

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 Summary Report for December 2015 to February 2016

[08/2016]

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22 August 2016

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. Paul Appleton

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 December 2015 to February 2016**

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for December 2015 to February 2016 certified by the ET Leader (ET's ref.: "60249820/C/RMKY16082201" dated 22 August 2016) and provided to us via e-mail on 22 August 2016.

We are pleased to inform you that we have no adverse comment on the captioned Quarterly Environmental Monitoring & Audit Report for December 2015 to February 2016.

Please be reminded that our verification to your report does not release any of your obligations in the EM&A Manual under the applicable Environmental Permit(s) for this Project.

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

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



Raymond Dai
Independent Environmental Checker

c.c.	HyD	Mr. Vico Cheung	(By Fax: 3188 6614)
	HyD	Mr. Wai-Ping Lee	(By Fax: 3188 6614)
	AECOM	Ms. Echo Leong	(By Fax: 2317 7609)
	CHEC	Mr. Lim Kim Chuan	(By Fax: 2578 0413)

Internal: DY, YH, ENPO Site

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EXECUTIVE SUMMARY

Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works (here below, known as “the Contract”) 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 11 April 2016 (EP-353/2009/K) and 13 March 2015 (EP-354/2009/D) (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 Contract).

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

Ramboll Environ Hong Kong Limited. 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 Contract 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 2017. 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 December 2015 and 29 February 2016. As informed by the Contractor, major activities in the reporting quarter were:-

Marine-base

- Rock fill
- Conforming Sloping Seawalls
- Maintenance of silt curtain & silt screen at sea water intake of HKIA
- Rubble Mound Seawall

Land-base

- Earthwork fill
- Surcharge removal & laying
- Deep Cement Mixing
- Removal of Temporary Seawall
- Vertical Band Drains
- Installations of Precast Culverts except sloping outfalls
- Geotechnical Instrumentation 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	17 sessions
1-hour TSP monitoring	17 sessions
Noise monitoring	14 sessions
Impact water quality monitoring	38 sessions
Impact dolphin monitoring	6 surveys
Joint Environmental site inspection	13 sessions

Breaches of Action and Limit Levels for Air Quality

All 1-Hour TSP and 24-Hour TSP results were below the Action and Limit Level in the reporting quarter.

Breaches of Action and Limit Levels for Noise

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

Breaches of Action and Limit Levels for Water Quality

For water quality monitoring, one (1) action level impact water quality monitoring exceedance at monitoring station IS(Mf)11 has been recorded on 28 December 2015 during flood tide. After investigation, there is no adequate information to conclude the recorded exceedance is related to this Contract; 2 limit level exceedances of turbidity level were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016; 2 action level exceedances of suspended solids were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016. No exceedance at other monitoring stations in the reporting quarter. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

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

A water quality complaint was referred to the ENPO at 10:22 am on the 4 December 2015 by EPD; ENPO referred this complaint to this Contract on the same day. With referred to the information provided by ENPO, EPD has contacted the complainant, and obtained the additional information from the complainant and it is suspected that the incident happened in the afternoon on 28 November 2015. A video was provided by the complainant who shows that turbid water behind a barge, the incident is suspected to be happened in the afternoon on 28 November 2015. After investigation, it is considered not related to this Contract.

No notification of summons or prosecution was received in the reporting period

1 INTRODUCTION

1.1 Background

- 1.1.1 Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works (here below, known as “the Contract”) 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).
- 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), January 2015 (EP-353/2009/H), July 2015 (EP-353/2009/I), February 2016 (EP-353/2009/J) and April 2016 (EP-353/2009/K). 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), December 2014 (EP-354/2009/C) and March 2015 (EP-354/2009/D).
- 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 11 April 2016 (EP-353/2009/K) and 13 March 2015 (EP-354/2009/D) (for TMCLKL Southern Landfall Reclamation only).
- 1.1.5 A Contract Specific EM&A Manual, which included all Contract -relation contents from the original EM&A Manuals for the Contract, 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 Contract).
- 1.1.7 China Harbour Engineering Company Limited (CHEC) was awarded by HyD as the Contractor to undertake the construction work of the Contract.
- 1.1.8 Ramboll Environ Hong Kong Limited 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 Contract 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 2017.
- 1.1.11 According to the Contract 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 Contract commenced on 12 March 2012.

1.2 Scope of Report

- 1.2.1 This is the sixteenth 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 Contract from 1 December 2015 to 29 February 2016.

1.3 Contract Organization

1.3.1 The Contract 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	Paul Appleton	3698 5889	2698 5999
IEC / ENPO (Ramboll Environ Hong Kong Limited)	Independent Environmental Checker	Raymond Dai	3465 2888	3465 2899
	Environmental Project Office Leader	Y. H. Hui	3547 2133	3465 2899
Contractor (China Harbour Engineering Company Limited)	Environmental Officer	Louie Chan	36932254	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-base

- Rock fill
- Conforming Sloping Seawalls
- Maintenance of silt curtain & silt screen at sea water intake of HKIA
- Rubble Mound Seawall

Land-base

- Earthwork fill
 - Surcharge removal & laying
 - Deep Cement Mixing
 - Removal of Temporary Seawall
 - Vertical Band Drains
 - Installations of Precast Culverts except sloping outfalls
 - Geotechnical Instrumentation 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 Contract is shown in Appendix B.
- 1.4.4 The general layout plan of the Contract 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 Contract 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 Contract 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 Contract 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 Contract Specific EM&A Manual. However, for monitoring location NMS3 (Ho Yu College), as proposed in the Contract 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. Reference is made to ET's proposal of relocation of air quality monitoring station (AMS7) dated on 2 February 2015, with no further comment received from IEC on 2 February 2015 and no objection received from EPD on 5 February 2015, the impact air quality monitoring station AMS7 (Hong Kong SkyCity Marriott Hotel) has been relocated to AMS7A (Chu Kong Air-Sea Union Transportation Company Limited) on 3 February 2015. Action Level for air quality, as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel, was adopted for this alternative air quality location.
- 2.1.4 As informed by the premises owner of (AMS7A) - Chu Kong Air-Sea Union Transportation Co. LTD would not grant us the permission to install air quality monitoring equipment (High volume sampler) and conduct 1-hour TSP/24 hour TSP monitoring at the premises of Chu Kong Air-Sea Union Transportation Co. LTD after December 2015. In order to fulfil the EM&A requirement of this Contract, as permission to conduct impact air quality monitoring at the premise of Hong Kong SkyCity Marriott Hotel has been granted in December 2015, ET proposed relocation of air quality monitoring station (AMS7A) on 15 December 2015, with no further comment received from IEC on 15 December 2015 and no particular comment received from EPD on 21 December 2015, the impact air quality monitoring station AMS7A (Chu Kong Air-Sea Union Transportation Company Limited) has been relocated to AMS7 (Hong Kong SkyCity Marriott Hotel) on 30 December 2015. The impact air quality monitoring for December 2015 was conducted before the relocation of AQM Station from AMS7A to AMS7. The impact air quality monitoring for January and February 2016 were conducted at AMS7 (Hong Kong SkyCity Marriott Hotel), Action Level for air quality, as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel will be adopted for this air quality monitoring location.
- 2.1.5 In accordance with the Contract 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.

- 2.1.6 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.
- 2.1.7 The monitoring locations used during the reporting quarter are depicted in Figures 2, 3 and 4 respectively.
- 2.1.8 The Contract 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/K and EP-354/2009/D) (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 Contract 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 AMS7A/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 As informed by the premises owner of (AMS7A) - Chu Kong Air-Sea Union Transportation Co. LTD would not grant us the permission to install air quality monitoring equipment (High volume sampler) and conduct 1-hour TSP/24 hour TSP monitoring at the premises of Chu Kong Air-Sea Union Transportation Co. LTD after December 2015. In order to fulfil the EM&A requirement of this Contract, as permission to conduct impact air quality monitoring at the premise of Hong Kong SkyCity Marriott Hotel has been granted in December 2015, ET proposed relocation of air quality monitoring station (AMS7A) on 15 December 2015, with no further comment received from IEC on 15 December 2015 and no particular comment received from EPD on 21 December 2015, the impact air quality monitoring station AMS7A (Chu Kong Air-Sea Union Transportation Company Limited) has been relocated to AMS7 (Hong Kong SkyCity Marriott Hotel) on 30 December 2015. The impact air quality monitoring for December 2015 was conducted before the relocation of AQM Station from AMS7A to AMS7. The impact air quality monitoring for January and February 2016 were conducted at AMS7 (Hong Kong SkyCity Marriott Hotel), Action Level for air quality, as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel will be adopted for this air quality monitoring location.
- 3.1.4 The weather was mostly fine and sunny, with occasional cloudy in the reporting quarter. The major dust source in the reporting quarter included construction activities from the Project, as well as nearby traffic emissions.
- 3.1.5 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		
		December 15	January 16	February 16
1-hr TSP	AMS2	18	18	15
	AMS3B	18	18	15
	AMS7A/7	18	18	15
24-hr TSP	AMS2	6	6	5
	AMS3B	6	6	5
	AMS7A/7	6	6	5

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

Monitoring Parameter	Location	Level of Exceedance	Numbers of Exceedance		
			December 15	January 16	February 16
1-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3B	Action	0	0	0
		Limit	0	0	0
	AMS7A/7	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	0	0

		Limit	0	0	0
	AMS7A/7	Action	0	0	0
		Limit	0	0	0
		Total	0	0	0

- 3.1.6 All 24-Hour TSP and 1-Hour TSP results were below the Action and Limit Level in the reporting quarter.
- 3.1.7 The event action plan is annexed in Appendix K.
- 3.1.8 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 December 2015, January 2016 and February 2016 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		
		December 15	January 16	February 16
	NMS2	5	4	5
	NMS3B	5	4	5

Table 3.4 Summary of Number of Monitoring Exceedances for Impact Noise

Monitoring Parameter	Location	Level of Exceedance	Level of Exceedance		
			December 15	January 16	February 16
	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.

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

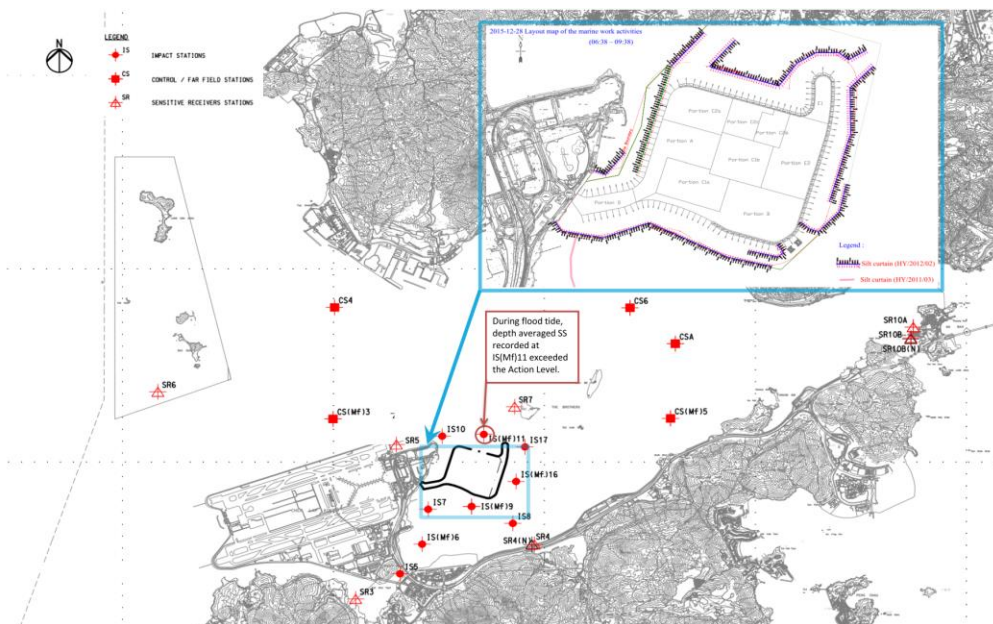
Table 3.5 Summary of Water Quality Exceedances in December 2015 – February 2016

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	0	0	0	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	0	(1) 5 Feb 16	0	(1) 5 Feb 16
	Limit	0	0	0	0	0	(1) 5 Feb 16	0	0	0	(1) 5 Feb 16
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	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)11	Action	0	0	0	0	0	0	0	(1) 28 Dec 15	0	(1) 28 Dec 15
	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	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR3	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR4(N)	Action	0	0	0	0	0	0	0	(1) 5 Feb 16	0	(1) 5 Feb 16
	Limit	0	0	0	0	0	(1) 5 Feb 16	0	0	0	(1) 5 Feb 16
SR5	Action	0	0	0	0	0	0	0	0	0	0
	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	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10B (N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
Total	Action	0	0	0	0	0	0	0	3		3
	Limit	0	0	0	0	0	2	0	0		2

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

3.3.2 One action level impact water quality monitoring exceedance has been recorded on 28 December 2015.

3.3.2.1 Layout map below shows the construction activities conducted during flood tide on 28 December 2015, no marine work or barge was working at north of HKBCF reclamation works near the sea area or area where IS(Mf)11 is located, therefore the construction activities was considered unlikely to cause the SS exceedances recorded at IS(Mf)11 during mid-flood tide on 28 December 2015.



3.3.2.2 Exceedance recorded at IS(Mf)11 during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.2.3 With reference to the silt curtain checking record, defects such as disconnection of the silt curtain was not observed at north part of the perimeter silt curtain which are close to the IS(Mf)11.

3.3.2.4 Furthermore, no filling activities was observed in progress at the sea area north to HKBCF reclamation works 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 IS(Mf)11. Also refer to the below photo record taken at sea area located north of HKBCF reclamation works on 28 December 2015 for reference of sea condition on 28 December 2015, which shows that no silt plume was observed.

3.3.2.5 Photo record which shows the sea condition at southern part of the HKBCF reclamation works on 28 December 2015. No silt plume was observed.



3.3.2.6 The turbidity data obtained on 28 December 2015 from monitoring station IS10 and IS(Mf)11, SR7 and IS17 which located at/near the vicinity of sea area at north of HKBCF reclamation works, did not exceed the action and limit level. This indicates the turbidity level at/near IS(Mf)11 was not adversely affected.

3.3.2.7 As such, the exceedance was likely due to local effects in the vicinity of IS(Mf)11.

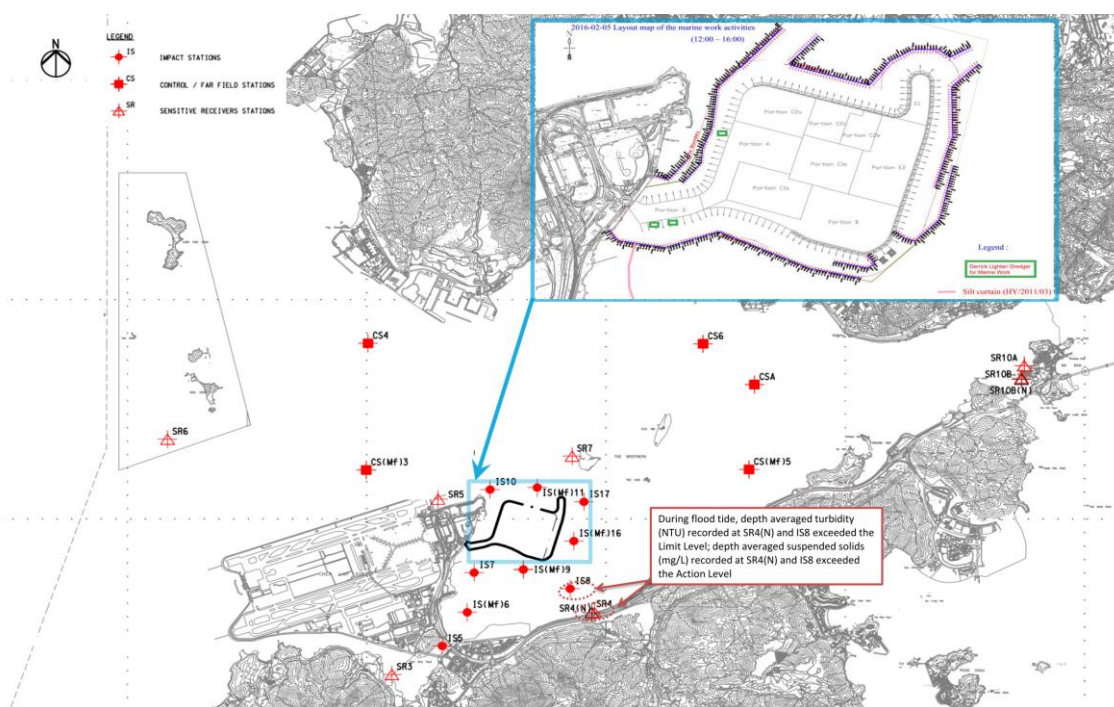
3.3.2.8 Action taken under the action plan:

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 exceedances were attributed to active construction activities of this Contract;
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.

3.3.2.9 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.

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

- 3.3.3 For water quality monitoring, 2 limit level exceedances of turbidity level were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016; 2 action level exceedances of suspended solids were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016. No exceedance at other monitoring stations in the reporting quarter.
- 3.3.3.1 Exceedances recorded at SR4(N) and IS8 during mid-flood tide are unlikely due to marine based construction activities of the Contract because:
- 3.3.3.2 With reference to the silt curtain checking record, no defect was observed at southern and southeastern parts of the perimeter silt curtain which are facing SR4(N) and IS8.
- 3.3.3.3 With referred to the layout map below, marine based construction works such box culverts and seawall construction were conducted at Portion D and Portion A respectively, however 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 during flood tide. (Also see below Photo record for sea condition observed on 5 February 2016 during flood tide.)



- 3.3.3.4 Photo record below which shows the sea condition at southern and southeastern part of the HKBCF reclamation works during flood tide on 5 February 2016.



- 3.3.3.5 Also, turbidity and suspended solids levels recorded at IS7, IS(Mf)9 and IS(Mf)16 were below the action and limit level. This indicates that the turbidity and suspended solids levels recorded at monitoring stations closer to the active works, were not adversely affected. As such, the exceedances recorded at SR4(N) and IS8 were unlikely attribute to the active works of this Contract.
- 3.3.3.6 With referred to the photo record taken at monitoring station IS8 on 5 February 2016 (also see below photo record) turbid water was observed at this area. However, with referred to the below photo record taken at southern and southeastern part of the HKBCF reclamation works during flood tide on 5 February 2016, turbid water was not noted. The photo record below shows that vessel activities was observed when monitoring was conducted at monitoring location IS8, as confirmed with the Contractor of HY/2010/02, this Contract did not have any construction vessels working outside the site boundary of Contract HY/2010/02 on 5 February 2016 (also refer to the below layout map).
- 3.3.3.7 Photo record below shows the sea condition taken on 5 February 2016 at monitoring location IS8 and facing monitoring station SR4(N), turbid water was observed at this area.



- 3.3.3.8 As shown below by the photo record taken on the 16 February 2016, the latest silt curtain position is within the area of the complete seawall and no more reclamation filling will be conducted by this Contract at the concerned area.



- 3.3.3.9 The exceedances were likely due to local effects in the vicinity of SR4(N) and IS8.
- 3.3.3.10 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.
- 3.3.3.11 Action taken under the action plan:
1. In situ measurement was repeated to confirm findings of the exceedance of turbidity.
 2. After considering the above mentioned investigation results, it appears that it is unlikely that the turbidity and suspended solids exceedances were attributed to active construction activities of this Contract;
 3. IEC, contractor and ER were informed via email;
 4. Monitoring data, all plant, equipment and Contractor's working methods were checked;

5-7. Since it is considered that the turbidity and suspended solid exceedances are unlikely to be contract related, as such, actions 5-7 under the EAP are not considered applicable.

- 3.3.3.12 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.
 - 3.3.3.13 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.
 - 3.3.3.14 The Contractor was reminded to adhere to the environmental permit requirement and undertake the necessary mitigation measures after the realignment of the perimeter silt curtain near southeastern corner of HKBCF Reclamation Works, as necessary.
- 3.3.4 The event action plan is annexed in Appendix K.

3.4 Dolphin Monitoring

- 3.4.1 In accordance with the Contract 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 December 2015 – February 2016

Number of Impact Surveys Completed^	6
Survey Distance Travelled under Favourable On- Effort Condition	642.4km
Number of Sightings	7 sightings (5 sightings are "on effort" (which are all under favourable condition), 2 sightings are "opportunistic")
Number of dolphin individual sighted	23 individuals (the best estimated group size)
Dolphin Encounter Rate#	NEL: 0 NWL: 1.2
Dolphin Group Size	Average of NEL: 0 Average of NWL: 3.3 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.

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.)

- 3.4.5 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.

Table 3.7 Summary of STG and ANI encounter rates in December 2015 – February 2016

	NEL	NWL	Level Exceeded
STG*	0	1.2	Limit
ANI**	0	4.5	

*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

- 3.4.6 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 Dark smoke was observed at portion C2a when a vessel was in operation. The Contractor was reminded to prevent. (Reminder)
- 3.5.4 Two idling generators were found at Portion B without proper NRMM labels. The Contractor was reminded to label the generator properly. Subsequently, the Contractor properly labelled one of the generator and the Contractor was reminded to label the another generator properly. As informed by the Contractor, another idle generator was provided with NRMM label and removed from site. (Closed)

Noise

- 3.5.5 No relevant adverse impact was observed in the reporting quarter.

Water Quality

- 3.5.6 Insufficient sand bund was observed at Portion C2b when DCM was conducted. The Contractor was reminded to provide sufficient bunding to prevent potential runoff. The Contractor subsequently enhanced sand bund at the works area. (Closed)
- 3.5.7 The Contractor was reminded to continue to carry out maintenance as necessary and ensure integrity of the perimeter silt curtain at all time. (Reminder)

Chemical and Waste Management

- 3.5.8 Chemical container was observed placing on bare ground at Portion C2b. The Contractor should provide drip trays as proper chemical container storage measure. Subsequently, the Contractor provided drip tray to oil drums. (Closed)
- 3.5.9 General refuse was observed on site, on ground at Portion D and on ground at portion C2a, the Contractor was reminded to clear the general refuse and keep the site clean and tidy. Subsequently, the Contractor collected and cleared the general refuse and kept the site clean and tidy. (Closed)
- 3.5.10 Bags of waste was observed, the Contractor was reminded to regularly clear bags of waste to keep the site clean and tidy. (Reminder)
- 3.5.11 Generator was observed without drip tray on barge San Han Bo 210, the Contractor was reminded to provide mitigation measure such as drip tray or bunding to generator. The Contractor subsequently provided bunding to the generator. (Closed)
- 3.5.12 Oil drums was observed without drip tray at Portion C2b, on barge 振明 93 and on barge 港龍, the Contractor was reminded to provided drip tray to oil drums. The Contractor subsequently removed the oil drums from the concerned area. (Closed)
- 3.5.13 A moveable lighting was observed without drip tray, the Contractor was reminded to provide preventive measures such as trip tray to the machine. The Contractor subsequently removed the machine from the area. (Closed)

3.5.14 Oil water mixture was observed accumulated inside bunding. The Contractor was reminded to regularly clear the oil water mixture accumulated inside drip tray. Subsequently, the Contractor removed the oil water mixture accumulated inside drip tray. (Closed)

3.5.15 Chemical container was observed without bunding. The Contractor was reminded to store chemical in bunded area. The Contractor subsequently removed the chemical container from the area. (Closed)

3.5.16 Wood materials were observed scattered at Portion C2a. The Contractor was reminded to regularly clear the materials and keep the site tidy. The Contractor subsequently assigned area for temporary storage of wood materials. (Closed)

Landscape and Visual Impact

3.5.17 No relevant adverse impact was observed in the reporting quarter.

Others

3.5.18 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

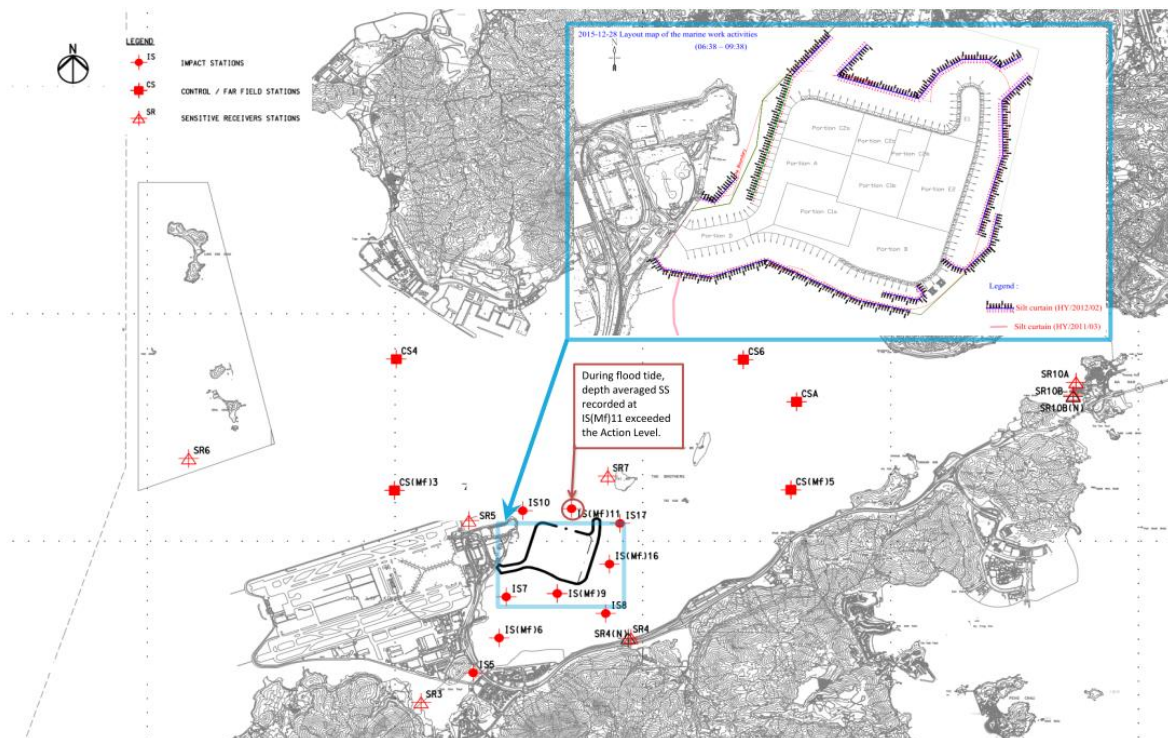
- 4.1.1 The Contractor registered as a chemical waste producer for this project. Sufficient numbers of receptacles were available for general refuse collection and sorting.
- 4.1.2 As advised by the Contractor, 81646.2m³ of fill were imported for the project use in the reporting period. 252kg of paper/cardboard packaging, 6,080kg of plastics, 800kg of chemical waste and 188.5m³ of general refuse were generated and disposed of in the reporting period. Monthly 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.
- 4.1.5 The treated marine sediment and/or treated excavated filling material specified by Contract no. HY/2013/01 has been received as public fill for Contract no. HY/2010/02's reclamation filling works since January 2015. As informed by the Contractor in the reporting quarter, such site arrangement has been discontinued since 24 February 2016.

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 reporting period.
- 5.1.7 As informed by the Contractor, 1 (one) number of any combination of floating concrete batching plants and floating grout production facilities was in operation between 25 Feb 2016 and 29 Feb 2016.

5.1.8 As informed by the Contractor on 23 December 2015, an oil spillage incident was observed near Cell No. 28 on 23 December 2015. For the location of the oil spillage recorded on 23 December 2015, also refer to the map shown below.



5.1.8.1 Details of the oil spillage incident (23 December 2015) including size, location, time of the spillage and Contractor's actions taken in response to the spill incident have been reviewed and summarised as follow:

- Oil on sea was observed on sea area near Cell No. 28 within perimeter silt curtain at 09:30 a.m. on 23 December 2015 by the Contractor and RSS (also refer to below layout map).
- The Contractor organised manpower to identify the spill source, but the source of oil spill was not identified.
- The Contractor equipped people involved in the cleanup works with personal protective equipment such as gloves prior to the removal of any leaked chemical or chemical waste.
- Pads and Pillow of the Spill Kit were applied to absorb and remove the spillage.

5.1.8.2 Impact water quality monitoring records of 23 December 2015 have been reviewed.

5.1.8.3 Observations and Results:

- Oil on sea was observed on sea area near Cell No. 28 within perimeter silt curtain at 09:30 a.m. on 23 December 2015 by the Contractor and RSS (also refer to above layout map).
- The following photo record shows the sea condition when the oil spillage on sea was observed.



5.1.8.4 The following actions were taken by the Contractor:

- The Contractor organized manpower to identify the spill source. During inspection, no construction vessel was observed around the concerned area and the source of oil spill was not identified.
- The oil spill was identified during inspection conducted by the Contractor and RSS on 23 December 2015 as discrete, non-continuous source with approximately 50m² spread. The below photo shows that the Contractor deployed absorption booms to remove the floating oil from water.



5.1.8.5 The below photos shows that the used absorption booms were collected using disposal bags as part of the spill kits item. The used absorption booms were disposed of as chemical waste by the Contractor.



5.1.8.6 The oil stain observed was limited at nearby southern sea area within the silt curtain.

5.1.8.7 No more sign of oil spillage was found on the nearby water after the clean-up.

5.1.8.8 Review of impact water quality monitoring data of 23 December 2015:

5.1.8.9 Monitoring stations IS7, IS(Mf)9, IS8, IS(Mf)6 and SR4(N) are the monitoring stations close to location of observed oil spill (also refer to above layout map). Impact water quality monitoring data recorded at monitoring station, IS7, IS(Mf)9, IS8, IS(Mf)6 and SR4 on 23 December 2015 were reviewed. There was no water quality exceedance recorded at IS7, IS(Mf)9, IS8, IS(Mf)6 and SR4(N) on 23 December 2015.

5.1.8.10 The Contractor was reminded to continue to follow the spill response plan when oil is observed on sea.

5.1.9 As informed by the Contractor, the perimeter silt curtain near Portion B of HKBCF has been arranged on 3 February 2016, IEC/ENPO was informed by ET on 3 February 2016. IEC/ENPO reminded the Project team on 18 Feb 2016 that notification to EPD should be made prior to each further removal of the perimeter silt curtain. On 22 February 2016, IEC/ENPO commented that water quality impact as a result of the concerned shifting of the perimeter silt curtain should be reviewed. ET reviewed the IWQM data and site condition at the concerned area.

5.1.9.1 The impact water quality monitoring data obtained after 3 February 2016 was reviewed and no Project related exceedance was observed.

5.1.9.2 As shown below by the photo record taken on the 16 February 2016 and it shows that the latest silt curtain position is within the area of the complete seawall. As informed by the Contractor, no more reclamation filling will be conducted by this Contract at the concerned area.



5.1.9.3 The situation is under ET's further review in the reporting period and a notification on the concerned site arrangement of the perimeter silt curtain of Contract HY/2010/02 will be given to the authority when the review is completed.

5.1.10 Oil spillage observed on 17 February 2016 at Sea surface near cell no.109

5.1.10.1 Details of the oil spillage incident (17 Feb 2016) including size, location, time of the spillage and Contractor’s actions taken in response to the spill incident have been reviewed and summarised as follow:

- The oil on sea was observed on 17 Feb 2016 by RSS and the Contractor. The incident was reported to ET, IEC and RSS.
- The Contractor organised manpower to identify the spill source, but the source of oil spill was not identified.
- The Contractor equipped people involved in the cleanup works with personal protective equipment such as gloves prior to the removal of any leaked chemical or chemical waste.
- Pads and Pillow of the Spill Kit were applied to absorb and remove the spillage.

5.1.10.2 Impact water quality monitoring records of 17 February 2016 have been reviewed.

5.1.10.3 Oil was observed on sea surface near steel cell no.109 within silt curtain at 11:00 a.m. on 17 Feb 2016 by the Contractor and the RSS. The following actions were taken by the Contractor:

5.1.10.4 The Contractor organised manpower to identify the spill source, the vessel (Luen Hing 638) located close to the oil spill was inspected but the source of oil spill was not identified.

5.1.10.5 The oil spill was identified during join site inspection conducted by the Contractor and RSS on 17 Feb 2016 as discrete, non-continuous source with approximately 20m² spread. Also refer to photo below:

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



5.1.10.7 Photo record shows that oil on sea was no longer observed at sea area near Cell 109. (Also refer to photo record below)



5.1.10.8 Monitoring stations IS10, SR5 and IS(Mf)11 are the monitoring stations close to location of observed oil spill. Impact water quality monitoring data record of IS10, SR5 and IS(Mf)11 during flood tide have been reviewed. There is no water quality exceedance recorded at IS10, SR5 and IS(Mf)11 on 17 February 2016 during flood tide.

5.1.10.9 The contractor was reminded to continue to follow the spill response plan when oil is observed on sea.

6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

6.1 Summary of Exceedances of the Environmental Quality Performance Limit

- 6.1.1 All 1-Hour TSP and 24-Hour TSP results were below the Action and Limit Level in the reporting quarter.
- 6.1.2 For construction noise, no exceedance was recorded at all monitoring stations in the reporting quarter.
- 6.1.3 For water quality monitoring, one (1) action level impact water quality monitoring exceedance at monitoring station IS(Mf)11 has been recorded on 28 December 2015 during flood tide. After investigation, there is no adequate information to conclude the recorded exceedance is related to this Contract; 2 limit level exceedances of turbidity level were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016; 2 action level exceedances of suspended solids were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016. No exceedance at other monitoring stations in the reporting quarter. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.
- 6.1.4 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.
- 6.1.5 A water quality complaint was referred to the ENPO at 10:22 am on the 4 December 2015 by EPD; ENPO referred this complaint to this Contract on the same day. With referred to the information provided by ENPO, EPD has contacted the complainant, and obtained the additional information from the complainant and it is suspected that the incident happened in the afternoon on 28 November 2015. A video was provided by the complainant who shows that turbid water behind a barge, the incident is suspected to be happened in the afternoon on 28 November 2015. After investigation, it is considered not related to this Contract.
- 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 A water quality complaint was referred to the ENPO at 10:22 am on the 4 December 2015 by EPD; ENPO referred this complaint to this Contract on the same day. With referred to the information provided by ENPO, EPD has contacted the complainant, and obtained the additional information from the complainant and it is suspected that the incident happened in the afternoon on 28 November 2015.

7.1.2.1 A video was provided by the complainant, the following photo is captured from the video which shows that turbid water was seen behind a barge, the incident is suspected to be happened in the afternoon on 28 November 2015.



7.1.2.2 Investigation actions:

- Review of the information (video and photo) provided by the complainant
- Checking whether there barge which is required to work at the concerned area for Contract HY/2010/02 HKBCF Reclamation Works in the afternoon on 28 November 2015.

7.1.2.3 Investigation results:

- By tracing the turbid water showed on the above photo, the source of turbid seawater is not from the inside or the near the site boundary Contract HY/2010/02 HKBCF Reclamation Works.
- In addition, after checking with the Contractor, there are no derrick/flat top barges travelled to or from the sea area adjacent to the north of Tung Chung Waterfront Road in the afternoon of 28 Nov 2015, as such, it is considered not related to this Contract.

7.1.2.4 Nevertheless, the Contractor was reminded to continue to fully maintain all water quality mitigation measures.

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

7.1.4 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.

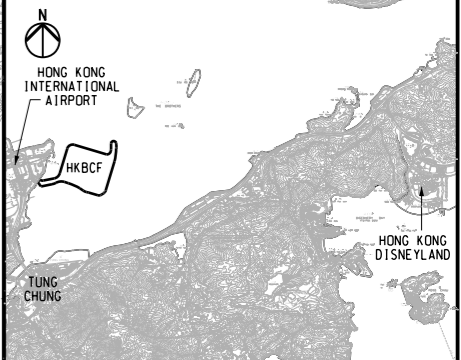
8.2 Recommendations on EM&A Programme

- 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 All 1-Hour TSP and 24-Hour TSP results were below the Action and Limit Level in the reporting quarter.
- 8.3.3 For construction noise, no exceedance was recorded at all monitoring stations in the reporting quarter.
- 8.3.4 For water quality monitoring, one (1) action level impact water quality monitoring exceedance at monitoring station IS(Mf)11 has been recorded on 28 December 2015 during flood tide. After investigation, there is no adequate information to conclude the recorded exceedance is related to this Contract; 2 limit level exceedances of turbidity level were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016; 2 action level exceedances of suspended solids were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016. No exceedance at other monitoring stations in the reporting quarter. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.
- 8.3.5 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.
- 8.3.6 Environmental site inspection was carried out 13 times in the reporting quarter. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.
- 8.3.7 A water quality complaint was referred to the ENPO at 10:22 am on the 4 December 2015 by EPD; ENPO referred this complaint to this Contract on the same day. With referred to the information provided by ENPO, EPD has contacted the complainant, and obtained the additional information from the complainant and it is suspected that the incident happened in the afternoon on 28 November 2015. A video was provided by the complainant who shows that turbid water behind a barge, the incident is suspected to be happened in the afternoon on 28 November 2015. After investigation, it is considered not related to this Contract.
- 8.3.8 No notification of summons or prosecution was received in the reporting quarter.
- 8.3.9 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.
- 8.3.10 The recommended environmental mitigation measures effectively minimize the potential environmental impacts from the Contract. 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.
- 8.3.11 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.

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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
- IntelBuild Technyx Asia Limited
- Tony Gee and Partners LLP

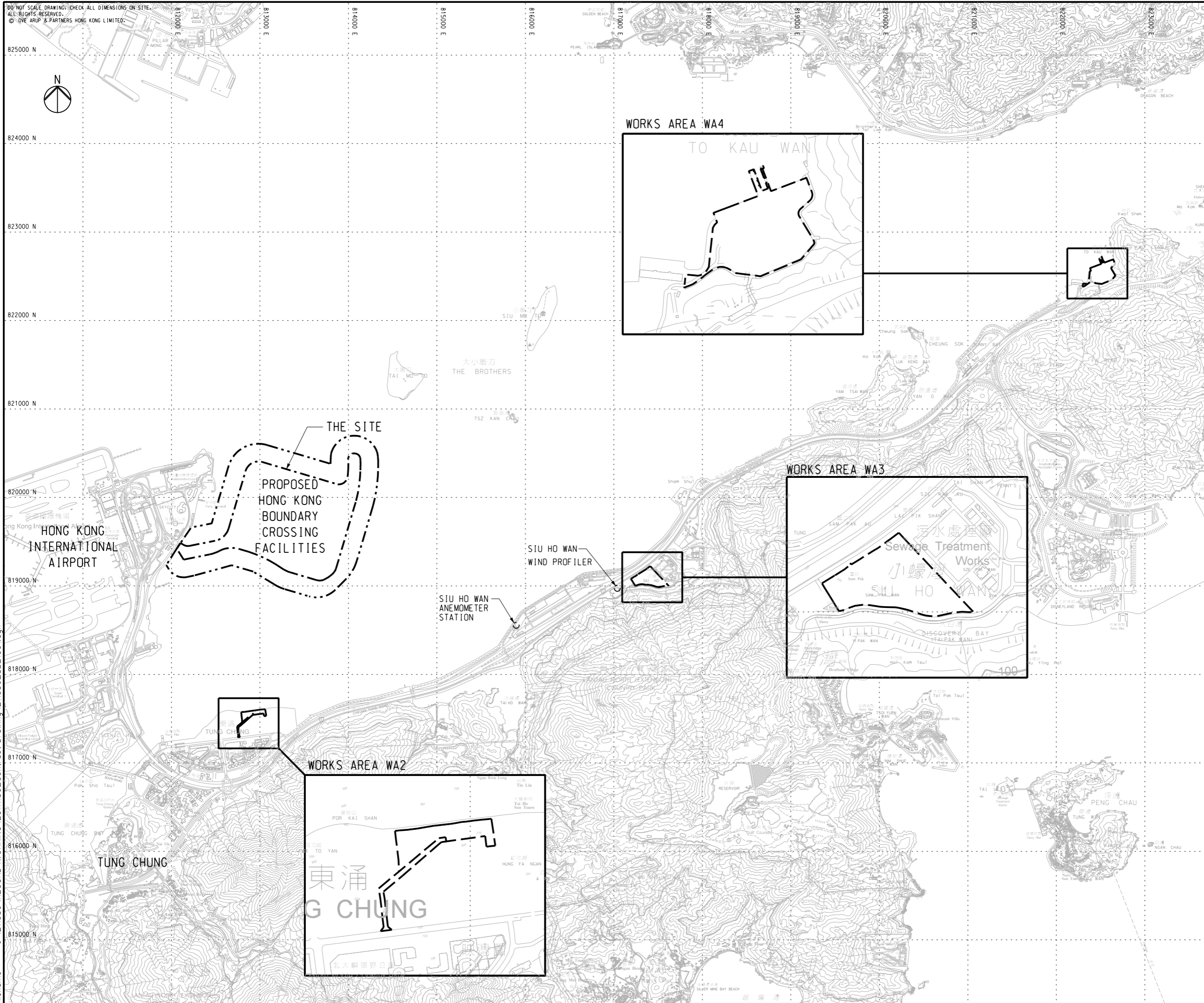
Contract No. and Title:
Contract No. HY/2010/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities
- Reclamation Works

Drawing title
KEY PLAN

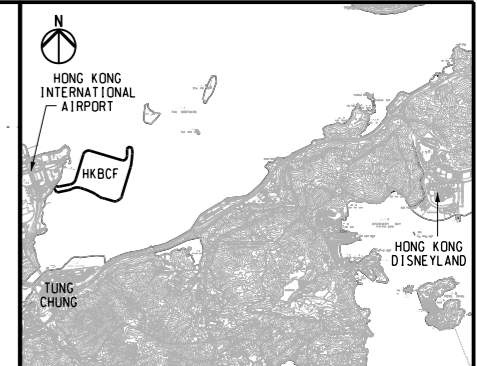
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Checked	KKY	Status	WORKING
Approved	DML	COPYRIGHT RESERVED	



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KEY PLAN

- NOTES**
- FOR LEGENDS AND NOTES FOR CHAIN LINK FENCE AND GATE REFER TO DRG NO. 211036/SL/1013.
 - 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.
 - FOR SETTING OUT COORDINATES OF DIFFERENT PORTIONS OF SITE REFER TO DRG NO. 211036/SL/1003.
 - ACCESS POINTS BETWEEN PORTIONS SHALL BE PROVIDED BY THE CONTRACTOR, AND THE LOCATIONS SHALL BE AGREED WITH THE ENGINEER ON SITE.
 - 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	○
	Intel:Build 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

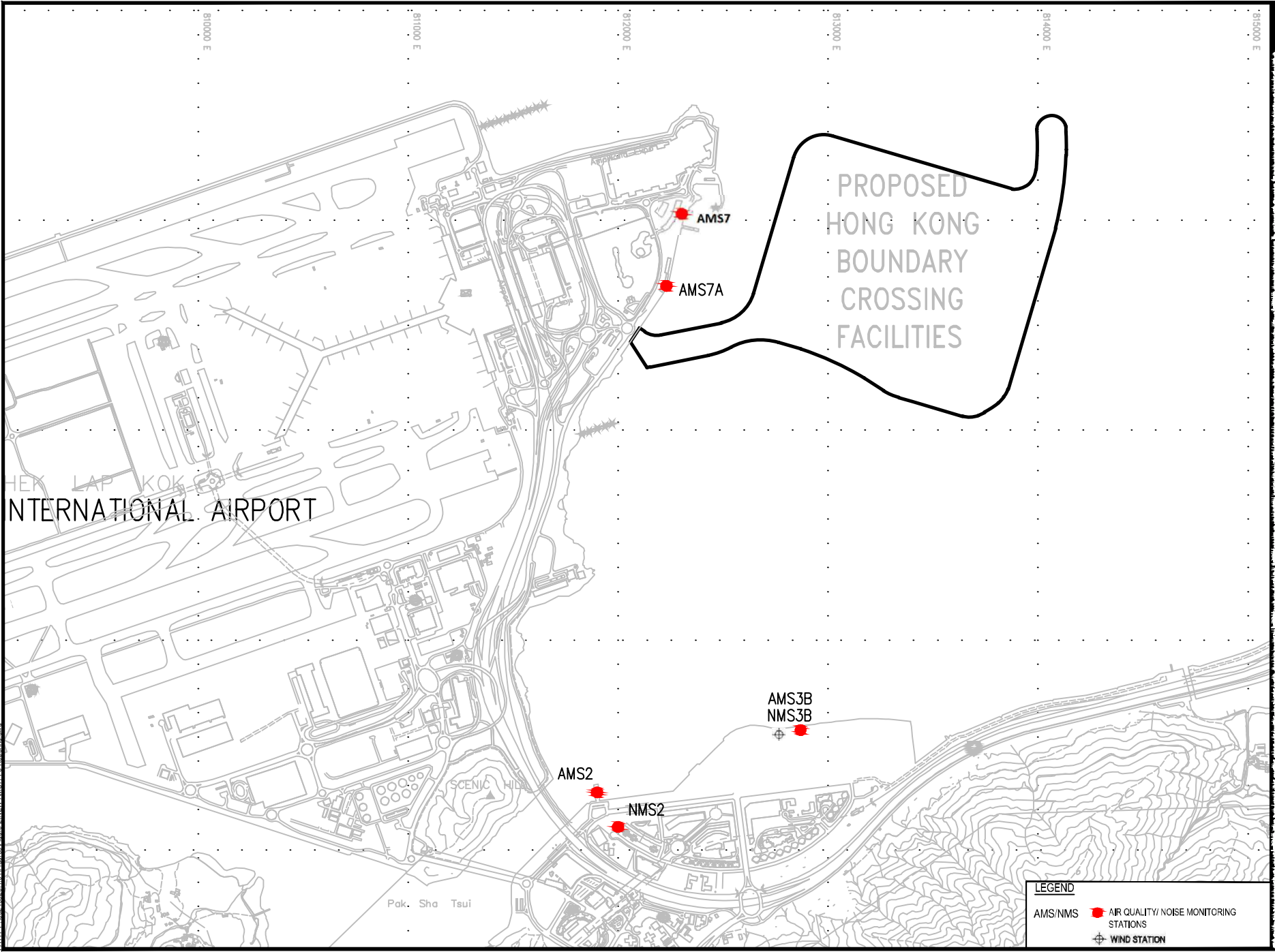
Drawing title
WORKS AREA LAYOUT
AND HOARDING PLAN
(SHEET 2 OF 3)

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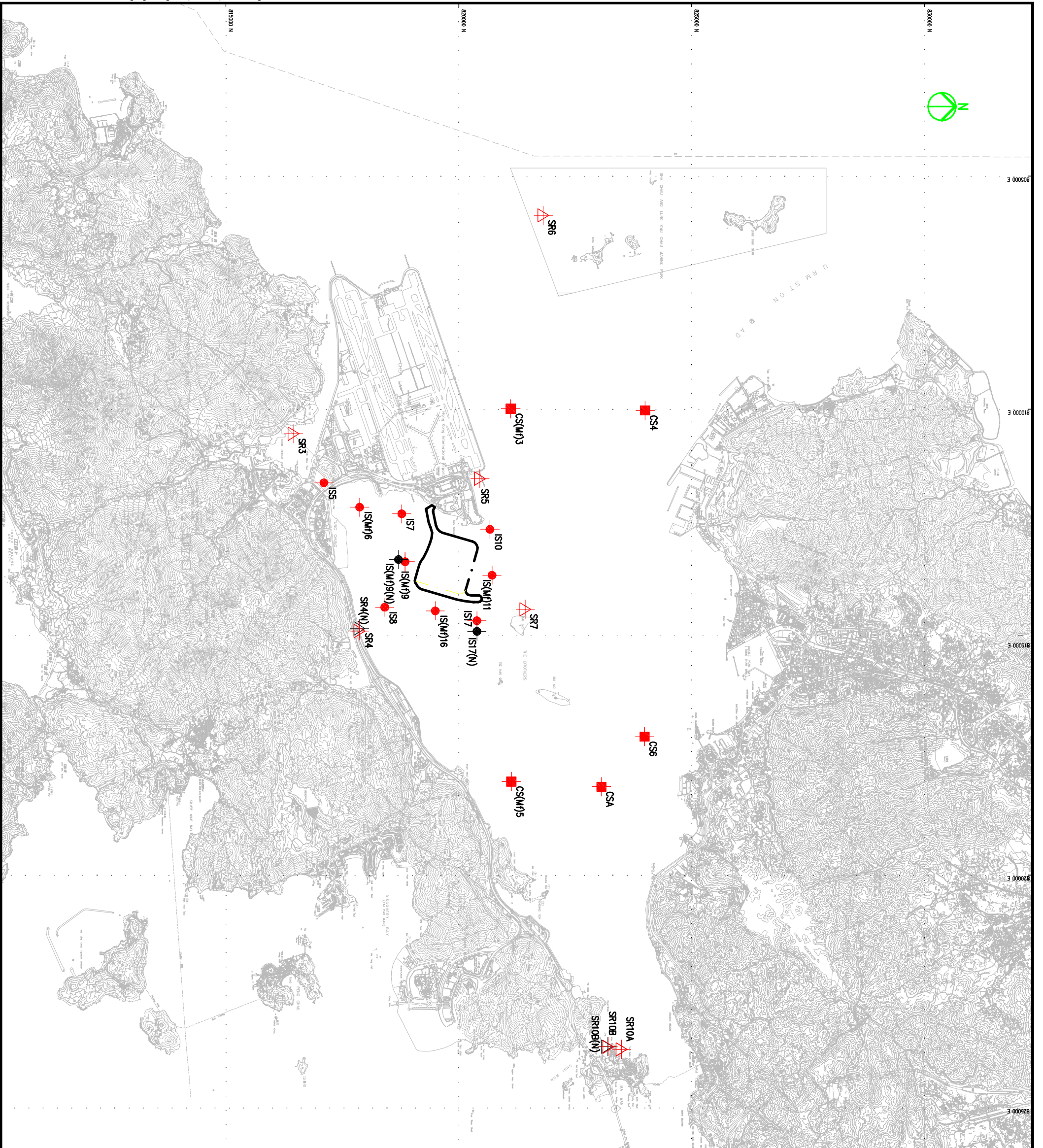
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 Hong Kong Project Management Office

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LEGEND	
AMS/NMS	AIR QUALITY/ NOISE MONITORING STATIONS
	WIND STATION

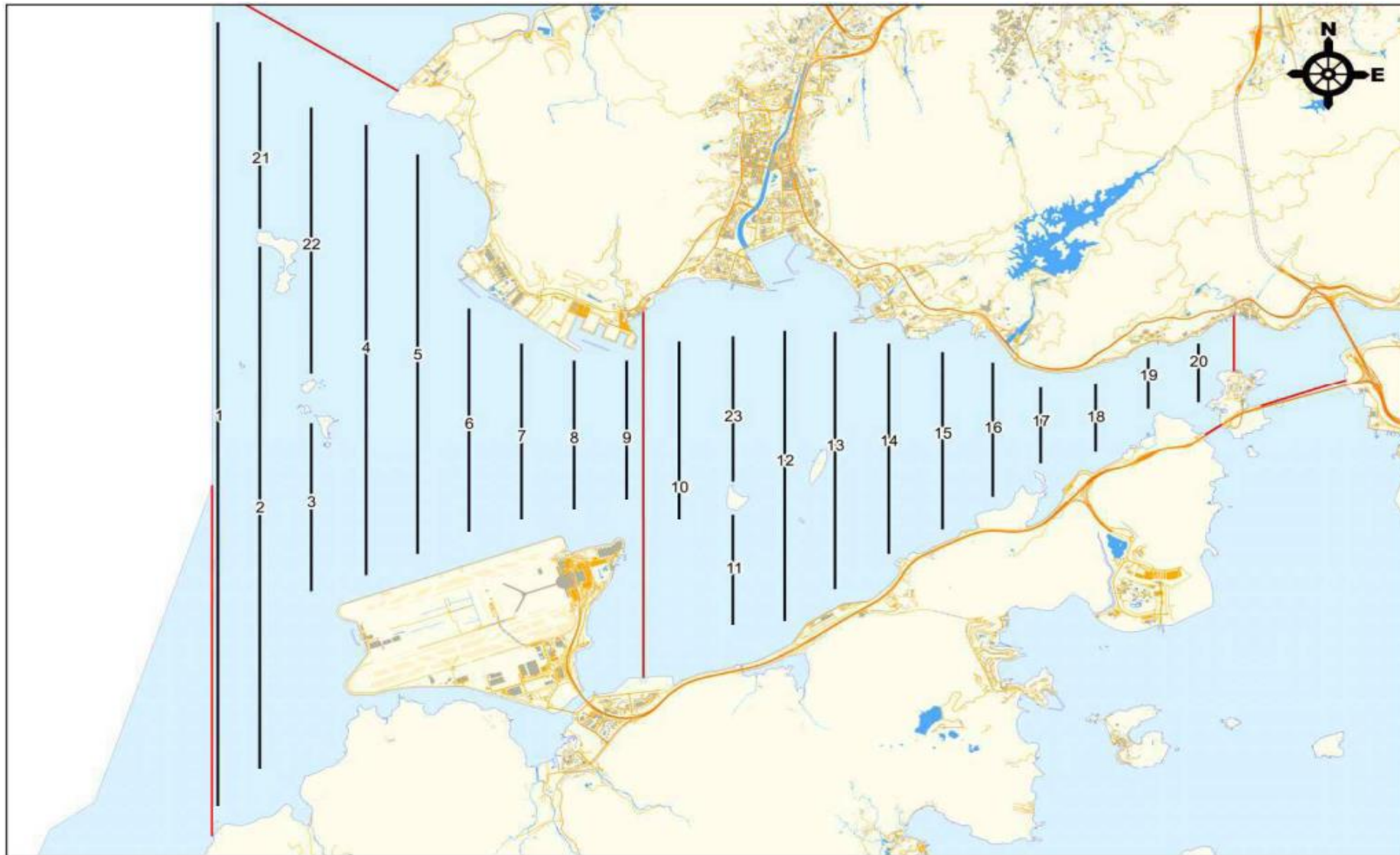


- LEGEND**
- IS IMPACT STATIONS
 - CS CONTROL / FAR FIELD STATIONS
 - SR SENSITIVE RECEIVERS STATIONS
 - SR SENSITIVE RECEIVERS STATIONS (RELOCATED)
 - IS IMPACT STATIONS (RELOCATED)

SETTING OUT SCHEDULE

MONITORING STATIONS	CO-ORDINATES	
	EASTING	NORTHING
IS5	811579	817106
IS(M)16	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

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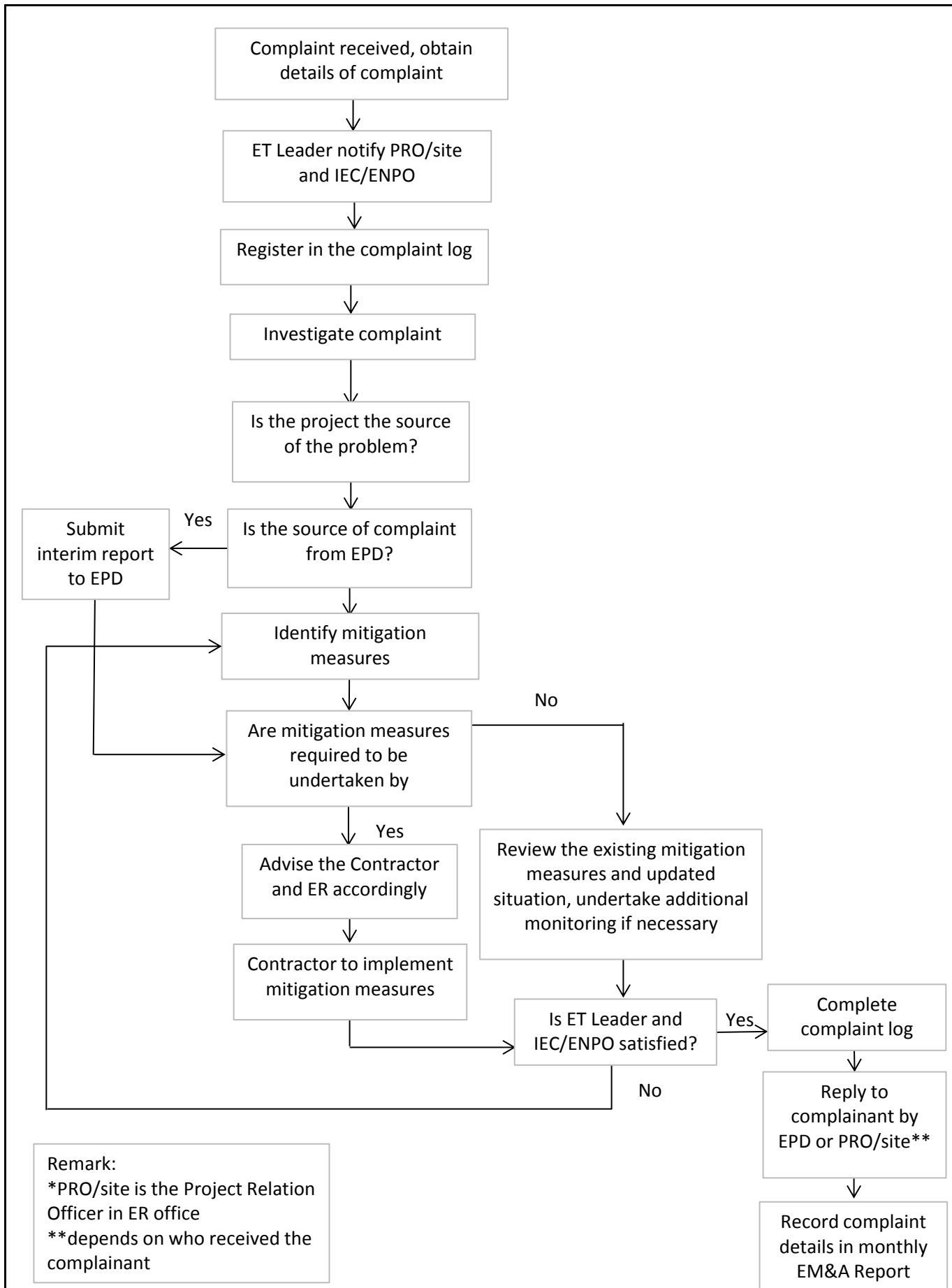


Remarks:

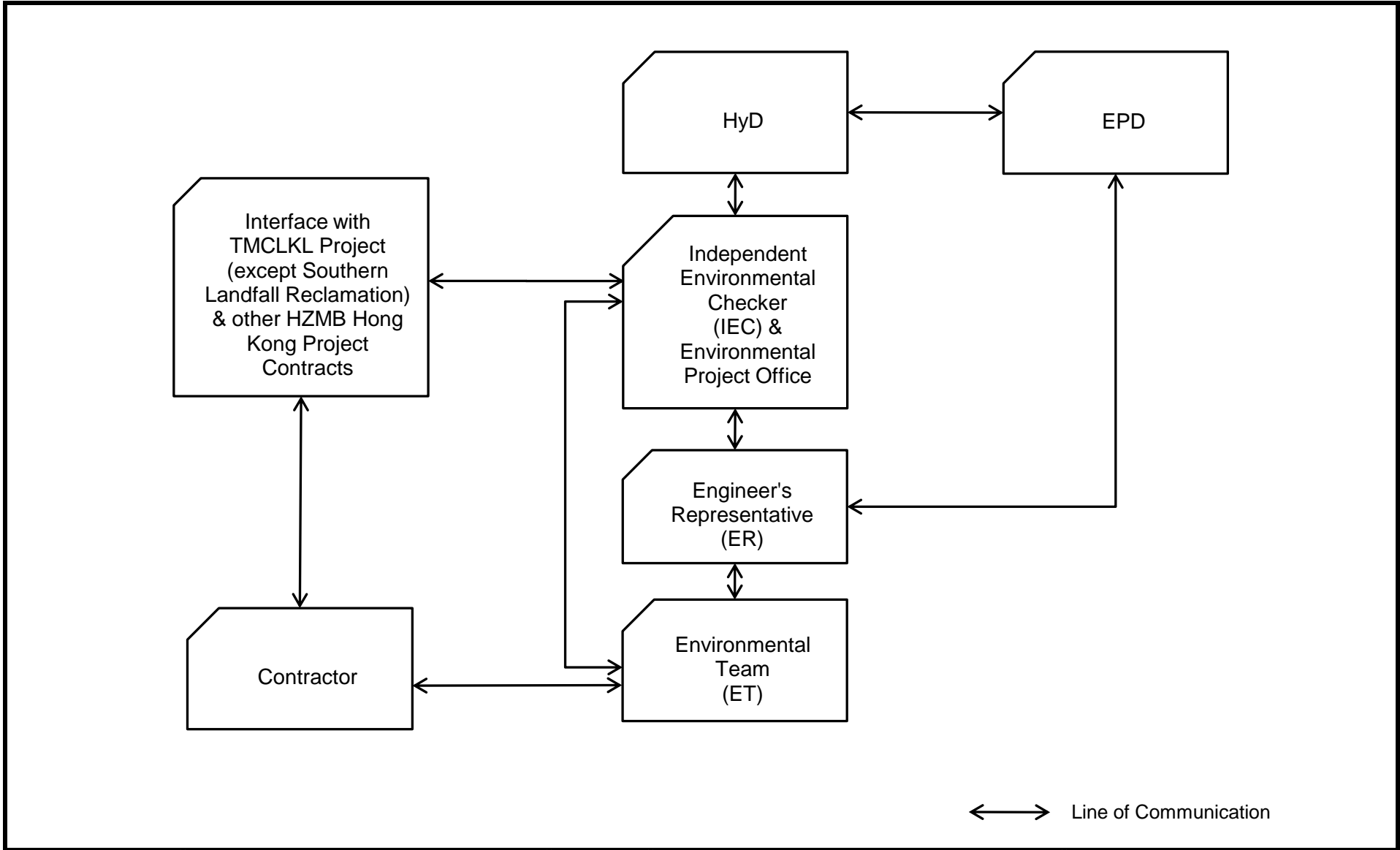
*Transect 10 is now 3.6km in length due to the HKBCF construction site.

^Coordinates for transect lines 1, 2, 7, 8, 9 and 11 have been updated in respect to the Proposal for Alteration of Transect Line for Dolphin Monitoring approved by EPD on 19 August 2015. The total transect length for both NEL and NWL combined is 108km.

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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
52nd_8 Monthly Progress Report Status as on 21Mar2016		1773	21-May-12 A	28-Feb-17																
Work Zone, as defined in PS Clause 1.03(6)		412	21-Jul-15 A	04-Sep-16																
Portion A, B, C & E		412	21-Jul-15 A	04-Sep-16																
Portion A, B, C & E		412	21-Jul-15 A	04-Sep-16																
Seawall		299	02-Sep-15 A	15-Jul-16																
Optimizing Rubble Mound Seawalls		205	09-Nov-15 A	04-Jun-16																
Rock Armour		205	09-Nov-15 A	04-Jun-16																
Seawall Portion A C120-C134 Ch5+050 - Ch5+650		205	09-Nov-15 A	04-Jun-16																
RFA0-010	PA at C118 - C134 Removal of Temporary Rockfill (170,000m3, 1,500m3/day)	140	09-Nov-15 A	30-Apr-16																
RFA0-020	PA at C118 - C134 Underlayer (21,600m3 1,000m3/day)	179	15-Nov-15 A	15-May-16																
RFA0-030	PA at C118 - C134 Rock Armour (1-3ton 30,840m3 & 0.3-1ton 14,466m3 244m3/day)	183	01-Dec-15 A	04-Jun-16																
Conforming Sloping Seawalls		299	02-Sep-15 A	15-Jul-16																
Rock Armour - Before Surcharge Period		299	02-Sep-15 A	15-Jul-16																
ACP1-00030	Precasting Accropode (18,092nos), 120nos/day	224	16-Nov-15 A	15-Jul-16																
Portion B At K028 - K039 (Ch1+102 - Ch1+600)		197	02-Sep-15 A	03-Apr-16																
BF-RFB1-040	PB at K028 - K039 in front of cells Removal of temporary rockfill 10205m3 190m3/day	141	02-Sep-15 A	20-Jan-16 A																
BF-RFB1-050	PB at K028 - K039 in front of cells Geotextile & Underlayer 10-60kg 15m/day	123	02-Nov-15 A	07-Mar-16 A																
BF-RFB1-060	PB at K028 - K039 in front of cells Rock Armour 0.3-1ton 11,244m3 244m3/day	107	01-Dec-15 A	03-Apr-16																
Portion E2 At K049 - C067 (Ch1+990 - Ch2+800)		239	12-Oct-15 A	10-Jun-16																
BF-RFE2-012	PE2 at K049 - K067 on cells Removal of temporary rockfill	193	12-Oct-15 A	25-Apr-16																
BF-RFE2-014	PE2 at K049 - K067 on cells Geotextile & Underlayer 10-60kg 11,733m3 200m3/day	203	17-Oct-15 A	10-May-16																
BF-RFE2-030	PE2 at K049 - K067 on cells Rock Armour 1-3ton 31,820m3 237m3/day	189	01-Dec-15 A	10-Jun-16																
BF-RFE2-040	PE2 at K049 - K067 in front of cells Removal of temporary rockfill 25,648m3	143	01-Dec-15 A	25-Apr-16																

■ Remaining Level of Effort ◆ Milestone
■ Actual Level of Effort ▼ Summary
■ Actual Work
■ Remaining Work
■ Critical Remaining Work

Contract No. Hong Kong - Zhuhai - Macao Bridge **Hong Kong Boundary Crossing Facilities - Reclamation Works**

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
BF-RFE2-050	PE2 at K049 - K067 in front of cells Geotextile & Underlayer 10-60kg 15m/day	127	01-Jan-16 A	10-May-16																
Portion C2c & C2b At C091 - C101 (Ch3+800 - Ch4+262)		182	01-Dec-15 A	03-Jun-16																
BF-RFC2c-010	PC2c at C091 - C101 on cells Removal of temporary rockfill	62	21-Jan-16 A	15-Apr-16																
BF-RFC2c-020	PC2c at C091 - C101 on cells Geotextile & Underlayer 10-60kg 12,393m3 200m3/day	62	28-Jan-16 A	30-Apr-16																
BF-RFC2c-030	PC2c at C091 - C101 on cells Rock Armour 2-5ton m3 25771m3 221m3/day	117	04-Feb-16 A	03-Jun-16																
BF-RFC2c-040	PC2c at C091 - C101 in front of cells Removal of temporary rockfill 41,188m3	51	01-Dec-15 A	20-Jan-16 A																
BF-RFC2c-052	PC2c at C091 - C101 Accropode Installation Trial stg1 180nrs 10nrs/day	24	19-Jan-16 A	15-Feb-16 A																
BF-RFC2c-054	PC2c at C091 - C101 Accropode Installation Stg2 900nrs 30nrs/day	16	16-Feb-16 A	02-Mar-16 A																
Reclamation		15	17-Nov-15 A	04-Dec-15 A																
Earthwork Fill		15	17-Nov-15 A	04-Dec-15 A																
Land Portion E1		15	17-Nov-15 A	04-Dec-15 A																
EFE1-010	PE1 Type D Earthwork Sand Fill upto +5.5mPD 118,263m3 5,000m3/day	16	17-Nov-15 A	04-Dec-15 A																
Surcharge		412	21-Jul-15 A	04-Sep-16																
Portion A Surcharge		8	12-Dec-15 A	20-Dec-15 A																
Edge Area From SOL offset within 180m to 50m		8	12-Dec-15 A	20-Dec-15 A																
SUEA0-199	Completion of Section A at Edge Area 0 - 40m	0		20-Dec-15 A																
CH5+110 to 5+440 Portion A North		8	12-Dec-15 A	20-Dec-15 A																
Area of 0 to 50m from Offset		8	12-Dec-15 A	20-Dec-15 A																
SUEA1-2185	PA North Area CH5+110 - CH5+440 Issue of Surcharge Removal	0		12-Dec-15 A																
SUEA1-2190	PA North 73m-10m Surcharge Sand Removal 80,000m3 10,000m3/day	8	12-Dec-15 A	20-Dec-15 A																
Land Portion B		411	22-Jul-15 A	04-Sep-16																
Edge Areas		344	27-Sep-15 A	04-Sep-16																
at K013 - K027		288	22-Nov-15 A	04-Sep-16																

- Remaining Level of Effort ◆ Milestone
- Actual Level of Effort ▼ Summary
- Actual Work
- Remaining Work
- Critical Remaining Work

52nd_8 Monthly Progress Report Status as on 21Mar2016

TASK filter: Three Month Rolling Programme (EP).

Contract No. Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016								
					Dec				Jan				Feb				Mar
					49				50				51				52
SUEB0-032	PB Edge Area K013-K027 Sand Surcharge Checking at +9.5mPD	23	22-Nov-15 A	14-Dec-15 A													
SUEB0-034	PB Edge Area K013-K027 Sand Surcharge upto 10.5mPD 38,102m3 5,000m3/day by Dump Trucks	7	15-Dec-15 A	22-Dec-15 A													
SUEB0-036	PB Edge Area K013-K027 Sand Surcharge Checking at +10.5mPD	9	23-Dec-15 A	31-Dec-15 A													
SUEB0-038	PB Edge Area K013-K027 Sand Surcharge up to 11.5mPD 38,103m3 5,000m3/day by Dump Trucks (8Jan2016)	4	01-Jan-16 A	05-Jan-16 A													
SUEB0-039	PB Edge Area K013-K027 Sand Surcharge Survey Inspection	3	06-Jan-16 A	08-Jan-16 A													
SUEB0-040	PB Edge Area K013-K027 Sand Surcharge Period at +11.5mPD 8mths (4Sep2016)	240	09-Jan-16 A	04-Sep-16													
at K028 - K035		296	27-Sep-15 A	18-Jul-16													
SUEB0-072	PB Edge Area K028-K035 Surcharge Strength Test Achievement (Await compliance for filling upto +11.5mPD)	91	27-Sep-15 A	26-Dec-15 A													
SUEB0-080	PB Edge Area K028-K035 Sand Surcharge Laying up to 11.5mPD 45,440m3 5,000m3/day by Dump Trucks	47	27-Dec-15 A	19-Feb-16 A													
SUEB0-090	PB Edge Area K028-K035 Sand Surcharge Period +11.5mPD 5mths	150	20-Feb-16 A	18-Jul-16													
at K047 - K052 (w Deep Cement Mixing)		210	17-Oct-15 A	13-May-16													
DCM-2070	PB Edge Area K047-K052 36-73m Surcharge Period 7mths (13May2016)	210	17-Oct-15 A	13-May-16													
Reclamation Areas		209	22-Jul-15 A	16-Feb-16 A													
at West of Main Area stg1		165	19-Aug-15 A	31-Jan-16 A													
SURB1-034	PB Main Area West final sand surcharge instruction of removal by RE	0	21-Jan-16 A														
SURB1-040	PB Main Area West-S Sand Surcharge Removal 291,223m3 10,000m3/day	154	19-Aug-15 A	31-Jan-16 A													
at West of Main Area stg2		170	01-Aug-15 A	31-Jan-16 A													
SURB2-040	PB Main Area West-N Sand Surcharge Removal 335,714m3 10,000m3/day	171	01-Aug-15 A	31-Jan-16 A													
at North- East of Main Area		209	22-Jul-15 A	16-Feb-16 A													
SURB3-030	PB Main Area North Sand Surcharge Period +11.5mPD 7mths (16Feb2016)	210	22-Jul-15 A	16-Feb-16 A													
Land Portion C2a		332	20-Sep-15 A	16-Aug-16													
Edge Areas		277	14-Nov-15 A	16-Aug-16													
Deep Cement Mixing Works at C101 - C103		266	21-Nov-15 A	12-Aug-16													

- Remaining Level of Effort
- Actual Level of Effort
- Actual Work
- Remaining Work
- Critical Remaining Work
- Milestone
- Summary

52nd_8 Monthly Progress Report Status as on 21Mar2016

TASK filter: Three Month Rolling Programme (EP).

Contract No. Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016								
					Dec				Jan				Feb				Mar
					49				50				51				52
DCM-3052	PC2a Edge Area C101-C103 CPT Test	23	21-Nov-15 A	13-Dec-15 A													
DCM-3060	PC2a Edge Area C101-C103 Filling up to +11.5mPD Surcharge (30m width, 14,607m3 5,000m3/day at DCM)	3	14-Dec-15 A	16-Dec-15 A													
DCM-3070	PC2a Edge Area C101-C103 Surcharge Period 8mths (Land Side) (12Aug2016)	240	17-Dec-15 A	12-Aug-16													
VO - Deep Cement Mixing Works at C104 - C107		102	01-Dec-15 A	12-Mar-16 A													
DCM-4140	PC2a Edge Area C104-C107 Hardening & Pause Period	30	01-Dec-15 A	30-Dec-15 A													
DCM-4150	PC2a Edge Area C104-C107 Filling up to +5.5mPD Type D (73m width, 17094m3) 5,000m3/day at DCM	12	31-Dec-15 A	13-Jan-16 A													
DCM-4155	PC2a Edge Area C104-C107 Completion of 0-43m	0		13-Jan-16 A													
DCM-4160	PC2a Edge Area C104-C107 Filling up to +8.5mPD Surcharge (30m width, 16889m3 5,000m3/day at DCM)	4	21-Jan-16 A	25-Jan-16 A													
DCM-4162	PC2a Edge Area C104-C107 Surcharge CPT Test	1	26-Jan-16 A	26-Jan-16 A													
DCM-4170	PC2a Edge Area C104-C107 Filling up to +11.5mPD Surcharge (30m width, 16889m3 5,000m3/day at DCM)	41	26-Jan-16 A	12-Mar-16 A													
VO - Deep Cement Mixing Works at C108 - C109		75	01-Dec-15 A	14-Feb-16 A													
DCM-5100	PC2a Edge Area C108-C109 Relocation of Cement Plant	7	01-Dec-15 A	07-Dec-15 A													
DCM-5110	PC2a Edge Area C108-C109 43m width Installation 471nrs 11nrs/day	39	08-Dec-15 A	15-Jan-16 A													
DCM-5120	PC2a Edge Area C108-C109 Hardening & Pause Period	30	16-Jan-16 A	14-Feb-16 A													
DCM-5130	PC2a Edge Area C108-C109 Filling up to +5.5mPD Type D (73m width, 8547m3) 5,000m3/day at DCM	2	01-Feb-16 A	02-Feb-16 A													
DCM-5140	PC2a Edge Area C108-C109 Completion of 0-43m	0		14-Feb-16 A													
at C110 - C112 Cellular Seawall		46	16-Jan-16 A	02-Mar-16 A													
VO - Deep Cement Mixing Works at C110 - C112		46	16-Jan-16 A	02-Mar-16 A													
DCM-4202	PC2a Edge Area C110-C112 Variation Order by the Engineer	0	16-Jan-16 A														
DCM-4210	PC2a Edge Area C110-C112 23m width Installation 597nrs 15nrs/day (w CNY)	47	16-Jan-16 A	02-Mar-16 A													
CH4+710 - CH5+110 Rubble Mound Seawall		277	14-Nov-15 A	16-Aug-16													
Deep Cement Mixing at CH4+710 - CH4+880		68	09-Dec-15 A	14-Feb-16 A													
DCM-5010	PC2a Ch4+710 - Ch4+880 DCM Mobilization from E2 K067	10	09-Dec-15 A	18-Dec-15 A													

- Remaining Level of Effort
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TASK filter: Three Month Rolling Programme (EP).

Contract No. Hong Kong - Zhuhai - Macao Bridge

Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
DCM-5012	PC2a Ch4+710 - Ch4+880 DCM Formation Level	6	19-Dec-15 A	24-Dec-15 A																
DCM-5020	PC2a Ch4+710 - Ch4+880 DCM Installation 111nrs 6nrs/day	24	25-Dec-15 A	17-Jan-16 A																
DCM-5030	PC2a Ch4+710 - Ch4+880 Hardening & Pause Period	28	18-Jan-16 A	14-Feb-16 A																
10-73m Ch4+880 - Ch5+010		264	27-Nov-15 A	16-Aug-16																
SUEC2a-1110	PC2a Ch4+880 - Ch5+010 Surcharge Sand to +11.5mPD 7,210m3 5,000m3/day	20	27-Nov-15 A	20-Dec-15 A																
SUEC2a-1120	PC2a Ch4+880 - Ch5+010 Surcharge Sand Period 8mths (16Aug2016)	240	21-Dec-15 A	16-Aug-16																
73-120m		240	14-Nov-15 A	10-Jul-16																
SUEC2a-2090	PC2a C113-C117 73m-120m Surcharge Sand Period 8mths (10Jul2016)	240	14-Nov-15 A	10-Jul-16																
Reclamation Areas		275	20-Sep-15 A	20-Jun-16																
C2aC1		240	25-Oct-15 A	20-Jun-16																
SURC2aC1-070	PC2a C2aC1 Sand Surcharge Period 8mths (20Jun2016)	240	25-Oct-15 A	20-Jun-16																
C2aC2		241	20-Sep-15 A	17-May-16																
SURC2aC2-070	PC2a C2aC2 Sand Surcharge Period 8mths (17May2016)	241	20-Sep-15 A	17-May-16																
Land Portion C1a		255	21-Jul-15 A	31-Mar-16																
Reclamation Areas		255	21-Jul-15 A	31-Mar-16																
C3		199	15-Sep-15 A	31-Mar-16																
SURC1a-025	PC1a North East Land Area Sand Surcharge Instruction Removal by RE	0	20-Dec-15 A																	
SURC1a-030	PC1a North East Land Area Sand Surcharge Removal 280,000m3 10,000m3/day	80	15-Sep-15 A	09-Dec-15 A																
SURC1a-040	PC1a North West Land Area Sand Surcharge Removal 297,616m3 10,000m3/day	101	10-Dec-15 A	31-Mar-16																
C4		239	21-Jul-15 A	16-Mar-16 A																
SURC1a-140	PC1a South East Land Area Sand Surcharge Period at +11.5mPD 7mths (15Feb2016)	210	21-Jul-15 A	15-Feb-16 A																
SURC1a-150	PC1a South West Land Area Sand Surcharge Period at +11.5mPD 8mths (16Mar2016)	240	21-Jul-15 A	16-Mar-16 A																
Land Portion C1b		209	16-Aug-15 A	12-Mar-16 A																

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TASK filter: Three Month Rolling Programme (EP).

Contract No. Hong Kong - Zhuhai - Macao Bridge

Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016			
					Dec				Jan		Feb	Mar
					49				50		51	52
Reclamation Areas		209	16-Aug-15 A	12-Mar-16 A								
West (1/4 Areas)		82	15-Sep-15 A	06-Dec-15 A								
SURC1b-024	PC1b West Instruction of Surcharge Removal stg2 by the Engioneer (Assumption)	0	06-Dec-15 A									
SURC1b-030	PC1b West Sand Surcharge Removal 336,434m3/10,000m3/day	77	15-Sep-15 A	06-Dec-15 A								
East (3/4 Areas)		55	07-Dec-15 A	31-Jan-16 A								
SURC1b-055	PC1b East Instruction of Surcharge Removal by the Engioneer (Assumption)	0	31-Jan-16 A									
SURC1b-060	PC1b East Sand Surcharge Removal 336,435m3 10,000m3/day	52	07-Dec-15 A	31-Jan-16 A								
SURC1b-095	Completion of Section PC1b	0		31-Jan-16 A								
North Side close to Portion C2b		209	16-Aug-15 A	12-Mar-16 A								
SURC1b-1030	PC1b Main Area Sand Surcharge Period as +11.5mPD 7mths (12Mar2016)	210	16-Aug-15 A	12-Mar-16 A								
North Side close to Portion C2c		188	01-Sep-15 A	07-Mar-16 A								
SURC1b-1080	PC1b Main Area Sand Surcharge Period as +11.5mPD 7mths (28Mar2016)	189	01-Sep-15 A	07-Mar-16 A								
Land Portion E2		368	16-Aug-15 A	17-Aug-16								
North Part		279	13-Nov-15 A	17-Aug-16								
Edge Areas - North (TM)		91	01-Jan-16 A	31-Mar-16								
SUEE2-440	PE2 North Edge TM Sand Surcharge Laying up to 8.5mPD 18248m3 5,000m3/day	15	01-Jan-16 A	18-Jan-16 A								
SUEE2-450	PE2 North Edge TM Sand Surcharge Period as +8.5mPD 4.5mths	8	19-Jan-16 A	26-Jan-16 A								
SUEE2-460	PE2 North Edge TM Surcharge CPT Test	8	19-Jan-16 A	26-Jan-16 A								
SUEE2-470	PE2 North Edge TM Sand Surcharge Laying up to +11.5mPD 18,248m3 5,000m3/day	56	27-Jan-16 A	31-Mar-16								
Edge Areas - East (TM) C064-C067		140	13-Nov-15 A	31-Mar-16								
SUEE2-130	PE2 East Edge C064-C067 Sand Surcharge Period as +8.5mPD 4.5mths	75	13-Nov-15 A	26-Jan-16 A								
SUEE2-135	PE2 East Edge C064-C067 Surcharge CPT Test	8	19-Jan-16 A	26-Jan-16 A								
SUEE2-140	PE2 East Edge C064-C067 Sand Surcharge Laying up to +11.5mPD 18,249m3 5,000m3/day	56	27-Jan-16 A	31-Mar-16								

<ul style="list-style-type: none"> █ Remaining Level of Effort █ Actual Level of Effort █ Actual Work █ Remaining Work █ Critical Remaining Work 	<ul style="list-style-type: none"> ◆ Milestone ▼ Summary 	<p>52nd_8 Monthly Progress Report Status as on 21Mar2016</p> <p>Page 6 of 23</p>	<p>TASK filter: Three Month Rolling Programme (EP).</p> <p style="text-align: right;"><i>Primavera Systems, Inc.</i></p>
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Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
Land Areas - West (C3)		272	20-Nov-15 A	17-Aug-16																
SURE2-170-50	PE2 Land C061-C064 Non-Tunnel Sand Surcharge non tunnel area Laying upto 11.5mPD stg2 60,000m3 5,000m3/day	53	20-Nov-15 A	20-Jan-16 A																
SURE2-180	PE2 Land C061-C064 Non-Tunnel Sand Surcharge Period as +11.5mPD non tunnel area 7mths	210	21-Jan-16 A	17-Aug-16																
South Part		247	16-Aug-15 A	18-Apr-16																
Edge Areas East C058 to C063		171	13-Oct-15 A	31-Mar-16																
SUEE2-025	PE2 Edge C058-C063 Sand Surcharge Strength Test	106	13-Oct-15 A	26-Jan-16 A																
SUEE2-030	PE2 Edge C058-C063 Sand Surcharge Laying up to +11.5mPD 62259m3 5,000m3/day	56	27-Jan-16 A	31-Mar-16																
VO DCM Edge Areas East C056 to C057		142	11-Nov-15 A	31-Mar-16																
DCM-4310	PE2 Edge C056-C057 43m width Installation 229nrs 10nrs/day	28	11-Nov-15 A	08-Dec-15 A																
DCM-4320	PE2 Edge C056-C057 Hardening & Pause Period	42	09-Dec-15 A	19-Jan-16 A																
DCM-4330	PE2 Edge C056-C057 Filling up to +5.5mPD Type D (73m width, 8,547m3) 5,000m3/day at DCM by Dump Trucks	5	11-Jan-16 A	15-Jan-16 A																
DCM-4340	PE2 Edge C056-C057 Completion of 0-43m with DCM	0		19-Jan-16 A																
DCM-4350	PE2 Edge C056-C057 Filling up to +8.5mPD Surcharge (30m width, 8,547m3) 5,000m3/day at DCM by Dump Trucks	2	20-Jan-16 A	21-Jan-16 A																
DCM-4360	PE2 Edge C056-C057 Surcharge CPT Test	10	22-Jan-16 A	31-Jan-16 A																
DCM-4370	PE2 Edge C056-C057 Filling up to +11.5mPD Surcharge (30m width, 8,547m3) 5,000m3/day at DCM by Dump Trucks	52	01-Feb-16 A	31-Mar-16																
Edge Areas East C052 to C055		141	16-Oct-15 A	05-Mar-16 A																
SURE2-420	PE2 Edge C052-C055 300m Zone Sand Surcharge Pause Period at 8.5mPD 4.5mths (27Feb2016)	135	16-Oct-15 A	27-Feb-16 A																
SURE2-425	PE2 Edge C052-C055 300m Zone Sand Surcharge CPT Test at 8.5mPD	7	28-Feb-16 A	05-Mar-16 A																
Land Areas		247	16-Aug-15 A	18-Apr-16																
300m to 100m Zone		210	22-Sep-15 A	18-Apr-16																
SURE2-530	PE2 Land C052-C056 300m Zone Sand Surcharge Period as +11.5mPD 7mths 18Apr2016	210	22-Sep-15 A	18-Apr-16																
Out of K052 300m		210	16-Aug-15 A	13-Mar-16 A																
SURE2-020	PE2 Land C052-C060 Non-Tunnel Sand Surcharge Period as +11.5mPD 7mths 13Mar2016	211	16-Aug-15 A	13-Mar-16 A																

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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016								
					Dec				Jan				Feb				Mar
					49				50				51				52
Land Portion E1		202	01-Dec-15 A	19-Jun-16													
Deep Cement Mixing C077 - C080 150m (Exclude VB & RS)		202	01-Dec-15 A	19-Jun-16													
DCM-4010	PE1 Edge Area DCM Mobilization from PC2a DCM plant and PE2 cement barge	7	01-Dec-15 A	07-Dec-15 A													
DCM-4020	PE1 Edge Area DCM Installation 415nrs 10nrs/day	30	08-Dec-15 A	06-Jan-16 A													
DCM-4050	PE1 Edge Area DCM Hardening	28	07-Jan-16 A	03-Feb-16 A													
DCM-4060	PE1 Edge Area DCM Filling upto +5.5mPD 25,000m3 5,000m3/day	6	28-Jan-16 A	03-Feb-16 A													
DCM-4080	PE1 Edge Area Surcharge Filling up to +8.5mPD (10,000m3) 10,000m3/day at interface of non DCM area	2	04-Feb-16 A	05-Feb-16 A													
DCM-4083	PE1 Edge Area Surcharge Pause Period 4.5mths at interface of non DCM area	135	06-Feb-16 A	19-Jun-16													
Edge Areas Excluded 150m of DCM Area		162	05-Dec-15 A	14-May-16													
SUEE1-005	PE1 Edge +5.5mPD Strength Test	9	05-Dec-15 A	13-Dec-15 A													
SUEE1-010	PE1 Edge Sand Surcharge Laying up to 8.5mPD 126,529m3 10,000m3/day	16	14-Dec-15 A	31-Dec-15 A													
SUEE1-020	PE1 Edge Sand Surcharge Period +8.5mPD 4.5mths	135	01-Jan-16 A	14-May-16													
Land Portion C2b		260	12-Sep-15 A	28-May-16													
Edge Areas		191	16-Nov-15 A	24-May-16													
SUEC2b-050	PC2b Edge Area PBF Surcharge w compaction upto 8.5mPD 12,054m3 5,000m3/day	52	16-Nov-15 A	10-Jan-16 A													
SUEC2b-060	PC2b Edge Area Surcharge Period as +8.5mPD 4.5mths	135	11-Jan-16 A	24-May-16													
Reclamation Areas		260	12-Sep-15 A	28-May-16													
North		210	01-Nov-15 A	28-May-16													
SURC2b-020	PC2b Main Area North Public Surcharge Period as +11.5mPD 7mths (28May2016)	210	01-Nov-15 A	28-May-16													
South		211	12-Sep-15 A	09-Apr-16													
SURC2b-034	PC2b Main Area South PBF Surcharge Period as +11.5mPD 7mths (9Apr2016)	211	12-Sep-15 A	09-Apr-16													
Land Portion C2c		296	27-Oct-15 A	17-Aug-16													
Edge Areas		173	20-Jan-16 A	10-Jul-16													

<ul style="list-style-type: none"> ■ Remaining Level of Effort ■ Actual Level of Effort ■ Actual Work ■ Remaining Work ■ Critical Remaining Work 	<ul style="list-style-type: none"> ◆ Milestone ▼ Summary 	<p>52nd_8 Monthly Progress Report Status as on 21Mar2016</p> <p>Page 8 of 23</p>	<p>TASK filter: Three Month Rolling Programme (EP).</p> <p style="text-align: right;"><i>Primavera Systems, Inc.</i></p>
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Contract No. Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016								
					Dec				Jan				Feb				Mar
					49				50				51				52
SUEC2c-010	PC2c Edge Area PBF Surcharge w compaction upto 8.5mPD 43,395m3 5,000m3/day	32	20-Jan-16 A	26-Feb-16 A													
SUEC2c-020	PC2c Edge Area PBF Surcharge Period +8.5mPD 4.5mths	135	27-Feb-16 A	10-Jul-16													
Reclamation Areas		296	27-Oct-15 A	17-Aug-16													
West		210	27-Oct-15 A	23-May-16													
SURC2c-W030	PC2c Main Area PBF Surcharge Period 7mths (23May2016)	210	27-Oct-15 A	23-May-16													
East		272	20-Nov-15 A	17-Aug-16													
SURC2c-E020	PC2c Main Area Sand Surcharge Laying upto 11.5mPD stg2 109,120m3 5,000m3/day by Dump Trucks	53	20-Nov-15 A	20-Jan-16 A													
SURC2c-E030	PC2c Main Area PBF Surcharge Period 7mths (17Aug2016)	210	21-Jan-16 A	17-Aug-16													
Geotechnical Instrumentation Works		29	17-Nov-15 A	20-Dec-15 A													
Geotechnical Instrumentation Works for Seawalls		13	05-Dec-15 A	20-Dec-15 A													
Cluster Type SD 26hrs Instrumentation and CPT Cluster behind cells		13	05-Dec-15 A	20-Dec-15 A													
Portion E1		13	05-Dec-15 A	20-Dec-15 A													
SD-13 C071		13	05-Dec-15 A	20-Dec-15 A													
CTSD-130	Installation of SD-13 (C071) PE1	13	05-Dec-15 A	20-Dec-15 A													
SD-14 C074		13	05-Dec-15 A	20-Dec-15 A													
CTSD-140	Installation of SD-14 (C074) PE1	13	05-Dec-15 A	20-Dec-15 A													
SD-15 C078		13	05-Dec-15 A	20-Dec-15 A													
CTSD-150	Installation of SD-15 (C078) PE1	13	05-Dec-15 A	20-Dec-15 A													
SD-16 C084		13	05-Dec-15 A	20-Dec-15 A													
CTSD-160	Installation of SD-16 (C084) PE1	13	05-Dec-15 A	20-Dec-15 A													
SD-17 C089		13	05-Dec-15 A	20-Dec-15 A													
CTSD-170	Installation of SD-17 (C089) PE1	13	05-Dec-15 A	20-Dec-15 A													
Geotechnical Instrumentation Works for Reclamation RA & RB		29	17-Nov-15 A	20-Dec-15 A													

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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
Settlement Marker Type 2		29	17-Nov-15 A	20-Dec-15 A																
SMT2-100	M2 - Installation of Settlement Marker Type2 at PE1	29	17-Nov-15 A	20-Dec-15 A																
Portion D		263	01-Aug-15 A	07-Apr-16																
Precast Yard for Seawall Blocks & Culverts		146	01-Aug-15 A	25-Dec-15 A																
Concrete Blocks		141	01-Aug-15 A	20-Dec-15 A																
PD-PY1-0200	Precast Seawall Blocks for Permanent construction 1,990hrs (3,180 - 1190)	142	01-Aug-15 A	20-Dec-15 A																
Culverts		34	21-Nov-15 A	25-Dec-15 A																
Culverts EC1		34	21-Nov-15 A	25-Dec-15 A																
EC1-6		14	21-Nov-15 A	05-Dec-15 A																
PY-EC1-06060	PD EC1-06 Base Curing	15	21-Nov-15 A	05-Dec-15 A																
EC1-7		14	01-Dec-15 A	15-Dec-15 A																
PY-EC1-07050	PD EC1-07 Base Removal of Formwork	2	08-Dec-15 A	09-Dec-15 A																
PY-EC1-07060	PD EC1-07 Base Curing	15	01-Dec-15 A	15-Dec-15 A																
EC1-8		30	25-Nov-15 A	25-Dec-15 A																
PY-EC1-08020	PD EC1-08 Base Reinforcement	7	25-Nov-15 A	01-Dec-15 A																
PY-EC1-08030	PD EC1-08 Base Formwork	7	02-Dec-15 A	08-Dec-15 A																
PY-EC1-08040	PD EC1-08 Base Concrete	2	09-Dec-15 A	10-Dec-15 A																
PY-EC1-08050	PD EC1-08 Base Removal of Formwork	2	18-Dec-15 A	19-Dec-15 A																
PY-EC1-08060	PD EC1-08 Base Curing	15	11-Dec-15 A	25-Dec-15 A																
Site Construction		158	14-Nov-15 A	07-Apr-16																
C1 to C4		158	14-Nov-15 A	07-Apr-16																
Installations of Precast Culverts except sloping outfalls		95	29-Nov-15 A	03-Mar-16 A																
Culvert C1		95	29-Nov-15 A	03-Mar-16 A																

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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016								
					Dec				Jan				Feb				Mar
					49				50				51				52
C1-2		61	25-Dec-15 A	24-Feb-16 A													
PD-C1-2-060	PD C1-2 Removal of South Steel Bulkhead	4	21-Jan-16 A	24-Jan-16 A													
PD-C1-2-070	PD C1-2 Manhole Insitu concrete	4	25-Dec-15 A	28-Dec-15 A													
PD-C1-2-120	PD C1-2 Backfill Manhole upto +5.5mPD	4	21-Feb-16 A	24-Feb-16 A													
C1-3		3	25-Feb-16 A	28-Feb-16 A													
PD-C1-3-120	PD C1-3 Backfill Manhole upto +5.5mPD	4	25-Feb-16 A	28-Feb-16 A													
C1-4		3	29-Feb-16 A	03-Mar-16 A													
PD-C1-4-120	PD C1-4 Backfill Manhole upto +5.5mPD	4	29-Feb-16 A	03-Mar-16 A													
C1-5		25	29-Nov-15 A	24-Dec-15 A													
PD-C1-5-070	PD C1-5 Manhole Insitu concrete	4	29-Nov-15 A	02-Dec-15 A													
PD-C1-5-090	PD C1-4/5 Movement Joint Insitu	4	21-Dec-15 A	24-Dec-15 A													
C1-6		31	24-Dec-15 A	24-Jan-16 A													
PD-C1-6-050	PD C1-6 Removal of North Steel Bulkhead	4	21-Jan-16 A	24-Jan-16 A													
PD-C1-6-070	PD C1-6 Manhole Insitu concrete	4	24-Dec-15 A	27-Dec-15 A													
PD-C1-6-090	PD C1-5/6 Movement Joint Insitu	4	25-Dec-15 A	28-Dec-15 A													
Culvert C2		36	19-Dec-15 A	24-Jan-16 A													
C2-2		36	19-Dec-15 A	24-Jan-16 A													
PD-C2-2-060	PD C2-2 Removal of South Steel Bulkhead	4	21-Jan-16 A	24-Jan-16 A													
PD-C2-2-070	PD C2-2 Manhole Insitu concrete	5	19-Dec-15 A	23-Dec-15 A													
C2-5		34	21-Dec-15 A	24-Jan-16 A													
PD-C2-5-050	PD C2-5 Removal of North Steel Bulkhead	4	21-Jan-16 A	24-Jan-16 A													
PD-C2-5-070	PD C2-5 Manhole Insitu concrete	4	21-Dec-15 A	24-Dec-15 A													
Culvert C3		55	30-Nov-15 A	24-Jan-16 A													

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Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016			
					Dec		Jan		Feb		Mar	
					49	50	51	52				
C3-2		26	29-Dec-15 A	24-Jan-16 A								
PD-C3-2-060	PD C3-2 Removal of South Steel Bulkhead	4	21-Jan-16 A	24-Jan-16 A								
PD-C3-2-070	PD C3-2 Manhole Insitu concrete	4	29-Dec-15 A	01-Jan-16 A								
C3-4		4	30-Nov-15 A	04-Dec-15 A								
PD-C3-4-070	PD C3-4 Manhole Insitu concrete	5	30-Nov-15 A	04-Dec-15 A								
C3-5		29	26-Dec-15 A	24-Jan-16 A								
PD-C3-5-050	PD C3-5 Removal of North Steel Bulkhead	4	21-Jan-16 A	24-Jan-16 A								
PD-C3-5-070	PD C3-5 Manhole Insitu concrete	4	26-Dec-15 A	29-Dec-15 A								
PD-C3-5-090	PD C3-4/5 Movement Joint Insitu	4	30-Dec-15 A	02-Jan-16 A								
Culvert C4		56	29-Nov-15 A	24-Jan-16 A								
C4-2		40	15-Dec-15 A	24-Jan-16 A								
PD-C4-2-050	PD C4-2 Removal of North Steel Bulkhead	4	21-Jan-16 A	24-Jan-16 A								
PD-C4-2-070	PD C4-2 Manhole Insitu concrete	5	15-Dec-15 A	19-Dec-15 A								
C4-3		12	30-Nov-15 A	12-Dec-15 A								
PD-C4-3-070	PD C4-3 Manhole Insitu concrete	5	08-Dec-15 A	12-Dec-15 A								
PD-C4-3-080	PD C4-2/3 Movement Joint Installation	5	08-Dec-15 A	12-Dec-15 A								
PD-C4-3-090	PD C4-2/3 Movement Joint Insitu	4	06-Dec-15 A	09-Dec-15 A								
PD-C4-3-110	PD C4-3 Backfill upto +3.5mPD except Manholes	3	30-Nov-15 A	02-Dec-15 A								
C4-4		23	30-Nov-15 A	23-Dec-15 A								
PD-C4-4-070	PD C4-4 Manhole Insitu concrete	5	13-Dec-15 A	17-Dec-15 A								
PD-C4-4-080	PD C4-3/4 Movement Joint Installation	2	18-Dec-15 A	19-Dec-15 A								
PD-C4-4-090	PD C4-3/4 Movement Joint Insitu	4	20-Dec-15 A	23-Dec-15 A								
PD-C4-4-100	PD C4-4 Backfill Beside of Culvert	3	30-Nov-15 A	02-Dec-15 A								

- Remaining Level of Effort
- Actual Level of Effort
- Actual Work
- Remaining Work
- Critical Remaining Work
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- Summary

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TASK filter: Three Month Rolling Programme (EP).

Contract No. Hong Kong - Zhuhai - Macao Bridge **Hong Kong Boundary Crossing Facilities - Reclamation Works**

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016			
					Dec				Jan		Feb	Mar
					49				50		51	52
PD-C4-4-110	PD C4-4 Backfill upto +3.5mPD except Manholes	3	03-Dec-15 A	05-Dec-15 A								
C4-5		55	29-Nov-15 A	23-Jan-16 A	[Summary bar from 29-Nov-15 to 23-Jan-16]							
PD-C4-5-050	PD C4-5 Removal of North Steel Bulkhead	3	21-Jan-16 A	23-Jan-16 A								
PD-C4-5-060	PD C4-5 Removal of South Steel Bulkhead	5	29-Nov-15 A	03-Dec-15 A								
PD-C4-5-070	PD C4-5 Manhole Insitu concrete	4	21-Dec-15 A	24-Dec-15 A								
PD-C4-5-080	PD C4-4/5 Movement Joint Installation	2	21-Dec-15 A	22-Dec-15 A								
PD-C4-5-090	PD C4-4/5 Movement Joint Insitu	4	23-Dec-15 A	26-Dec-15 A								
PD-C4-5-100	PD C4-5 Backfill Beside of Culvert	3	03-Dec-15 A	05-Dec-15 A								
PD-C4-5-110	PD C4-5 Backfill upto +3.5mPD except Manholes	2	06-Dec-15 A	07-Dec-15 A								
PD-C4-5-130	PD C4 Handover to Hy/2013/02	0		07-Dec-15 A								
Permanent Access to Portion A		30	04-Jan-16 A	03-Feb-16 A	[Summary bar from 04-Jan-16 to 03-Feb-16]							
PD-A2090	PD - C2 Divert Access	7	21-Jan-16 A	27-Jan-16 A								
PD-A2110	PD - C4 Divert Access	7	04-Jan-16 A	10-Jan-16 A								
PD-A2140	Completion of Access to PA	0		03-Feb-16 A								
Removal of Temporary Access to Portion A		6	28-Jan-16 A	03-Feb-16 A	[Summary bar from 28-Jan-16 to 03-Feb-16]							
PD-A1110	PD C2 - Removal of Temporary Access	7	28-Jan-16 A	03-Feb-16 A								
Construction of Sloping Outfalls		141	19-Nov-15 A	05-Mar-16 A	[Summary bar from 19-Nov-15 to 05-Mar-16]							
Culvert C1 Sloping Outfall		137	19-Nov-15 A	05-Mar-16 A	[Summary bar from 19-Nov-15 to 05-Mar-16]							
PD-C1-0110	PD C1-1 Outfall Excavation	24	19-Nov-15 A	12-Dec-15 A								
PD-C1-0120	PD C1-1 Outfall Formation	7	13-Dec-15 A	19-Dec-15 A								
PD-C1-0125	PD C1-1 Buoyancy	2	31-Dec-15 A	01-Jan-16 A								
PD-C1-0130	PD C1-1 Outfall Installation	1	02-Jan-16 A	02-Jan-16 A								
PD-C1-0140	PD C1-1 Outfall Removal of Buoyancy & Bulkhead	4	03-Jan-16 A	06-Jan-16 A								

- █ Remaining Level of Effort ◆ Milestone
- █ Actual Level of Effort ▾ Summary
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TASK filter: Three Month Rolling Programme (EP).

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Hong Kong Boundary Crossing Facilities - Reclamation Works

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016													
					Dec				Jan		Feb		Mar									
					49				50		51		52									
PD-V2-0110	PD C2/C3 - Vertical Seawall Blocks V2 VSOP15-11 Type 2A x3 & 2D 808nrs (30nrs/day)	29	11-Jan-16 A	13-Feb-16 A																		
PD-V2-0130	PD C3/C4 - Vertical Seawall Blocks V2 VSOP10-05 Type 2A x4, 2AC 905nrs (30nrs/day)	61	15-Feb-16 A	07-Apr-16																		
Rockfill Type 2 behind seawall		47	28-Jan-16 A	29-Feb-16 A																		
PD-V2-0190	PD C1/C2 - Vertical Seawall V2 Rock fill Type 2 VSOP19-16 2,100m3	4	28-Jan-16 A	31-Jan-16 A																		
PD-V2-0200	PD C2/C3 - Vertical Seawall V2 Rock fill Type 2 VSOP15-11 3,400m3	34	15-Feb-16 A	29-Feb-16 A																		
Geotextile Type 1		47	01-Feb-16 A	05-Mar-16 A																		
PD-V2-0240	PD C1/C2 - Vertical Seawall V2 Geotextile Type 1 VSOP19-16 1,500m2	3	01-Feb-16 A	03-Feb-16 A																		
PD-V2-0250	PD C2/C3 - Vertical Seawall V2 Geotextile Type 1 VSOP15-11 2,400m2	5	22-Feb-16 A	05-Mar-16 A																		
Reclamation upto +3.25mPD		8	21-Feb-16 A	29-Feb-16 A																		
PD-V2-0290	PD C1/C2 - Vertical Seawall V2 backfill with compaction upto +3.25mPD VSOP20-16	8	21-Feb-16 A	29-Feb-16 A																		
Extension Culvert EC1		128	26-Nov-15 A	07-Mar-16 A																		
Excavation & Supporting		5	26-Nov-15 A	01-Dec-15 A																		
PD-EC1-0-050	PD EC1 Formation of Foundation EC1-7 & EC1-8	6	26-Nov-15 A	01-Dec-15 A																		
Insitu Concrete		123	01-Dec-15 A	07-Mar-16 A																		
EC1-1		90	01-Dec-15 A	29-Feb-16 A																		
PD-EC1-1-040	PD EC1-1 Removal of Buoyancy	2	01-Dec-15 A	02-Dec-15 A																		
PD-EC1-1-045	PD EC1-1 External Wall Frameworks	3	16-Jan-16 A	18-Jan-16 A																		
PD-EC1-1-050	PD EC1-1 External Wall Rebar Fixing	27	19-Jan-16 A	18-Feb-16 A																		
PD-EC1-1-060	PD EC1-1 External Wall Formwork Installation	25	22-Jan-16 A	19-Feb-16 A																		
PD-EC1-1-070	PD EC1-1 External Wall Rebar & Formwork Checking	1	20-Feb-16 A	20-Feb-16 A																		
PD-EC1-1-080	PD EC1-1 External Wall Insitu Concrete	1	22-Feb-16 A	22-Feb-16 A																		
PD-EC1-1-090	PD EC1-1 External Wall Formwork Removal	1	23-Feb-16 A	23-Feb-16 A																		
PD-EC1-1-100	PD EC1-1 External Wall Support Framework Removal	3	24-Feb-16 A	26-Feb-16 A																		

- █ Remaining Level of Effort ◆ Milestone
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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016			
					Dec	Jan	Feb	Mar	Dec	Jan	Feb	Mar
					49	50	51	52				
PD-EC1-1-110	PD EC1-1 Internal Wall Cleaning	3	24-Feb-16 A	26-Feb-16 A								
PD-EC1-1-120	PD EC1-1 Internal Wall Rebar Fixing	1	27-Feb-16 A	27-Feb-16 A								
PD-EC1-1-130	PD EC1-1 Internal Chamfer Formwork Installation	1	27-Feb-16 A	27-Feb-16 A								
PD-EC1-1-140	PD EC1-1 Internal Chamfer Rebar & Formwork Checking	1	28-Feb-16 A	28-Feb-16 A								
PD-EC1-1-150	PD EC1-1 Internal Wall Chamfer & Baseslab Concrete	1	28-Feb-16 A	28-Feb-16 A								
PD-EC1-1-160	PD EC1-1 Internal Wall Chamfer Formwork Removal	1	29-Feb-16 A	29-Feb-16 A								
EC1-2		84	03-Dec-15 A	25-Feb-16 A								
PD-EC1-2-030	PD EC1-2 Installation of Precast Culvert Base	2	03-Dec-15 A	04-Dec-15 A								
PD-EC1-2-040	PD EC1-2 Removal of Buoyancy	2	05-Dec-15 A	06-Dec-15 A								
PD-EC1-2-045	PD EC1-2 External Wall Frameworks	6	07-Dec-15 A	12-Dec-15 A								
PD-EC1-2-050	PD EC1-2 External Wall Rebar Fixing	4	13-Dec-15 A	17-Dec-15 A								
PD-EC1-2-060	PD EC1-2 External Wall Formwork Installation	3	18-Dec-15 A	20-Dec-15 A								
PD-EC1-2-070	PD EC1-2 External Wall Rebar & Formwork Checking	1	21-Dec-15 A	21-Dec-15 A								
PD-EC1-2-080	PD EC1-2 External Wall Insitu Concrete	1	22-Dec-15 A	22-Dec-15 A								
PD-EC1-2-090	PD EC1-2 External Wall Formwork Removal	1	23-Dec-15 A	23-Dec-15 A								
PD-EC1-2-100	PD EC1-2 External Wall Support Framework Removal	3	24-Dec-15 A	26-Dec-15 A								
PD-EC1-2-110	PD EC1-2 Internal Wall Cleaning	4	27-Dec-15 A	30-Dec-15 A								
PD-EC1-2-120	PD EC1-2 Internal Wall Rebar Fixing	5	31-Dec-15 A	04-Jan-16 A								
PD-EC1-2-130	PD EC1-2 Internal Chamfer Formwork Installation	4	05-Jan-16 A	08-Jan-16 A								
PD-EC1-2-140	PD EC1-2 Internal Chamfer Rebar & Formwork Checking	1	08-Jan-16 A	08-Jan-16 A								
PD-EC1-2-150	PD EC1-2 Internal Wall Chamfer & Baseslab Concrete	1	09-Jan-16 A	09-Jan-16 A								
PD-EC1-2-160	PD EC1-2 Internal Wall Chamfer Formwork Removal	2	10-Jan-16 A	11-Jan-16 A								
PD-EC1-2-170	PD EC1-2 Internal Wall Formwork Installation	4	21-Jan-16 A	24-Jan-16 A								

- Remaining Level of Effort Milestone
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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016										
					Dec				Jan				Feb				Mar		
					49				50				51				52		
PD-EC1-2-180	PD EC1-2 Internal Wall Rebar & Formwork Checking	1	25-Jan-16 A	25-Jan-16 A															
PD-EC1-2-190	PD EC1-2 Internal Wall Concrete	1	26-Jan-16 A	26-Jan-16 A															
PD-EC1-2-200	PD EC1-2 Internal Wall Formwork Removal	2	27-Jan-16 A	28-Jan-16 A															
PD-EC1-2-210	PD EC1-2 Top Slab Support	3	29-Jan-16 A	31-Jan-16 A															
PD-EC1-2-220	PD EC1-2 Top Slab Formwork	5	01-Feb-16 A	05-Feb-16 A															
PD-EC1-2-230	PD EC1-2 Top Slab Rebar Fixing	7	06-Feb-16 A	16-Feb-16 A															
PD-EC1-2-240	PD EC1-2 Top Slab Rebar & Formwork Checking	1	17-Feb-16 A	17-Feb-16 A															
PD-EC1-2-250	PD EC1-2 Top Slab Insitu Concrete	1	18-Feb-16 A	18-Feb-16 A															
PD-EC1-2-260	PD EC1-2 Top Slab Side Formwork Removal	2	21-Feb-16 A	22-Feb-16 A															
PD-EC1-2-270	PD EC1-2 Top Slab Curing	7	19-Feb-16 A	25-Feb-16 A															
EC1-3		90	01-Dec-15 A	29-Feb-16 A															
PD-EC1-3-020	PD EC1-3 Buoyancy	3	01-Dec-15 A	03-Dec-15 A															
PD-EC1-3-030	PD EC1-3 Installation of Precast Culvert Base	1	05-Dec-15 A	05-Dec-15 A															
PD-EC1-3-040	PD EC1-3 Removal of Buoyancy	2	06-Dec-15 A	07-Dec-15 A															
PD-EC1-3-045	PD EC1-3 External Wall Frameworks	3	18-Dec-15 A	20-Dec-15 A															
PD-EC1-3-050	PD EC1-3 External Wall Rebar Fixing	4	21-Dec-15 A	24-Dec-15 A															
PD-EC1-3-060	PD EC1-3 External Wall Formwork Installation	3	25-Dec-15 A	27-Dec-15 A															
PD-EC1-3-070	PD EC1-3 External Wall Rebar & Formwork Checking	1	27-Dec-15 A	27-Dec-15 A															
PD-EC1-3-080	PD EC1-3 External Wall Insitu Concrete	1	28-Dec-15 A	28-Dec-15 A															
PD-EC1-3-090	PD EC1-3 External Wall Formwork Removal	1	29-Dec-15 A	29-Dec-15 A															
PD-EC1-3-100	PD EC1-3 External Wall Support Framework Removal	3	30-Dec-15 A	01-Jan-16 A															
PD-EC1-3-110	PD EC1-3 Internal Wall Cleaning	3	02-Jan-16 A	04-Jan-16 A															
PD-EC1-3-120	PD EC1-3 Internal Wall Rebar Fixing	4	05-Jan-16 A	08-Jan-16 A															

- Remaining Level of Effort
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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016							
					Dec				Jan		Feb		Mar			
					49				50		51		52			
PD-EC1-3-130	PD EC1-3 Internal Chamfer Formwork Installation	1	09-Jan-16 A	09-Jan-16 A												
PD-EC1-3-140	PD EC1-3 Internal Chamfer Rebar & Formwork Checking	1	10-Jan-16 A	10-Jan-16 A												
PD-EC1-3-150	PD EC1-3 Internal Wall Chamfer & Baseslab Concrete	1	10-Jan-16 A	10-Jan-16 A												
PD-EC1-3-160	PD EC1-3 Internal Wall Chamfer Formwork Removal	2	11-Jan-16 A	12-Jan-16 A												
PD-EC1-3-170	PD EC1-3 Internal Wall Formwork Installation	10	25-Jan-16 A	03-Feb-16 A												
PD-EC1-3-180	PD EC1-3 Internal Wall Rebar & Formwork Checking	27	08-Jan-16 A	03-Feb-16 A												
PD-EC1-3-190	PD EC1-3 Internal Wall Concrete	1	04-Feb-16 A	04-Feb-16 A												
PD-EC1-3-200	PD EC1-3 Internal Wall Formwork Removal	2	21-Feb-16 A	22-Feb-16 A												
PD-EC1-3-210	PD EC1-3 Top Slab Support	1	23-Feb-16 A	23-Feb-16 A												
PD-EC1-3-220	PD EC1-3 Top Slab Formwork	1	24-Feb-16 A	24-Feb-16 A												
PD-EC1-3-230	PD EC1-3 Top Slab Rebar Fixing	4	25-Feb-16 A	28-Feb-16 A												
PD-EC1-3-240	PD EC1-3 Top Slab Rebar & Formwork Checking	1	29-Feb-16 A	29-Feb-16 A												
EC1-4		87	06-Dec-15 A	02-Mar-16 A	Summary											
PD-EC1-4-010	PD EC1-4, EC1-5 & EC1-6 Back & Delivery stg15	7	06-Dec-15 A	12-Dec-15 A												
PD-EC1-4-020	PD EC1-4 Buoyancy	2	13-Dec-15 A	14-Dec-15 A												
PD-EC1-4-030	PD EC1-4 Installation of Precast Culvert Base	1	15-Dec-15 A	15-Dec-15 A												
PD-EC1-4-040	PD EC1-4 Removal of Buoyancy	2	16-Dec-15 A	17-Dec-15 A												
PD-EC1-4-045	PD EC1-4 External Wall Frameworks	3	21-Dec-15 A	23-Dec-15 A												
PD-EC1-4-050	PD EC1-4 External Wall Rebar Fixing	6	24-Dec-15 A	29-Dec-15 A												
PD-EC1-4-060	PD EC1-4 External Wall Formwork Installation	3	28-Dec-15 A	30-Dec-15 A												
PD-EC1-4-070	PD EC1-4 External Wall Rebar & Formwork Checking	1	31-Dec-15 A	31-Dec-15 A												
PD-EC1-4-080	PD EC1-4 External Wall Insitu Concrete	1	31-Dec-15 A	31-Dec-15 A												
PD-EC1-4-090	PD EC1-4 External Wall Formwork Removal	1	01-Jan-16 A	01-Jan-16 A												

- Remaining Level of Effort ◆ Milestone
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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
PD-EC1-4-100	PD EC1-4 External Wall Support Framework Removal	3	02-Jan-16 A	04-Jan-16 A																
PD-EC1-4-110	PD EC1-4 Internal Wall Cleaning	4	05-Jan-16 A	08-Jan-16 A																
PD-EC1-4-120	PD EC1-4 Internal Wall Rebar Fixing	5	09-Jan-16 A	13-Jan-16 A																
PD-EC1-4-130	PD EC1-4 Internal Chamfer Formwork Installation	3	12-Jan-16 A	14-Jan-16 A																
PD-EC1-4-140	PD EC1-4 Internal Chamfer Rebar & Formwork Checking	1	15-Jan-16 A	15-Jan-16 A																
PD-EC1-4-150	PD EC1-4 Internal Wall Chamfer & Baseslab Concrete	1	16-Jan-16 A	16-Jan-16 A																
PD-EC1-4-160	PD EC1-4 Internal Wall Chamfer Formwork Removal	2	17-Jan-16 A	18-Jan-16 A																
PD-EC1-4-170	PD EC1-4 Internal Wall Formwork Installation	7	25-Jan-16 A	31-Jan-16 A																
PD-EC1-4-180	PD EC1-4 Internal Wall Rebar & Formwork Checking	6	26-Jan-16 A	31-Jan-16 A																
PD-EC1-4-190	PD EC1-4 Internal Wall Concrete	1	01-Feb-16 A	01-Feb-16 A																
PD-EC1-4-200	PD EC1-4 Internal Wall Formwork Removal	2	02-Feb-16 A	03-Feb-16 A																
PD-EC1-4-210	PD EC1-4 Top Slab Support	6	11-Feb-16 A	16-Feb-16 A																
PD-EC1-4-220	PD EC1-4 Top Slab Formwork	6	17-Feb-16 A	22-Feb-16 A																
PD-EC1-4-230	PD EC1-4 Top Slab Rebar Fixing	4	19-Feb-16 A	22-Feb-16 A																
PD-EC1-4-240	PD EC1-4 Top Slab Rebar & Formwork Checking	1	23-Feb-16 A	23-Feb-16 A																
PD-EC1-4-250	PD EC1-4 Top Slab Insitu Concrete	1	24-Feb-16 A	24-Feb-16 A																
PD-EC1-4-260	PD EC1-4 Top Slab Side Formwork Removal	2	25-Feb-16 A	26-Feb-16 A																
PD-EC1-4-270	PD EC1-4 Top Slab Curing	7	25-Feb-16 A	02-Mar-16 A																
EC1-5		78	16-Dec-15 A	03-Mar-16 A																
PD-EC1-5-020	PD EC1-5 Buoyancy	2	16-Dec-15 A	17-Dec-15 A																
PD-EC1-5-030	PD EC1-5 Installation of Precast Culvert Base	1	18-Dec-15 A	18-Dec-15 A																
PD-EC1-5-040	PD EC1-5 Removal of Buoyancy	2	19-Dec-15 A	20-Dec-15 A																
PD-EC1-5-045	PD EC1-5 External Wall Frameworks	3	28-Dec-15 A	30-Dec-15 A																

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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
PD-EC1-5-050	PD EC1-5 External Wall Rebar Fixing	3	31-Dec-15 A	02-Jan-16 A																
PD-EC1-5-060	PD EC1-5 External Wall Formwork Installation	3	03-Jan-16 A	05-Jan-16 A																
PD-EC1-5-070	PD EC1-5 External Wall Rebar & Formwork Checking	1	06-Jan-16 A	06-Jan-16 A																
PD-EC1-5-080	PD EC1-5 External Wall Insitu Concrete	1	06-Jan-16 A	06-Jan-16 A																
PD-EC1-5-090	PD EC1-5 External Wall Formwork Removal	1	07-Jan-16 A	07-Jan-16 A																
PD-EC1-5-100	PD EC1-5 External Wall Support Framework Removal	3	08-Jan-16 A	10-Jan-16 A																
PD-EC1-5-110	PD EC1-5 Internal Wall Cleaning	3	11-Jan-16 A	13-Jan-16 A																
PD-EC1-5-120	PD EC1-5 Internal Wall Rebar Fixing	5	18-Jan-16 A	22-Jan-16 A																
PD-EC1-5-130	PD EC1-5 Internal Chamfer Formwork Installation	4	23-Jan-16 A	26-Jan-16 A																
PD-EC1-5-140	PD EC1-5 Internal Chamfer Rebar & Formwork Checking	1	27-Jan-16 A	27-Jan-16 A																
PD-EC1-5-150	PD EC1-5 Internal Wall Chamfer & Baseslab Concrete	1	28-Jan-16 A	28-Jan-16 A																
PD-EC1-5-160	PD EC1-5 Internal Wall Chamfer Formwork Removal	2	29-Jan-16 A	30-Jan-16 A																
PD-EC1-5-170	PD EC1-5 Internal Wall Formwork Installation	10	01-Feb-16 A	14-Feb-16 A																
PD-EC1-5-180	PD EC1-5 Internal Wall Rebar & Formwork Checking	1	15-Feb-16 A	15-Feb-16 A																
PD-EC1-5-190	PD EC1-5 Internal Wall Concrete	1	16-Feb-16 A	16-Feb-16 A																
PD-EC1-5-200	PD EC1-5 Internal Wall Formwork Removal	2	17-Feb-16 A	18-Feb-16 A																
PD-EC1-5-210	PD EC1-5 Top Slab Support	3	19-Feb-16 A	21-Feb-16 A																
PD-EC1-5-220	PD EC1-5 Top Slab Formwork	11	22-Feb-16 A	03-Mar-16 A																
EC1-6		75	19-Dec-15 A	07-Mar-16 A																
PD-EC1-6-020	PD EC1-6 Buoyancy	3	19-Dec-15 A	21-Dec-15 A																
PD-EC1-6-030	PD EC1-6 Installation of Precast Culvert Base	1	22-Dec-15 A	22-Dec-15 A																
PD-EC1-6-040	PD EC1-6 Removal of Buoyancy	2	23-Dec-15 A	24-Dec-15 A																
PD-EC1-6-045	PD EC1-6 External Wall Frameworks	3	25-Dec-15 A	27-Dec-15 A																

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Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016								
					Dec				Jan				Feb				Mar
					49				50				51				52
PD-EC1-6-050	PD EC1-6 External Wall Rebar Fixing	5	28-Dec-15 A	01-Jan-16 A													
PD-EC1-6-060	PD EC1-6 External Wall Formwork Installation	9	02-Jan-16 A	10-Jan-16 A													
PD-EC1-6-070	PD EC1-6 External Wall Rebar & Formwork Checking	1	11-Jan-16 A	11-Jan-16 A													
PD-EC1-6-080	PD EC1-6 External Wall Insitu Concrete	1	12-Jan-16 A	12-Jan-16 A													
PD-EC1-6-090	PD EC1-6 External Wall Formwork Removal	1	13-Jan-16 A	13-Jan-16 A													
PD-EC1-6-100	PD EC1-6 External Wall Support Framework Removal	4	14-Jan-16 A	17-Jan-16 A													
PD-EC1-6-110	PD EC1-6 Internal Wall Cleaning	4	18-Jan-16 A	21-Jan-16 A													
PD-EC1-6-120	PD EC1-6 Internal Wall Rebar Fixing	7	20-Jan-16 A	26-Jan-16 A													
PD-EC1-6-130	PD EC1-6 Internal Chamfer Formwork Installation	13	27-Jan-16 A	12-Feb-16 A													
PD-EC1-6-140	PD EC1-6 Internal Chamfer Rebar & Formwork Checking	1	12-Feb-16 A	12-Feb-16 A													
PD-EC1-6-150	PD EC1-6 Internal Wall Chamfer & Baseslab Concrete	1	13-Feb-16 A	13-Feb-16 A													
PD-EC1-6-160	PD EC1-6 Internal Wall Chamfer Formwork Removal	1	14-Feb-16 A	14-Feb-16 A													
PD-EC1-6-170	PD EC1-6 Internal Wall Formwork Installation	4	15-Feb-16 A	18-Feb-16 A													
PD-EC1-6-180	PD EC1-6 Internal Wall Rebar & Formwork Checking	1	19-Feb-16 A	19-Feb-16 A													
PD-EC1-6-190	PD EC1-6 Internal Wall Concrete	1	20-Feb-16 A	20-Feb-16 A													
PD-EC1-6-200	PD EC1-6 Internal Wall Formwork Removal	2	21-Feb-16 A	22-Feb-16 A													
PD-EC1-6-210	PD EC1-6 Top Slab Support	3	23-Feb-16 A	25-Feb-16 A													
PD-EC1-6-220	PD EC1-6 Top Slab Formwork	11	26-Feb-16 A	07-Mar-16 A													
EC1-7		66	22-Dec-15 A	01-Mar-16 A													
PD-EC1-7-010	PD EC1-7 & C1-1 Back & Delivery stg16	6	22-Dec-15 A	27-Dec-15 A													
PD-EC1-7-020	PD EC1-7 Buoyancy	2	28-Dec-15 A	29-Dec-15 A													
PD-EC1-7-030	PD EC1-7 Installation of Precast Culvert Base	1	30-Dec-15 A	30-Dec-15 A													
PD-EC1-7-040	PD EC1-7 Removal of Buoyancy	2	31-Dec-15 A	01-Jan-16 A													

- █ Remaining Level of Effort
- █ Actual Level of Effort
- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work
- ◆ Milestone
- ▼ Summary

52nd_8 Monthly Progress Report Status as on 21Mar2016

TASK filter: Three Month Rolling Programme (EP).

Contract No. **Hong Kong - Zhuhai - Macao Bridge** **Hong Kong Boundary Crossing Facilities - Reclamation Works**

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016				
					Dec				Jan		Feb		Mar
					49				50		51		52
PD-EC1-7-045	PD EC1-7 External Wall Frameworks	4	19-Jan-16 A	22-Jan-16 A									
PD-EC1-7-050	PD EC1-7 External Wall Rebar Fixing	15	23-Jan-16 A	06-Feb-16 A									
PD-EC1-7-060	PD EC1-7 External Wall Formwork Installation	13	26-Jan-16 A	11-Feb-16 A									
PD-EC1-7-070	PD EC1-7 External Wall Rebar & Formwork Checking	1	12-Feb-16 A	12-Feb-16 A									
PD-EC1-7-080	PD EC1-7 External Wall Insitu Concrete	1	13-Feb-16 A	13-Feb-16 A									
PD-EC1-7-090	PD EC1-7 External Wall Formwork Removal	1	14-Feb-16 A	14-Feb-16 A									
PD-EC1-7-100	PD EC1-7 External Wall Support Framework Removal	4	15-Feb-16 A	18-Feb-16 A									
PD-EC1-7-110	PD EC1-7 Internal Wall Cleaning	1	19-Feb-16 A	19-Feb-16 A									
PD-EC1-7-120	PD EC1-7 Internal Wall Rebar Fixing	3	19-Feb-16 A	21-Feb-16 A									
PD-EC1-7-130	PD EC1-7 Internal Chamfer Formwork Installation	9	22-Feb-16 A	01-Mar-16 A									
EC1-8		87	02-Jan-16 A	29-Feb-16 A									
PD-EC1-8-010	PD EC1-8 & C4-1 Back & Delivery stg17	8	02-Jan-16 A	09-Jan-16 A									
PD-EC1-8-020	PD EC1-8 Buoyancy	2	10-Jan-16 A	11-Jan-16 A									
PD-EC1-8-030	PD EC1-8 Outfall Installation of Precast Culvert Base	2	13-Jan-16 A	14-Jan-16 A									
PD-EC1-8-040	PD EC1-8 Removal of Buoyancy	2	15-Jan-16 A	16-Jan-16 A									
PD-EC1-8-045	PD EC1-8 External Wall Frameworks	3	21-Feb-16 A	22-Feb-16 A									
PD-EC1-8-050	PD EC1-8 External Wall Rebar Fixing	3	23-Feb-16 A	24-Feb-16 A									
PD-EC1-8-060	PD EC1-8 External Wall Formwork Installation	4	25-Feb-16 A	26-Feb-16 A									
PD-EC1-8-070	PD EC1-8 External Wall Rebar & Formwork Checking	1	26-Feb-16 A	27-Feb-16 A									
PD-EC1-8-080	PD EC1-8 External Wall Insitu Concrete	1	27-Feb-16 A	27-Feb-16 A									
PD-EC1-8-090	PD EC1-8 External Wall Formwork Removal	1	28-Feb-16 A	28-Feb-16 A									
PD-EC1-8-100	PD EC1-8 External Wall Support Framework Removal	3	28-Feb-16 A	29-Feb-16 A									
Backfilling & Reclamation		22	10-Jan-16 A	01-Feb-16 A									

<ul style="list-style-type: none"> Remaining Level of Effort Actual Level of Effort Actual Work Remaining Work Critical Remaining Work 	<p>52nd_8 Monthly Progress Report Status as on 21Mar2016</p> <p>Page 22 of 23</p>	<p>TASK filter: Three Month Rolling Programme (EP).</p> <p style="text-align: right;"><i>Primavera Systems, Inc.</i></p>
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Contract No. Hong Kong - Zhuhai - Macao Bridge **Hong Kong Boundary Crossing Facilities - Reclamation Works**

Activity ID	Activity Name	Original Duration	Start	Finish	2015				2016											
					Dec				Jan				Feb				Mar			
					49				50				51				52			
PD-EC1-0100-010	Backfill west side of EC1-2 to EC1-6 for Handover to Other Contractors	22	10-Jan-16 A	31-Jan-16 A																
PD-EC1-0100-012	Handover 40m strip to other Contractor	0		01-Feb-16 A																
Works Area WA2 (Tung Chung)		1458	21-May-12 A	28-Feb-17																
Zone A		1458	21-May-12 A	28-Feb-17																
A1880	Maintenance of Engineer's Accommodation	1458	21-May-12 A	28-Feb-17																
Works Area TKO Fill Bank		1278	25-Sep-12 A	30-Nov-16																
WA-TKO-1040	Operate and Maintain Public Fill Sorting Facilities in Zone A, B1 & B2	1278	25-Sep-12 A	30-Nov-16																

█ Remaining Level of Effort ◆ Milestone
█ Actual Level of Effort ▼ Summary
█ Actual Work
█ Remaining Work
█ Critical Remaining Work

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: <ul style="list-style-type: none"> • 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
		<p>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;</p> <ul style="list-style-type: none"> • 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
		<p>audible high level alarm which is interlocked with the material filling line and no overfilling is allowed;</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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; <ul style="list-style-type: none"> • 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	<p><u>Construction and Demolition Material</u></p> <p>The following mitigation measures should be implemented in handling the waste:</p> <ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> • 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	<p><u>C&D Waste</u></p> <ul style="list-style-type: none"> • 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
		<p>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.</p>		
<p>S8.2.12- S8.3.15 of HKBCFEIA and S12.6 of TMCLKLEIA</p>	<p>WM6</p>	<p><u>Chemical Waste</u></p> <ul style="list-style-type: none"> • 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 	<p>All construction sites</p>	<p>V</p>

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	<p><u>Sewage</u></p> <ul style="list-style-type: none"> 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	<p><u>General Refuse</u></p> <ul style="list-style-type: none"> 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
		<p>considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided.</p> <ul style="list-style-type: none"> • 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	<p>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:</p>	During filling	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<ul style="list-style-type: none"> • 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
		<p>to prevent sediment loss at navigation accesses. The length of each staggered layers shall be at least 200m;</p> <ul style="list-style-type: none"> • 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	<p><u>Land Works</u></p> <p>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:</p>	All land-based construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
TMCLKLEIA		<ul style="list-style-type: none"> • 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
		<p>should be covered with tarpaulin or similar fabric during rainstorms;</p> <ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> • Good site practices • Strict enforcement of no marine dumping • Site runoff control • Spill response plan 		
S10.7 of HKBCFEIA	E2	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Dolphin Exclusion Zone • Dolphin watching plan 	Marine works	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E5	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Control vessel speed 	Marine traffic	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
HKBCFEIA and S8.14 of TMCLKLEIA		<ul style="list-style-type: none"> • Skipper training • Predefined and regular routes for working vessels; avoid Brothers Islands 		
S10.10 of HKBCFEIA and S8.14 of TMCLKLEIA	E7	<ul style="list-style-type: none"> • Vessel based dolphin monitoring 	Northeast and Northwest Lantau	V
Fisheries				
S11.7 of HKBCFEIA	F1	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<p><u>Mitigate Landscape Impacts</u></p> <p>G1/CM4 Grass-hydroseed or sheeting bare soil surface and stock pile areas.</p> <p>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</p>	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	<u>Mitigate Landscape Impacts</u> 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	<u>Mitigate Visual Impacts</u> V1 Minimize time for construction activities during construction period.	All construction site areas	V
S10.9 of TMCLKLEIA	LV5	<u>Mitigate Visual Impacts</u> 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	<ul style="list-style-type: none"> 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 $\mu\text{g}/\text{m}^3$	500 $\mu\text{g}/\text{m}^3$
AMS3B*	368 $\mu\text{g}/\text{m}^3$	500 $\mu\text{g}/\text{m}^3$
AMS6	360 $\mu\text{g}/\text{m}^3$	500 $\mu\text{g}/\text{m}^3$
AMS7A^/AMS7	370 $\mu\text{g}/\text{m}^3$	500 $\mu\text{g}/\text{m}^3$

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

^ Action Level set out at AMS7 Hong Kong SkyCity Marriot Hotel is adopted

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

Location	Action Level	Limit Level
AMS2	176 $\mu\text{g}/\text{m}^3$	260 $\mu\text{g}/\text{m}^3$
AMS3B*	167 $\mu\text{g}/\text{m}^3$	260 $\mu\text{g}/\text{m}^3$
AMS6	173 $\mu\text{g}/\text{m}^3$	260 $\mu\text{g}/\text{m}^3$
AMS7A^/AMS7	183 $\mu\text{g}/\text{m}^3$	260 $\mu\text{g}/\text{m}^3$

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

^ Action Level set out at AMS7 Hong Kong SkyCity Marriot Hotel 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)
NMS3B		*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)	<u>Surface and Middle</u> 5.0 <u>Bottom</u> 4.7	<u>Surface and Middle</u> 4.2 (except 5 mg/L for FCZ) <u>Bottom</u> 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 and 130% 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.

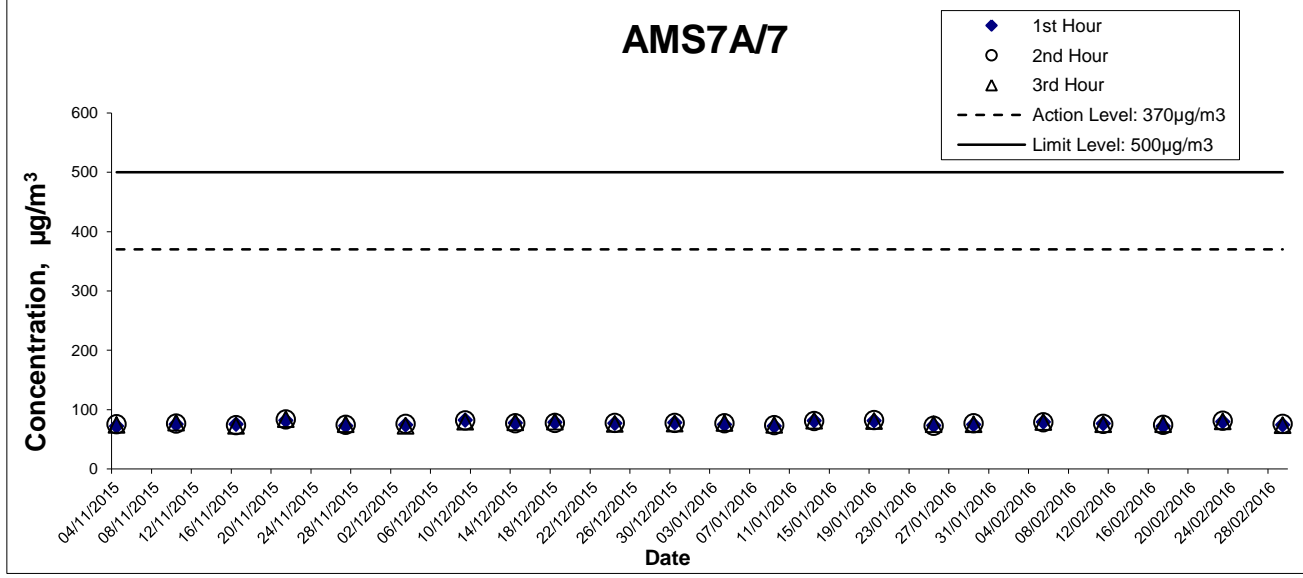
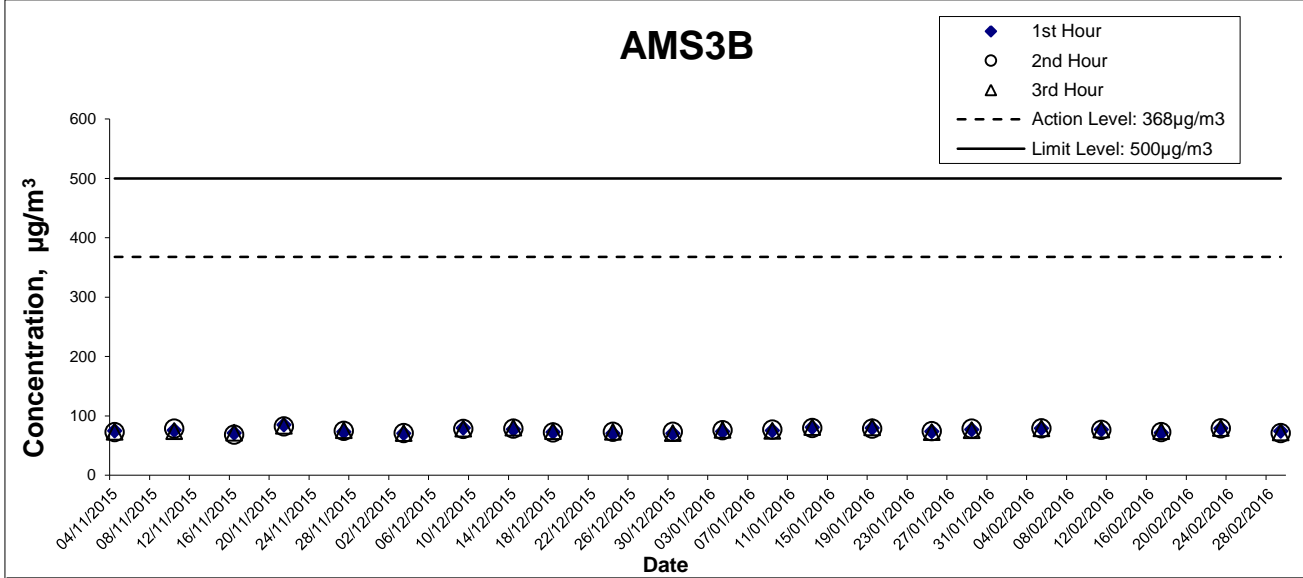
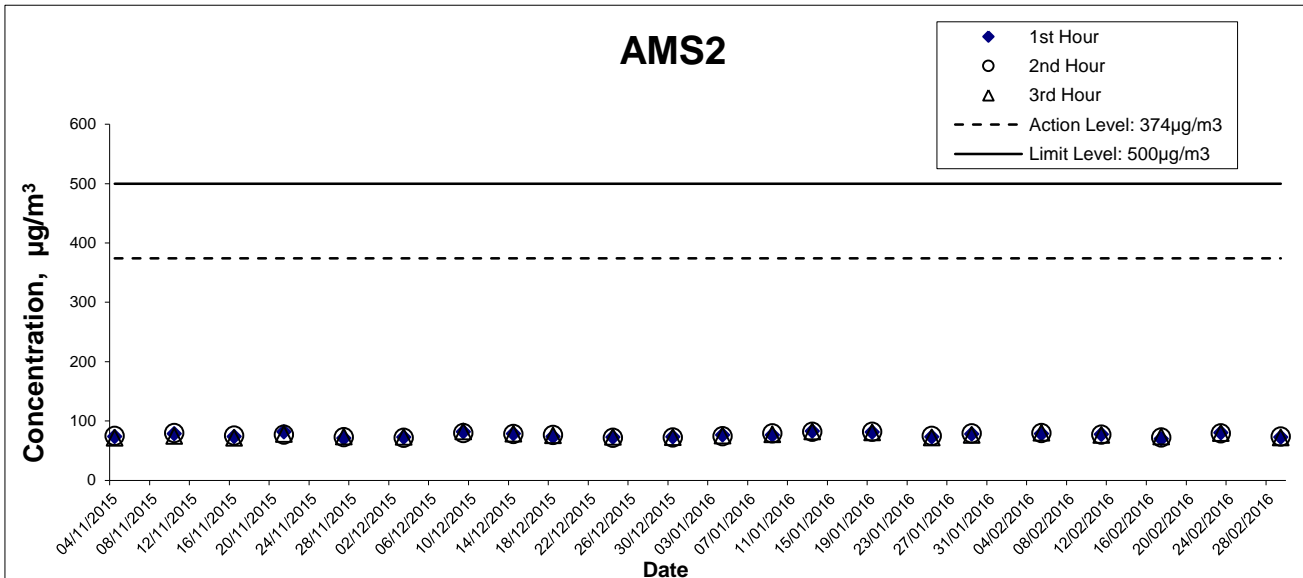
Table 5(a) Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL):

	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)]	

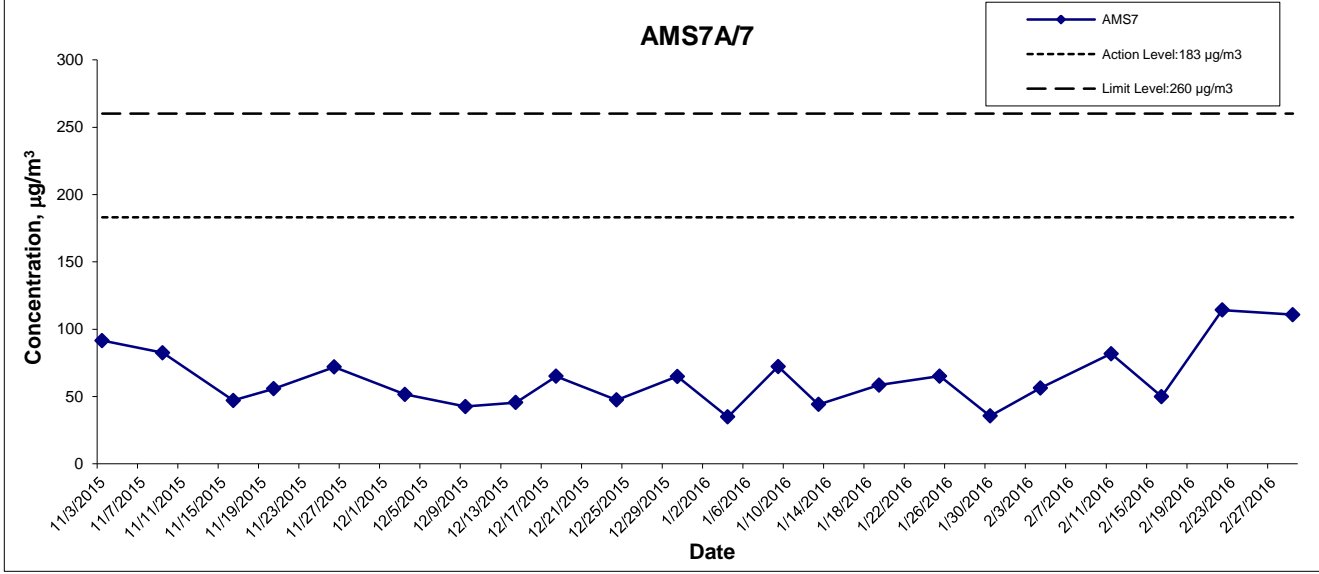
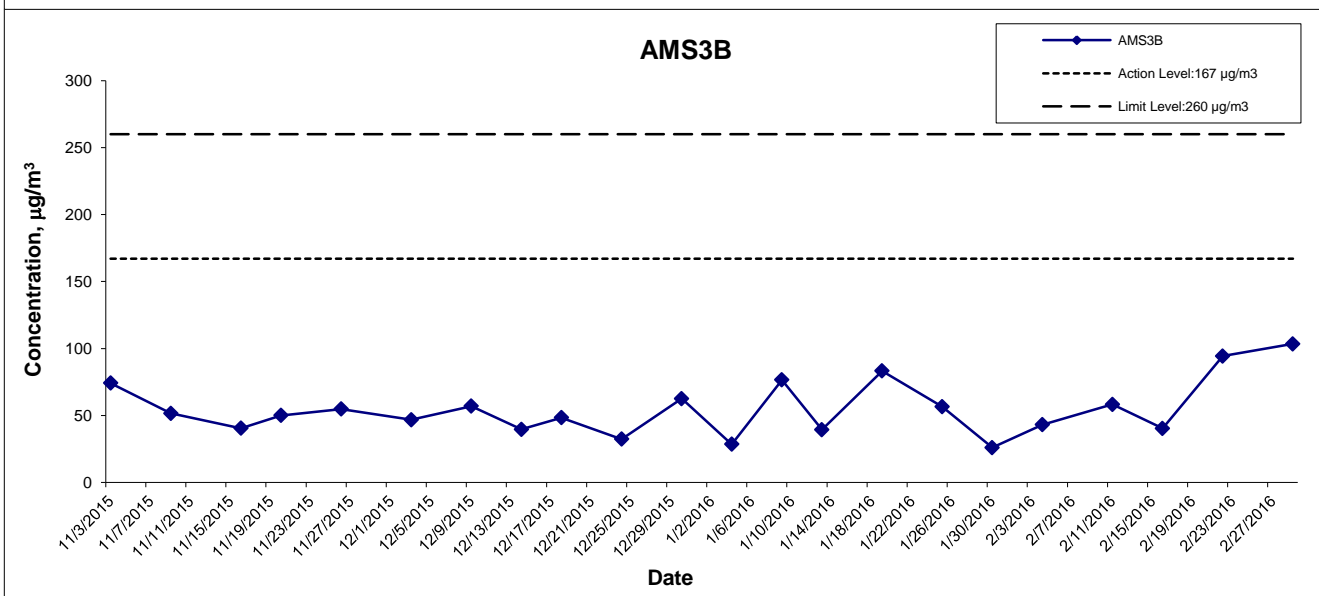
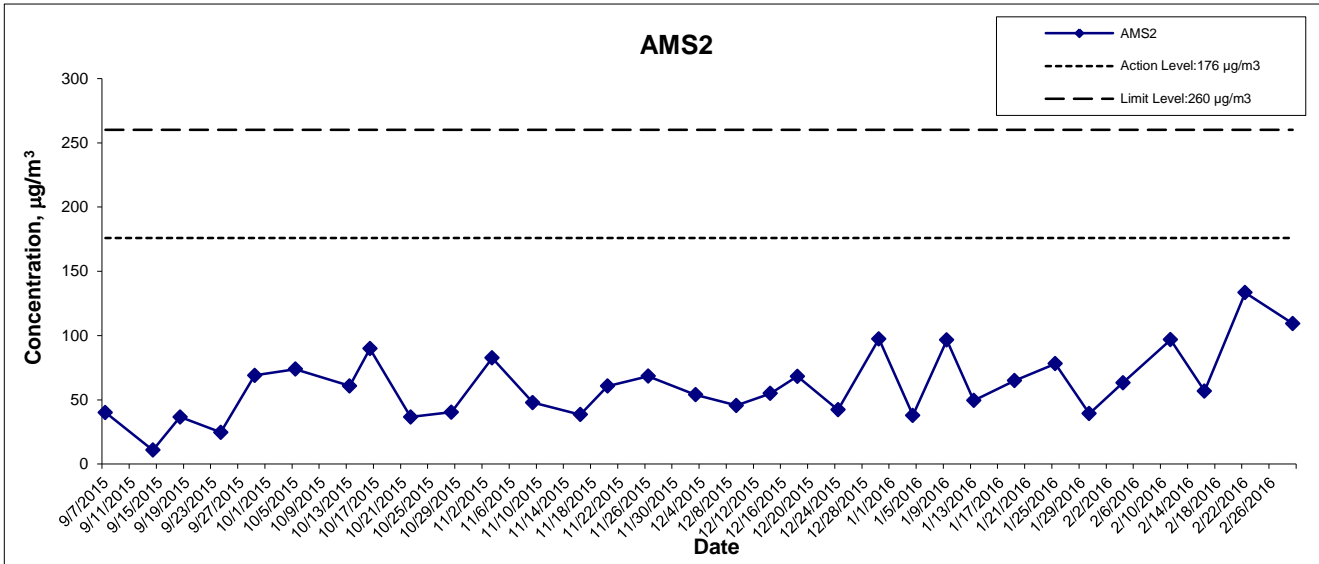
For North Lantau Social Cluster, action level will be trigger if either NEL **or** NWL fall below the criteria; limit level will be triggered if both NEL **and** NWL fall below the criteria.

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)]	



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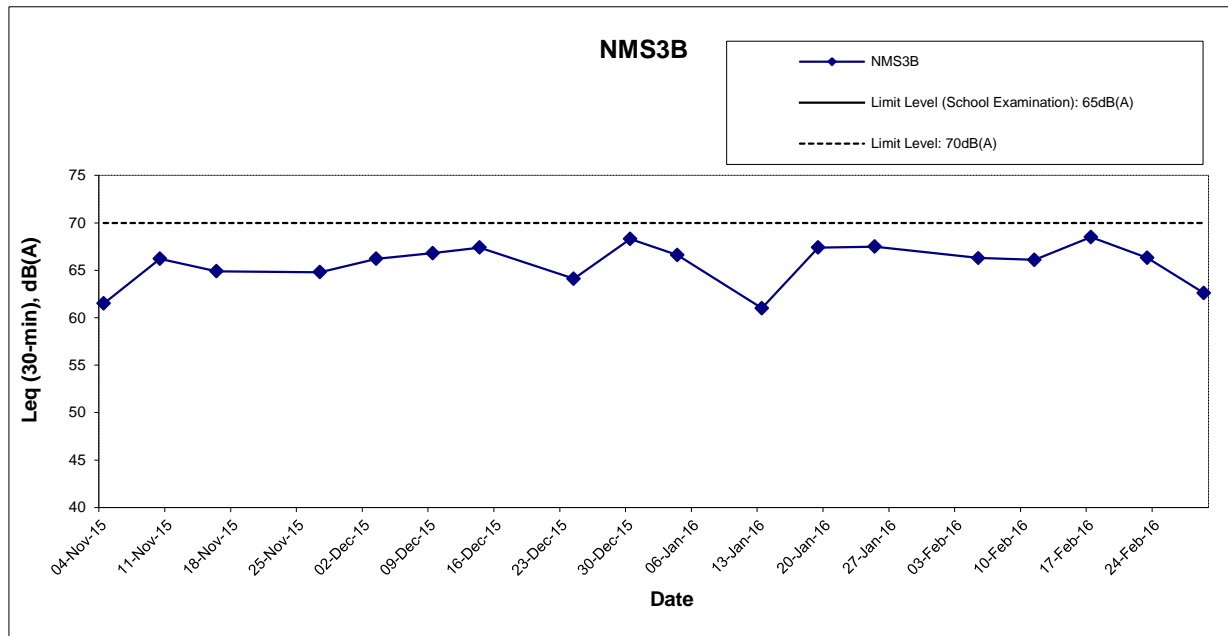
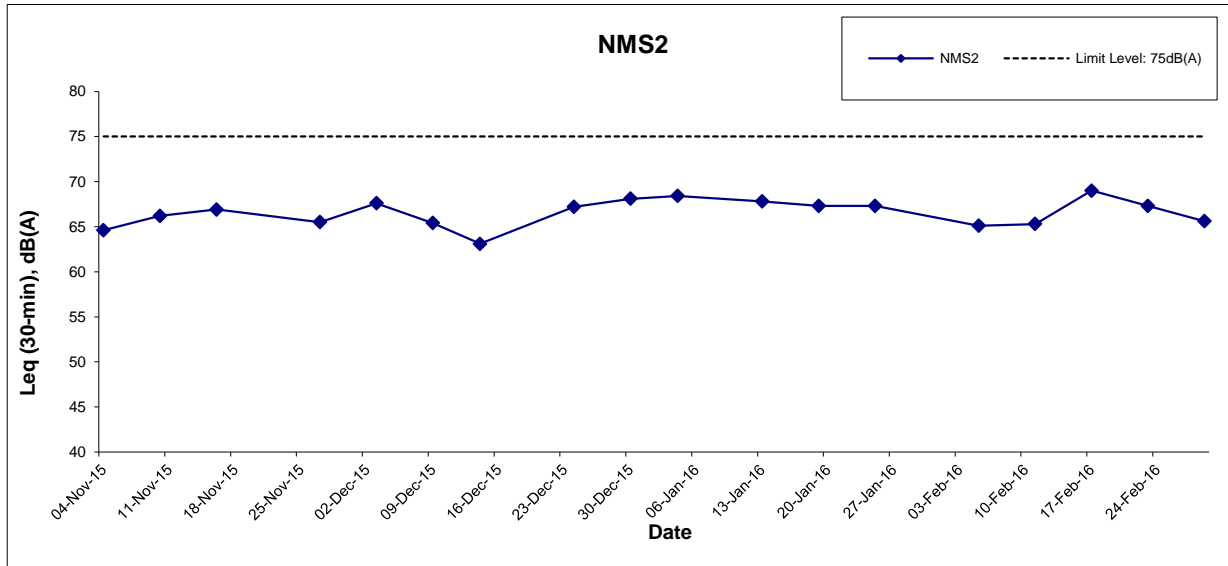


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Graphical Presentation of Impact 24-hour TSP
 Monitoring Results





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.

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 - RECLAMATION WORKS

Graphical Presentation of Impact Daytime
 Construction Noise Monitoring Results

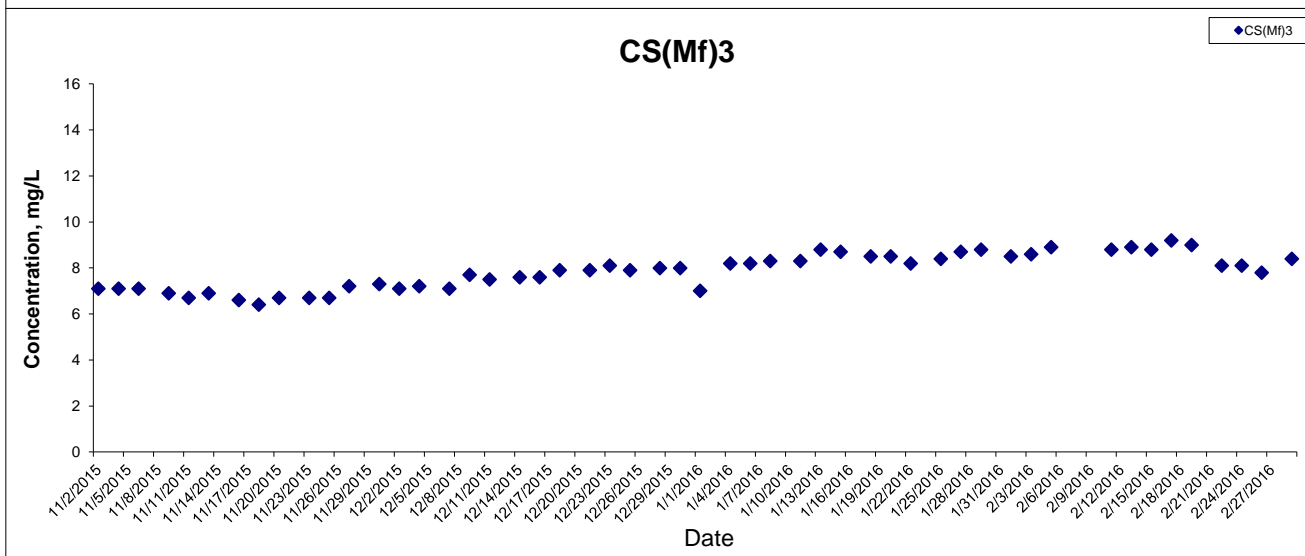
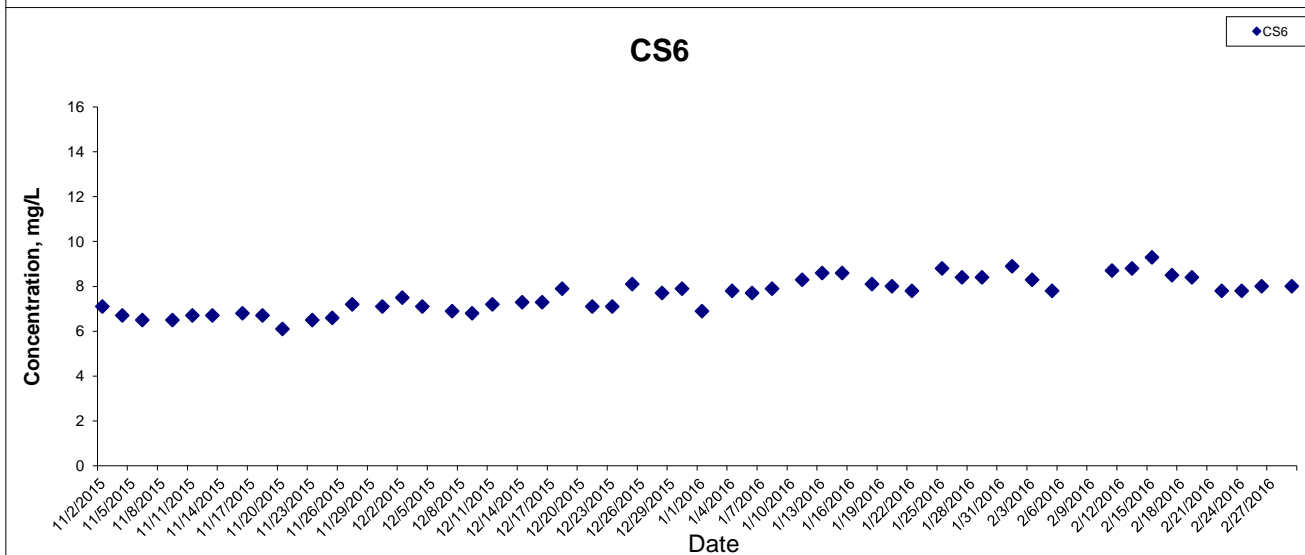
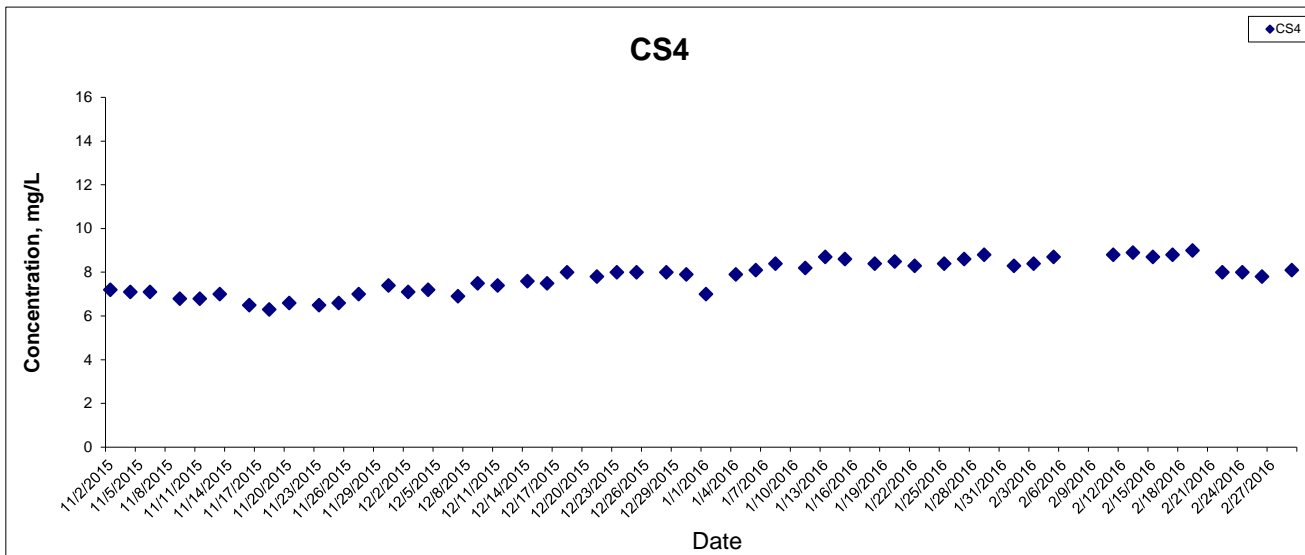


Project No.: 60249820

Date: Mar 2016

Appendix F

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



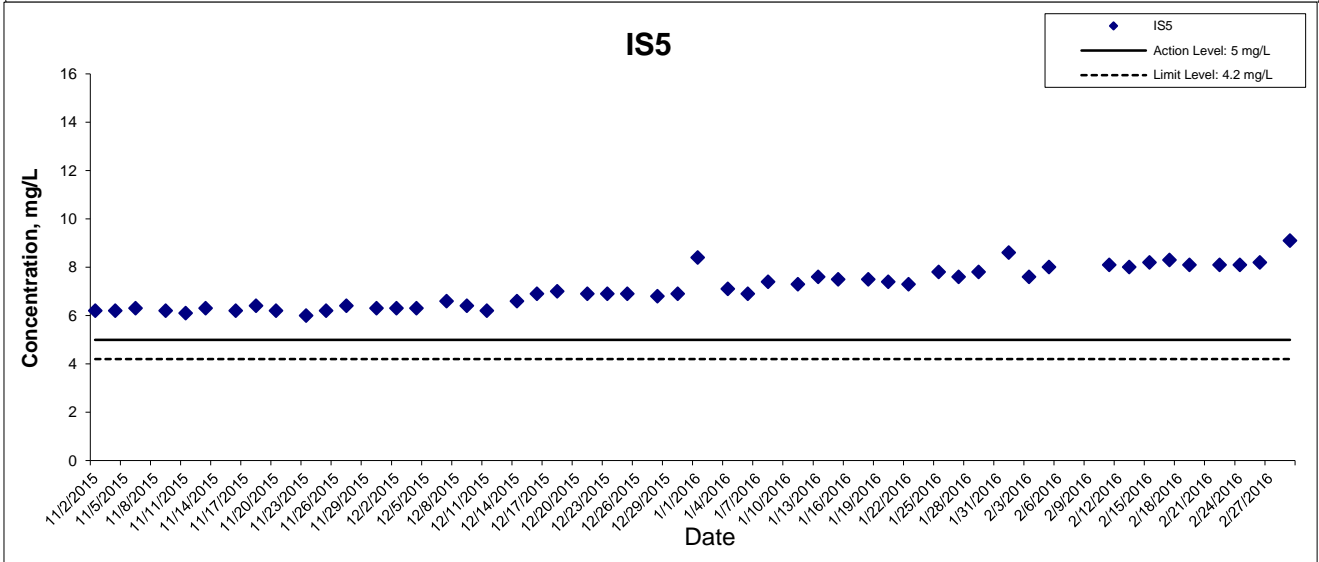
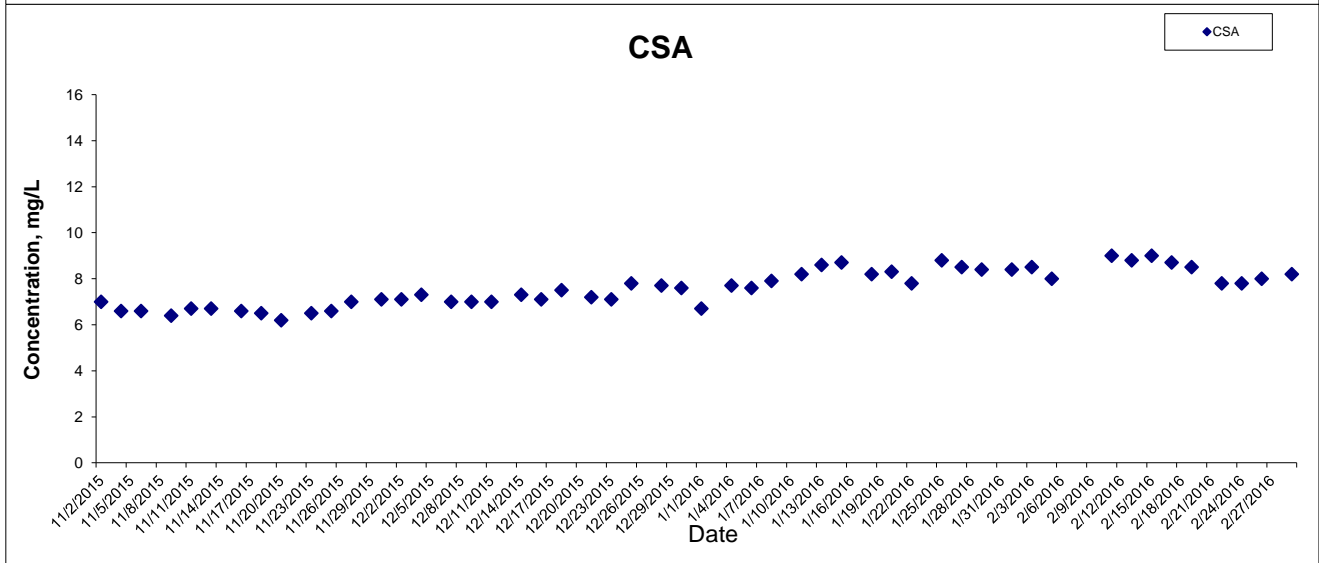
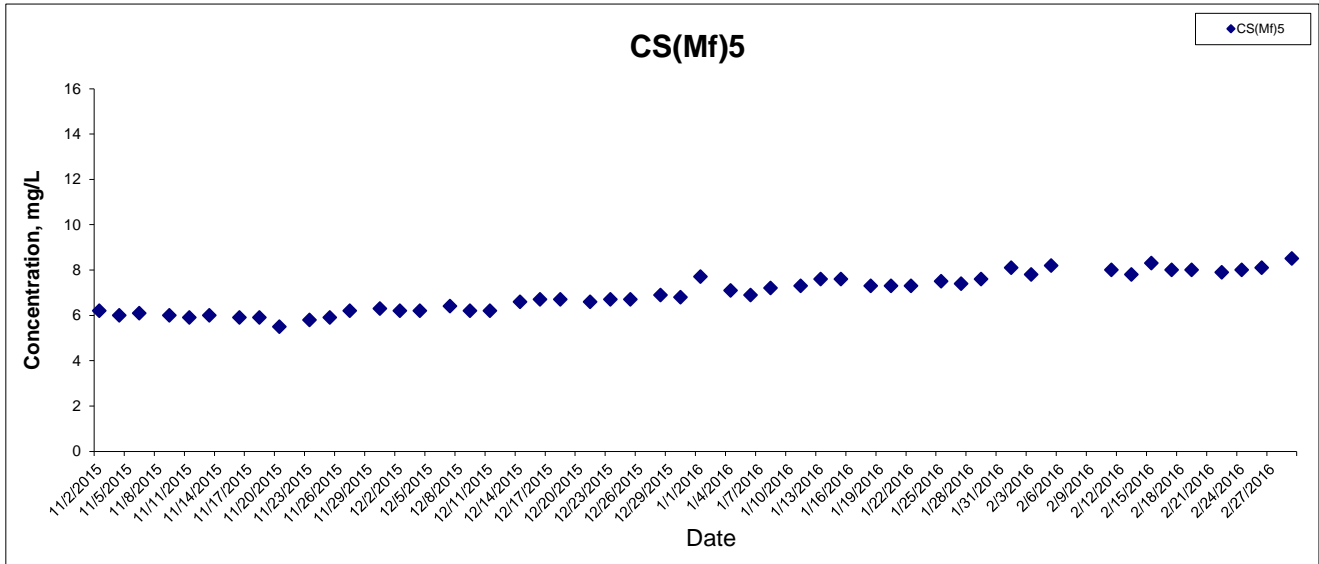
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Graphical Presentation of Impact Water Quality
 Monitoring Results



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



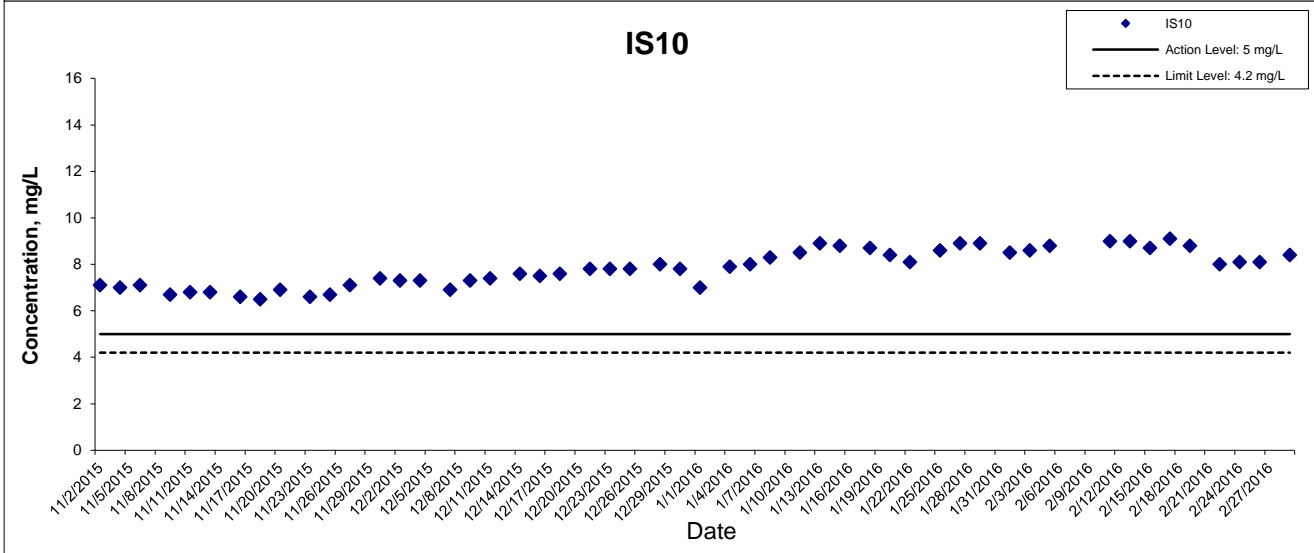
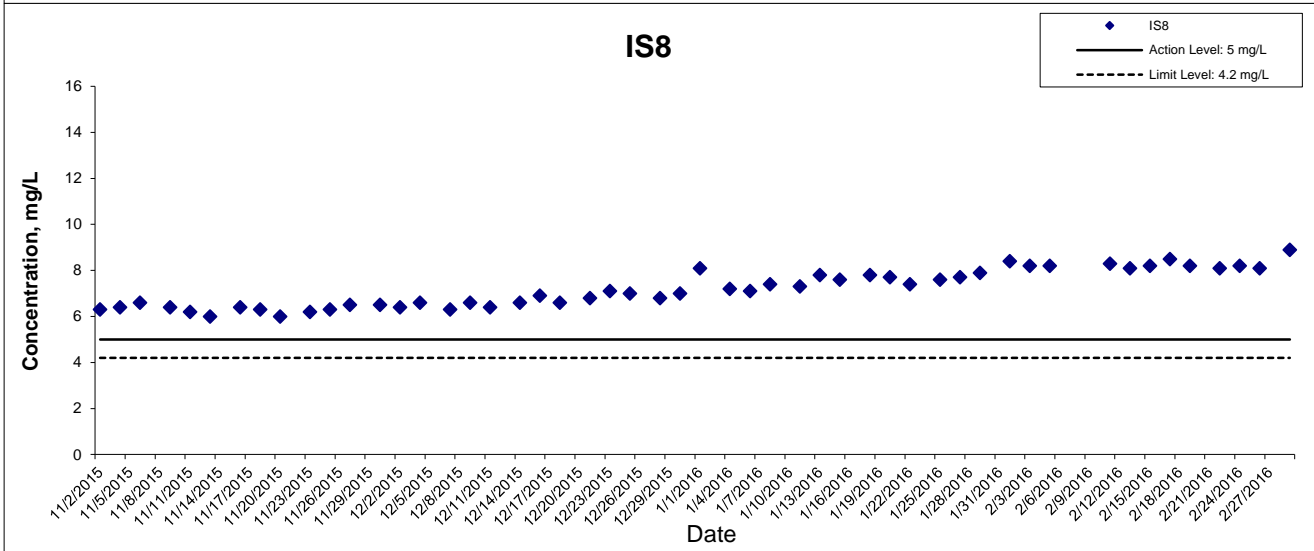
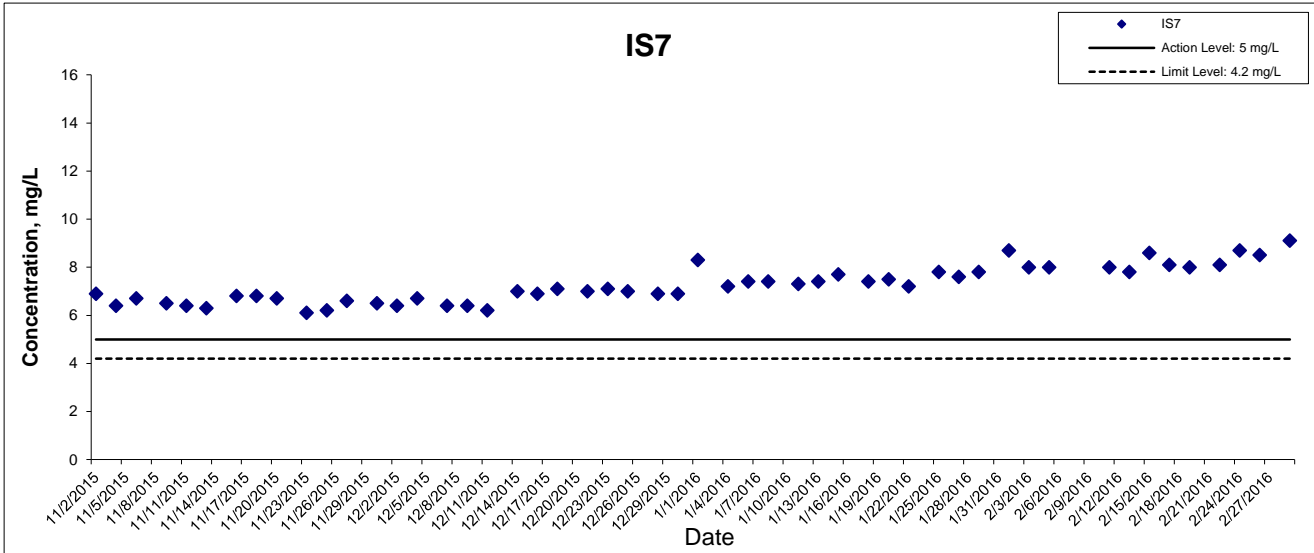
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Graphical Presentation of Impact Water Quality
 Monitoring Results

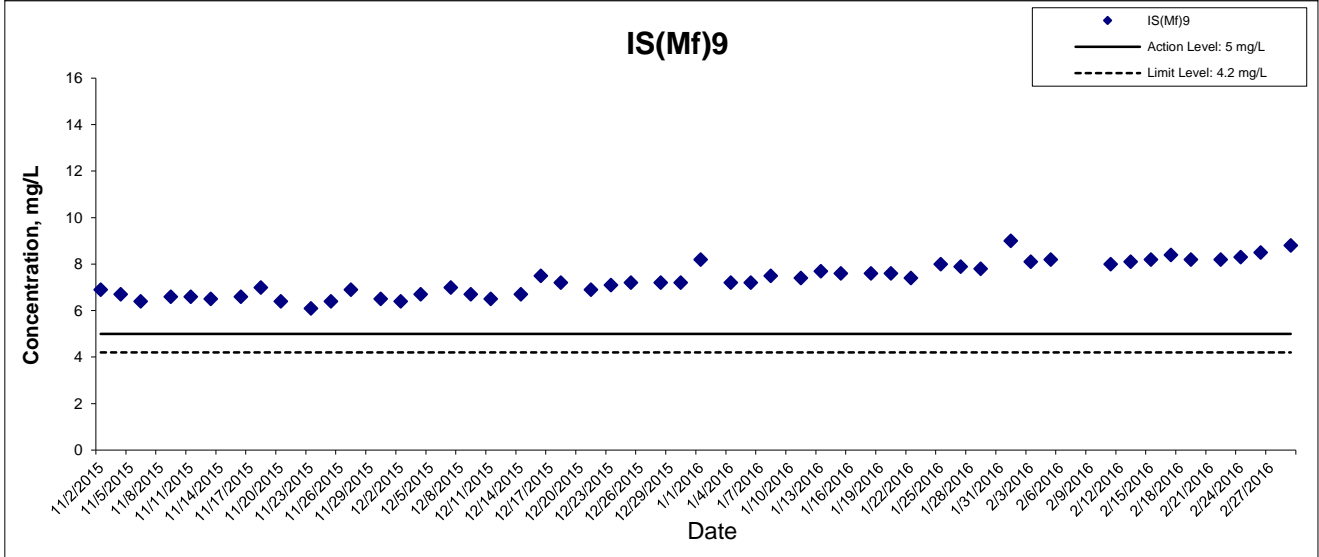
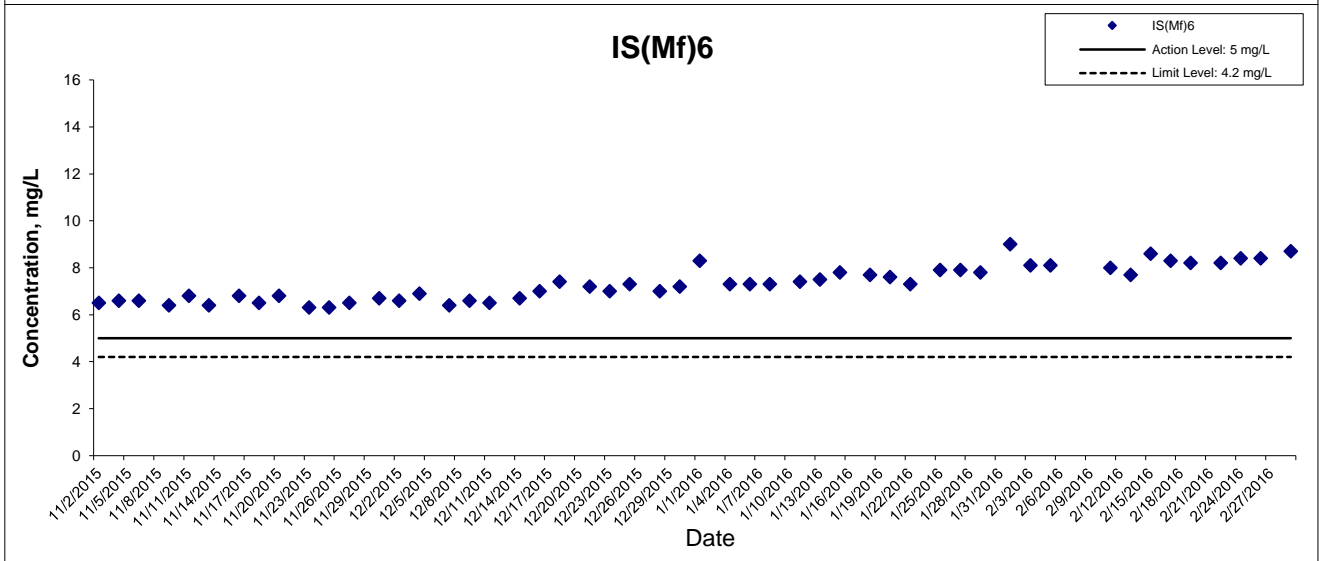
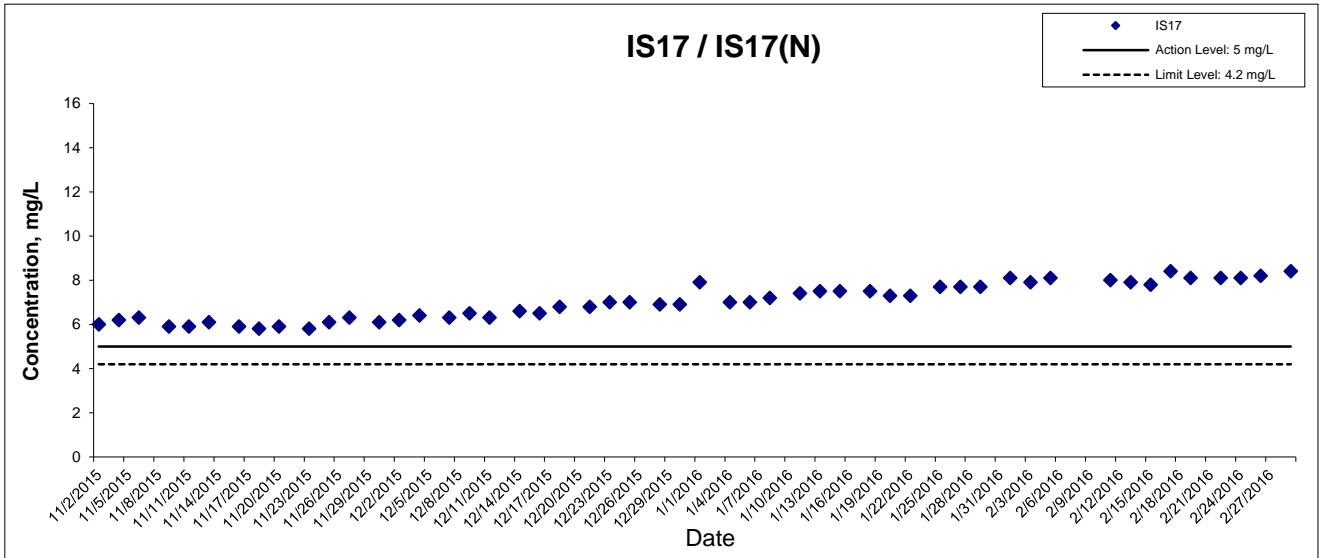


Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



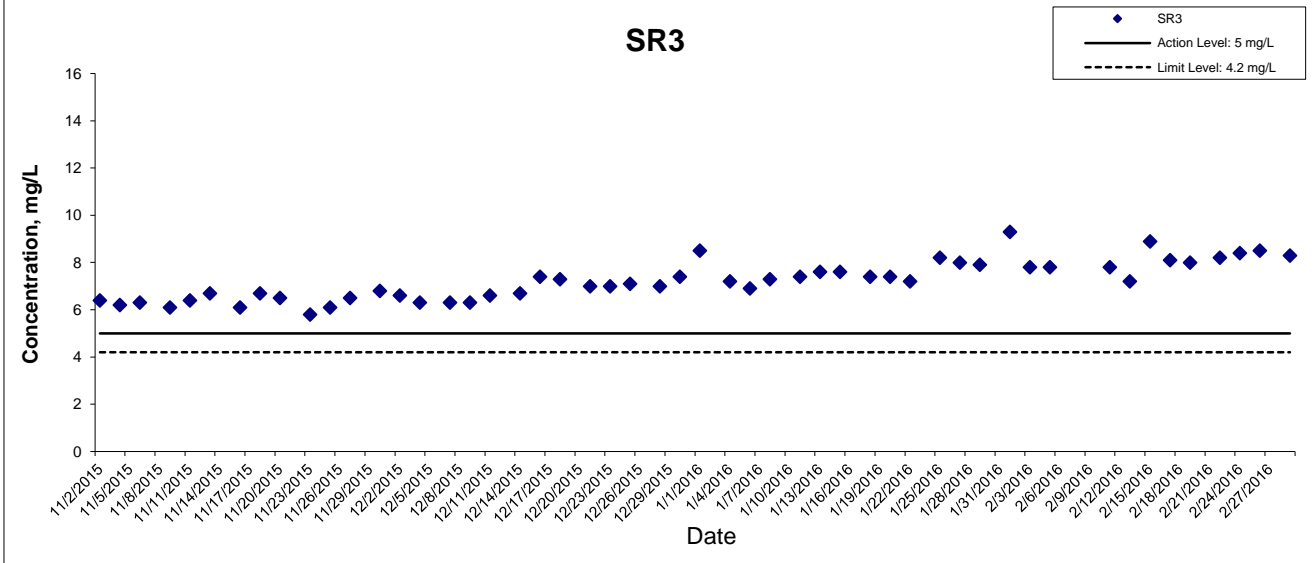
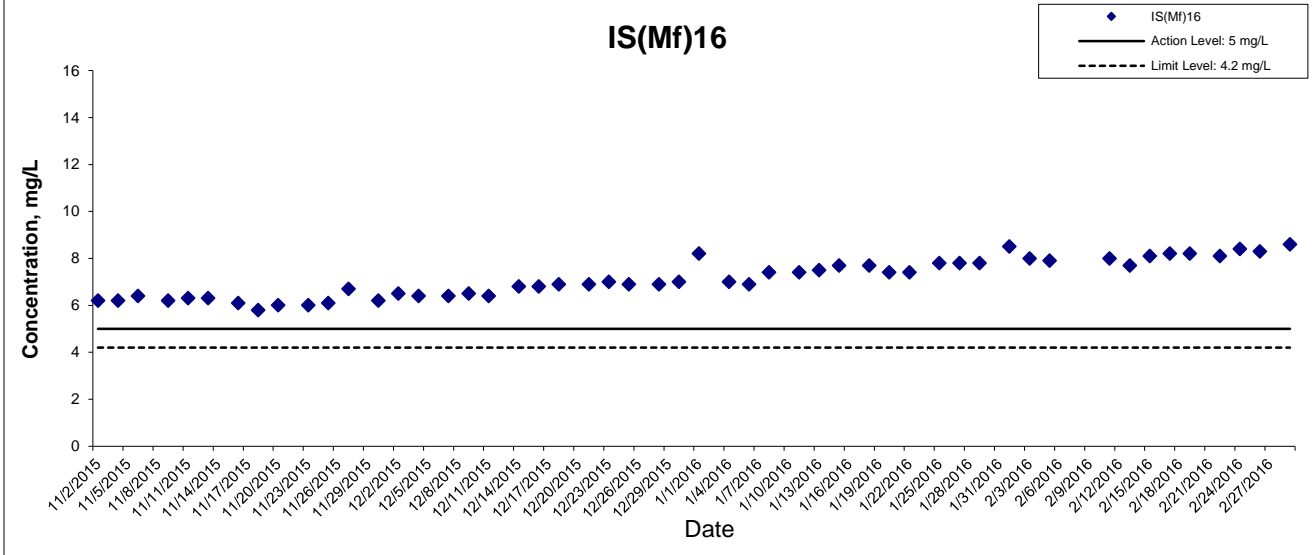
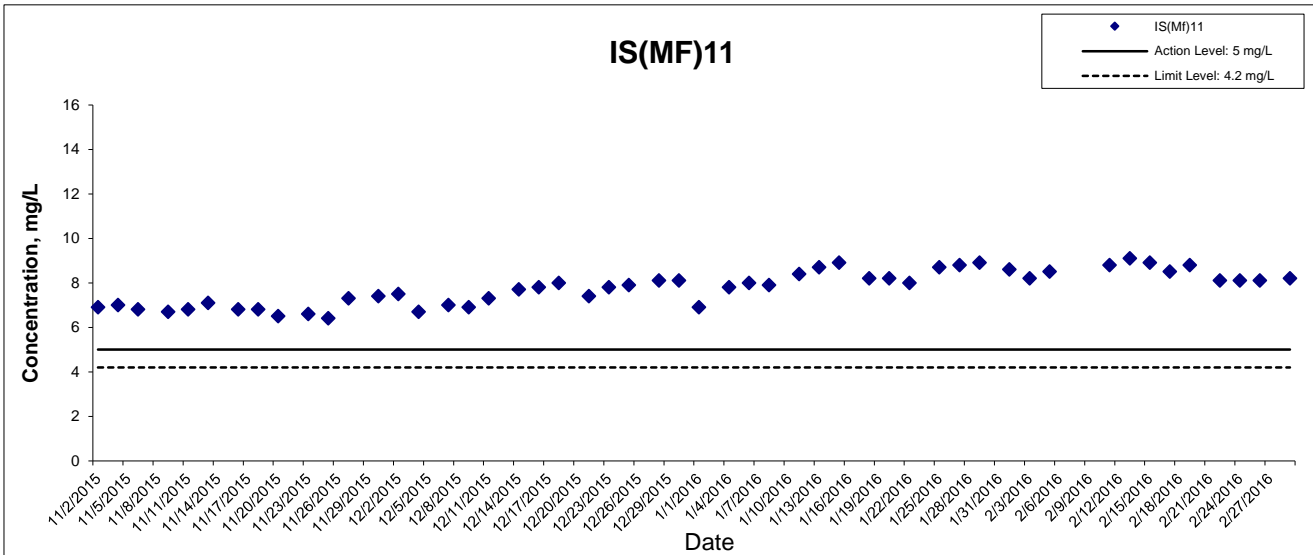
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Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



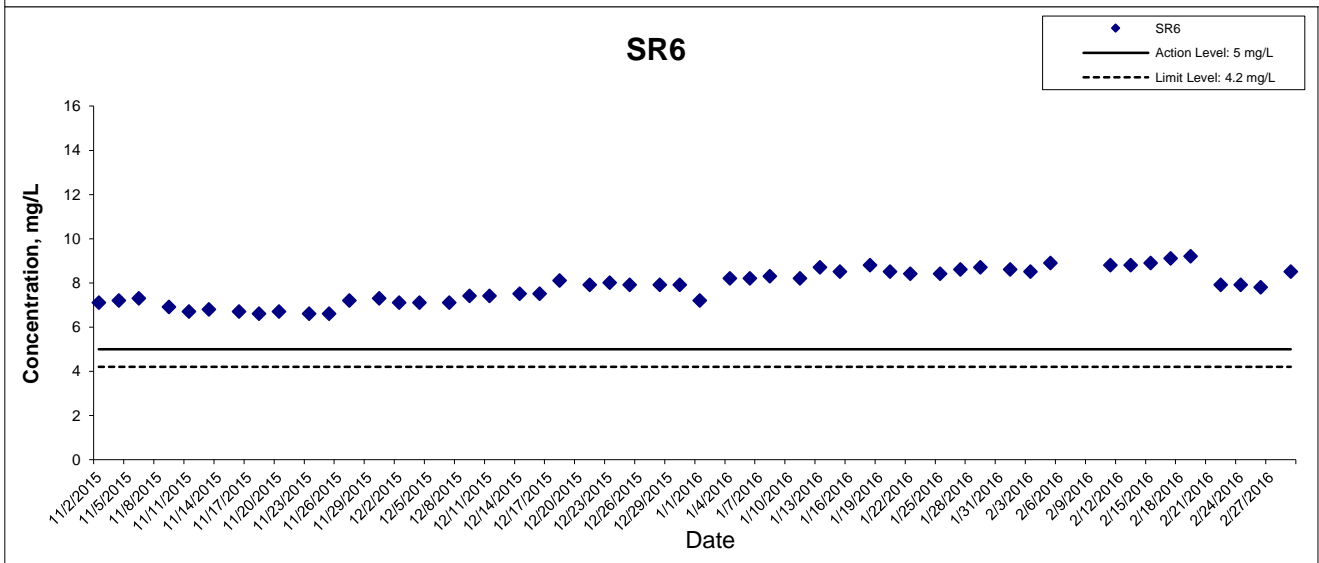
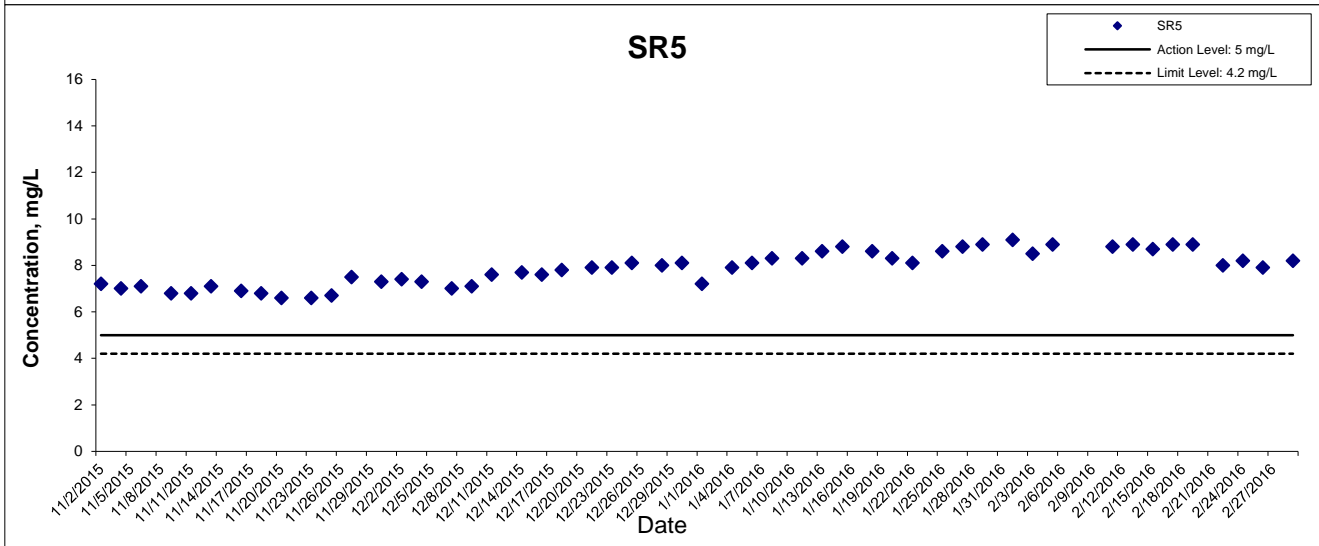
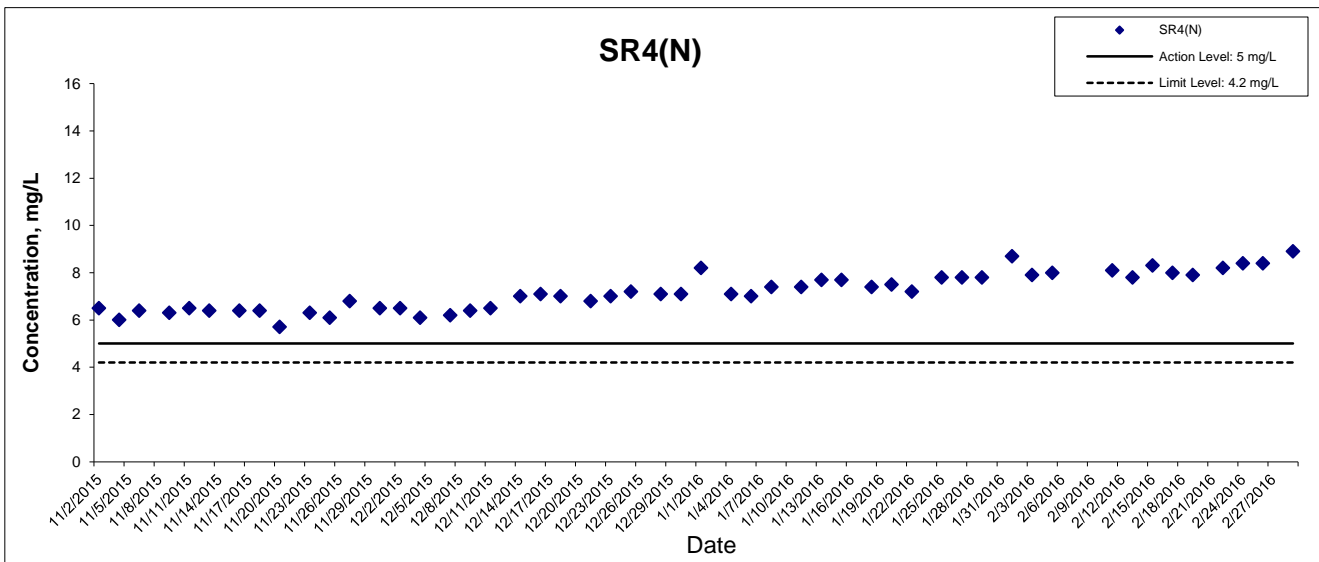
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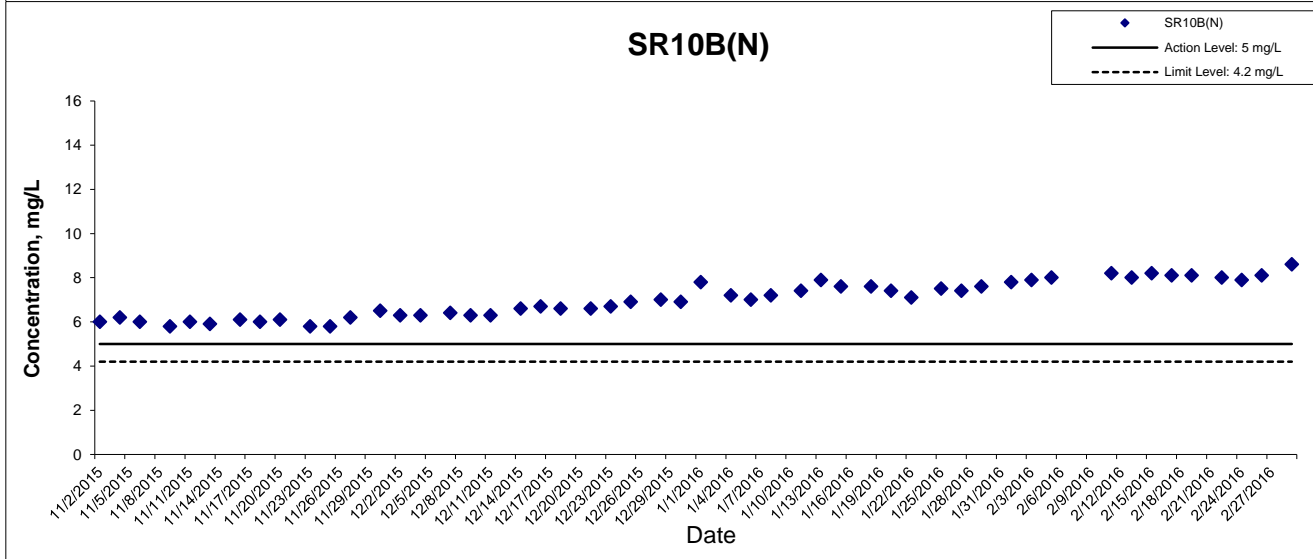
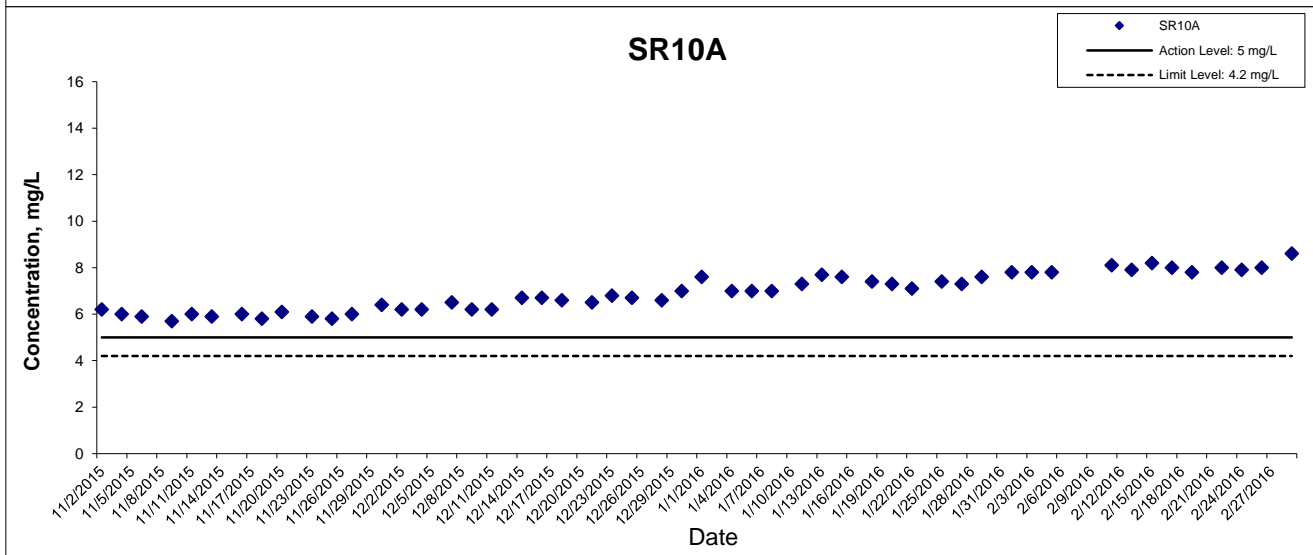
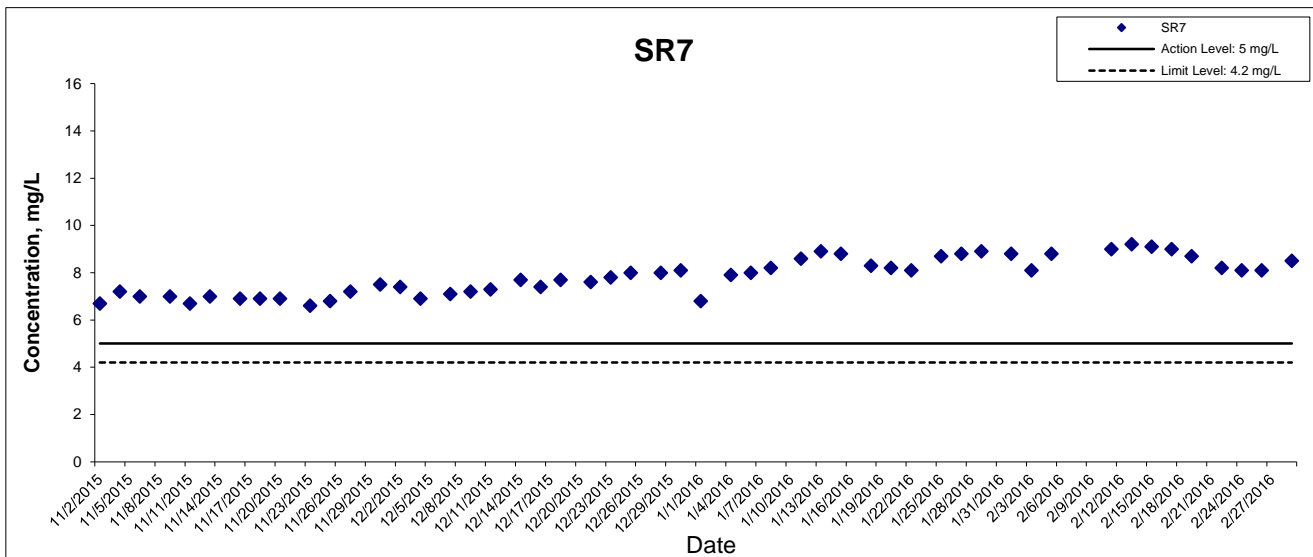
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HONG KONG BOUNDARY CROSSING FACILITIES

- RECLAMATION WORKS

**Graphical Presentation of Impact Water Quality
Monitoring Results**

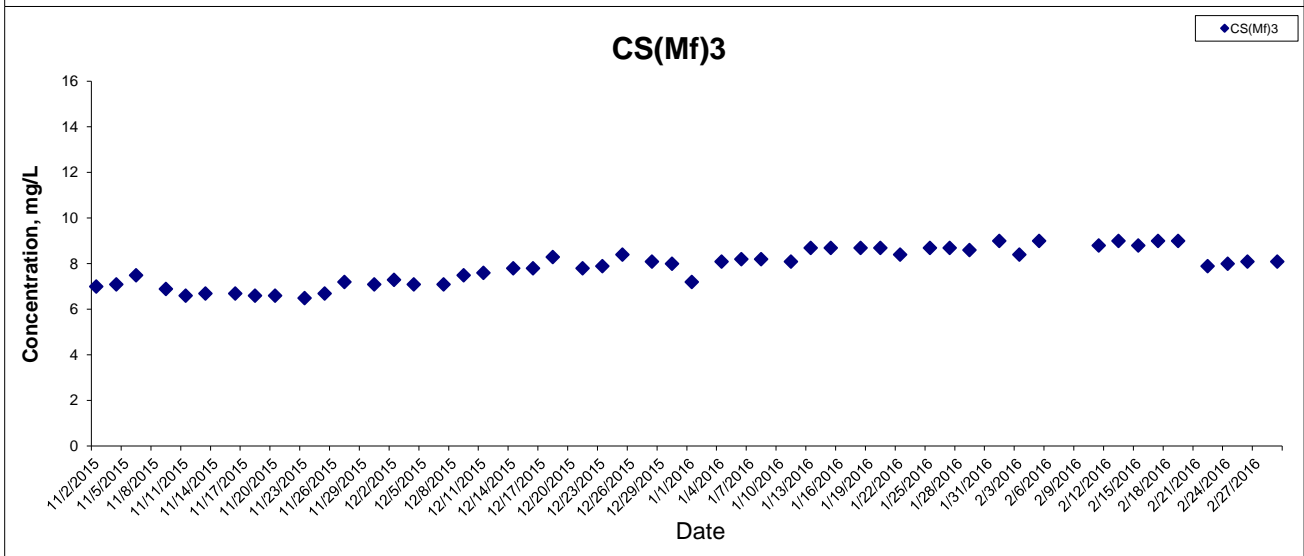
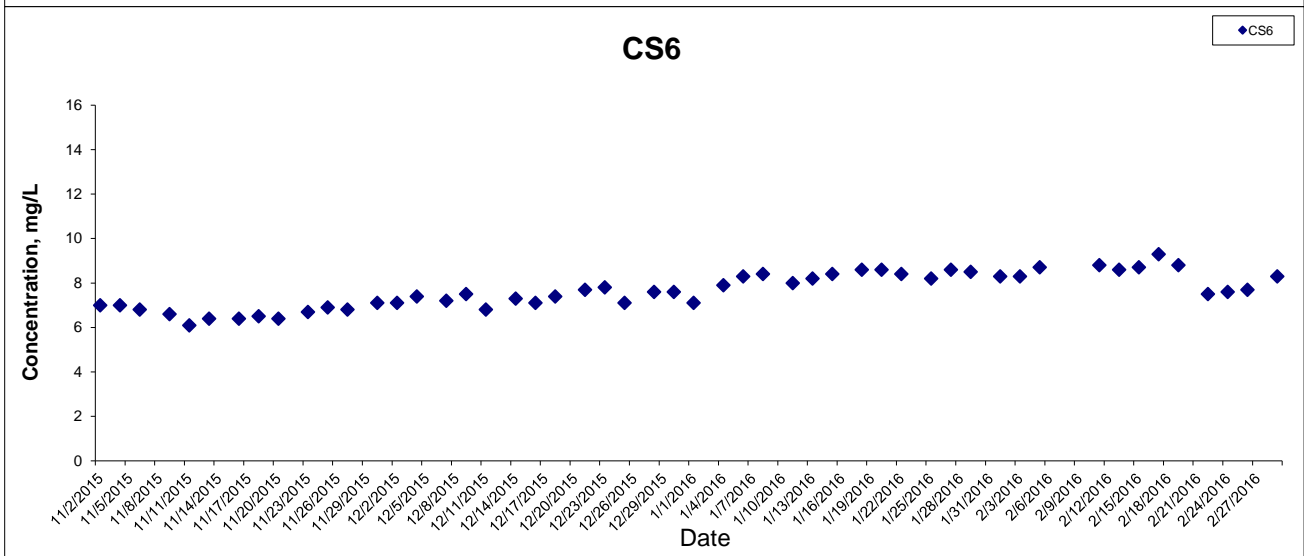
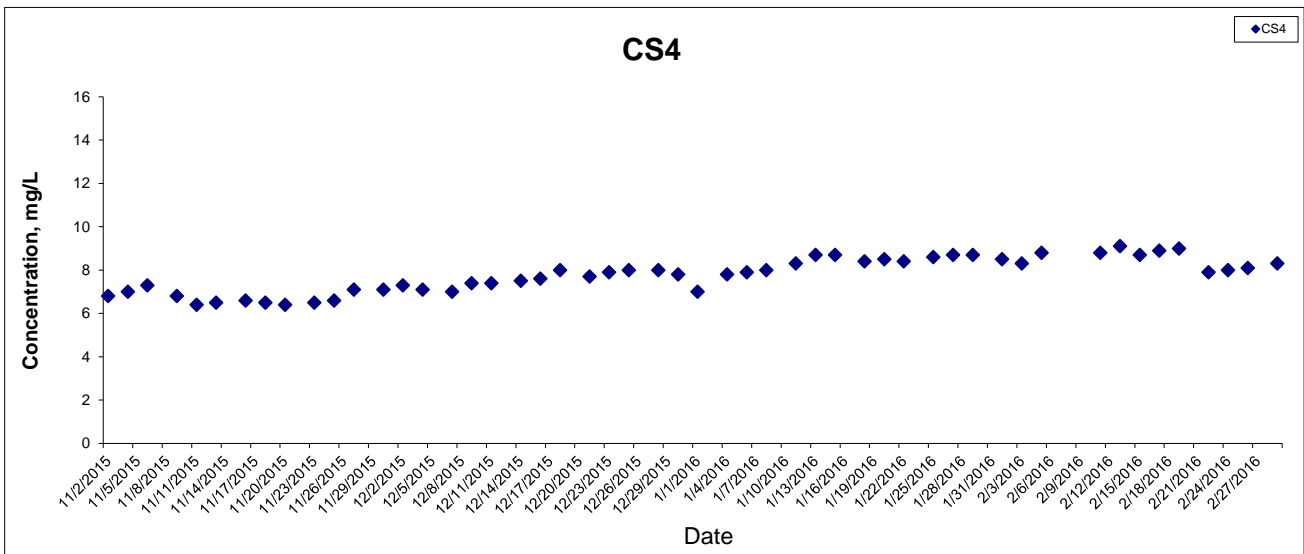


Project No.: 60249820

Date: March 2016

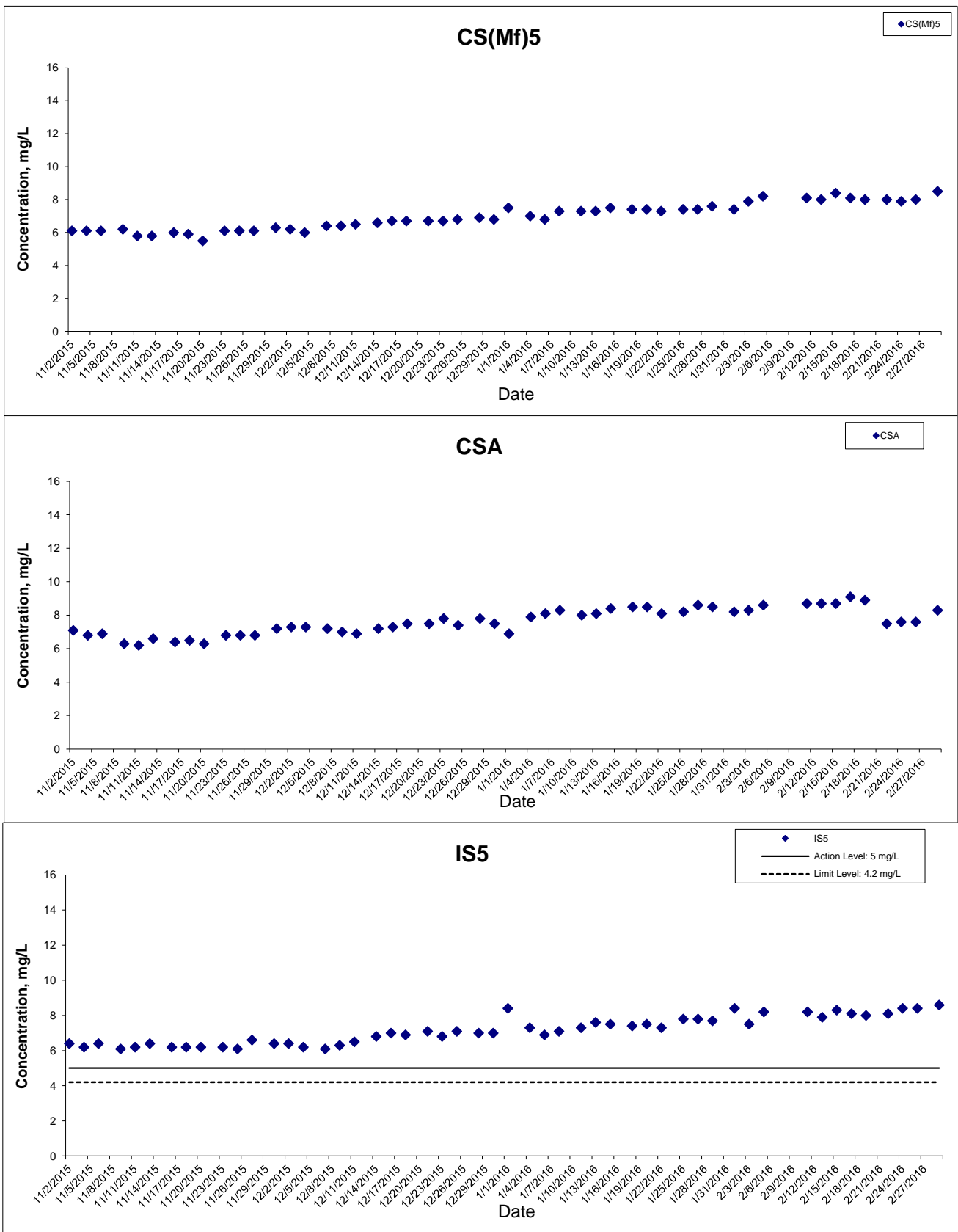
Appendix G

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



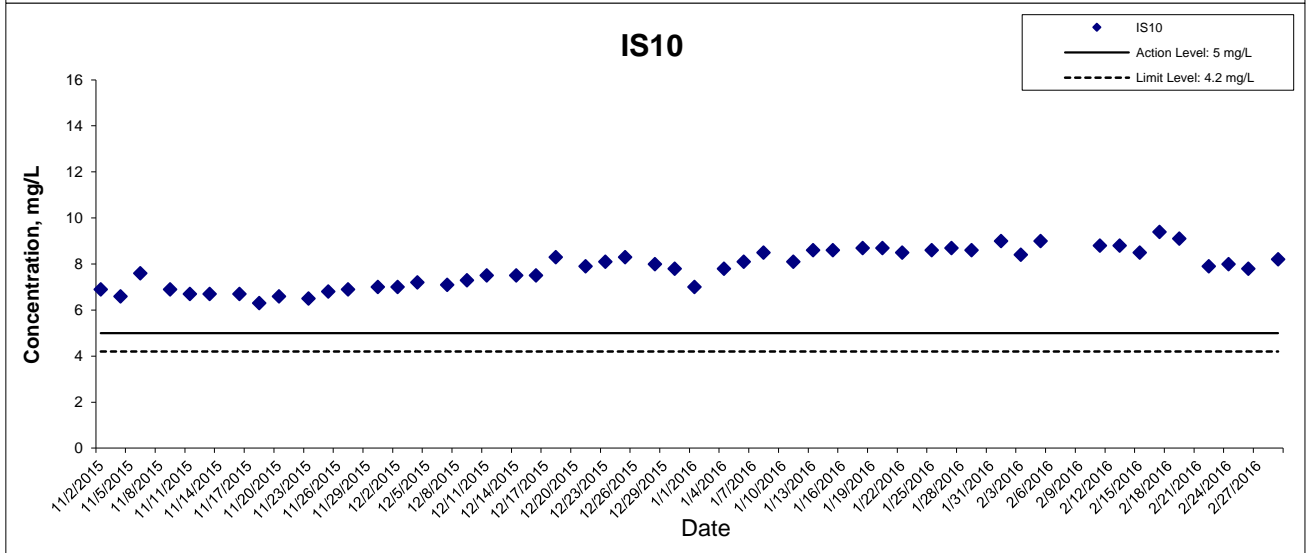
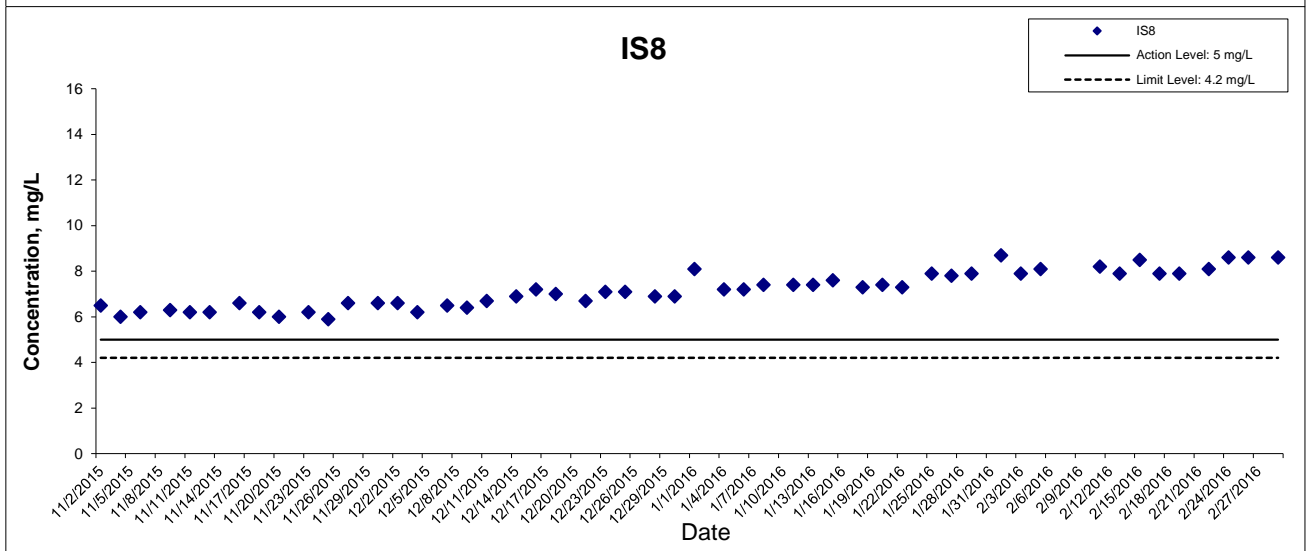
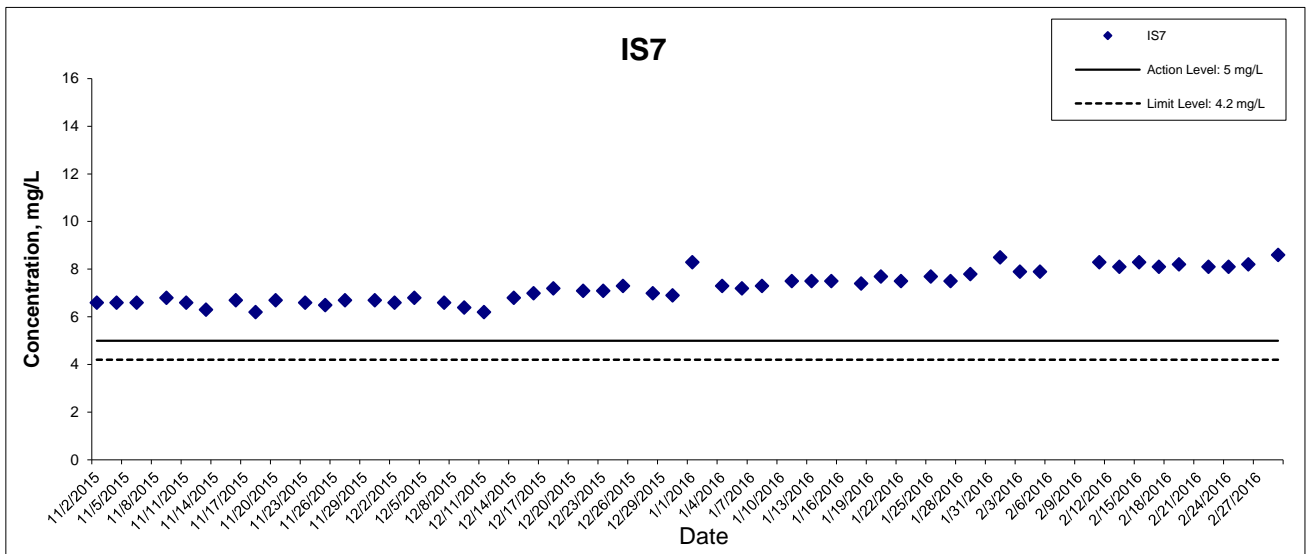
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Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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 - RECLAMATION WORKS

Graphical Presentation of Impact Water Quality
 Monitoring Results

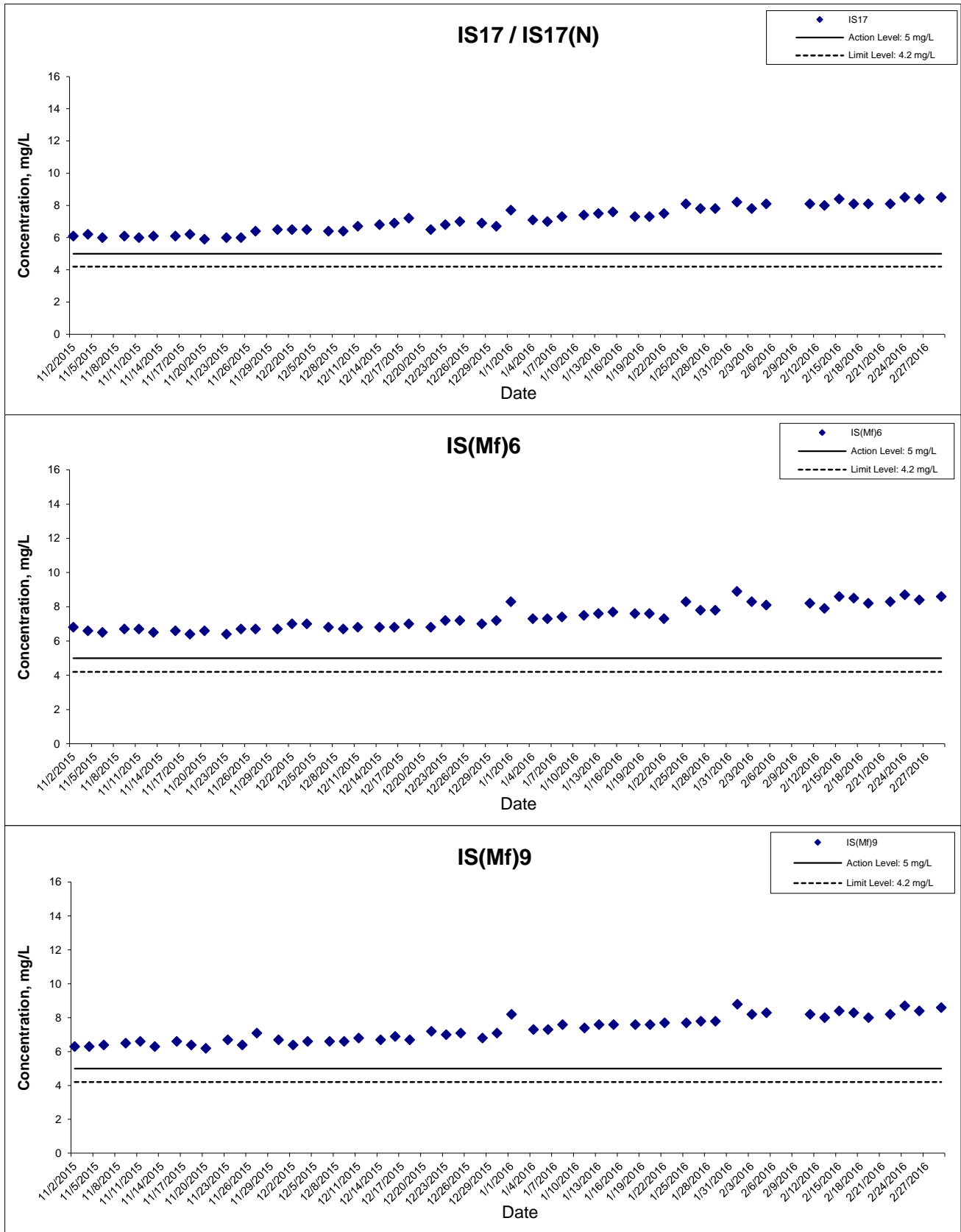


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Date: March 2016

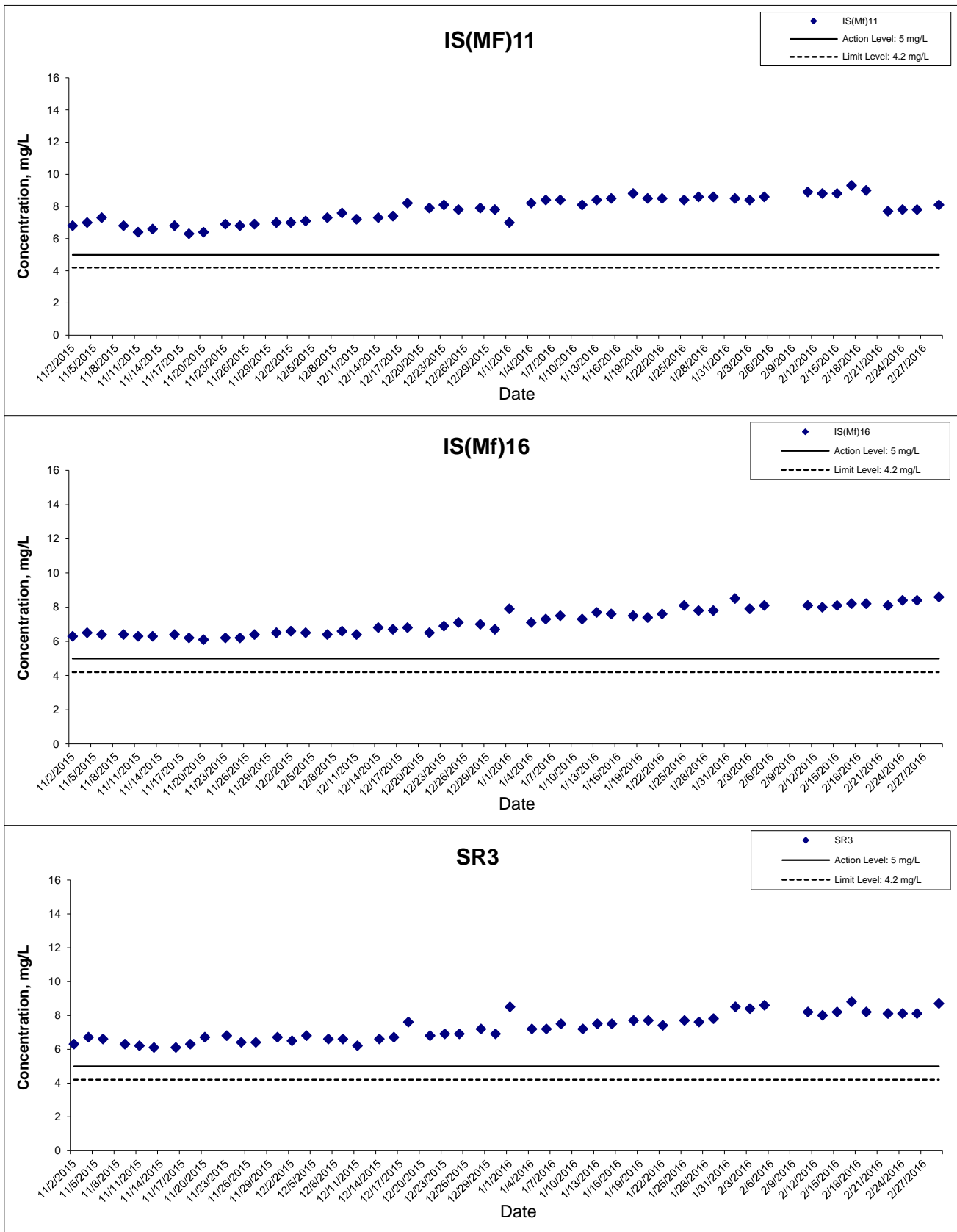
Appendix G

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



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



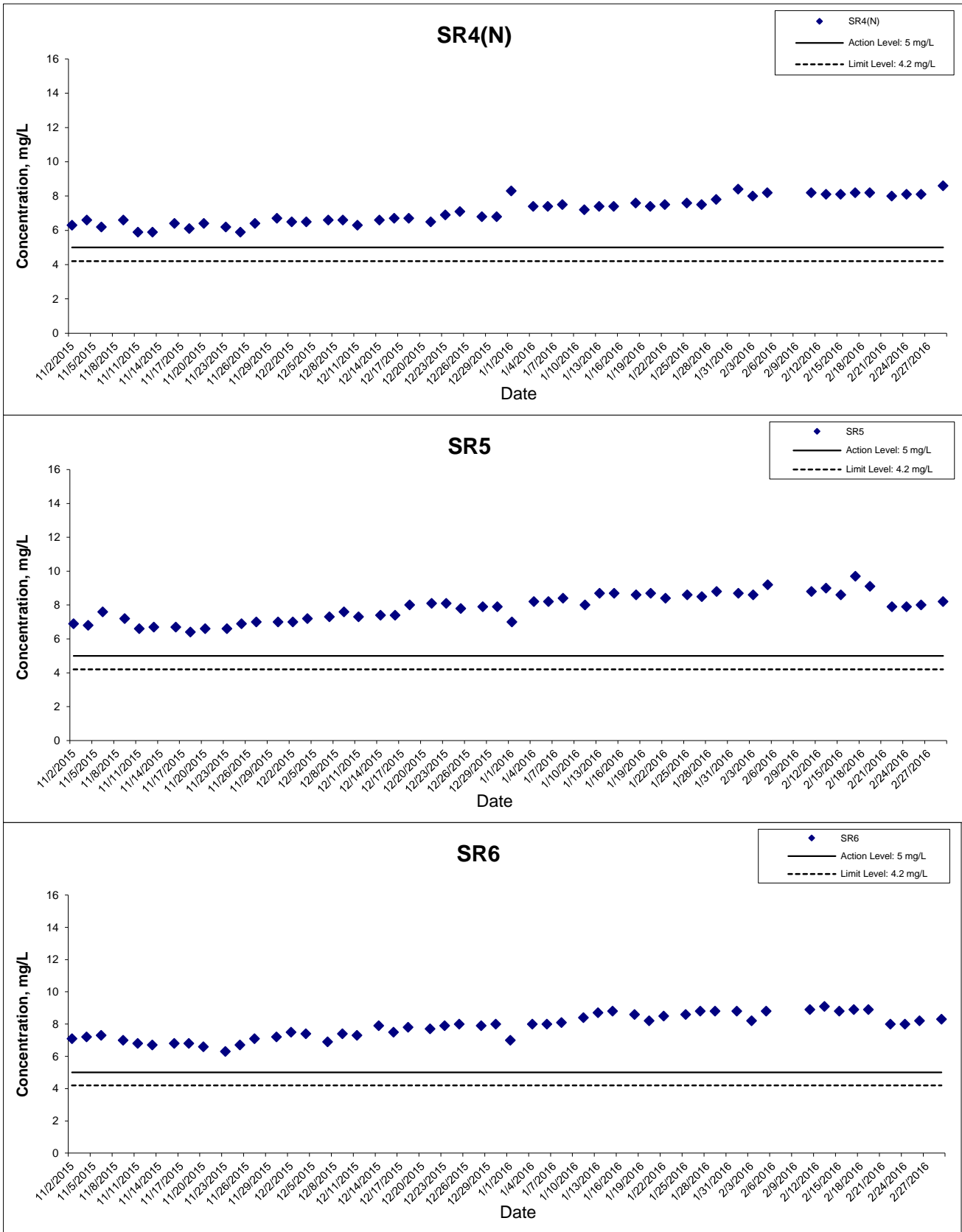
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 - RECLAMATION WORKS

Graphical Presentation of Impact Water Quality
 Monitoring Results

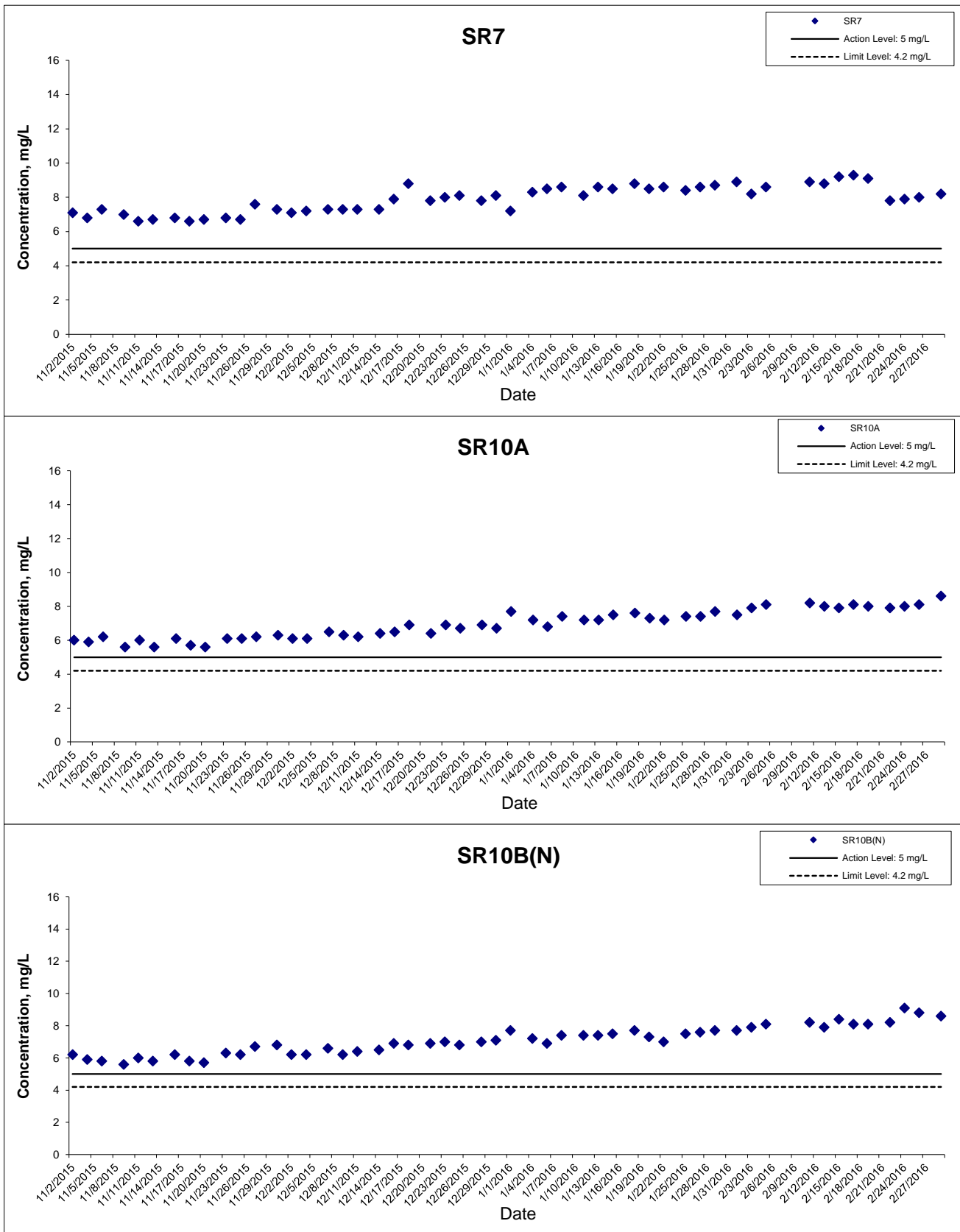


Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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



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 - RECLAMATION WORKS

Graphical Presentation of Impact Water Quality
 Monitoring Results

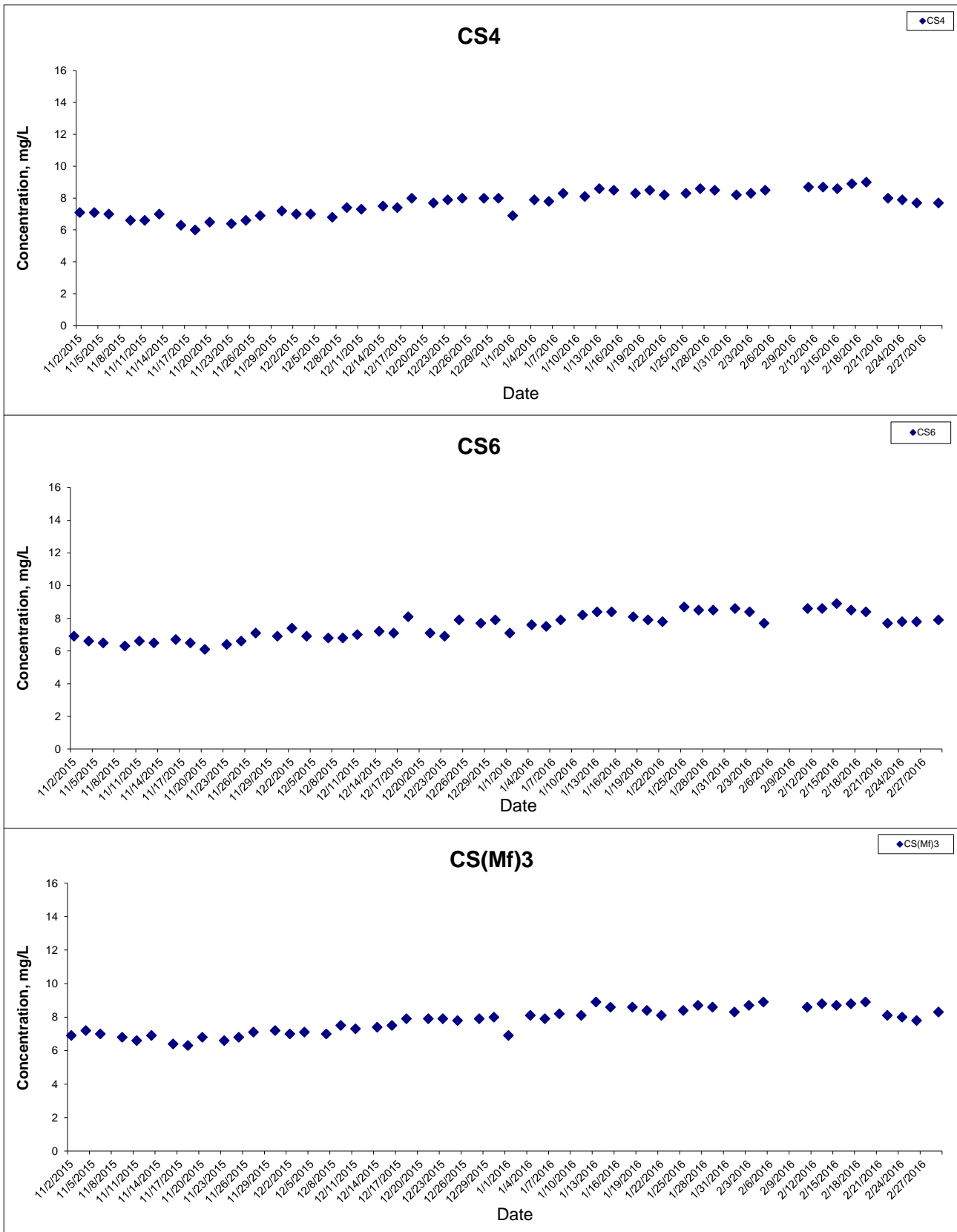


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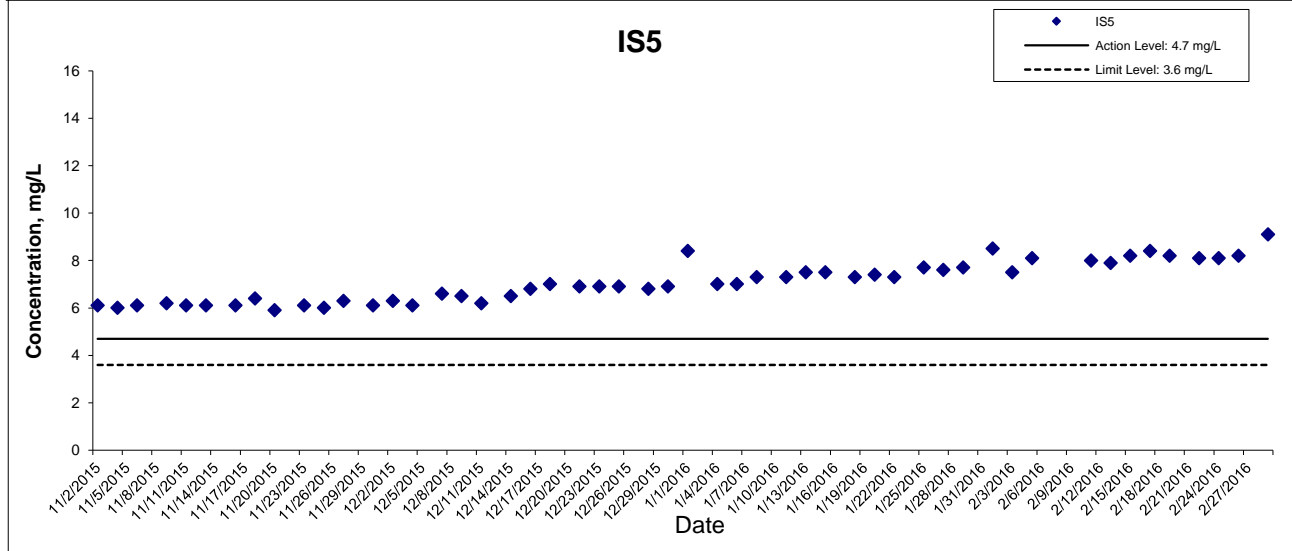
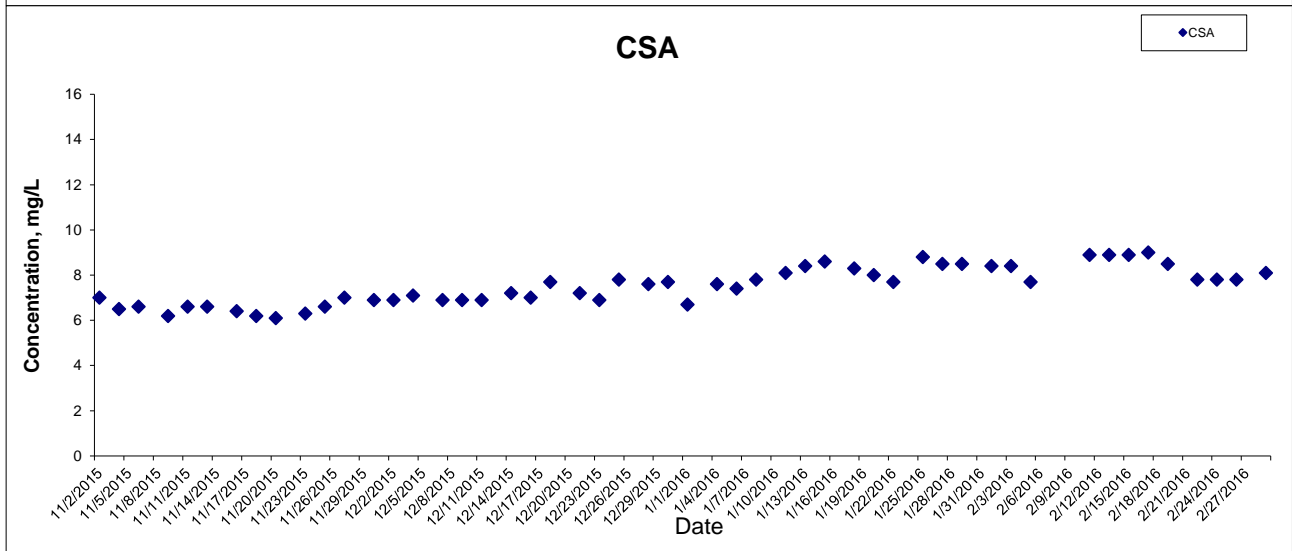
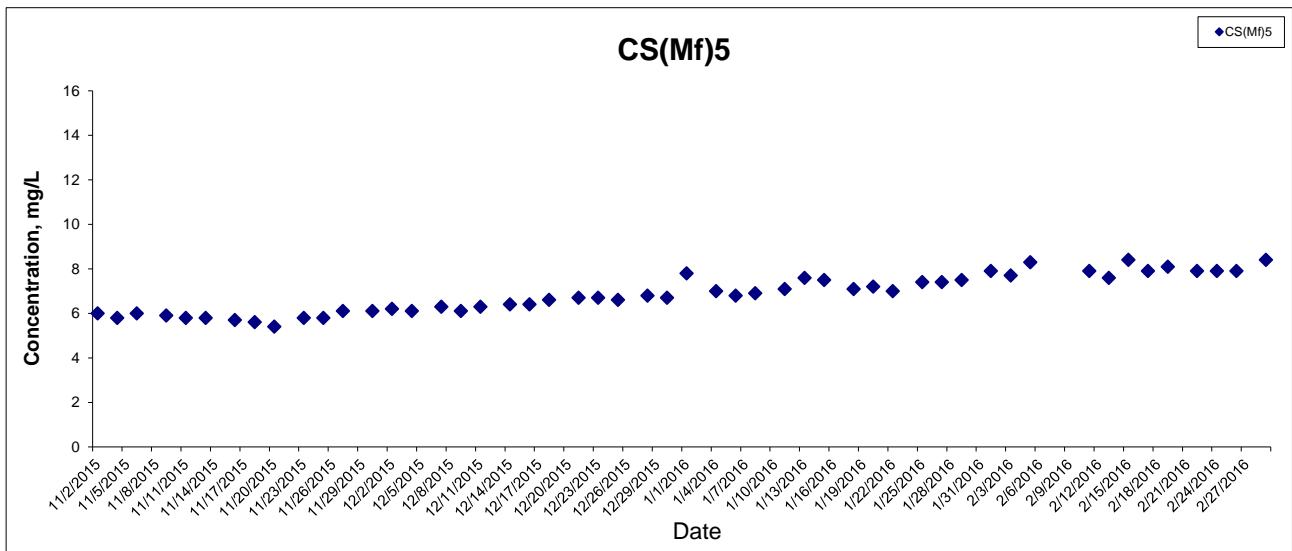
Appendix G

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



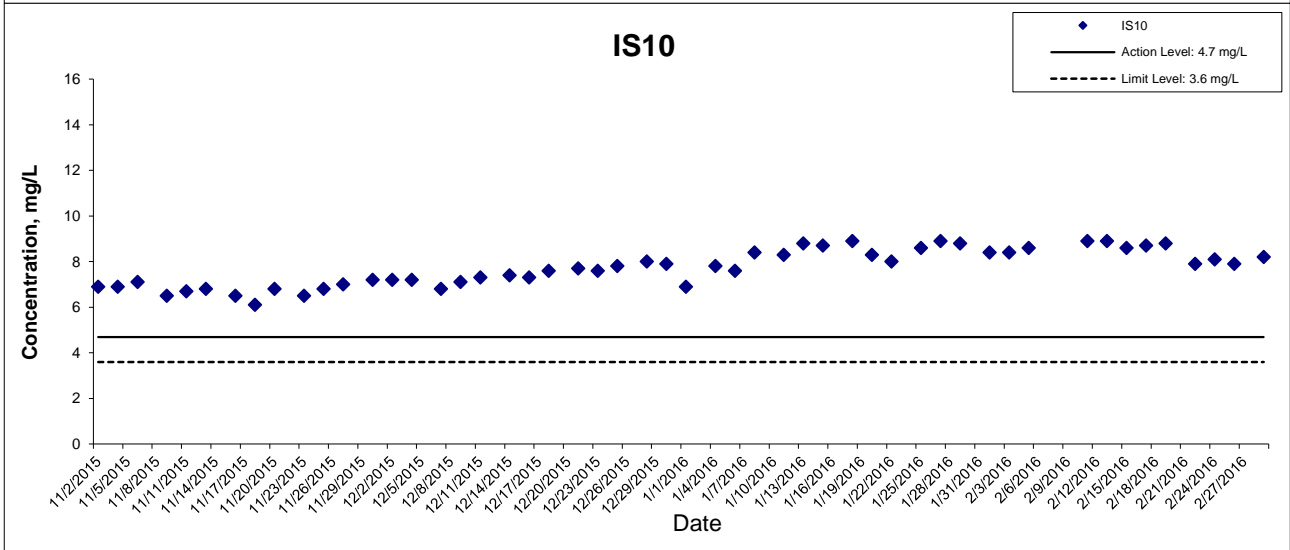
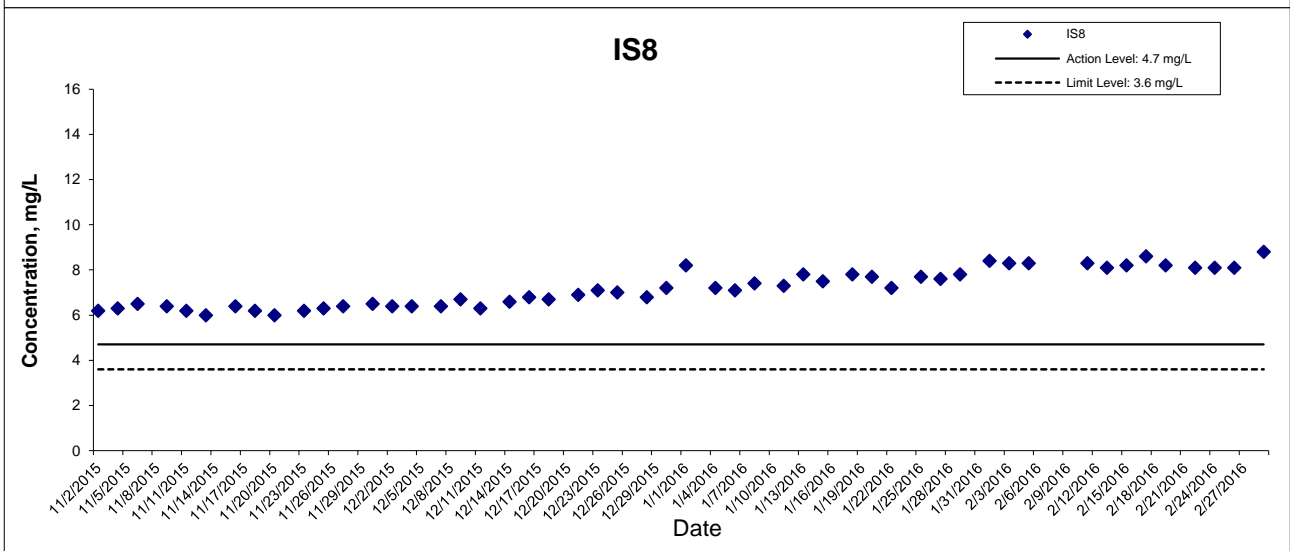
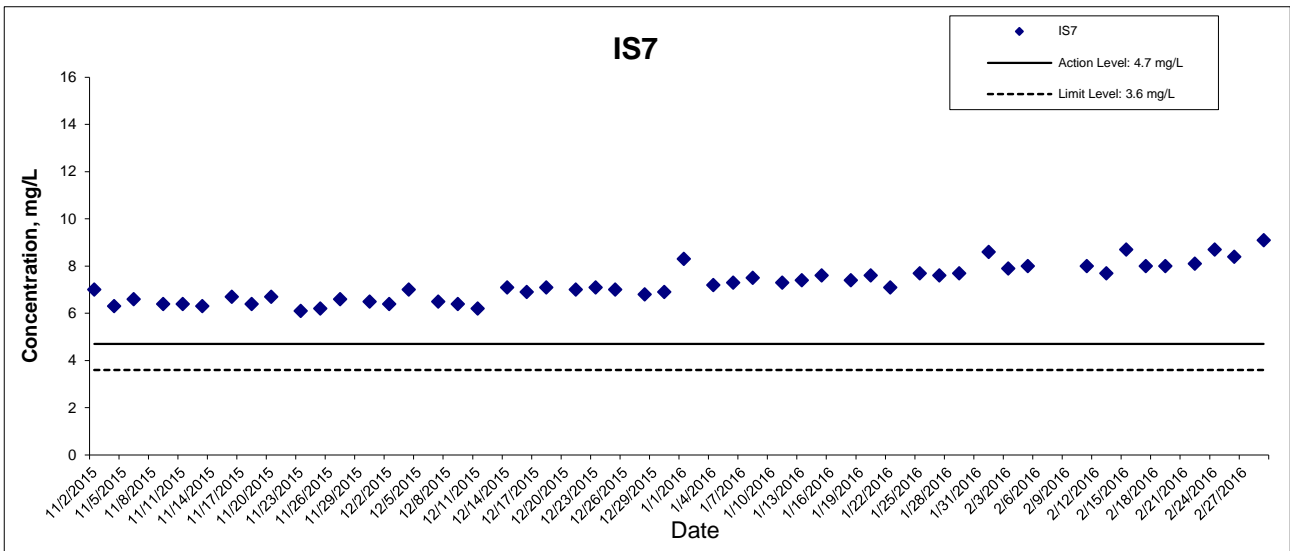
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 - RECLAMATION WORKS

Graphical Presentation of Impact Water Quality
 Monitoring Results

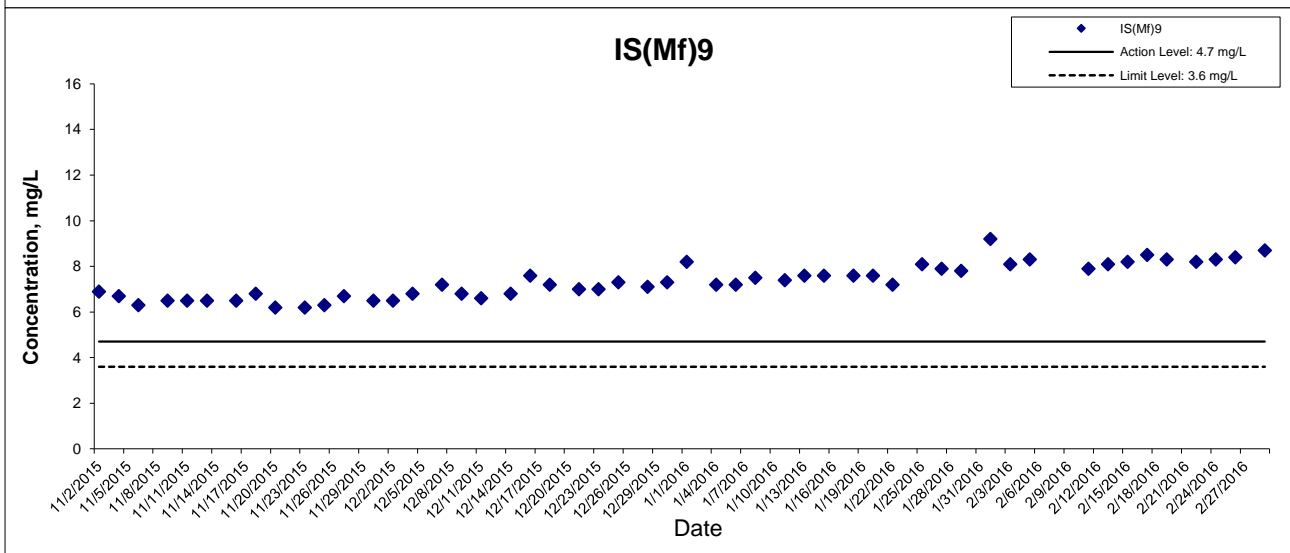
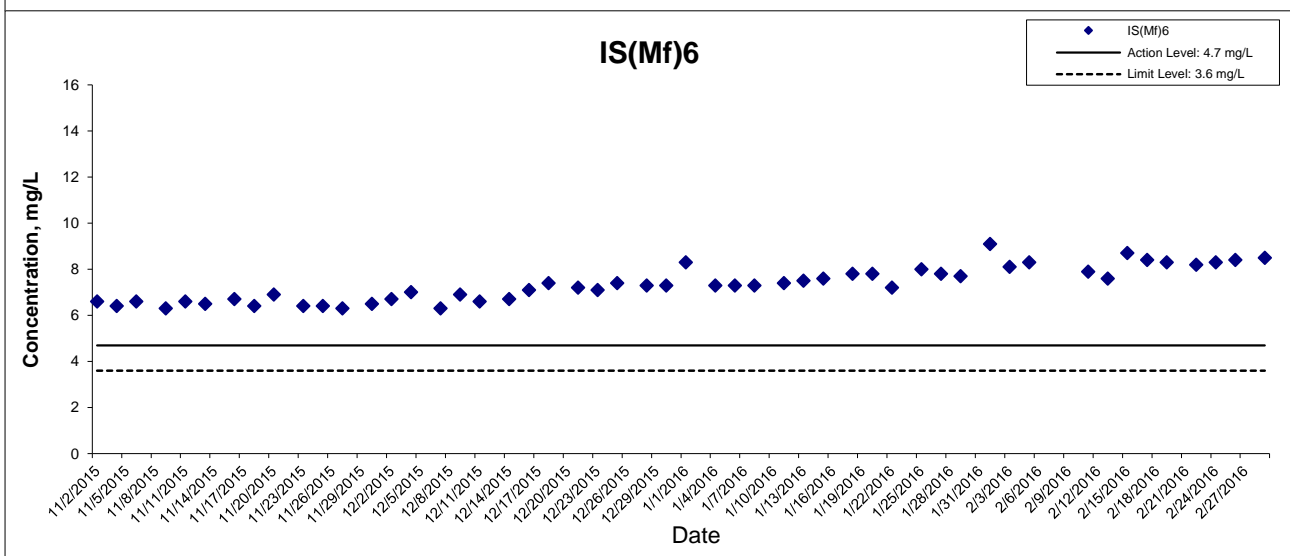
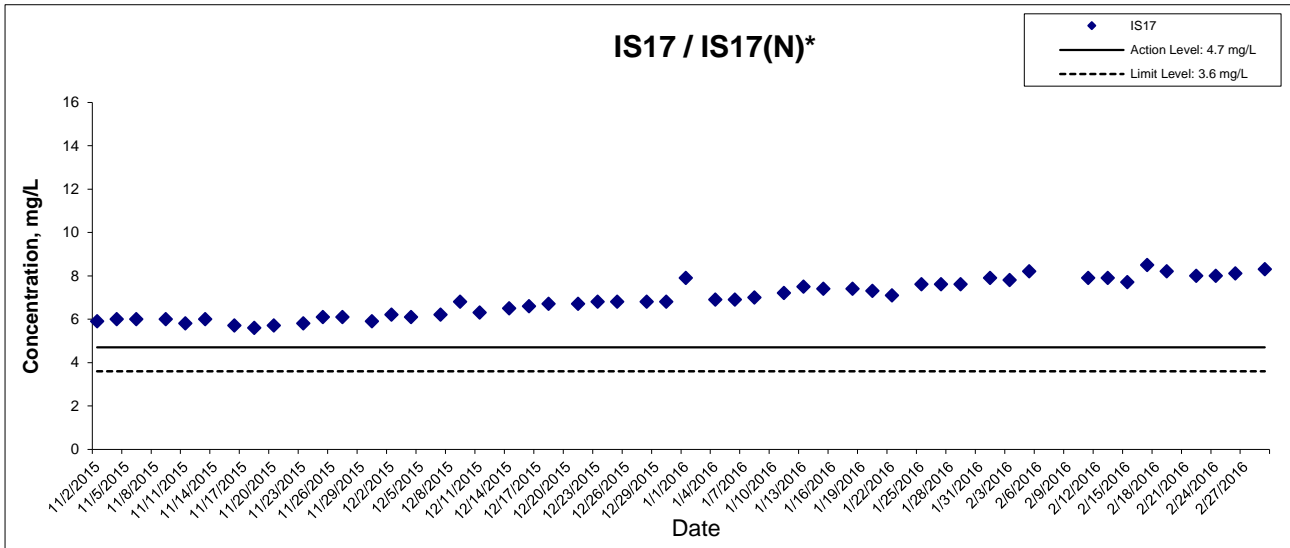


Dissolved Oxygen (Bottom) at Mid-Ebb Tide



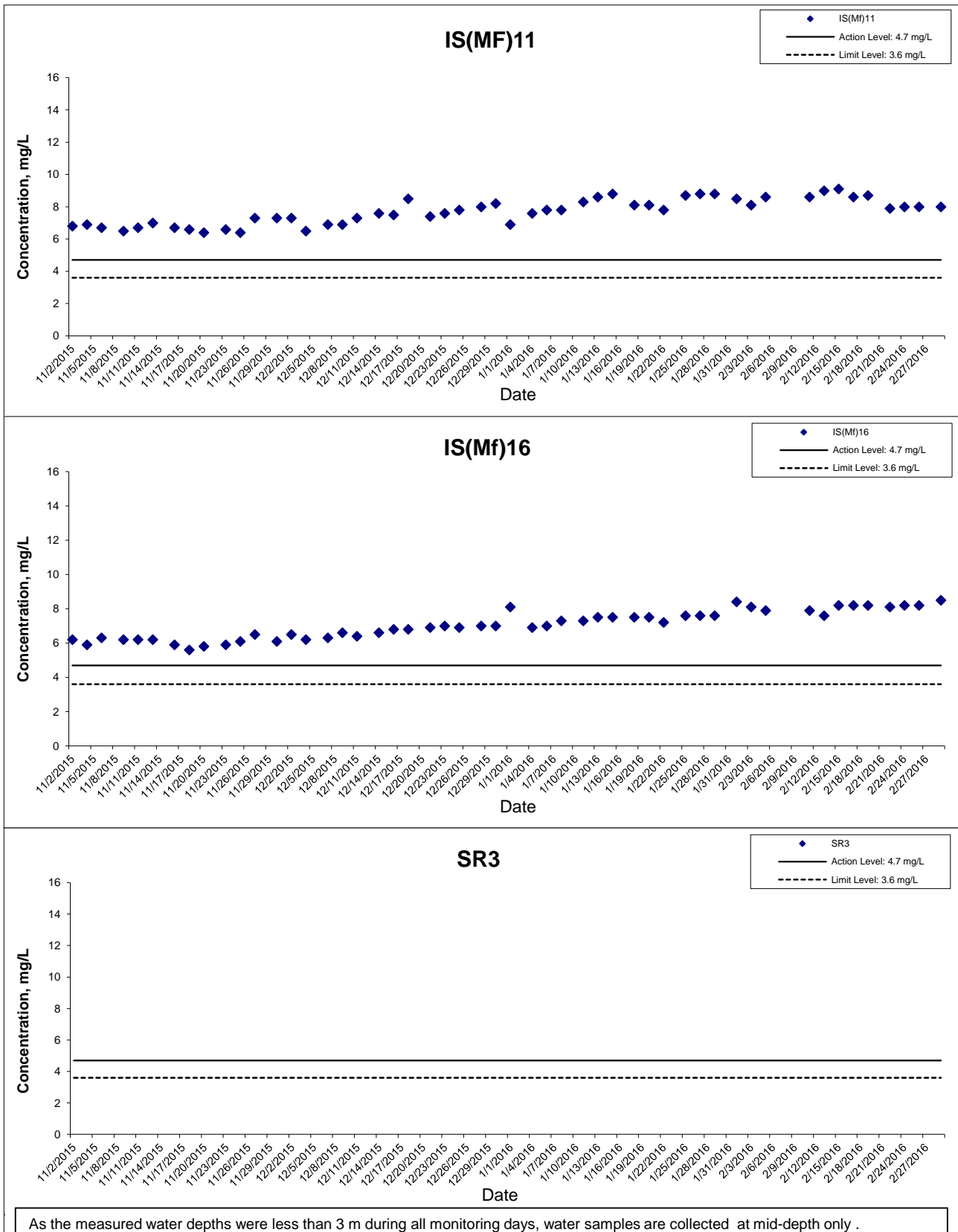
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



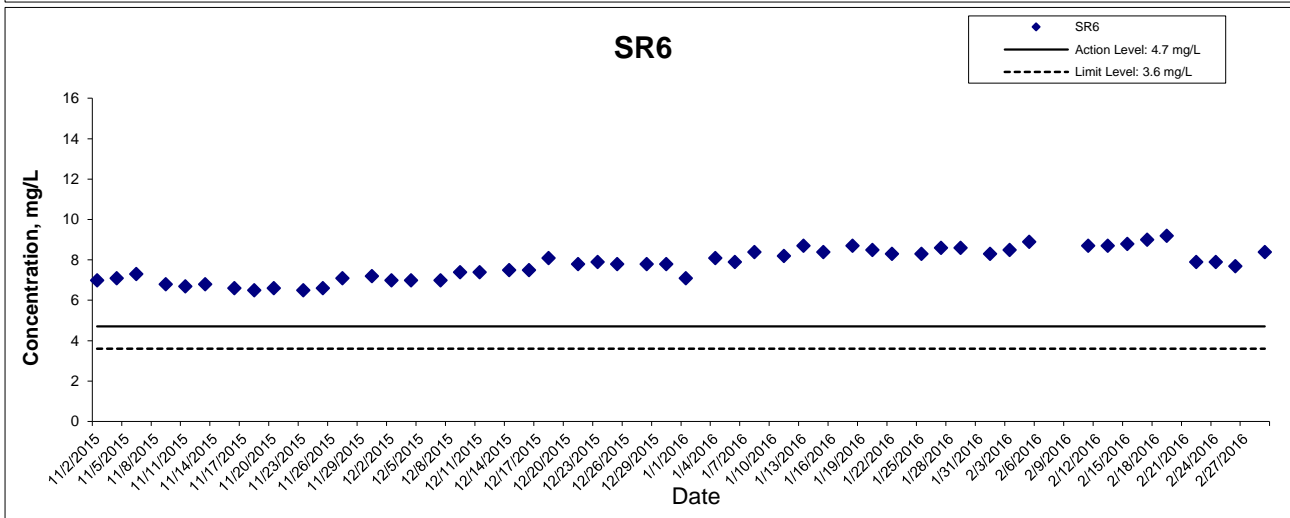
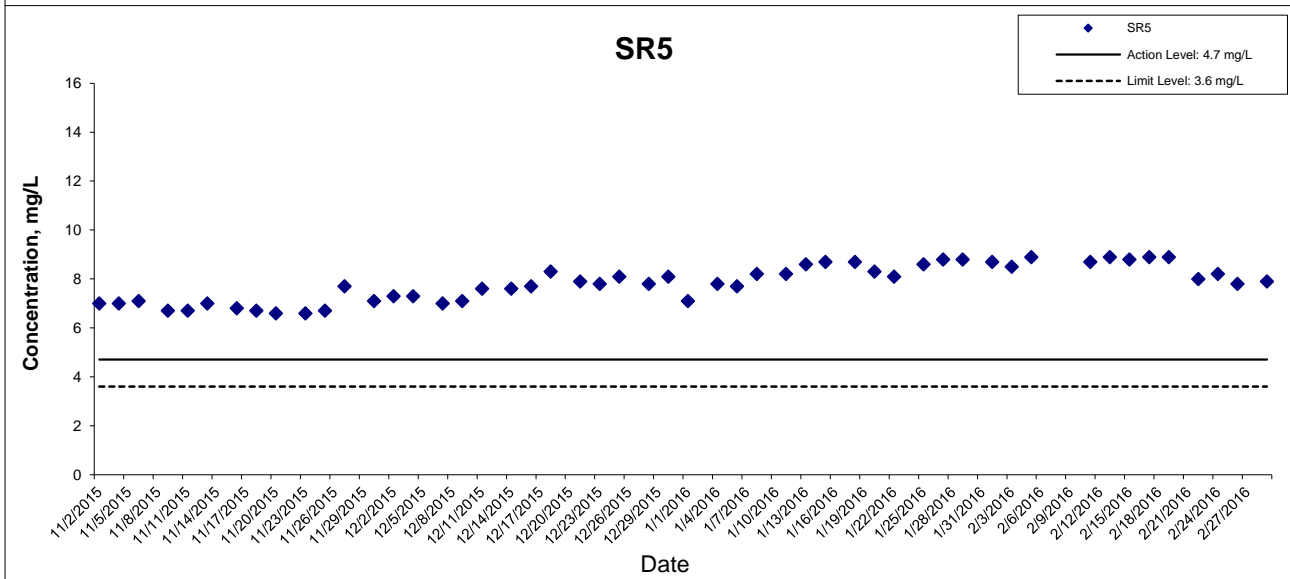
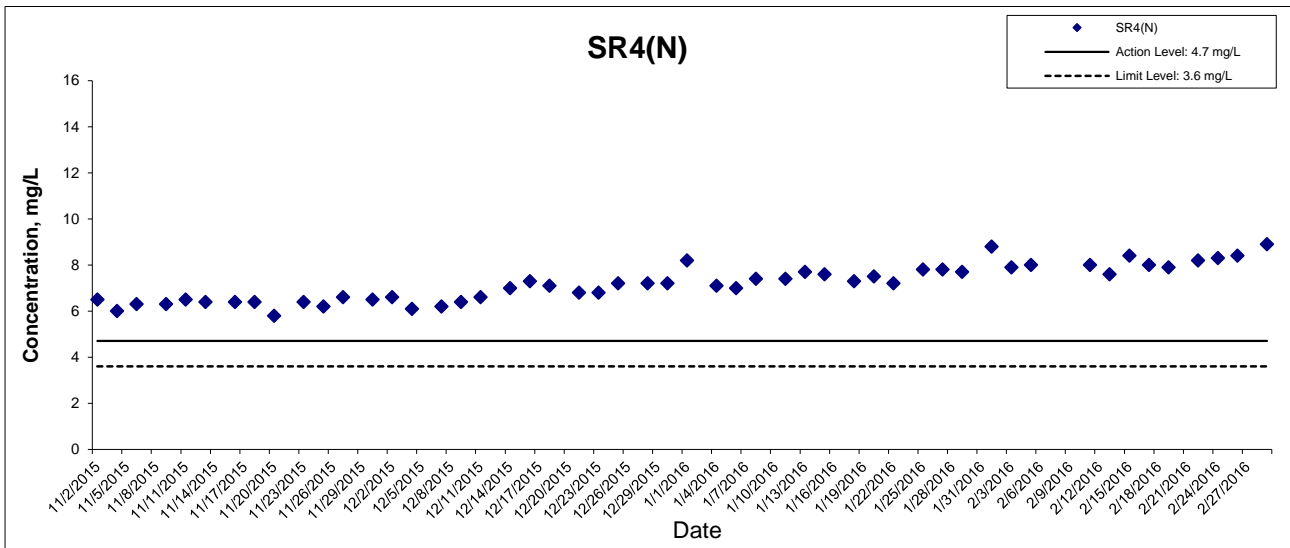
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



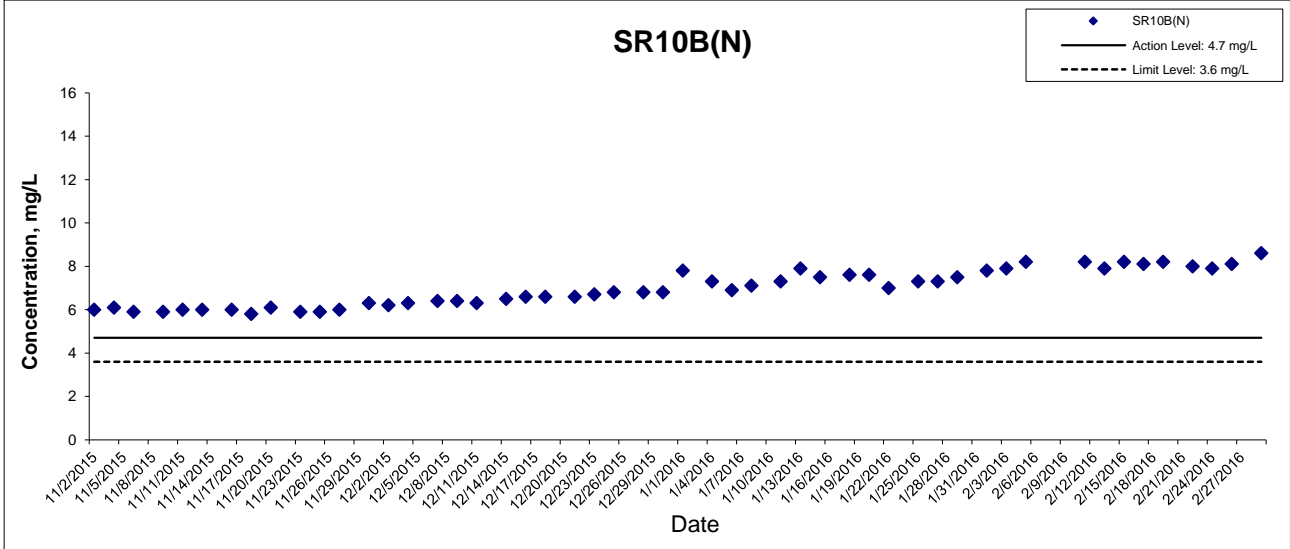
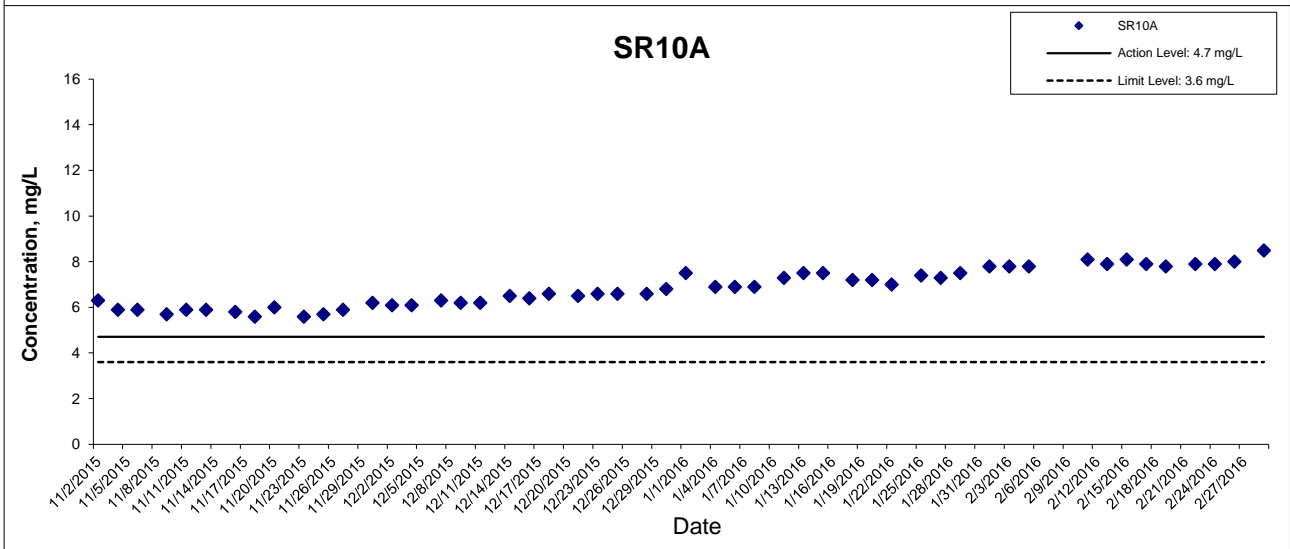
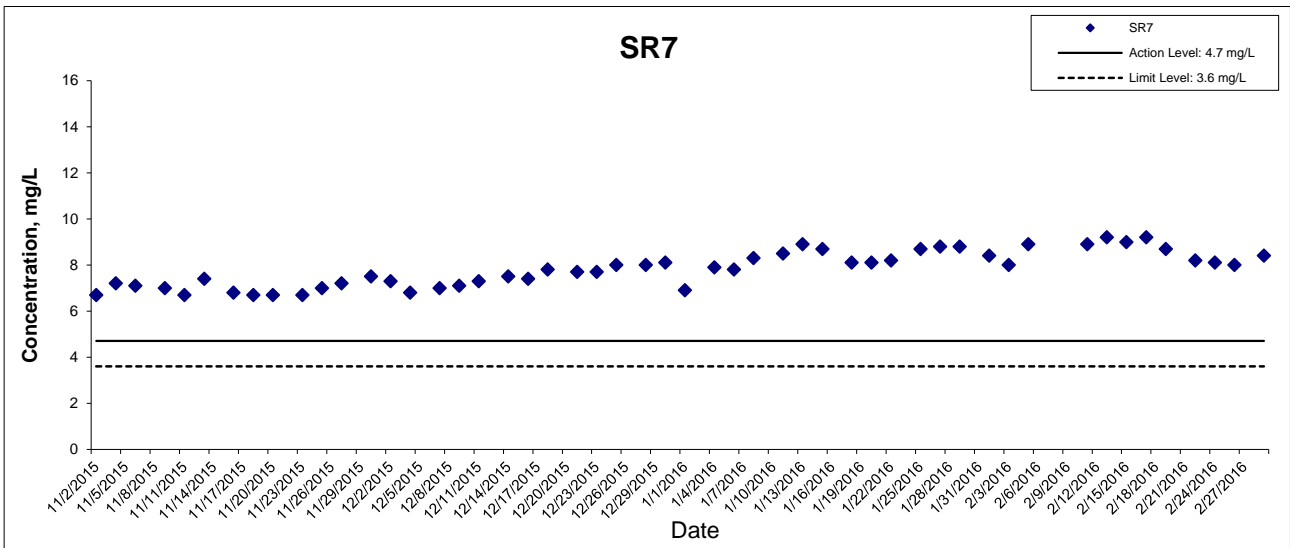
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



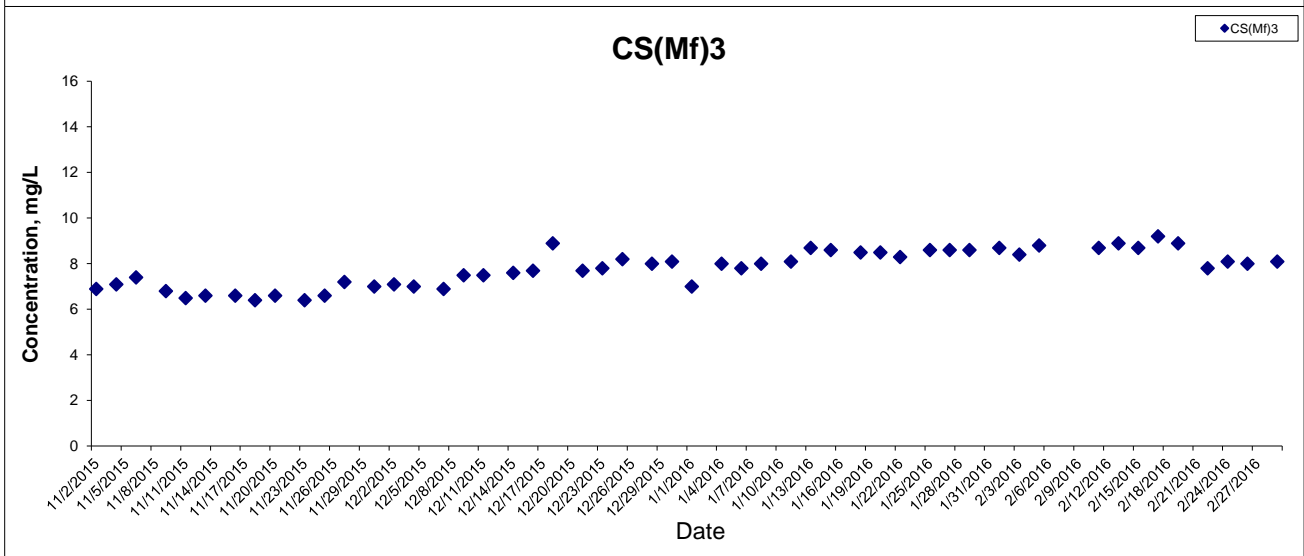
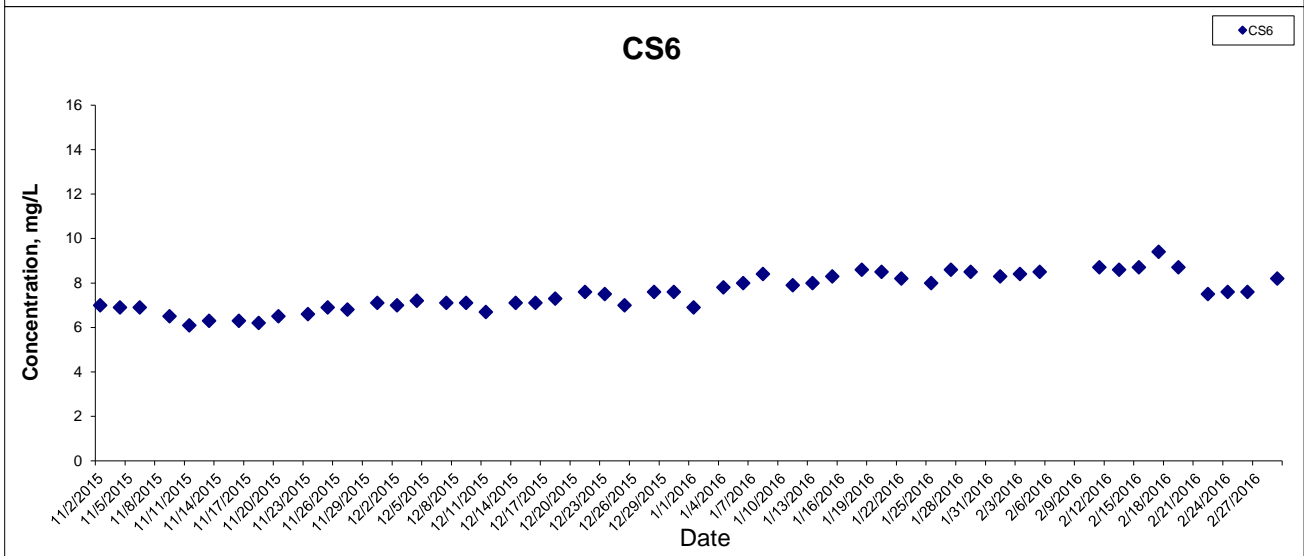
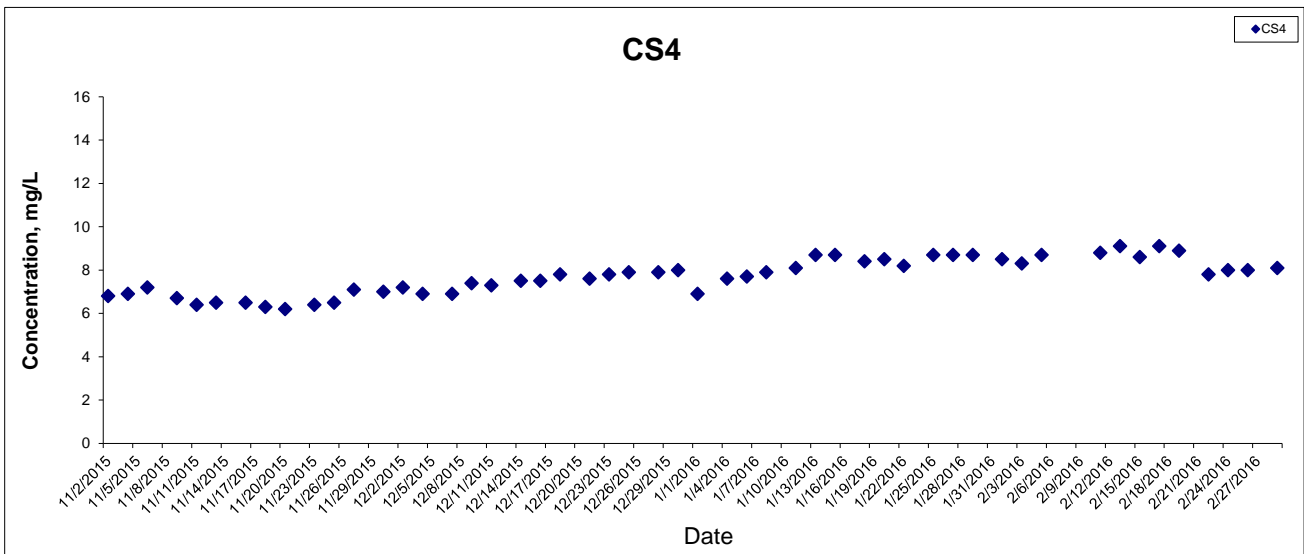
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 - RECLAMATION WORKS

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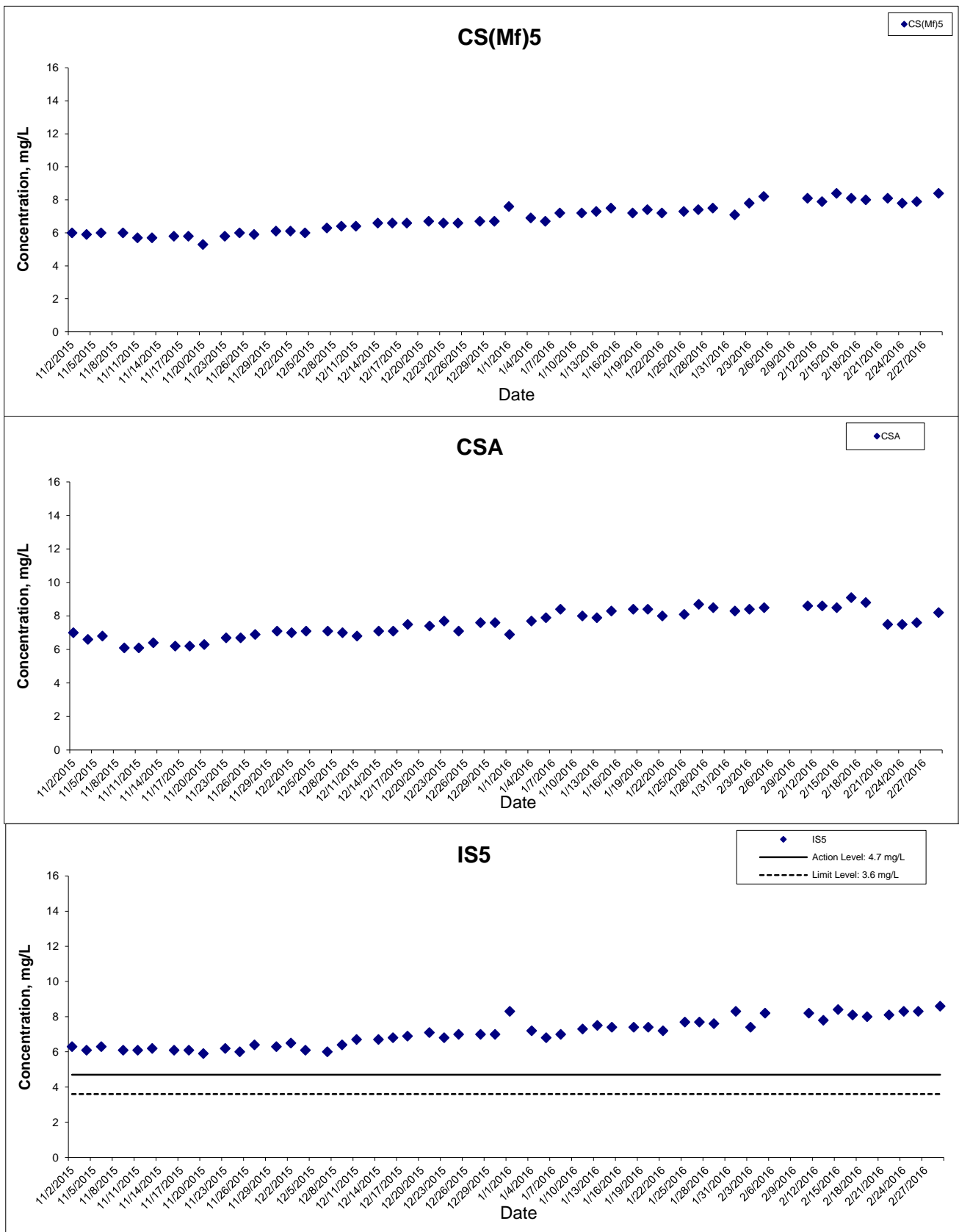


Dissolved Oxygen (Bottom) at Mid-Flood Tide



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Dissolved Oxygen (Bottom) at Mid-Flood Tide



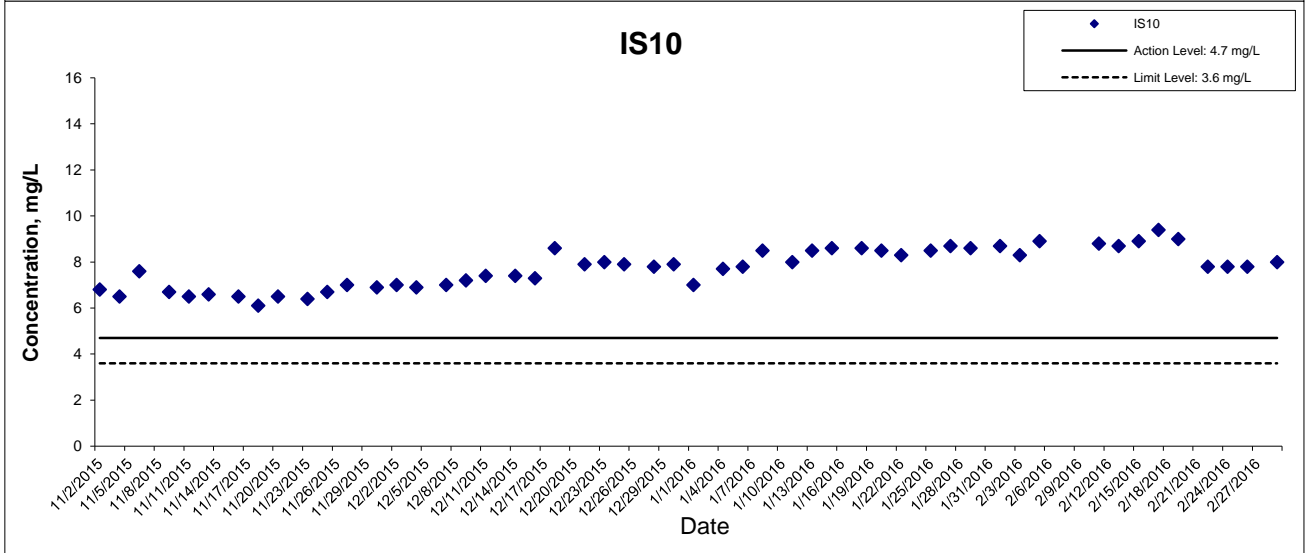
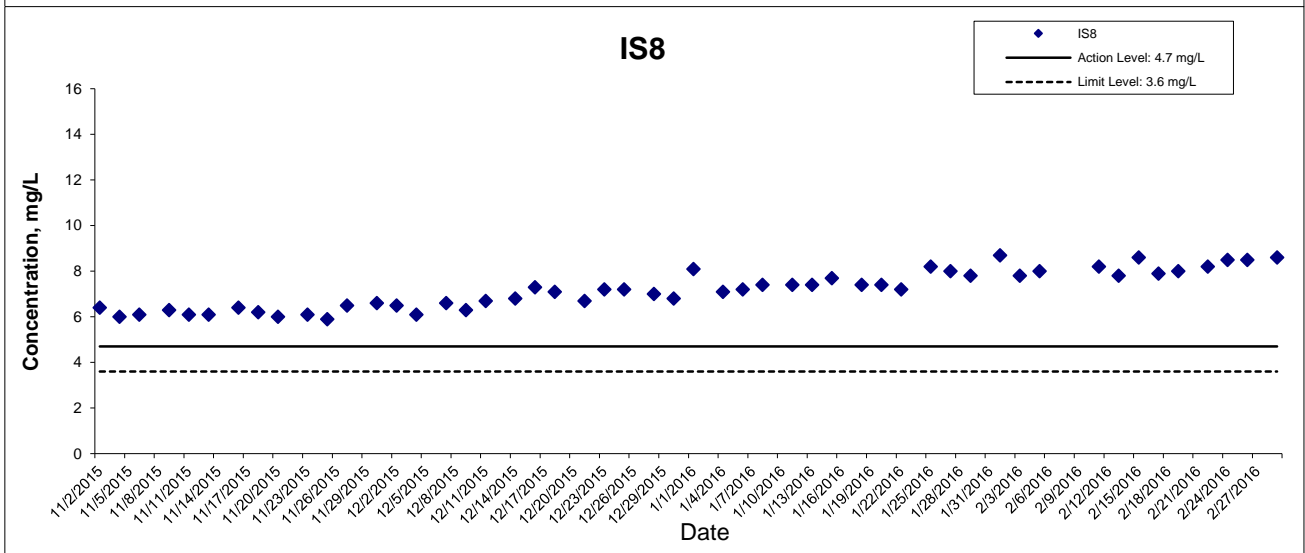
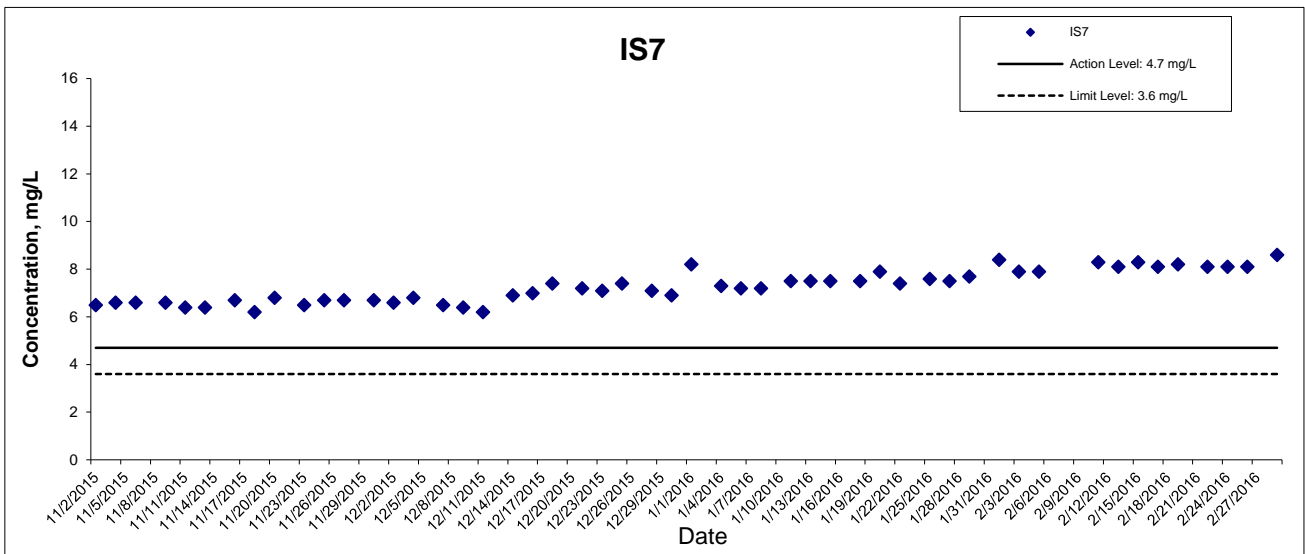
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 HONG KONG BOUNDARY CROSSING FACILITIES
 - RECLAMATION WORKS

Graphical Presentation of Impact Water Quality
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



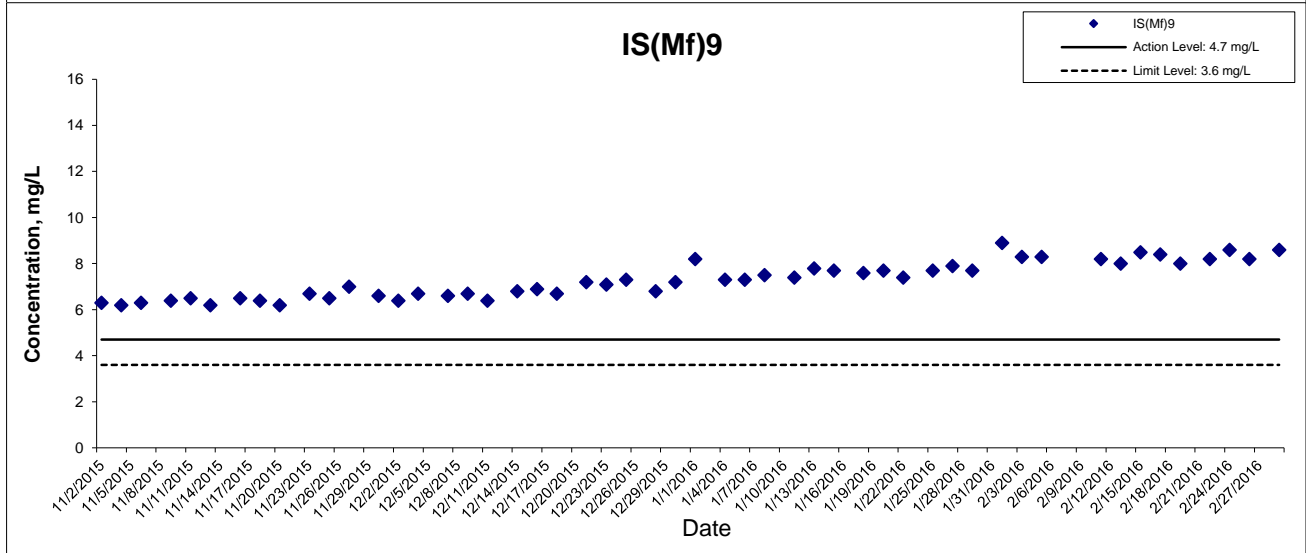
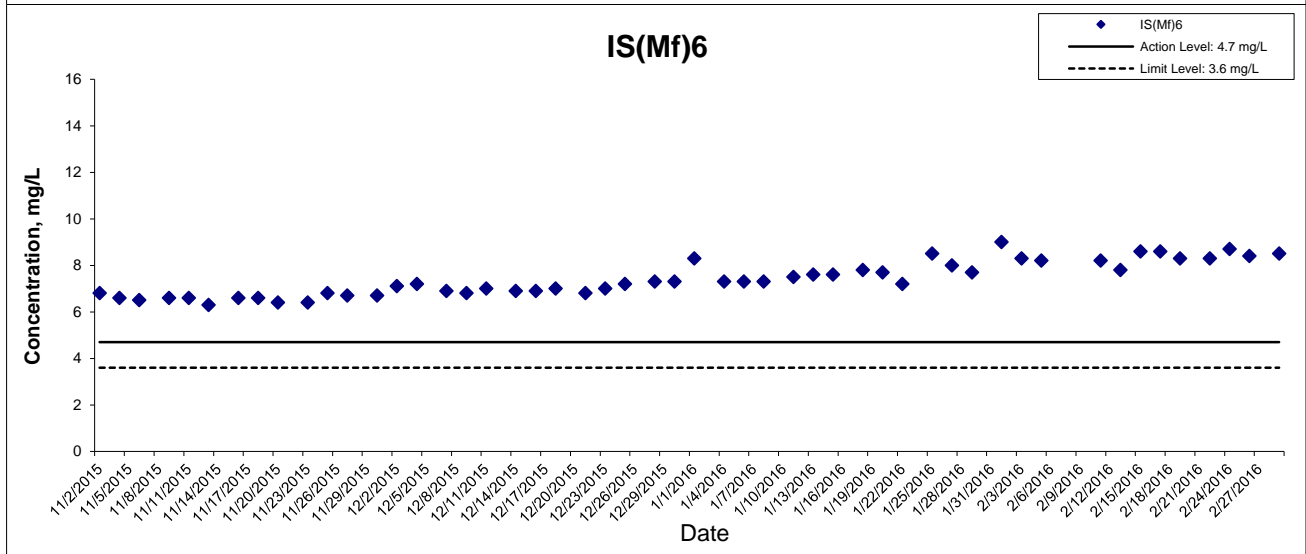
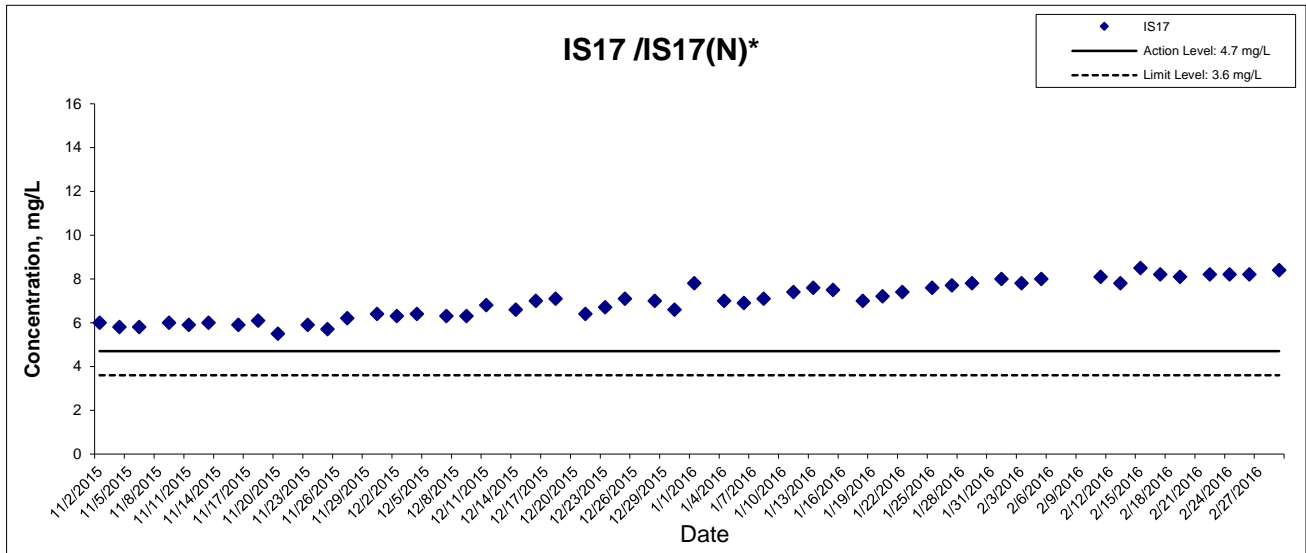
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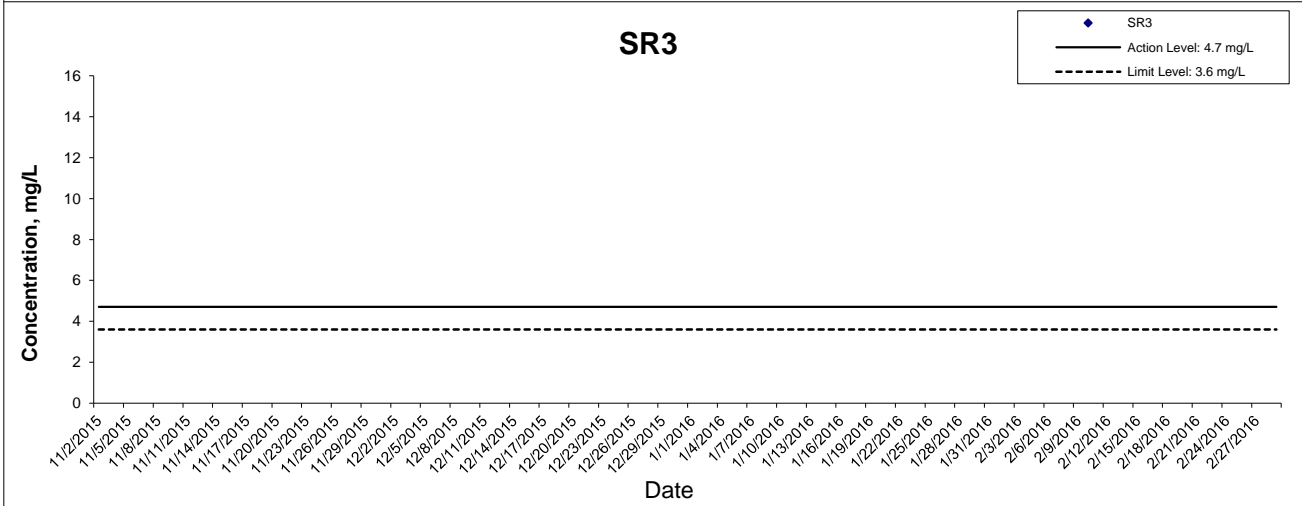
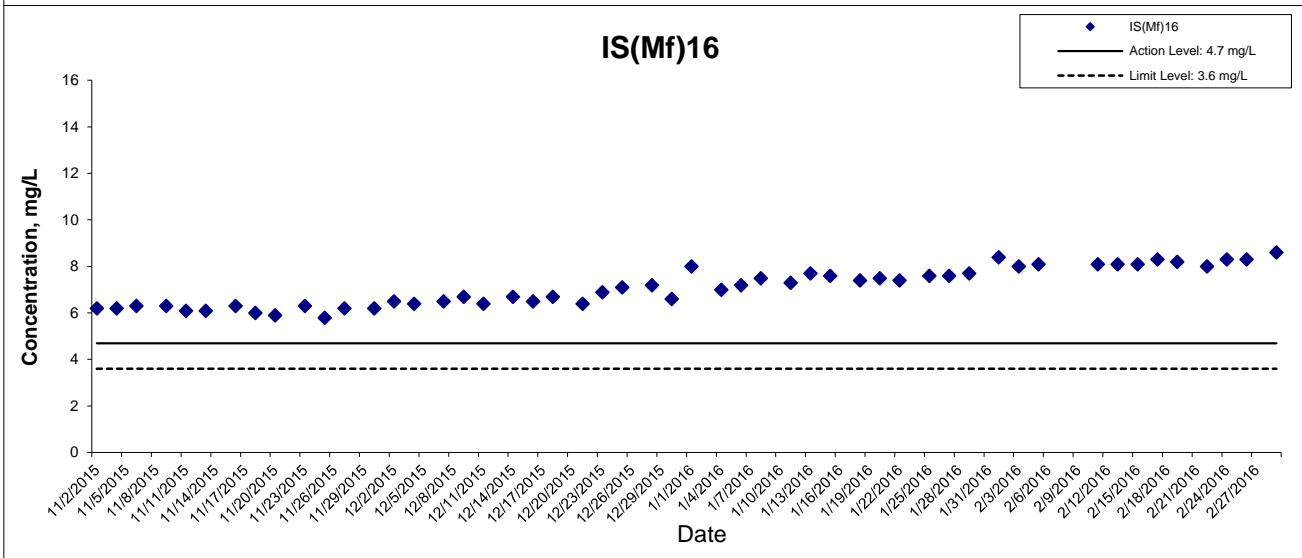
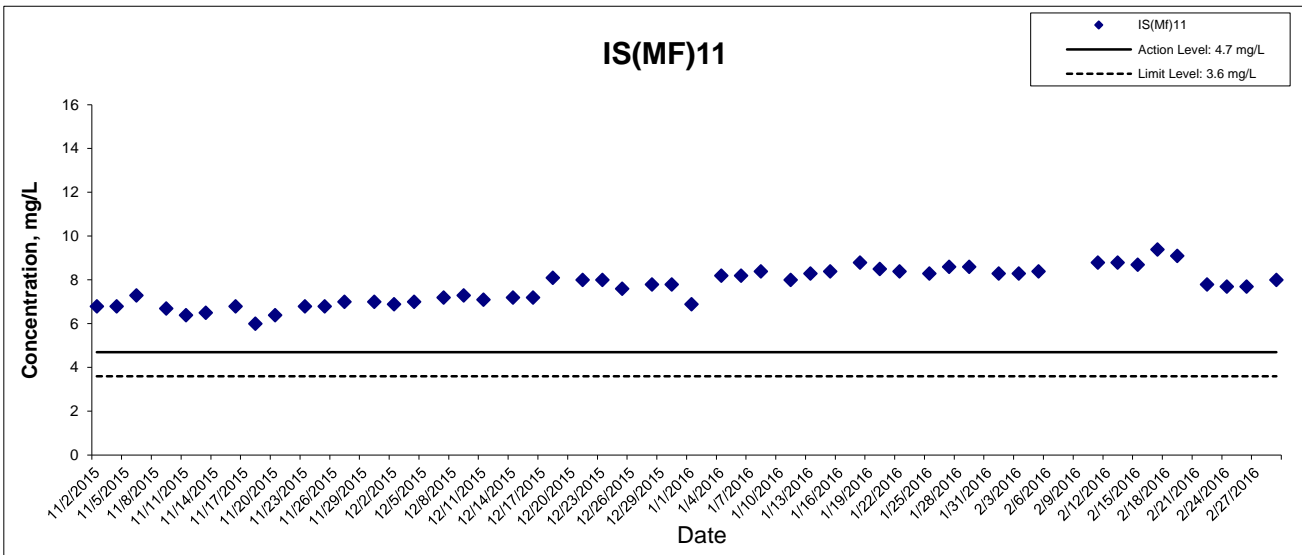


Dissolved Oxygen (Bottom) at Mid-Flood Tide



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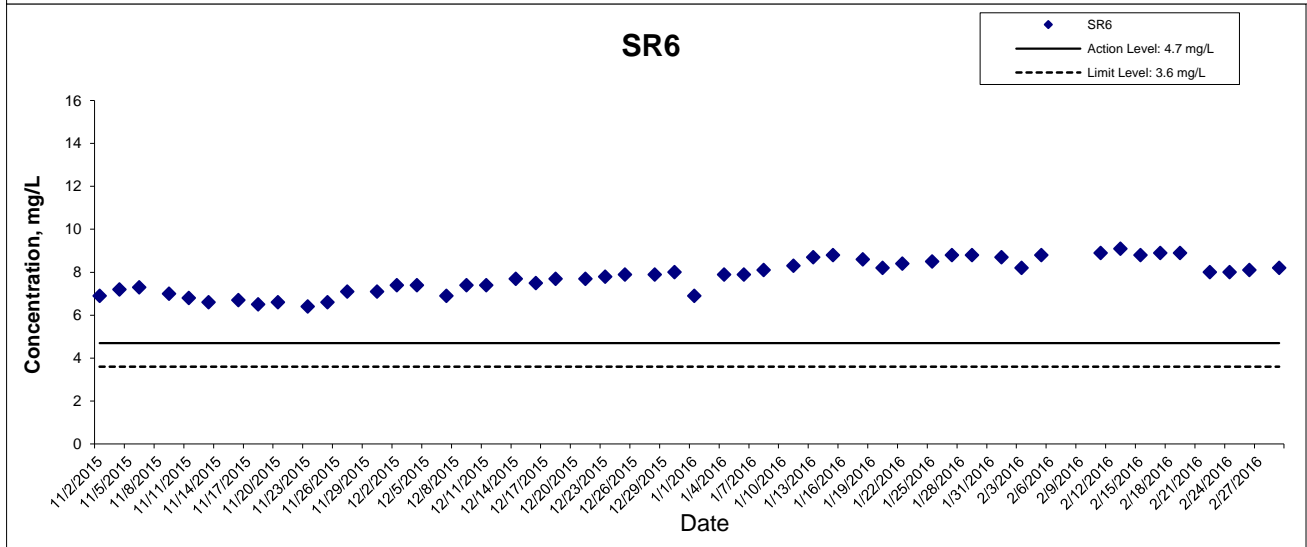
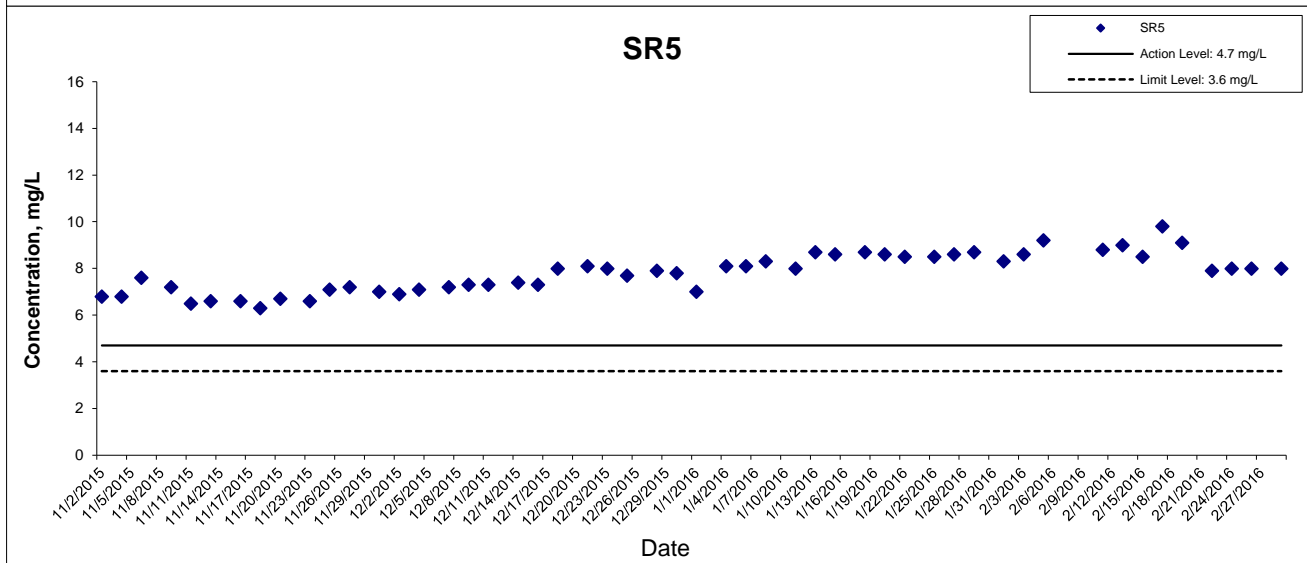
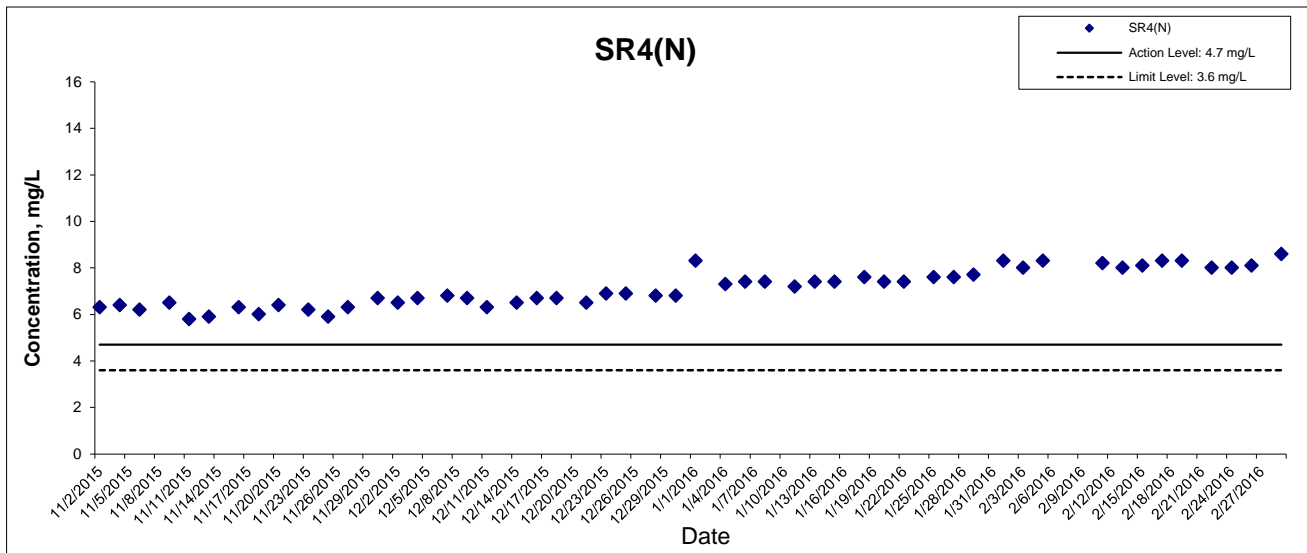
Dissolved Oxygen (Bottom) at Mid-Flood Tide



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

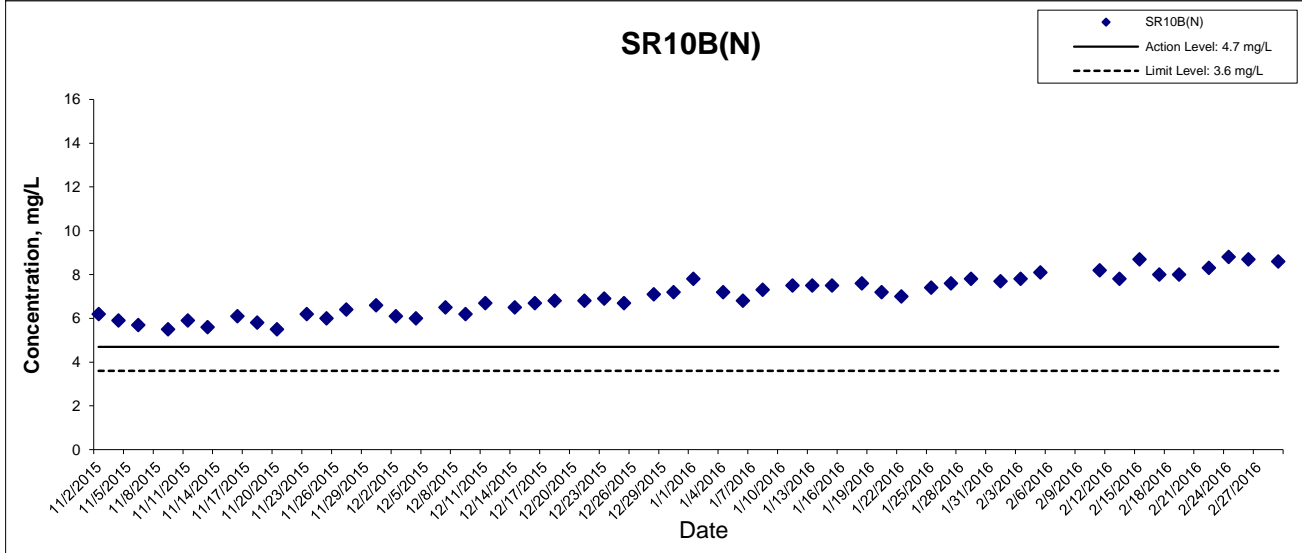
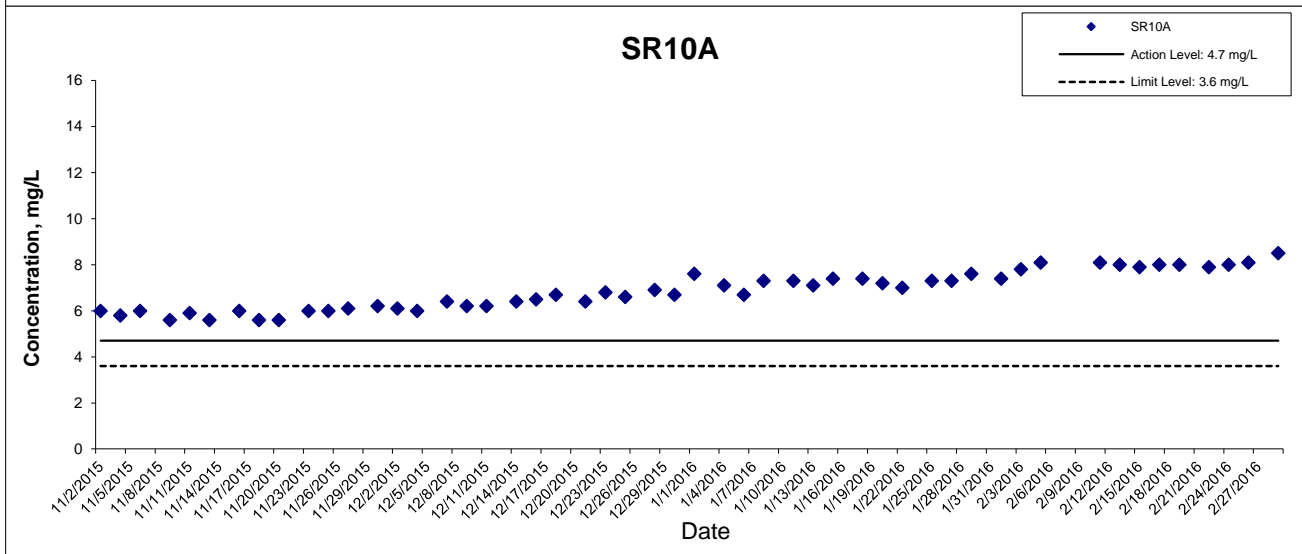
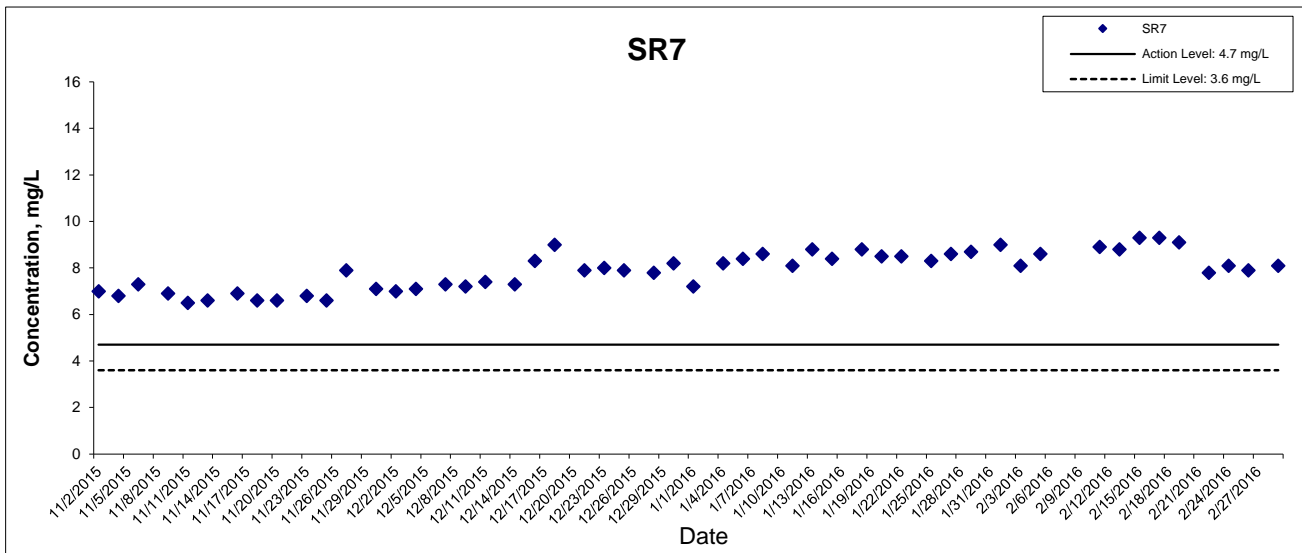
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



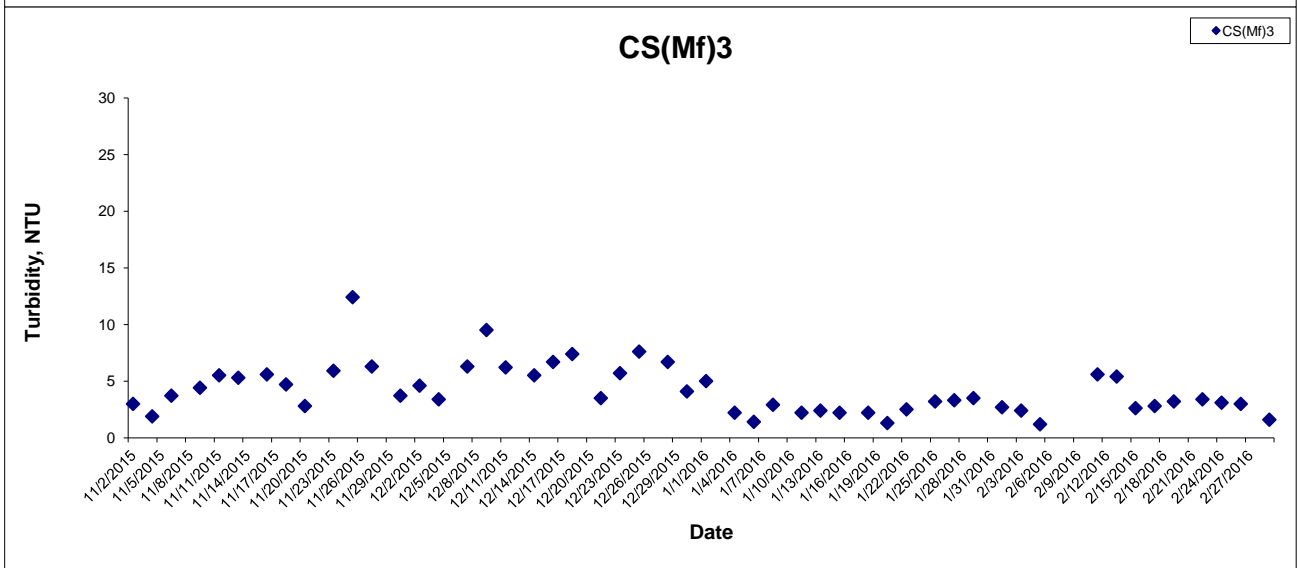
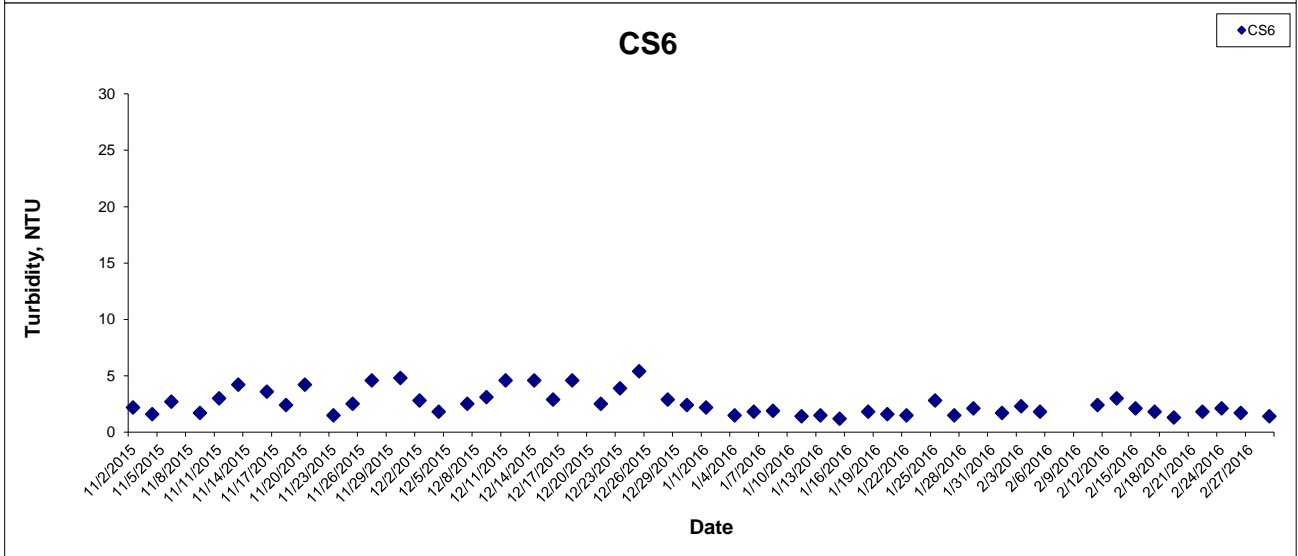
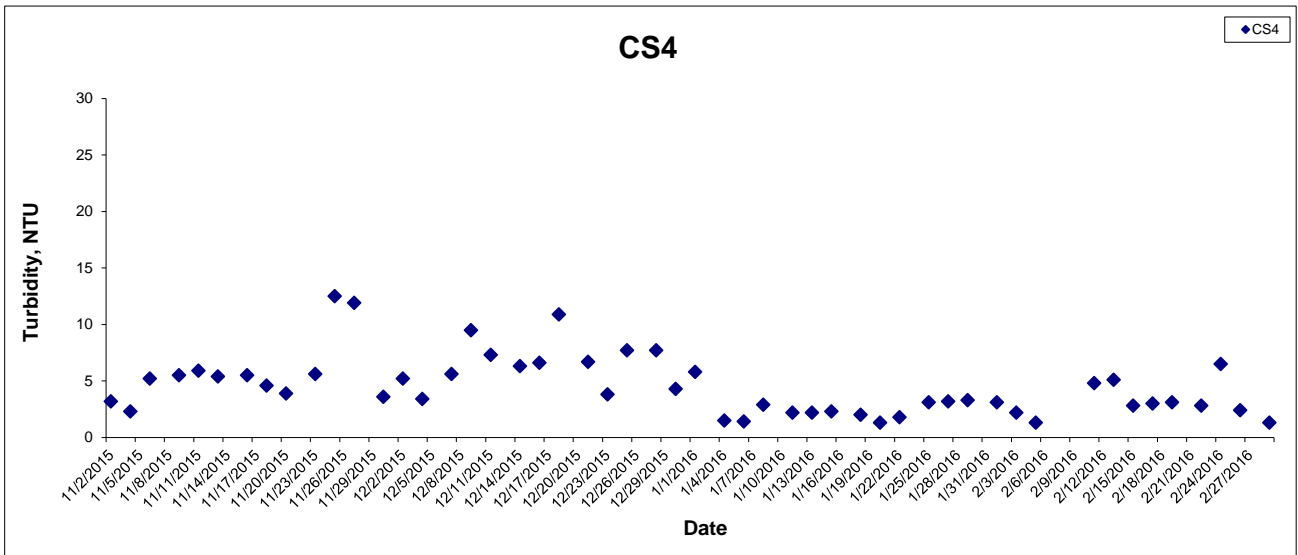
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



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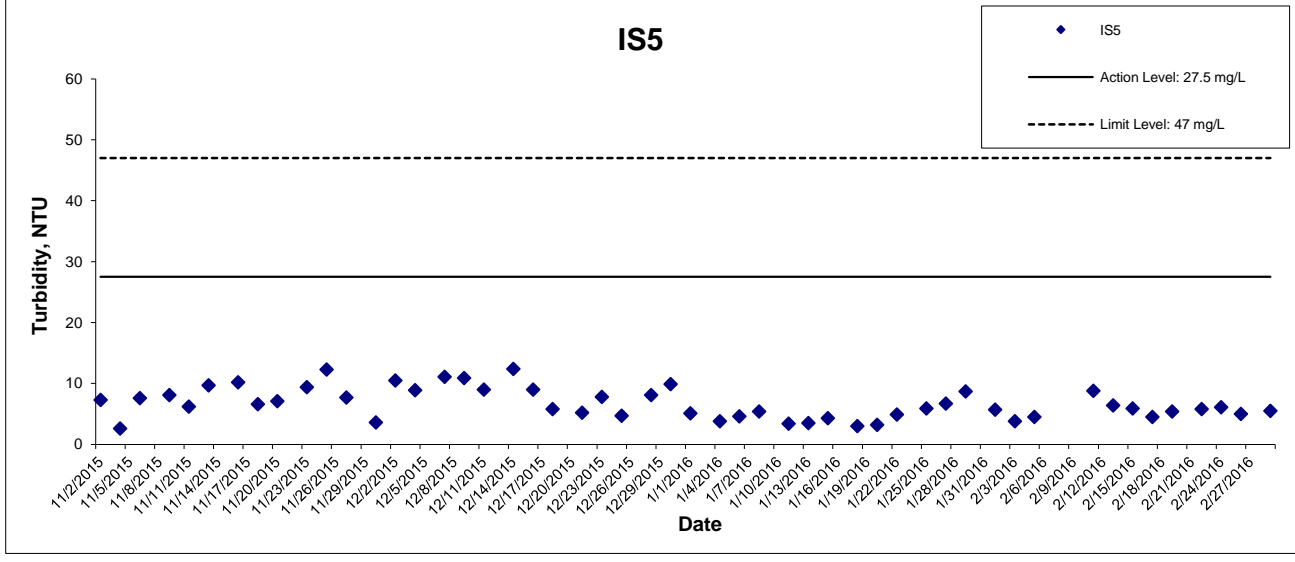
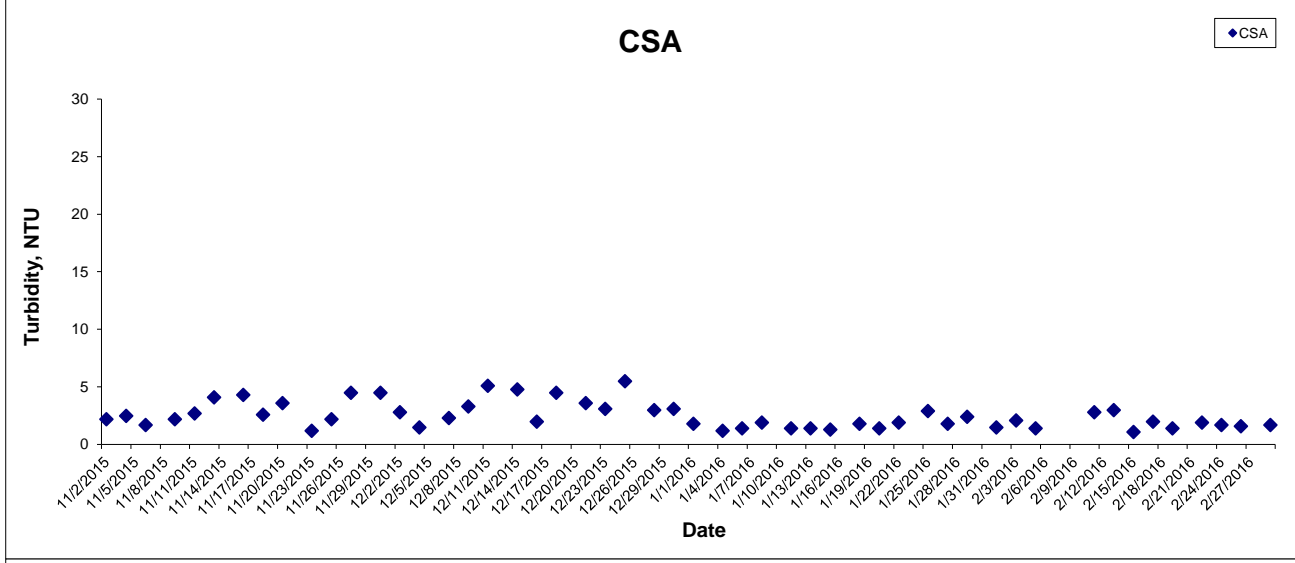
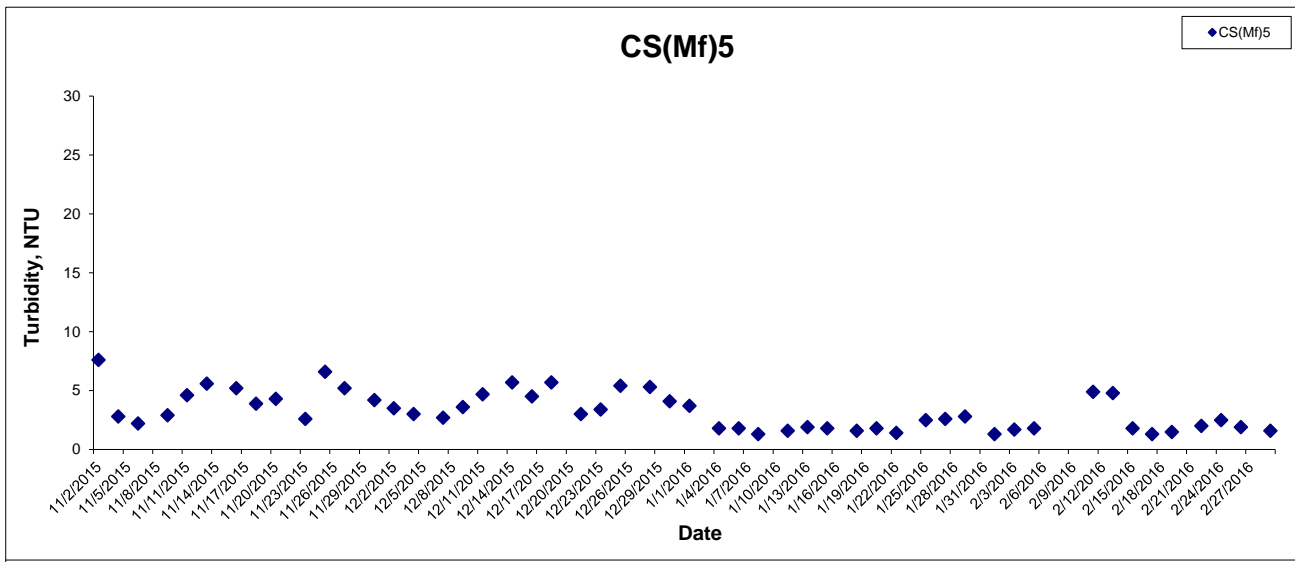
Turbidity at Mid-Ebb Tide



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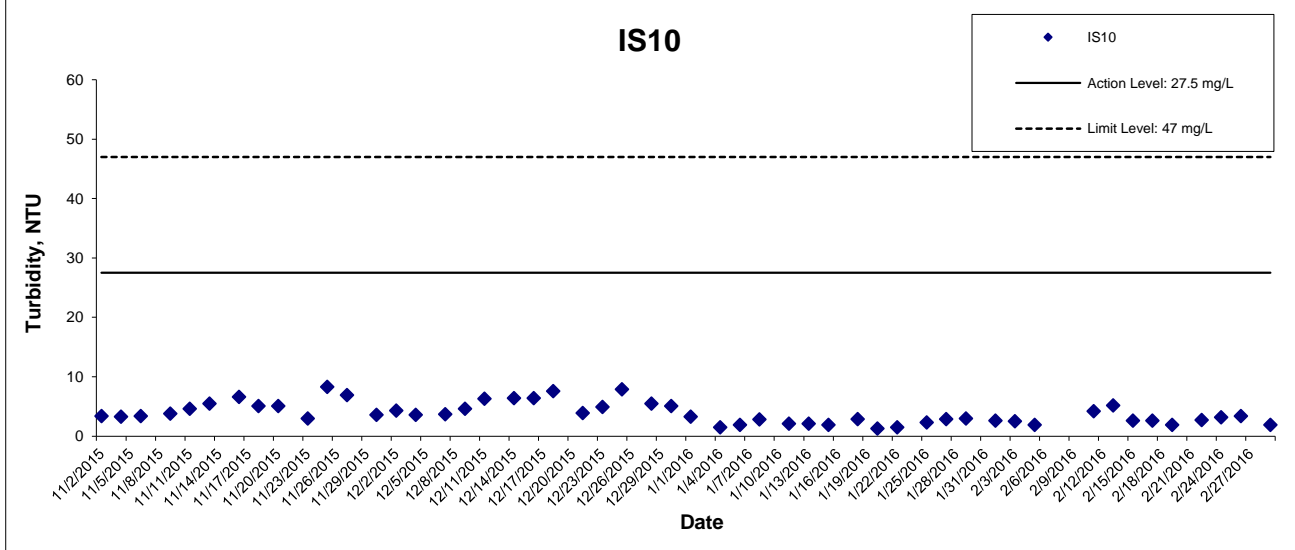
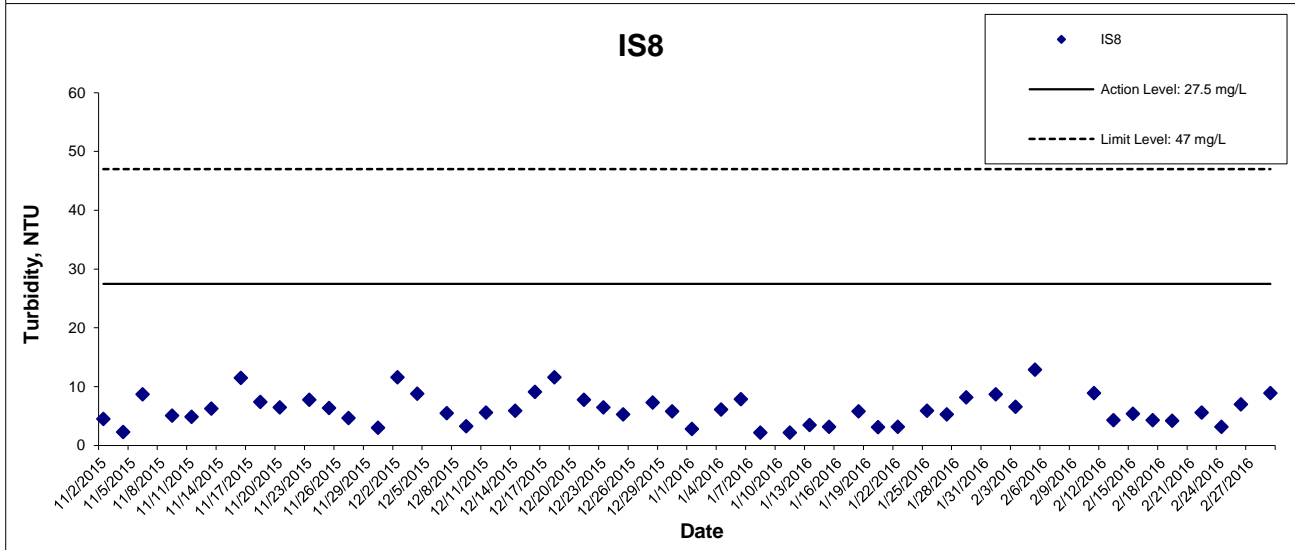
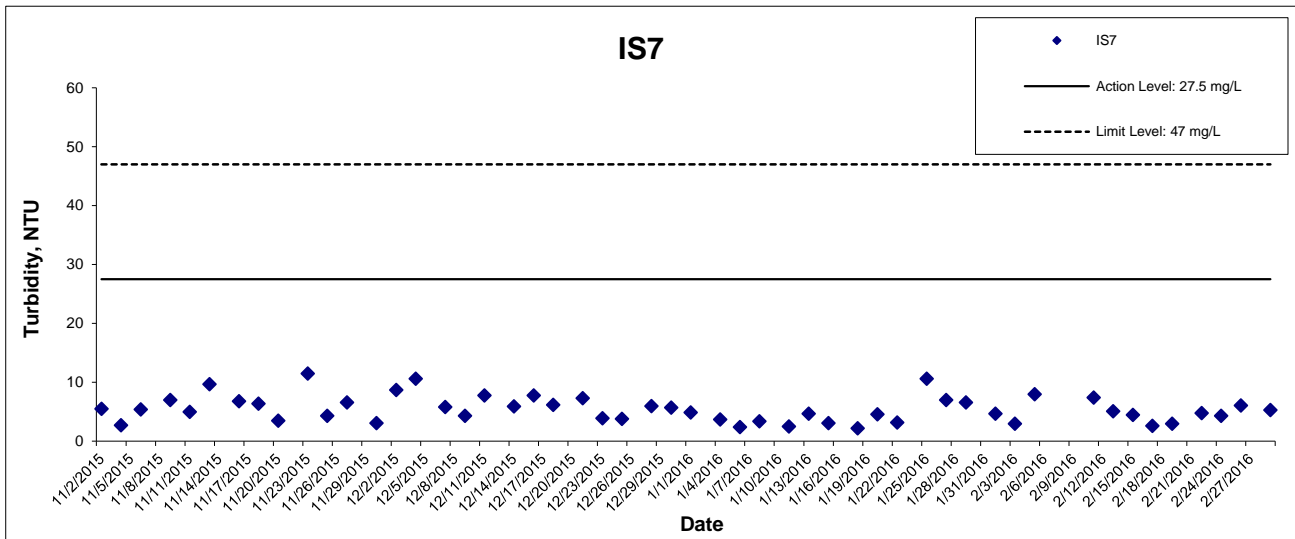


Turbidity at Mid-Ebb Tide



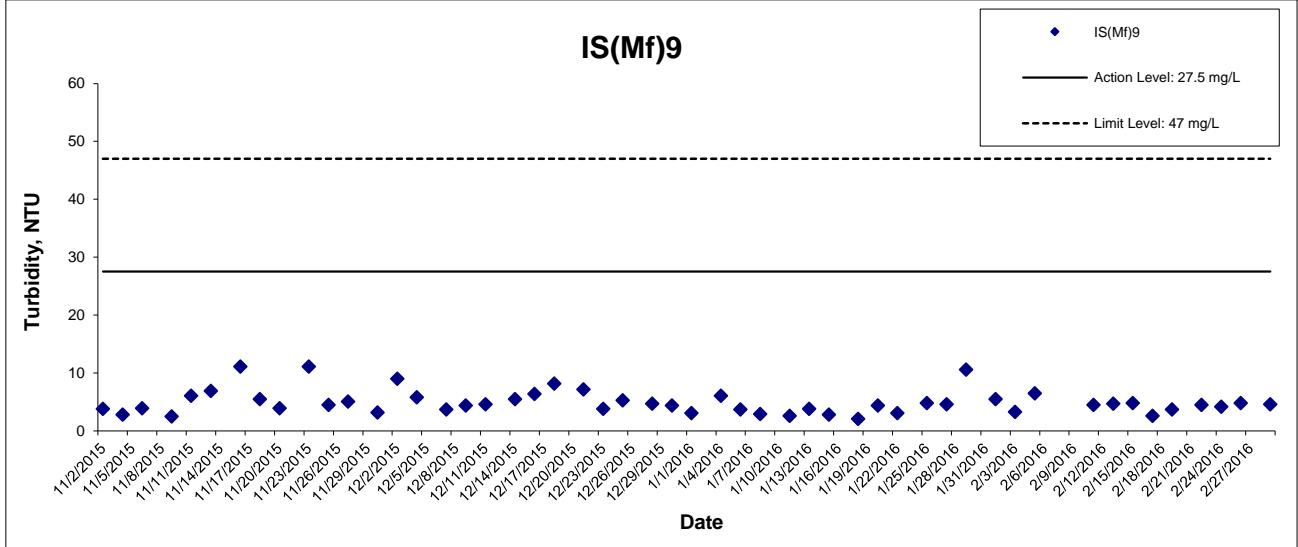
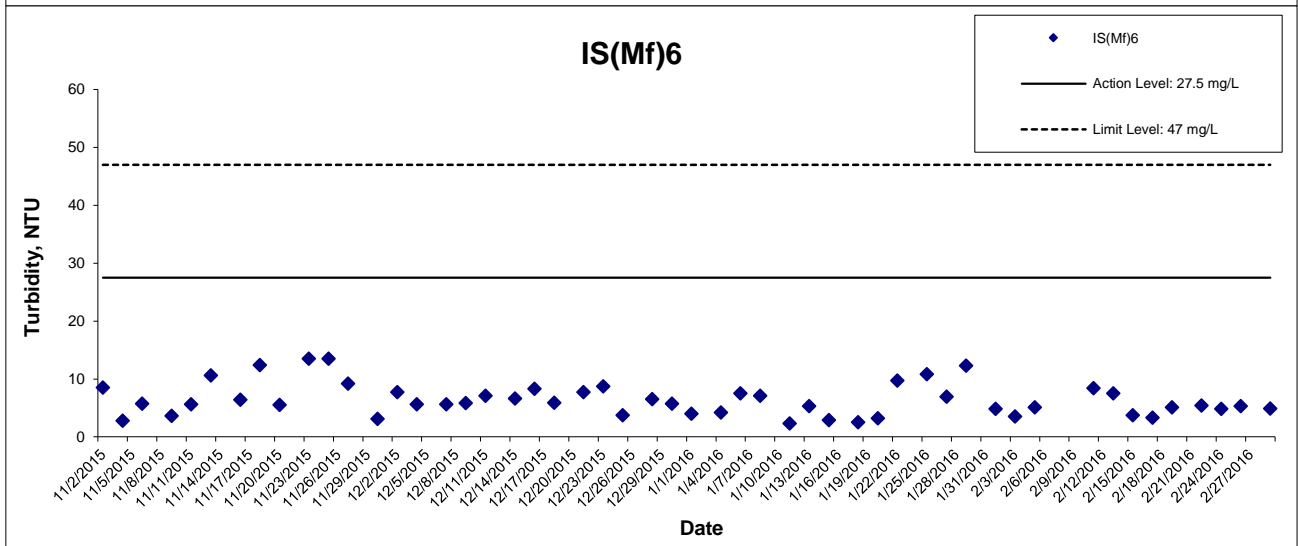
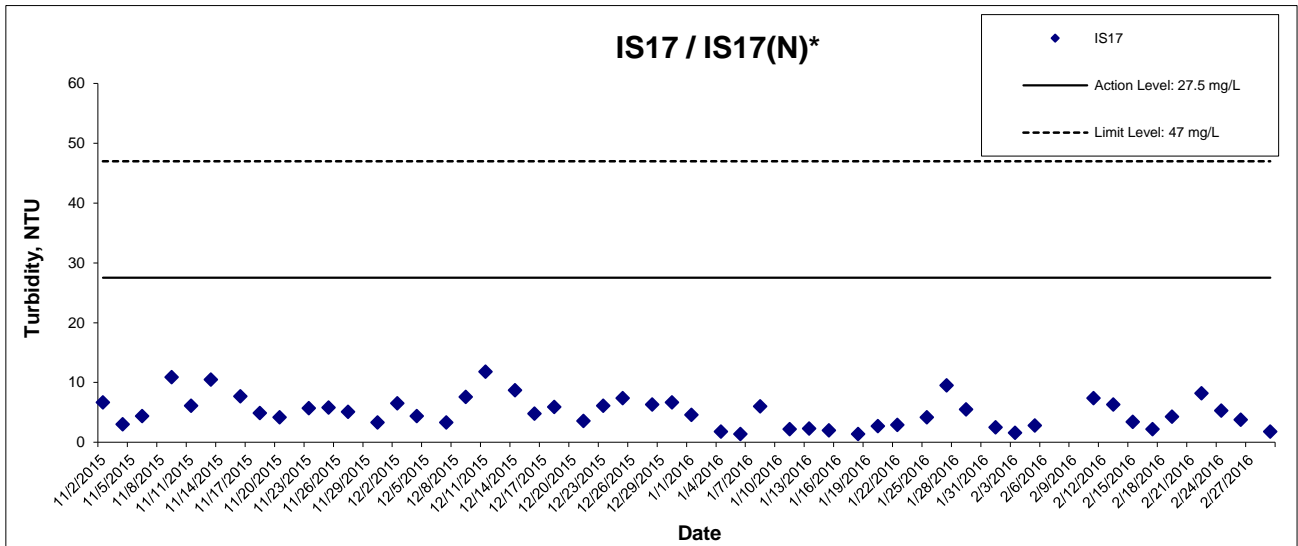
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Turbidity at Mid-Ebb Tide



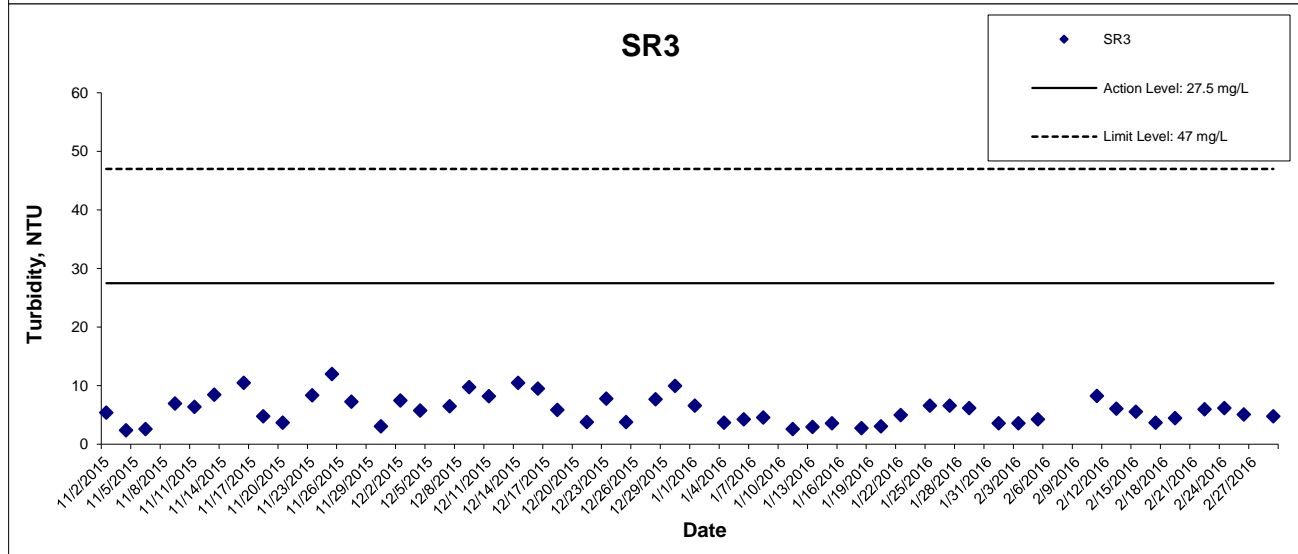
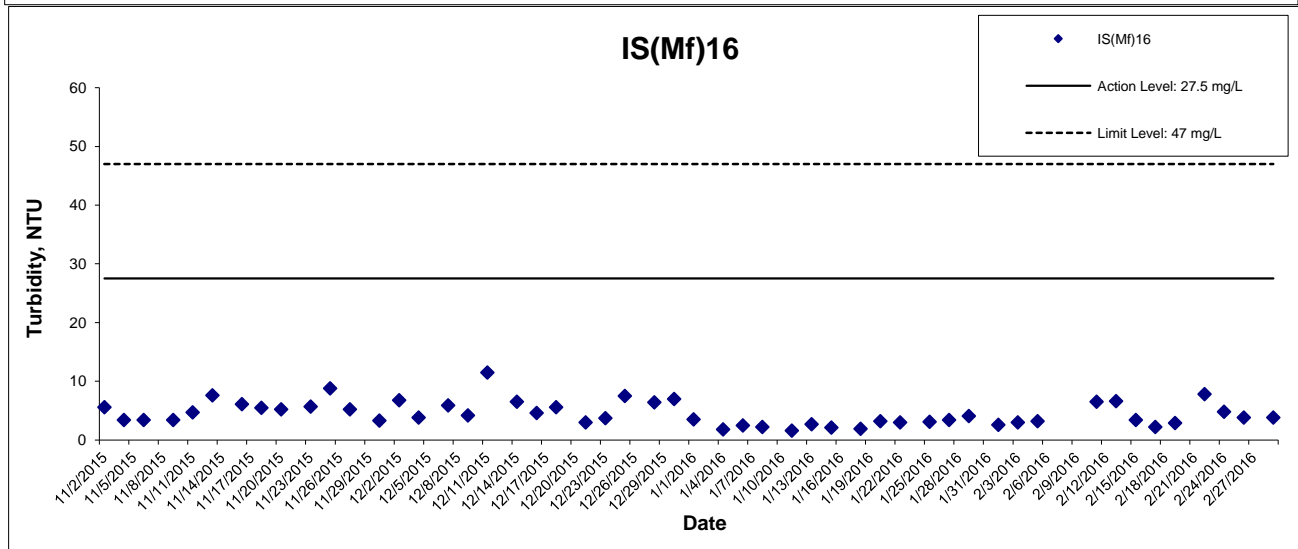
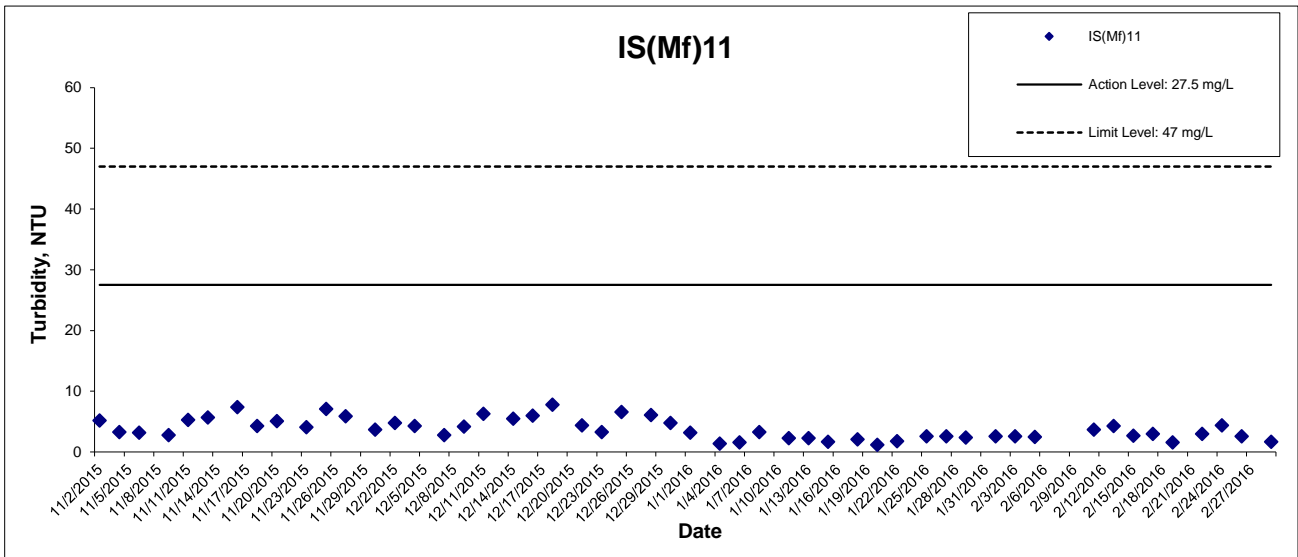
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Turbidity at Mid-Ebb Tide



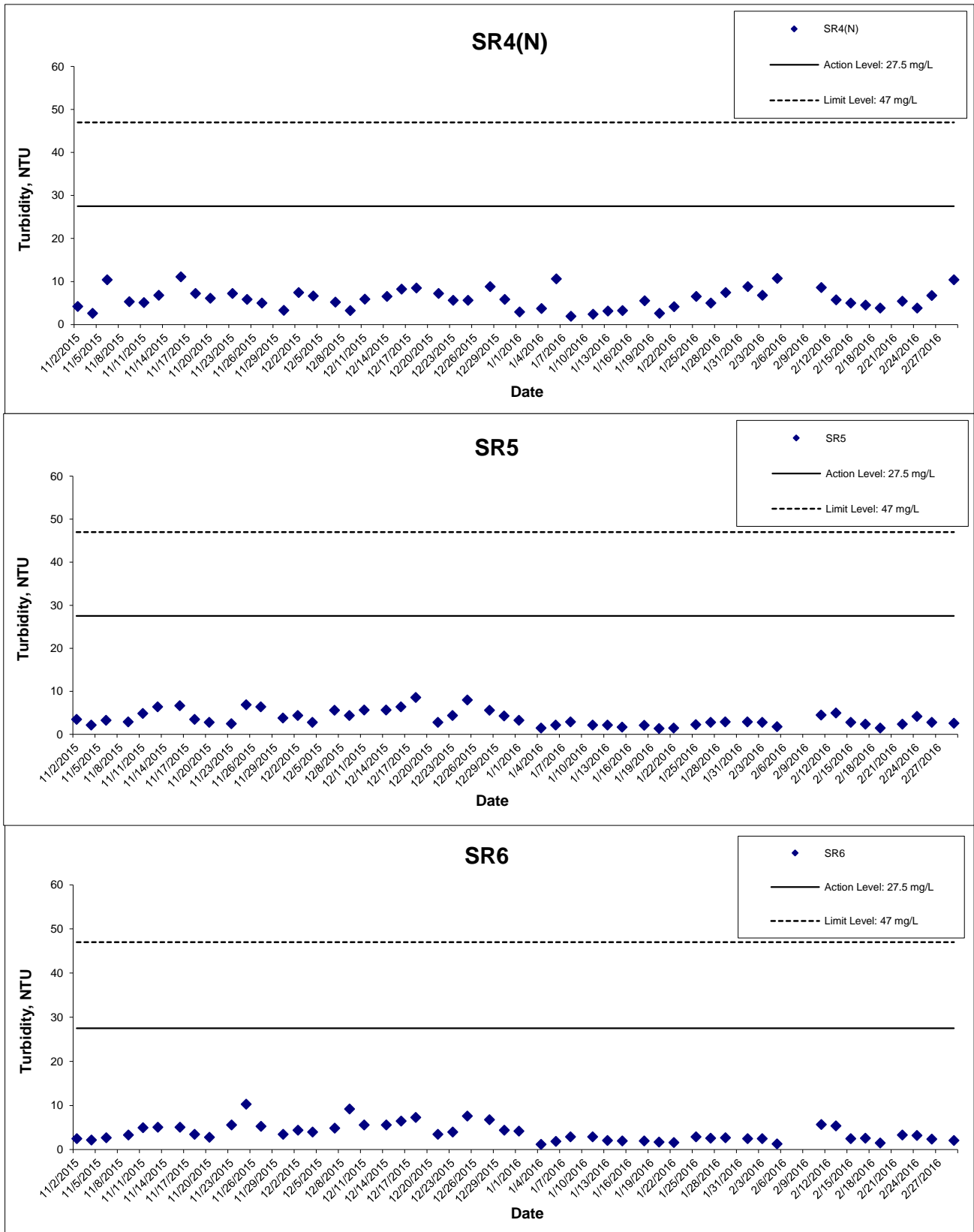
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Turbidity at Mid-Ebb Tide



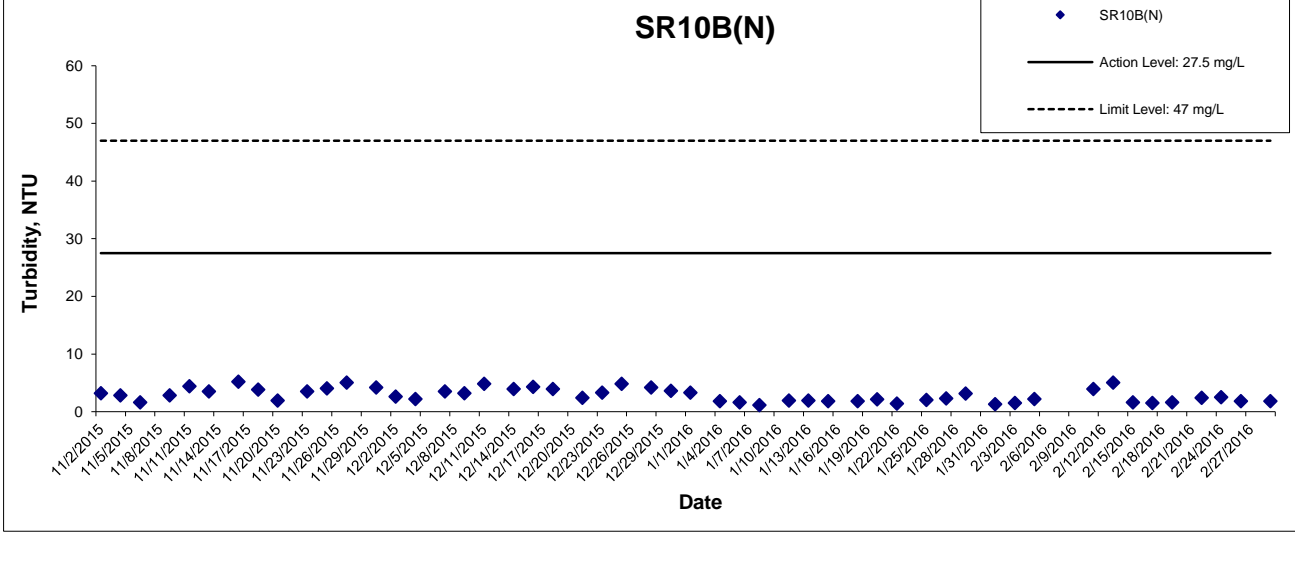
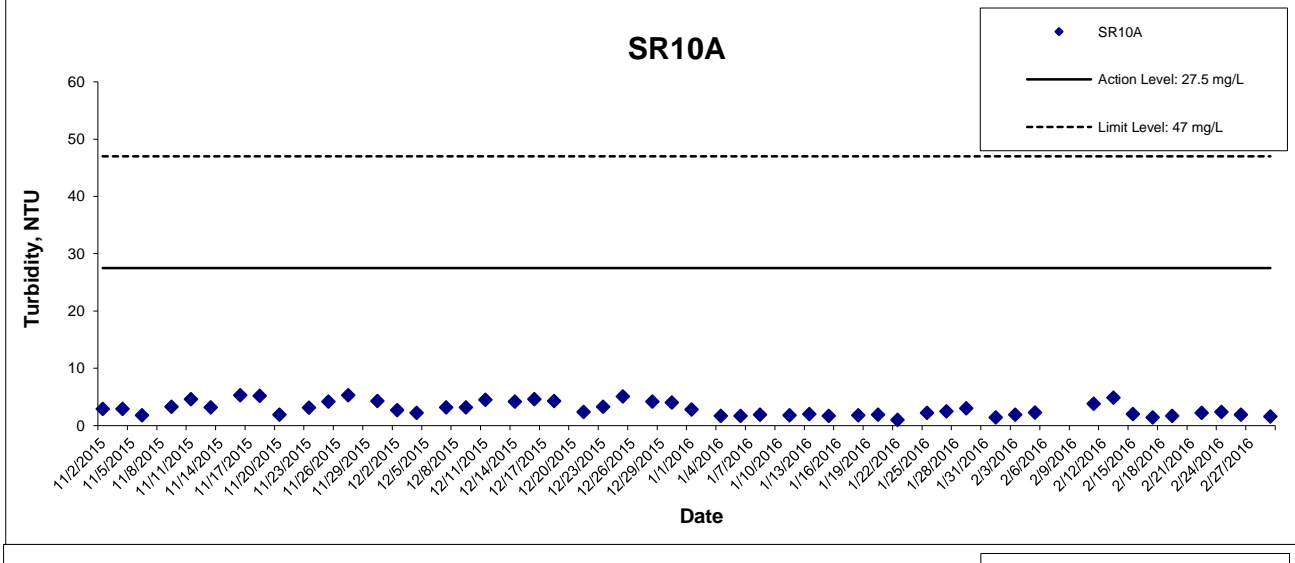
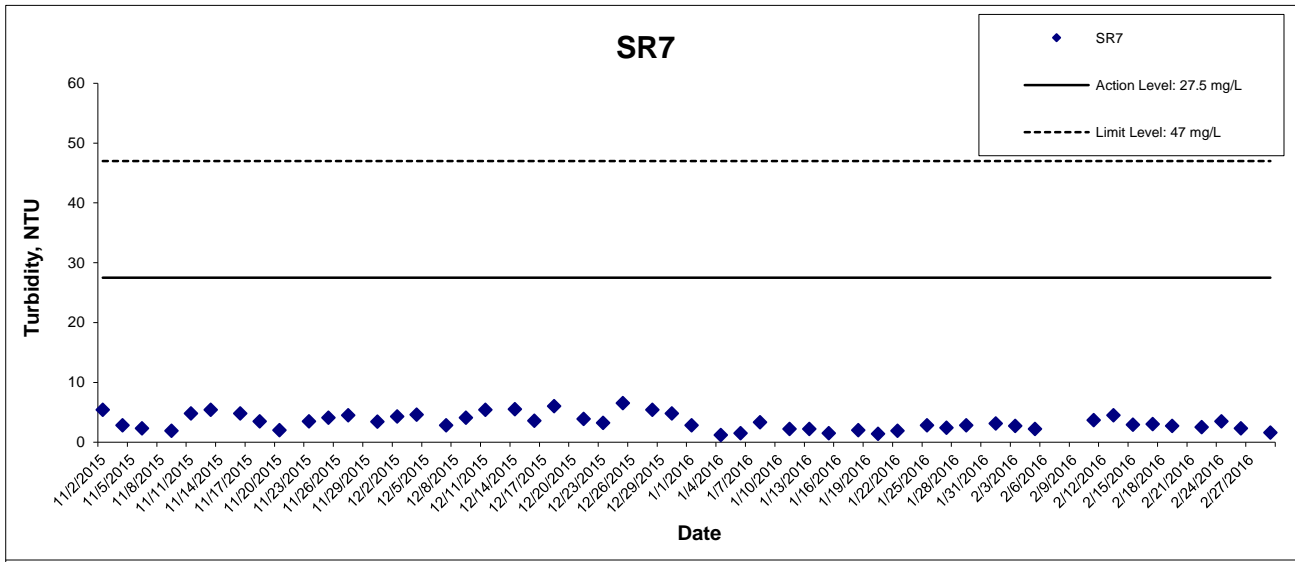
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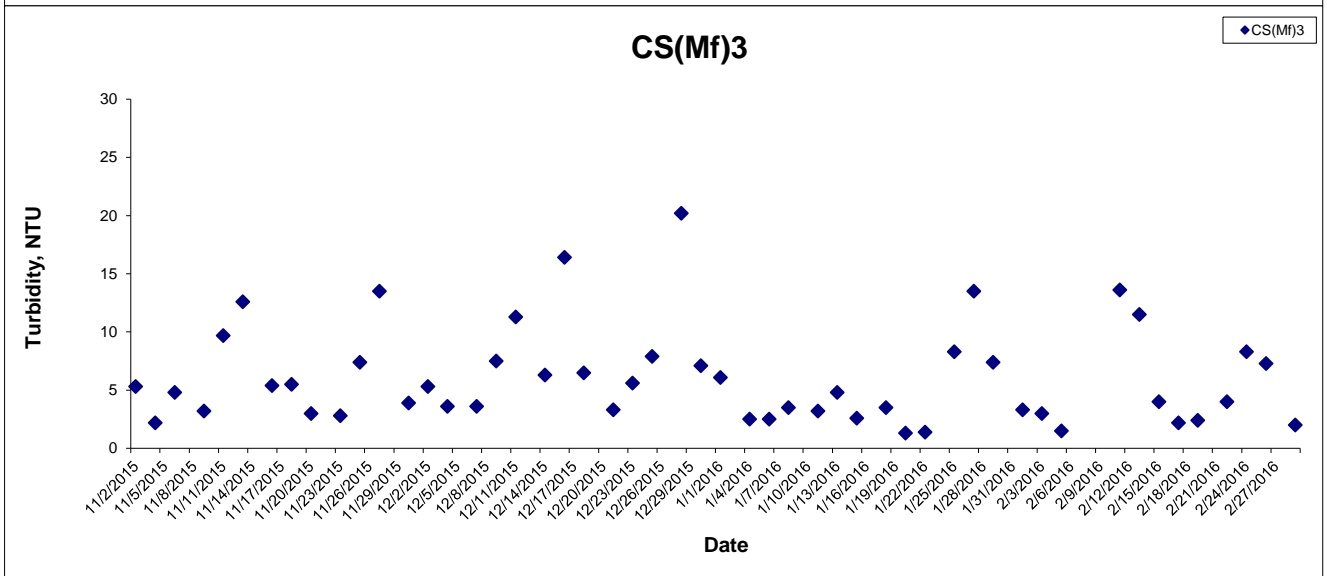
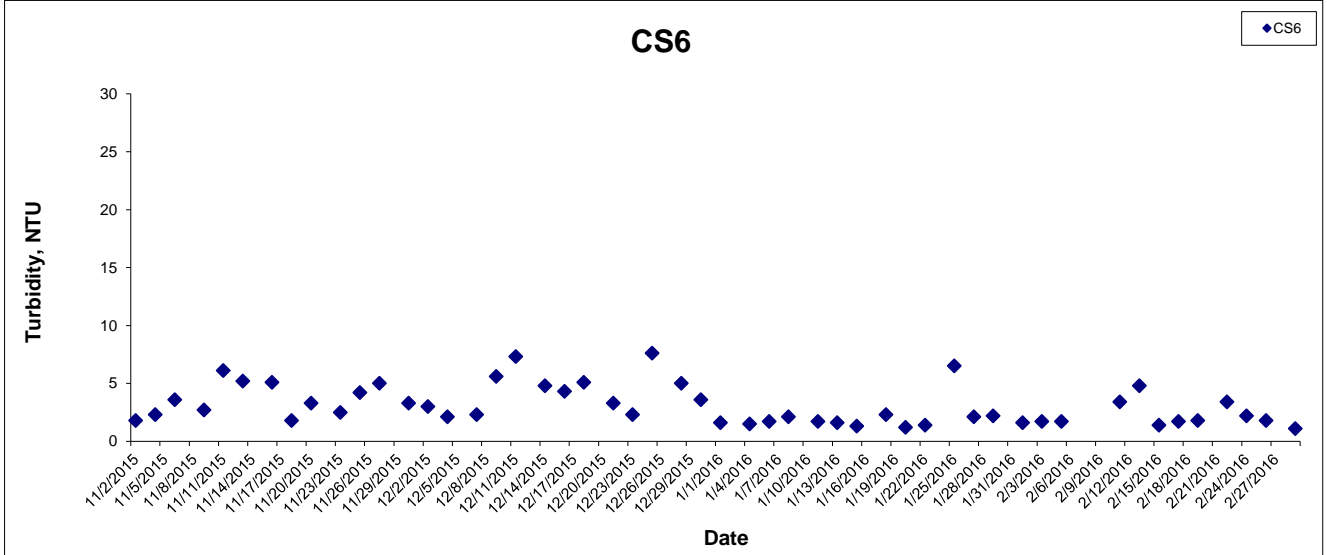
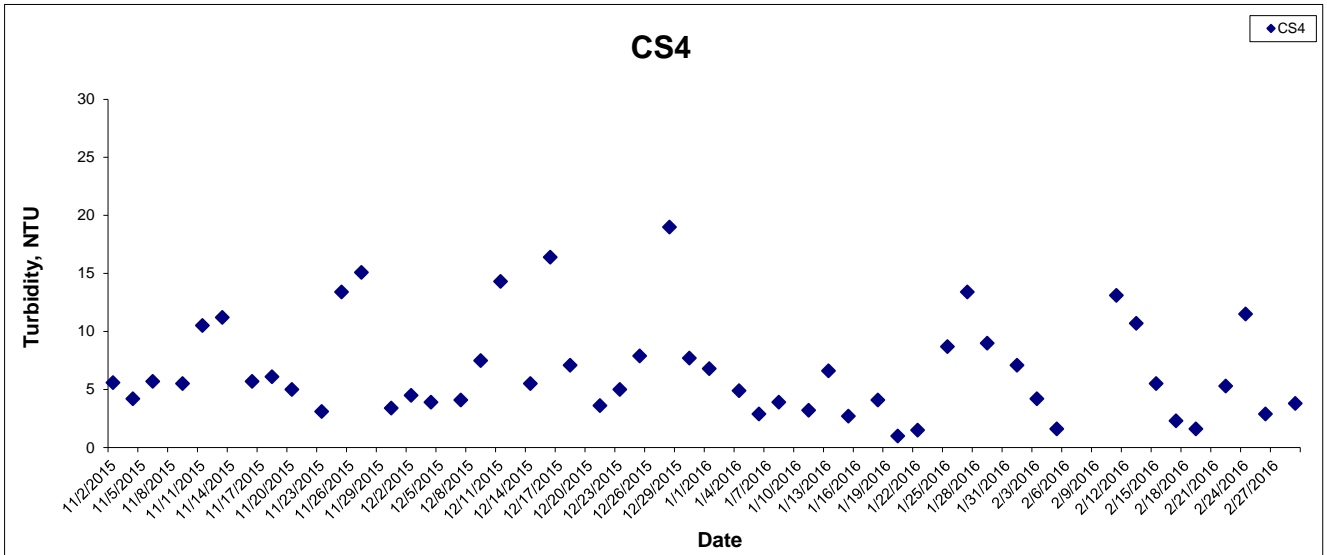
Turbidity at Mid-Ebb Tide



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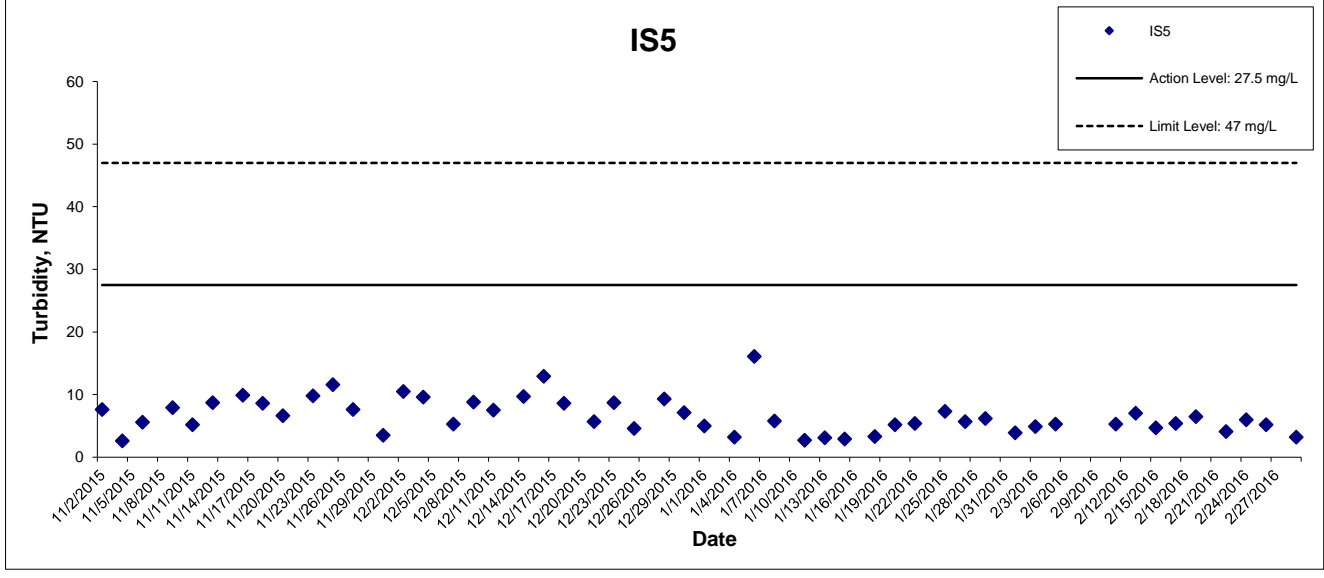
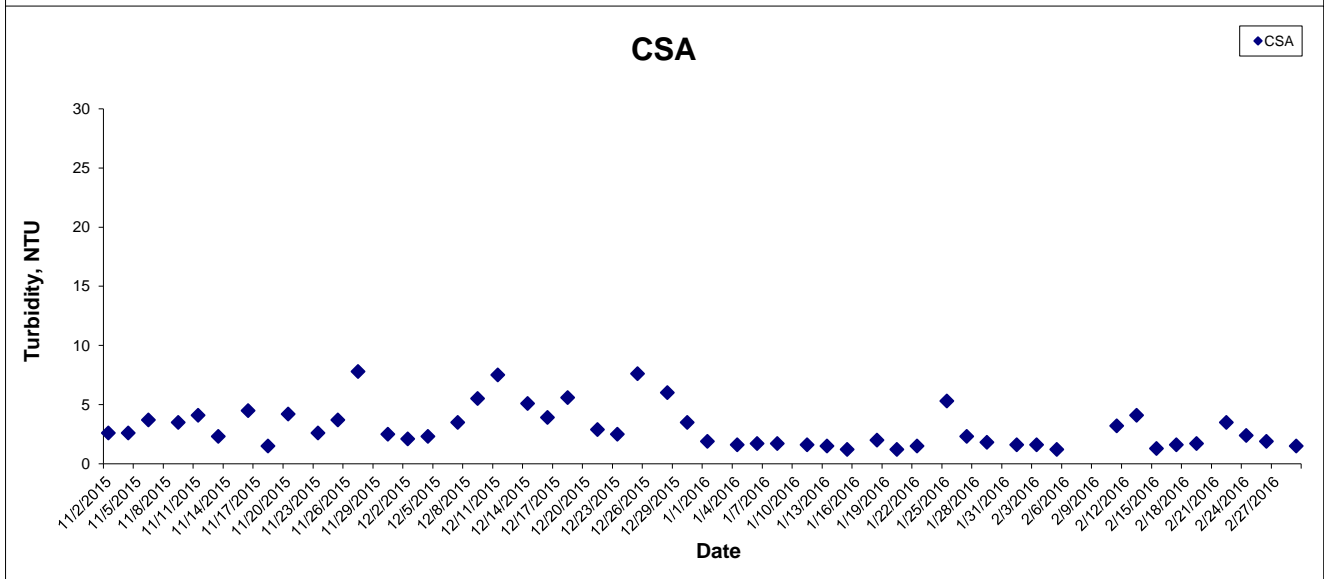
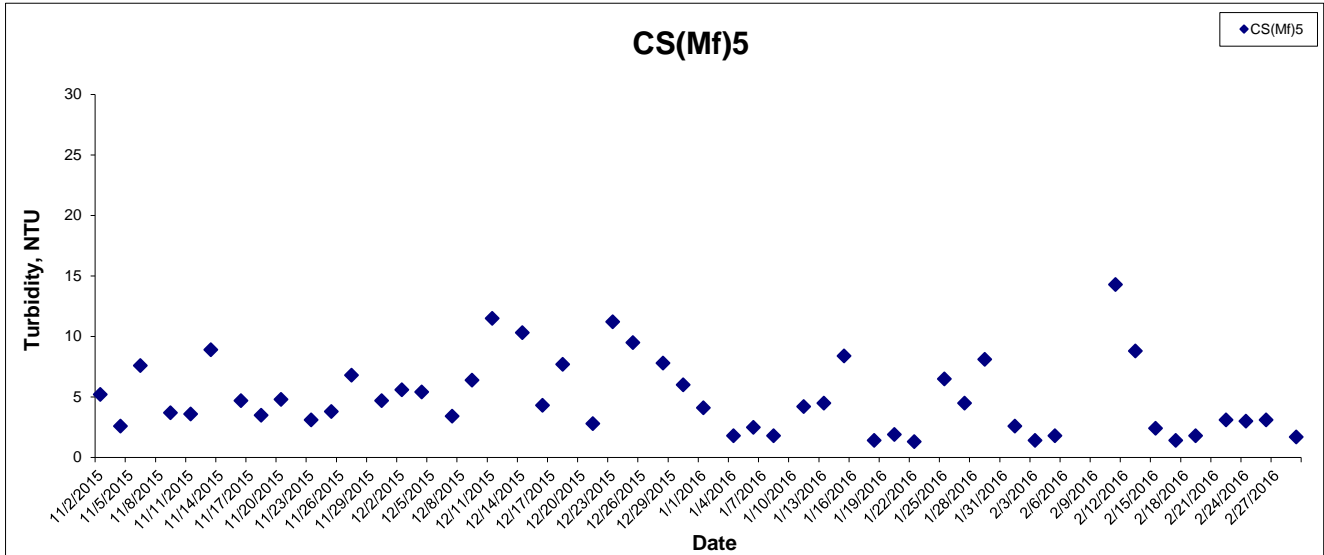


Turbidity at Mid-Flood Tide



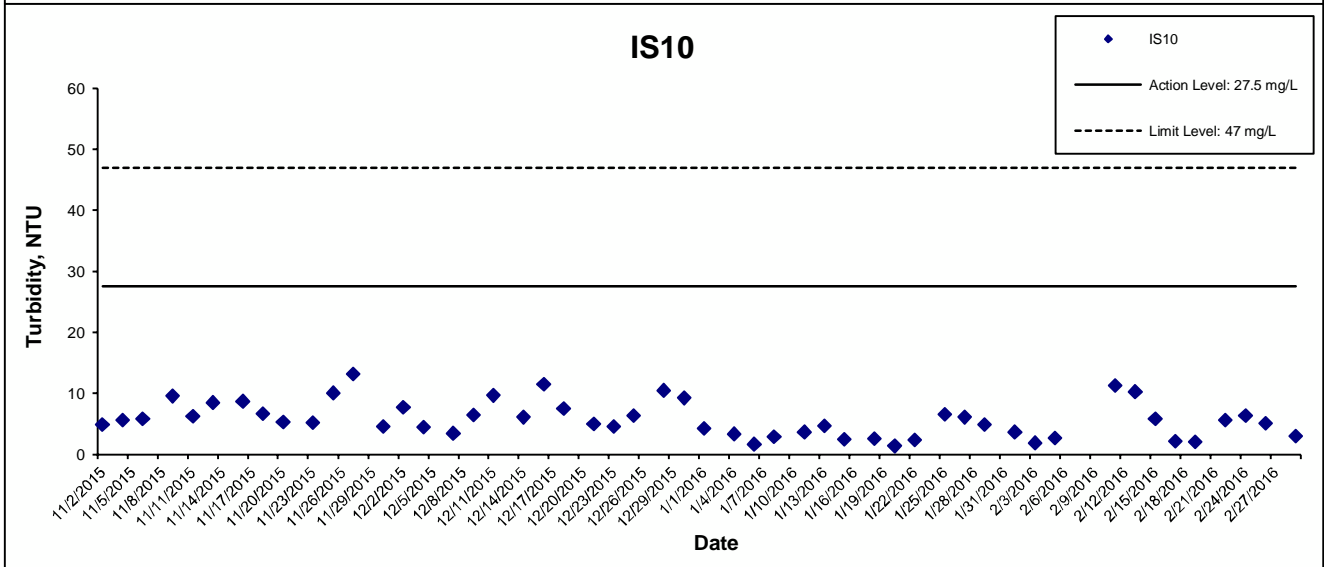
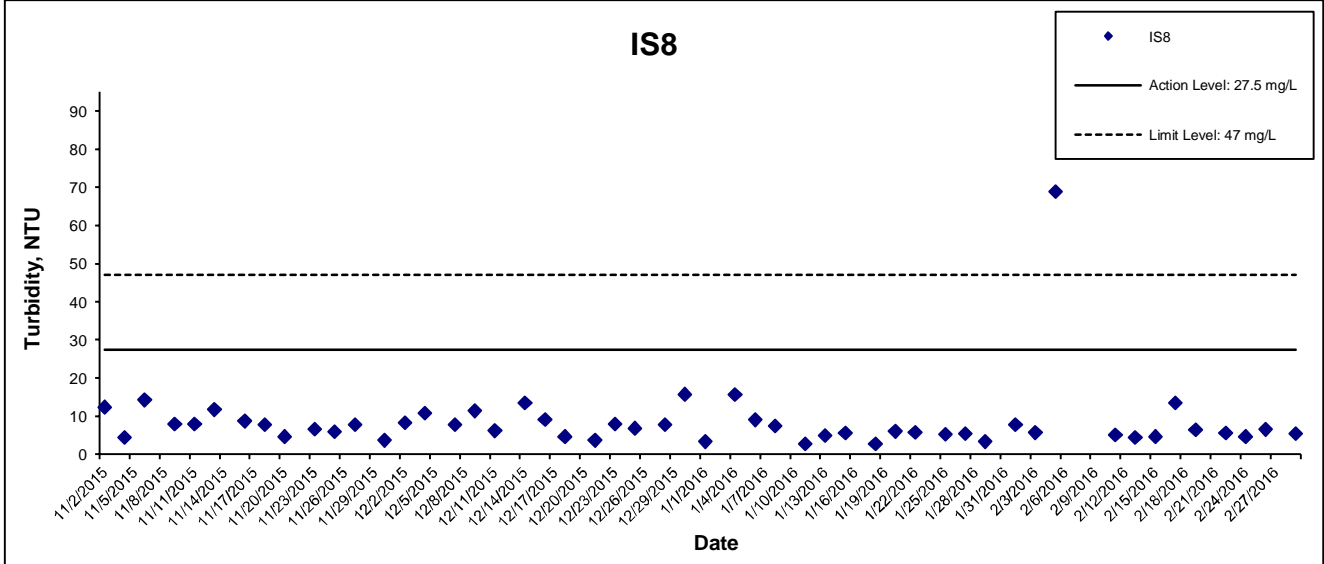
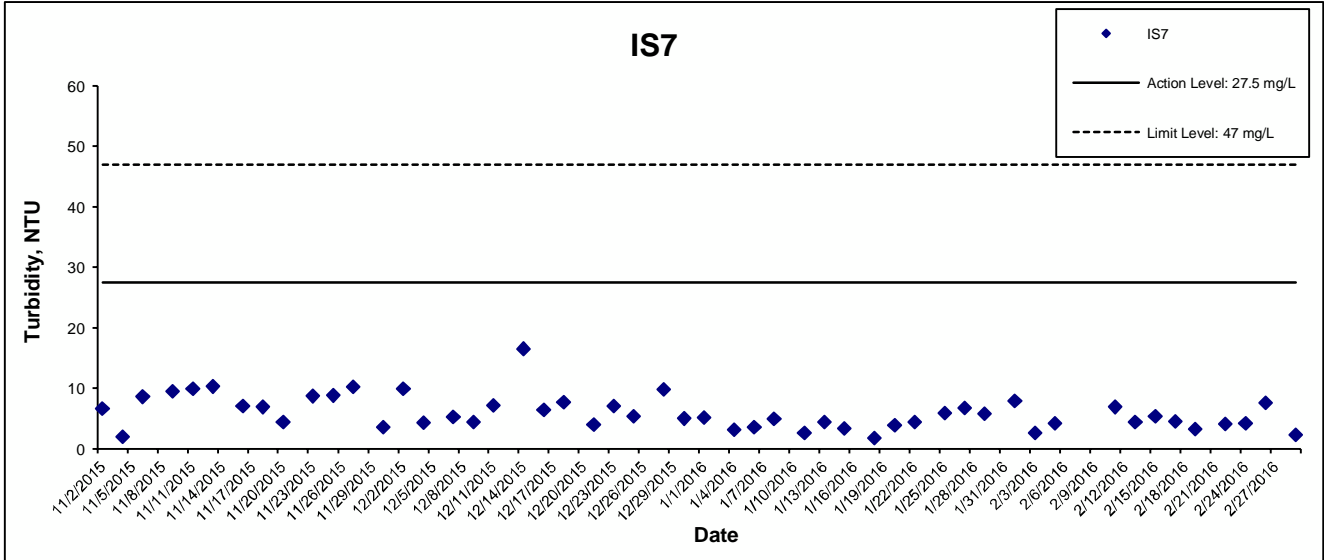
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Turbidity at Mid-Flood Tide



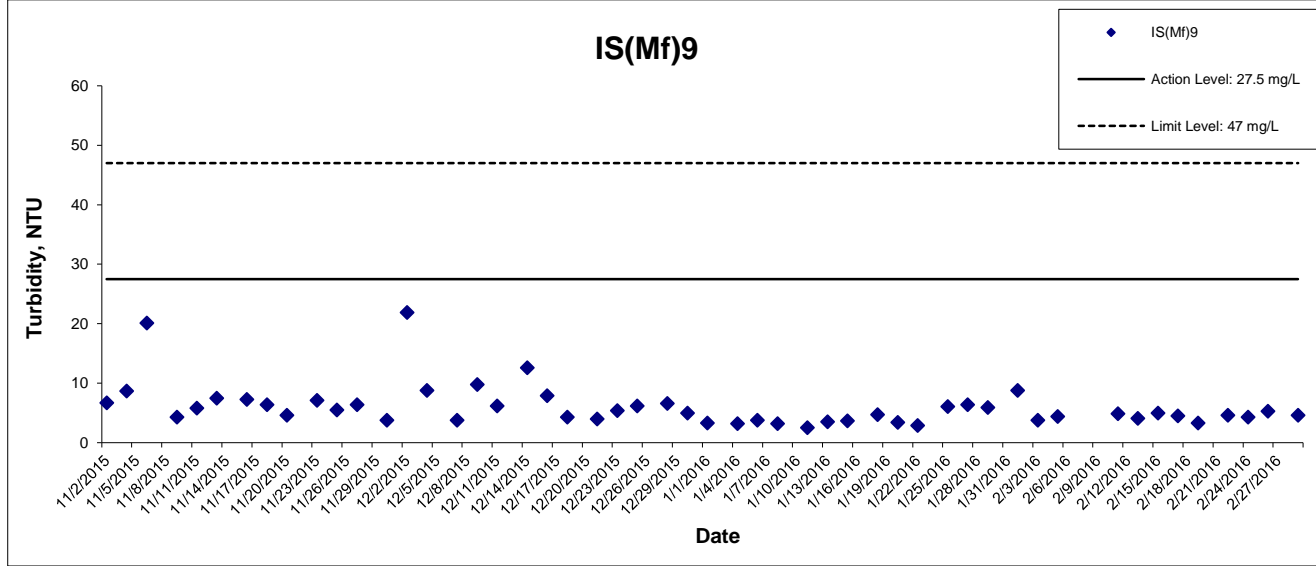
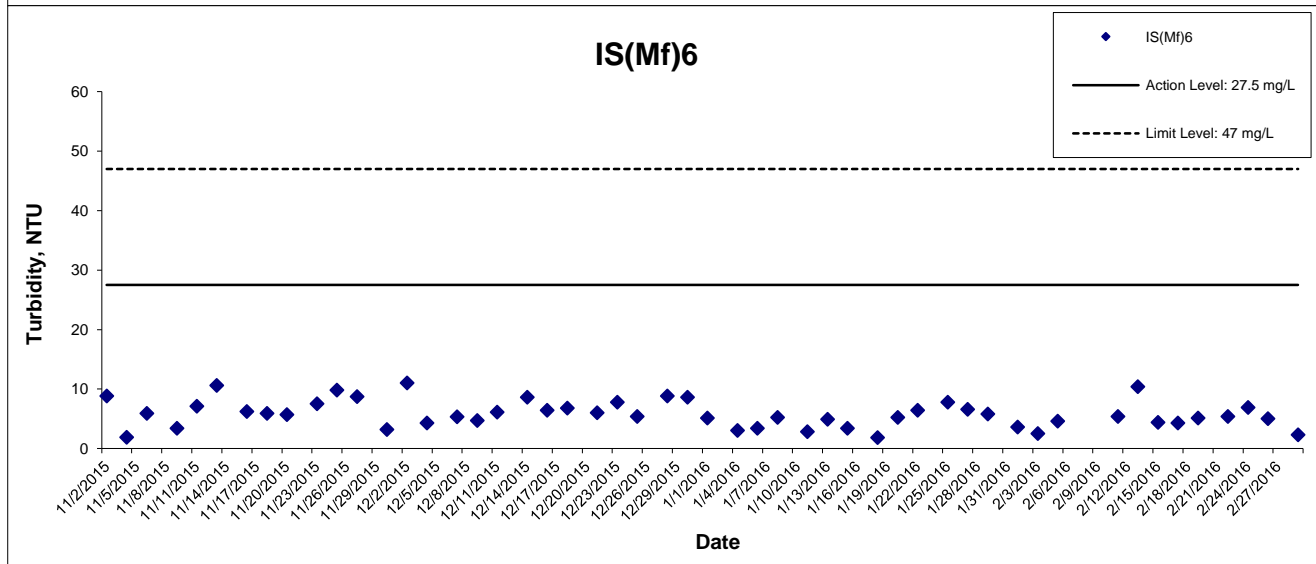
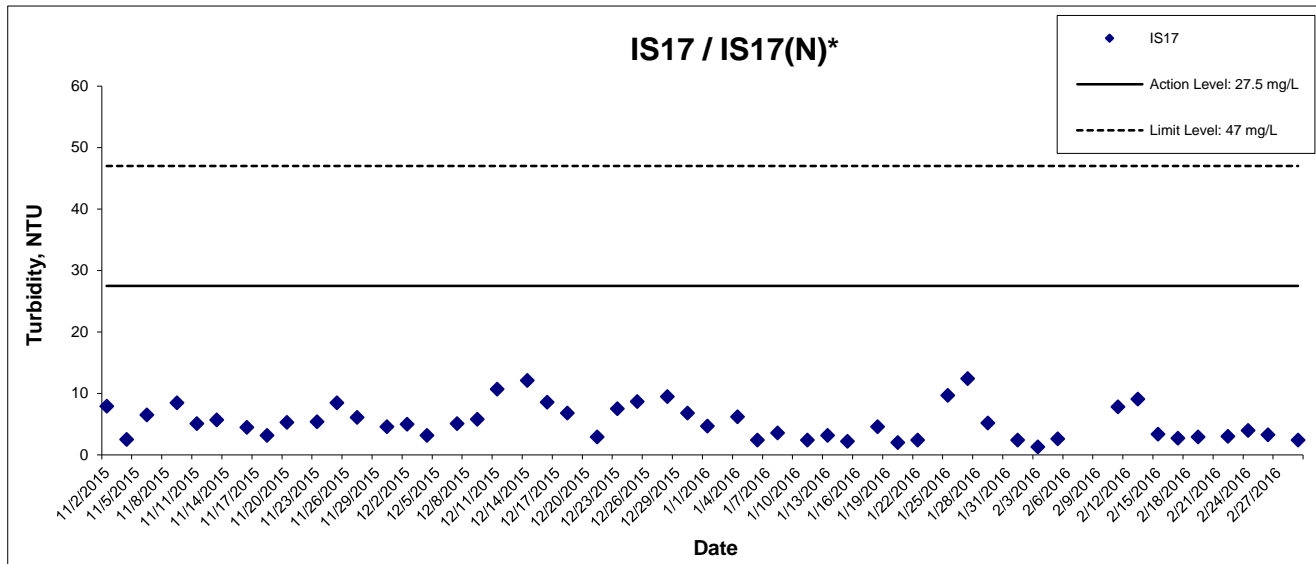
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Turbidity at Mid-Flood Tide



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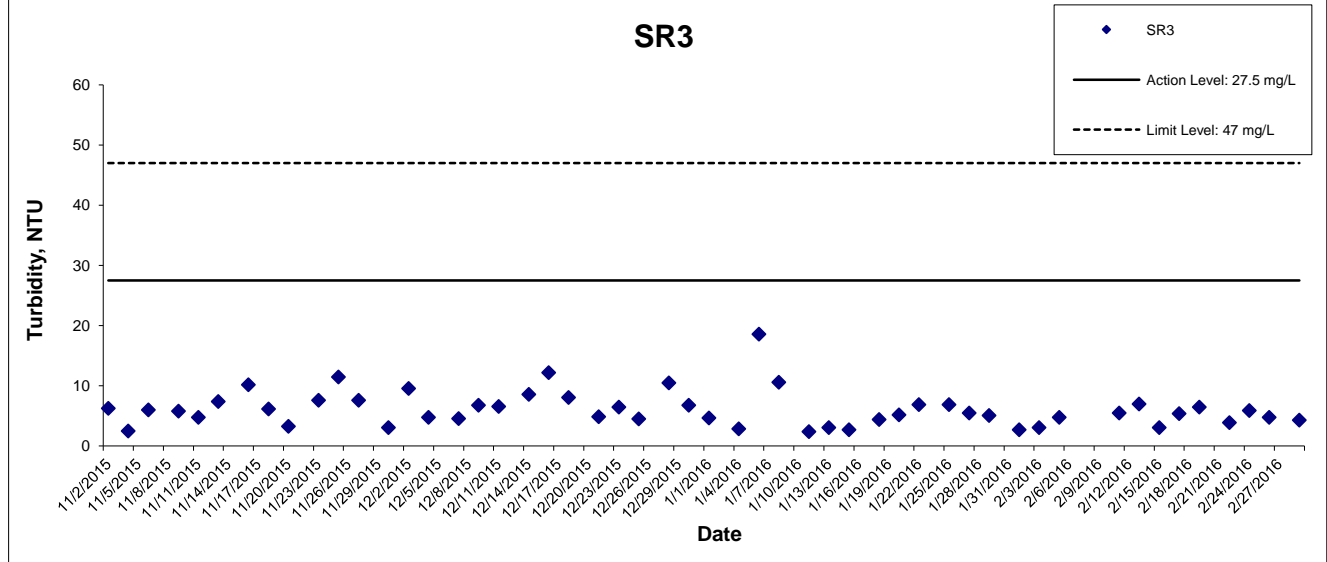
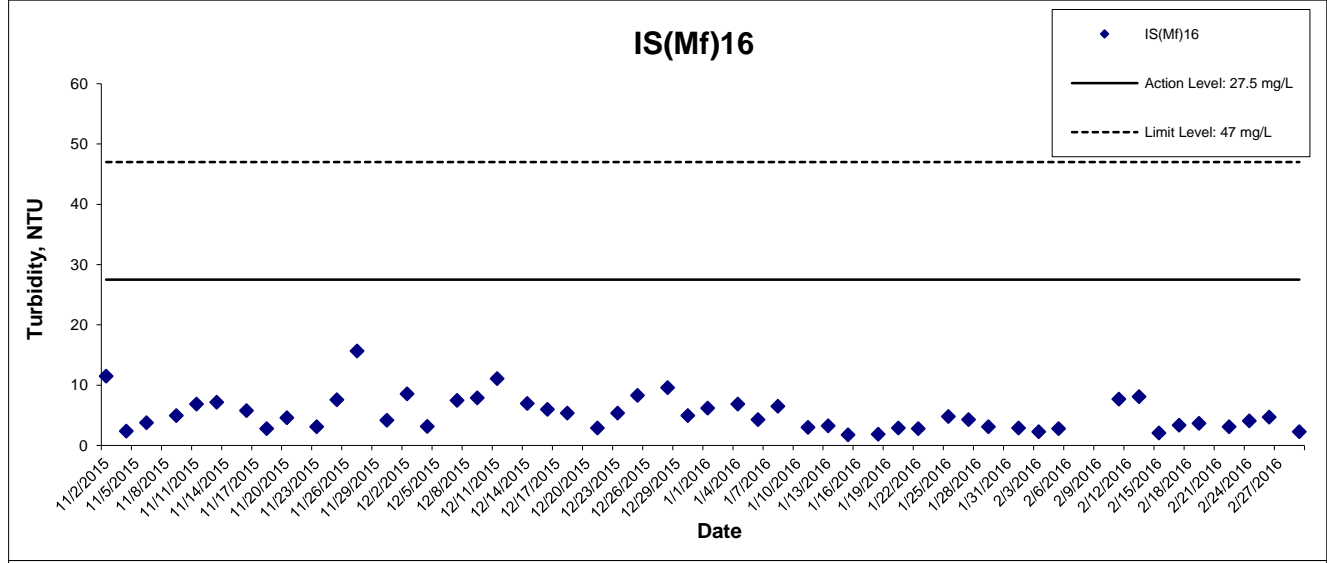
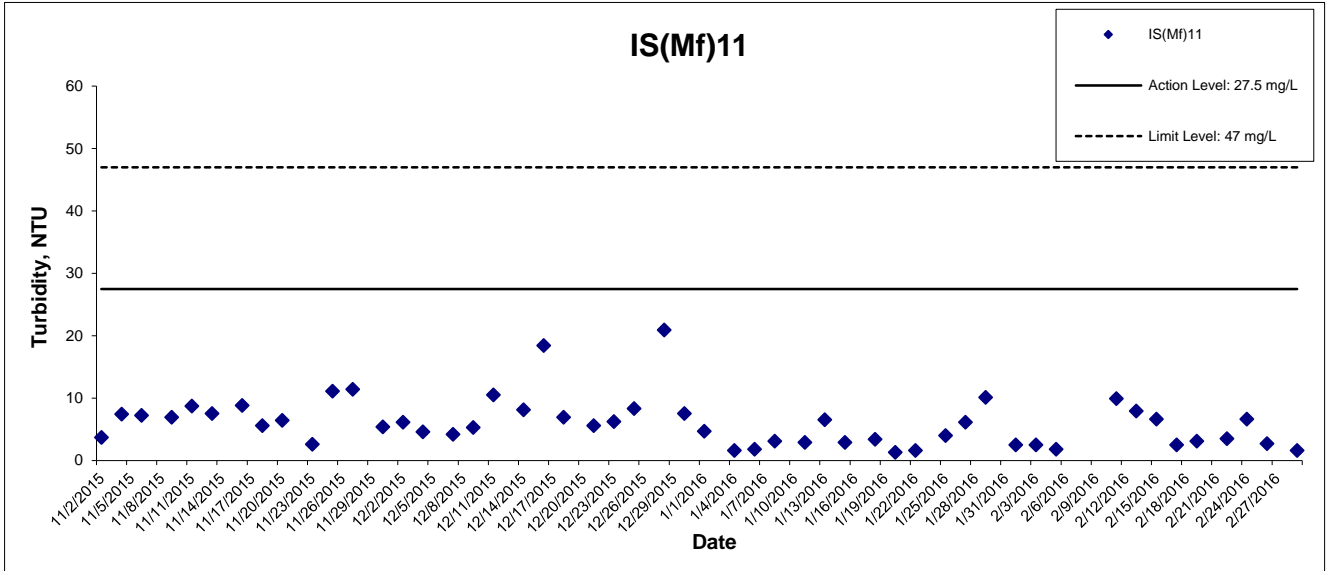
Turbidity at Mid-Flood Tide



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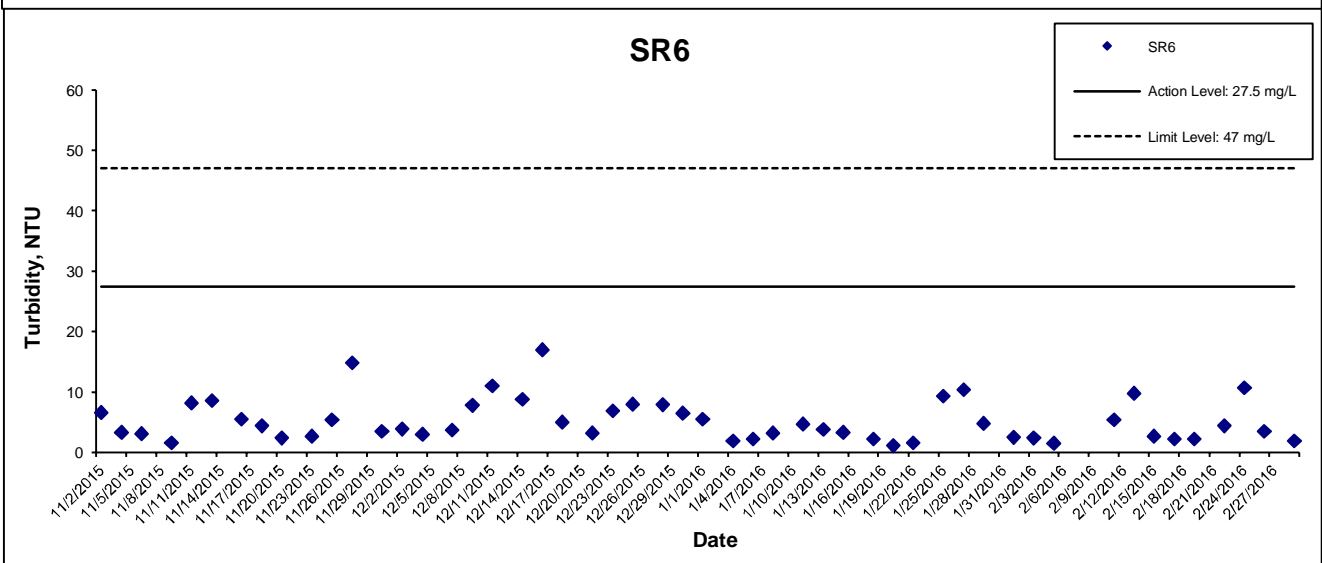
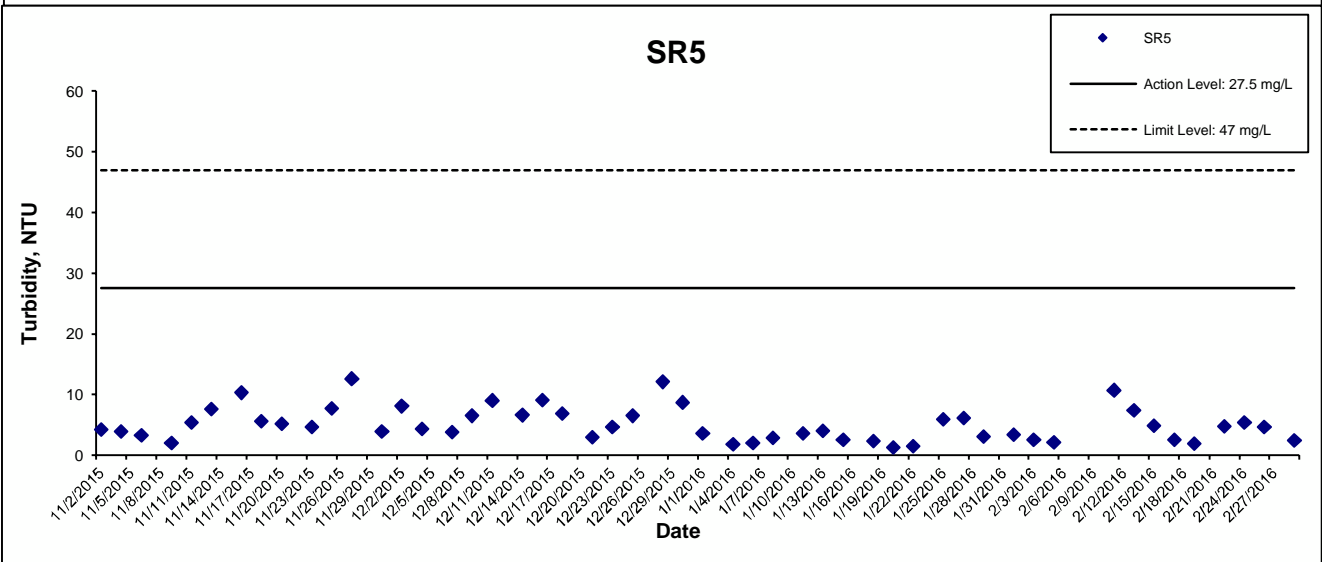
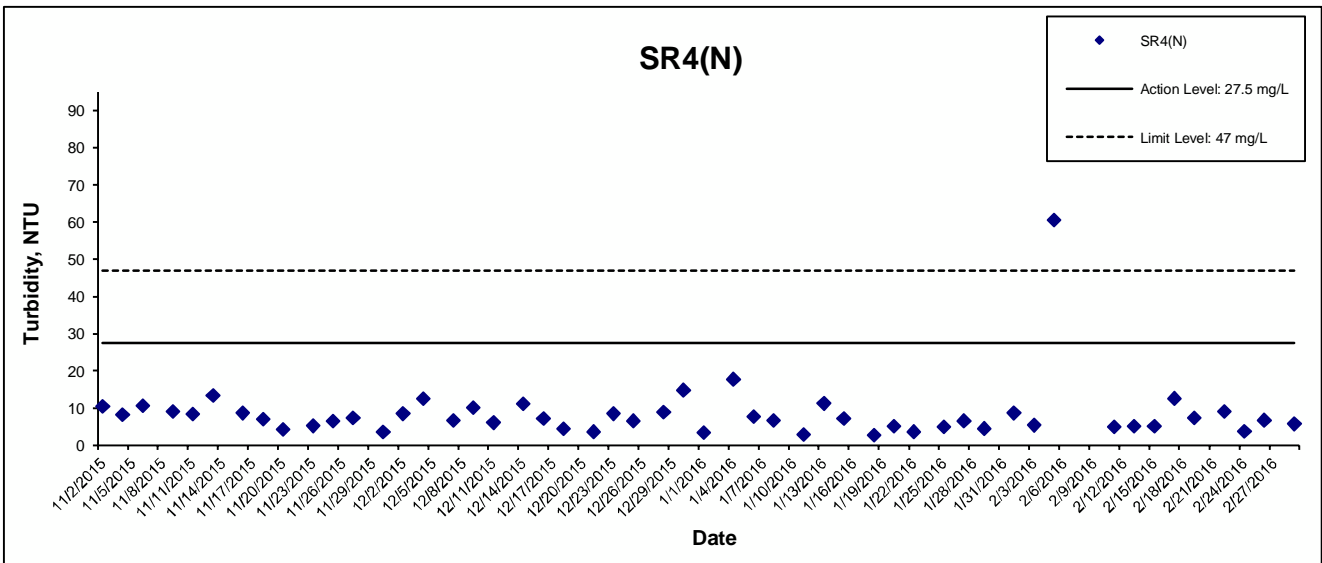


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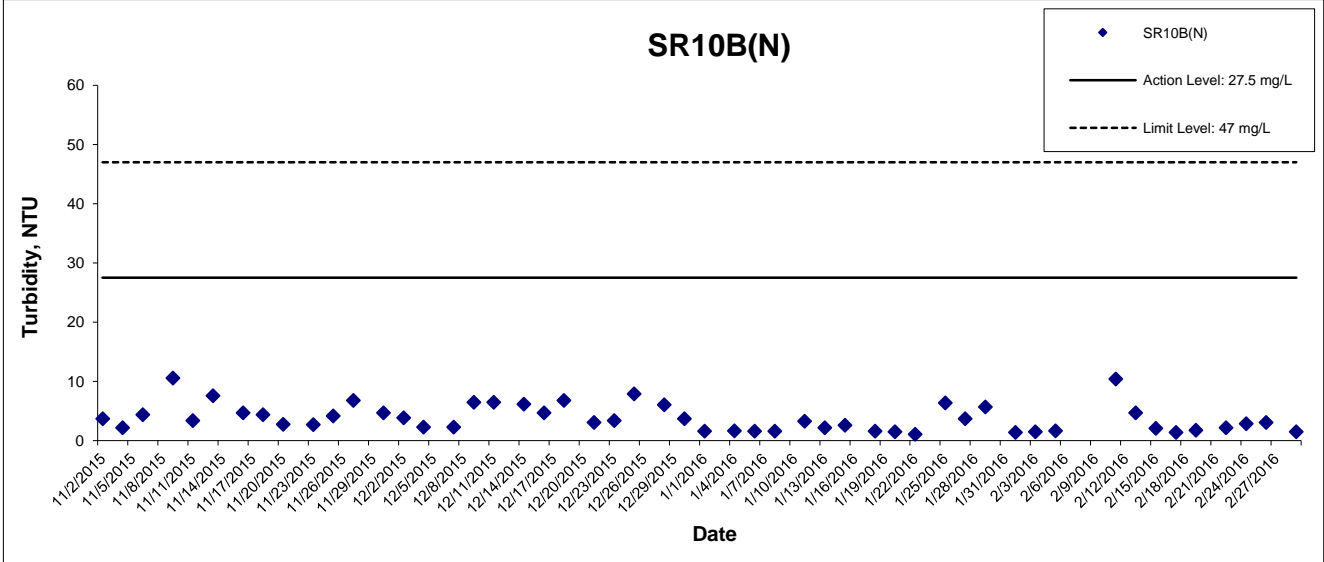
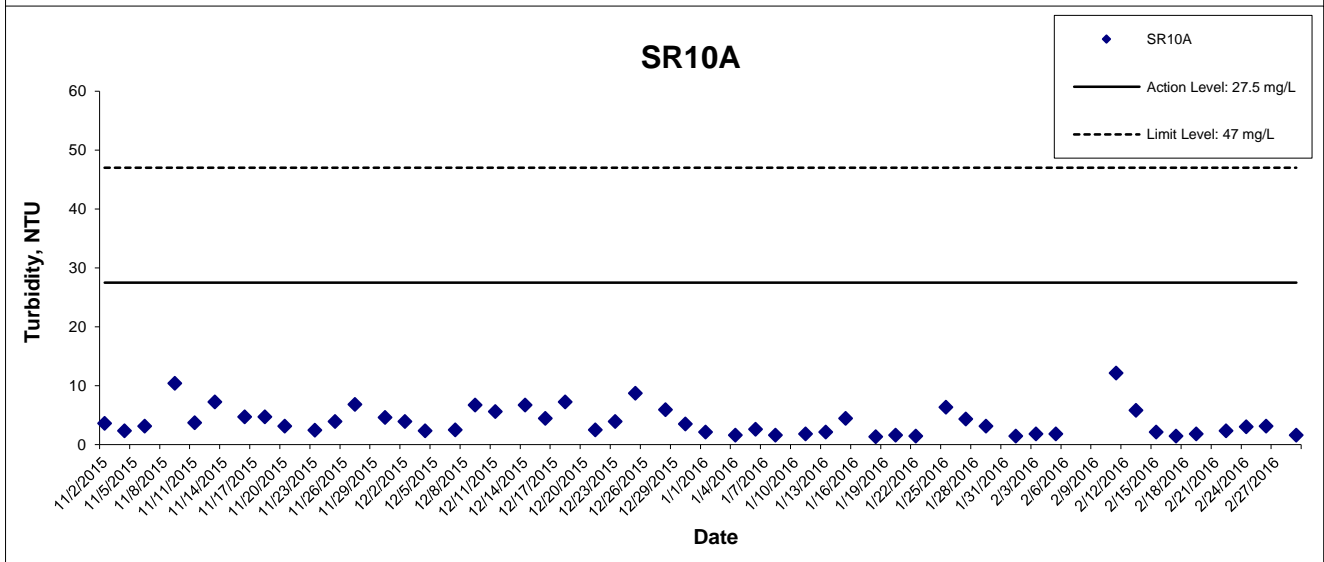
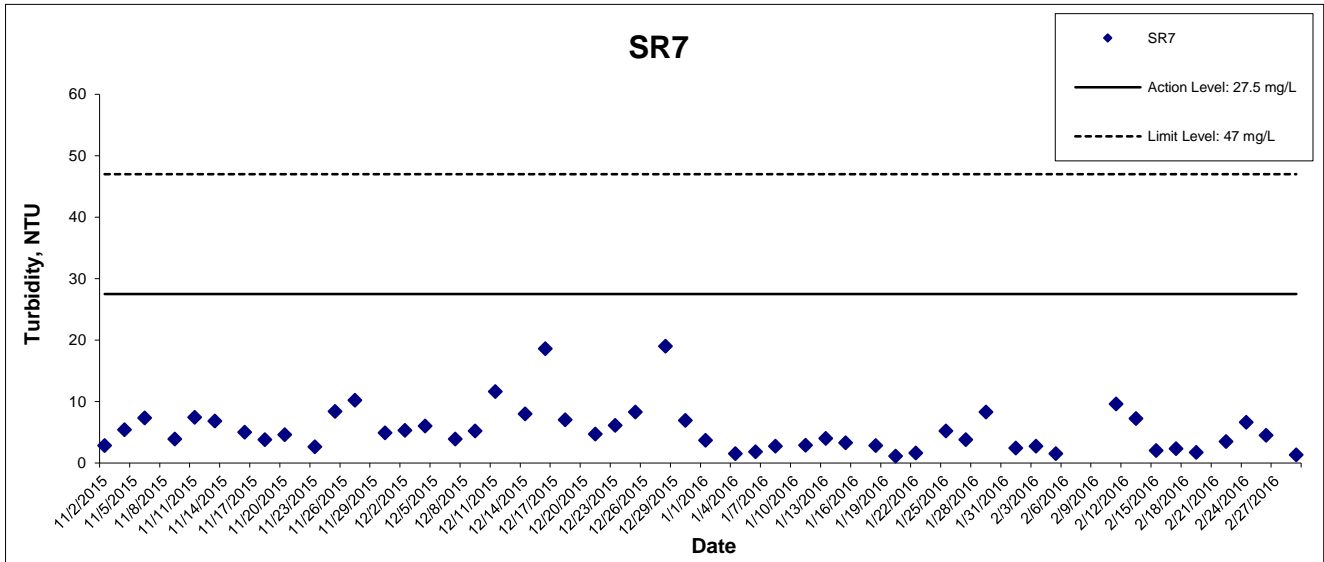
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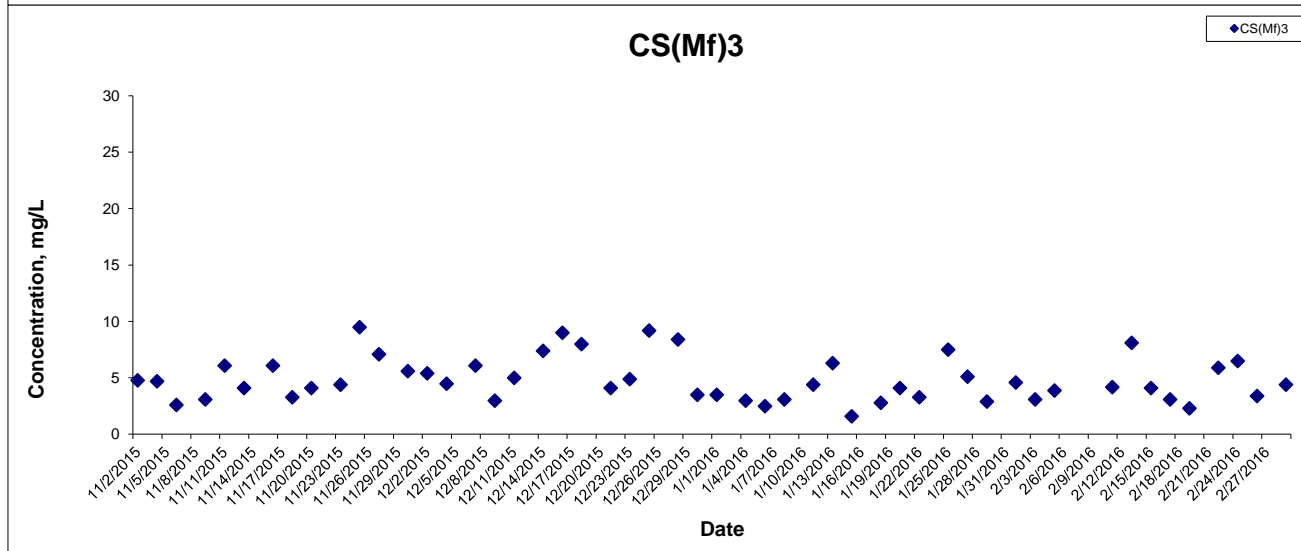
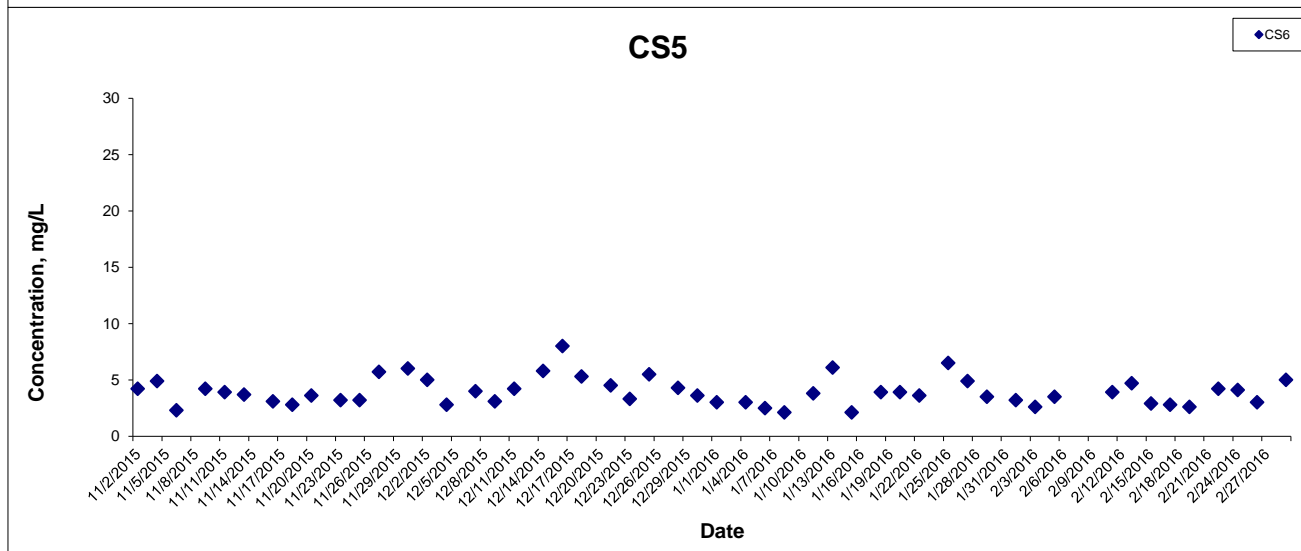
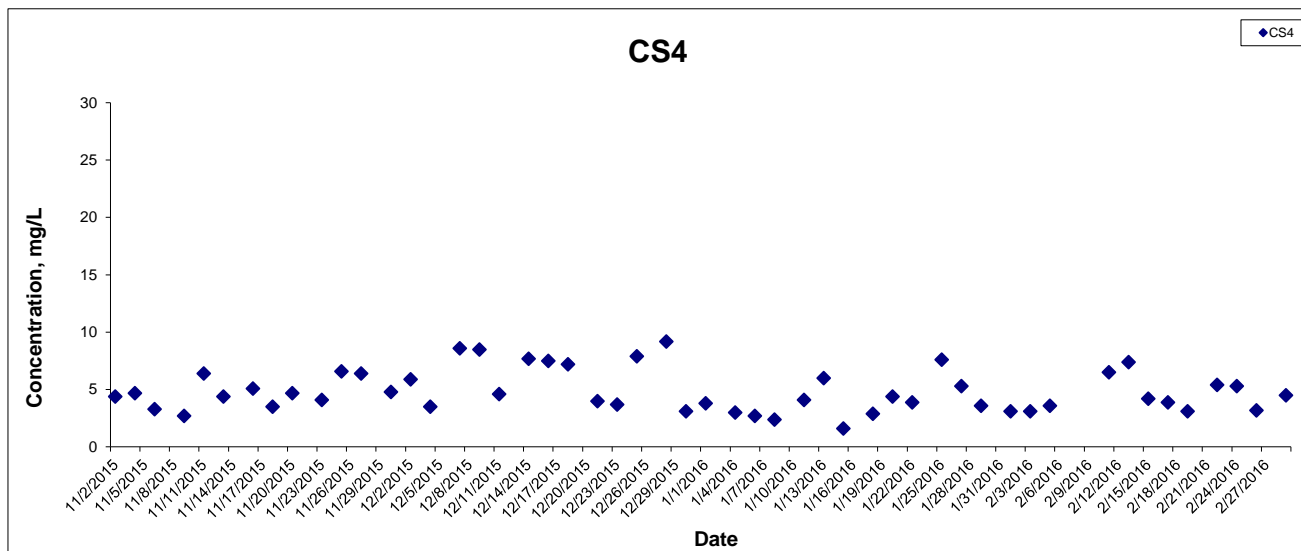
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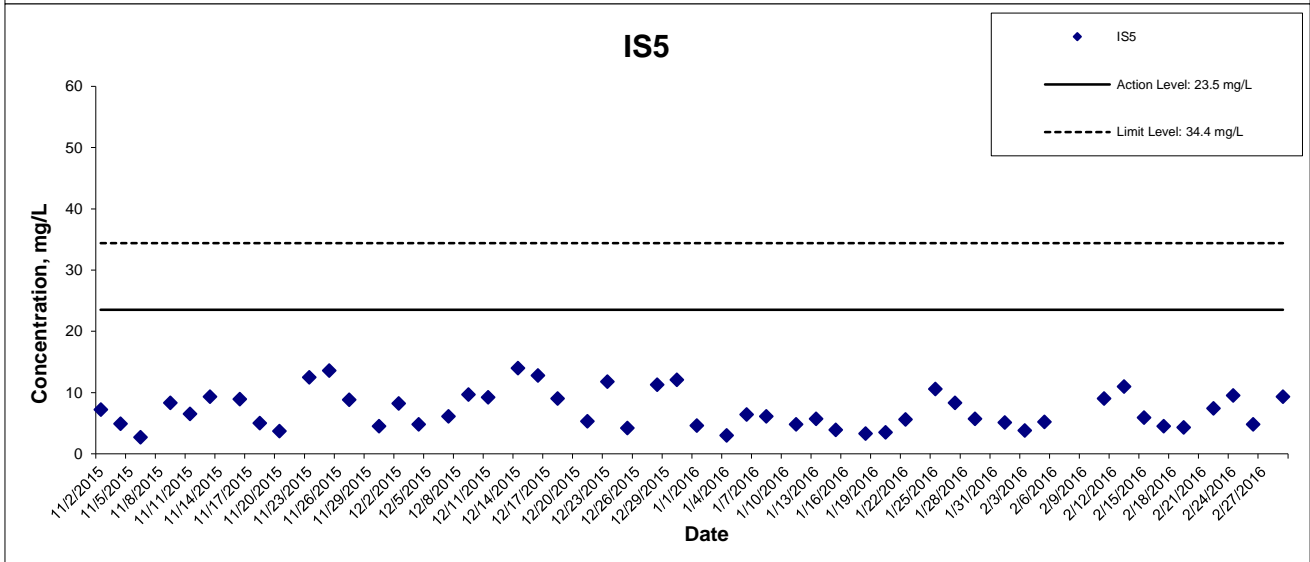
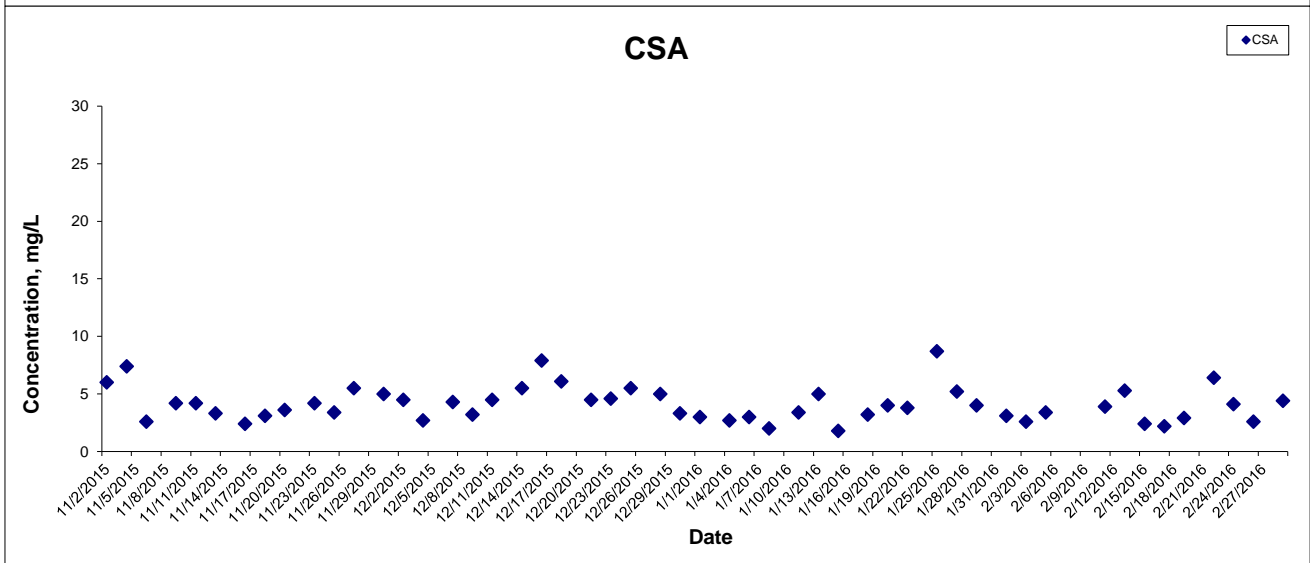
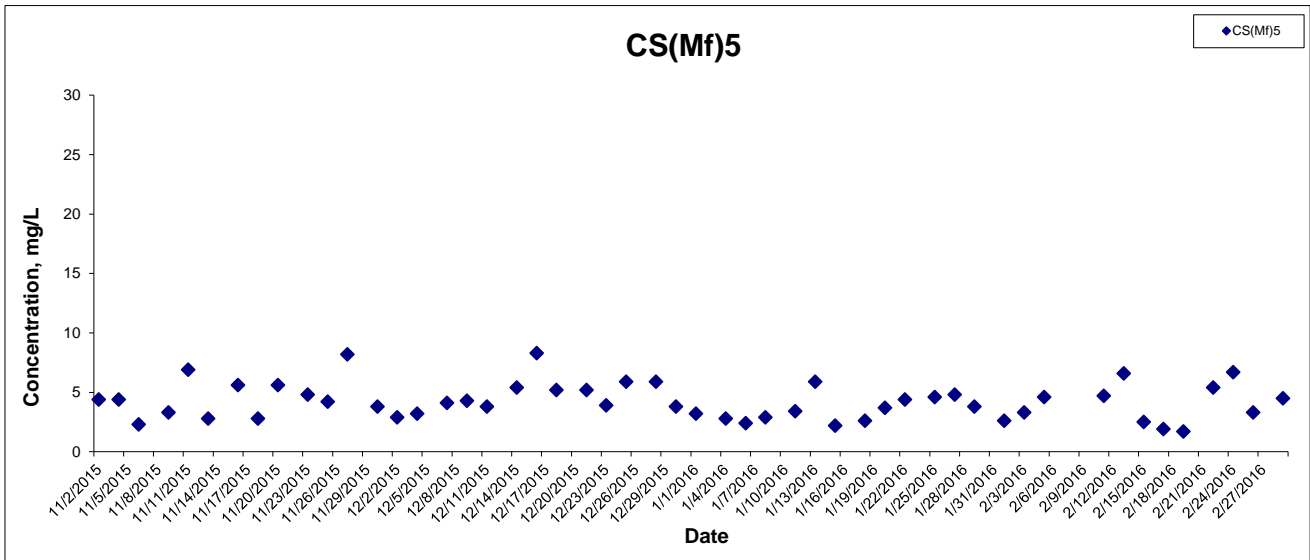
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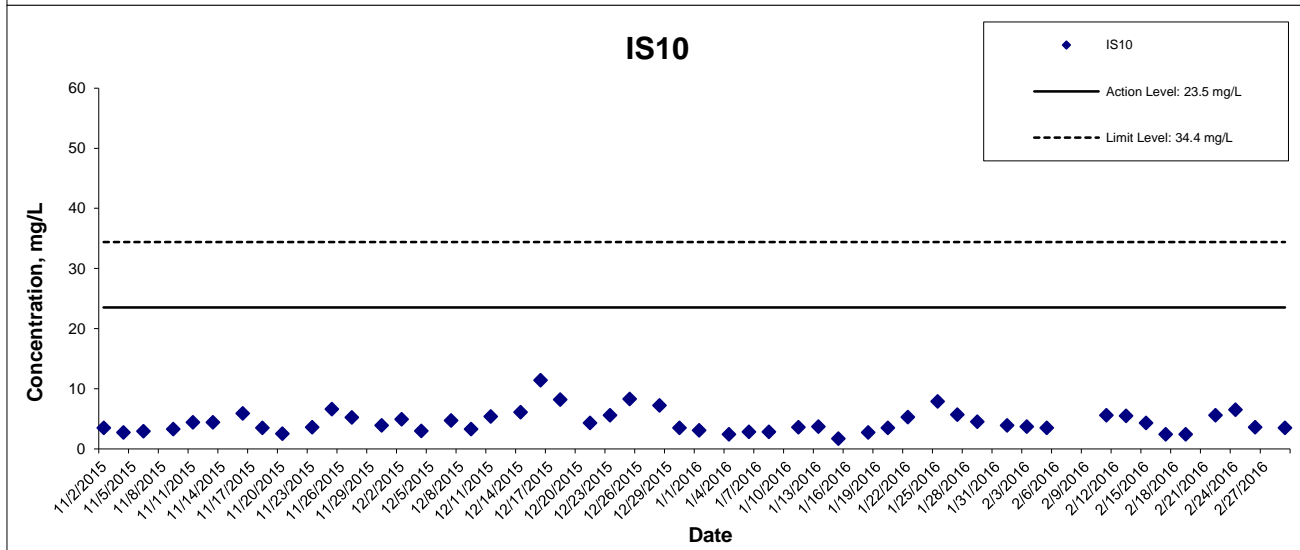
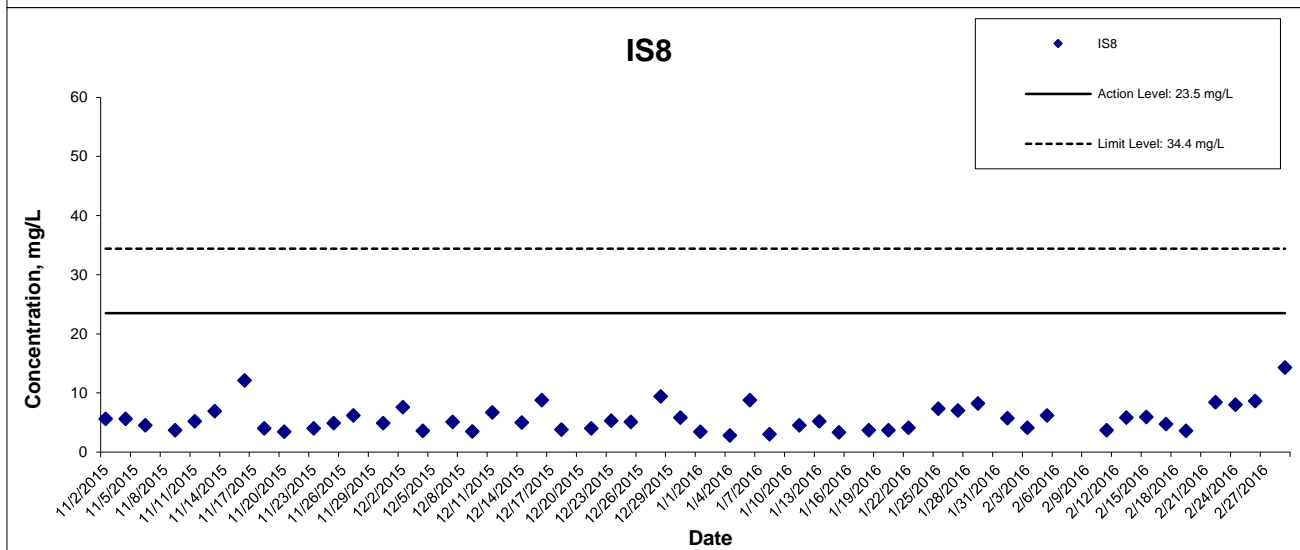
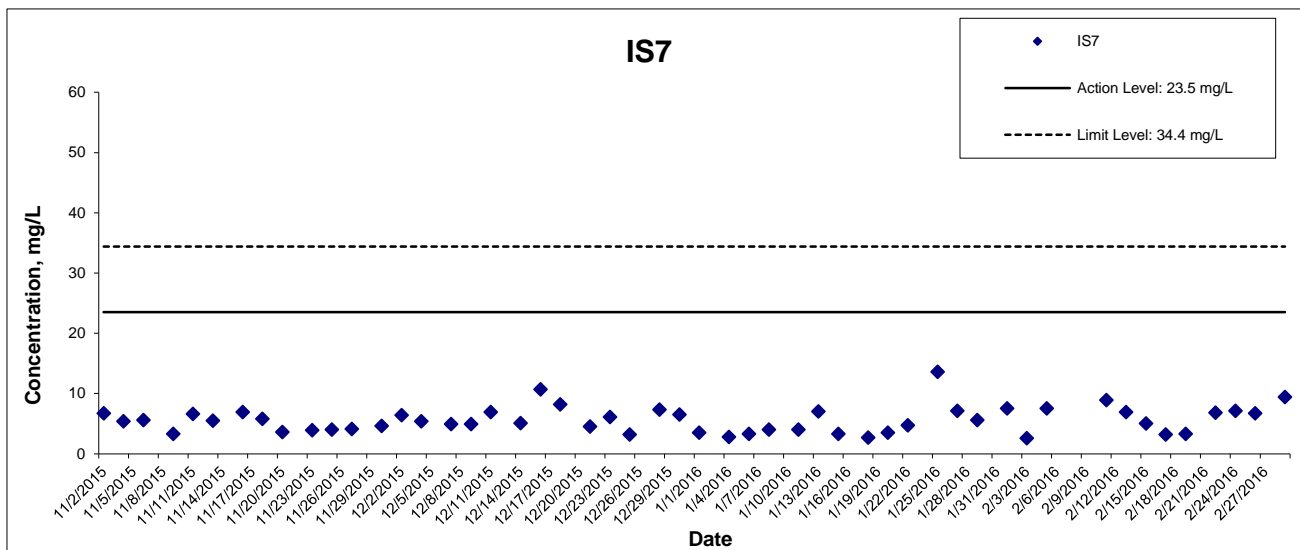
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- RECLAMATION WORKS

Graphical Presentation of Impact Water Quality
Monitoring Results

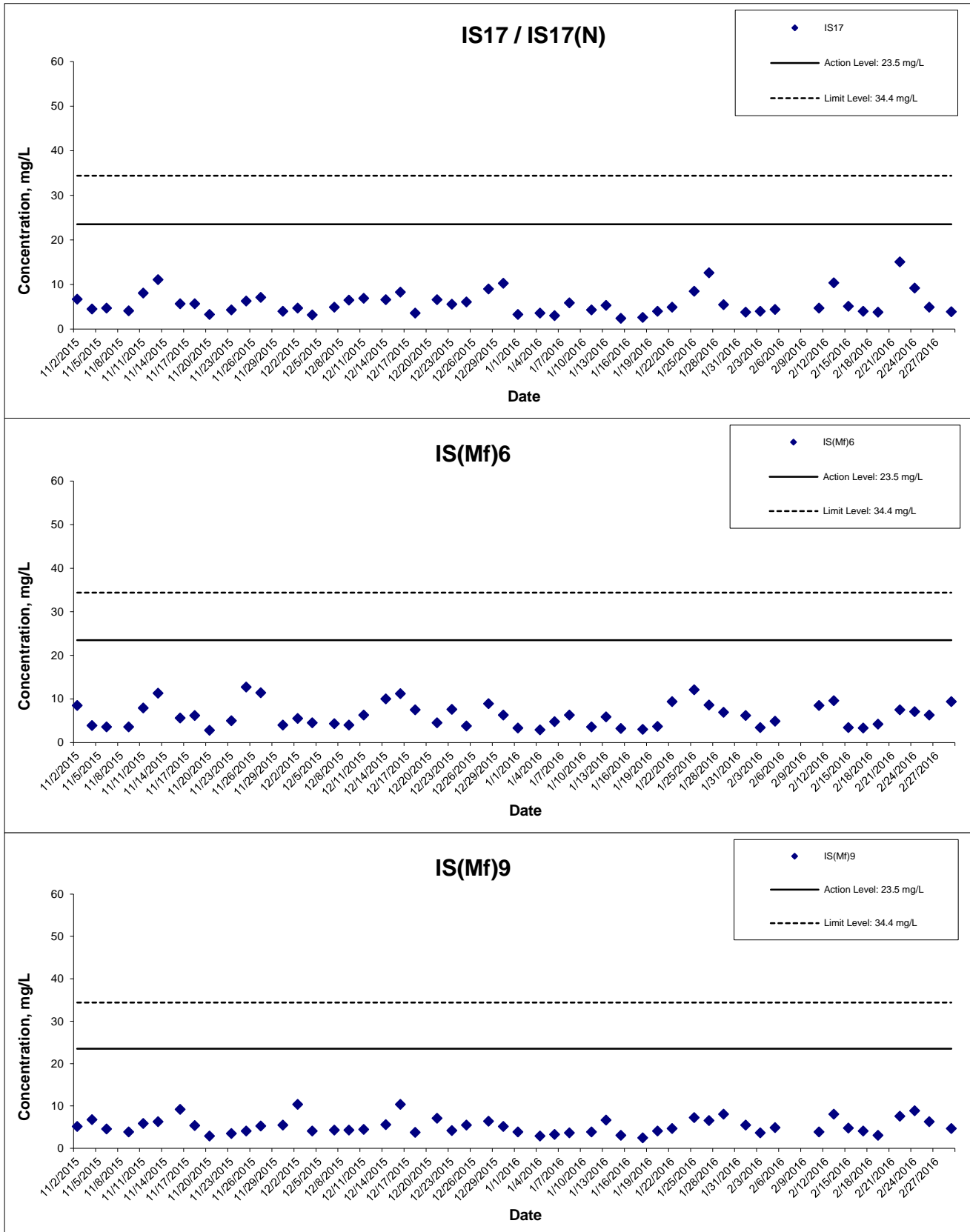


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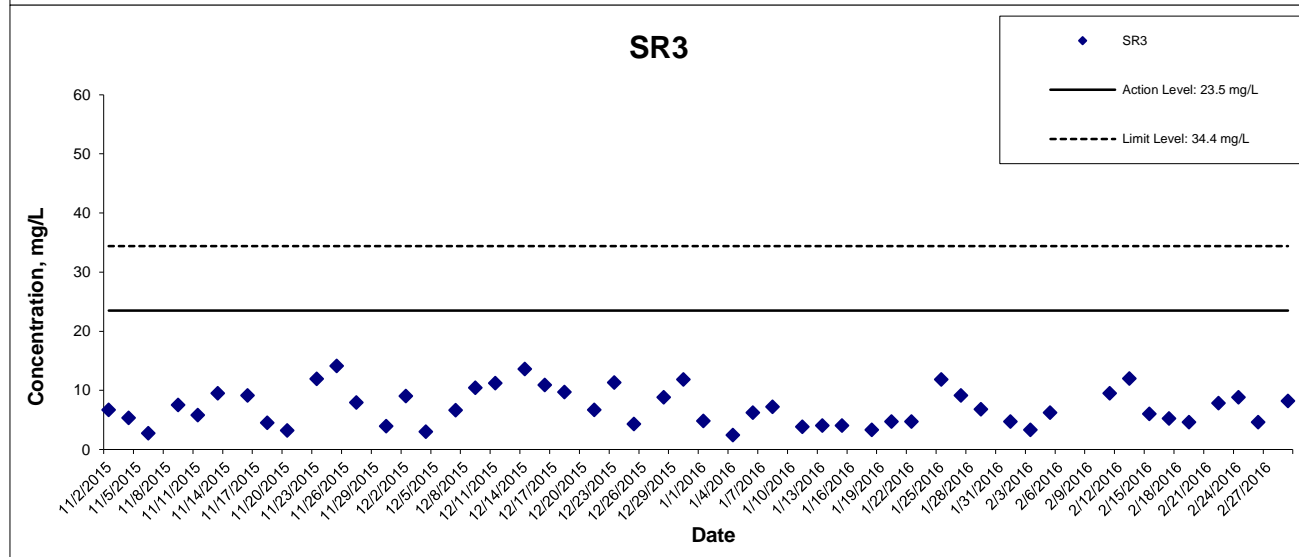
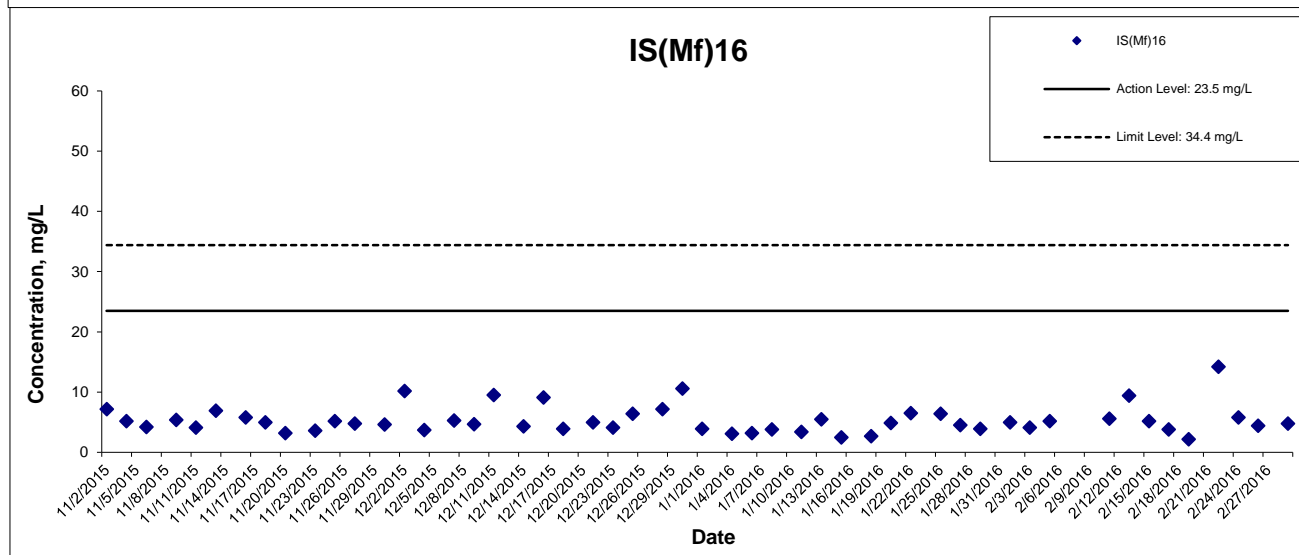
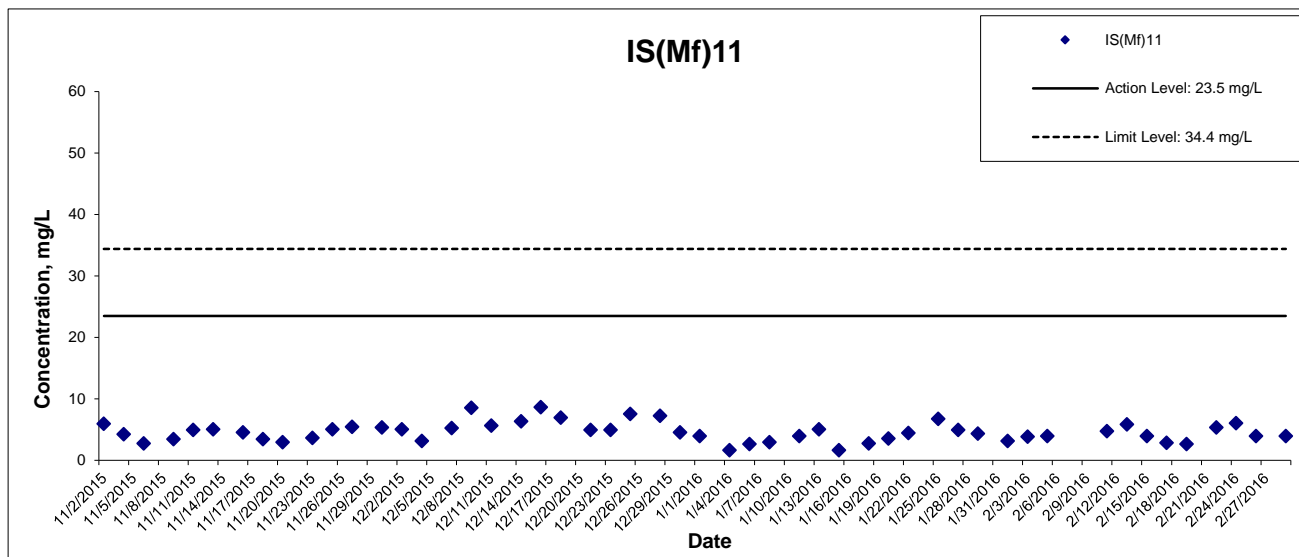
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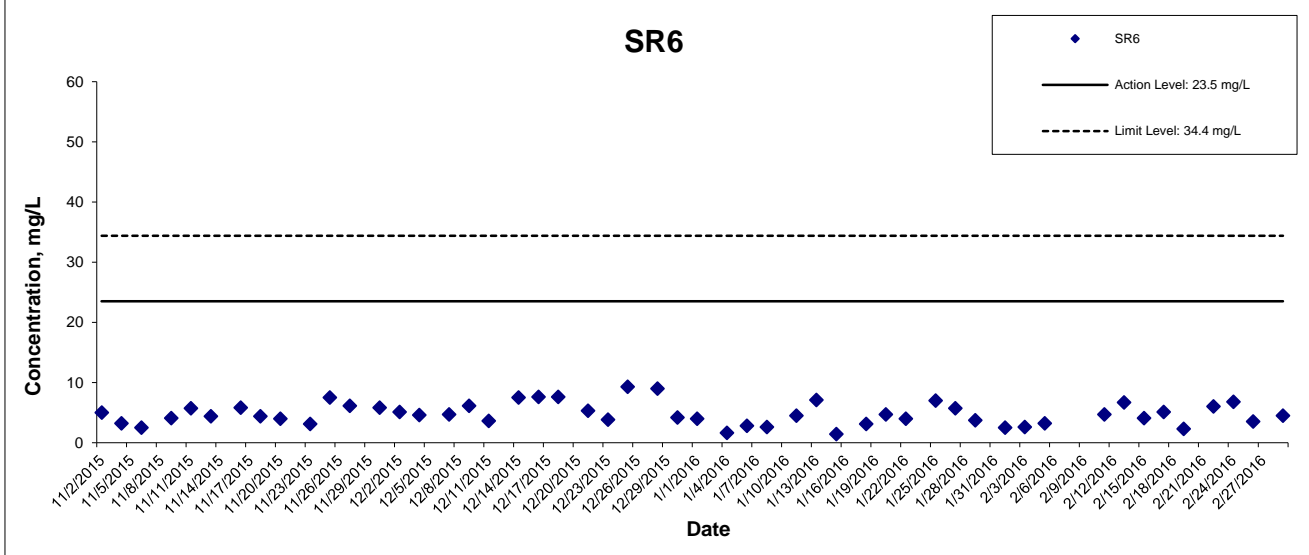
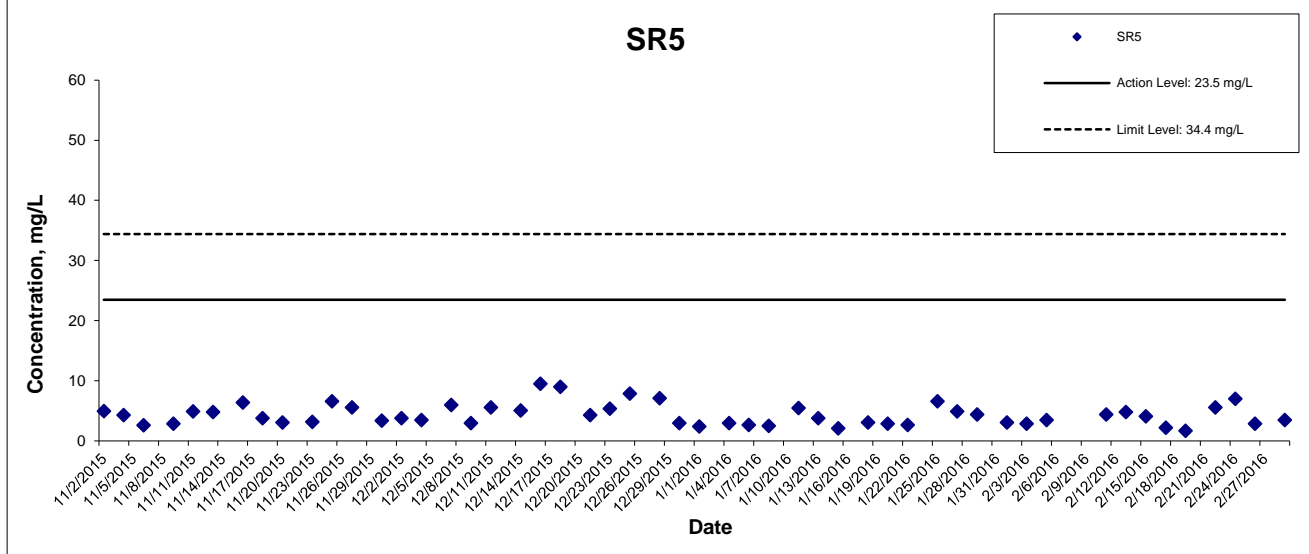
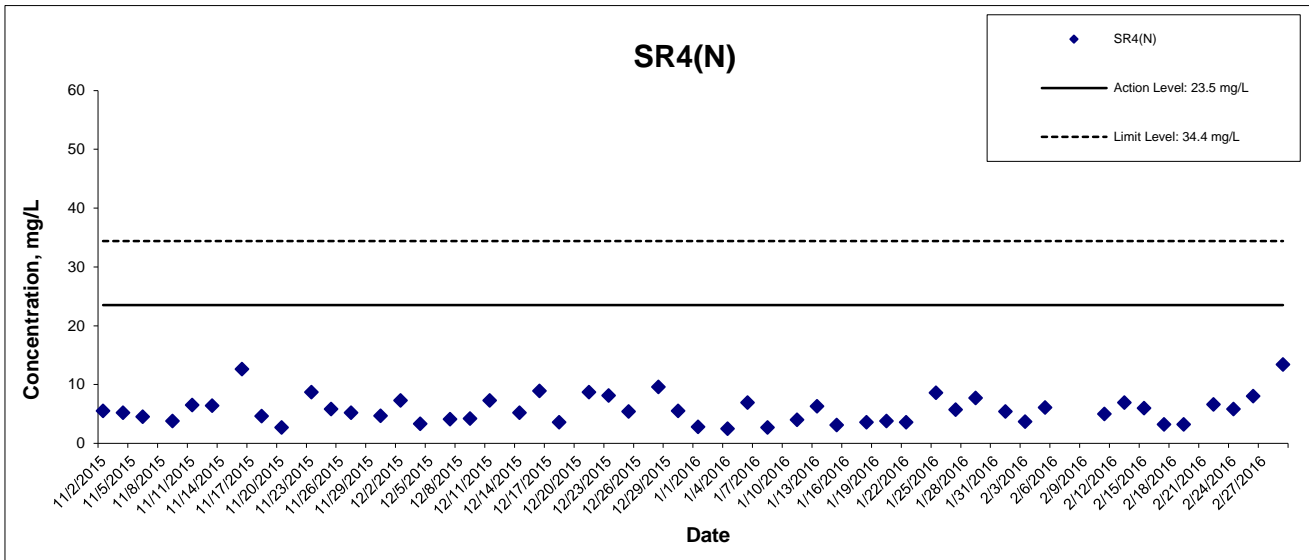
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 Monitoring Results**

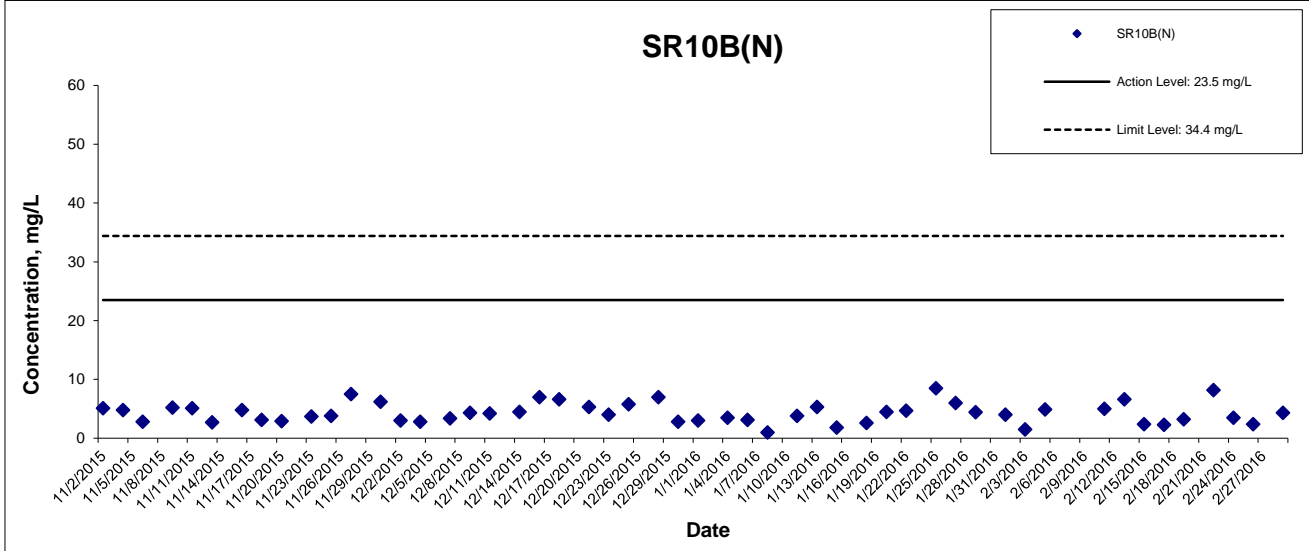
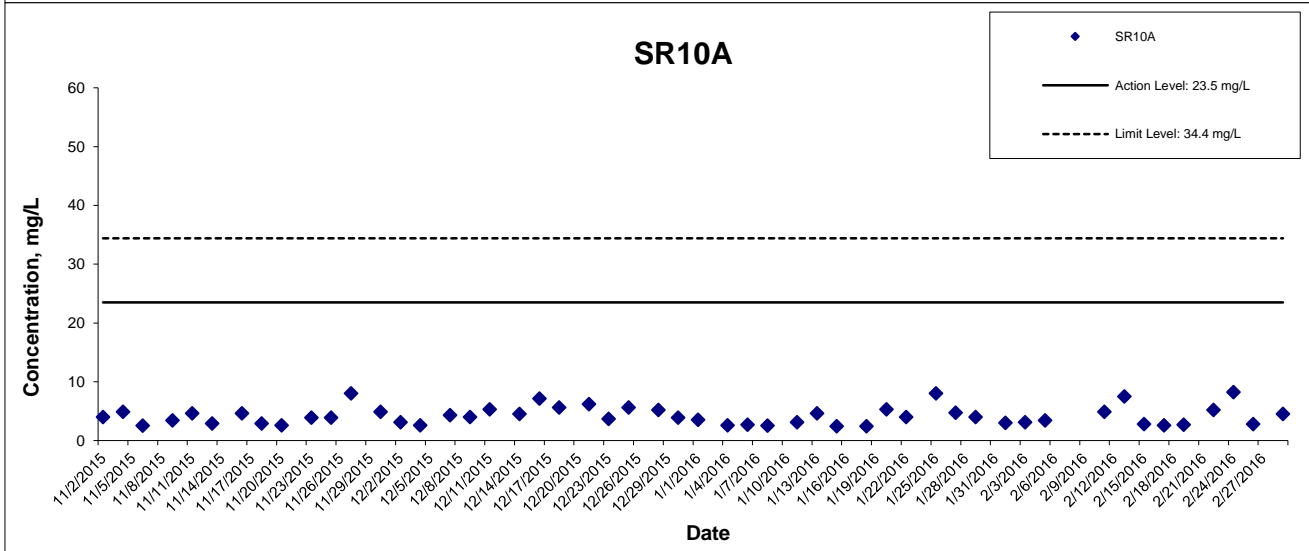
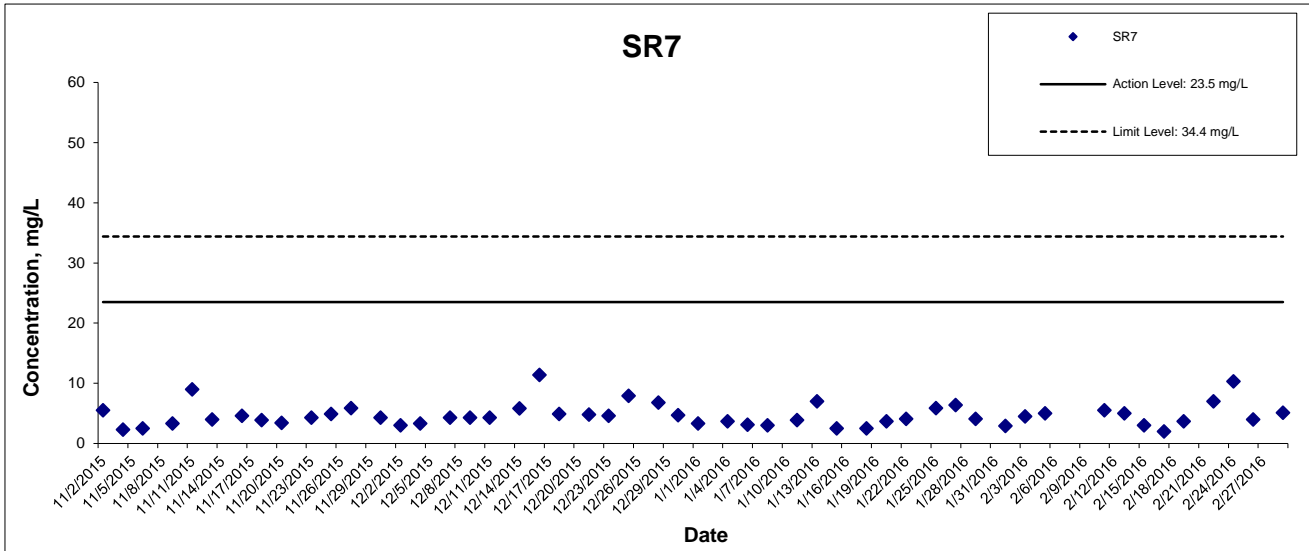


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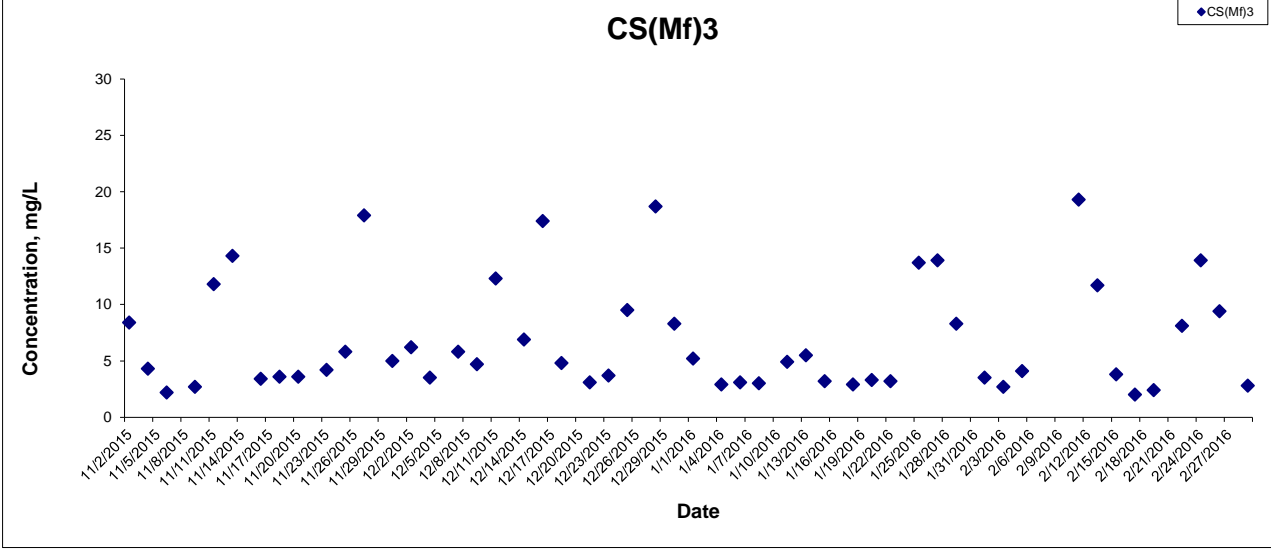
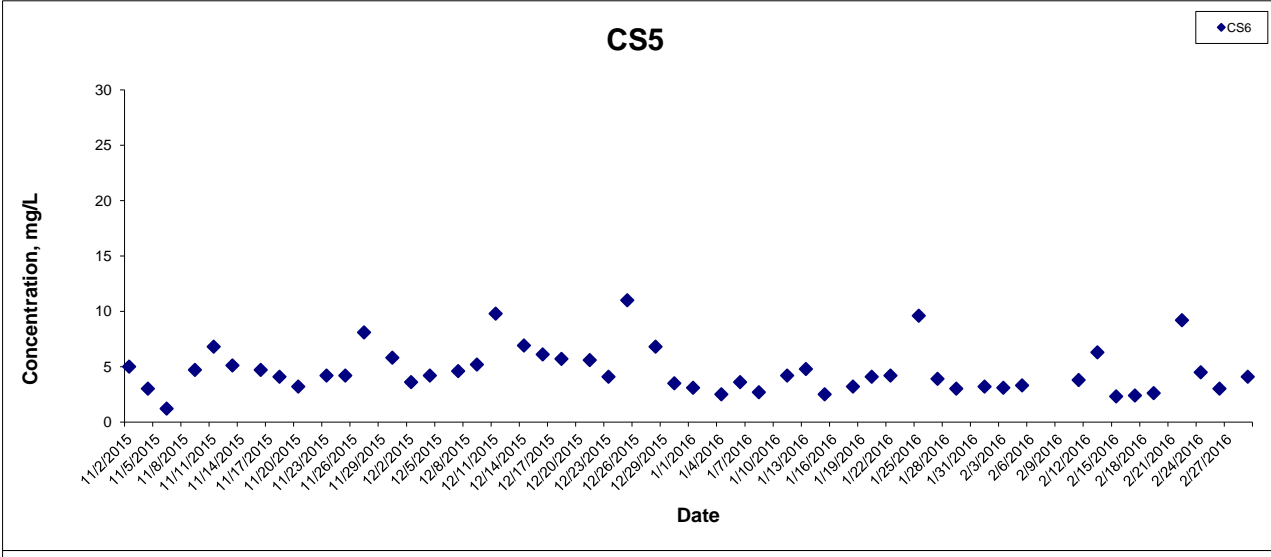
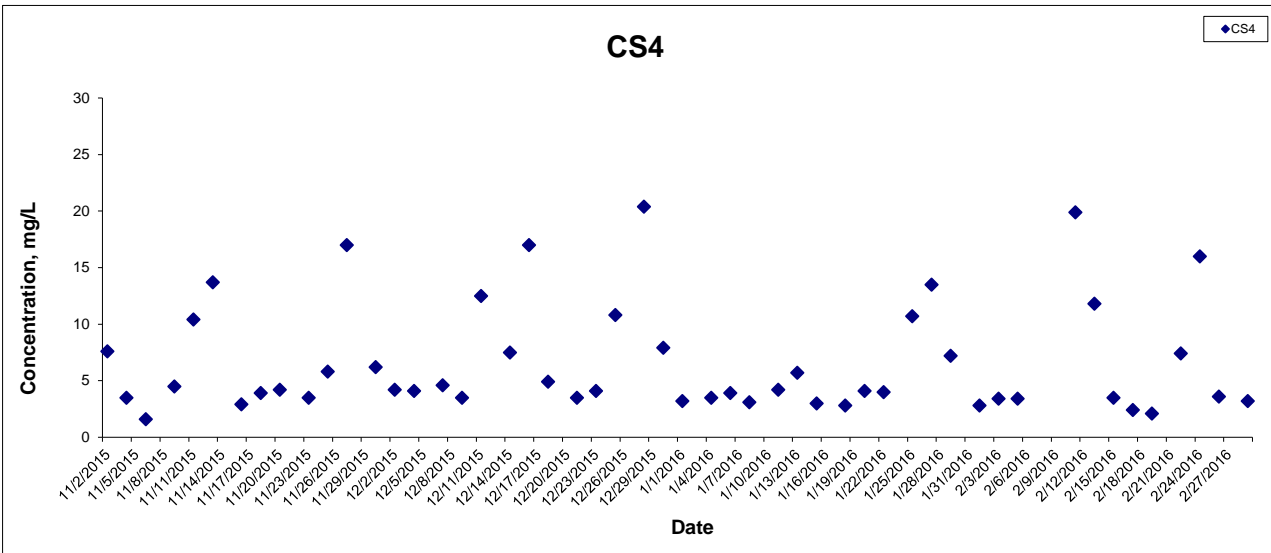
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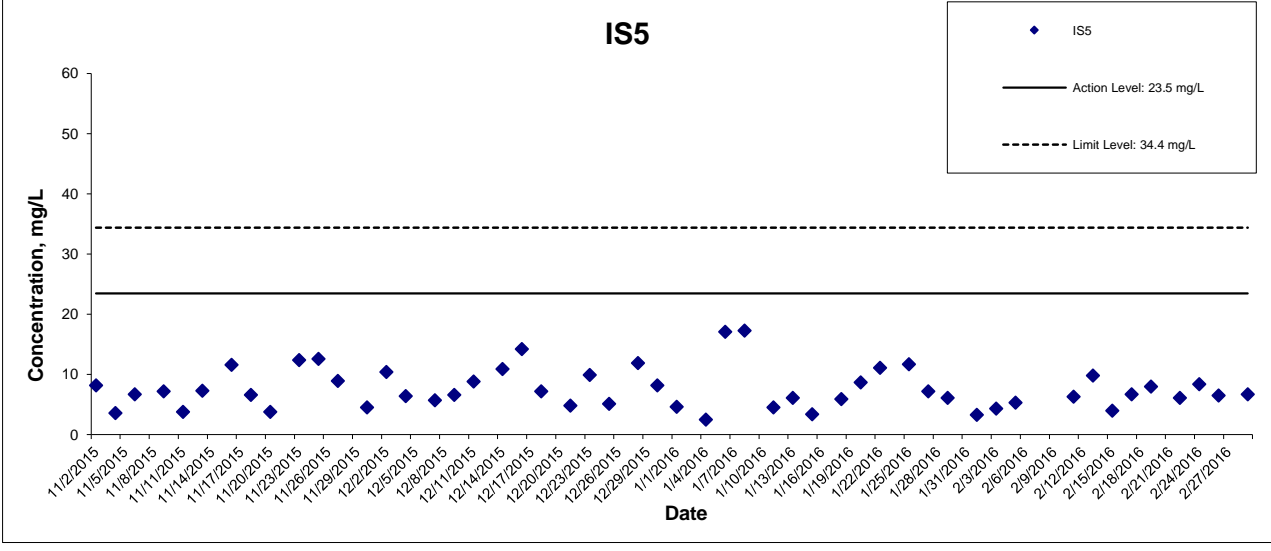
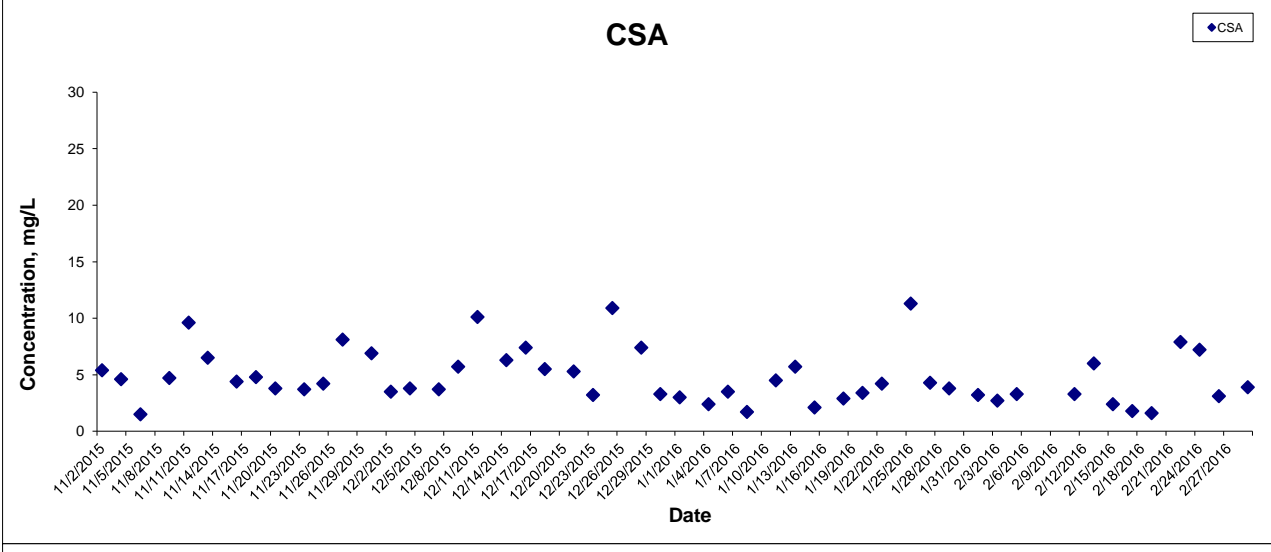
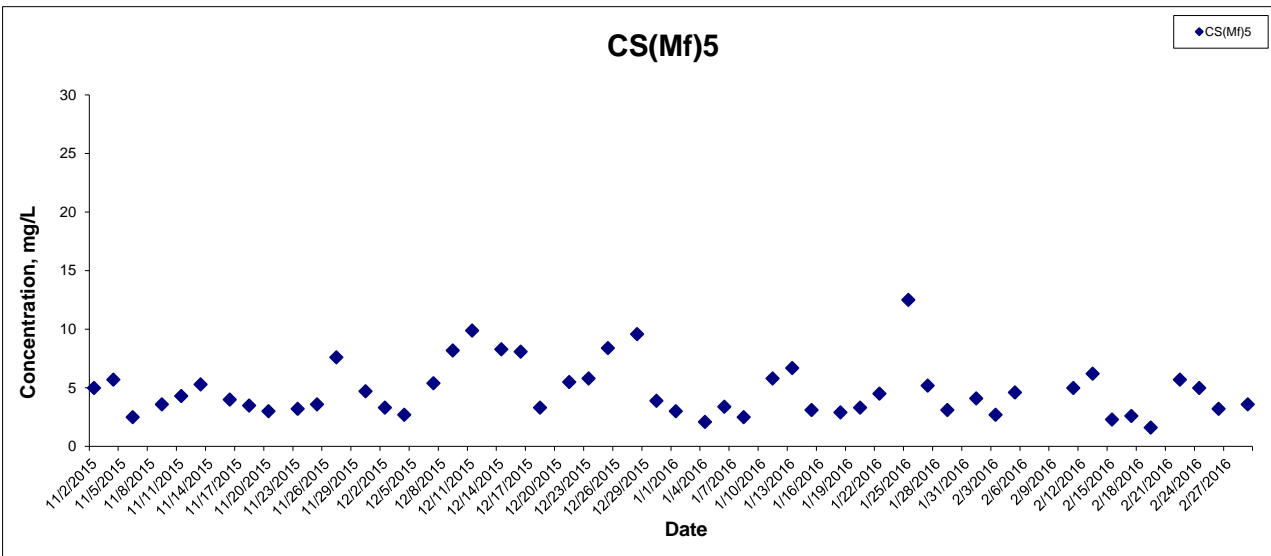


Suspended Solids at Mid-Flood Tide



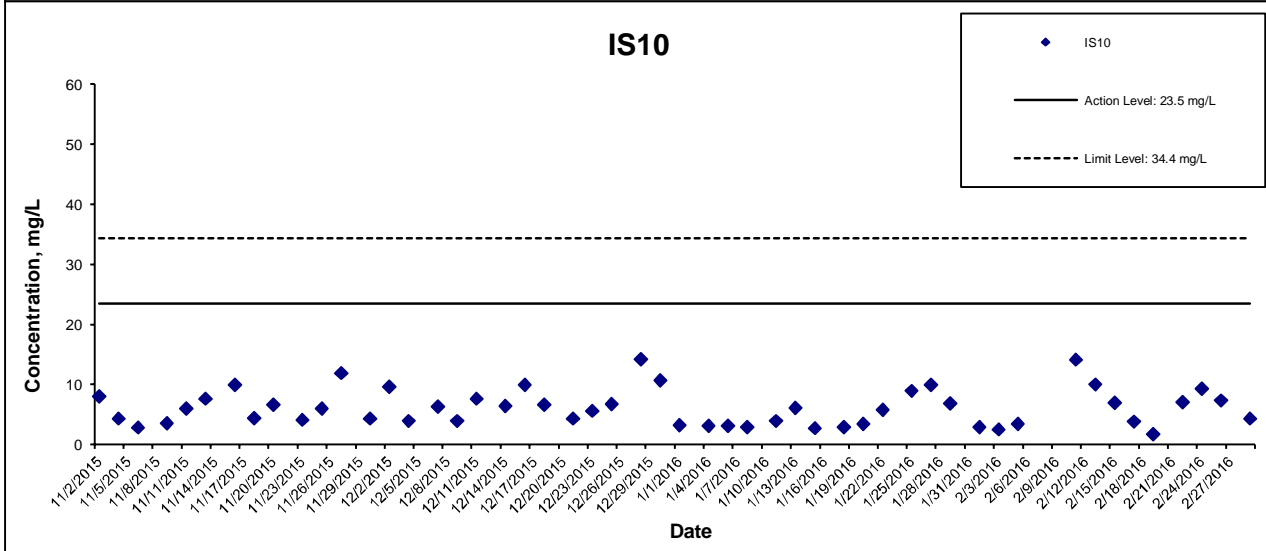
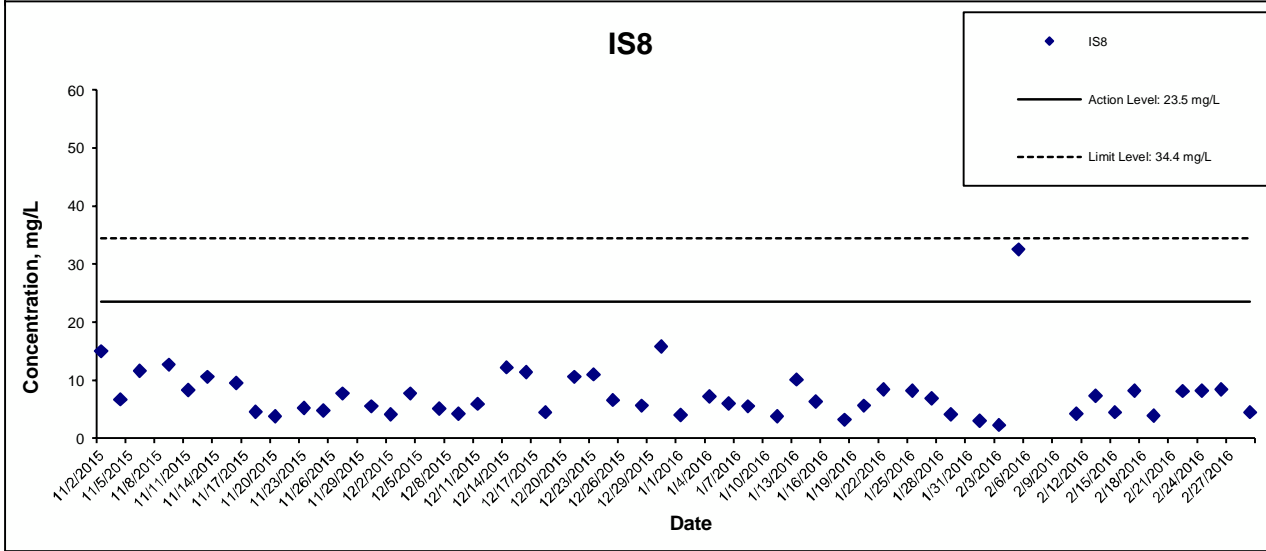
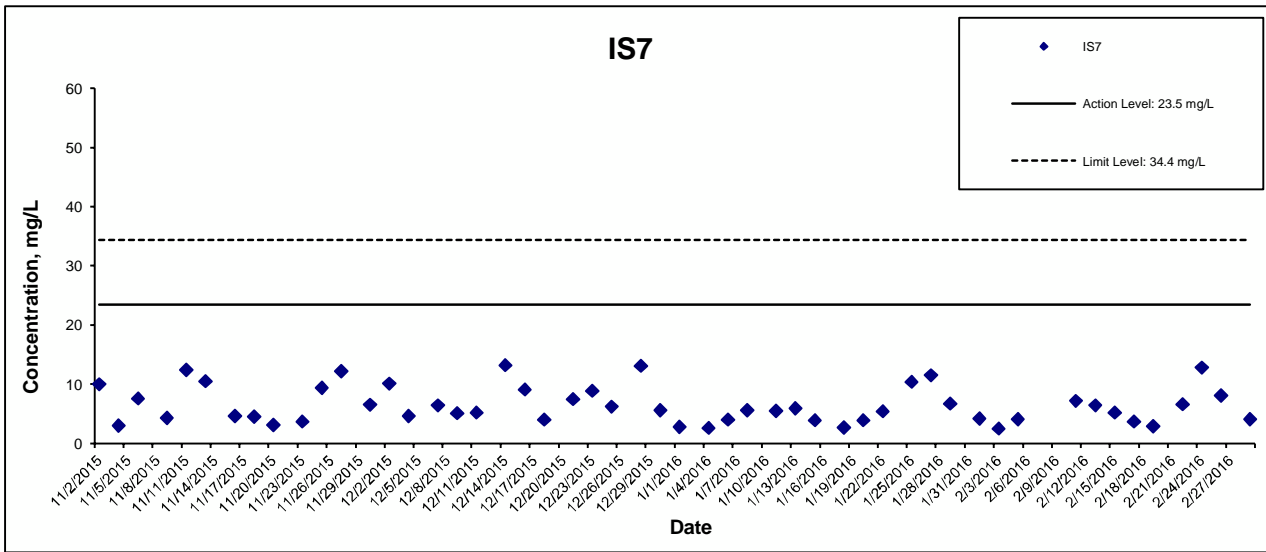
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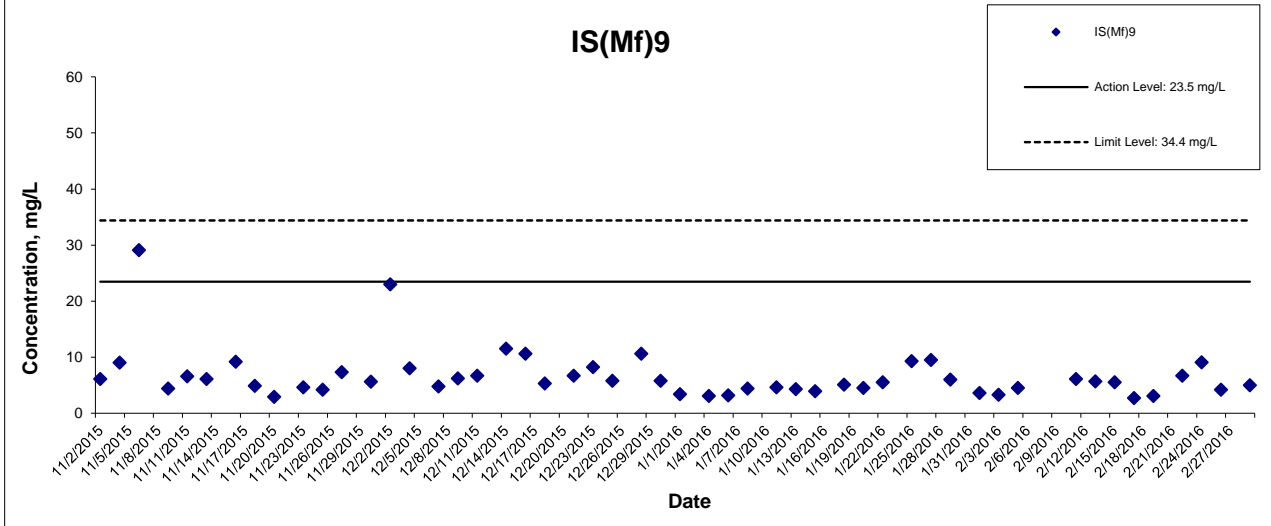
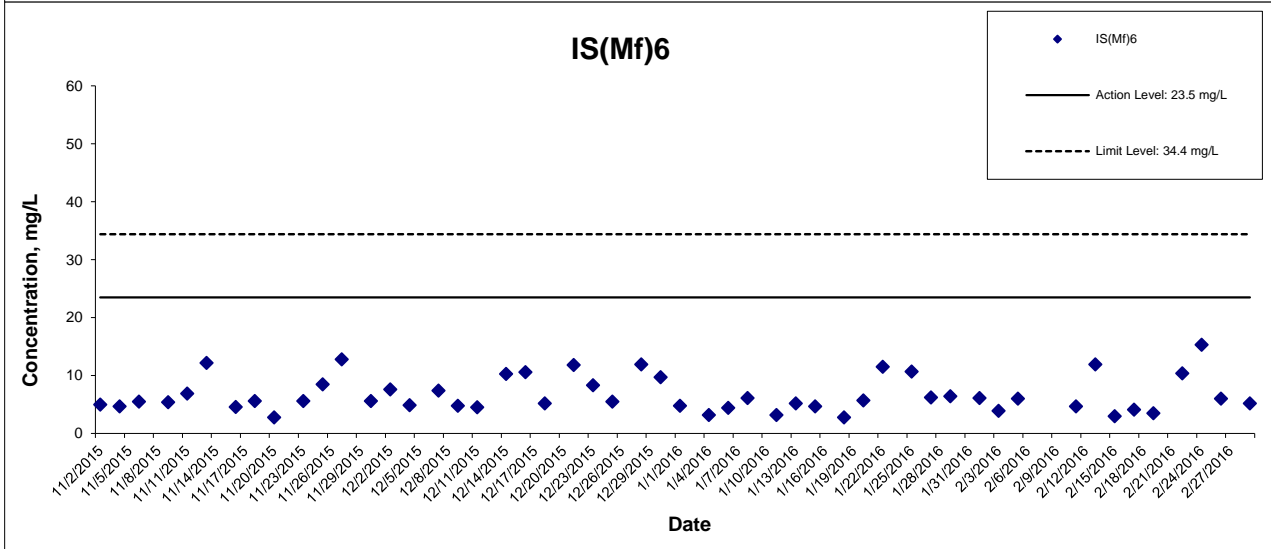
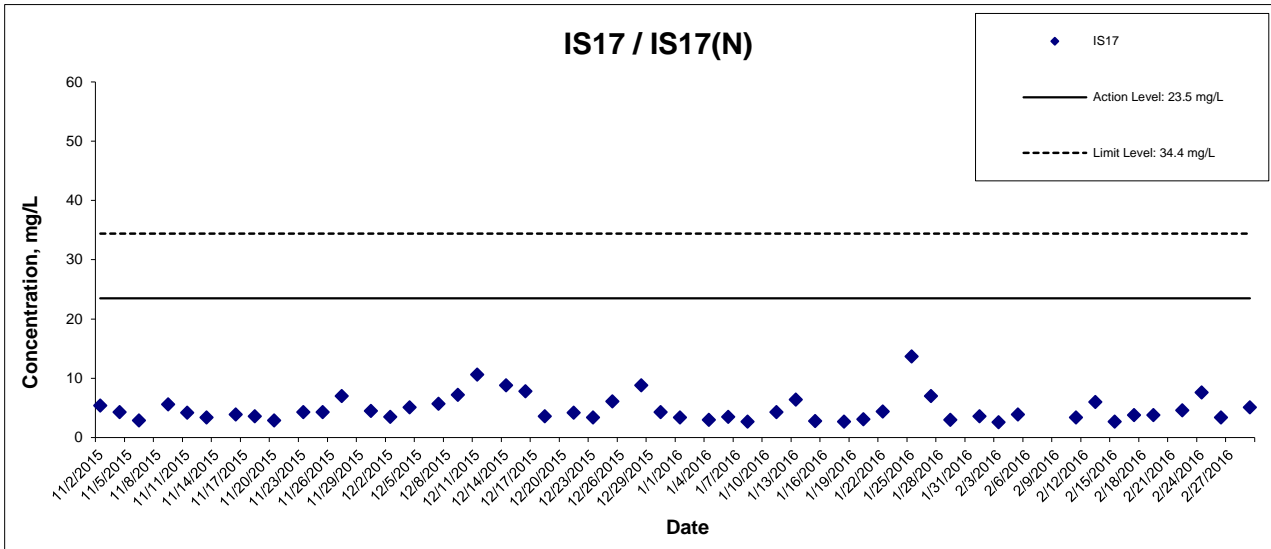


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Date: March 2016

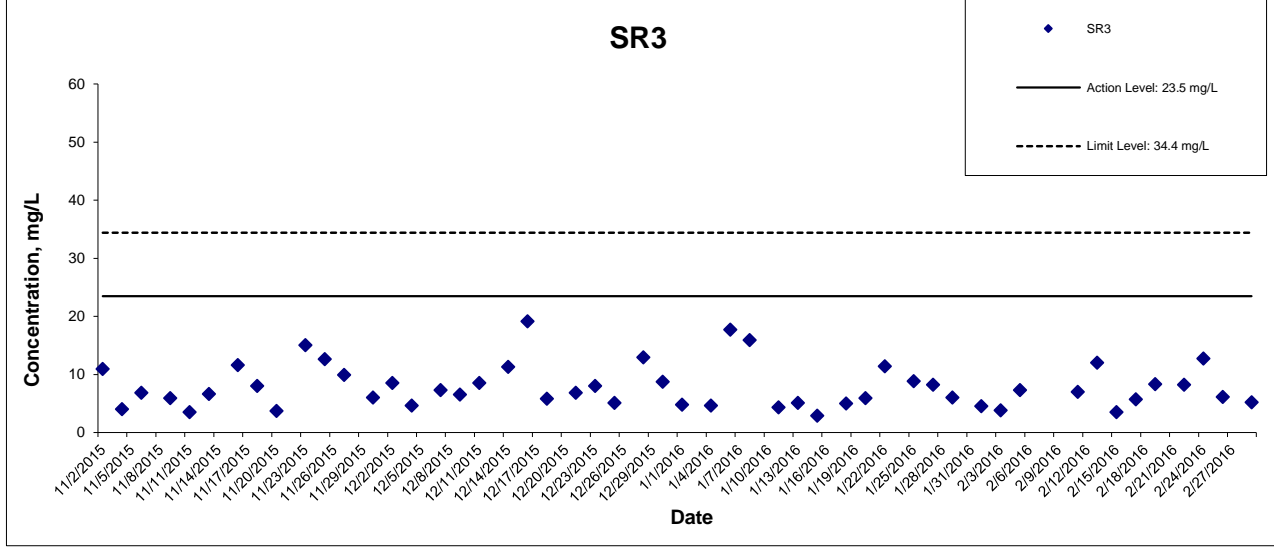
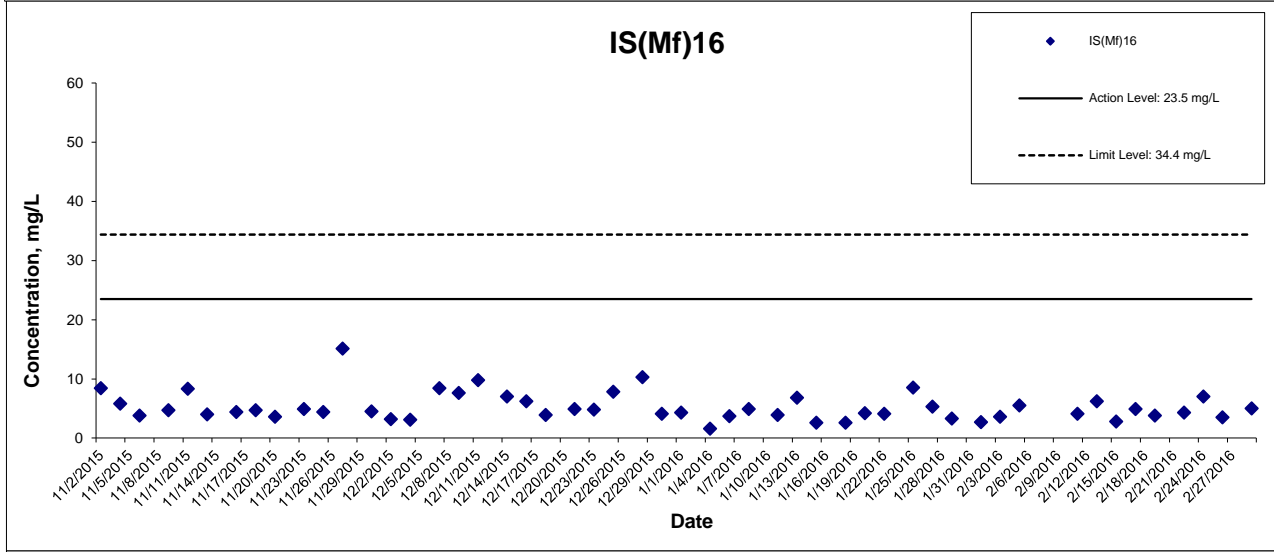
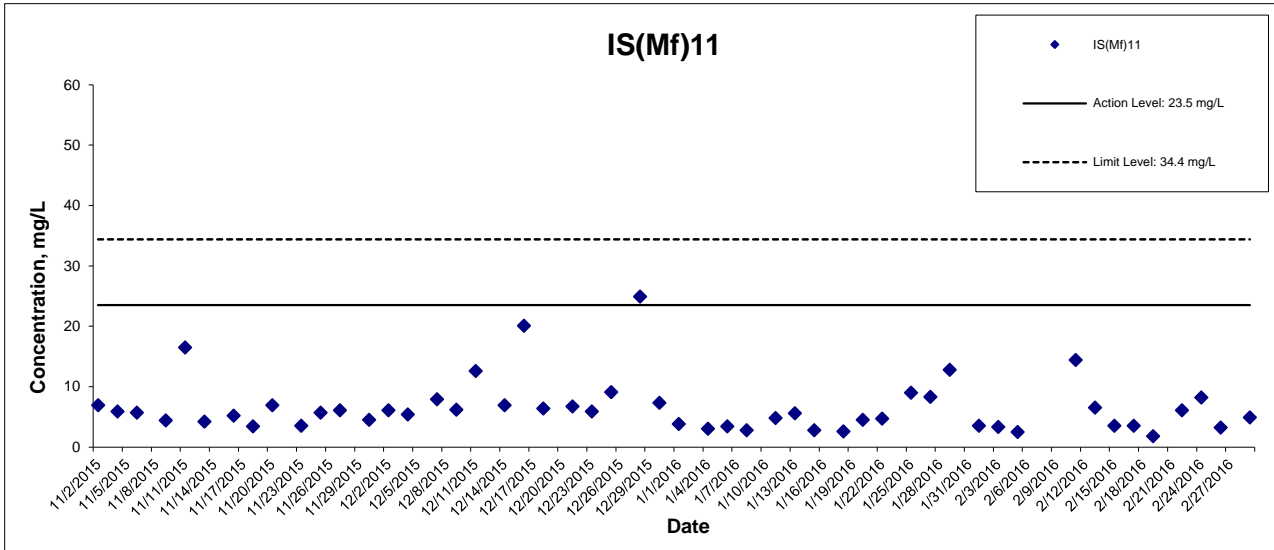
Appendix G

Suspended Solids at Mid-Flood Tide



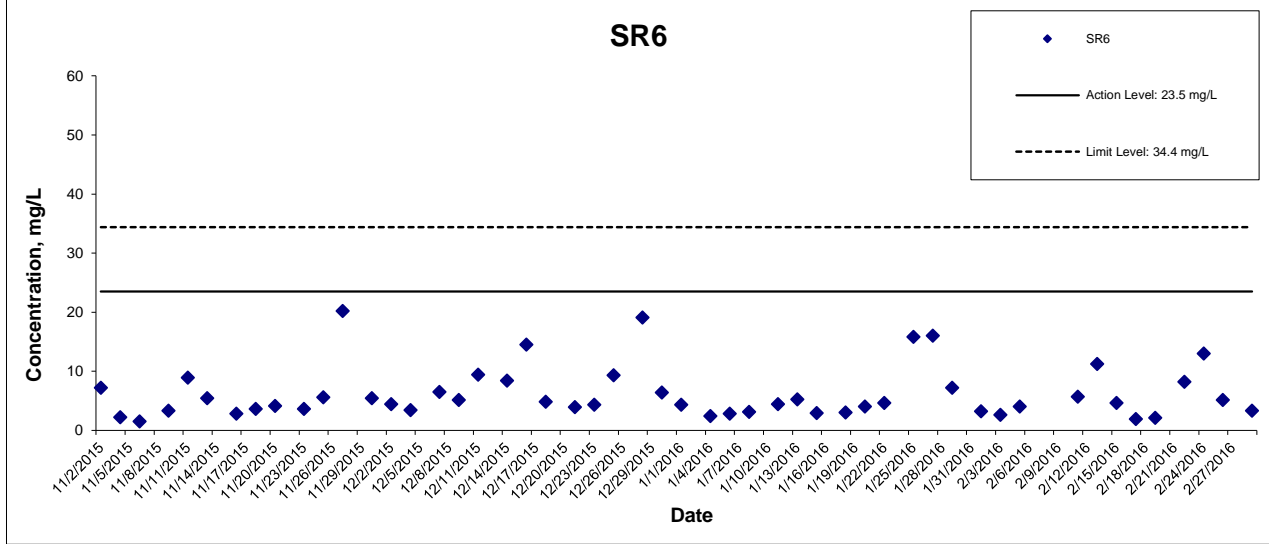
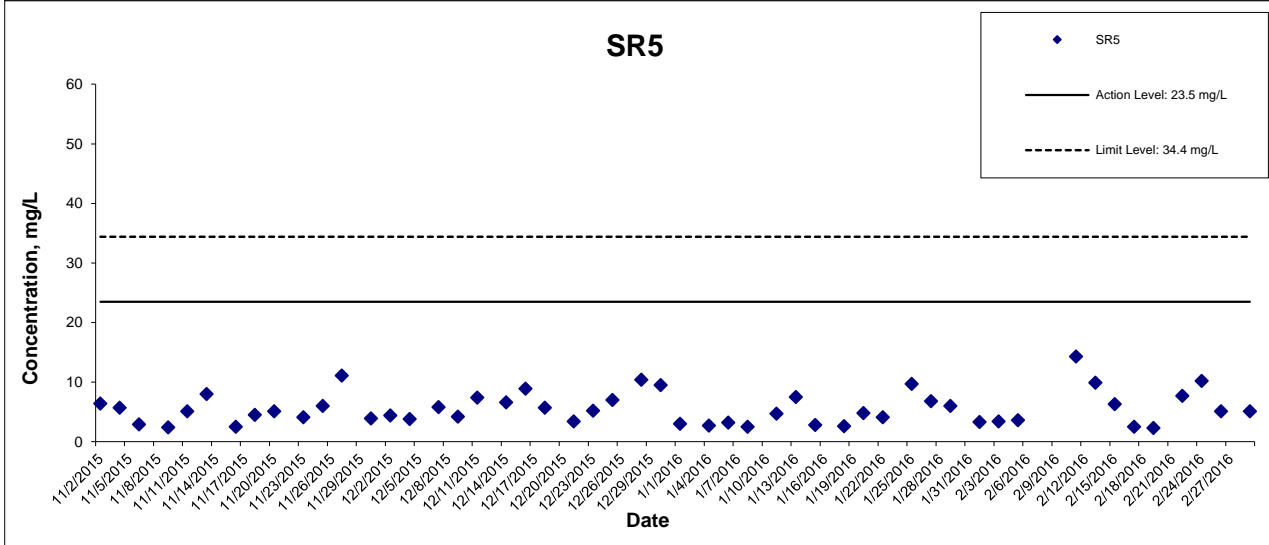
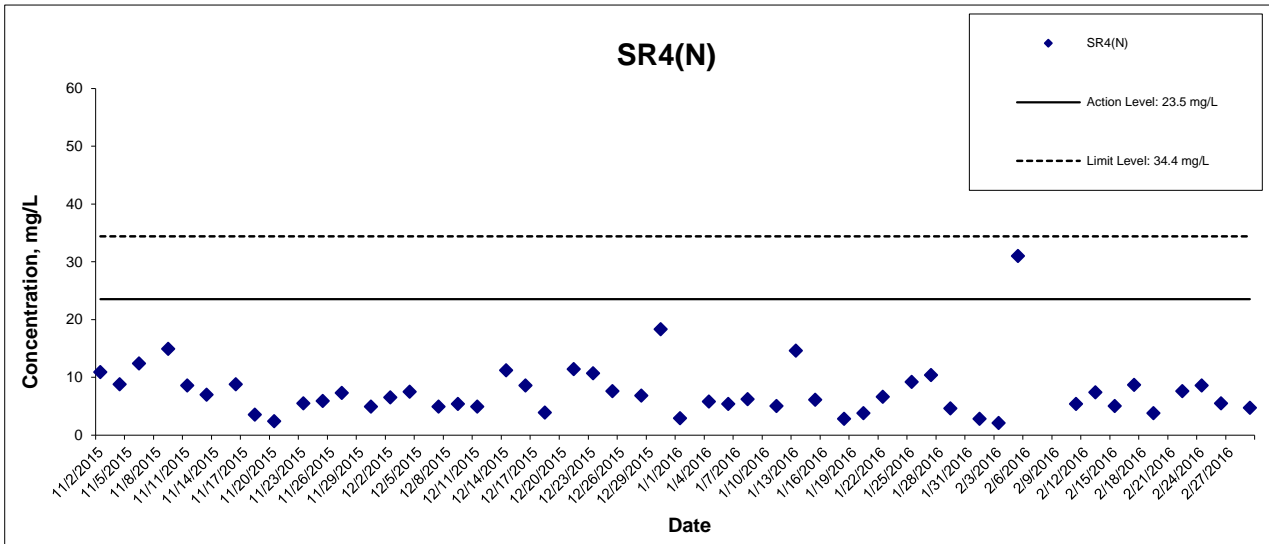
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HONG KONG BOUNDARY CROSSING FACILITIES

- RECLAMATION WORKS

**Graphical Presentation of Impact Water Quality
Monitoring Results**

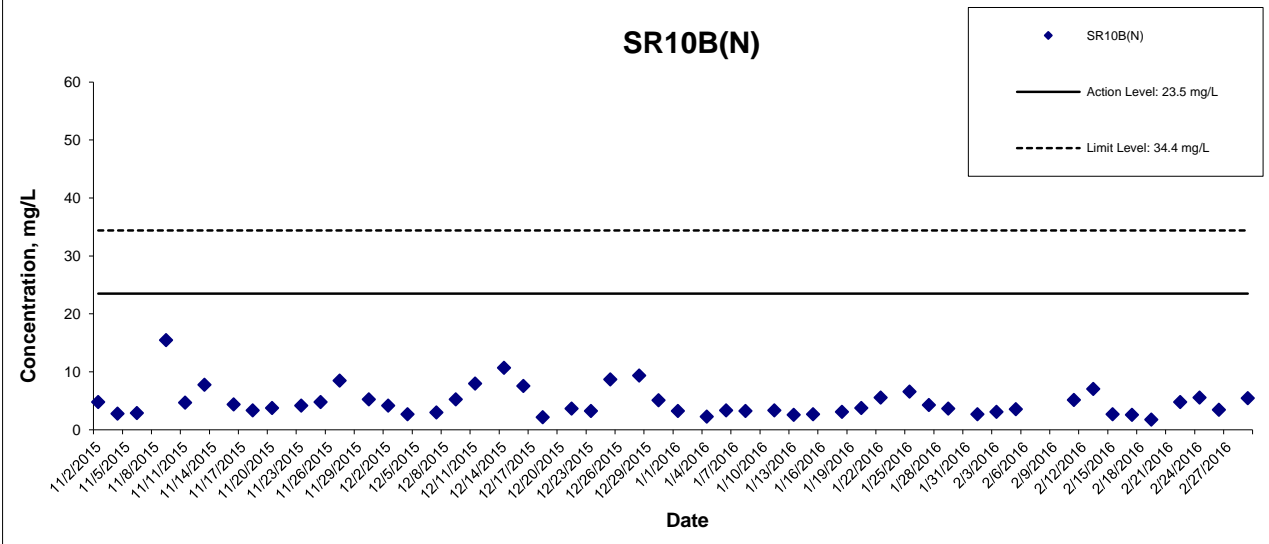
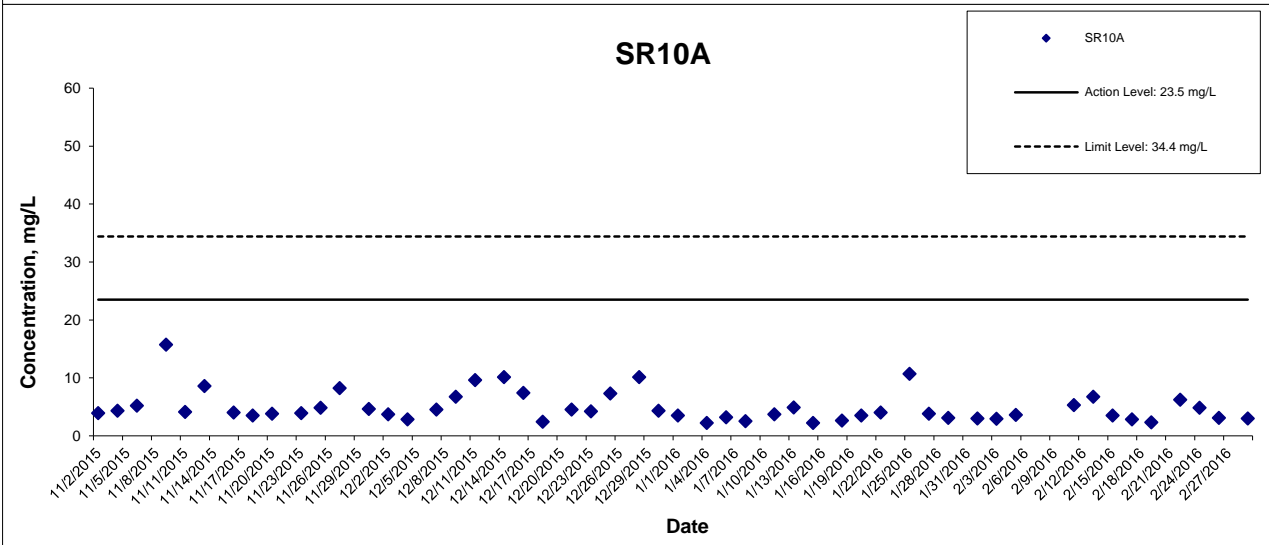
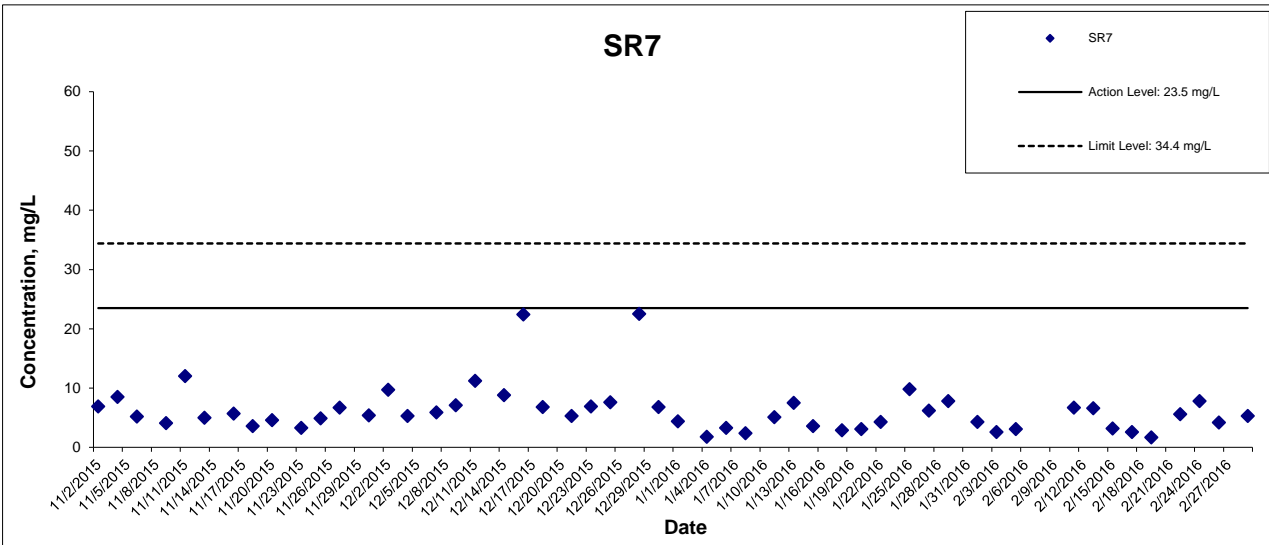


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Appendix G

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



December 2015–
February 2016
Quarterly Report

Dolphin Impact Monitoring

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- Annex II Impact Monitoring Survey Effort Summary (December 2015 – February 2016)
- Annex III Impact Monitoring Sighting Database (December 2015 – February 2016)
- Annex IV March 2012– February 2016 (and Baseline September – November 2011)
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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 main 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 landfall (Fig. 1).

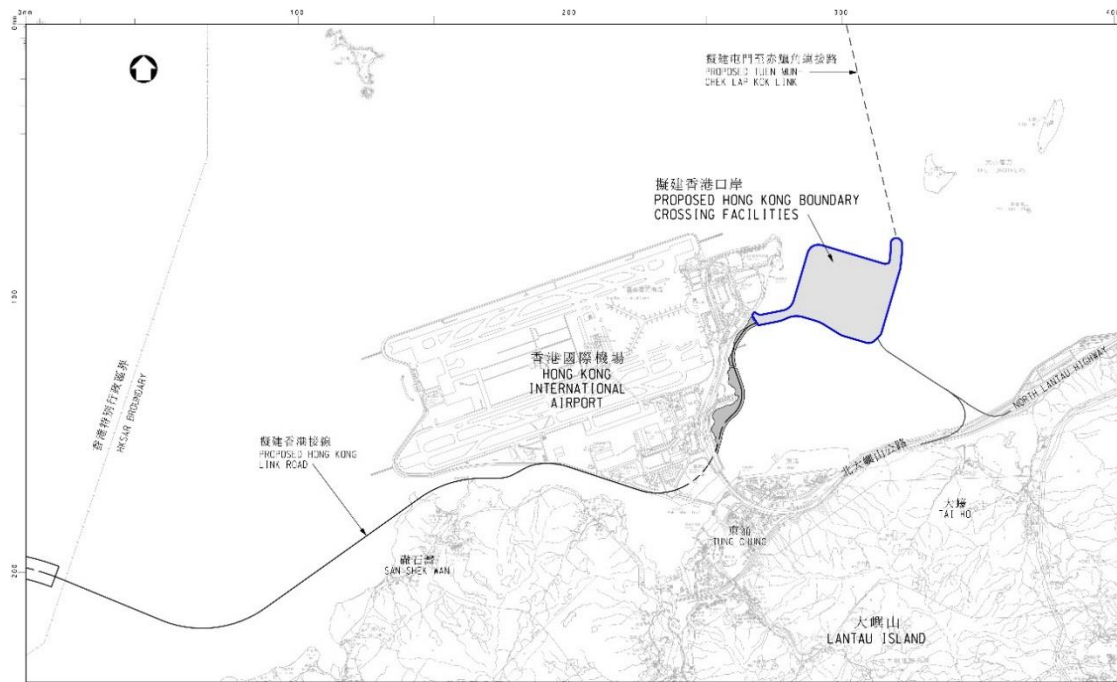


Figure 1. The Hong Kong Boundary Crossing (HKBCF) Reclamation Sites, North Lantau, Hong Kong (http://www.hzmb.hk/eng/img/overview/about_overview03_p01l.jpg)

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 sixteenth quarterly (December 2015 – February 2016) 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 during a different season (autumn), however, some monitoring was conducted in the winter prior to HZMB project commencement therefore, December 2011-January 2012, December 2012-February 2013, December 2013-February 2014 and December 2014-February 2015 can be compared directly to this reporting period as well as referencing the baseline data. 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 incorporated¹

¹http://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 restricted 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 and are used herein solely for comparative purposes.

2.2. Line-transect Vessel Surveys

The co-ordinates for the transect lines and layout map were provided by AFCD, however, as HZMB construction works have progressed, some transect lines have been blocked, temporarily or permanently, either by the working vessels or the bridge structure itself. These are detailed in monthly submissions to ENPO. For this reporting quarter, the surveys were conducted over 23 transects (totalling ~108km) which were surveyed twice per month by boat (Table 1; Figure 2). 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”. As per EM&A protocols, the boat travels at a speed of 7-8 knots (13-15 km/hr), except during some periods when tide and current flow exceeds 7 knots and thus the vessel travels at the same speed as the current. 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 Logger² and is not part of the observer team. This is not ideal 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.

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

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).

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 size³. 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	815456	113.87029	22.2777	12	815542	824882	113.97565	22.3630
1	804671	831404	113.86998	22.4217	13	816506	819480	113.98507	22.3142
2	805475	815913	113.87808	22.2818	13	816506	824859	113.98501	22.3628
2	805477	826654	113.87790	22.3788	14	817537	820220	113.99507	22.3209
3	806464	819435	113.88762	22.3136	14	817537	824613	113.99502	22.3606
3	806464	822911	113.88755	22.3450	15	818568	820735	114.00507	22.3256
4	807518	819771	113.89783	22.3167	15	818568	824433	114.00503	22.3589
4	807518	829230	113.89766	22.4021	16	819532	821420	114.01442	22.3317
5	808504	820220	113.90740	22.3208	16	819532	824209	114.01439	22.3569
5	808504	828602	113.90725	22.3965	17	820451	822125	114.02333	22.3381
6	809490	820466	113.91697	22.3230	17	820451	823671	114.02332	22.3521
6	809490	825352	113.91688	22.3671	18	821504	822371	114.03356	22.3404
7	810499	820880	113.92675	22.3268	18	821504	823761	114.03354	22.3529
7	810499	824613	113.92669	22.3605	19	822513	823268	114.04334	22.3485
8	811508	821123	113.93654	22.3290	19	822513	824321	114.04333	22.3580
8	811508	824254	113.93649	22.3572	20	823477	823402	114.05270	22.3497
9	812516	821303	113.94632	22.3306	20	823477	824613	114.05269	22.3606
9	812516	824254	113.94628	22.3573	21	805476	827081	113.87788	22.3827
10	813525	820827	113.95611	22.3263	21	805476	830562	113.87781	22.4141
10	813525	824657	113.95607	22.3609	22	806464	824033	113.88752	22.3552
11	814556	818853	113.96616	22.3049	22	806464	829598	113.88742	22.4054
11	814556	820992	113.96613	22.3278	23	814559	821739	113.96614	22.3346
12	815542	818807	113.97573	22.3081	23	814559	824768	113.96610	22.3619

The total transect length for NEL and NWL combined is 108km (approved 19-08-2015)

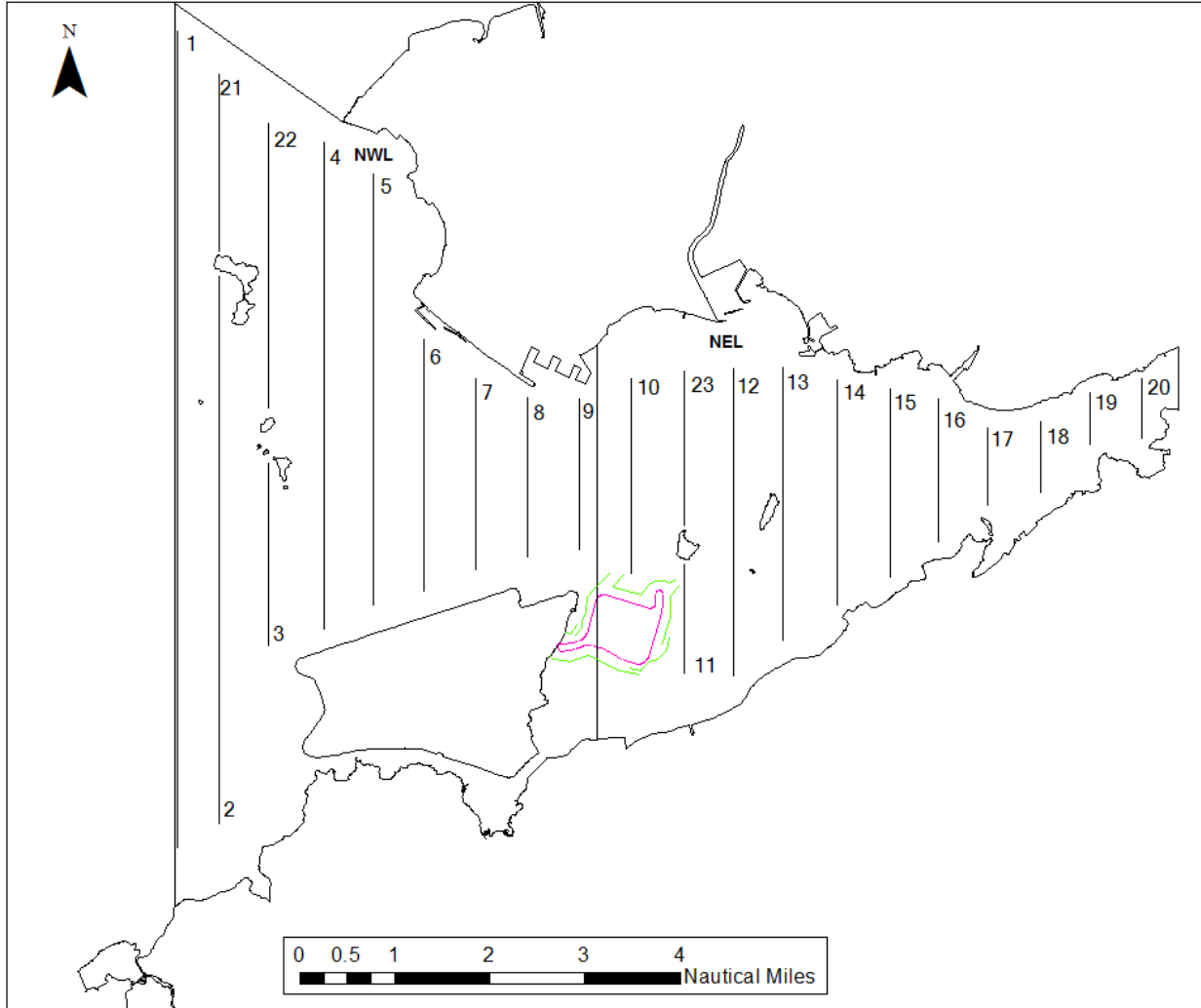


Figure 2 Location of Transect Lines for Impact Monitoring during HKBCF (modification approved 19-08-2015)

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© 10.3.

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

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 2.0⁴. 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 Auttala 2010; de Faria Oshima and de Oliveira Santos, 2016.). AFCD Annual Reports use a minimum of 15 resightings for kernel analyses (AFCD 2012). For the purposes of reporting on this project, 15 or more independent resightings per individual will be used to map utilisation densities using the fixed kernel method. At the time of this report, only 12 independent resightings have been recorded for one dolphin since impact monitoring began. Home range analysis shall be conducted once 15 resightings have been recorded so that results can be compared directly to the AFCD Annual Reports.

3. RESULTS AND DISCUSSIONS

3.1. Summary of survey effort and dolphin sightings

From December 2015 – February 2016, 12 vessel surveys were conducted in NEL and NWL survey areas (Annex I). A total of 651.7km of “on-effort” transect lines were conducted, 98.6% of which were under favorable conditions (Beaufort 3 or better) (Annex II). Only those periods of “on-effort” survey conducted under favourable conditions were included in quantitative analyses. During December 2015 – February 2016, seven groups of dolphins, numbering 23 (min 23: max 23⁵) individuals, were recorded. Of these, five groups were “on-effort” and the remaining two “opportunistic” (Annex III).

Of the seven sightings, all groups 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. The baseline surveys were conducted outside the winter period, however, single surveys were conducted for an advanced monitoring period during Dec 2011- Jan 2012. Although this monitoring only comprised two surveys over two months, it is still useful to add them to this comparison so that a temporal perspective from a time prior to the onset of the HZMB project might be gained. During December 2011 – Jan 2012, six and three groups were recorded in NWL and NEL, respectively. For period December 2012- February 2013, a total of 50 groups were sighted, 38 of which were located in NWL and 12 in NEL. For period December 2013- February 2014, a total of 26 groups were sighted, 25 of which were located in NWL and 1 in NEL. For period December 2014- February 2015, a total of 15 groups were sighted, all of which were located in NWL. There are differences between the number of sightings made during baseline compared to winter 2012-13, 2013-14, 2014-15 and 2015-16. For both NEL and NWL, the number of groups during baseline was **less** than that recorded during winter 2012-13, but more than that recorded during the following winters of 2013-14, 2014-14 and 2015-16⁶ (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 In ArcGIS versions 9.2 and later, kernel range density calculation tools are integrated in the toolbox section and a separate extension is no longer required

⁵ During sightings a minimum, maximum and best estimate of group size is noted; the range stated represents the minimum and maximum numbers estimated)

⁶ As the advanced surveys were less frequent than subsequent monitoring, absolute numbers of groups are not compared directly but are incorporated into later encounter rate calculations

Table 2. A Comparison of Total Sightings Recorded in NEL and NWL Areas During Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013, Dec 2013 - Feb 14, Dec 2014 - Feb 15 and Dec 2015 – Feb 2016

Monitoring Period	Total Dolphin Sighting in NWL	Total Dolphin Sighting in NEL
	Number of Groups	Number of Groups
Dec 2011 – Jan 2012* (Advanced Monitoring)	6	3
Sep – Nov 2011 (Baseline Monitoring)	34	10
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	38	12
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	25	1
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	15	0
Dec 2015 – Feb 2016 (HKBCF Sixteenth Quarter)	7	0

* Survey conducted once per month

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 the five periods baseline, winter 2012-13, winter 2013-14, winter 2014-15 and winter 2015-16 were compared. From baseline to the following four winter periods⁷, there is a decrease in absolute numbers of on effort sightings recorded (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; Dec 2011 – Jan 2012; Dec 2012- Feb 2013, Dec 2013 – Feb 2014, Dec 2014 – Feb 2015 and Dec 2015 – Feb 2016.

Monitoring Period	Groups of Dolphin sighted in NEL and NWL
Dec 2011 – Jan 2012* (Advanced Monitoring)	9
Sep – Nov 2011 (Baseline Monitoring)	44
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	34
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	21
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	9
Dec 2015 – Feb 2016 (HKBCF Twelfth Quarter)	5

* Survey conducted once per month

3.2. Distribution

During the baseline survey, ~77% of all on effort sightings were made in NWL. During the winter periods 2011-12, 2012-13, 2013-14 and 2014-15, 67%, 85%, 95% and 100% of all sightings were made in NWL, respectively. In this period, Dec 2015- Feb 2016, all sightings were made in NWL; during the winter periods since 2011-12, dolphin sightings

⁷ Please note this does not incorporate any seasonal trend in between the winter periods

have occurred less frequently in the NEL habitat and indeed, since January 2014, no on effort encounters with dolphins have been noted in NEL. Again, there is no correction for effort in these observations (Table 4). The sightings, cluster around two locations, the northern section of NWL and are either within or adjacent to the Sha Chau Lung Kwu Chau Marine Park (SCLKCMP) and adjacent to Tai O in south NWL (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. Tai O has always been frequently used by dolphins.

Table 4. A Comparison of “On Effort” Sightings Recorded in NEL and NWL During Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013, Dec 2013 – Feb 2014, Dec 2014 – Feb 2015 and Dec 2015 – Feb 2016.

Monitoring Period	No. of Dolphin Groups sighted in NWL	No. of Dolphin Groups sighted in NEL
Dec 2011 – Jan 2012* (Advanced Monitoring)	6	3
Sep – Nov 2011 (Baseline Monitoring)	34	10
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	29	5
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	20	1
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	9	0
Dec 2015 – Feb 2016 (HKBCF Sixteenth Quarter)	5	0

* Survey conducted once per month

3.3. Encounter rate

As some of the survey periods have different transect lengths, variation in sightings occurrence was quantified by correcting for effort (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 545.6km⁸ of survey effort was conducted under favourable conditions in the NEL and NWL survey areas. In NEL, a decrease in encounter rates has been documented since before construction activities started at HKBCF and this has been attributed, largely, to the fast ferries which traverse this area (Marcotte *et al* 2015). In NEL, there was a slight increase in encounter rates between the winter periods 2011-12 (advanced monitoring) and 2012-13 (first year of construction), but a decrease is apparent in winters 2013-14, 2014-15 and 2015-16 to rates far lower than the advanced monitoring period. In NWL, there is a similar pattern, an increase in encounter rate between advanced monitoring and the following winter period in 2012-13 (the first year of construction) and thereafter, a continuing decline in to date. The baseline monitoring encounter rate is the highest calculated for both areas but it is noted this is from a different season compared to this quarter (Table 5).

⁸ Updated data set provided April 2013

Table 5. A Comparison of Encounter Rates* in NEL and NWL Areas During Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013, Dec 2013 – Feb 2014, Dec 2014 – Feb 2015 and Dec 2015 – Feb 2016.

Monitoring Period	Encounter Rate NEL	Encounter Rate NWL
Dec 2011 – Jan 2012* (Advanced Monitoring)	4.6	6.1
Sep – Nov 2011 (Baseline Monitoring)	5.4	9.5
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	2.3	6.6
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	0.5	4.8
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	0	2.1
Dec 2015 – Feb 2016 (HKBCF Sixteenth Quarter)	0	1.2

* Survey conducted once per month

The AFCD Annual Reports describe variation in spatial distribution between areas and between seasons in both NEL and NWL. For years prior to the HZMB construction, it is 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 winter period during the first year of construction (December 2012- February 2013) is within the annual limits recorded for this area previously, however, for the subsequent three winters (December 2013-February 2014, December 2014-February 2015 and December 2015- February 2016), the encounter rate falls below the lowest previously recorded annual encounter rate in AFCD records. For NEL, the encounter rate in December 2012- February 2013 is at the lower end of that recorded previously for NEL and the following three winters (December 2013-February 2014, December 2014-February 2015 and December 2015- February 2016), are below the annual norms for the area. 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; 2015). 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, and other adjacent areas. It is likely that all activities contribute to the ongoing decline in dolphin numbers from Hong Kong areas NEL and NWL.

3.4. Group size

During Dec 2015-Feb 2016, group size of all sightings varied from 1 to 8 individuals with an average of 3.3. in NWL and 0 in NEL. For baseline monitoring, the NWL average group size was 4.5 and the NEL average group size was 3.5. For the winter periods 2011-12, 2012-13, 2013-14 and 2014-15, the NWL average group sizes were 2, 3.6, 4.2 and 2.8, respectively, and in NEL, for the same periods, it was 4.3, 2.8, 1 and 0, respectively (Table 6). The group size in NEL over the winter period since 2011 shows a steady decrease. The group size in NWL for the same seasons is variable with the group size calculated for this quarter more than that of advanced monitoring (winter 2011-12) and December 2014-February 2015. A map depicting group size distribution shows that only two groups seen had five or more individuals (Fig. 7).

Table 6. A Comparison of Sightings Group Size Averages Recorded in Sep – Nov 2011; Dec 2011–Jan 2012; Dec 2012-Feb 2013, Dec 2013–Feb 2014, Dec 2014-Feb 2015 and Dec 2015-Feb 2016.

Monitoring Period	Average Group Size (NWL)	Average Group Size (NEL)
Dec 2011 – Jan 2012* (Advanced Monitoring)	2	4.3
Sep – Nov 2011 (Baseline Monitoring)	4.5	3.5
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	3.6	2.8
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	4.2	1
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	2.8	0
Dec 2015 – Feb 2016 (HKBCF Sixteenth Quarter)	3.3	0

3.5. Habitat use

Quantitative grid analyses indicates areas of high to moderate use within and adjacent to the SCLKCMP (Figs. 8; 9). When compared to previous winter periods, a shift in area and diminished frequency of use is noted, from NEL to the northern area of NWL (Fig. 10).

3.6. Mother-calf pairs

No mother and calf pairs were sighted in this quarter.

3.7. Activities

Of the seven groups sighted (using all sightings), one (14.2%) was engaged in feeding activities; three (42.9%) were travelling; two (28.6%) were feeding/travelling/surface active/milling; and one group was associated with an active gillnet fishing (14.2%). Travelling was the dominant activity during daylight hours in Dec 2015 – Feb 2016 (Fig. 11). With so few encounters, any habitat patterns of behavior are not apparent (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. All dolphins including those sighted only in the baseline are included. 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. One new dolphin has been identified in the last quarter and the catalogue now stands at 119 individuals. This dolphin (HZMB 130) had been seen previously but adequate dorsal fin shots were only captured in February 2016. This dolphin has a distinctive scar on the lower peduncle which can only be seen on some occasions. The HZMB catalogue has identified 14 dolphins that were seen in both baseline and impact monitoring period. Two further dolphins have been identified during impact monitoring which have been matched to the AFCD photo ID data held on the AFCD website⁹.

⁹[www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi_chi/files/Photoid Booklet.pdf](http://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Photoid%20Booklet.pdf)

There are 15 dolphins which have been sighted on six days or more during impact monitoring, nine (9) of which are known from the AFCD catalogue (HZMB 001 [WL46]; HZMB 002 [WL111]; HZMB 011 [EL01]; HZMB 041 [NL24]; HZMB 044 [NL98]; HZMB 51 [NL213]; HZMB 054 [CH34]; HZMB 083 [NL136]; HZMB 098 [NL104]) (Table 7). The highest number of re-sightings recorded during impact monitoring surveys is 12 (HZMB 002 and HZMB 054), excluding multiple sightings made on the same day (Annex IV).

Table 7. Dolphins Frequently Recorded During Impact Monitoring Surveys.

HZMB ID	AFCD ID	SEEN IN BASELINE	No. DAYS SIGHTED IMPACT MONITORING
HZMB 002	WL111	Y	12
HZMB 054	CH34	Y	12
HZMB 044	NL98	Y	11
HZMB 023	unknown	*	10
HZMB 051	NL213	N	9
HZMB 098	NL104	Y	8
HZMB 041	NL24	Y	7
HZMB 005	unknown	*	7
HZMB 083	NL136	Y	7
HZMB 011	EL01	Y	6
HZMB 001	WL46	N	6
HZMB 040	unknown	*	6
HZMB 064	unknown	*	6
HZMB 074	unknown	*	6
HZMB 094	unknown	*	6

* cannot be determined

4. CONCLUSION

The data from December 2015 – February 2016 shows some consistencies with the baseline data (conducted during a different season) and with the same periods in 2012-13, 2013-14 and 2014-15. Habitat use and behavioural trends all fall within those reported in AFCD Long Term Monitoring reports although as sightings numbers decrease, such patterns are difficult to compare. The quarterly encounter rates for both NEL and NWL is lower than that reported for **annual** rates published previously and the seasonal trend for these two areas is of a declining encounter rate. Density distribution maps depict key areas of higher use within NWL, in particular, SCLKMP. Areas to the south of SCLKCMP and Tai O have seen diminished use since 2013 and this trend continues to date. In general, the encounter rate, habitat use and group size information suggests that in winter 2015-16, fewer dolphins are using the NWL area. It has been some time since any dolphin was sighted in NEL during impact monitoring. These observations are only for winter 2015-16, however, these trends have been apparent throughout the last three quarter periods.

The decreases in encounter rates in both NEL and NWL are noted. HKBCF monthly reporting notes that the conditions of EM&A Manuel have been consistently upheld and that all measures stipulated to minimise disturbance to dolphins remain in place. Although it is likely that ongoing HKBCF activities are having an effect on dolphin encounter rates in NEL, it is also noted that other HZMB projects are ongoing in both NEL and NWL (and south of NWL into adjacent WL waters). In addition, extensive marine works which are not part of HKBCF have been ongoing in NEL and also in parts

of NWL throughout this current quarter period and new projects have been initiated along the airport platform area. Some collaboration with cross border authorities has been initiated, with regards to sharing photo ID catalogues, and at recent meetings held between all environmental teams for HZMB, it was noted that some of the dolphins previously recorded in Hong Kong waters but which have been absent in 2015, have been recorded, at least occasionally, in adjacent waters. An additional study initiated by ENPO and conducted in the Southwest Lantau (reported separately by others on the ENPO website) details further individual dolphin movement in Hong Kong waters.

At this stage, the intensity of in water marine works associated with the HKBCF is decreasing, however, the drivers behind the population decline stated in the AFCD long term monitoring programme for Hong Kong waters and independent studies for adjacent Pearl River Estuary (PRE) waters (Huang *et al* 2012) remain uncertain. Recent work indicates that habitat abandonment of NEL waters prior to HKBCF initiation was partially driven by the increase in high speed ferry traffic (Marcotte *et al* 2015) and that toxin burden may have a greater impact than initially predicted (Gui *et al.* 2014). Therefore, the HZMB Project was initiated at a time when there was already a widespread and long term reduction in the number of dolphins within what is believed to be their entire range of the PRE. The strict mitigation initiatives at HKBCF aim to minimize the localised impact of HKBCF construction, however, this in itself will not be sufficient to ameliorate the myriad of other impacts throughout the dolphins habitat.

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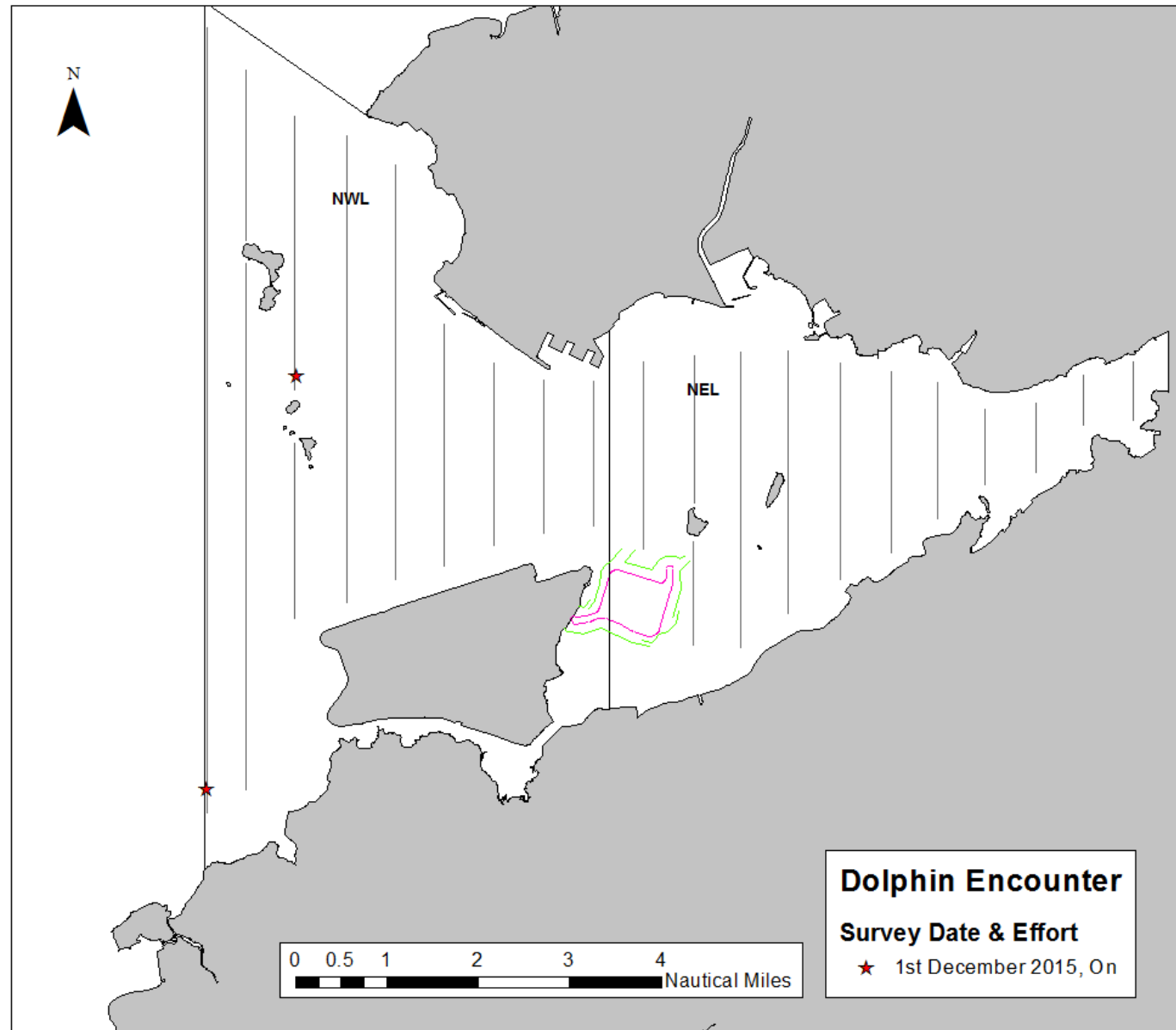


Figure 3 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (December 2015)

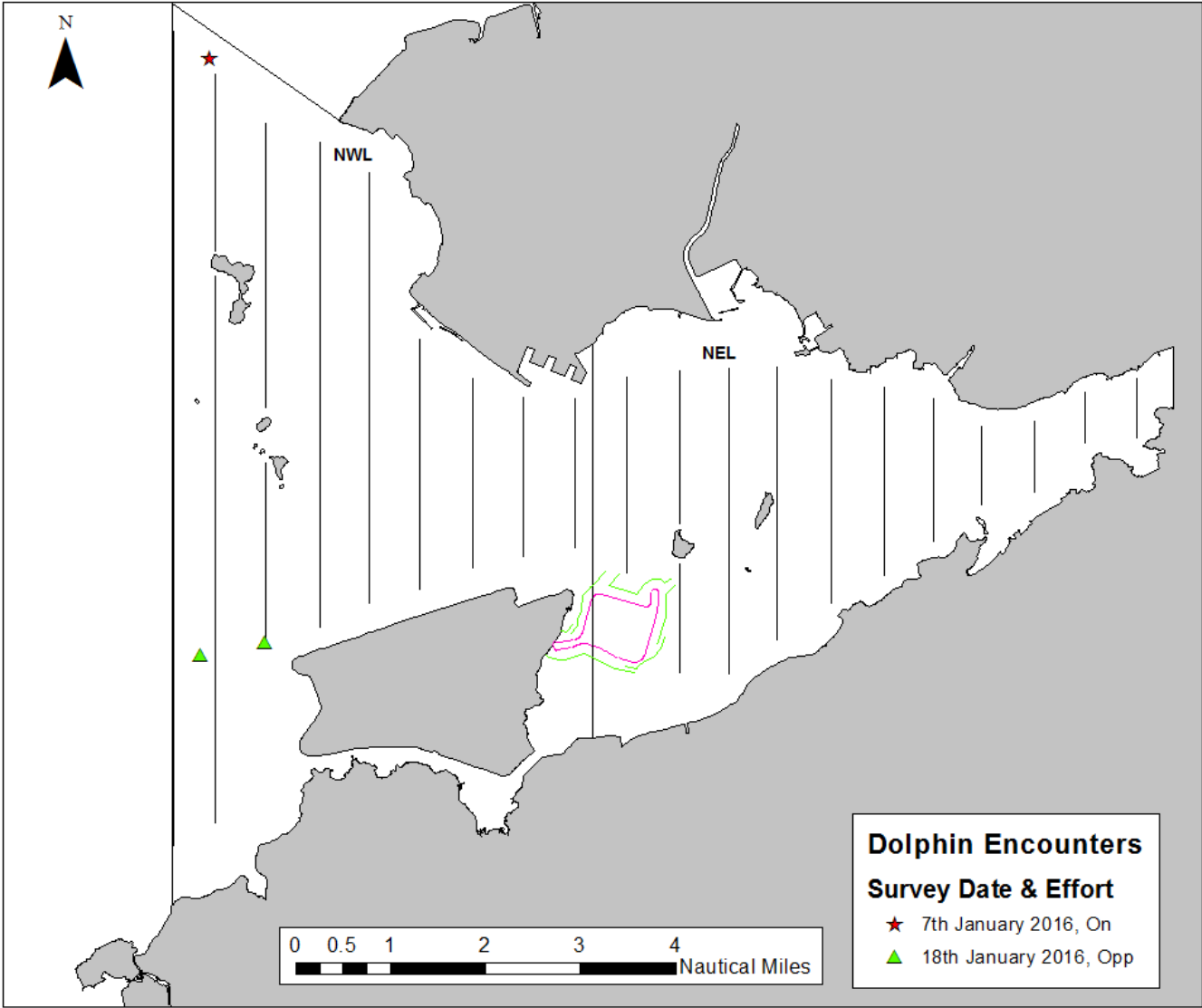


Figure 4 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (January 2016)

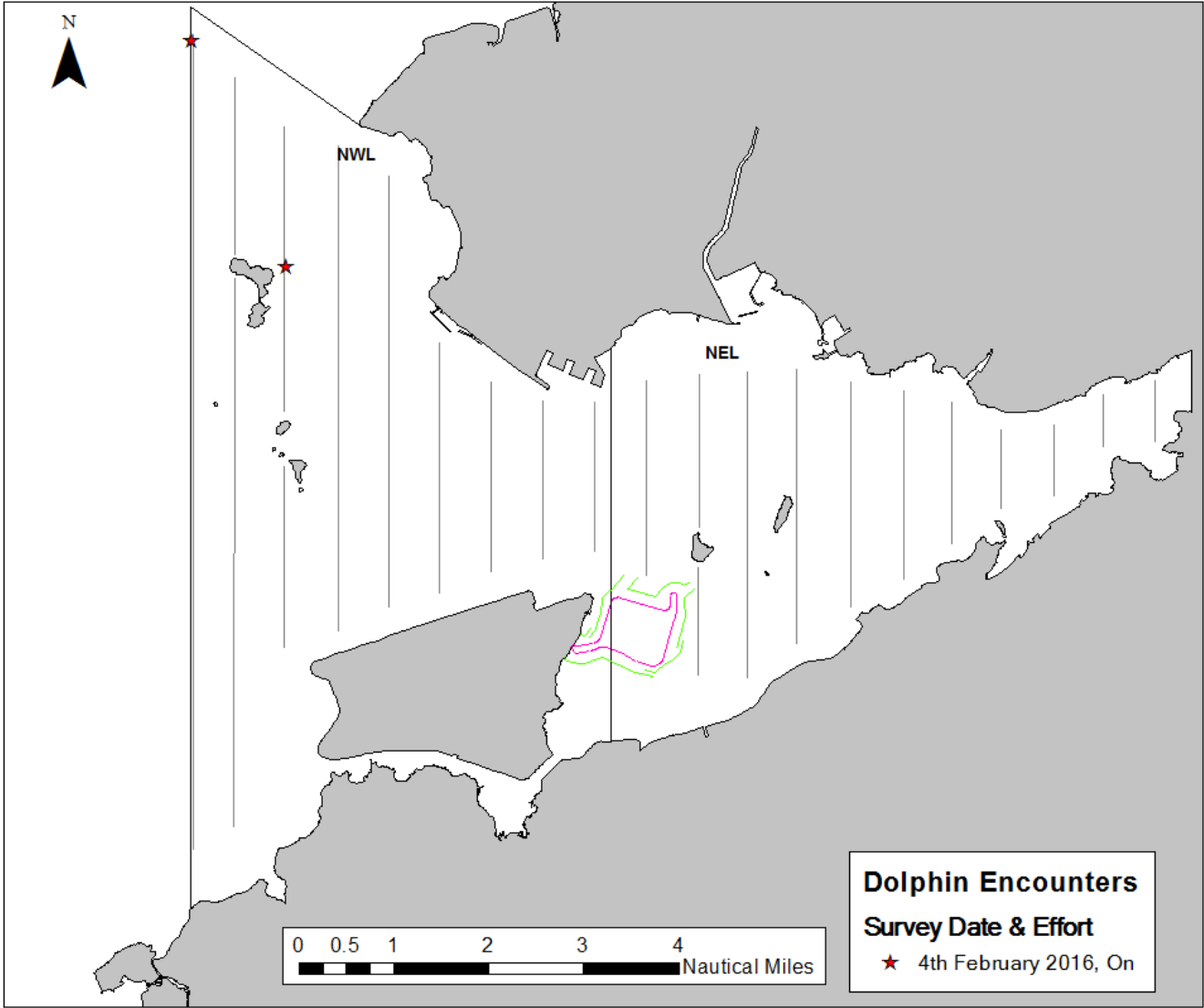


Figure 5 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (February 2016)

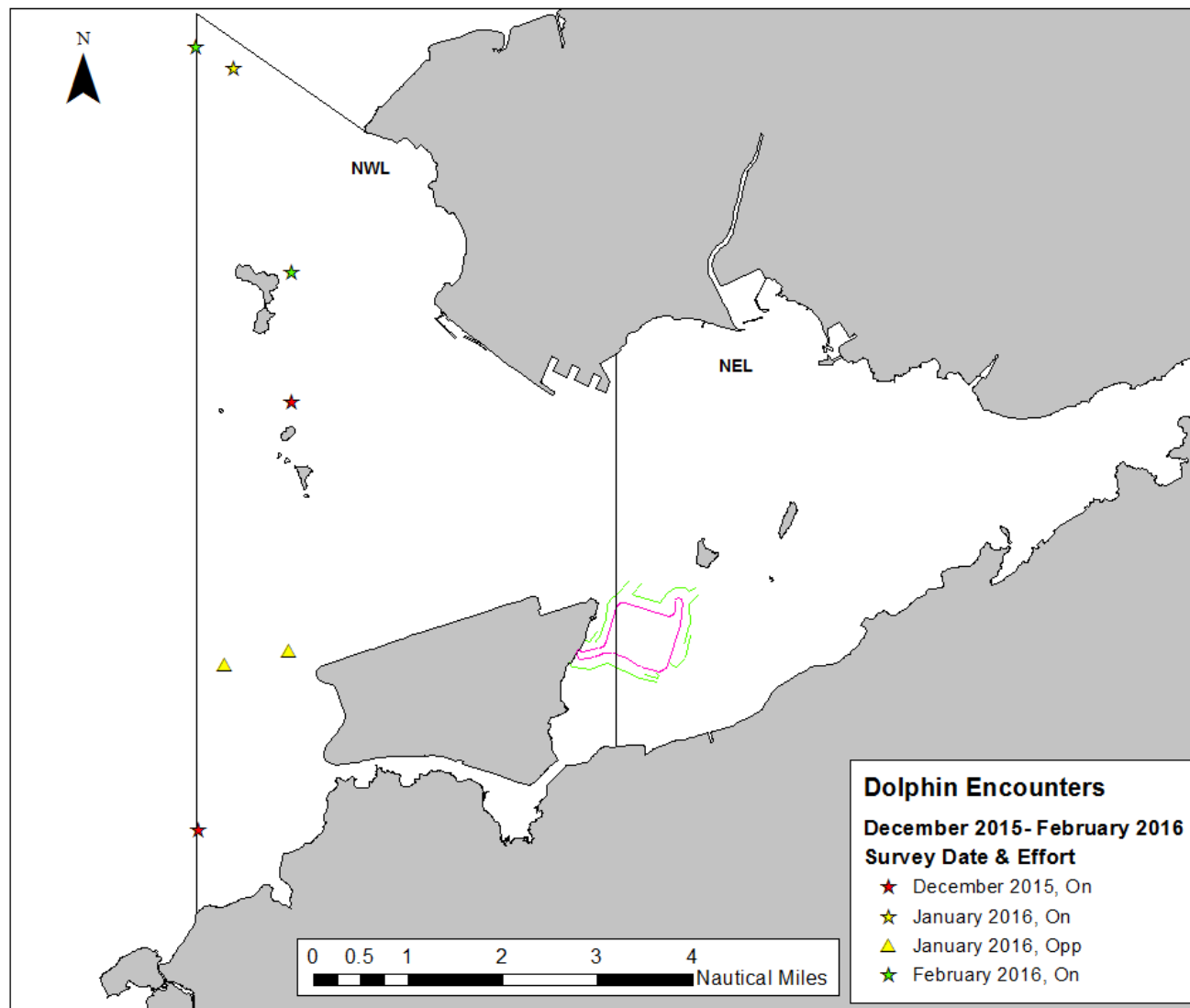


Figure 6. Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (December 2015 – February 2016)

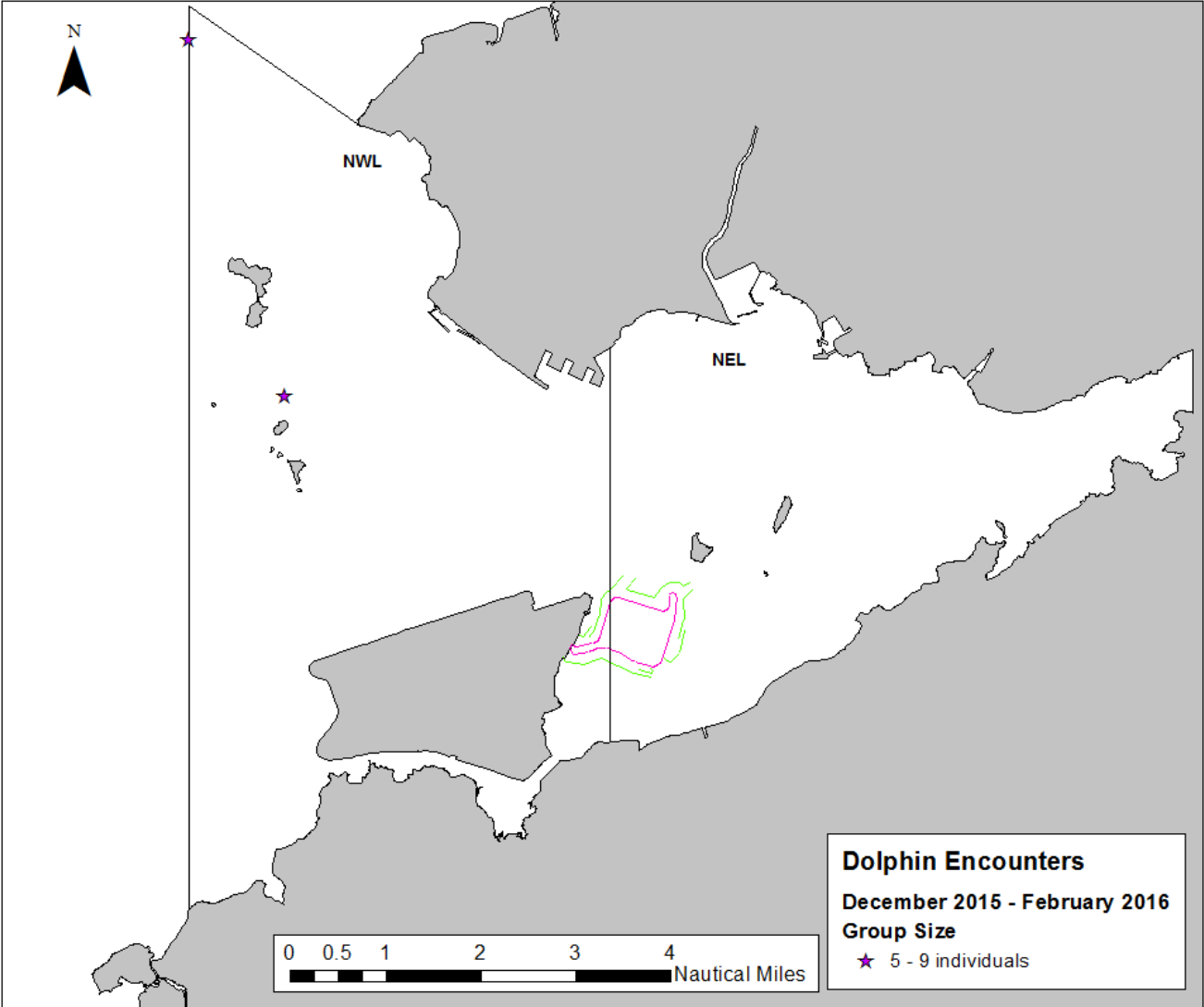


Figure 7. The Location of Dolphin Groups Numbering 5 and Above Individuals (December 2015 – February 2016)

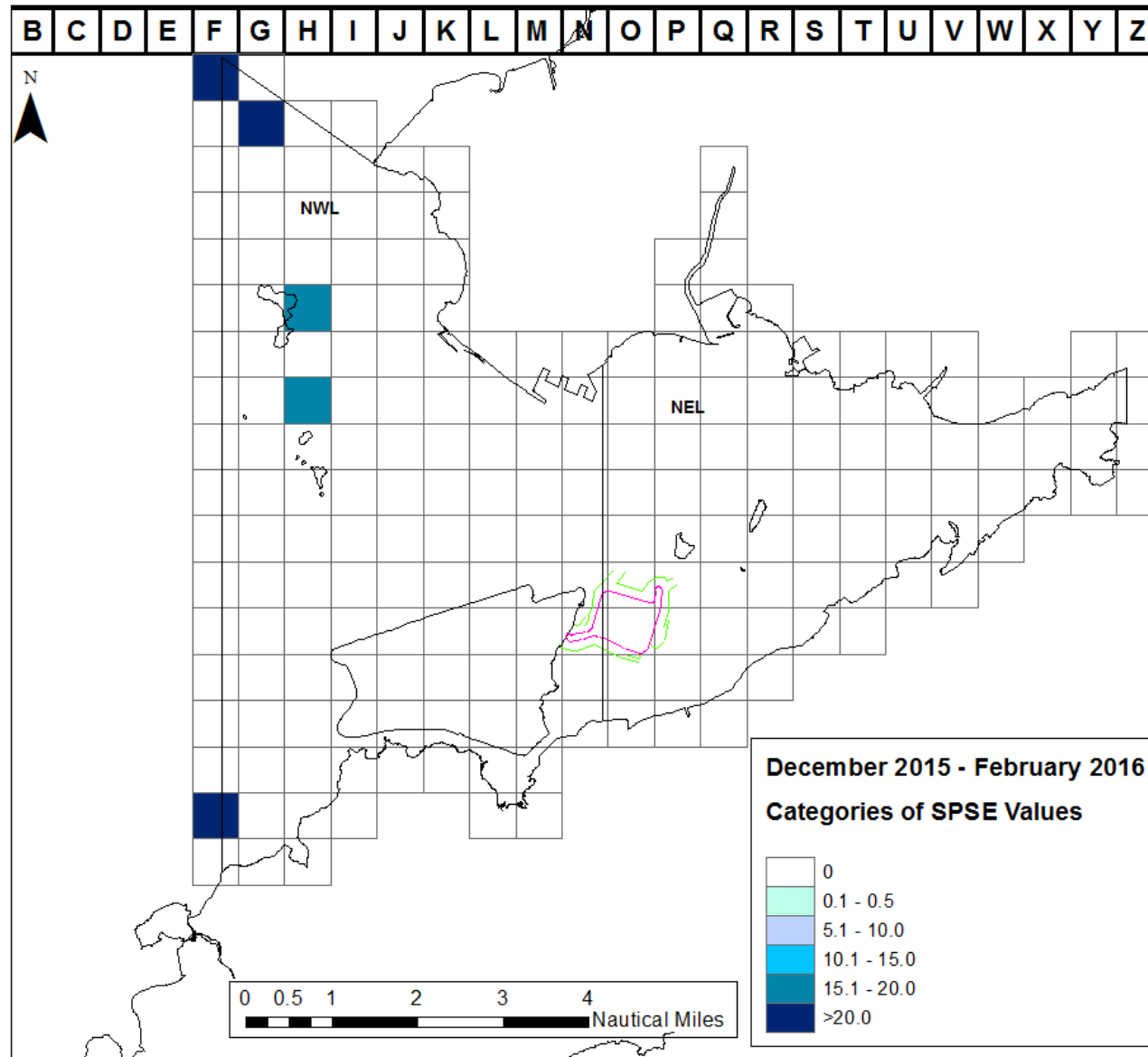


Figure 8. Sighting density SPSE (number of on-effort sightings per 100 units of survey effort) for December 2015 – February 2016

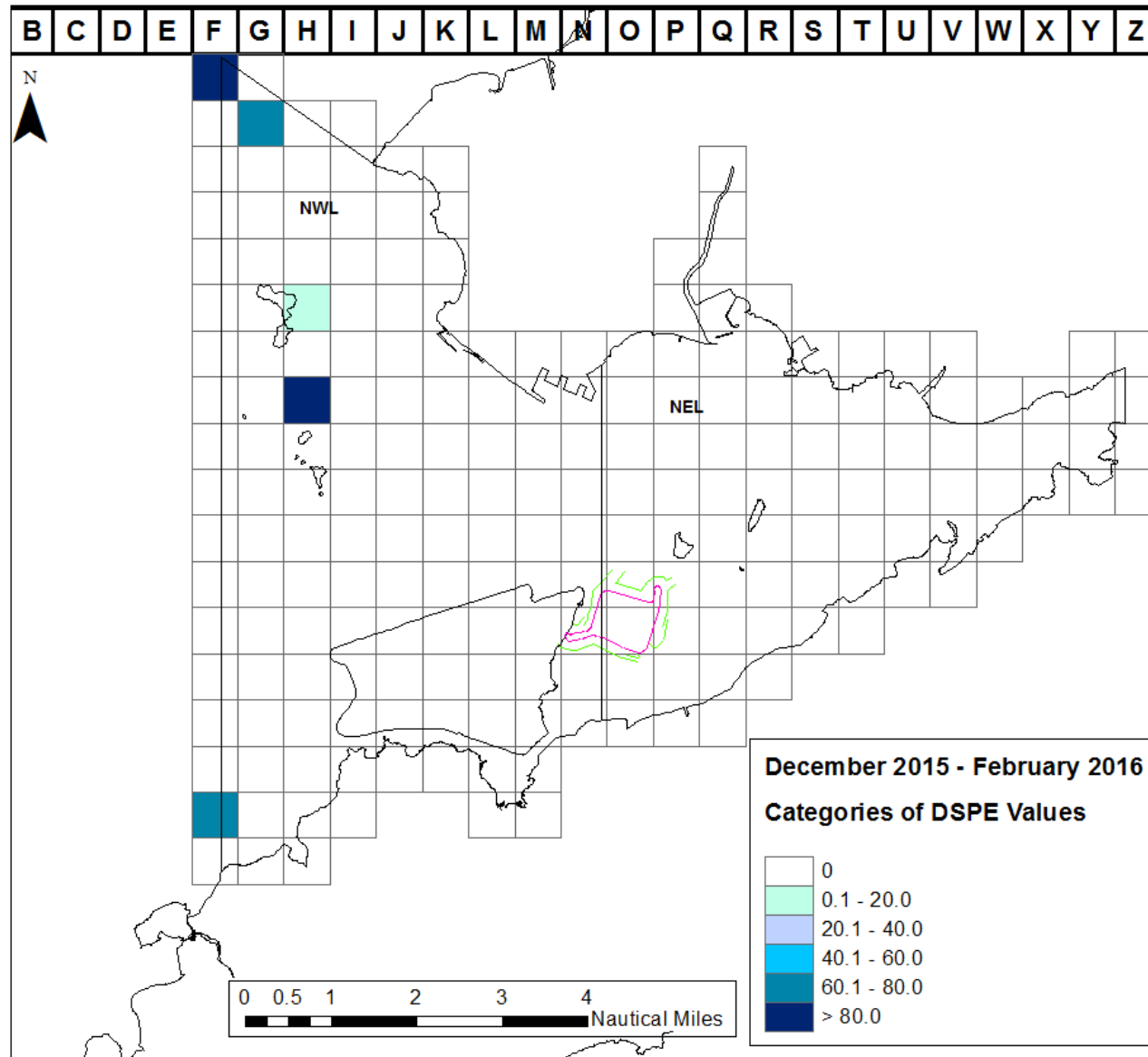


Figure 9. Dolphin density DPSE (number of dolphins per 100 units of survey effort) for December 2015 – February 2016.

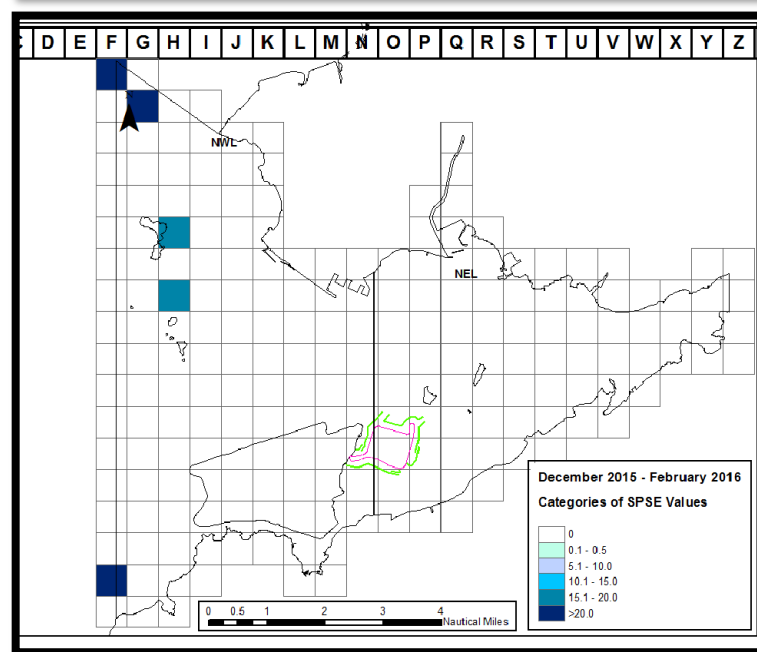
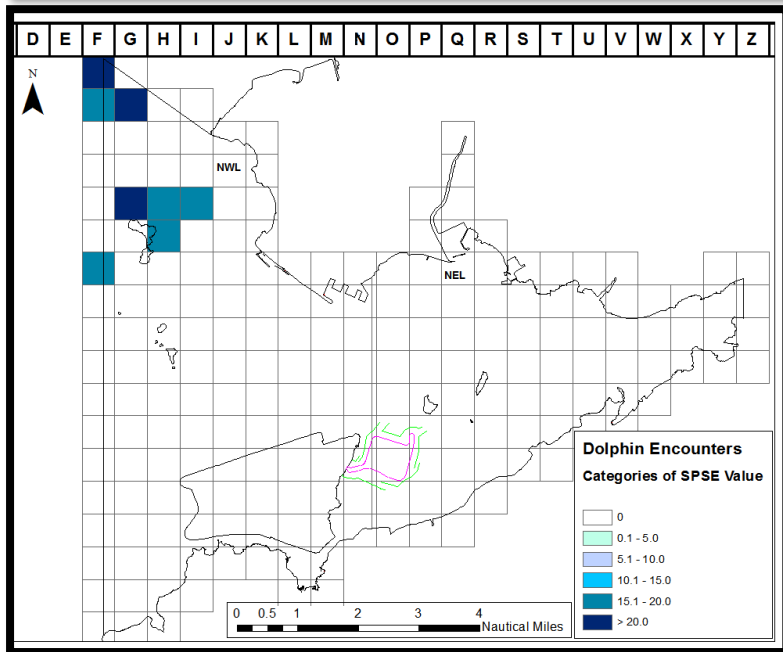
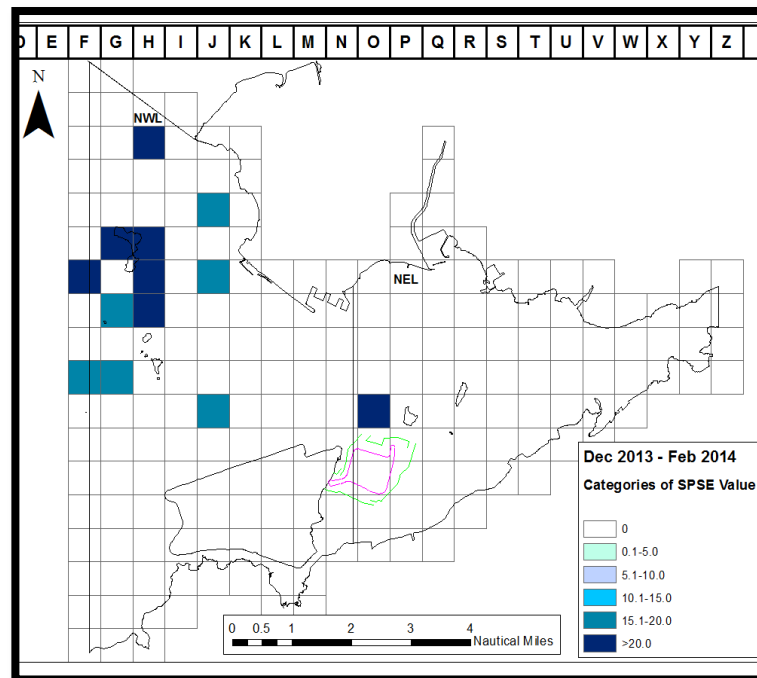
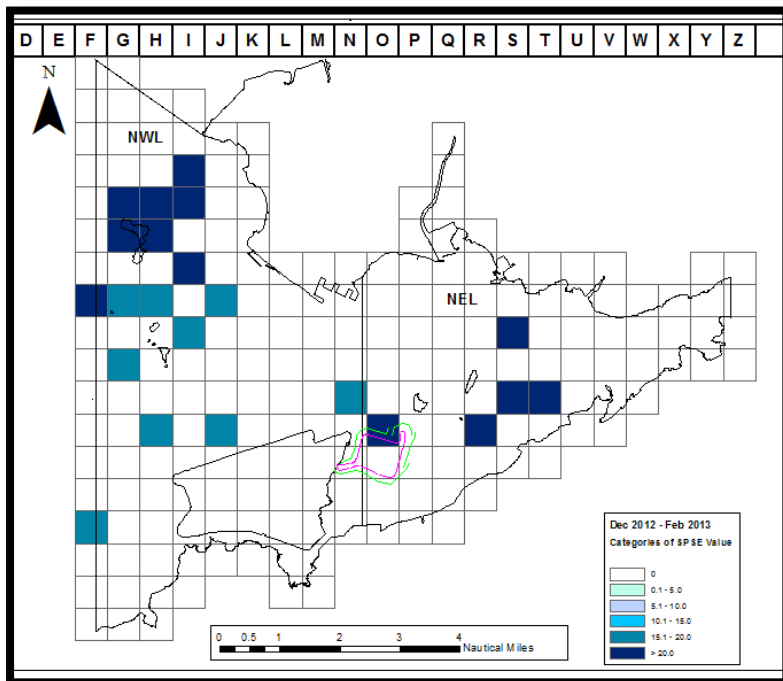


Figure 10. Changes in dolphin density SPSE for winter periods 2012-13 to 2015-16 highlighting shift to the northwest in habitat use.

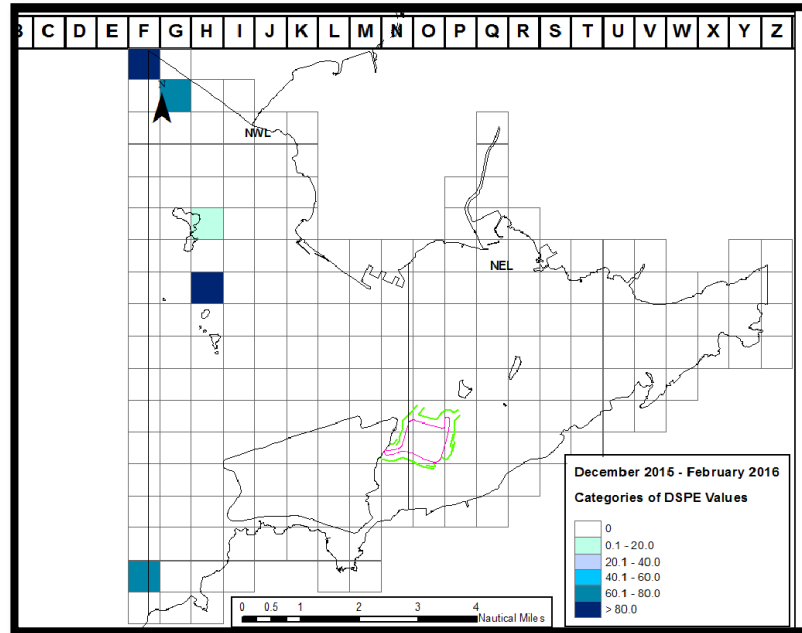
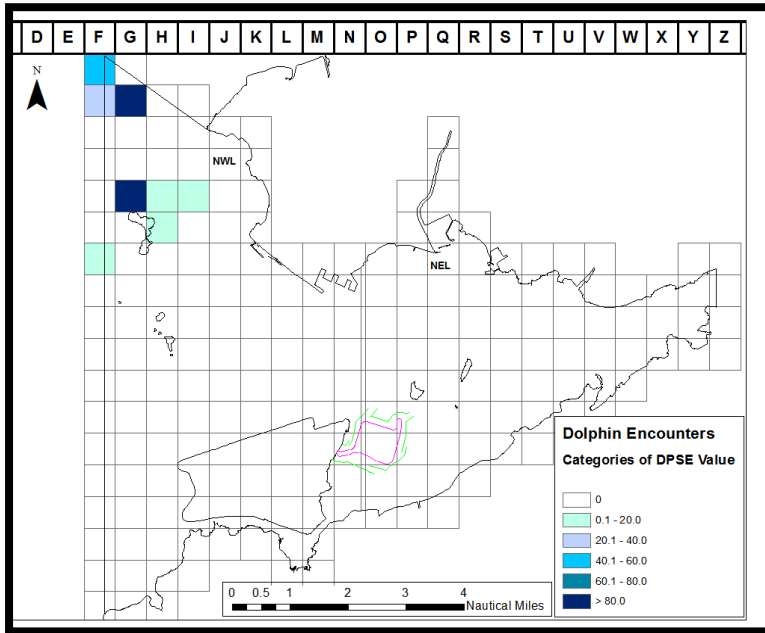
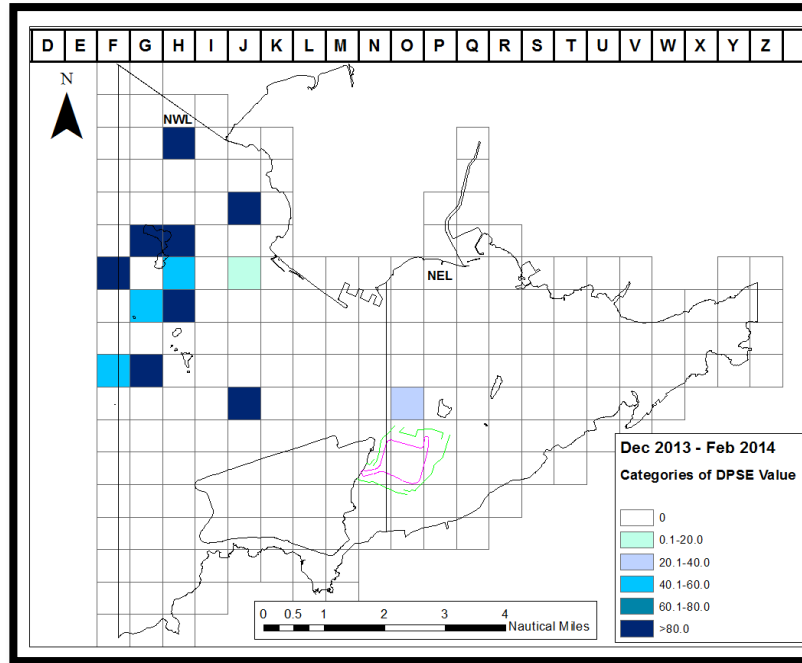
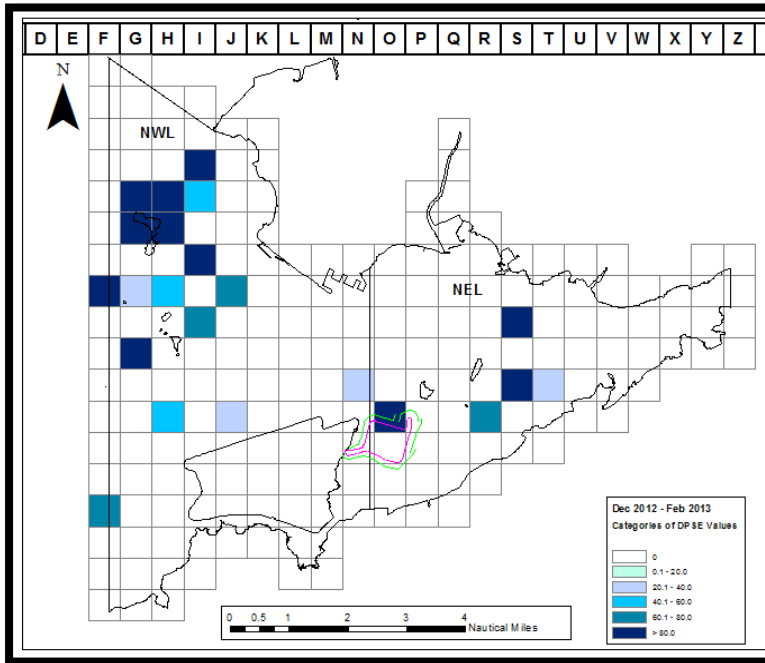


Figure 10 (con). Changes in dolphin density DPSE for winter periods 2012-13 to 2015-16 highlighting shift to the northwest in habitat use.

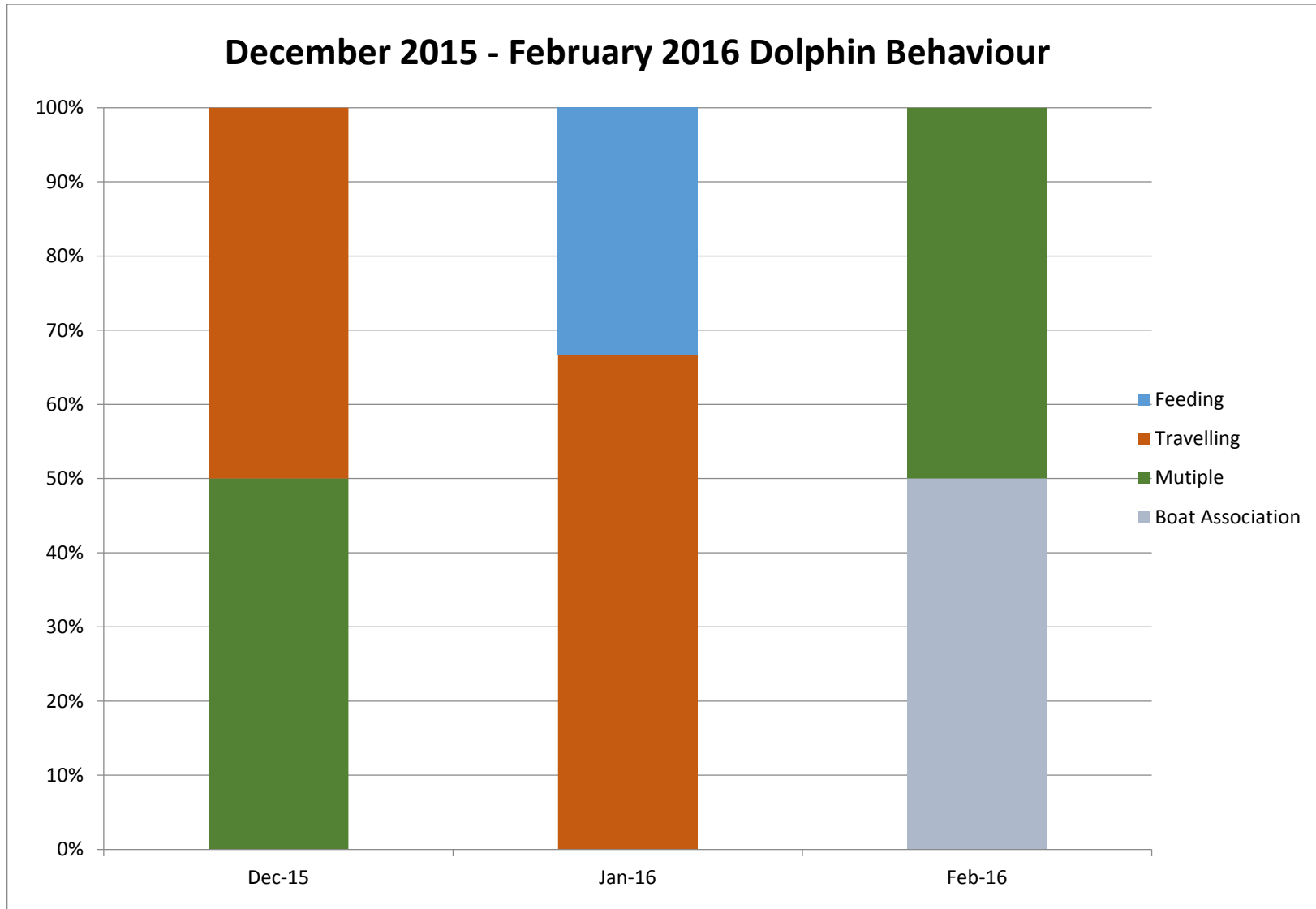


Figure 11. Activity Budget for Dolphin Behaviour December 2015 – February 2016.

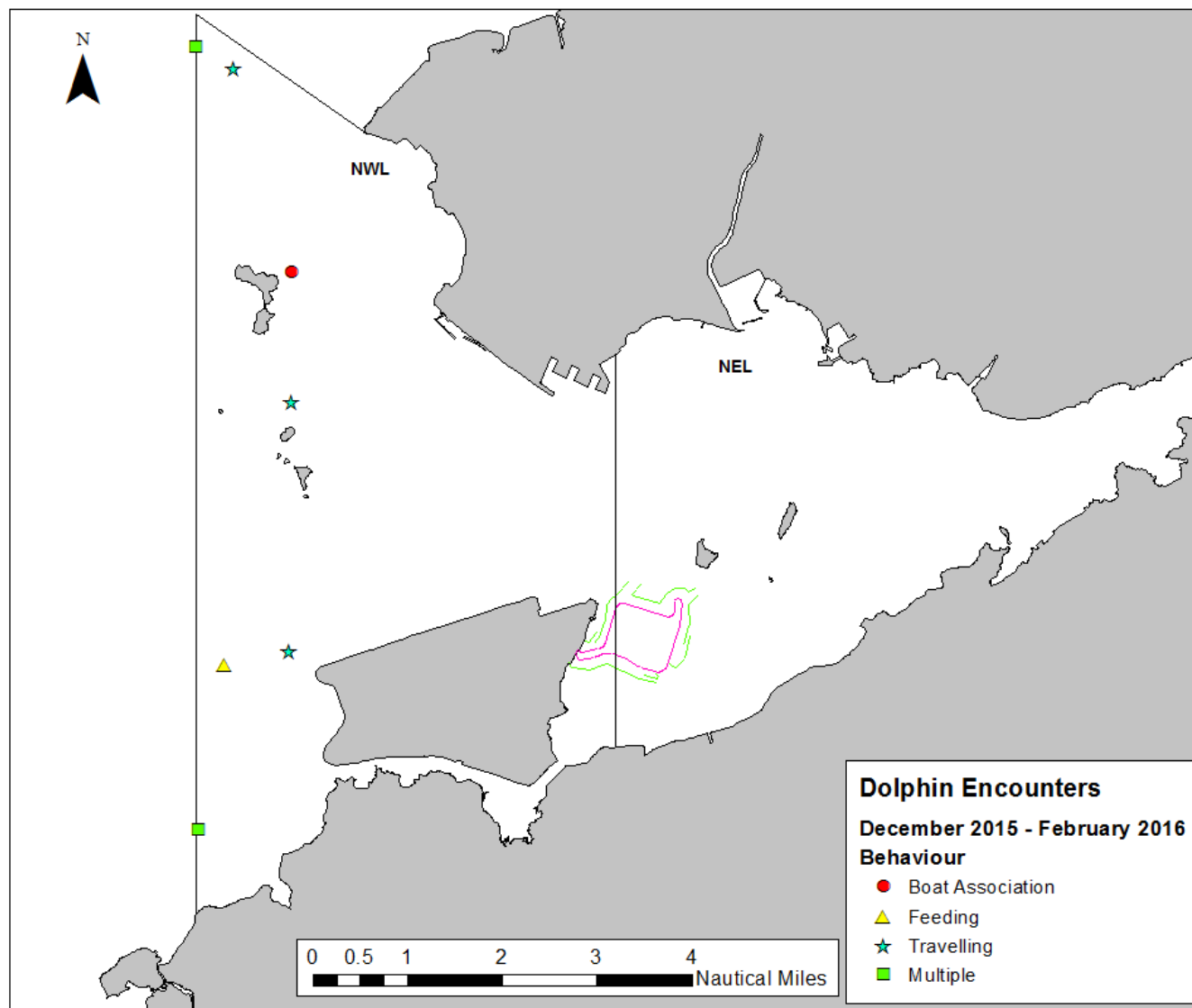


Figure 12. The Location of Different Behavioural Activities December 2015 – February 2016

Annex I. Impact Monitoring Survey Schedule and Details (December 2015 – February 2016)

Date	Location of Survey	No. Sightings ON	No. Sightings Opp	Total km ON EFFORT (favourable conditions)
12/01/2015	NWL (1-7, 21, 22)	2	0	66.3
12/02/2015	NE and NW Lantau (7-20,23)	0	0	42.7
12/07/2015	NE and NW Lantau (5-20,23)	0	0	59.6
12/08/2015	NWL (1-4, 21, 22)	0	0	48.9
01/07/2016	NWL (1-6, 21, 22)	1	0	62.1
01/08/2016	NE and NW Lantau (7-20,23)	0	0	46.5
01/18/2016	NWL (1-5, 21, 22)	0	2	57.2
01/19/2016	NE and NW Lantau (6-20,23)	0	0	51.8
02/04/2016	NWL (1-6, 21, 22)	2	0	62.1
02/05/2016	NE and NW Lantau (7-20,23)	0	0	36.9
02/18/2016	NWL (1-6, 21, 22)	0	0	62.5
02/19/2016	NE and NW Lantau (7-20,23)	0	0	45.8

Annex II. Impact Monitoring Survey Effort Summary (December 2015 – February 2016)

Date	Area	State (on effort)	Effort (km)	Season	Vessel	Type
12/01/2015	NWL	1	27.6	WINTER	HKDW	IMPACT
12/01/2015	NWL	2	27.8	WINTER	HKDW	IMPACT
12/01/2015	NWL	3	10.9	WINTER	HKDW	IMPACT
12/02/2015	NWL	1	3.4	WINTER	HKDW	IMPACT
12/02/2015	NWL	2	2.8	WINTER	HKDW	IMPACT
12/02/2015	NEL	1	31.6	WINTER	HKDW	IMPACT
12/02/2015	NEL	2	4.9	WINTER	HKDW	IMPACT
12/07/2015	NWL	1	3.1	WINTER	HKDW	IMPACT
12/07/2015	NWL	2	9.2	WINTER	HKDW	IMPACT
12/07/2015	NWL	3	10.7	WINTER	HKDW	IMPACT
12/07/2015	NEL	1	26.8	WINTER	HKDW	IMPACT
12/07/2015	NEL	2	9.8	WINTER	HKDW	IMPACT
12/08/2015	NWL	1	0.3	WINTER	HKDW	IMPACT
12/08/2015	NWL	2	40.3	WINTER	HKDW	IMPACT
12/08/2015	NWL	3	8.3	WINTER	HKDW	IMPACT
01/07/2016	NWL	1	24	WINTER	HKDW	IMPACT
01/07/2016	NWL	2	38.1	WINTER	HKDW	IMPACT
01/08/2016	NWL	1	10	WINTER	HKDW	IMPACT
01/08/2016	NEL	1	36.5	WINTER	HKDW	IMPACT
01/18/2016	NWL	1	13.2	WINTER	HKDW	IMPACT
01/18/2016	NWL	2	32.7	WINTER	HKDW	IMPACT
01/18/2016	NWL	3	11.3	WINTER	HKDW	IMPACT
01/19/2016	NWL	1	14.9	WINTER	HKDW	IMPACT
01/19/2016	NEL	1	36.9	WINTER	HKDW	IMPACT
02/04/2016	NWL	1	23.6	WINTER	HKDW	IMPACT
02/04/2016	NWL	2	28.4	WINTER	HKDW	IMPACT
02/04/2016	NWL	3	10.1	WINTER	HKDW	IMPACT
02/05/2016	NWL	3	3	WINTER	HKDW	IMPACT
02/05/2016	NWL	4	6.9	WINTER	HKDW	IMPACT
02/05/2016	NEL	1	4	WINTER	HKDW	IMPACT
02/05/2016	NEL	2	19.9	WINTER	HKDW	IMPACT
02/05/2016	NEL	3	10	WINTER	HKDW	IMPACT
02/05/2016	NEL	4	2.4	WINTER	HKDW	IMPACT
02/18/2016	NWL	1	62.5	WINTER	HKDW	IMPACT
02/19/2016	NWL	1	10	WINTER	HKDW	IMPACT
02/19/2016	NEL	1	35.8	WINTER	HKDW	IMPACT

Annex III. Impact Monitoring Sighting Database (December 2015 – February 2016)

Project	Contract	Date	Sighting No.	Time	Group Size	Area	Beaufort	PSD	Effort	Type	Latitude	Longitude	Season	Boat Association
HKBCF	HY/2010/02	01-Dec-15	1178	9:48:35 AM	3	NWL	1	17	On	Impact	22.28242	113.8703	Winter	No
HKBCF	HY/2010/02	01-Dec-15	1180	1:20:14 PM	8	NWL	2	0	On	Impact	22.35813	113.8879	Winter	No
HKBCF	HY/2010/02	7-Jan-16	1189	11:03:13 AM	2	NWL	2	102	On	Impact	22.41689	113.8768	Winter	No
HKBCF	HY/2010/02	18-Jan-16	1193	12:27:56 PM	2	NWL	1	N/A	Opp	Impact	22.31153	113.8754	Winter	No
HKBCF	HY/2010/02	18-Jan-16	1194	12:59:55 PM	2	NWL	1	N/A	Opp	Impact	22.31386	113.8875	Winter	No
HKBCF	HY/2010/02	4-Feb-16	1198	11:28:43 AM	5	NWL	2	193	On	Impact	22.42073	113.8697	Winter	No
HKBCF	HY/2010/02	4-Feb-16	1199	2:01:22 PM	1	NWL	2	129	On	Impact	22.38092	113.8878	Winter	Yes

Annex IV
March 2012– February 2016
(and Baseline September – November 2011)
Photo Identification Information

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 130		04/02/2016	1199	NWL
		30/03/2015	1089	NWL
		09/02/2015	1071	NWL
		22/09/2014	1006	NWL
HZMB 129		07/01/2016	1189	NWL
		22/10/2015	1156	NWL
		07/09/2015	1143	NWL
		25/08/2015	1138	NWL
HZMB 128		03/01/2015	1056	NWL
HZMB 127		03/01/2015	1056	NWL
HZMB 126		23/02/2015	1068	NWL
		03/01/2015	1054	NWL
HZMB 125		13/10/2014	1019	NWL
HZMB 124		22/09/2014	1005	NWL
HZMB 123		25/08/2014	998	NWL
HZMB 122		22/10/2015	1156	NWL
		04/08/2014	989	NWL
HZMB 121		14/07/2014	968	NWL
HZMB 120		31/05/2014	951	NWL
HZMB 119		19/04/2014	940	NWL
HZMB 118		06/01/2014	890	NWL
HZMB 117		17/06/2014	964	NWL
		06/01/2014	888	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 116		25/08/2014	999	NWL
HZMB 115		14/07/2014	972	NWL
		14/07/2014	971	NWL
		26/12/2013	879	NWL
		26/12/2013	879	NWL
HZMB 114		05/11/2015	1162	NWL
		24/10/2013	827	NWL
HZMB 113		24/10/2013	827	NWL
HZMB 112		15/10/2013	815	NWL
HZMB 111		15/10/2013	815	NWL
HZMB 110		18/01/2016	1193	NWL
		15/10/2013	812	NWL
HZMB 108		11/06/2015	1118	NWL
		30/08/2013	780	NEL
HZMB 107		28/07/2015	1126	NWL
		13/10/2014	1019	NWL
		31/05/2014	951	NWL
		21/08/2013	770	NWL
HZMB 106		21/08/2013	769	NWL
HZMB 105		31/05/2014	951	NWL
		08/07/2013	711	NWL
HZMB 104		08/07/2013	711	NWL
HZMB 103		08/07/2013	711	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 102		08/07/2013	706	NWL
HZMB 101		08/07/2013	706	NWL
HZMB 100		08/07/2013	706	NWL
HZMB 099		13/06/2013	681	NWL
		13/06/2013	680	NWL
HZMB 098	NL104	23/02/2015	1077	NWL
		18/12/2014	1044	NWL
		04/08/2014	992	NWL
		06/01/2014	888	NWL
		02/11/2013	849	NWL
		02/11/2013	845	NWL
		24/10/2013	831	NWL
		08/07/2013	711	NWL
		24/05/2013	659	NWL
		07/11/2011	Baseline	NWL
		05/11/2011	Baseline	NWL
		05/11/2011	Baseline	NWL
		02/11/2011	Baseline	NWL
		28/10/2011	Baseline	NWL
23/09/2011	Baseline	NWL		
16/09/2011	Baseline	NWL		
HZMB 097		09/05/2013	647	NWL
HZMB 096		01/04/2013	621	NWL
HZMB 095		30/08/2013	780	NEL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		25/06/2013	697	NWL
		13/06/2013	682	NWL
		01/04/2013	621	NWL
HZMB 094		13/10/2014	1019	NWL
		31/05/2014	954	NWL
		17/02/2014	910	NWL
		26/06/2013	703	NWL
		25/06/2013	698	NWL
		18/03/2013	601	NWL
HZMB 093		24/05/2013	657	NWL
		21/02/2013	587	NWL
HZMB 092		20/04/2015	1097	NWL
		21/02/2013	589	NWL
		15/02/2013	581	NWL
HZMB 091		15/02/2013	579	NWL
HZMB 090		25/06/2013	697	NWL
		13/06/2013	682	NWL
		15/02/2013	579	NWL
HZMB 089		15/02/2013	579	NWL
HZMB 088		15/02/2013	579	NWL
HZMB 087		15/02/2013	579	NWL
HZMB 086	NL242	19/03/2015	1086	NWL
		09/05/2013	642	NWL
		15/02/2013	579	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		10/10/2011	Baseline	NWL
HZMB 085		13/10/2014	1019	NWL
		31/05/2014	954	NWL
HZMB 084		26/06/2013	703	NWL
		15/02/2013	579	NWL
		14/02/2013	575	NWL
HZMB 083	NL136	01/12/2015	1180	NWL
		11/05/2015	1104	NWL
		19/12/2013	863	NWL
		28/03/2013	607	NWL
		15/02/2013	579	NWL
		28/01/2013	568	NWL
		28/01/2013	564	NWL
		19/04/2012	267	NWL
		28/10/2011	Baseline	NWL
		28/10/2011	Baseline	NWL
		10/10/2011	Baseline	NEL
HZMB 082		06/09/2011	Baseline	NWL
		20/10/2014	1024	NWL
		21/02/2013	587	NWL
		15/02/2013	579	NWL
HZMB 081		28/01/2013	563	NWL
		28/01/2013	559	NWL
		28/01/2013	557	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 080		28/01/2013	556	NWL
HZMB 079		28/01/2013	556	NWL
HZMB 078		15/02/2013	579	NWL
		08/01/2013	552	NWL
HZMB 077		26/12/2013	878	NWL
		08/07/2013	706	NWL
		11/12/2012	541	NWL
HZMB 076		08/07/2013	706	NWL
		11/12/2012	541	NWL
HZMB 075		06/12/2012	525	NEL
HZMB 074		09/05/2013	647	NWL
		01/04/2013	623	NWL
		01/04/2013	621	NWL
		21/02/2013	594	NEL
		10/12/2012	529	NEL
		06/12/2012	525	NEL
HZMB 073		09/05/2013	647	NWL
		01/04/2013	623	NWL
		01/04/2013	621	NWL
		21/02/2013	594	NEL
		10/12/2012	529	NEL
		06/12/2012	525	NEL
HZMB 072		24/10/2012	476	NWL
HZMB 071		24/10/2012	475	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		12/10/2012	466	NWL
HZMB 070		24/10/2012	476	NWL
HZMB 069		04/06/2015	1116	NWL
		21/08/2013	774	NWL
		08/07/2013	711	NWL
		24/10/2012	476	NWL
HZMB 068		20/10/2014	1025	NWL
		01/11/2013	839	NWL
		24/10/2012	476	NWL
HZMB 067		24/10/2012	475	NWL
HZMB 066	NL93	28/01/2013	559	NWL
		11/12/2012	537	NWL
		24/10/2012	475	NWL
		12/10/2012	466	NWL
		07/11/2011	Baseline	NWL
		05/11/2011	Baseline	NWL
HZMB 064		19/03/2015	1086	NWL
		17/06/2014	964	NWL
		09/05/2013	647	NWL
		28/01/2013	561	NWL
		24/10/2012	475	NWL
		12/10/2012	466	NWL
HZMB 063		09/05/2013	647	NWL
		12/10/2012	466	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 062		06/12/2012	525	NEL
		11/10/2012	457	NWL
HZMB 060		18/09/2012	447	NWL
HZMB 059		21/02/2013	591	NWL
		18/09/2012	445	NWL
HZMB 057		18/09/2012	440	NWL
HZMB 056		18/09/2012	442	NWL
		05/09/2012	433	NEL
HZMB 055		04/09/2012	425	NWL
HZMB 054	CH34	01/12/2015	1180	NWL
		20/04/2015	1097	NWL
		15/01/2015	1062	NWL
		31/05/2014	953	NWL
		06/01/2014	888	NWL
		07/11/2013	854	NWL
		02/11/2013	845	NWL
		24/10/2013	831	NWL
		30/08/2013	780	NEL
		08/07/2013	711	NWL
		18/09/2013	448	NWL
		05/09/2012	432	NEL
		07/11/2011	Baseline	NWL
		05/11/2011	Baseline	NWL
02/11/2011	Baseline	NWL		

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		01/11/2011	Baseline	NEL
		01/11/2011	Baseline	NEL
		28/10/2011	Baseline	NWL
		06/10/2011	Baseline	NWL
HZMB 053		04/09/2012	425	NWL
HZMB 052		04/09/2012	423	NWL
HZMB 051	NL213	11/05/2015	1104	NWL
		04/08/2014	989	NWL
		09/05/2013	644	NWL
		01/04/2013	622	NWL
		15/02/2013	582	NWL
		15/02/2013	581	NWL
		28/01/2013	559	NWL
		28/01/2013	556	NWL
		04/09/2012	422	NWL
HZMB 050		14/07/2014	971	NWL
		10/01/2014	900	NWL
		06/01/2014	888	NWL
		15/02/2013	579	NWL
		04/09/2012	421	NWL
HZMB 049		09/10/2015	1151	NWL
		29/07/2014	982	NWL
		03/09/2012	419	NWL
HZMB 048		03/09/2012	419	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 047		28/04/2015	1100	NWL
		03/09/2012	412	NWL
HZMB 046		03/09/2012	412	NWL
HZMB 045		17/02/2014	910	NWL
		13/06/2013	682	NWL
		15/02/2013	579	NWL
		01/11/2012	495	NWL
HZMB 044	NL98	18/01/2016	1194	NWL
		13/10/2014	1019	NWL
		17/02/2014	910	NWL
		19/12/2013	864	NWL
		02/11/2013	845	NWL
		01/11/2013	842	NWL
		15/10/2013	819	NWL
		09/05/2013	648	NWL
		09/05/2013	647	NWL
		01/04/2013	623	NWL
		01/04/2013	621	NWL
		15/02/2013	579	NWL
		01/11/2012	495	NWL
		07/11/2011	Baseline	NWL
06/11/2011	Baseline	NEL		
01/11/2011	Baseline	NEL		
06/10/2011	Baseline	NEL		

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 043		03/09/2012	407	NWL
HZMB 042	NL260	22/10/2015	1156	NWL
		19/12/2013	863	NWL
		01/11/2012	495	NWL
		07/11/2011	Baseline	NWL
HZMB 041	NL24	05/06/2014	960	NEL
		17/02/2014	910	NWL
		02/11/2013	845	NWL
		09/05/2013	648	NWL
		09/05/2013	647	NWL
		01/04/2013	623	NWL
		01/04/2013	621	NWL
		15/02/2013	579	NWL
		01/11/2012	495	NWL
		06/11/2011	Baseline	NEL
		05/11/2011	Baseline	NWL
		05/11/2011	Baseline	NWL
HZMB 040		17/02/2014	910	NWL
		06/01/2014	893	NWL
		15/10/2013	821	NWL
		08/07/2013	714	NWL
		08/07/2013	711	NWL
		21/02/2013	589	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		01/11/2012	493	NWL
HZMB 038		01/11/2012	490	NWL
HZMB 037		01/11/2012	490	NWL
HZMB 036		03/09/2012	407	NWL
		01/11/2012	490	NWL
HZMB 035		15/02/2013	579	NWL
		01/11/2012	490	NWL
HZMB 034		01/11/2012	493	NWL
HZMB 028		17/11/2014	1035	NWL
		01/04/2013	625	NWL
		06/08/2012	373	NWL
HZMB 027		19/12/2013	863	NWL
		15/02/2013	579	NWL
		28/01/2013	568	NWL
		28/01/2013	564	NWL
		14/06/2012	299	NWL
HZMB 026		13/10/2014	1018	NWL
		25/06/2013	697	NWL
		09/05/2013	642	NWL
		28/01/2013	561	NWL
		13/06/2012	295	NEL
HZMB 025		22/02/2013	596	NEL
		21/02/2013	591	NWL
		06/12/2012	525	NEL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		11/10/2012	457	NWL
		13/06/2012	295	NEL
HZMB 024		18/03/2013	601	NWL
		13/06/2012	295	NEL
HZMB 023		09/10/2015	1153	NWL
		09/10/2015	1152	NWL
		20/04/2015	1097	NWL
		18/12/2014	1044	NWL
		17/11/2014	1035	NWL
		06/01/2014	888	NWL
		08/07/2013	715	NWL
		08/07/2013	711	NWL
		01/04/2013	619	NWL
		21/02/2013	589	NWL
		15/02/2013	579	NWL
		10/07/2012	330	NWL
HZMB 022		09/07/2015	1143	NWL
		20/04/2015	1097	NWL
		18/12/2014	1044	NWL
		17/11/2014	1035	NWL
		04/08/2014	991	NWL
		06/01/2014	888	NWL
		24/10/2013	827	NWL
		08/07/2013	715	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		08/07/2013	711	NWL
		01/04/2013	619	NWL
		21/02/2013	589	NWL
		15/02/2013	579	NWL
		10/07/2012	330	NWL
HZMB 021	NL37	10/07/2012	330	NWL
		16/09/2011	Baseline	NWL
HZMB 020		10/07/2012	330	NWL
HZMB 019		10/07/2012	330	NWL
HZMB 018		17/02/2014	910	NWL
		09/05/2013	647	NWL
		21/02/2013	594	NEL
		10/12/2012	529	NEL
		10/07/2012	330	NWL
HZMB 017		10/07/2012	330	NWL
HZMB 016		08/07/2013	706	NWL
		11/12/2012	539	NWL
		18/09/2012	446	NWL
		04/09/2012	421	NWL
		10/07/2012	330	NWL
HZMB 015		10/07/2012	330	NEL
HZMB 014	NL176	25/08/2015	1139	NWL
		26/12/2013	880	NWL
		06/08/2012	373	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		13/06/2012	295	NEL
		06/11/2011	Baseline	NEL
		01/11/2011	Baseline	NEL
		01/11/2011	Baseline	NEL
HZMB 013		28/05/2012	281	NWL
HZMB 012		28/05/2012	281	NWL
HZMB 011	EL01	22/02/2013	597	NEL
		21/02/2013	592	NEL
		14/02/2013	572	NEL
		06/11/2012	517	NEL
		19/09/2012	452	NWL
		31/03/2012	261	NEL
		02/11/2011	Baseline	NWL
		01/11/2011	Baseline	NEL
HZMB 009		19/03/2015	1084	NWL
		28/05/2012	281	NWL
HZMB 008		06/07/2015	1122	NWL
		28/05/2012	281	NWL
HZMB 007	NL246	10/12/2012	529	NEL
		06/11/2011	Baseline	NEL
		16/09/2011	Baseline	NWL
HZMB 006		22/10/2015	1158	NWL
		21/02/2013	594	NEL
		11/12/2012	539	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		01/11/2012	495	NWL
		29/03/2012	250	NWL
HZMB 005		09/02/2015	1070	NWL
		09/02/2015	1069	NWL
		09/11/2013	860	NWL
		07/11/2013	858	NWL
		15/10/2013	813	NWL
		10/12/2012	532	NWL
		06/08/2012	374	NWL
		28/05/2012	287	NWL
HZMB 004		28/07/2015	1126	NWL
		04/09/2012	421	NWL
		31/03/2012	262	NWL
HZMB 003	NL179	15/10/2013	812	NWL
		25/06/2013	697	NWL
		10/12/2012	529	NEL
		31/03/2012	261	NWL
		06/11/2011	Baseline	NEL
		16/09/2011	Baseline	NWL
HZMB 002	WL111	31/05/2014	951	NWL
		26/12/2013	878	NWL
		19/12/2013	863	NWL
		01/11/2013	839	NWL
		15/10/2013	819	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		24/09/2013	798	NWL
		14/02/2013	573	NWL
		11/12/2012	536	NWL
		11/12/2012	535	NWL
		12/10/2012	466	NWL
		24/10/2012	475	NWL
		28/05/2012	281	NWL
		29/03/2012	250	NWL
		02/11/2011	Baseline	NWL
HZMB 001	WL46	25/08/2014	997	NWL
		21/08/2013	771	NWL
		13/06/2013	681	NWL
		01/04/2013	617	NWL
		14/02/2013	573	NWL
		29/03/2012	250	NWL
	CH98	02/11/2011	Baseline	NWL
	NL11	02/11/2011	Baseline	NWL
		07/11/2011	Baseline	NWL
	NL12	02/11/2011	Baseline	NWL
	NL33	23/09/2011	Baseline	NWL
		01/11/2011	Baseline	NEL
		05/11/2011	Baseline	NWL
		07/11/2011	Baseline	NWL
	NL46	28/10/2011	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	CH153	11/10/2011	Baseline	NWL
	NL48	07/11/2001	Baseline	NWL
		02/11/2011	Baseline	NWL
		16/09/2011	Baseline	NWL
	NL75	16/09/2011	Baseline	NWL
		16/09/2011	Baseline	NWL
		01/11/2011	Baseline	NEL
	NL80	02/11/2011	Baseline	NWL
	NL118	06/09/2011	Baseline	NWL
	NL120	06/11/2011	Baseline	NEL
		10/10/2011	Baseline	NWL
	NL123	06/11/2011	Baseline	NEL
		10/10/2011	Baseline	NWL
		06/10/2011	Baseline	NWL
	NL139	01/11/2011	Baseline	NEL
		10/10/2011	Baseline	NEL
		16/09/2011	Baseline	NWL
	NL165	05/11/2011	Baseline	NWL
		02/11/2011	Baseline	NWL
	NL170	06/10/2011	Baseline	NEL
	NL188	07/11/2011	Baseline	NWL
		01/11/2011	Baseline	NWL
		28/10/2011	Baseline	NWL
	NL191	07/09/2011	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	NL202	07/11/2011	Baseline	NWL
		28/10/2011	Baseline	NWL
	NL210	07/11/2011	Baseline	NWL
		05/11/2011	Baseline	NWL
		02/11/2011	Baseline	NWL
		07/09/2011	Baseline	NWL
	NL214	05/11/2011	Baseline	NWL
		02/11/2011	Baseline	NWL
		28/10/2011	Baseline	NWL
	NL220	10/10/2011	Baseline	NEL
	NL224	28/10/2011	Baseline	NWL
	NL226	05/11/2011	Baseline	NWL
		17/10/2011	Baseline	WL
	NL230	02/11/2011	Baseline	NWL
		17/10/2011	Baseline	WL
	NL233	28/10/2011	Baseline	NWL
		06/10/2011	Baseline	NWL
		16/09/2011	Baseline	NWL
	NL241	07/11/2011	Baseline	NWL
		02/11/2011	Baseline	NWL
		16/09/2011	Baseline	NWL
	NL244	01/11/2011	Baseline	NEL
		01/11/2011	Baseline	NWL
		05/09/2011	Baseline	WL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	NL256	02/11/2011	Baseline	NWL
	NL258	16/09/2011	Baseline	NWL
		05/09/2011	Baseline	WL
	NL259	07/11/2011	Baseline	NWL
	NL261	01/11/2011	Baseline	NEL
	NL264	06/11/2011	Baseline	NEL
		06/10/2011	Baseline	NEL
		23/09/2011	Baseline	NWL
	NL269	02/11/2011	Baseline	NWL
	NL272	05/11/2011	Baseline	NWL
		02/11/2011	Baseline	NWL
		28/10/2011	Baseline	NWL
		16/09/2011	Baseline	NWL
	NL278	02/11/2011	Baseline	NWL
	NL279	02/11/2011	Baseline	NWL
	SL42	02/11/2011	Baseline	NWL
	SL43	28/10/2011	Baseline	NWL
	WL04	05/11/2011	Baseline	NWL
		02/11/2011	Baseline	NWL
		17/10/2011	Baseline	WL
		10/10/2011	Baseline	NWL
		16/09/2011	Baseline	NWL
	WL05	01/11/2011	Baseline	NEL
		01/11/2011	Baseline	NEL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	WL11	07/11/2011	Baseline	NWL
	WL25	17/10/2011	Baseline	WL
		23/09/2011	Baseline	WL
		16/09/2011	Baseline	NWL
	WL88	02/11/2011	Baseline	WL
		16/09/2011	Baseline	NWL
	WL116	16/09/2011	Baseline	NWL
	WL124	02/11/2011	Baseline	NWL
	WL156	28/10/2011	Baseline	NWL
		23/09/2011	Baseline	WL
	WL162	16/09/2011	Baseline	NWL
	NL275	23/09/2011	Baseline	WL
	SL48	02/11/2011	Baseline	WL
		17/10/2011	Baseline	WL
		23/09/2011	Baseline	WL
	CH108	02/11/2011	Baseline	WL
		02/11/2011	Baseline	WL
	CH157	02/11/2011	Baseline	WL
	NL206	07/10/2011	Baseline	WL
	WL28	23/09/2011	Baseline	WL
	WL42	02/11/2011	Baseline	WL
		05/09/2011	Baseline	WL
	WL47	17/10/2011	Baseline	WL
	WL61	17/10/2011	Baseline	WL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
		23/09/2011	Baseline	WL
	WL66	07/11/2011	Baseline	WL
	WL68	05/09/2011	Baseline	WL
		05/09/2011	Baseline	WL
	WL72	02/11/2011	Baseline	WL
		02/11/2011	Baseline	WL
		23/09/2011	Baseline	WL
	WL87	23/09/2011	Baseline	WL
	WL88	02/11/2011	Baseline	WL
		16/09/2011	Baseline	WL
	WL116	16/09/2011	Baseline	WL
	WL118	02/11/2011	Baseline	WL
		02/11/2011	Baseline	WL
	WL123	02/11/2011	Baseline	WL
	WL124	02/11/2011	Baseline	WL
	WL128	07/11/2011	Baseline	WL
		02/11/2011	Baseline	WL
	WL131	02/11/2011	Baseline	WL
		02/11/2011	Baseline	WL
		23/09/2011	Baseline	WL
	WL132	23/09/2011	Baseline	WL
	WL137	02/11/2011	Baseline	WL
	WL138	02/11/2011	Baseline	WL
	WL144	02/11/2011	Baseline	WL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	<i>WL 145</i>	<i>05/09/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 146</i>	<i>17/10/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 153</i>	<i>07/11/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 157</i>	<i>23/09/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 158</i>	<i>23/09/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 163</i>	<i>07/11/2011</i>	<i>Baseline</i>	<i>WL</i>
		<i>02/11/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 165</i>	<i>17/10/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 167</i>	<i>17/10/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 170</i>	<i>07/11/2011</i>	<i>Baseline</i>	<i>WL</i>
	<i>WL 171</i>	<i>28/10/2011</i>	<i>Baseline</i>	<i>WL</i>

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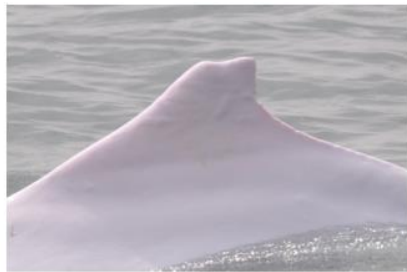
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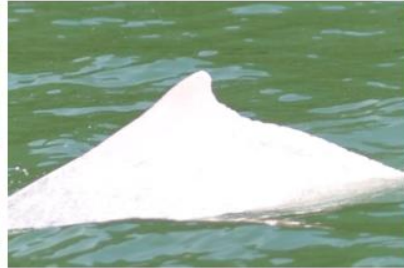
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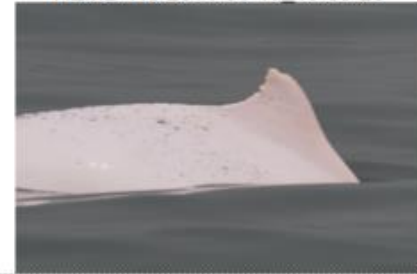
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HZMB 130 2016-02-04_14-10-27_01 MED





China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for December / 2015 (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-15	0.0000	0.0000	0.0000	0.0000	0.0000	1774.7845	0.0000	0.4200	4.0000	2.4000	0.0455
Feb-15	0.0000	0.0000	0.0000	0.0000	0.0000	1120.6675	0.0000	0.1400	0.0000	0.0000	0.0390
Mar-15	0.0000	0.0000	0.0000	0.0000	0.0000	390.8735	0.0040	0.3340	0.0020	0.0000	0.0390
Apr-15	0.0000	0.0000	0.0000	0.0000	0.0000	251.3183	0.0000	0.1400	0.0000	0.0000	0.0390
May-15	0.0000	0.0000	0.0000	0.0000	0.0000	778.9842	0.0000	0.1960	0.0000	0.0000	0.0260
Jun-15	0.0000	0.0000	0.0000	0.0000	0.0000	400.6428	0.0000	0.1680	0.0000	0.0000	0.0520
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	4717.2709	0.0040	1.3980	4.0020	2.4000	0.2405
Jul-15	0.0000	0.0000	0.0000	0.0000	0.0000	60.7108	0.0150	0.4750	0.0020	0.0000	0.0585
Aug-15	0.0000	0.0000	0.0000	0.0000	0.0000	60.6718	0.0000	0.3360	5.1200	0.0000	0.0585
Sep-15	0.0000	0.0000	0.0000	0.0000	0.0000	69.8487	0.0000	0.0000	0.0000	0.0000	0.0780
Oct-15	0.0000	0.0000	0.0000	0.0000	0.0000	32.4733	0.0000	0.2800	0.0000	0.0000	0.0715
Nov-15	0.0000	0.0000	0.0000	0.0000	0.0000	40.5700	0.0000	0.3920	0.0000	0.0000	0.0715
Dec-15	0.0000	0.0000	0.0000	0.0000	0.0000	23.0400	0.0000	0.0000	0.0000	0.0000	0.0845
Total	0.0000	0.0000	0.0000	0.0000	0.0000	5004.5856	0.0190	2.8810	9.1240	2.4000	0.6630

- 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 6.5m³ by volume.
 - (4) Chemical waste refer to spent “battery” and “oil with water”.



China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for February / 2016 (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 2,5)	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-16	0.0000	0.0000	0.0000	0.0000	0.0000	52.4729	0.0000	0.2520	0.0000	0.8000	0.0520
Feb-16	0.0000	0.0000	0.0000	0.0000	0.0000	6.1333	0.0000	0.0000	6.0800	0.0000	0.0520
Mar-16											
Apr-16											
May-16											
Jun-16											
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	58.6062	0.0000	0.2520	6.0800	0.8000	0.1040
Jul-16											
Aug-16											
Sep-16											
Oct-16											
Nov-16											
Dec-16											
Total	0.0000	0.0000	0.0000	0.0000	0.0000	58.6062	0.0000	0.2520	6.0800	0.8000	0.1040

- 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 6.5m³ by volume.
 - (4) Chemical waste refer to spent “battery” and “oil with water”.
 - (5) About 152 Water-barriers were recycled (~40kg each, Total: ~4000kg or ~4.0 '000kg).

Appendix J

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

Cumulative statistics on Exceedances

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

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

Cumulative statistics on 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	4 December 2015	A water quality complaint was referred to the ENPO at 10:22 am on the 4 December 2015 by EPD; ENPO referred this complaint to this Contract on the same day. With referred to the information provided by ENPO, EPD has contacted the complainant, and obtained the additional information from the complainant and it is suspected that the incident happened in the	Closed	1	35

		<p>afternoon on 28 November 2015. A video was provided by the complainant who shows that turbid water behind a barge, the incident is suspected to be happened in the afternoon on 28 November 2015. After investigation, it is considered not related to this Contract.</p>			
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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Repeat <i>in situ</i> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Repeat <i>in situ</i> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> Repeat statistical data analysis to confirm findings; 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; Identify source(s) of impact; Inform the IEC, ER/SOR and Contractor; Check monitoring data. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor; Discuss monitoring results and finding with the ET and the Contractor. 	<ol style="list-style-type: none"> Discuss monitoring with the IEC and any other measures proposed by the ET; 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. 	<ol style="list-style-type: none"> Inform the ER/SOR and confirm notification of the non-compliance in writing; Discuss with the ET and the IEC and propose measures to the IEC and the ER/SOR; Implement the agreed measures.
Limit Level	<ol style="list-style-type: none"> Repeat statistical data analysis to confirm findings; 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; Identify source(s) of impact; Inform the IEC, ER/SOR and Contractor of findings; Check monitoring data; 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor; Discuss monitoring results and findings with the ET and the Contractor; Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. Review proposals for additional monitoring and any other mitigation measures submitted 	<ol style="list-style-type: none"> Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 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. 	<ol style="list-style-type: none"> Inform the ER/SOR and confirm notification of the non-compliance in writing; Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. Implement the agreed additional dolphin monitoring

	<p>6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.</p> <p>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.</p>	<p>by ET and Contractor and advise ER/SOR of the results and findings accordingly.</p> <p>5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly.</p>	<p>3. Supervise the implementation of additional monitoring and/or any other mitigation measures.</p>	<p>and/or any other mitigation measures.</p>
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Report No. D012
Monitoring Period December 2015 - February 2016

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	1.2	4.5	

[#] 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 but this project activities may contribute to disturbance.
 - 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.
 - Meetings were held on 9 December 2014, 27 April 2015, 10 July 2015, 6 October 2015, 15 January 2016 and 20 April 2016 between ENPO, project ET for this and other HZMB contracts and engineer representatives, to discuss dolphin encounter rates during the period September-November 2014, December 2014-February 2015, March 2015-May 2015, June 2015-August 2015, September 2015 - November 2015 and December 2015 – February 2016. It was concluded that the HZMB construction work is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to individual HZMB contracts and processes cannot be separated from the other activities within the dolphin's habitat.
- b) Action required under the action plan
 Please refer to corresponding Event and Action Plan.
- c) Action taken under the action plan

Report No. D012
Monitoring Period December 2015 - February 2016

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.***

On 20 April 2016, a meeting was held between ENPO, ET for this contract and other HZMB contracts and engineer representatives following the limit level/action level exceedances for Chinese white dolphin encounter rate during the period December 2015-February 2016. After 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, as well as areas from outside these, should be reviewed to give a better, overall picture of current dolphin distribution patterns and to monitor individual dolphin movement. As AFCD data suggests that some dolphins have been distributed outside the range of the current monitoring for this Project. ENPO updated that the Hong Kong-Zhuhai-Macao Bridge Authority (HZMBA) for the Mainland section of the HZMB has recently commenced an interim survey on fisheries resources and CWD in the Mainland waters. ENPO presented the preliminary findings of the HZMBA interim survey on CWD sighting and photo-identification works which provided solid evidence that some CWD that were previously more often sighted in HK waters have expanded their ranges into mainland waters and some with reduced usage in Hong Kong waters. These data on changes in CWD ranges partially explain the decline in sightings North Lantau waters. These preliminary data were included in the December 2015 – February 2016 quarterly Southwest Lantau survey report which is available on ENPO's website.

In the last year, there has been a consistent decrease of dolphins in the NEL and NWL areas. As stated in previous investigation reports, the HZMB works is one of the contributing factors affecting the dolphins and it was reiterated at this latest meeting that there are also concurrent works ongoing in both NEL and NWL, some of which are not part of the HZMB Project. Further, it was noted that it is extremely difficult to attribute specific impacts from any single works or activity 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 has been consistently less dolphins adjacent to HZMB construction sites as all parts of the HZMB Project 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, pollution, competition with fisheries. All ETs noted at the meeting that mitigation across individual HZMB sites has been fully implemented. The regular checking and auditing of all mitigation works at the HKBCF reclamation works record that all dolphin mitigation measures in the form of vessel routes and speeds, etc., have been implemented and DEZ/DWP are in place. The meeting summarised that multiple factors, as listed above and including the HZMB project, have all contributed to dolphin distribution changes in Hong Kong.

For water quality monitoring, one (1) action level impact water quality monitoring exceedance at monitoring station IS(Mf)11 has been recorded on 28 December 2015 during flood tide. After investigation, there is no adequate information to conclude the recorded exceedance is related to this Contract; 2 limit level exceedances of turbidity level were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016; 2 action level exceedances of suspended solids were recorded at monitoring station SR4(N) and IS8 respectively on 5 February 2016. No exceedance at other monitoring stations in the reporting month. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract. IWQM exceedances were at locations which dolphins have not been noted previously, i.e., close to Tung Ching Public pier and it is unlikely that short-lived and localised increased sedimentation would affect dolphins when it is not their usual habitat.

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. It is noted that other fishing activities are ongoing in Hong Kong waters which also pose a risk of entanglement, however, data from strandings programme often cannot discern which type of fishery is (and/or net) is responsible for an individual entanglement. In other areas where coastal fisheries have been monitored by independent observers, it was noted that of trawling, purse seine and gill netting have the highest bycatch incidence for bottlenose dolphins, with trawling noted as having the greatest impact (Allen *et al* 2014). Globally, trawling fisheries are of the greatest conservation concern due to their high impact on small cetaceans (Ross and Isaac 2004), and although there may still be other fisheries in operation in Hong Kong which pose an entanglement risk to dolphins, none are as intensive or as widespread as the trawl fishery was. 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;2015). A recent publication incorporating data from AFCD assessed impacts known from Hong Kong between 1996 and 2013 and concluded that high speed ferries have significantly contributed to the decline in dolphins from NEL. This paper also suggests that there has been an overall decline of dolphins in the northern waters of Lantau Island (Marcotte *et al* 2015). This paper also states that caution should be exercised when interpreting these preliminary findings and further analysis is encouraged. Noting the preliminary findings of Marcotte *et al* (2015) It is noted that the high speed ferries from NEL have been re-routed to travel to the east and north of Sha Chau Lung Kwu Chau Marine Park (SCLKCMP) during the reporting period resulting in increased high speed ferry traffic adjacent

to an area that the dolphins have traditionally used frequently. A reduction in the number of sightings in the northern SCLKCMP area has been noted since December 2015 and this observation supports the preliminary findings of Marcotte *et al* (2015) that dolphin declines may be correlated with an increase in the frequency of HSF. This was discussed during the meeting held on 20 April 2016, and all ETs agreed that there is likely a relationship between increased HSF and decreased dolphin density. During the meeting, the CWD experts of both projects noted that sightings in northern SCLKCMP were lower than that previously recorded. It was further observed that high speed ferry (HSF) travel from SkyPier had been re-routed to the waters north of SCLKCMP in late December 2015. HSF are known to cause disturbance to dolphins. A recent publication (Li *et al* 2015) examined the acoustic disturbance of high speed boats¹ on Chinese white dolphins and observed that frequencies of over >100kHz dominated. This is within the dolphins communication range. The recorded boat noise raised the ambient underwater noise levels from ~5 to 47 decibels, with louder levels recorded at higher speeds and at closer distances. In Hong Kong, similar vessels include small fishing boats, commonly referred to as “P4s” and HSF. This study notes the potential impact these elevated levels have on Chinese white dolphins in southern China and it can be assumed that similar acoustic disturbance may occur in Hong Kong waters. It is known from studies elsewhere that dredging and marine piling activities cause significant disturbance to marine mammals (David 2006; Jefferson *et al.* 2009; Bailey *et al* 2010), including vibratory piling which was conducted as part of the HZMB construction (Wang *et al* 2014; Yang *et al* 2015). Activities which are stressful to dolphins are usually associated with increased underwater noise levels and this includes vessel traffic (from all construction works in the proximity of North Lantau). It is also noted that Hong Kong and adjacent ports are the world’s busiest commercial shipping area with heavy shipping traffic.

As discussed in previous meetings, 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. Underwater noise levels from vessels are related to the horse power of the engine, the size and shape of the hull, the propeller type and the speed of the vessel. Although few quantitative comparative studies have been conducted, one such study investigates different sound sources from vessels of different lengths (Kipple and Gabriele, 2007). Vessels over 250 foot (approx. 76m) fall into the same sound source category (170 – dB re 1 microPa at 1 yard). As both the large capacity barge and the smaller capacity sand vessel it replaces are within the over 250 foot length category and fall into the same sound source category², a reduction in both the number of active vessels and the number of journeys across NEL per day will lead to a reduction in sources of underwater noise levels, therefore reducing the underwater noise attributable to sand barges. Protective measures (e.g., speed limit control) for the proposed Brothers Marine Park (BMP) are underway.

Other non project related works and activities around the HZMB project area may contribute to changes in dolphin distribution and include, but may not be limited to;

- Shift in distribution or change in composition of prey resources (Buchary *et al.* 2003).

¹ Boats travelling at over 15kmph

² Please note, actual sound sources levels from Hong Kong vessels have not been measured but sound reduction assumption have been inferred from measurements from similar vessels elsewhere.

- 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)

3. Repeat review to ensure all the dolphin protective measures are fully and properly

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 monitoring was in place depending on site activities, i.e., Dolphin Exclusive Zone for silt curtain laying 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 HKBCF Project can be found to coincide with the observed reduction in dolphin encounter rates in NEL and NWL. As discussed at the series of meetings held, it was agreed that all HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to individual Projects cannot be quantified nor separate from the other stress factors. 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 the HKBCF Project.

These factors were reported in D005, D006, D007, D008, D009, D010 and D011, 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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