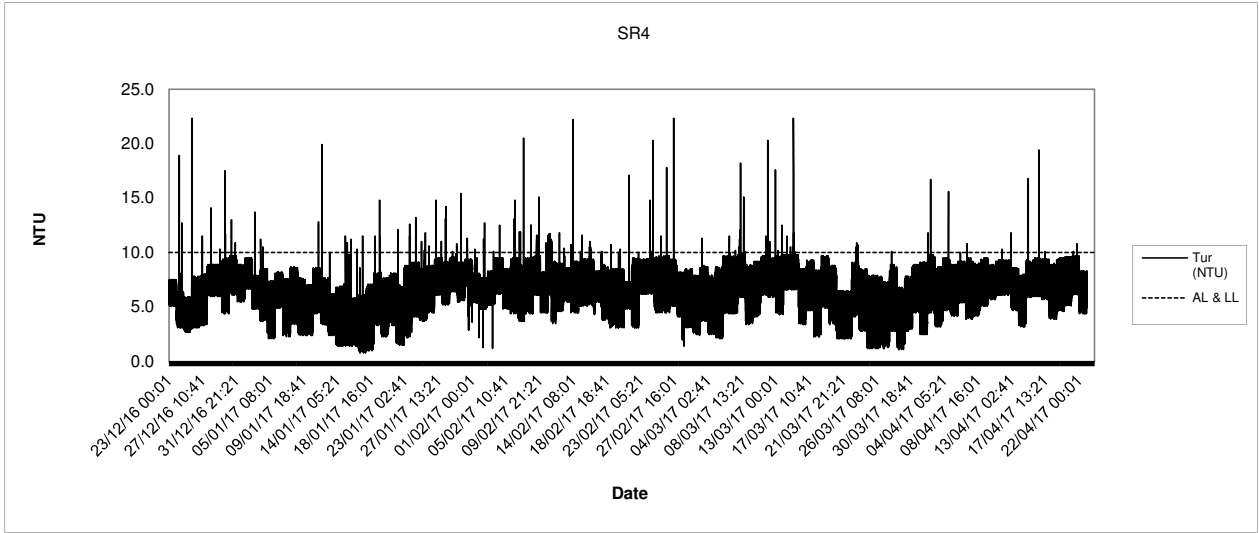


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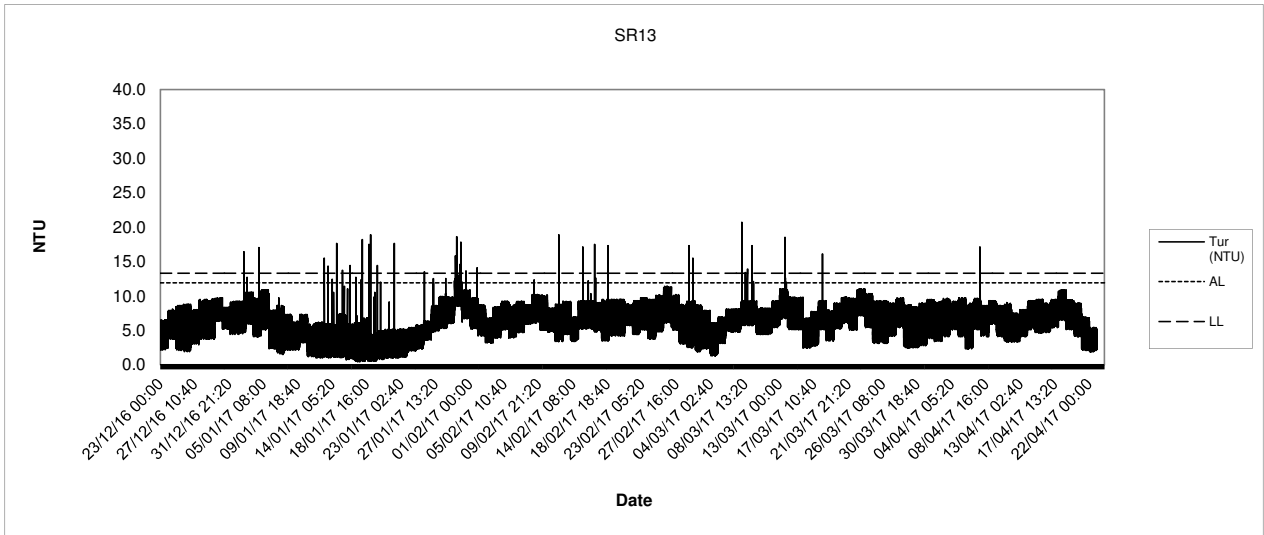
Appendix E

Graphical Presentation – 24-hr Monitoring Results

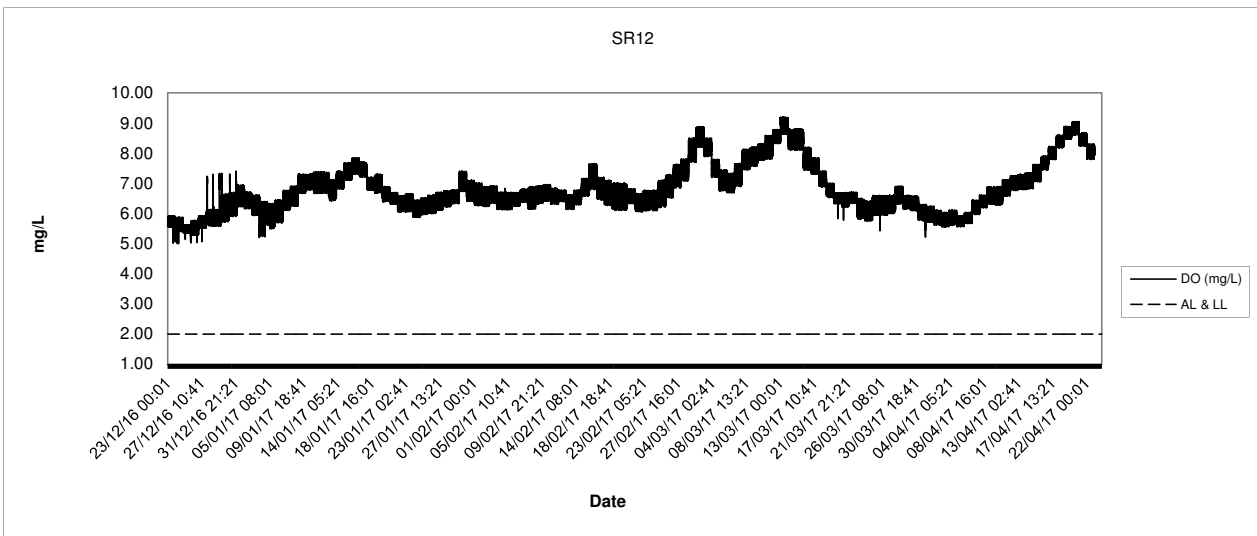
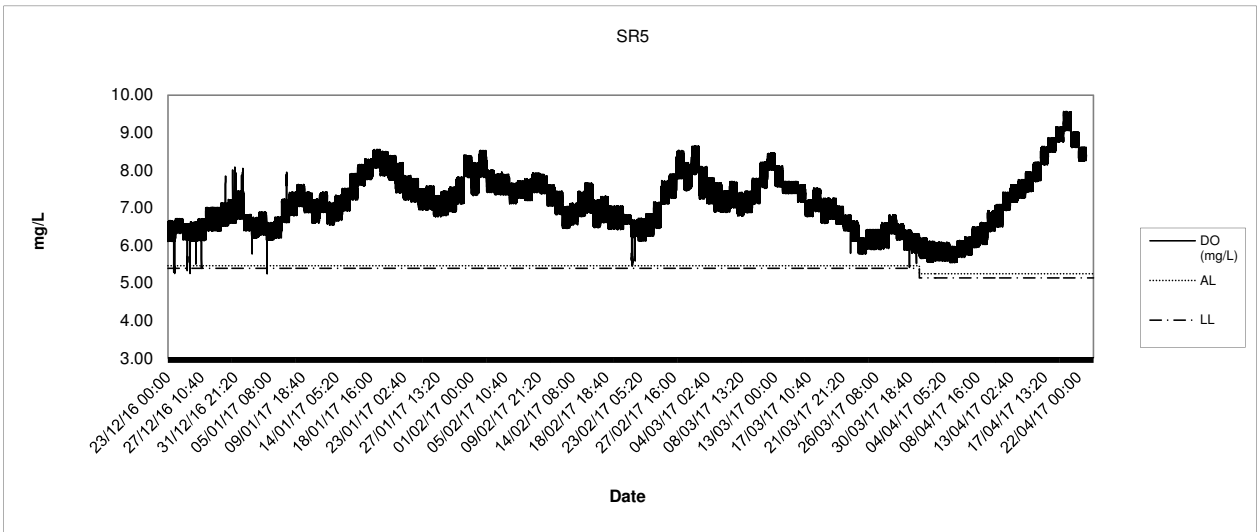
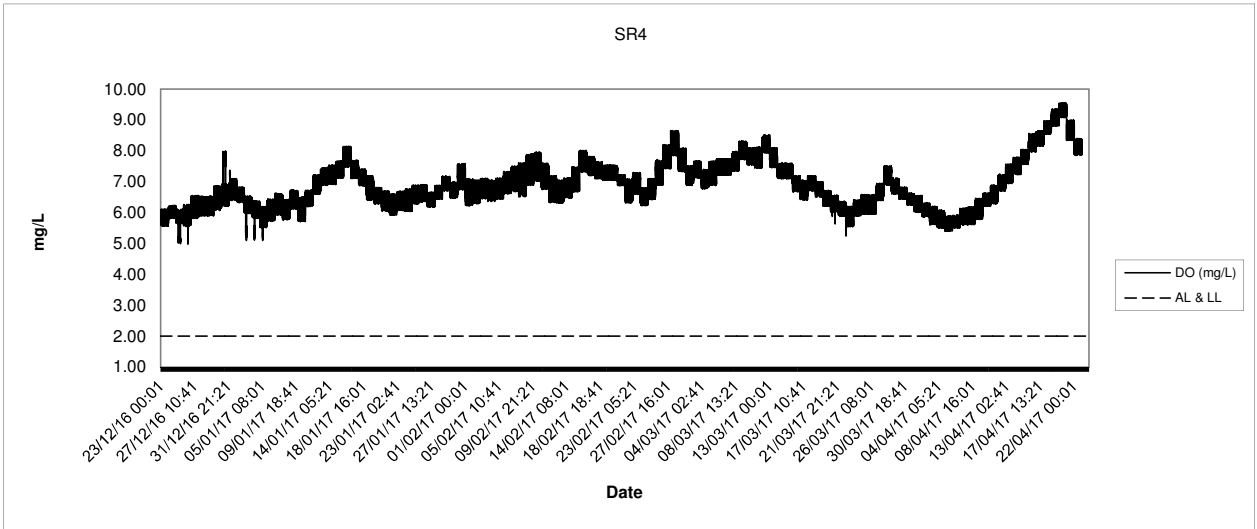
**Turbidity
24-hr Water Quality Monitoring**



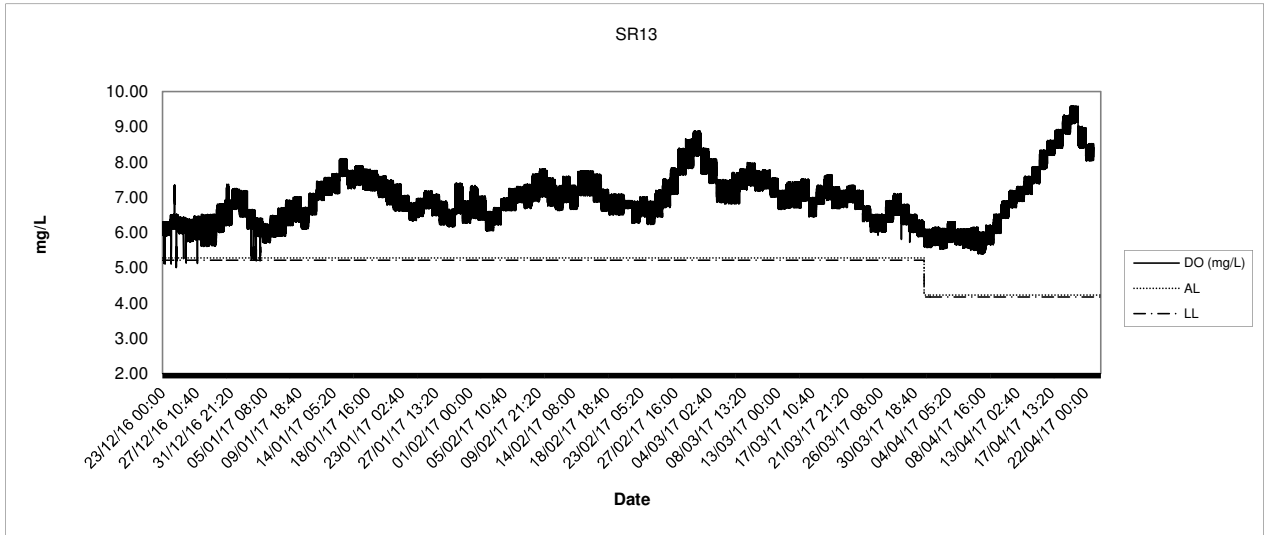
Turbidity 24-hr Water Quality Monitoring



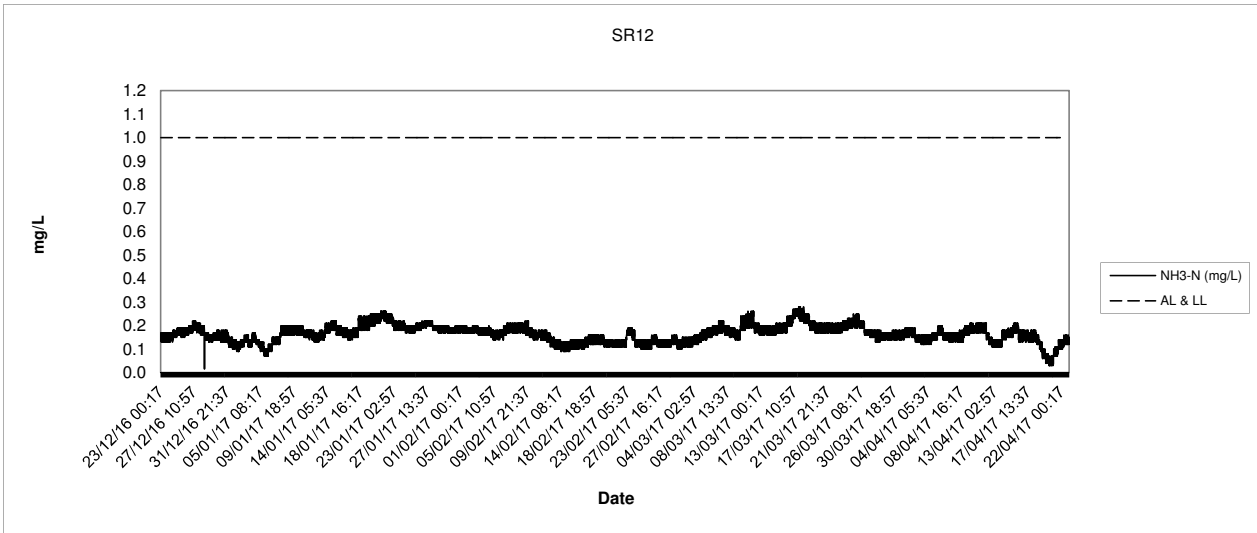
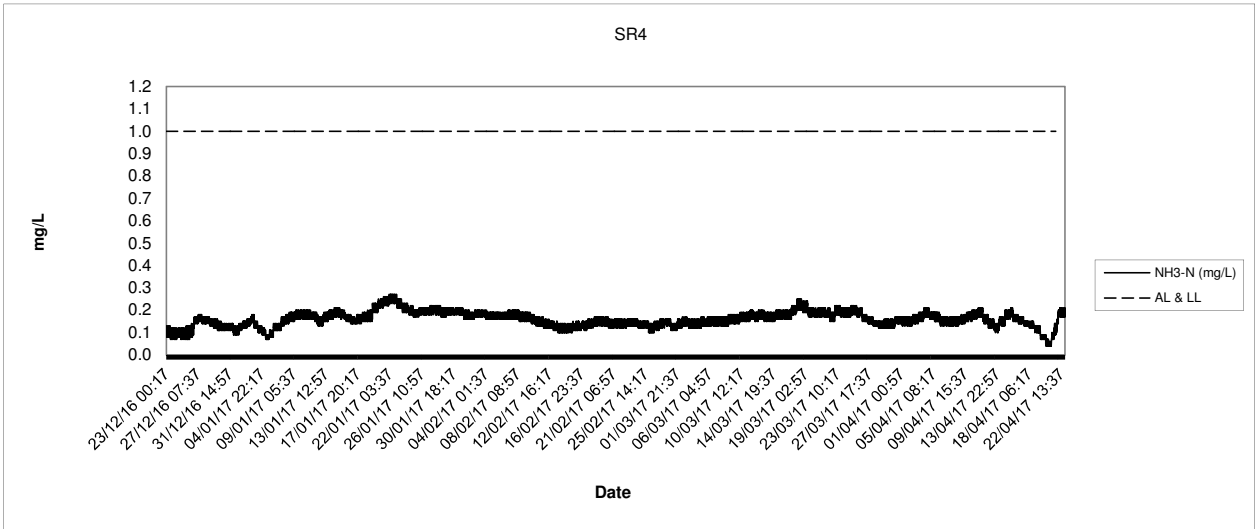
Dissolved Oxygen
24-hr Water Quality Monitoring



Dissolved Oxygen
24-hr Water Quality Monitoring



**Ammonia-N
24-hr Water Quality Monitoring**



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Report No.: 0394/13/ED/0359A

Appendix F

Environmental Mitigation Implementation Schedule

EIA Ref	EM&A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
3.8	2.9	A	Water Quality					
		A1	<u>Use of Silt Screens</u> Silt Screens shall be installed at the flushing water intakes WSRs WSD1, WSD8, WSD9 and EMSD1 to minimise the effect of potential increase in SS levels at the seawater intakes.	Minimize the effect of potential increase in SS levels at the seawater intakes	Contractor	WSD8, WSD9 and EMSD1	Construction Phase	Implemented
3.8	2.9	A2	<u>Use of Silt Curtains</u> To minimize the potential SS impact from dredging, deployment of silt curtains around the grab dredgers is recommended; and Before commencement of dredging works, the holder of the Environmental Permit shall submit detailed proposal of the design and arrangement of the frame type silt curtain to EPD for approval.	Minimize the release of suspended soil from the dredging area	Contractor	Construction Work Sites	Construction Phase	Implemented
		A3	Water Quality Monitoring Program Water quality monitoring shall be carried out in accordance with Section 2 of the Environmental Monitoring and Audit (EM&A) Manual. Event and Action Plan (EAP) for water quality shall be followed in case of any exceedance in action and limit level.	Perform water quality monitoring at sensitive receivers during construction phase	ET	Monitoring Locations as stated in Table 2.1 of the EM&A Manual	Construction Phase	Implemented
3.8 (EP Ref 3)	-	A4	Dredging Operation Only two types of dredgers are allowed for this Project: (a) grab dredger with closed grab, and (b) cutter suction dredger spud pole grab dredger.	Minimize potential adverse effect as a result of dredging activities	Contractor	Construction Work Sites	Construction Phase	Implemented
		A5	The speed of any construction vessels shall not exceed 10 knots when passing through the area of the Project.					Implemented
		A6	No more than three two grab dredgers with closed grab (or one cutter suction dredger with two closed grab dredgers) shall be operated within the Project Area at any one time for the Project.					Implemented
		A7	Only one closed grab dredger or one cutter suction dredger shall be operated in Zone 2B and during which no other closed grab dredger shall be allowed in other zones within the Project Area.					Implemented
		A8	No more than one grab dredger with closed grab (or one cutter suction dredger) shall be operated within each of the five main zones at any one time for the Project in which the cutter suction dredger shall only be operated in Zones 2 and 4 with maximum dredging rate of 700 m ³ in 30 minutes in any given hour (max. 8,400 m ³ /day, based on a 12-hour operation per day).					Implemented
		A9	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 1 to 2 (subzones Z1A, Z1B, Z2A, Z2B and Z2C) shall follow the Dredging Plan for the Hotspot, as shown in EP-426/2011/A.					Implemented
		A10	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 3 to 4 (subzones Z3A to Z4B) shall not exceed 1,600 m ³ per day during dry season or 3,440 m ³ per day during wet season as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A11	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 5 to 6 (subzones Z5A, Z5B and Z6A) shall not exceed 4,000 m ³ per					NA-Dredging works

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			day during both dry and wet seasons as shown in EP-426/2011/A.					substantially completed
		A12	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 5 to 8 (subzones Z5C, Z6B, Z6C, Z6D, Z7 and Z8) shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A13	The maximum dredging rate for closed grab dredger at Northern Fairway – Zones 9 to 12 shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A14	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13A shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A15	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13B shall not exceed 4,000 m ³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works substantially completed
		A16	The dredging pump of cutter suction dredger shall be operated during cutting to reduce the sediment loss to water body.					NA-no CSD employed
		A17	Project dredging works within Zone 1 to 6 (including sub-zones) of the Container Basin shall not be carried out at the same time with Terminal Operator's maintenance dredging activities.					NA-No Terminal Operator's maintenance dredging carried out
		A18	Cutter suction dredger is only to be deployed for the removal of harder material during daytime only (07:00 to 19:00) in Zone 2 (including subzones) of the Container Basin.					NA-no CSD employed
		A19	In case of rainstorm warning in effect during dredging works, the dredged material on barge shall be covered properly before transportation to disposal site.					Implemented
		A20	In case of exceedance of SS and NH ₃ -N at the Tsing Yi WSD flushing intake due to dredging operation is evidenced, the Contractor shall propose mitigation measures not limited to reducing dredging rate. If exceedance persists, the Contractor shall propose not to undertake dredging operation in close proximity to the Tsing Yi flushing water intake during flood tide. The Contractor shall liaise with the ETL, IEC, ER, EPD and WSD for the proposed mitigation measures.					NA-no exceedance due to dredging operation
		A21	If further mitigation measures are required due to continuous exceedance of SS and NH ₃ -N, consideration shall then be given to dredge only on the state of the tide which would avoid migration of SS towards the WSD and EMSD intakes.					NA-no exceedance due to dredging operation
		A22	Dredging sub-zone Z2B where high NH ₃ -N in sediment is found shall be					Implemented

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			isolated with dredging works to be carried out towards the end of construction programme.					
		A23	Administrative control in terms of dredging rate adjustment in controlling the release of contaminants shall be employed as mitigation measures.					Implemented
		A24	Field trials shall be carried out to propose the most effective dredging process and rate to control the release of ammoniacal nitrogen and UIA into the water column and achieve compliance at the WSD1 seawater intake (NH ₃ -N) and at the beaches for UIA. Capital dredging works in dredging sub-zone Z2B (Figure 1.2h refers) should not therefore be carried out until the proposed method and rate are confirmed.					Implemented
		A25	Detailed dredging plan shall be prepared providing details of individual dredging subzones and dredging rate taking into account of the field trial results.					Implemented
3.8	-		<u>Other Good Site Practices for Dredging</u>	Minimize potential adverse effect as a result of dredging activities	Contractor	Construction Work Sites	Construction Phase	
		A26	All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.					Implemented
		A27	The speed of all Contractor's vessels should be controlled within the works area to prevent propeller wash from stirring up the seabed sediments.					Implemented
		A28	All barges / dredgers used should be fitted with tight fitting seals to their bottom openings to prevent leakage of material.					Implemented
		A29	Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds.					Implemented
		A30	No overflow of dredged mud should be allowed. Barges or hopper should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation.					Implemented
		B	Waste Management					
			<u>Good Site Practices</u>					
4.5	3.3	B1	Obtain the profile of different sediment categories and careful planning of sediment removal.	Minimize potential adverse effect arising from the handling of dredged material	Contractor	Construction Work Sites (General)	Construction Phase	Implemented
		B2	Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site.					Implemented
		B3	Training of site personnel in proper waste management and chemical handling procedures.					Implemented
		B4	Provision of sufficient waste disposal points and regular collection of waste.					Implemented
		B5	Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting sediment material is not anticipated.					Implemented
		B6	Use well maintained PME on site.					Implemented
			<u>General Refuse</u>					
4.5	3.3	B7	General refuse should be stored in enclosed bins. A reputable waste collector should be employed by the contractor to remove general refuse from the site.	Minimize the adverse effect arising from the handling of site general refuse	Contractor	Construction Work Sites (General)	Construction Phase	Implemented

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			<u>Chemical Waste</u>					
4.5	3.3	B8	If chemical wastes are produced at the construction site, the Contractor shall be required to register with the 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 shall be used, and incompatible chemicals should be stored separately. Appropriate labels shall 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, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the approved Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Minimize the adverse effect arising from the handling of site chemical waste	Contractor	Construction Work Site	Construction Phase	Implemented
4.5	3.3		<u>Marine Dredged Sediment</u>					
		B9	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality.	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality	Contractor	Construction Work Site	Construction Phase	Implemented
		B10	Bottom opening of barges will be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and dredgers before the vessel is moved.					Implemented
		B11	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 EPD.					Implemented
		B12	Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.					Implemented
		B13	Sediment Quality Report shall be prepared and submit to EPD under DASO.					Implemented
		B14	If disposal of Type 3 sediment is identified, agreement with EPD shall be reached regarding the treatment of sediment before disposal.					NA – no type 3 material disposed
		B15	Project works shall not be carried out before obtaining confirmation from MFC on disposal option.					Implemented
		B16	Follow strictly all conditions stipulated in the dumping permit.					Implemented
		C	Marine Ecology					
5.7	4.1	C1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to marine ecology due to dredging operation.	Review and assess the potential adverse effect on marine ecology	Contractor	Construction Work Sites	Construction Phase	Implemented
		D	Fisheries					
6.7	5.1	D1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to fisheries due to dredging operation.	Review and assess the potential adverse effect on fisheries	Contractor	Construction Work Sites	Construction Phase	Implemented
		E	Hazard to Life					
7.8.2	6.2	E1	Sound communication channel shall be established with the oil companies, Marine Department, and Fire Services Department for effective notification and emergency evacuation in case of accidents.		Contractor	Construction Work Sites (General)	Construction Phase	Implemented
		E2	Proper safety and emergency training shall be given to the relevant					Implemented

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			operation staff at the dredging site. Emergency plans and procedures should be prepared and drills should be performed periodically.					
		F	Landscape Visual and Glare					
8.9 Table 8-3 & 8-6	7.2	F1	Visa shields to the lights of dredgers shall be provided.	Minimize landscape and visual impacts during construction phase	Contractor	Construction activities' area	Throughout design, construction phase	Implemented
		F2	The light source shall not point directly to any VSRs.					Implemented
		F3	Lights shall be switched off if they are not in use.					Implemented
		G	Cultural Heritage					
9.5	8		<u>Monitoring Brief</u>	Minimize potential marine archaeological impact during dredging activities	Contractor	Locations of the 20 unidentified sonar contacts and masked areas	During Construction works	
		G1	A monitoring brief shall be conducted during the dredging. It shall only be required during dredging at the locations of the 20 unidentified sonar contacts and masked areas and does not need to cover all of the dredging activities. Dredging staff should be briefed about the possibility of locating archaeological objects and a marine archaeologist shall be available to monitor the dredged spoil and provide advice. If material indicative of archaeological remains is retrieved, the AMO should be contacted as soon as possible.					NA- no archaeological deposit was found during reporting period.
		H	Noise					
10.8	9		<u>Good Site Practices</u>	Control and minimize the generation of undue noise nuisance	Contractor	Construction Work Sites (Along the alignment of dredging)	Construction Phase	
		H1	Only well-maintained plant shall be operated on-site and plant should be serviced regularly during the construction program.					Implemented
		H2	Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.					Implemented
		H3	Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from nearby NSRs.					Implemented
		H4	If dredging is to be carried out during restricted hours, work locations close to NSRs shall be avoided.					Implemented
		I	Construction Dust					
11.7	10		<u>Dust Control</u>	Good site practice to control dust and odour impact to the nearby sensitive receivers	Contractor	Construction Work Sites (General)	Construction Phase	
		I1	Requirements of the Air Pollution Control (Construction Dust) Regulation, where relevant, shall be adhered to during the construction period.					Implemented
			<u>Odour</u>		Contractor	Construction Work Sites (General)	Construction Phase	
		I2	To minimize potential odour emissions, if dredged sediment is anticipated to be placed on barge for more than a day the load shall be properly covered as far as practicable to minimise the exposed area and potential odour.					NA-no work in such condition
		I3	If dredged sediment is found to be malodorous it shall be removed from site as soon as possible within one hour after the barge being filled up.					NA-no work in such condition

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MaterialLab

Report No.: 0394/13/ED/0359A

Appendix G
Waste Generation in Reporting Period

Name of Department : Civil Engineering and Development Department

Contract No. : CV/2013/04

Monthly Summary Waste Flow Table for 2017 (year)

Year	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete (see Note 4)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m ³)
2017										
Jan	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Feb	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Mar	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Apr	nil	nil	nil	nil	nil	nil	nil	nil	4.8	0.01
May										
Jun										
Jul										
Aug										
Sep										
Oct										
Nov										
Dec										
Total	nil	nil	nil	nil	nil	nil	nil	nil	4.8	0.04

Notes:

- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- (2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (3) Broken concrete for recycling into aggregates

Yearly Summary Waste Flow Table

Year	Estimated Annual Quantities of Inert C&D Materials (in '000m ³)										Estimated Annual of C&D Wastes									
	Total Quantity Generated		Broken Concrete (see Note 3)		Reused in the Contract		Reused in other Projects		Disposed as Public Fill		Metals		Paper/cardboard packaging		Plastics (see Note 2)		Chemical Waste		Others, e.g. general refuse	
	(a)		(b)		(c)		(d)		(a-b-c-d)		(in '000 kg)		(in '000 kg)		(in '000 kg)		(in '000 kg)		(in '000 m ³)	
	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.
2013	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.003	0.01
2014	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.2	0.16
2015	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	13	14.4	0.2	0.12
2016	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	17	Nil	0.2	0.12
2017	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	10	-	0.15	-
2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020																				
2021																				
Grand Total	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	40	14.4	0.753	0.41

Notes:

- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- (2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material
- (3) Broken concrete for recycling into aggregates.

Monthly Summary of Sediment Disposal (2014-2017)

Marine Sediment Type	Type 1 – Open Sea Disposal	Type 2 – Confined Marine Disposal	Type 3 – Special Treatment / Disposal
Month	Monthly Quantity (m ³)	Monthly Quantity (m ³)	Monthly Quantity (m ³)
2014			
Jan-Dec	549,430	99,660	nil
2015			
Jan-Dec	938,560	372,370	nil
2016			
January	12,580	22,290	nil
February	47,980	30,300	nil
March	34,550	20,070	nil
April	31,040	14,540	nil
May	23,960	20,490	1,260
June	29,950	26,820	nil
July	9,500	18,040	nil
August	6,300	700	nil
September	nil	nil	nil
October	nil	nil	nil
November	nil	nil	nil
December	nil	nil	nil
2017			
January	nil	nil	nil
February	nil	nil	nil
March	nil	nil	nil
April	nil	3,000	nil
Total	1,683,850	628,280	1,260

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Appendix H
Quarterly Assessment of Construction Impact

Cluster 1 TIN(Lab)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (lab) (mg/L)		
SR5	1/4/2014 Mid-Flood	0.38
SR5	1/7/2014 Mid-Flood	0.41
SR5	1/9/2014 Mid-Flood	0.38
SR5	1/11/2014 Mid-Flood	0.42
SR5	1/14/2014 Mid-Flood	0.28
SR5	1/16/2014 Mid-Flood	0.34
SR5	1/18/2014 Mid-Flood	0.47
SR5	1/21/2014 Mid-Flood	0.26
SR5	1/23/2014 Mid-Flood	0.44
SR5	1/25/2014 Mid-Flood	0.37
SR5	1/27/2014 Mid-Flood	0.32
SR5	1/29/2014 Mid-Flood	0.52

Impact TIN (lab) (mg/L)		
SR5	1/23/2017 Mid-Flood	0.33
SR5	1/25/2017 Mid-Flood	0.38
SR5	1/27/2017 Mid-Flood	0.31
SR5	1/31/2017 Mid-Flood	0.42
SR5	2/2/2017 Mid-Flood	0.45
SR5	2/4/2017 Mid-Flood	0.44
SR5	2/7/2017 Mid-Flood	0.42
SR5	2/9/2017 Mid-Flood	0.41
SR5	2/11/2017 Mid-Flood	0.42
SR5	2/14/2017 Mid-Flood	0.41
SR5	2/16/2017 Mid-Flood	0.46
SR5	2/18/2017 Mid-Flood	0.49
SR5	2/21/2017 Mid-Flood	0.47
SR5	2/23/2017 Mid-Flood	0.49
SR5	2/25/2017 Mid-Flood	0.34
SR5	2/28/2017 Mid-Flood	0.34
SR5	3/2/2017 Mid-Flood	0.36
SR5	3/4/2017 Mid-Flood	0.40
SR5	3/7/2017 Mid-Flood	0.47
SR5	3/9/2017 Mid-Flood	0.37
SR5	3/11/2017 Mid-Flood	0.35
SR5	3/14/2017 Mid-Flood	0.45
SR5	3/16/2017 Mid-Flood	0.46
SR5	3/18/2017 Mid-Flood	0.47
SR5	3/21/2017 Mid-Flood	0.58
SR5	3/23/2017 Mid-Flood	0.47
SR5	3/25/2017 Mid-Flood	0.68
SR5	3/28/2017 Mid-Flood	0.40
SR5	3/30/2017 Mid-Flood	0.47
SR5	4/1/2017 Mid-Flood	0.42
SR5	4/4/2017 Mid-Flood	0.51
SR5	4/6/2017 Mid-Flood	0.56
SR5	4/8/2017 Mid-Flood	0.66
SR5	4/11/2017 Mid-Flood	0.56
SR5	4/13/2017 Mid-Flood	0.38
SR5	4/15/2017 Mid-Flood	0.57
SR5	4/18/2017 Mid-Flood	0.67
SR5	4/20/2017 Mid-Flood	0.68
SR5	4/22/2017 Mid-Flood	0.57

Cluster 1 TIN(Lab)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (lab)		Impact TIN (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	12	Number of Valid Observations	39
Number of Distinct Observations	12	Number of Distinct Observations	35
Minimum	0.257	Minimum	0.306
Maximum	0.524	Maximum	0.68
Mean of Raw Data	0.383	Mean of Raw Data	0.463
Standard Deviation of Raw Data	0.0771	Standard Deviation of Raw Data	0.0996
Kstar	19.61	Kstar	21.71
Mean of Log Transformed Data	-0.98	Mean of Log Transformed Data	-0.791
Standard Deviation of Log Transformed Data	0.208	Standard Deviation of Log Transformed Data	0.208
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.994	Correlation Coefficient R	0.968
Shapiro Wilk Test Statistic	0.986	Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical (0.95) Value	0.859	Shapiro Wilk Critical (0.95) Value	0.939
Approximate Shapiro Wilk P Value	0.993	Approximate Shapiro Wilk P Value	0.0132
Lilliefors Test Statistic	0.108	Lilliefors Test Statistic	0.156
Lilliefors Critical (0.95) Value	0.256	Lilliefors Critical (0.95) Value	0.142
Data appear Normal at (0.05) Significance Level		Data not Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs			
User Selected Options			
Full Precision	OFF		
Confidence Coefficient	95%		
Substantial Difference	0		
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)		
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median		
Area of Concern Data: Impact (Lab)			
Background Data: Baseline (Lab) x 1.3			
Raw Statistics			
	Site	Background	
Number of Valid Observations		39	12
Number of Distinct Observations		35	12
Minimum		0.306	0.257
Maximum		0.68	0.524
Mean		0.463	0.383
Median		0.447	0.381
SD		0.0996	0.0771
SE of Mean		0.016	0.0223
Wilcoxon-Mann-Whitney (WMW) Test			
H0: Mean/Median of Site or AOC <= Mean/Median of Background			
Site Rank Sum W-Stat		1120	
WMW Test U-Stat		2.343	
WMW Critical Value (0.050)		1.645	
P-Value		9.57E-03	
Conclusion with Alpha = 0.05			
Reject H0, Conclude Site > Background			
P-Value < alpha (0.05)			

Cluster 1 TIN(Lab)
Upstream Control vs Impact

Upstream Control TIN (lab) (mg/L)				Impact TIN (lab) (mg/L)			
C2A	1/23/2017	Mid-Flood	0.58	SR5	1/23/2017	Mid-Flood	0.33
C2A	1/25/2017	Mid-Flood	0.65	SR5	1/25/2017	Mid-Flood	0.38
C2A	1/27/2017	Mid-Flood	0.65	SR5	1/27/2017	Mid-Flood	0.31
C2A	1/31/2017	Mid-Flood	0.52	SR5	1/31/2017	Mid-Flood	0.42
C2A	2/2/2017	Mid-Flood	0.56	SR5	2/2/2017	Mid-Flood	0.45
C2A	2/4/2017	Mid-Flood	1.03	SR5	2/4/2017	Mid-Flood	0.44
C2A	2/7/2017	Mid-Flood	0.56	SR5	2/7/2017	Mid-Flood	0.42
C2A	2/9/2017	Mid-Flood	0.64	SR5	2/9/2017	Mid-Flood	0.41
C2A	2/11/2017	Mid-Flood	0.52	SR5	2/11/2017	Mid-Flood	0.42
C2A	2/14/2017	Mid-Flood	0.51	SR5	2/14/2017	Mid-Flood	0.41
C2A	2/16/2017	Mid-Flood	0.73	SR5	2/16/2017	Mid-Flood	0.46
C2A	2/18/2017	Mid-Flood	0.72	SR5	2/18/2017	Mid-Flood	0.49
C2A	2/21/2017	Mid-Flood	0.77	SR5	2/21/2017	Mid-Flood	0.47
C2A	2/23/2017	Mid-Flood	0.71	SR5	2/23/2017	Mid-Flood	0.49
C2A	2/25/2017	Mid-Flood	0.46	SR5	2/25/2017	Mid-Flood	0.34
C2A	2/28/2017	Mid-Flood	0.40	SR5	2/28/2017	Mid-Flood	0.34
C2A	3/2/2017	Mid-Flood	0.55	SR5	3/2/2017	Mid-Flood	0.36
C2A	3/4/2017	Mid-Flood	0.78	SR5	3/4/2017	Mid-Flood	0.40
C2A	3/7/2017	Mid-Flood	0.47	SR5	3/7/2017	Mid-Flood	0.47
C2A	3/9/2017	Mid-Flood	0.36	SR5	3/9/2017	Mid-Flood	0.37
C2A	3/11/2017	Mid-Flood	0.74	SR5	3/11/2017	Mid-Flood	0.35
C2A	3/14/2017	Mid-Flood	0.41	SR5	3/14/2017	Mid-Flood	0.45
C2A	3/16/2017	Mid-Flood	0.72	SR5	3/16/2017	Mid-Flood	0.46
C2A	3/18/2017	Mid-Flood	0.90	SR5	3/18/2017	Mid-Flood	0.47
C2A	3/21/2017	Mid-Flood	0.57	SR5	3/21/2017	Mid-Flood	0.58
C2A	3/23/2017	Mid-Flood	0.42	SR5	3/23/2017	Mid-Flood	0.47
C2A	3/25/2017	Mid-Flood	0.48	SR5	3/25/2017	Mid-Flood	0.68
C2A	3/28/2017	Mid-Flood	0.46	SR5	3/28/2017	Mid-Flood	0.40
C2A	3/30/2017	Mid-Flood	0.50	SR5	3/30/2017	Mid-Flood	0.47
C2A	4/1/2017	Mid-Flood	0.57	SR5	4/1/2017	Mid-Flood	0.42
C2A	4/4/2017	Mid-Flood	0.50	SR5	4/4/2017	Mid-Flood	0.51
C2A	4/6/2017	Mid-Flood	0.52	SR5	4/6/2017	Mid-Flood	0.56
C2A	4/8/2017	Mid-Flood	0.59	SR5	4/8/2017	Mid-Flood	0.66
C2A	4/11/2017	Mid-Flood	0.56	SR5	4/11/2017	Mid-Flood	0.56
C2A	4/13/2017	Mid-Flood	0.69	SR5	4/13/2017	Mid-Flood	0.38
C2A	4/15/2017	Mid-Flood	0.75	SR5	4/15/2017	Mid-Flood	0.57
C2A	4/18/2017	Mid-Flood	0.59	SR5	4/18/2017	Mid-Flood	0.67
C2A	4/20/2017	Mid-Flood	0.43	SR5	4/20/2017	Mid-Flood	0.68
C2A	4/22/2017	Mid-Flood	0.67	SR5	4/22/2017	Mid-Flood	0.57

Cluster 1 TIN(Lab)
Upstream Control vs Impact

Impact TIN (Lab)		Upstream Control TIN (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	39	Number of Valid Observations	39
Number of Distinct Observations	35	Number of Distinct Observations	37
Minimum	0.306	Minimum	0.359
Maximum	0.68	Maximum	1.027
Mean of Raw Data	0.463	Mean of Raw Data	0.595
Standard Deviation of Raw Data	0.0996	Standard Deviation of Raw Data	0.142
Kstar	21.71	Kstar	17.58
Mean of Log Transformed Data	-0.791	Mean of Log Transformed Data	-0.545
Standard Deviation of Log Transformed Data	0.208	Standard Deviation of Log Transformed Data	0.232
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.968	Correlation Coefficient R	0.975
Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical (0.95) Value	0.939	Shapiro Wilk Critical (0.95) Value	0.939
Approximate Shapiro Wilk P Value	0.0132	Approximate Shapiro Wilk P Value	0.149
Lilliefors Test Statistic	0.156	Lilliefors Test Statistic	0.13
Lilliefors Critical (0.95) Value	0.142	Lilliefors Critical (0.95) Value	0.142
Data not Normal at (0.05) Significance Level		Data appear Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs			
User Selected Options			
Full Precision	OFF		
Confidence Coefficient	95%		
Substantial Difference	0		
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)		
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median		
Area of Concern Data: Impact (Lab)			
Background Data: C2A (Lab)			
Raw Statistics			
	Site	Background	
Number of Valid Observations	39	39	
Number of Distinct Observations	35	37	
Minimum	0.306	0.359	
Maximum	0.68	1.027	
Mean	0.463	0.595	
Median	0.447	0.568	
SD	0.0996	0.142	
SE of Mean	0.016	0.0228	
Wilcoxon-Mann-Whitney (WMW) Test			
H0: Mean/Median of Site or AOC <= Mean/Median of Background			
Site Rank Sum W-Stat	1104		
WMW Test U-Stat	-4.372		
WMW Critical Value (0.050)	1.645		
P-Value	6.15E-06		
Conclusion with Alpha = 0.05			
Do Not Reject H0, Conclude Site <= Background			
P-Value < alpha (0.05)			