

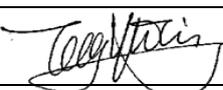
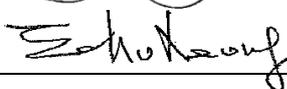
China Harbour Engineering Company Limited

Contract No. HY/2010/02

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

**Quarterly EM&A Summary Report for
September 2017 – November 2017**

[11/2018]

	Name	Signature
Prepared & Checked:	Y T Tang	
Reviewed, Approved and Certified:	Echo Leong (ETL)	

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<p>Disclaimer</p> <p>This report is prepared for China Harbour Engineering Company Limited and is given for its sole benefit in relation to and pursuant to Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities-Reclamation Works and may not be disclosed to, quoted to or relied upon by any person other than China Harbour Engineering Company Limited without our prior written consent. No person (other than China Harbour Engineering Company Limited) into whose possession a copy of this report comes may rely on this report without our express written consent and China Harbour Engineering Company Limited may not rely on it for any purpose other than as described above.</p>		

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5 November 2018

By Fax (3698 5999) and By Post

Ove Arup & Partners Hong Kong Ltd.
Chief Resident Engineer's Office
11 Tung Chung Waterfront Road, Tung Chung, Lantau
Hong Kong

Attention: Mr. Seven Yau

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 Summary Report for September 2017 to November 2017**

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for September 2017 to November 2017 certified by the ET Leader (ET's ref.: "60249820/C/RMKY18110201" dated 2 November 2018) and provided to us via e-mail on 2 November 2018.

We are pleased to inform you that we have no adverse comments on the captioned Quarterly Environmental Monitoring & Audit Report for September 2017 to November 2017.

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 Hong Kong Limited



Raymond Dai
Independent Environmental Checker

c.c.	HyD	Mr. Tony Pang	(By Fax: 3188 6614)
	HyD	Ms. Molly Kwan	(By Fax: 3188 6614)
	AECOM	Ms. Echo Leong	(By Fax: 2317 7609)
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Internal: DY, YH, DF, HW, ENPO Site

TABLE OF CONTENTS

	PAGE
EXECUTIVE SUMMARY	3
1 INTRODUCTION	7
1.1 Background	7
1.2 Scope of Report	7
1.3 Contract Organization	8
1.4 Summary of Construction Works	9
2 SUMMARY OF EM&A PROGRAMME REQUIREMENTS	10
2.1 Monitoring Parameters	10
2.2 Environmental Quality Performance (Action/Limit Levels)	12
2.3 Environmental Mitigation Measures	12
3 MONITORING RESULTS	13
3.1 Air Quality Monitoring	13
3.2 Noise Monitoring	15
3.3 Water Quality Monitoring	16
3.4 Dolphin Monitoring	18
3.5 Environmental Site Inspection and Audit	19
4 ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS	21
4.1 Summary of Solid and Liquid Waste Management	21
5 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES	22
5.1 Implementation Status of Environmental Mitigation Measures	22
6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT	24
6.1 Summary of Exceedances of the Environmental Quality Performance Limit	24
7 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS	25
7.1 Summary of Environmental Complaints, Notification of Summons and Successful Prosecutions	25
8 COMMENTS, RECOMMENDATIONS AND CONCLUSIONS	26
8.1 Comments on mitigation measures	26
8.2 Recommendations on EM&A Programme	27
8.3 Conclusions	28

List of Tables

Table 1.1	Contact Information of Key Personnel
Table 3.1	Summary of Number of Exceedances for 1-hr & 24-hr TSP Monitoring
Table 3.3	Summary of Number of Monitoring Exceedances for Impact Noise

Figures

Figure 1	General Contract Layout Plan
Figure 2	Impact Air Quality and Noise Monitoring Stations and Wind Station
Figure 3a	Impact Water Quality Monitoring Stations
Figure 3b	Impact Water Quality Monitoring Stations (Effective after 8 September 2017)
Figure 4	Impact Dolphin Monitoring Line Transect Layout Map
Figure 5	Environmental Complaint Handling Procedure

List of Appendices

Appendix A	Contract Organization for Environmental Works
Appendix B	Three Month Rolling Construction Programmes
Appendix C	Implementation Schedule of Environmental Mitigation Measures (EMIS)
Appendix D	Summary of Action and Limit Levels
Appendix E	Quarterly Summary of Waste Flow Table
Appendix F	Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions
Appendix G	Event Action Plan

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. The EM&A programme, including air quality, noise, water quality and dolphin monitoring and environmental site inspections, was commenced on 12 March 2012.

This report documents the findings of EM&A works conducted in the period between 1 September 2017 – 30 November 2017. As informed by the Contractor, major activities in the reporting quarter were:-

Marine-base

- Maintenance of localized silt curtain
- Outfall installation
- Additional GI works
- Reinstatement of seawall

Land-base

- Maintenance works of Site Office at Works Area WA2

Reporting Change

With respect to substantial completion of marine works by the end of June 2017, it is anticipated that the remaining construction works under Contract No. HY/2010/02, which include ground investigation (GI) works, construction of temporary timber platform, removal of jetty and reinstatement of seawall at the western section and construction of outfall at the eastern seawall, would cause limited disturbance to water column and not to the seabed. In view of this, a proposal for change of EM&A programme/requirements was prepared by ET in accordance with Condition 5.1 of EP-353/2009/K and Condition 4.1 of EP-354/2009/D, to terminate water quality monitoring works at stations IS5, IS(Mf)6, IS8, SR4(N), SR5(N), SR6, SR10A, SR10B(N), CS4, CSA and CS6, and dolphin monitoring (line-transect vessel survey method) covering NEL and NWL when perimeter silt curtain under the Contract is completely removed and vessel traffic numbers average 10 per month for Contract No. HY/2010/02. A revised proposal has been updated and sent to IEC/ENPO for their further review on 15 August 2017 and IEC/ENPO verified the revised proposal on 16 August 2017. The revised proposal has been sent to authority by project team for review and approval on 21 August 2017. The authority subsequently approved the proposal on 7 September 2017.

Termination of water quality monitoring works at stations IS5, IS(Mf)6, IS8, SR4(N), SR5(N), SR6, SR10A, SR10B(N), CS4, CSA and CS6 for Contract No. HY/2010/02 are adopted starting from 8 September 2017.

The monthly EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1.0). It should be noted that the air quality, noise, water quality and dolphin monitoring works for the

Contract are covered by Contract No. HY/2013/01 Hong Kong-Zhuhai-Macao Bridge HKBCF – Passenger Clearance Building effective since 1 September 2017. The ET of the Contract is required to conduct EM&A monitoring as part of EM&A programme if these monitoring stations are no longer covered under Contract No. HY/2013/01.

As informed by IEC/ENPO on 28 September 2017, air quality monitoring station (AMS3B), meteorological station and noise monitoring station (NMS3B) were slightly relocated to AECOM PRE's Office effective since 1 September 2017.

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

Joint Environmental site inspection 14 sessions

*monitoring works for the Contract are covered by Contract No. HY/2013/01 Hong Kong-Zhuhai Macao Bridge HKBCF – Passenger Clearance Building.

Breaches of Action and Limit Levels for Air Quality

For impact air quality monitoring, 1 action level exceedance of 24-Hour TSP was recorded at AMS3B on 28 November 2017. After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract. No other 1-hour and 24-hour action and limit level exceedances were recorded at all monitoring stations by Environmental Team of Contract No. HY/2013/01 in the reporting period. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of November 2017.

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

In September 2017, total of 82 action level exceedances for dissolved oxygen and 4 limit level exceedances were recorded on 1, 6, 8, 11, 13, 15, 18, 22, 27 & 29 September 2017. 3 action level exceedances for turbidity were recorded at IS(Mf)11 on 6 September and at IS10(N) & IS(Mf)11 on 8 September 2017 during flood tide. Total of 4 action level exceedances for suspended solids were recorded at IS8, SR4(N) & SR6 on 6 September 2017 and at IS(Mf)11 on 8 September 2017 during flood tide, 1 limit level exceedance was recorded on 8 September 2017 at IS10(N) during flood tide. After investigation, it was concluded that those exceedance were unlikely related to this Contract. No other exceedance was recorded at monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of September 2017.

In October 2017, 2 action level exceedances of suspended solids were recorded at IS(Mf)11 and SR7 during flood tide on 20 October 2017. After investigation, it was concluded that those exceedances were unlikely to be contract related. No other exceedance was recorded at all monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of October 2017.

In November 2017, 6 action level exceedances of suspended solids were recorded at IS(Mf)11, IS(Mf)16 and SR7 during flood tide on 3, 6, 8 and 20 November 2017. After investigation, it was concluded that those exceedances were unlikely to be contract related. No other exceedance was recorded at all monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of November 2017.

Breaches of Action and Limit Levels for Impact Dolphin Monitoring

Impact dolphin monitoring results at all transects are reported in the EM&A Report prepared for Contract No. HY/2013/01.

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 complaint was forwarded to us by ENPO on 27 October 2017; the complainant complained that yellowish muddy water was discharged into the sea from construction site location C3 of the artificial island of the Hong Kong-Zhuhai-Macao Bridge and this has been persist for one week. After investigation, there is no adequate information to conclude the complaint is related to this Contract.

A complaint was forwarded to us by ENPO on 23 November 2017; the complainant complained that, on Hong Kong- Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Artificial Island, due to watering was not provided to all areas, large amount of fugitive dust was generated, especially at the toll kiosks. After investigation, there is no adequate information to conclude the complaint is 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.
- 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 twenty third 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 September 2017 to 30 November 2017.

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 Hong Kong Limited)	Independent Environmental Checker	Raymond Dai	3465 2888	3465 2899
	Environmental Project Office Leader	Y. H. Hui	3465 2850	3465 2899
Contractor (China Harbour Engineering Company Limited)	Environmental Officer	Louie Chan	3693 2254	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

- Maintenance of localized silt curtain
- Outfall installation
- Additional GI works
- Reinstatement of seawall

Land-base

- Maintenance works of Site Office 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 has been conducted at AMS7 (Hong Kong SkyCity Marriott Hotel) since 1 January 2016, 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 Due to the commencement of marine work of the Expansion of Hong Kong International Airport into a Three-Runway System (3RS Project), a large portion of works site boundary will be established at the northern part of the existing airport Island. The recent arrangement of works boundary of 3RS Project which delineates the boundary of the designated 3RS Project (for the indicative 3RS boundary, please refer to Figure 5). The works area of 3RS project will affect several water quality monitoring stations and the dolphin monitoring transect lines which are being used for conducting monitoring under Contract No. HY/2010/02. The EM&A Programme for the HZMB HKBCF Project will therefore be affected. As a result, a proposal was prepared by ET in September 2016 in accordance with condition 5.1 of EP-353/2009/K and condition 4.1 of EP-354/2009/D, to relocate water quality monitoring stations from SR5, IS10, CS(Mf)3 and alternate the transect lines of impact dolphin monitoring 2, 3, 4, 5, 6 and 7. A revised proposal has been updated and sent to IEC/ENPO for their further review on 24 March 2017 and IEC/ENPO verified the revised proposal on the same date. The revised proposal has been sent to authority by project team for review and approval on 3 April 2017. The authority subsequently approved the proposal on 12 May 2017.
- 2.1.9 Due to substantial completion of marine works by the end of June 2017, it is anticipated that the remaining construction works under Contract No. HY/2010/02, which include ground investigation (GI) works, construction of temporary timber platform, removal of jetty and reinstatement of seawall at the western section, construction of outfall at the eastern seawall, would cause limited disturbance to water column and not to the seabed. In view of this, a proposal for change of EM&A programme/requirements was prepared by ET in accordance with Condition 5.1 of EP-353/2009/K and Condition 4.1 of EP-354/2009/D, to terminate water quality monitoring works at stations IS5, IS(Mf)6, IS8, SR4(N), SR5(N), SR6, SR10A, SR10B(N), CS4, CSA and CS6, and impact dolphin monitoring (line-transect vessel survey method) covering NEL and NWL when perimeter silt curtain under the Contract is completely removed and vessel traffic numbers average 10 per month for Contract No. HY/2010/02. A revised proposal has been updated and sent to IEC/ENPO for their further review on 15 August 2017 and IEC/ENPO verified the revised proposal on 16 August 2017. The revised proposal has been sent to authority by project team for review and approval on 21 August 2017. The authority subsequently approved the proposal on 7 September 2017.
- 2.1.10 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 AMS7).
- 3.1.2 The air quality monitoring works for the Contract are covered by Contract No. HY/2013/01 Hong Kong-Zhuhai Macao Bridge HKBCF – Passenger Clearance Building.
- 3.1.3 The monitoring requirements, monitoring equipment, monitoring parameters, frequency and duration, monitoring methodology, monitoring schedule and meteorological information are detailed in the monthly EM&A Reports prepared for Contract No. HY/2013/01.
- 3.1.4 The ET of the Contract or other ET of the HZMB project is required to conduct air quality monitoring at AMS2, AMS3B and AMS7 as part of EM&A programme if these air quality monitoring stations are no longer covered under Contract No. HY/2013/01.
- 3.1.5 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.
- 3.1.6 As informed by IEC/ENPO on 28 September 2017, air quality monitoring station (AMS3B) and the meteorological station were relocated to AECOM PRE’s Office effective since 1 September 2017.
- 3.1.7 The number of exceedances recorded in each month of the reporting quarter are presented in Table 3.1.

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

Monitoring Parameter	Location	Level of Exceedance	Numbers of Exceedance		
			Sept 17	Oct 17	Nov 17
1-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3B	Action	0	0	0
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
			Total	0	0
24-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3B	Action	0	0	1
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
			Total	0	0

- 3.1.8 The monitoring results for 1-hour TSP and 24-hour TSP are reported in the monthly EM&A Report prepared for Contract No. HY/2013/01.
- 3.1.9 There was 1 action level exceedance of 24-hour TSP recorded by ET of Contract No. HY/2013/01 at AMS3B on 28 November 2017 8:00am to 29 November 2017 8:00am.
- 3.1.10 After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract.

- 3.1.11 For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A Report November 2017.
- 3.1.11.1 After investigation, it was concluded that the recorded exceedance was unlikely to cause by construction works under this Contract since all dusty materials adopted which might generate fugitive dust were wet with sea water for dust suppression. Meteorological information provided by Contract No. HY2013/01 during the monitoring period showed East and Southeast winds were prevailing with wind speed ranging from 0-0.4m/s, indicating the source of exceedance was unlikely to be Contract related.
- 3.1.11.2 The detailed Investigation Report No. A030 (including the causes of exceedance and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in Appendix F of monthly EM&A report of November 2017.
- 3.1.12 No other 1-hour and 24-hour action and limit level exceedances was recorded at all monitoring stations by Environmental Team of Contract No. HY/2013/01 in the reporting period.
- 3.1.13 The event action plan is annexed in Appendix G.
- 3.1.14 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, was recorded at all monitoring stations and reported by Environmental Team of Contract No. HY/2013/01 in the reporting period.

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 The impact noise monitoring works for the Contract are covered by Contract No. HY/2013/01 Hong Kong-Zhuhai Macao Bridge HKBCF – Passenger Clearance Building.
- 3.2.4 The monitoring requirements, monitoring equipment, monitoring parameters, frequency and duration, monitoring methodology and monitoring schedule are detailed in the monthly EM&A Reports prepared for Contract No. HY/2013/01.
- 3.2.5 The ET of the Contract or other ET of the HZMB project is required to conduct impact noise monitoring at NMS2 and NMS3B as part of EM&A programme if these impact noise monitoring stations are no longer covered under Contract No. HY/2013/01.
- 3.2.6 If exceedance(s) is/are recorded by the ET of the Contract or referred by the other ET under the HZMB project to the contract, the ET of the Contract will carry out an investigation and findings will be reported in the monthly EM&A Report.
- 3.2.7 No Action or Limit Level Exceedance of construction noise was recorded in the reporting quarter.
- 3.2.8 Major noise sources during the noise monitoring included construction activities of the Project and nearby traffic noise.
- 3.2.9 The number of exceedances are summarized in and Table 3.3.

Table 3.3 Summary of Number of Monitoring Exceedances for Impact Noise

Monitoring Parameter	Location	Level of Exceedance	Number of Exceedance		
			Sept 17	Oct 17	Nov 17
NMS2		Action	0	0	0
		Limit	0	0	0
NMS3B		Action	0	0	0
		Limit	0	0	0
		Total	0	0	0

- 3.2.10 The graphical plots of the trends of the monitoring results are provided by Contract No. HY/2013/01. No specific trend of the monitoring results or existence of persistent pollution source was noted.
- 3.2.11 The event action plan is annexed in Appendix G.

3.3 Water Quality Monitoring

- 3.3.1 The monitoring locations used during the reporting quarter are depicted in Figure 3a and 3b. Figure 3a shows the Impact water quality monitoring stations before the proposal for scaling down of EM&A programme was approved by the Authority on 7 September 2017. Figure 3b shows the Impact water quality monitoring stations retained after the proposal for scaling down of EM&A programme was approved by the Authority on 7 September 2017.
- 3.3.2 In the reporting month of September 2017, total of 82 action level exceedances for dissolved oxygen and 4 limit level exceedances were recorded on 1, 6, 8, 11, 13, 15, 18, 22, 27 & 29 September 2017. 3 action level exceedances for turbidity were recorded at IS(Mf)11 on 6 September and at IS10(N) & IS(Mf)11 on 8 September 2017 during flood tide. Total of 4 action level exceedances for suspended solids were recorded at IS8, SR4(N) & SR6 on 6 September 2017 and at IS(Mf)11 on 8 September 2017 during flood tide, 1 limit level exceedance was recorded on 8 September 2017 at IS10(N) during flood tide. After investigation, it was concluded that those exceedance were unlikely related to this Contract. No other exceedance was recorded at monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of reporting month September 2017.
- 3.3.2.1 After investigation, the recorded dissolved oxygen exceedances were not relevant to this Contract since no organic matter discharge/accumulation at active works area was observed and there were only outfall pipeline installation works and seawall construction carried out which were unlikely to cause deterioration of DO at the monitoring stations recorded in tables of Appendix E of monthly EM&A report of reporting month September 2017.
- 3.3.2.2 It was concluded that the 3 turbidity and 5 suspended solids exceedances recorded on 6 & 8 September 2017 were unlikely related to Construction works under this Contract after investigation since photo record provided by the Contract showed that active works area was confined within silt curtain which was properly maintained. Only outfall pipeline works was carried out on above mentioned dates which was unlikely to cause elevation of turbidity and SS at the monitoring stations recorded in tables of Appendix E of monthly EM&A report of reporting month September 2017.
- 3.3.2.3 The detailed Investigation Reports No. W109-W118 (including the causes of exceedance and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in Appendix F of monthly EM&A report of reporting month September 2017.
- 3.3.3 In the reporting monthly of October, 2 action level exceedances of suspended solids were recorded at IS(Mf)11 and SR7 during flood tide on 20 October 2017. After investigation, it was concluded that those exceedance were unlikely related to Construction works under this Contract. No other exceedance was recorded at monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of reporting month October 2017.
- 3.3.3.1 After investigation, it was concluded that the recorded exceedances of suspended solids on 20 October 2017 were unlikely related to Construction works under this Contract since photo record on 21 & 26 October 2017 provided by the Contractor showed that active works area was confined within silt curtain which was properly maintained and no silt plume was observed. Only seawall construction and outfall pipeline installation were carried out which were unlikely to cause elevation of SS at the monitoring stations recorded in table of Appendix E of monthly EM&A report of reporting month October 2017.
- 3.3.3.2 The detailed Investigation Reports No. W119 (including the causes of exceedance and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in Appendix F of monthly EM&A report of reporting month October 2017.
- 3.3.4 In the reporting month of November, 6 action level exceedances of suspended solids were recorded at IS(Mf)11, IS(Mf)16 and SR7 during flood tide on 3, 6, 8 and 20 November 2017. After investigation, it was concluded that those exceedance were unlikely related to Construction works under this Contract. No other exceedance was recorded at monitoring stations in the reporting month. For level of

exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of reporting month November 2017.

- 3.3.4.1 After investigation, it was concluded that the recorded exceedances of suspended solids in November 2017 were unlikely related to Construction works under this Contract since photo records provided by the Contractor showed that active works area was confined within silt curtain which was properly maintained and no silt plume was observed. Only seawall construction and outfall pipeline installation were carried out which were unlikely to cause elevation of SS at the monitoring stations recorded in table of Appendix E of monthly EM&A report of reporting month November 2017.
- 3.3.4.2 The detailed Investigation Reports No. W120-123 (including the causes of exceedance and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in Appendix F of monthly EM&A report of reporting month November 2017.
- 3.3.5 No other exceedance was recorded at all monitoring stations in the reporting quarter.
- 3.3.6 The event action plan is annexed in Appendix G.

3.4 Dolphin Monitoring

- 3.4.1 The layout map of impact dolphin monitoring have been provided by AFCD and is shown in Figure 4.
- 3.4.2 The monitoring results for impact dolphin monitoring are reported in the monthly EM&A Reports (for September 2017 and November 2017) prepared for Contract No. HY/2013/01.

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, 14 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 Discolored NRMM label were affixed on generator near Portion B and excavator at Portion A, the Contractor was reminded to affix appropriate label on the generator and excavator. Appropriate NRMM label was affixed on the concerned generator. (Closed) The Contractor was reminded to affix appropriate label on the excavator. (Reminder)

3.5.4 The Contractor was reminded to provide effective dust suppression mechanism by spraying water or dust suppression chemical during operation of excavate work. (Reminder)

3.5.5 Dark smoke emission was observed from derrick lighter barge (利航 8) at Portion A. The Contractor was reminded that smoke emission from plant/equipment should be avoided. As informed by Contractor, the concerned barge has been removed from the site. (Closed)

3.5.6 Generator (Airman SDG25) without NRMM label was observed on jack- up barge, Fugro Kingstown. The Contractor was reminded to check and confirm if NRMM label is required or available for the concerned PME. As informed by the Contractor, the concerned generator was removed from barge. (Closed)

3.5.7 Discoloured NRMM label was observed on excavator near Portion B. The Contractor was reminded to affix appropriate NRMM label. The Contractor subsequently affixed appropriate NRMM label on the concerned excavator. (Closed)

3.5.8 Drilling machine without NRMM label was observed on jack-up barge, B40529VSNIFE. The Contractor was reminded to affix approved NRMM label on the concerned drilling machine. The Contractor subsequently affixed appropriate NRMM label on the concerned drilling machine. (Closed)

3.5.9 Generator without NRMM label was observed on jack-up barge, Fugro Kingstown. The Contractor was reminded to affix approved NRMM label on the concerned generator. The Contractor subsequently rectified the adverse observation. (Closed)

Noise

3.5.10 No relevant adverse impact was observed in the reporting month.

Water Quality

3.5.11 It was observed that silt curtain around the outfall of Portion B was disconnected on 17 and 24 August 2017, the Contractor was reminded to reinstate the silt curtain at the concerned area and provide maintenance regularly. According to the Contractor, silt curtain around the outfall of Portion B was reinstated and properly maintained. (Closed)

3.5.12 Stagnant water and general refuse were observed at site entrance and Portion B. The Contractor was reminded to clean stagnant water regularly to keep the site clean and tidy. (Reminder)

3.5.13 Disconnected silt curtain was observed at Portion A. The Contractor was reminded to reinstate concerned silt curtain and provide regular maintenance. The Contractor subsequently rectified the adverse observation (Closed)

Chemical and Waste Management

- 3.5.14 Spilled oil from generator was observed retaining on drip tray at Portion B. The Contractor was reminded to clear spilled oil. The Contractor subsequently cleared the oil retained on drip tray. (Reminder)
- 3.5.15 General refuse were observed at outfall area of Portion B. The Contractor was reminded to keep the site clean and tidy. The Contractor subsequently cleared general refuse at outfall area of Portion B. (Reminder)
- 3.5.16 The Contractor was reminded to clear oil retained in drip tray on Chun Ming 98 and dispose as chemical waste. (Reminder)

Ecological impact

- 3.5.17 The Contractor was reminded to implement dolphin watching for additional works. As informed by Contractor, dolphin watching for additional works was implemented at Outfall and Western Portion Seawall. (Reminder)

Landscape and Visual Impact

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

Others

- 3.5.19 Environmental Permit was not observed on Furgo Kingstown, the Contractor was reminded to affix valid Environmental Permit on barge for Contract No. HY/2010/02. The Contractor subsequently provided valid Environmental Permit on barge. (Closed)
- 3.5.20 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 had registered as a chemical waste producer for this Project. Receptacles were available for general refuse collection and sorting.
- 4.1.2 As advised by the Contractor, 252kg of paper/cardboard packaging and 32.5m³ of others, e.g. general refuse were generated and disposed of in the reporting period. Monthly summary of waste flow table is detailed in Appendix E.
- 4.1.3 The Contractor is advised to properly maintain on site C&D materials and wastes storage, 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 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, Labeling and Storage of Chemical Wastes.
- 4.1.5 After checking with the Contractor, no surplus surcharge was exported to Macau during the reporting quarter. The Contractor was reminded to ensure consistency in quantities in case of any C&D material disposed off-site and/or no surcharge material removed off site.

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 malfunction 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 Due to the commencement of marine work of the Expansion of Hong Kong International Airport into a Three-Runway System (3RS Project), a large portion of works site boundary will be established at the northern part of the existing airport Island. The recent arrangement of works boundary of 3RS Project which delineates the boundary of the designated 3RS Project (for the indicative 3RS boundary, please refer to Figure 5). The works area of 3RS project will affect several water quality monitoring stations and the dolphin monitoring transect lines which are being used for conducting monitoring under Contract No. HY/2010/02. The EM&A Programme for the HZMB HKBCF Project will therefore be affected. As a result, a proposal was prepared by ET in September 2016 in accordance with condition 5.1 of EP-353/2009/K and condition 4.1 of EP-354/2009/D, to relocate water quality monitoring stations from SR5, IS10, CS(Mf)3 and alternate the transect lines of impact dolphin monitoring 2, 3, 4, 5, 6 and 7. Comment was subsequently received from IEC/ENPO. The comments were under ET's review in the reporting quarter. A revised proposal has been updated and sent to IEC/ENPO for their further review on 24 March 2017 and IEC/ENPO verified the revised proposal on the same date. The revised proposal has been sent to authority by project team for review and approval on 3 April 2017. The authority subsequently approved the proposal on 12 May 2017.
- 5.1.8 Due to substantial completion of marine works by the end of June 2017, it is anticipated that the remaining construction works under Contract No. HY/2010/02, which include ground investigation (GI) works, construction of temporary timber platform, removal of jetty and reinstatement of seawall at the western section, construction of outfall at the eastern seawall, would cause limited disturbance to water column and not to the seabed. In view of this, a proposal for change of EM&A programme/requirements was prepared by ET in accordance with Condition 5.1 of EP-353/2009/K and Condition 4.1 of EP-354/2009/D, to terminate water quality monitoring works at stations IS5, IS(Mf)6, IS8, SR4(N), SR5(N), SR6, SR10A, SR10B(N), CS4, CSA and CS6, and impact dolphin monitoring (line-transect vessel survey method) covering NEL and NWL when perimeter silt curtain

under the Contract is completely removed and vessel traffic numbers average 10 per month for Contract No. HY/2010/02. A revised proposal has been updated and sent to IEC/ENPO for their further review on 15 August 2017 and IEC/ENPO verified the revised proposal on 16 August 2017. The revised proposal has been sent to authority by project team for review and approval on 21 August 2017. The authority subsequently approved the proposal on 7 September 2017.

- 5.1.9 After review, no floating grout production was in operation at any time in reporting period for Contract No.HY/2010/02. Condition 3.26A of EP-353/2009/K for Contract No.HY/2010/02 is complied with during the reporting quarter.

6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

6.1 Summary of Exceedances of the Environmental Quality Performance Limit

- 6.1.1 For impact air quality monitoring, 1 action level exceedance of 24-Hour TSP was recorded at AMS3B on 28 November 2017. After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract. No other 1-hour and 24-hour action and limit level exceedances was recorded at all monitoring stations by Environmental Team of Contract No. HY/2013/01 in the reporting period. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of corresponding monthly EM&A report
- 6.1.2 For construction noise, no exceedance was recorded at all monitoring stations in the reporting quarter.
- 6.1.3 For impact water quality monitoring:
- 6.1.3.1 In September 2017, total of 82 action level exceedances for dissolved oxygen and 4 limit level exceedances were recorded on 1, 6, 8, 11, 13, 15, 18, 22, 27 & 29 September 2017. 3 action level exceedances for turbidity were recorded at IS(Mf)11 on 6 September and at IS10(N) & IS(Mf)11 on 8 September 2017 during flood tide. Total of 4 action level exceedances for suspended solids were recorded at IS8, SR4(N) & SR6 on 6 September 2017 and at IS(Mf)11 on 8 September 2017 during flood tide, 1 limit level exceedance was recorded on 8 September 2017 at IS10(N) during flood tide. After investigation, it was concluded that those exceedance were unlikely related to this Contract. No other exceedance was recorded at monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of September 2017.
- 6.1.3.2 In October 2017, 2 action level exceedances of suspended solids were recorded at IS(Mf)11 and SR7 during flood tide on 20 October 2017. After investigation, it was concluded that those exceedances were unlikely to be contract related. No other exceedance was recorded at all monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of October 2017.
- 6.1.3.3 In November 2017, 6 action level exceedances of suspended solids were recorded at IS(Mf)11, IS(Mf)16 and SR7 during flood tide on 3, 6, 8 and 20 November 2017. After investigation, it was concluded that those exceedances were unlikely to be contract related. No other exceedance was recorded at all monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of November 2017.
- 6.1.4 For impact dolphin monitoring, impact dolphin monitoring results at all transects are reported in the EM&A Report prepared for Contract No. HY/2013/01.
- 6.1.5 Cumulative statistics on exceedances is provided in Appendix F.

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 complaint was forwarded to us by ENPO on 27 October 2017; the complainant complained that yellowish muddy water was discharged into the sea from construction site location C3 of the artificial island of the Hong Kong-Zhuhai-Macao Bridge and this has been persist for one week. After investigation, there is no adequate information to conclude the complaint is related to this Contract.
- 7.1.3 A complaint was forwarded to us by ENPO on 23 November 2017; the complainant complained that, on Hong Kong- Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Artificial Island, due to watering was not provided to all areas, large amount of fugitive dust was generated, especially at the toll kiosks. After investigation, there is no adequate information to conclude the complaint is related to this Contract.
- 7.1.4 Notification of summons or prosecution was received in the reporting quarter.
- 7.1.5 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 For impact air quality monitoring, 1 action level exceedance of 24-Hour TSP was recorded at AMS3B on 28 November 2017. After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract. No other 1-hour and 24-hour action and limit level exceedances was recorded at all monitoring stations by Environmental Team of Contract No. HY/2013/01 in the reporting period. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of November 2017.
- 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:
- 8.3.4.1 In September 2017, total of 82 action level exceedances for dissolved oxygen and 4 limit level exceedances were recorded on 1, 6, 8, 11, 13, 15, 18, 22, 27 & 29 September 2017. 3 action level exceedances for turbidity were recorded at IS(Mf)11 on 6 September and at IS10(N) & IS(Mf)11 on 8 September 2017 during flood tide. Total of 4 action level exceedances for suspended solids were recorded at IS8, SR4(N) & SR6 on 6 September 2017 and at IS(Mf)11 on 8 September 2017 during flood tide, 1 limit level exceedance was recorded on 8 September 2017 at IS10(N) during flood tide. After investigation, it was concluded that those exceedance were unlikely related to this Contract. No other exceedance was recorded at monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of September 2017.
- 8.3.4.2 In October 2017, 2 action level exceedances of suspended solids were recorded at IS(Mf)11 and SR7 during flood tide on 20 October 2017. After investigation, it was concluded that those exceedances were unlikely to be contract related. No other exceedance was recorded at all monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report of October 2017.
- 8.3.4.3 In November 2017, 6 action level exceedances of suspended solids were recorded at IS(Mf)11, IS(Mf)16 and SR7 during flood tide on 3, 6, 8 and 20 November 2017. After investigation, it was concluded that those exceedances were unlikely to be contract related. No other exceedance was recorded at all monitoring stations in the reporting month. For level of exceedance, location and when exceedances were recorded, please refer to Appendix E of monthly EM&A report November 2017.
- 8.3.5 For dolphin monitoring, dolphin monitoring results at all transects are reported in the EM&A Report prepared for Contract No. HY/2013/01.
- 8.3.6 Environmental site inspection was carried out 14 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 complaint was forwarded to us by ENPO on 27 October 2017; the complainant complained that yellowish muddy water was discharged into the sea from construction site location C3 of the artificial island of the Hong Kong-Zhuhai-Macao Bridge and this has been persist for one week. After investigation, there is no adequate information to conclude the complaint is related to this Contract.
- 8.3.8 A complaint was forwarded to us by ENPO on 23 November 2017; the complainant complained that, on Hong Kong- Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Artificial Island, due to watering was not provided to all areas, large amount of fugitive dust was generated, especially at the toll kiosks. After investigation, there is no adequate information to conclude the complaint is related to this Contract.
- 8.3.9 No notification of summons or prosecution was received in the reporting quarter.

- 8.3.10 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.
- 8.3.11 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.
- 8.3.12 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

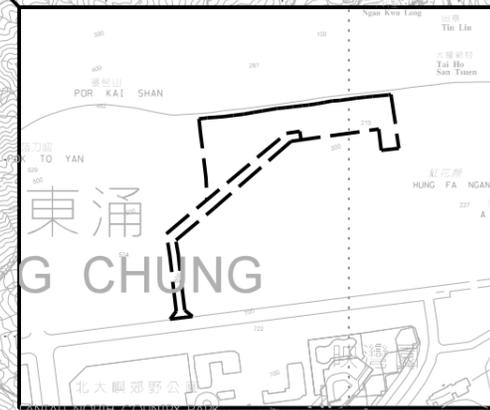
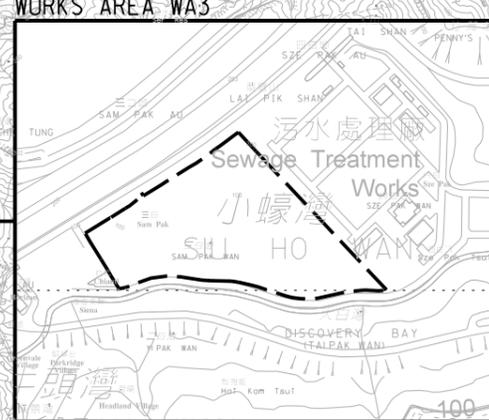
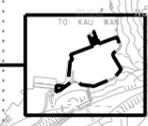
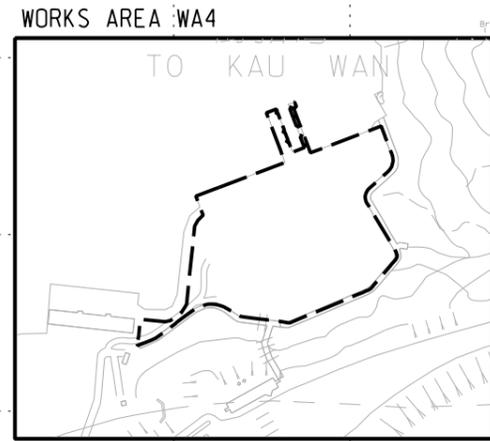
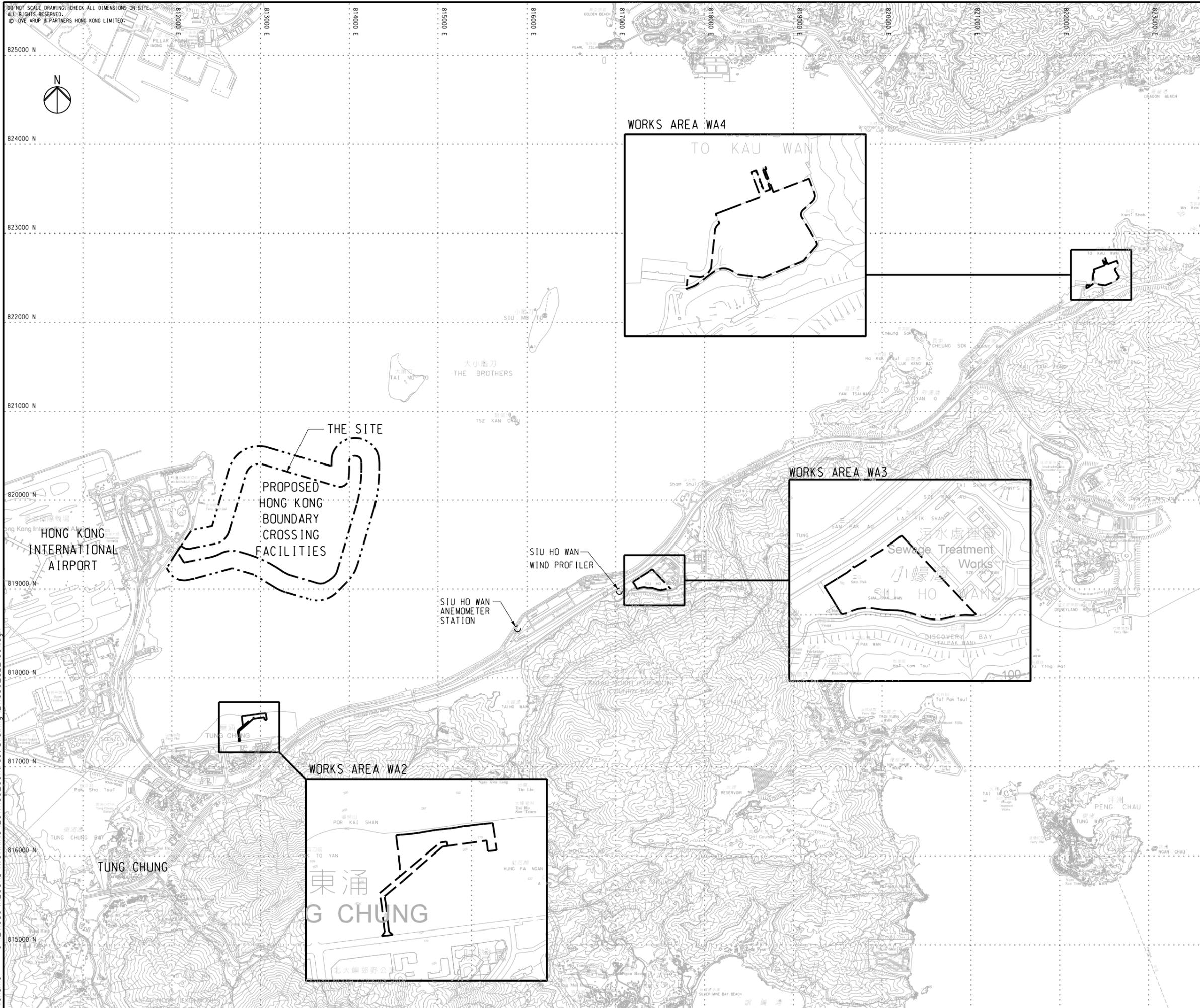
Drawing title
KEY PLAN

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

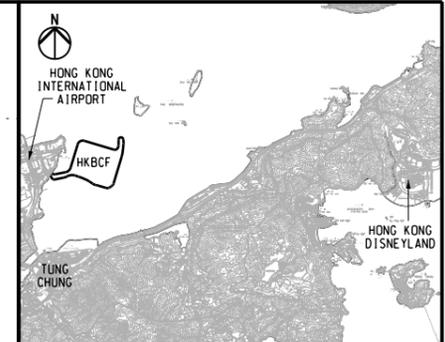
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港珠澳大橋香港工程管理局
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

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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	○

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Hong Kong-Zhuhai-Macao Bridge
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- Reclamation Works

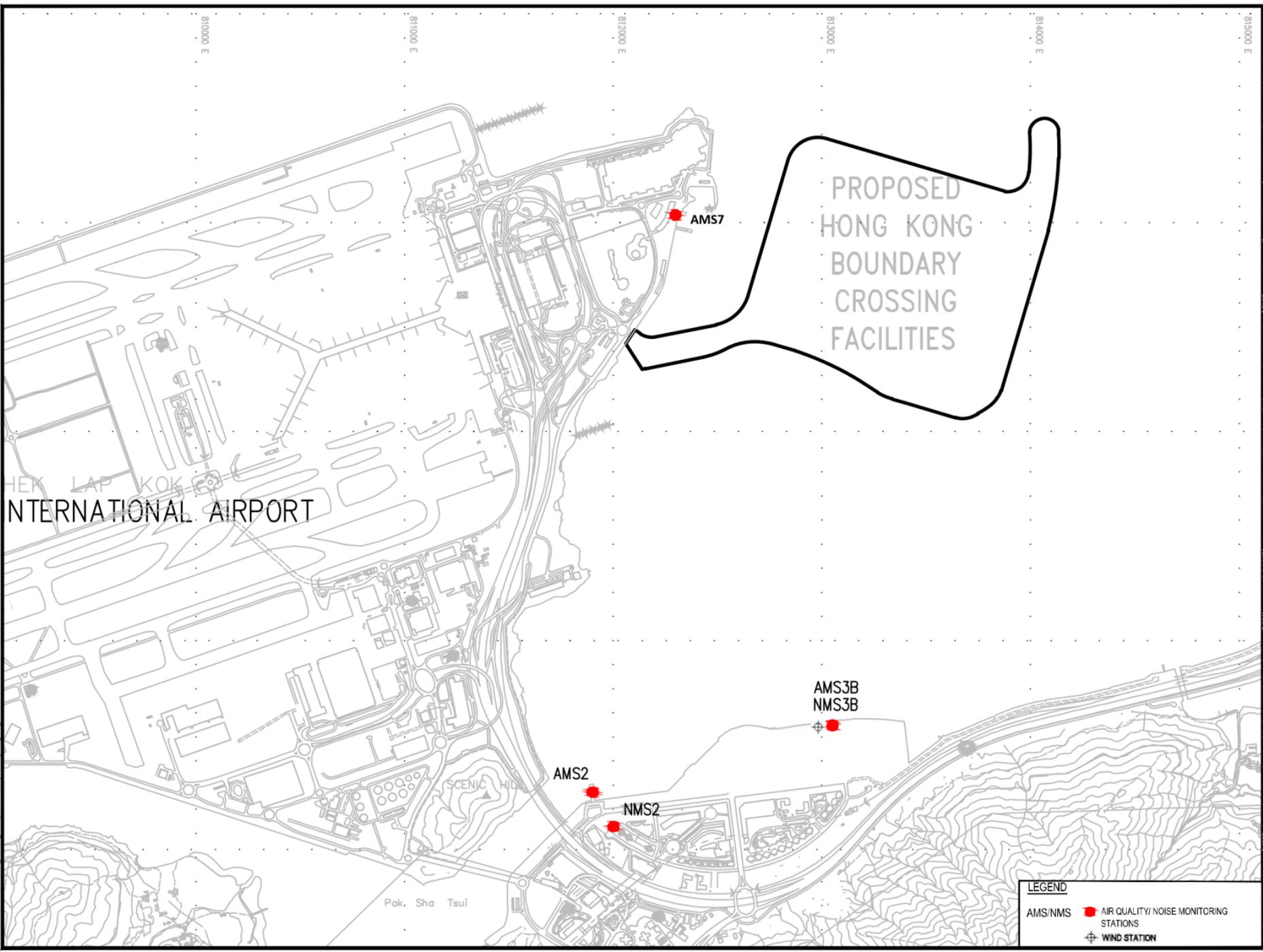
Drawing title
WORKS AREA LAYOUT
AND HOARDING PLAN
(SHEET 2 OF 3)

Drawing no. 211036/SL/1014		Rev. -	
Drawn RL	Date 06/10	Checked KKY	Approved DML
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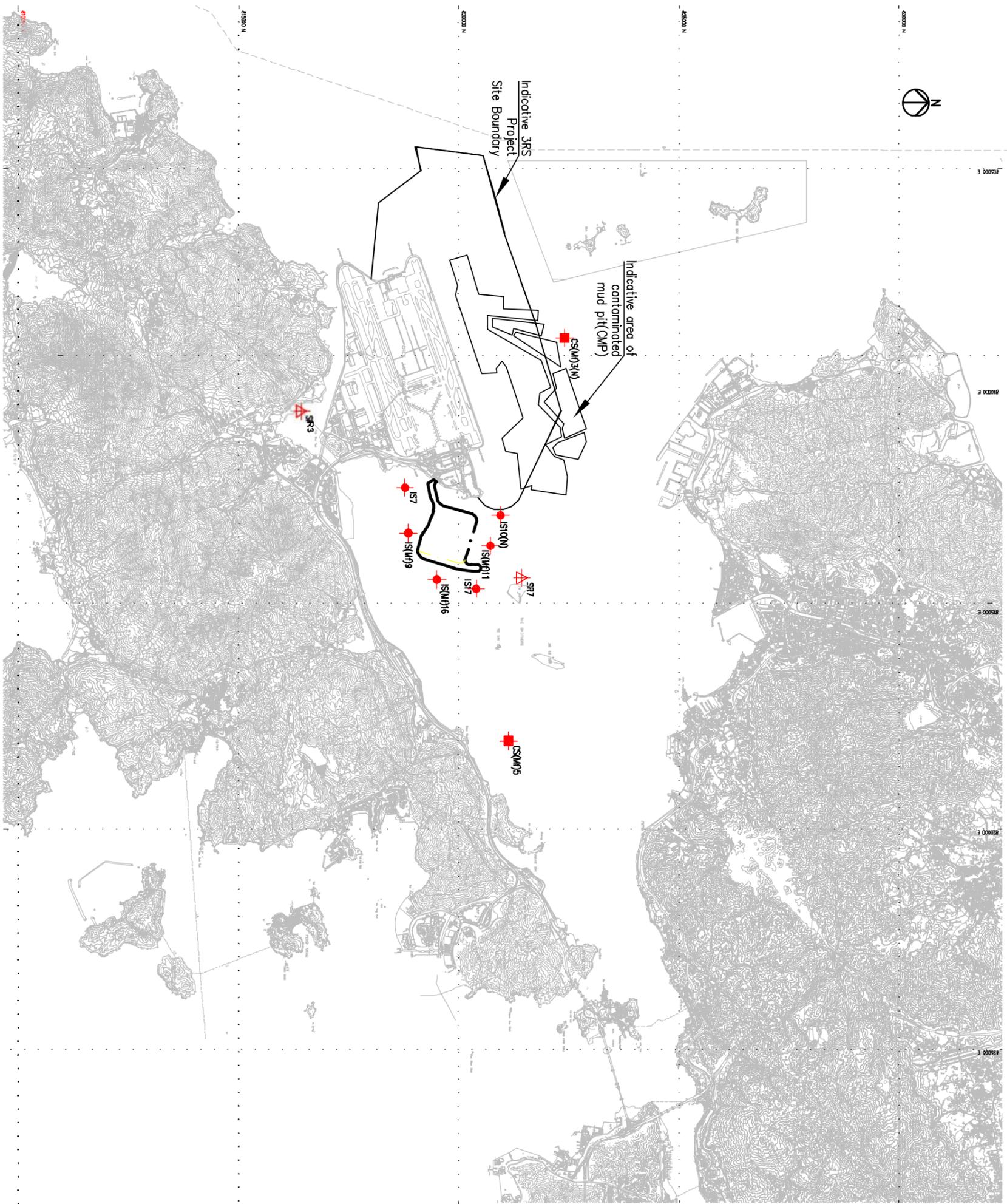
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LEGEND

AMS/NMS ■ AIR QUALITY/ NOISE MONITORING STATIONS

 ⊕ WIND STATION

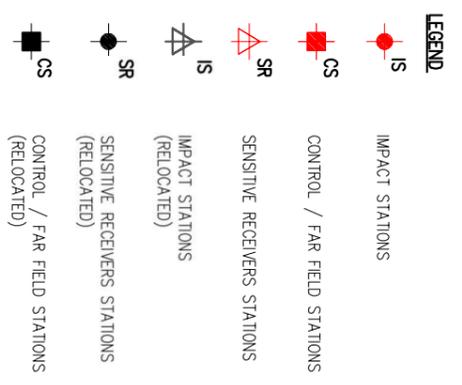
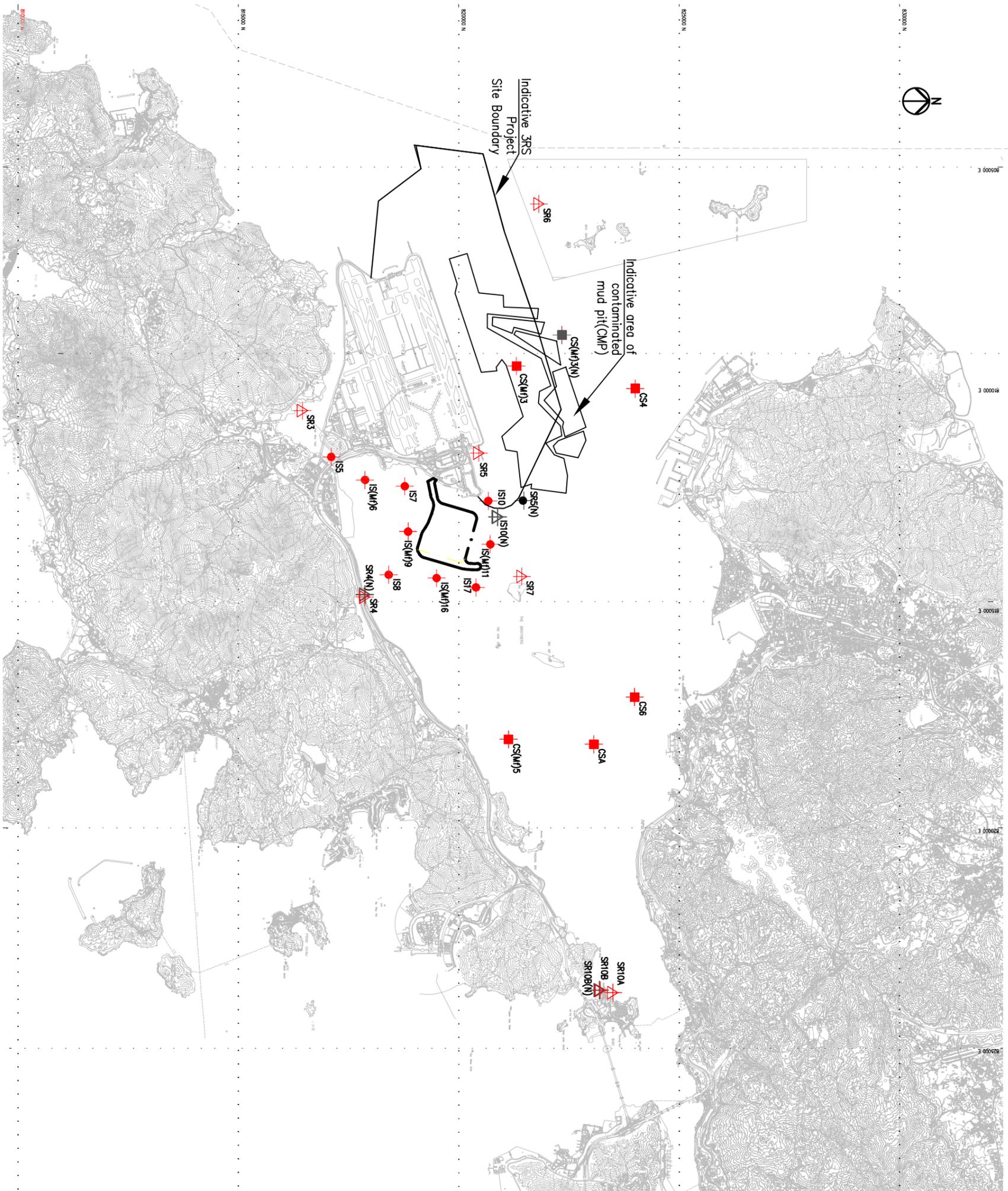


- LEGEND**
- IS IMPACT STATIONS
 - CS CONTROL / FAR FIELD STATIONS
 - SR SENSITIVE RECEIVERS STATIONS

SETTING OUT SCHEDULE

Monitoring Stations	Co-ordinates	
	EASTING	NORTHING
IS7	812244	818777
IS(M)9	813273	818850
IS10(N)	812942	820881
IS(M)11	813562	820716
IS(M)16	814328	819497
IS17	814539	820391
SR3	810525	816456
SR7	814293	821431
CS(M)3(N)	808814	822355
CS(M)5	817990	821129

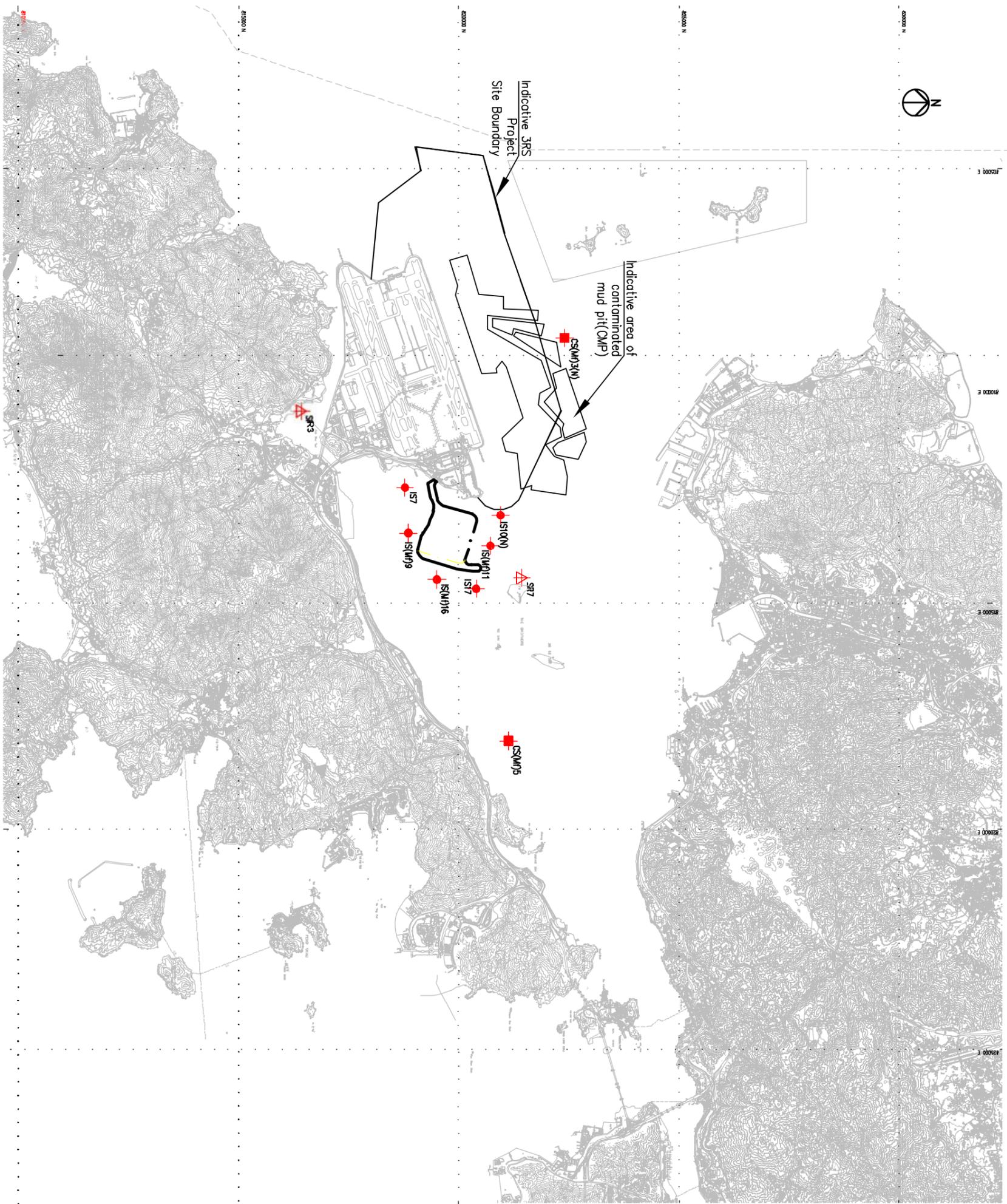
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SETTING OUT SCHEDULE

MONITORING STATIONS	CO-ORDINATES	
	EASTING	NORTHING
IS5	811579	817106
IS(M)6	812101	817873
IS7	812244	818777
IS8	814251	818412
IS(M)9	813273	818850
SR5(N)	812589	821475
IS(M)11	813562	820716
IS(M)16	814328	819497
IS17	814539	820391
SR3	810525	816456
SR4(N)	814705	817859
IS10(N)	812942	820881
SR6	805837	821818
SR7	814233	821431
SR10A	823741	823495
SR10B(N)	823683	823187
CS(M)3(N)	808814	822355
CS(M)5	817990	821129
CS4	810025	824004
CS6	817028	823992
CSA	818103	823064
IS10	812577	820670
SR5	811489	820455
CS(M)3	809989	821117

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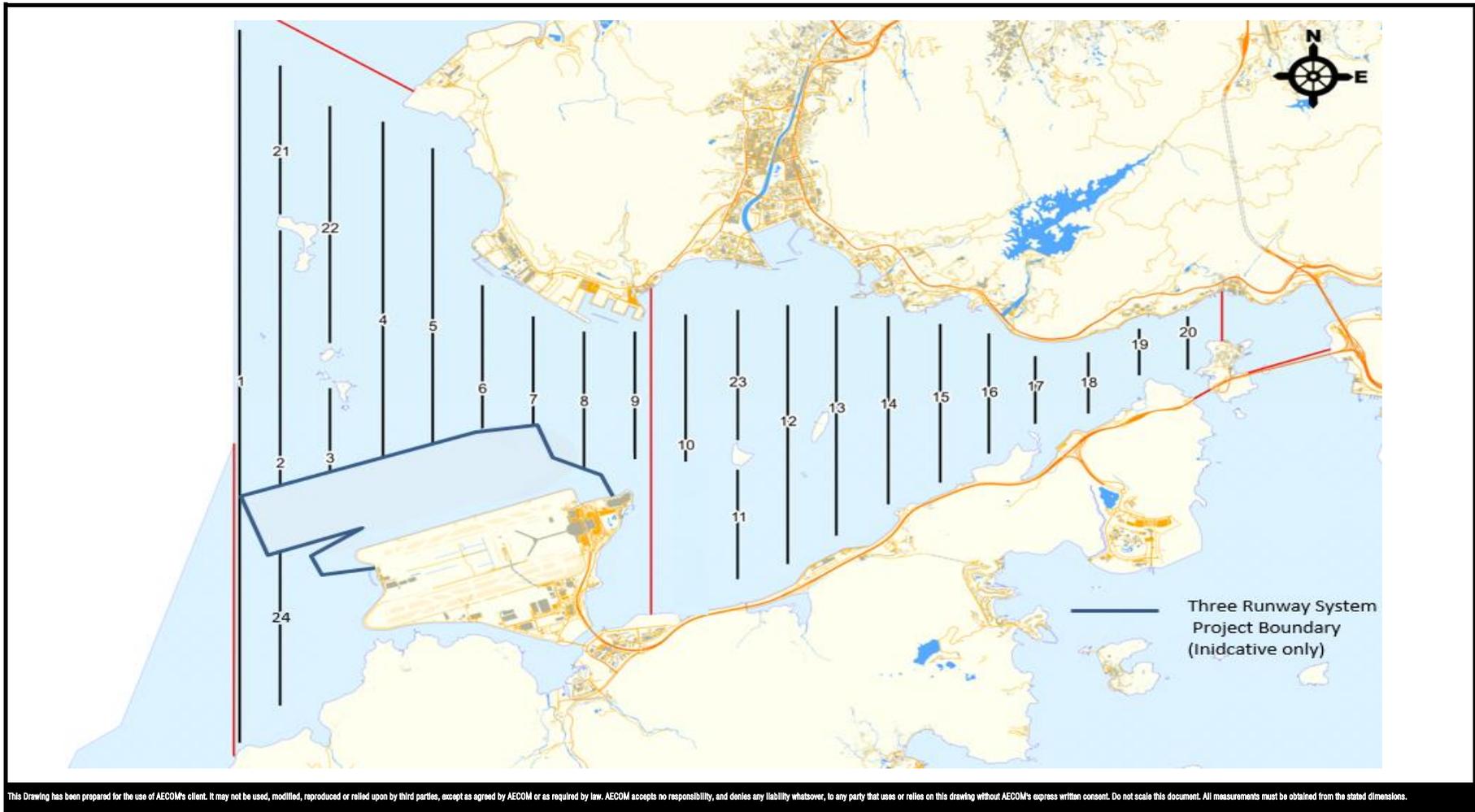


- LEGEND**
- IS IMPACT STATIONS
 - CS CONTROL / FAR FIELD STATIONS
 - SR SENSITIVE RECEIVERS STATIONS

SETTING OUT SCHEDULE

Monitoring Stations	Co-ordinates	
	EASTING	NORTHING
IS7	812244	818777
IS(M)9	813273	818850
IS10(N)	812942	820881
IS(M)11	813562	820716
IS(M)16	814328	819497
IS17	814539	820391
SR3	810525	816456
SR7	814293	821431
CS(M)3(N)	808814	822355
CS(M)5	817990	821129

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Remarks:

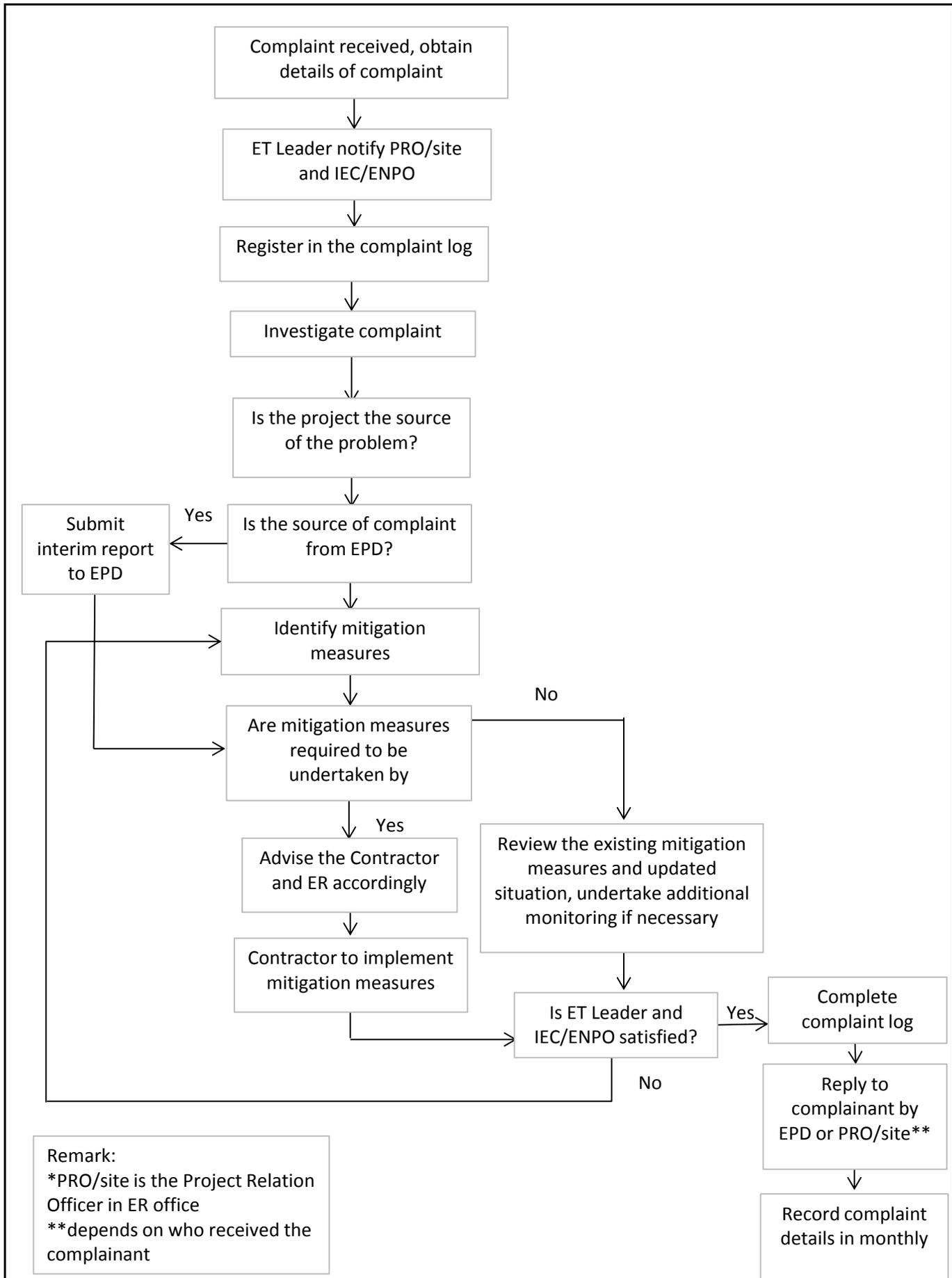
^Coordinates for transect lines 2, 3, 4, 5, 6 and 7 have been updated and line 24 was added in respect to the Proposal for Alteration of Transect Line of Dolphin Monitoring and Alternative Monitoring Location for Impact Water Quality Monitoring (IWQM) Stations due to Commencement of Third Runway Project (3RS) which was approved by EPD on 12 May 2017. The total transect length for both NEL and NWL combined is reduced to approximately 99km.

**HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS**
Project No.: 60249820 Date: Nov 2017

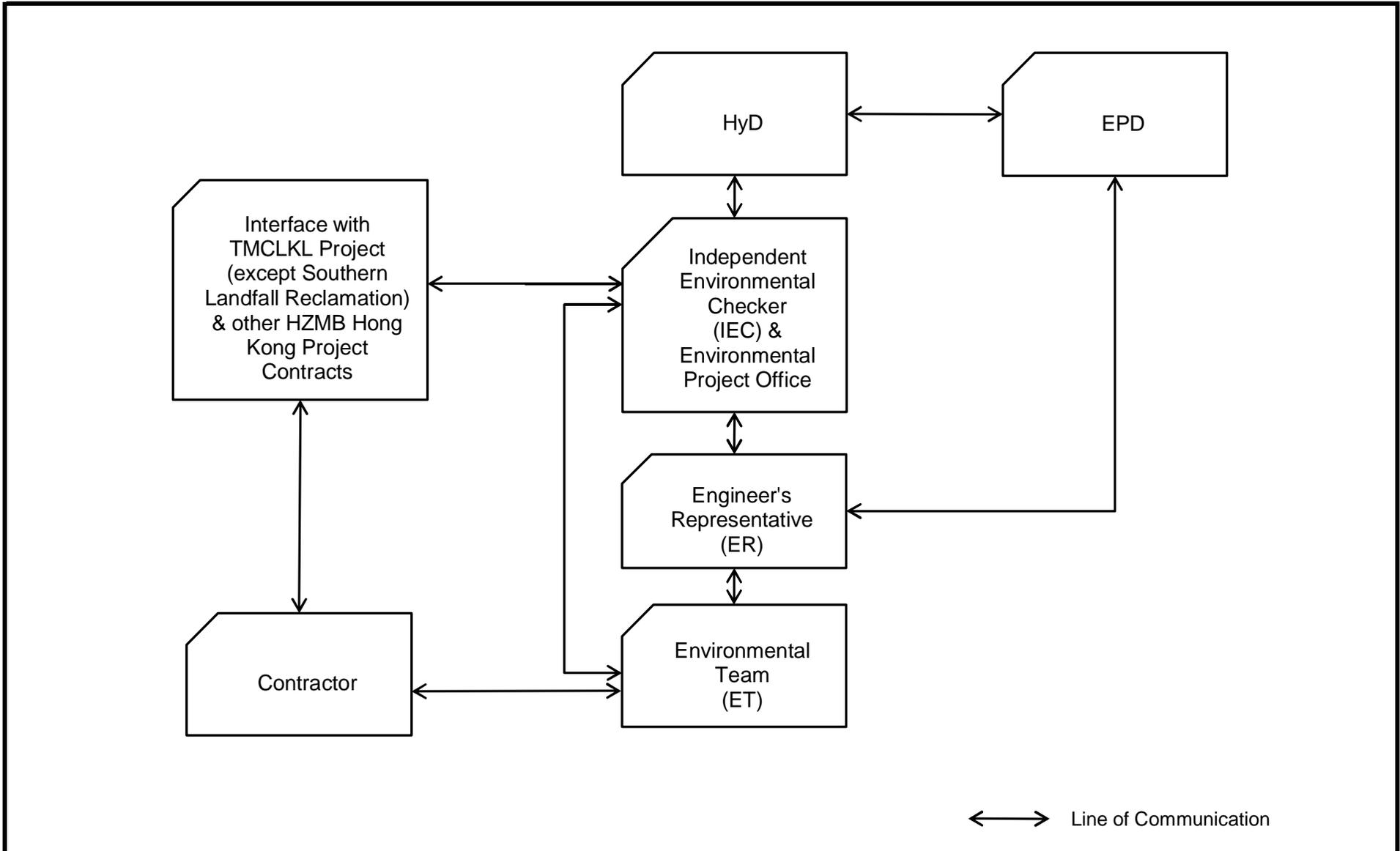
**Impact Dolphin Monitoring
Line Transect Layout Map**



Figure 4



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Activity ID Activity Name

70th Monthly Progress Report Status as on 21 September 2017

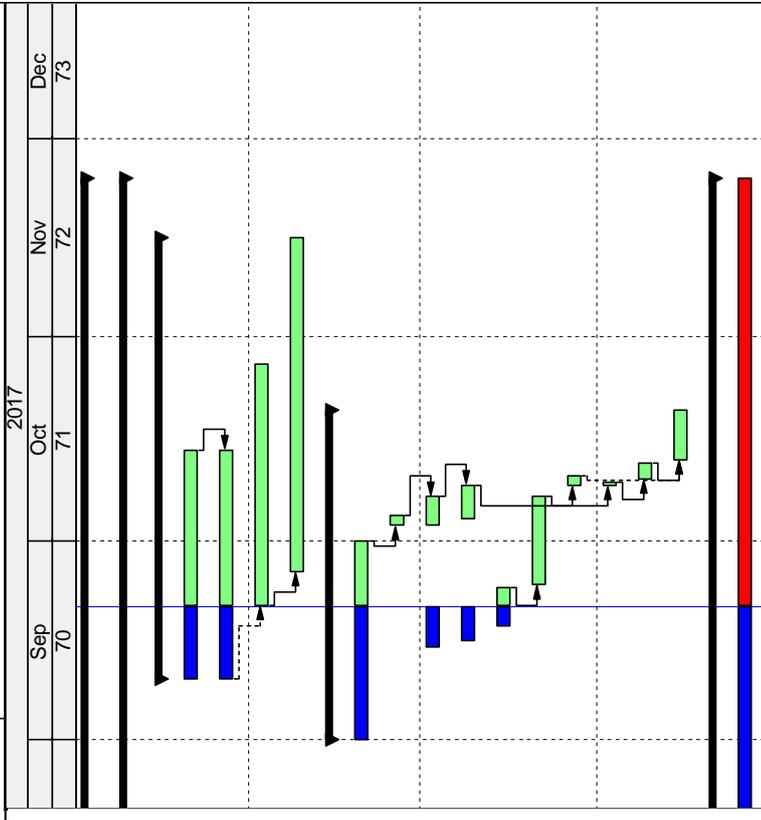
Additional Works

Reinstatement of Seawall After Removal of Temporary Jetty by C2 contractor

OS01-0030	Removal of Temp Rockfill Seaside
OS01-0040	Removal of Temp Rockfill Landside
OS01-0050	Installation Underlayer
OS01-0060	Installation of Rock Armour
OS02-0020	Effluent Discharge Pipe K047/048
	Cut Down existing steel sheet pile & capping beam
OS02-0030	300mm Rockfill bedding
OS02-0040	Discharge pipe laying
OS02-0050	Discharge Pipe Concrete Surrounding
OS02-0060	Outfall Precast Concrete
OS02-0070	Outfall Curing
OS02-0080	Outfall Installation
OS02-0100	Flexible Joint
OS02-0110	Backfill
OS02-0120	Reinstatement at K047/048

Additional GI Works

OS03-0020 Outstanding Marine Based GI Works 194nos



█ Remaining Level of Effort █ Remaining Work ▶ S...
█ Actual Level of Effort █ Critical Remaining Work
█ Actual Work ◆ Milestone

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; 		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<ul style="list-style-type: none"> • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • All unpaved roads/exposed area shall be watered which results in dust suppression by forming moist cohesive films among the discrete grains of road surface material. • No burning of debris or other materials on the works areas is allowed; • Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created; • Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading; • During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and 		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<ul style="list-style-type: none"> Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable 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	(The dust monitoring works under EM&A programme for the Contract are covered by Contract No. HY/2013/01)
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 	All construction sites	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<p>properly extracted and vented to fabric filtering system to meet the emission limits for TSP;</p> <ul style="list-style-type: none"> • 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 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	<p>The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point:</p> <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)				

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
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 so that the noise is directed away from nearby NSRs; • silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • mobile plant should be sited as far away from NSRs as possible and practicable; • material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 	All construction sites	V
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

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
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 TMCLKLEIA	N6	Implement a noise monitoring under EM&A programme.	Selected representative noise monitoring station	(The noise monitoring works under EM&A programme for the Contract are covered by Contract No. HY/2013/01.)
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

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
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; • 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 	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<ul style="list-style-type: none"> 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 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. 	All construction sites	V
S8.2.12- S8.3.15 of HKBCFEIA and S12.6 of TMCLKLEIA	WM6	<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 	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<p>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.</p> <ul style="list-style-type: none"> 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 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

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
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 considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided. • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes. • Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest 	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		licensed landfill or refuse transfer station. <ul style="list-style-type: none"> • All waste containers shall be in a secure area on hardstanding. 		
Water Quality (Construction Phase)				
	W1	Mitigation during the marine works to reduce impacts to within acceptable levels have been recommended and will comprise a series of measures that restrict the method and sequencing of backfilling, as well as protection measures. Details of the measures are provided below: <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; 	During filling	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<ul style="list-style-type: none"> • 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 to prevent sediment loss at navigation accesses. The length of each staggered layers shall be at least 200m; • Single layer silt curtain to be applied around the North-east airport water intake; • The silt-curtains should be maintained in good condition to ensure the sediment plume generated from filling be confined effectively within the site boundary; • The filling works shall be scheduled to spread the works evenly over a working day; 		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<ul style="list-style-type: none"> • 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 TMCLKLEIA	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> <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 	All land-based construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<p>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;</p> <ul style="list-style-type: none"> • 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 should be covered with tarpaulin or similar fabric during rainstorms; • manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; • discharges of surface run-off into foul sewers must always be prevented in 		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<p>order not to unduly overload the foul sewerage system;</p> <ul style="list-style-type: none"> • 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; • 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 		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		capacity equal to 110% of the storage capacity of the largest tank; and <ul style="list-style-type: none"> • 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	(The water quality monitoring works under EM&A programme for the Contract are covered by Contract No. HY/2013/01.)
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 • Good site practices • Strict enforcement of no marine dumping • Site runoff control 	Seawall, reclamation area	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		<ul style="list-style-type: none"> • 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 HKBCFEIA and S8.14 of TMCLKLEIA	E6	<ul style="list-style-type: none"> • Control vessel speed • Skipper training • Predefined and regular routes for working vessels; avoid Brothers Islands 	Marine traffic	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
S10.10 of HKBCFEIA and S8.14 of TMCLKLEIA	E7	<ul style="list-style-type: none"> • Vessel based dolphin monitoring 	Northeast and Northwest Lantau	(The vessel based dolphin monitoring works under EM&A programme for the Contract covered by Contract No. HY/2013/01.)
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</p>	All construction site areas	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		adopt “natural-look” by means of using armour rocks in the form of natural 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 µg/m ³	500 µg/m ³
AMS3B*	368 µg/m ³	500 µg/m ³
AMS6	360 µg/m ³	500 µg/m ³
AMS7	370 µg/m ³	500 µg/m ³

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

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

Location	Action Level	Limit Level
AMS2	176 µg/m ³	260 µg/m ³
AMS3B*	167 µg/m ³	260 µg/m ³
AMS6	173 µg/m ³	260 µg/m ³
AMS7	183 µg/m ³	260 µg/m ³

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

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

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



China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for November / 2017 (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	Surplus Surcharge exported to Macau	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 '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m ³)
Jan-17	0.0000	0.0000	0.0000	15.6100	73.2375	0.0000	18.8927	0.0000	0.3640	0.0000	0.0000	0.0455
Feb-17	0.0000	0.0000	0.0000	39.0950	182.3675	0.0000	17.5747	0.0000	0.3920	0.0000	0.0000	0.0260
Mar-17	0.0000	0.0000	0.0000	60.6496	171.6925	0.0000	20.6013	0.0000	0.0000	0.0000	0.0000	0.0585
Apr-17	0.0000	0.0000	0.0000	2.4750	55.3140	0.0000	39.9607	0.0000	0.4480	0.0000	0.0000	0.0325
May-17	0.0000	0.0000	0.0000	0.0000	4.5540	0.0000	22.4307	0.0000	0.0000	0.0000	0.0000	0.0455
Jun-17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3920	0.0000	0.0000	0.0390
Sub-total	0.0000	0.0000	0.0000	117.8296	487.1655	0.0000	119.4601	0.0000	1.5960	0.0000	0.0000	0.2470
Jul-17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3360	0.0000	0.0000	0.0195
Aug-17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3360	0.0000	0.0000	0.0130
Sep-17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0130
Oct-17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0130
Nov-17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2520	0.0000	0.0000	0.0065
Dec-17												
Total	0.0000	0.0000	0.0000	117.8296	487.1655	0.0000	119.4601	0.0000	2.5200	0.0000	0.0000	0.3120

- Notes:
- (1) Broken concrete for recycling into aggregates.
 - (2) Plastics refer to plastic bottles / containers / sheets / foam / barrier 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”.

Appendix F

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 month	Total no. received since project commencement
Environmental complaints	27 October 2017	A complaint forwarded to us by ENPO on 27 October 2017; the complainant complained that yellowish muddy water was discharged into the sea from construction site location C3 of the artificial island of the Hong Kong-Zhuhai-Macao Bridge and this has been persist for one week. After investigation, there is no adequate information to	Closed	1	47

		conclude the complaint is related to this Contract.			
Environmental complaints	23 November 2017	IEC/ENPO received a complaint on 23 November 2017 which was referred by EPD, and subsequently referred to ET for investigation. The complainant complained that, on Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Artificial Island, due to watering was not provided to all areas, large amount of fugitive dust was generated, especially at the toll kiosks. After investigation, there is no adequate information to conclude the complaint is related to this Contract.	Closed	1	48
Notification of summons	-	-	-	-	2
Successful Prosecutions	-	-	-	-	2

Appendix G – 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 Contractors 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"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor. 	<ol style="list-style-type: none"> 1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If ER/SOR is satisfied with the proposal of any other measures, ER/SOR to signify the agreement in writing on the measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the ER/SOR; 3. Implement the agreed measures.
Limit Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor of findings; 5. Check monitoring data; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and 	<ol style="list-style-type: none"> 1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If ER/SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring

	<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>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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