AECOM

China Harbour Engineering Company Limited

Contract No. HY/2010/02

Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works

Quarterly EM&A Report for September 2014- November 2014

[04/2015]

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Ref.: HYDHZMBEEM00_0_2898L.15 17 April 2015

Engineer's Representative By Fax (3698 5999) and By Post
Ove Arup & Partners
Chief Resident Engineer's Office
5 Ying Hei Road, Tung Chung, Lantau
Hong Kong

Attention: Mr. Roger Marechal

Dear Sir,

Re: Agreement No. CE 48/2011 (EP)
Environmental Project Office for the
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing Facilities, and Tuen Mun-Chek Lap Kok Link – Investigation

Contract No. HY/2010/02 HZMB HKBCF – Reclamation Works
Quarterly EM&A Report for September 2014 to November 2014

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for September 2014 to November 2014 (Letter ref: 60249820/C/RMKY15041701 dated 17 April 2015) copied to us by e-mail on 17 April 2015.

We are pleased to inform you that we have no adverse comment on the captioned Quarterly EM&A Report for September 2014 to November 2014.

ET is reminded to submit the proposed modelling analyses in the next Quarterly EM&A Report for December 2014 to February 2015 as stated in the previous report for June 2014 to August 2014.

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

Yours sincerely,

Raymond Dai
Independent Environmental Checker

c.c.	HyD	Mr. Matthew Fung	(By Fax: 3188 6614)
	HyD	Mr. Wai-ping Lee	(By Fax: 3188 6614)
	AECOM	Ms. Echo Leong	(By Fax: 2317 7609)
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Internal: DY, YH, SL, JM, ENPO Site

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EXECUTIVE SUMMARY

Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as "the Project") mainly comprises reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL). It is a designated project and is governed by the current permits for the Project, i.e. the amended Environmental Permits (EPs) issued on 19 January 2015 (EP-353/2009/H) and 10 December 2014 (EP-354/2009/C) (for TMCLKL Southern Landfall Reclamation only).

Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project's reclamation works (i.e. the Engineer for the Project).

China Harbour Engineering Company Limited (CHEC) was awarded by HyD as the Contractor to undertake the construction work of the Project.

ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

AECOM Asia Co. Ltd. (AECOM) was appointed by CHEC to undertake the role of Environmental Team for the Project for carrying out the environmental monitoring and audit (EM&A) works.

The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016. The EM&A programme, including air quality, noise, water quality and dolphin monitoring and environmental site inspections, was commenced on 12 March 2012.

This report documents the findings of EM&A works conducted in the period between 1 September 2014 and 30 November 2014. As informed by the Contractor, major activities in the reporting quarter were:-

Marine-based Works

- Cellular structure installation
- Laying geo-textile
- Optimizing rubble mound seawalls
- Conforming sloping seawalls
- Sand blanket laying
- Sand filling
- Rock filling
- Public filling
- Maintenance of silt curtain & silt screen at sea water intake of HKIA
- Band drain installation
- Surcharge remove & laying
- Backfill cellular structure
- Geotechnical Instrumentation works
- Surcharge laying
- Capping Beams structures
- Construction of temporary jetties for surcharge laying
- Temporary Watermain construction
- Flat barge of unloading public fill for surcharge laying
- Precast Yard Setup
- Precast Yard for seawall blocks & culverts

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- Maintenance of Temporary Marine Access at Works Area WA2

A summary of monitoring and audit activities conducted in the reporting quarter is listed below:

24-hour Total Suspended Particulates (TSP) monitoring	16 sessions
1-hour TSP monitoring	16 sessions
Noise monitoring	13 sessions
Impact water quality monitoring	39 sessions
Impact dolphin monitoring	6 surveys
Joint Environmental site inspection	13 sessions

Breaches of Action and Limit Levels for Air Quality

One (1) 24-hour TSP result at AMS3B exceeded Action Level on 27 October 2014, after investigation, the exceedance was considered not related to this Contract. All 1-Hour TSP results were below the Action and Limit Level in the reporting period.

Breaches of Action and Limit Levels for Noise

For construction noise, no exceedance was recorded at all monitoring stations in the reporting period.

Breaches of Action and Limit Levels for Water Quality

A total of (23) twenty-three exceedances were recorded in this reporting quarter:

(1) One Action Level Exceedance of SS at IS8 at mid-flood tide on 5 September 2014; (2) Two Action Level Exceedances of SS at IS5 and SR3 respectively at Mid-Ebb tide were recorded on 10 September 2014 and (1) one Action level exceedance of SS were recorded at SR10B(N) at Mid-Flood tide on 12 September 2014; (1) One Limit Level Exceedance of Turbidity and (1) Limit Level Exceedance of Suspended Solids were recorded at IS17 during ebb tide on 10 October 2014; (1) One Action Level Exceedance of SS at SR10B(N) was recorded on10 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS8 was recorded on 3 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS(Mf)11 was recorded on 6 October 2014 during ebb tide; (2) Two Action Level Exceedances of SS at IS(Mf)11 and SR5 were recorded on 6 October 2014 during flood tide; (3) Three Action Level Exceedances of SS were recorded at IS10, SR4(N) and SR5 on 13 October 2014 during flood tide; (1) One Action Level Exceedance of SS was recorded at IS17 on 20 October 2014 during ebb tide; (1) action level exceedance and (1) limit level exceedance of SS were recorded at SR4(N) and IS8 respectively on 20 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at SR10A and SR10B(N) on 22 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at IS10 and SR4(N) during flood tide on 24 October 2014. (1) Action Level Exceedance of SS was recorded at IS8 on 31 October 2014 during ebb tide. (1) action level exceedance of SS was recorded at IS17 on 28 November 2014 during mid ebb tide.

After investigation, all impact water quality exceedances were considered not related to this Contract except the Limit Level Exceedance of Turbidity, Limit Level Exceedance of Suspended Solids recorded at IS17 during ebb tide on 10 October 2014 and Action Level Exceedance of Suspended Solids recorded at IS17 during flood tide on 20 October 2014, which were considered related to this Contract. Recommendation has been given and rectification has been carried on by the Contractor on 28 October 2014.

Breaches of Action and Limit Levels for Impact Dolphin Monitoring

One (1) Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. Event Action Plan for Impact Dolphin Monitoring was triggered. For detail of investigation, please refer to appendix L.

Implementation Status and Review of Environmental Mitigation Measures

Most of the recommended mitigation measures, as included in the EM&A programme, were implemented properly in the reporting quarter.

The recommended environmental mitigation measures effectively minimize the potential environmental impacts

from the Project. The EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

Moreover, regular review and checking on the construction methodologies, working processes and plants were carried out to ensure the environmental impacts were kept minimal and recommended environmental mitigation measures were implemented effectively.

Complaint, Notification of Summons and Successful Prosecution

Three environmental complaints have been received in September 2014.

As informed by the Contractor on 15 Sept 14, there is an environmental complaint received on 29 August 14 by HyD. The complainant who lives at Tower 4, Melody Garden, Tuen Mun called reflecting environmental issues arisen from many sand barges in the waters facing her apartment. According to the complainant, sand was blown into her apartment because the barges were not covered and it was worse when sand was transferred from one vessel to another on conveyor belts. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

As informed by the Contractor, a public complaint has been received by ICC on 9 September 2014 and it was referred to this Contract, the complainant raised concern about a large amount of general refuse such as food container and plastic bottles were observed on sea area off the Gold Coast, Tuen Mun. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

An air quality complaint has been received by the Contractor on 29 September 2014 via email. The complaint was first received by EPD via email on 5 September 2014 and it was referred by EPD to the HZMB HK Project Management Office (Management Office) to handle the complaint directly on 10 September 2014 following the request of the complainant. The Management Office responded to the complainant directly on 17 September 2014. Subsequently, the complainant followed up with the response given by the Management Office and complained again on 26 September 2014. This follow up complaint was referred to the project team to investigate. The complainant complained that many of the sand barges did not stay at area of reclamation works near Chek Lap Kok or at the sea area near Tuen Mun River Trade Terminal but moored in the sea area close to Melody Garden. Sand were easily blown to the inside house during days with moderate wind. The complainant suggested that, sand barges should be requested to move away from residential areas and sand barges should be provided with cover fabric and sprinkling to minimise environmental pollution caused by sand. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

Two environmental complaints have been received in October 2014.

As informed by the Contractor on 14 October 2014, a follow up air quality complaint has been received by this Contract (same case to environmental complaint reported in the last reporting month). The complainant complained that about 20-30 sand barges always moor at the sea area opposite to tower 4 of Melody Garden and Richland Garden. This problem has affected the air quality. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

With reference to RSS's letter ref.: 211036/(HY2010/02)/M05/432/B07605 dated on 30 September 2014 pertaining the performance on barges operations at the sea area off the Tuen Mun Ferry Pier. A complaint concerning leakage of sand filling material from vessels at sea area off Tuen Mun Ferry Pier was first received by EPD from Tuen Mun District Council (TM DC) on 19 September 2014 and it was subsequently referred by EPD to the Highways Department to handle on 23 September 2014 through EPD's memo ref.: EP/RW/0000362128.Referring to EPD's Memo, it is also noted that some local residents at Tuen Mun expressed their concern that the stockpile of dusty sand material on the barges should be covered with impervious sheeting to avoid causing fugitive dust emissions of sand and dust. Subsequently, TM DC followed up their complaint with Highways Department on 17 October 2014. The follow up complaint concerning water quality impact at sea area off Tuen Mun area was referred to the project team to response on 17 October 2014. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

No notification of summons or prosecution was received in the reporting quarter.

1 INTRODUCTION

1.1 Background

1.1.1 Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as "the Project") mainly comprises seawall construction and reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL).

1.1.2 The environmental impact assessment (EIA) reports (Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities – EIA Report (Register No. AEIAR-145/2009) (HKBCFEIA) and Tuen Mun – Chek Lap Kok Link – EIA Report (Register No. AEIAR-146/2009) (TMCLKLEIA), and their environmental monitoring and audit (EM&A) Manuals (original EM&A Manuals), for the Project were approved by Environmental Protection Department (EPD) in October 2009.

1.1.3 EPD subsequently issued the Environmental Permit (EP) for HKBCF in November 2009 (EP-353/2009) and the Variation of Environmental Permit (VEP) in June 2010 (EP-353/2009/A), November 2010 (EP-353/2009/B), November 2011 (EP-353/2009/C), March 2012 (EP-353/2009/D), October 2012 (EP-353/2009/E), April 2013 (EP-353/2009/F), August 2013 (EP-353/2009/G) and January 2015 (EP-353/2009/H). Similarly, EPD issued the Environmental Permit (EP) for TMCLKL in November 2009 (EP-354/2009) and the Variation of Environmental Permit (VEP) in December 2010 (EP-354/2009/A), January 2014 (EP-354/2009/B) and December 2014 (EP-354/2009/C).

1.1.4 The Project is a designated project and is governed by the current permits for the Project, i.e. the amended EPs issued on 19 January 2015 (EP-353/2009/H) and 10 December 2014 (EP-354/2009/C) (for TMCLKL Southern Landfall Reclamation only).

1.1.5 A Project Specific EM&A Manual, which included all project-relation contents from the original EM&A Manuals for the Project, was issued in May 2012.

1.1.6 Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project's reclamation works (i.e. the Engineer for the Project).

1.1.7 China Harbour Engineering Company Limited (CHEC) was awarded by HyD as the Contractor to undertake the construction work of the Project.

1.1.8 ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

1.1.9 AECOM Asia Co. Ltd. (AECOM) was appointed by CHEC to undertake the role of Environmental Team for the Project for carrying out the EM&A works.

1.1.10 The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016.

1.1.11 According to the Project Specific EM&A Manual, there is a need of an EM&A programme including air quality, noise, water quality and dolphin monitoring and environmental site inspections. The EM&A programme of the Project commenced on 12 March 2012.

1.2 Scope of Report

1.2.1 This is the eleventh quarterly EM&A Report under the Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. 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 from 1 September 2014 to 30 November 2014.

1.3 Project Organization

1.3.1 The project organization structure is shown in Appendix A. The key personnel contact names and numbers are summarized in Table 1.1.

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone	Fax
Engineer's Representative (ER) (Ove Arup & Partners Hong Kong Limited)	Chief Resident Engineer	Roger Marechal	2528 3031	2668 3970
IEC / ENPO (ENVIRON Hong Kong Limited)	Independent Environmental Checker	Raymond Dai	3465 2888	3548 6988
	Environmental Project Office Leader	Y.H. Hui	3465 2868	3465 2899
Contractor (China Harbour Engineering Company Limited)	General Manager (S&E)	Daniel Leung	3157 1086	2578 0413
	Environmental Officer	Richard Ng	36932253	2578 0413
	24-hour Hotline	Alan C.C. Yeung	9448 0325	--
ET (AECOM Asia Company Limited)	ET Leader	Echo Leong	3922 9280	2317 7609

1.4 Summary of Construction Works

1.4.1 The construction phase of the Project under the EP commenced on 12 March 2012.

1.4.2 As informed by the Contractor, details of the major works carried out in the reporting quarter are listed below:-

Marine-based Works

- Cellular structure installation
- Laying geo-textile
- Optimizing rubble mound seawalls
- Conforming sloping seawalls
- Sand blanket laying
- Sand filling
- Rock filling
- Public filling
- Maintenance of silt curtain & silt screen at sea water intake of HKIA
- Band drain installation
- Surcharge remove & laying
- Backfill cellular structure
- Geotechnical Instrumentation works
- Surcharge laying
- Capping Beams structures
- Construction of temporary jetties for surcharge laying
- Temporary Watermain construction
- Flat barge of unloading public fill for surcharge laying
- Precast Yard Setup
- Precast Yard for seawall blocks & culverts

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- Maintenance of Temporary Marine Access at Works Area WA2

1.4.3 The 3-month rolling construction programme of the Project is shown in Appendix B.

1.4.4 The general layout plan of the Project site showing the detailed works areas is shown in Figure 1.

1.4.5 The environmental mitigation measures implementation schedule are presented in Appendix C.

2 SUMMARY OF EM&A PROGRAMME REQUIREMENTS

2.1 Monitoring Parameters

2.1.1 The Project Specific EM&A Manual designated 4 air quality monitoring stations, 2 noise monitoring stations, 21 water monitoring stations (9 Impact Stations, 7 Sensitive Receiver Stations and 5 Control/Far Field Stations) to monitor environmental impacts on air quality, noise and water quality respectively. Pre-set and fixed transect line vessel based dolphin survey was required in two AFCD designated areas (Northeast and Northwest Lantau survey areas). The impact dolphin monitoring at each survey area should be conducted twice per month.

2.1.2 For impact air quality monitoring, monitoring locations AMS2 (Tung Chung Development Pier) and AMS7 (Hong Kong SkyCity Marriott Hotel) were set up at the proposed locations in accordance with Project Specific EM&A Manual. The conditional omission of Monitoring Station AMS6 was effective since 19 November 2012. For monitoring location AMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact air quality monitoring was conducted at site boundary of the site office area in Works Area WA2 (AMS3B) respectively. Same baseline and Action Level for air quality, as derived from the baseline monitoring data recorded at Ho Yu College, was adopted for this alternative air quality location.

2.1.3 For impact noise monitoring, monitoring locations NMS2 (Seaview Crescent Tower 1) was set up at the proposed locations in accordance with Project Specific EM&A Manual. However, for monitoring location NMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact noise monitoring was conducted at site boundary of the site office area in Works Area WA2 (NMS3B) respectively. Same baseline noise level, as derived from the baseline monitoring data recorded at Ho Yu College was adopted for this alternative noise monitoring location.

2.1.4 In accordance with the Project Specific EM&A Manual, twenty-one stations were designated for impact water quality monitoring. The nine Impact Stations (IS) were chosen on the basis of their proximity to the reclamation and thus the greatest potential for water quality impacts, the seven Sensitive Receiver Stations (SR) were chosen as they are close to the key sensitive receives and the five Control/ Far Field Stations (CS) were chosen to facilitate comparison of the water quality of the IS stations with less influence by the Project/ ambient water quality conditions.

2.1.5 Due to safety concern and topographical condition of the original locations of SR4 and SR10B, alternative impact water quality monitoring stations, naming as SR4(N) and SR10B(N), were adopted, which are situated in vicinity of the original impact water quality monitoring stations (SR4 and SR10B) and could be reachable. Same baseline and Action Level for water quality, as derived from the baseline monitoring data recorded, were adopted for these alternative impact water quality monitoring stations.

2.1.6 The monitoring locations used during the reporting quarter are depicted in Figures 2, 3 and 4 respectively.

2.1.7 The Project Specific EM&A Manual also required environmental site inspections for air quality, noise, water quality, chemical, waste management, marine ecology and landscape and visual impact.

2.2 Environmental Quality Performance (Action/Limit Levels)

2.2.1 The environmental quality performance limits (i.e. Action and/or Limit Levels) of air and water quality monitoring were derived from the baseline air and water quality monitoring results at the respective monitoring stations, while the environmental quality performance limits of noise monitoring were defined in the EM&A Manual.

2.2.2 The environmental quality performance limits of air quality, noise and water monitoring are given in Appendix D.

2.3 Environmental Mitigation Measures

2.3.1 Relevant environmental mitigation measures were stipulated in the Particular Specification and EPs (EP-353/2009/H and EP-354/2009/C) (for TMCLKL Southern Landfall Reclamation only) for the Contractor to adopt. A list of environmental mitigation measures and their implementation statuses are given in Appendix C.

3 MONITORING RESULTS

3.1 Air Quality Monitoring

3.1.1 In accordance with the Project Specific EM&A Manual, impact 1-hour Total Suspended Particulates (TSP) monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was carried out for at least once every 6 days at the 4 monitoring stations (AMS2, AMS3B, AMS6 and AMS7).

3.1.2 The monitoring locations for impact air quality monitoring are depicted in Figure 2. However, for AMS6 (Dragonair/CNAC (Group) Building), permission on setting up and carrying out impact monitoring works was sought, however, access to the premise has not been granted yet on this report issuing date.

3.1.3 The weather was mostly sunny, with occasional cloudy and occasional rainy in the reporting quarter. The major dust source in the reporting quarter included construction activities from the Project, as well as nearby traffic emissions.

3.1.4 The number of monitoring events and exceedances recorded in each month of the reporting quarter are presented in Table 3.1 and Table 3.2 respectively.

Table 3.1 Summary of Number of Monitoring Events for 1-hr & 24-hr TSP Concentration

Monitoring Parameter	Location	No. of monitoring events		
		September 14	October 14	November 14
1-hr TSP	AMS2	18	15	15
	AMS3B	18	15	15
	AMS7	18	15	15
24-hr TSP	AMS2	6	5	5
	AMS3B	6	5	5
	AMS7	6	5	5

Table 3.2 Summary of Number of Exceedances for 1-hr & 24-hr TSP Monitoring

Monitoring Parameter	Location	Level of Exceedance	Level of Exceedance		
			September 14	October 14	November 14
1-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3B	Action	0	0	0
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
		Total	0	0	0
24-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3B	Action	0	**1**	0
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
		Total	0	**1**	0

3.1.5 One (1) 24-hour TSP result at AMS3B exceeded Action Level on 27 October 2014, after investigation, the exceedance was considered not related to this Contract. All 1-Hour TSP results were below the Action and Limit Level in the reporting period.

3.1.5.1 For the 24-hour TSP action level exceedance on 27 October 2014 at AMS3B:

3.1.5.2 According to information provided by the Contractor, no land-based construction was being undertaken at Works Area WA2 during the monitoring period.

3.1.5.3 Site inspection has been conducted on 7 November 2014 to review works activities of adjacent construction site(s) for identifying the possible source(s), construction site was observed and the source of impact may be contributed by adjacent construction site which do not belongs to this contract. Please see below photo record for reference.

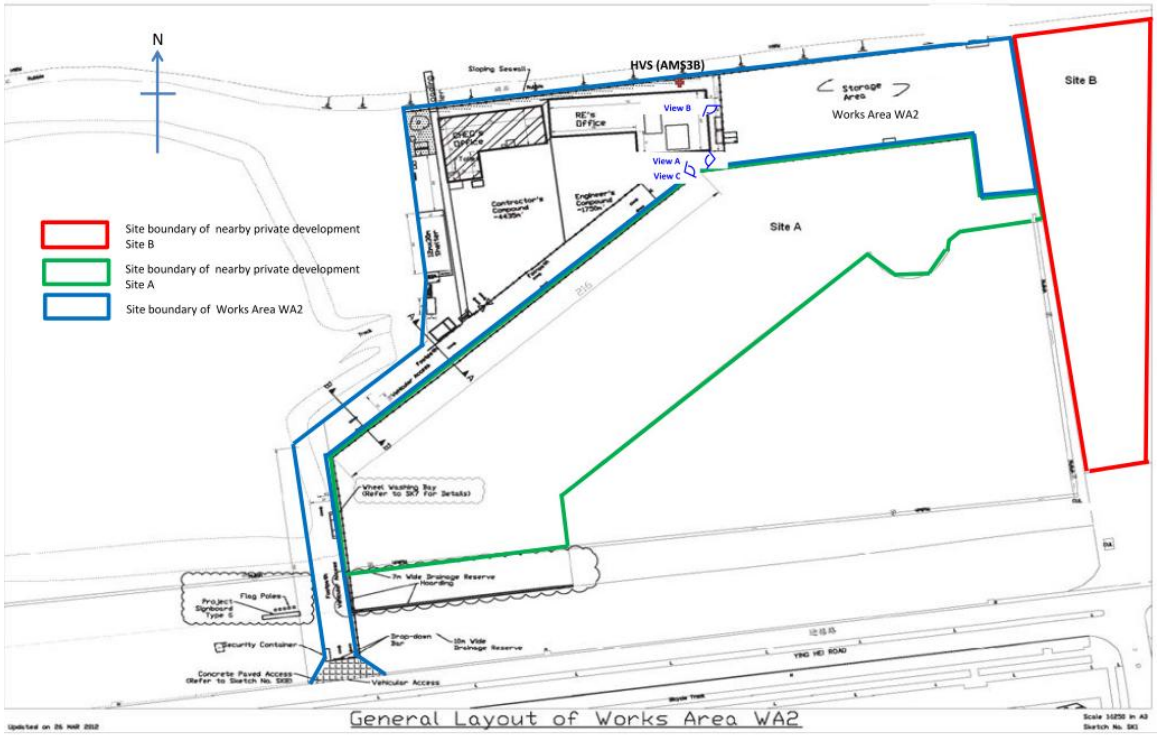
3.1.5.4 Functional checking on HVS at AMS3B was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3B, initial flow, final flow and average rate are 1.34m3/min. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.5.5 The 1-hr TSP values recorded at AMS3B on 27 October 14, which are within the monitoring period of the 1-hr TSP, were 75μg/m^3, 76μg/m^3 and 76μg/m^3 respectively. All measured values are well below the Action and Limit Levels.

3.1.5.6 The measured 24-hr TSP values recorded at AMS2 and AMS7 (which are closer to the marine-based works areas) on 27 October 2014 date were 76μg/m3 and 92μg/m3, which are below the Action and Limit Levels.

3.1.5.7 The measured 24-hr TSP values recorded at AMS3B on next monitoring date, 1 November 2014 was 76μg/m^3, which did not exceed the Action or Limit Level.

3.1.5.8 Below layout map shows the location of HVS at AMS3B:



- Photo record taken on 7 November 2014 during ad hoc site inspection: View B on layout map

- Photo record taken on 7 November 2014 during ad hoc site inspection: View C on layout map

3.1.5.9 The following dust mitigation measures have been implemented at Works Area WA2:

1 Works Area WA2's surface was hard-paved, compacted or hydro-seeded (Please refer to above layout map and photo records below (View A))

2 Vehicle washing facility was provided at vehicle exit points,
3 Measures for preventing fugitive dust emission are provided, e.g. canvas/tarpaulin covers.

3.1.5.10 After investigation, the dust exceedance was considered not to be due to works of this Contract.

3.1.6 The event action plan is annexed in Appendix K.

3.1.7 Meteorological information collected from the wind station during the monitoring periods on the monitoring dates, as shown in Figure 2, including wind speed and wind direction, is annexed in Appendix H of monthly EM&A report September, October and November 2014 respectively.

3.2 Noise Monitoring

3.2.1 Impact noise monitoring was conducted at the 2 monitoring stations (NMS2 and NMS3B) for at least once per week during 07:00 – 19:00 in the reporting quarter.

3.2.2 The monitoring locations used during the reporting quarter are depicted in Figure 2.

3.2.3 No Action or Limit Level Exceedance of construction noise was recorded in the reporting quarter.

3.2.4 Major noise sources during the noise monitoring included construction activities of the Project and nearby traffic noise.

3.2.5 The number of impact noise monitoring events and exceedances are summarized in Table 3.3 and Table 3.4 respectively.

Table 3.3 Summary of Number of Monitoring Events for Impact Noise

Monitoring Parameter	Location	No. of monitoring events		
		September 14	October 14	November 14
	NMS2	5	4	4
	NMS3B	5	4	4

Table 3.4 Summary of Number of Monitoring Exceedances for Impact Noise

Monitoring Parameter	Location	Level of Exceedance	Level of Exceedance		
			September 14	October 14	November 14
	NMS2	Action	0	0	0
		Limit	0	0	0
	NMS3B	Action	0	0	0
		Limit	0	0	0
		Total	0	0	0

3.2.6 The graphical plots of the trends of the monitoring results are provided in Appendix F. No specific trend of the monitoring results or existence of persistent pollution source was noted.

3.2.7 The event action plan is annexed in Appendix K.

3.3 Water Quality Monitoring

3.3.1 The monitoring locations used during the reporting quarter are depicted in Figure 3.

3.3.2 A total of (23) twenty-three exceedances were recorded in this reporting quarter:

3.3.3 (1) One Action Level Exceedance of SS at IS8 at mid-flood tide on 5 September 2014, (2) Two Action Level Exceedances of SS at IS5 and SR3 respectively at Mid-Ebb tide were recorded on 10 September 2014 and (1) one Action Level Exceedance of SS were recorded at SR10B(N) at Mid-Flood tide on 12 September 2014. (1) One Limit Level Exceedance of Turbidity and (1) Limit Level Exceedance of Suspended Solids were recorded at IS17 during ebb tide on 10 October 2014; (1) One Action Level Exceedance of SS at SR10B(N) was recorded on 10 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS8 was recorded on 3 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS(Mf)11 was recorded on 6 October 2014 during ebb tide; (2) Two Action Level Exceedances of SS at IS(Mf)11 and SR5 were recorded on 6 October 2014 during flood tide; (3) Three Action Level Exceedances of SS were recorded at IS10, SR4(N) and SR5 on 13 October 2014 during flood tide; (1) One Action Level Exceedance of SS was recorded at IS17 on 20 October 2014 during ebb tide; (1) Action Level Exceedance and (1) Limit Level Exceedance of SS were recorded at SR4(N) and IS8 respectively on 20 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at SR10A and SR10B(N) on 22 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at IS10 and SR4(N) during flood tide on 24 October 2014. (1) Action Level Exceedance of SS was recorded at IS8 on 31 October 2014 during ebb tide. (1) Action Level Exceedance of SS was recorded at IS17 on 28 November 2014 during mid ebb tide.

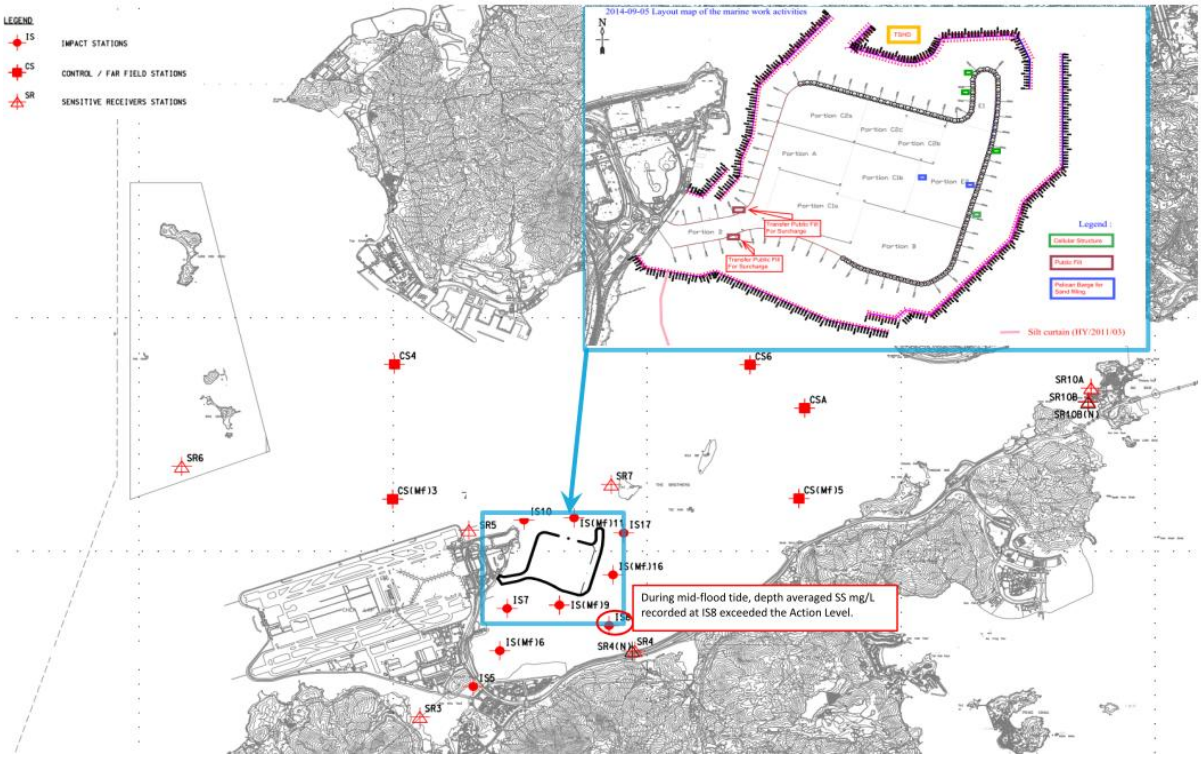
Table 3.5 Summary of Water Quality Exceedances in September 2014 – November 2014

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
IS5	Action	0	0	0	0	0	0	(1) 10 Sep 14	0	1	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS8	Action	0	0	0	0	0	0	(1) 31 Oct 14	(2) 5 Sep 14 and 3 Oct 14	1	2
	Limit	0	0	0	0	0	0	0	(1) 20 Oct 14	0	1
IS(Mf)9	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS10	Action	0	0	0	0	0	0	0	(2) 13 and 24 Oct 14	0	2
	Limit	0	0	0	0	0	0	0	0	0	0

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
IS(Mf)11	Action	0	0	0	0	0	0	(1) 6 Oct 14	(1) 6 Oct 14	1	1
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)16	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS17	Action	0	0	0	0	0	0	(2) 20 Oct and 28 Nov 14	0	0	2
	Limit	0	0	0	0	(1) 10 Oct 14	0	(1) 10 Oct	0	2	0
SR3	Action	0	0	0	0	0	0	(1) 10 Sep 14	0	1	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR4(N)	Action	0	0	0	0	0	0	0	(3) 13, 20 and 24 Oct 14	0	3
	Limit	0	0	0	0	0	0	0	0	0	0
SR5	Action	0	0	0	0	0	0	0	(2) 6 and 13 Oct 14	0	2
	Limit	0	0	0	0	0	0	0	0	0	0
SR6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10A	Action	0	0	0	0	0	0	0	(1) 22 Oct 14	0	1
	Limit	0	0	0	0	0	0	0	0	0	0
SR10B (N)	Action	0	0	0	0	0	0	(1) 12 Sep 14	(2) 10 and 22 Oct 14	1	2
	Limit	0	0	0	0	0	0	0	0	0	0
Total	Action	0	0	0	0	0	0	7	13	20	
	Limit	0	0	0	0	1	0	1	1	3	

Note: S: Surface;
M: Mid-depth;

3.3.4 (1) One Action Level Exceedance of SS (27.4mg/L) was recorded at IS8 during flood tide on 5 September 2014. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.



3.3.4.1 For marine works, marine filling was conducted at portion E2 during flood at area behind cellular structures on 5 September 2014. Also refer to layout map above.

3.3.4.2 Exceedance was not due to marine based construction works of the Project because:

3.3.4.3 As informed by the Contractor, filling was conducted on 3, 5 and 8 September 2014 at Portion E2, but with referred to monitoring record and photo record attached, no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain and no discoloration of sea water has been observed.

3.3.4.4 Photo record of sea condition taken during flood tide at the North of HKBCF Reclamation Works near IS8 on 5 September 2014.

3.3.4.5 Construction activities were reviewed, almost the same marine works were conducted at almost the same location on 3, 5 and 8 September 2014, but no SS exceedance was recorded on 3 and 8 September 2014. This indicates that the SS exceedance was unlikely to attribute to marine works of this Contract.

3.3.4.6 IS(Mf)9 and IS(Mf)16 are located closer to the active works than monitoring station IS8. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during the flood tide on the same day at IS(Mf)9 and IS(Mf)16 were below the Action and Limit Level which shows that the water quality closer to active works was not adversely affected.

3.3.4.7 The monitoring location of monitoring station IS8 are considered located upstream to the active works of this project during flood tide. Therefore it was unlikely that the exceedance recorded at IS8 was due to active construction activities of this project.

3.3.4.8 Turbidity level (NTU) result recorded on 5 September 2014 at IS8 during flood tide is 24.5 NTU which is below the Action and Limit Level, this indicates turbidity level was not adversely affected.

3.3.4.9 The exceedance was likely due to local effects in the vicinity of IS8.

3.3.4.10 For action required under the action plan, refer to EM&A manual of this Contract for Event and Action Plan for Water Quality.

3.3.4.11 Action taken under the action plan:

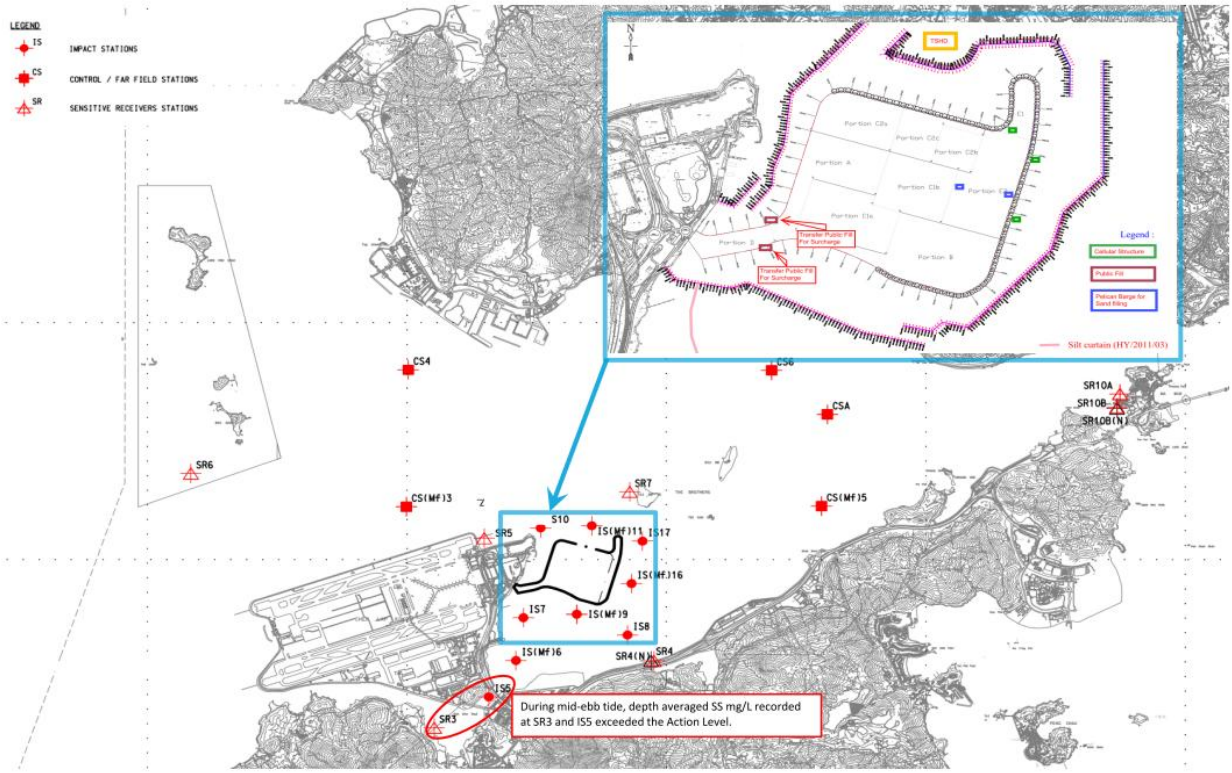
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.4.12 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.4.13 As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.5 (2) Two Action Level Exceedances of SS (26mg/L and 32.3mg/L) were recorded at IS5 and SR3 during ebb tide on 10 September 2014. The exceedances were confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.5.1 For marine works, marine filling was conducted at portion E2 during ebb tide at area behind cellular structures on 10 September 2014.



3.3.5.2 Exceedances were not due to marine based construction works of the Project because:

3.3.5.3 As informed by the Contractor, filling was conducted on 8, 10 and 12 September 2014 at Portion E2, but with referred to monitoring record and photo record attached, no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain and no discoloration of sea water has been observed.

3.3.5.4 Photo record of sea condition taken at South of HKBCF Reclamation Works near IS5 and SR3 on 10 September 2014.

3.3.5.5 Construction activities were reviewed, almost the same marine works were conducted at almost the same location on 8, 10 and 12 September 2014, but no SS exceedance was recorded at IS5 or SR3 on 8 and 12 September 2014. This indicates that the SS exceedances were unlikely to attribute to marine works of this Contract.

3.3.5.6 IS7 and IS(Mf)6 are located closer to the active works than monitoring station IS5 and SR3. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during the ebb tide on the same day at IS7 and IS(Mf)6 were below the Action and Limit Level which shows that the water quality closer to active works was not adversely affected. Therefore it was unlikely that the SS exceedances recorded at IS5 and SR3 were due to active construction activities of this project.

3.3.5.7 Turbidity level (NTU) result recorded on 10 September 2014 at IS5 and SR3 during ebb tide are 22.3 NTU and 23.9 NTU respectively which are below the Action and Limit Level, this indicates turbidity level was not adversely affected.

3.3.5.8 The exceedances were likely due to local effects in the vicinity of IS5 and SR3.

3.3.5.9 Action taken under the action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.5.10 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.5.11 As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.6 (1) One Action Level Exceedance of SS (24.5mg/L) was recorded at IS10B(N) during ebb tide on 12 September 2014. The exceedance was confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.6.1 For marine works, marine filling was conducted at portion E2 during flood at area behind cellular structures on 12 September 2014. Also refer to layout map attached.

3.3.6.2 Exceedance was not due to marine based construction works of the Project because:

3.3.6.3 IS(Mf)11 and IS10 are located downstream and closer to the active works than monitoring station SR10B(N) during flood tide. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during flood tide on the same day at IS(Mf)11 and IS10 were below the Action and Limit Level which indicates project work is unlikely to contribute to the action level exceedance recorded at SR10B(N).

3.3.6.4 The monitoring location of monitoring station SR10B(N) are considered upstream and remote to the active works of this project during flood tide. Therefore it was unlikely that the exceedance recorded at SR10B(N) during flood tide was due to active construction activities of this project.

3.3.6.5 The exceedance was likely due to local effects in the vicinity of SR10B(N).

3.3.6.6 Action taken under the action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.6.7 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

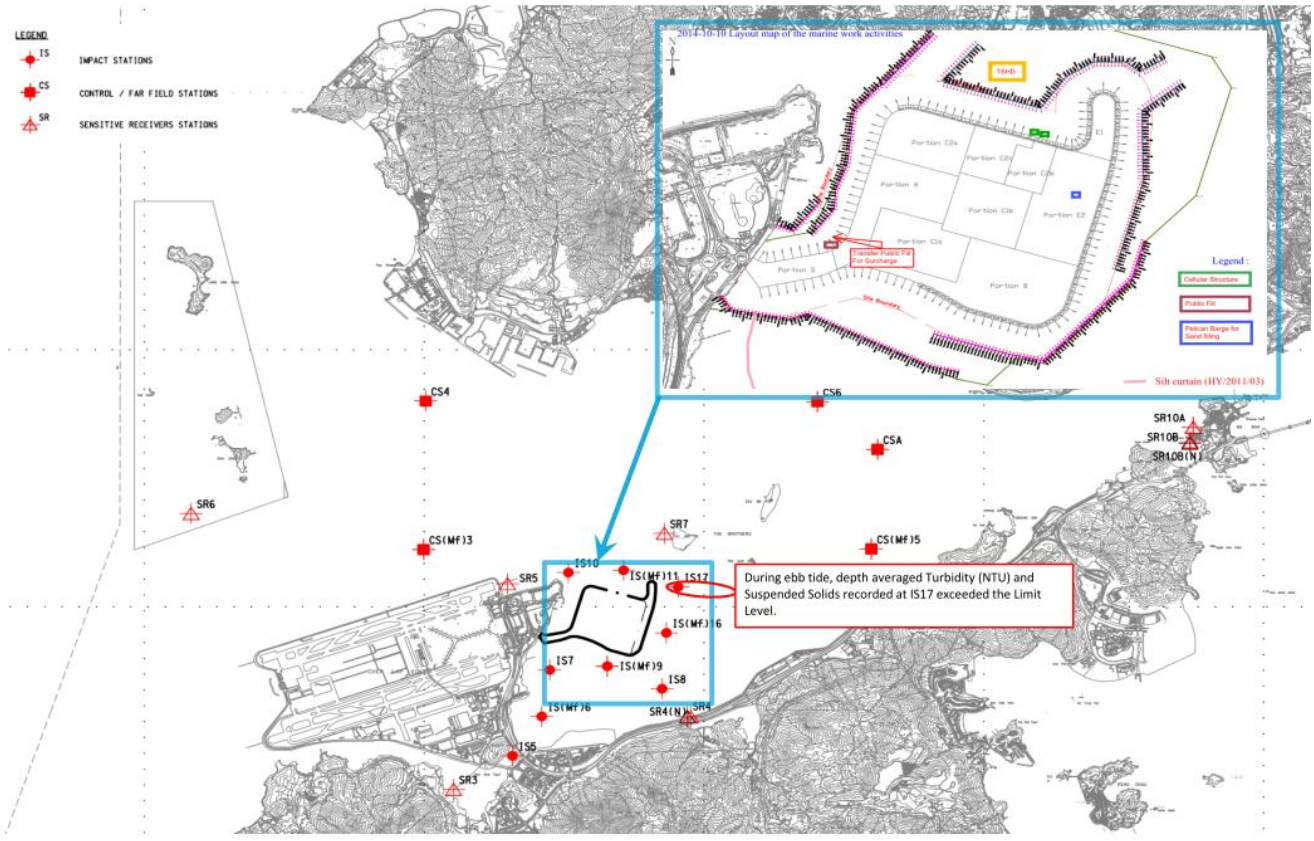
3.3.6.8 As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.7 (1) One Limit Level Exceedance of Turbidity and (1) Limit Level Exceedance of Suspended Solids were recorded at IS17 during ebb tide on 10 October 2014. The exceedance was confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.7.1 Exceedances recorded at IS17 are likely due to marine based construction activities of the Project because: marine based construction activities of the Project because:

3.3.7.2 With refer to monitoring record, appearance of water was relatively more turbid at IS17 when compared with the appearance of water at IS(Mf)11, IS10 and IS(Mf)16 during monitoring at ebb tide on 10 Oct 14.

3.3.7.3 As informed by the Contractor, sand filling was carried out at Portion E2 on 8, 10 and 13 Oct 14 at almost the same location but no exceedance was recorded at monitoring station IS17 on 8 and 13 Oct 14 during mid ebb tide. This indicates filling works were unlikely to cause the exceedance in turbidity at monitoring station IS17.



3.3.7.4 The source of impact is likely due pelican barge's propeller movement at shallow water during ebb tide when the position of the barge was adjusted at portion E. In addition, with refer to the silt curtain condition on 10 Oct 14, defects of the perimeter silt curtain was observed at northwest of the construction site. The dispersion of turbid water from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain is potentially due to defects of northwest part of the perimeter silt curtain.

3.3.7.5 Action taken under the event and action plan

1. In situ measurement was repeated to confirm findings of the exceedance of turbidity. Repeat in situ measurement is not applicable to suspended solid as SS was not measured in situ;
2. Source of impact refer to Section 4.7.3.3

3. IEC, Contractor, ER and EPD were noticed of the limit level exceedances via email;
4. Monitoring data was reviewed; plant, equipment and contractor's working methods were checked. Please refer to the layout map above.
5. The Contractor was reminded to ensure swift provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.
6. Mitigation measures such as perimeter silt curtain was implemented by the Contractor, however defects of the perimeter silt curtain was observed, the Contractor was reminded to ensure swift provision of maintenance to the silt curtains once defects were found. With refer to the maintenance record provided by the Contractor, maintenance work for the defects of the northwest part of the perimeter silt curtain was conducted on 28 October 2014.
7. Monitoring results show no recurrence of exceedance at IS17 during ebb tide on 13 Oct 2014.

3.3.7.6 ET's conclusions and recommendations for mitigation: Exceedances recorded at IS17 are likely to be related to vessel movement at shallow water during ebb tide. The Contractor was further reminded to control the vessel traffic at this area and ensure swift provision of maintenance to the silt curtains once defect was found.

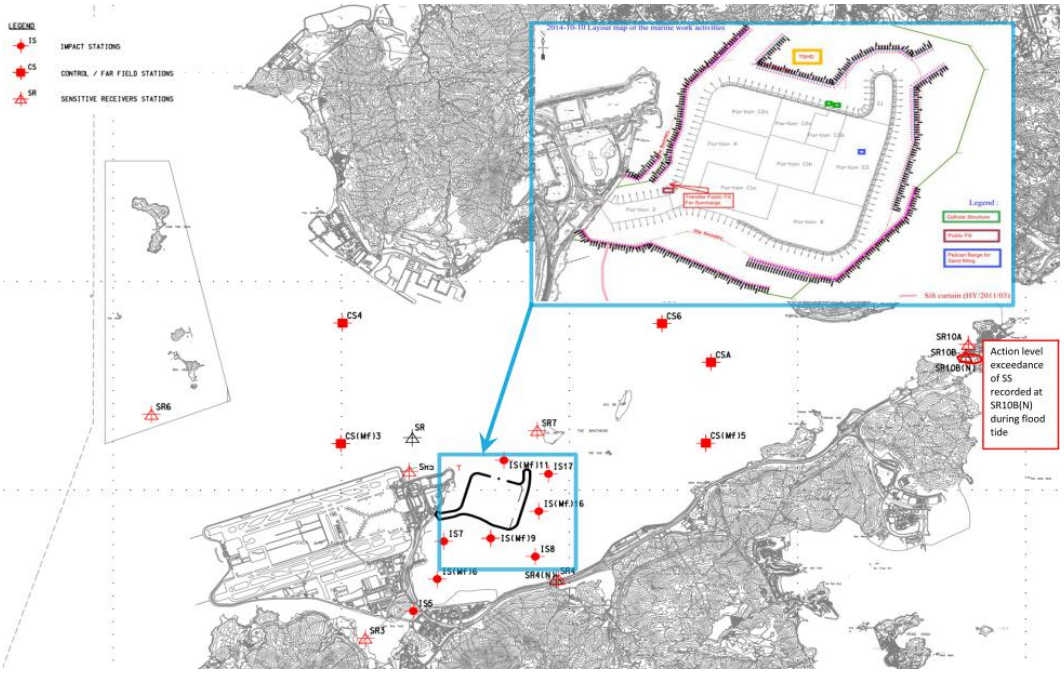
3.3.7.7 Contractor's actions to implement the mitigation: As informed by the Contractor, traffic control such as vessel speed limit was implemented and operation of sand filling vessel at shallow water during ebb tide was avoided. Monitoring results show no recurrence of exceedance at IS17 on 13 Oct 2014.

3.3.7.8 With refer to the maintenance record provided by the Contractor, maintenance work for the defects of the northwest part of the perimeter silt curtain was conducted on 28 October 2014.

3.3.8 (1) One Action Level Exceedance of SS at SR10B(N) was recorded on 10 October 2014 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.8.1 Exceedance was not due to marine based construction works of the Project because:

3.3.8.2 IS(Mf)11 and IS10 are located downstream and closer to the active works than monitoring station SR10B(N) during flood tide. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during flood tide on the same day at IS(Mf)11 and IS10 were below the Action and Limit Level which indicates project work is unlikely to contribute to the action level exceedance recorded at SR10B(N).



3.3.8.3 The monitoring location of monitoring station SR10B(N) are considered upstream and remote to the active works of this project during flood tide. Therefore it was unlikely that the exceedance recorded at SR10B(N) during flood tide was due to active construction activities of this project.

3.3.8.4 The exceedance was likely due to local effects in the vicinity of SR10B(N).

3.3.8.5 Action taken under the action plan

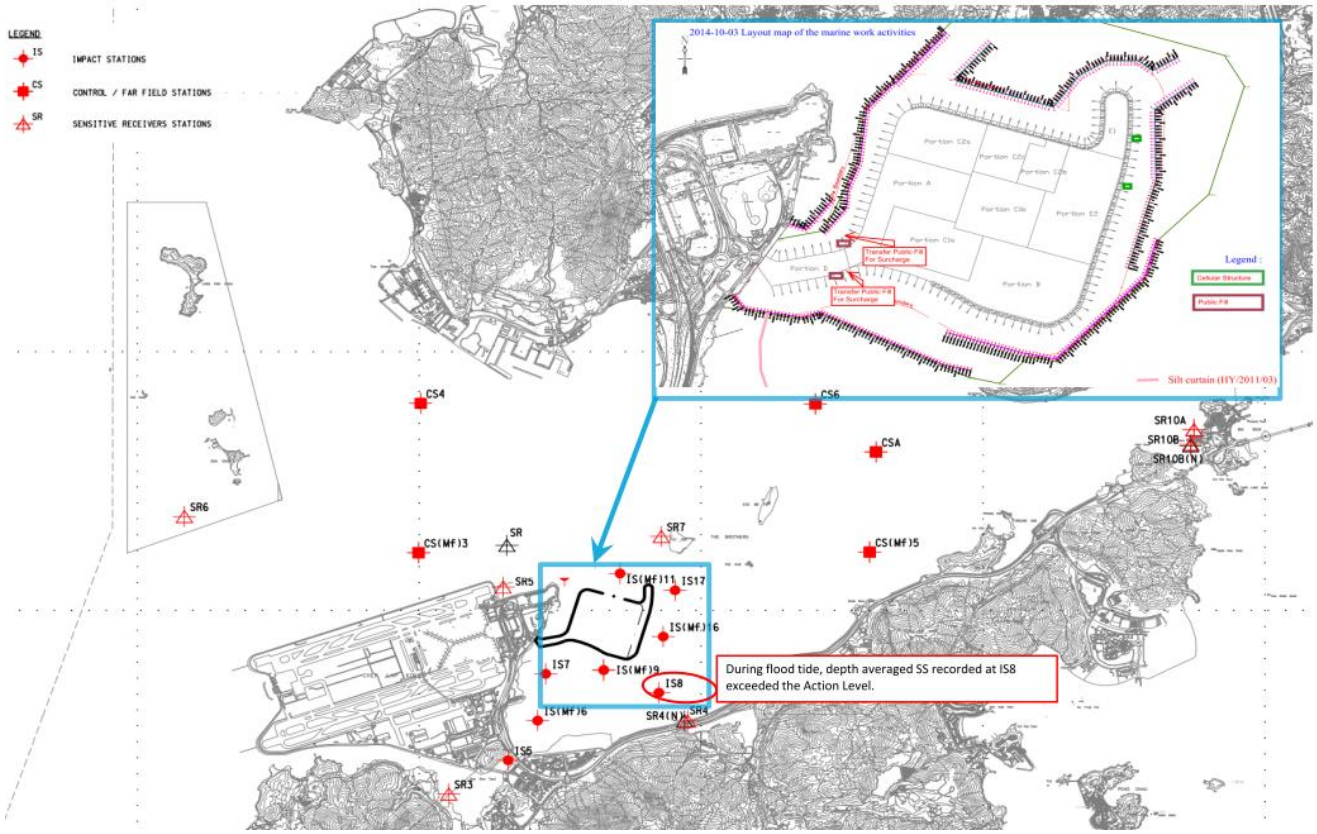
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.8.6 ET's conclusions and recommendations for mitigation: Exceedance was not due to marine based construction works of the Project. Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.8.7 Contractor's actions to implement the mitigation: As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.9 (1) One Action Level Exceedance of SS at IS8 was recorded on 3 October 2014 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.9.1 Layout map for work activities carried out on 03 October 14 is showed below:



3.3.9.2 Exceedance recorded at IS8 during mid-flood tide is unlikely due to marine based construction activities of the Project because:

3.3.9.3 With reference to the information provided by the Contractor, only cellular structure installation was conducted at the northeast part of the HKBCF reclamation works during mid flood tide, but cellular structure installation is unlikely to cause silt plume and contribute to the elevation of SS at IS8 during flood tide.

3.3.9.4 IS(Mf)9 and IS(Mf)16 are located closer to the active works than monitoring station IS8. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during the flood tide on the same day at IS(Mf)9 and IS(Mf)16 were below the Action and Limit Level which shows that the water quality closer to active works was not adversely affected.

3.3.9.5 In accordance with the silt curtain integrity checking record of 3 October 2014, disconnection of the perimeter silt curtain was observed at the southeast part of HKBCF Reclamation Works, but with referred to monitoring record and photo record below, no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain and no discoloration of sea water has been observed. (Please refer to below photo). In accordance with the silt curtain integrity checking record, the observed disconnection was rectified on 6 October 2014.

3.3.9.6 Photo record above shows the sea condition taken during flood tide at HKBCF Reclamation Works near IS8 on 3 October 2014.

3.3.9.7 Turbidity level recorded at IS8, IS(Mf)9 and IS(Mf)16 were below the action and limit level. This indicates the turbidity level at area near IS8 was not adversely affected.

3.3.9.8 The exceedance was likely due to local effects in the vicinity of IS8.

3.3.9.9 As such, the exceedance recorded at IS8 is unlikely to be project related.

3.3.9.10 Action taken under the event and action plan:

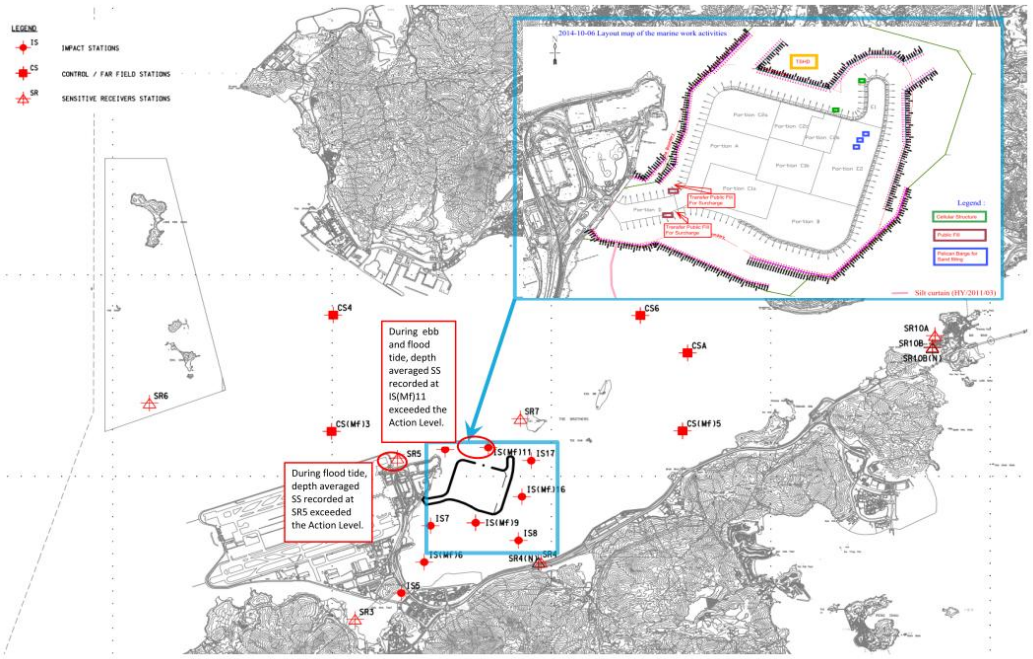
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.9.11 ET’s conclusions and recommendations for mitigation: Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.9.12 Contractor’s actions to implement the mitigation: As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.10 (1) One Action Level Exceedance of SS at IS(Mf)11 was recorded on 6 October 2014 during ebb tide; (2) Two Action Level Exceedances of SS at IS(Mf)11 and SR5 were recorded on 6 October 2014 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during each tide following the Action and Limit Levels for Water Quality, i.e. CS6, CSA and CS(Mf)5 during flood tide and CS4 and CS(Mf)3 during ebb tide.

3.3.10.1 Layout map below shows active works conducted on 6-Oct-14. Works such as cellular structure installation was conducted at north part of the HKBCF Reclamation Works and sand filling was conducted at Portion E2 when monitoring was conducted.



3.3.10.2 Exceedance recorded at SR5 during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.10.3 With reference to the silt curtain checking record defects was observed at parts of the perimeter silt curtain which are close to the SR5.

3.3.10.4 With reference to the information provided by the Contractor, same types of work were carried out at almost the same locations on 3, 6 and 8 October 2014, impact water quality monitoring data recorded on 3 and 8 October 2014 at SR5 are all below the Action and Limit Level which indicates exceedance at SR5 was unlikely due to active works.

3.3.10.5 The location of monitoring station IS10 is located downstream and closer to active works than SR5 but no exceedance was recorded at IS10 during flood tide. This the acton level exceedance of SS at SR5 is unlikely attribute to active construction works.

3.3.10.6 Turbidity level recorded at SR5, IS10 and IS(Mf)11 recorded on 6 October 2014 were below the action and limit level. This indicates the turbidity level at area near SR5 was not adversely affected.

3.3.10.7 With refer to monitoring record, no silt plumes was observed when monitoring is conducted in SR5.

3.3.10.8 The exceedance was likely due to local effects in the vicinity of SR5.

3.3.10.9 Exceedances recorded at IS(Mf)11 during ebb and flood tide are unlikely due to marine based construction activities of the Project because:

3.3.10.10 With reference to the information provided by the Contractor, same types of work were carried out at almost the same locations on 3, 6 and 8 October 2014, impact water quality monitoring data recorded on 3 and 8 October 2014 at IS(Mf)11 are all below the Action and Limit Level which indicates exceedance were unlikely due to active works.

3.3.10.11 With reference to the silt curtain checking record defects was observed at parts of the perimeter silt curtain which are close to the IS(Mf)11. As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.10.12 Turbidity level recorded at SR5, IS10, IS(Mf)11 and IS17 recorded on 6 October 2014 were below the action and limit level. This indicates the turbidity level at area near IS(Mf)11 was not adversely affected.

3.3.10.13 With refer to monitoring record, no dispersion of turbid water from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain or silt plumes was observed when monitoring is conducted in IS(Mf)11.

3.3.10.14 The exceedances were likely due to local effects in the vicinity of IS(Mf)11.

3.3.10.15 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.10.16 Action taken under the event and action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

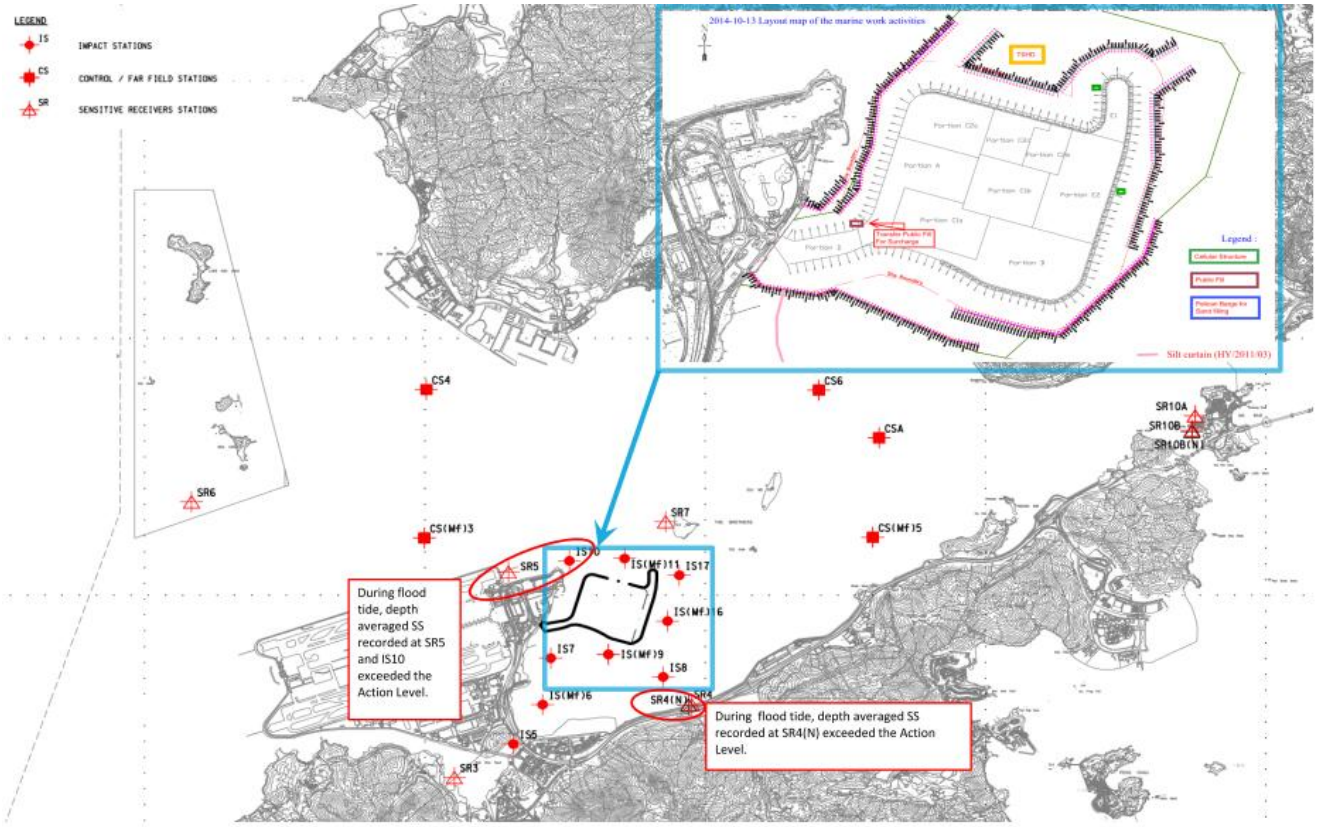
3.3.10.17 ET's conclusions and recommendations for mitigation: Mitigation measures such as perimeter silt curtain was implemented by the Contractor, however defects of the perimeter silt curtain was observed, the Contractor was reminded to ensure swift provision of maintenance to the silt curtains once defects were found.

3.3.10.18 Contractor's actions to implement the mitigation: With refer to the maintenance record provided by the Contractor, maintenance work for the defects of the northwest part of the perimeter silt curtain was conducted on 28 October 2014.

3.3.10.19 Photo shows sea condition at northwest part of HKBCF reclamation works on 6 Oct 2014 during ebb tide.

3.3.11 (3) Three Action Level Exceedances of SS were recorded at IS10, SR4(N) and SR5 on 13 October 2014 during flood tide. The exceedances were confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.11.1 Layout map below shows active works conducted on 13-Oct-14. Works such as construction works for cellular structure were conducted at northeast part of the HKBCF Reclamation Works.



3.3.11.2 Exceedance recorded at IS10 and SR5 during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.11.3 With reference to the silt curtain checking record, defects was observed at parts of the perimeter silt curtain which are close to the IS10 and SR5.

3.3.11.4 With reference to the information provided by the Contractor, active construction works were carried out at locations closer to SR5 and IS10 on 10 October 2014. There were more active construction works carried out on 15 October 2014 during the same tide, impact water quality monitoring data recorded on 10 and 15 October 2014 at SR5 and IS10 are all below the Action and Limit Level which indicate exceedances at SR5 and IS10 were unlikely due to active construction works for cellular structure.

3.3.11.5 Relative more turbid water were observed at IS10 and SR5 during flood tide but no filling activities was observed in progress and no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted at IS10 and SR5.

3.3.11.6 Also, turbidity level recorded at SR5, IS10 and IS(Mf)11 were below the action and limit level. This indicates the turbidity level at area near SR5 and IS10 was not adversely affected.

3.3.11.7 The exceedance was likely due to local effects in the vicinity of SR5 and IS10.

3.3.11.8 Exceedance recorded at SR4(N) during flood tide IS unlikely due to marine based construction activities of the Project because:

3.3.11.9 With reference to the silt curtain checking record defects was not observed at southeast part of the perimeter silt curtain which the closest to SR4(N).

3.3.11.10 The SS level recorded at IS(Mf)9, IS8 and IS(Mf)16 which located closer to active works were below the action and limit level which indicates exceedance at SR4(N) were unlikely due to active construction works for cellular structure.

3.3.11.11 Turbidity level recorded at SR4(N), IS(Mf)9, IS8 and IS(Mf)16 were below the action and limit level. This indicates the turbidity level at area near IS(Mf)11 was not adversely affected.

3.3.11.12 The exceedance was likely due to local effects in the vicinity of SR4(N).

3.3.11.13 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.11.14 Action taken under the event and action plan:

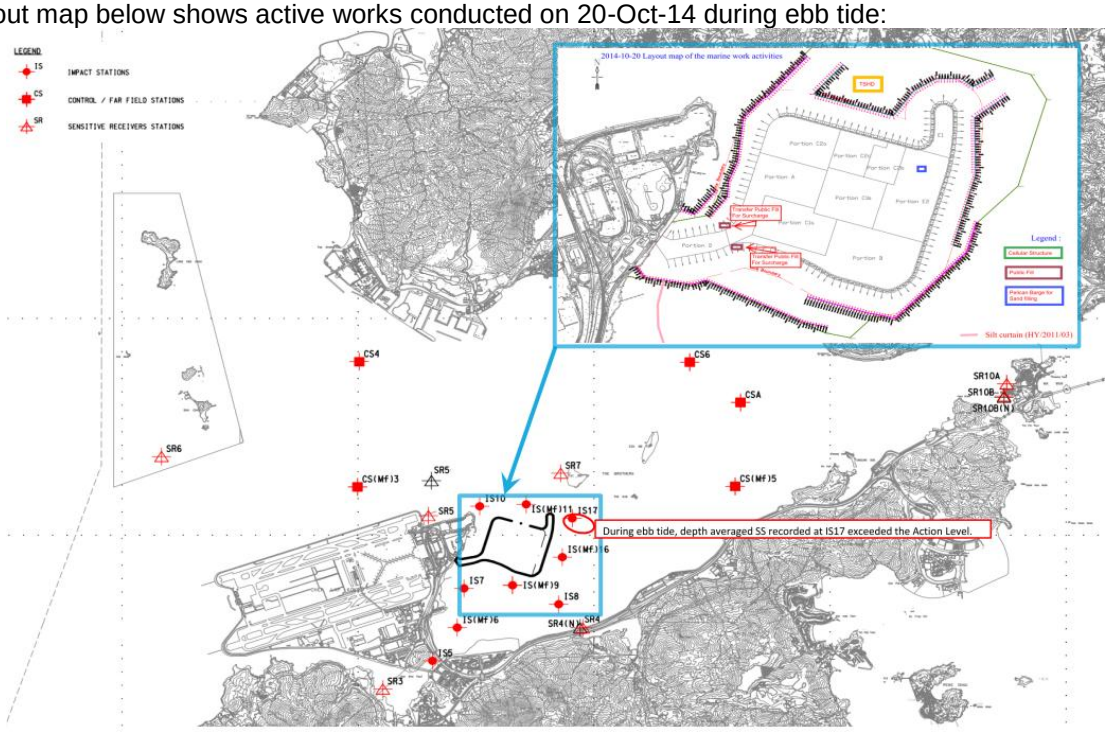
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.11.15 ET’s conclusions and recommendations for mitigation: Mitigation measures such as perimeter silt curtain was implemented by the Contractor, however defects of the perimeter silt curtain was observed, the Contractor was reminded to ensure swift provision of maintenance to the silt curtains once defects were found.

3.3.11.16 Contractor’s actions to implement the mitigation: With refer to the maintenance record provided by the Contractor, maintenance work for the defects of the northwest part of the perimeter silt curtain was conducted on 28 October 2014.

3.3.12 (1) One Action Level Exceedance of SS was recorded at IS17 on 20 October 2014 during ebb tide. The exceedance was confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.12.1 Layout map below shows active works conducted on 20-Oct-14 during ebb tide:



3.3.12.2 Exceedance recorded at IS17 is likely due to marine based construction activities of the Project because:

3.3.12.3 With refer to monitoring record, appearance of water was relatively more turbid at IS17 when compared with the appearance of water at IS(Mf)11, IS10 and IS(Mf)16 during monitoring at ebb tide on 20-Oct-14.

3.3.12.4 With refer to the layout map above; sand filling was carried out at Portion E2 on 20-Oct-14 during ebb tide.

3.3.12.5 The source of impact is likely due pelican barge's propeller movement at shallow water during ebb tide when the position of the barge was adjusted at Portion E. In addition, with refer to the silt curtain condition on 20-Oct-14, defects of the perimeter silt curtain was observed at Northeastern of the construction site. The turbid water observed at IS17 is likely due to the dispersion of turbid water from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain through the defective part of the perimeter silt curtain.

3.3.12.6 Action taken under the event and action plan

1. Repeat in situ measurement is not applicable to suspended solid as SS was not measured in situ;
2. Source of impact refer to bullet point section 4.7.8.4
3. IEC, Contractor, ER and EPD were noticed of the limit level exceedances via email;
4. Monitoring data was reviewed, plant, equipment and contractor's working methods were checked. Please refer to the layout map above.
5. The Contractor was reminded to ensure swift provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.
6. Mitigation measures such as perimeter silt curtain was implemented by the Contractor, however defects of the perimeter silt curtain was observed, the Contractor was reminded to ensure swift provision of maintenance to the silt curtains once defects were found. With refer to

the maintenance record provided by the Contractor, maintenance work for the defects of the Northeastern part of the perimeter silt curtain was conducted on 28-Oct-14.

7. Monitoring results show no recurrence of exceedance at IS17 during ebb tide on 22 Oct 2014.

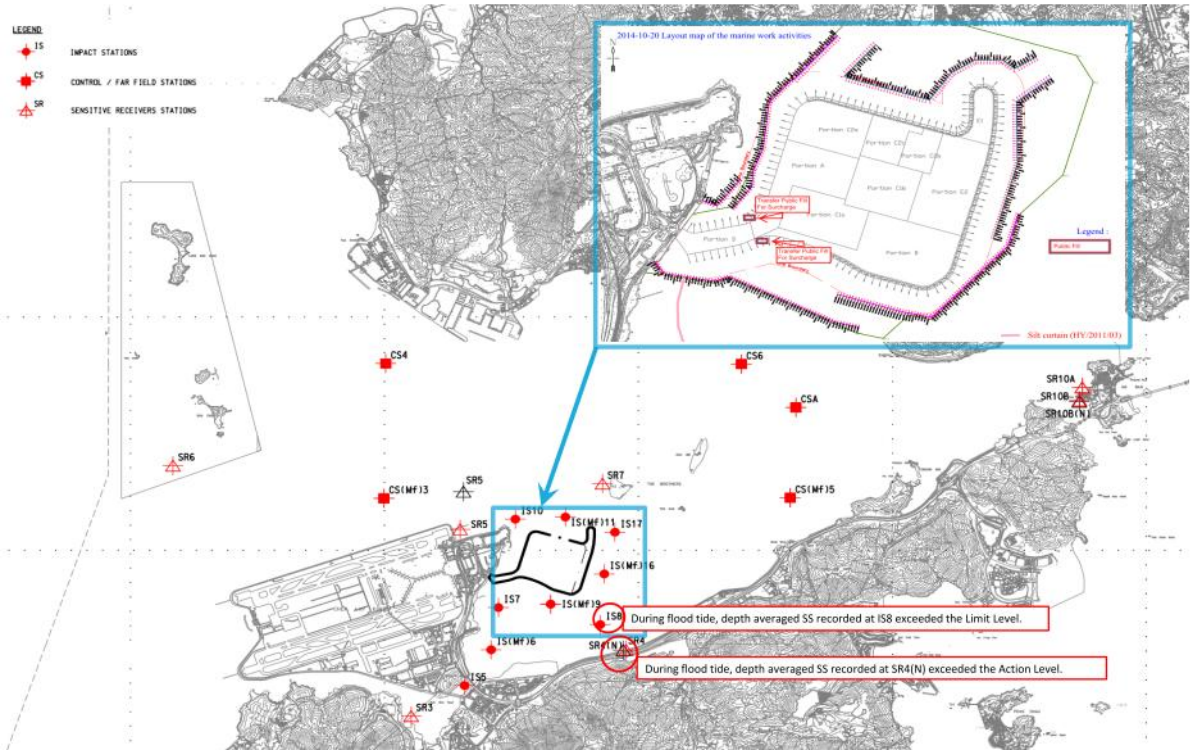
3.3.12.7 ET's conclusions and recommendations for mitigation: Exceedances recorded at IS17 are likely to be related to vessel movement at shallow water during ebb tide. The Contractor was further reminded to control the vessel traffic at this area and ensure swift provision of maintenance to the silt curtains once defect was found.

3.3.12.8 Contractor's actions to implement the mitigation: As informed by the Contractor, traffic control such as vessel speed limit was implemented and operation of sand filling vessel at shallow water during ebb tide was avoided. Monitoring results show no recurrence of exceedance at IS17 on 22-Oct-14.

3.3.12.9 With refer to the maintenance record provided by the Contractor, maintenance work for the defects of the Northeastern part of the perimeter silt curtain was conducted on 28-Oct-14.

3.3.13 (1) One action level exceedance and (1) limit level exceedance of SS were recorded at SR4(N) and IS8 respectively on 20 October 2014 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.13.1 Layout map below shows active works conducted on 20-Oct-14 during flood tide.



3.3.13.2 With reference to the information provided by the Contractor, only public fill was transferred at Portion D for surcharge on 20 October 2014 during flood tide and no active marine construction activity from this Contract was conducted near IS8, as such, it is unlikely to cause silt plume and contribute to the elevation of SS at IS8 during flood tide.

3.3.13.3 IS(Mf)9 is located closer to the construction site than monitoring station IS8. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during the flood tide on the same day at IS(Mf)9 was below the Action and Limit Level which shows that the water quality closer to construction site was not adversely affected.

3.3.13.4 In accordance with the silt curtain integrity checking record of 20 October 2014, no defect of the perimeter silt curtain was observed at the southeast part of HKBCF Reclamation Works. In addition, with referred to monitoring record , no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain and no discoloration of sea water has been observed at IS8.

3.3.13.5 Turbidity level recorded at IS8, IS(Mf)9 and IS(Mf)16 were below the action and limit level. This indicates the turbidity level at area near IS8 was not adversely affected.

3.3.13.6 The exceedance was likely due to local effects in the vicinity of IS8.

3.3.13.7 As such, the exceedance recorded at IS8 is unlikely to be project related.

3.3.13.8 Exceedance recorded at SR4(N) during flood tide is unlikely due to marine based construction activities of the Project because:

3.3.13.9 With reference to the information provided by the Contractor, only public fill was transferred at Portion D for surcharge on 20 October 2014 during flood tide and no active marine construction activity from this Contract was conducted near SR4(N), as such, it is unlikely to cause silt plume and contribute to the elevation of SS at SR4(N) during flood tide.

3.3.13.10 With reference to the silt curtain checking record defects was not observed at southeast part of the perimeter silt curtain which the closest to SR4(N) on 20 October 2014.

3.3.13.11 The SS level recorded at IS(Mf)9, IS8 and IS(Mf)16 which located closer to active works were below the action and limit level on 20 October 2014 which indicates exceedance at SR4(N) was unlikely due to active construction works for cellular structure .

3.3.13.12 Turbidity level recorded at SR4(N), IS(Mf)9, IS8 and IS(Mf)16 on 20 October 2014 were below the action and limit level. This indicates the turbidity level at area near IS(Mf)11 was not adversely affected.

3.3.13.13 The exceedance was likely due to local effects in the vicinity of SR4(N).

3.3.13.14 Action taken under the event and action plan:

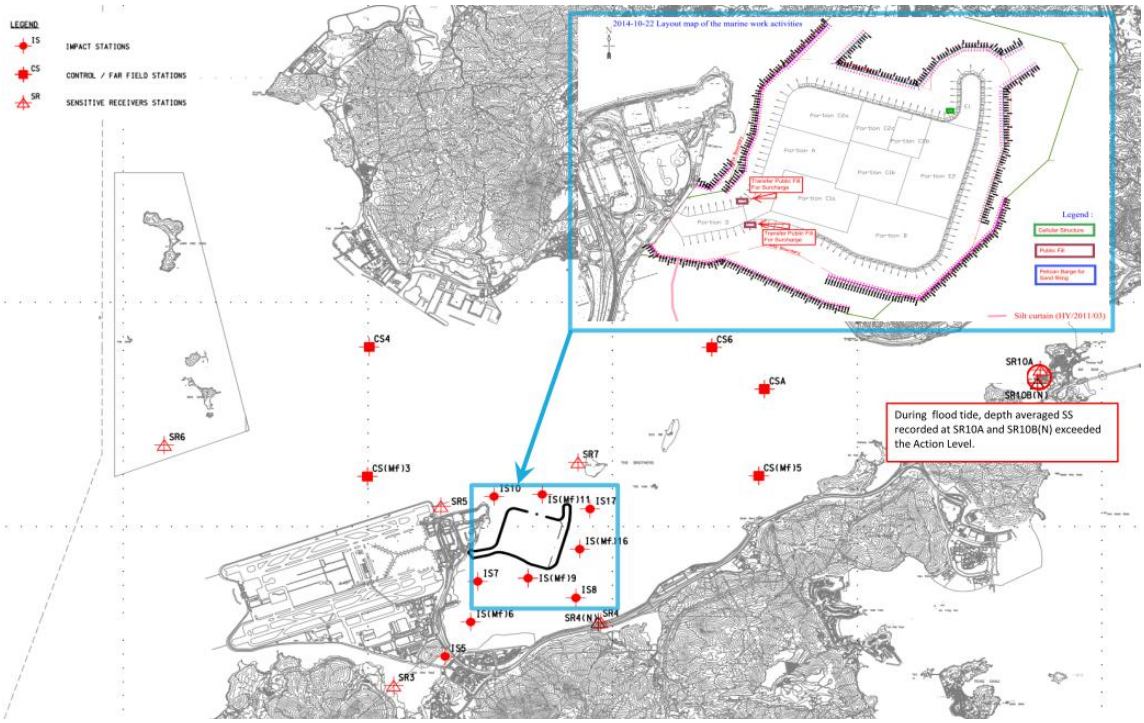
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.13.15 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once

3.3.13.16 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis.

3.3.14 (2) Two Action Level Exceedances of SS were recorded at SR10A and SR10B(N) on 22 October 2014 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.14.1 For marine works, works involve cellular structure was conducted at portion E1 during flood tide on 22 October 2014. Also refer to layout map below:



3.3.14.2 Exceedances were not due to marine based construction works of the Project because:

3.3.14.3 IS(Mf)11 and IS10 are located downstream and closer to the active works than monitoring station SR10B(N) and SR10A during flood tide on 22 October 2014. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during flood tide on the same day at IS(Mf)11 and IS10 were below the Action and Limit Level which indicates project work is unlikely to contribute to the action level exceedance recorded at SR10B(N) and SR10A.

3.3.14.4 The monitoring location of monitoring station SR10B(N) and SR10A are considered upstream and remote to the active works of this project during flood tide. Therefore it was unlikely that the exceedances recorded at SR10B(N) and SR10A during flood tide were due to active construction activities of this project on 22 October 2014.

3.3.14.5 The exceedances are likely due to local effects in the vicinity of SR10B(N) and SR10A.

3.3.14.6 Action taken under the event and action plan:

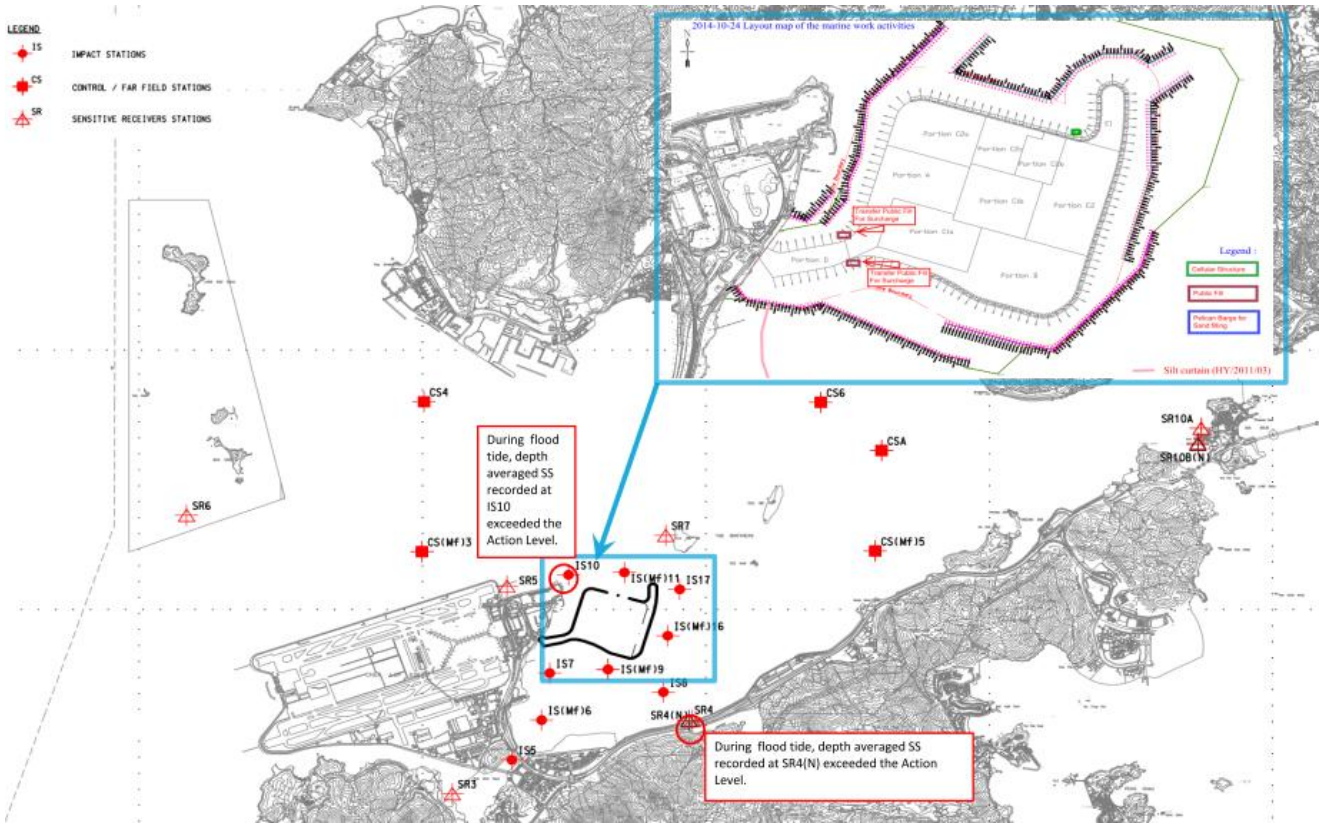
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.14.7 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.14.8 As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.15 (2) Two Action Level Exceedances of SS were recorded at IS10 and SR4(N) during flood tide on 24 October 2014. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.15.1 Layout map below shows active works conducted on 24-Oct-14.



3.3.15.2 Exceedance recorded at IS10 during mid-flood tide is unlikely due to marine based construction activities of the Project because:

3.3.15.3 With reference to the silt curtain checking record, defects was observed at parts of the perimeter silt curtain which are close to the IS10.

3.3.15.4 With reference to the information provided by the Contractor, active construction works for cellular structure was carried out northeast part of the perimeter silt curtain. Almost the same active construction works was carried out on 22 and 27 October 2014 during the same tide, impact water quality monitoring data recorded on 22 and 27 October 2014 IS10 are all below the Action and Limit Level which indicate exceedance recorded at IS10 was unlikely due to active construction works for cellular structure.

3.3.15.5 No filling activities was observed in progress and no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted at IS10.

3.3.15.6 Also, turbidity level recorded at SR5, IS10 and IS(Mf)11 recorded on 24 October 2014 were below the action and limit level. This indicates the turbidity level at area near IS10 was not adversely affected.

3.3.15.7 The exceedance was likely due to local effects in the vicinity of IS10.

3.3.15.8 Exceedance recorded at SR4(N) during flood tide IS unlikely due to marine based construction activities of the Project because:

3.3.15.9 With reference to the silt curtain checking record defects was not observed at southeast part of the perimeter silt curtain which the closest to SR4(N).

3.3.15.10 The SS level recorded at IS(Mf)9, IS8 and IS(Mf)16 which located closer to active works were below the action and limit level which indicates exceedance at SR4(N) were unlikely due to active construction works for cellular structure .

3.3.15.11 Turbidity level recorded at SR4(N), IS(Mf)9, IS8 and IS(Mf)16 recorded on 24 October 2014 were below the action and limit level. This indicates the turbidity level at area near IS(Mf)11 was not adversely affected.

3.3.15.12 The exceedance was likely due to local effects in the vicinity of SR4(N).

3.3.15.13 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.15.14 Action taken under the event and action plan:

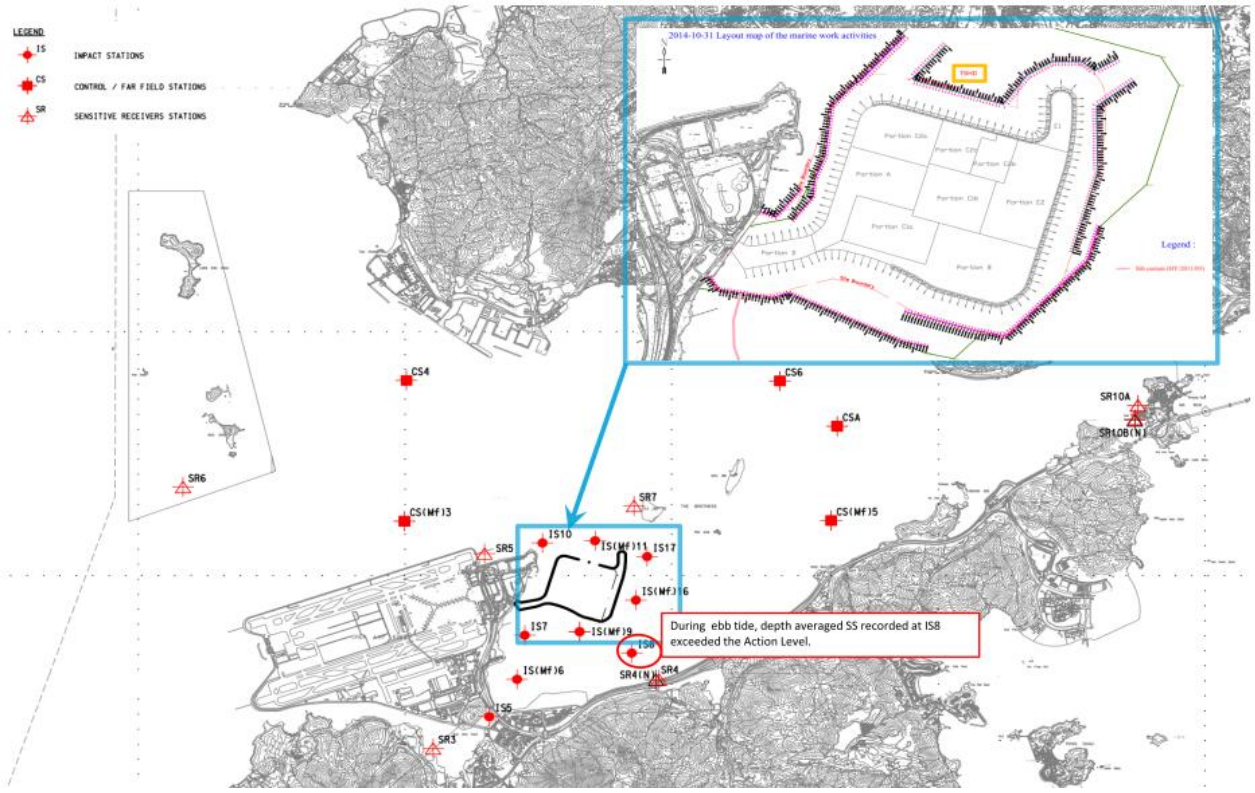
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.15.15 ET’s conclusions and recommendations for mitigation: Mitigation measures such as perimeter silt curtain was implemented by the Contractor, however defects of the perimeter silt curtain was observed, the Contractor was reminded to ensure swift provision of maintenance to the silt curtains once defects were found.

3.3.15.16 Contractor’s actions to implement the mitigation: With refer to the maintenance record provided by the Contractor, maintenance work for the defects of the northwest part of the perimeter silt curtain was conducted on 28 October 2014.

3.3.16 For the action level exceedance of SS noted at IS8 during ebb tide on 31 October 2014. The exceedance was confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.17 Layout map below shows active works conducted on 31-Oct-14 during ebb tide.



3.3.17.1 Exceedance recorded at IS8 during ebb tide is unlikely due to marine based construction activities of the Project because:

3.3.17.2 With reference to the information provided by the Contractor, no marine works was conducted during ebb tide, it is unlikely to cause silt plume and contribute to the elevation of SS at IS8 during ebb tide.

3.3.17.3 IS(Mf)9 is located closer to the construction site than monitoring station IS8. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during the ebb tide on 31 October 2014 at IS(Mf)9 was below the Action and Limit Level which shows that the water quality closer to construction site was not adversely affected.

3.3.17.4 In accordance with the silt curtain integrity checking record of 31 October 2014, no defect of the perimeter silt curtain was observed at the southeast part of HKBCF Reclamation Works. In addition, with referred to monitoring record , no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain and no discoloration of sea water has been observed at IS8.

3.3.17.5 Turbidity level recorded at IS8, IS(Mf)9 and IS(Mf)16 on 31 October were below the action and limit level. This indicates the turbidity level at area near IS8 was not adversely affected

3.3.17.6 The exceedance was likely due to local effects in the vicinity of IS8.

3.3.17.7 As such, the exceedance recorded at IS8 is unlikely to be project related.

3.3.17.8 Action taken under the event and action plan:

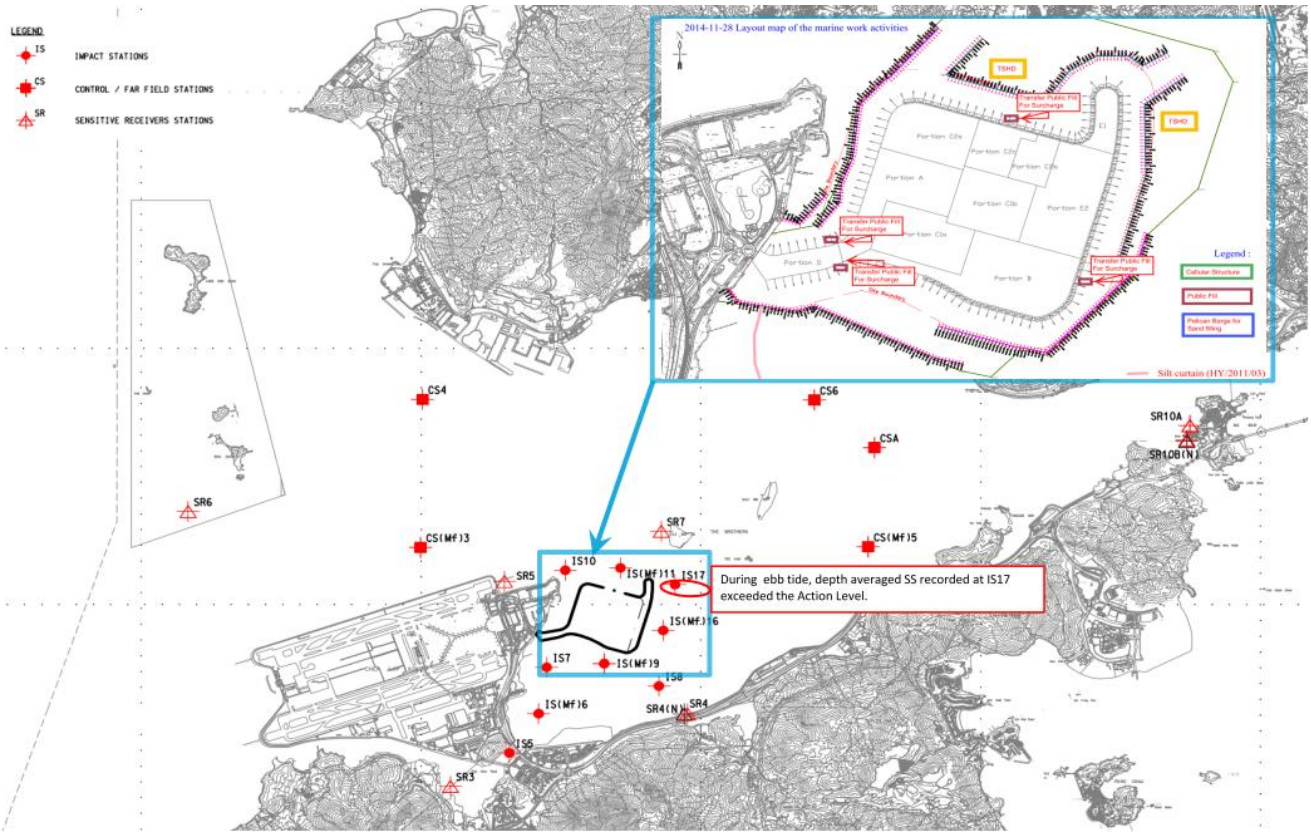
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this project;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5 - 7 under the EAP are not considered applicable.

3.3.17.9 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.17.10 As informed by the Contractor, maintenance work of the silt curtain is on-going and carried out by the Contractor on a daily basis.

3.3.18 For water quality, one (1) action level exceedance was recorded at IS17 on 28 November 2014 during mid ebb tide. The exceedance was confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.18.1 Layout map below shows active works conducted on 28 November 2014 during ebb tide.



3.3.18.2 Exceedance recorded at IS17 on 28 November 2014 during ebb tide is unlikely due to marine based construction activities of the Project because:

3.3.18.3 With refer to monitoring record, appearance of water was relatively more turbid at IS17 when compared with the appearance of water at IS(Mf)11, IS10 and IS(Mf)16 during monitoring at ebb tide on 28 November 2014.

3.3.18.4 However, with refer to the layout map attached; only public fill was being transferred as surcharge at near Portion D, C2c and B and since no filling was conducted during ebb tide on IS17 on 28 November 2014.Ttherefore, they are unlikely contribute to the action level exceedance of SS at IS17.

3.3.18.5 The location and type of active works conducted were almost the same on 26 and 28 November 2014 during ebb tide but no exceedance was recorded a IS17 on 26 November 2014. This indicates that the exceedance at monitoring station IS17 were unlikely to be contributed by active works.

3.3.18.6 In addition, with referred to monitoring record, no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain.

3.3.18.7 Turbidity level recorded at IS17, IS(Mf)11 and IS(Mf)16 on 28 November 2014 were below the action and limit level. This indicates the turbidity level at area near IS17 was not adversely affected.

3.3.18.8 The exceedance was likely due to local effects in the vicinity of IS17.

3.3.18.9 As such, the exceedance recorded at IS17 is unlikely to be project related.

3.3.18.10 Action taken under the action plan

3.3.18.11 Not applicable as SS was not measured in situ;

3.3.18.12 After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this Contract;

3.3.18.13 IEC, contractor and ER were informed via email;

3.3.18.14 Monitoring data, all plant, equipment and Contractor's working methods were checked;

3.3.18.15 Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

3.3.18.16 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.18.17 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.19 The event action plan is annexed in Appendix K.

3.4 Dolphin Monitoring

3.4.1 In accordance with the Project Specific EM&A Manual, pre-set and fixed transect line vessel based dolphin survey was required in two AFCD designated areas (Northeast Lantau (NEL) and Northwest Lantau (NWL) survey areas). The impact dolphin monitoring at each survey area should be conducted twice per month.

3.4.2 The impact dolphin monitoring conducted is vessel-based and combines line-transect and photo-ID methodology, which have adopted similar survey methodologies as that adopted during baseline monitoring to facilitate comparisons between datasets.

3.4.3 The layout map of impact dolphin monitoring have been provided by AFCD and is shown in Figure 4.

3.4.4 The effort summary and sighting details during the reporting quarter are shown in the Appendix H. A summary of key findings of the dolphin surveys completed during the reporting quarter is shown below:

Table 3.6 Summary of Key Dolphin Survey Findings in September – November 2014

Number of Impact Surveys Completed^	6
Survey Distance Travelled under Favourable On- Effort Condition	660.3km
Number of Sightings	15 sightings (9 sightings are ”on effort” (which are all under favourable condition), 6 “sightings are opportunistic”)
Number of dolphin individual sighted	54 individuals (the best estimated group size)
Dolphin Encounter Rate#	NEL: 0 NWL: 2.1
Dolphin Group Size	Average of NEL: 0 Average of NWL: 3.6 Varied from 1-8 individuals
Most Often frequent dolphin sighting area	Northern Sha Chau and Lung Kwu Chau Marine Park, the western limit of NWL and Tai O area.

3.4.5 Remarks:
^ Completion of line transect survey of NEL and NWL survey area once was counted as one complete survey.
# Dolphin Encounter Rate = (Sum of 1st 2nd, 3rd month’s total sighting/ Sum of 1st , 2nd, 3rd month’s total effort)*100km (encounter rates are calculated using on effort sightings made under favourable conditions only.)

3.4.6 One (1) Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. Investigation report is annexed in Appendix L. Actions were taken according to the Event Action Plan for impact dolphin monitoring. Please refer to Appendix L for details of action taken.

Table 3.7 Summary of STG and ANI encounter rates in September - November 2014

	NEL	NWL	Level Exceeded
STG*	0	2.1	Limit
ANI**	0	7.1	

*Quarterly Average Encounter Rate of Number of Dolphin Sightings (STG) presents averaged encounter rates of the three monitored months in terms of groups per 100km per survey event.
STG Encounter rate = (Average of (total number sighting/total effort) of 1st and 2nd completed survey# of 1st month+ Average of (total number sighting/total effort) of 1st and 2nd completed survey# of 2nd month + Average of (total number sighting/total effort) of 1st and 2nd completed survey# of 3rd month)/3*100km
**Quarterly Average Encounter Rate of Total Number of Dolphins (ANI) presents averaged encounter rates of the three monitored months in terms of individuals per 100km per survey event.

ANI Encounter rate = (Average of (total number of Individual/total effort) of 1st and 2nd completed survey# of 1st month+ Average of (total number of Individual/total effort) of 1st and 2nd completed survey# of 2nd month + Average of (total number of Individual/total effort) of 1st and 2nd completed survey# of 3rd month +)/3*100km

3.4.7 Details of the comparison and analysis methodology and their findings and discussions are annexed in Appendix H.

3.5 Environmental Site Inspection and Audit

3.5.1 Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. In the reporting quarter, 13 site inspections were carried out. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.

3.5.2 Particular observations during the site inspections are described below:

Air Quality

3.5.3 Filling was observed conducted by barge, the Contractor was reminded to keep the filling material wet or lower the conveyor belt to prevent generation of fugitive dust. (Reminder)

3.5.4 Dust was observed when truck passed a slope; the Contractor was reminded to enhance the dust control measures to prevent generation of fugitive dust. The Contractor enhanced the dust control measures to prevent generation of fugitive dust. (Closed)

3.5.5 Fugitive dust was observed generated when truck pass through a road at Portion D. The Contractor is reminded to provide sufficient dust control measures to prevent generation of fugitive dust. The Contractor provided dust control measures to prevent generation of fugitive dust. (Closed)

3.5.6 Dust control measure was not observed at the ramp of Portion D. The Contractor was reminded to provide dust control measure such to ramp with exposed soil which the water car has no access. (Reminder)

3.5.7 Exposed sand was observed at near Portion A. The Contractor was reminded to enhance dust control measures. (Reminder)

Noise

3.5.8 No adverse observation was identified in the reporting quarter.

Chinese White Dolphin

3.5.9 No adverse observation was identified in the reporting quarter.

Water Quality

3.5.10 Muddy water was observed at land area where ground investigation works was conducted, the Contractor was reminded to prevent muddy water to be released out of the site boundary. (Reminder)

3.5.11 Defects such as disconnection and insufficient overlapping of the perimeter silt curtain have been observed. The Contractor was advised to rectify the defects such as disconnection and insufficient overlapping of the perimeter silt curtain as soon as possible. The Contractor rectified the defects such as disconnection and insufficient overlapping of the perimeter silt curtain as soon as possible. (Closed)

3.5.12 Public fill were observed on the edge of barge at Portion D. The Contractor was reminded to clear it to prevent potential runoff to the surrounding (Reminder)

3.5.13 Defects such as disconnection and insufficient overlapping of the perimeter silt curtain have been observed. The Contractor was advised to rectify the defects such as disconnection and insufficient overlapping of the perimeter silt curtain as soon as possible. The Contractor rectified the defects such as disconnection and insufficient overlapping of the perimeter silt curtain. (Closed)

3.5.14 Silty water was observed at both side of the northern part of the perimeter silt curtain. The Contractor was reminded to conduct necessary checking of the integrity of the silt curtain and swiftly carry out

maintenance and repair once any defect is found. Photo record shows that the situation was not observed on 10 Oct 2014. (Closed)

3.5.15 Powered Mechanical Equipment (PME) was observed located close to sea. The Contractor was reminded to put the PME away from sea to prevent potential runoff. (Reminder)

3.5.16 Oil water mixture was observed stored inside oil drums without cover/lid and drip tray. The Contractor was reminded to provide cover/lid to tightly cover oil drums and provide drip tray to prevent spillage and runoff. The oil drum was removed by the Contractor. (Closed)

Chemical and Waste Management

3.5.17 General refuses observed at cell 56 and on water of arc cell between cell 55 and 56 and near a container office. The Contractor was reminded to clear the general refuses and keep the site clean and tidy. The Contractor cleared the general refuses and kept the site clean and tidy. (Closed)

3.5.18 General refuses was observed near a container office. The Contractor was reminded to clear the general refuses and keep the site clean and tidy. The Contractor cleared the general refuses and keeps the site clean and tidy. (Closed)

3.5.19 Battery and oil drum were placed on bare ground without drip tray. The Contractor was reminded to provide mitigation measures such as drip tray such that spillage/leakage can be easily collected. The Contractor provided mitigation measures such as drip tray so that spillage/leakage can be easily collected. (Closed)

3.5.20 Water was observed accumulated inside drip tray on barge SHB209. The Contractor was reminded to clear the water accumulated inside drip tray regularly. The Contractor cleared the water accumulated inside drip tray. (Closed)

3.5.21 Stack of cardboard paper and wave barriers were observed when inspection was conducted at area between steel cell #91 – 94. The Contractor was reminded to stored general refuse within a temporary refuse collection facility, in appropriate containers prior to collection and disposal. (Reminder)

3.5.22 General refuse was observed at portion D, the Contractor was reminded to clear the general refuse regularly to keep the site clean and tidy. The Contractor cleared the generate refuse. (Closed)

3.5.23 General refuse was observed on ground and temporary waste collection or rubbish bin was not observed. The Contractor was reminded to regularly collect and store general refuse within a temporary refuse collection facility, in appropriate containers prior to collection and disposal. The Contractor provided regularly collect and store general refuse within a temporary refuse collection facility and general refuse was stored in containers prior to collection and disposal. (Closed)

3.5.24 Rubbish bin was not observed. The Contractor was reminded to provide rubbish bin to collect and temporarily keep general refuse. The Contractor provided mitigation measures such as rubbish bin to collect and temporarily keep general refuse. (Closed)

3.5.25 Defects (hole and deformed frame) were observed within frame of a drip trays. The Contractor was reminded to provide proper mitigation measure such as drip tray without defect to PMEs. The Contractor provided proper mitigation measure such as drip tray without defect to PMEs. (Closed)

3.5.26 Oil drum was observed without drip tray. The Contractor was reminded to provide mitigation measures such as drip tray or bunding to oil drum. The Contractor was provided mitigation measures such as drip tray or bunding to oil drum. (Closed)

3.5.27 Oil drum was observed without drip tray. The Contractor was reminded to provide mitigation measures such as drip tray or bunding to oil drum. The Contractor provided mitigation measures such as drip tray to oil drum. (Closed)

3.5.28 Oil drum was observed without drip tray, the Contractor was reminded to provide drip tray to oil drums. The Contractor cleared the oil drum. (Closed)

3.5.29 It was observed that the frame of a drip tray was deformed; the Contractor was reminded to provide drip tray without defects. The Contractor provided drip tray without defects to oil drums. (Closed)

3.5.30 Oil and water mixture was observed accumulated inside a drip tray. The Contractor was reminded to clear the mixture to prevent runoff. The Contractor cleared the mixture. (Closed)

3.5.31 Oil drum and generator was observed without drip tray. The Contractor was reminded to provide mitigation measures such as drip trays to oil drum and generator. The Contractor removed the oil drum and generated from the area (Closed)

3.5.32 Oil stain was observed on sea area and the Contractor was reminded to take actions following the spill response plan and rectify the situation. The Contractor used absorption booms and pads as SOC to remove all the observed oil stain on 13 Nov 14 and the used booms and pads were treated and disposed of as chemical waste. (Closed)

3.5.33 Oil drum was observed without drip tray. The Contractor was reminded to provide mitigation measures such as drip tray to oil drums. The Contractor removed the oil drum from the area. (Closed)

Landscape and Visual Impact

3.5.34 No relevant works was carried out in the reporting Quarter.

Others

3.5.35 The text on the EP was blurred and cannot be seen clearly on barge SHB209. The Contractor was reminded to replace the copy of the EP so that the text of the EP can be shown clearly. The Contractor replaced the copy of the EP so that the text of the EP can be shown clearly. (Closed)

3.5.36 Rectifications of remaining identified items are undergoing by the Contractor. Follow-up inspections on the status on provision of mitigation measures will be conducted to ensure all identified items are mitigated properly.

4 ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS

4.1 Summary of Solid and Liquid Waste Management

4.1.1 The Contractor registered as a chemical waste producer for this project. Sufficient numbers of receptacles were available for general refuse collection and sorting.

4.1.2 As advised by the Contractor, 4,909,877m^3 of fill were imported for the Project use in the reporting period. 444kg of paper/cardboard packaging, 342,625kg of metals, 1kg of plastics, 1,200kg of chemical waste, 260m^3 of general refuse were generated and disposed of in the reporting period. Summary of waste flow table is detailed in Appendix I.

4.1.3 The Contractor is advised to properly maintain on site C&D materials and wastes collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse / recycle of C&D materials and wastes. The Contractor is reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.

4.1.4 The Contractor is reminded that chemical waste containers should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

5 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

5.1 Implementation Status of Environmental Mitigation Measures

5.1.1 In response to the site audit findings, the Contractors carried out corrective actions.

5.1.2 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in Appendix C. Most of the recommended mitigation measures are being upheld. Moreover, regular review and checking on the construction methodologies, working processes and plants were carried out to ensure the environmental impacts were kept minimal and recommended environmental mitigation measures were implemented effectively.

5.1.3 Training of marine travel route for marine vessels operator was given to relevant staff and relevant records were kept properly.

5.1.4 Regarding the implementation of dolphin monitoring and protection measures (i.e. implementation of Dolphin Watching Plan, Dolphin Exclusion Zone and Silt Curtain integrity Check), regular checks were conducted by experienced MMOs within the works area to ensure that no dolphins were trapped by the silt curtain area. There were no dolphins spotted within the silt curtain during this quarter. The relevant procedures were followed and all measures were well implemented. The silt curtains were also inspected in accordance to the submitted plan.

5.1.5 Acoustic decoupling measures on noisy plants on construction vessels were checked regularly and the Contractor was reminded to ensure provision of ongoing maintenance to noisy plants and to carry out improvement work once insufficient acoustic decoupling measures were found.

5.1.6 Frequency of watering per day on exposed soil was checked; with reference to the record provided by the Contract, watering was conducted at least 8 times per day on reclaimed land. The frequency of watering is the mainly refer to water truck. Sprinklers are only served to strengthen dust control measure for busy traffic at the entrance of Portion D. As informed by the Contractor, during the mal-function period of sprinkler, water truck will enhance watering at such area. The Contractor was reminded to ensure provision of watering of at least 8 times per day on all exposed soil within the Project site and associated works areas throughout the construction phase.

5.1.7 EPD conducted inspection at HKBCF Reclamation Works at 11:36am on 23 October 2014, silt plume was observed spreading out from the Portion E1 of the construction site through the silt curtain when filling activities by derrick barge (振明 28) was undergoing.

5.1.7.1 EPD subsequently issued a yellow form and requested Contractor to report them via ET Leader and IEC within 7 days after issuing the yellow form for the remedial actions and preventive actions taken to improve the situation.

5.1.7.2 Insufficient Mitigation Measures: Silt plume was found spreading out from Portion E1 of the construction site through the silt curtain on 23 October 2014.

5.1.7.3 Review of Contractor's investigation report and rectifications.

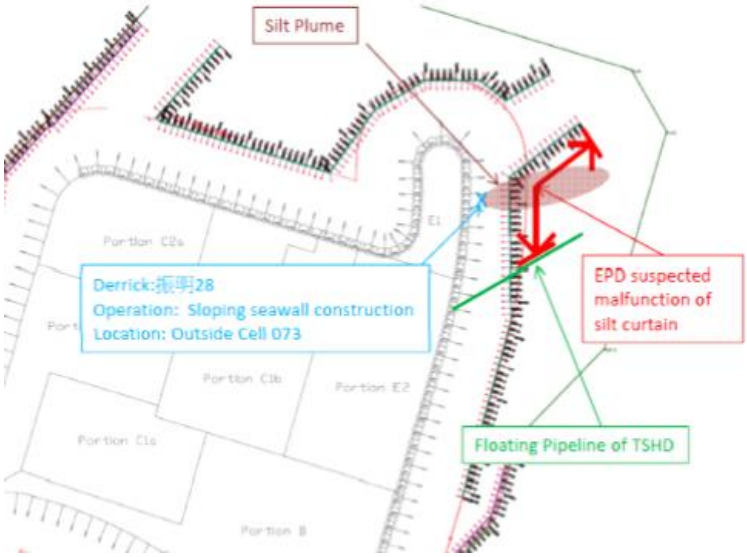
5.1.7.4 Investigation actions:

- Review of monitoring data obtained 20, 22, 24 and 27 October 2014.
- Investigation report provided by the Contractor on 29 October 2014 was reviewed:
- Diver checking and rectification record for integrity of silt curtain has been checked.
- Inspection condition of sea area near Portion E1 on 31 October 2014 around 1pm.

5.1.7.5 Investigation results:

- Suspended Solids (SS) level and turbidity level recorded at IS(Mf)11, IS17 and IS(Mf)16 and IS8 on 20, 22, 24 and 27 October 2014 were reviewed. (for IWQM data, refer to Appendix J)
- Review of Suspended Solids (SS) level and turbidity level recorded at IS(Mf)11, IS17 and IS(Mf)16 and IS8 on 20 October 2014:
- Limit Level Exceedance of SS at IS8 during flood tide and Action Level Exceedance of IS17 during ebb tide was noted on 20 October 2014. After investigation, the exceedance recorded at IS8 are unlikely to be project related. However, exceedance recorded at IS17 is likely due to marine based construction activities of the Project. For details of investigation, please refer to investigation details section 4.7.3 to 4.7.4.
- Review of Suspended Solids (SS) level and turbidity level recorded at IS(Mf)11, IS17, IS(Mf)16 and IS8 on 22, 24 and 27 October 2014:
- Turbidity level and Suspended Solids recorded on 22, 24 and 27 October 2014 at IS(Mf)11, IS17, IS(Mf)16 and IS8 were below the action and limit level. This indicates the turbidity level and suspended solid at sea area close to portion E1 was not adversely affected on 22, 24 and 27 October 2014.
- The silt plume was no longer observed at 02:09pm on 23 October 2014 after derrick barge (振明 28) ceased the work at 11:40am.
- The Contractor arranged diver to check the integrity of the concerned silt curtain. Minor damaged found on the concerned silt curtain and rectification works had been carried out by the Contractor.

- Diver checking and rectification record for integrity of silt curtain has been checked and it shows that the part of the silt curtain which was suspected to be malfunction (showed by red arrow in the diagram below) has been rectified by the Contractor.



- Subsequently, a rock placement trial was conducted by the Contractor on 28 October 2014. Silt plume was observed during the process but Figure 3.8 of the investigation report shows that spreading to the outside of the silt curtain was prevented by the silt curtain.
- Photo records taken on 31 October 2014 shows the sea condition at sea area near the northeast side of the HKBCF Reclamation Works and no silt plume was observed spreading out from Portion E1 of the construction site through the silt curtain:

5.1.7.6 As informed by the Contractor, rockfill materials would be placed more slowly by the derrick as well as the lowest dropping point to minimize the generation of silt plume. Daily site inspection in the area would be conducted so that any damaged parts of silt curtain can be observed and repaired promptly.

5.1.7.7 The Contractor was further reminded to ensure swift provision of maintenance to the perimeter silt curtains once defects of the perimeter silt curtain were observed and continue the preventive measures during rock filling and keep the site inspected at least daily to ensure compliance with respect to the recommendations in the EIA Report and EM&A Manual in particular on EIA Ref. Section 9.11.1.1

5.1.7.8 IWQM results on 29 and 31 October 2014 were review, no exceedance was recorded at IS17, IS(Mf)11 and IS(Mf)16 which indicates that no adverse water quality impact after the implementation of the preventive measures.

5.1.7.9 To prevent recurrence of the observed incident, inspection has been conducted by the Contractor on a daily basis to review if there is an impact to the water quality caused by rock filling activities using derrick barge and to promptly provide maintenance once any damaged parts of silt curtain is observed. The Contractor was further reminded to carry out swift rectification works to the situation once any adverse impact to the water quality is observed.

5.1.7.10 The Contractor was reminded that all water quality mitigation measures with respect to the recommendations in the EIA Report and EM&A Manual in particular on EIA Ref. Section 9.11.1.1 should be fully and properly implemented.

5.1.8 Review of Contractor's work and mitigation measures with respect to the recommendations in the EIA Ref. Section 9.11.1.6:

5.1.8.1 Actions taken:

- Review of monitoring results on 27 and 29 October 2014.
- Ad hoc site inspection was conducted on 31 October 2014

5.1.8.2 Investigation results:

- IWQM data obtained on 27 and 29 October 2014 were reviewed; no water quality monitoring exceedance was noted on 27 and 29 October 2014.
- Ad hoc site inspection was subsequently conducted on 31 October 2014 but no silt plume or turbid water was observed on 31 October 2014. Photo records taking on 31 October 2014 at around 01:00pm which shows the sea condition at sea area near Portion E1 of the HKBCF Reclamation Works:

5.1.8.3 The water quality will be closely monitored through IWQM works of this Contract, should any water quality exceedance is recorded, investigation will be conducted following the EAP for IWQM. Furthermore, joint site inspection will be conducted regularly to check whether the water quality at monitoring stations of HKBCF reclamation works is adversely affected.

5.1.8.4 The Contractor was reminded that all water quality mitigation measures with respect to the recommendations in the EIA Report and EM&A Manual in particular on EIA Ref. Section 9.11.1.6 should be fully and properly implemented.

5.1.9 As informed by the Contractor, an oil spillage incident (<10m^2) was found at open sea area near cells 51 at 2:00 p.m. on 12 November 2014. Following the spill response plan, ET, IEC and the RSS were informed of the incident by the Contractor. The oil spill was identified on 12 November 2014 as continuous source with approximately less than 10m^2 spread.

5.1.9.1 Investigation actions:

- Details of the oil spillage incident (12 November 2014) including size, location, time of the spillage and Contractor's action taken in response to the spill incident, have been reviewed.
- Site inspection was conducted on 14 November 2014 to observe the sea condition near sea area next to steel cell 51.
- Impact water quality monitoring record of 12, 14 and 17 November 2014 have been reviewed.

5.1.9.2 The oil spillage was caused by a drilling machine fell into the water near steel cell 51. The drilling machine which caused the oil spillage was lifted up and as informed by the Contractor, the machine was lifted and removed from the water on 12 November 2014 soon after the oil spillage incident was observed. (Also refer to photo record below).

5.1.9.3 The Contractor used absorption booms to enclose and remove the floating oil from water and absorption booms used was collected using disposal bags as part of the spill kits item. The used absorption booms were disposed of as chemical waste (Also refer to photo record below).

5.1.9.4 Site inspection was conducted 13 November 2014. Oil spillage was further observed on site. The oil spill observed on 13 November 2014 was identified as discrete, non-continuous source with approximately 50m2 spread. After the inspection jointly conducted with RSS and the Contractor, the source of oil spillage was not identified. In addition, there was no exceedance recorded at monitoring station IS(Mf)16 on 12, 14 and 17 November 2014 which is the closest to sea area next to steel cell 51. This indicates it is unlikely that water quality is affected by the oil spillage occurred at sea area near steel cell 51.

5.1.9.5 Ad hoc site inspection was conducted on 14 November 2014 and no oil spillage was observed on site. (Also refer to photo record below).

5.1.9.6 The contractor was reminded to continue to follow the spill response plan in the event of accidental oil spillage.

5.1.10 As informed by the Contractor, oil was observed at sea area near cells 51 at 10:00am on 13 November 2014. Following the spill response plan ET, IEC and the RSS were informed of the incident by the Contractor.

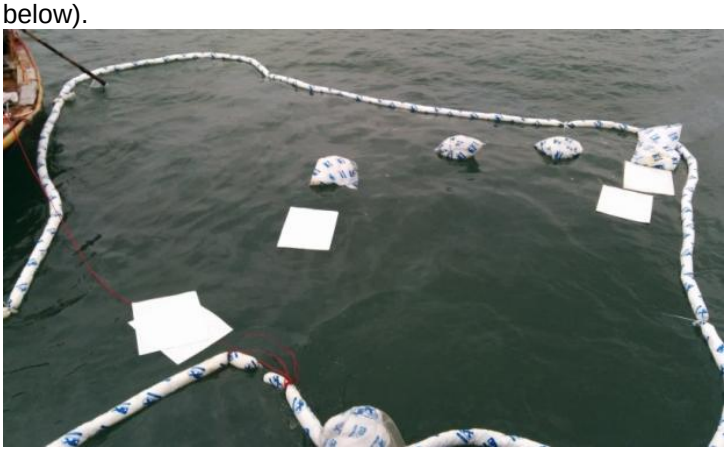
5.1.10.1 Investigation actions:

- Details of the oil spillage incident (13 November 2014) including size, location, time of the spillage and Contractor's action taken in response to the spill incident, have been reviewed.
- Site inspection was conducted on 14 November 2014 to observe the sea condition near sea area next to steel cell 51.
- Impact water quality monitoring record of 14 and 17 November 2014 has been reviewed.

5.1.10.2 The oil spill was identified during join site inspection conducted by the Contractor, ET and RSS on 13 November 2014 as discrete, non-continuous source with approximately 50m2 spread.

5.1.10.3 After the inspection jointly conducted with ET, RSS and the Contractor on 13 November 2014, the source of oil spillage was not identified

5.1.10.4 The Contractor used absorption booms as secondary oil container to contain and remove the floating oil from water and absorption booms used was collected using disposal bags as part of the spill kits item. The used absorption booms were disposed of as chemical waste. (Also refer to photo record below).



5.1.10.5 The oil stain observed was limited at nearby eastern sea area within the silt curtain.

5.1.10.6 An independent site inspection was conducted on 14 November 2014 at sea area next to steel cell 51 and no oil spillage was observed on site. (Also refer to photo record below).

5.1.10.7 Impact water quality monitoring record of 14 and 17 November 2014 of IS(Mf)16 which is the closest location to location of observed oil spill have been reviewed. There is no water quality exceedance recorded at IS(Mf) 16 on 14 and 17 November 2014.

5.1.10.8 The contractor was reminded to continue to follow the spill response plan in the event of accidental oil spillage.

5.1.10.9 Recommendation:

- The Contractor was reminded to keep chemical and chemical waste containers in good condition and free from corrosion and damage which may impair the performance of the containers.
- The Contractor was reminded to provide tightly closed lids to chemical container so as to avoid leakage of chemicals and chemical waste. In addition, the Contractor was reminded to ensure every chemical and chemical waste containers securely closed or sealed, correctly placed and kept clean.
- The contractor was reminded to continue to follow the spill response plan in the event of accidental oil spillage.

6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

6.1 Summary of Exceedances of the Environmental Quality Performance Limit

6.1.1 One (1) 24-hour TSP result at AMS3B exceeded Action Level on 27 October 2014, after investigation, the exceedance was considered not related to this Contract. All 1-Hour TSP results were below the Action and Limit Level in the reporting period.

6.1.2 For construction noise, no exceedance was recorded at all monitoring stations in the reporting period.

6.1.3 A total of (23) twenty-three exceedances were recorded in this reporting quarter: (1) One Action Level Exceedance of SS at IS8 at mid-flood tide on 5 September 2014, (2) Two Action Level Exceedances of SS at IS5 and SR3 respectively at Mid-Ebb tide were recorded on 10 September 2014 and (1) one Action level exceedance of SS were recorded at SR10B(N) at Mid-Flood tide on 12 September 2014. (1) One Limit Level Exceedance of Turbidity and (1) Limit Level Exceedance of Suspended Solids were recorded at IS17 during ebb tide on 10 October 2014; (1) One Action Level Exceedance of SS at SR10B(N) was recorded on10 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS8 was recorded on 3 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS(Mf)11 was recorded on 6 October 2014 during ebb tide; (2) Two Action Level Exceedances of SS at IS(Mf)11 and SR5 were recorded on 6 October 2014 during flood tide; (3) Three Action Level Exceedances of SS were recorded at IS10, SR4(N) and SR5 on 13 October 2014 during flood tide; (1) One Action Level Exceedance of SS was recorded at IS17 on 20 October 2014 during ebb tide; (1) action level exceedance and (1) limit level exceedance of SS were recorded at SR4(N) and IS8 respectively on 20 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at SR10A and SR10B(N) on 22 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at IS10 and SR4(N) during flood tide on 24 October 2014. (1) Action Level Exceedance of SS was recorded at IS8 on 31 October 2014 during ebb tide. (1) action level exceedance of SS was recorded at IS17 on 28 November 2014 during mid ebb tide.

6.1.4 After investigation, all impact water quality exceedances were considered not related to this Contract except the Limit Level Exceedance of Turbidity, Limit Level Exceedance of Suspended Solids recorded at IS17 during ebb tide on 10 October 2014 and Action Level Exceedance of Suspended Solids recorded at IS17 during flood tide on 20 October 2014, which were considered related to this Contract. Recommendation has been given and rectification has been carried on by the Contractor on 28 October 2014.

6.1.5 One (1) limit level exceedance of Chinese White Dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors.

6.1.6 Cumulative statistics on exceedances is provided in Appendix J.

7 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

7.1 Summary of Environmental Complaints, Notification of Summons and Successful Prosecutions

7.1.1 The Environmental Complaint Handling Procedure is annexed in Figure 5.

7.1.2 Five (5) environmental complaints have been received in reporting quarter.

7.1.3 As informed by the Contractor on 15 Sept 14, there is an environmental complaint received on 29 August 14 by HyD. The complainant who lives at Tower 4, Melody Garden, Tuen Mun called reflecting environmental issues arisen from many sand barges in the waters facing her apartment. According to the complainant, sand was blown into her apartment because the barges were not covered and it was worse when sand was transferred from one vessel to another on conveyor belts.

7.1.3.1 Investigation Actions:

- 1hr TSP and 24hrs TSP monitoring data of 4 August to 1 September 2014 have been reviewed.
- Site inspections were conducted jointly on 28 August and 4 September 2014 with RSS and the Contractor.

7.1.3.2 Investigation findings:

- There is no sufficient information provided by the complainant to make sure that the concerned barges are related to this project.
- Date of the observed impact was not specified by the complainant so the impact air quality monitoring (IAQM) results available for August 2014 and early September 2014 for monitoring stations close to the concerned area – AQMS1, ASR1, ASR5, ASR6 and ASR10 have been reviewed and there was no impact air quality monitoring result that shows 1-hour TSP or 24-hour TSP exceeded the action (AL)/limit level (LL).
- Photo record below shows that sand barges were not covered but they are equipped with watering equipment and in order to prevent generation of fugitive dust, watering equipment was used to keep the sand filling material wet.

- In addition, site inspection has been jointly conducted with the Contractor and RSS on 28 August and 4 September 2014, but no generation of fugitive dust was observed to be caused by barges loaded with filling material. Transfer of sand between vessels was not observed.

7.1.3.3 After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

7.1.3.4 The Contractor was advised to ensure to continue the provision of fugitive dust mitigation measures to barges loaded with filling material such as watering to sand filling material on sand barges to keep the surface of stockpile of filling material wet.

7.1.4 As informed by the Contractor, a public complaint has been received by ICC on 9 September 2014 and it was referred to this Contract, the complainant raised concern about a large amount of general refuse such as food container and plastic bottles were observed on sea area off the Gold Coast, Tuen Mun.

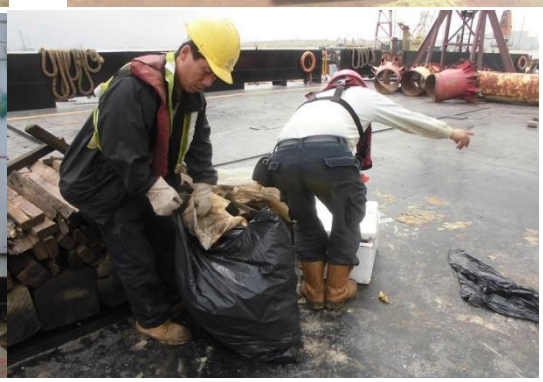
7.1.4.1 Investigation actions:

- Site inspections were conducted jointly on 25 September 2014 with RSS and the Contractor and 18 jointly with RSS, IEC and the Contractor
- Site visit to the sea area between HKBCF Reclamation Works and Tune Mun was conducted on 22 September 2014.
- Checking sample of training record

7.1.4.2 Investigation findings:

- There is no sufficient information provided by the complainant to make sure that the general refuse such as food container and plastic bottles are related to this project.
- Photo of site condition was reviewed, temporary refuse collection facility/ appropriate containers such as rubbish bins were provided by the Contractor on reclamation and vessel to collect general refuses, please refer to the photo below:
-



- Photo records shows collection of general refuse by workers on a regular basis:


- Site inspections were conducted on 18 September 2014 jointly with RSS, IEC and the Contractor and jointly on 25 September 2014 with RSS and the Contractor, but no general refuse was observed on sea area.
- In addition, site visit to the sea area between HKBCF Reclamation Works and Tune Mun was conducted on 22 September 2014. No general refuse was observed to flow from HKBCF Reclamation Works to Tune Mun area. Also refer to photo record below:

7.1.4.3 Below photo shows condition of the sea area facing Tuen Mun on 22 September14.

7.1.4.4 Below photo shows condition of the sea area facing HKBCF Reclamation Works on 22 September 14.

7.1.4.5 After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

7.1.4.6 The Contractor was advised to ensure to continue the provision of waste mitigation measures to barges on reclamation land and vessels.

7.1.4.7 The Contractor was recommended that the site and surroundings shall be kept tidy and litter free. General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes.

7.1.5 An air quality complaint has been received by the Contractor on 29 September 2014 via email. The complaint was first received by EPD via email on 5 September 2014 and it was referred by EPD to the HZMB HK Project Management Office (Management Office) to handle the complaint directly on 10 September 2014 following the request of the complainant. The Management Office responded to the complainant directly on 17 September 2014.

7.1.5.1 Subsequently, the complainant followed up with the response given by the Management Office and complained again on 26 September 2014. This follow up complaint was referred to the project team to investigate. The complainant complained that many of the sand barges did not stay at area of reclamation works near Chek Lap Kok or at the sea area near Tuen Mun River Trade Terminal but moored in the sea area close to Melody Garden. Sand were easily blown to the inside house during days with moderate wind.

7.1.5.2 The complainant suggested that, sand barges should be requested to move away from residential areas and sand barges should be provided with cover fabric and sprinkling to minimise environmental pollution caused by sand.

7.1.5.3 Investigation Actions:

- 1hr TSP and 24hrs TSP monitoring data of September 2014 have been reviewed.
- Site inspections were conducted jointly with RSS, IEC and the Contractor on 18 September 2014 and jointly with RSS and the Contractor on 25 September 2014.

7.1.5.4 Investigation findings:

- There is no sufficient information provided by the complainant to make sure that the concerned barges are related to this project.
- Date of the observed impact was not specified by the complainant so the impact air quality monitoring (IAQM) results available for September 2014 for monitoring stations close to the concerned area – AQMS1, ASR1, ASR5, ASR6 and ASR10 have been reviewed and there was no impact air quality monitoring result that shows 1-hour TSP or 24-hour TSP exceeded the action (AL)/limit level (LL).
- Photo record below shows that sand barges were not covered but they are equipped with watering equipment and in order to prevent generation of fugitive dust, watering equipment was used to keep the sand filling material wet.

- In addition, site inspections were conducted jointly with RSS, IEC and the Contractor on 18 September 2014 and jointly with RSS and the Contractor on 25 September 2014, but no generation of fugitive dust was observed to be caused by barges loaded with filling material.
- After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

7.1.5.5 The Contractor was advised to ensure to continue the provision of fugitive dust mitigation measures to barges loaded with filling material such as watering to sand filling material on sand barges to keep the surface of stockpile of filling material wet.

7.1.6 As informed by the Contractor on 14 October 2014, a follow up air quality complaint has been received by this Contract (same case to environmental complaint EC-026). The complainant complained that about 20-30 sand barges always moor at the sea area opposite to tower 4 of Melody Garden and Richland Garden. This problem has affected the air quality.

7.1.6.1 Investigation Actions:

- 1hr TSP and 24hrs TSP monitoring data of complaint period 1- 15 October 2014 have been reviewed.
- Site inspections were conducted jointly with RSS, IEC and the Contractor on 16 October 2014 and jointly with RSS and the Contractor on 23 October 2014.

7.1.6.2 Investigation findings:

- There is no sufficient information provided by the complainant to make sure that the concerned barges are related to this project.
- Date of the observed impact was not specified by the complainant so the impact air quality monitoring (IAQM) results within the complaint period 1- 15 October 2014 for monitoring stations close to the concerned area – AQMS1, ASR1, ASR5, ASR6 and ASR10 have been reviewed and there was one action level exceedance of 24hr TSP on impact air quality monitoring result recorded at ASR1 but no information which shows that the action level exceedance at ASR1 is related to vessel of this Contract. IAQM data AQMS1, ASR1, ASR5, ASR6 and ASR10 also available online from: http://www.hzmbenpo.com/php/list_air_year_All.php)
- As informed by the Contractor, the Contractor would continue to provide watering to stockpile of sand on sand delivery barges.
- Photo record below shows that sand barges were not covered but they are equipped with watering equipment and in order to prevent generation of fugitive dust, watering equipment was used to keep the sand filling material wet.

- In addition, site inspections were conducted jointly with RSS, IEC and the Contractor on 16 October 2014 and jointly with RSS and the Contractor on 23 October 2014, but no generation of fugitive dust was observed to be caused by barges loaded with filling material.
- Sand barges usually moor at around Sham Shui Kok anchorage area and the Contractor would continue to provide watering to stockpile of sand on sand delivery barges, therefore the potential impact to resident areas concerned by the complainant is low.
- The Contractor usually moor vessel at around Sham Shui Kok anchorage area (Except upon request by HK government and under this circumstances, then they will moor at Tuen Mun waters shortly for inspection.)

7.1.6.3 After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

7.1.6.4 The Contractor was advised to ensure to continue the provision of fugitive dust mitigation measures to barges loaded with filling material such as watering to sand filling material on sand barges to keep the surface of stockpile of filling material wet.

7.1.7 With reference to RSS's letter ref.: 211036/(HY2010/02)/M05/432/B07605 dated on 30 September 2014 pertaining the performance on barges operations at the sea area off the Tuen Mun Ferry Pier. A complaint concerning leakage of sand filling material from vessels at sea area off Tuen Mun Ferry Pier was first received by EPD from Tuen Mun District Council (TM DC) on 19 September 2014 and it was subsequently referred by EPD to the Highways Department to handle on 23 September 2014 through EPD's memo ref.: EP/RW/0000362128. Referring to EPD's Memo, it is also noted that some local residents at Tuen Mun expressed their concern that the stockpile of dusty sand material on the barges should be covered with impervious sheeting to avoid causing fugitive dust emissions of sand and dust. Subsequently, TM DC followed up their complaint with Highways Department on 17 October 2014. The follow up complaint concerning water quality impact at sea area off Tuen Mun area was referred to the project team to response on 17 October 2014.

7.1.7.1 Investigation actions:

- Spot check of travel route record of sand delivery barges and review whether sand delivery barges of this Contract would moor/stay at sea area near Tuen Mun Ferry Pier
- Impact water quality monitoring (IWQM) results recorded in September and October 2014 which cover IWQM station(s) - IS14, IS15 and SR9 which are near to the concern area(s), have been reviewed.
- Regular site inspections were conducted jointly with RSS, IEC and the Contractor on 16 October 2014 and jointly with RSS and the Contractor on 23 October 2014.

7.1.7.2 Investigation findings:

- Spot check of travel route record also shows that that sand delivering vessels follow a designated marine travel route. However, only in particular cases, those vessels will moor near sea area off Butterfly beach for government department to carry out inspection. In general, the sand delivery barges were requested by the Contractor to moor as far away from residence as possible and continue to provide watering to stockpile of sand on sand delivery barges.
- Impact water quality monitoring (IWQM) results recorded in September and October 2014 which cover IWQM station(s) - IS14, IS15 and SR9 which are near to the concern area(s), have been reviewed. However no IWQM exceedance was noted in September and October 2014 at monitoring station IS14, IS15 and SR9 which are near to the concern area(s). (IWQM data of IS14, IS15 and SR9 available online at: http://www.hzmbenpo.com/php/list_water_year.php)
- In addition, site inspections were conducted jointly with RSS, IEC and the Contractor on 16 October 2014 and jointly with RSS and the Contractor on 23 October 2014, but no leakage of sand material or generation of fugitive dust was observed to be caused by barges loaded with sand material.
- In addition, sand delivery barges are equipped with watering equipment and in order to prevent generation of fugitive dust, watering equipment was used to keep the sand filling material wet.

- Nonetheless, as informed by the Contractor, the Contractor would study the feasibility of covering stockpile of sand on sand delivery barges.

7.1.7.3 After investigation, there is no adequate information to conclude the observed impact is related to this Contract. However, as informed by the Contractor, the Contractor would study the feasibility of covering stockpile of sand on sand delivery barges.

7.1.7.4 Nonetheless, the Contractor was advised to ensure that all vessels should have regular maintenance to ensure that all Sand Barge functioning well so that any leakage of filling material is prevented.

7.1.7.5 The Contractor was reminded, when vessel was not requested by government department for inspection at sea area off Tuen Mun Ferry Pier, the Contractor should avoid mooring their vessels at the concerned area as far as possible.

7.1.7.6 The Contractor was advised to ensure to continue the provision of fugitive dust mitigation measures to barges loaded with filling material such as watering to sand filling material on sand barges to keep the surface of stockpile of filling material wet.

7.1.7.7 In response to the concern raised on both air quality and water quality, effectiveness of relevant mitigation measures would be monitored through regular EM&A monitoring and site inspection of this project.

7.1.8 No notification of summons or prosecution was received in the reporting quarter.

7.1.9 Statistics on complaints, notifications of summons and successful prosecutions are summarized in Appendix N.

8 COMMENTS, RECOMMENDATIONS AND CONCLUSIONS

8.1 Comments on mitigation measures

8.1.1 According to the environmental site inspections performed in the reporting quarter, the following recommendations were provided:

Air Quality Impact

- All working plants and vessels on site should be regularly inspected and properly maintained to avoid dark smoke emission.
- All vehicles should be washed to remove any dusty materials before leaving the site.
- Haul roads should be sufficiently dampened to minimize fugitive dust generation.
- Wheel washing facilities should be properly maintained and reviewed to ensure properly functioning.
- Temporary exposed slopes and open stockpiles should be properly covered.
- Enclosure should be erected for cement debagging, batching and mixing operations.
- Water spraying should be provided to suppress fugitive dust for any dusty construction activity.
- Regular review and provide maintenance to dust control measures such as sprinkler system.

Construction Noise Impact

- Quieter powered mechanical equipment should be used as far as possible.
- Noisy operations should be oriented to a direction away from sensitive receivers as far as possible.
- Proper and effective noise control measures for operating equipment and machinery on-site should be provided, such as erection of movable noise barriers or enclosure for noisy plants. Closely check and replace the sound insulation materials regularly
- Vessels and equipment operating should be checked regularly and properly maintained.
- Noise Emission Label (NEL) shall be affixed to the air compressor and hand-held breaker operating within works area.
- Acoustic decoupling measures should be properly implemented for all existing and incoming construction vessels with continuous and regularly checking to ensure effective implementation of acoustic decoupling measures.

Water Quality Impact

- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities in order to make sure they are functioning effectively.
- Construction of seawall should be completed as early as possible.
- Regular inspect and review the loading process from barges to avoid splashing of material.
- Silt, debris and leaves accumulated at public drains, wheel washing bays and perimeter u-channels and desilting facilities should be cleaned up regularly.
- Silty effluent should be treated/ desilted before discharged. Untreated effluent should be prevented from entering public drain channel.

- Proper drainage channels/bunds should be provided at the site boundaries to collect/intercept the surface run-off from works areas.
- Exposed slopes and stockpiles should be covered up properly during rainstorm.

Chemical and Waste Management

- All types of wastes, both on land and floating in the sea, should be collected and sorted properly and disposed of timely and properly. They should be properly stored in designated areas within works areas temporarily.
- All chemical containers and oil drums should be properly stored and labelled.
- All plants and vehicles on site should be properly maintained to prevent oil leakage.
- All kinds of maintenance works should be carried out within roofed, paved and confined areas.
- All drain holes of the drip trays utilized within works areas should be properly plugged to avoid any oil and chemical waste leakage.
- Oil stains on soil surface and empty chemical containers should be cleared and disposed of as chemical waste.
- Regular review should be conducted for working barges and patrol boats to ensure sufficient measures and spill control kits were provided on working barges and patrol boats to avoid any spreading of leaked oil/chemicals.

Landscape and Visual Impact

- All existing, retained/transplanted trees at the works areas should be properly fenced off and regularly inspected.
- Control night-time lighting and glare by hooding all lights.

8.2 Recommendations on EM&A Programme

8.2.1 The impact monitoring programme for air quality, noise, water quality and dolphin ensured that any deterioration in environmental condition was readily detected and timely actions taken to rectify any non-compliance. Assessment and analysis of monitoring results collected demonstrated the environmental impacts of the Project. With implementation of recommended effective environmental mitigation measures, the Project's environmental impacts were considered as environmentally acceptable. The weekly environmental site inspections ensured that all the environmental mitigation measures recommended were effectively implemented.

8.2.2 The recommended environmental mitigation measures, as included in the EM&A programme, effectively minimize the potential environmental impacts from the Project. Also, the EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

8.3 Conclusions

8.3.1 The construction phase and EM&A programme of the Project commenced on 12 March 2012.

8.3.2 One (1) 24-hour TSP result at AMS3B exceeded Action Level on 27 October 2014, after investigation, the exceedance was considered not related to this Contract. All 1-Hour TSP results were below the Action and Limit Level in the reporting period.

8.3.3 For construction noise, no exceedance was recorded at all monitoring stations in the reporting period.

8.3.4 A total of (23) twenty-three exceedances were recorded in this reporting quarter: (1) One Action Level Exceedance of SS at IS8 at mid-flood tide on 5 September 2014, (2) Two Action Level Exceedances of SS at IS5 and SR3 respectively at Mid-Ebb tide were recorded on 10 September 2014 and (1) one Action level exceedance of SS were recorded at SR10B(N) at Mid-Flood tide on 12 September 2014. (1) One Limit Level Exceedance of Turbidity and (1) Limit Level Exceedance of Suspended Solids were recorded at IS17 during ebb tide on 10 October 2014; (1) One Action Level Exceedance of SS at SR10B(N) was recorded on10 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS8 was recorded on 3 October 2014 during flood tide; (1) One Action Level Exceedance of SS at IS(Mf)11 was recorded on 6 October 2014 during ebb tide; (2) Two Action Level Exceedances of SS at IS(Mf)11 and SR5 were recorded on 6 October 2014 during flood tide; (3) Three Action Level Exceedances of SS were recorded at IS10, SR4(N) and SR5 on 13 October 2014 during flood tide; (1) One Action Level Exceedance of SS was recorded at IS17 on 20 October 2014 during ebb tide; (1) action level exceedance and (1) limit level exceedance of SS were recorded at SR4(N) and IS8 respectively on 20 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at SR10A and SR10B(N) on 22 October 2014 during flood tide; (2) Two Action Level Exceedances of SS were recorded at IS10 and SR4(N) during flood tide on 24 October 2014. (1) Action Level Exceedance of SS was recorded at IS8 on 31 October 2014 during ebb tide.(1) action level exceedance of SS was recorded at IS17 on 28 November 2014 during mid ebb tide.

8.3.5 After investigation, all impact water quality exceedances were considered not related to this Contract except the Limit Level Exceedance of Turbidity, Limit Level Exceedance of Suspended Solids recorded at IS17 during ebb tide on 10 October 2014 and Action Level Exceedance of Suspended Solids recorded at IS17 during flood tide on 20 October 2014, which were considered related to this Contract. Recommendation has been given and rectification has been carried on by the Contractor on 28 October 2014.

8.3.6 One (1) Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors.

8.3.7 Environmental site inspection was carried out thirteen times in the reporting quarter. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.

8.3.8 As informed by the Contractor on 15 Sept 14, there is an environmental complaint received on 29 August 14 by HyD. The complainant who lives at Tower 4, Melody Garden, Tuen Mun called reflecting environmental issues arisen from many sand barges in the waters facing her apartment. According to the complainant, sand was blown into her apartment because the barges were not covered and it was worse when sand was transferred from one vessel to another on conveyor belts. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

8.3.9 As informed by the Contractor, a public complaint has been received by ICC on 9 September 2014 and it was referred to this Contract, the complainant raised concern about a large amount of general refuse such as food container and plastic bottles were observed on sea area off the Gold Coast,

Tuen Mun. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

8.3.10 An air quality complaint has been received by the Contractor on 29 September 2014 via email. The complaint was first received by EPD via email on 5 September 2014 and it was referred by EPD to the HZMB HK Project Management Office (Management Office) to handle the complaint directly on 10 September 2014 following the request of the complainant. The Management Office responded to the complainant directly on 17 September 2014. Subsequently, the complainant followed up with the response given by the Management Office and complained again on 26 September 2014. This follow up complaint was referred to the project team to investigate. The complainant complained that many of the sand barges did not stay at area of reclamation works near Chek Lap Kok or at the sea area near Tuen Mun River Trade Terminal but moored in the sea area close to Melody Garden. Sand were easily blown to the inside house during days with moderate wind. The complainant suggested that, sand barges should be requested to move away from residential areas and sand barges should be provided with cover fabric and sprinkling to minimise environmental pollution caused by sand. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

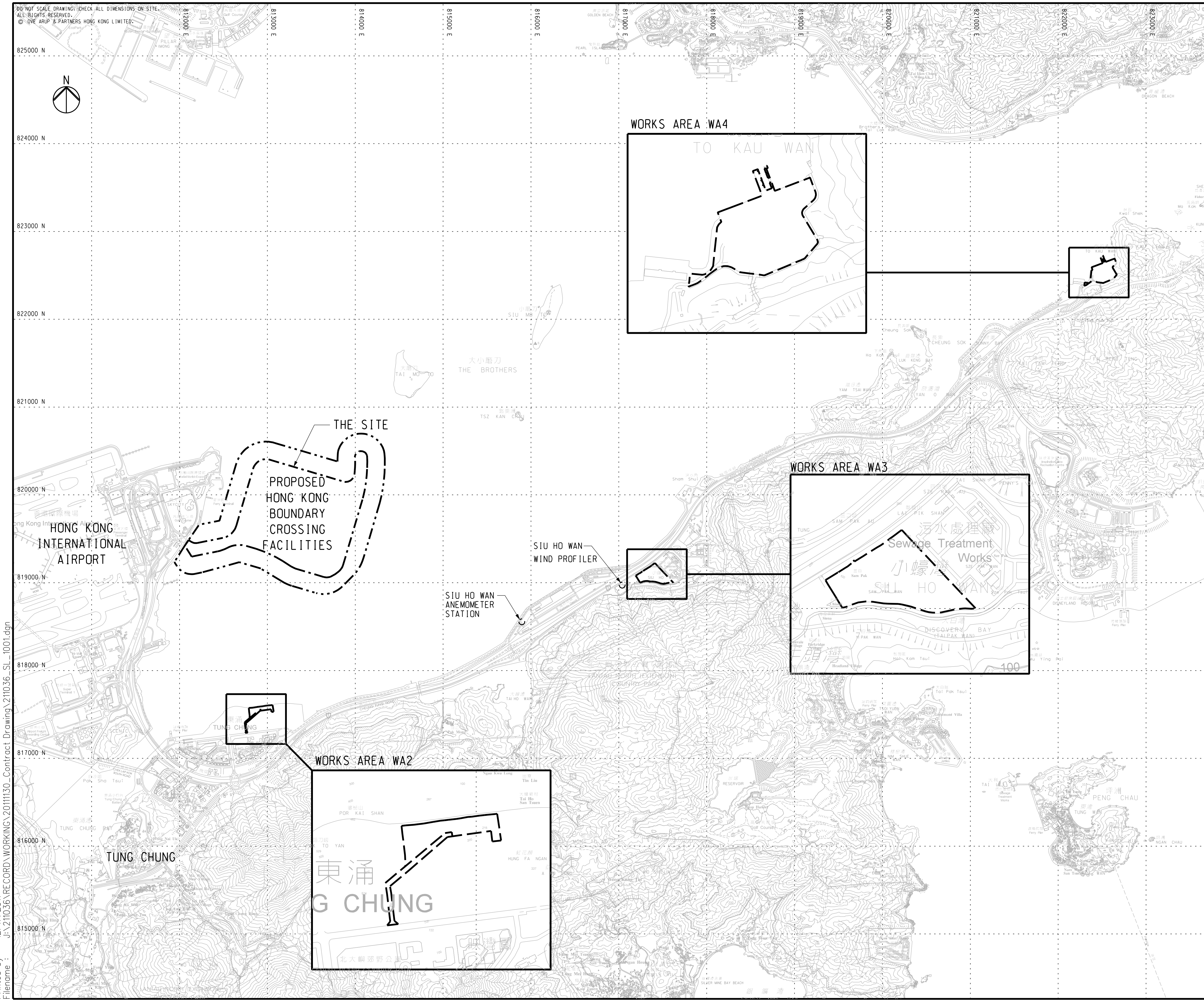
8.3.11 As informed by the Contractor on 14 October 2014, a follow up air quality complaint has been received by this Contract (same case to environmental complaint reported in the last reporting month). The complainant complained that about 20-30 sand barges always moor at the sea area opposite to tower 4 of Melody Garden and Richland Garden. This problem has affected the air quality. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

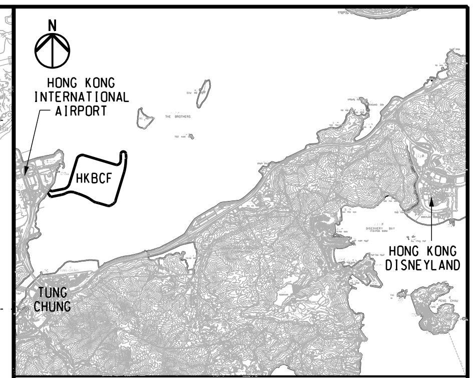
8.3.12 With reference to RSS's letter ref.: 211036/(HY2010/02)/M05/432/B07605 dated on 30 September 2014 pertaining the performance on barges operations at the sea area off the Tuen Mun Ferry Pier. A complaint concerning leakage of sand filling material from vessels at sea area off Tuen Mun Ferry Pier was first received by EPD from Tuen Mun District Council (TM DC) on 19 September 2014 and it was subsequently referred by EPD to the Highways Department to handle on 23 September 2014 through EPD's memo ref.: EP/RW/0000362128.Referring to EPD's Memo, it is also noted that some local residents at Tuen Mun expressed their concern that the stockpile of dusty sand material on the barges should be covered with impervious sheeting to avoid causing fugitive dust emissions of sand and dust. Subsequently, TM DC followed up their complaint with Highways Department on 17 October 2014. The follow up complaint concerning water quality impact at sea area off Tuen Mun area was referred to the project team to response on 17 October 2014. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.

8.3.13 Apart from the above mentioned monitoring, most of the recommended mitigation measures, as included in the EM&A programme, were implemented properly in the reporting quarter.

8.3.14 The recommended environmental mitigation measures effectively minimize the potential environmental impacts from the Project. The EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

8.3.15 Moreover, regular review and checking on the construction methodologies, working processes and plants were carried out to ensure the environmental impacts were kept minimal and recommended environmental mitigation measures were implemented effectively.





KEY PLAN

NOTES

1. ALL COORDINATES ARE RELATED TO HONG KONG 1980 GRID.
2. ALL LEVELS ARE IN METRES ABOVE HONG KONG PRINCIPAL DATUM (mPD).
3. REFER TO DRG NO. 211036/SL/1002 FOR THE DEFINITION OF SETTING OUT LINE (SOL) FOR THE HONG KONG BOUNDARY CROSSING FACILITIES (HKBCF) RECLAMATION SITE.
4. REFER TO DRG NO. 211036/SL/1004 FOR DETAILS OF SITE BOUNDARY.
5. FOR EXTENT OF SORTING FACILITIES AT FILL BANK AT TSEUNG KWAN O AREA 137 REFER TO DRG NO. 211036/SL/1015.

LEGEND

— · · — SITE BOUNDARY
— · — SETTING OUT LINE (SOL)
— — — WORKS AREA BOUNDARY

Rev	Description	By	Date
-	FOR CONSTRUCTION	HYJL	11/11

Consultant

ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

Supported By :
- Ecosystems Ltd.
- EDA Marine Ltd.
- Geotechnical Consulting Group (Asia) Ltd.
- Hong Kong Cetacean Research Project
- InteliBuild Technyx Asia Limited
- Tony Gee and Partners LLP

Contract No. and Title:

Contract No. HY/2010/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities
- Reclamation Works

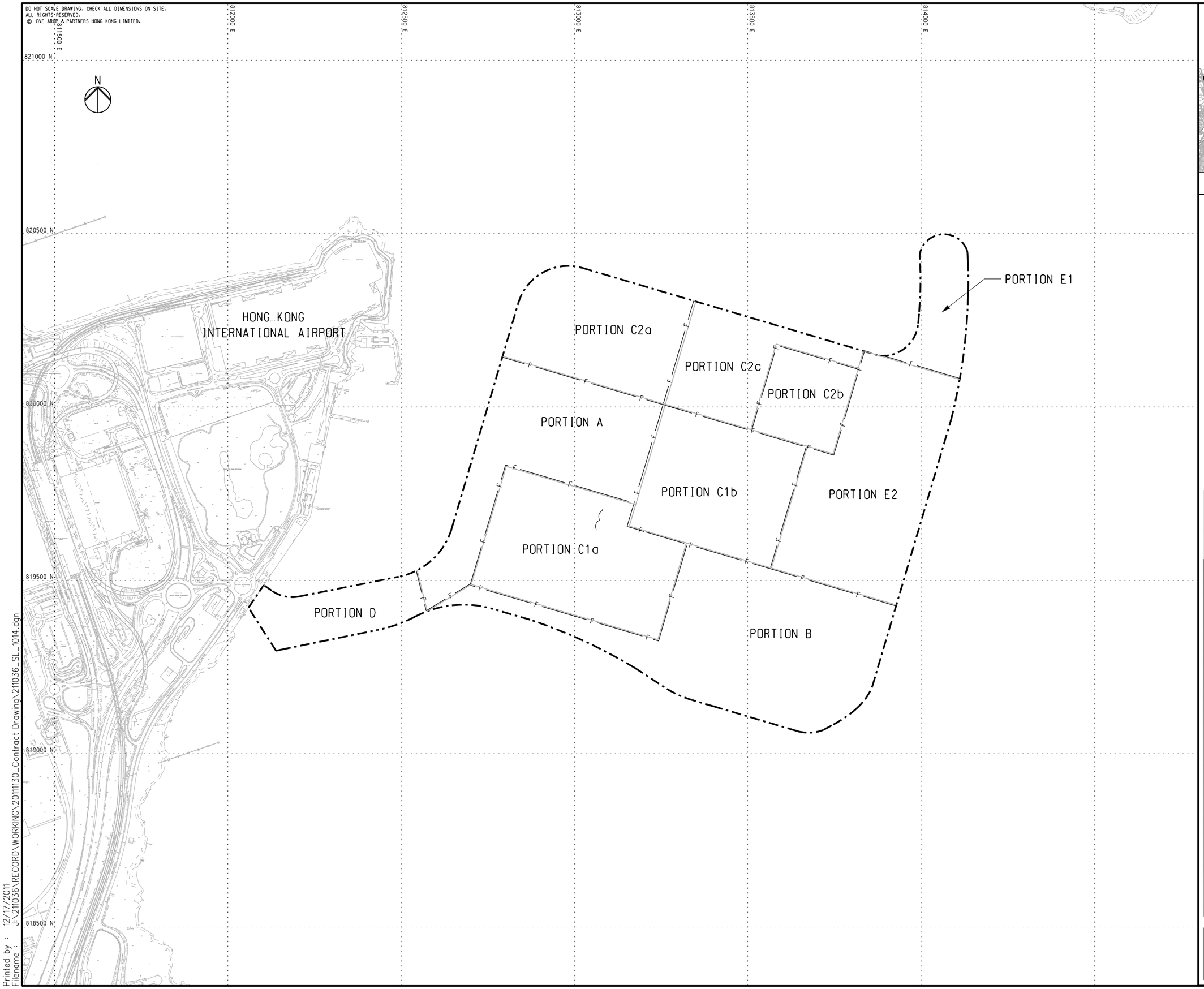
Drawing title

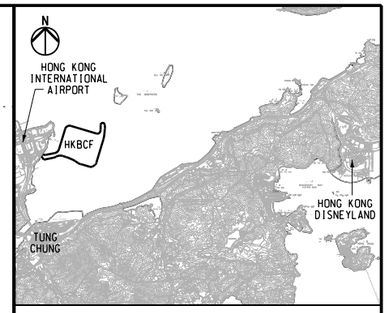
KEY PLAN

Drawing no.		Rev.	
211036/SL/1001		-	
Drawn	Date	Checked	Approved
RL	11/09	KKY	DML
Scale: 1:20000 @A1 1:40000 @A3		Status: WORKING	

路政署
HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

Printed by : 12/17/2011
Filename : J:\211036\RECORD\WORKING\20111130_Contract Drawing\211036_SL_1001.dgn





KEY PLAN

NOTES

1. FOR LEGENDS AND NOTES FOR CHAIN LINK FENCE AND GATE REFER TO DRG NO. 211036/SL/1013.
2. THE ERECTION OF CHAIN LINK FENCE AND GATES SHALL BE COMPLETED BY THE HANDOVER DATE OF EACH PORTION OF SITE, OR AS INSTRUCTED BY THE ENGINEER.
3. FOR SETTING OUT COORDINATES OF DIFFERENT PORTIONS OF SITE REFER TO DRG NO. 211036/SL/1003.
4. ACCESS POINTS BETWEEN PORTIONS SHALL BE PROVIDED BY THE CONTRACTOR. AND THE LOCATIONS SHALL BE AGREED WITH THE ENGINEER ON SITE.
5. FOR HOARDING AND FENCE AT FILL BANK AT TSEUNG KWAN O AREA 137 REFER TO DRG NO. 211036/SL/1015.

LEGEND

- SETTING OUT LINE (SOL)
- WORKS AREA BOUNDARY
- PORTIONS BOUNDARY LINE

Rev	Description	By	Date
-	FOR CONSTRUCTION	HYJL	11/11

Consultant

ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

Supported By :
- Ecosystems Ltd.
- EDA Marine Ltd.
- Geotechnical Consulting Group (Asia) Ltd.
- Hong Kong Cetacean Research Project
- InteliBuild Technyx Asia Limited
- Tony Gee and Partners LLP

Contract No. and Title:
Contract No. HY/2010/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities
- Reclamation Works

Drawing title
WORKS AREA LAYOUT
AND HORADING PLAN
(SHEET 2 OF 3)

Drawing no.	Rev.
211036/SL/1014	-

Drawn	Date	Checked	Approved
RL	06/10	KKY	DML

Scale 1:5000 @A1 1:10000 @A3
Status WORKING

路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

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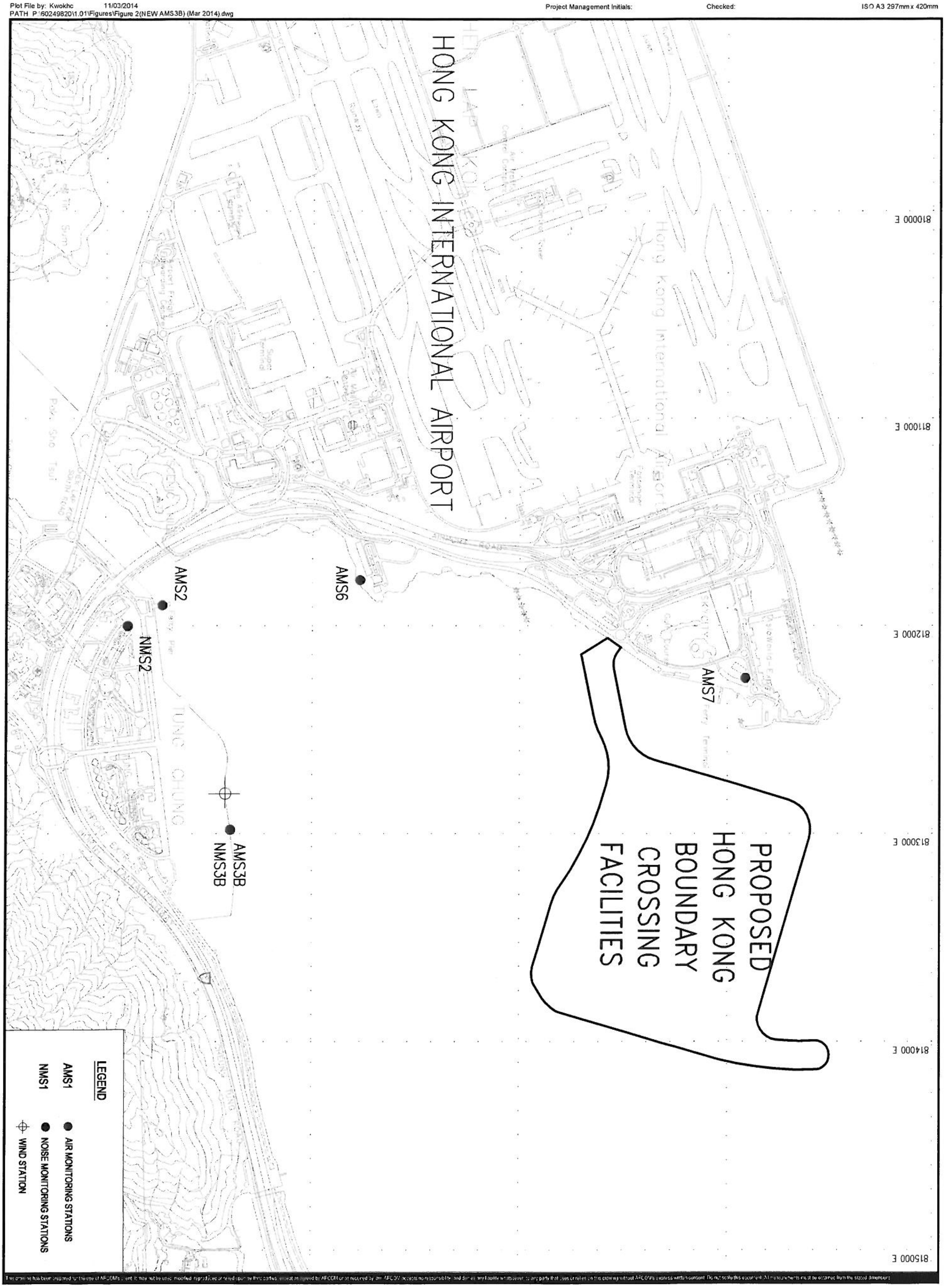

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS
Project No.: - Date: MARCH 2014

AIR QUALITY AND NOISE MONITORING STATIONS FOR HKBCF

AECOM

Figure 2

Plot File by: Kwokhc
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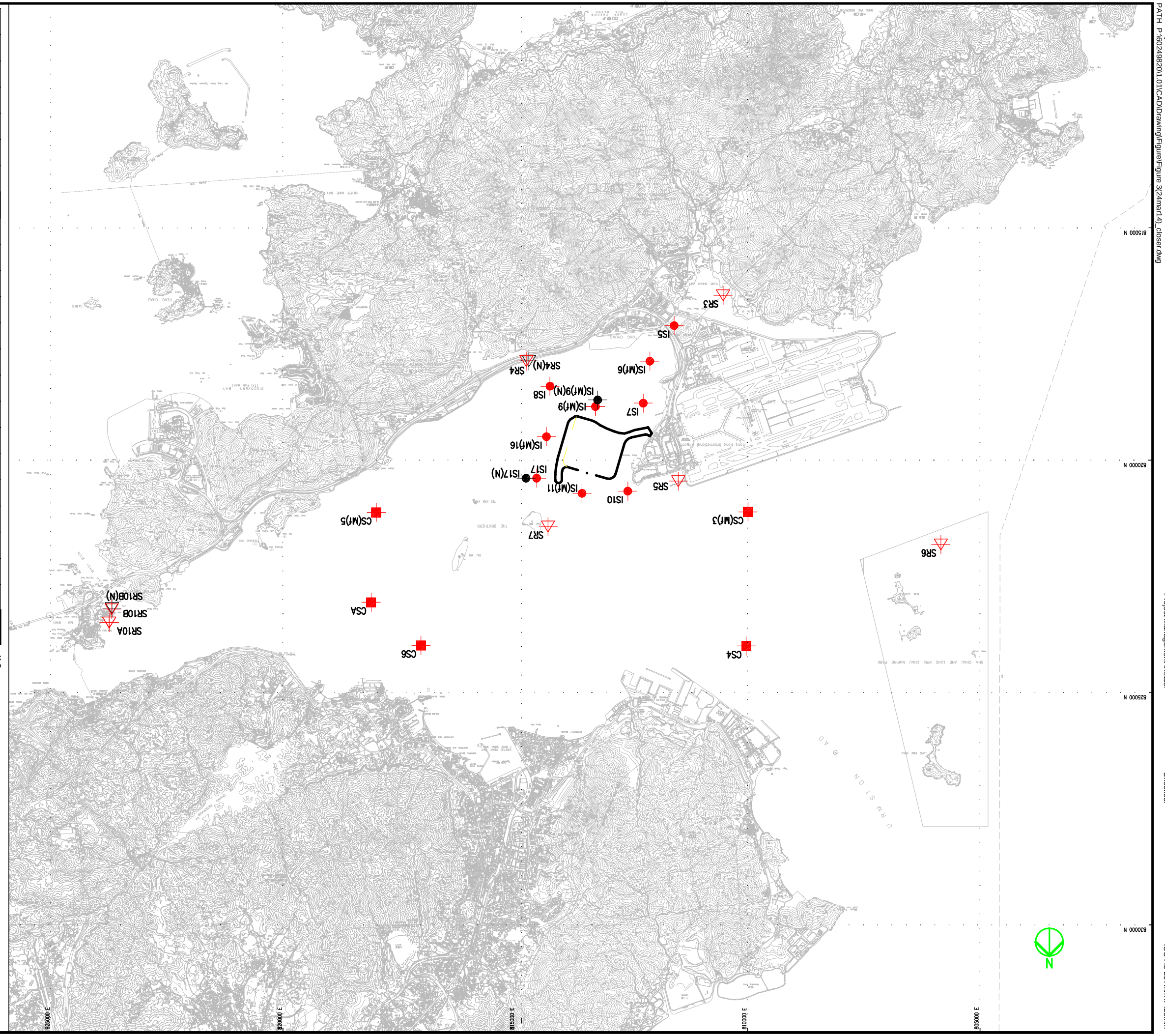
25/03/2014

Project Management Initials:

Checked:

ISO A3 297mm x 420mm



MONITORING STATIONS	CO-ORDINATES	
	EASTING	NORTHING
IS5	811579	817106
IS(M)6	812101	817873
IS7	812244	818777
IS8	814251	818412
IS(M)9	813273	818850
IS(M)9(N)	813226	818708
IS10	812577	820670
IS(M)11	813562	820716
IS(M)16	814328	819497
IS17	814539	820391
IS17(N)	814767	820391
SR3	810525	816456
SR4(N)	814705	817859
SR5	811489	820455
SR6	805837	821818
SR7	814293	821431
SR10A	823741	823495
SR10B(N)	823683	823187
CS(M)3	809989	821117
CS(M)5	817990	821129
CS4	810025	824004
CS6	817028	823992
CSA	818103	823064

SETTING OUT SCHEDULE

LEGEND

- IS — IMPACT STATIONS
- CS — CONTROL / FAR FIELD STATIONS
- SR — SENSITIVE RECEIVERS STATIONS
- SR — SENSITIVE RECEIVERS STATIONS (RELOCATED)
- IS — IMPACT STATIONS (RELOCATED)

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

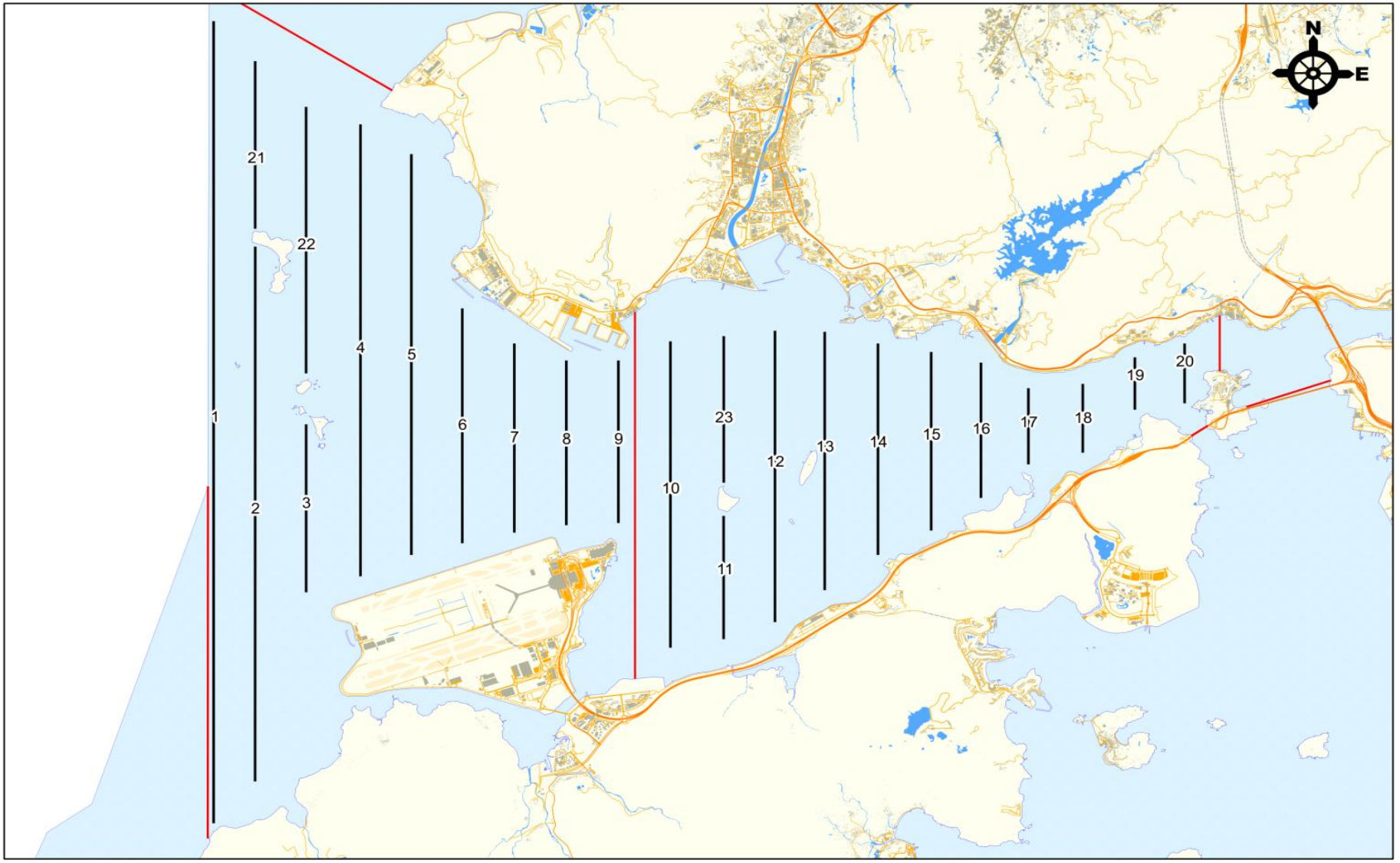
Project No.: -

Date: MAR 2014

WATER QUALITY MONITORING STATION

AECOM

Figure 3



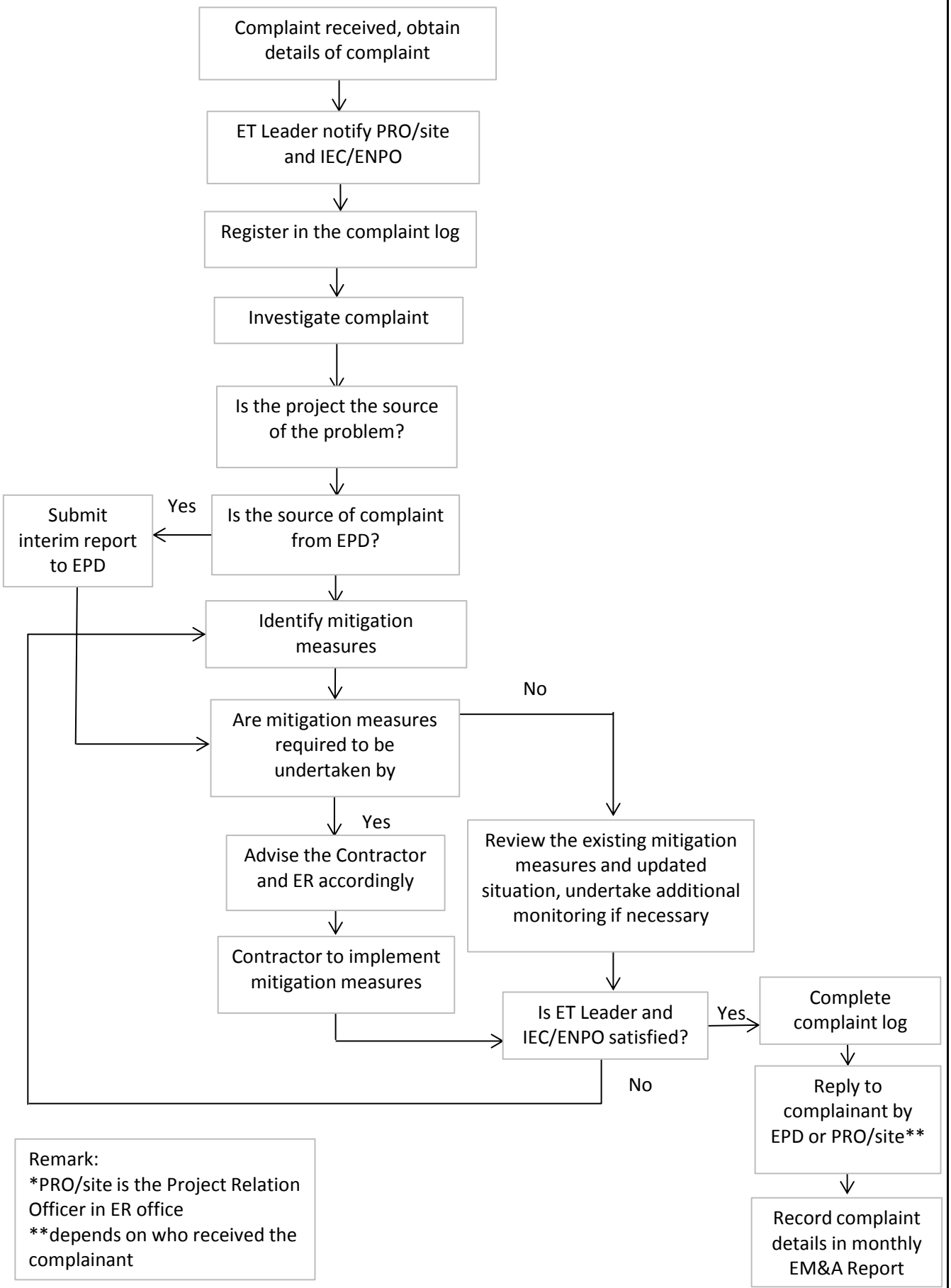
***Remark: Transect 10 is now 3.6km in length due to the HKBCF construction site. The total transect length for both NEL and NWL combined is 111km.**

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS
Project No.: 60249820 Date: January 13

Impact Dolphin Monitoring
Line Transect Layout Map

AECOM

Figure 4

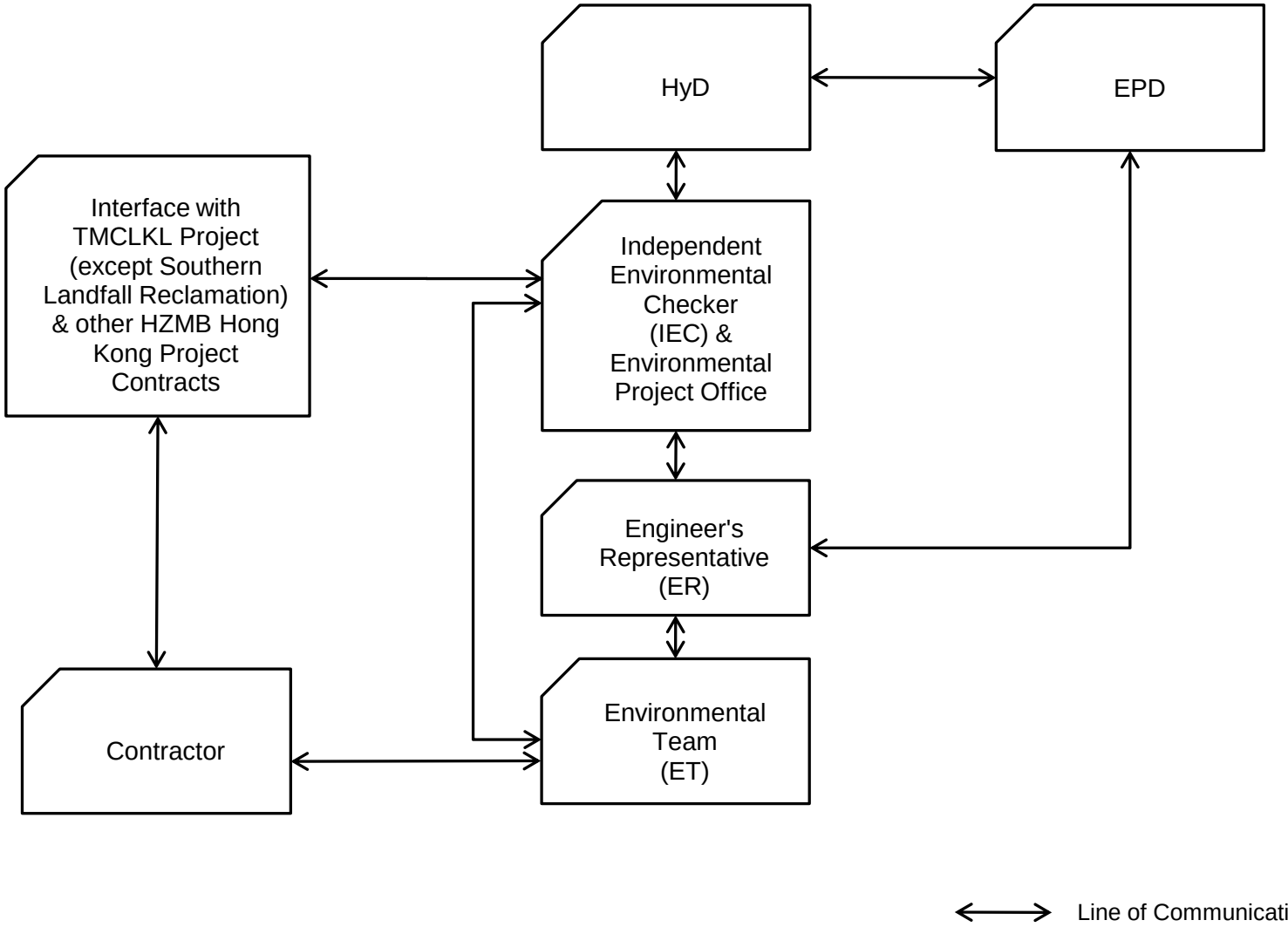


HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CORSSING FACILITIES
- RECLAMATION WORKS

AECOM

Environmental Complaint Handling Procedure

Project No.: 60249820 **Date: July 2012** **Figure 5**



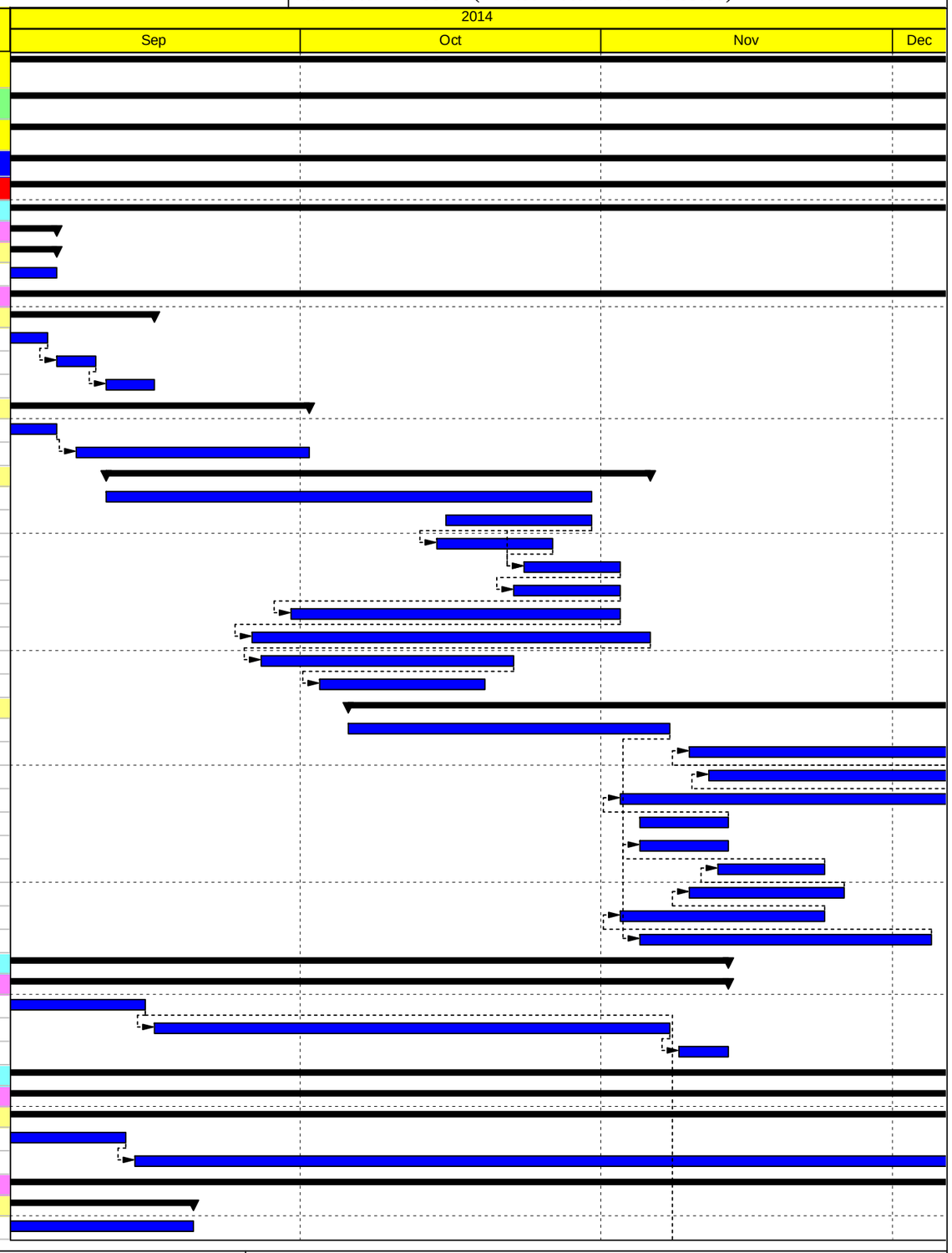
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
--RECLAMATION WORKS
Project No.: 60249820 Date: April 2013

Project Organisation for Environmental Works

AECOM

Appendix A

Activity ID	Activity Name	Start	Finish
37th Monthly Progress Report Status as on 21Dec2014 Ver.5h5			
Work Zone, as defined in PS Clause 1.03(6)			
Portion A, B, C & E			
Portion A, B, C & E			
Seawall			
Cellular Structures			
Connecting Arcs			
Portion E2 between K051/K052 to C066/C067 16arcs			
CAE2-025L	PE2 Connecting Arc C063/C064 - C065/C066 Landside upper arcs splicing 3nrs (WC1)	09-Jun-14 A	06-Sep-14 A
Capping Beams			
Portion E2 between K057 to C067 Capping Beams			
CBE2-000-010	PE2 Capping Beams structure K057	31-Aug-14 A	05-Sep-14 A
CBE2-000-020	PE2 Capping Beams structure K058	06-Sep-14 A	10-Sep-14 A
CBE2-000-030	PE2 Capping Beams structure K059	11-Sep-14 A	16-Sep-14 A
Portion C2a between C112 to C103 Capping Beams			
CBC2a-010	PC2a Capping Beams structure C106 to C103 4cells 4days/cell	21-Aug-14 A	06-Sep-14 A
CBC2a-020	PC2a Capping Beams structure C112 to C107 6cells 4days/cell	08-Sep-14 A	02-Oct-14 A
Portion C2c between C102 to C091 Capping Beams			
CBC2c-000-030	PC2c Capping Beams structure C100	11-Sep-14 A	31-Oct-14 A
CBC2c-000-050	PC2c Capping Beams structure C098	16-Oct-14 A	31-Oct-14 A
CBC2c-000-060	PC2c Capping Beams structure C097	15-Oct-14 A	27-Oct-14 A
CBC2c-000-070	PC2c Capping Beams structure C096	24-Oct-14 A	03-Nov-14 A
CBC2c-000-080	PC2c Capping Beams structure C095	23-Oct-14 A	03-Nov-14 A
CBC2c-000-090	PC2c Capping Beams structure C094	30-Sep-14 A	03-Nov-14 A
CBC2c-000-100	PC2c Capping Beams structure C093	26-Sep-14 A	06-Nov-14 A
CBC2c-000-110	PC2c Capping Beams structure C092	27-Sep-14 A	23-Oct-14 A
CBC2c-000-120	PC2c Capping Beams structure C091	03-Oct-14 A	20-Oct-14 A
Portion E1 between C090 to C074 Capping Beams			
CBE1-010-010	PE1 Capping Beams structure C090	06-Oct-14 A	08-Nov-14 A
CBE1-030-140	PE1 Capping Beams structure C081	10-Nov-14 A	15-Dec-14 A
CBE1-030-150	PE1 Capping Beams structure C082	12-Nov-14 A	09-Dec-14 A
CBE1-030-160	PE1 Capping Beams structure C083	03-Nov-14 A	15-Dec-14 A
CBE1-030-170	PE1 Capping Beams structure C084	05-Nov-14 A	14-Nov-14 A
CBE1-030-180	PE1 Capping Beams structure C085	05-Nov-14 A	14-Nov-14 A
CBE1-030-190	PE1 Capping Beams structure C086	13-Nov-14 A	24-Nov-14 A
CBE1-030-200	PE1 Capping Beams structure C087	10-Nov-14 A	26-Nov-14 A
CBE1-030-210	PE1 Capping Beams structure C088	03-Nov-14 A	24-Nov-14 A
CBE1-030-220	PE1 Capping Beams structure C089	05-Nov-14 A	05-Dec-14 A
Optimizing Rubble Mound Seawalls			
Seawall Portion C2a at C117 - C113			
RFC2a-0080	PC2a at C117 - C113 Rockfill (Cat1) for platform upto +2.5mPD 19,530m3	31-Aug-14 A	15-Sep-14 A
RFC2a-0090	PC2a at C117 - C113 Rockfill (Cat1 Fill) upto +6.0mPD & geotextile laying 7,980m3	16-Sep-14 A	08-Nov-14 A
RFC2a-0100	PC2a at C117 - C113 UnderLayer (0mPD 12,600m3	09-Nov-14 A	14-Nov-14 A
Conforming Sloping Seawalls			
Geotextile			
Seawall Portion E1 at C068 - C090 23cells			
SGE1-010	PE1 Geotextile at C090 - C081 10cells	11-Jul-14 A	13-Sep-14 A
SGE1-030	PE1 Geotextile at C076 - C068 9cells	14-Sep-14 A	20-Dec-14 A
Rockfill			
Seawall Portion C2c at C102 - C091 12cells			
RFC2c-000	PC2c Rockfill at C102 - C091 12cells	18-Jun-14 A	20-Sep-14 A



Remaining Level of Effort
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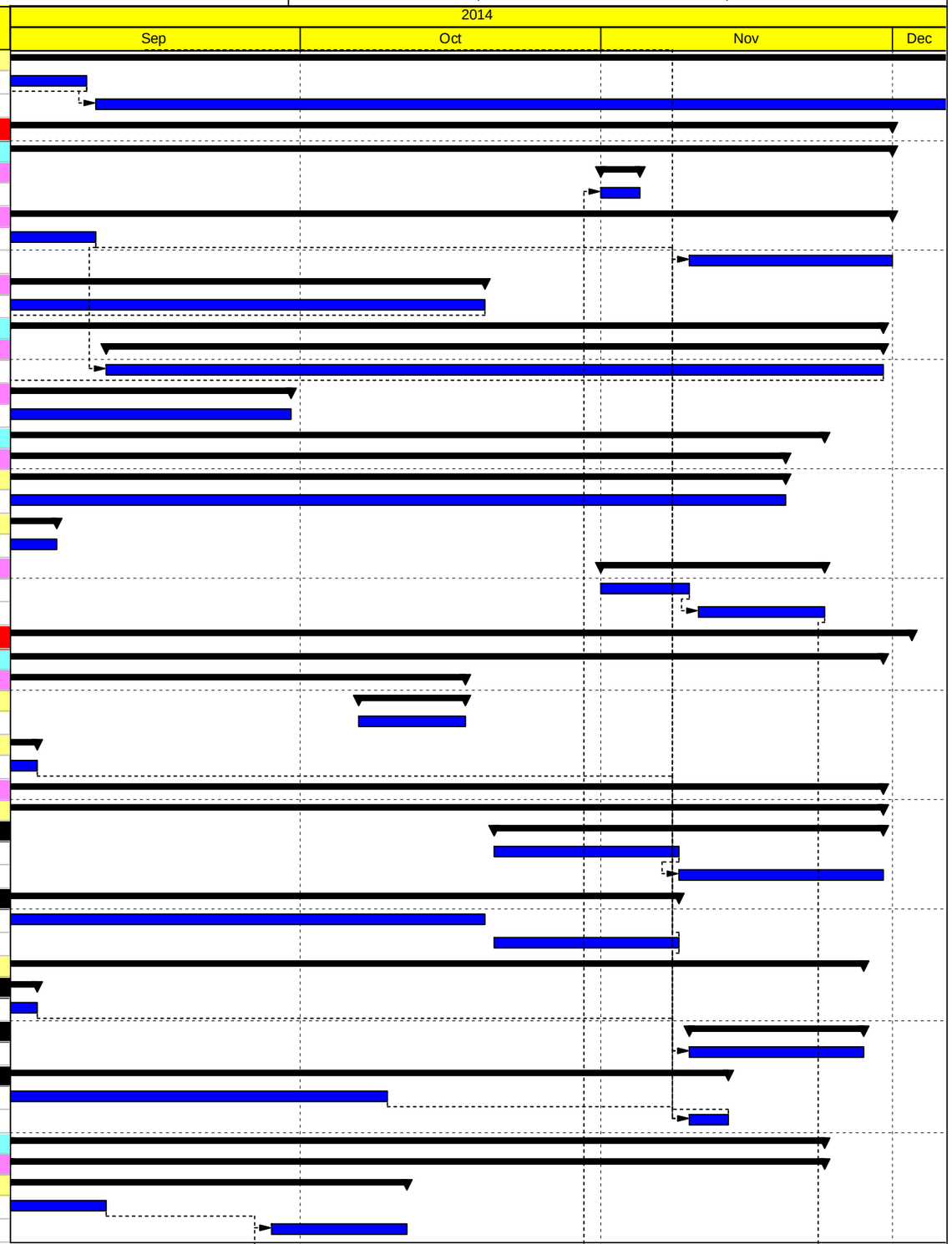
Summary

Activity ID	Activity Name	Start	Finish
	Seawall Portion E2 at K052 - C067 16cells		
RFE2-010	PE2 Rockfill at C052 - C062 11cells	14-May-14 A	09-Sep-14 A
RFE2-020	PE2 Rockfill at C063 - C067 5cells	10-Sep-14 A	20-Dec-14 A
	Reclamation		
	Marine Fill		
	Land Portion C1b		
MFC1b-030	PC1b East Sand Fill upto +2.5mPD 254,612m3 60,000m3/day by TSHD	01-Nov-14 A	05-Nov-14 A
	Land Portion C2a		
MFC2a-010	PC2a East Marine Fill Sand 100% 265,452m3 10,000m3/day by pelican	01-Aug-14 A	10-Sep-14 A
MFC2a-020	PC2a West Marine Fill Sand 100% 200,000m3 20,000m3/day by Pelican	10-Nov-14 A	01-Dec-14 A
	Land Portion E2		
MFE2-012	PE2 South Marine Sand Fill upto +2.5mPD 516,405m3 20,000m3/day by Pelican	01-Sep-14 A	20-Oct-14 A
	Vertical Band Drains by Land Plant		
	Land Portion C2a 111,740nrs by Land		
VBDC2a-030	Vertical Band Drains outstanding 50,100nrs by land plant at PC2a 2,000nrs/day (6HP)	11-Sep-14 A	30-Nov-14 A
	Land Portion E2 Southern Part 84,746nrs		
VBDE2-012	Vertical Band Drains 18,774nrs by land plant at PE2 South 1,500nrs/day (11HP)	01-Sep-14 A	30-Sep-14 A
	Earthwork Fill		
	Land Portion B		
	Narrow Area K013 - K027		
EFB0-010	PB Edge K013 - K027 Type D Sand Fill upto +5.5mPD 216,000m3 10,000m3/day by dumptr	11-Aug-14 A	20-Nov-14 A
	Major Reclamation Area		
EFB0-040	PB Main North Type D Sand Fill upto +5.5mPD 369,646m3 40,000m3/day by TSHD	21-Aug-14 A	06-Sep-14 A
	Land Portion C1a		
EFC1a-020	PC1a Main Area Type D Earthwork Sand Fill upto +5.5mPD stg1 100,000m3 20,000m3/day	01-Nov-14 A	10-Nov-14 A
EFC1a-030	PC1a Main Area Type D Earthwork Sand Fill upto +5.5mPD stg2 225,240m3 20,000m3/day	11-Nov-14 A	24-Nov-14 A
	Surcharge		
	Portion A Surcharge		
	Main Reclamation Areas		
	A1 PCB West		
SURA0-230	PA PCB North Sand Surcharge Removal 185,993m3 10,000m3/day	07-Oct-14 A	18-Oct-14 A
	A2 East		
SURA0-410	PA A2 East Surcharge Laying upto +11.5mPD 185,670m3 5,000m3/day	02-Jul-14 A	04-Sep-14 A
	Edge Area From SOL offset within 180m to 50m		
	CH5+000 to 5+300 (at C125 - C119) North		
	Area of Offset 120m to 40m		
SUEA1-0010	PA North (from 73m) Sand Surcharge Laying upto +8.5mPD 61,063m3 20,000m3/day	21-Oct-14 A	09-Nov-14 A
SUEA1-0030	PA North (from 40m) Check Point Testing	09-Nov-14 A	30-Nov-14 A
	Area of Offset 40m to 10m		
SUEA1-0110	PA North (10 - 73m) Pause Period +5.5mPD 2mths	21-Aug-14 A	20-Oct-14 A
SUEA1-0140	PA North (10 - 73m) Sand Surcharge Laying upto +8.5mPD 65,340m3 20,000m3/day	21-Oct-14 A	09-Nov-14 A
	CH5+300 to 5+700 (at C134 - C126)		
	Area of CLP substation		
SUEA2-0040	PA CLP Substation Area Sand Surcharge upto +11.5mPD 30,492m3 10,000m3/day by Pump	16-Aug-14 A	04-Sep-14 A
	Area of Offset 180m to 40m (other CLP area) near Portion B		
SUEA3-0010	PA A2 West Sand Surcharge Laying upto +8.5mPD 50,820m3 20,000m3/day	10-Nov-14 A	28-Nov-14 A
	Area of Offset 40m to 10m (other CLP area)		
SUEA4-0010	PA South (10 - 73m) Pause Period +5.5mPD 2mths	10-Aug-14 A	10-Oct-14 A
SUEA4-0030	PA South (10 - 40m) Sand Surcharge Laying upto +7.5mPD 74,052m3 20,000m3/day	10-Nov-14 A	14-Nov-14 A
	Land Portion B		
	Reclamation Areas		
	at East of Main Area (HY/2012/07)		
SURB0-010	PB Main Area East Sand Surcharge upto +8.5mPD 131,390m3 40,000m3/day by TSHD	01-Sep-14 A	11-Sep-14 A
SURB0-020	PB Main Area East Sand Surcharge upto +11.5mPD 131,390m3 40,000m3/day by TSHD	28-Sep-14 A	12-Oct-14 A



Remaining Level of Effort
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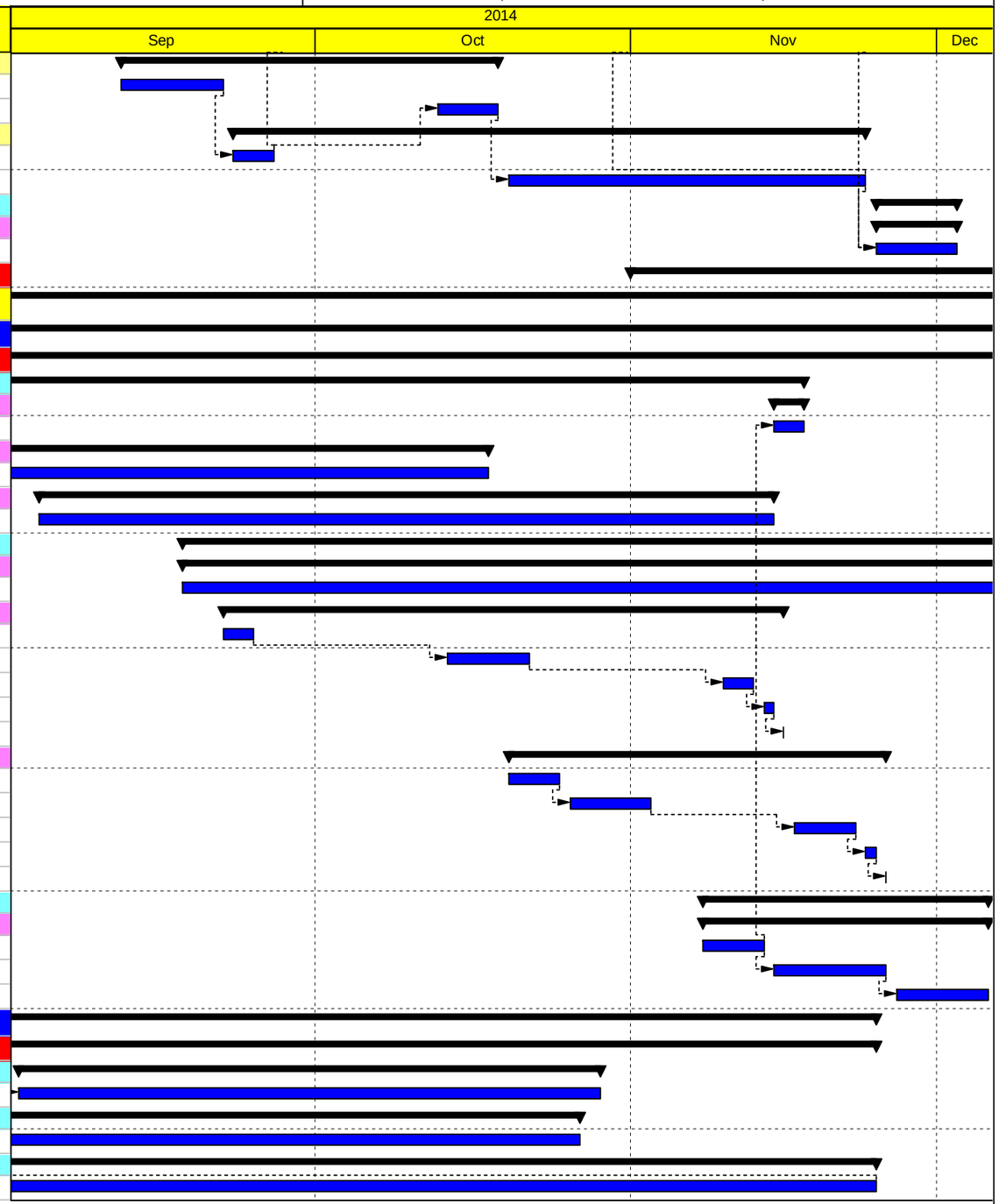
Activity ID	Activity Name	Start	Finish
at West of Main Area stg1			
SURB1-010	PB Main Area West-S Sand Surcharge upto +8.5mPD 180,000m3 60,000m3/day by TSHD	12-Sep-14 A	22-Sep-14 A
SURB1-020	PB Main Area West-S Sand Surcharge upto +11.5mPD 180,000m3 60,000m3/day by TSHD	13-Oct-14 A	19-Oct-14 A
at West of Main Area stg2			
SURB2-010	PB Main Area West-N Sand Surcharge upto +8.5mPD 314,695m3 60,000m3/day by TSHD	23-Sep-14 A	27-Sep-14 A
SURB2-020	PB Main Area West-N Sand Surcharge upto +11.5mPD 314,695m3 60,000m3/day by TSHD	20-Oct-14 A	24-Nov-14 A
Land Portion C1a			
Reclamation Areas			
SURC1a-015	PC1a Main Area Sand Surcharge upto 8.5mPD stg1 260,000m3 60,000m3/day by TSHD	25-Nov-14 A	03-Dec-14 A
Geotechnical Instrumentation Works			
Portion D			
Precast Yard for Seawall Blocks & Culverts			
Culverts			
Culverts C4			
C4-2			
PY-C4-2010	PD C04-2 - Foundation Platform	15-Nov-14 A	18-Nov-14 A
C4-3			
PY-C4-5010	PD C04-3 (38.84m) Casting	17-Jul-14 A	18-Oct-14 A
C4-4			
PY-C4-4000	PD C04-4 (38.84m) Casting	04-Sep-14 A	15-Nov-14 A
Culverts C3			
C3-3			
PY-C3-3000	PD C03-3 (38.84m) Casting	18-Sep-14 A	14-Dec-14 A
C3-4			
PY-C3-4010	PD C03-4 - Foundation Platform	22-Sep-14 A	25-Sep-14 A
PY-C3-4020	PD C03-4 - Foundation Rebar Fixing	14-Oct-14 A	22-Oct-14 A
PY-C3-4030	PD C03-4 - Foundation Formwork	10-Nov-14 A	13-Nov-14 A
PY-C3-4040	PD C03-4 - Foundation Concrete	14-Nov-14 A	15-Nov-14 A
PY-C3-4050	PD C03-4 - Foundation Formwork Removal	16-Nov-14 A	16-Nov-14 A
C3-5			
PY-C3-5010	PD C03-5 - Foundation Platform	20-Oct-14 A	25-Oct-14 A
PY-C3-5020	PD C03-5 - Foundation Rebar Fixing	26-Oct-14 A	03-Nov-14 A
PY-C3-5030	PD C03-5 - Foundation Formwork	17-Nov-14 A	23-Nov-14 A
PY-C3-5040	PD C03-5 - Foundation Concrete	24-Nov-14 A	25-Nov-14 A
PY-C3-5050	PD C03-5 - Foundation Formwork Removal	26-Nov-14 A	26-Nov-14 A
Culverts C1			
C1-5			
PY-C1-5010	PD C01-5 - Foundation Platform	08-Nov-14 A	14-Nov-14 A
PY-C1-5020	PD C01-5 - Foundation Rebar Fixing	15-Nov-14 A	26-Nov-14 A
PY-C1-5030	PD C01-5 - Foundation Formwork	27-Nov-14 A	06-Dec-14 A
Site Construction			
Surcharge			
West1 Portion			
A1658	PD West1 - Surcharge Laying upto +11.5mPD 42,843m3 2,500m3/day	02-Sep-14 A	29-Oct-14 A
West2 Portion			
A2218	PD West2 - Surcharge Laying upto +11.5mPD 42,843m3 2,500m3/day	29-Aug-14 A	27-Oct-14 A
East1 Portion			
A1688	PD East1 - Surcharge Laying upto +11.5mPD 42,843m3 2,500m3/day	27-Aug-14 A	25-Nov-14 A



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Appendix C - Implementation Schedule of Environmental Mitigation Measures

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
Air Quality				
S5.5.6.1 of HKBCFEIA	A1	The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	All construction sites	V
S5.5.6.2 of HKBCFEIA and S4.8.1 of TKCLKLEIA	A2	Proper watering of exposed spoil should be undertaken throughout the construction phase: • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • All unpaved roads/exposed area shall be watered which results in dust suppression by forming moist cohesive films among the discrete grains of road surface material. • No burning of debris or other materials on the works areas is allowed; • Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created; • Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading; • During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.		
S5.5.6.3 of HKBCFEIA and S4.8.1 of TKCLKLEIA	A3	The Contractor should undertake proper watering on all exposed spoil and associated work areas (with at least 8 times per day) throughout the construction phase.	All construction sites	V
S5.5.6.4 of HKBCFEIA and S4.11 of TKCLKLEIA	A4	Implement regular dust monitoring under EM&A programme during the construction stage.	Selected representative dust monitoring station	V
S5.5.7.1 of HKBCFEIA	A5	The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant: • Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; • All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; • Vents for all silos and cement/ pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; • The materials which may generate airborne dusty emissions should be wetted by water spray system;	All construction sites	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• All receiving hoppers should be enclosed on three sides up to 3m above unloading point; • All conveyor transfer points should be totally enclosed; • All access and route roads within the premises should be paved and wetted; and • Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body.		
S5.5.2.7 of HKBCFEIA	A6	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: • All road surface within the barging facilities will be paved; • Dust enclosures will be provided for the loading ramp; • Vehicles will be required to pass through designated wheels wash facilities; and • Continuous water spray at the loading points.	All construction sites	N/A (Construction in process)
Construction Noise (Air borne)				
S6.4.10 of HKBCFEIA	N1	Use of good site practices to limit noise emissions by considering the following: • only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • plant known to emit noise strongly in one direction, where possible, be orientated	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		so that the noise is directed away from nearby NSRs; • silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • mobile plant should be sited as far away from NSRs as possible and practicable; • material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.		
S6.4.11 of HKBCFEIA	N2	Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	All construction sites	V
S6.4.12 of HKBCFEIA	N3	Install movable noise barriers (typically density @14kg/m^2), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	For plant items listed in Appendix 6D of the EIA report at all construction sites	N/A
S6.4.13 of HKBCFEIA	N4	Select “Quiet plants” which comply with the BS 5228 Part 1 or TM standards.	For plant items listed in Appendix 6D of the EIA report at all construction sites	V
S6.4.14 of HKBCFEIA	N5	Sequencing operation of construction plants where practicable.	All construction sites where practicable	V
S5.1 of	N6	Implement a noise monitoring under EM&A programme.	Selected	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
TMCLKLEIA			representative noise monitoring station	
Waste Management (Construction Waste)				
S12.6 of TMCLKLEIA	WM1	The Contractor shall identify a coordinator for the management of waste.	All construction sites	V
S12.6 of TMCLKLEIA	WM2	The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	All construction sites	V
S12.6 of TMCLKLEIA	WM3	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All construction sites	V
S8.3.8 of HKBCFEIA and S12.6 of TMCLKLEIA	WM4	*Construction and Demolition Material* The following mitigation measures should be implemented in handling the waste: • Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; • Carry out on-site sorting; • Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; • Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible;	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; • Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction; • In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation; and • The surplus surcharge should be transferred to a fill bank.		
S8.3.9-S8.3.11 of HKBCFEIA and S12.6 of TMCLKLEIA	WM5	*C&D Waste* • Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding and falsework should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. • The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.		
S8.2.12-S8.3.15 of HKBCFEIA and S12.6 of TMCLKLEIA	WM6	*Chemical Waste* • Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. • The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated. • Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		which also offers a chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD.		
S8.3.16 of HKBCFEIA and S12.6 of TMCLKLEIA	WM7	*Sewage* • Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly.	All construction sites	V
S8.3.17 of HKBCFEIA and S12.6 of TMCLKLEIA	WM8	*General Refuse* • The site and surroundings shall be kept tidy and litter free. General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. • A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. • Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. • Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided. • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes. • Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. • All waste containers shall be in a secure area on hardstanding.		
Water Quality (Construction Phase)				
	W1	Mitigation during the marine works to reduce impacts to within acceptable levels have been recommended and will comprise a series of measures that restrict the method and sequencing of backfilling, as well as protection measures. Details of the measures are provided below:	During filling	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• Reclamation filling for the Project shall not proceed until at least 200m of leading seawall at the reclamation area formed above +2.2mPD, unless otherwise agreement was obtained from EPD, except for the 300m gaps for marine access. All underwater filling works shall be carried out behind seawalls to avoid dispersion of suspended solids outside the Project limit; • Except for the filling of the cellular structures, not more than 15% public fill shall be used for reclamation filling below +2.5mPD during construction of the seawall; • After the seawall is completed except for the 300m marine access as indicated in the EPs, not more than 30% public fill shall be used for reclamation filling below +2.5mPD, unless otherwise agreement from EPD was obtained; • Upon completion of 200m leading seawall, no more than a total of 60 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 60,000 m3 for HKBCF and TMCLKL southern landfall reclamation during the filling operation; and • Upon completion of the whole section of seawall except for the 300m marine access as indicated in the EPs, no more than a total of 190 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 190,000 m3 for the remaining filling operations for HKBCF and TMCLKL southern landfall reclamation. • Floating type perimeter silt curtains shall be around the HKBCF site before the commencement of marine works. Staggered layers of silt curtain shall be provided		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		to prevent sediment loss at navigation accesses. The length of each staggered layers shall be at least 200m; • Single layer silt curtain to be applied around the North-east airport water intake; • The silt-curtains should be maintained in good condition to ensure the sediment plume generated from filling be confined effectively within the site boundary; • The filling works shall be scheduled to spread the works evenly over a working day; • Cellular structure shall be used for seawall construction; • A layer of geotextile shall be placed on top of the seabed before any filling activities take place inside the cellular structures to form the seawall; • The conveyor belts shall be fitted with windboards and conveyor release points shall be covered with curtain to prevent any spillage of filling materials onto the surrounding waters; and • An additional layer of silt curtain shall be installed near the active stone column installation points. A layer of geotextile with stone blanket on top shall be placed on the seabed prior to stone column installation works.		
S9.11.1.3 of HKBCFEIA and S6.10 of	W2	<u>Land Works</u> General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include:	All land-based construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
TMCLKLEIA		• wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; • sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; • storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; • silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm; • temporary access roads should be surfaced with crushed stone or gravel; • rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; • measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; • open stockpiles of construction materials (e.g. aggregates and sand) on site		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		should be covered with tarpaulin or similar fabric during rainstorms; • manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; • discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; • all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit; • wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; • the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; • wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; • vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for offsite disposal;		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; • waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; • all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and • surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the storm water system..		
S9.14 of HKBCFEIA and S6.10 of TMCLKLEIA	W3	Implement a water quality monitoring programme	At identified monitoring location	V
S6.10 of TMCLKLEIA	W4	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All construction site areas	V
Ecology (Construction Phase)				
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E1	• Install silt curtain during the construction • Limit works fronts • Construct seawall prior to reclamation filling where practicable	Seawall, reclamation area	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• Good site practices • Strict enforcement of no marine dumping • Site runoff control • Spill response plan		
S10.7 of HKBCFEIA	E2	• Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater.	Land-based works areas	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E3	• Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time.	Land-based works areas	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E4	• Dolphin Exclusion Zone • Dolphin watching plan	Marine works	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E5	• Decouple compressors and other equipment on working vessels • Proposal on design and implementation of acoustic decoupling measures applied during reclamation works • Avoidance of percussive piling	Marine works	V
S10.7 of	E6	• Control vessel speed	Marine traffic	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
HKBCFEIA and S8.14 of TMCLKLEIA		• Skipper training • Predefined and regular routes for working vessels; avoid Brothers Islands		
S10.10 of HKBCFEIA and S8.14 of TMCLKLEIA	E7	• Vessel based dolphin monitoring	Northeast and Northwest Lantau	V
Fisheries				
S11.7 of HKBCFEIA	F1	• Reduce re-suspension of sediments • Limit works fronts • Good site practices • Strict enforcement of no marine dumping • Spill response plan	Seawall, reclamation area	V
S11.7 of HKBCFEIA	F2	• Install silt-grease trap in the drainage system collecting surface runoff	Reclamation area	V
Landscape & Visual (Construction Phase)				
S14.3.3. 3 of HKBCFEIA and S10.9 of TMCLKLEIA	LV1	*Mitigate Landscape Impacts* G1/CM4 Grass-hydroseed or sheeting bare soil surface and stock pile areas. G9 Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt “natural-look” by means of using armour rocks in the form of natural	All construction site areas	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of new coastline.		
S10.9 of TMCLKLEIA	LV2	*Mitigate Landscape Impacts* CM7 Ensure no run-off into water body adjacent to the Project Area.	All construction site areas	V
S14.3.3. 3 of HKBCFEIA	LV4	*Mitigate Visual Impacts* V1 Minimize time for construction activities during construction period.	All construction site areas	V
S10.9 of TMCLKLEIA	LV5	*Mitigate Visual Impacts* CM6 Control night-time lighting and glare by hooding all lights.	All construction site areas	V
EM&A				
S15.2.2 of HKBCFEIA	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	All construction site areas	V
S15.5 - S15.6 of HKBCFEIA	EM2	• An Environmental Team needs to be employed as per the EM&A Manual. • Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. • An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	All construction site areas	V

Legend: V = implemented; x = not implemented; N/A = not applicable

Appendix D - Summary of Action and Limit Levels

Table 1 – Action and Limit Levels for 1-hour TSP

Location	Action Level	Limit Level
AMS2	374 $\mu g/m^3$	500 $\mu g/m^3$
AMS3A*	368 $\mu g/m^3$	500 $\mu g/m^3$
AMS6	360 $\mu g/m^3$	500 $\mu g/m^3$
AMS7	370 $\mu g/m^3$	500 $\mu g/m^3$

Remarks: * Action Level set out at AMS3 Ho Yu College is adopted.

Table 2 – Action and Limit Levels for 24-hour TSP

Location	Action Level	Limit Level
AMS2	176 $\mu g/m^3$	260 $\mu g/m^3$
AMS3A*	167 $\mu g/m^3$	260 $\mu g/m^3$
AMS6	173 $\mu g/m^3$	260 $\mu g/m^3$
AMS7	183 $\mu g/m^3$	260 $\mu g/m^3$

Remarks: * Action Level set out at AMS3 Ho Yu College is adopted.

Table 3 – Action and Limit Levels for Construction Noise (0700-1900 hrs of normal weekdays)

Location	Action Level	Limit Level
NMS2	When one documented complaint, related to 0700 – 1900 hours on normal weekdays, is received from any one of the sensitive receivers	75 dB(A)
NMS3A		*65 / 70 dB(A)

*Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65dB(A) applies during school examination period.

Table 4 – Action and Limit Levels for Water Quality

Parameters	**Action**	**Limit**
DO in mg L^{-1} (Surface, Middle & Bottom)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4 .2 (except 5 mg/L for FCZ) Bottom 3.6
SS in mg L^{-1} (depth-averaged)	23.5 and 120% of upstream control station's SS at the same tide of the same day	34.4 and 130% of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes
Turbidity in NTU (depth-averaged)	27.5 and 120% of upstream control station's turbidity at the same tide of the same day	47.0 and130% of upstream control station's turbidity at the same tide of the same day

Notes:

1. "depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
2. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
3. For turbidity, SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

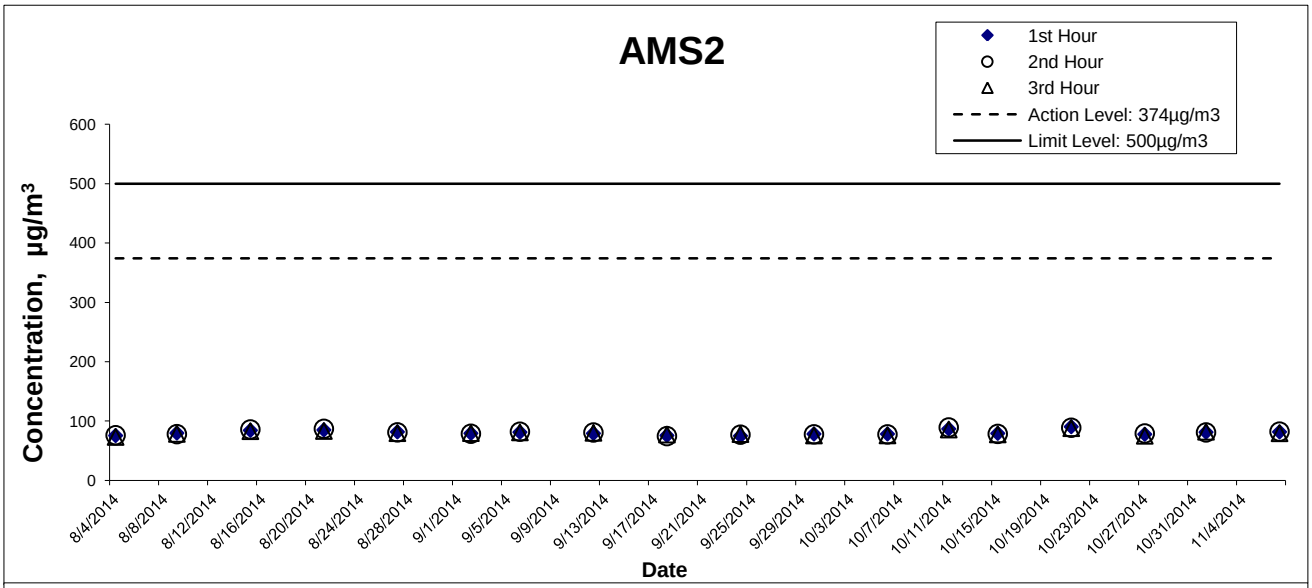
Table 5(a) Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL):

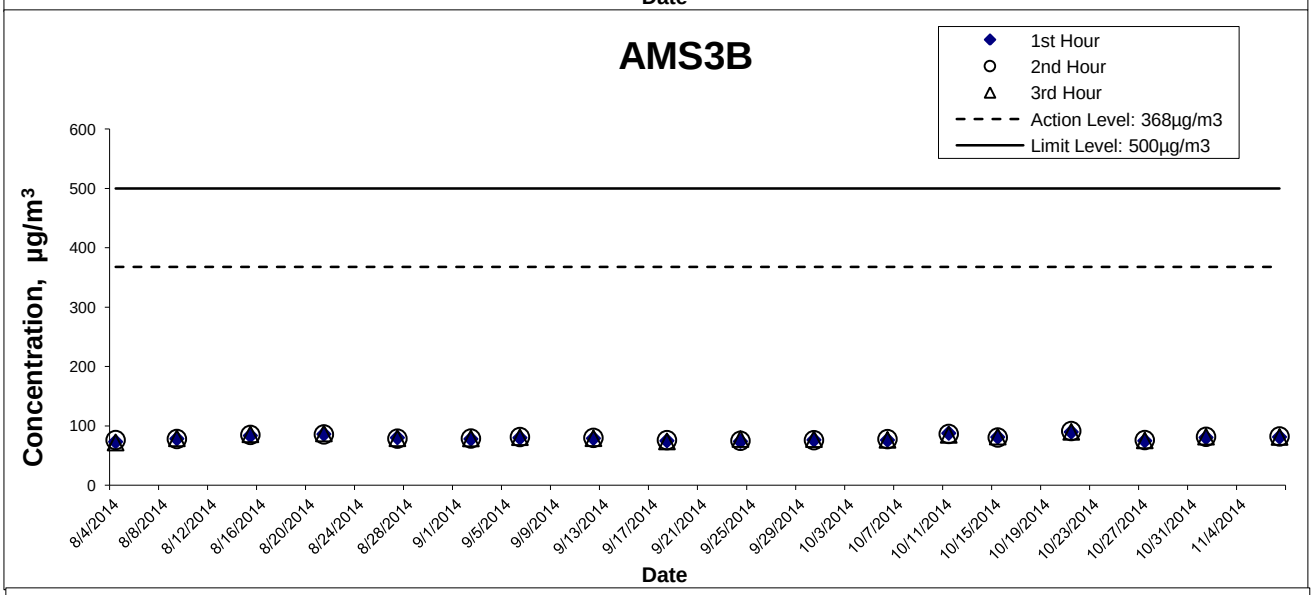
	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG < 70% of baseline) & (ANI < 70% of baseline)	(STG < 70% of baseline) & (ANI < 70% of baseline)
Limit Level	[(STG < 40% of baseline) & (ANI < 40% of baseline)] AND [(STG < 40% of baseline) & (ANI < 40% of baseline)]	

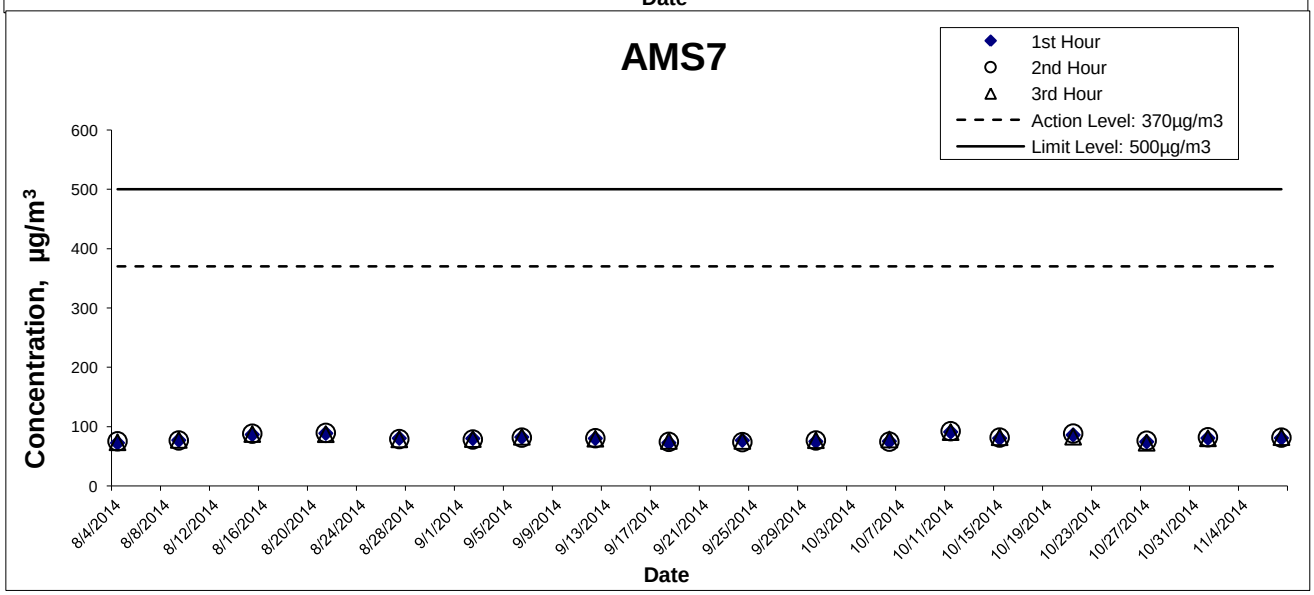
For North Lantau Social Cluster, action level will be trigger if either NEL **or** NWL fall below the criteria; limit level will be triggered if both NEL **and** NWL fall below the criteria.

Table 5(b) Derived Value of Action Level (AL) and Limit Level (LL) for Chinese White Dolphin Monitoring

	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG < 4.2) & (ANI < 15.5)	(STG < 6.9) & (ANI < 31.3)
Limit Level	[(STG < 2.4) & (ANI <8.9)] AND [(STG < 3.9)& (ANI < 17.9)]	







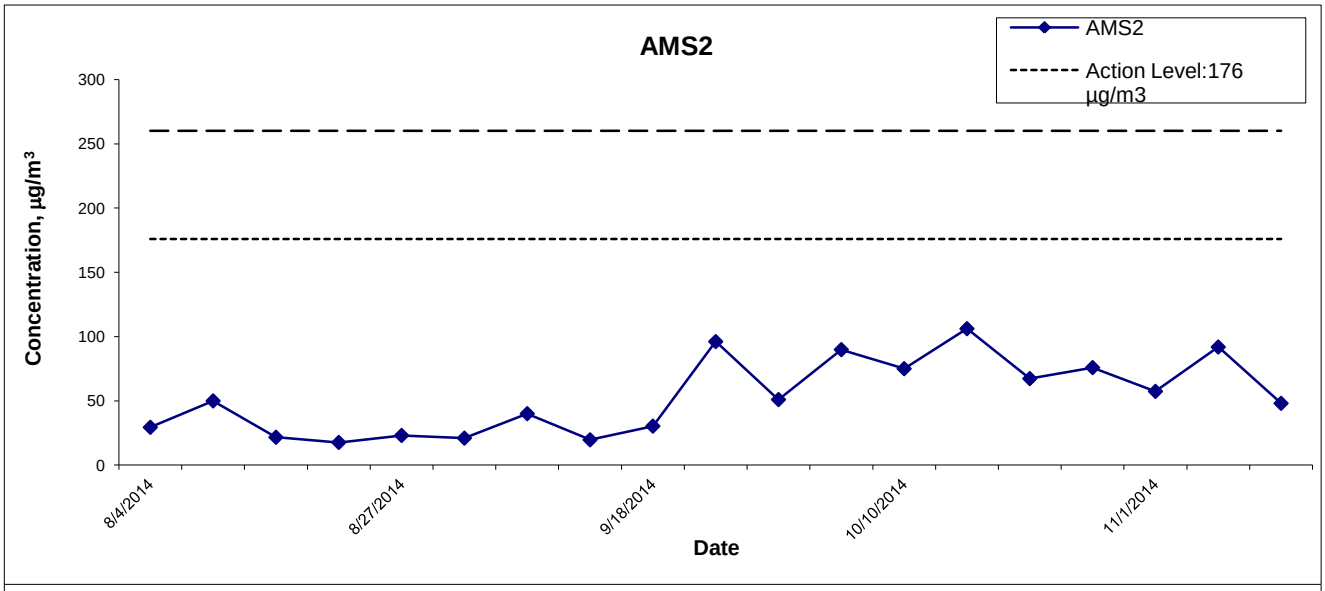
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

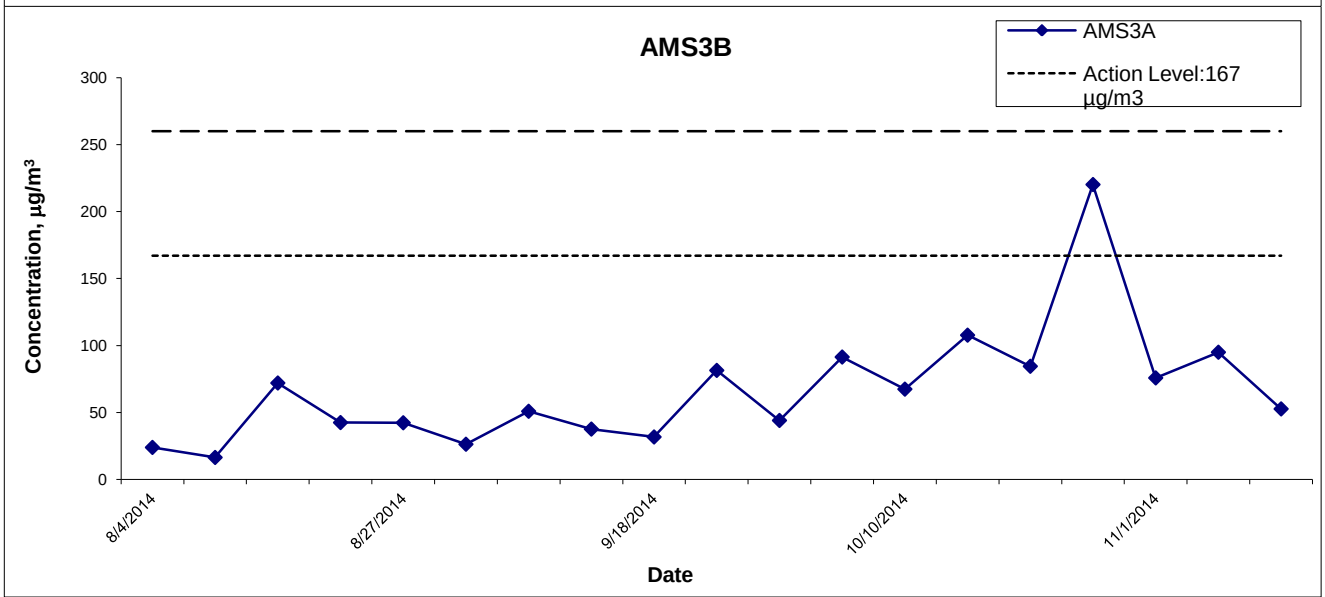
AECOM

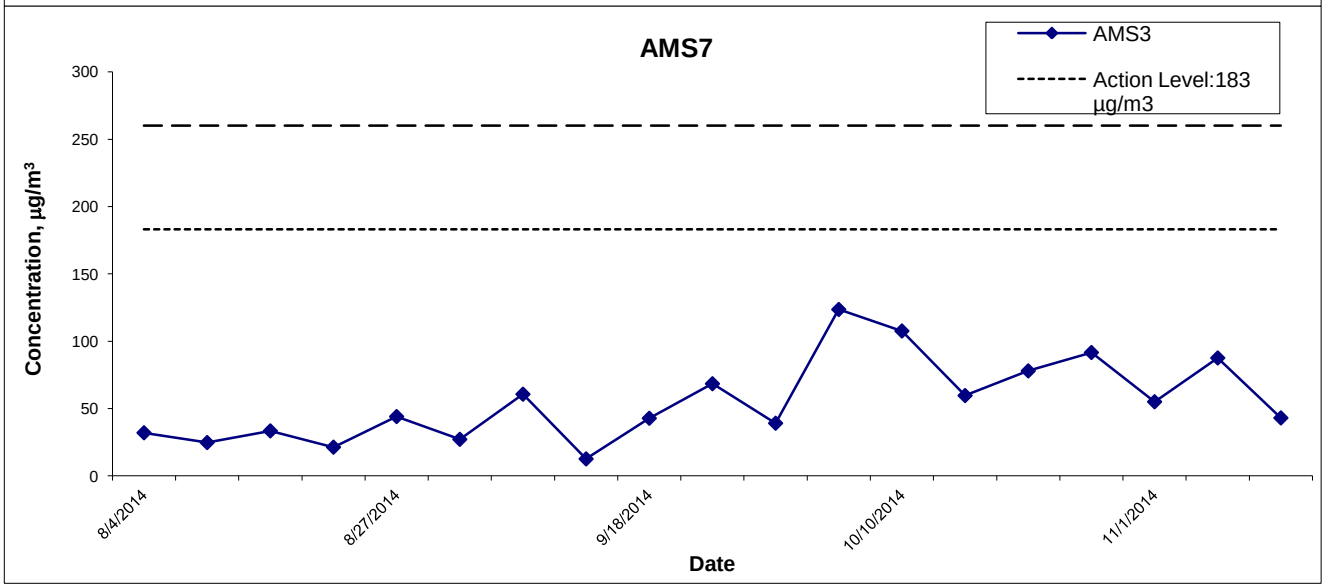
Graphical Presentation of Impact 1-hour TSP Monitoring Results

Project No.: 60249820 **Date: Nov 2014**

Appendix E







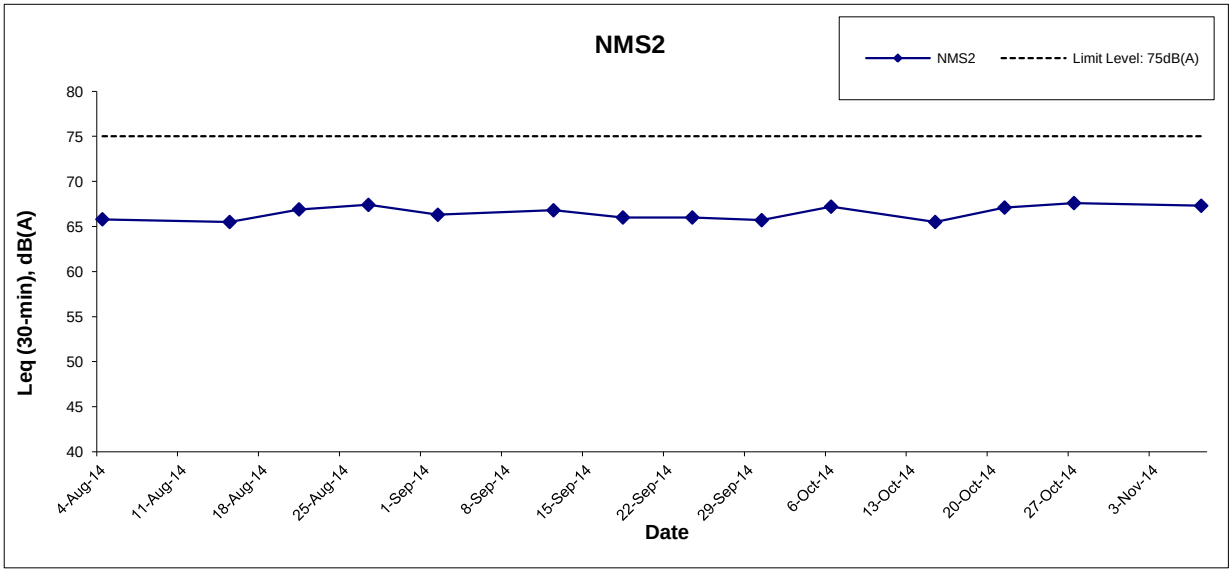
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

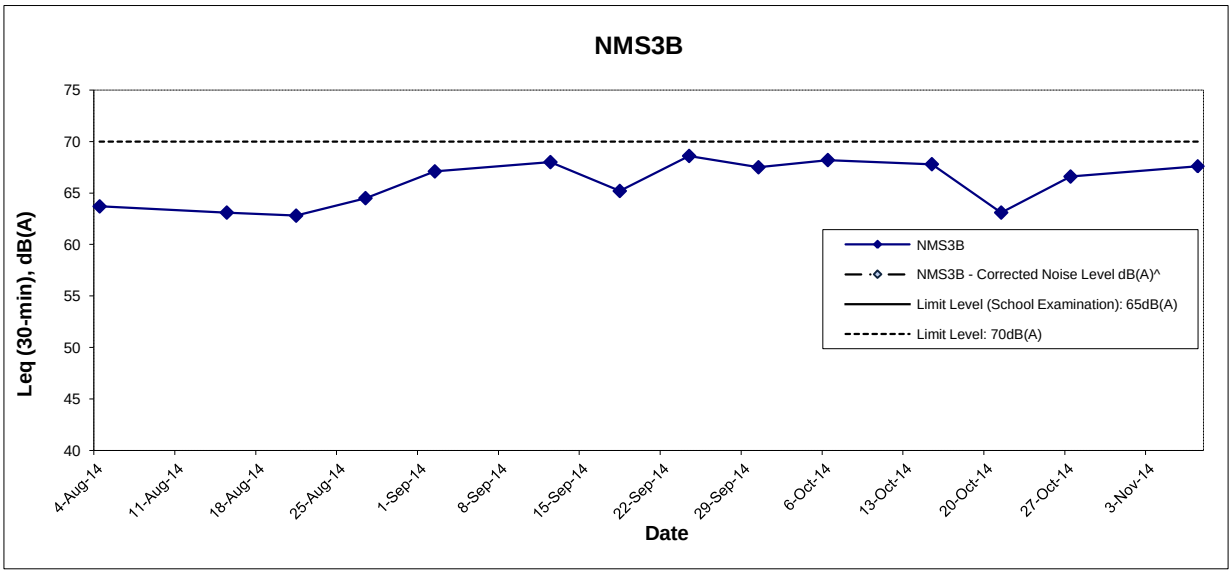
AECOM

Graphical Presentation of Impact 24-hour TSP Monitoring Results

Project No.: 60249820 **Date: Nov 2014**

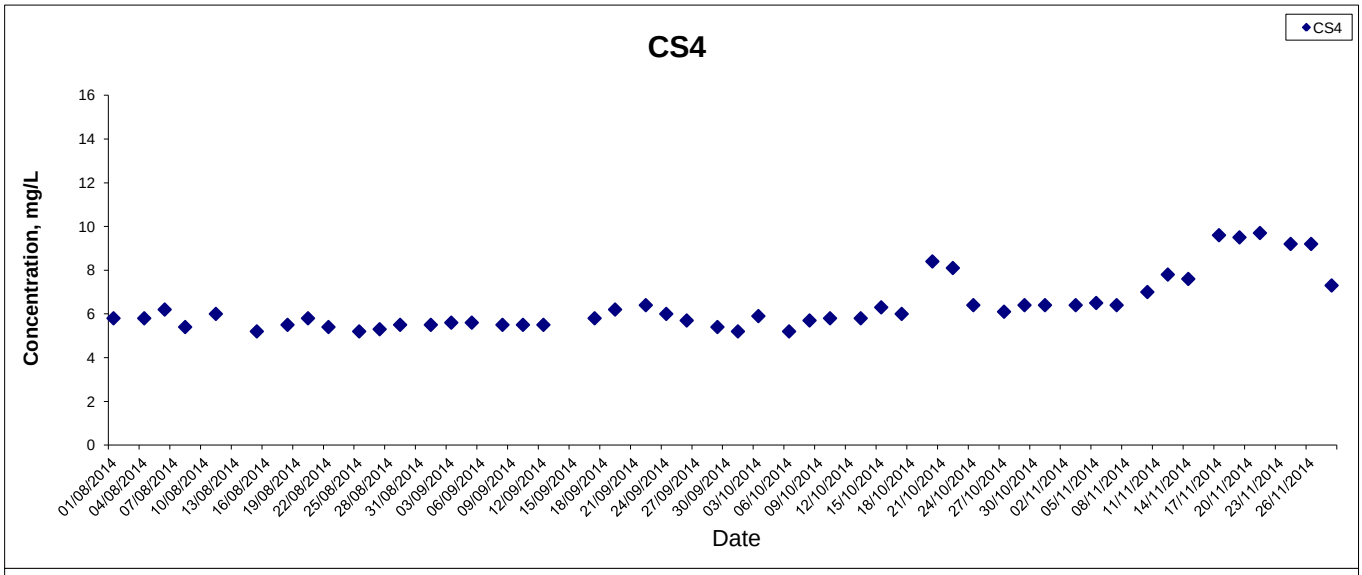
Appendix E

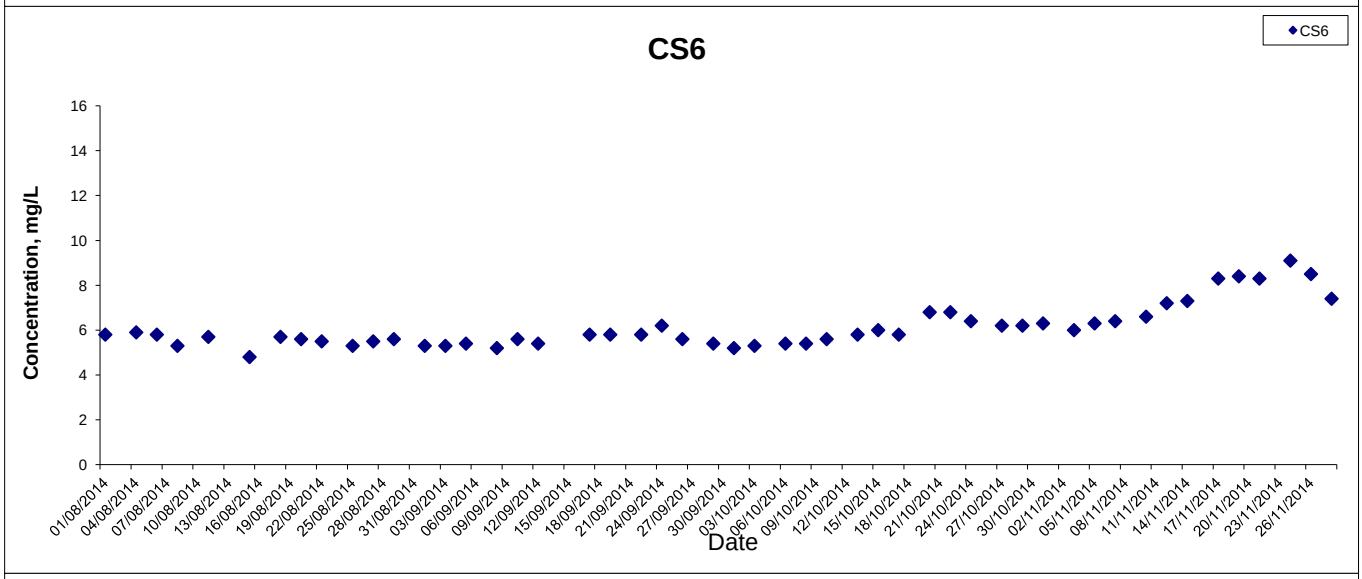


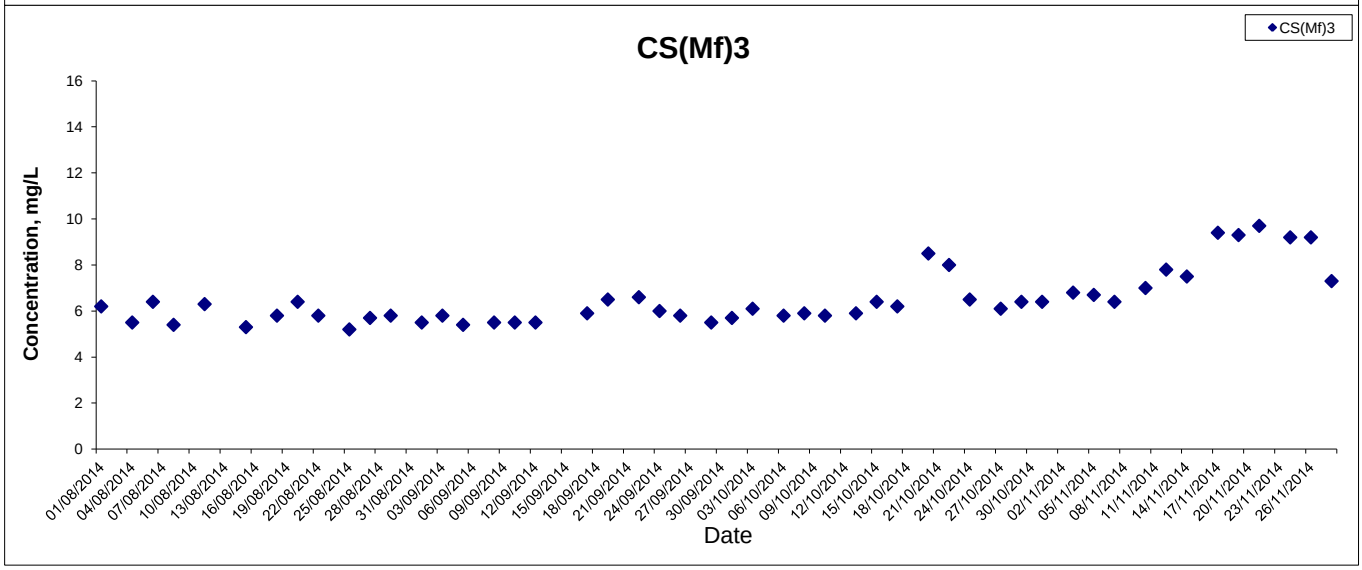


Remarks: Effective from July 2012, the Limit Level at NMS3A was revised to 70dB(A). Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65dB(A) applies during school examination period.

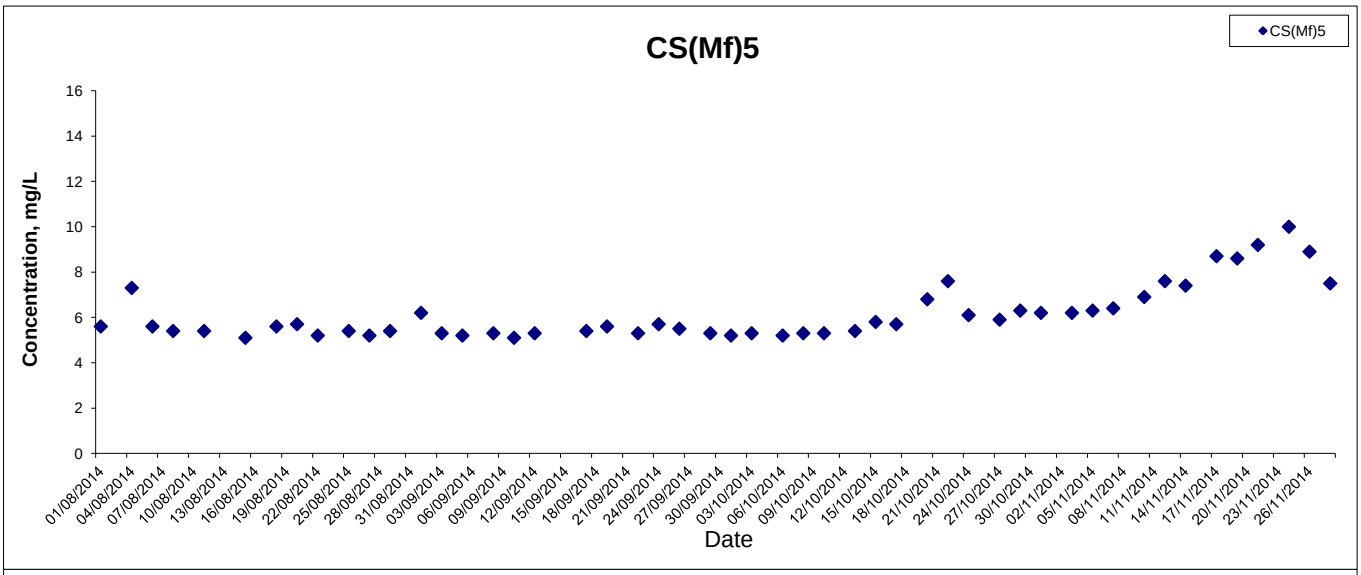
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

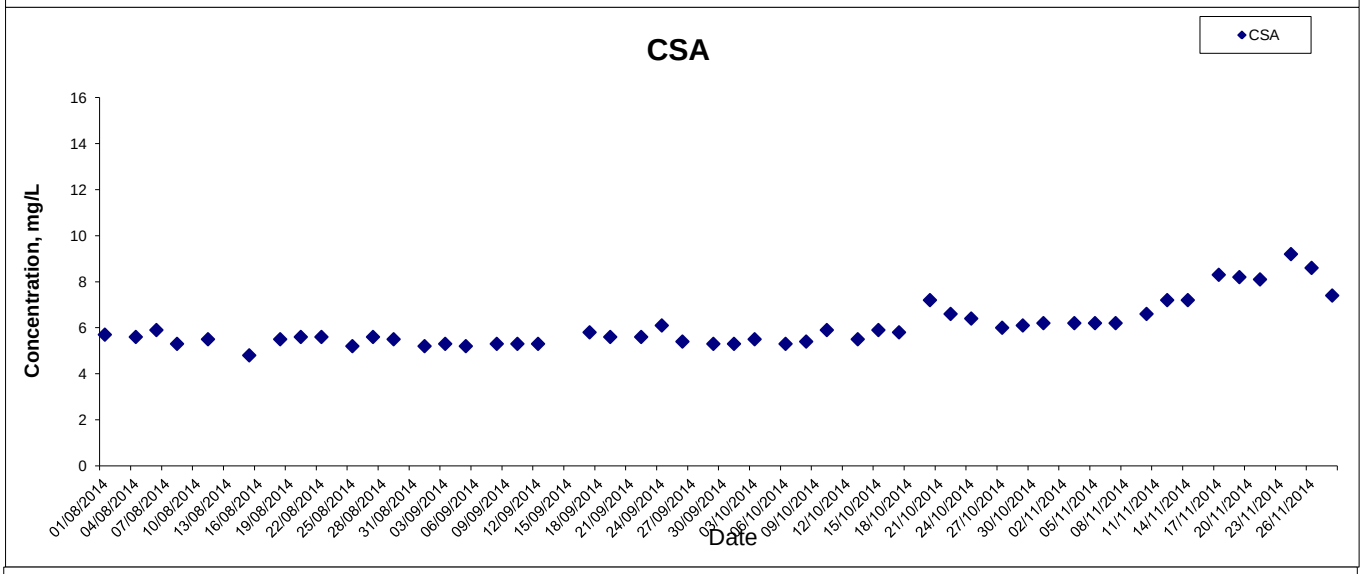


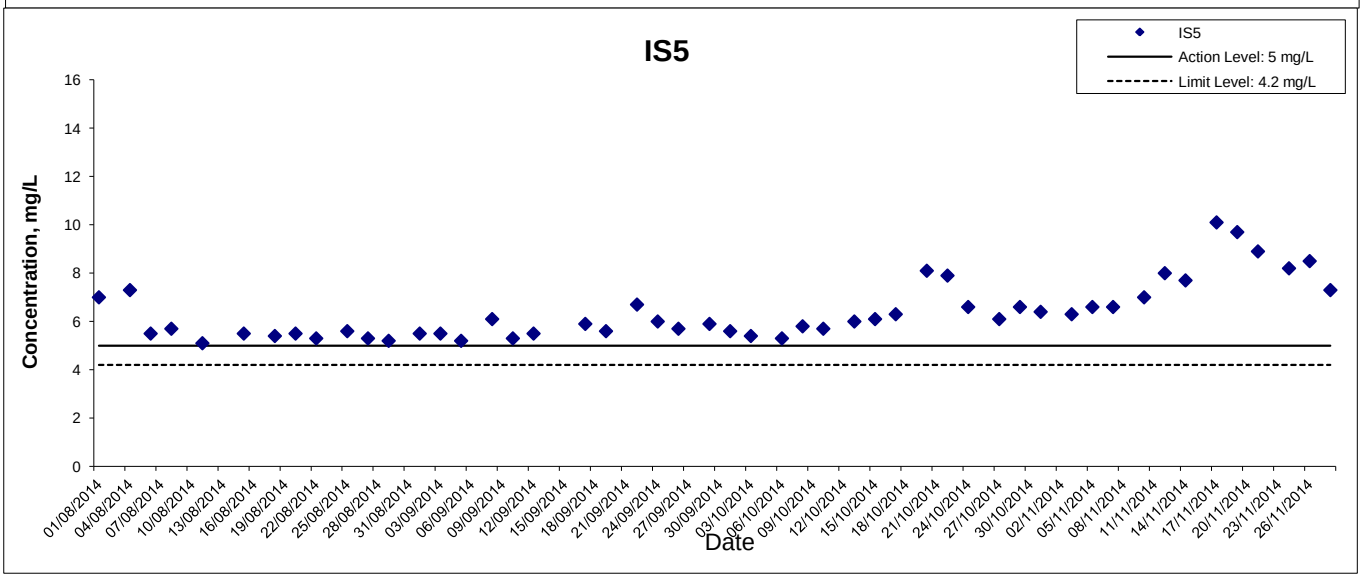




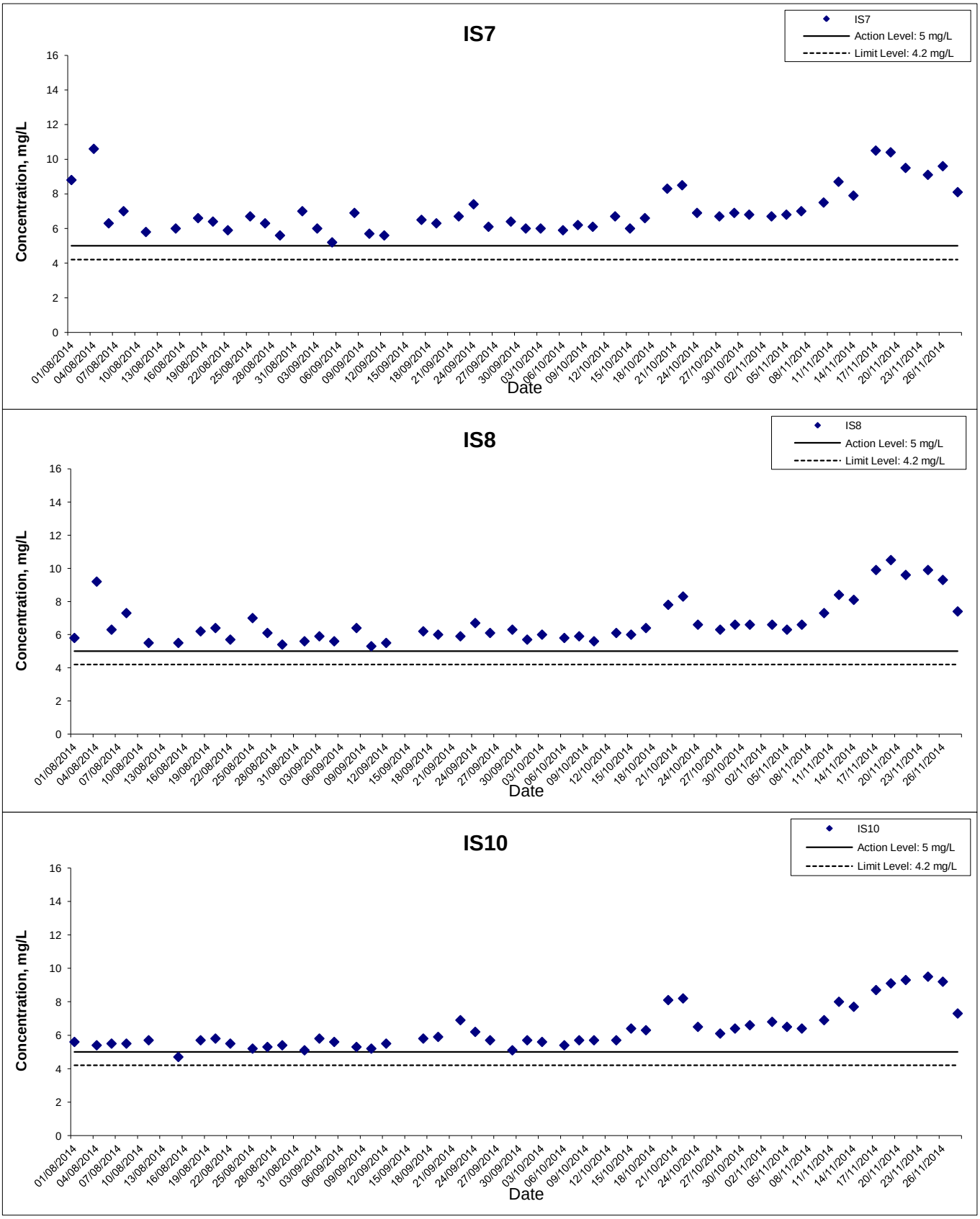
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide







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



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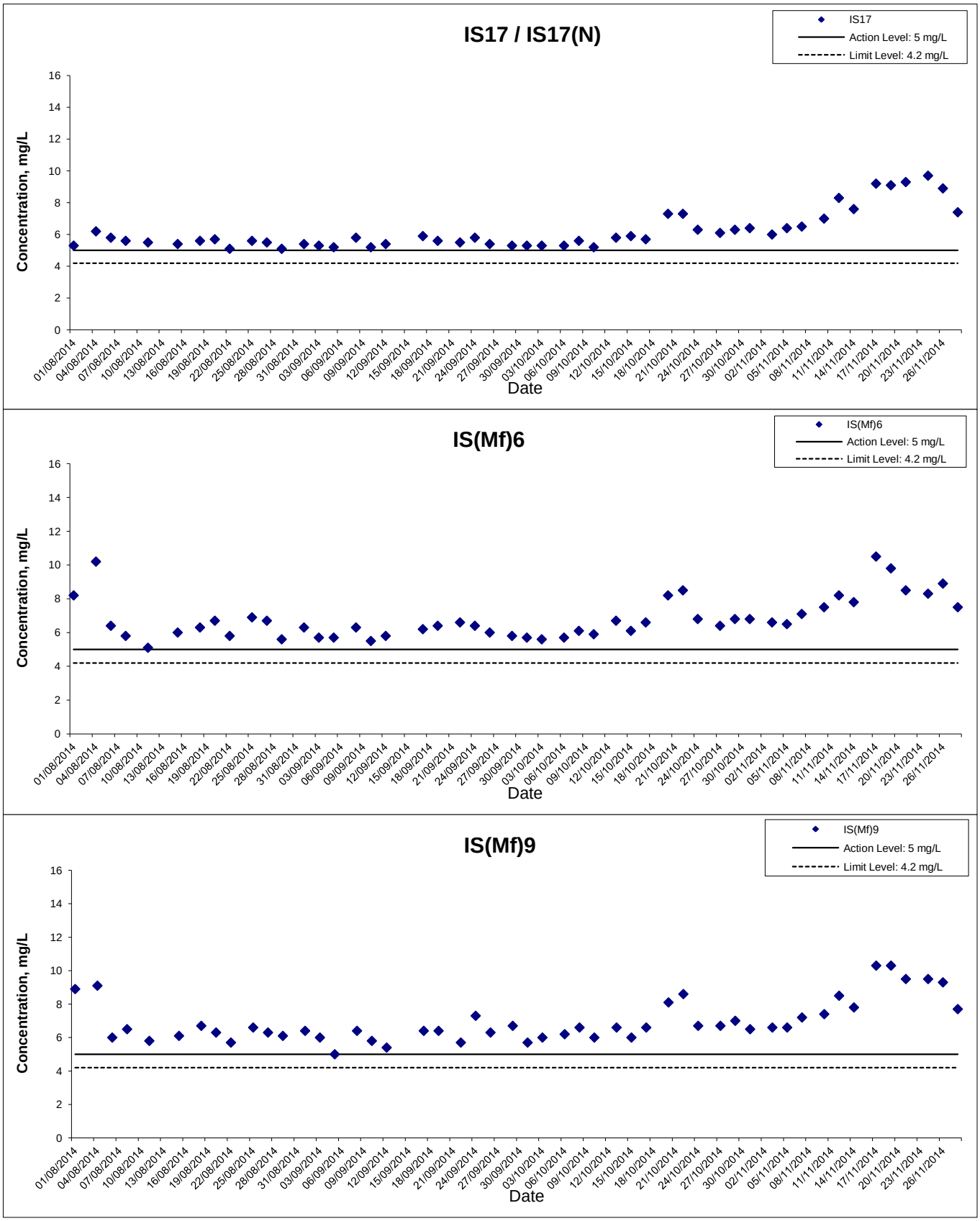

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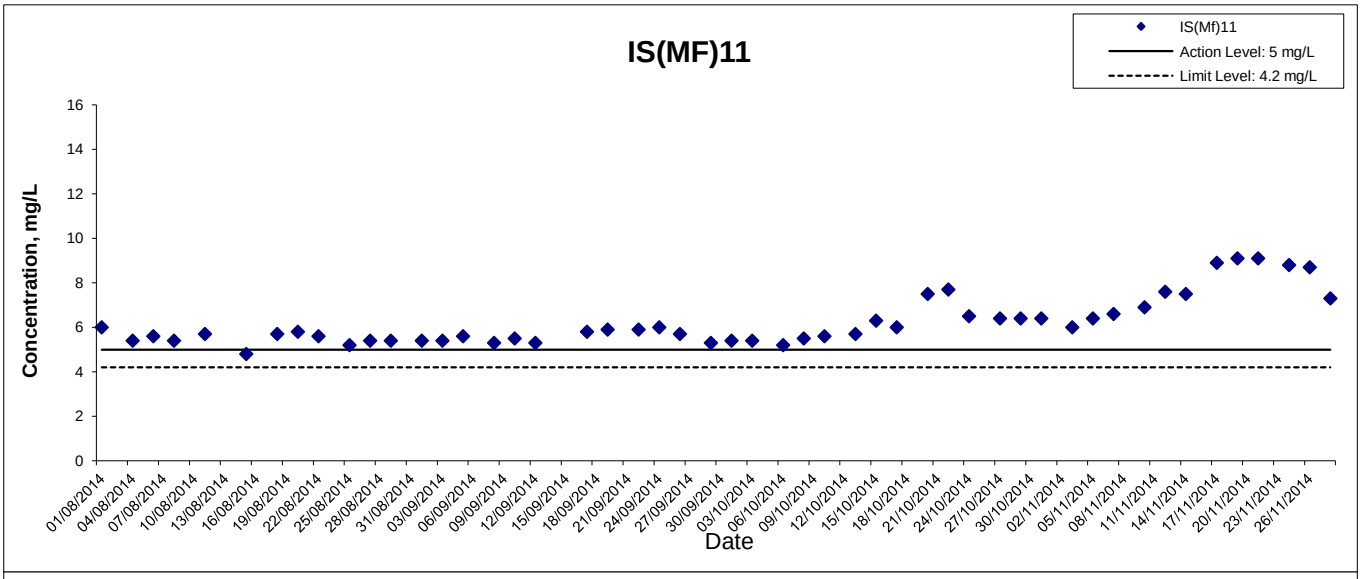
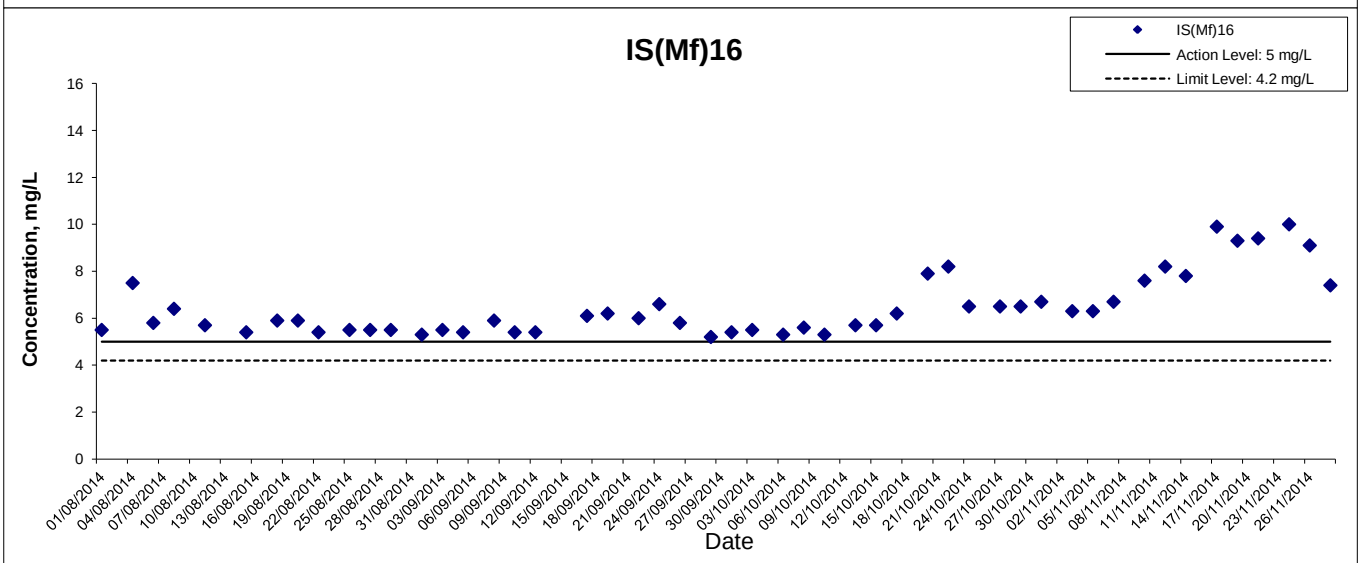
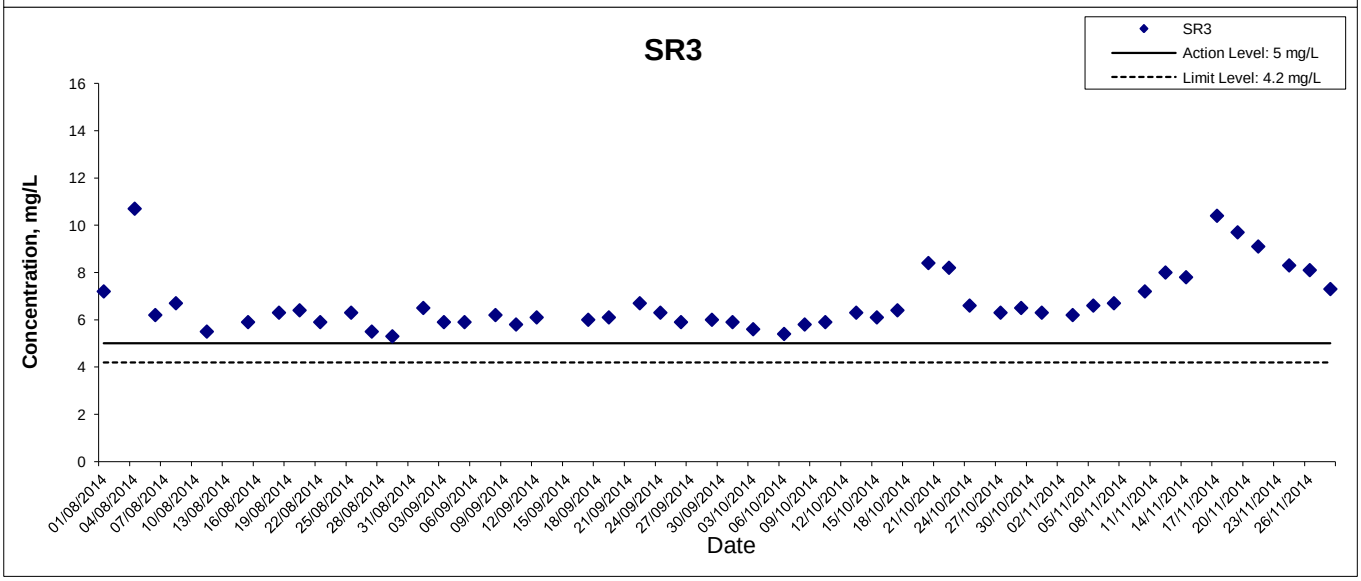
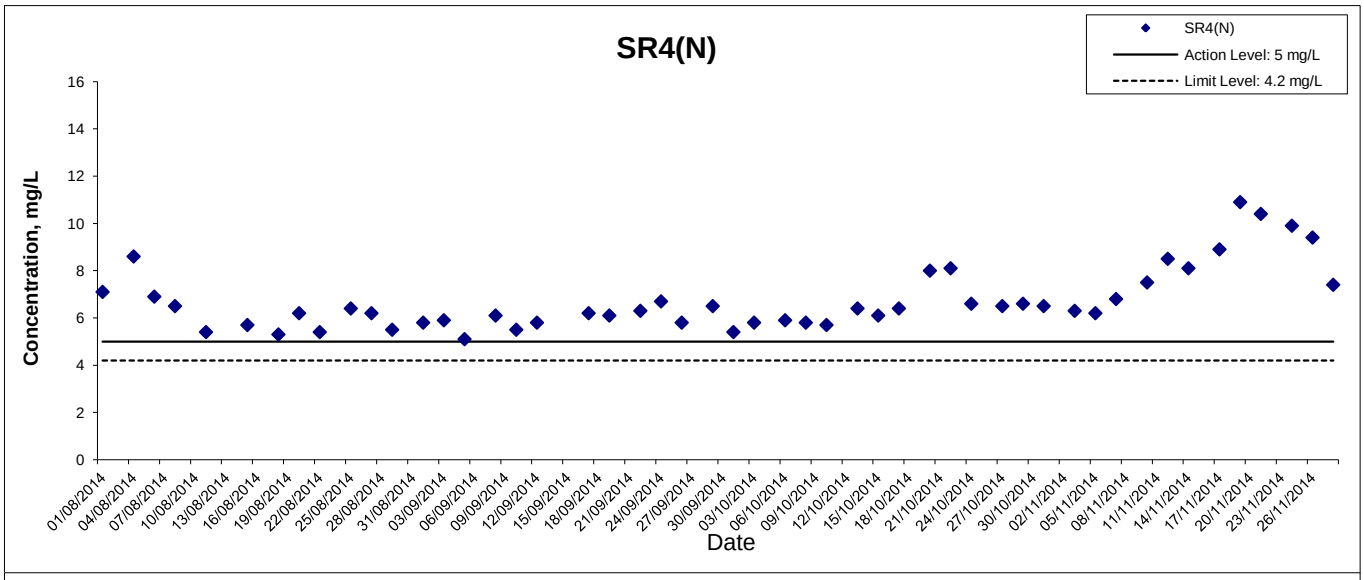
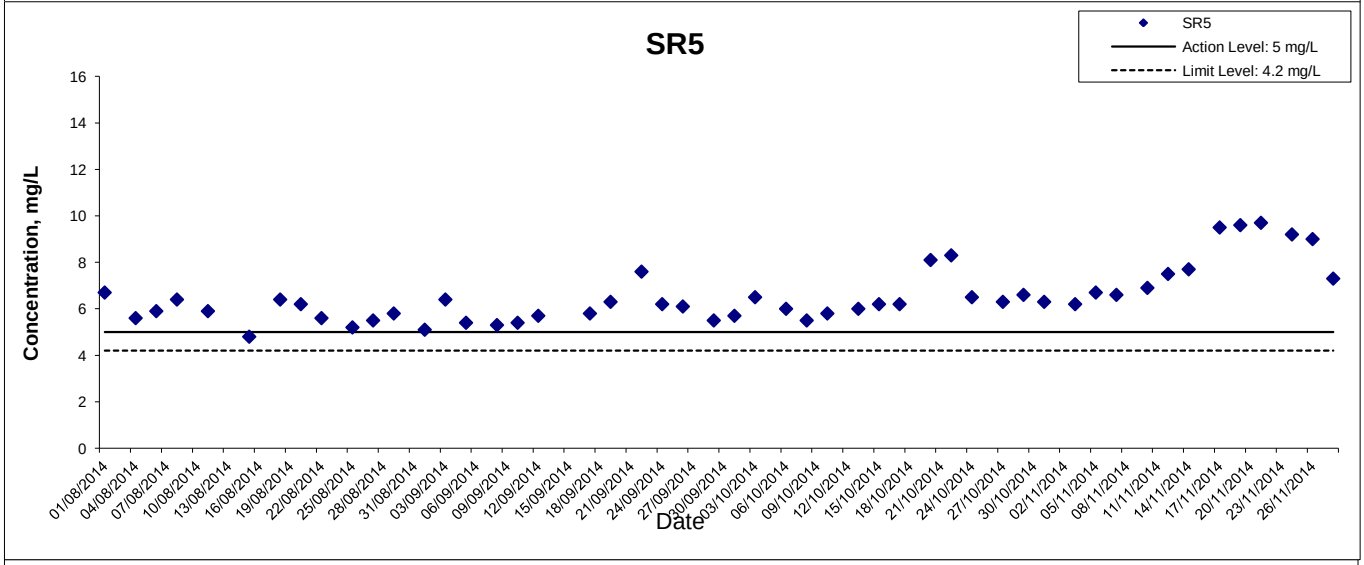
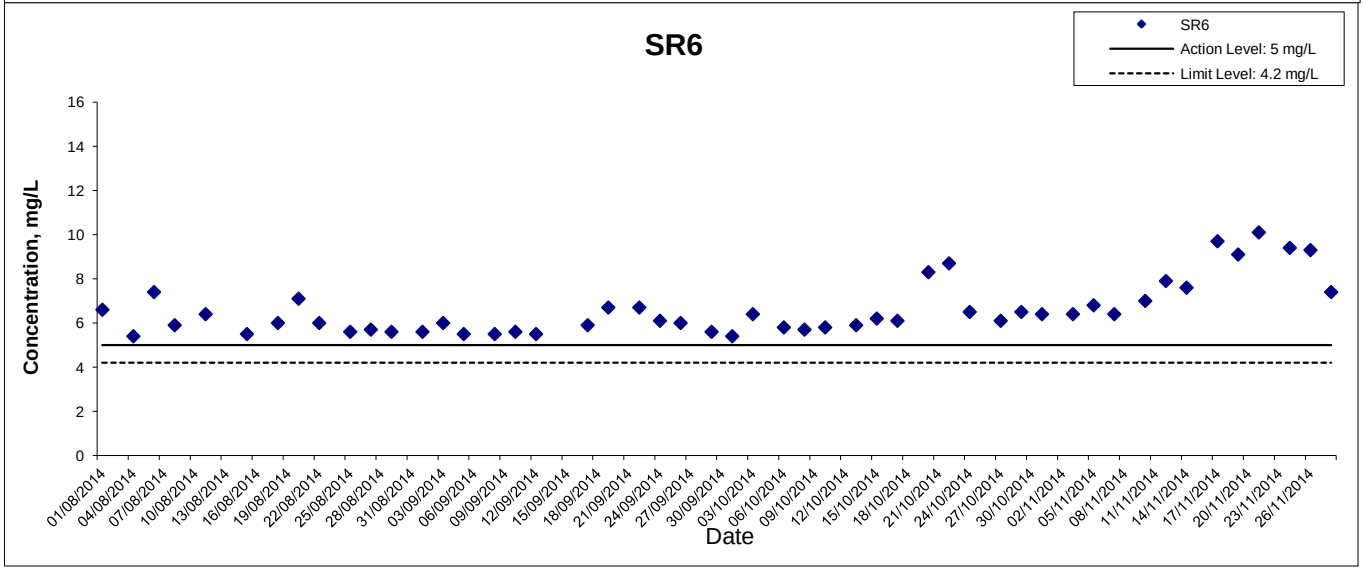


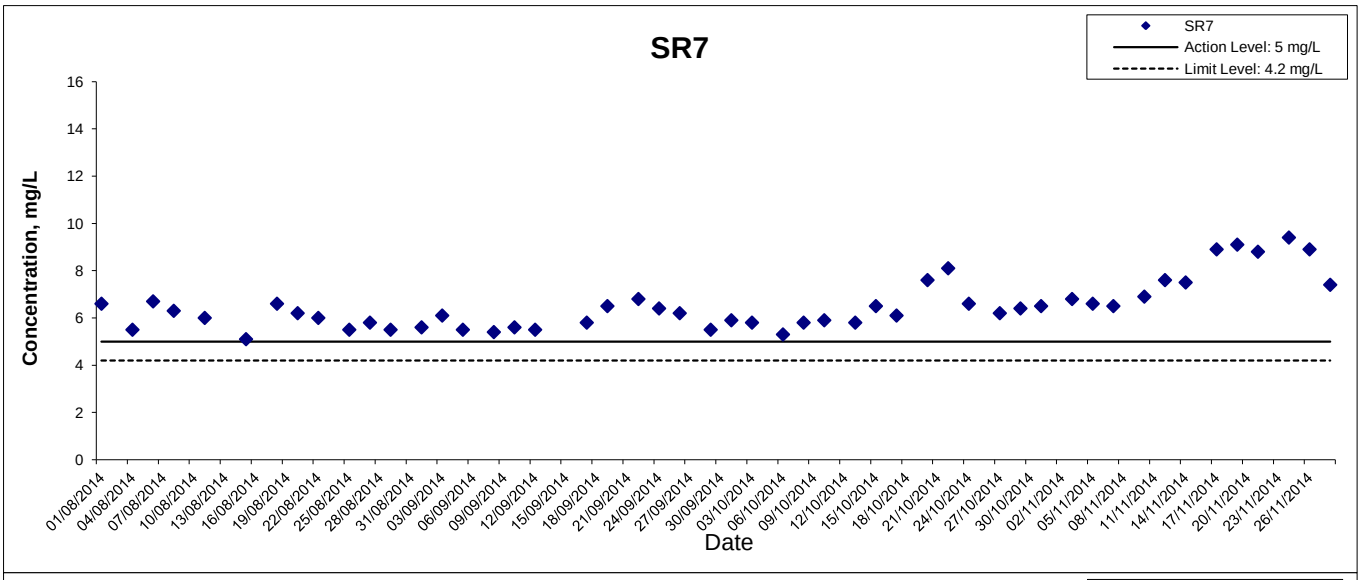


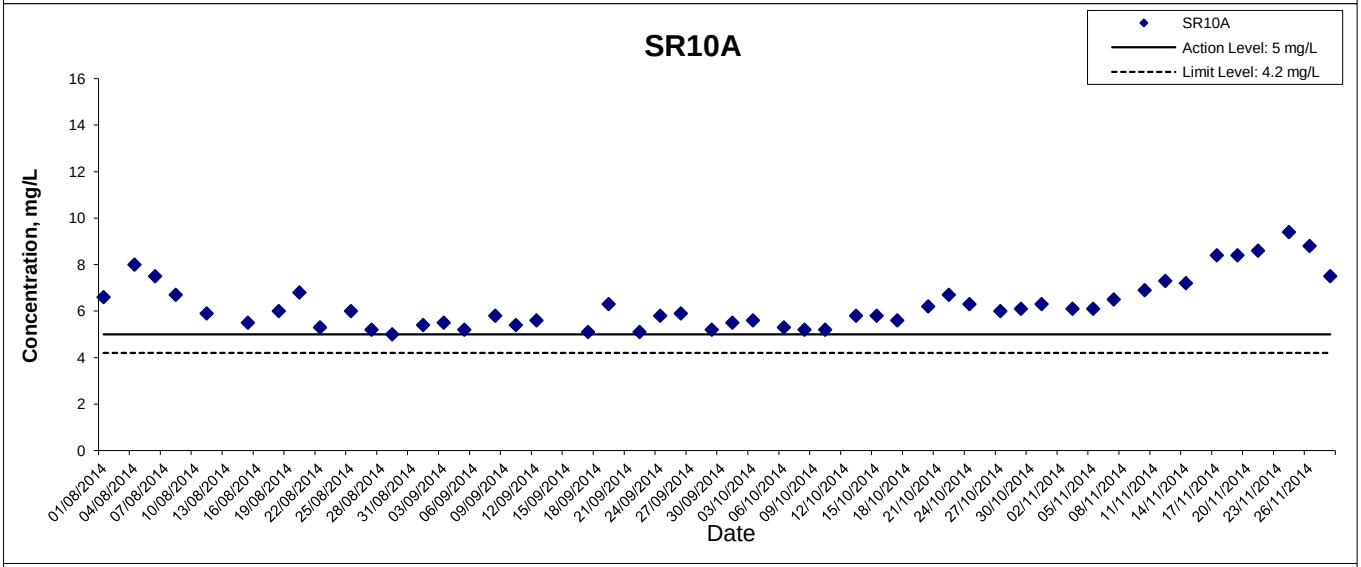


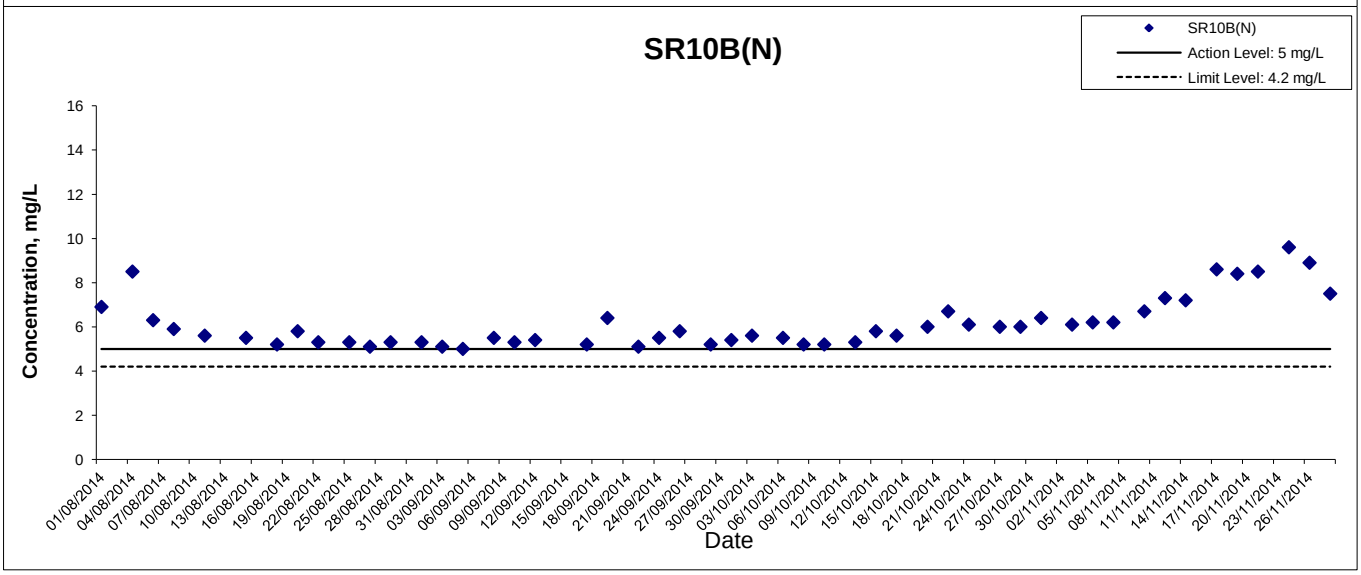




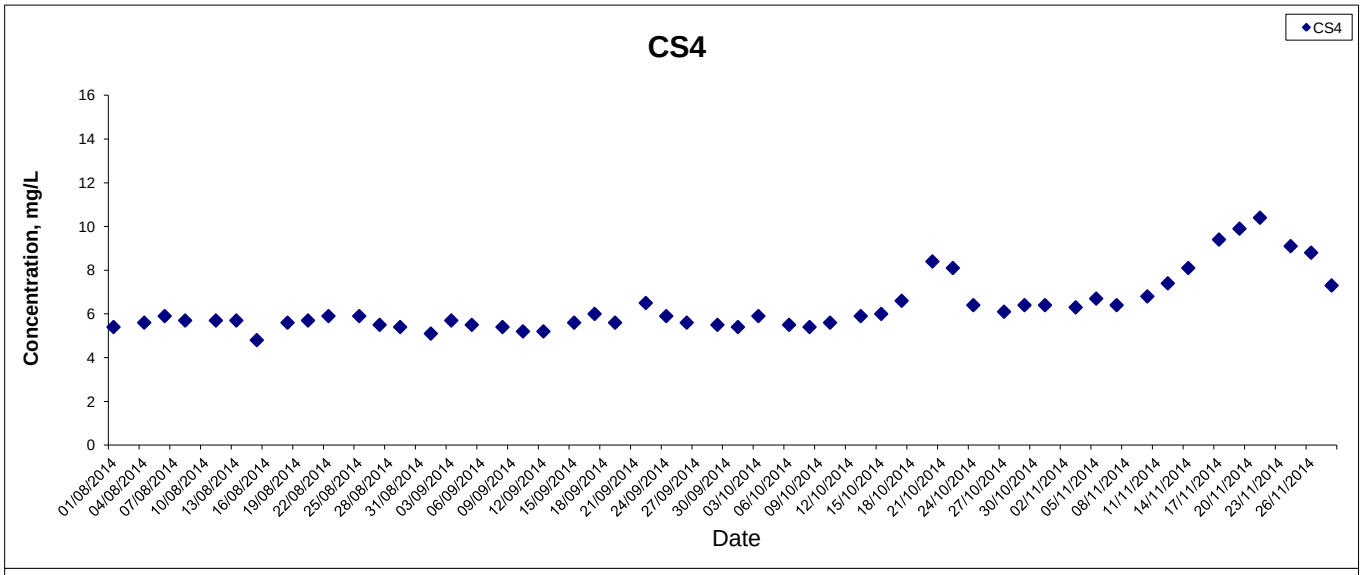


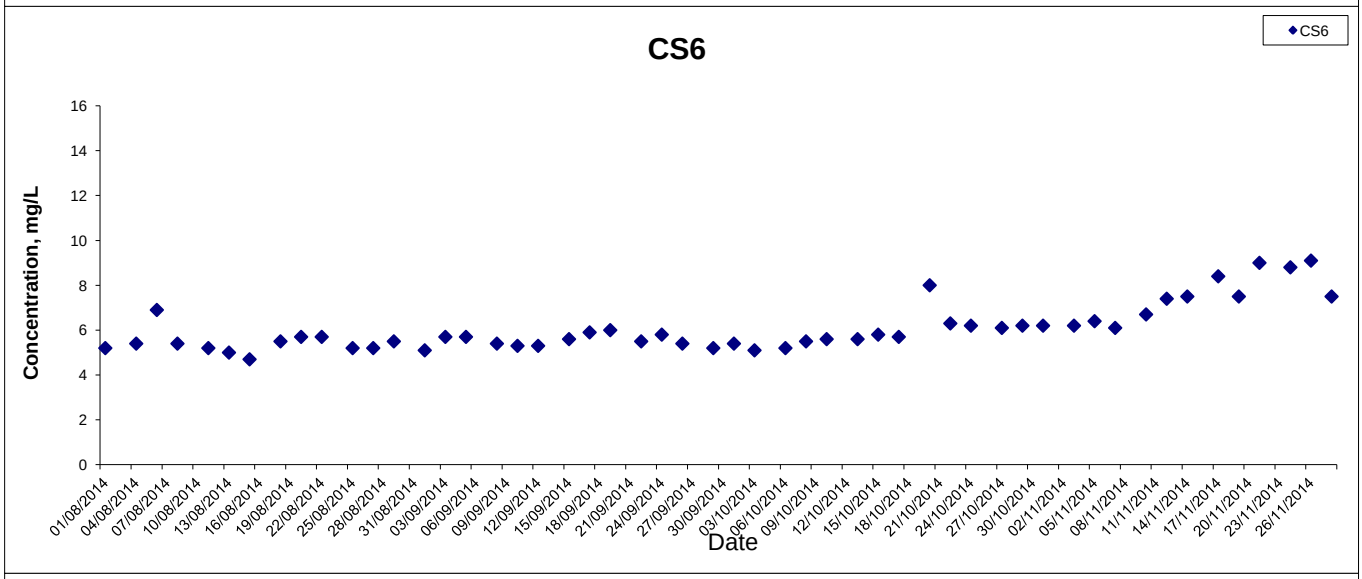


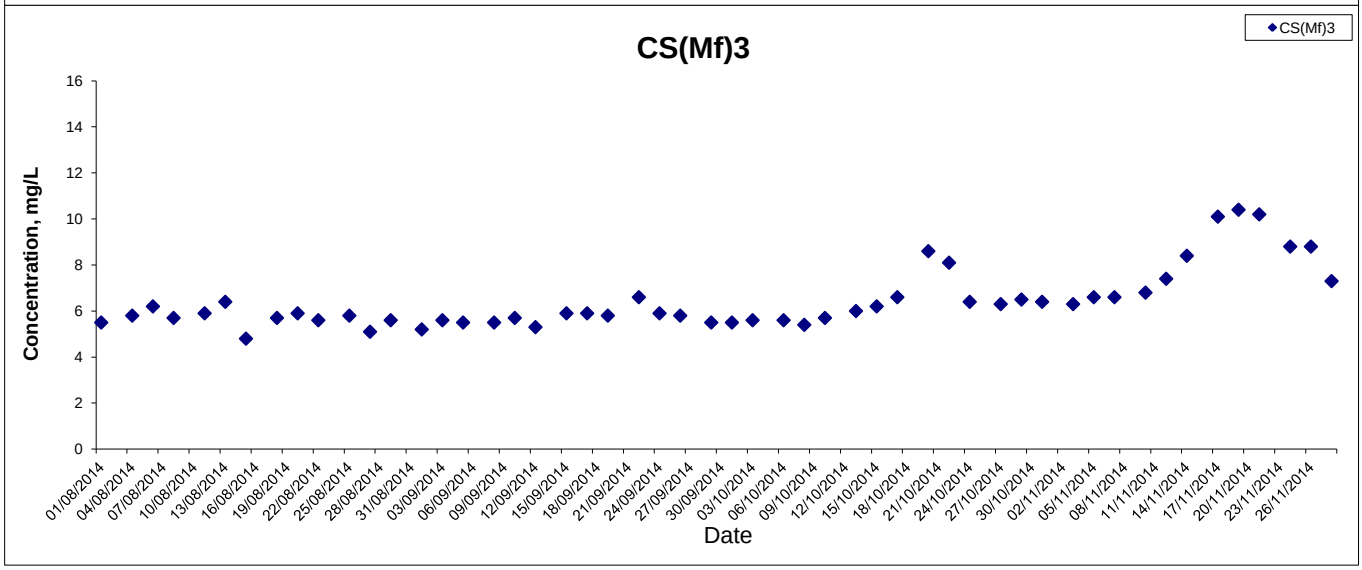




Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide







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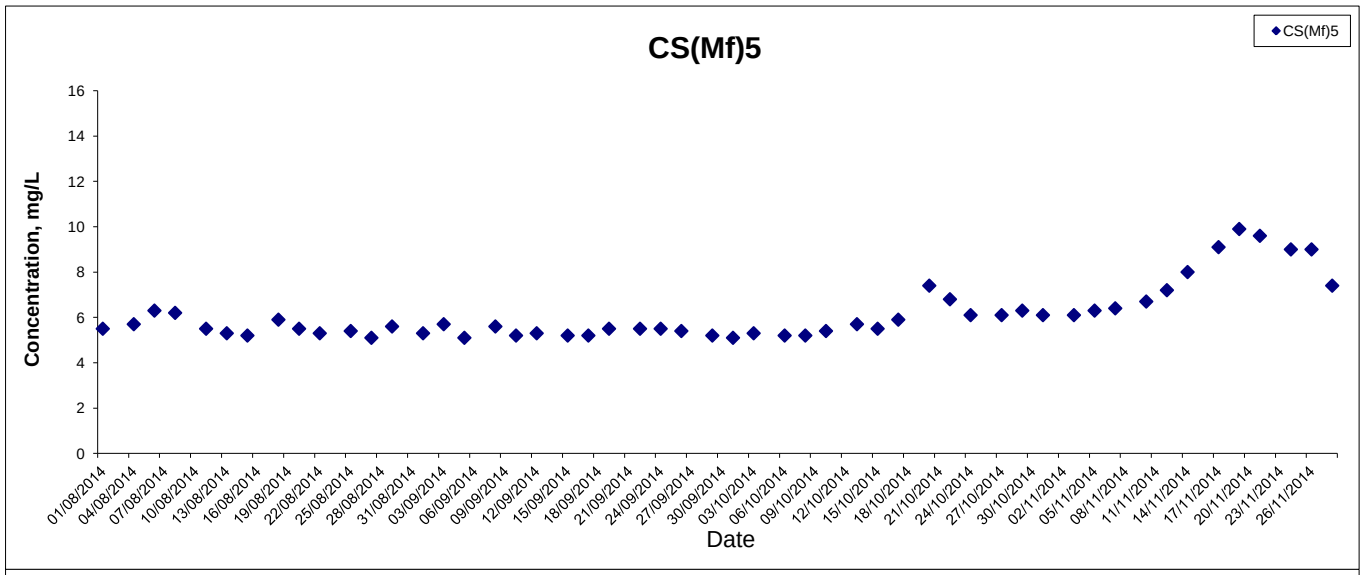
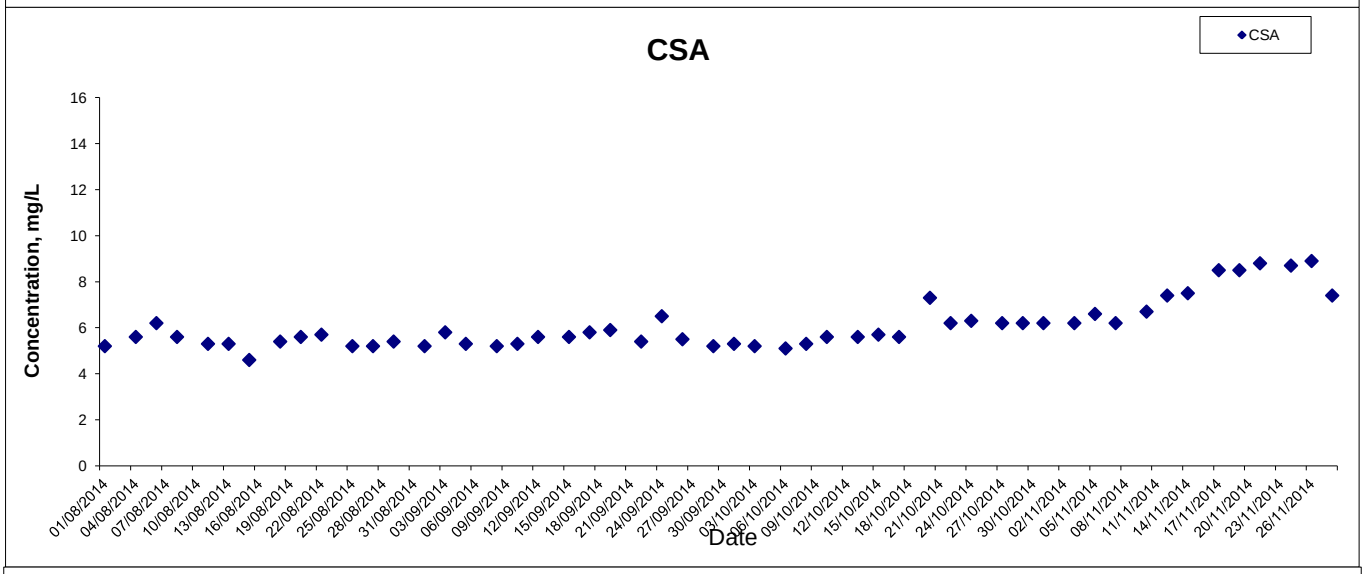
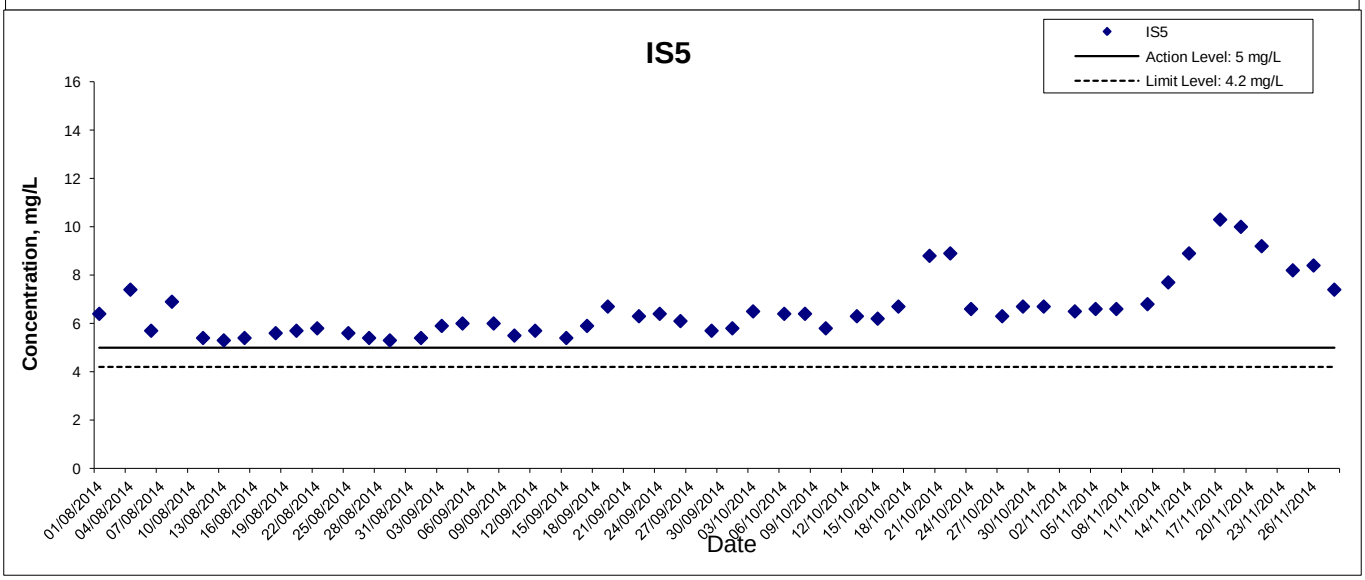
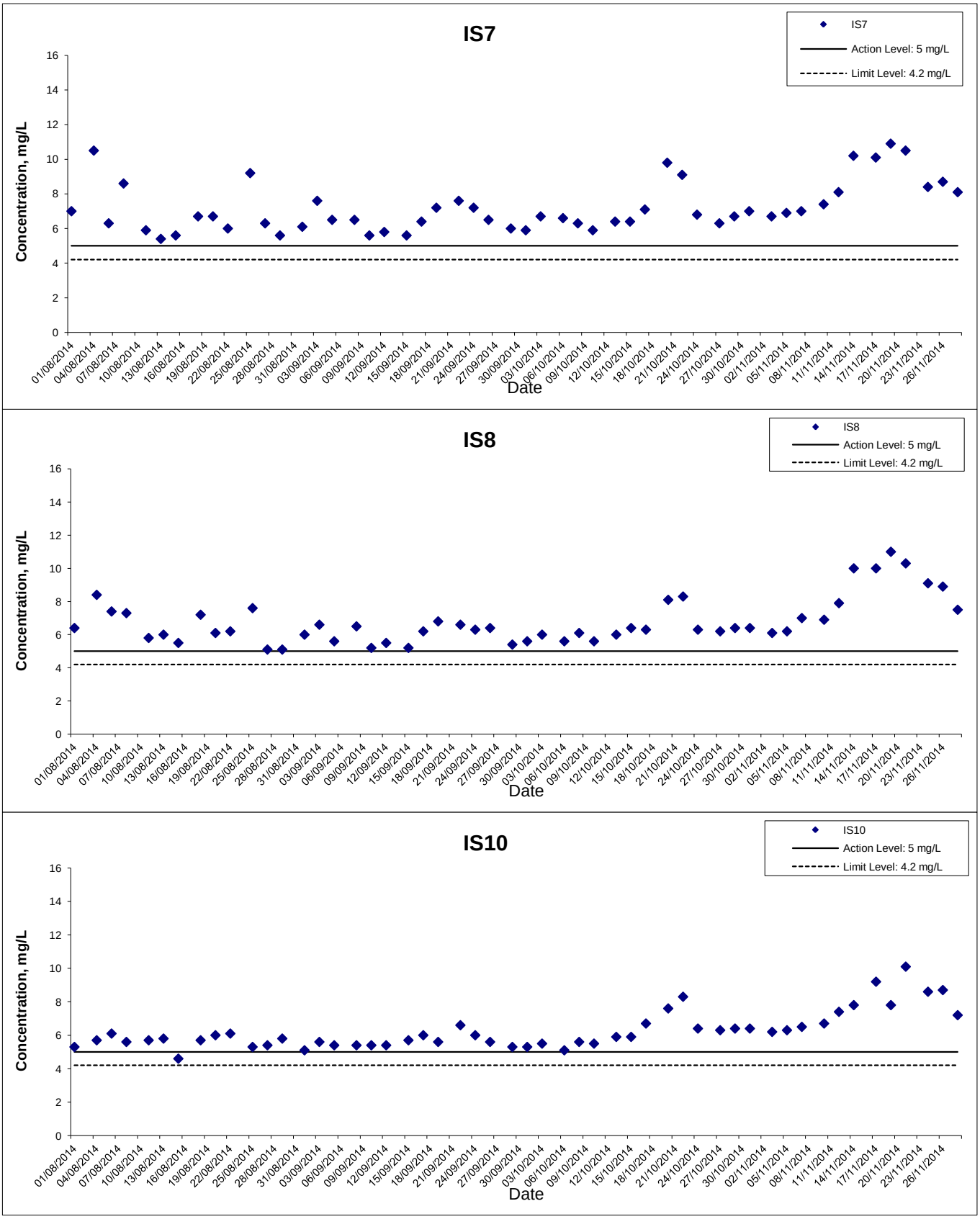






Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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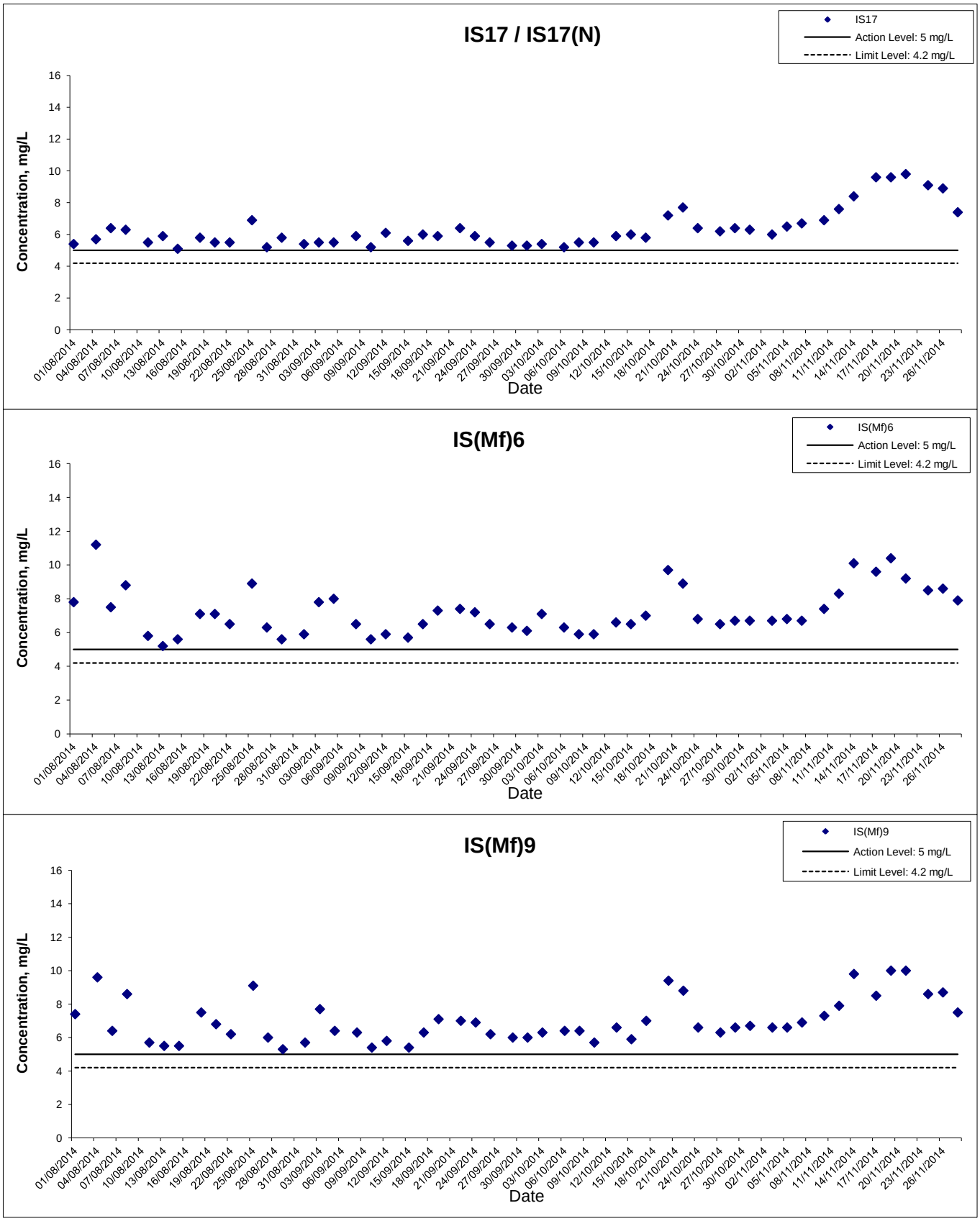

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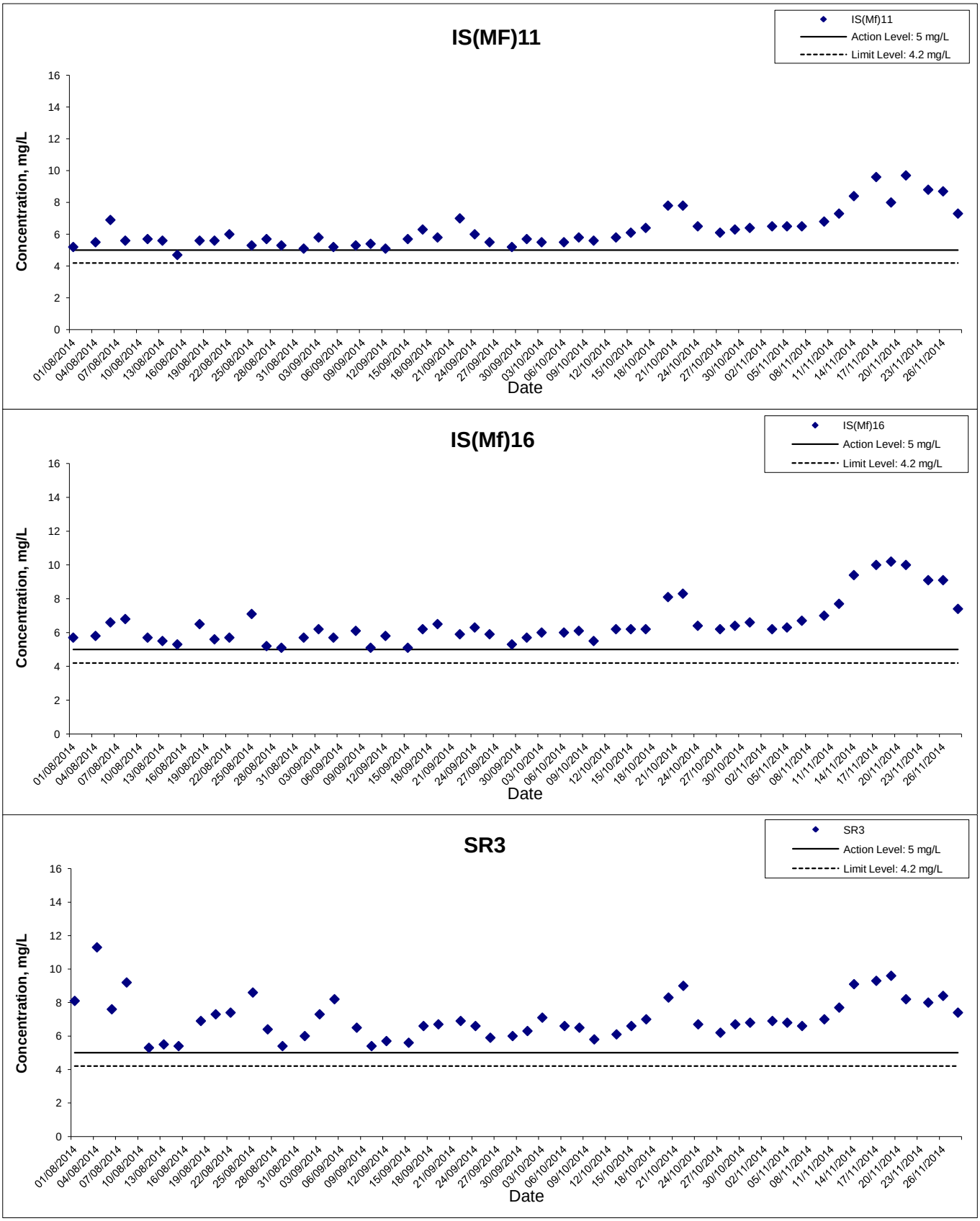
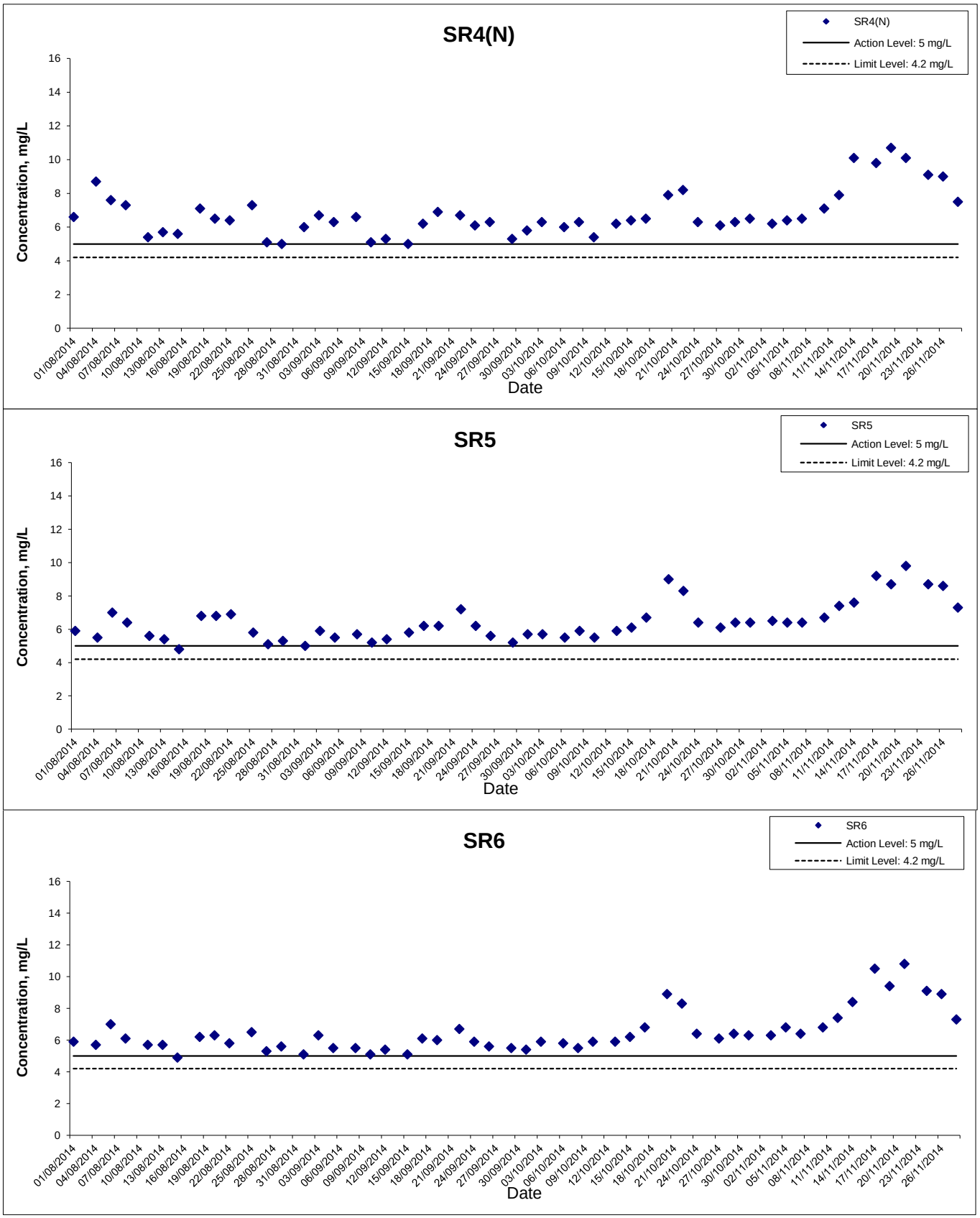
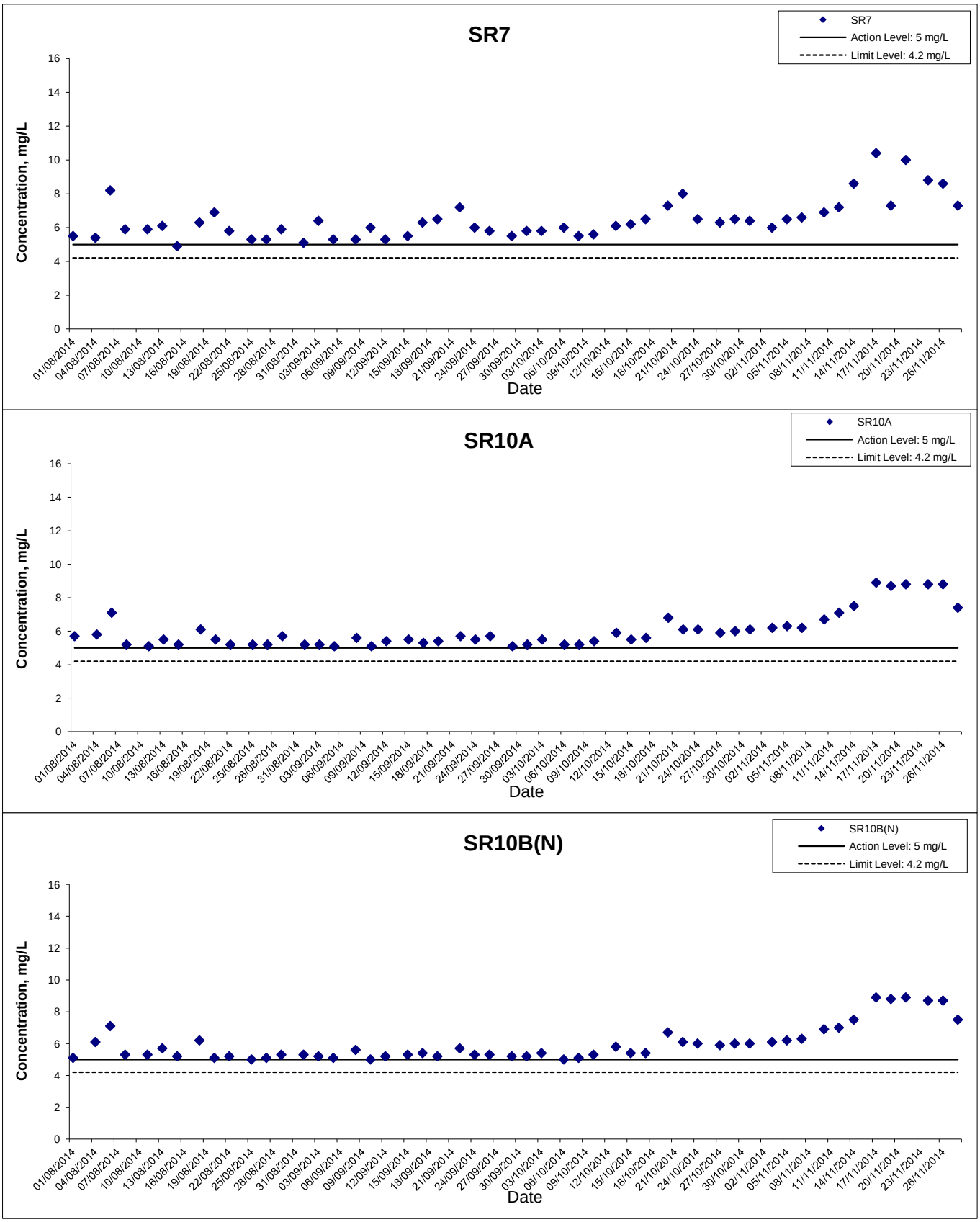


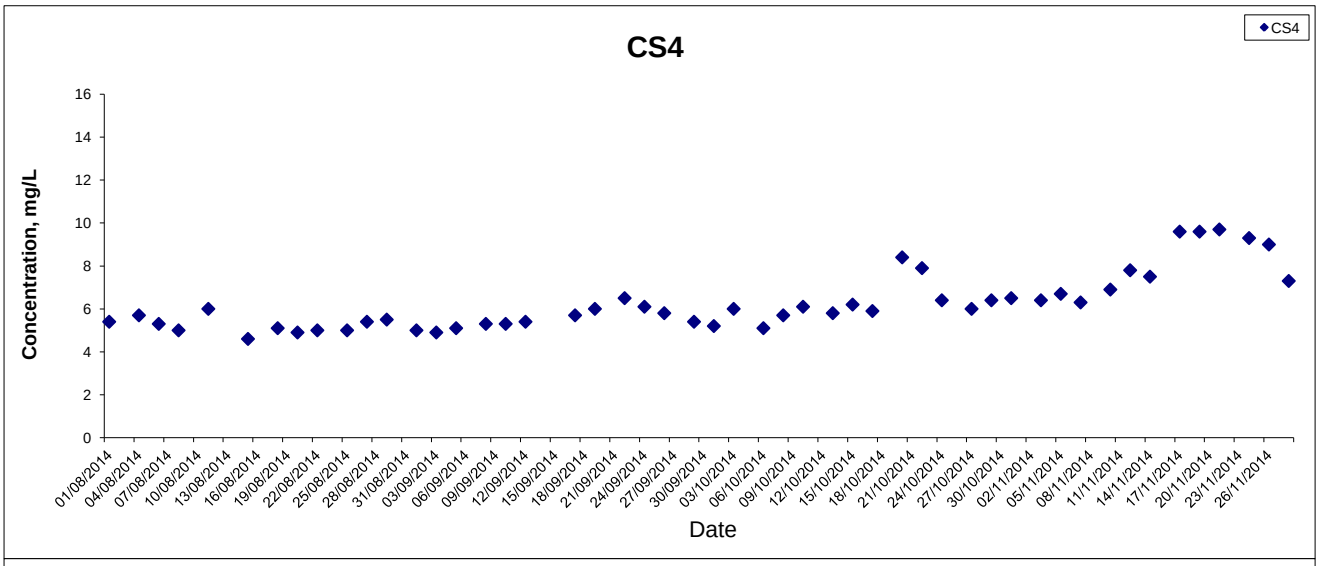
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

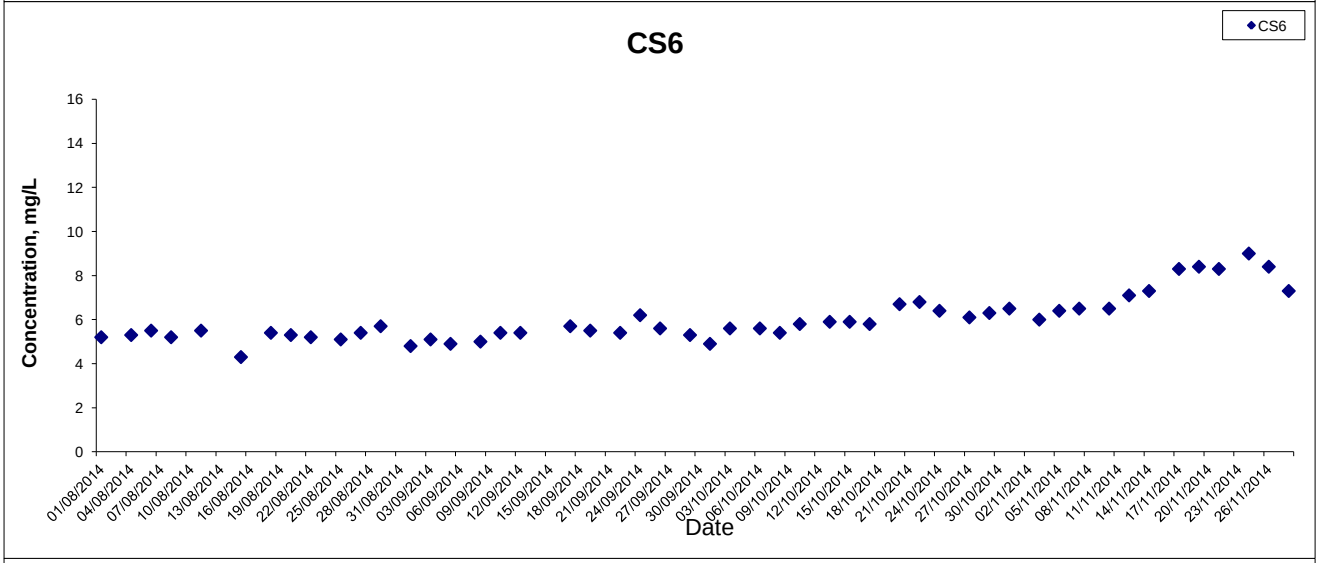


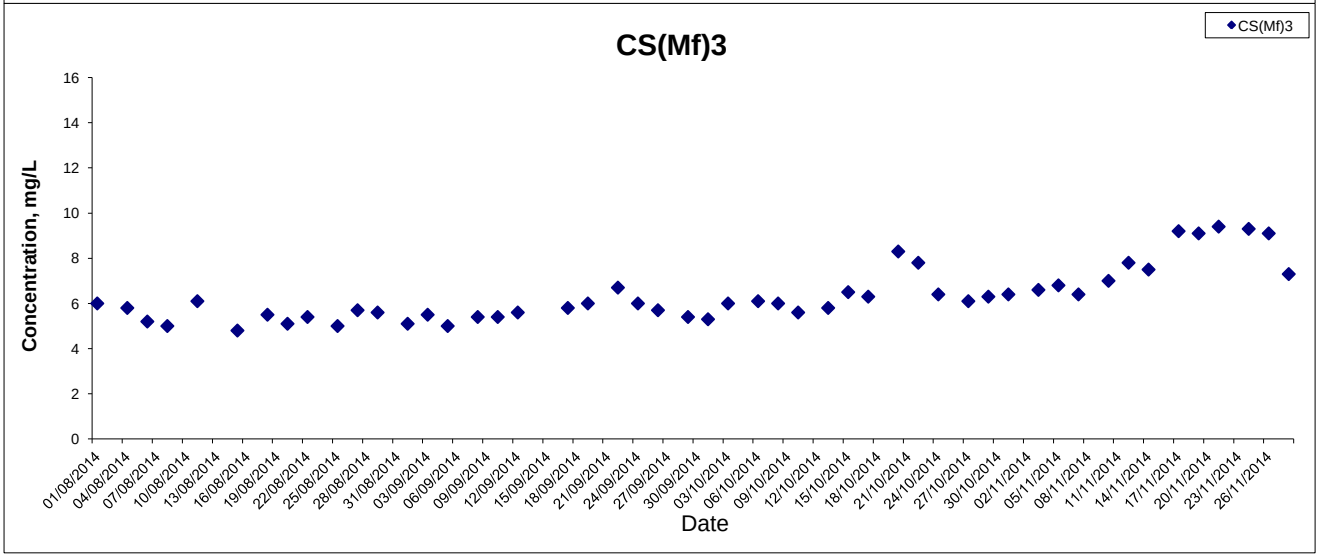
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



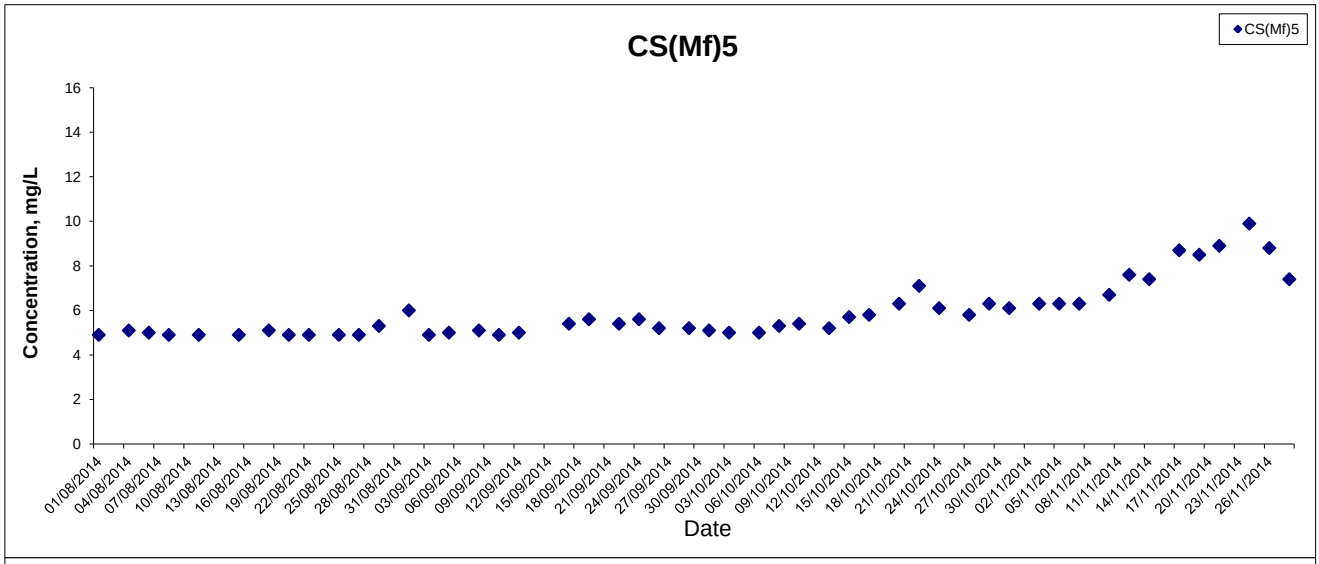
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

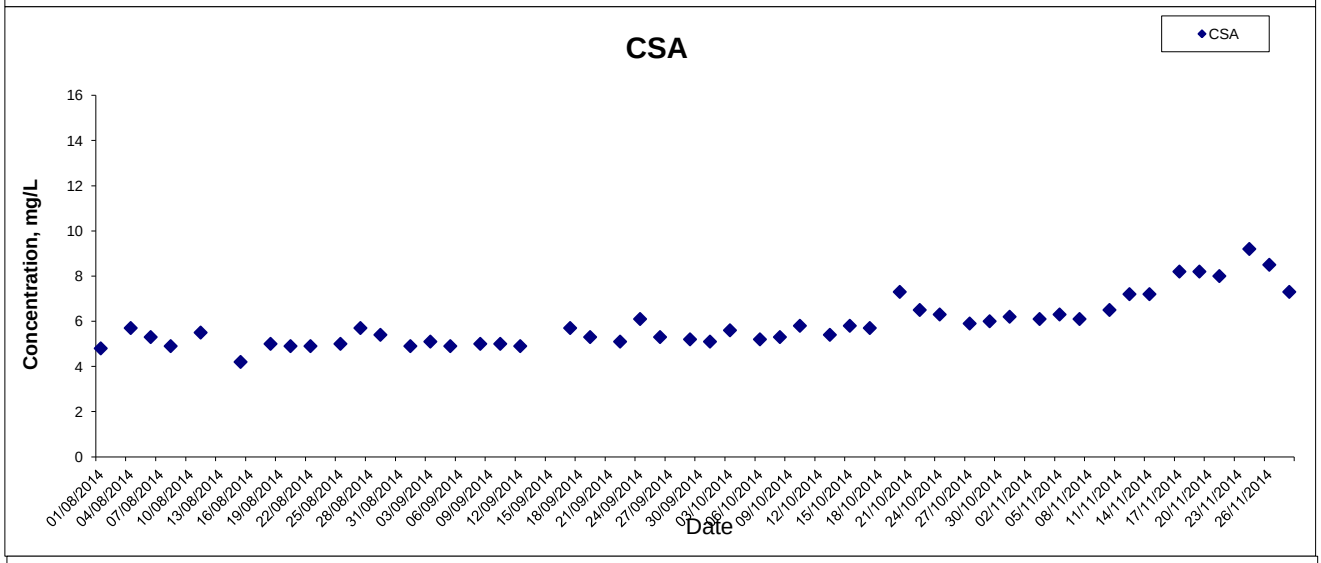


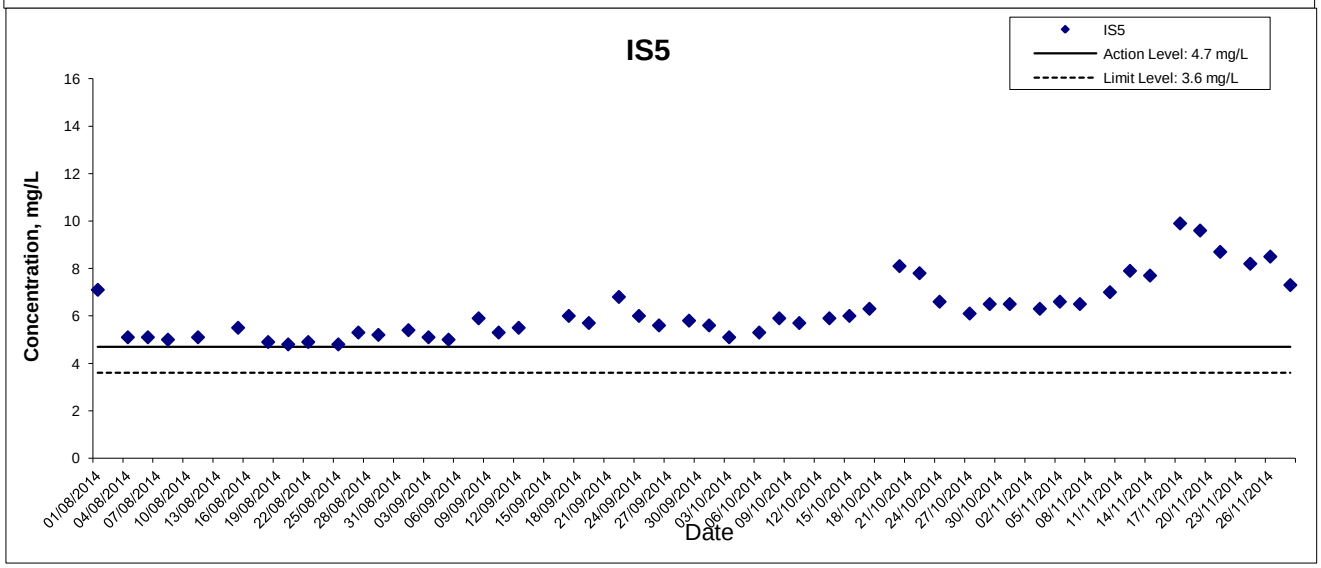




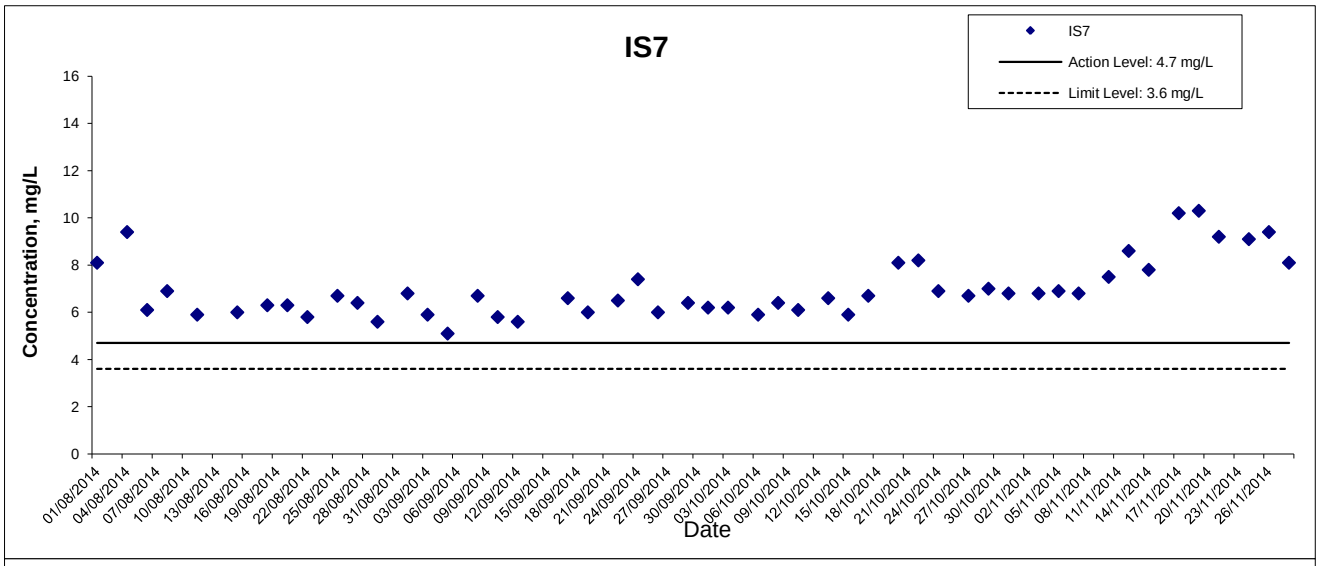
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

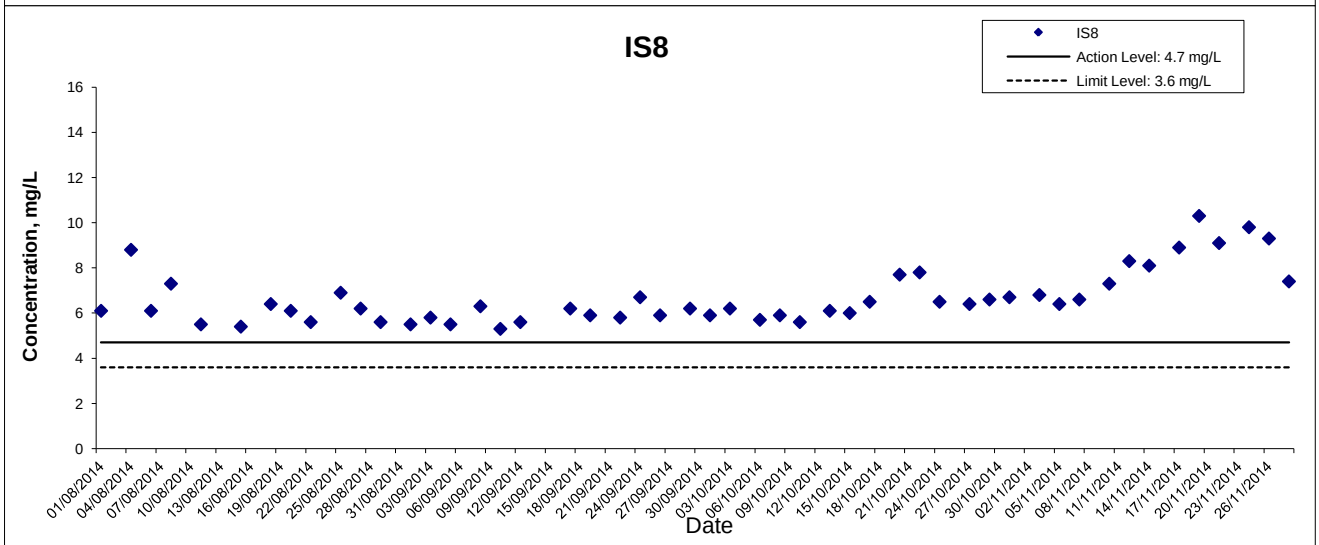


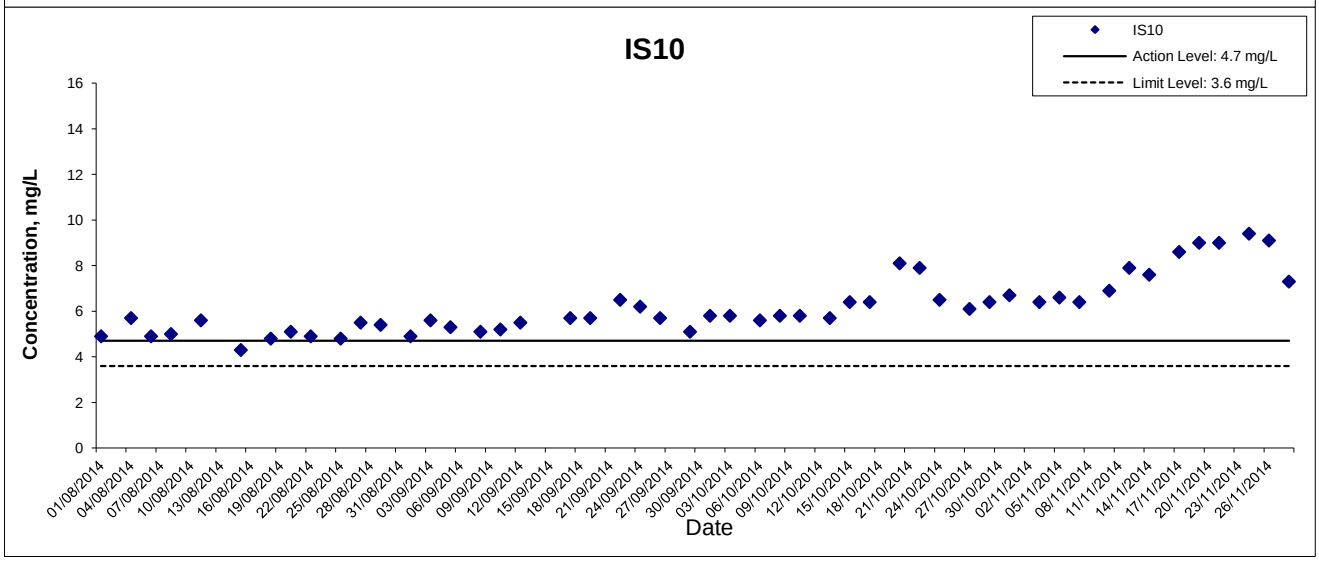




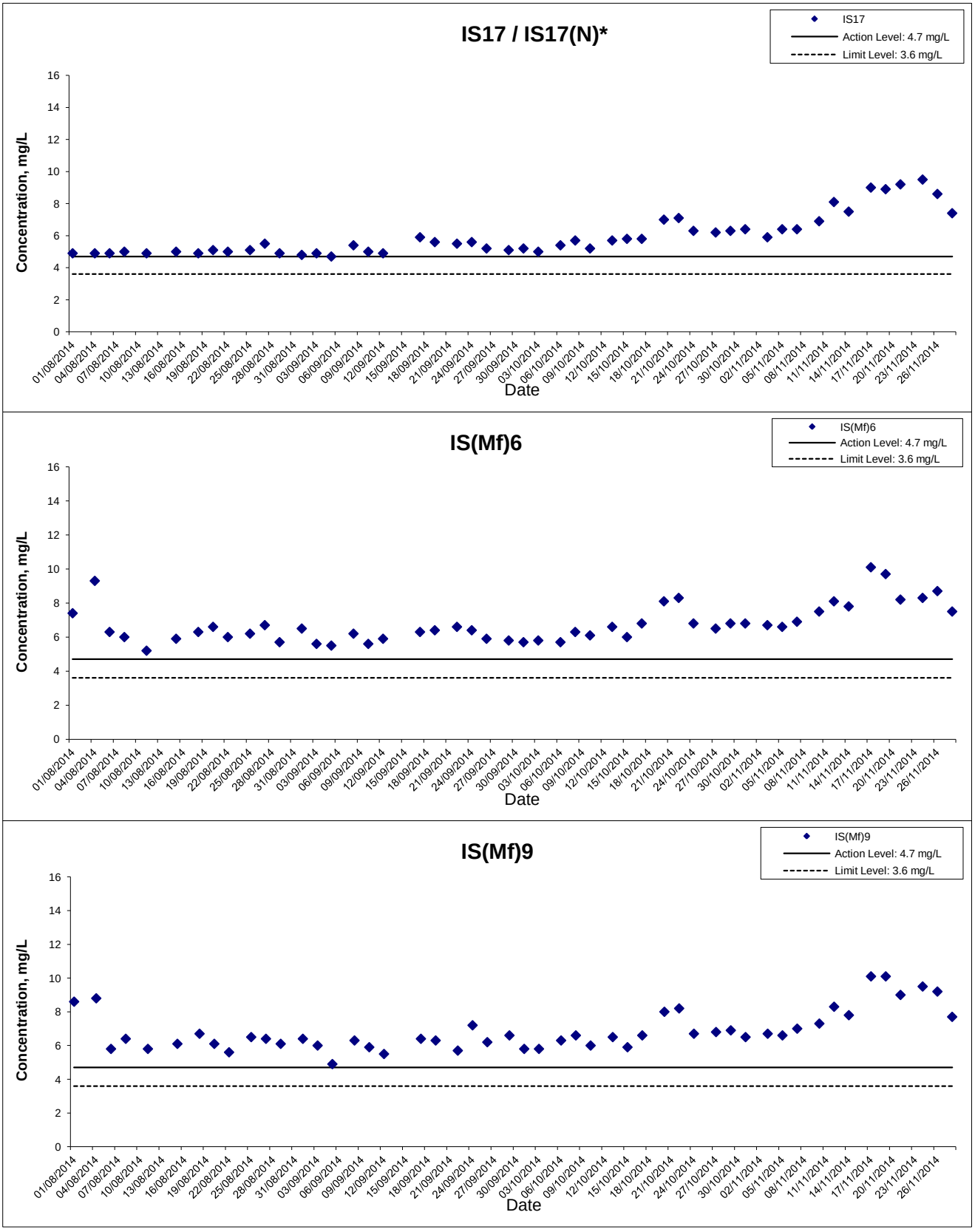
Dissolved Oxygen (Bottom) at Mid-Ebb Tide







Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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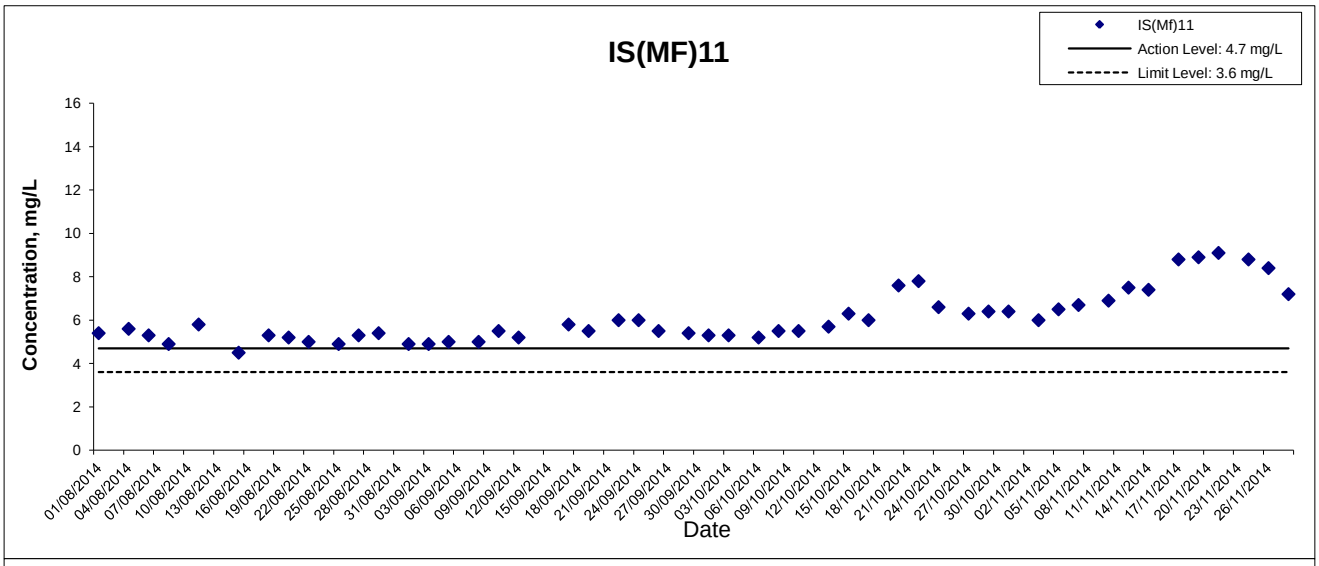
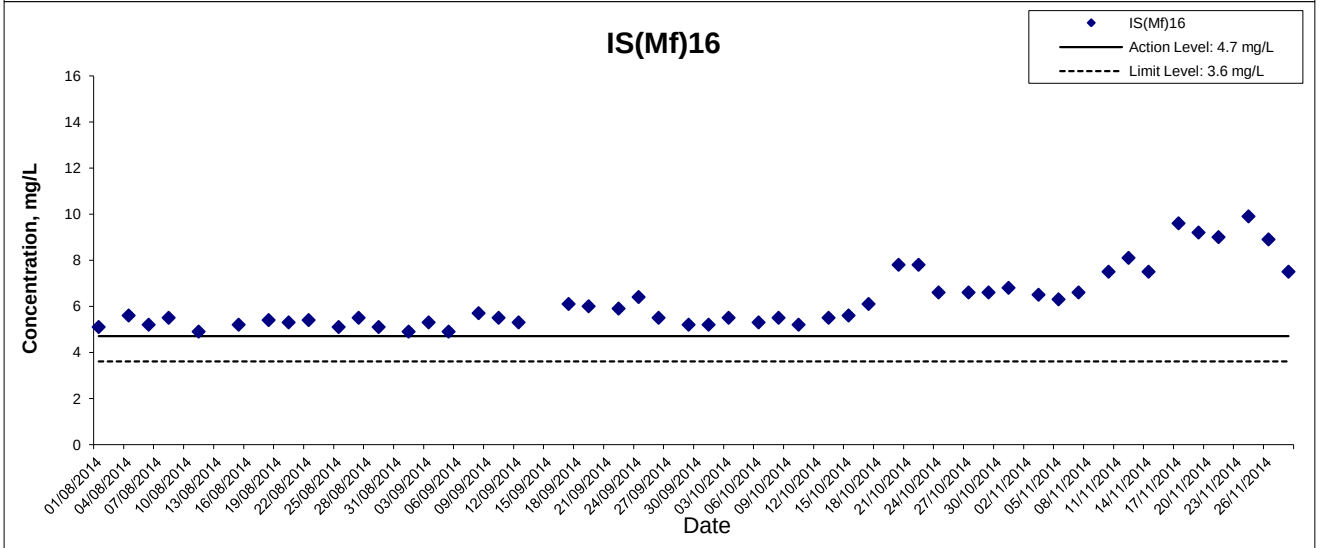
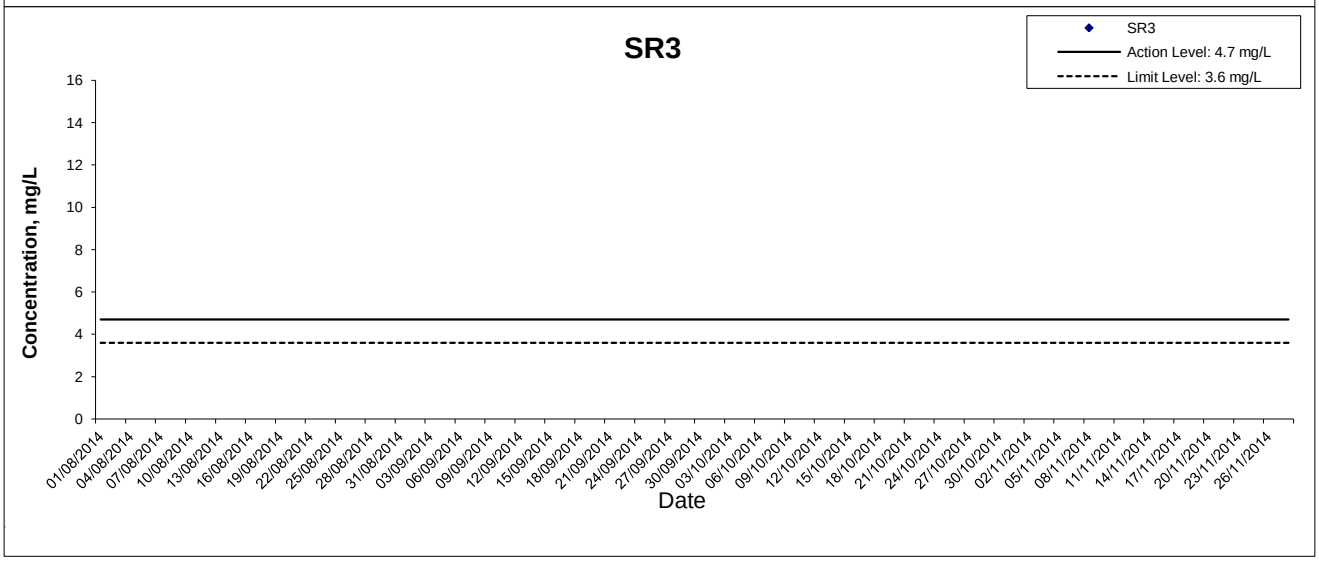
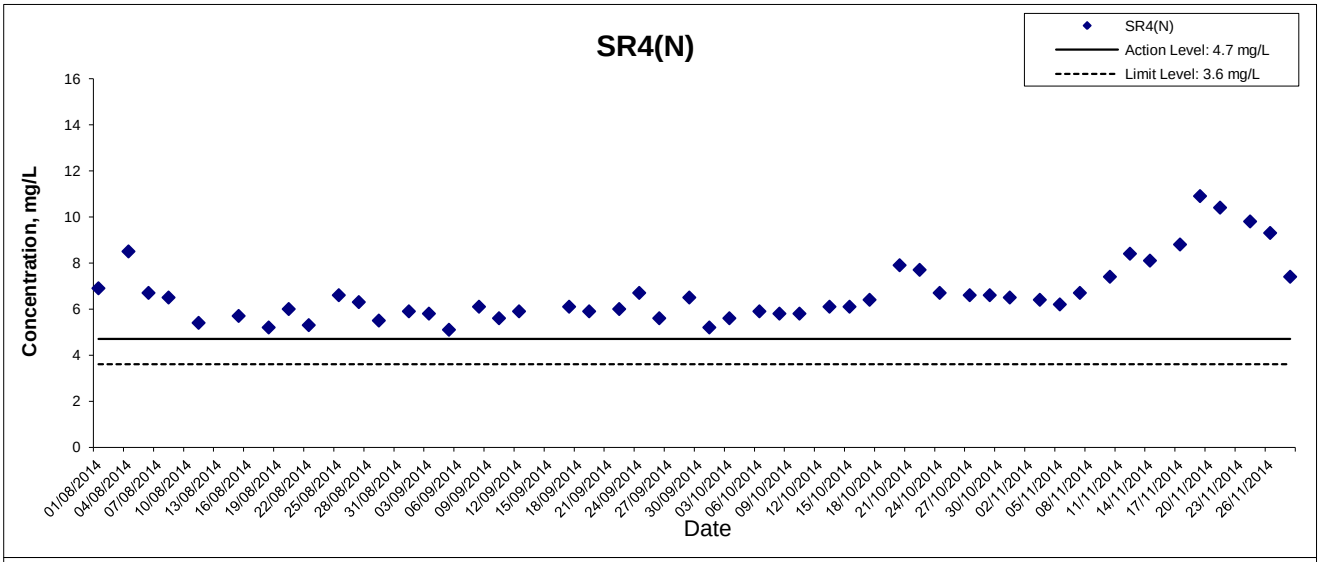
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

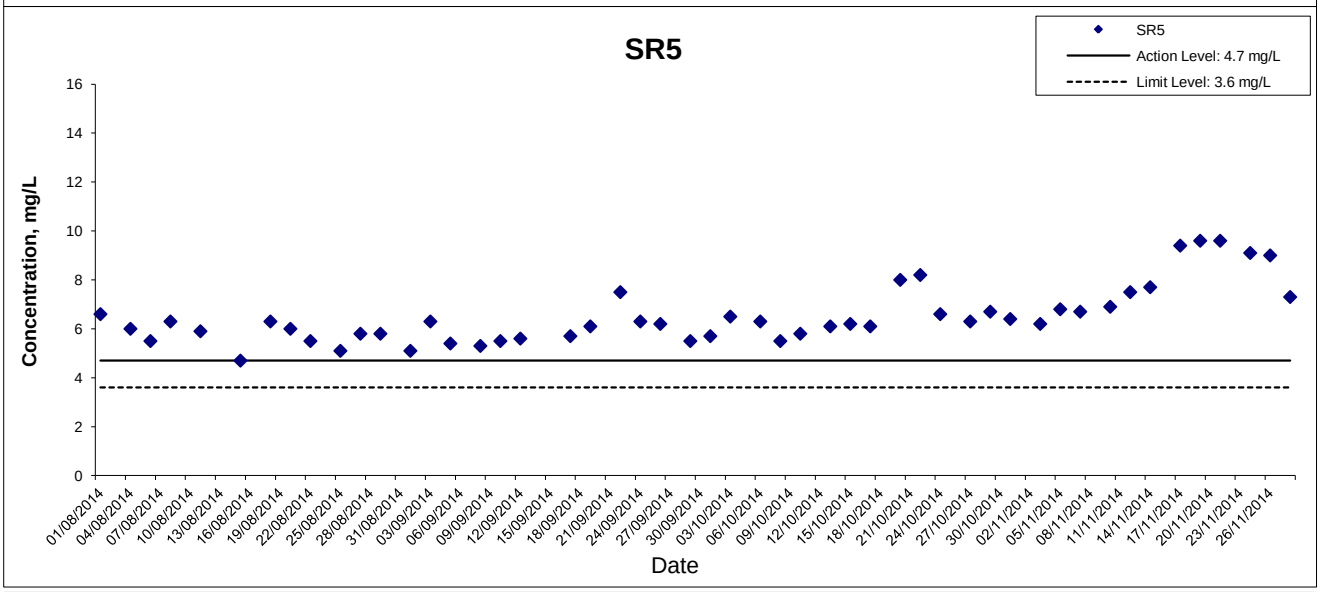


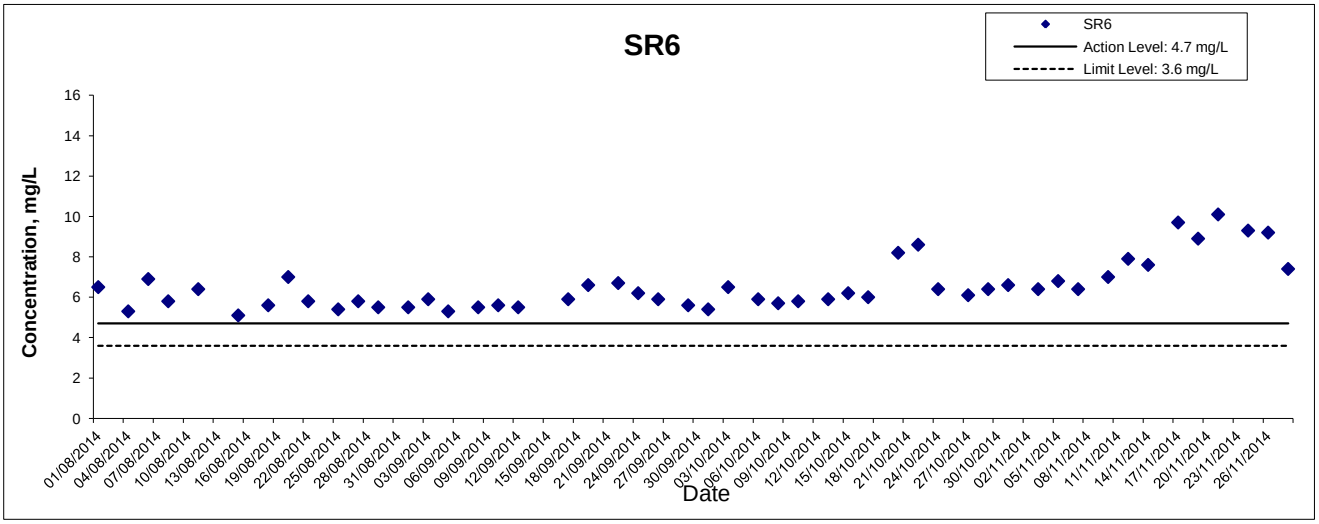




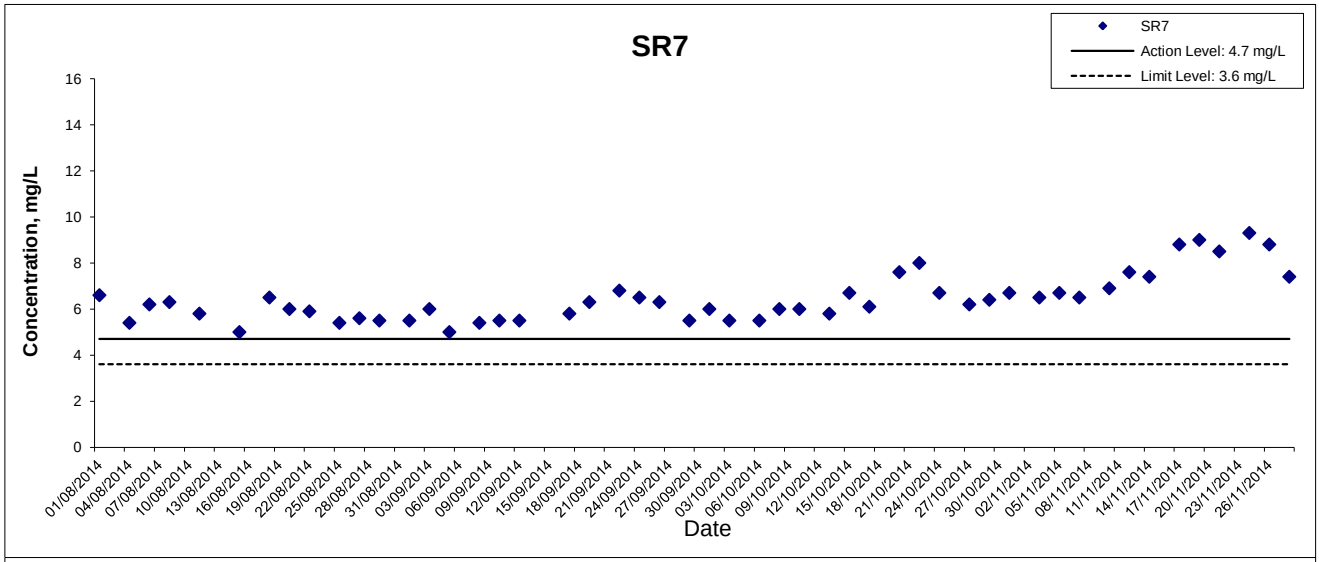
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

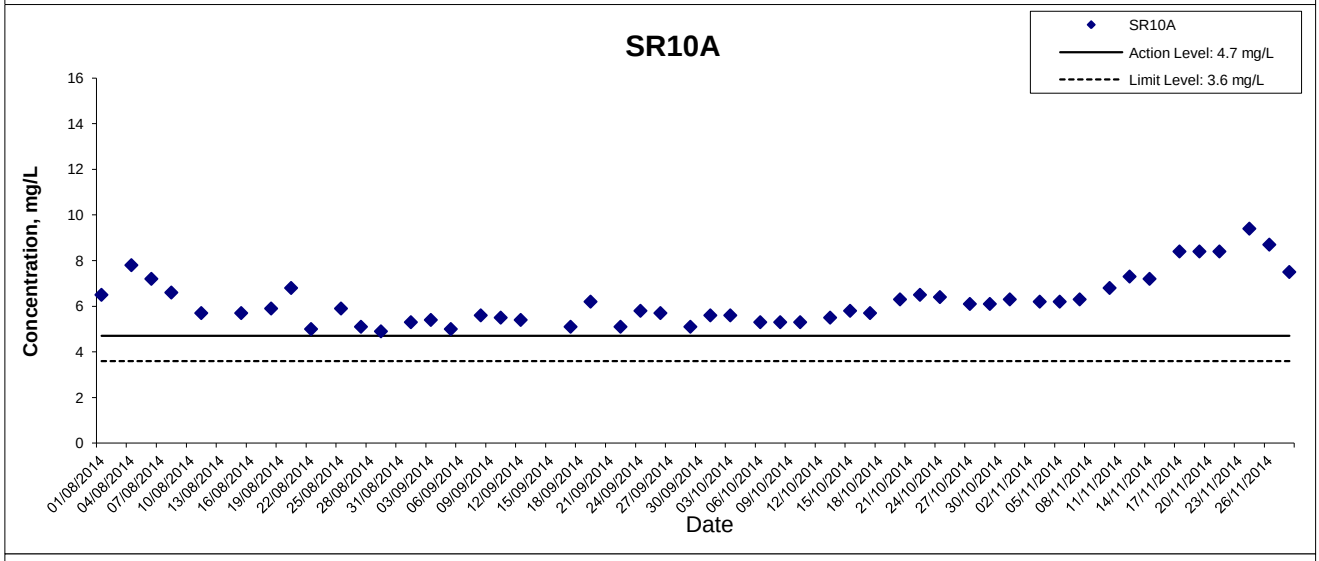


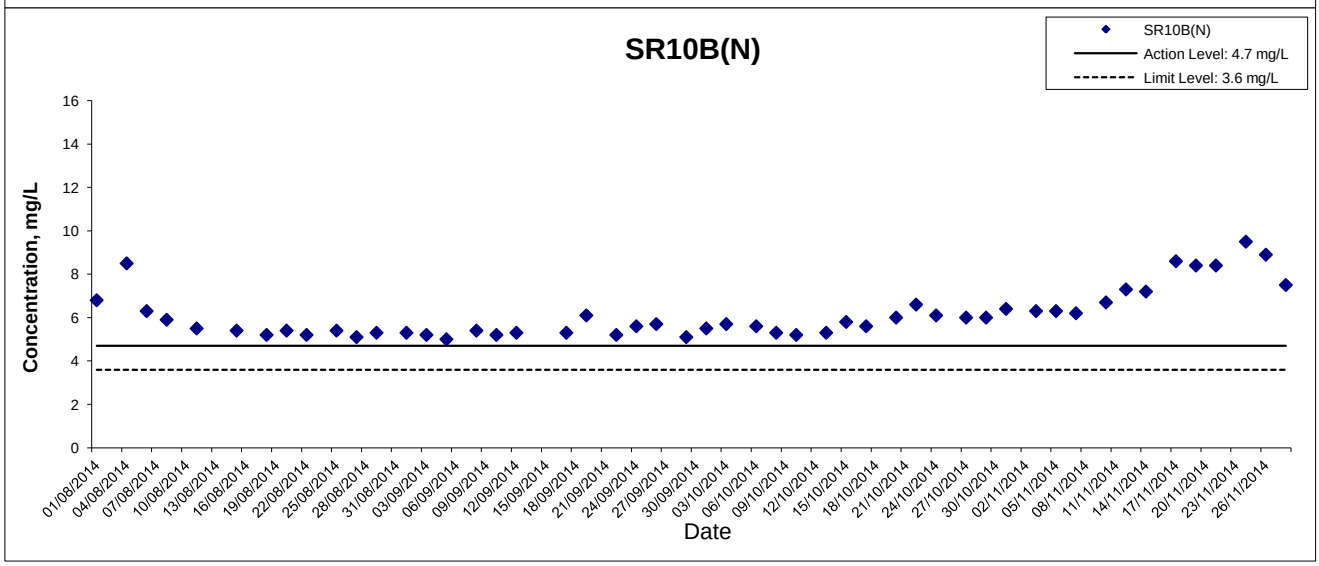




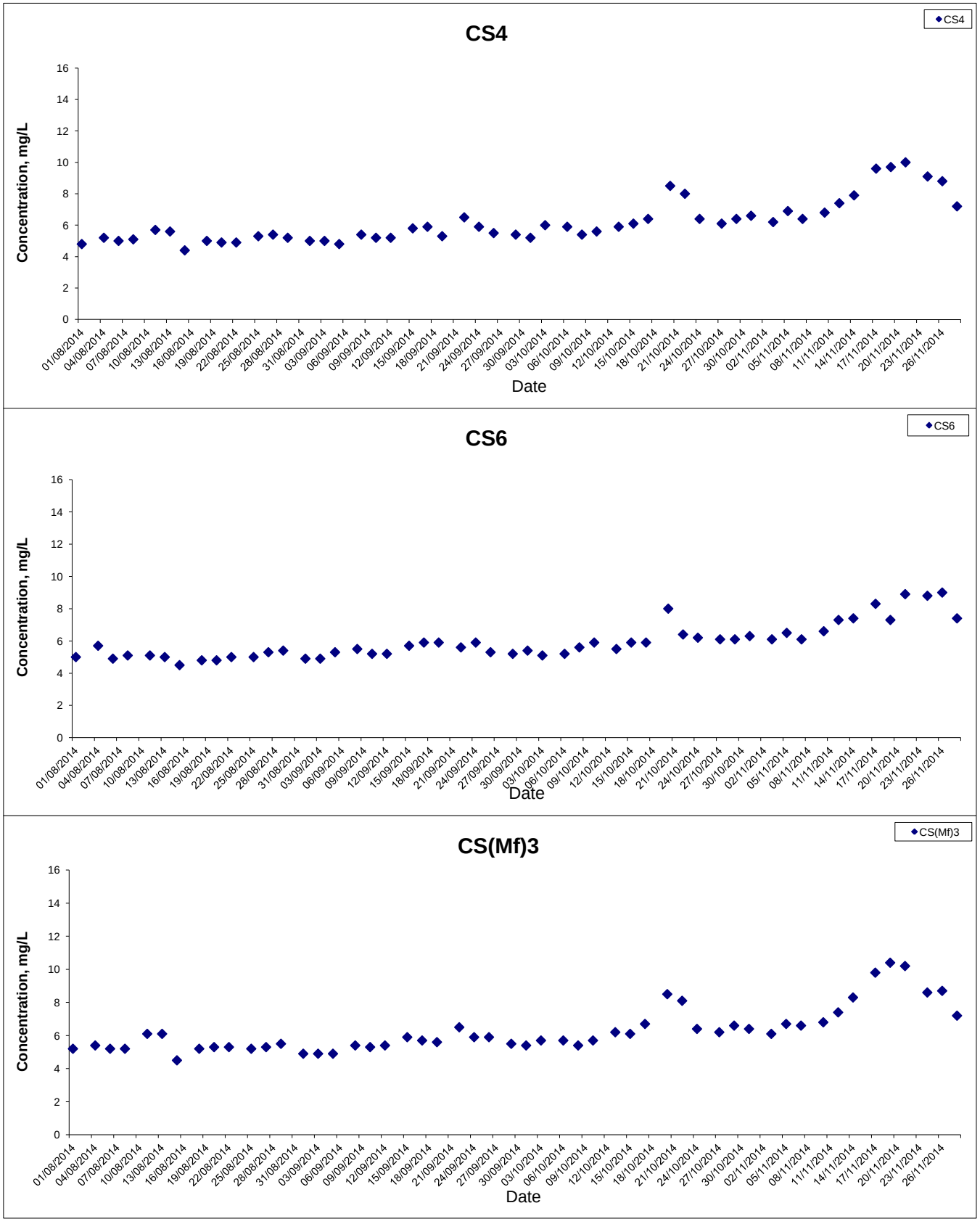
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



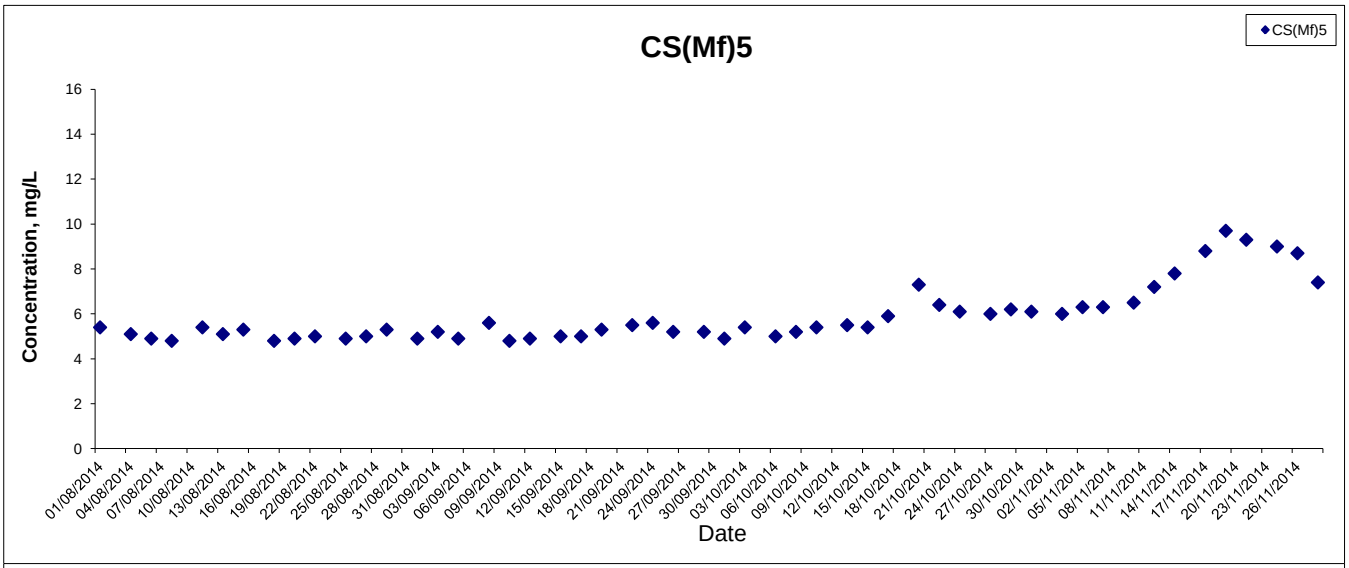


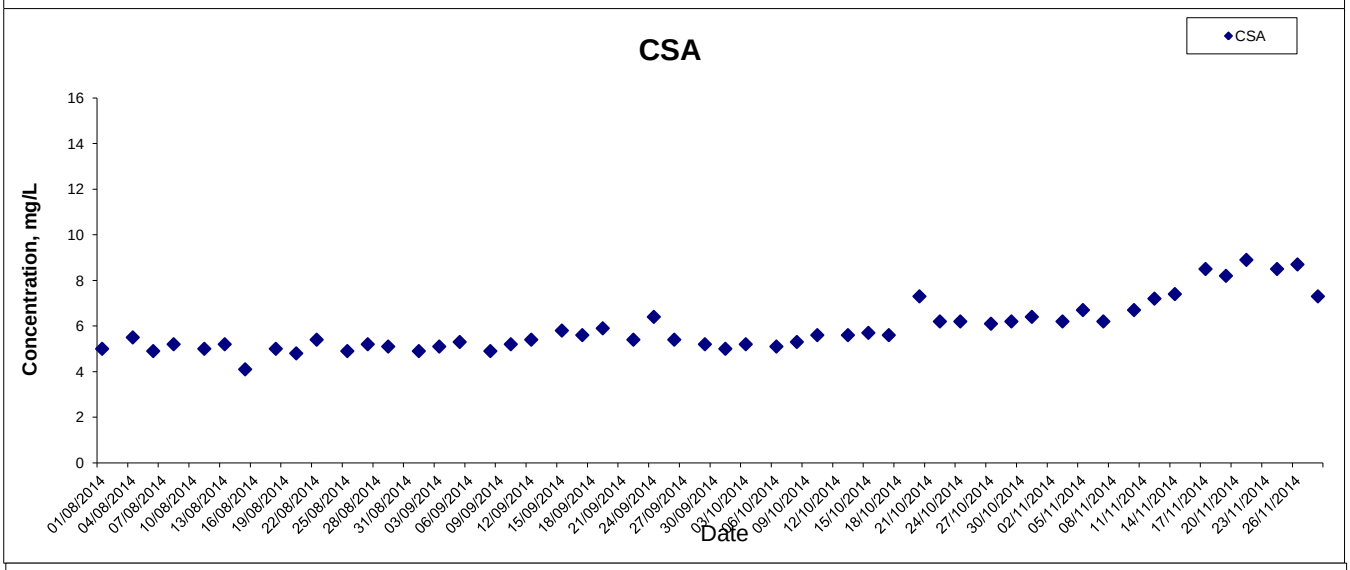


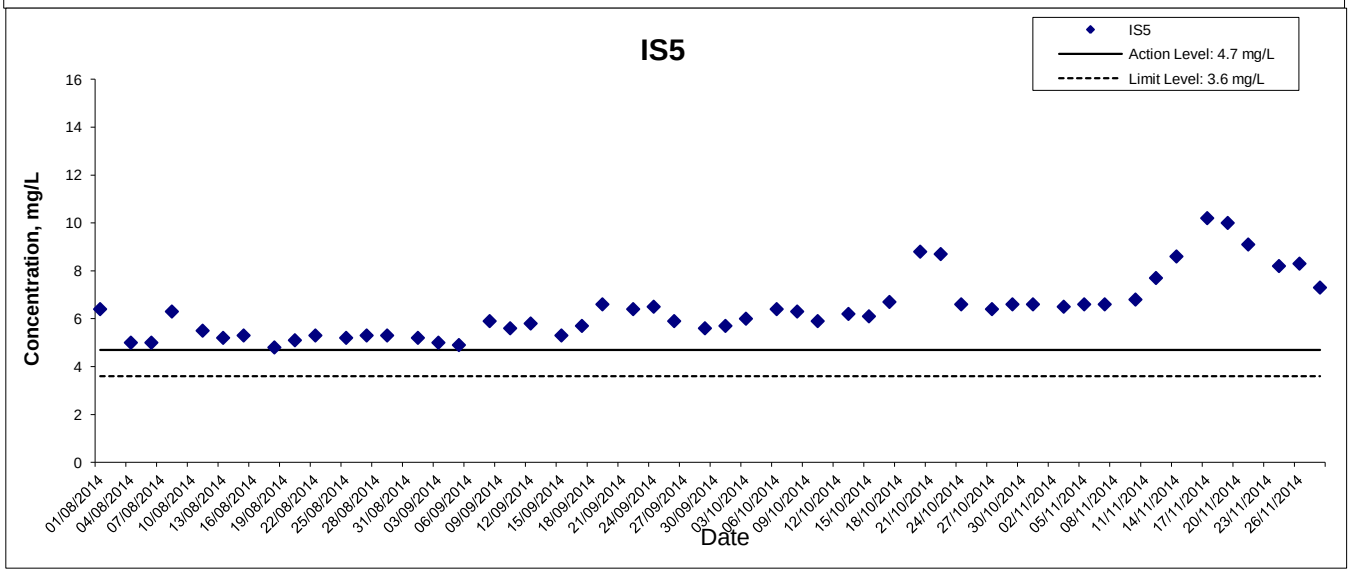
Dissolved Oxygen (Bottom) at Mid-Flood Tide



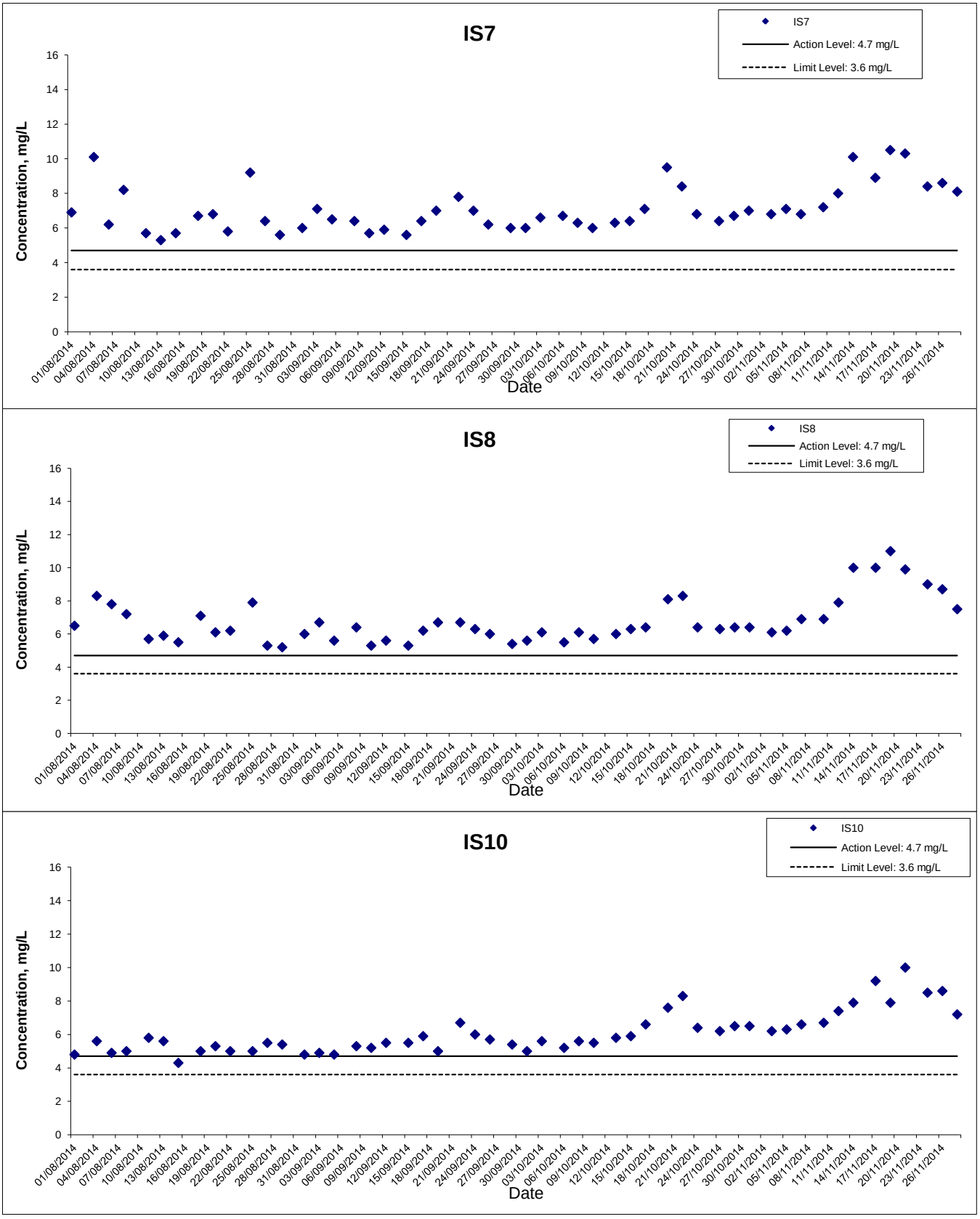
Dissolved Oxygen (Bottom) at Mid-Flood Tide



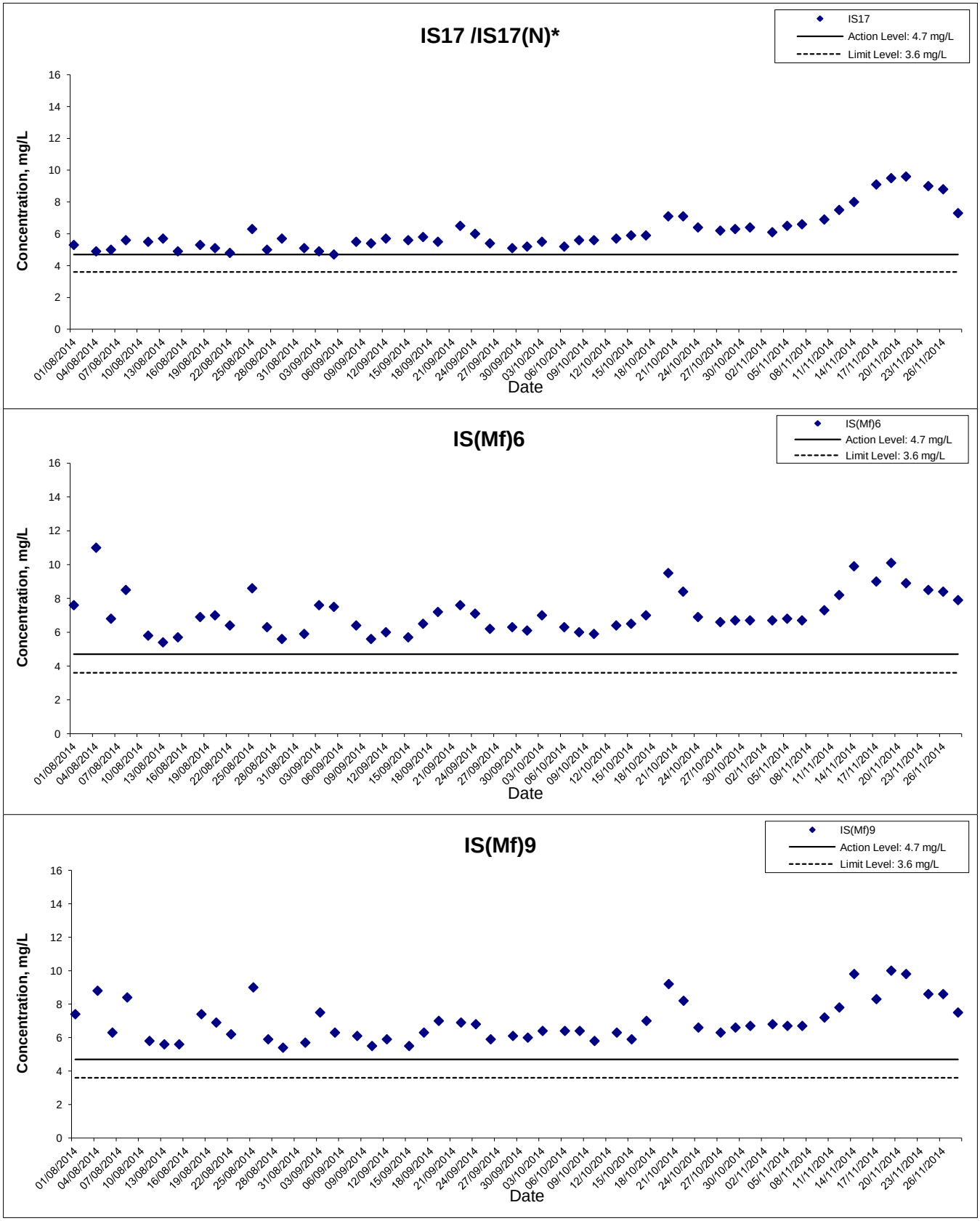




Dissolved Oxygen (Bottom) at Mid-Flood Tide



Dissolved Oxygen (Bottom) at Mid-Flood Tide



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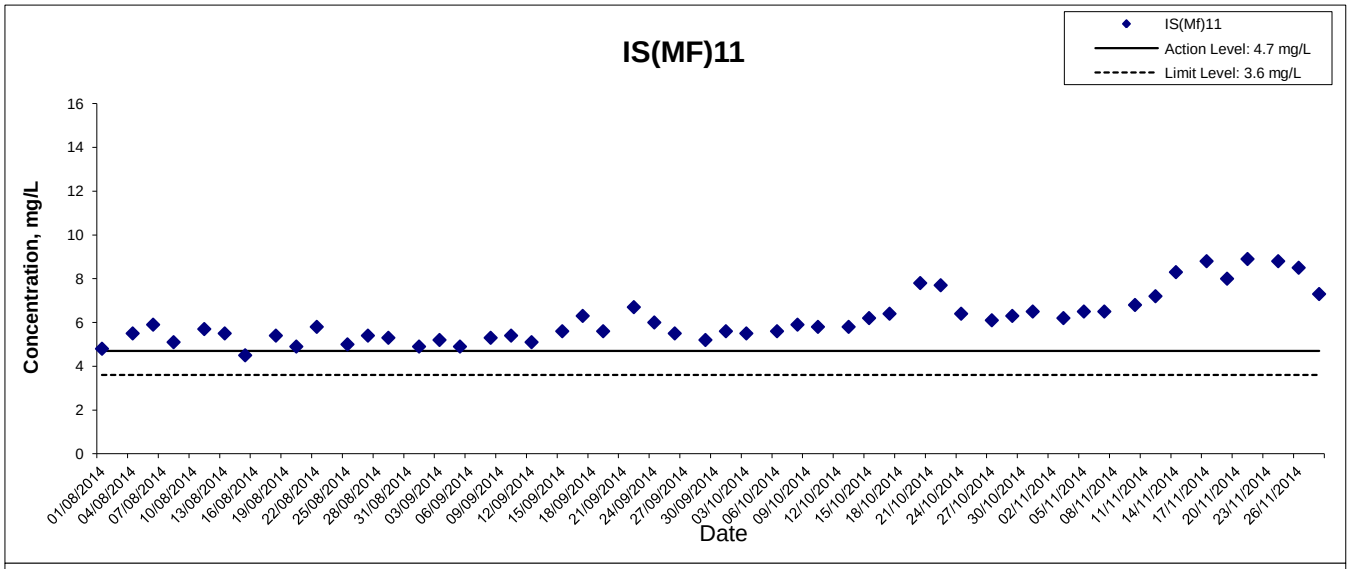
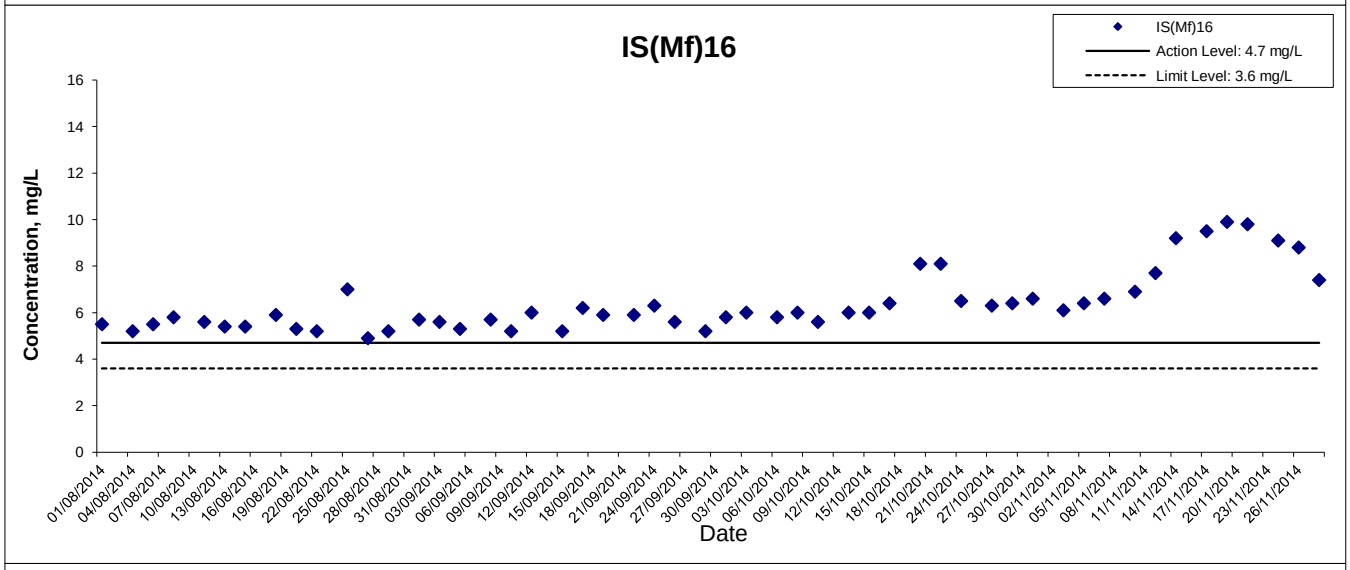
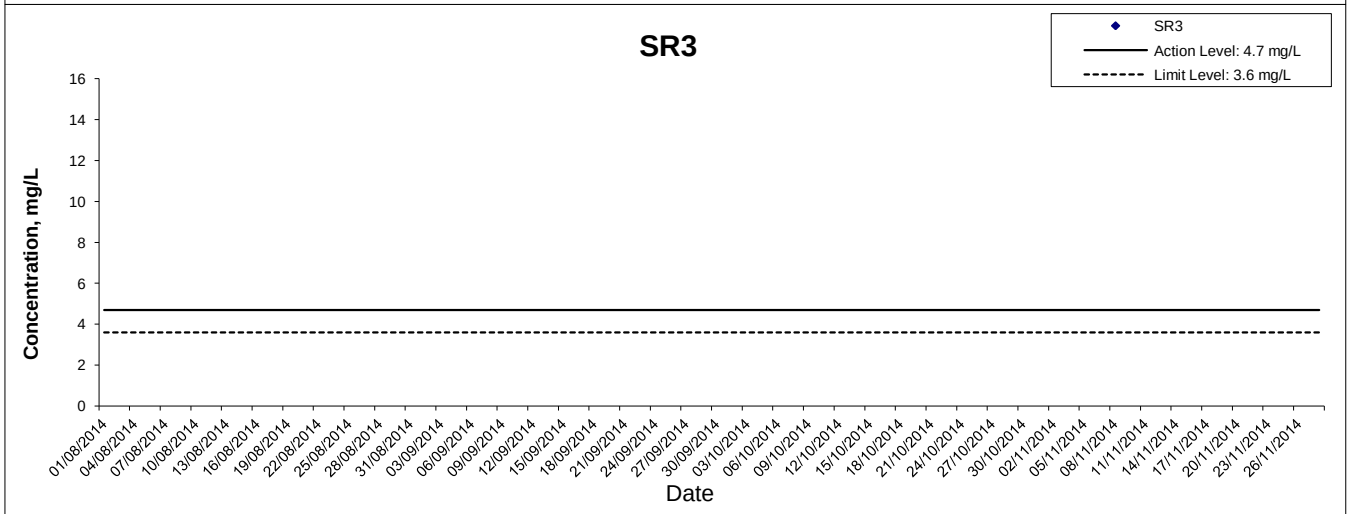
Date: Oct 2014

Dissolved Oxygen (Bottom) at Mid-Flood Tide



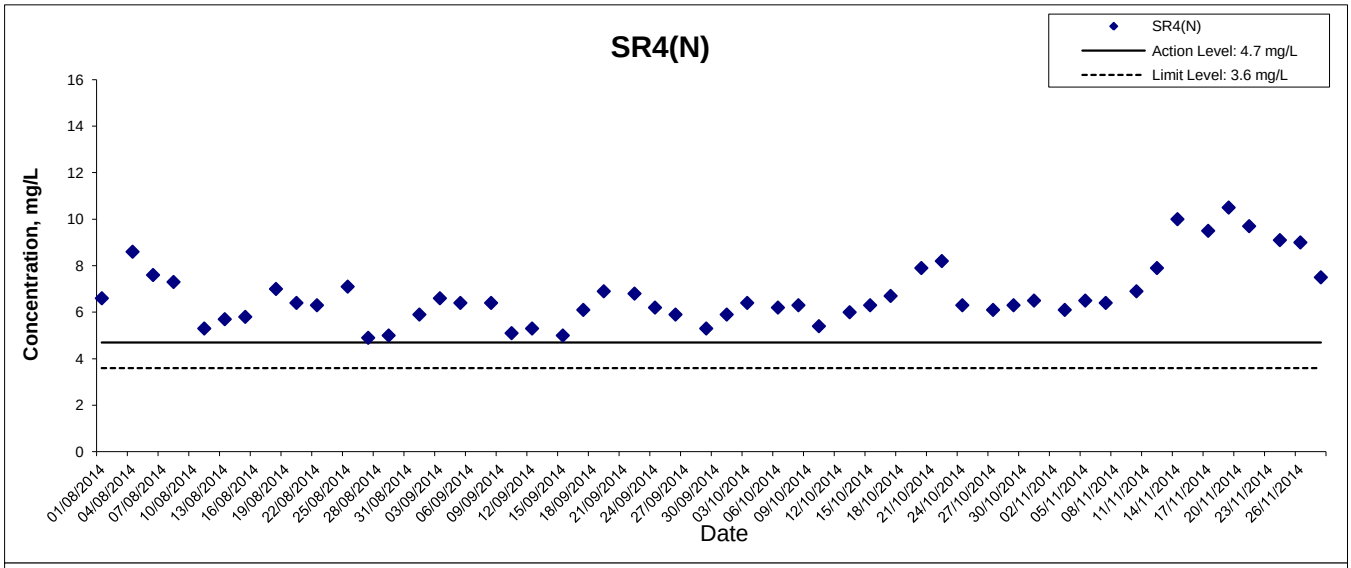


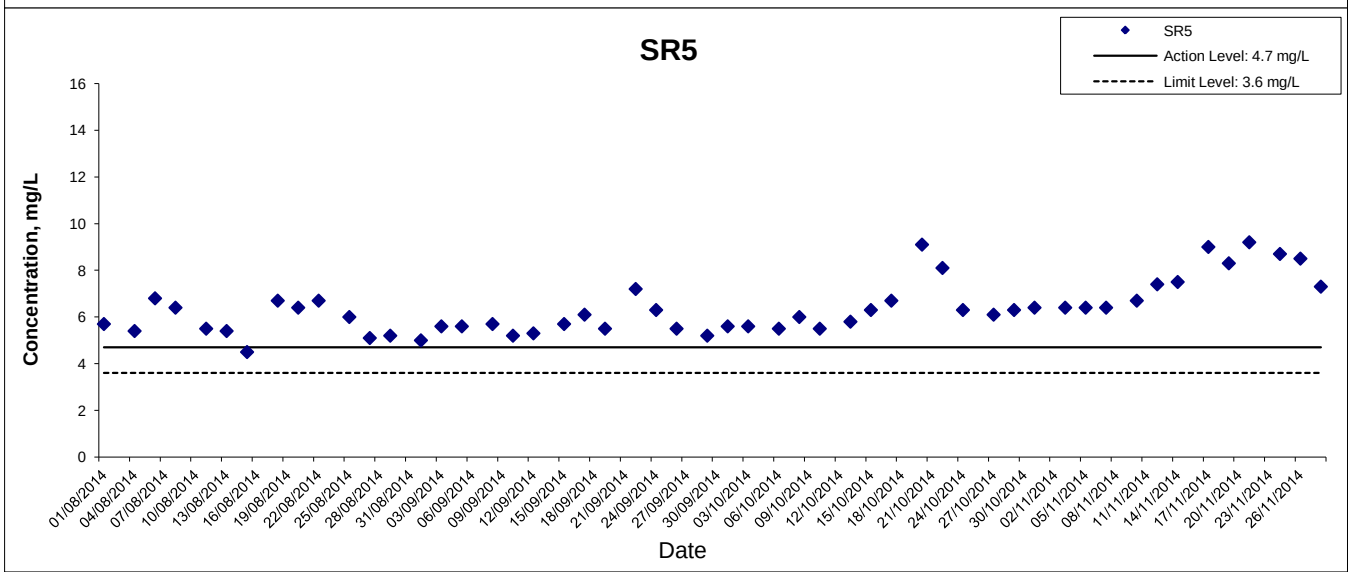


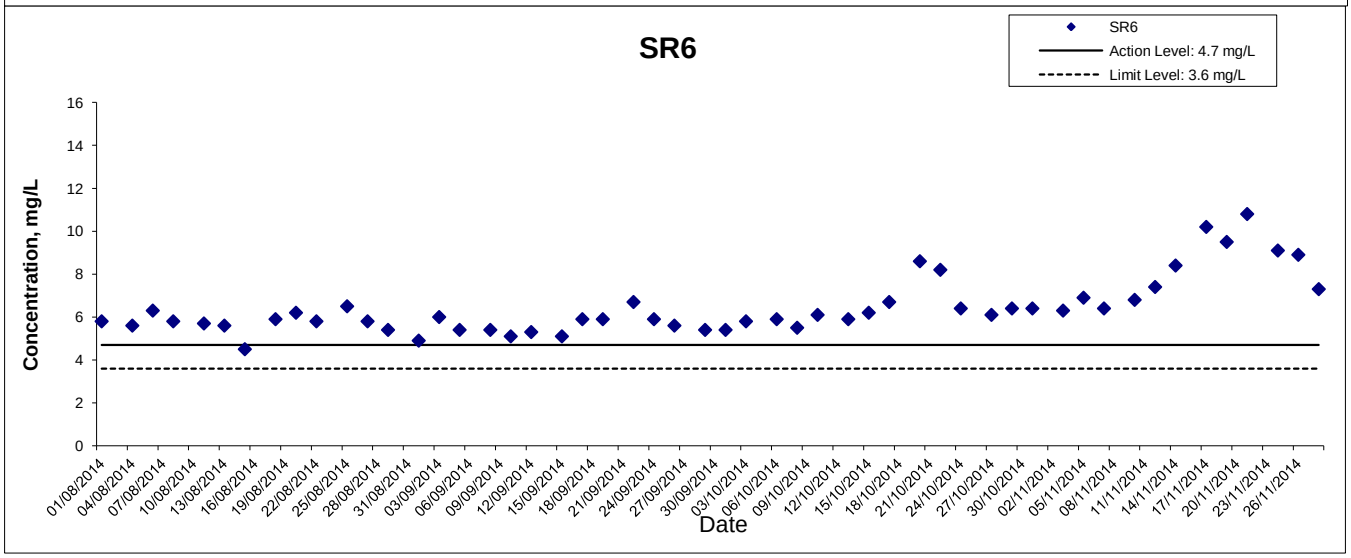
As the measured water depths were less than 3 m during all monitoring days, water samples are collected at mid-depth only .

Date: Oct 2014

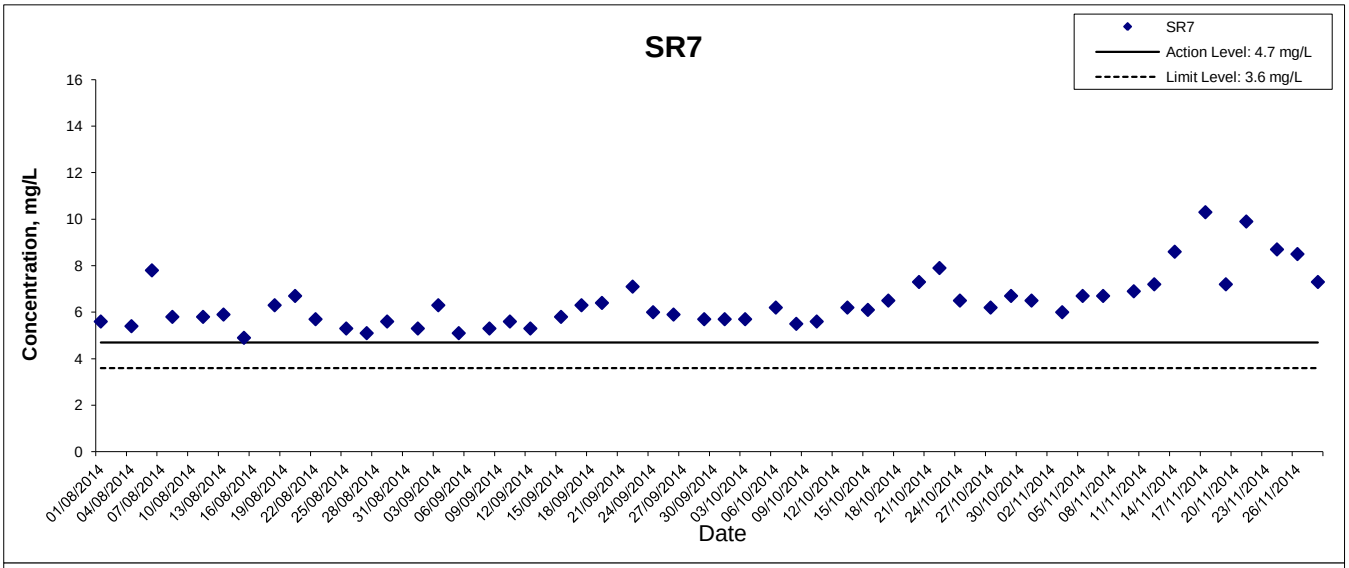
Dissolved Oxygen (Bottom) at Mid-Flood Tide

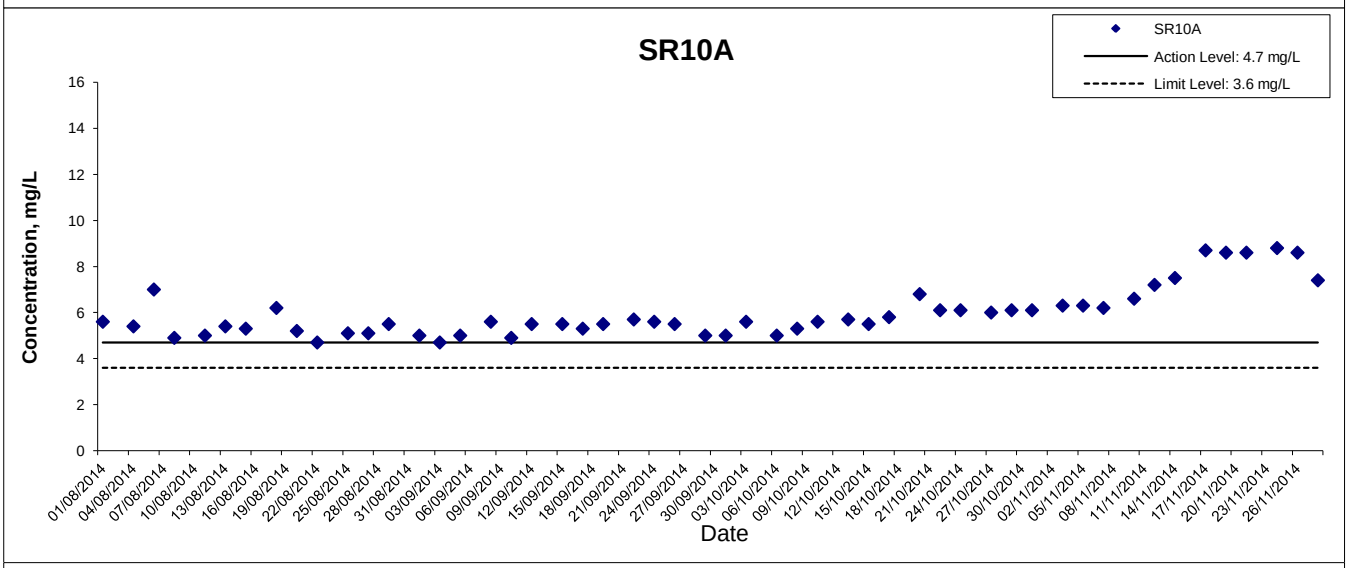


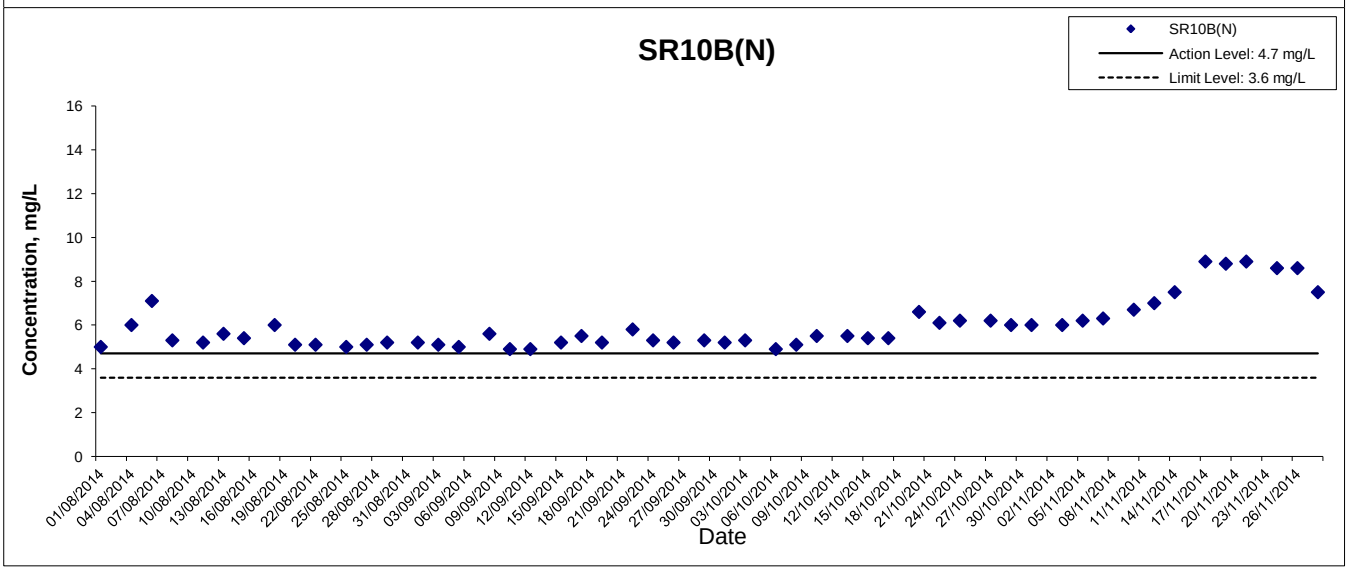




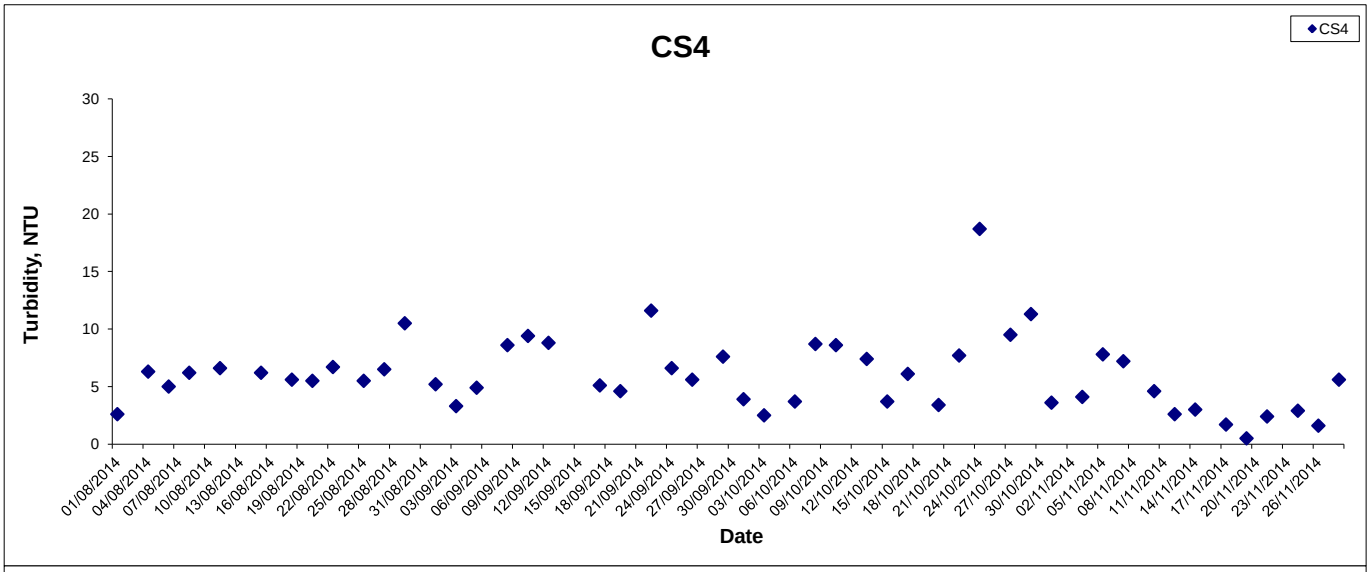
Dissolved Oxygen (Bottom) at Mid-Flood Tide

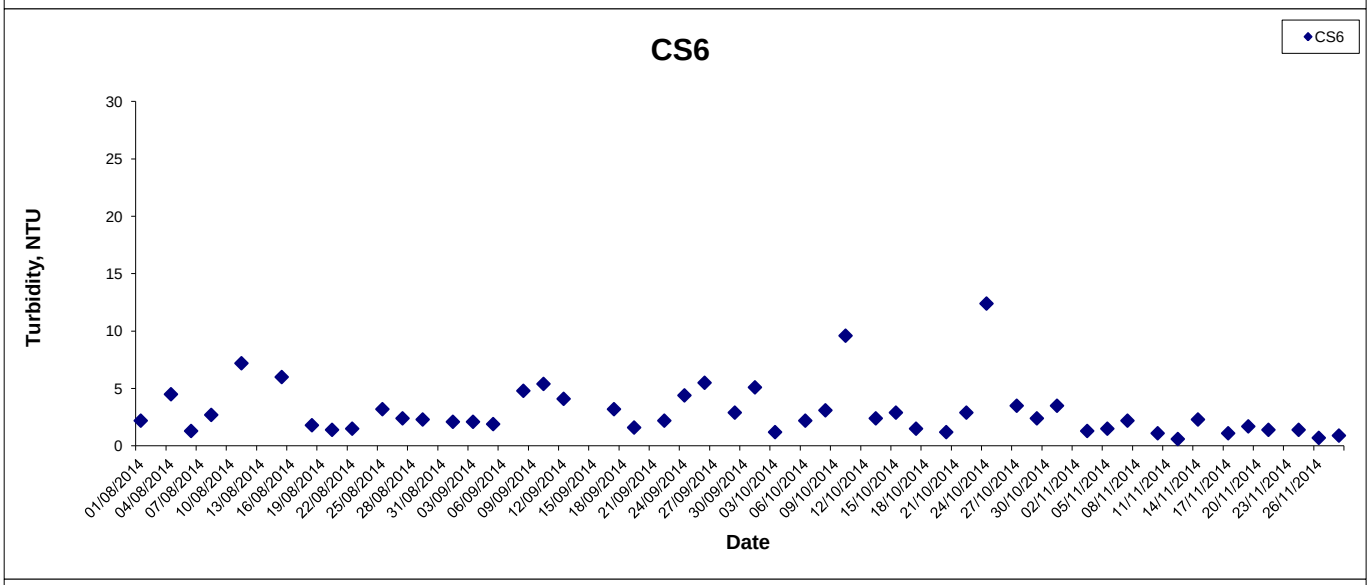


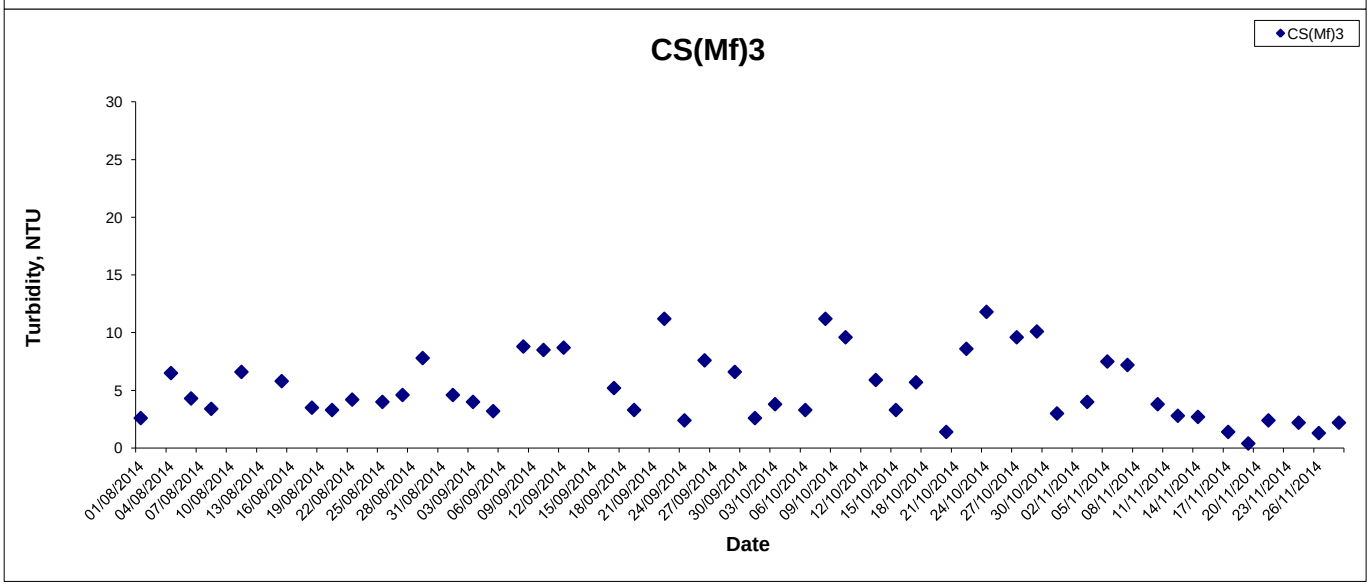




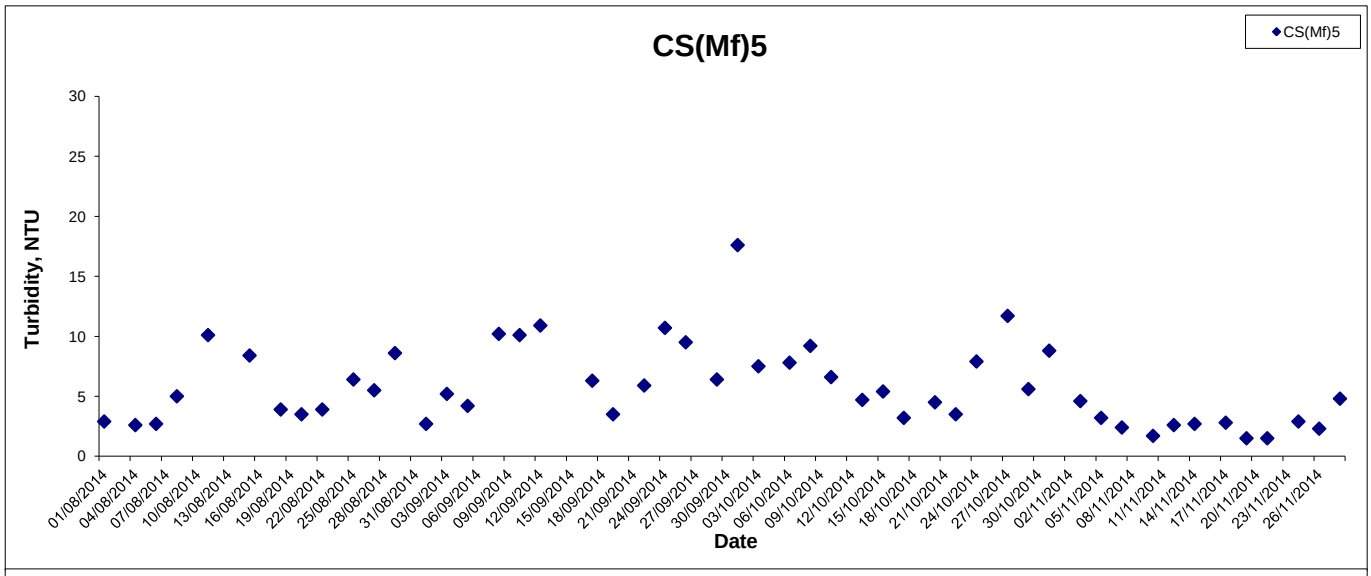
Turbidity at Mid-Ebb Tide

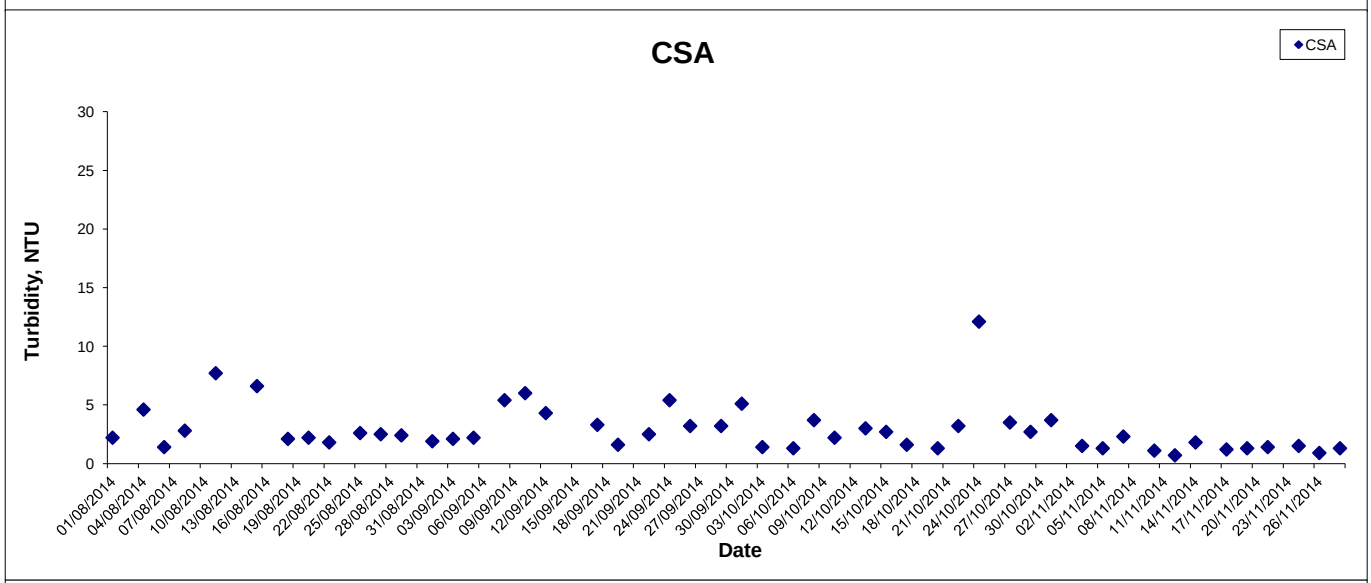


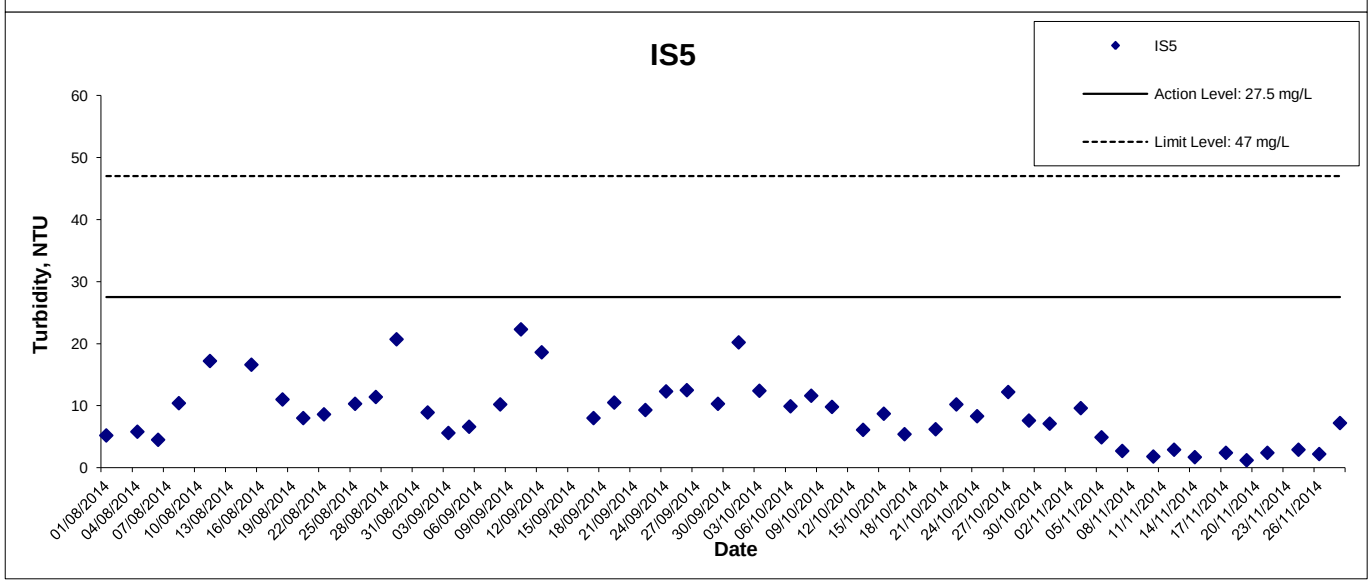




Turbidity at Mid-Ebb Tide







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HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

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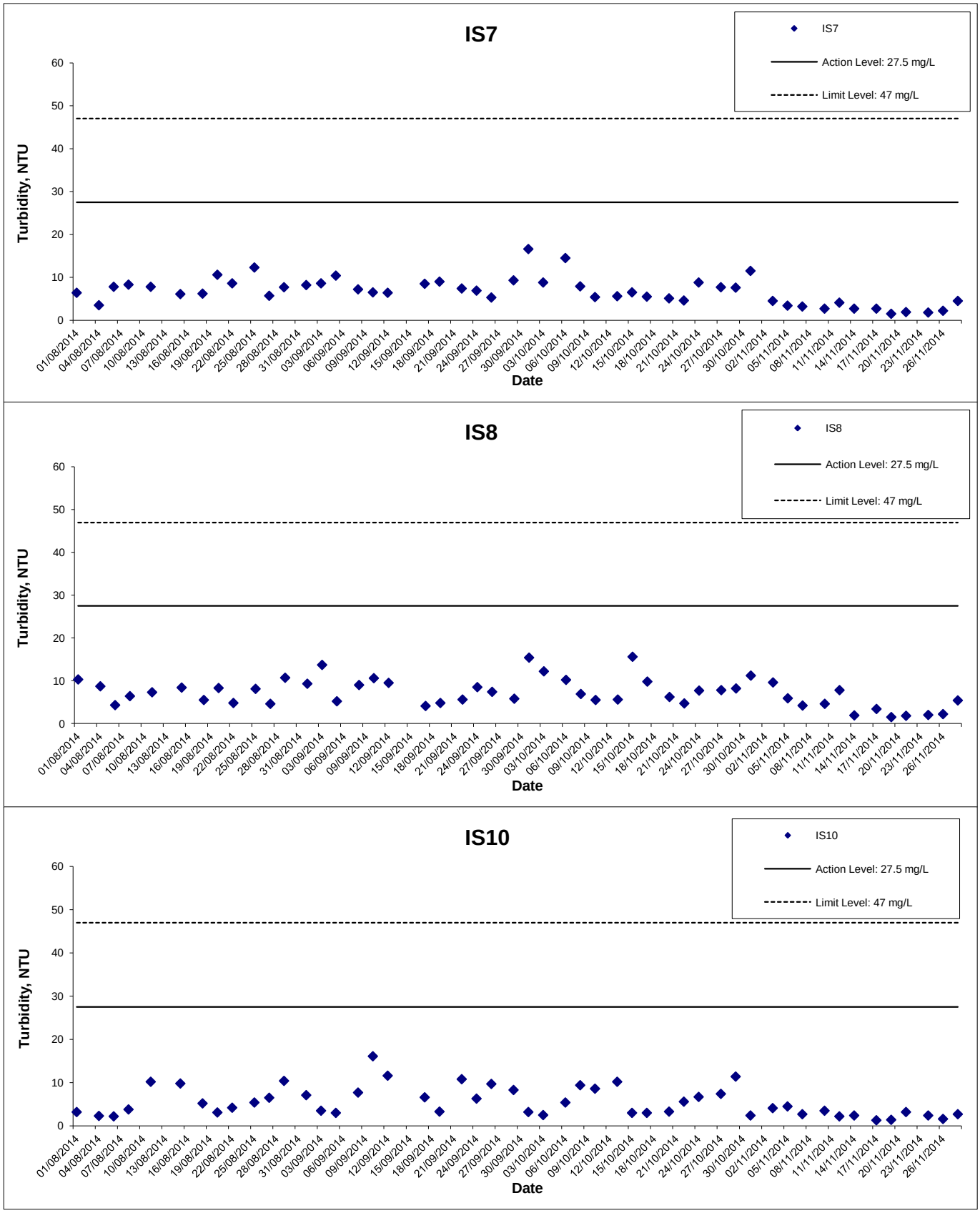
Graphical Presentation of Impact Water Quality Monitoring Results

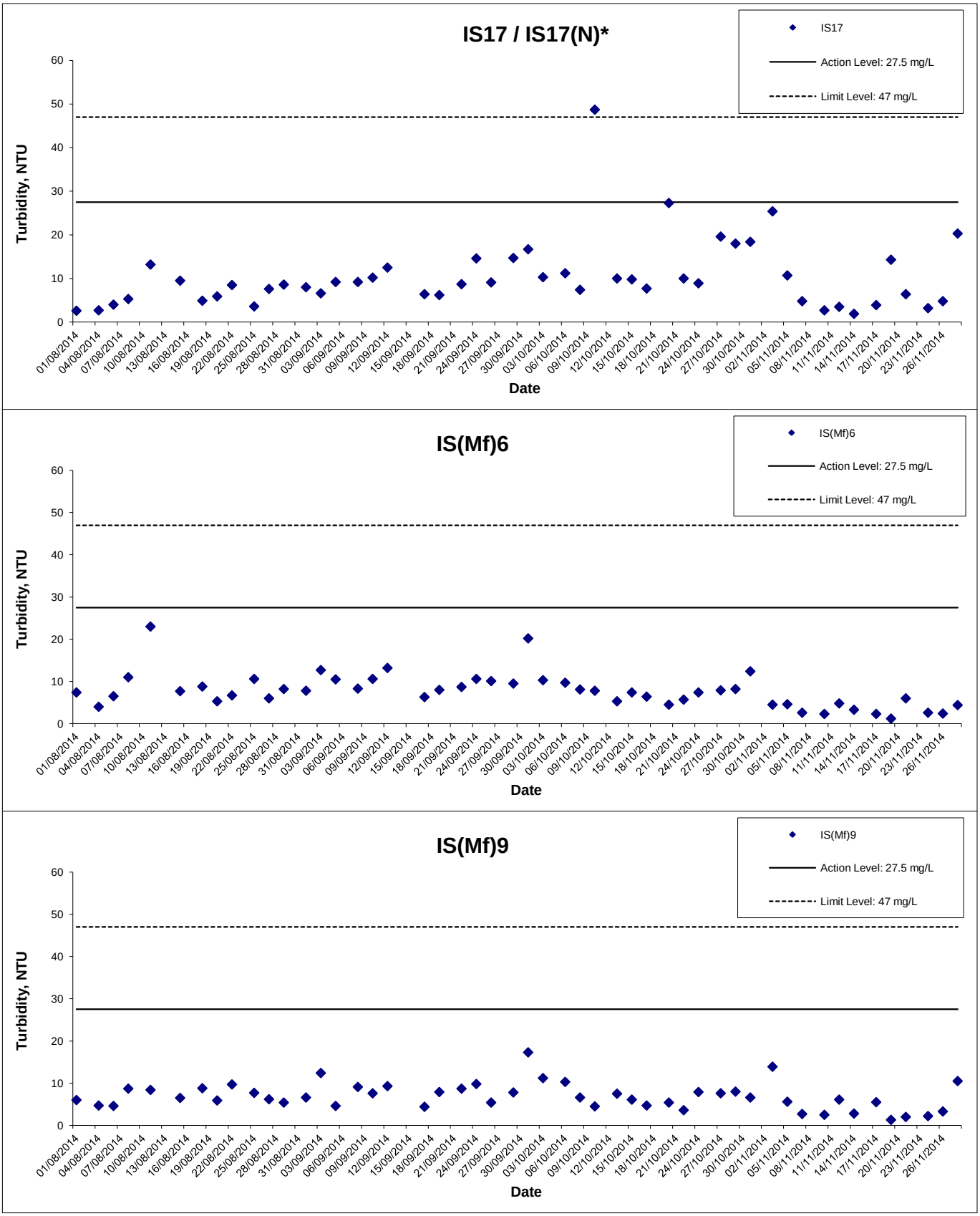
Project No.: 60249820 **Date: Dec 2014**

Appendix G

Turbidity at Mid-Ebb Tide



Turbidity at Mid-Ebb Tide



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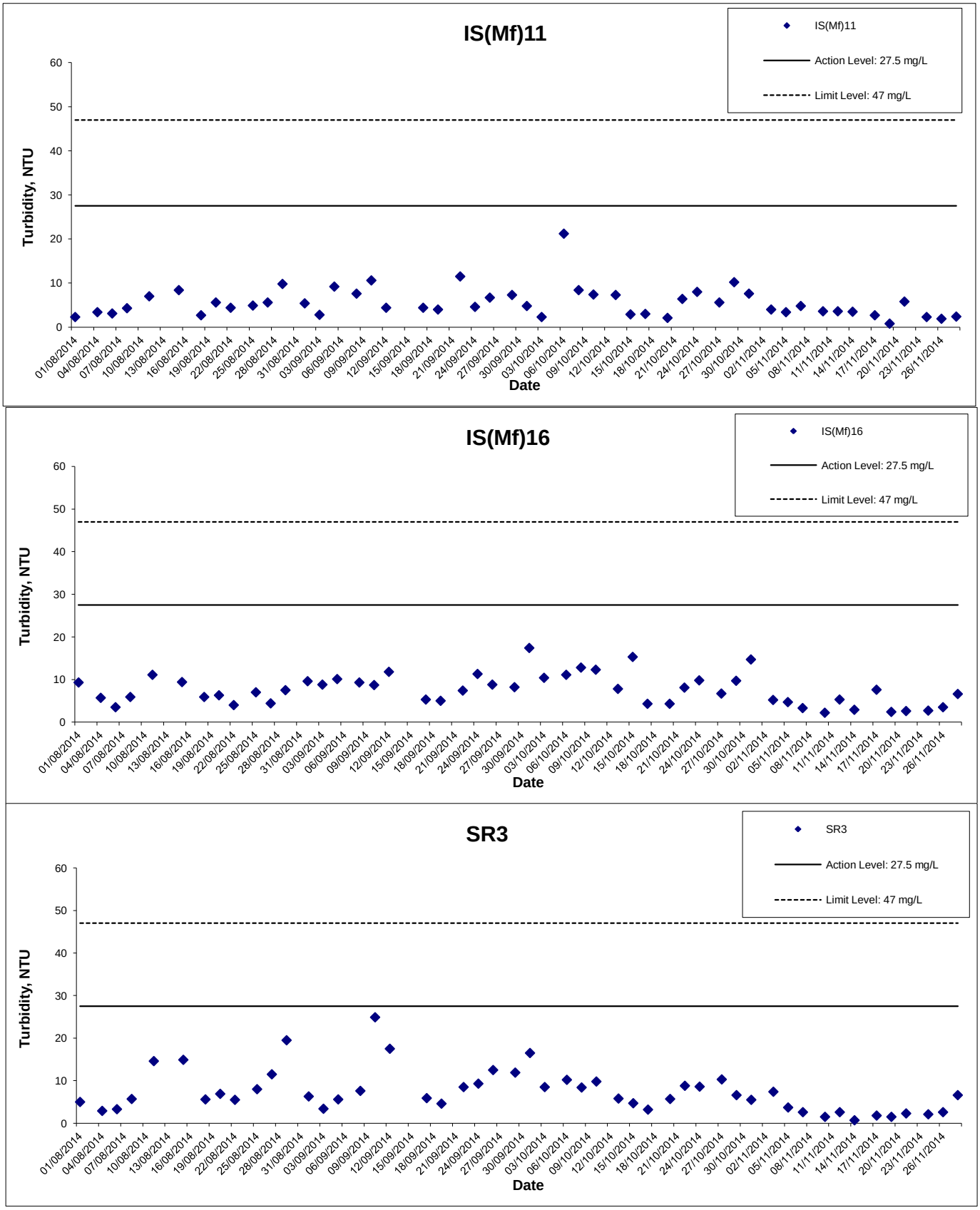
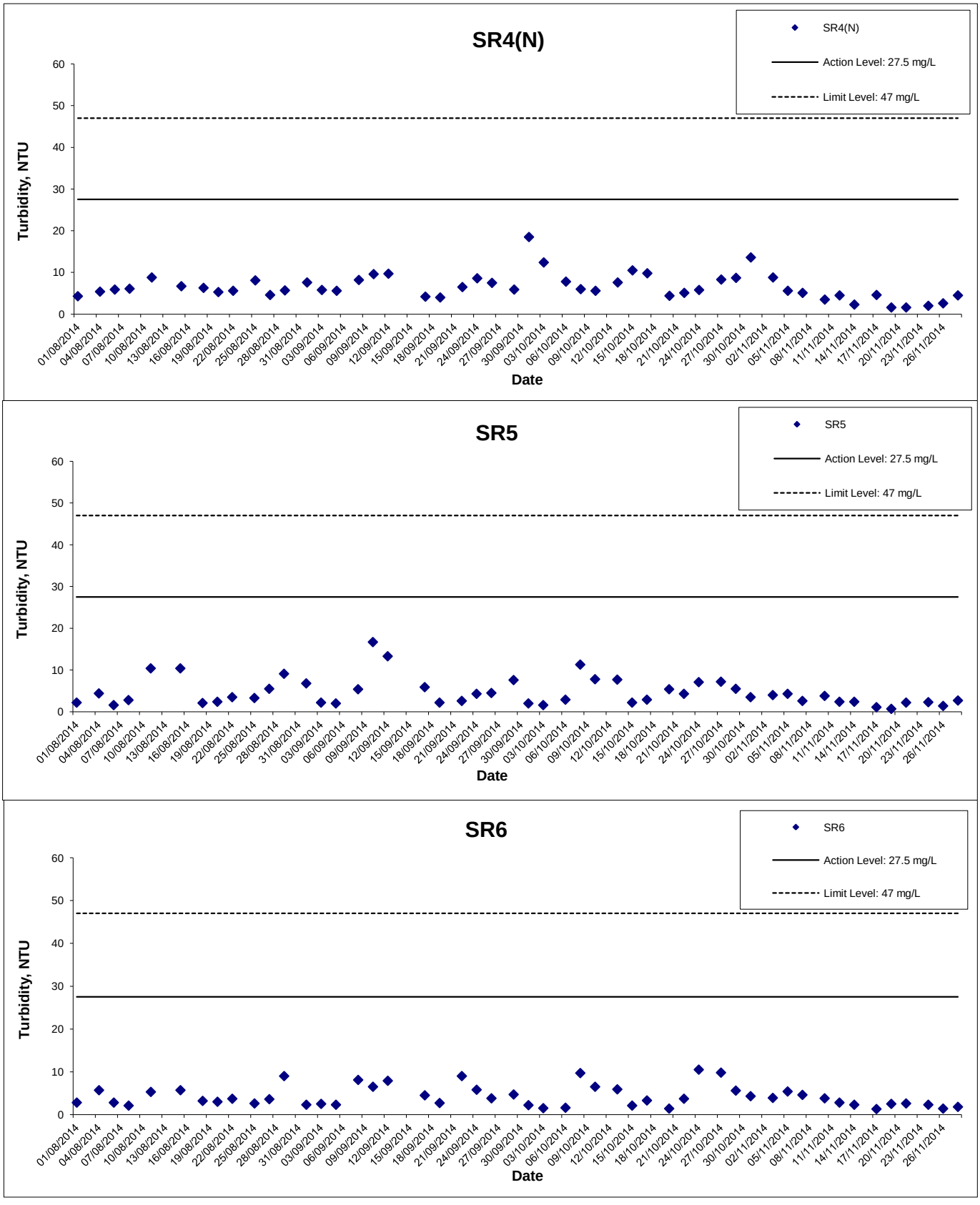
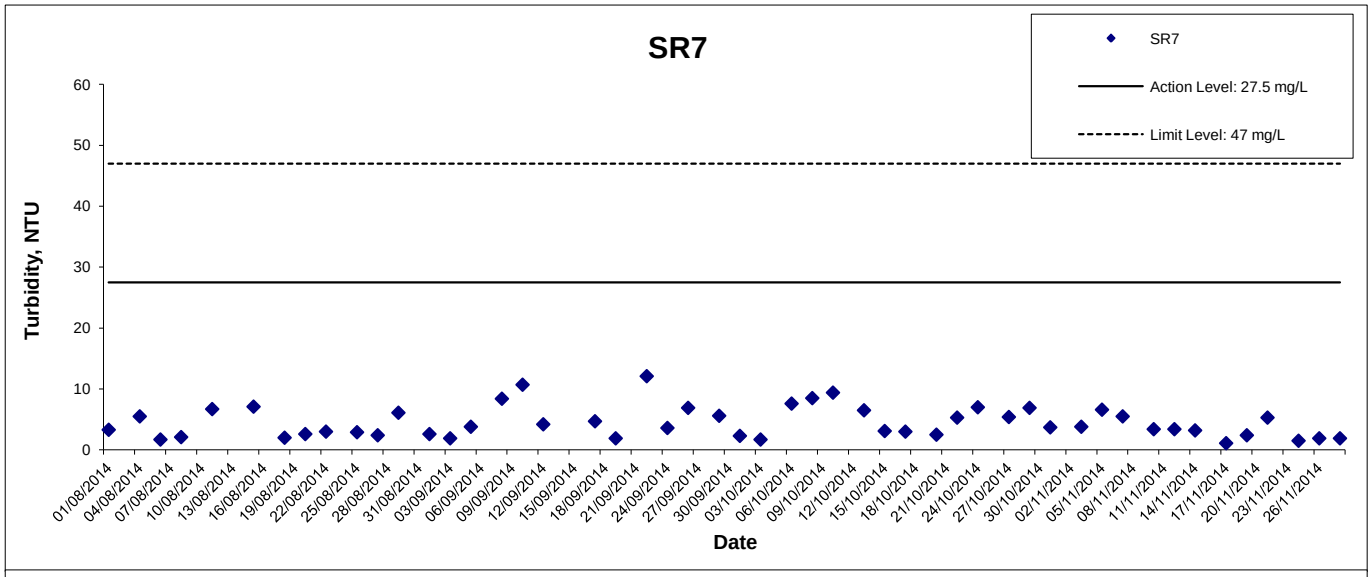
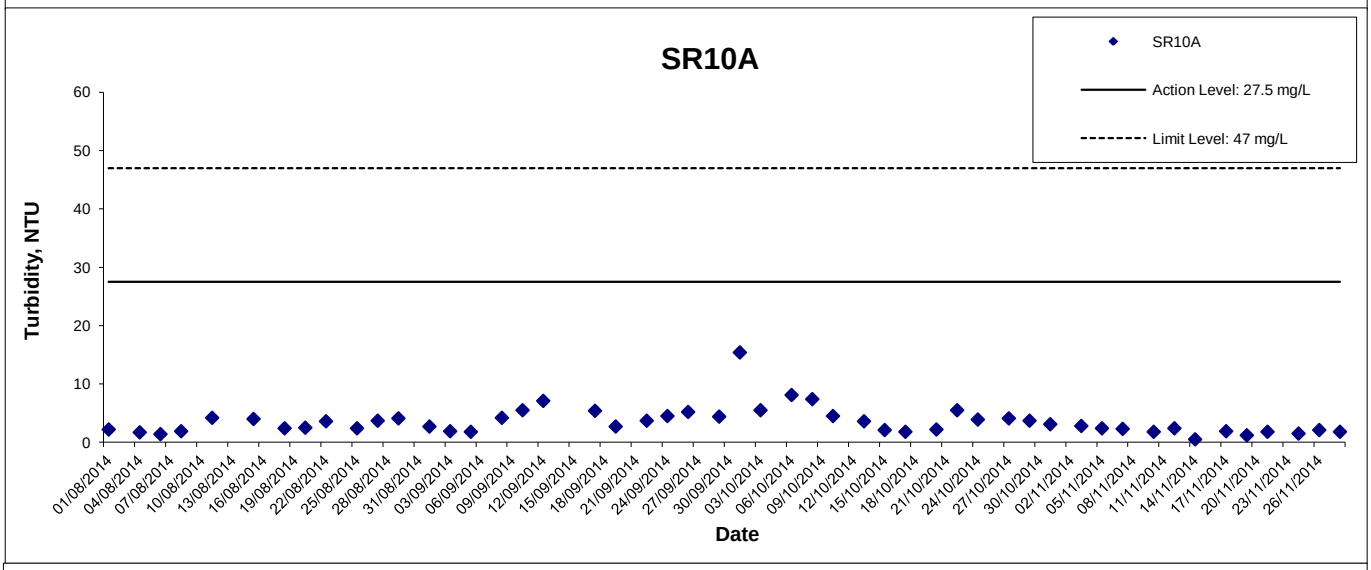


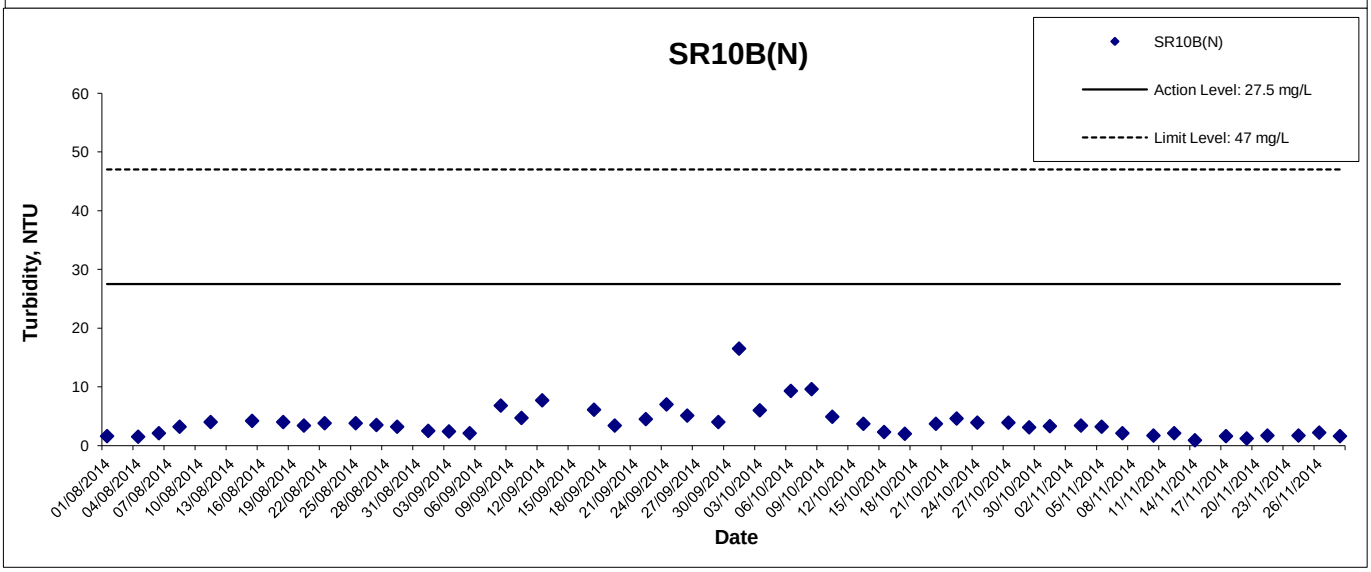
Turbidity at Mid-Ebb Tide



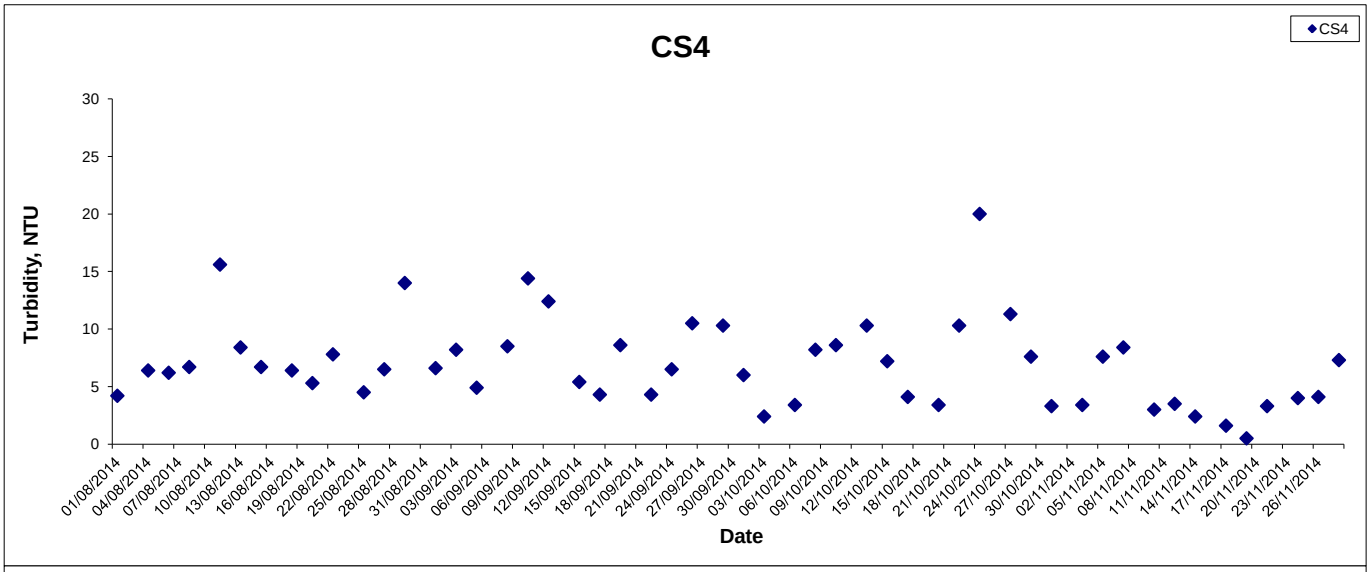
Turbidity at Mid-Ebb Tide

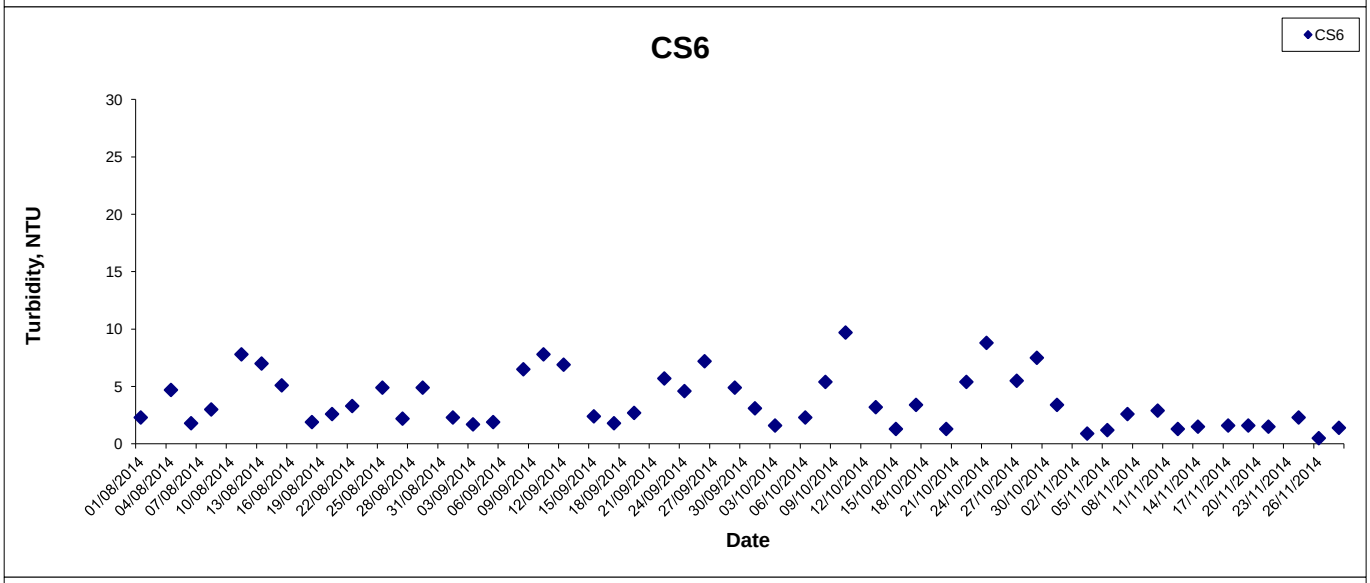


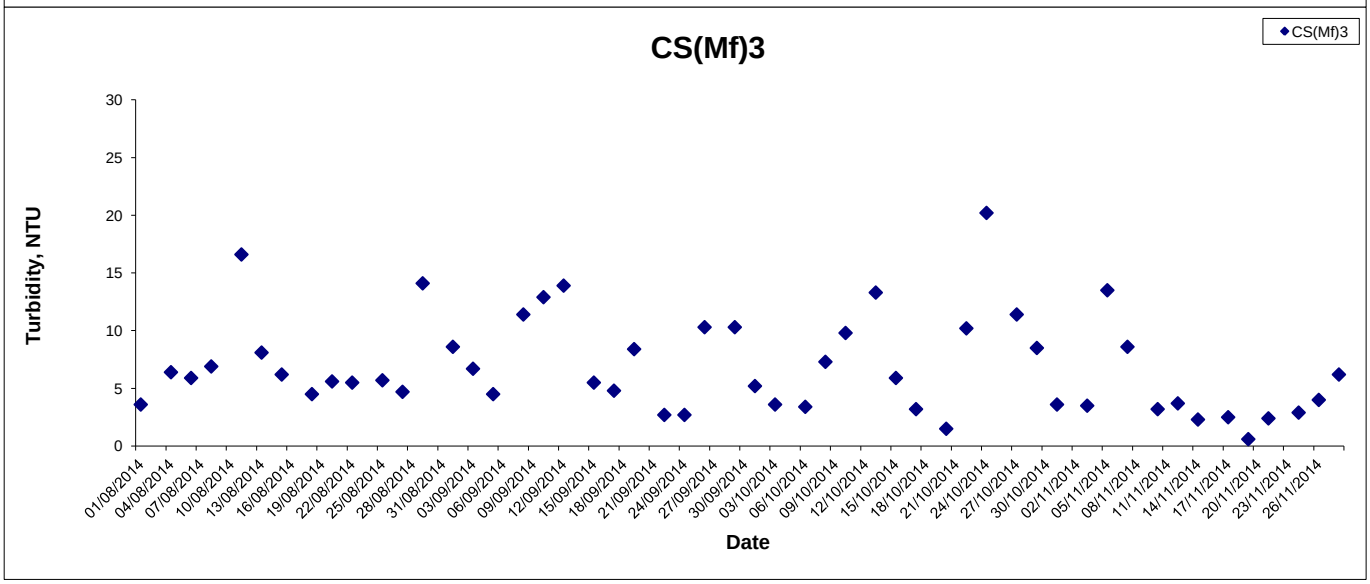




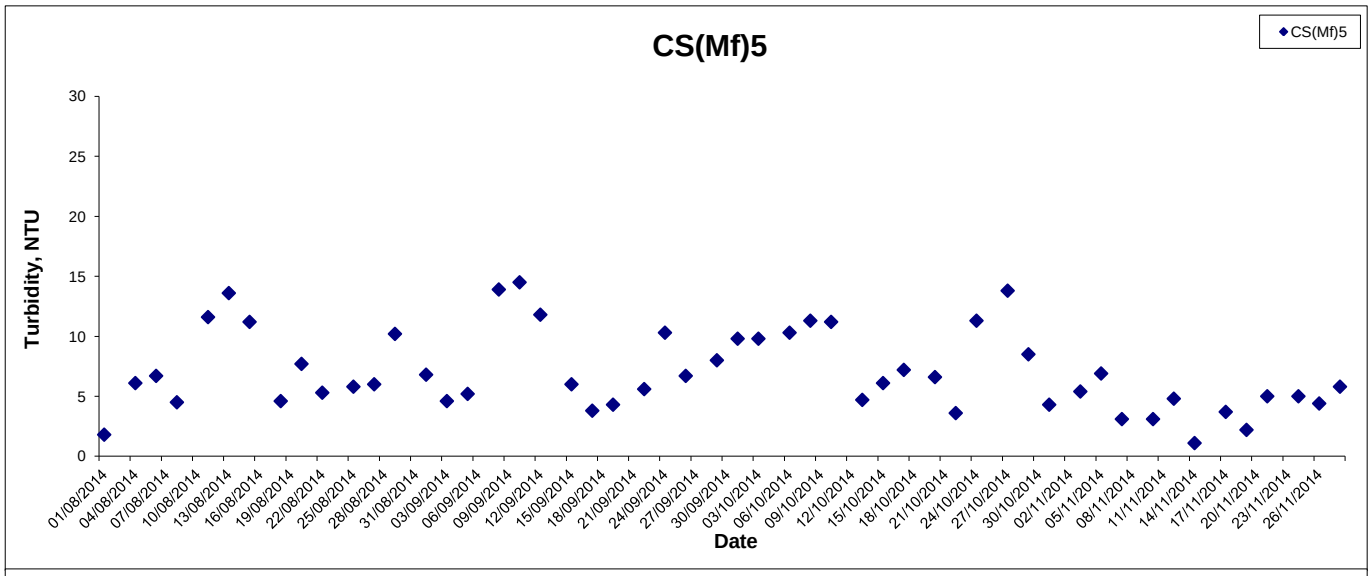
Turbidity at Mid-Flood Tide

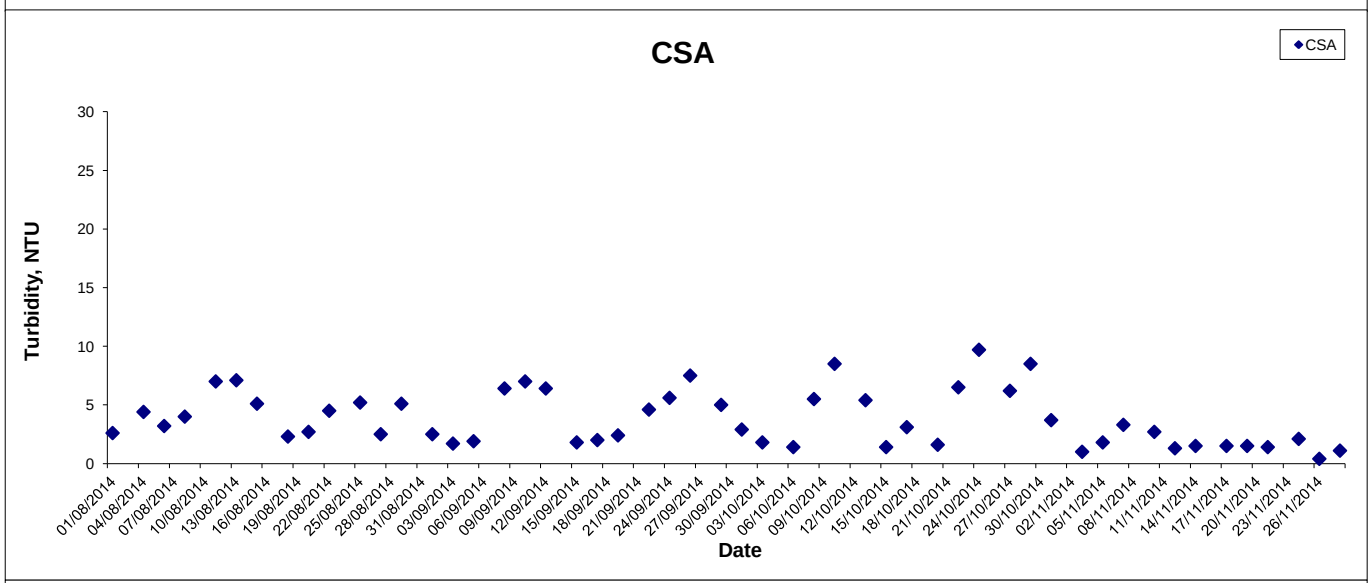


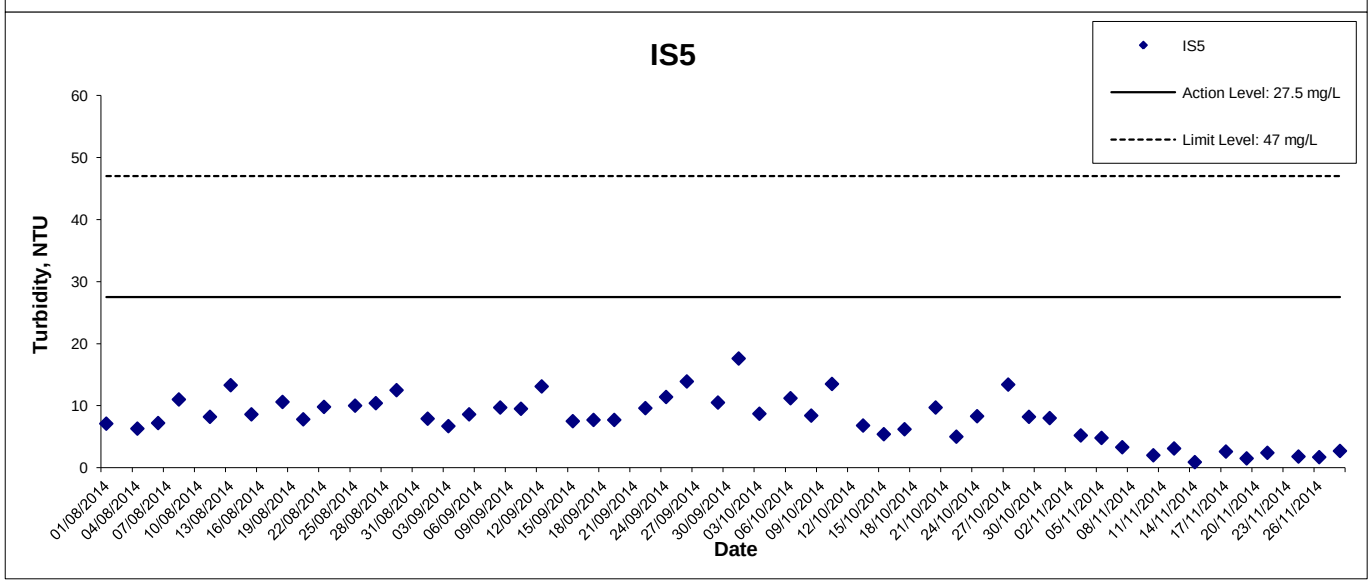




Turbidity at Mid-Flood Tide







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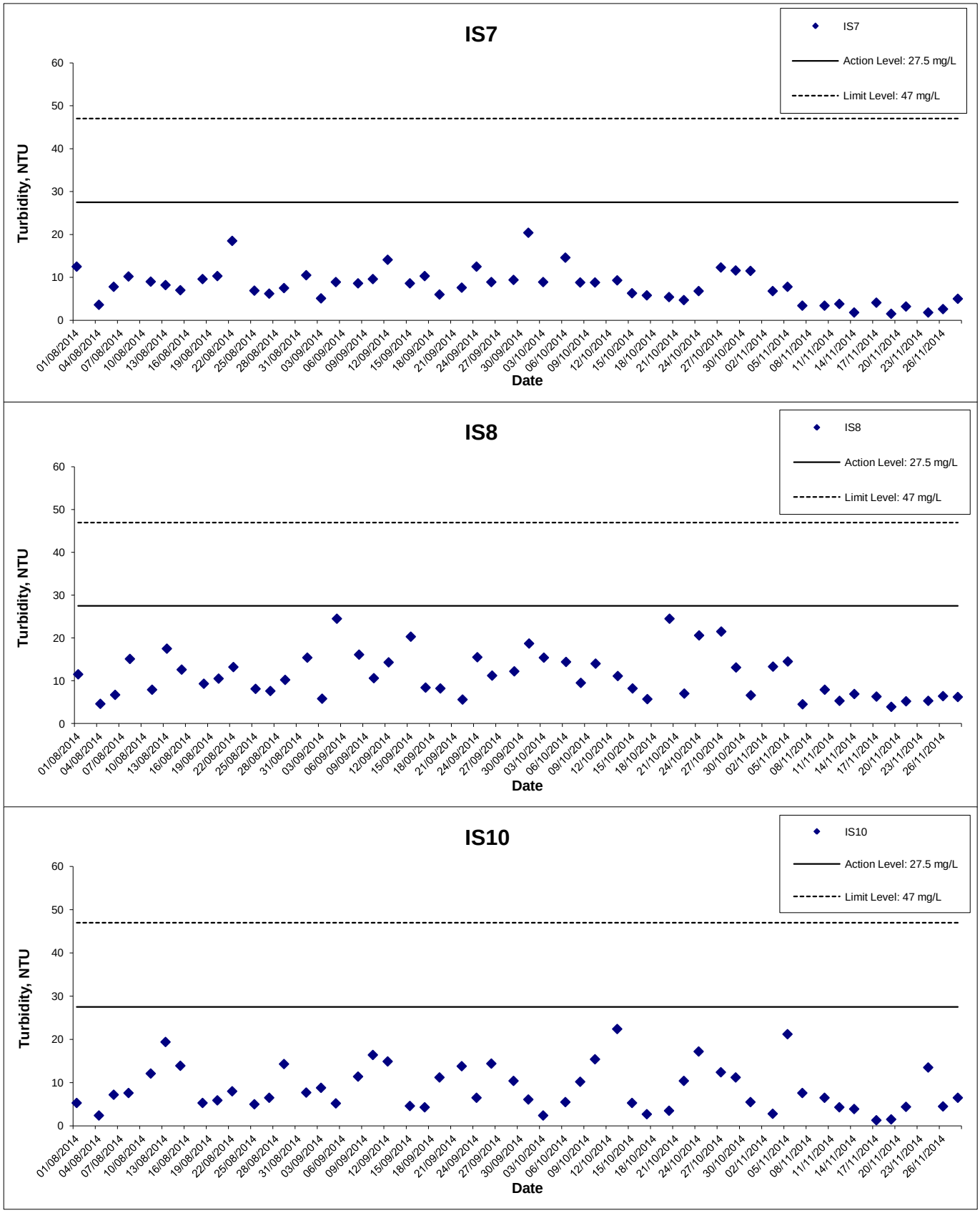
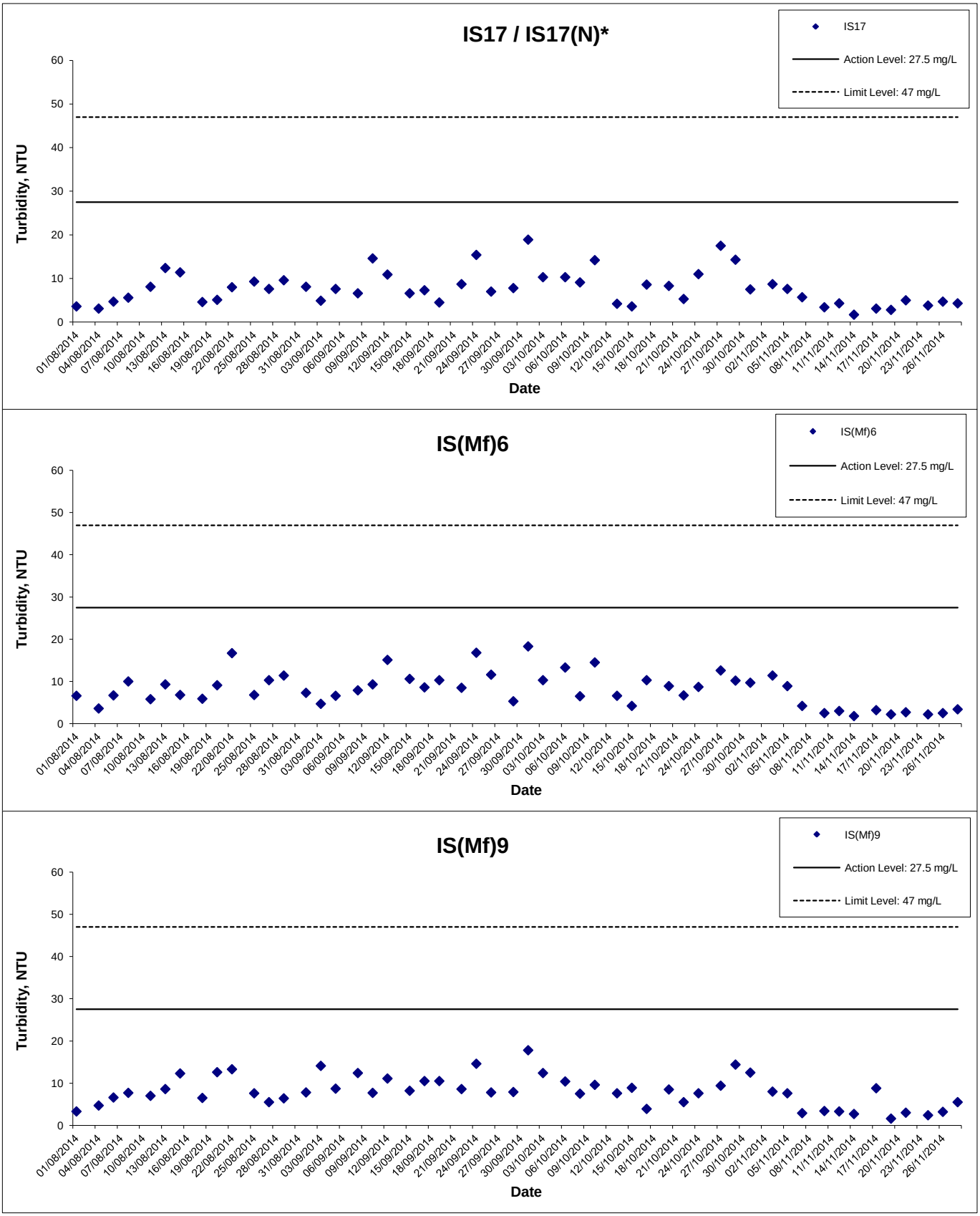
Turbidity at Mid-Flood Tide



Turbidity at Mid-Flood Tide



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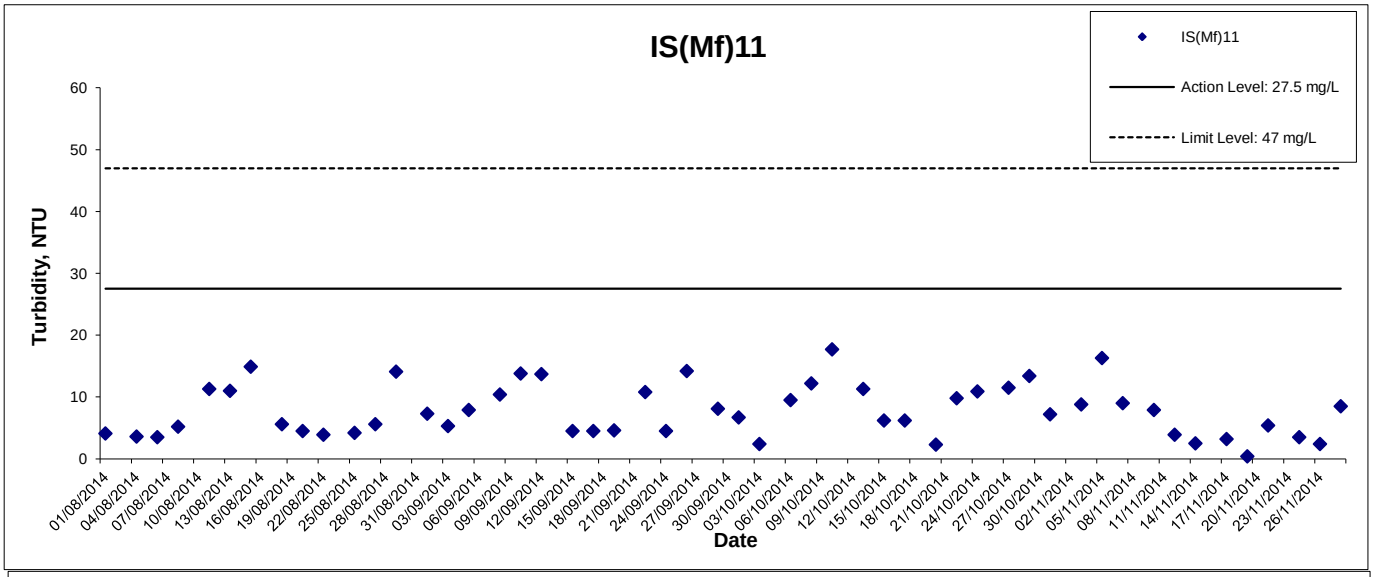
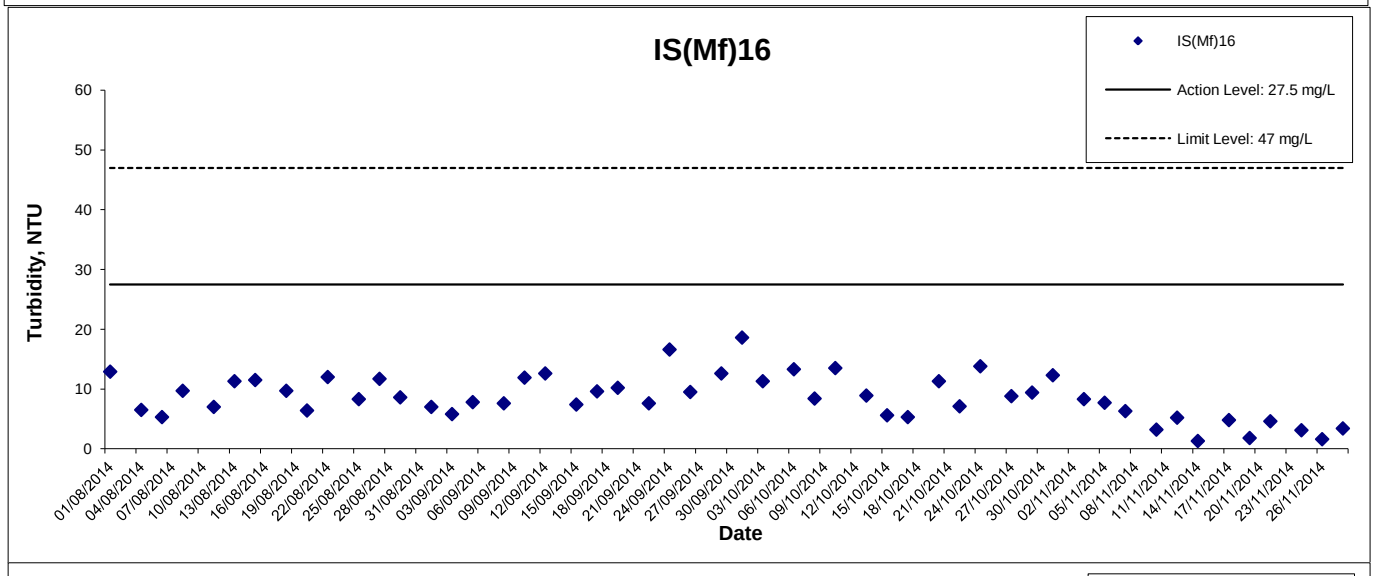
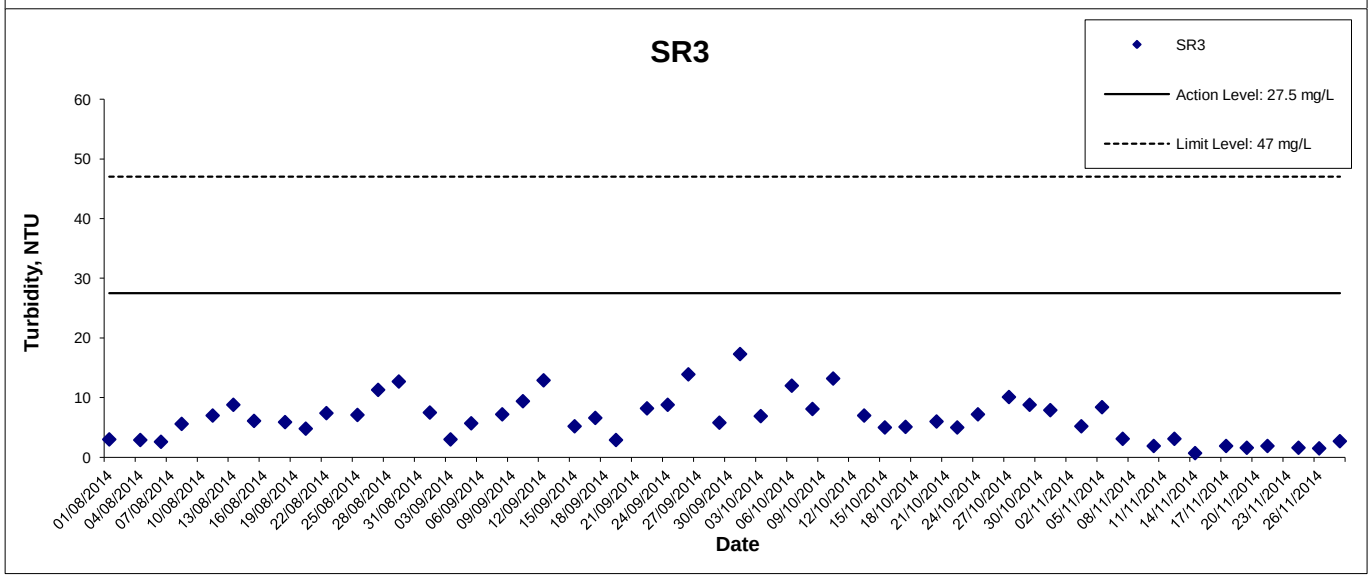
Turbidity at Mid-Flood Tide







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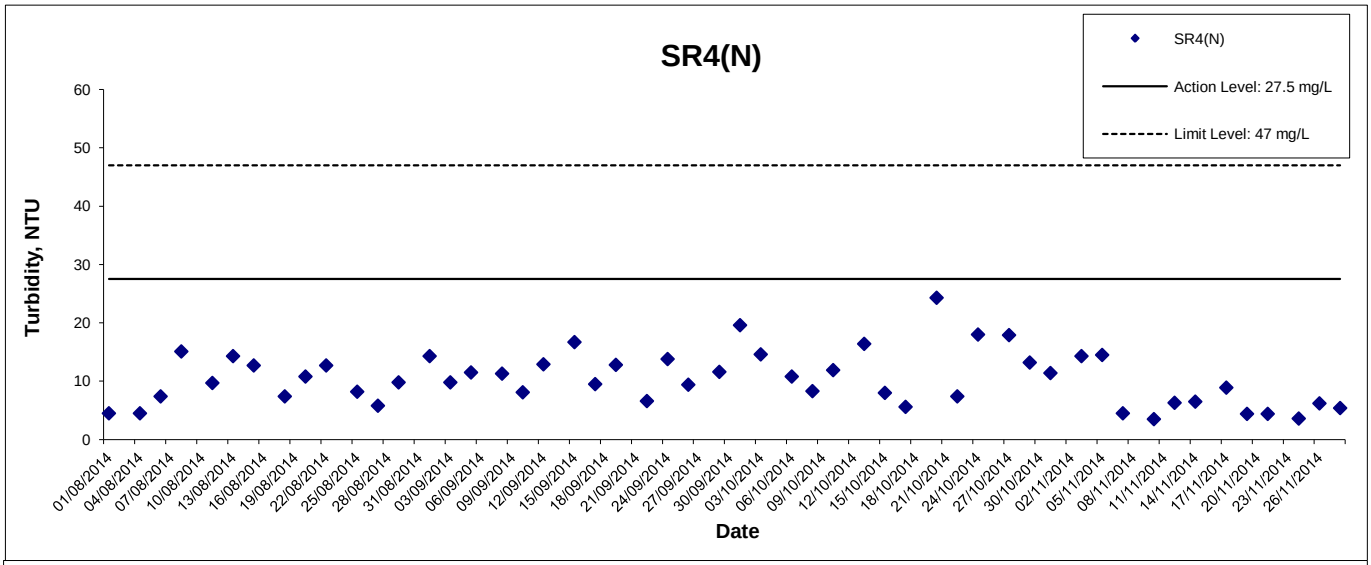

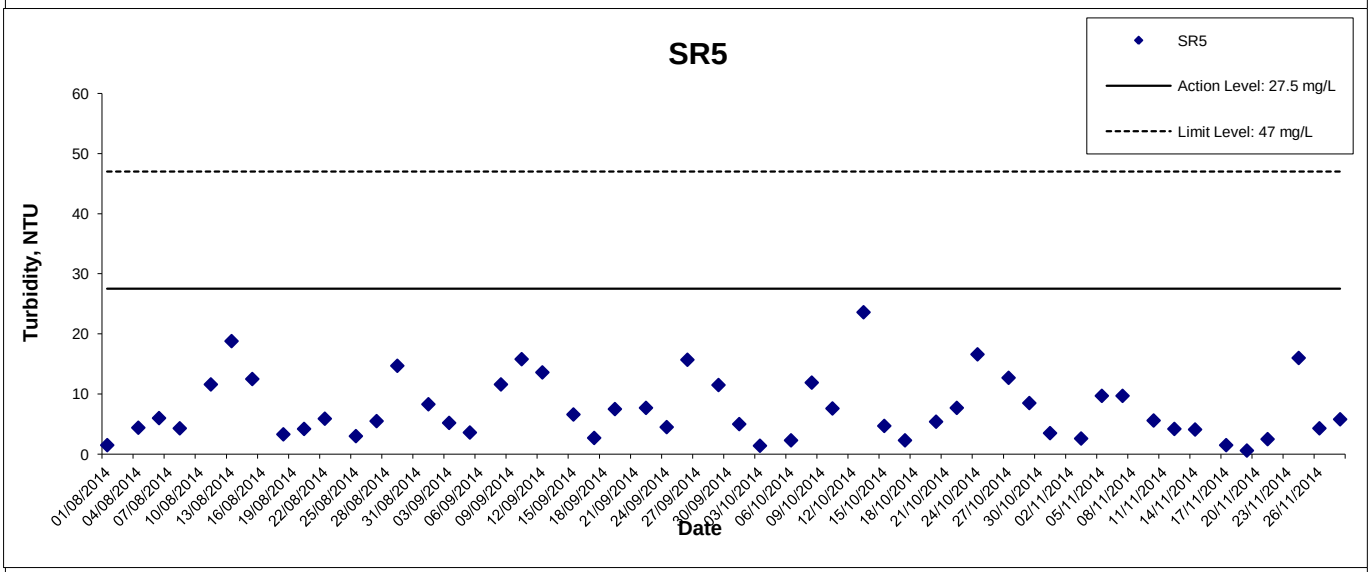

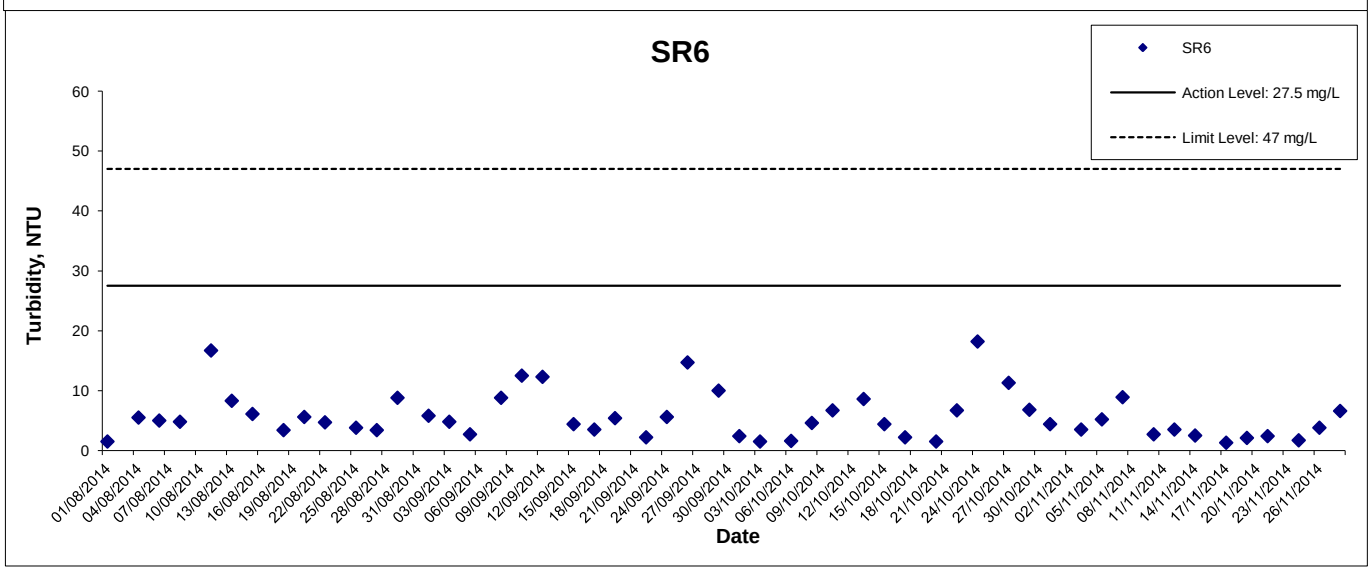

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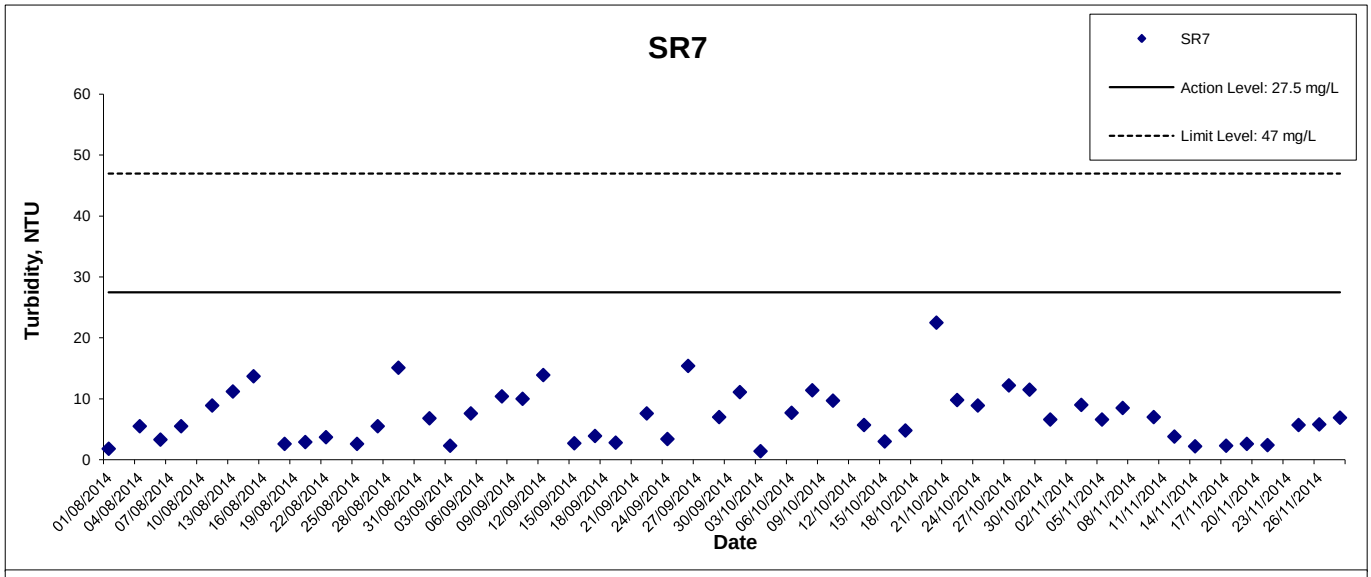
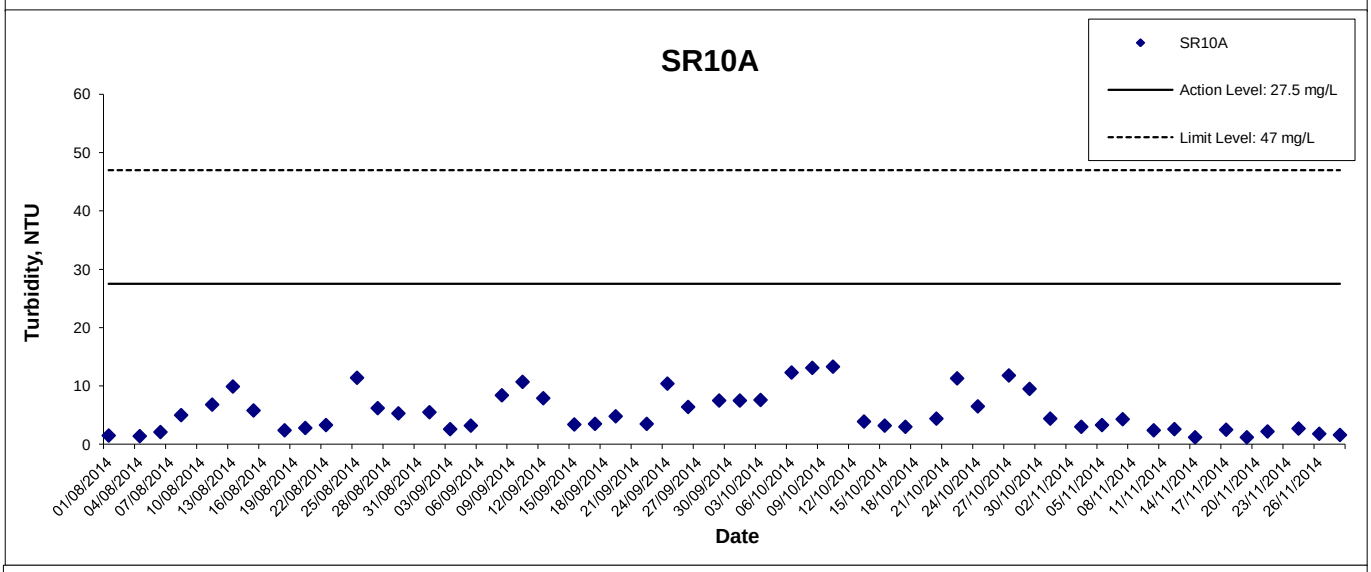
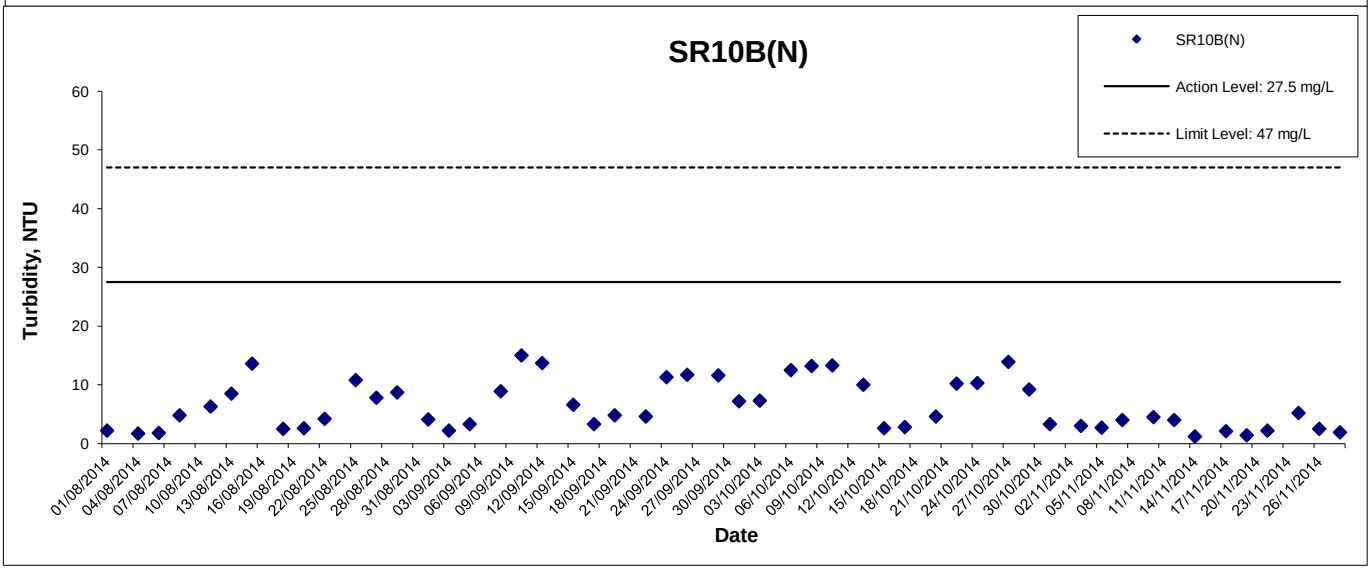
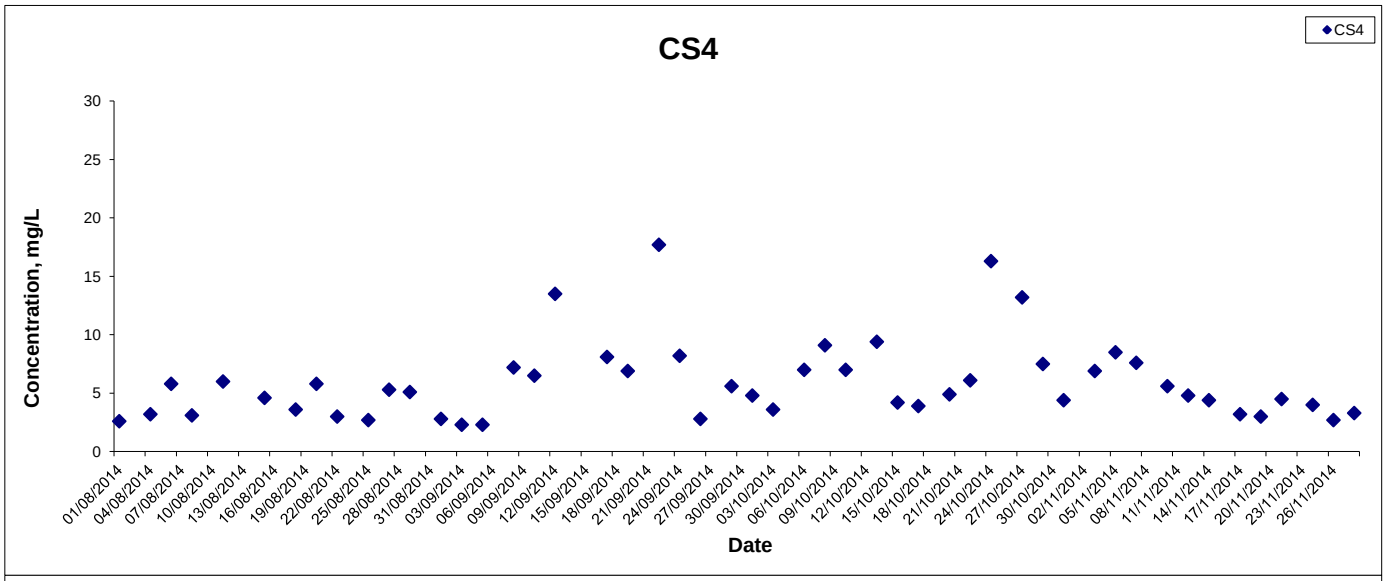
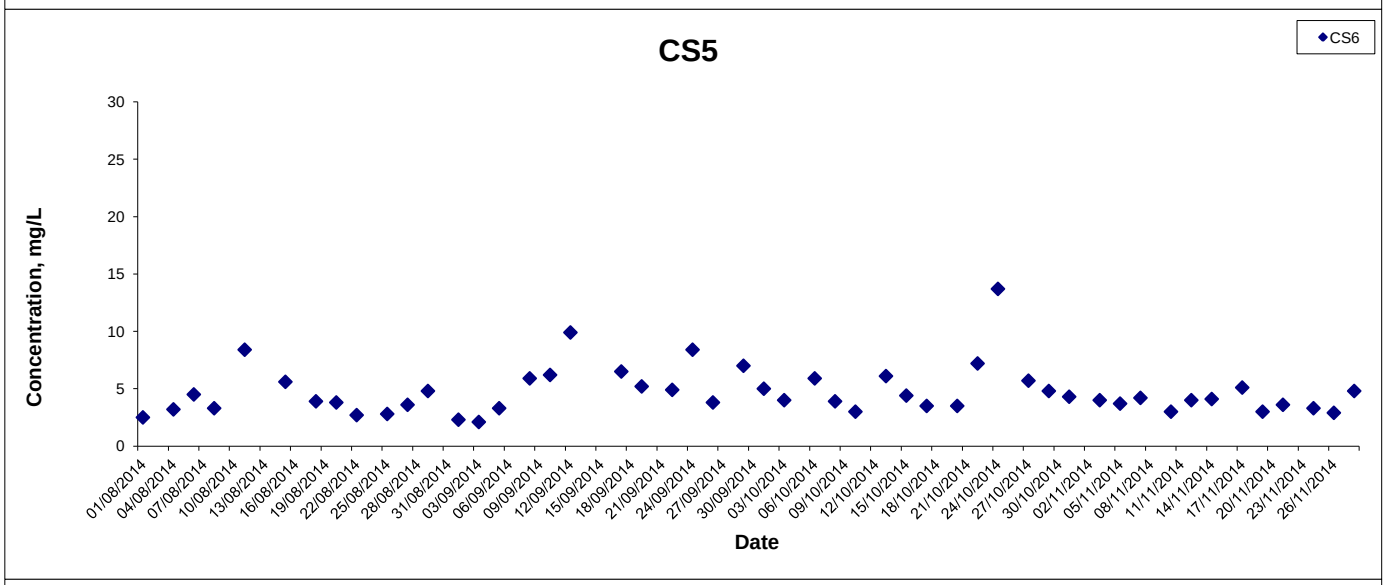


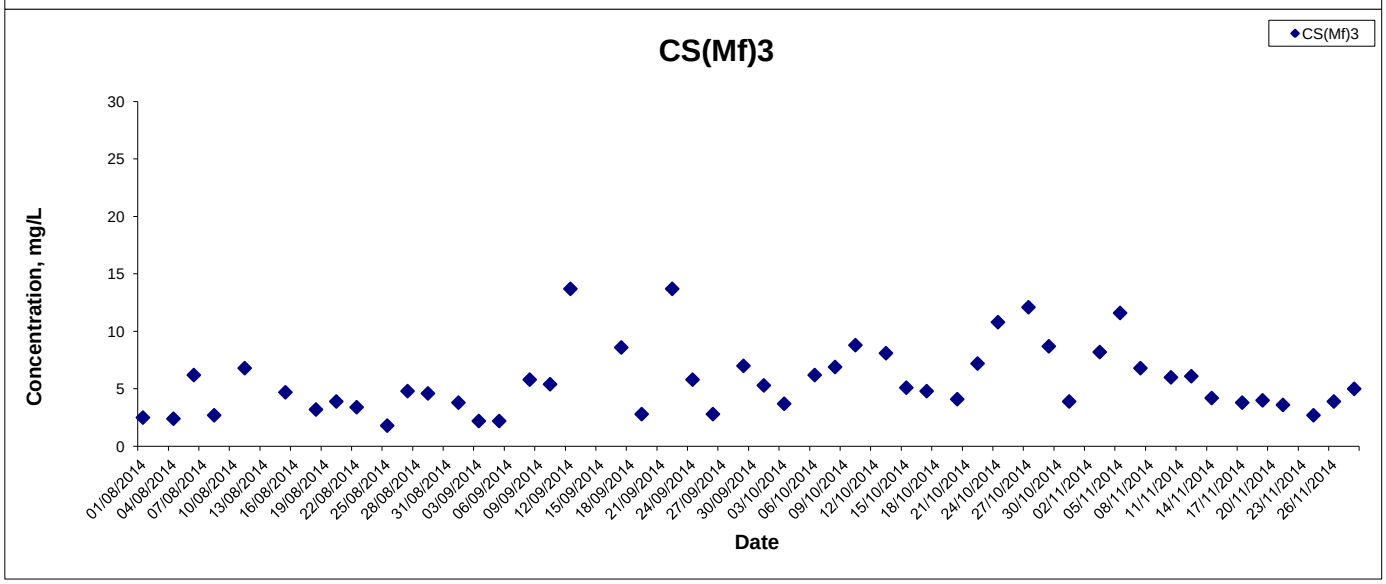




Suspended Solids at Mid-Ebb Tide







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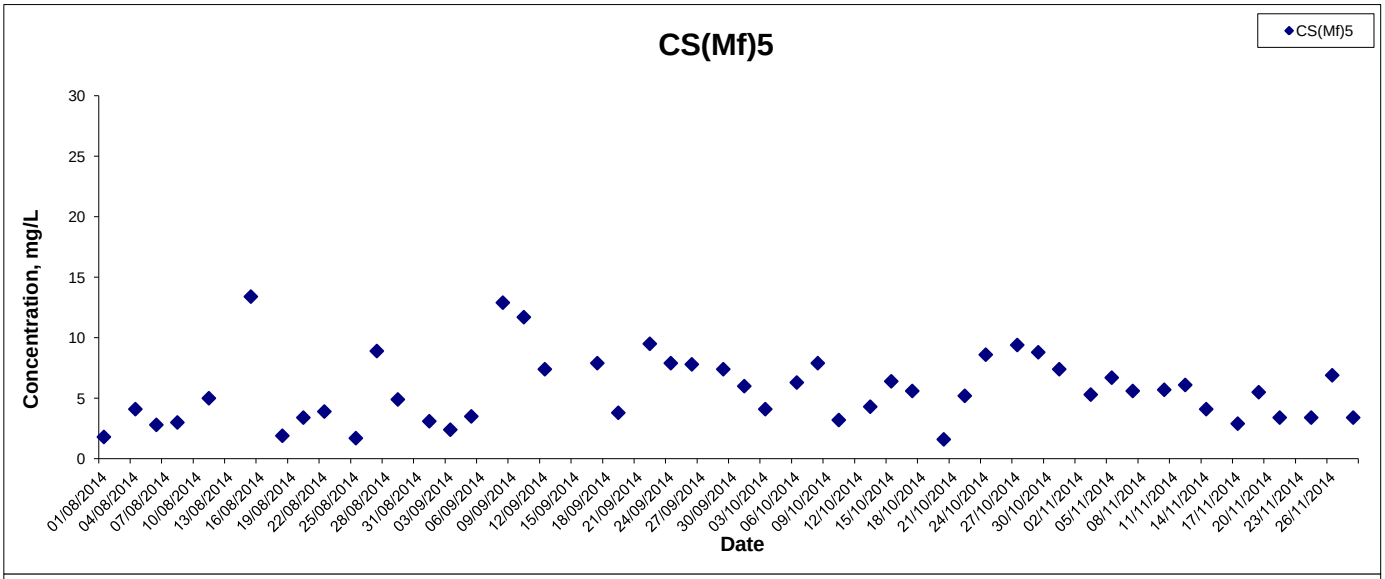

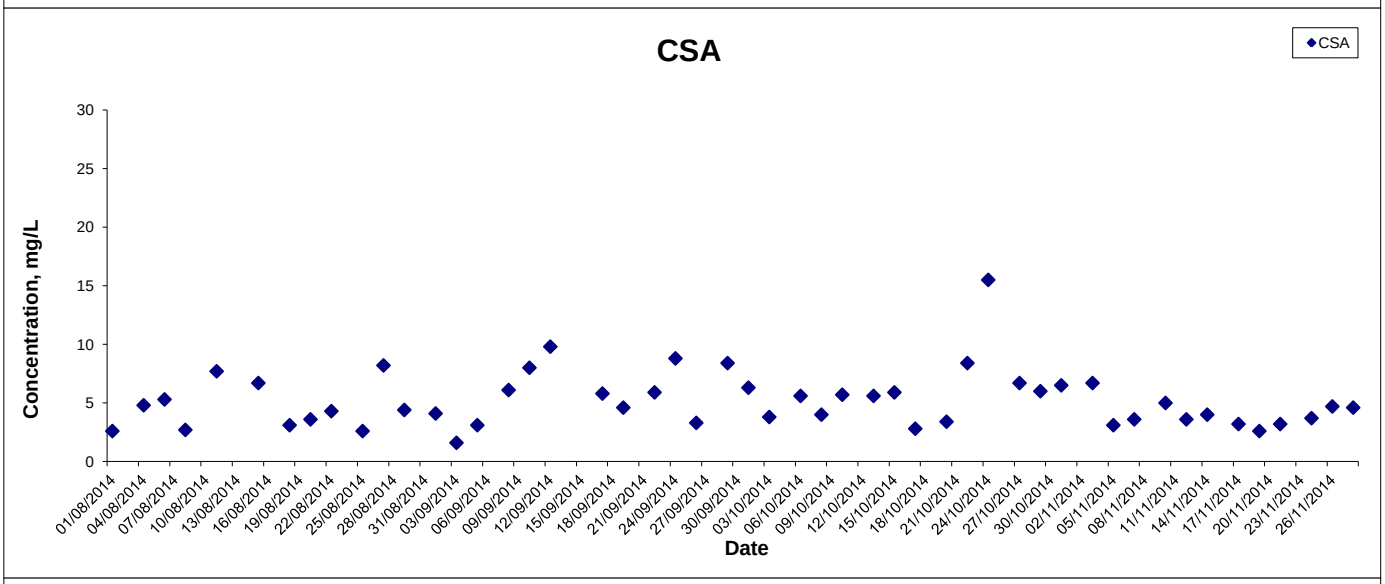

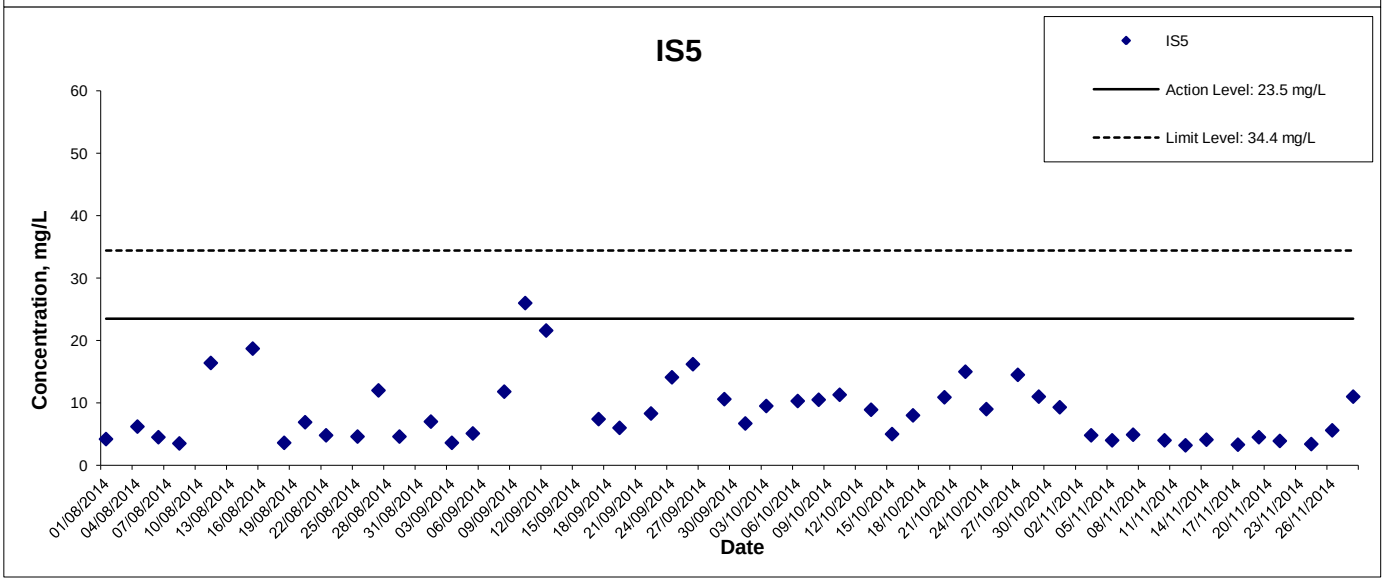

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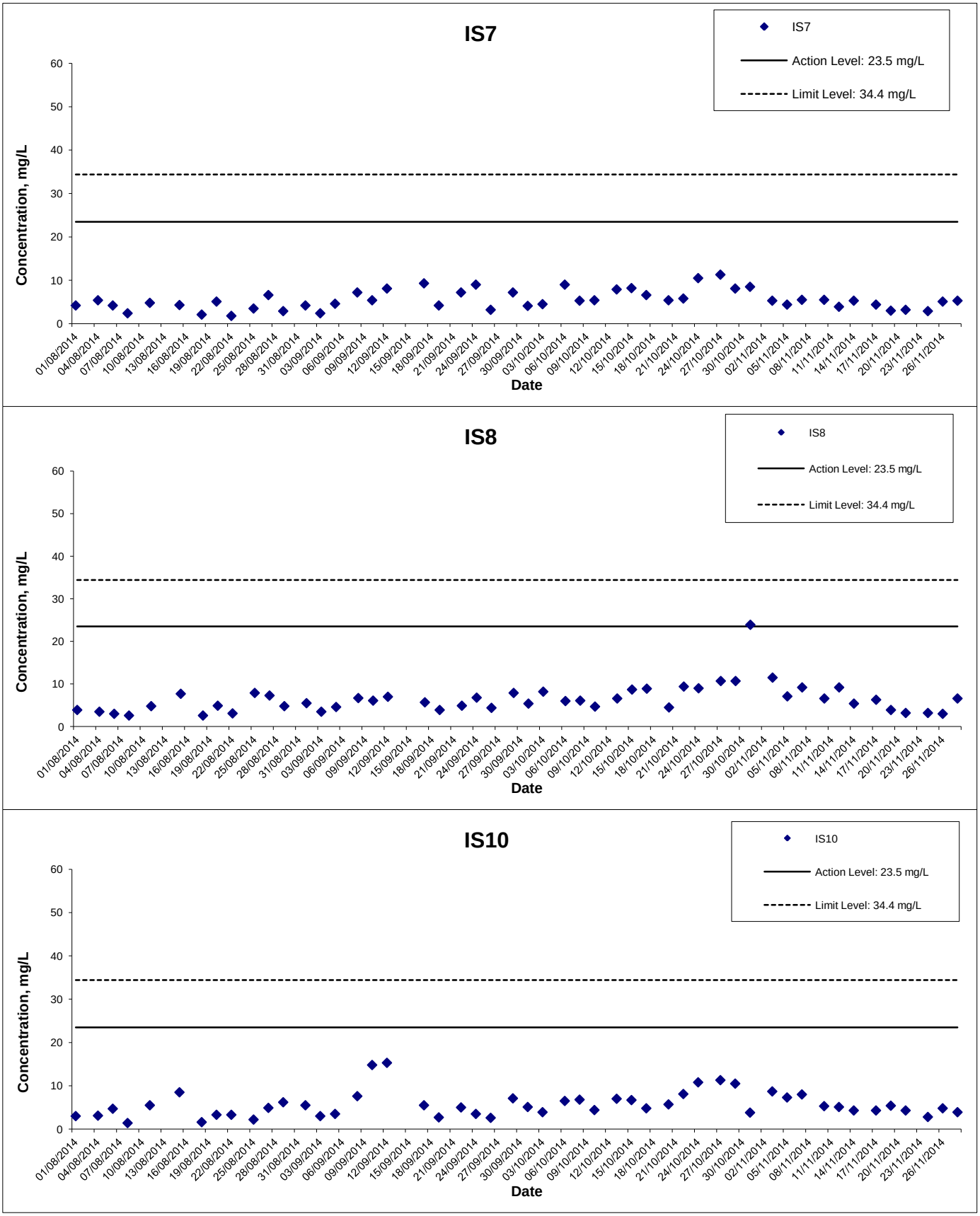

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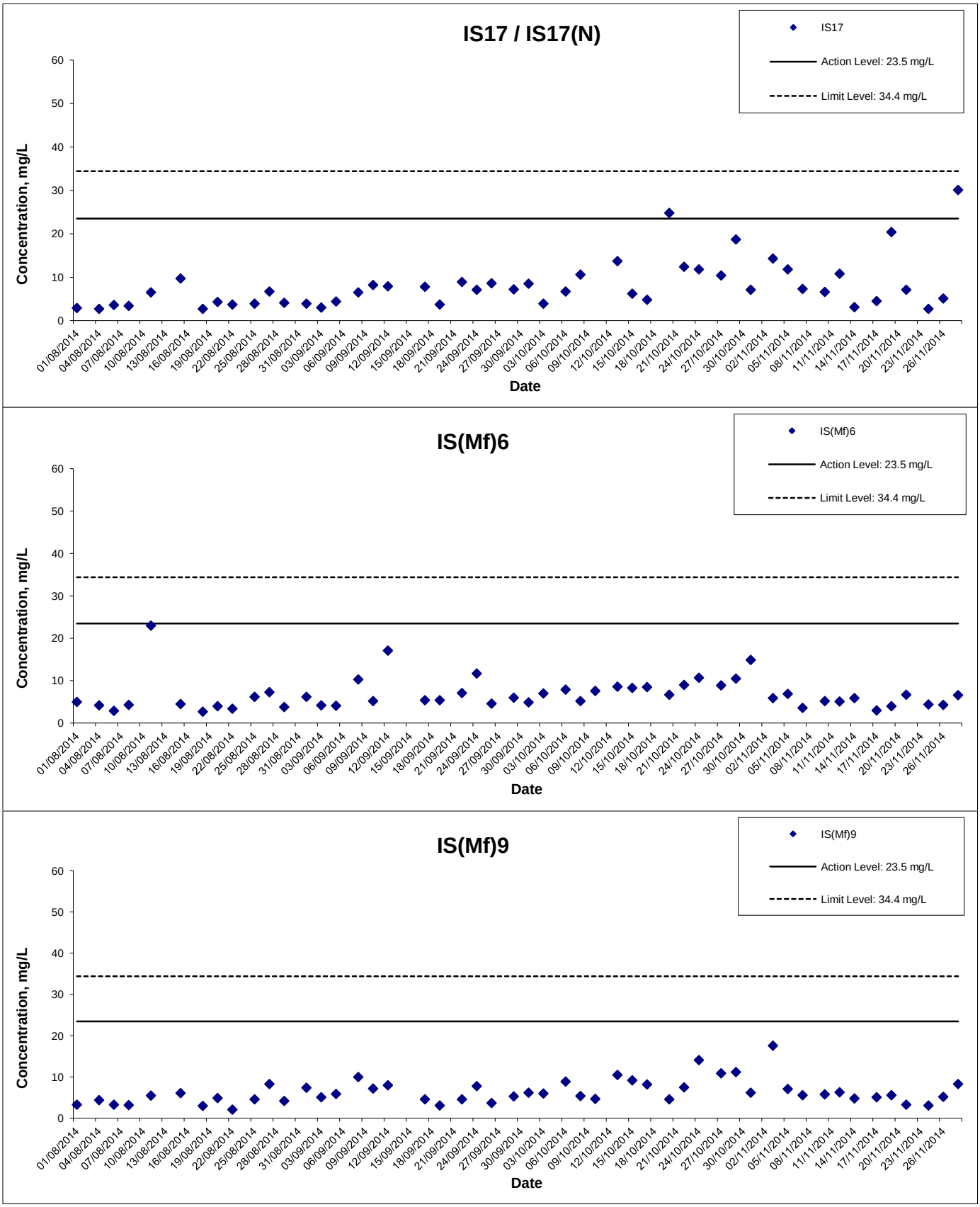

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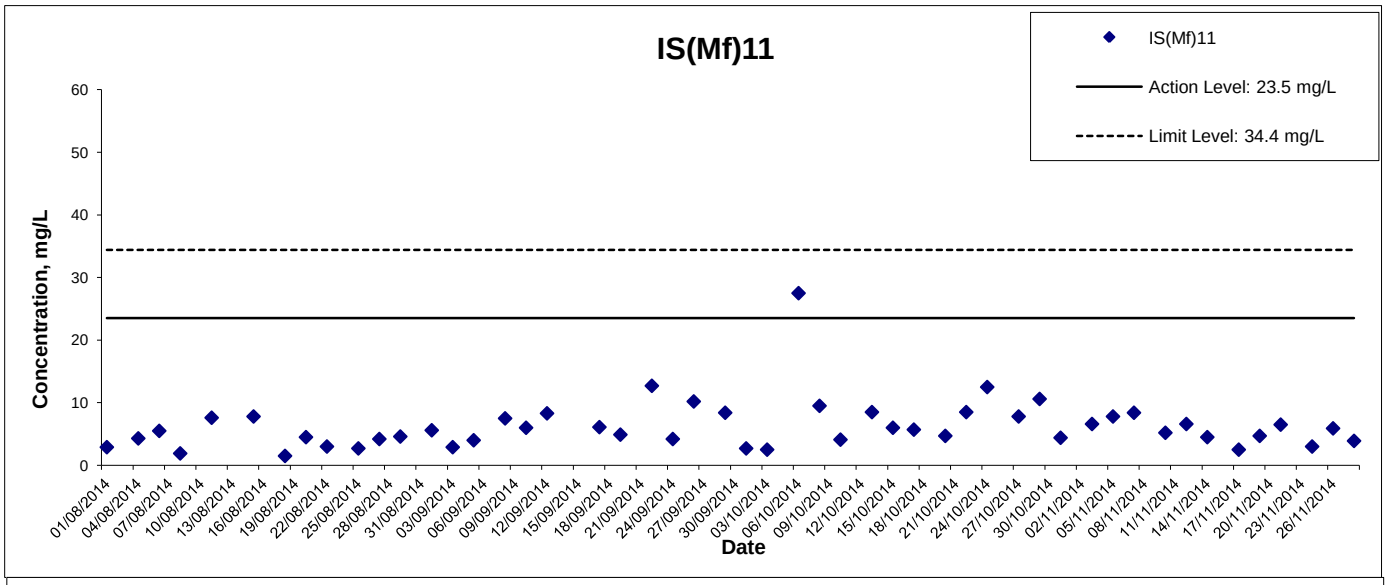

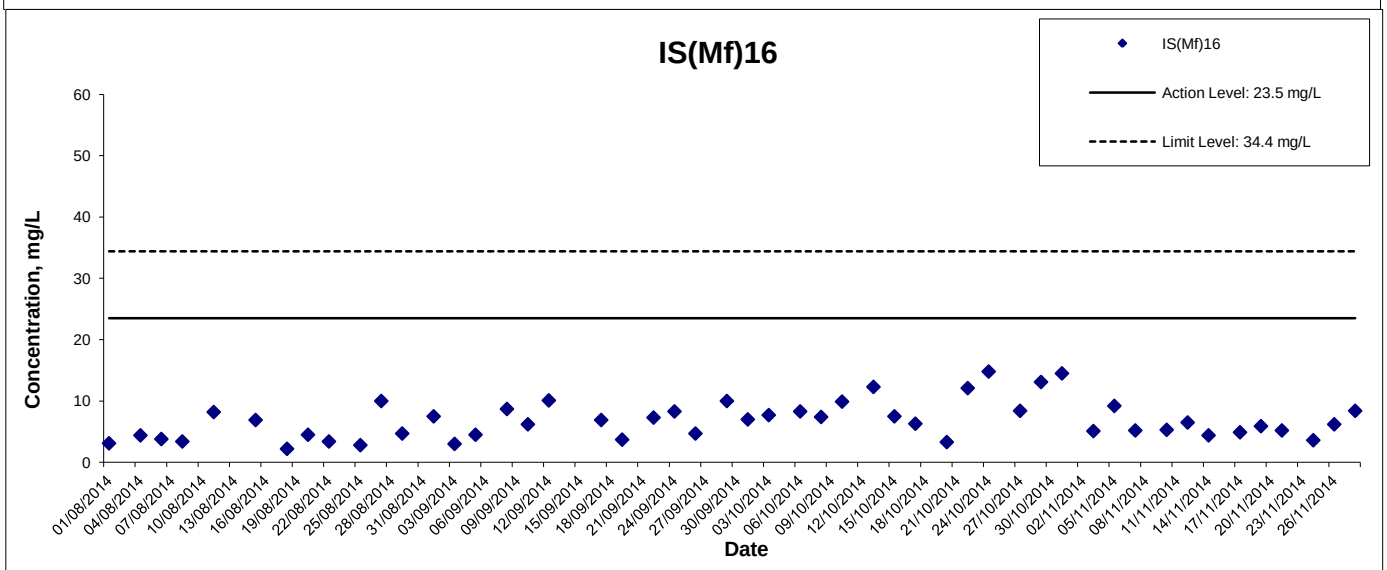

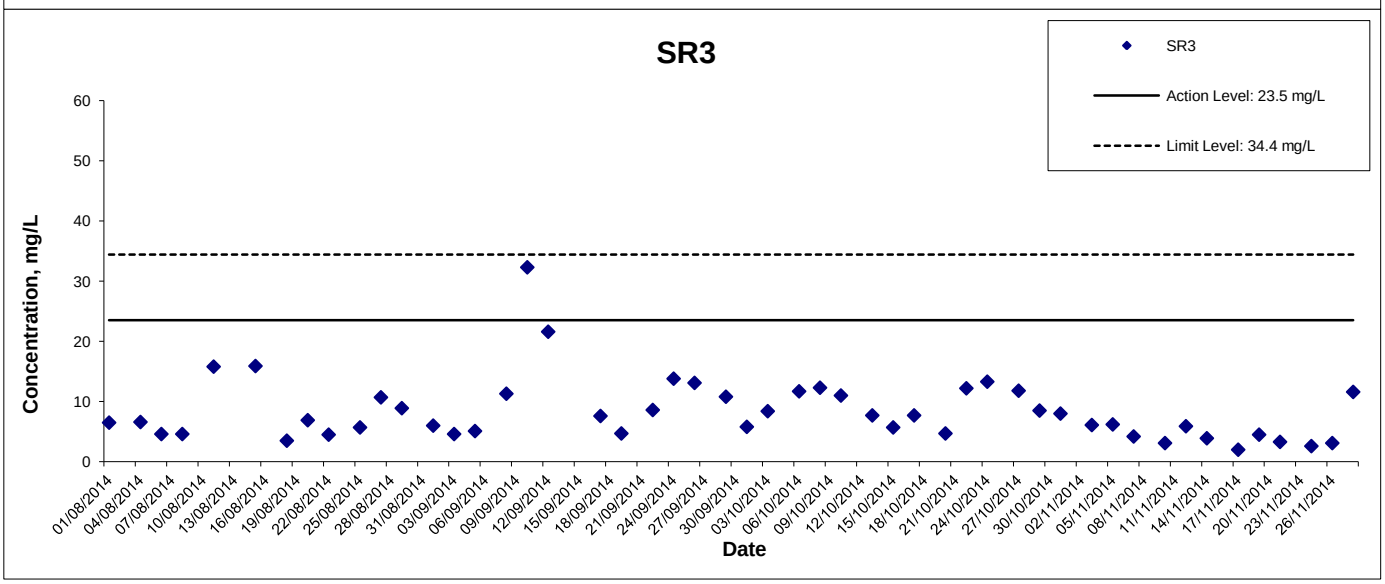

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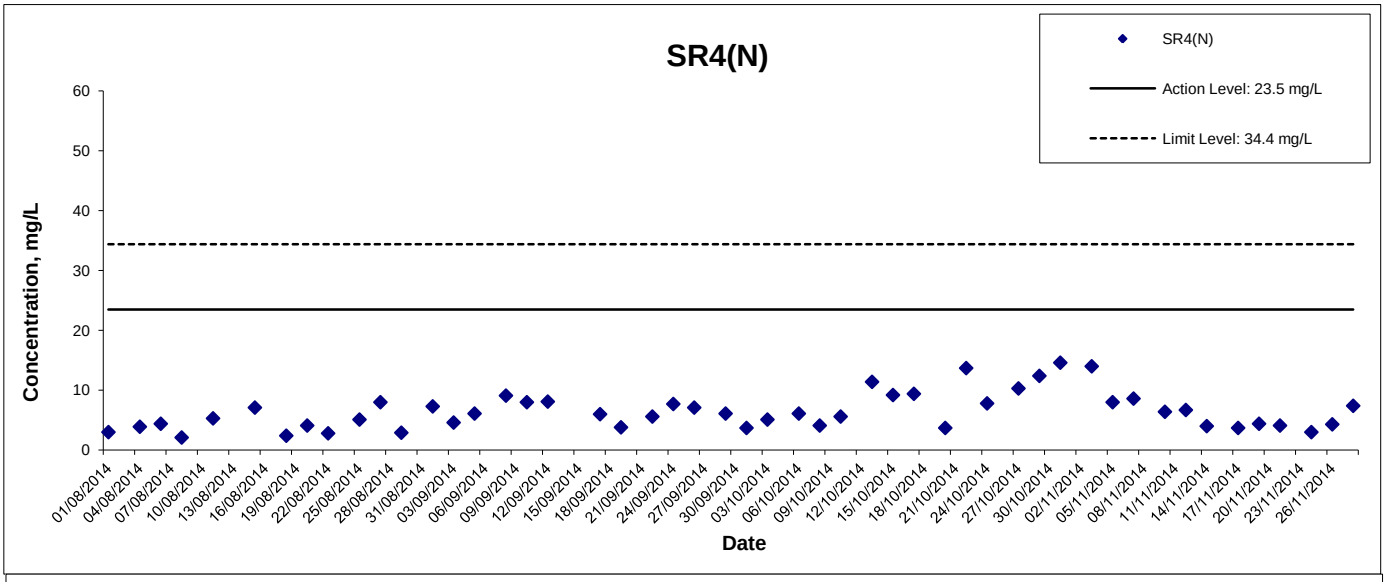

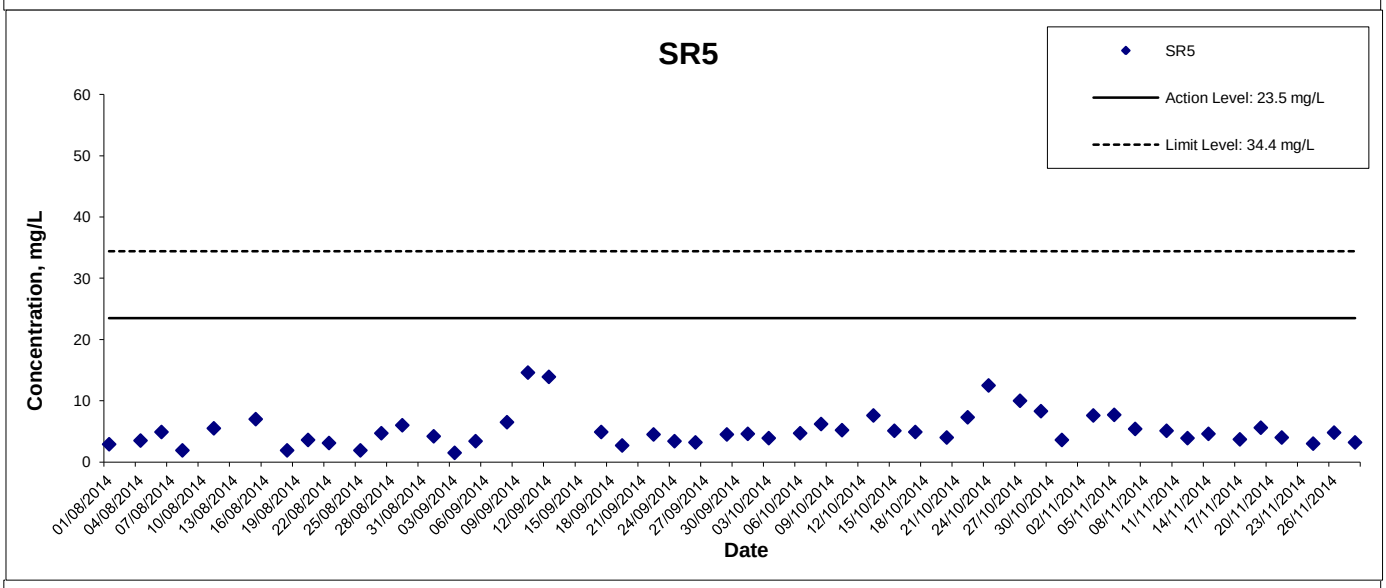

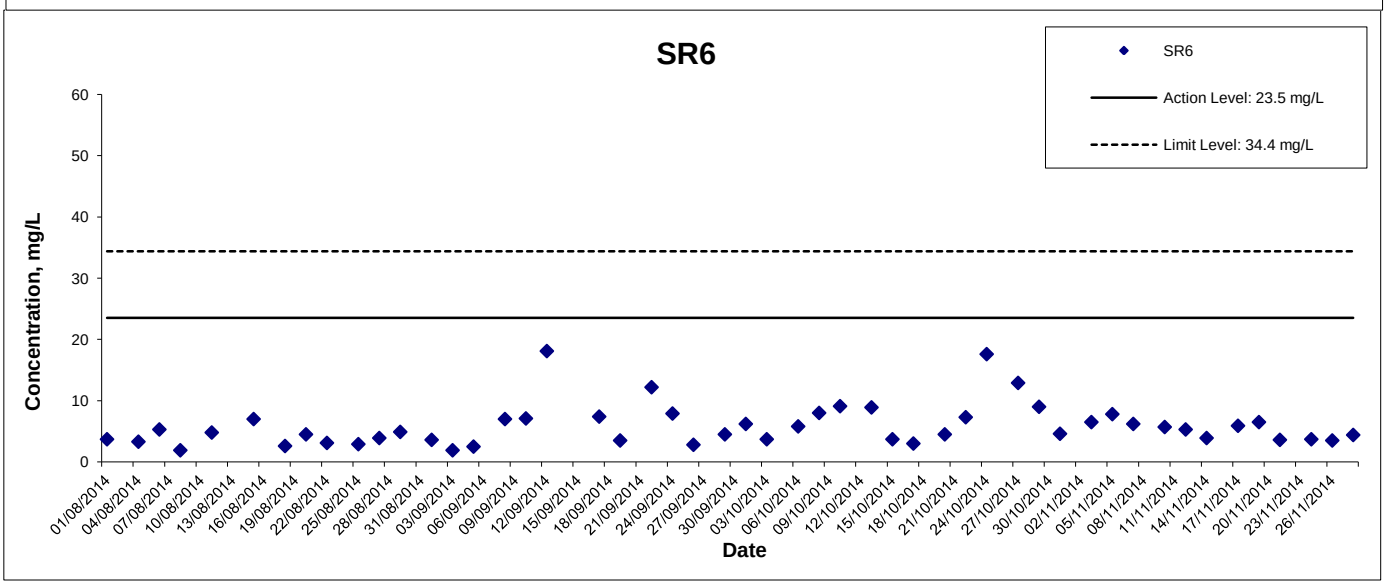

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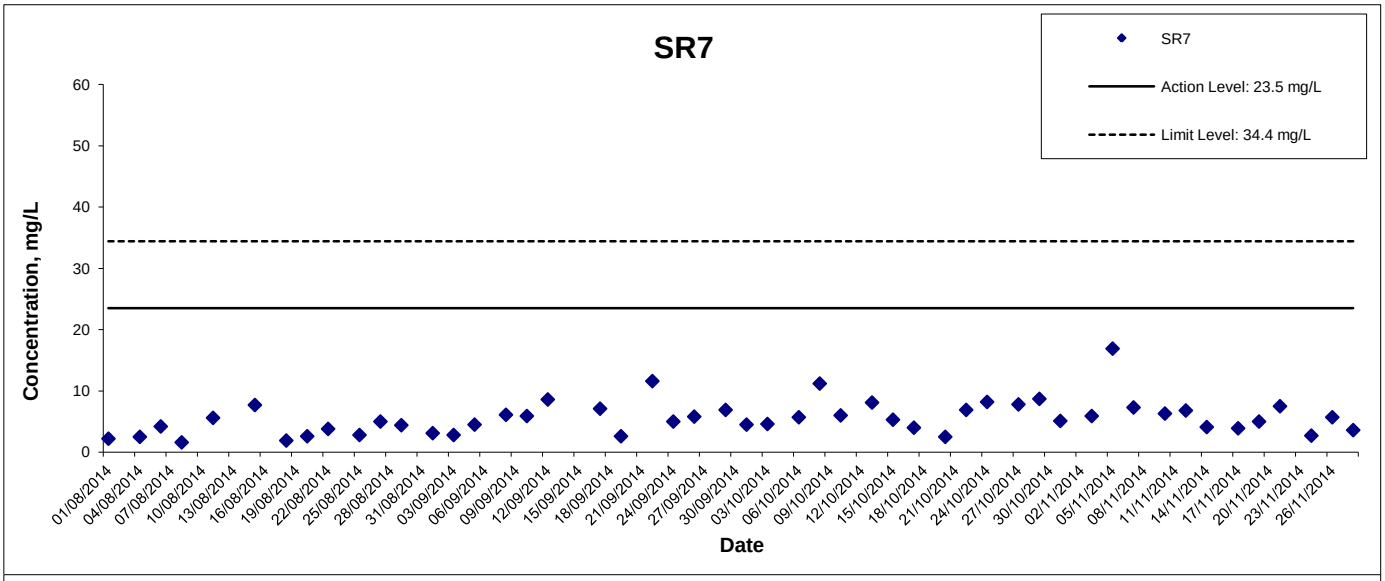

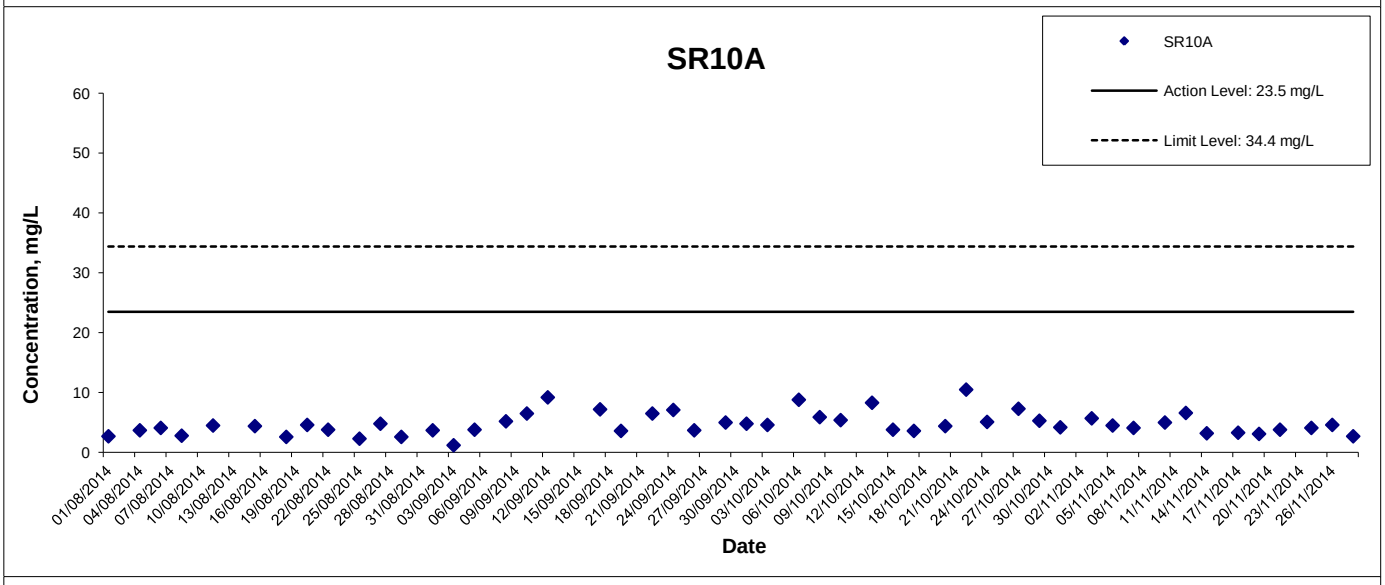

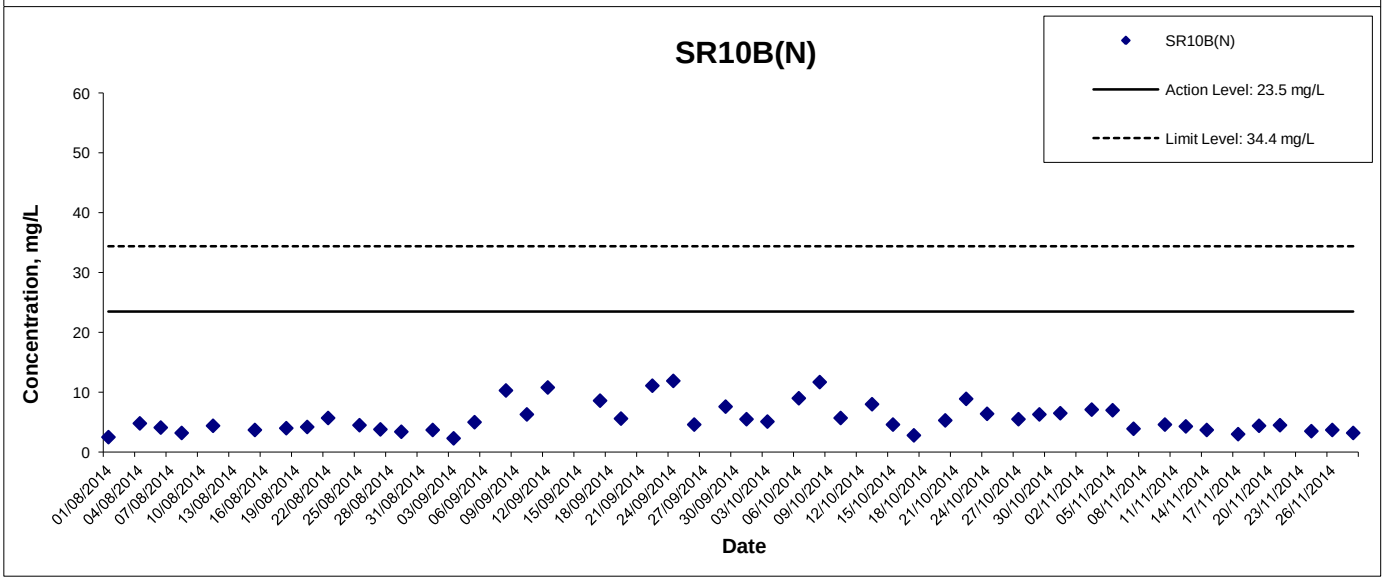

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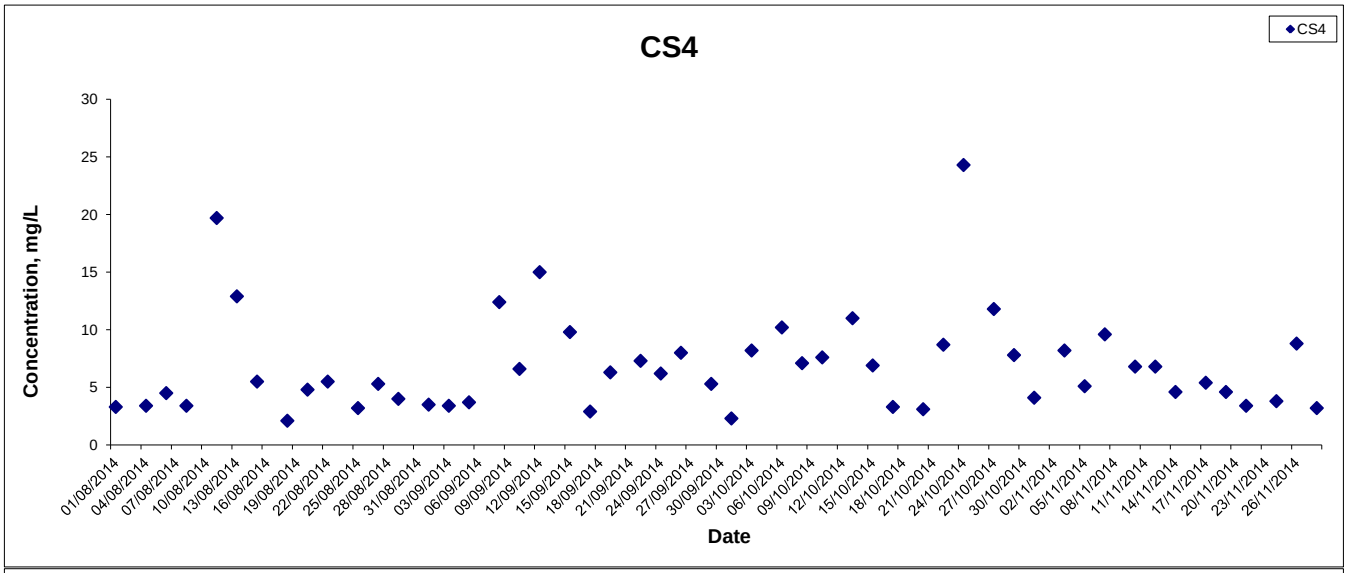

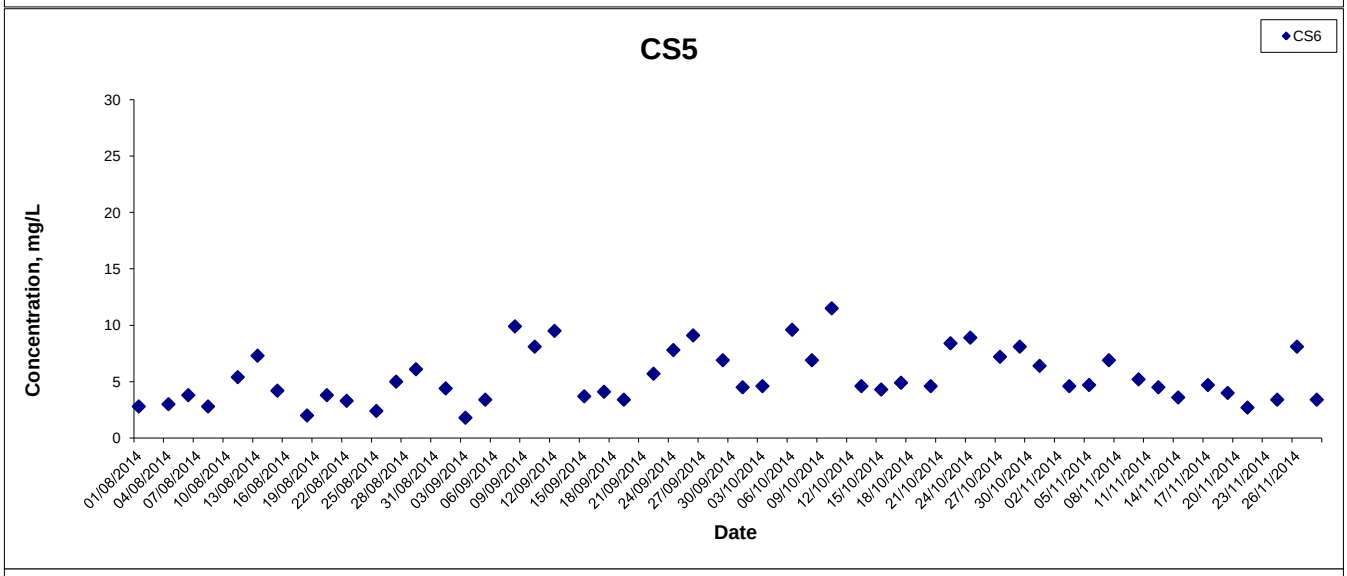

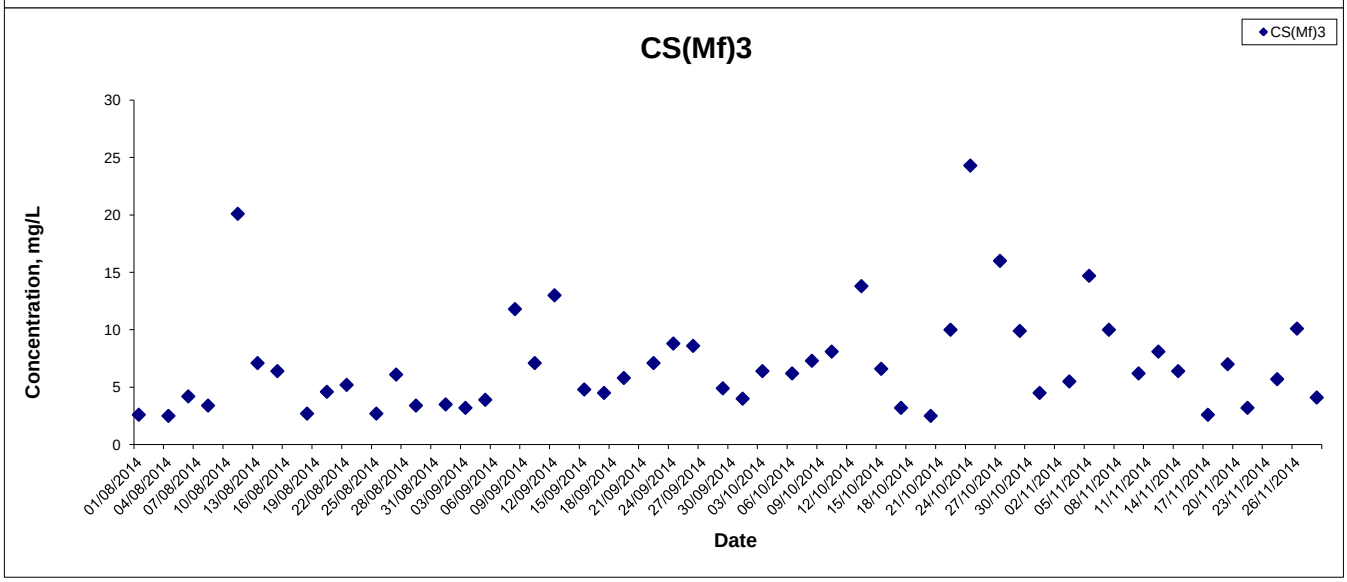

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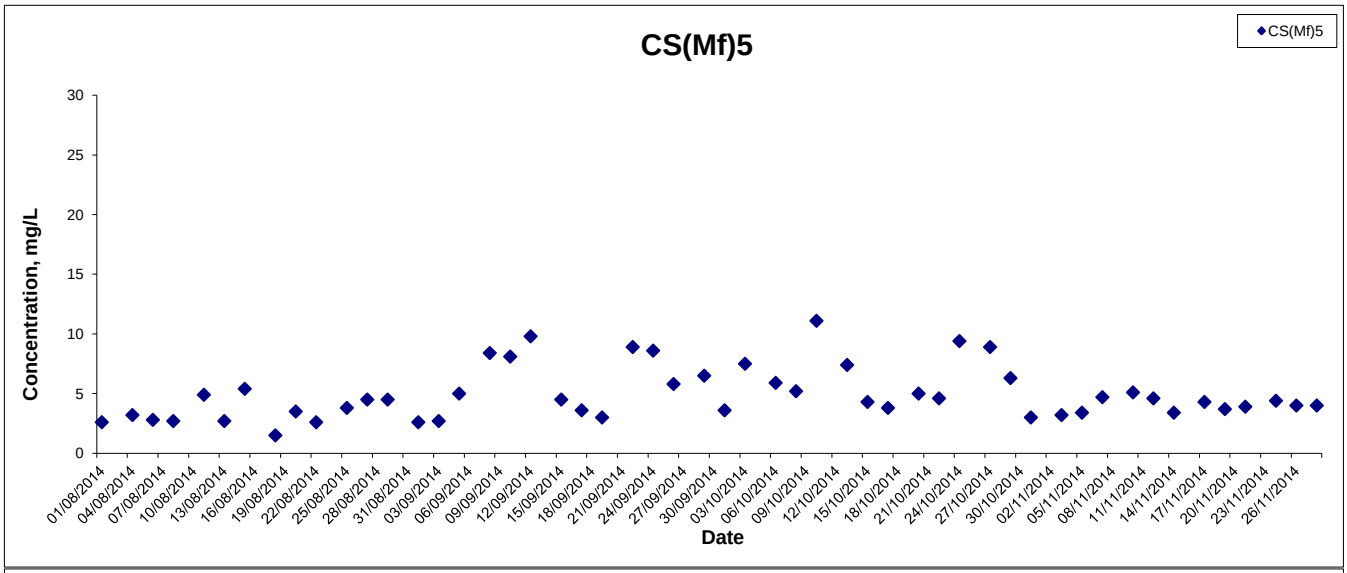
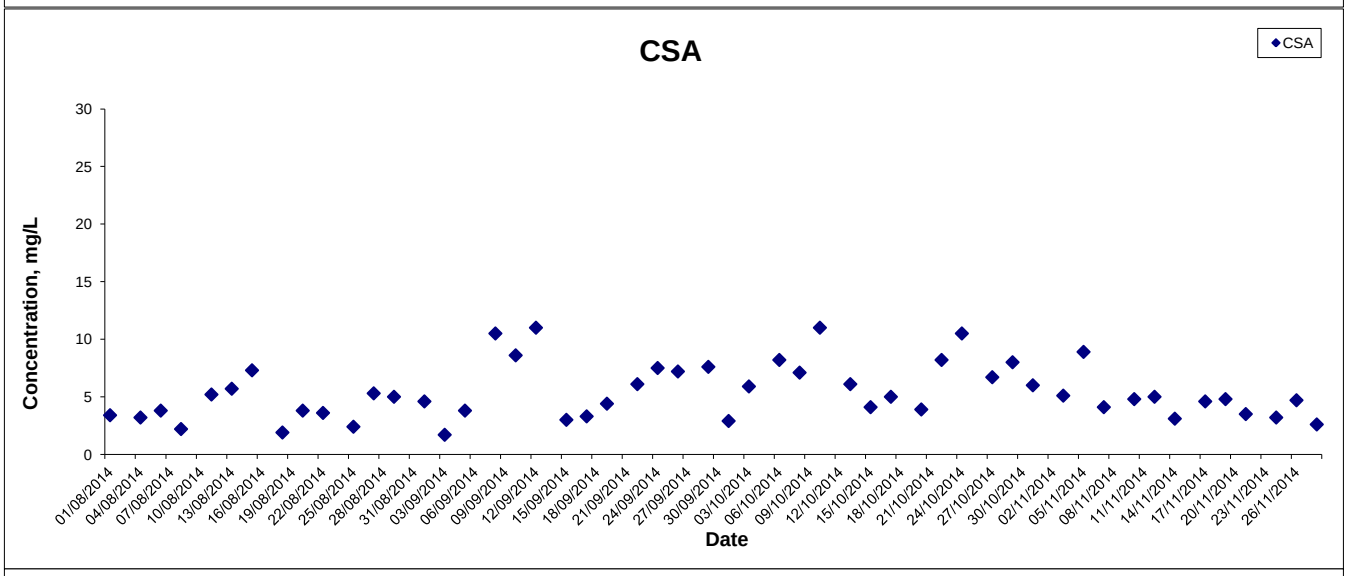
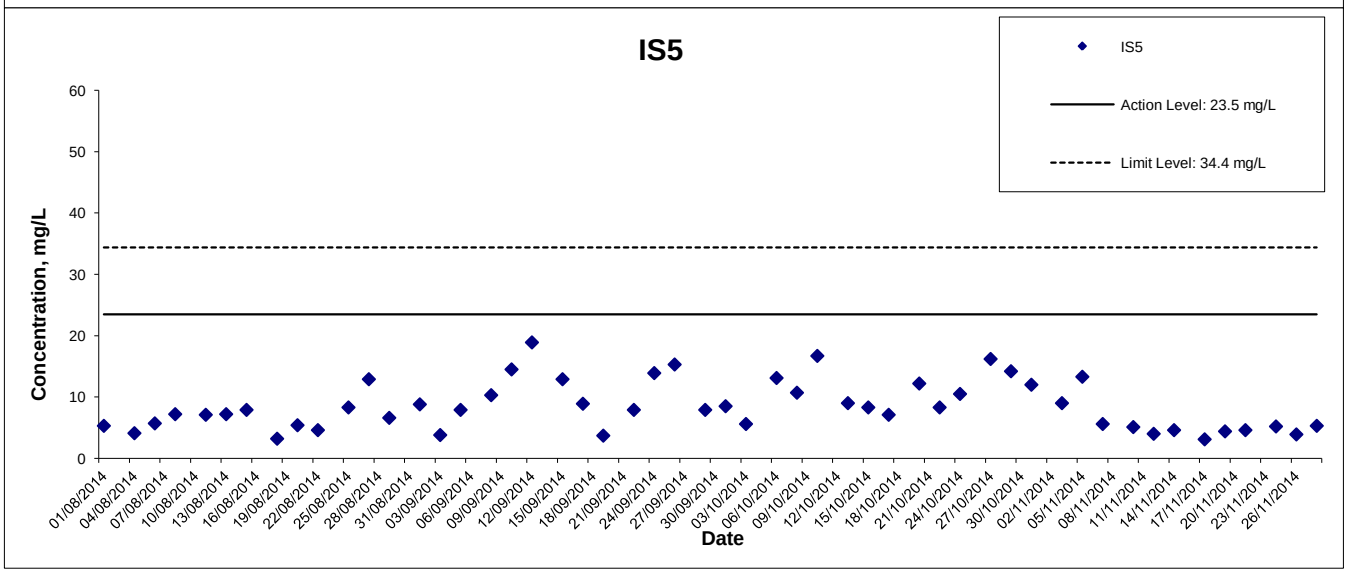






HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

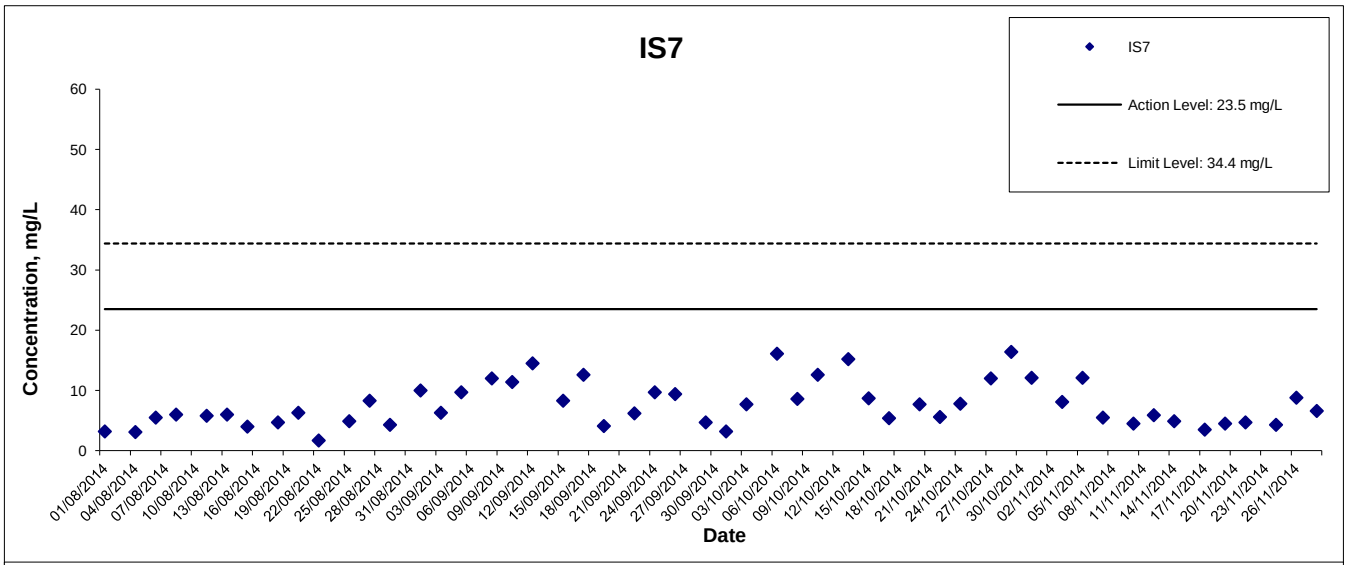
AECOM

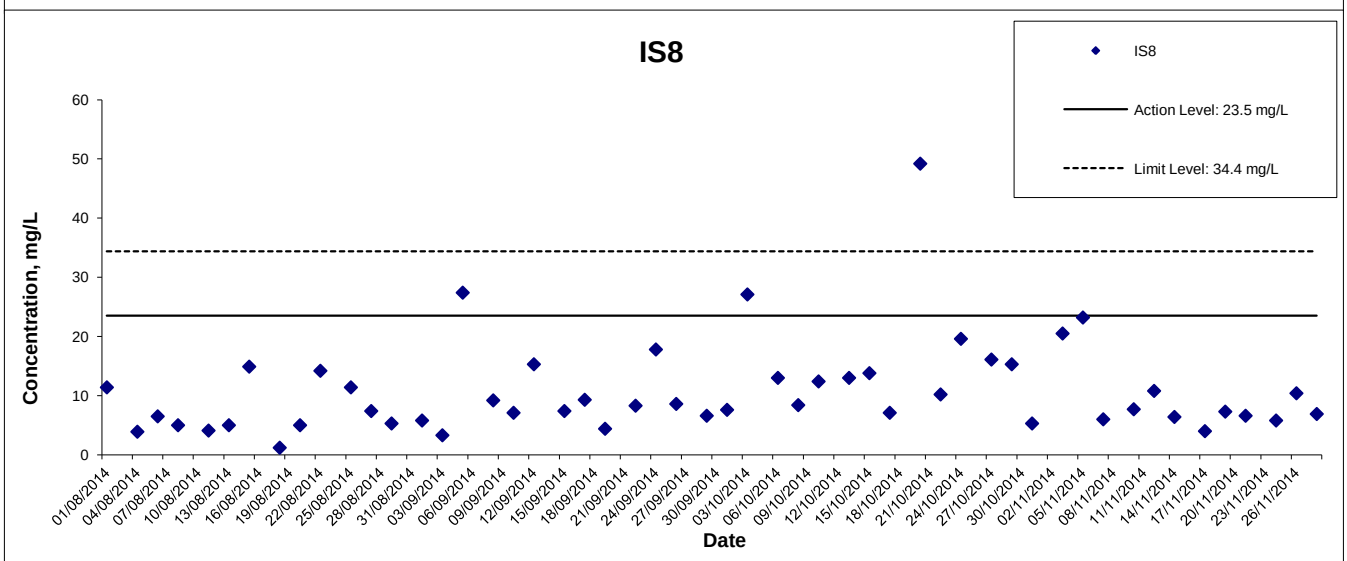
Graphical Presentation of Impact Water Quality Monitoring Results

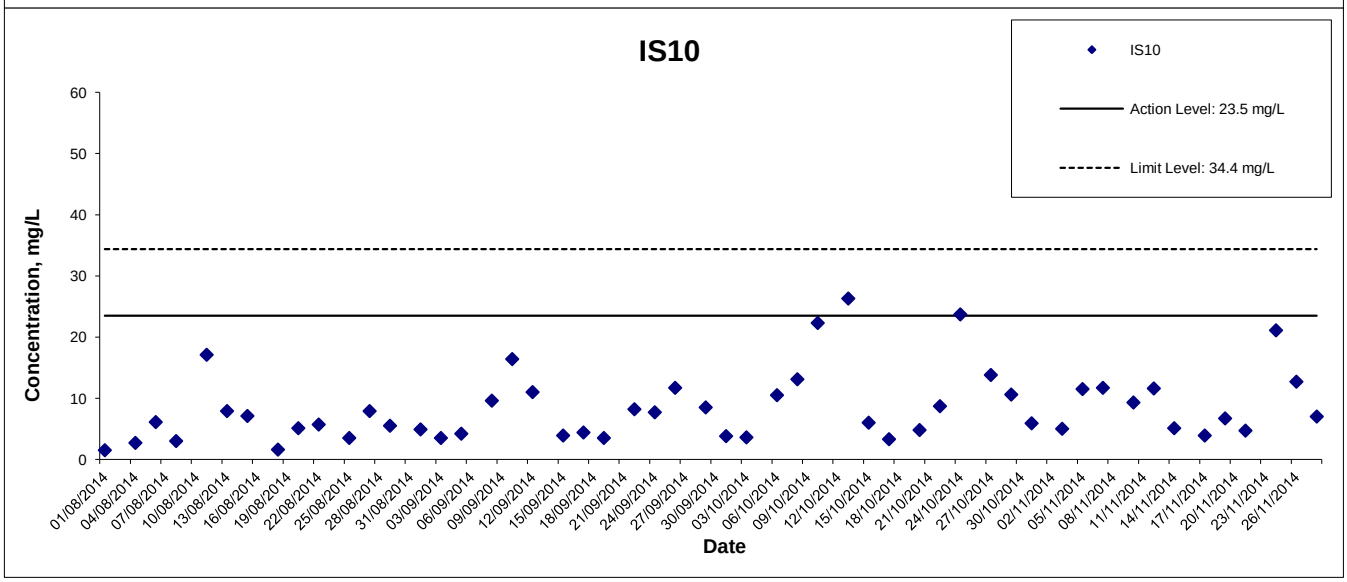
Project No.: 60249820 Date: Dec 2014

Appendix G

Suspended Solids at Mid-Flood Tide







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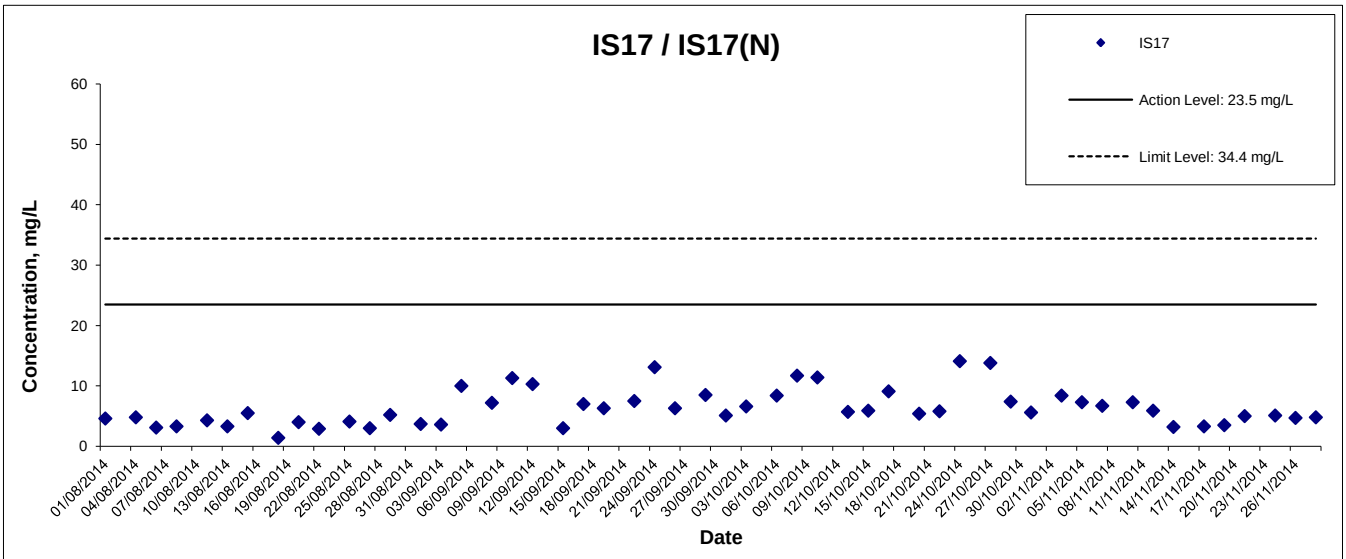

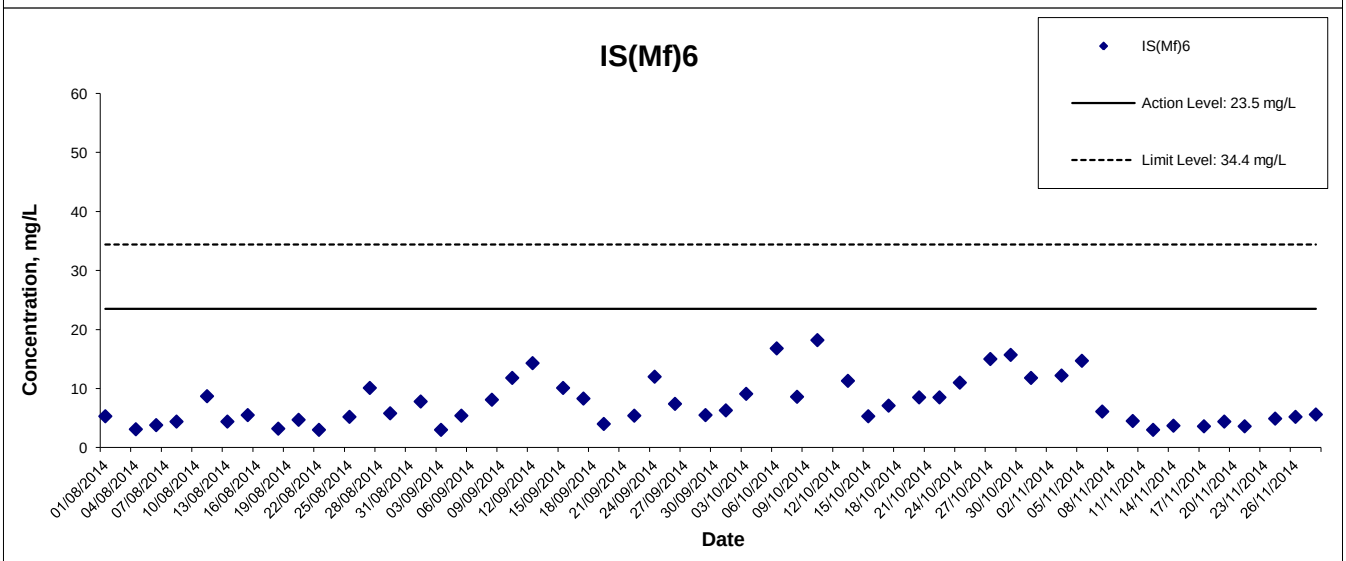

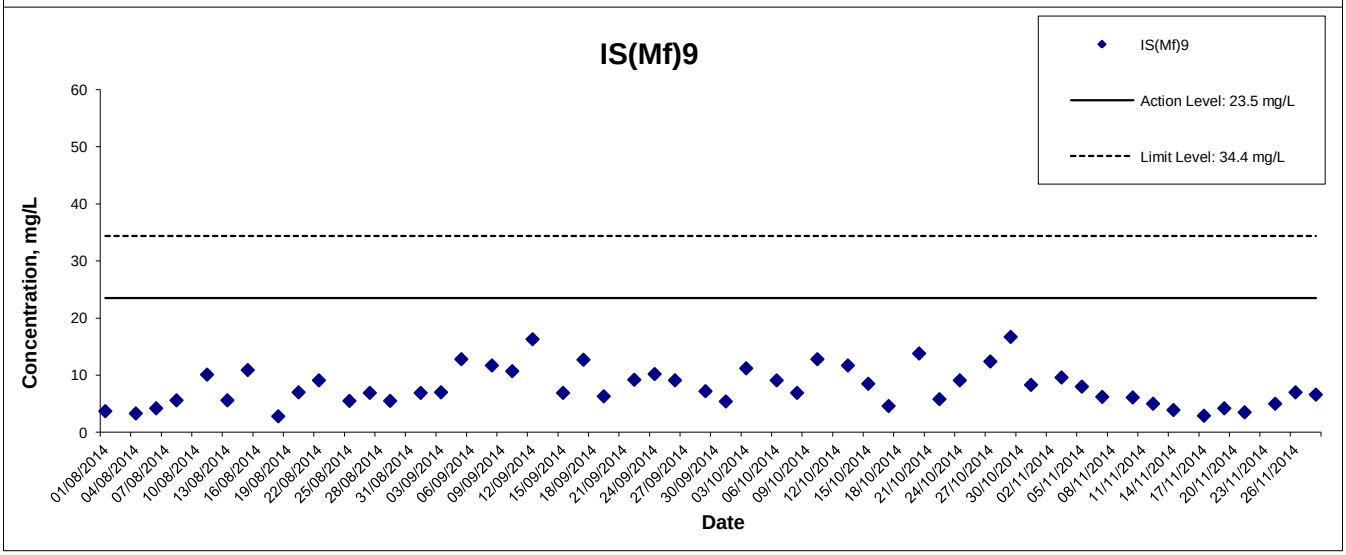

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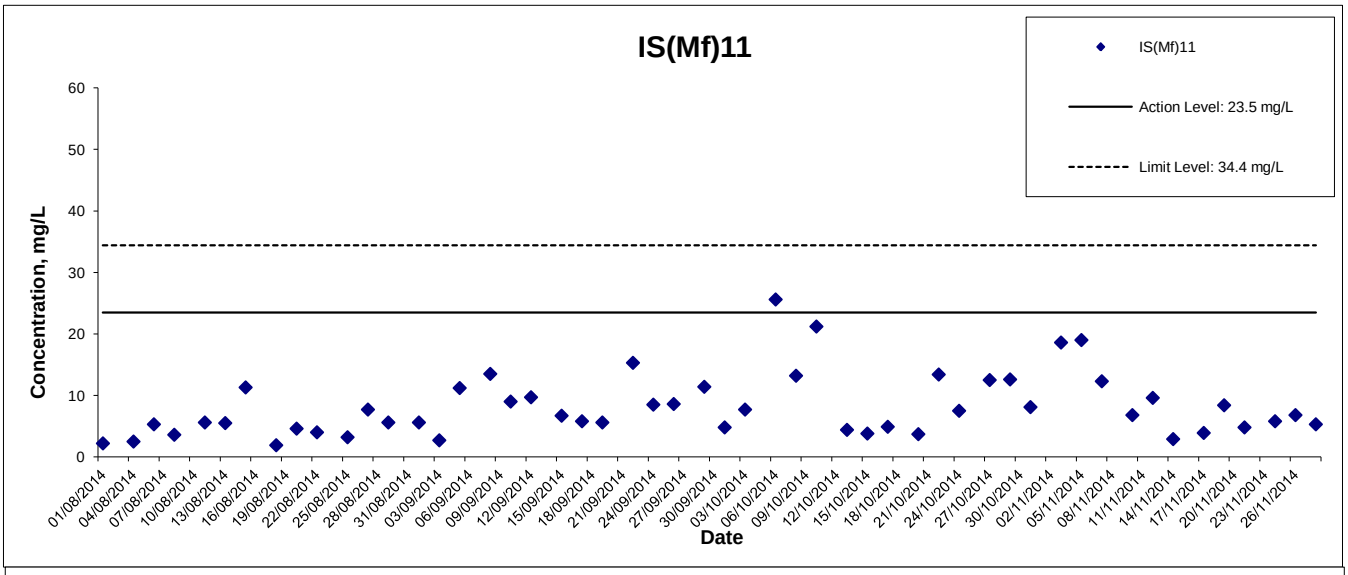

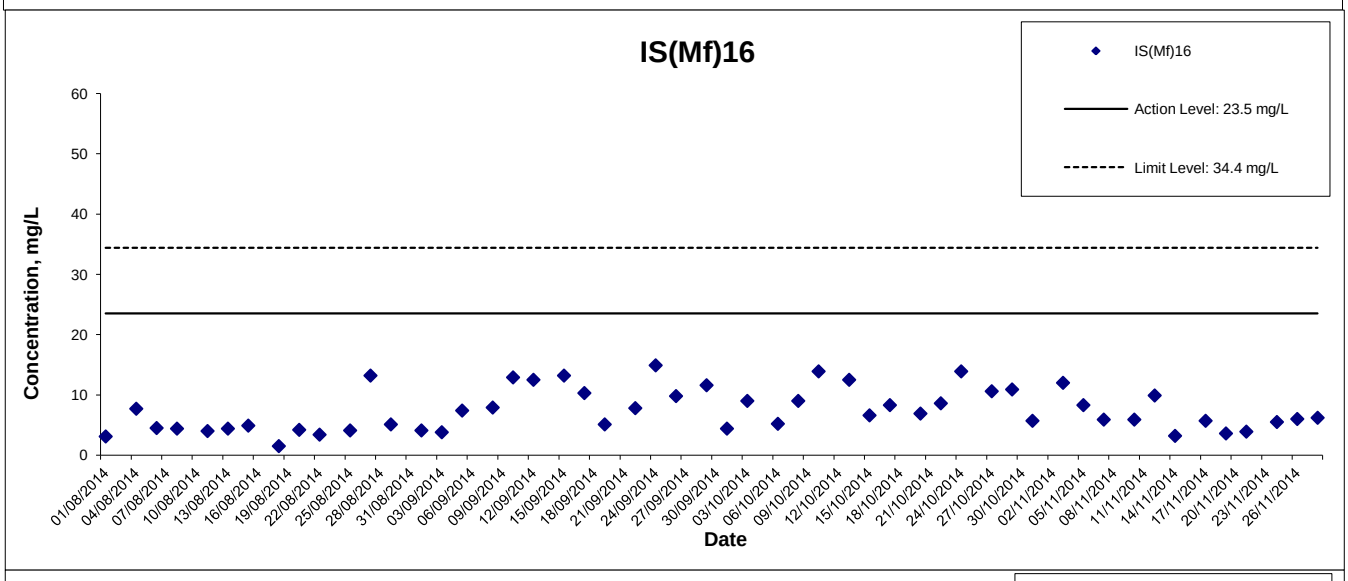

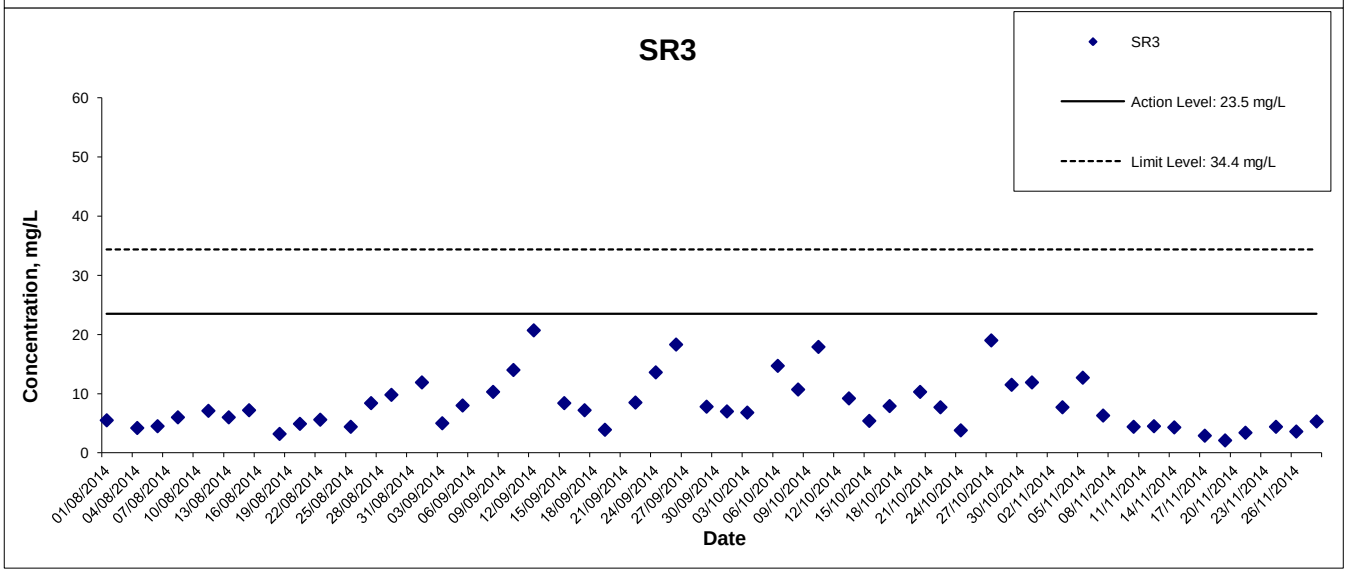

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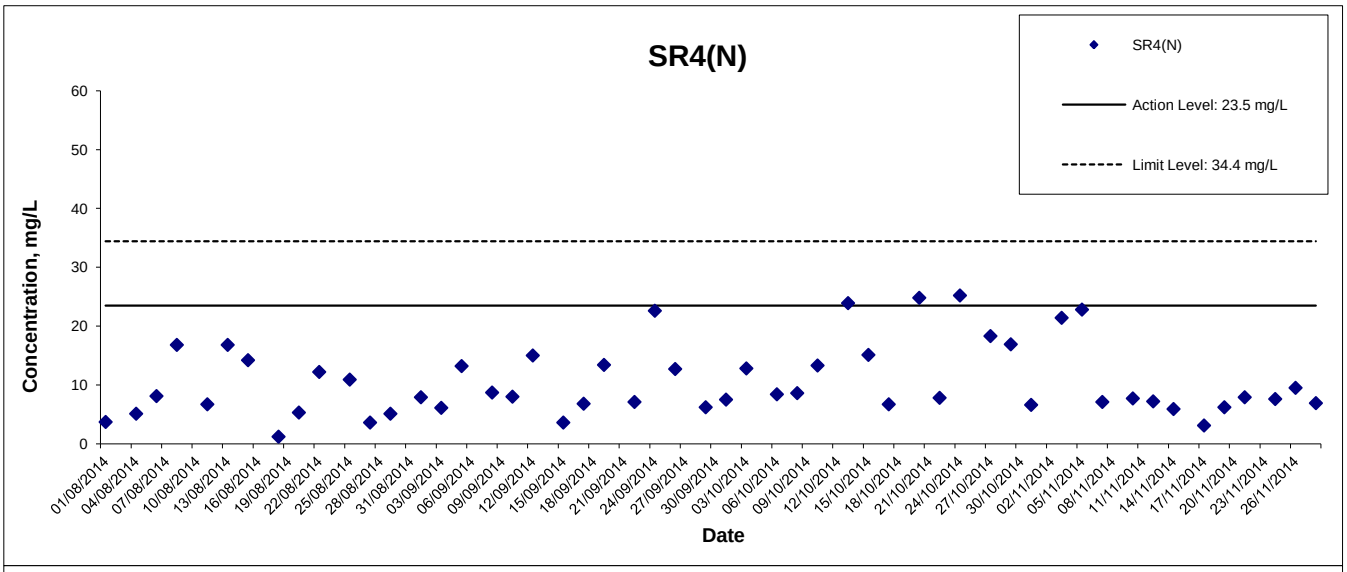

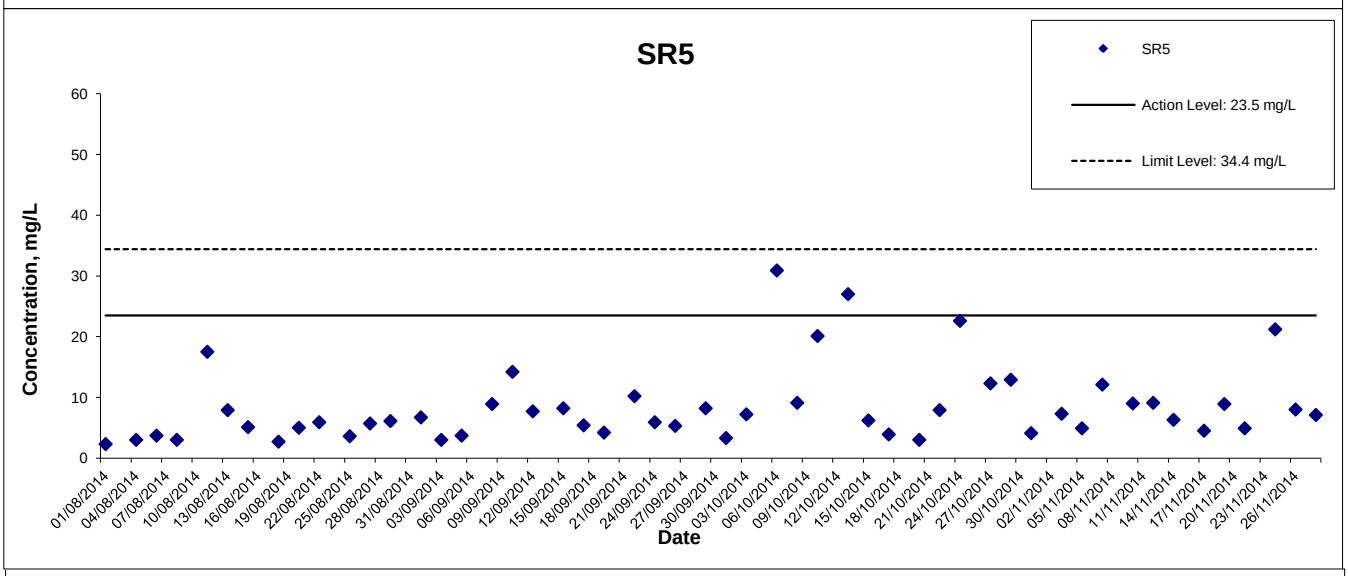

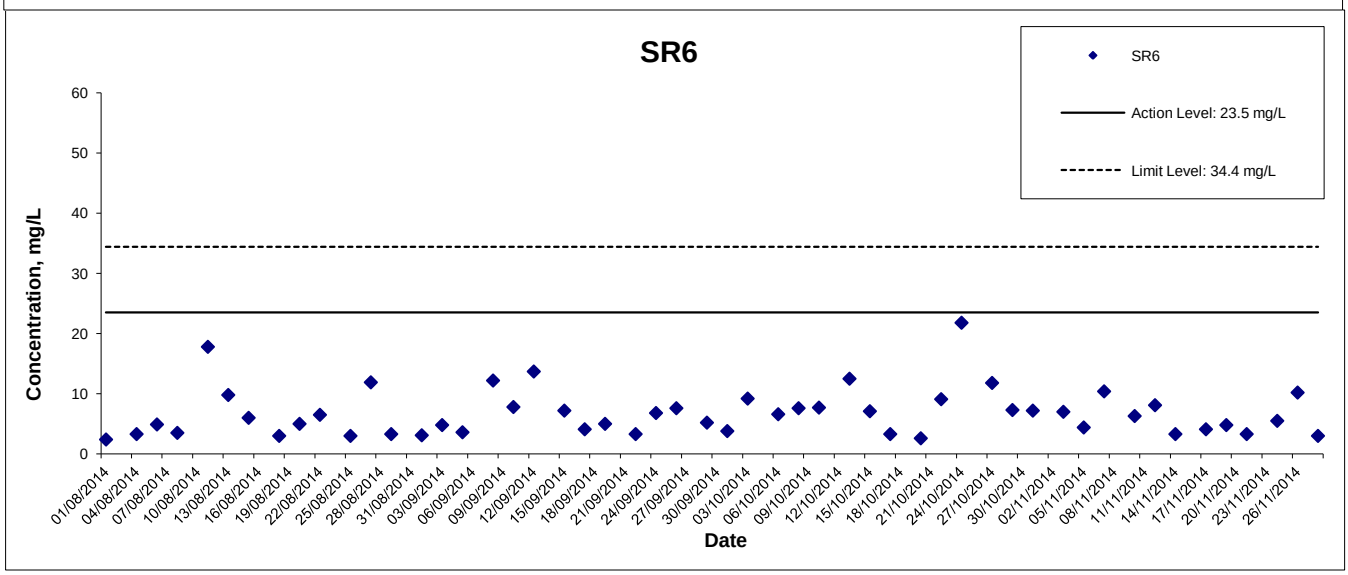

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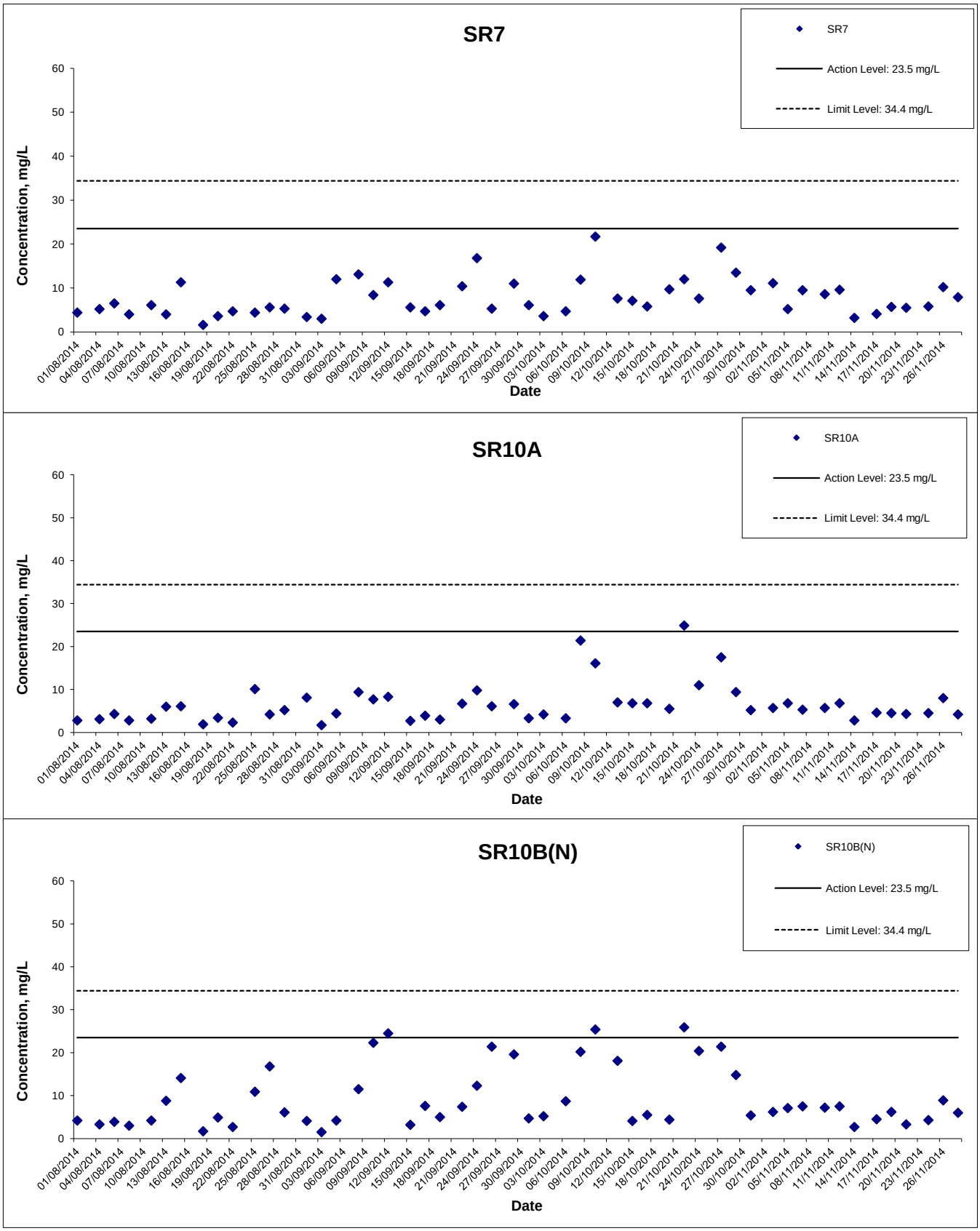

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities-Reclamation Works


November 2014, Northwest Lantau Island, Hong Kong SAR

September – November 2014 Quarterly Report

Dolphin Impact Monitoring

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ANNEXES

1. Introduction

In March 2012, construction for the Hong Kong-Zhuhai-Macao Bridge (HZMB) began in Hong Kong territorial waters. In Hong Kong, the HZMB comprises three projects; the Hong Kong Boundary Crossing Facilities (HKBCF) Project; the Hong Kong Link Road (HKLR) Project and; the Tuen Mun-Chek Lap Kok Link (TM-CLKL) Project. The HKBCF, the first of the HZMB projects to commence in Hong Kong, requires the total reclamation of approximately 149 hectares (ha); which consists of 130 ha for the HKBCF artificial island and 19 ha for the TM-CLKL southern landfall (Fig. 1).

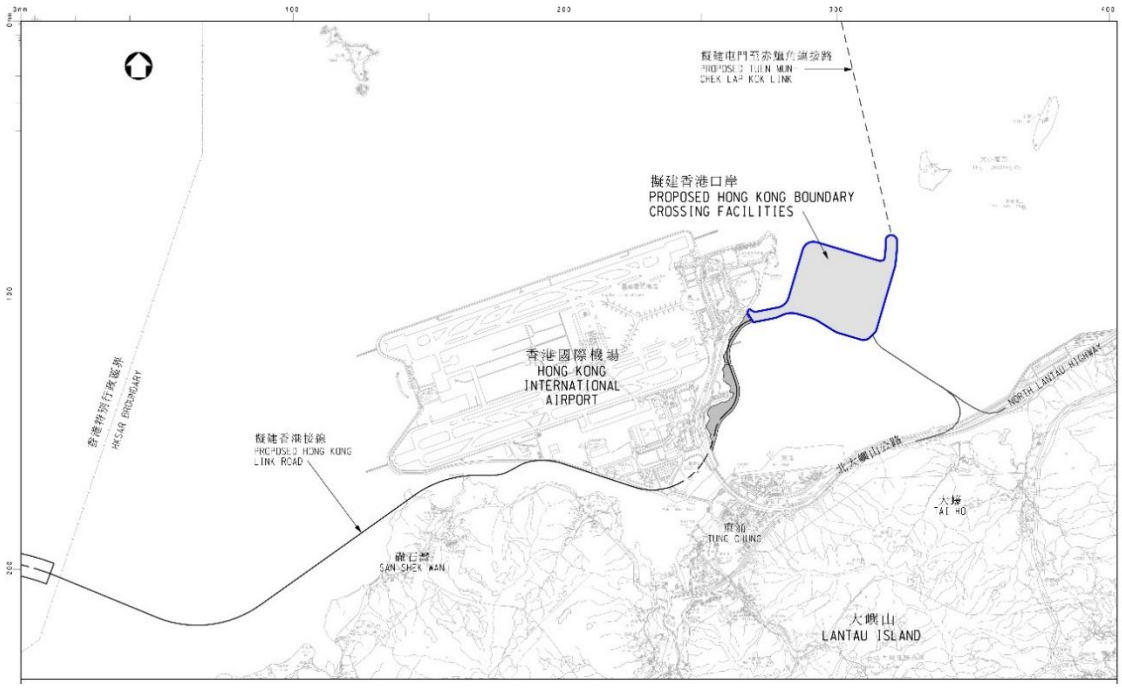

Figure 1. The Hong Kong Boundary Crossing (HKBCF) Reclamation Sites, North Lantau, Hong Kong (http://www.hzmb.hk/eng/img/overview/about_overview03_p01l.jpg**)**

The EM&A Manuals and Environmental Permits (EP) associated with all three projects have special provision for Chinese white dolphins (CWD) as they occur regularly in the waters which will be affected by the HZMB development. This report comprises the eleventh quarterly (September – November 2014) summary of data associated with the impact monitoring conducted for contract HY/2010/02, HKBCF-Reclamation Works. The format of this report follows as closely as possible the outline provided for the Baseline Monitoring Report. The baseline monitoring was conducted at the same as this quarter thus four years of quarterly monitoring can be compared in this report; 2011; 2012; 2013 and 2014. Where appropriate, information from previous reports, data provided by the Hong Kong Highways Department (HyD) and data from the Agriculture, Fisheries and Conservation Department (AFCD) Marine Mammal Annual Monitoring reports have also been incorporated[1]

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

2. OBJECTIVES AND METHODOLOGY

2.1. Objectives of the Present Study

The EM&A Manual for HZMB states that "A dolphin monitoring programme at North Lantau and West Lantau waters, in particular the dolphin sighting hotspots (e.g. Brothers Islands) and areas where juveniles have been sighted (e.g. West Lantau waters), should be set up to verify the predictions of impacts and to ensure that there are no unforeseen impacts on the dolphin population during construction phase". For HKBCF the study area known as West Lantau was not included in the site specific EM&A Manual for construction phase survey work. As such, for HKBCF, vessel-based dolphin surveys to monitor impact are conducted in the areas known as Northeast Lantau (NEL) and Northwest Lantau (NWL). These surveys are conducted twice monthly and for the duration of the construction phase of HKBCF. The HZMB baseline study (incorporating HKBCF, TM-CLK and HKLR phases of the bridge development), indicates that the data gathered from these surveys are intended to monitor impacts by;

- providing ongoing assessment of the spatial and temporal distribution patterns and habitat use of CWD during the construction phase of the HKBCF project.
- identifying individual CWD by their natural marks, coloration and scars for comparison with the baseline data and to assess individual distribution patterns and habitat use.
- comparing impact survey data to that gathered during the baseline data period so that any changes deemed to be of a significant nature can be assessed and mitigated appropriately.

The baseline monitoring report includes distribution analysis, encounter rate analysis, behavioural analysis, quantitative grid analysis and ranging pattern analysis. Protocols for data interpretation and analyses methods were provided in the baseline monitoring report.

2.2. Line-transect Vessel Surveys

The co-ordinates for the transect lines and layout map were provided by AFCD, however, these have been modified as the construction works at HKBCF has shortened one of the transect lines The study area now incorporates 23 transects (totalling ~111km) which are surveyed twice per month by boat (Table 1; Figure 2). As HZMB construction works have progressed, some transect lines have been temporarily blocked either by the working vessels or the bridge structure itself. These are detailed in monthly submissions to ENPO. Extensive HZMB works in NWL will result in the permanent blockages of some lines in the next quarter. Line transect surveys should be conducted systematically (Buckland *et al* 2001). When the start of a transect line is reached, "on effort" survey begins. When the vessel is travelling between transect lines and to and from the study area, it is deemed to be "off effort". The transect line is surveyed at a speed of 7-8 knots (13-15 km/hr). During some periods, tide and current flow in the study site exceeds 7 knots and thus the vessel travels at the same speed as the current during these periods. A minimum of four marine mammal observers (MMOs) are present on each survey, rotating through four positions; observers (2), data recorder (1) and rest (1). Rotations occur every 30 minutes or at the end of dolphin sightings. The data recorder enters vessel effort, observer effort, weather and sightings information directly onto the programme Logger[2] and is not part of the observer team. This is not standard line transect survey procedure, however, the baseline study was conducted this way thus it has been requested that only two observers be used for impact surveys.

[2] Logger is purpose built software which automatically collects and stores GPS data and contains a user configurable interface for the manual entry of the data required for line transect and other cetacean research studies (Gillespie *et al* 2010).

When the boat is travelling along the transect line ("on effort"), observers search the area in front of the boat between 90° and 270° abeam (bow being 0°). When a group of dolphins is sighted, position, bearing and distance data are recorded immediately onto Logger and, after a short observation, an estimate is made of group size[3]. This is an "on effort" sighting. These input parameters are linked to the time-GPS-ships data which are automatically stored in Logger throughout the survey period. In this manner, information on heading, position, speed, weather, effort and sightings are stored in an interlinked database which can be subsequently used in a variety of analytical software packages.

Once the vessel leaves the transect line, it is deemed to be "off-effort". The dolphins are approached with the purpose of taking high resolution images. Then the vessel returns to the transect line at the point of departure and is again "on effort". If another group of dolphins is seen while travelling back to the transect line, or when with the first group of dolphins, the sightings are considered as "opportunistic" and noted accordingly.

2.2.1 Baseline Survey Data and Data from Impact Monitoring

Data from the baseline was provided by the Highways Department (January 2013). These data were extracted from the original baseline survey as the baseline survey encompassed a wider area than that stipulated in the EM&A Manual for the HKBCF Project, as such, a subset of the baseline data set was provided and appropriate rates and densities recalculated from the data provided. For impact monitoring, detailed datasets are available online via the ENPO website. A summary of the survey schedule and transects completed is referenced in Annex I.

[3] Group size is defined as an aggregation of dolphins within 100m of each other involved in similar behaviour (Connor *et al* 1998).

Table 1. The Dolphin Monitoring Transect Co-Ordinates for HKBCF Monthly Monitoring

ID	x	y	Long	Lat	ID	x	y	Long	Lat
1	804671	814577	113.870308	22.269741	12	815542	824882	113.975647	22.362962
1	804671	831404	113.869975	22.421696	13	816506	819480	113.985072	22.314192
2	805475	815457	113.878087	22.277704	13	816506	824859	113.985005	22.362771
2	805477	826654	113.877896	22.378814	14	817537	820220	113.995070	22.320883
3	806464	819435	113.887615	22.313643	14	817537	824613	113.995018	22.360556
3	806464	822911	113.887550	22.345030	15	818568	820735	114.005071	22.325550
4	807518	819771	113.897833	22.316697	15	818568	824433	114.005030	22.358947
4	807518	829230	113.897663	22.402113	16	819532	821420	114.014420	22.331747
5	808504	820220	113.907397	22.320761	16	819532	824209	114.014390	22.356933
5	808504	828602	113.907252	22.396462	17	820451	822125	114.023333	22.338117
6	809490	820466	113.916965	22.323003	17	820451	823671	114.023317	22.352084
6	809490	825352	113.916884	22.367128	18	821504	822371	114.033556	22.340353
7	810499	820690	113.926752	22.325043	18	821504	823761	114.033544	22.352903
7	810499	824613	113.926688	22.360464	19	822513	823268	114.043340	22.348458
8	811508	820847	113.936539	22.326475	19	822513	824321	114.043331	22.357971
8	811508	824254	113.936486	22.357241	20	823477	823402	114.052695	22.349680
9	812516	820892	113.946329	22.326894	20	823477	824613	114.052686	22.360610
9	812516	824254	113.946279	22.357255	21	805476	827081	113.877878	22.382668
10	813525	818270	113.956156	22.303225	21	805476	830562	113.877811	22.414103
10*	813525	824657	113.956065	22.360912	22	806464	824033	113.887520	22.355164
11	814556	818449	113.966160	22.304858	22	806464	829598	113.887416	22.405423
11	814556	820992	113.966125	22.327820	23	814559	821739	113.966142	22.334574
12	815542	818807	113.975726	22.308109	23	814559	824768	113.966101	22.361920

*Transect 10 is now 3.6km in length due to the HKBCF construction site. The total transect length for both NEL and NWL combined is 111km

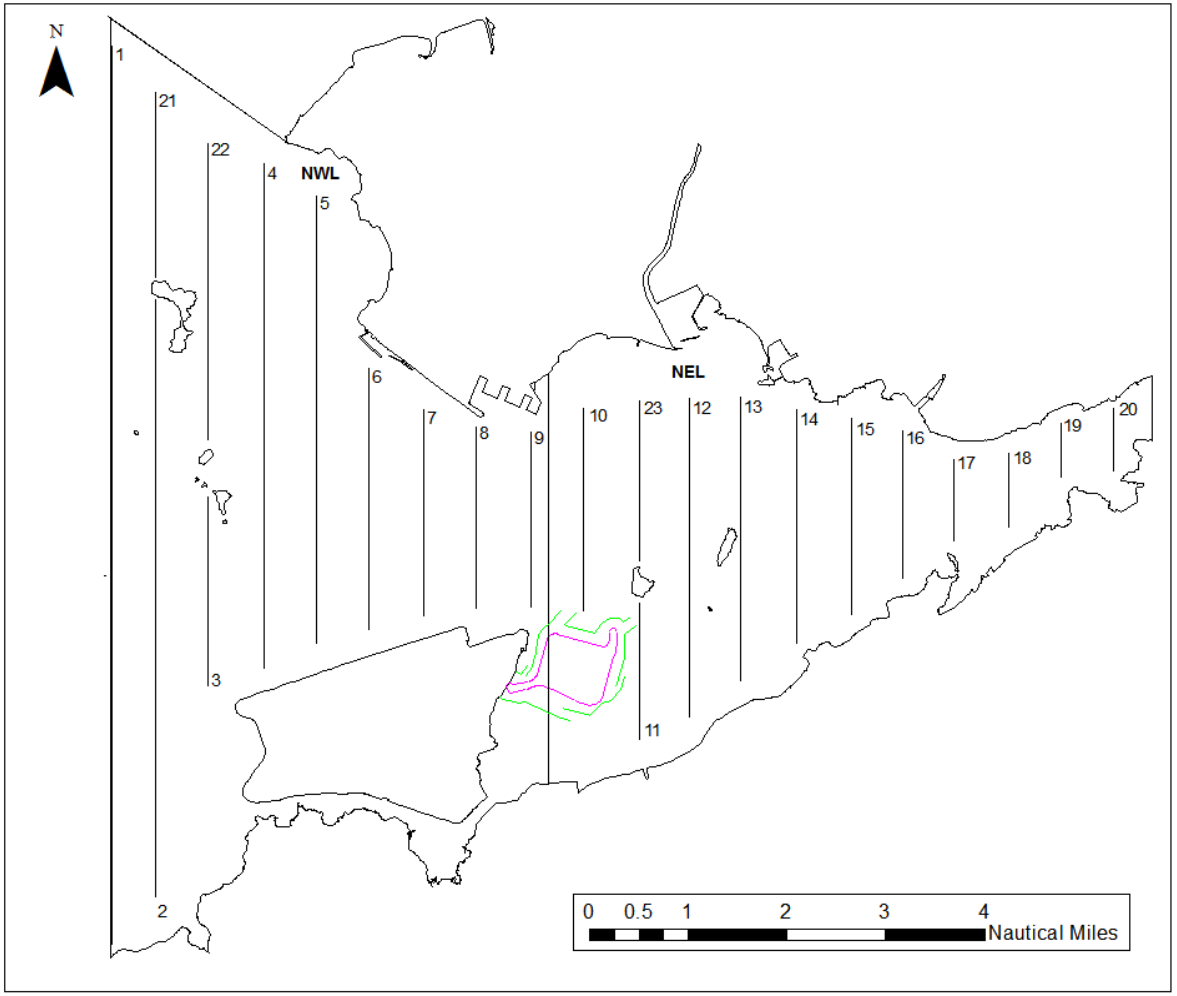

Figure 2 **Location of the Transect Lines for Baseline and Impact Monitoring during HKBCF (modified to accommodate HKBCF). Please note the silt curtain was repositioned in September 2014**

2.3. Photo-identification

When a dolphin(s) is sighted, the vessel leaves the transect line and slowly approaches the group or individual. Attempts are made to photograph every individual sighted although close approaches to mother and calf pairs are not attempted. Digital SLR cameras (Nikon D90; D7100) using long lenses (Nikor 80-400mm and fixed length 300mm) are used to obtain high resolution images. Effort is made to ensure consistency of image quality, e.g., no shadow and at an angle perpendicular to the dorsal fin. Polarising filters are used to minimise glare. In this manner, the best image clarity is achieved and image sorting and matching is more consistent. Images are sorted according to clarity and presence/absence of identifying features (nicks /cuts/deformities/injury/pigmentation). Only images deemed to be of suitable quality and as containing sufficient markings for unambiguous identification are included in the photo-identification catalogue. A recent review of photo identification techniques was referred to ensure that current protocols for this monitoring conform to internationally recognised best practises. Recommendations from this review will be considered for future analyses (Urian *et al* 2014).

2.4. Data Analyses

2.4.1. Distribution pattern analysis

Dolphin sightings data are mapped in the Geographic Information System (GIS) ArcView© 10.1.

2.4.2. Encounter rate analysis

For this report, the baseline encounter rates were re-calculated using the revised data provided rather than quoting directly from the baseline report. Calculation followed the EM&A Manuel methodology ("on-effort" sightings made during favourable weather and good visibility conditions).

2.4.3. Quantitative grid analysis of habitat use

Quantitative grid analysis is performed by mapping both sighting and dolphin densities plotted onto 1kmx1km grid squares. Only "on effort" sightings made while on a transect line and under favourable conditions should be included in grid analyses. These densities are standardised by effort by calculating survey coverage in each line transect survey to determine the number of times the grid has been surveyed. Densities are calculated using the following formulae;

SPSE and DPSE:

$$SPSE = (S/E \times 100)/SA\%$$
$$DPSE = (D/E \times 100)/SA\%$$

Where;

S= total number "on effort" sightings
D = total number dolphins from "on effort" sightings
E = total number units survey effort
SA% = percentage of sea area

2.4.4. Behavioural analysis

When dolphins are sighted during vessel surveys, their behaviour is observed. Different activities are categorised (i.e. feeding, traveling, surface active, associated with boats, unknown) and recorded in the sighting data form of Logger. The sightings form is integrated with survey effort and positional data and can be subsequently mapped to examine distribution and behavioural trends. All sightings data ("on-effort" and "opportunistic") are used in this analysis.

2.4.5. Ranging pattern analysis

Home ranges for individual dolphins can be calculated using a variety of software (Worton 1989). In the baseline monitoring report, the program Animal Movement Analyst Extension, created by the Alaska Biological Science Centre, USGS was used in conjunction with ArcView© 3.1 and Spatial Analyst 2.0. Using the fixed kernel method, kernel density estimates and kernel density plots are created using all sightings. In the baseline monitoring, data from other studies and from outside the baseline monitoring period were used to map individual ranges. It is important to maximize the number of sightings used as kernel analyses cannot be conducted unless more than 20 independent sightings are made for an individual although it is recommended that a minimum of 70 resightings are used before kernel analyses has any accuracy (Wauters *et al* 2007; Kauhala and Auttila 2010). AFCD Annual Reports use a minimum of 15 resightings for kernel analyses (AFCD 2012). To date, too few data on individual dolphins exist from impact monitoring alone, i.e., 15 or more independent resightings per individual, to map utilisation densities using the fixed kernel method. The most resightings for an individual dolphin in the impact monitoring period (33 months) is twelve (HZMB 002:WL111).

3. RESULTS AND DISCUSSIONS

3.1. Summary of survey effort and dolphin sightings

From September – November 2014, 12 vessel surveys were conducted in NEL and NWL survey areas. A total of 660.3 km of "on-effort" transect lines were conducted, of which 657.8km were under favourable conditions. Therefore, 99.6% of vessel surveys were conducted under favorable conditions (Annex II). Only those periods of "on-effort" survey conducted under favourable conditions were included in quantitative analyses. During September – November 2014, 15 groups of dolphins, numbering 54 (min 54: max 58[4]) individuals, were sighted from the vessel surveys. Of these, nine groups were "on-effort" and the remaining six "opportunistic" (Annex III).

Of the 15 sightings, all were located in NWL. The baseline report, conducted during September-November 2011, notes a total of 44 groups, 34 of which occurred in NWL and 10 in NEL. For period September – November 2012, a total of 71 groups were sighted, 53 of which were located in NWL and 18 in NEL. For period September – November 2013, a total of 42 groups were sighted, 41 of which were located in NWL and 1 in NEL. There are differences between the number of sightings made during baseline compared to the same period in 2012; 2013 and 2014. For NEL, the number of groups almost doubled between baseline (2011) and September – November 2012 and then decreased markedly in both 2013 and 2014 (September – November). For NWL, both September – November 2012 and 2013 recorded larger numbers of groups when compared to baseline monitoring, however, in the same period in 2014, the absolute number of sightings is reduced to below that recorded for the baseline period (Table 2). Maps depicting location of sightings which have not been corrected for effort or survey track length are included as Figs. 3; 4; 5; 6.

[4] During sightings a minimum, maximum and best estimate of group size is noted; the range stated represents the minimum and maximum numbers estimated

Table 2. A Comparison of Total Sightings Recorded in NEL and NWL Areas During Sep – Nov 2011; 2012; 2013 and 2014

Monitoring Period	Total Dolphin Sighting in NWL	Total Dolphin Sighting in NEL
	Number of Groups	Number of Groups
Sep – Nov 2011 (Baseline Monitoring)	34	10
Sep – Nov 2012 (HKBCF Third Quarter)	53	18
Sep – Nov 2013 (HKBCF Seventh Quarter)	41	1
Sep – Nov 2014 (HKBCF Eleventh Quarter	15	0

As per the EM&A manual, only "on effort" sightings can be used for some analyses therefore the combined number of "on effort" sightings for all three periods was compared There is an increase in the total number of "on effort" sightings between baseline monitoring (2011) and impact monitoring (2012) but a decrease below both previous totals in September – November 2013 and a marked, further decrease in September – November 2014 (Table 3). No correction for effort is made with these numbers, this is calculated in section 3.3.

Table 3. A Comparison of "On Effort" Sightings Recorded in NEL and NWL Combined During Sep – Nov 2011; 2012; 2013 and 2014.

Monitoring Period	Groups of Dolphin sighted in NEL and NWL
Sep - Nov 2011 (Baseline Monitoring)	44
Sep – Nov 2012 (HKBCF Third Quarter)	52
Sep – Nov 2013 (HKBCF Seventh Quarter)	28
Sep – Nov 2014 (HKBCF Eleventh Quarter)	9

3.2. Distribution

During the both the baseline survey and the same period the following year, approximately three quarters of all "on effort" sightings were made in NWL. For the period September – November 2013 and 2014, however, no "on effort" sightings were made in NEL. The similarity between the 2011 and 2012 periods is noted, however, there is no correction for effort (Table 4). Throughout September – November 2014, the area of most use was the northern section of NWL, within and adjacent to the Shau Chau and Lung Kwu Chau Marine Park (SCLKCMP). The other area most frequented was at Tai O. One group was sighted to the east of the airport platform. No groups were recorded in NEL (Fig. 6). These areas are highlighted consistently throughout AFCD annual monitoring reports as well as during pre construction monitoring. SCLKCMP is frequented all year round by dolphins and is perceived to be critical habitat whereas the use of NEL is regarded as more seasonal, however, the decrease in the number of groups occurring in NEL compared to the same season in previous years is noteworthy. The increased use of Tai O is also marked compared to the same period in previous years.

Table 4. A Comparison of "On Effort" Sightings Recorded in NEL and NWL During Sep – Nov 2011; 2012; 2013 and 2014.

Monitoring Period	No. of Dolphin Groups sighted in NWL	No. of Dolphin Groups sighted in NEL
Sep - Nov 2011 (Baseline Monitoring)	34	10
Sep – Nov 2012 (HKBCF Third Quarter)	39	13
Sep – Nov 2013 (HKBCF Seventh Quarter)	28	0
Sep – Nov 2014 (HKBCF Eleventh Quarter)	9	0

3.3. Encounter rate

As the survey periods have different transect lengths, variation in sightings occurrence was quantified by correcting for the different amount of effort (number and distance of transect lines surveyed, i.e., km spent "on-effort"), to obtain an encounter rate. The baseline study (Sep-Nov 2011) reports that a total of 545.6km of survey effort was conducted under favourable conditions in the NEL and NWL survey areas. In NEL and NWL combined, 659.8km; 665.9km and 657.8km of track-line were conducted under favourable conditions during the periods September – November 2012; 2013 and 2014, respectively. In NEL, there is a slight increase in encounter rate between baseline and the same period the following year, however, for the period September – November 2013 and 2014, there is a marked decrease in encounter rate. For NWL, there is a continuous decline in encounter rate from the baseline period through the same period the next and subsequent years, i.e., 9.5 to 8.9 to 6.3 to 2.1 (Table 5).

Table 5. A Comparison of Encounter Rates in NEL and NWL Areas During September-November 2011; 2012; 2013 and 2014.

Monitoring Period	Encounter Rate NEL	Encounter Rate NWL
Sept-Nov 2011 (Baseline Monitoring)	5.4	9.5
Sep – Nov 2012 (HKBCF Third Quarter)	5.9	8.9
Sep – Nov 2013 (HKBCF Seventh Quarter)	0	6.3
Sep – Nov 2014 (HKBCF Eleventh Quarter)	0	2.1

The AFCD Annual Reports describe variation in spatial distribution between areas and between seasons in NEL and NWL. The AFCD monitoring data prior to HZMB construction (1996- to 2012) reported that overall **annual encounter rate** for NEL varies between 1.6 and 6.2 and the **annual encounter rate** for NWL varies between 5.8 and 17.0. The encounter rate for NWL for the three periods (September – November 2011; 2012; 2013) is within the annual limits recorded for this area previously and for this quarter, September – November 2014, the encounter rate falls below the lowest previously recorded encounter rate in AFCD records. For NEL, the encounter rates in September – November 2011 and 2012 are within the recorded annual norms for the area, however, the encounter rate of zero for the same period 2013 and 2014 is not. Historically, there have been both up and down movements within these limits, however, the general trend in yearly encounter rate for dolphins in all areas of Hong Kong is that of significant decline over the last decade and prior to new development projects in the Lantau area (AFCD 2013;2014). As the impact of the work at HKBCF continues, other

works associated with the bridge have increased both in intensity and in geographical area. Other projects not associated with the HZMB Project have also been ongoing in the NEL and NWL areas. The most marked changes in encounter rates have been observed in year two of the construction works in NEL and for NWL, only now in year three, has the September – November encounter rate fallen below the lowest previously recorded for this area during this quarter.

3.4. Group size

During September – November 2014, group size of all sightings varied from 1 to 8 individuals with an average of 3.6. For baseline monitoring, the NWL average group size was 4.5 and the NEL average group size was 3.5. For the period September – November 2012, the NWL average group size was 3.1 and in NEL it was 3.6. For the period September – November 2013, the NWL average group size was 3.2 and in NEL it was 1.0 (Table 6). NEL shows a decreased number in groups size (noting no groups were seen in period 2014). In NWL, groups sizes between September – November 2012 and 2013 are approximately the same although both are lower than the baseline monitoring. The group size for NWL in 2014 has increased slightly. A map depicting the four groups which were sighted with more than 5 individuals, shows that two occurred at Tai O, one at SCLKCMP and one to the east of the airport platform. Two of these groups contained calves (Fig. 7).

Table 6. A Comparison of Sightings Group Size Averages Recorded in NEL and NWL Areas During Sep – Nov 2011; 2012; 2013 and 2014

Monitoring Period	Average Group Size (NWL)	Average Group Size (NEL)
Sep - Nov 2011 (Baseline Monitoring)	4.5	3.5
Sep – Nov 2012 (HKBCF Third Quarter)	3.1	3.6
Sep – Nov 2013 (HKBCF Seventh Quarter)	3.2	1.0
Sep – Nov 2014 (HKBCF Eleventh Quarter)	3.6	0

As encounter rate and group size are both subject to variation, the use of other more powerful analyses may be more appropriate to discern differences over the shorter term, such as multi-variate analyses (Taylor *et al* 2007). This is important so that project impact can be monitored over relevant time scales. Alternative analyses have been proposed and developed using two years of impact monitoring data. The draft report is currently under review. Considerable input of data from multiple sources has been provided and the contribution of both government agencies and private sector sources is gratefully acknowledged.

3.5. Habitat use

Quantitative grid analyses indicates that the most frequented areas in NWL were the northern SCLKCMP, the western limit of NWL and Tai O. In NEL, no “on effort” sightings occurred therefore no qualitative grid analyses can be conducted (Figs. 8; 9). The grid analyses from this quarter shows a similar distribution in NWL to that published in the AFCD long term monitoring reports and the baseline monitoring report. These areas of high use have been consistent in the long term and continue to be so. The decrease in dolphin sightings between September – November 2013 and, particularly, September – November 2014 is noted.

3.6. Mother-calf pairs

Four of the groups sighted contained mother and calf pairs. All groups were sighted in NWL (Fig. 10). One of the calves has been seen consistently with its mother since January 2013 (the mother is HZMB 026). Calves comprised 7.4% of all dolphins sighted. In the last year, quarterly calculated percentages of calf occurrence show that this quarter has a higher percentage of calves than the same period in 2013 and for most of the previous year (5.7% June-Aug 2014; 10.3% March-May 2014; 6.7% December 2013 – February 2014; September – November 2013 4.3%). This perhaps indicates that the Hong Kong habitat has high importance to calves and as such, although the absolute number of dolphins has decreased, the number of calves has remained disproportionally high. That is, calves and their mothers are less likely to completely leave the northern Lantau habitat compared to other more socially flexible dolphins within the population.

3.7. Activities

Of the 15 groups sighted (using all sightings), eight (53%) were engaged in feeding activities; three (20%) were travelling and four (27%) were feeding/travelling/surface active. Feeding was the predominant activity during daylight hours in September – November 2014 with travelling/feeding/surface active (multiple) behaviours being the next most dominant behavioural category (Fig. 11). In NWL, feeding occurred most often at northeast SCLKCMP and Tai O (Fig. 12).

3.8. Photo-identification work

The photo-identification catalogue was regularly updated and re-sightings of dolphins previously identified were recorded. The project specific photo-identification catalogue for the impact monitoring period is presented in Annex IV. Not all dolphins sighted have sufficient scarring, injury or pigmentation uniqueness to be unambiguously identified. During the baseline survey, 96 individuals were noted in the NEL, NWL and WL areas. Of these, 57 were noted in the NEL and NWL area. No new dolphins which have been identified in the last quarter are from the baseline study, however, several well known individuals have been recorded throughout September – November 2014. There are six dolphins which have been sighted more than seven times, five of which are known from the AFCD catalogue (HZMB 002 [WL111]; HZMB 011 [EL01]; HZMB 022; HZMB 041 [NL24]; HZMB 044 [NL98]; HZMB054 [CH34]). HZMB 002 and HZMB 044 were not seen during the baseline study. When both baseline and impact monitoring data is pulled, HZMB 54 has been seen the most in 15 different sighting groups. HZMB 041 and HZMB 044 have been sighted 10 times; HZMB 002 has been sighted twelve times, HZMB 022 has been sighted nine times and HZMB 011 has been sighted eight times. Even when pooled with baseline data, only one of the identified dolphins has been seen the minimal amount of times it is possible to conduct a kernel analysis with (using AFCD criteria) (HZMB 054@15 resightings) and this does not consider independence of sightings, a critical assumption in kernel analyses. (Annex VI; Table1).

4. CONCLUSION

Habitat use, group size and behavioural trends recorded in September – November 2014, show consistencies with the results reported in the same period 2011 (baseline); 2012 and 2013. Density distribution maps depicted key habitat of frequent use within NWL, in particular, SCLKMP and Tai O. Group size is slightly increased in 2014, however, not back to the level recorded in the baseline preiod. Behavioural patterns were broadly similar, with feeding behavior predominating all months. Using AFCD Long Term Monitoring reports as a reference, as well as baseline data from the same quarterly period, there is an apparent decreased use of NEL during years 2 and 3 of construction works and, by year 3 a marked decrease in NWL. Noting the continued decline in NEL habitat and the marked decrease in use of NWL in the reporting quarter,

parties of all HZMB projects held several meetings to review all relevant data. Across all sites, the mitigation measures as stated in the EM&A Manual are being upheld and regularly checked. No causal link could be found to definitely coincide with any particular construction activities or site activities. The EIA predicted that impact would occur during the construction of the HZMB project which would manifest as displacement from the dolphins habitat. On comparison of encounter rates from 2011 to date, for the quarter September to November, NEL has a marked decrease in 2013. A similar sharp drop in NWL encounter rate is now noted in 2014. The outcome of the meetings held was to acknowledge that consistent decreases have been seen throughout NEL and NWL and that this is a result of the cumulative impacts from the various processes which occurred within Lantau water. It is also noted that HZMB is not the only active project which is occurring in the Lantau area. The significant decline in dolphin numbers throughout the last ten years prior to construction commencement has also been highlighted (AFCD 2013) as this process is ongoing and was not accounted for during the EIA process.

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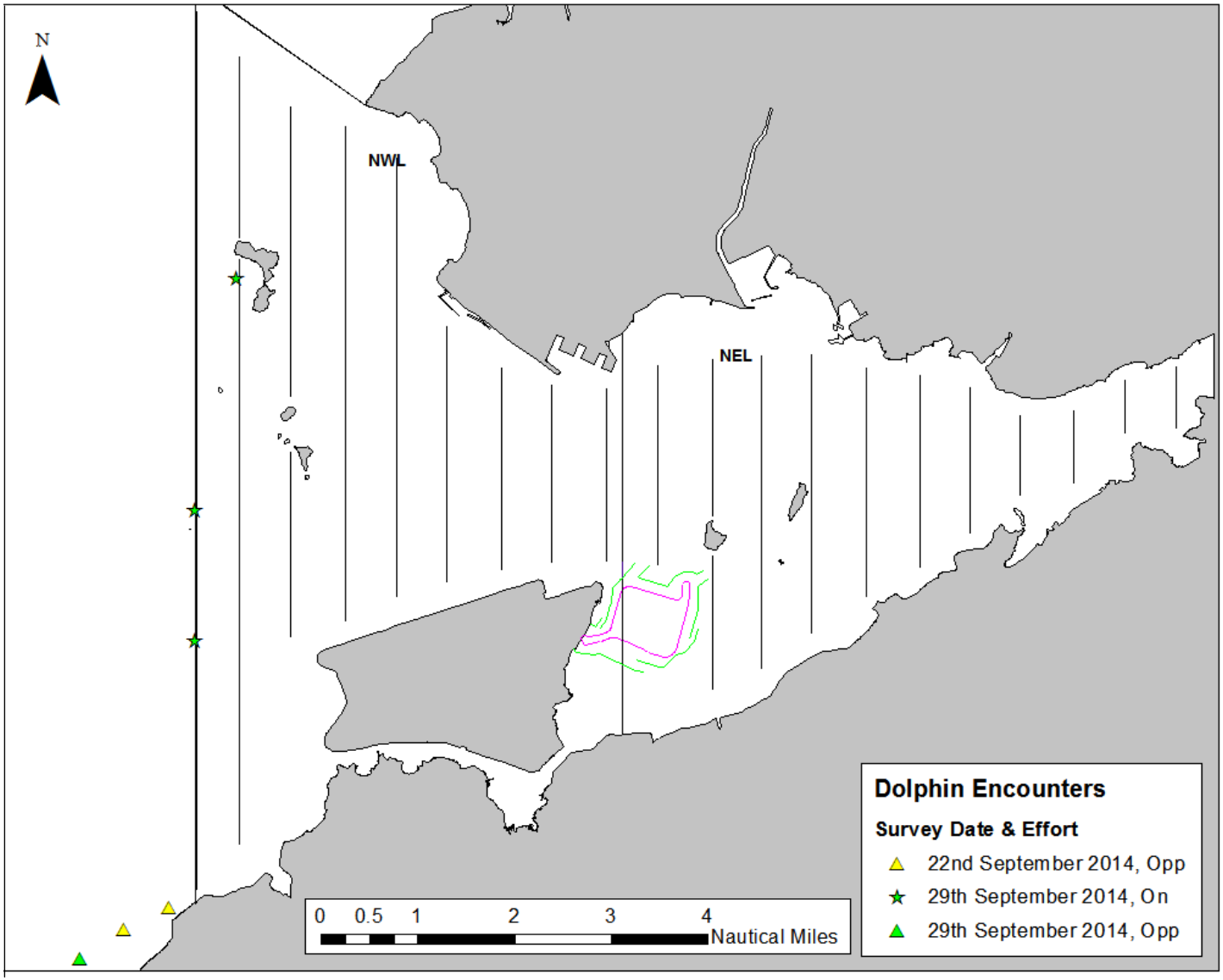

Figure 3 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (September 2014)

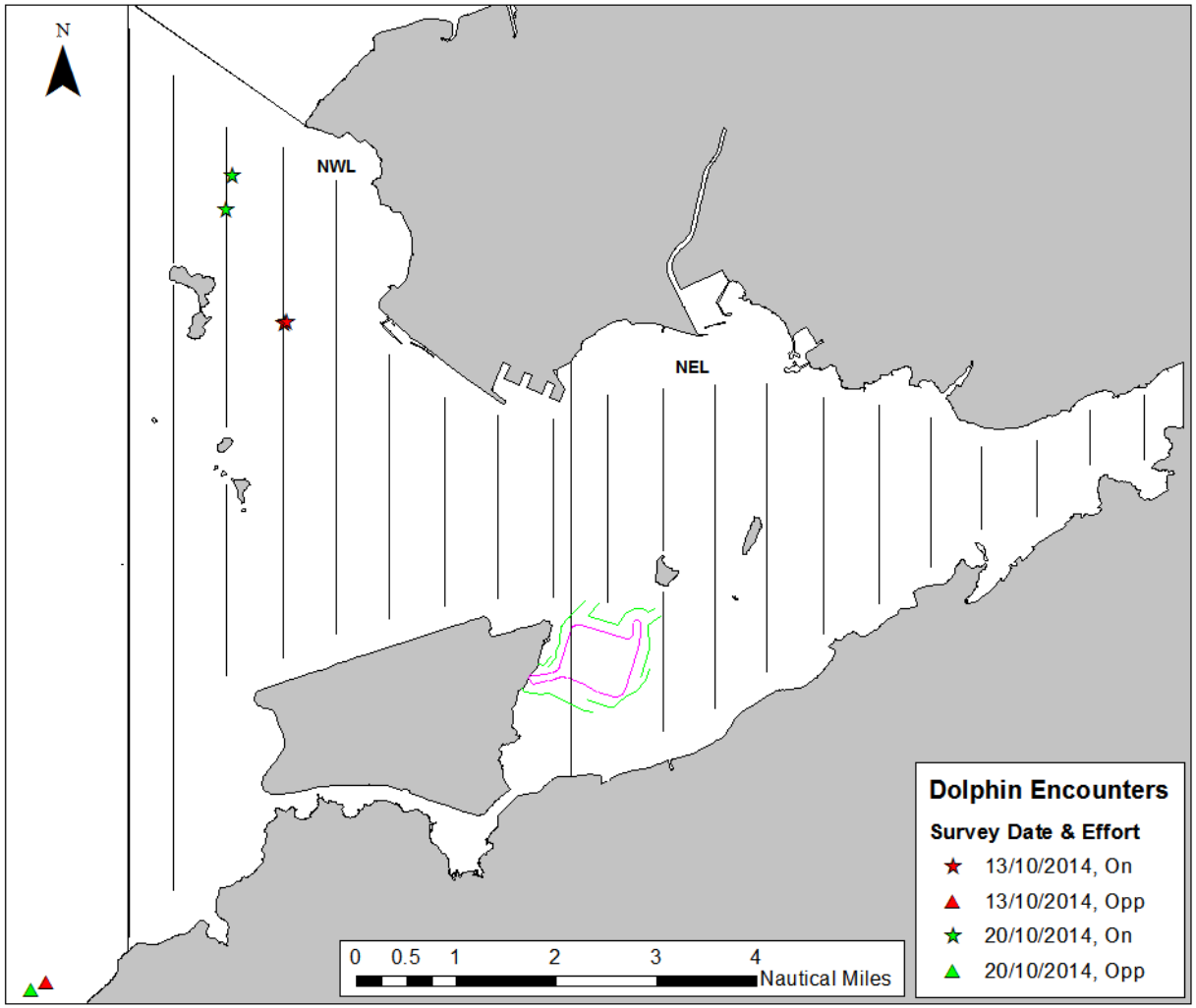

Figure 4 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (October 2014)

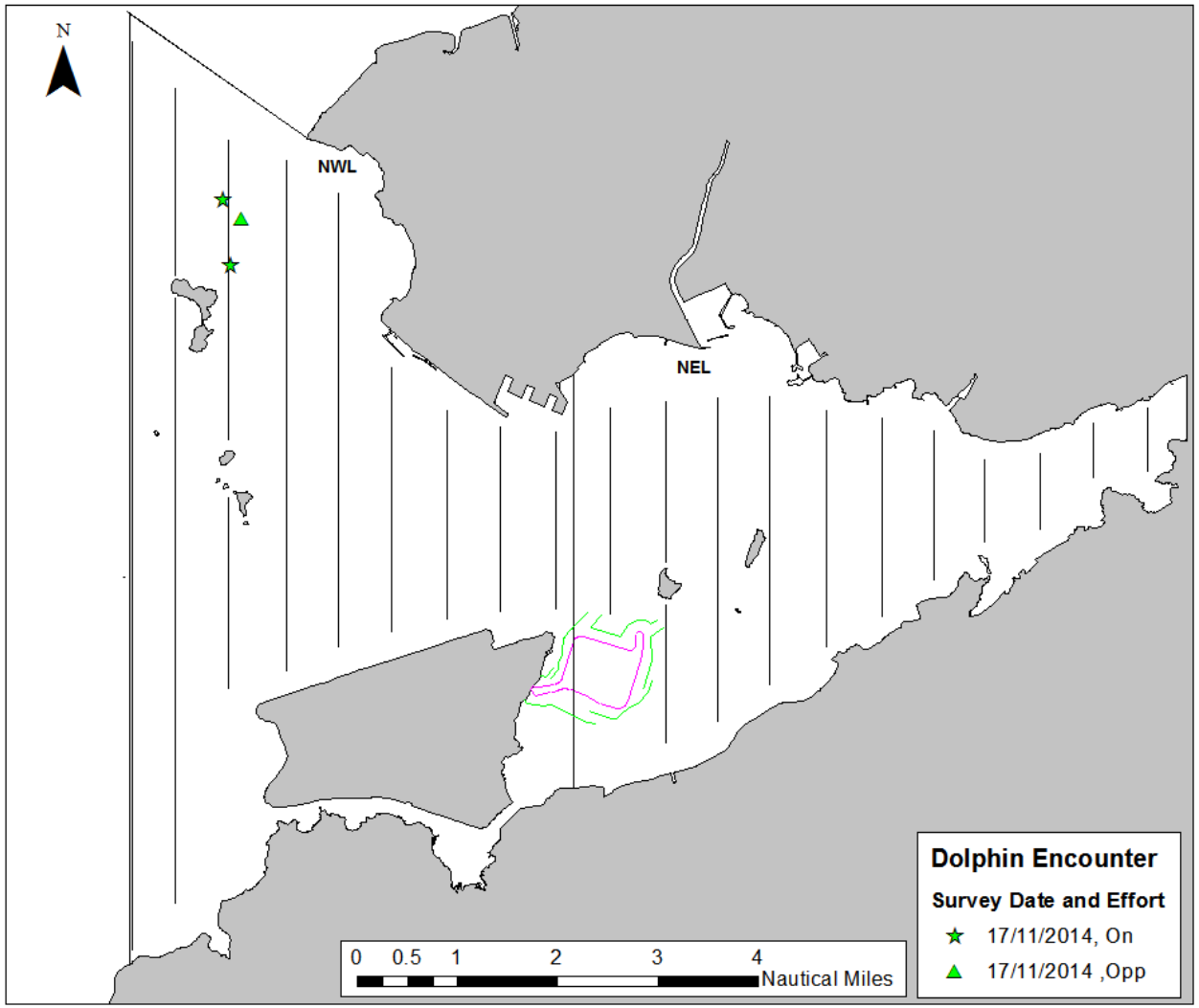

Figure 5 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (November 2014)

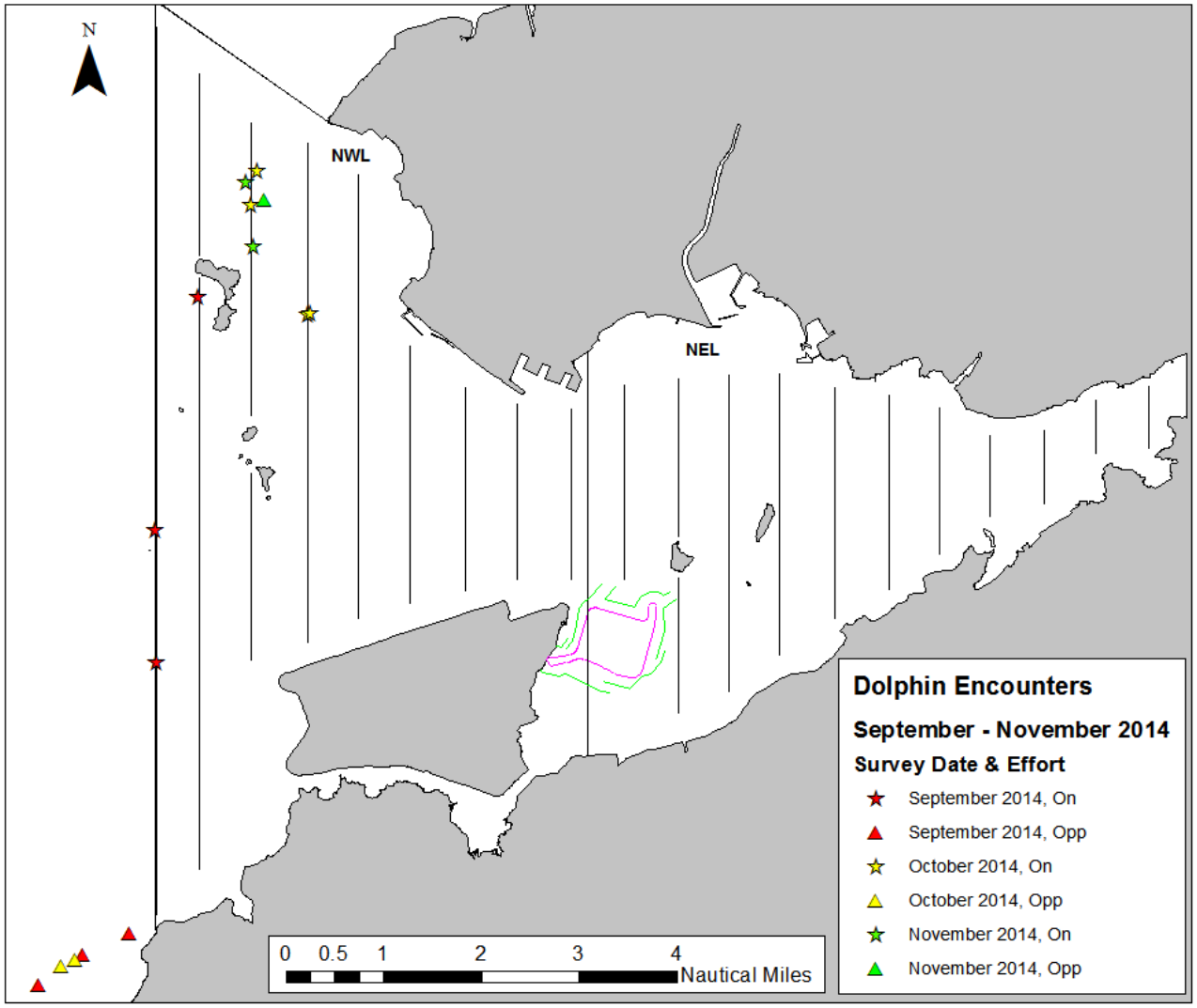

Figure 6. Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (September – November 2014)

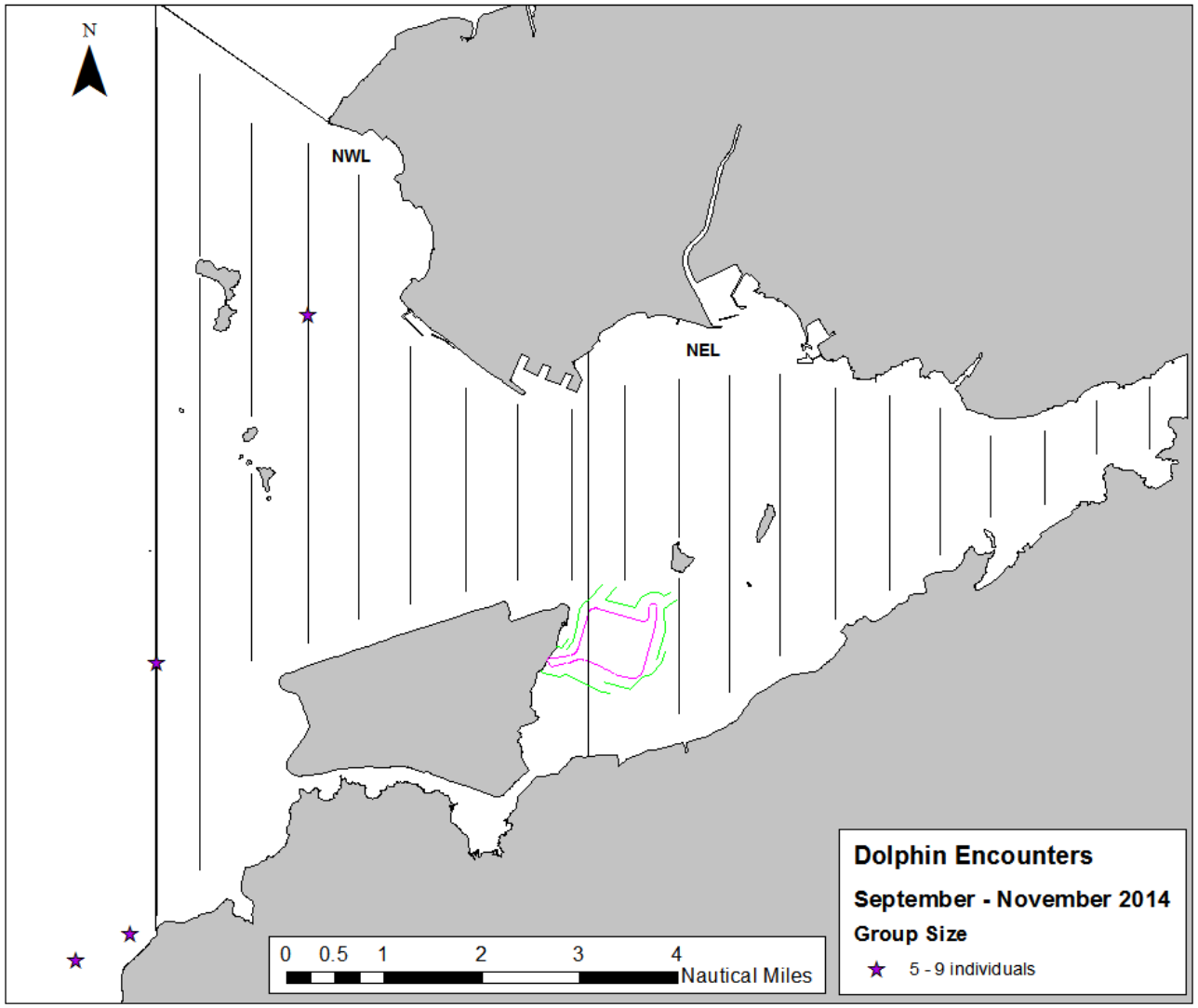

Figure 7. The Location of Dolphin Groups Numbering 5 and Above Individuals (September – November 2014)

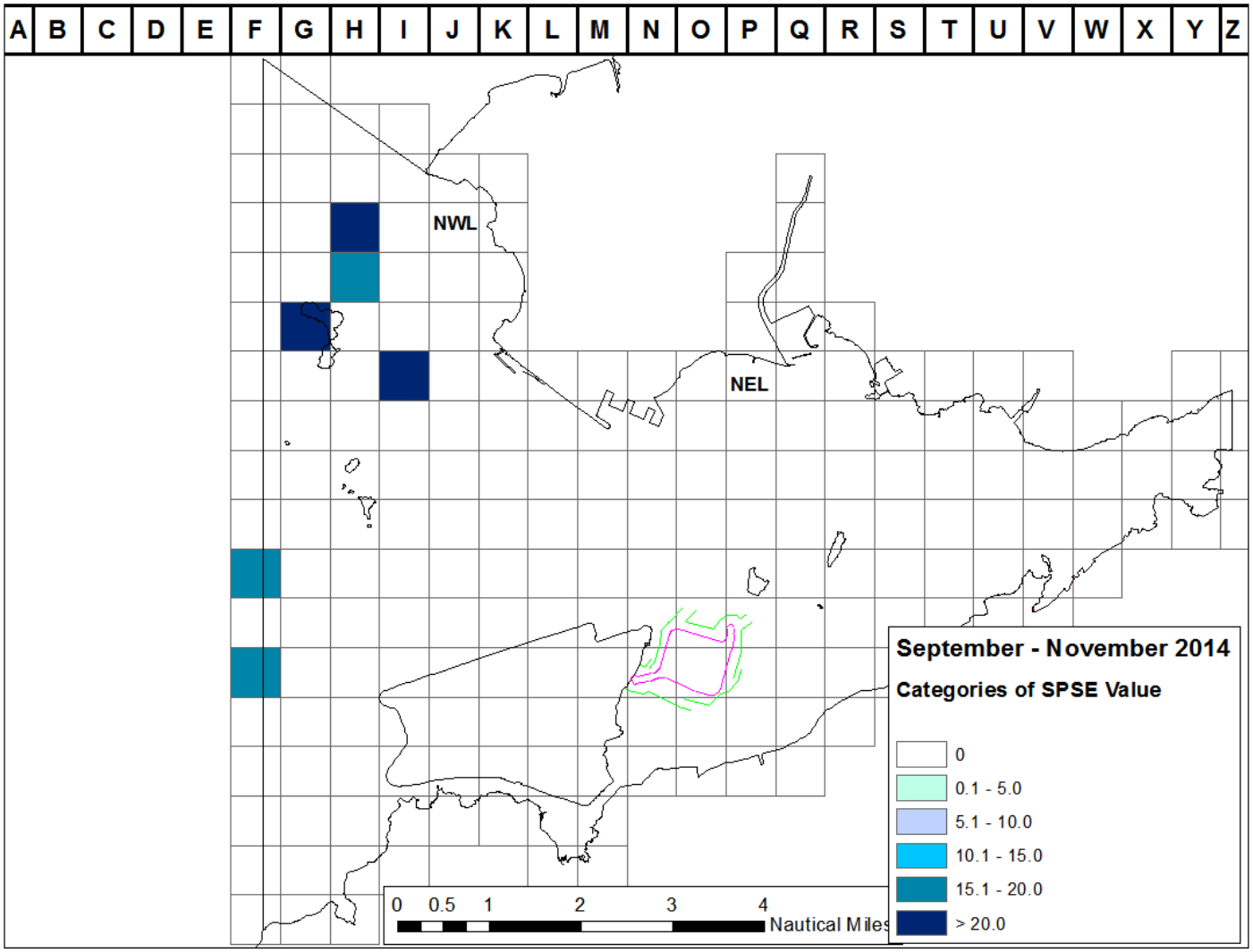

Figure 8. Sighting density SPSE (number of on-effort sightings per 100 units of survey effort) for September – November 2014.

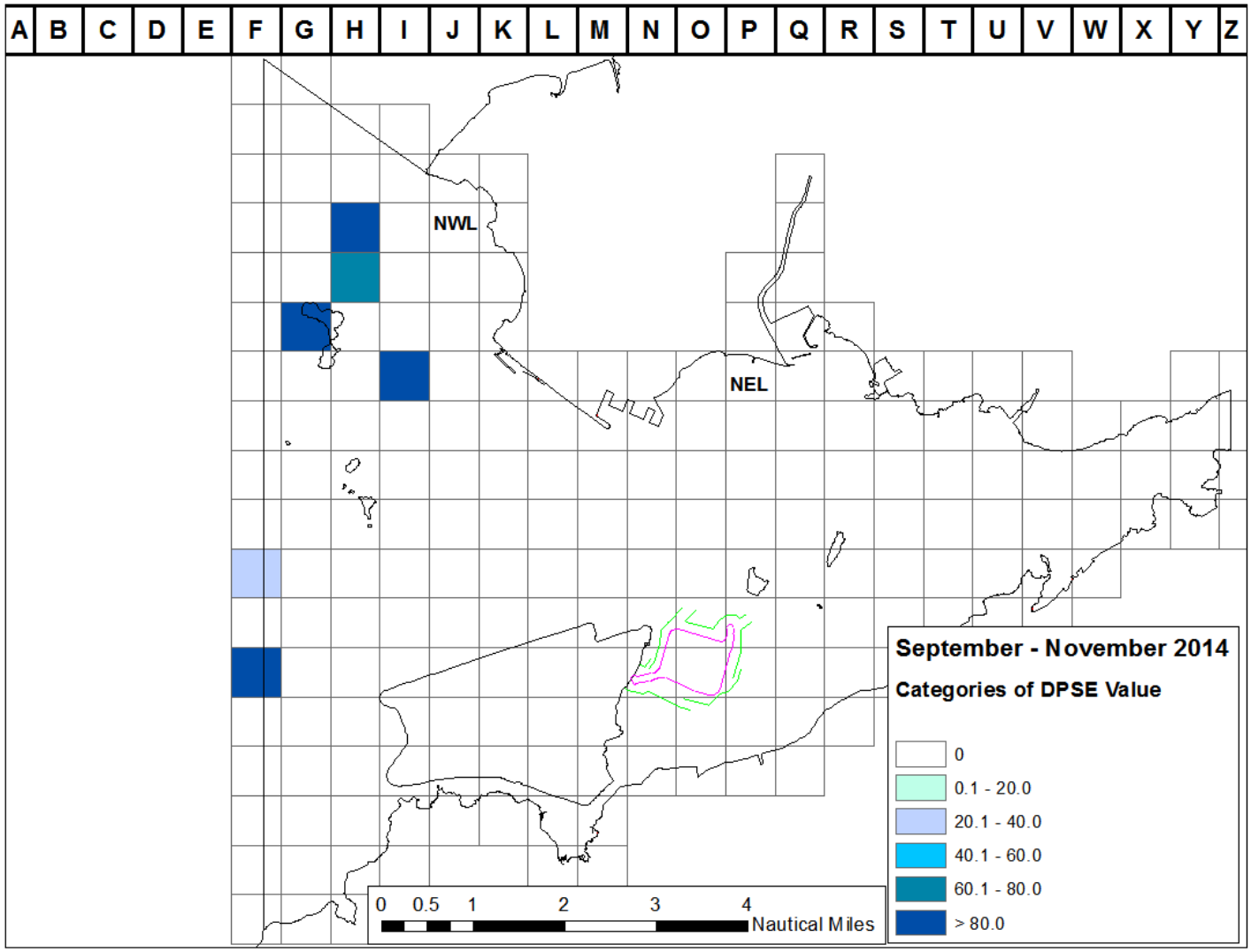

Figure 9. Dolphin density DPSE (number of dolphins per 100 units of survey effort) for September – November 2014.

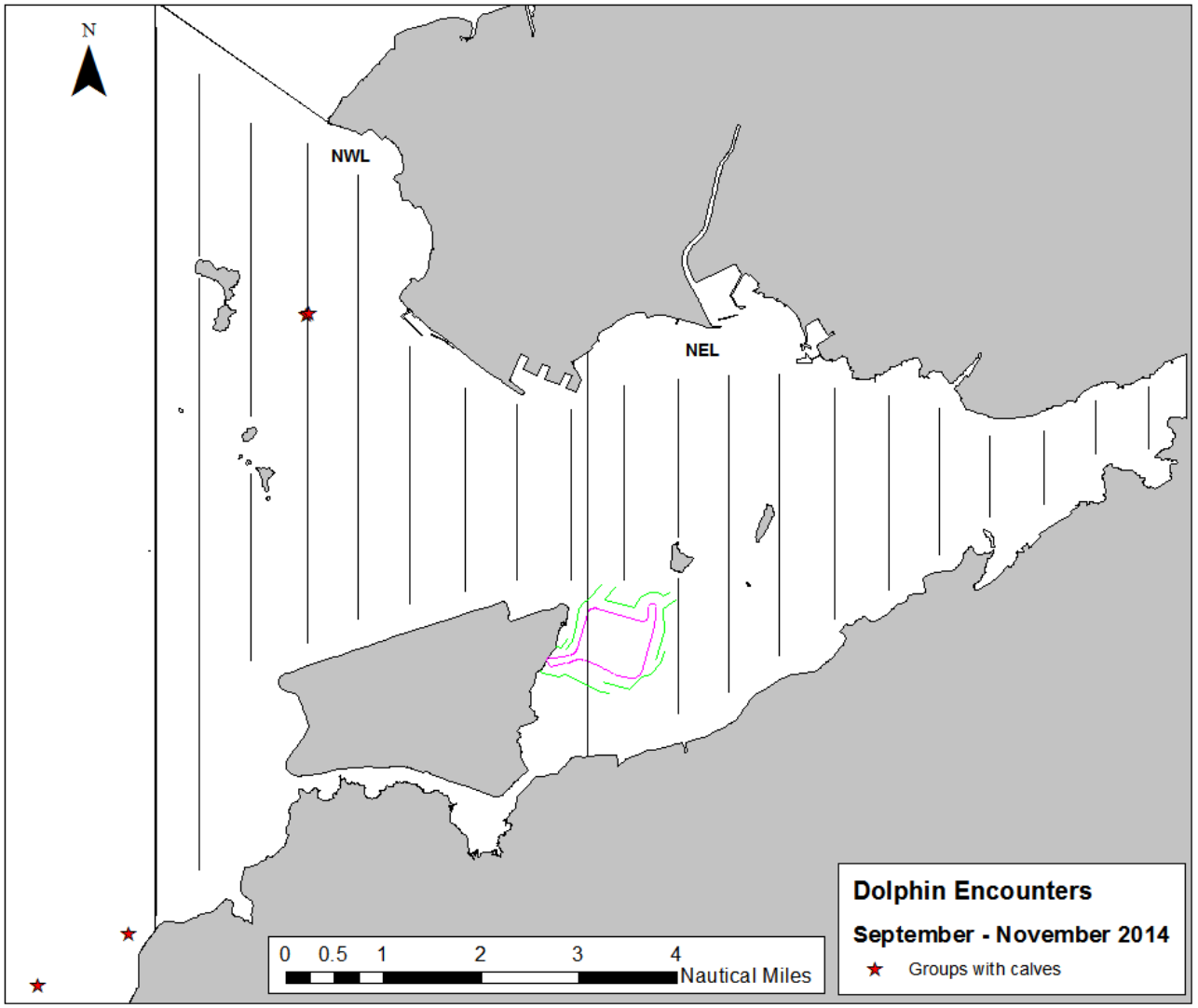

Figure 10. Location of groups containing mother and calf pairs during September – November 2014.

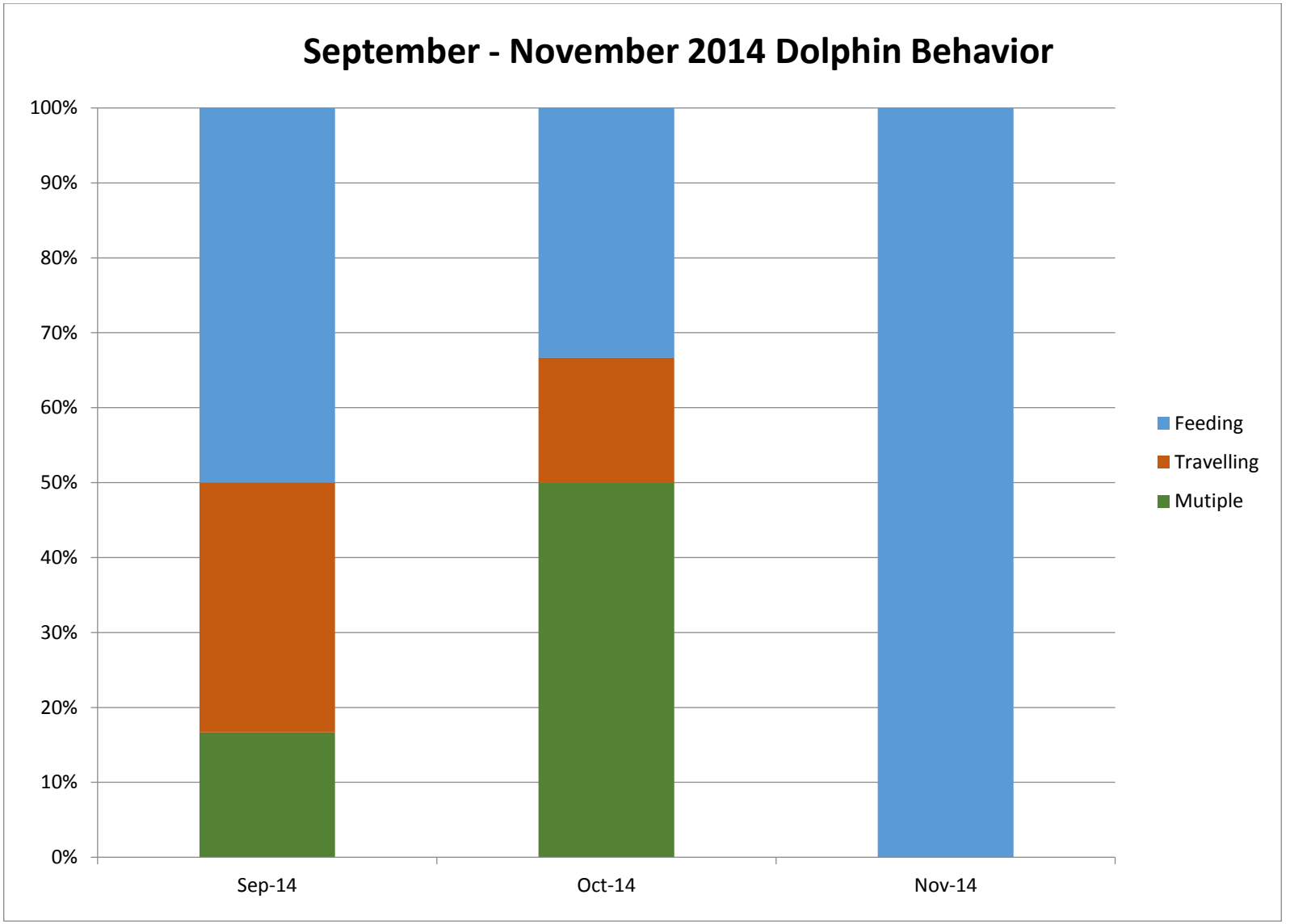

Figure 11. Activity Budget for Dolphin Behaviour September – November 2014.

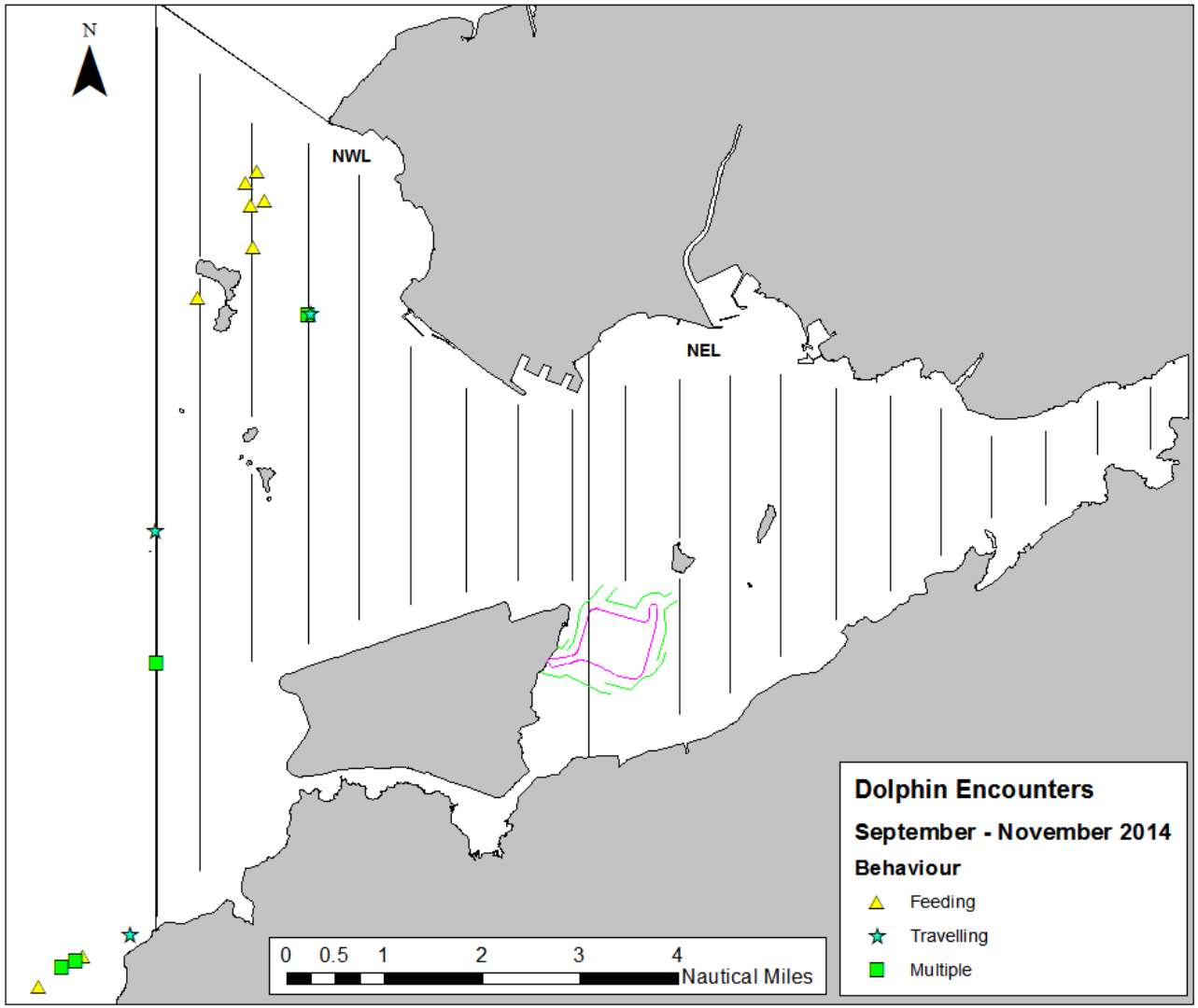

Figure 12. The Location of Different Behavioural Activities September – November 2014

Annex I Impact Monitoring Survey Schedule and Details (September – November 2014)

Date	Location of Survey	No. Sightings On Effort	No. Sightings Opportunistic	Total km "on effort" (favourable conditions)
09/21/2014	NE and NW Lantau (6-20,23)	0	0	52.3
09/22/2014	NWL (1-5, 21, 22)	0	2	58.1
09/29/2014	NWL (1-6, 21, 22)	3	1	63.2
09/30/2014	NE and NW Lantau (7-20,23)	0	0	46.7
10/13/2014	NWL (1-6, 21, 22)	2	1	63.0
10/14/2014	NE and NW Lantau (7-20,23)	0	0	47.2
10/20/2014	NWL (1-6,21,22)	2	1	62.7
10/21/2014	NE and NW Lantau (7-20,23)	0	0	47.2
11/03/2014	NWL (1-6, 21, 22)	0	0	62.9
11/04/2014	NE and NW Lantau (7-20,23)	0	0	47.4
11/17/2014	NE and NW Lantau (1-5)	2	1	55.5
11/18/2014	NWL (6-20,23)	0	0	51.6

Annex II. Impact Monitoring Survey Effort Summary (September – November 2014)

Date	Area	Sea State (on effort)	Effort (km)	Season	Vessel	Type
09/21/2014	NWL	1	3.1	AUTUMN	HKDW	IMPACT
09/21/2014	NWL	2	11.7	AUTUMN	HKDW	IMPACT
09/21/2014	NEL	1	29.9	AUTUMN	HKDW	IMPACT
09/21/2014	NEL	2	7.6	AUTUMN	HKDW	IMPACT
09/22/2014	NWL	1	21.2	AUTUMN	HKDW	IMPACT
09/22/2014	NWL	2	36.9	AUTUMN	HKDW	IMPACT
09/29/2014	NWL	1	26.2	AUTUMN	HKDW	IMPACT
09/29/2014	NWL	2	37	AUTUMN	HKDW	IMPACT
09/30/2014	NWL	1	7.5	AUTUMN	HKDW	IMPACT
09/30/2014	NWL	2	2.5	AUTUMN	HKDW	IMPACT
09/30/2014	NEL	1	5.9	AUTUMN	HKDW	IMPACT
09/30/2014	NEL	2	30.8	AUTUMN	HKDW	IMPACT
10/13/2014	NWL	1	13.1	AUTUMN	HKDW	IMPACT
10/13/2014	NWL	2	33.3	AUTUMN	HKDW	IMPACT
10/13/2014	NWL	3	16.6	AUTUMN	HKDW	IMPACT
10/14/2014	NWL	2	3.1	AUTUMN	HKDW	IMPACT
10/14/2014	NWL	3	6.9	AUTUMN	HKDW	IMPACT
10/14/2014	NEL	1	32.9	AUTUMN	HKDW	IMPACT
10/14/2014	NEL	2	4.3	AUTUMN	HKDW	IMPACT
10/20/2014	NWL	1	14.7	AUTUMN	HKDW	IMPACT
10/20/2014	NWL	2	47	AUTUMN	HKDW	IMPACT
10/20/2014	NWL	3	1	AUTUMN	HKDW	IMPACT
10/21/2014	NWL	1	9.9	AUTUMN	HKDW	IMPACT
10/21/2014	NEL	1	37.3	AUTUMN	HKDW	IMPACT
11/03/2014	NWL	1	16.6	AUTUMN	HKDW	IMPACT
11/03/2014	NWL	2	37.7	AUTUMN	HKDW	IMPACT
11/03/2014	NWL	3	8.6	AUTUMN	HKDW	IMPACT
11/04/2014	NWL	1	5.3	AUTUMN	HKDW	IMPACT
11/04/2014	NWL	2	4.8	AUTUMN	HKDW	IMPACT
11/04/2014	NEL	1	3.7	AUTUMN	HKDW	IMPACT
11/04/2014	NEL	2	33.6	AUTUMN	HKDW	IMPACT
11/17/2014	NWL	1	21.7	AUTUMN	HKDW	IMPACT
11/17/2014	NWL	2	22.5	AUTUMN	HKDW	IMPACT
11/17/2014	NWL	3	11.3	AUTUMN	HKDW	IMPACT
11/17/2014	NWL	4	2.5	AUTUMN	HKDW	IMPACT
11/18/2014	NWL	1	3.4	AUTUMN	HKDW	IMPACT
11/18/2014	NWL	2	11.5	AUTUMN	HKDW	IMPACT
11/18/2014	NEL	1	36.7	AUTUMN	HKDW	IMPACT

Annex III. Impact Monitoring Sighting Database (September – November 2014)

Project	Contract	Date	Sighting No.	Time	Group Size	Area	Beaufort	PSD	Effort	Type	Latitude	Longitude	Season	Boat Assoc
HKBCF	HY/2010/02	22-Sep-14	1005	09:18	3	NWL	2	N/A	Opp	Impact	22.26291	113.8568	Autumn	PS
HKBCF	HY/2010/02	22-Sep-14	1006	09:58	5	NWL	2	N/A	Opp	Impact	22.26662	113.8653	Autumn	No
HKBCF	HY/2010/02	29-Sep-14	1009	09:26	3	NWL	1	N/A	Opp	Impact	22.25776	113.8486	Autumn	No
HKBCF	HY/2010/02	29-Sep-14	1010	10:07	6	NWL	2	0	On	Impact	22.31313	113.8700	Autumn	No
HKBCF	HY/2010/02	29-Sep-14	1011	10:38	2	NWL	2	588	On	Impact	22.33570	113.8699	Autumn	No
HKBCF	HY/2010/02	29-Sep-14	1012	11:39	3	NWL	1	17	On	Impact	22.37583	113.8776	Autumn	No
HKBCF	HY/2010/02	13-Oct-14	1018	09:17	6	NWL	3	N/A	Opp	Impact	22.26215	113.8554	Autumn	No
HKBCF	HY/2010/02	13-Oct-14	1019	13:35	8	NWL	1	173	On	Impact	22.37272	113.8978	Autumn	No
HKBCF	HY/2010/02	13-Oct-14	1020	14:10	2	NWL	1	155	On	Impact	22.37295	113.8984	Autumn	No
HKBCF	HY/2010/02	20-Oct-14	1024	09:24	2	NWL	1	N/A	Opp	Impact	22.26098	113.8527	Autumn	No
HKBCF	HY/2010/02	20-Oct-14	1025	13:21	1	NWL	3	132	On	Impact	22.39161	113.8873	Autumn	No
HKBCF	HY/2010/02	20-Oct-14	1026	13:36	3	NWL	3	101	On	Impact	22.39747	113.8884	Autumn	No
HKBCF	HY/2010/02	17-Nov-14	1034	13:11	2	NWL	3	12	On	Impact	22.39554	113.8864	Autumn	No
HKBCF	HY/2010/02	17-Nov-14	1035	13:29	4	NWL	3	N/A	Opp	Impact	22.39238	113.8898	Autumn	No
HKBCF	HY/2010/02	17-Nov-14	1036	13:47	4	NWL	3	283	On	Impact	22.38444	113.8879	Autumn	No

Annex IV

March 2012– November 2014

(and Baseline September – November 2011)

Photo Identification Information

Table 1. Sightings of Individually Identified Chinese White Dolphin (*Sousa chinensis*) between March 2012 – November 2014 and during the Baseline Survey (September - November 2011)

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 125		2014/10/13	1019	NWL
HZMB 124		2014/09/22	1005	NWL
HZMB 123		2014/08/25	998	NWL
HZMB 122		2014/08/04	989	NWL
HZMB 121		2014/07/14	968	NWL
HZMB 120		2014/05/31	951	NWL
HZMB 119		2014/04/19	940	NWL
HZMB 118		2014/01/06	890	NWL
HZMB 117		2014/06/17	964	NWL
		2014/01/06	888	NWL
HZMB 116		2014/08/25	999	NWL
		2014/07/14	972	NWL
		2014/07/14	971	NWL
		2013/12/26	879	NWL
HZMB 115		2013/12/26	879	NWL
HZMB 114		2013/10/24	827	NWL
HZMB 113		2013/10/24	827	NWL
HZMB 112		2013/10/15	815	NWL
HZMB111		2013/10/15	815	NWL
HZMB 110		2013/10/15	812	NWL
HZMB 108		2013/08/30	780	NEL
HZMB 107		2014/10/13	1019	NWL
		2013/08/21	770	NWL
HZMB 106		2013/08/21	769	NWL
HZMB 105		2014/05/31	951	NWL
		2013/07/08	711	NWL
HZMB 104		2013/07/08	711	NWL
HZMB 103		2013/07/08	711	NWL
HZMB 102		2013/07/08	706	NWL
HZMB 101		2013/07/08	706	NWL
HZMB 100		2013/07/08	706	NWL
HZMB 099		2013/06/13	681	NWL
		2013/06/13	680	NWL
HZMB 098	NL104	2014/08/04	992	NWL
		2014/01/06	888	NWL
		2013/11/02	849	NWL
		2013/11/02	845	NWL
		2013/10/24	831	NWL
		2013/07/08	711	NWL
		2013/05/24	659	NWL

HZMB 097		2013/05/09	647	NWL
HZMB 096		2013/04/01	621	NWL
HZMB 095		2013/08/30	780	NEL
		2013/06/25	697	NWL
		2013/06/13	682	NWL
		2013/04/01	621	NWL
HZMB 094		2014/10/13	1019	NWL
		2014/05/31	954	NWL
		2014/02/17	910	NWL
		2013/06/26	703	NWL
		2013/06/25	698	NWL
		2013/03/18	601	NWL
HZMB 093		2013/05/24	657	NWL
		2013/02/21	587	NWL
HZMB 092		2013/02/21	589	NWL
		2013/02/15	581	NWL
HZMB 091		2013/02/15	579	NWL
HZMB 090		2013/06/25	697	NWL
		2013/06/13	682	NWL
		2013/02/15	579	NWL
HZMB 089		2013/02/15	579	NWL
HZMB 088		2013/02/15	579	NWL
HZMB 087		2013/02/15	579	NWL
HZMB 086	NL242	2013/05/09	642	NWL
		2013/02/15	579	NWL
		2011/10/10	Baseline	NWL
HZMB 085		2014/10/13	1019	NWL
		2014/05/31	954	NWL
		2013/06/26	703	NWL
		2013/02/15	579	NWL
HZMB 084		2013/02/14	575	NWL
HZMB 083	NL136	2013/12/19	863	NWL
		2013/03/28	607	NWL
		2013/02/15	579	NWL
		2013/01/28	568	NWL
		2012/01/28	564	NWL
HZMB 082		2014/10/20	1024	NWL
		2013/02/21	587	NWL
		2013/02/15	579	NWL
		2013/01/28	563	NWL
HZMB 081		2013/01/28	559	NWL
		2013/01/28	557	NWL
HZMB 080		2013/01/28	556	NWL
HZMB 079		2013/01/28	556	NWL
HZMB 078		2013/02/15	579	NWL
		2013/01/08	552	NWL

HZMB 077		2013/12/26	878	NWL
		2013/07/08	706	NWL
		2012/12/11	541	NWL
HZMB 076		2013/07/08	706	NWL
		2012/12/11	541	NWL
HZMB 075		2012/12/06	525	NEL
HZMB 074		2013/05/09	647	NWL
		2013/04/01	623	NWL
		2013/04/01	621	NWL
		2013/02/21	594	NEL
		2012/12/10	529	NEL
		2012/12/06	525	NEL
HZMB 073		2013/05/09	647	NWL
		2013/04/01	623	NWL
		2013/04/01	621	NWL
		2013/02/21	594	NEL
		2012/12/10	529	NEL
		2012/12/06	525	NEL
HZMB 072		2012/10/24	476	NWL
HZMB 071		2012/10/24	475	NWL
		2012/10/12	466	NWL
HZMB 070		2012/10/24	476	NWL
HZMB 069		2013/08/21	774	NWL
		2013/07/08	711	NWL
		2012/10/24	476	NWL
HZMB 068		2014/10/20	1025	NWL
		2013/11/01	839	NWL
		2012/10/24	476	NWL
HZMB 067		2012/10/24	475	NWL
HZMB 066	NL93	2013/01/28	559	NWL
		2012/12/11	537	NWL
		2012/10/24	475	NWL
		2012/10/12	466	NWL
HZMB 064		2014/06/17	964	NWL
		2013/05/09	647	NWL
		2013/01/28	561	NWL
		2012/10/24	475	NWL
		2012/10/12	466	NWL
HZMB 063		2013/05/09	647	NWL
		2012/10/12	466	NWL
HZMB 062		2012/12/06	525	NEL
		2012/10/11	457	NWL
HZMB 060		2012/09/18	447	NWL
HZMB 059		2013/02/21	591	NWL
		2012/09/18	445	NWL
HZMB 057		2012/09/18	440	NWL

HZMB 056		2012/09/18	442	NWL
		2012/09/05	433	NEL
HZMB 055		2012/09/04	425	NWL
HZMB 054	CH34	2014/05/31	953	NWL
		2014/01/06	888	NWL
		2013/11/07	854	NWL
		2013/11/02	845	NWL
		2013/10/24	831	NWL
		2013/08/30	780	NEL
		2013/07/08	711	NWL
		2013/09/18	448	NWL
		2012/09/05	432	NEL
		2011/11/07	Baseline	NWL
		2011/11/05	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/11/01	Baseline	NEL
		2011/11/01	Baseline	NEL
		2011/10/28	Baseline	NWL
		2011/10/06	Baseline	NWL
HZMB 053		2012/09/04	425	NWL
HZMB 052		2012/09/04	423	NWL
HZMB 051	NL213	2014/08/04	989	NWL
		2013/05/09	644	NWL
		2013/04/01	622	NWL
		2013/02/15	582	NWL
		2013/02/15	581	NWL
		2013/01/28	559	NWL
		2013/01/28	556	NWL
		2012/09/04	422	NWL
HZMB 050		2014/07/14	971	NWL
		2014/01/10	900	NWL
		2014/01/06	888	NWL
		2013/02/15	579	NWL
		2012/09/04	421	NWL
HZMB 049		2014/07/29	982	NWL
		2012/09/03	419	NWL
HZMB 048		2012/09/03	419	NWL
HZMB 047		2012/09/03	412	NWL
HZMB 046		2012/09/03	412	NWL
HZMB 045		2014/02/17	910	NWL
		2013/06/13	682	NWL
		2013/02/15	579	NWL
		2012/11/01	495	NWL

HZMB 044	NL98	2014/10/13	1019	NWL
		2014/02/17	910	NWL
		2013/12/19	864	NWL
		2013/11/02	845	NWL
		2013/11/01	842	NWL
		2013/10/15	819	NWL
		2013/05/09	648	NWL
		2013/05/09	647	NWL
		2013/04/01	623	NWL
		2013/04/01	621	NWL
		2013/02/15	579	NWL
		2012/11/01	495	NWL
HZMB 043		2012/09/03	407	NWL
HZMB 042	NL260	2013/12/19	863	NWL
		2012/11/01	495	NWL
		2011/11/07	Baseline	NWL
HZMB 041	NL24	2014/06/05	960	NEL
		2014/02/17	910	NWL
		2013/11/02	845	NWL
		2013/05/09	648	NWL
		2013/05/09	647	NWL
		2013/04/01	623	NWL
		2013/04/01	621	NWL
		2013/02/15	579	NWL
		2012/11/01	495	NWL
		2011/11/06	Baseline	NEL
		2011/11/05	Baseline	NWL
		2011/11/05	Baseline	NWL
		2011/10/10	Baseline	NWL
HZMB 040		2014/02/17	910	NWL
		2014/01/06	893	NWL
		2013/10/15	821	NWL
		2013/07/08	714	NWL
		2013/07/08	711	NWL
		2013/02/21	589	NWL
		2012/11/01	493	NWL
HZMB 038		2012/11/01	490	NWL
HZMB 037		2012/11/01	490	NWL
HZMB 036		2012/09/03	407	NWL
		2012/11/01	490	NWL
HZMB 035		2013/02/15	579	NWL
		2012/11/01	490	NWL
HZMB 034		2012/11/01	493	NWL
HZMB 028		2014/11/17	1035	NWL
		2013/04/01	625	NWL
		2012/08/06	373	NWL

HZMB 027		2013/12/19	863	NWL
		2013/02/15	579	NWL
		2013/01/28	568	NWL
		2013/01/28	564	NWL
		2012/06/14	299	NWL
HZMB 026		2014/10/13	1018	NWL
		2013/06/25	697	NWL
		2013/05/09	642	NWL
		2013/01/28	561	NWL
		2012/06/13	295	NEL
HZMB 025		2013/02/22	596	NEL
		2013/02/21	591	NWL
		2012/12/06	525	NEL
		2012/10/11	457	NWL
		2012/06/13	295	NEL
HZMB 024		2013/03/18	601	NWL
		2012/06/13	295	NEL
HZMB 023		2014/11/17	1035	NWL
		2014/01/06	888	NWL
		2013/07/08	715	NWL
		2013/07/08	711	NWL
		2013/04/01	619	NWL
		2013/02/21	589	NWL
		2013/02/15	579	NWL
		2012/07/10	330	NWL
HZMB 022		2014/11/17	1035	NWL
		2014/08/04	991	NWL
		2014/01/06	888	NWL
		2013/10/24	827	NWL
		2013/07/08	715	NWL
		2013/07/08	711	NWL
		2013/04/01	619	NWL
		2013/02/21	589	NWL
		2013/02/15	579	NWL
		2012/07/10	330	NWL
HZMB 021	NL37	2012/07/10	330	NWL
		2011/09/16	Baseline	NWL
HZMB 020		2012/07/10	330	NWL
HZMB 019		2012/07/10	330	NWL
HZMB 018		2014/02/17	910	NWL
		2013/05/09	647	NWL
		2013/02/21	594	NEL
		2012/12/10	529	NEL
		2012/07/10	330	NWL
HZMB 017		2012/07/10	330	NWL

HZMB 016		2013/07/08	706	NWL
		2012/12/11	539	NWL
		2012/09/18	446	NWL
		2012/09/04	421	NWL
		2012/07/10	330	NWL
HZMB 015		2012/07/10	330	NEL
HZMB 014	NL176	2013/12/26	880	NWL
		2012/08/06	373	NWL
		2012/06/13	295	NEL
		2011/11/06	Baseline	NEL
		2011/11/01	Baseline	NEL
		2011/11/01	Baseline	NEL
HZMB 013		2012/05/28	281	NWL
HZMB 012		2012/05/28	281	NWL
HZMB 011	EL01	2013/02/22	597	NEL
		2013/02/21	592	NEL
		2013/02/14	572	NEL
		2012/11/06	517	NEL
		2012/09/19	452	NWL
		2012/03/31	261	NEL
		2011/11/02	Baseline	NWL
		2011/11/01	Baseline	NEL
HZMB 009		2012/05/28	281	NWL
HZMB 008		2012/05/28	281	NWL
HZMB 007	NL246	2012/12/10	529	NEL
HZMB 006		2013/02/21	594	NEL
		2012/12/11	539	NWL
		2012/11/01	495	NWL
		2012/03/29	250	NWL
HZMB 005		2013/11/09	860	NWL
		2013/11/07	858	NWL
		2013/10/15	813	NWL
		2012/12/10	532	NWL
		2012/08/06	374	NWL
		2012/05/28	287	NWL
HZMB 004		2012/09/04	421	NWL
		2012/03/31	262	NWL
HZMB 003	NL179	2013/10/15	812	NWL
		2013/06/25	697	NWL
		2012/12/10	529	NEL
		2012/03/31	261	NWL
		2011/11/06	Baseline	NEL
		2011/09/16	Baseline	NWL

HZMB 002	WL111	2014/05/31	951	NWL
		2013/12/26	878	NWL
		2013/12/19	863	NWL
		2013/11/01	839	NWL
		2013/10/15	819	NWL
		2013/09/24	798	NWL
		2013/02/14	573	NWL
		2012/12/11	536	NWL
		2012/12/11	535	NWL
		2012/10/12	466	NWL
		2012/10/24	475	NWL
		2012/05/28	281	NWL
		2012/03/29	250	NWL
HZMB 001	WL46	2014/08/25	997	NWL
		2013/08/21	771	NWL
		2013/06/13	681	NWL
		2013/04/01	617	NWL
		2013/02/14	573	NWL
		2012/03/29	250	NWL
	CH98	2011/11/02	Baseline	NWL
	NL11	2011/11/02	Baseline	NWL
		2011/11/07	Baseline	NWL
	NL12	2011/11/02	Baseline	NWL
	NL33	2011/09/23	Baseline	NWL
		2011/11/01	Baseline	NEL
		2011/11/05	Baseline	NWL
		2011/11/07	Baseline	NWL
	NL37	2011/09/16	Baseline	NWL
	NL46	2011/10/28	Baseline	NWL

HZMB 001 2012-03-18_10-52-16

HZMB 001 2012-03-18_11-07-00

HZMB 002 2012-06-12_10-29-16

HZMB 002 2012-07-12_13-58-22_04

HZMB 003 2012-12-10_11-20-34_02

HZMB 003 2013-04-29_11-24-53

HZMB 004 2012-03-18_10-54-28_01

HZMB 004 2012-09-04_09-24-54

HZMB 005 2012-03-18_10-51-26_01

HZMB 005 2012-12-10_15-49-53_04

HZMB 006 2012-03-18_11-21-16_02

HZMB 006 2012-06-12_10-41-00_02

HZMB 007 2012-03-18_11-06-40_01

HZMB 007 2013-04-29_11-45-01_02

HZMB 008 2012-05-28_09-14-06

HZMB 009 2012-05-28_09-15-02

HZMB 011 2013-02-21_16-56-38_02

HZMB 011 2013-05-29_12-43-48 _02

HZMB 012 2013-07-24_11-05-47_01

HZMB 013 2012-05-28_09-11-04_01

HZMB 013 2012-05-28_09-19-30_01

HZMB 014 2012-06-13_12-57-56_02 1C

HZMB 015 2012-07-10_10-22-28_02

HZMB 016 2012-06-12_10-24-34_02

HZMB 016 2012-06-12_10-30-52_01

HZMB 017 2012-07-10_10-31-34_03

HZMB 018 2013-02-21_17-10-34

HZMB 019 2012-07-10_10-42-50_01

HZMB 020 2012-07-10_10-43-22_02

HZMB 021 WL 2012-07-10_10-23-30

HZMB 022 2013-04-01_10-38-58

HZMB 022 WL_2013-04-29_11-33-24_02

HZMB 023 2013-02-21_13-23-54

HZMB 023 2013-04-01_10-43-27

HZMB 024 2012-06-14_13-09-40_04

HZMB 024 2012-06-14_13-12-02_01

HZMB 025 2012-12-06_11-44-34

HZMB 025 2013-02-21_16-49-44

HZMB 026 2012-07-16_14-02-34

HZMB 026 2013-05-09_09-46-55

HZMB 027 2012-06-14_13-33-40

HZMB 027 2012-07-16_13-54-40_04

HZMB 028 2013-04-01_16-02-43_02

HZMB 028 2013-04-01_16-15-16_01

HZMB 029 2012-08-25_11-57-08_01

HZMB 030 2012-08-25_11-57-04_03

HZMB 031 2012-08-25_11-58-40_01

HZMB 034 2012-07-11_12-44-32_01

HZMB 034 2013-02-21_16-49-34_02

HZMB 035 2012-11-01_11-59-54

HZMB 035 2013-02-15_15-03-24_03

HZMB 036 2012-11-01_11-37-20_01

HZMB 037 2012-11-01_11-47-18_03

HZMB 038 2012-11-01_11-40-32_01

HZMB 040 2013-02-21_13-19-31_02

HZMB 040 2013-02-21_13-27-55_01

HZMB 041 2013-05-09_12-03-33_01

HZMB 041 GA_2013-04-01_12-34-20

HZMB 042 2012-06-15_13-57-32_04

HZMB 042 2012-06-15_14-06-56_04

HZMB 043 2012-09-03_08-54-50_02

HZMB 044 2013-05-09_12-04-04_02

HZMB 044 GA_2013-04-01_14-34-02

HZMB 045 2012-06-15_13-53-00

HZMB 045 2013-02-15_14-58-16_01

HZMB 046 2012-09-03_10-21-44_03

HZMB 047 2012-07-17_12-21-34

HZMB 047 2012-07-17_12-22-54_02

HZMB 048 2012-09-03_15-33-04_03

HZMB 049 2013-06-14_10-25-43_03

HZMB 049 2013-06-14_10-26-45_03

HZMB 050 2013-02-15_14-59-04_03

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HZMB 051 2013-01-28_10-57-38

HZMB 051 2013-02-15_15-56-54_04

HZMB 052 2012-09-04_10-33-08

HZMB 053 2012-09-04_11-08-56_01

HZMB 054 2012-07-16_13-59-44_03

HZMB 054 2012-09-05_11-06-42_04

HZMB 055 2012-09-04_11-21-04_01

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HZMB 063 2012-10-12_14-54-50_03

HZMB 064 2012-10-12_14-54-48_01

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HZMB 068 2012-10-24_14-32-56_02

HZMB 069 2012-10-24_14-37-06

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HZMB 078 2013-02-15_15-03-16_03

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HZMB 082 2013-01-28_12-59-32_01

HZMB 082 WL 2013-02-15_14-57-44_02

HZMB 083 2013-02-15_15-00-38_03

HZMB 084 2013-02-14_15-54-46

HZMB 085 2013-02-15_14-45-40_02

HZMB 085 2013-05-29_12-44-11 _02

HZMB 086 2012-07-12_13-39-18_01

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HZMB 087 2013-02-15_14-58-54_04

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HZMB 088 2013-02-15_14-57-08_02

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HZMB 093 2013-05-24_13-47-19_01

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HZMB 094 2013-05-29_12-43-45 _01

HZMB 095 2013-06-13_13-39-12_03

HZMB 096 GA_2013-04-01_12-54-16

HZMB 097 2013-05-09_12-00-05_01

HZMB 097 2013-05-09_12-04-09

HZMB 098 2013-04-29_10-57-14_03

HZMB 098 WL_2013-07-12_10-08-01_01

HZMB 099 2013-06-13_10-00-39_01

HZMB 100 2013-07-08_09-34-44 _03

HZMB 100 2013-07-08_09-43-16 _03

HZMB 101 2013-07-08_09-35-35 _01

HZMB 101 WL 2013-07-08_09-42-35 _03

HZMB 102 2013-07-08_09-43-13

HZMB 103 2013-07-08_13-52-32 _02

HZMB 104 2013-07-08_14-00-59 _01

HZMB 104 2013-07-08_14-08-35 _02

HZMB 105 WL 2013-07-08_14-17-45

HZMB 106 WL_2013-08-21_09-37-43

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HZMB 107 2013-08-21_12-01-31_01

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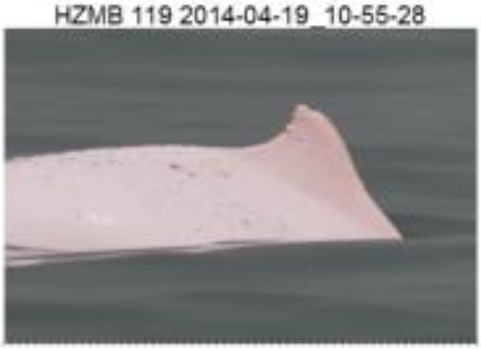

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HZMB 122 2014-08-04_09-34-18_01

HZMB 123 2014-08-25#2

HZMB 124 LL 2014-09-22_09-33-30

HZMB 125 2014-10-13_13-58-29_04 M

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for November / 2014 (year)

Project : Hong Kong – Zhuhai – Macao Bridge, Hong Kong Boundary Crossing Facilities – Reclamation Works Contract No.: HY/2010/02

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete (see Note 1)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste (see Note 4)	Others, e.g. general refuse (see Note 3)
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan-14	0.0000	0.0000	0.0000	0.0000	0.0000	1158.9828	0.0000	0.1680	0.0000	2.0000	0.0325
Feb-14	0.0000	0.0000	0.0000	0.0000	0.0000	1064.5957	0.0000	0.2520	0.0000	0.0000	0.0520
Mar-14	0.0000	0.0000	0.0000	0.0000	0.0000	1111.9982	0.0000	0.0000	0.0000	1.4000	0.1690
Apr-14	0.0000	0.0000	0.0000	0.0000	0.0000	1294.8080	0.0000	0.0000	0.0000	0.0000	0.0845
May-14	0.0000	0.0000	0.0000	0.0000	0.0000	1181.4168	0.0400	0.0240	0.0000	1.0000	0.2250
Jun-14	0.0000	0.0000	0.0000	0.0000	0.0000	752.7711	0.0000	0.1400	0.0000	8.8000	0.1690
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	6564.5726	0.0400	0.5840	0.0000	13.2000	0.7320
Jul-14	0.0000	0.0000	0.0000	0.0000	0.0000	1252.4373	0.0030	0.0340	0.0010	0.2000	0.2145
Aug-14	0.0000	0.0000	0.0000	0.0000	0.0000	1427.9730	0.0000	0.1960	0.0000	0.0000	0.0650
Sep-14	0.0000	0.0000	0.0000	0.0000	0.0000	1370.5108	0.0000	0.2240	0.0000	0.0000	0.1365
Oct-14	0.0000	0.0000	0.0000	0.0000	0.0000	1750.7552	0.0030	0.0410	0.0000	1.2000	0.0650
Nov-14	0.0000	0.0000	0.0000	0.0000	0.0000	1788.6110	342.6220	0.1790	0.0010	0.0000	0.0585
Dec-14											
Total	0.0000	0.0000	0.0000	0.0000	0.0000	14154.8599	342.6680	1.2580	0.0020	14.6000	1.2715

Notes: (1) Broken concrete for recycling into aggregates.

(2) Plastics refer to plastic bottles/ containers, plastic sheets/ foam from packaging materials.

(3) Use the conversion factor : 1 full load of dumping truck being equivalent to 6.5m^3 by volume.

(4) Chemical waste refer to spent “battery” and “oil with water”.

Appendix J

Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

Cumulative statistics on Exceedances

		Total no. recorded in this reporting quarter	Total no. recorded since project commencement
1-Hour TSP	Action	-	-
	Limit	-	-
24-Hour TSP	Action	-	-
	Limit	-	-
Noise	Action	-	-
	Limit	-	-
Water Quality	Action	1	2
	Limit	2	3
Dolphin Monitoring	Action	-	-
	Limit	-	-

Remarks: Exceedances which are not project-related are not presented in this table.

Cumulative statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

	Date Received	Subject	Status	Total no. received in this quarter	Total no. received since project commencement
Environmental complaints	15 September 2014	As informed by the Contractor on 15 Sept 14, there is an environmental complaint received on 29 August 14 by HyD. The complainant who lives at Tower 4, Melody Garden, Tuen Mun called reflecting environmental issues arisen from many sand barges in the waters facing her apartment. According to the complainant,	Closed	1	24

		sand was blown into her apartment because the barges were not covered and it was worse when sand was transferred from one vessel to another on conveyor belts. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.			
	22 September 2014	As informed by the Contractor on 22 September, a public complaint has been received by ICC on 9 September 2014 and it was referred to this Contract, the complainant raised concern about a large amount of general refuse such as food container and plastic bottles were observed on sea area off the Gold Coast, Tuen Mun. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.	Closed	2	25
	29 September 2014	An air quality complaint has been received by the Contractor on 29 September 2014 via email. The complaint was first received by EPD via email on 5 September 2014 and it was referred by EPD to the HZMB HK Project Management Office (Management Office) to handle the complaint directly on 10 September 2014 following the request of the complainant. The Management Office responded to the	Closed	3	26

		complainant directly on 17 September 2014. Subsequently, the complainant followed up with the response given by the Management Office and complained again on 26 September 2014. This follow up complaint was referred to the project team to investigate. The complainant complained that many of the sand barges did not stay at area of reclamation works near Chek Lap Kok or at the sea area near Tuen Mun River Trade Terminal but moored in the sea area close to Melody Garden. Sand were easily blown to the inside house during days with moderate wind. The complainant suggested that, sand barges should be requested to move away from residential areas and sand barges should be provided with cover fabric and sprinkling to minimise environmental pollution caused by sand. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.			
	14 October 2014	As informed by the Contractor yesterday, 14 October 2014, a follow up air quality complaint has been received by this Contract (same case to environmental complaint reported in the last	Closed	4	26A

		reporting month). The complainant complained that about 20-30 sand barges always moor at the sea area opposite to tower 4 of Melody Garden and Richland Garden. This problem has affected the air quality. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.			
	30 September 2014	With reference to RSS's letter ref.: 211036/(HY2010/02)/M05/432/B07 605 dated on 30 September 2014 pertaining the performance on barges operations at the sea area off the Tuen Mun Ferry Pier. A complaint concerning leakage of sand filling material from vessels at sea area off Tuen Mun Ferry Pier was first received by EPD from Tuen Mun District Council (TM DC) on 19 September 2014 and it was subsequently referred by EPD to the Highways Department to handle on 23 September 2014 through EPD's memo ref.: EP/RW/0000362128. Referring to EPD's Memo, it is also noted that some local residents at Tuen Mun expressed their concern that the stockpile of dusty sand material on the barges should be covered with impervious sheeting to avoid causing fugitive dust emissions of sand and dust. Subsequently, TM DC followed up their complaint	Closed	5	27

		with Highways Department on 17 October 2014. The follow up complaint concerning water quality impact at sea area off Tuen Mun area was referred to the project team to response on 17 October 2014. After investigation, there is no adequate information to conclude the observed impact is related to this Contract.			
Notification of summons	-	-	-	-	2
Successful Prosecutions	-	-	-	-	2

Appendix K – Event Action Plan

Event / Action Plan for Air Quality

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level				
Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Limit Level				
Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Construction Noise

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Action Level	1. Notify IEC and Contractor; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Water Quality

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Action level being exceeded by one sampling day	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Repeat measurement on next day of exceedance to confirm findings.	1. Check monitoring data submitted by ET and Contractor's working methods; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of non-compliance in writing; 2. Discuss with IEC on the proposed mitigation measures; 3. Make agreement on mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER; 5. Implement the agreed mitigation measures. 6. Amend working methods if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Action level being exceeded by two or more consecutive sampling days	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Action level; 8. Repeat measurement on next day of exceedance to confirm findings.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of non-compliance in writing; 2. Discuss with IEC on the proposed mitigation measures; 3. Make agreement on mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER within 3 working days of notification; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Limit level being exceeded by one sampling day	1. Repeat *in-situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Limit level being exceeded by two or more consecutive sampling days	1. Repeat *in-situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the ER accordingly.	1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Make agreement on the mitigation measures to be implemented; 5. Ensure mitigation measures are properly implemented; 6. Assess the effectiveness of the implemented mitigation measures; 7. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Take immediate action to avoid further exceedance; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER; 6. Implement the agreed mitigation measures; 7. Resubmit proposals of mitigation measures if problem still not under control; 8. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

Event / Action Plan for Dolphin Monitoring

Event	ET Leader	IEC	ER / SOR	Contractor
Action Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor.	1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If ER/SOR is satisfied with the proposal of any other measures, ER/SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the ER/SOR; 3. Implement the agreed measures.
Limit Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor of findings; 5. Check monitoring data;	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If ER/SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring

	6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.	by ET and Contractor and advise ER/SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly.	3. Supervise the implementation of additional monitoring and/or any other mitigation measures.	and/or any other mitigation measures.

Report No. **D007**
Monitoring Period **September 2014 - November 2014**

The Action and Limit Levels of Chinese White Dolphin (CWD) monitoring which was extracted from the enhanced Event and Action Plan[#] are reproduced below:

	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG<4.2) & (ANI<15.5)	(STG<6.9) & (ANI<31.3)
Limit Level	[(STG<2.4) & (ANI<8.9)] AND [(STG<3.9) & (ANI<17.9)]	

Quarterly Encounter Rate

	STG*	ANI**	Level Exceeded
NEL	0.0	0.0	Limit
NWL	2.1	7.1	

[#] Reference is made to the enhanced Event Action Plan for Chinese White Dolphin Monitoring accepted by EPD on 7 May 2013.

*Quarterly Encounter Rate of Number of Dolphin Sightings (STG) presents averaged encounter rates of the three monitored months in terms of groups per 100km per survey event.

**Quarterly Encounter Rate of Total Number of Dolphins (ANI) presents averaged encounter rates of the three monitored months in terms of individuals per 100km per survey event.

Investigation Results:

a) Causes of exceedance

- After review of all available and relevant data, including the raw data and analyses of other parameters included in the EM&A, no significant variation is detected in key environmental parameters.
- No direct relationship with Project construction activities can be found between either the increase or decrease of dolphin numbers in NEL.
- It was observed that both NEL and NWL areas have been affected by construction and transport activities which are not related to this Contract. These activities may cause impact to marine mammals, usually manifested as a shift in distribution although we do not yet know the long term effect of these activities which are not part of this Contract.
- Current mitigation measures are being upheld. Both day and night MMO and PAM systems have been fully implemented from the start of works of the Project.
- There has been no failure or reduction of dolphin-specific mitigation measures.
- A meeting between ENPO, project ET for this and other HZMB projects and engineer representatives was held on 9 December 2014 following the limit level/action level exceedances for Chinese white dolphin encounter rate during the period September-November 2014 to ascertain source of impact and mitigation processes. It was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors.

b) Action required under the action plan
Please refer to corresponding Event and Action Plan.

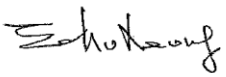
c) Action taken under the action plan
1. Statistical data analysis has been repeated to confirm findings;
2. All available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A have been reviewed;
3. Identification of souce of impact was carried out;
4. The IEC, ER and Contractor have been informed of findings;
5. Monitoring data have been checked;
6. Repeated review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary;
7. After investigation, there was no evidence that indicated that the reduced number of dolphins in NWL and NEL was related solely to Project works. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. Please also refer to the attachment for full investigation result.

d) ET's conclusions and recommendations for mitigation

- Current mitigation measures for CWD are being implemented fully, and the Contractor has been reminded to consistently implement exisiting mitigation measures.
- It was considered that the current monitoring works under the EM&A programmes have already provided a high level of monitoring effort, and that additional monitoring in the three monitoring areas was not considered necessary as it may not generate additional information regarding dolphin distribution pattern in these three areas. Instead, it was considered that existing data can be reviewed and alternative analytical methods can be explored to see if it could provide new insight to the dolphin distribution pattern.
- It was suggested that the protection measures (e.g., speed limit control) for the proposed Brothers Island Marine Park (BMP) shall be brought forward as soon as possible before its establishment so as to provide a better habitat for dolphin recovery. It was noted that under the Regular Marine Travel Route Plan, the contractors have committed to reduce the vessel speed in BMP. .

e) Contractor's actions to implement the mitigation

- The Contractor was reminded to ensure relevant mitigation measures were fully implemented.
- It was recommended that the marine works of HZMB projects should be accelerated and completed as soon as possible so as to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible.
- It was also recommended that the marine works footprint (e.g., reduce the size of peripheral silt curtain) and vessels for the marine works should be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible. The team for HY/2010/02 advised that the contractor was already using large capacity sand barge so as to reduce the number of vessel traffics, and had already submitted a proposal to resize the peripheral silt curtain.

ET Leader Signature & Date:  15-Apr-15

Report No. D007
Monitoring Period September - November 2014

Investigation Report Attachment

1. Review all available and relevant data (construction activities), including raw data and analyses of other parameters (air, noise, water and underwater acoustic) covered in the EM&A, to ascertain if differences are a result of natural variation or previously observed seasonal differences.

The data from noise levels and air quality from the reporting quarter were reviewed and no exceedence has occurred that are considered project related. The data from impact water quality monitoring (IWQM) from the reporting quarter were reviewed, Limit Level (LL) Exceedance of Turbidity, LL Exceedance of Suspended Solids were recorded at IS17 on 10 October 2014 during ebb tide and Action Level (AL) Exceedance of Suspended Solids was recorded at IS17 on 20 October 2014 during flood tide, which were considered related to this Contract.

For LL exceedances in SS and Turbidity recorded at IS17 on 10 October 2014, IWQM results recorded at IS17 during ebb tide on 13 October 2014 was reviewed and results shown that there was no recurrence of exceedance at IS17. For AL exceedance in SS recorded at IS17 on 20 October 2014 during flood tide, IWQM results recorded at IS17 during flood tide on 22, 24 and 27 October 2014 were reviewed and results shown that there was no recurrence of exceedance at IS17. The reported exceedances were short in duration and its effect was localized at location next to northern part of transect line 11. Recommendations were given and rectification has been carried out by the Contractor on 28 October 2014. Actions were taken under the action plan.

Since project related IWQM exceedances only recorded at IS17 on 10 and 20 October 2014, therefore in terms of its relative location with the transect line(s) for CWD monitoring, the IWQM exceedances were at location close to northern part of transect line 11 only. In addition, the reported exceedances were short in duration and its effect was localized, therefore it is unlikely that the LL exceedance in CWD monitoring is caused by the water quality exceedances observed in the reporting quarter.

A meeting between ENPO, project ET for this and other HZMB projects and engineer representatives were held on 9 December 2014 following the limit level/action level exceedances for Chinese white dolphin encounter rate during the period Sept-Nov 2014. On review of the AFCD annual monitoring data, it was advised that dolphins in Hong Kong waters may have re-distributed throughout Hong Kong waters and that data from all three monitoring sections and areas from outside these should be reviewed to give a better, overall picture of current dolphin distribution patterns.

In the last year there has been a consistent decrease of dolphins in the NEL and NWL areas when this Projects works have been conducted. It was concluded that the HZMB works is one of the contributing factors affecting the dolphins although it is also noted that there were also concurrent works which have been ongoing at the same time as many other works and activities which are not associated with HZMB. Some dolphins have been distributed outside the range of current monitoring for this project, as suggested by the AFCD monitoring data. Further, it was discussed that it was extremely difficult to attribute impact from any one of many abovementioned contributing factors and also, it is not possible to separate the impact caused by one part of the HZMB project from another. It was noted that there have been consistently less dolphins around the HZMB construction sites as all parts of the HZMB development have been initiated. These are in addition to the existing pressures the dolphins faced in

the Lantau habitat before the HZMB development started, e.g., boat traffic, habitat degradation, All mitigation across HZMB sites appears to have been fully implemented and for the HKBCF Reclamation Works, all dolphin mitigation measures in the form of vessel routes and speeds, etc., have been implemented. The meetings held subsequent to this period summarised that the combined impact of the HZMB should be considered and changes throughout the dolphins known range in Hong Kong.

2. Identify source(s) of impacts.

There is a documented significant population decline of the Hong Kong dolphin and, in 2008, an expert panel concluded that the anthropogenic activities which occur in the Hong Kong and adjacent habitat have the potential to affect the dolphin population through pollution, infection, lowered prey availability, intense and low noise levels, collisions, behavioural changes, disturbance, entanglement in fishing gear and habitat modification by activities such as construction, dredging, sewage disposal, industrial effluent discharge, shipping, reclamation, fishing. Since this review, pro-active management by AFCD has resulted in a reduction of the negative impacts caused by non-sustainable fishing, i.e., as the trawling ban progresses, more prey should be available to dolphins, and a general reduction in fishing activities will reduce the potential for entanglement in fishing gear. Other identified impacts, however, are ongoing and it is noted that construction activities and the high speed ferry traffic in NEL and NWL have both increased since 2008 (AFCD Annual Monitoring Reports 2009;2010;2011;2012;2013;2014). It is known from studies elsewhere that dredging and all piling activities cause significant disturbance to marine mammals (David 2006; Jefferson *et al.* 2009; Bailey *et al* 2010). These activities do not occur as part of this Project but may do elsewhere in the NEL and NWL areas as well as in Hong Kong and adjacent habitat. Activities which are stressful to dolphins are usually associated with increased underwater noise levels. HZMB works together with many other works and activities which do not belong to this Contract were being conducted concurrently may be a source of increased underwater noise levels in NEL and NWL include, but may not be limited to;

- HZMB Project marine construction work (all areas, some areas involve piling)
- Vessel traffic (from all construction works in the proximity of North Lantau). Also the adjacent waters are one of the world's busiest port facility with heavy shipping traffic.
- Other activities that may catalyse a shift in habitat use that is not noise related is an alteration in prey resources.
- Recent publications suggest that the health status of the dolphins in Hong Kong and adjacent waters may be poor due to the long term accumulation of pollutants therefore, making them more susceptible to new stressors (Gui *et al* 2014)

Following the meeting held on the 9 December 2014, the ET for HY/2010/02 advised that the contractor was already using large capacity sand barges so as to reduce the number of vessel traversing the north Lantau. Further, the suggestion during the meeting that protective measures (e.g., speed limit control) for the proposed Brothers Island Marine Park (BMP) shall be brought forward as soon as possible is currently being considered.

3. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise if additional measures are necessary.

Site inspection of the implementation of vessel speed limit, acoustic decoupling measures, spillage and runoff prevention measures on barges, training records related to regular marine travel routes for Contract's vessels, record of implementation of dolphin watching plan and silt curtain integrity checking record were conducted during weekly site inspection. The appropriate mitigation was in place depending on site activities, i.e., Dolphin Exclusive Zone for silt curtain laying (if any) and Dolphin Watching Plan for all other Project activities.

4. Investigate whether the exceedance was caused by any of the construction activity associated with the works contract.

No single construction works associated with the Project can be found to coincide with the observed dolphin encounter rates. As discussed at the series of meetings held, it was agreed that HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. However, All mitigation measures as detailed in the EM&A are being upheld and additional measures to restrict traffic number and routing have been proposed and, in some cases, already implemented for this Project.

It was noted that although activities for this Project are reducing, both NEL and NWL areas have also been affected by construction and transport activities which are not related to this project. It is not possible to separate individual activities, however, overall these activities may cause impact to marine mammals, in this instance a shift in distribution outside the monitoring area for this Project.

These factors were reported in D005 and D006, and the conclusions therein are still valid, that is, there are ongoing construction works, both Project related and not, which are known to impact dolphins. At this time, the long term impacts of these works cannot be assessed although expanding the scope of monitoring areas will provide better data on impacts outside the NEL and NWL zones.

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