

# **Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2**

Annual EM&A Review Report

November 2016 to October 2017

**Submitted to**

Environmental Protection Department

**Prepared By**

Meinhardt Infrastructure and Environment Ltd

Meinhardt Infrastructure and Environment Limited

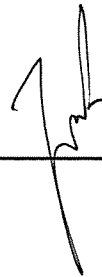
**Entrusted Portion of Widening of Tolo  
Highway / Fanling Highway between Island  
House Interchange and Fanling Stage 2**

Annual EM&A Review Report

(November 2016 to October 2017)

Certified by:

Fredrick Leong



Position:

Environmental Team Leader

Date:

26 January 2018

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Attn: Mr. James Penny

**Your Reference**

**Environmental Monitoring and Audit (EM&A) for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling Stage 2 (between Tai Hang to Wo Hop Shek Interchange) – Entrusted Works Environmental Permit No. EP-324/2008/E– Annual EM&A Report for November 2016 to October 2017 for the portion of Stage 2 works entrusted to CEDD under Contract No. CV/2012/09**

**Our Reference**

JFP/EC/ST/pl/T329380/22  
.05/L-0199

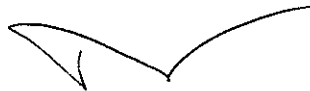
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We refer to the Annual EM&A Report for November 2016 to October 2017 for the Project received on 5 January 2017 submitted by ET via email. We confirm we have no comment.

Yours faithfully  
for MOTT MACDONALD HONG KONG LIMITED



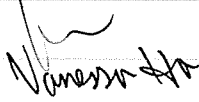
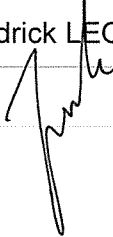

Steven Tang  
Independent Environmental Checker

c.c.

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## Contents

	Page
<b>EXECUTIVE SUMMARY</b>	<b>i</b>
<b>1 INTRODUCTION AND PROJECT INFORMATION</b>	<b>1</b>
1.1 Background.....	1
1.2 Construction Programme and Activities.....	1
1.3 Project Organisation.....	3
1.4 Purpose of the Report .....	3
<b>2 SUMMARY OF EM&amp;A REQUIREMENTS</b>	<b>3</b>
2.1 Environmental Impact Hypothesis under Monitoring.....	3
2.2 Monitoring Requirements .....	4
2.3 Environmental Mitigation Measures.....	4
<b>3 SUMMARY OF EM&amp;A MONITORING DATA</b>	<b>5</b>
3.1 Monitoring Data.....	5
3.2 Summary of Monitoring Exceedances .....	5
<b>4 ENVIRONMENTAL NON-CONFORMANCE</b>	<b>7</b>
4.1 Summary of Environmental Non-Compliance.....	7
4.2 Summary of Environmental Complaints.....	7
4.3 Summary of Environmental Summon and Successful Prosecutions.....	7
<b>5 REVIEW OF THE VALIDITY OF EIA PREDICTIONS</b>	<b>7</b>
<b>6 REVIEW OF EM&amp;A PROGRAMME</b>	<b>7</b>
<b>7 CONCLUSIONS</b>	<b>7</b>

### List of Tables

Table 1.1	Contact Information of Key Personnel
Table 2.1	Monitoring Parameter
Table 3.1	Summary of Monitoring Data in the Reporting Period
Table 3.2	Summary of Exceedance Events in the Reporting Period

### List of Figures

Figure 1	Demarcation of Entrusted Portion of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling – Stage 2
Figure 2	Environmental Monitoring Locations

### List of Appendices

Appendix A	Construction Programme
Appendix B	Project Organization Structure
Appendix C	Summary of Event and Action Plan
Appendix D	Implementation Schedule of Environmental Mitigation Measures (EMIS)
Appendix E	Summary of Meteorological Condition Extracted from Hong Kong Observatory

Appendix F Environmental Monitoring Data for Air, Noise and Water Quality

Appendix G Statistics on Complaints, Notifications of Summons and Successful Prosecutions

## EXECUTIVE SUMMARY

This report documents the findings of EM&A works conducted during the period between November 2016 and October 2017.

The impact stage EM&A programme for the Project includes air quality, noise and water quality monitoring.

The EM&A programme was carried out by the ET in accordance with the EM&A Manual requirements. It is concluded from the environmental monitoring and audit works that adequate environmental mitigation measures have been implemented by the civil works contractors where appropriate in the reporting period.

In the reporting period, 7 exceedance events were recorded and the exceedances were concluded not related to the Project. No necessary remedial actions have been taken.

No environmental non-compliance was noted. No environmental complaint was received. No environmental related prosecution or notification of summons was received in the reporting period.

The box culvert works have been partially completed by the end of March 2014 except the last construction activity, i.e. installation of a base slab at Box Culvert ID4. The box culvert works had been completed in March 2017. The 4-week post-construction water quality monitoring at I5 was completed in 28 April 2017.

## **1 INTRODUCTION AND PROJECT INFORMATION**

### **1.1 Background**

- 1.1.1 The Project is a Designated Project under the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499). An Environmental Impact Assessment (EIA) Report together with an Environmental Monitoring and Audit (EM&A) Manual were approved on 14 July 2000 (Register Number: EIA-043/2000). The Project is governed by an Environmental Permit (EP) (EP-324/2008) which was granted on 23 December 2008. A variation of EP (VEP) was applied and the VEP (EP-324/2008/A) was subsequently granted on 31 January 2012. An additional VEP has been applied on 24 February 2014 and the VEP (EP-324/2008/B) was subsequently granted on 17 March 2014. Furthermore, an additional VEP has been applied on 9 March 2015 and the VEP (EP-324/2008/C) was subsequently granted on 27 March 2015. The previous VEP (EP-324/2008/D) was granted on 27 August 2015. The current VEP (EP-324/2008/E) was granted on 26 January 2017.
- 1.1.2 Chun Wo Construction & Engineering Co Ltd (Chun Wo) was commissioned by the Civil Engineering and Development Department (CEDD) as the Civil Contractor for the Entrusted Portion of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling Stage 2. Meinhardt Infrastructure & Environment Ltd (MIEL) has been appointed by Chun Wo as the Environmental Team (ET) to fulfill the corresponding EM&A requirements pursuant to Environmental Permit No. EP-324/2008/D in accordance with the Updated EM&A Manual (dated October 2013) for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling Stage 2. The EM&A programme commenced in 5 November 2013.
- 1.1.3 **Figure 1** shows the works areas for the Entrusted Portion of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling Stage 2.

### **1.2 Construction Programme and Activities**

- 1.2.1 The master construction programme for the entire construction period is presented in **Appendix A**. The major construction activities undertaken in the reporting period are summarized below:
- Abutment Construction;
  - Boundary wall construction for DSD pumping station;
  - Construction of Boundary Wall for DSD Pumping Station;
  - Construction of Profile Barrier on Viaduct deck;
  - Construction of Remaining Base Slab of Box Culvert ID4;
  - Demolition of Existing Vehicular Bridge;
  - Drainage Work;
  - Existing Kiu Tau Vehicular Bridge demolition;
  - Extended Podium Construction near Bored Pile Wall;



- Footbridge Construction;
- Gabion Wall Construction;
- Installation of Noise Barrier Steel Column & Panel;
- Installation Works of Mini-pile;
- Noise Barrier Construction;
- Parapet Installation;
- Pier / Pier Table Construction;
- Pile Cap Works;
- Pipe Jacking works for DN2200 Water Mains;
- Pit Construction for Heading Works;
- Planter Wall Construction;
- Portal Construction;
- Pre-drilling for Noise Barrier.
- Remaining Works on New Kiu Tau Footbridge;
- Retaining Wall Construction;
- Roadworks;
- Roundabout Modification Works.
- Sewer Works;
- Storm Drains Laying;
- Stressing of External Tendon;
- Trenchless excavation.
- Utilities Duct Laying;
- Viaduct Segment Erection;
- Water Main Laying; and
- Cable Detection and Trial Trenches.

### 1.3 Project Organisation

1.3.1 The project organization structure is shown in **Appendix B**. The key personnel contact names and numbers for the Project, together with the general enquiry hotline, are summarised in **Table 1.1**.

**Table 1.1 Contact Information of Key Personnel**

Party	Role	Position	Name	Tele- phone	Fax
AECOM	Engineer's Representative	Senior Resident Engineer	Mr. Alan Lee	2171 3303	2171 3498
		Resident Engineer (Environmental)	Mr. Perry Yam	2171 3350	
Mott MacDonald	Independent Environmental Checker (IEC)	IEC	Mr. Steven Tang	2828 5920	2827 1823
Chun Wo	Contractor	Site Agent	Mr. Daniel Ho	2638 6144	2638 7077
		Environmental Officer	Ms. Tiffany Tsang	2638 6150	
Meinhardt	Environmental Team (ET)	ET Leader	Mr. Fredrick Leong	2859 1739	2540 1580
Enquiry Hotline	General Enquiry	--	Ms Helena Mak	6355 1731	--

### 1.4 Purpose of the Report

1.4.1 This is the Annual EM&A Review Report which summaries the impact monitoring results and audit findings for the Project during the reporting period between November 2016 and October 2017.

## 2 SUMMARY OF EM&A REQUIREMENTS

### 2.1 Environmental Impact Hypothesis under Monitoring

2.1.1 The EIA Report concluded that with proper mitigation measures implemented, fugitive dust emission during construction phase would be controlled and will not exceed the acceptable criteria.

2.1.2 For construction noise, exceedances were predicted only at 2 schools (SR41 Wong Shiu Chi Middle School and SR45 HK Teacher's Association Secondary School) but they are out of the scope of this EM&A Programme. Hence the EIA did not anticipate any noise exceedances during construction phase within the scope of this EM&A Programme.

2.1.3 For water quality, it is also anticipated that with proper protection measures being implemented, the water quality during construction phase would be locally confined and controllable.

2.1.4 The above criteria have been tested under this EM&A Programme during the reporting period.

## 2.2 Monitoring Requirements

2.2.1 In accordance with the Updated EM&A Manual, environmental parameters including air quality, noise and water quality have been monitored. The specific parameters, monitoring frequency and the respective Action and Limit Levels are given in **Table 2.1** and the location of the monitoring station is shown in the **Figure 2**.

**Table 2.1 Monitoring Parameter**

Parameter	Unit	Action Level	Limit Level	Frequency
<b>Air Quality</b>				
1-hour TSP	µg/m <sup>3</sup>	292.7	500	Three times every 6 days
24-hour TSP	µg/m <sup>3</sup>	170.3	260	Once every 6 days
<b>Construction Noise</b>				
Leq 30min	dB(A)	When one documented valid complaint is received	75	Once every Week
<b>Water Quality</b>				
Depth		--	--	Three occasions per week
Temperature	°C	--	--	Three occasions per week
Salinity	ppt	--	--	Three occasions per week
pH	--	--	--	Three occasions per week
DO	mg/L	6.7	4mg/L or 40% saturation at 15 degree Celsius	Three occasions per week
DO Saturation	%	--	--	Three occasions per week
Turbidity	NTU	81.9NTU or 120% of upstream control station's Tby of the same day	91.9NTU or 130% of upstream control station's Tby of the same day	Three occasions per week
SS	mg/L	42.6 mg/L or 120% of upstream control station's SS of the same day	46.8 mg/L or 130% of upstream station's SS of the same day and specific sensitive receiver water quality requirements	Three occasions per week

2.2.2 The Event and Action Plan for the occurrence of non-compliance of the criteria of the monitoring parameters is annexed in **Appendix C**.

## 2.3 Environmental Mitigation Measures

2.3.1 Environmental mitigation measures have been recommended in the EM&A Manual and is given in **Appendix D**. The implementation status for the reporting period is also given in the Appendix.

### 3 SUMMARY OF EM&A MONITORING DATA

#### 3.1 Monitoring Data

3.1.1 Monitoring has been conducted in accordance with the specification in the EM&A Manual in the reporting period. Summary of meteorological condition for the reporting period have been extracted from Hong Kong Observatory and are given in **Appendix E**. Monitoring data with graphical presentation for the reporting period have been given in **Appendix F**. A summary on the monitoring results has also been given in **Table 3.1**.

**Table 3.1 Summary of Monitoring Data in the Reporting Period**

Monitoring Location	Minimum	Maximum	Average
<b>Air Quality</b>			
1-hour Total Suspended Particulate			
SR77	78.5µg/m <sup>3</sup>	235.4µg/m <sup>3</sup>	143.8µg/m <sup>3</sup>
24-hour Total Suspended Particulate			
SR77	14.1µg/m <sup>3</sup>	138.4µg/m <sup>3</sup>	74.2µg/m <sup>3</sup>
<b>Construction Noise</b>			
SR77	59.0dB(A)	74.0dB(A)	67.2dB(A)
<b>Water Quality</b>			
DO			
I5	5.17mg/L	11.5mg/L	8.0mg/L
C3a	5.1mg/L	9.7mg/L	7.1mg/L
C3b	5.4mg/L	9.6mg/L	7.6mg/L
Turbidity			
I5	2.0NTU	66.1NTU	10.8NTU
C3a	5.9NTU	135.0NTU	25.2NTU
C3b	3.2NTU	73.2NTU	12.9NTU
SS			
I5	2.5mg/L	16mg/L	6.8mg/L
C3a	2.6mg/L	27.0mg/L	8.8mg/L
C3b	2.9mg/L	38.5mg/L	7.6mg/L

#### 3.2 Summary of Monitoring Exceedances

3.2.1 The number of exceedance events recorded in the reporting period is summarized in **Table 3.2**.

3.2.2 Investigation for the exceedance event in the reporting period has been completed and the exceedance was concluded not related to the Project. No necessary remedial actions have been taken. The respective investigation report has been presented in the respective Monthly EM&A Report.

**Table 3.2 Summary of Exceedance Events in the Reporting Period**

Parameter		Number of Exceedance Events	Number of Project Related Exceedance Events
<b>Air Quality</b>			
1-hour Total Suspended Particulates	Action Level	0	0
	Limit Level	0	0
24-hour Total Suspended Particulates	Action Level	0	0
	Limit Level	0	0

Parameter		Number of Exceedance Events	Number of Project Related Exceedance Events
<b>Construction Noise</b>			
Leq 30min	Action Level	0	0
	Limit Level	0	0
<b>Water Quality</b>			
DO	Action Level	6	0
	Limit Level	0	0
Turbidity	Action Level	0	0
	Limit Level	0	0
SS	Action Level	0	0
	Limit Level	1	0

3.2.3 The Contractor has been reminded to strengthen the mitigation measures including:

*Air Quality*

- All vehicles should be washed to remove any dusty materials before leaving the construction site.
- Ensure all vehicles are properly washed to remove mud and debris before leaving the site.
- Stockpiling shall be covered to avoid dust generation

*Chemical and Waste Management*

- Good housekeeping should be maintained and stagnant water should be removed from secondary containment regularly.
- Provide proper chemical and chemical waste management.
- A spill response procedure shall be in place and absorption material available for minor spillages.
- Ensure all chemical drums on site to be placed on drip tray
- Refuse shall be cleared frequently to provide sufficient waste skip for workers and keep site work area clean
- Housekeeping shall be enhanced and refuse shall be collected regularly

*Water Quality*

- Surface run-off, rainwater and waste water from construction site discharged into appropriate drains via adequately designed sand/ silt removal facilities (e.g. sand traps, silt traps and sedimentation basins) and pH adjusted before discharge.
- *Ensure the de-silting facilities are cleared frequently to prevent direct discharge of construction site runoff*
- *Implement sufficient mitigation measures to avoid runoff leakage from road works areas and divert site effluent to wastewater treatment facilities*

## **4 ENVIRONMENTAL NON-CONFORMANCE**

### **4.1 Summary of Environmental Non-Compliance**

4.1.1 No environmental non-compliance was recorded in the reporting period.

### **4.2 Summary of Environmental Complaints**

4.2.1 No environmental complaint was received in the reporting period.

### **4.3 Summary of Environmental Summon and Successful Prosecutions**

4.3.1 No environmental related prosecution or notification of summons was received in the reporting period. The cumulative statistics are provided in is provided in **Appendix G**.

## **5 REVIEW OF THE VALIDITY OF EIA PREDICTIONS**

5.1.1 The EIA report predicted that with proper implementation of the mitigation measures for air, noise and water quality, environmental impact would be locally confined and controllable. During the reporting period, 7 exceedances were recorded and the exceedances were concluded not related to the Project. Hence, it is considered that the EIA predictions is valid for the reporting period.

## **6 REVIEW OF EM&A PROGRAMME**

6.1.1 The EM&A programme was considered successfully and adequately conducted during the course of the reporting period.

6.1.2 The box culvert works have been partially completed by the end of March 2014 except the last construction activity, i.e. installation of a base slab at Box Culvert ID4. The box culvert works had been completed in March 2017. The 4-week post-construction water quality monitoring at I5 was completed in 28 April 2017.

## **7 CONCLUSIONS**

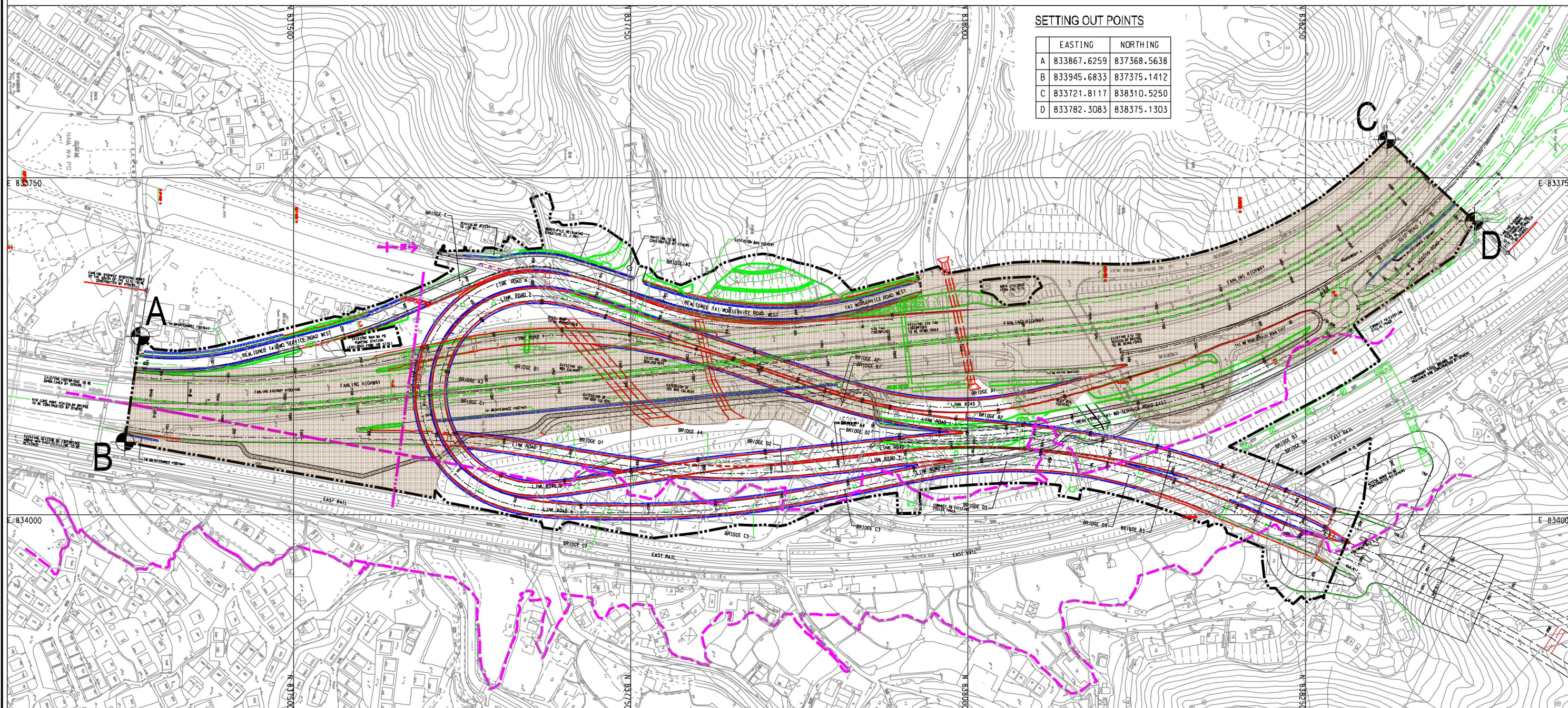
7.1.1 The EM&A programme was carried out by the ET in accordance with the EM&A Manual requirements. It is concluded from the environmental monitoring and audit works that adequate environmental mitigation measures have been implemented by the civil works contractors where appropriate in the reporting period.

7.1.2 In the reporting period, 7 exceedance events have been recorded and the exceedances were concluded not related to the Project. No necessary remedial actions have been taken.

7.1.3 No environmental non-compliances were noted. No environmental complaint was received in the reporting period.

7.1.4 The box culvert works have been partially completed by the end of March 2014 except the last construction activity, i.e. installation of a base slab at Box Culvert ID4. The box culvert works had been completed in March 2017. The 4-week post-construction water quality monitoring at I5 was completed in 28 April 2017.

## Figure

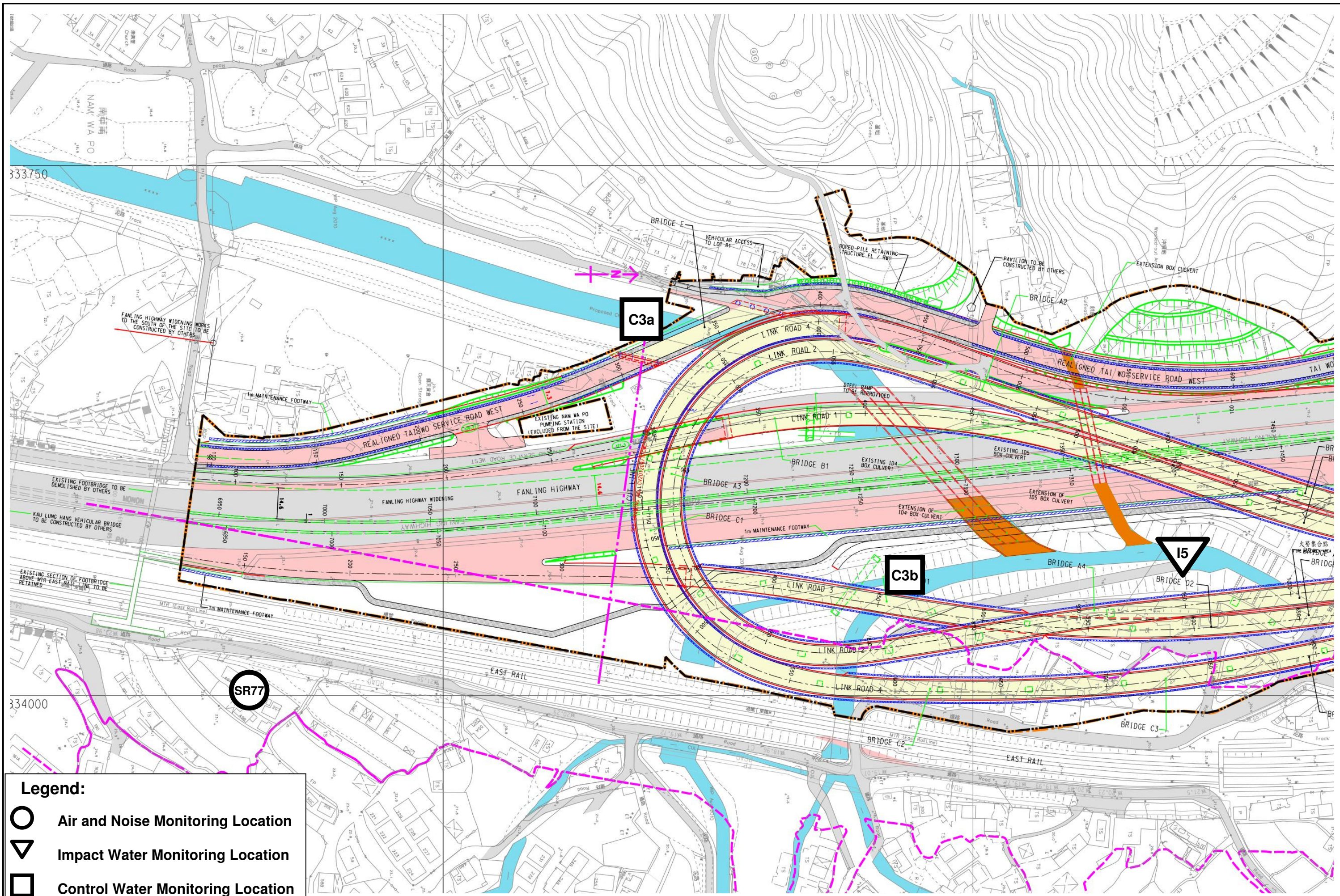


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**Legend:**

 Works Area for Entrusted Portion



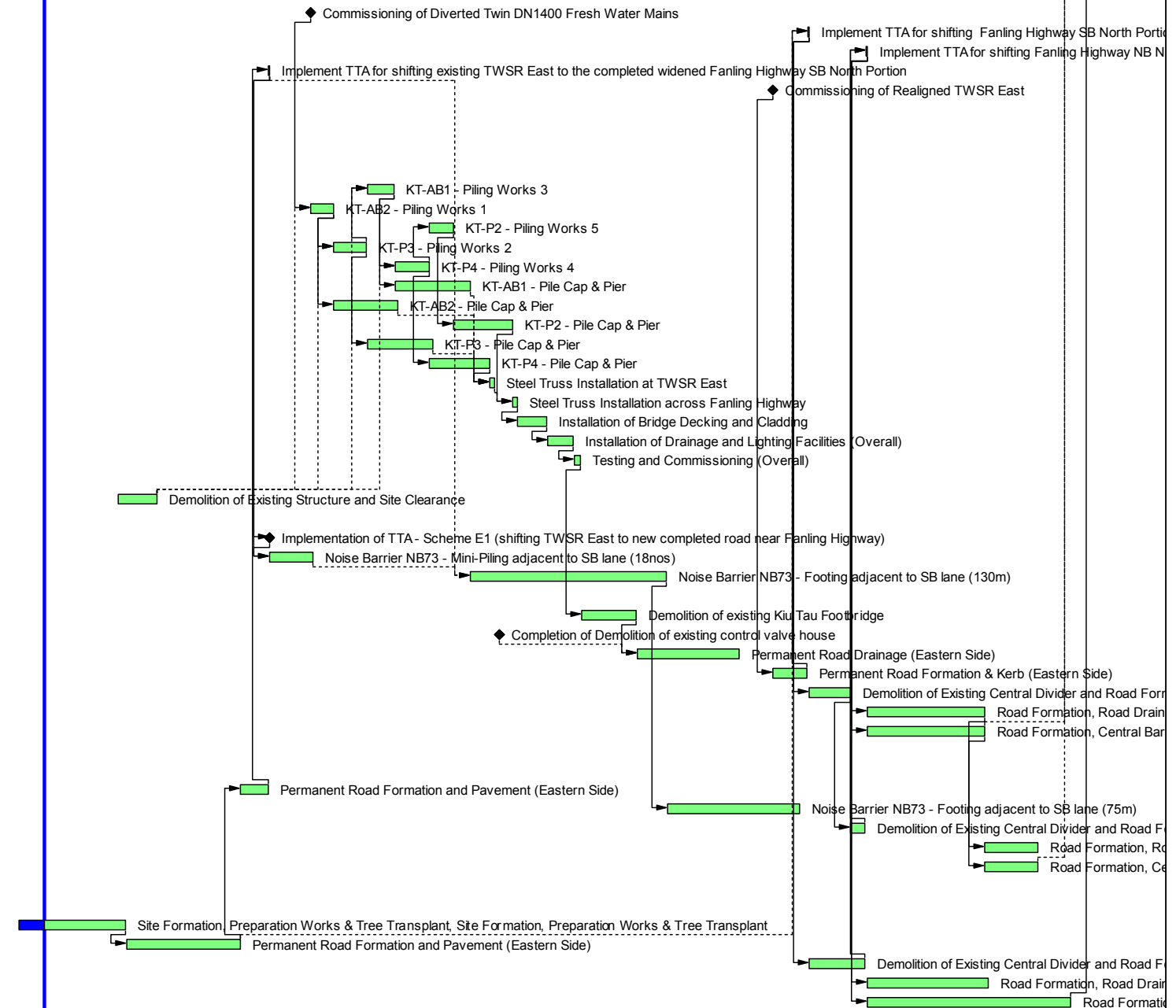


- Legend:**
- Air and Noise Monitoring Location
  - ▽ Impact Water Monitoring Location
  - Control Water Monitoring Location

Figure 2: Environmental Monitoring Locations

# Appendix A Construction Programme

Activity ID	Activity Name	OD	Start	Finish	Total Float	2014												2015												2016												2017												2018											
						A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
<b>CWP - Under Development (Postpone Pipe Jacking)</b>																																																																	
<b>Key Dates (Forecast)</b>																																																																	
<b>Major Works</b>																																																																	
KD-0105	KD1: Complete Section 1A - all HyD's entrustment works in Zone3 and SBZ2 except for landscaping works	0		07-Dec-17	53																																																												
KD-0205	KD2: Complete Section 1B - all HyD's entrustment works in NBZ1 except for landscaping works	0		09-Jan-18	234																																																												
<b>Major Milestones and Events</b>																																																																	
MS-0220	Commissioning of Diverted Twin DN1400 Fresh Water Mains	0		14-Nov-14	132																																																												
MS-1000A	Implement TTA for shifting Fanling Highway SB North Portion (CH7470-7925) eastward to the completed road near TWSI	2	07-Dec-16	08-Dec-16	3																																																												
MS-1000B	Implement TTA for shifting Fanling Highway NB North Portion (CH7470-7925) eastward to the designed alignment	2	06-Mar-17	07-Mar-17	3																																																												
MS-3000	Implement TTA for shifting existing TWSR East to the completed widened Fanling Highway SB North Portion	2	11-Sep-14	12-Sep-14	7																																																												
MS-3010	Commissioning of Realigned TWSR East	0	15-Oct-16		3																																																												
<b>Section IA &amp; IB - Fanling Highway Widening (KD-1 &amp; KD-2)</b>																																																																	
<b>Fanling Highway North Portion between CH7470 and CH7925</b>																																																																	
<b>Fanling Highway Zone 6 between CH7470 and CH7600 (Provision of Kiu Tau Footbridge)</b>																																																																	
<b>Kiu Tau Footbridge Re-provision (East)</b>																																																																	
FHW-5000A	KT-AB1 - Piling Works 3	30	09-Feb-15	21-Mar-15	612																																																												
FHW-5000B	KT-AB2 - Piling Works 1	30	15-Nov-14	19-Dec-14	132																																																												
FHW-5000C	KT-P2 - Piling Works 5	30	14-May-15	18-Jun-15	612																																																												
FHW-5000D	KT-P3 - Piling Works 2	40	20-Dec-14	07-Feb-15	612																																																												
FHW-5000E	KT-P4 - Piling Works 4	40	23-Mar-15	13-May-15	612																																																												
FHW-5010A	KT-AB1 - Pile Cap & Pier	90	23-Mar-15	14-Jul-15	660																																																												
FHW-5010B	KT-AB2 - Pile Cap & Pier	75	20-Dec-14	27-Mar-15	745																																																												
FHW-5010C	KT-P2 - Pile Cap & Pier	75	19-Jun-15	16-Sep-15	612																																																												
FHW-5010D	KT-P3 - Pile Cap & Pier	75	09-Feb-15	19-May-15	705																																																												
FHW-5010E	KT-P4 - Pile Cap & Pier	75	14-May-15	12-Aug-15	635																																																												
FHW-5020	Steel Truss Installation at TWSR East	7	13-Aug-15	20-Aug-15	635																																																												
FHW-5030	Steel Truss Installation across Fanling Highway	7	17-Sep-15	24-Sep-15	612																																																												
FHW-5040	Installation of Bridge Decking and Cladding	35	25-Sep-15	07-Nov-15	612																																																												
FHW-5050	Installation of Drainage and Lighting Facilities (Overall)	35	09-Nov-15	18-Dec-15	612																																																												
FHW-5060	Testing and Commissioning (Overall)	7	19-Dec-15	29-Dec-15	612																																																												
<b>At-Grade Road Works (130m)</b>																																																																	
FHW-5100	Demolition of Existing Structure and Site Clearance	45	27-Jan-14	26-Mar-14	135																																																												
FHW-5110*	Pipe Laying & Connection - Twin DN1400 Watermains (CHE & CHG) adjacent to existing TWSRE (90m, 9m depth)	186	31-Mar-14	14-Nov-14	132																																																												
FHW-5120	Implementation of TTA - Scheme E1 (shifting TWSR East to new completed road near Fanling Highway)	0	13-Sep-14		573																																																												
FHW-5130	Noise Barrier NB73 - Mini-Piling adjacent to SB lane (18nos)	54	13-Sep-14	17-Nov-14	573																																																												
FHW-5140	Noise Barrier NB73 - Footing adjacent to SB lane (130m)	240	14-Jul-15	07-May-16	332																																																												
FHW-5150*	Pipe Laying - DN1200 & DN600 Watermains (CHB & CHC) along existing TWSRE (120m long, 3m depth)	240	04-Sep-15	02-Jul-16	373																																																												
FHW-5160	Demolition of existing Kiu Tau Footbridge	65	30-Dec-15	22-Mar-16	885																																																												
FHW-5170	Completion of Demolition of existing control valve house	0		28-Aug-15	1050																																																												
FHW-5180	Permanent Road Drainage (Eastern Side)	125	23-Mar-16	24-Aug-16	885																																																												
FHW-5190	Permanent Road Formation & Kerb (Eastern Side)	45	15-Oct-16	06-Dec-16	3																																																												
FHW-5200	Demolition of Existing Central Divider and Road Formation (Middle Part, Pavement Only)	45	09-Dec-16	09-Feb-17	3																																																												
FHW-5300	Road Formation, Road Drainage, Kerb, Noise Barrier (Western Side)	145	08-Mar-17	01-Sep-17	520																																																												
FHW-5400	Road Formation, Central Barrier (Remaining Works at Middle Part)	145	08-Mar-17	01-Sep-17	57																																																												
<b>Fanling Highway Zone 7 between CH7600 and CH7660 (Existing Vehicular Bridge)</b>																																																																	
<b>At-Grade Roadworks (60m)</b>																																																																	
FHW-6100	Permanent Road Formation and Pavement (Eastern Side)	35	31-Jul-14	10-Sep-14	7																																																												
FHW-6110	Noise Barrier NB73 - Footing adjacent to SB lane (75m)	166	09-May-16	24-Nov-16	332																																																												
FHW-6200	Demolition of Existing Central Divider and Road Formation (Middle Part, Pavement Only)	20	10-Feb-17	04-Mar-17	3																																																												
FHW-6300	Road Formation, Road Drainage, Kerb (Western Side)	65	02-Sep-17	20-Nov-17	520																																																												
FHW-6400	Road Formation, Central Barrier (Remaining Works at Middle Part)	65	02-Sep-17	20-Nov-17	57																																																												
<b>Fanling Highway Zone 8 between CH7660 and CH7925</b>																																																																	
<b>At-Grade Roadworks (265m)</b>																																																																	
FHW-7100	Site Formation, Preparation Works & Tree Transplant	127	30-Aug-13 A	07-Feb-14	7																																																												
FHW-7110	Permanent Road Formation and Pavement (Eastern Side)	140	08-Feb-14	30-Jul-14	7																																																												
FHW-7200	Demolition of Existing Central Divider and Road Formation (Middle Part, Pavement Only)	65	09-Dec-16	04-Mar-17	3																																																												
FHW-7300	Road Formation, Road Drainage, Kerb (Western Side)	150	08-Mar-17	07-Sep-17	3																																																												
FHW-7400	Road Formation, Central Barrier (Remaining Works at Middle Part)	250	08-Mar-17	09-Jan-18	187																																																												



- Actual Work
- Remaining Work
- Critical Remaining Work
- ◆ Milestone

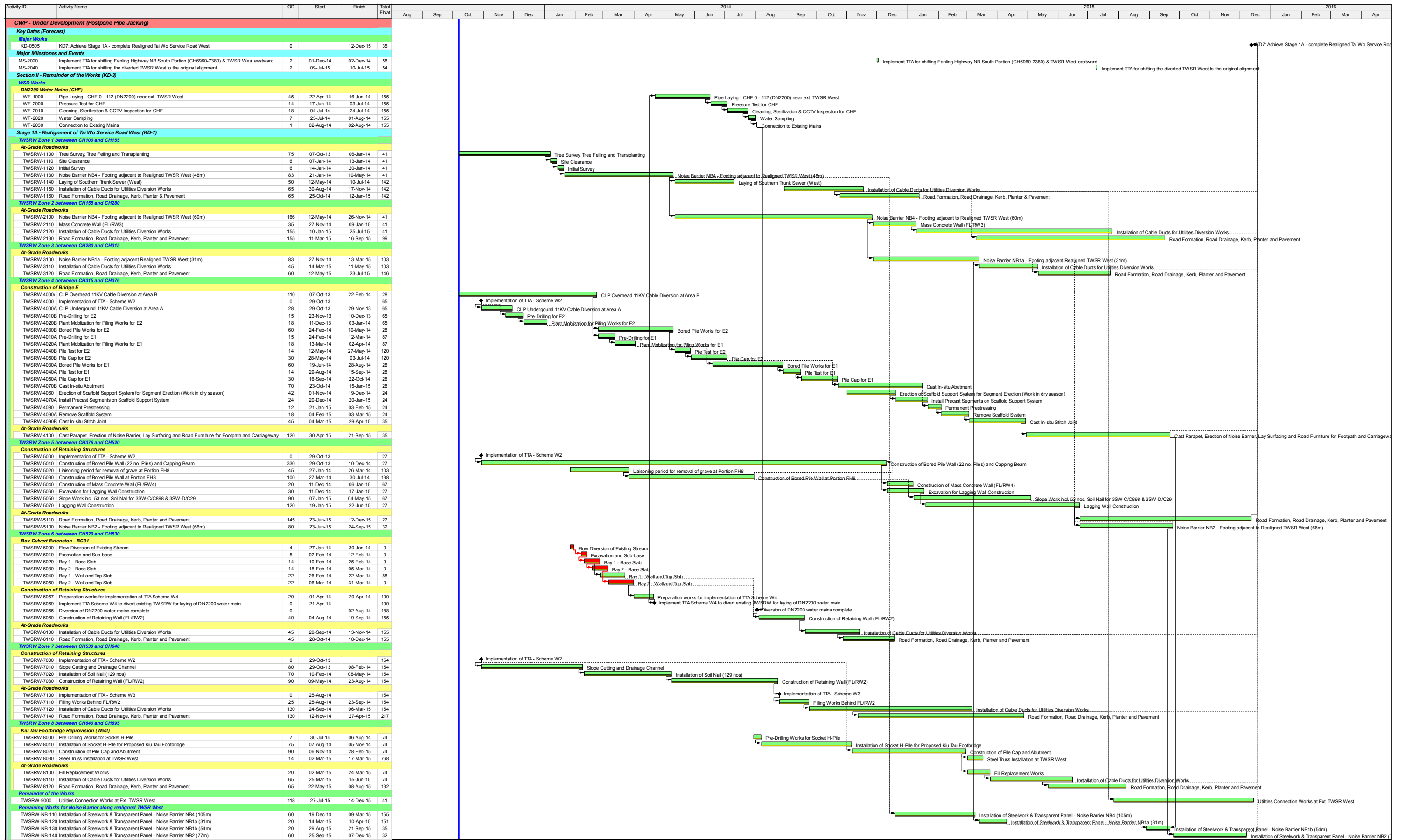
**CEDD Contract No. CV/2012/09**  
**Liantang / Heung Yuen Wai BCP - Site Formation & Infrastructure Works, Contract 3**

**Works Sequence for Fanling Highway North Portion**

Date	Revision	Checked	Approved
11-Oct-13		SL	







**俊和建築工程有限公司**  
**CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.**

- █ Actual Work
- █ Remaining Work
- █ Critical Remaining Work
- ◆ Milestone
- Project Baseline Bar

**CEDD Contract No. CV/2012/09**

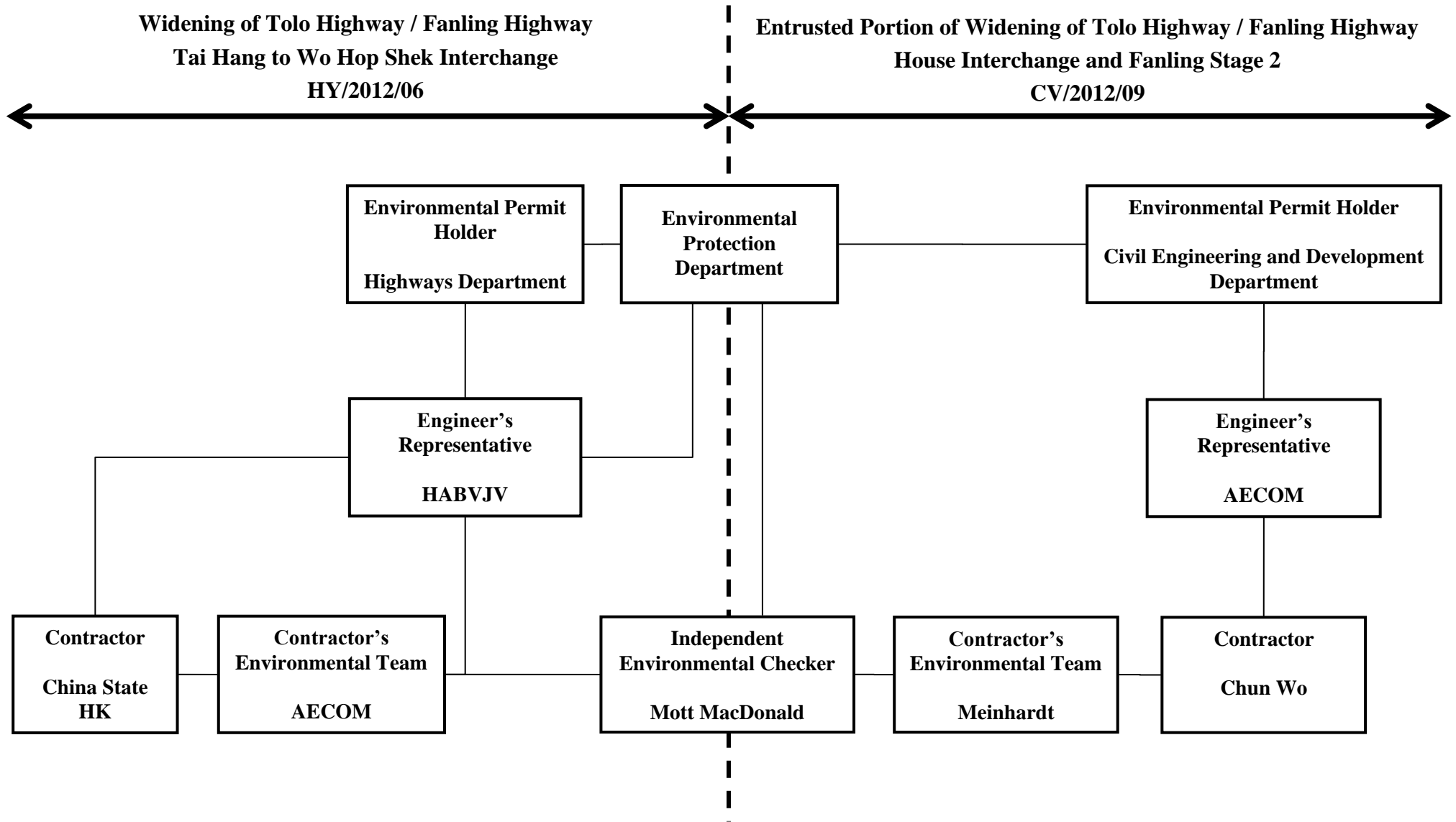
**Liantang / Heung Yuen Wai BCP - Site Formation & Infrastructure Works, Contract 3**

**Works Sequence for TWSRW**

Date	Revision	Checked	Approved
11-Sep-13		SL	

# Appendix B

## Project Organization Structure





# Appendix C

## Summary of Event and Action Plan

**Event and Action Plan for Air Quality**

Event	Action			
	ET Leader	IEC	ER	Contractor
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and ER;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice;</li> <li>2. Amend working methods if appropriate.</li> </ol>
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and ER;</li> <li>3. Repeat measurements to confirm findings;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Discuss with IEC and Contractor on remedial actions required;</li> <li>6. If exceedance continues, arrange meeting with IEC and ER;</li> <li>7. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the ER on the effectiveness of the proposed remedial measures;</li> <li>5. Supervise Implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>2. Implement the agreed proposals;</li> <li>3. Amend proposal if appropriate.</li> </ol>

Event	Action			
	ET Leader	IEC	ER	Contractor
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC, ER, Contractor and EPD;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise ER on the effectiveness of the proposed remedial measures;</li> <li>5. Supervise implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Amend proposal if appropriate.</li> </ol>
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, Contractor, and EPD;</li> <li>2. Identify source;</li> <li>3. Repeat measurement to confirm findings;</li> <li>4. Increase frequency to daily;</li> <li>5. Analyse Contractor's working procedures to determine possible mitigation to be;</li> <li>6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly;</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Ensure remedial measures properly implemented;</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Resubmit proposals if problem still not under control;</li> <li>5. Stop the relevant portion of works as determined by ER until the exceedance is abated.</li> </ol>

**Event and Action Plan for Noise Quality**

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify IEC and the Contractor.</li> <li>2. Carry out investigation.</li> <li>3. Report the results of investigation to IEC and the Contractor.</li> <li>4. Discuss with the Contractor and formulate remedial measures.</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review with analysed results submitted by ET.</li> <li>2. Review the proposed remedial measures by the Contractor and advise ER accordingly.</li> <li>3. Supervise the implement of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>4. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC.</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, EPD and the Contractor.</li> <li>2. Identify the source.</li> <li>3. Repeat measurement to confirm findings.</li> <li>4. Increase monitoring frequency.</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented.</li> <li>6. Inform IEC, ER, and EPD the causes &amp; actions taken for the exceedances.</li> <li>7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results.</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions.</li> <li>2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly.</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>4. Ensure remedial measures are properly implemented.</li> <li>5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification.</li> <li>3. Implement the agreed proposals.</li> <li>4. Resubmit proposals if problem still not under control.</li> <li>5. Stop the relevant activity of works as determined by the ER until the exceedance is abated.</li> </ol>

**Event and 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"> <li>1. Repeat in-situ measurement on next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, Contractor &amp; ER;</li> <li>4. Check monitoring data, all plant, equipment &amp; contractor's working methods;</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET &amp; Contractor's working methods;</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing; Notify, Contractor</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER &amp; confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Amend working methods if appropriate.</li> </ol>
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat measurement on next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, Contractor, ER &amp; EPD;</li> <li>4. Check monitoring data, all plant, equipment &amp; Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, ER &amp; Contractor;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Increase monitoring to daily until no exceedance of Action level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Checking monitoring data submitted by ET &amp; Contractor's working method;</li> <li>2. Discuss with ET &amp; Contractor on possible remedial actions;</li> <li>3. Review the proposed mitigation measures submitted by Contractor &amp; advise the ER accordingly;</li> <li>4. Supervise the implementation of mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC on the proposed mitigation measures;</li> <li>2. Ensure mitigation measures properly implemented;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the Engineer &amp; confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant &amp; equipment &amp; consider changes of working methods;</li> <li>4. Submit proposal of mitigation measures to ER within 3 working days of notification &amp; discuss with ET, IEC &amp; ER;</li> <li>5. Implement the agreed mitigation measures.</li> </ol>

Event	Action			
	ET Leader	IEC	ER	Contractor
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat measurement on next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, contractor, ER &amp; EPD;</li> <li>4. Check monitoring data, all plant, equipment &amp; contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, Contractor &amp; ER.</li> </ol>	<ol style="list-style-type: none"> <li>1. Checking monitoring data submitted by ET &amp; Contractor's working method;</li> <li>2. Discuss with ET &amp; Contractor on the possible mitigation measures;</li> <li>3. Review the proposed mitigation measures submitted by Contractor &amp; advise the ER accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Discuss with IEC, ET &amp; Contractor on the proposed mitigation measures;</li> <li>3. Request Contractor to review the working methods.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER &amp; confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant &amp; equipment &amp; consider changes of working methods;</li> <li>4. Submit proposal of mitigation measures to ER within 3 working days of notification &amp; discuss with ET, IEC &amp; ER.</li> </ol>
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat measurement on the next day of exceedance to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Inform IEC, Contractor, ER &amp; EPD;</li> <li>4. Check monitoring data, all plant, equipment &amp; Contractor's working methods;</li> <li>5. Discuss mitigation measures within IEC, Contractor &amp; ER;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</li> </ol>	<ol style="list-style-type: none"> <li>1. Checking monitoring data submitted by ET &amp; Contractor's working method;</li> <li>2. Discuss with ET &amp; Contractor on potential remedial actions;</li> <li>3. Review Contractor's mitigation measures whenever necessary to assure their effectiveness &amp; advise the ER accordingly;</li> <li>4. Supervise the implementation of mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC, ET &amp; Contractor on the proposed mitigation measures;</li> <li>2. Request Contractor to critically review the working methods;</li> <li>3. Make agreement on the mitigation measures to be implemented;</li> <li>4. Ensure mitigation measures are properly implemented;</li> <li>5. Consider &amp; instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposal of mitigation measures to ER within 3 working days of notification &amp; discuss with ET, IEC &amp; ER;</li> <li>3. Implement the agreed mitigation measures;</li> <li>4. Resubmit proposals of mitigation measures if problem still not under control;</li> <li>5. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.</li> </ol>

# **Appendix D Implementation Schedule of Environmental Mitigation Measures (EMIS)**

Impact	Environmental Protection Measures	Timing	Responsibility	Implementation Status #
<b>Air Quality</b>				
Air Quality during Construction	<ul style="list-style-type: none"> <li>Restricting heights from which materials are dropped, as far as practicable to minimize the fugitive dust arising from unloading/loading.</li> <li>All stockpiles of excavated materials or spoil of more than 50m<sup>3</sup> shall be enclosed, covered or dampened during dry or windy conditions.</li> <li>Effective water sprays shall be used to control potential dust emission sources such as unpaved haul roads and active construction areas.</li> <li>All spraying of materials and surfaces shall avoid excessive water usage.</li> <li>Vehicles that have the potential to create dust while transporting materials shall be covered, with the cover properly secured and extended over the edges of the side and tail boards.</li> <li>Materials shall be dampened, if necessary, before transportation.</li> <li>Travelling speeds shall be controlled to reduce traffic induced dust dispersion and re-suspension within the site from the operating haul trucks.</li> <li>Vehicle washing facilities shall be provided to minimise the quantity of material deposited on public roads.</li> </ul>	During Construction	Contractor	✓  Rem  Rem  ✓ ✓  ✓ ✓  Obs./ Rem
Air Quality during Operation	Not required	N/A	N/A	N/A
<b>Noise</b>				
Noise during Construction	<ul style="list-style-type: none"> <li>Use of silenced plant or plant equipped with mufflers or dampers in substitute of ordinary plant.</li> <li>Reduce the number of equipment and their percentage on-time.</li> </ul>	During Construction	Contractor	✓  ✓
Noise during Operation	Not required	N/A	N/A	N/A
<b>Water Quality</b>				
Water Quality during Construction	<u>Road Widening Works, Earthworks and Culvert Extension Works</u> <ul style="list-style-type: none"> <li>Wastewater generated from any concrete batching washdown of equipment or similar activities should be discharged into foul sewers, after the removal of settleable solids, and pH adjustment as necessary. All sewage discharges from the study area should meet the TM standards and approval from EPD through the licensing process is required.</li> </ul>	During Construction	Contractor	Obs./ Rem
	<ul style="list-style-type: none"> <li>Sand traps, oil interceptors and other pollution prevention installations should be provided, properly cleaned and maintained.</li> </ul>			✓

Notes (<sup>#</sup>): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;



	<ul style="list-style-type: none"> <li>• Runoff from exposed working areas, unfinished slopes and from unlined temporary channels should be directed to stilling basins and/or silt traps before discharging to the drainage outfalls.</li> <li>• Regular inspections of stilling basins and/or silt traps is required to ensure that sediment is not conveyed into the existing drainage system.</li> <li>• Open stockpiles should be covered with a tarpaulin cover.</li> <li>• During the wet season, any exposed top soils should be covered with a tarpaulin, shotcreted or hydroseeded.</li> <li>• Sand and silt from wash-water from vehicle washing should be settled out before discharging into storm drains.</li> <li>• Fuels should be stored in bunded areas such that spillage can be easily collected.</li> </ul>			<p>Obs./ Rem</p> <p>Obs</p> <p>✓</p> <p>✓</p> <p>Rem</p> <p>Obs</p>
Water Quality during Operation	Not required	N/A	N/A	N/A
<b>Waste Management</b>				
Waste Management during Construction	<p><u>General Waste</u></p> <ul style="list-style-type: none"> <li>• Transport of wastes off site as soon as possible.</li> <li>• Maintenance of accurate waste records.</li> <li>• Minimisation of waste generation for disposal (via reduction/recycling/re-use).</li> <li>• No on-site burning will be permitted.</li> <li>• Use of re-useable metal hoardings/signboards.</li> </ul> <p><u>Vegetation from site clearance</u></p> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate disposal.</li> <li>• Mulching to reduce bulk and where possible review opportunities for the possible beneficial use within landscaping areas.</li> </ul> <p><u>Demolition Wastes</u></p> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate disposal.</li> <li>• Appropriate stockpile management.</li> </ul>	<p>During Construction</p> <p>During Construction</p> <p>During Construction</p>	<p>Contractor</p> <p>Contractor</p> <p>Contractor</p>	<p>Obs./ Rem</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>

	<p><u>Excavated Materials</u></p> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate disposal / reuse.</li> <li>• Appropriate stockpile management.</li> <li>• Re-use of excavated material on or off site (where possible).</li> <li>• Special handling and disposal procedures in the event that contaminated materials are excavated.</li> </ul>	During Construction	Contractor	<p>✓</p> <p>✓</p> <p>✓</p> <p>N/A</p>
	<p><u>Construction Wastes</u></p> <ul style="list-style-type: none"> <li>• Segregation of materials to facilitate recycling/reuse (within designated area in appropriate containers/stockpiles).</li> <li>• Appropriate stockpile management.</li> <li>• Planning to reduce over ordering and waste generation.</li> <li>• Recycling and re-use of materials where possible (e.g. metal, wood from formwork)</li> <li>• For material which cannot be re-used/recycled, collection should be carried out by an approved waste contractor for landfill disposal.</li> </ul>	During Construction	Contractor	<p>Rem</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
	<p><u>Bentonite Slurries</u></p> <ul style="list-style-type: none"> <li>• Bentonite slurries should be reused as far as possible.</li> <li>• Disposal in accordance with Practice Note For Professional Persons ProPECC PN 1/94.</li> </ul> <p><u>Chemical Wastes</u></p> <ul style="list-style-type: none"> <li>• Storage within locked, covered and bunded area.</li> <li>• The storage area shall not be located adjacent to sensitive receivers e.g. drains.</li> <li>• Minimise waste production and recycle oils/solvents where possible.</li> <li>• A spill response procedure shall be in place and absorption material available for minor spillages.</li> <li>• Use appropriate and labelled containers.</li> <li>• Educate site workers on site cleanliness/waste management procedures.</li> </ul>	<p>During Construction</p> <p>During Construction</p>	<p>Contractor</p> <p>Contractor</p>	<p>N/A</p> <p>N/A</p> <p>✓</p> <p>Rem</p> <p>✓</p> <p>✓</p> <p>Obs.</p> <p>✓</p> <p>Obs./ Rem</p>

Notes (#): ✓ – Compliance; Rem – Reminder; Obs – Observation; N/C – Non Compliance; N/A – Not Applicable;

	<ul style="list-style-type: none"> <li>• If chemical wastes are to be generated, the contractor must register with EPD as a chemical waste producer.</li> <li>• The chemical wastes shall be collected by a licensed chemical waste collector.</li> </ul> <p><u>Municipal Wastes</u></p> <ul style="list-style-type: none"> <li>• Waste shall be stored within a temporary refuse collection facility, in appropriate containers prior to collection and disposal.</li> <li>• Regular, daily collections are required by an approved waste collector.</li> </ul>	During Construction	Contractor	✓ ✓ ✓ ✓
Waste Management during Operation	Not required.	N/A	N/A	N/A
<b>Ecology</b>				
Ecology during Construction	<p><u>Accurate Delineation of Works Area</u></p> <ul style="list-style-type: none"> <li>• Boundaries of proposed works areas shall be clearly identified and separated from external areas by a physical barrier to prevent encroachment of adjacent habitats.</li> <li>• Individual trees which fall within the works areas but which work plans show do not require removal are to be retained and fenced off to maximise protection.</li> </ul> <p><u>Dust generation</u></p> <p>There are a number of measures which shall be taken as specified in the Air Pollution Control (Construction Dust) Regulation on 'Dust Control Requirements, including the following key measures to be applied during construction:</p> <ul style="list-style-type: none"> <li>• vehicle washing facilities to be provided at every discernible or designated vehicle exit point;</li> </ul>	During Construction	Contractor	✓ ✓
	<ul style="list-style-type: none"> <li>• all temporary site access roads shall be sprayed with water to suppress dust as necessary;</li> <li>• all dusty materials should be sprayed with water immediately prior to any handling; and</li> <li>• all debris should be covered entirely by impervious sheeting or stored in a sheltered debris collection area.</li> </ul>			✓ ✓ ✓

	<p><u>Surface Run-off</u></p> <p>In general, mitigation measures shall be in accordance with ProPECC PN1/94 on 'Construction Site Drainage'. Key measures include:</p> <ul style="list-style-type: none"> <li>• Bund and cover stockpiles to avoid run-off;</li> <li>• Channel any run-off through a system of oil, grease and sediment / silt traps and reuse water on site where ever practical;</li> <li>• All vehicle maintenance to be undertaken within a bunded area; and</li> <li>• Maximise vegetation retention on-site to maximise absorption (minimise transport).</li> </ul>	During Construction	Contractor	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
Ecology during Operation	<ul style="list-style-type: none"> <li>• To conduct compensatory ecological planting as specified in the latest landscape plans approved by EPD (Clause 2.6 of the Environmental Permit refers).</li> </ul>	During Construction and operation	<p>Contractor (during construction) / LCSD* (during operation)</p> <p>(Note: * The division of vegetation planting and maintenance responsibilities shall follow the guidelines stipulated in ETWB TCW No. 2/2004.)</p>	N/A
<b>Landscape and Visual</b>				
Landscape and Visual during Construction	<p><u>Preservation of Existing Vegetation</u></p> <ul style="list-style-type: none"> <li>• Trees identified for retention within the project limit would be protected during the works</li> <li>• The tree transplanting and planting works shall be implemented by approved Landscape Contractors</li> </ul>	During Construction	Contractor	<p>✓</p> <p>✓</p>
	<p><u>Temporary Works Areas</u></p> <ul style="list-style-type: none"> <li>• Where feasible the works areas would be screened using hoarding and existing vegetation would be retained where possible to reduce the landscape and visual impacts arising from the construction activity. The landscape of these works areas would be restored following the completion of the construction phase.</li> </ul>	During Construction	Contractor	<p>✓</p>

	<p><u>Hoarding</u></p> <ul style="list-style-type: none"> <li>• A hoarding would be erected where practicable in the most visually sensitive locations to screen the temporary construction works from the local VSRs.</li> </ul> <p><u>Top Soils</u></p> <ul style="list-style-type: none"> <li>• The works will result in disturbance to extensive areas of topsoil. Topsoil worthy of retention should be stockpiled for use following completion of the civil engineering works. It should either be temporarily vegetated with hydroseeded grass or turned over on a regular basis.</li> </ul> <p><u>Protection of Important Landscape Features</u></p> <ul style="list-style-type: none"> <li>• Important features such as temples, Island House and kilns within the study area, although remote from the proposed works retained and adequately protected.</li> </ul>	During Construction	Contractor	✓
		During Construction	Contractor	N/A
		During Construction	Contractor	N/A
Landscape and Visual during Operation	Not required.	N/A	N/A	N/A

# **Appendix E**

## **Summary of Meteorological Condition Extracted from Hong Kong Observatory**

## **Summary of Meteorological Condition Extracted From The Hong Kong Observatory**

### **November 2016**

November 2016 was characterized by relatively warm weather during the first three weeks, followed by rainy and cooler weather in the latter part of the month. Overall, the month was warmer and much wetter than usual. The mean temperature for the month was 22.3 degrees, 0.5 degree above the normal figure of 21.8 degrees. The monthly total rainfall recorded at the Hong Kong Observatory was 131.3 millimetres, more than three times the November normal of 37.6 millimetres and the eighth highest on record for November. The accumulated rainfall of 3020.2 millimetres up to end of November was about 27 percent above the normal figure of 2371.7 millimetres for the same period.

Under the influence of a continental airstream, the weather in Hong Kong was generally fine and dry for the first seven days of the month. As a cold front moved across the coast of Guangdong on 8 November, local weather became cloudy with a few rain patches that day. Temperatures fell over the next couple of days as cool air reached the coastal areas under freshening northerly winds and rain became more widespread over the territory.

With the northeast monsoon moderating, rain eased off on 11 November and sunny periods appeared on 12 and 13 November. Under the influence of an upper-air anticyclone, the weather became generally fine and rather warm as temperatures at the Hong Kong Observatory rose to a maximum of 29.2 degrees on 15 November, the highest of the month. A freshening of easterly winds the next day brought cloudier weather, and after a fine day on 17 November, moist maritime air moved back towards the coast of Guangdong over the next few days, bringing with it a mixture of sunshine, clouds and rain patches.

Easterly winds strengthened and rain became heavier on 22 November. The arrival of a cold front the next day brought appreciably cooler weather. Meanwhile, rain started to ease off as drier continental air reached the south China coastal areas with some sunny intervals in Hong Kong on 24 and 25 November. Yet the moist maritime air was never too far away from the coast and coupled with a replenishment of the northeast monsoon, rainy weather returned on 26 November. As northerly winds strengthened, temperatures fell during the day and dropped to a minimum of 12.8 degrees at the Hong Kong Observatory the next morning, the lowest of the month.

With the setting in of dry continental air, sunny periods emerged later on 27 November and the weather remained mostly fine and dry towards the end of the month.

Three tropical cyclones occurred over the South China Sea and the western North Pacific in the month.

### **December 2016**

With the northeast monsoon over the south China coastal areas remaining relatively weak for most of the month, December 2016 was warmer than usual. The monthly mean temperature of 19.6 degrees was 1.7 degrees above the normal figure of 17.9 degrees and the third highest for December since record began in 1884. The total rainfall recorded in the month was only 6.6 millimetres, less than one quarter of the normal figure of 26.8 millimetres. But in terms of rainfall for the whole year, the annual total of 3026.8 millimetres was about 26 percent above

the yearly normal of 2398.5 millimetres.

Under the influence of the northeast monsoon, the month started off with fine and dry conditions in Hong Kong on the first two days. The weather became cloudy on 3 December as a band of clouds covered the south China coast and the northern part of the South China Sea. Under light wind conditions, it was hazy with sunny periods over the next couple of days as temperatures climbed to a rather warm 25.9 degrees on 5 December, the highest of the month.

Apart from a lull in the northeast monsoon with relatively warm weather on 12 and 13 December, further replenishments of continental air brought a spell of generally fine and dry conditions to the territory from 6 to 16 December. Easterly winds freshened over the south China coastal areas on 11 December, but temperatures only began falling significantly as the winds turned northerly on 14 December. It was only then that the weather became appreciably cooler over the next couple of days.

After a cool and cloudier day on 17 December, the weather soon warmed up again as sunny skies emerged on 18 and 19 December. With moist maritime air edging back towards the coast of Guangdong, increasing cloudiness on 20 December was followed by a day of humid conditions and light rain on 21 December. The rain eased off the next day and the weather turned fine again as dry continental air returned to the south China coastal areas after the passage of a cold front. The strengthening of easterly winds brought patches of light rain on the night of 23 December, and the weather remained mostly cloudy till Christmas Day.

Despite a fine and relatively warm day on 26 December during another break in the northeast monsoon, the passage of a cold front brought strengthening northerly winds that night and falling temperatures the next day. Windy conditions were enhanced by the presence of a weakening tropical cyclone Nock-Ten over the central part of the South China Sea, with winds reaching gale force on high ground in Hong Kong. Under the influence of the intense northeast monsoon, a continental airstream brought fine and very dry weather to the territory on 27 December, while the first issuance of the Cold Weather Warning this winter saw temperatures plummeting to a minimum of 11.5 degrees the next morning, the lowest in the month.

After a cloudy day on 28 December, the northeast monsoon started to subside and temperatures gradually recovered with sunny periods towards the end of the month.

Two tropical cyclones occurred over the South China Sea and the western North Pacific in the month.

### **January 2017**

With no significant cold surge affecting the coastal areas of Guangdong, January 2017 became the warmest January in Hong Kong with record-breaking monthly mean temperature of 18.5 degrees and monthly mean minimum temperature of 17.0 degrees, 2.2 degrees and 2.5 degrees above their respective normals. The month was drier than usual in terms of rainfall amount with only 7.8 millimetres in total, less than one-third of the normal of 24.7 millimetres for January.

Under the influence of an easterly maritime airstream, the weather in Hong Kong was mild with a mixture of sunshine and cloudy episodes for the first five days in the month. The weather turned generally fine on 6 January and with abundant sunshine over the next couple of days,



temperatures at the Hong Kong Observatory rose to a maximum of 25.5 degrees on 8 January, the highest of the month. The arrival of a replenishment of the northeast monsoon that night brought cloudier and slightly cooler weather in the next two days.

With a strengthening easterly airstream and cloud bands associated with a low pressure area over the South China Sea moving in towards the coastal areas of Guangdong, a spell of cloudy and misty weather set in over the territory on 11 January. As replenishments of the northeast monsoon reached the south China coast under an overcast sky, local weather turned progressively cooler with rain patches on 12 - 16 January. With the northeast monsoon moderating gradually and the weather warming up again, the lingering cloud bands started to dissipate and gave way to mainly fine weather on 19 January.

Following the arrival of a significant replenishment of the northeast monsoon, northerly winds of continental origin brought dry and cooler weather to Hong Kong on 20 - 22 January. Under clear skies, temperatures at the Hong Kong Observatory fell to a minimum of 13.6 degrees on the morning of 22 January, the lowest of the month. With relative humidity falling below 40 percent during the day over a sunny weekend, hill fires were reported in Siu Lek Yuen of Sha Tin. Despite a strengthening easterly airstream on 24 January, fine weather persisted on 23-27 January. Affected by a moist easterly airstream, local weather became cloudy on 28 January with rain patches and poor visibility in some areas over the Chinese New Year holiday period. It also turned appreciably cooler by the end of the month as a fresh to strong easterly airstream brought a replenishment of the northeast monsoon to the south China coastal areas on the night of 30 January.

One tropical cyclone occurred over the South China Sea and the western North Pacific in the month.

## **February 2017**

February 2017 was brighter than usual, with the duration of sunshine in the month more than 40 percent above normal. The month was also relatively mild with a mean temperature of 17.0 degrees, 0.2 degree above the normal of 16.8 degrees. The monthly total rainfall was 19.9 millimetres, less than half of the normal of 54.4 millimetres. The accumulated rainfall of 27.7 millimetres in the first two months of the year was about 65 percent below the normal of 78.9 millimetres for the same period.

The month had a mild start with sunny periods on the first day. A freshening easterly airstream brought cloudier conditions and slightly cooler weather over the next couple of days. With the northeast monsoon moderating and humid maritime air moving in towards the coast of Guangdong, the weather was a mixture of sunshine, haze, mist and some rain patches on 4 and 5 February. Easterly winds strengthened on 6 February and once again brought cloudier and slightly cooler weather to Hong Kong over the next couple of days.

With a cold front moving across the coastal areas of Guangdong on the night of 8 February, local winds strengthened from the north and temperatures fell significantly overnight. Under the influence of an intense winter monsoon following the passage of the cold front, the weather became cold and dry in the next three days. After a chilly morning on 11 February, the lingering clouds were finally cleared away and a spell of sunny weather lasted for more than a week till 18 February. With plenty of sunshine and the northeast monsoon subsiding, the weather became rather warm on 16 – 18 February as daytime temperatures climbed to the mid-

twenties.

Affected by a moist maritime airstream, the weather turned generally cloudy with a few rain patches and relatively low visibility on 19 February. Warm conditions returned the next day as the clouds thinned out and temperatures at the Hong Kong Observatory rose to a maximum of 25.5 degrees, the highest of the month. The maritime airstream also brought foggy weather to Hong Kong on the morning of 21 February with visibility at Waglan Island falling below 200 metres. With the setting in of a fresh to strong easterly airstream that day, the weather turned cooler and cloudy with rain patches, and a few thunderstorms also affected Hong Kong on the morning of 22 February.

Following the passage of a cold front early on 23 February, an intense northeast monsoon brought overcast sky, light rain patches and cold mornings that persisted for the next three days. Temperatures at the Hong Kong Observatory fell to a minimum of 10.6 degrees on the morning of 26 February, the lowest of the month. Under the influence of a dry continental airstream, there were sunny periods with cool mornings towards the end of the month.

There was no tropical cyclone over the South China Sea and the western North Pacific in the month.

### **March 2017**

Going into a season of transition between the northeast monsoon and the mild and humid maritime airstream over the south China coast, local weather in March 2017 was marked by fluctuating temperatures. While the monthly mean temperature of 19.3 degrees was only 0.2 degree above the normal of 19.1 degrees, total rainfall in the month, 48.0 millimetres, was about 42 percent below the March normal of 82.2 millimetres. The accumulated rainfall of 75.7 millimetres in the first three months of the year was about 53 percent below the normal of 161.3 millimetres for the same period.

With the northeast monsoon bringing a continental airstream to southern China, the weather in Hong Kong was generally fine and dry on the first four days in the month, with the daytime relative humidity falling below 30 percent on 2 March.

As the northeast monsoon subsided and a maritime airstream set in, the weather turned cloudier on 5 March and a spell of cloudy conditions persisted in the next fortnight. Coastal fog on the morning of 6 March brought the visibility down to around 100 metres at Waglan Island. Meanwhile, a replenishment of the northeast monsoon reached the coast of Guangdong later that day and brought cooler weather over the next couple of days. More than 10 millimetres of rain fell over the northeastern part of the New Territories on 8 March. Under the influence of a moist easterly airstream, there were mist and light rain patches in the next four days. Morning fog on 13 March with visibility below 1000 metres in the harbour was followed by a relatively warm day with sunny intervals.

After another foggy start on 14 March, a cold front crossed the coast of Guangdong later in the morning and brought overcast sky with widespread rain. Easterly winds strengthened and conditions remained rather windy over the next couple of days with cooler temperatures. As the northeast monsoon gradually subsided, a maritime airstream moved in towards the coast of Guangdong and there were some light rain patches and coastal fog in Hong Kong on 17-18 March. Affected by an upper-air disturbance, rain turned heavier on 19 March with more than

30 millimetres falling over the New Territories.

Apart from some mist or fog patches, the cloudy spell ended as the weather in Hong Kong turned fine and very warm on 20-21 March. With abundant sunshine, temperatures at the Hong Kong Observatory climbed to a maximum of 27.6 degrees on 21 March, the highest of the month. The clouds and light rain returned the next day as a freshening easterly airstream brought a replenishment of the northeast monsoon and cooler weather to the coast of Guangdong. As the monsoon winds subsided, there were sunny periods with some mist on 23-24 March. A cold front then moved across the coast of Guangdong on 25 March. Under cloudy sky with some light rain patches, temperatures over the territory fell significantly and temperatures at the Hong Kong Observatory dropped to a minimum of 13.8 degrees the next morning, the lowest of the month and a temperature swing of nearly 14 degrees in a matter of five days.

With a continental air mass spreading to the south China coast, local weather turned mainly fine and dry on 27 March. As a maritime airstream pushed back towards the coast of Guangdong, local weather became warmer and more humid with mist patches over the next three days. While it was foggy on the morning of 31 March, a cold front moved across the coast of Guangdong during the day, bringing cooler and rainy weather with a few thunderstorms to the territory.

### **April 2017**

April 2017 was warmer than usual with a mean temperature of 23.3 degrees, 0.7 degree above the normal of 22.6 degrees. The month was also drier than usual in terms of rainfall with 58.8 millimetres recorded in the month, only about one-third of the normal of 174.7 millimetres. The accumulated rainfall recorded in the first four months of the year was 134.5 millimetres, a deficit of 60 percent compared to the normal of 336.1 millimetres for the same period.

Under the influence of a continental airstream brought by the northeast monsoon, the weather in Hong Kong was sunny and dry on the first four days of the month. The month started off with a cool morning on 1 April and the minimum temperature of 15.5 degrees recorded at the Hong Kong Observatory was the lowest of the month. With the moderation of the northeast monsoon, the weather turned cloudier on 5 April with a mixture of sunny periods, coastal fog patches and isolated showers over the next five days. Temperatures climbed steadily during the period, leading to a rather warm night on 9 April under the influence of a southerly airstream.

Upon the passage of a trough of low pressure, widespread rain affected the territory on 11 April. Rain was heavy at times on 12 April, with more than 30 millimetres falling in some places, before easing off the next day. Meanwhile, the weather turned cooler as well, as a replenishment of the northeast monsoon reached the south China coast. Following the moderation of the northeast monsoon, the weather was mainly fine from 14 to 19 April apart from some mist and haze. With plenty of sunshine, daytime conditions became rather hot with temperatures at the Hong Kong Observatory rising to a maximum of 30.7 degrees on 18 April, the highest of the month.

The setting in of unsettled weather associated with a southerly airstream on 20 April marked the beginning of a showery spell that lasted for more than a week. Thundery showers brought over 3000 lightning strokes to the territory on 21 April ahead of the passage of a cold front later that day. The weather then became appreciably cooler on 22 and 23 April. A freshening of easterly winds on 24 April was followed by more showers and squally thunderstorms the next day. After a lull in the northeast monsoon and a relatively warm day on 26 April, the passage of

a trough of low pressure brought another replenishment of the northeast monsoon to the coast of Guangdong and cooler weather to Hong Kong over the next couple of days.

With the northeast monsoon subsiding, the weather was generally fine and rather warm on the last two days of the month.

Two tropical cyclones occurred over the South China Sea and the western North Pacific in the month.

### **May 2017**

Due to the heavy rain on the morning of 24 May, the month was wetter than usual. The total rainfall recorded in the month was 399.3 millimetres, about 31 percent above of the normal figure of 304.7 millimetres. The accumulated rainfall recorded in the first five months of the year was 533.8 millimetres, a deficit of about 17 percent compared to the normal figure of 640.8 millimetres for the same period.

Under the influence of a maritime airstream, the weather in Hong Kong was hot with sunny periods on the first three days of the month. There was also coastal fog on the morning of 2 May. Upon the passage of a trough of low pressure, local weather deteriorated with heavy showers and squally thunderstorms on 4 May. More than 30 millimetres of rainfall were recorded over widespread areas. With the weakening of the trough of low pressure, the weather became mainly fine and hot in the next couple of days apart from some mist and haze.

A fresh easterly airstream brought cloudier weather and a few showers to the territory on 7-8 May. With the passage of a trough of low pressure, there were thundery showers on the early morning of 9 May. Under light wind condition, the visibility was rather low on the next day. With the setting up of a ridge of high pressure over the coast of Guangdong and the northern part of the South China Sea, the weather became mainly fine and hot on 11 May, with temperatures at the Hong Kong Observatory rising to a maximum of 31.6 degrees, the highest of the month.

With a trough of low pressure lingering over the coastal areas of Guangdong and the northern part of the South China Sea, the weather became more showery in mid May. The showers were heavy at times on 15 May, bringing over 50 millimetres of rainfall to Kowloon and Shatin. With the trough of low pressure moving to the northern part of the South China Sea and the onset of a relatively dry easterly airstream, mainly fine weather returned on 17 May. Under the influence of a maritime airstream, the weather turned generally cloudy with a few showers over the next six days.

With the passage of a trough of low pressure across the coast of Guangdong, local weather deteriorated with heavy showers and squally thunderstorms on 24 May. The heavy rain, which necessitated the issuance of the first Black Rainstorm Warning this year, brought more than 70 millimetres of rainfall to widespread areas with rainfall exceeding 300 millimetres in Kwai Tsing and Sham Shui Po. Serious flooding were reported in many places over the territory including Lai Chi Kok, Tseung Kwan O, Ho Man Tin, central and western parts of the Hong Kong Island.

With the trough of low pressure moving towards the northern part of the South China Sea, local weather improved with sunny intervals on 25 May. An easterly airstream brought mainly cloudy weather with one or two isolated showers to the territory the next day. Affected by a dry

continental airstream, it was mainly fine and dry on 27-29 May. With the continental airstream weakening and being gradually replaced by a southwesterly airstream, the weather was hot with a few showers towards the end of the month.

### **June 2017**

As a result of the very hot weather in early June and the rainy spell in mid-June, the month was overall warmer and wetter than usual. The monthly mean temperature was 28.8 degrees, 0.9 degree above the normal of 27.9 degrees. The total rainfall recorded in the month was 656.0 millimetres, about 44 percent above the June normal of 456.1 millimetres. The accumulated rainfall recorded in the first half year was 1189.8 millimetres, a surplus of 8 percent compared to the normal of 1096.9 millimetres for the same period.

Under the influence of an active southwest monsoon, the weather was mainly cloudy and showery on the first two days of the month. The weather turned brighter on 3 June, and with winds subsiding and more sunshine, the weather became very hot on 5 – 7 June. Despite the fine conditions, a lingering trough over the inland areas of Guangdong also led to some significant development of showery activities along the coast that affected the territory on 6 and 7 June. Generally fine weather persisted till 11 June with temperature at the Hong Kong Observatory that day soaring to a maximum of 34.1 degrees, the highest of the month.

Meanwhile, an area of low pressure over the South China Sea developed into a tropical storm, named Merbok, on 11 June. Merbok moved across the northern part of the South China Sea on 12 June and intensified further into a severe tropical storm that night. It traversed the eastern part of Hong Kong waters and made landfall over the Dapeng Peninsula before midnight. With the approach of Merbok, local winds strengthened significantly with heavy squally showers later on 12 June, leading to the issuance of the No.8 Gale or Storm Signal for the first time in June since 2012. As Merbok weakened over land, its rainbands continued to affect the south China coastal region with gusty winds and heavy rain, with temperature at the Hong Kong Observatory falling to the month's lowest of 24.3 degrees in rain and the issuance of the Red Rainstorm Warning Signal on the morning of 13 June. More than 150 millimetres of rainfall were generally recorded over the territory on 13 – 14 June, with rainfall over the urban areas exceeding 250 millimetres.

Under the influence of an enhanced southwest monsoon in the wake of Merbok on 15 and 16 June and with the development of a lingering trough of low pressure along the coastal areas of the Guangdong, the weather remained unstable and rainy till 21 June. In particular, outbreaks of heavy rain and squally thunderstorms on 17 June brought more than 100 millimetres of rainfall to the territory and again led to the issuance of the Red Rainstorm Warning Signal.

After the dissipation of the trough, the weather turned fine and hot on 22 June. A mixture of sunshine and showers then persisted for the next five days. Despite the development of another trough over southern China, showery activities over the coastal region gradually subsided and daytime conditions became very hot as generally fine weather prevailed over the territory towards the end of the month.

### **July 2017**

With a trough of low pressure lingering over the south China coastal region in the early part of the month and frequent tropical cyclone activities over the northern part of the South China Sea in the latter half, July 2017 was cloudier with more rain than usual. The monthly total

rainfall was 570.0 millimetres, more than 50 percent above the normal figure of 376.5 millimetres. The accumulated rainfall recorded in the first seven months of the year was 1759.8 millimetres, nearly 20 percent above the normal figure of 1473.3 millimetres for the same period.

An active southwest monsoon brought cloudy and showery weather to Hong Kong on the first three days of the month, with some isolated heavy downpour affecting mostly the New Territories. Under the influence of a broad trough of low pressure over the coast of Guangdong and the northern part of the South China Sea, the weather became even more unsettled with occasional heavy showers and squally thunderstorms that lasted till 8 July despite some interludes of sunshine. With the setting in of the subtropical ridge over southeastern China, showery activities gradually eased off after 9 July. While hot and mainly fine weather prevailed in Hong Kong over the next five days, some isolated heavy showers did affect the Sai Kung areas on 12 July.

Meanwhile, easterly winds along the coastal areas of Guangdong gradually strengthened as an area of low pressure near Hainan Island eventually developed into a tropical cyclone named Talas on 15 July. Even though Talas moved away towards the coast of Vietnam, local weather turned cloudy and showery once again on 16 July. The weather deteriorated further over the next couple of days as enhanced easterly flow in the wake of Talas brought outbreaks of heavy rain and squally thunderstorms to Hong Kong that required the issuance of rainstorm warnings on 17 – 18 July, with more than 400 millimetres of rain falling over the eastern part of Hong Kong Island and the northeastern part of the New Territories during the 2-day stormy episode. The lowest temperature in the month at the Hong Kong Observatory, 24.4 degrees, was recorded in rain on 17 July.

A mixture of sunshine and showers then prevailed on 19 – 22 July, culminating in a very hot day on 22 July as a couple of tropical cyclones, Roke and Sonca, hovered over the northern part of the South China Sea. With Roke making landfall over the eastern part of Hong Kong on the morning of 23 July, local weather deteriorated with outbreaks of heavy squally showers. Showery weather continued to affect the territory the next day as Roke soon dissipated inland and Sonca headed towards the coast of Vietnam.

The establishment of an anticyclone over southeastern China brought fine and very hot conditions to Hong Kong on 25 and 26 July. With yet another tropical cyclone brewing over the northern part of the South China Sea, local weather turned cloudier with isolated showers on 27 July. The developing cyclone was eventually named Haitang and headed towards Taiwan in quick succession following the passage of another tropical cyclone Nesat that moved in from the western North Pacific. With both cyclones passing at a distance to the east of Hong Kong, subsiding air over the Guangdong region led to prolonged sunshine and very hot conditions in the territory towards the end of the month. Oppressive heat under a hazy sky saw temperature at the Hong Kong Observatory soaring to the month's highest of 34.8 degrees on 30 July. The mean temperature that day was 31.8 degrees, one of the highest for July since record began in 1884.

## **August 2017**

August 2017 was hotter than normal and the prolonged heat was relieved by the successive strikes of tropical cyclones Hato and Pakhar within a 5-day period during the latter part of the

month. Both cyclones led to the raising of Gale or Storm Signal No.8, with Hato even necessitating the issuance of the Hurricane Signal No.10 on 23 August, the first time since July 2012. The mean temperature recorded in the month was 29.3 degrees, the seventh highest for August on record and 0.7 degree above the August normal of 28.6 degrees. Due to the rain brought by Hato and in particular Pakhar, the monthly total rainfall amounted to 489.1 millimetres, about 13 percent more than the normal figure of 432.2 millimetres. The accumulated rainfall this year up to August was 2248.9 millimetres, a surplus of 18 percent compared to the normal figure of 1905.5 millimetres for the same period.

Under the influence of an active southwest monsoon, the weather in Hong Kong was generally cloudy with morning showers that affected mostly the southeastern part of the territory on the first two days of the month. The showers got heavier and became more widespread on the morning of 3 August, leading to the issuance of the Red Rainstorm Warning Signal. After another showery morning on 4 August, particularly over the southern and southeastern part of the territory, the weather turned sunny and very hot on 5 August as a ridge of high pressure extended over southeastern China. Generally fine and very hot conditions then persisted for another three days.

With a freshening of the southwest monsoon, the weather turned cloudy on 9 August and showery activities increased. A southwest-to-northeast corridor of heavier showers extended from Tsuen Wan to the Tolo Harbour on 10 August, and then shifted eastwards the next day running from Hong Kong Island to Sai Kung. As the monsoon winds subsided, convective development became less active on 12 August despite some localized showers over Lantau Island. A spell of fine weather then prevailed for the next ten days, with a ridge of high pressure extending westwards from the Pacific to cover southeastern China on 16 – 18 August. Despite an outbreak of thundery showers due to intense day heating at Tai Po on 18 August, showers during the fine spell were mostly isolated and the territory enjoyed two shower-free days on 20 and 21 August.

With prolonged sunshine, daytime temperatures at the Hong Kong Observatory reached 33 degrees or higher during the latter part of the fine spell. As Hato headed towards Hong Kong, subsidence effect ahead of its circulation brought hazy skies and oppressive heat on 22 August. The maximum temperature at the Hong Kong Observatory that afternoon soared to an all-time record-breaking high of 36.6 degrees. Squally showers associated with the outer rainbands of Hato then started to affect the territory later that day. The situation deteriorated further overnight as stormy weather battered the city during the passage of Hato on the morning of 23 August. Hurricane force winds affected Cheung Chau and the southeastern part of the territory, and a maximum gust of 193 kilometres per hour was recorded at Waglan Island. As the approach of Hato coincided with the astronomical high tide, storm surge induced by Hato resulted in unusually high water level and serious flooding in many parts of the territory, including Tai O, Heng Fa Chuen, Lei Yue Mun, Sha Tin and Lau Fau Shan. The water level at Quarry Bay rose to a maximum of 3.57 metres that morning, the second highest after the record high of 3.96 metres set by Super Typhoon Wanda in 1962. With Hato making landfall over Zhuhai to the west of Macau in the afternoon and weakening further inland, local winds subsided significantly later in the day.

The weather was a mixture of sunshine and scattered showers over the next couple of days, with some heavy showers affecting Tuen Mun and Shek Kong on 25 August. Ahead of the visit of Pakhar, oppressively hot and hazy conditions affected Hong Kong once again on 26 August.

Rain and squalls associated with the intense rainbands north of Pakhar started to affect the territory later that evening. Stormy weather persisted for most of the day on 27 August as Pakhar skirted past just to the southwest of Hong Kong, with winds persistently reaching storm force over the northeastern and southern parts of the territory and occasionally attaining hurricane force on high ground. Temperature at the Hong Kong Observatory fell to the month's lowest of 24.0 degrees in rain that day. Heavy showers and some squally thunderstorms continued to affect the territory the next day as winds gradually subsided. As the lingering rainbands associated with Pakhar finally cleared away, the weather turned sunny on 29 August. Hot conditions with a mixture of sunshine, haze and thundery evening showers then persisted towards the end of the month.

### **September 2017**

Hong Kong's weather was unseasonably hot in September 2017. The monthly mean temperature was 29.0 degrees, 1.3 degrees above the normal figure of 27.7 degrees and one of the hottest September since record began in 1884. The month was also drier than usual with a total rainfall of 192.4 millimetres, about 59 percent of the normal figure of 327.6 millimetres. The accumulated rainfall this year up to September was 2441.3 millimetres, a surplus of 9 percent compared to the normal figure of 2233.1 millimetres for the same period.

Under the influence of a continental airstream, the weather in Hong Kong was hazy with sunny periods and evening thunderstorms on the first day of the month. Meanwhile, the tropical depression over the northeastern part of the South China Sea was named Mawar and intensified into a tropical storm. While lingering over the northeastern part of the South China Sea, Mawar further intensified into a severe tropical storm the next day. Mawar drifted towards the coast of eastern Guangdong slowly on 3 September and made landfall near Shanwei and weakened into a tropical storm on that night. Mawar moved across inland Guangdong on the morning of 4 September and weakened into an area of low pressure progressively during that day. Affected by the rainbands associated with Mawar, there were squally heavy showers and thunderstorms over the territory on 2-4 September. Local winds strengthened while Mawar skirting more than 100 kilometres to the northeast of Hong Kong on the morning of 4 September. Temperatures at the Hong Kong Observatory also fell to a minimum of 25.3 degrees in that morning, the lowest of the month.

With a southerly airstream prevailing over the coast of Guangdong and the northern part of the South China Sea, local weather was a mixture of sunshine and showers on the ensuing six days. Under the influence of the anticyclone aloft, the weather in Hong Kong turned generally fine and hot apart from isolated showers on 11 September. While it was sunny and hazy on the morning of 12 September, convective activities triggered by high temperatures brought thundery showers to the territory in the afternoon. Affected by the northeast monsoon, it was mainly fine with isolated showers on 13-14 September.

Under the dominance of the anticyclone aloft, local weather was sunny and very hot with some haze on the ensuing five days. With the anticyclone aloft weakening gradually, there were some showers and thunderstorms on 20-21 September. The showery activities over the northern part of the South China Sea and the coast of Guangdong brought heavy and thundery morning showers to Hong Kong on the next two days.

Meanwhile, an area of low pressure over the central part of the South China Sea intensified into a tropical depression on the night of 23 September. The tropical depression moved west-



northwest across the northern part of South China Sea on 24 September and made landfall over Hainan Island that night. Affected by the outer rainbands of the tropical depression, there were a few squally showers and thunderstorms on 24 September. Dominated by the anticyclone aloft, it remained generally fine and hot on 25-29 September. With abundant sunshine, temperatures at the Observatory soared to a maximum of 34.1 degrees on the afternoon of 28 September, the highest of the month. Affected by a fresh northeast monsoon, local weather became mainly cloudy with showers and a few thunderstorms in the morning on 30 September.

Six tropical cyclones occurred over the South China Sea and the western North Pacific in the month.

### **October 2017**

With cooler air from the north only reaching the south China coastal areas later in the month, there were fine and unseasonably hot days in the first half of October 2017. The Very Hot Weather Warning was issued on a couple of occasions, the first time such warnings were required in the month of October. Overall, the monthly mean temperature was 26.3 degrees, 0.8 degree above the normal figure of 25.5 degrees. The monthly total rainfall was 99.6 millimetres, near the October normal of 100.9 millimetres. The accumulated rainfall this year up to October was 2540.9 millimetres, about 9 percent higher than the normal figure of 2334.0 millimetres for the same period.

Under the influence of a fresh easterly airstream, the weather in Hong Kong was mainly cloudy and showery on the first day of the month. Showery conditions persisted till the next morning and with winds moderating, the weather soon turned sunny and very hot. Temperature at the Hong Kong Observatory rose to a maximum of 33.5 degrees, the highest of the month, on the afternoon of 3 October. Despite the recurrence of cloudy and showery interludes associated with a strengthening of the northeast monsoon on 4 October and again on 9 October, the weather remained mostly fine and hot till 13 October, when the arrival of a northerly airstream brought cooler temperatures to Hong Kong over the next couple of days.

Meanwhile, clouds and rain associated with an approaching tropical cyclone, Khanun, were also moving in towards the territory. The passage of Khanun over the northern part of the South China Sea, combined with the influence of the northeast monsoon, brought a day of stormy weather on 15 October when the Tropical Cyclone Gale or Storm Signal No.8 was issued for the fifth time this year, a joint record with the years 1964 and 1999. Despite Khanun moving away and weakening, windy and rainy weather continued to affect Hong Kong till 17 October.

With winds moderating, the weather turned sunny on 18 October and a spell of fine weather then prevailed for the rest of the month as a continental airstream dominated over the south China coastal areas. Conditions got progressively drier with daytime relative humidity dropping below 50 per cent towards the end of the month. Meanwhile, freshening northerly winds brought replenishment of cooler air to the coast of Guangdong that caused temperature at the Hong Kong Observatory falling twice to around 20 degrees during the period. The lowest temperature of the month, 19.0 degrees, was recorded on the morning of 31 October.

Five tropical cyclones occurred over the South China Sea and the western North Pacific in the month.

# **Appendix F Environmental Monitoring Data for Air, Noise and Water Quality**



Appendix F  
Air Quality Monitoring Results and their Graphical Presentation

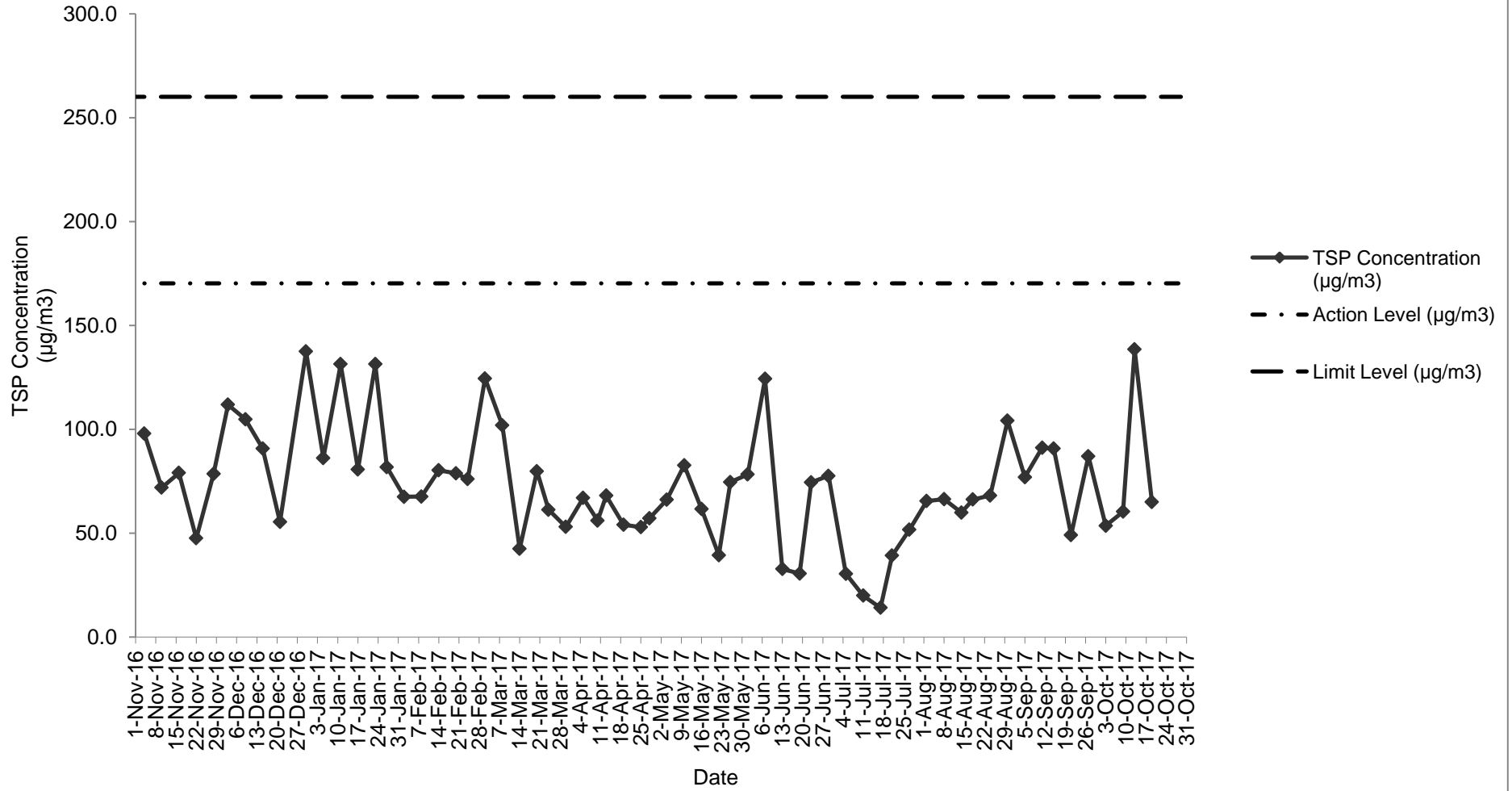
24-Hour TSP Monitoring Result at Station: SR77

Sampling Date	Weather Condition	Paper No.	Wt. of paper (g)			Elapse Time			Flow Rate (CFM)			Flow Rate (m <sup>3</sup> /min)			Total Volume (m <sup>3</sup> )	TSP Concentration (µg/m <sup>3</sup> )	Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )	Wind speed m/s	Wind direction
			Initial Wt.	Final Wt.	Wt. of Dust	Initial	Final	Sampling Hour	Initial	Final	Avg Flow Rate	Initial	Final	Avg Flow Rate						
27-Jul-17	Fine	CC70	2.8542	2.9617	0.1075	6844.67	6868.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	51.7	170.3	260.0	<5	N
2-Aug-17	Fine	CC72	2.8640	3.0001	0.1361	6871.67	6895.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	65.4	170.3	260.0	<5	N
8-Aug-17	Sunny	CC74	2.8523	2.9904	0.1381	6898.67	6922.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	66.4	170.3	260.0	<5	N
14-Aug-17	Sunny	CC76	2.8575	2.9821	0.1246	6925.67	6949.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	59.9	170.3	260.0	<5	N
18-Aug-17	Sunny	CC78	2.8599	2.9976	0.1377	6952.67	6976.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	66.2	170.3	260.0	<5	N
24-Aug-17	Sunny	CC80	2.8262	2.9679	0.1417	6979.67	7003.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	68.1	170.3	260.0	<5	N
30-Aug-17	Fine	CC82	2.8299	3.0465	0.2166	7006.67	7030.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	104.2	170.3	260.0	<5	N
5-Sep-17	Fine	CC84	2.8574	3.0175	0.1601	7033.67	7057.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	77.0	170.3	260.0	<5	N
11-Sep-17	Sunny	CC86	2.8448	3.0344	0.1896	7060.67	7084.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	91.2	170.3	260.0	<5	N
15-Sep-17	Fine	CC88	2.8430	3.0316	0.1886	7087.67	7111.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	90.7	170.3	260.0	<5	N
21-Sep-17	Fine	CC90	2.8425	2.9447	0.1022	7114.67	7138.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	49.1	170.3	260.0	<5	N
27-Sep-17	Fine	CC92	2.8518	3.0328	0.1810	7141.67	7165.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	87.0	170.3	260.0	<5	N
3-Oct-17	Sunny	CC94	2.8702	2.9816	0.1114	7168.67	7192.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	53.6	170.3	260.0	<5	N
9-Oct-17	Cloudy	CC96	2.8471	2.9727	0.1256	7195.67	7219.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	60.4	170.3	260.0	<5	N
13-Oct-17	Sunny	CC98	2.8352	3.1231	0.2879	7222.67	7246.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	138.4	170.3	260.0	<5	N
19-Oct-17	Fine	CC100	2.8611	3.0131	0.1520	7249.67	7276.67	27.00	51	51	51.0	1.44	1.44	1.44	2339.54	65.0	170.3	260.0	<5	N
25-Oct-17	Sunny	CC102	2.8584	3.0483	0.1899	7279.67	7303.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	91.3	170.3	260.0	<5	N
31-Oct-17	Sunny	CC104	2.8589	3.1052	0.2463	7306.67	7330.67	24.00	51	51	51.0	1.44	1.44	1.44	2079.59	118.4	170.3	260.0	<5	N

Summary For the Reporting Period (Nov 2016 - Oct 2017)	
Average	74.2
Minimum	14.1
Maximum	138.4

Note: No major dust source observed during the monitoring period  
Data in **Bold** denotes exceedance of respective Action Level  
Data in **Bold Underline** denotes exceedance of respective Limit Level

### 24-Hour TSP Monitoring Result at Station: SR77 (Nov 2016 - Oct 2017)



**Appendix F**  
**Air Quality Monitoring Results and their Graphical Presentation**

**1-Hour TSP Monitoring Result at Station: SR77**

Date	Weather Condition	Time	Conc.(µg/m <sup>3</sup> )			Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )
			1 <sup>st</sup> Hour	2 <sup>nd</sup> Hour	3 <sup>rd</sup> Hour		
4-Nov-16	Sunny	9:00 - 12:06	148.9	147.7	146.6	292.7	500.0
10-Nov-16	Cloudy	9:00 - 12:07	83.1	87.7	84.2	292.7	500.0
16-Nov-16	Sunny	9:00 - 12:07	147.7	142.0	146.6	292.7	500.0
22-Nov-16	Rainy	9:00 - 12:06	113.1	118.9	115.4	292.7	500.0
28-Nov-16	Sunny	9:00 - 12:07	137.3	135.0	132.7	292.7	500.0
3-Dec-16	Sunny	9:00 - 12:07	155.8	154.6	151.2	292.7	500.0
9-Dec-16	Fine	9:00 - 12:06	155.8	151.2	153.5	292.7	500.0
15-Dec-16	Sunny	9:00 - 12:07	159.3	157.0	153.5	292.7	500.0
21-Dec-16	Cloudy	9:00 - 12:05	166.2	155.8	158.1	292.7	500.0
30-Dec-16	Cloudy	9:00 - 12:08	142.0	138.5	137.3	292.7	500.0
5-Jan-17	Cloudy	9:00 - 12:07	168.5	167.3	165.0	292.7	500.0
11-Jan-17	Cloudy	9:00 - 12:07	187.0	182.3	184.7	292.7	500.0
17-Jan-17	Cloudy	9:00 - 12:06	185.8	184.7	180.0	292.7	500.0
23-Jan-17	Sunny	9:00 - 12:06	187.0	181.2	175.4	292.7	500.0
27-Jan-17	Cloudy	9:00 - 12:07	199.7	187.0	193.9	292.7	500.0
2-Feb-17	Fine	9:00 - 12:09	152.3	158.1	154.6	292.7	500.0
8-Feb-17	Fine	9:00 - 12:06	163.9	160.4	157.0	292.7	500.0
14-Feb-17	Sunny	9:00 - 12:07	151.2	157.0	159.3	292.7	500.0
20-Feb-17	Sunny	9:00 - 12:06	175.4	173.1	172.0	292.7	500.0
24-Feb-17	Cloudy	9:00 - 12:06	162.7	173.1	169.6	292.7	500.0
2-Mar-17	Sunny	9:00 - 12:08	192.7	196.2	189.3	292.7	500.0
8-Mar-17	Fine	9:00 - 12:06	124.6	121.2	126.9	292.7	500.0
14-Mar-17	Cloudy	9:00 - 12:08	158.1	153.5	150.0	292.7	500.0
20-Mar-17	Sunny	9:00 - 12:06	190.4	196.2	191.6	292.7	500.0
24-Mar-17	Sunny	9:00 - 12:08	174.3	172.0	169.6	292.7	500.0
30-Mar-17	Sunny	9:00 - 12:06	227.4	217.0	207.7	292.7	500.0
5-Apr-17	Sunny	9:00 - 12:05	172.0	173.1	169.6	292.7	500.0
10-Apr-17	Fine	9:00 - 12:06	102.7	105.0	103.9	292.7	500.0
13-Apr-17	Cloudy	9:00 - 12:08	108.5	111.9	116.6	292.7	500.0
19-Apr-17	Sunny	9:00 - 12:08	100.4	106.2	105.0	292.7	500.0
25-Apr-17	Cloudy	9:00 - 12:08	108.5	107.3	109.6	292.7	500.0
28-Apr-17	Sunny	9:00 - 12:08	103.9	109.6	102.7	292.7	500.0
4-May-17	Rainy	9:00 - 12:06	117.7	111.9	113.1	292.7	500.0
10-May-17	Cloudy	9:00 - 12:08	197.3	195.0	188.1	292.7	500.0
16-May-17	Cloudy	9:00 - 12:09	193.9	196.2	198.5	292.7	500.0
22-May-17	Cloudy	9:00 - 12:07	117.7	115.4	118.9	292.7	500.0
26-May-17	Fine	9:00 - 12:09	124.6	120.0	126.9	292.7	500.0
1-Jun-17	Cloudy	9:00 - 12:06	155.8	151.2	150.0	292.7	500.0
7-Jun-17	Fine	9:00 - 12:08	208.9	206.6	210.0	292.7	500.0
13-Jun-17	Cloudy	9:00 - 12:07	180.4	150.0	210.0	292.7	500.0
19-Jun-17	Rainy	9:00 - 12:08	123.5	120.0	125.8	292.7	500.0
23-Jun-17	Fine	9:00 - 12:08	109.6	103.9	107.3	292.7	500.0
29-Jun-17	Fine	9:00 - 12:07	85.4	88.9	83.1	292.7	500.0
5-Jul-17	Cloudy	9:00 - 12:07	94.6	100.4	99.3	292.7	500.0
11-Jul-17	Cloudy	9:00 - 12:08	90.0	101.6	84.2	292.7	500.0
17-Jul-17	Rainy	9:00 - 12:08	83.1	78.5	86.6	292.7	500.0
21-Jul-17	Fine	9:00 - 12:07	92.3	86.6	87.7	292.7	500.0
27-Jul-17	Fine	9:00 - 12:08	113.1	120.0	116.6	292.7	500.0
2-Aug-17	Fine	9:00 - 12:07	114.3	121.2	117.7	292.7	500.0
8-Aug-17	Sunny	9:00 - 12:07	165.0	161.6	159.3	292.7	500.0
14-Aug-17	Sunny	9:00 - 12:08	160.4	167.3	158.1	292.7	500.0
18-Aug-17	Sunny	9:00 - 12:07	118.9	121.2	109.6	292.7	500.0
24-Aug-17	Sunny	9:00 - 12:05	96.9	91.2	102.7	292.7	500.0
30-Aug-17	Fine	9:00 - 12:07	151.2	147.7	152.3	292.7	500.0
5-Sep-17	Fine	9:00 - 12:07	114.3	117.7	100.4	292.7	500.0
11-Sep-17	Sunny	9:00 - 12:07	139.6	132.7	131.6	292.7	500.0
15-Sep-17	Fine	9:00 - 12:07	131.6	139.6	136.2	292.7	500.0

**Appendix F**  
**Air Quality Monitoring Results and their Graphical Presentation**

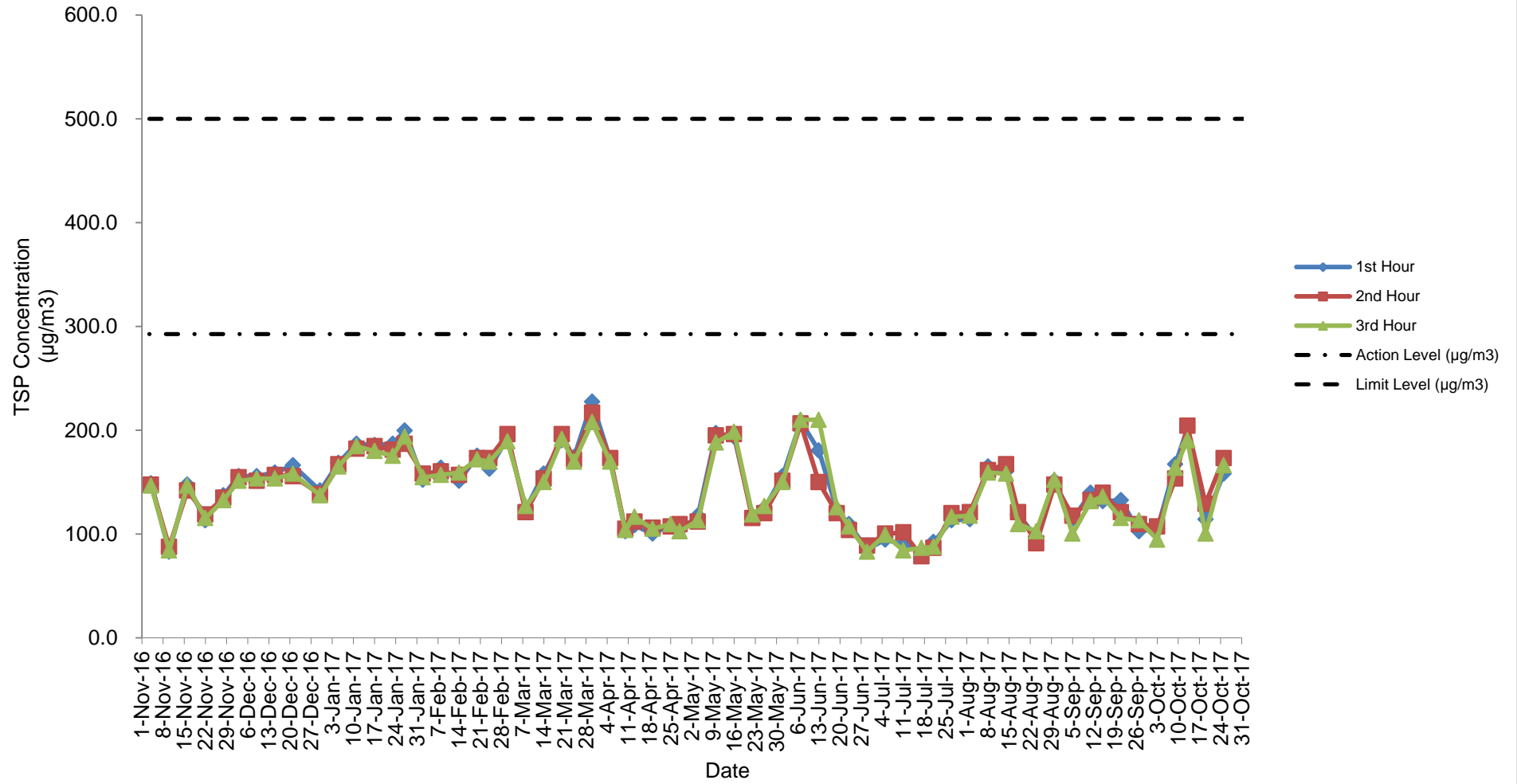
**1-Hour TSP Monitoring Result at Station: SR77**

Date	Weather Condition	Time	Conc.( $\mu\text{g}/\text{m}^3$ )			Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
			1 <sup>st</sup> Hour	2 <sup>nd</sup> Hour	3 <sup>rd</sup> Hour		
21-Sep-17	Fine	9:00 - 12:07	132.7	121.2	115.4	292.7	500.0
27-Sep-17	Fine	9:00 - 12:07	102.7	109.6	113.1	292.7	500.0
3-Oct-17	Sunny	9:00 - 12:07	105.0	107.3	94.6	292.7	500.0
9-Oct-17	Cloudy	9:00 - 12:06	167.3	153.5	163.9	292.7	500.0
13-Oct-17	Sunny	9:00 - 12:08	202.0	204.3	190.4	292.7	500.0
19-Oct-17	Fine	9:00 - 12:08	114.3	129.3	100.4	292.7	500.0
25-Oct-17	Sunny	9:00 - 12:08	158.1	173.1	166.2	292.7	500.0
31-Oct-17	Sunny	9:00 - 12:08	223.9	230.8	235.4	292.7	500.0

<b>Summary For the Reporting Period (Nov 2016 - Oct 2017)</b>	
<b>Average</b>	143.8
<b>Minimum</b>	78.5
<b>Maximum</b>	235.4

Note: No major dust source observed during the monitoring period

### 1-Hour TSP Monitoring Result at station: SR77 (Nov 2016 - Oct 2017)





**Appendix F**  
**Noise Monitoring Results and their Graphical Presentation**

**Noise Monitoring Result at SR77**

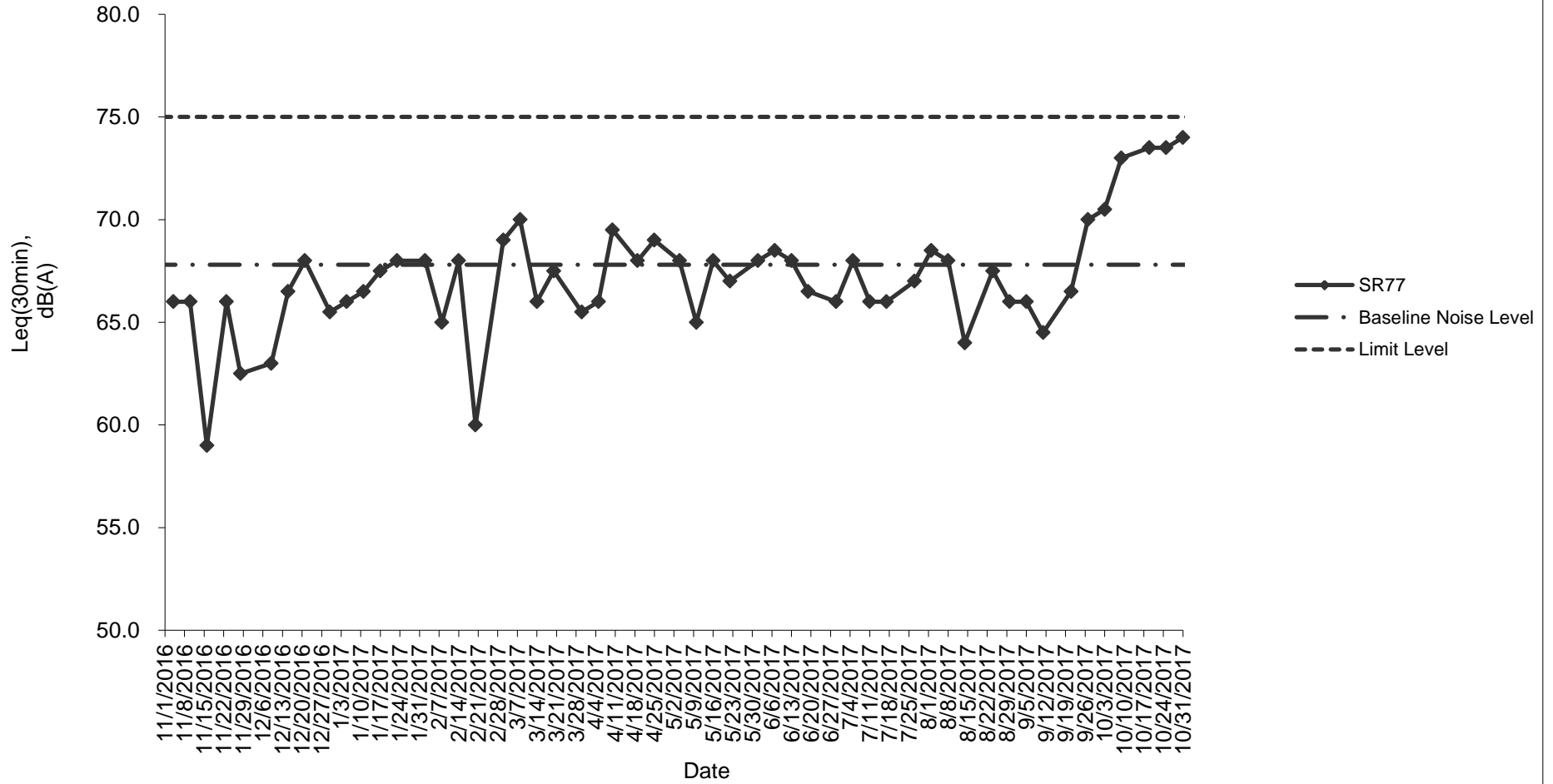
Date	Weather Condition	Start Time	End Time	Measured Noise Level (dB(A))*			Baseline Corrected Level, dB(A)**	Baseline Noise Level (dB(A)), Leq(30min)	Limit Level dB(A)	Exceedance (Y / N)
				L10(30min)	L90(30min)	Leq(30min)				
2016/11/04	Sunny	11:30	12:00	92.0	59.5	66.0	-	67.8	75.0	N
2016/11/10	Cloudy	11:30	12:00	92.0	62.0	66.0	-	67.8	75.0	N
2016/11/16	Sunny	13:30	14:00	87.0	54.0	59.0	-	67.8	75.0	N
2016/11/23	Rainy	16:30	17:00	91.0	63.0	66.0	-	67.8	75.0	N
2016/11/28	Sunny	11:30	12:00	88.0	67.0	62.5	-	67.8	75.0	N
2016/12/09	Fine	11:30	12:00	89.0	56.0	63.0	-	67.8	75.0	N
2016/12/15	Sunny	11:30	12:00	95.0	57.0	66.5	-	67.8	75.0	N
2016/12/21	Cloudy	11:30	12:00	86.0	65.0	68.0	-	67.8	75.0	N
2016/12/30	Cloudy	11:30	12:00	90.0	60.5	65.5	-	67.8	75.0	N
2017/01/05	Cloudy	11:30	12:00	90.5	54.0	66.0	-	67.8	75.0	N
2017/01/11	Cloudy	11:30	12:00	90.0	63.5	66.5	-	67.8	75.0	N
2017/01/17	Cloudy	11:30	12:00	85.5	66.5	67.5	-	67.8	75.0	N
2017/01/23	Sunny	11:30	12:00	91.0	66.0	68.0	-	67.8	75.0	N
2017/02/02	Fine	11:30	12:00	87.0	65.0	68.0	-	67.8	75.0	N
2017/02/08	Fine	11:30	12:00	95.0	59.0	65.0	-	67.8	75.0	N
2017/02/14	Sunny	11:30	12:00	98.0	61.0	68.0	-	67.8	75.0	N
2017/02/20	Sunny	11:30	12:00	93.0	55.0	60.0	-	67.8	75.0	N
2017/03/02	Sunny	11:30	12:00	93.0	61.0	69.0	-	67.8	75.0	N
2017/03/08	Fine	11:30	12:00	97.0	65.0	70.0	-	67.8	75.0	N
2017/03/14	Cloudy	11:30	12:00	95.0	62.0	66.0	-	67.8	75.0	N
2017/03/20	Sunny	11:03	11:33	99.0	62.5	67.5	-	67.8	75.0	N
2017/03/30	Sunny	11:30	12:00	97.0	58.0	65.5	-	67.8	75.0	N
2017/04/05	Sunny	11:30	12:00	93.5	58.0	66.0	-	67.8	75.0	N
2017/04/10	Fine	11:30	12:00	95.0	63.0	69.5	-	67.8	75.0	N
2017/04/19	Sunny	11:30	12:00	98.0	65.0	68.0	-	67.8	75.0	N
2017/04/25	Cloudy	11:30	12:00	89.0	59.0	69.0	-	67.8	75.0	N
2017/05/04	Rainy	11:30	12:00	88.0	66.5	68.0	-	67.8	75.0	N
2017/05/10	Cloudy	11:30	12:00	91.0	60.0	65.0	-	67.8	75.0	N
2017/05/16	Cloudy	11:30	12:00	93.0	61.5	68.0	-	67.8	75.0	N
2017/05/22	Cloudy	11:30	12:00	92.0	62.0	67.0	-	67.8	75.0	N
2017/06/01	Cloudy	11:30	12:00	95.0	59.5	68.0	-	67.8	75.0	N
2017/06/07	Fine	11:30	12:00	93.0	56.0	68.5	-	67.8	75.0	N
2017/06/13	Cloudy	11:30	12:00	97.0	62.5	68.0	-	67.8	75.0	N
2017/06/19	Rainy	11:30	12:00	93.5	58.0	66.5	-	67.8	75.0	N
2017/06/29	Fine	11:30	12:00	89.0	57.5	66.0	-	67.8	75.0	N
2017/07/05	Cloudy	11:30	12:00	89.0	57.0	68.0	-	67.8	75.0	N
2017/07/11	Cloudy	11:30	12:00	90.0	62.0	66.0	-	67.8	75.0	N
2017/07/17	Cloudy	11:30	12:00	93.0	60.0	66.0	-	67.8	75.0	N
2017/07/27	Fine	11:30	12:00	93.5	57.0	67.0	-	67.8	75.0	N
2017/08/02	Fine	11:30	12:00	97.0	61.0	68.5	-	67.8	75.0	N
2017/08/08	Sunny	11:00	11:30	95.0	56.0	68.0	-	67.8	75.0	N
2017/08/14	Sunny	11:30	12:00	95.0	55.0	64.0	-	67.8	75.0	N
2017/08/24	Sunny	11:30	12:00	92.5	56.5	67.5	-	67.8	75.0	N
2017/08/30	Fine	11:30	12:00	99.0	58.0	66.0	-	67.8	75.0	N
2017/09/05	Fine	11:30	12:00	92.5	57.5	66.0	-	67.8	75.0	N
2017/09/11	Sunny	11:30	12:00	91.0	55.0	64.5	-	67.8	75.0	N
2017/09/21	Fine	11:30	12:00	92.0	57.0	66.5	-	67.8	75.0	N
2017/09/27	Fine	11:30	12:00	76.0	62.0	70.0	-	67.8	75.0	N
2017/10/03	Sunny	11:30	12:00	74.5	61.5	70.5	-	67.8	75.0	N
2017/10/09	Cloudy	11:30	12:00	89.0	64.5	73.0	-	67.8	75.0	N
2017/10/19	Fine	11:30	12:00	93.5	62.0	73.5	-	67.8	75.0	N
2017/10/25	Sunny	11:30	12:00	92.5	59.5	73.5	-	67.8	75.0	N
2017/10/31	Sunny	11:30	12:00	93.0	59.0	74.0	-	67.8	75.0	N

Summary For the Reporting Period (Nov 2016 - Oct 2017)	
Average	67.2
Minimum	59.0
Maximum	74.0

**Remarks**

- \* +3dB(A) Façade effect correction included
- \*\* Baseline corrected level is only calculated when measured noise level (Leq) > limit level.
- \*\*\* Data in **Underline** denotes exceedance of respective Limit Level

### Noise monitoring result: SR77 (Nov 2016 - Oct 2017)





Project Name: Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3  
 Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:07	<0.5	20.7	20.7	6.5	6.5	6.5	6.5	73.0	73.0	18.4	16.4	<0.1	<0.1	15.0	15.0
			20.7		6.5		6.5		73.0		16.4					
C3b	11:25	<0.5	20.0	20.0	6.8	6.8	7.8	7.8	86.1	86.1	7.8	7.8	<0.1	<0.1	6.6	6.7
			20.0		6.8		7.8		86.1		7.8					
I5	11:34	<0.5	20.6	20.6	7.1	7.1	9.9	9.9	110.5	110.5	8.4	8.4	<0.1	<0.1	5.3	5.3
			20.6		7.1		9.9		110.5		8.4					

Date of Monitoring 12/28/2016 Weather : Cloudy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:12	<0.5	17.2	17.2	6.9	6.9	8.3	8.3	86.7	86.7	9.8	9.8	<0.1	<0.1	9.0	8.6
			17.2		6.9		8.3		86.7		9.8					
C3b	11:32	<0.5	16.5	16.5	7.0	7.0	8.8	8.8	89.7	89.7	10.4	10.4	<0.1	<0.1	5.8	5.0
			16.5		7.0		8.8		89.7		10.4					
I5	11:46	<0.5	16.7	16.7	7.1	7.1	10.9	10.9	112.2	112.2	5.2	5.2	<0.1	<0.1	5.3	4.7
			16.7		7.1		10.9		112.2		5.2					

Date of Monitoring 12/30/2016 Weather : Cloudy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:19	<0.5	20.1	20.1	6.5	6.5	7.8	7.8	86.1	86.1	20.2	20.2	<0.1	<0.1	15.0	15.5
			20.1		6.5		7.8		86.1		20.2					
C3b	11:41	<0.5	17.6	17.6	6.7	6.7	8.8	8.8	92.7	92.7	5.8	5.8	<0.1	<0.1	3.6	4.0
			17.6		6.7		8.8		92.7		5.8					
I5	11:52	<0.5	19.5	19.5	6.9	6.9	9.2	9.2	100.4	100.4	20.9	20.9	<0.1	<0.1	15.0	15.0
			19.5		6.9		9.2		100.4		20.9					

NOTE:  
 Data in **Bold** denotes exceedance of respective Action Level  
 Data in **Bold Underline** denotes exceedance of respective Limit Level



Project Name: Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3  
 Suspended Solid (October 20 Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:10	<0.5	19.6	19.6	6.3	6.3	6.9	6.9	75.5	75.5	12.7	12.7	<0.1	<0.1	7.0	7.8
			19.6		6.3		6.9		75.5		12.7		<0.1		8.6	
			18.3		6.7		8.2		87.4		10.5		<0.1		11.0	
C3b	11:32	<0.5	18.3	18.3	6.7	6.7	8.2	8.2	87.4	87.4	10.5	10.5	<0.1	<0.1	7.4	9.2
			18.3		6.7		8.2		87.4		10.5		<0.1		7.4	
			18.8		7.0		8.4		90.4		7.0		<0.1		4.5	
I5	11:43	<0.5	18.8	18.8	7.0	7.0	8.4	8.4	90.4	90.4	7.0	7.0	<0.1	<0.1	3.1	3.8
			18.8		7.0		8.4		90.4		7.0		<0.1		3.1	

Date of Monitoring 1/25/2017 Weather : Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:07	<0.5	20.9	20.9	6.4	6.4	7.1	7.1	79.2	79.2	13.1	13.1	<0.1	<0.1	6.9	6.9
			20.9		6.4		7.1		79.2		13.1		<0.1		6.9	
			19.7		6.8		8.1		88.6		7.5		<0.1		3.7	
C3b	11:29	<0.5	19.7	19.7	6.8	6.8	8.1	8.1	88.6	88.6	7.5	7.5	<0.1	<0.1	3.9	3.8
			19.7		6.8		8.1		88.6		7.5		<0.1		3.9	
			20.5		7.0		8.2		90.7		6.9		<0.1		3.0	
I5	11:43	<0.5	20.5	20.5	7.0	7.0	8.2	8.2	90.7	90.7	6.9	6.9	<0.1	<0.1	3.4	3.2
			20.5		7.0		8.2		90.7		6.9		<0.1		3.4	

Date of Monitoring 1/27/2017 Weather : Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:06	<0.5	19.9	19.9	6.4	6.4	7.9	7.9	87.1	87.1	15.0	15.0	<0.1	<0.1	14.0	14.5
			19.9		6.4		7.9		87.1		15.0		<0.1		15.0	
			18.9		6.7		7.9		85.2		9.2		<0.1		4.6	
C3b	11:32	<0.5	18.9	18.9	6.7	6.7	7.9	7.9	85.2	85.2	9.2	9.2	<0.1	<0.1	4.0	4.3
			18.9		6.7		7.9		85.2		9.2		<0.1		4.0	
			19.6		6.9		8.0		87.7		5.7		<0.1		<2.5	
I5	11:47	<0.5	19.6	19.6	6.9	6.9	8.0	8.0	87.7	87.7	5.7	5.7	<0.1	<0.1	2.8	2.8
			19.6		6.9		8.0		87.7		5.7		<0.1		2.8	

NOTE:  
 Data in **Bold** denotes exceedance of respective Action Level  
 Data in **Bold Underline** denotes exceedance of respective Limit Level

Project Name: Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3  
 Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2

Date of Monitoring: 2/1/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:07	<0.5	20.8	6.3	7.4	83.2	14.4	<0.1	11
C3b	11:32	<0.5	20.0	6.6	7.6	83.3	7.6	<0.1	3.85
I5	11:48	<0.5	20.8	7.0	7.9	88.6	6.3	<0.1	2.8

Date of Monitoring: 2/3/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:08	<0.5	18.9	6.4	7.2	77.5	12.9	<0.1	13.05
C3b	11:36	<0.5	18.7	6.7	8.0	85.2	7.5	<0.1	3.65
I5	11:50	<0.5	19.1	6.9	7.4	79.5	5.6	<0.1	2.8

Date of Monitoring: 2/6/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:22	<0.5	22.2	6.4	7.7	88.2	21.4	<0.1	25.5
C3b	11:44	<0.5	20.5	6.6	7.2	80.0	7.5	<0.1	5.8
I5	11:56	<0.5	21.5	6.8	6.8	77.4	5.7	<0.1	<2.5

Date of Monitoring: 2/8/2017 Weather: Cloudy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	8:44	<0.5	18.4	6.3	5.7	60.3	14.3	<0.1	17.95
C3b	9:09	<0.5	18.3	6.5	6.6	70.1	7.6	<0.1	5.75
I5	9:22	<0.5	18.3	6.8	5.2	55.0	6.1	<0.1	3.2

Date of Monitoring: 2/10/2017 Weather: Cloudy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	12:26	<0.5	16.9	6.6	8.6	88.5	17.0	<0.1	18
C3b	11:50	<0.5	16.1	6.5	9.3	94.5	11.2	<0.1	7.3
I5	12:01	<0.5	15.2	6.7	8.5	85.1	8.1	<0.1	5.9

Date of Monitoring: 2/13/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:17	<0.5	19.1	6.4	8.6	93.1	18.2	<0.1	14
C3b	11:46	<0.5	18.2	6.6	7.8	83.2	8.5	<0.1	4.15
I5	11:56	<0.5	18.0	7.1	8.1	85.3	6.4	<0.1	<2.5

Date of Monitoring: 2/15/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	10:54	<0.5	18.8	6.6	9.7	103.7	24.4	<0.1	34.5
C3b	11:10	<0.5	18.1	6.8	8.1	86.3	10.0	<0.1	14.5
I5	11:23	<0.5	18.5	7.2	7.6	80.7	11.1	<0.1	15

Date of Monitoring: 2/17/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:07	<0.5	21.4	6.7	8.9	101.1	17.4	<0.1	16.5
C3b	11:31	<0.5	20.5	6.9	8.2	91.0	8.6	<0.1	10.5
I5	11:42	<0.5	21.0	7.0	8.8	98.8	12.4	<0.1	10.35

Project Name: Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3  
Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2

Date of Monitoring: 2/20/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:28	<0.5	22.9	7.1	8.4	85.0	12.9	<0.1	11.5
C3b	11:57	<0.5	21.5	7.1	9.0	92.1	9.0	<0.1	12
I5	12:08	<0.5	22.2	7.3	8.3	82.4	5.7	<0.1	4.75

Date of Monitoring: 2/22/2017 Weather: Cloudy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:27	<0.5	21.1	7.0	8.6	95.6	32.8	<0.1	24.5
C3b	11:49	<0.5	20.7	7.1	8.8	98.8	12.6	<0.1	10.25
I5	12:01	<0.5	22.0	7.2	9.1	103.8	23.5	<0.1	14

Date of Monitoring: 2/24/2017 Weather: Cloudy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:22	<0.5	15.7	6.6	9.5	95.7	13.2	<0.1	12.5
C3b	11:46	<0.5	15.6	7.1	8.3	83.5	29.5	<0.1	21.5
I5	11:59	<0.5	14.9	7.3	9.2	91.4	6.9	<0.1	5.95

Date of Monitoring: 2/27/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)	pH	DO (mg/L)	DO (% saturation)	Turbidity (NTU)	Salinity (g/L)	SS (mg/L)
			Average Value	Average Value	Average Value	Average Value	Average Value	Average Value	Average Value
C3a	11:36	<0.5	19.3	7.0	8.5	91.7	31.6	<0.1	38
C3b	11:56	<0.5	18.3	7.1	8.0	85.3	8.2	<0.1	9
I5	12:09	<0.5	20.3	7.2	7.9	87.5	24.7	<0.1	15





Project Name: Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3  
 Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:54	<0.5	19.9	19.9	7.3	7.3	5.5	5.5	60.1	60.1	27.7	27.7	<0.1	<0.1	30.0	34.0
			19.9		7.3		5.5		60.1		27.7		<0.1		38.0	
C3b	12:13	<0.5	19.9	19.9	7.3	7.3	6.5	6.5	71.4	71.4	4.2	4.2	<0.1	<0.1	4.2	4.5
			19.9		7.3		6.5		71.4		4.2		<0.1		4.7	
I5	12:22	<0.5	20.4	20.4	7.6	7.6	6.4	<b>6.4</b>	71.2	71.2	3.8	3.8	<0.1	<0.1	3.2	3.2
			20.4		7.6		6.4		71.2		3.8		<0.1		3.1	

Date of Monitoring: 3/24/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:37	<0.5	26.1	26.1	7.1	7.1	6.6	6.6	81.6	81.6	24.2	24.2	<0.1	<0.1	11.0	15.5
			26.1		7.1		6.6		81.6		24.2		<0.1		20.0	
C3b	12:01	<0.5	23.4	23.4	7.0	7.0	6.5	6.5	76.2	76.2	5.2	5.2	<0.1	<0.1	4.1	4.2
			23.4		7.0		6.5		76.2		5.2		<0.1		4.3	
I5	12:12	<0.5	26.9	26.9	7.3	7.3	10.2	10.2	128.0	128.0	3.9	3.9	<0.1	<0.1	4.2	4.1
			26.9		7.3		10.2		128.0		3.9		<0.1		4.0	

Date of Monitoring: 3/27/2017 Weather: Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	13:34	<0.5	23.7	23.7	6.5	6.5	7.2	7.2	84.9	84.9	15.8	15.8	<0.1	<0.1	9.4	11.2
			23.7		6.5		7.2		84.9		15.8		<0.1		13.0	
C3b	13:50	<0.5	20.8	20.8	6.9	6.9	6.8	6.8	76.4	76.4	6.8	6.8	<0.1	<0.1	6.2	6.9
			20.8		6.9		6.8		76.4		6.8		<0.1		7.5	
I5	14:00	<0.5	21.9	21.9	7.2	7.2	7.7	7.7	87.9	87.9	2.2	2.2	<0.1	<0.1	3.3	3.8
			21.9		7.2		7.7		87.9		2.2		<0.1		4.3	

Date of Monitoring: 3/29/2017 Weather: Rainy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:16	<0.5	21.9	21.9	6.2	6.2	5.9	5.9	66.8	66.8	28.6	28.6	<0.1	<0.1	24.0	25.5
			21.9		6.2		5.9		66.8		28.6		<0.1		27.0	
C3b	11:28	<0.5	21.4	21.4	6.6	6.6	6.6	6.6	74.8	74.8	19.1	19.1	<0.1	<0.1	9.5	9.2
			21.4		6.6		6.6		74.8		19.1		<0.1		8.8	
I5	11:34	<0.5	21.8	21.8	6.9	6.9	6.3	<b>6.3</b>	71.5	71.5	18.4	18.4	<0.1	<0.1	16.0	15.5
			21.8		6.9		6.3		71.5		18.4		<0.1		15.0	

Date of Monitoring: 3/31/2017 Weather: Rainy

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	12:06	<0.5	22.2	22.2	6.3	6.3	5.5	5.5	63.4	63.4	78.7	78.7	<0.1	<0.1	20.0	30.0
			22.2		6.3		5.5		63.4		78.7		<0.1		40.0	
C3b	12:32	<0.5	22.2	22.2	6.4	6.4	6.4	6.4	73.1	73.1	34.6	34.6	<0.1	<0.1	13.0	13.5
			22.2		6.4		6.4		73.1		34.6		<0.1		14.0	
I5	12:42	<0.5	22.2	22.2	6.7	6.7	6.7	6.7	76.6	76.6	66.1	66.1	<0.1	<0.1	41.0	<b>40.5</b>
			22.2		6.7		6.7		76.6		66.1		<0.1		40.0	

NOTE:  
 Data in **Bold** denotes exceedance of respective Action Level  
 Data in **Bold Underline** denotes exceedance of respective Limit Level



Project Name: Contract No. CV/2012/09 Liantang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure works - Contract 3  
 Entrusted Portion of Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling - Stage 2

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:57	<0.5	24.9	24.9	8.0	8.0	5.5	5.5	66.1	66.1	37.2	37.2	<0.1	<0.1	21.0	19.5
			24.9		8.0		5.5		66.1		37.2		<0.1		18.0	
C3b	12:14	<0.5	24.4	24.4	7.7	7.7	6.4	6.4	76.7	76.7	18.0	18.0	<0.1	<0.1	14.0	12.5
			24.4		7.7		6.4		76.7		18.0		<0.1		11.0	
I5	12:24	<0.5	25.2	25.2	7.4	7.4	6.7	6.7	82.1	82.1	13.5	13.5	<0.1	<0.1	4.5	4.7
			25.2		7.4		6.7		82.1		13.5		<0.1		4.9	

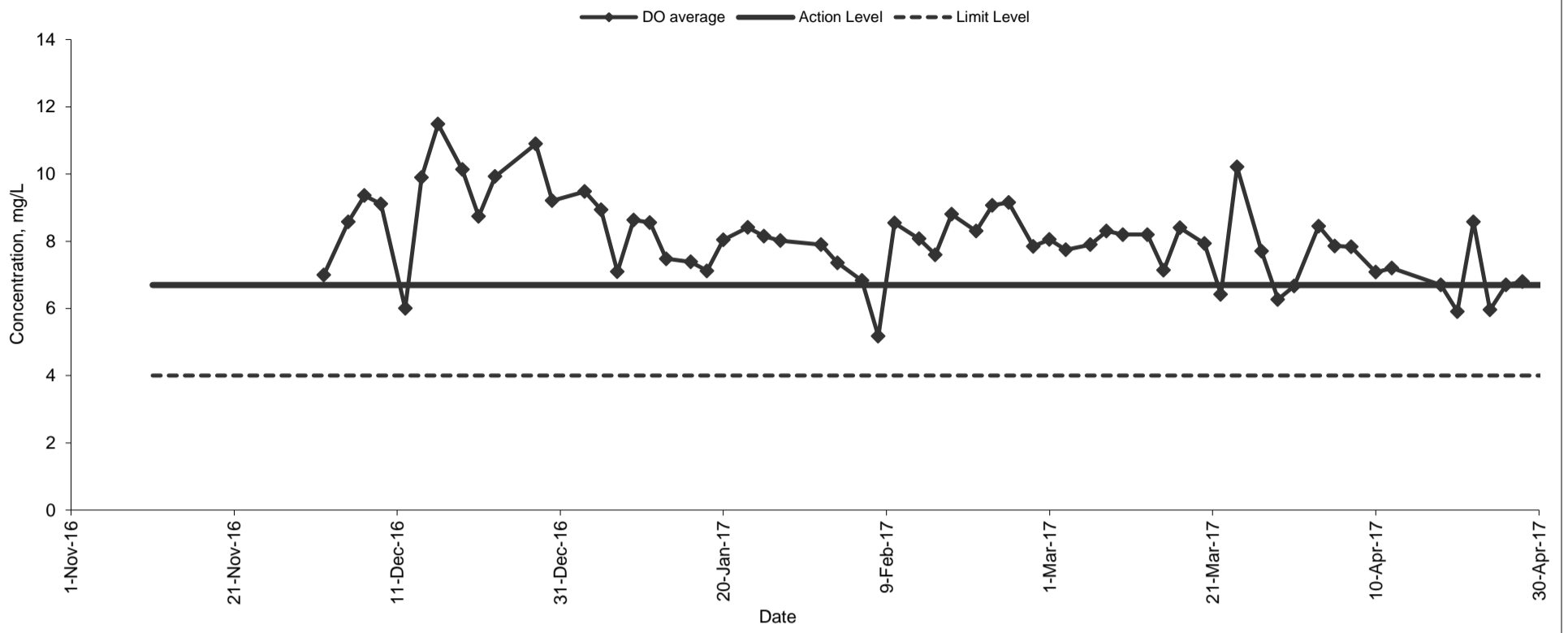
Date of Monitoring: 4/28/2017 Weather : Sunny

Monitoring Location	Time	Water Depth (m)	Temperature (°C)		pH		DO (mg/L)		DO (% saturation)		Turbidity (NTU)		Salinity (g/L)		SS (mg/L)	
			Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
C3a	11:53	<0.5	25.1	25.1	6.5	6.5	6.4	6.4	73.1	73.1	22.7	22.7	<0.1	<0.1	21.0	20.0
			25.1		6.5		6.4		73.1		22.7		<0.1		19.0	
C3b	12:19	<0.5	24.7	24.7	6.9	6.9	6.2	6.2	72.0	72.0	11.4	11.4	<0.1	<0.1	11.0	10.2
			24.7		6.9		6.2		72.0		11.4		<0.1		9.4	
I5	12:30	<0.5	24.9	24.9	7.1	7.1	6.8	6.8	84.1	84.1	2.8	2.8	<0.1	<0.1	2.5	2.5
			24.9		7.1		6.8		84.1		2.8		<0.1		<2.5	

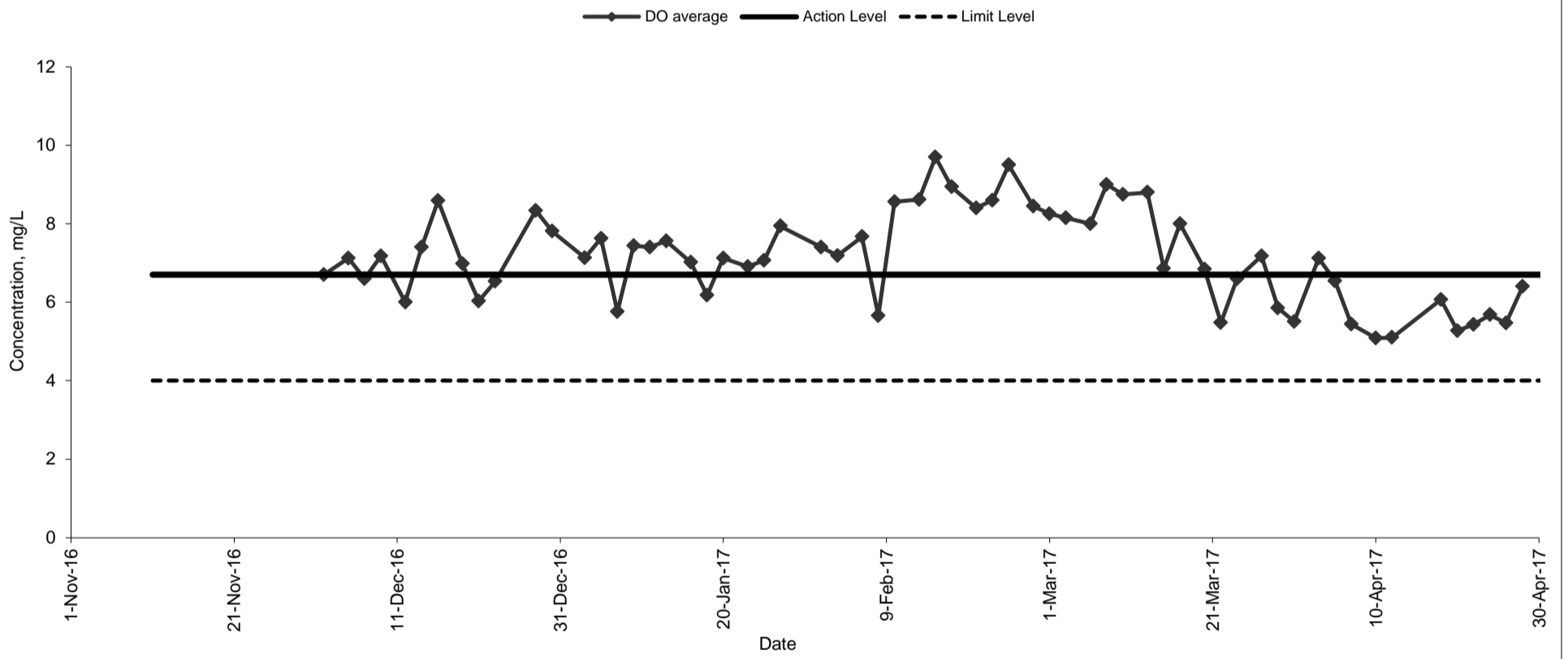
NOTE:  
 Data in **Bold** denotes exceedance of respective Action Level  
 Data in **Bold Underline** denotes exceedance of respective Limit Level

# Dissolved Oxygen

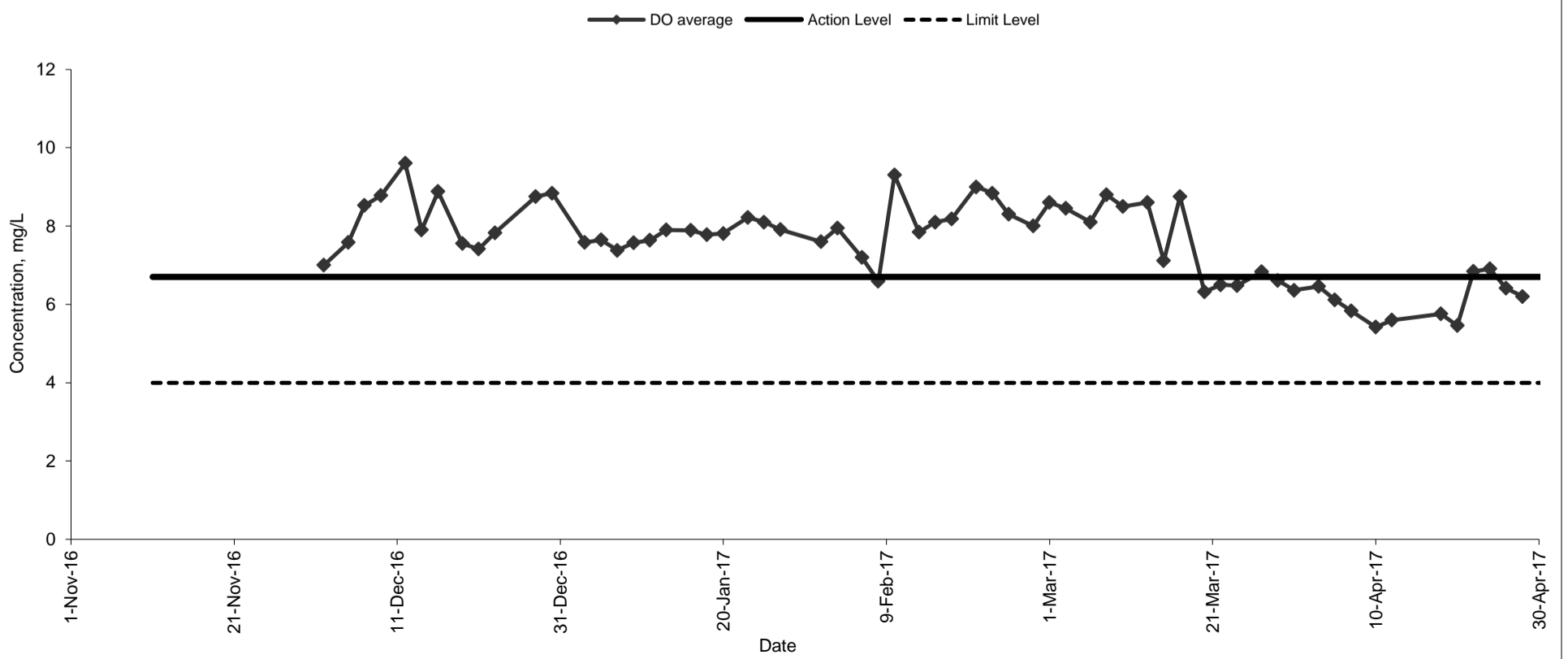
## I5



## C3a

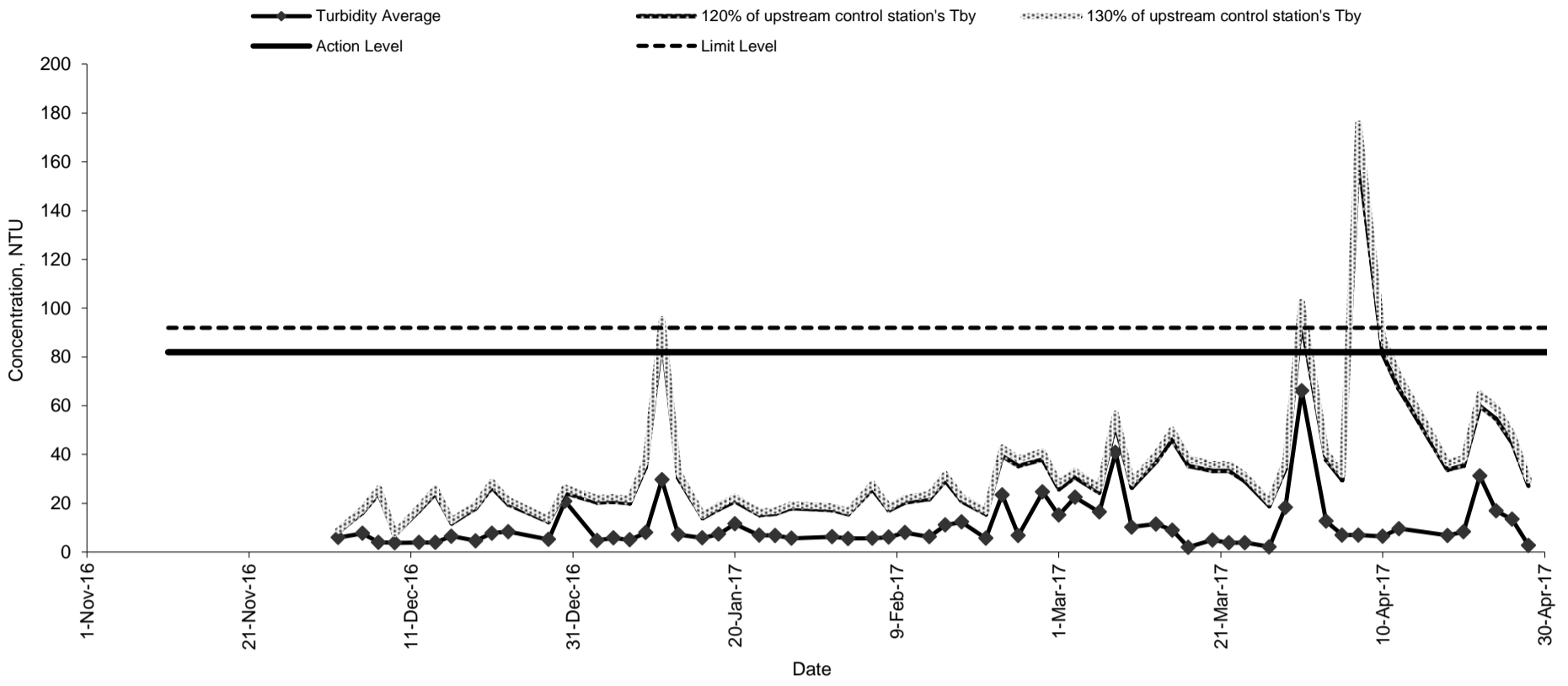


## C3b

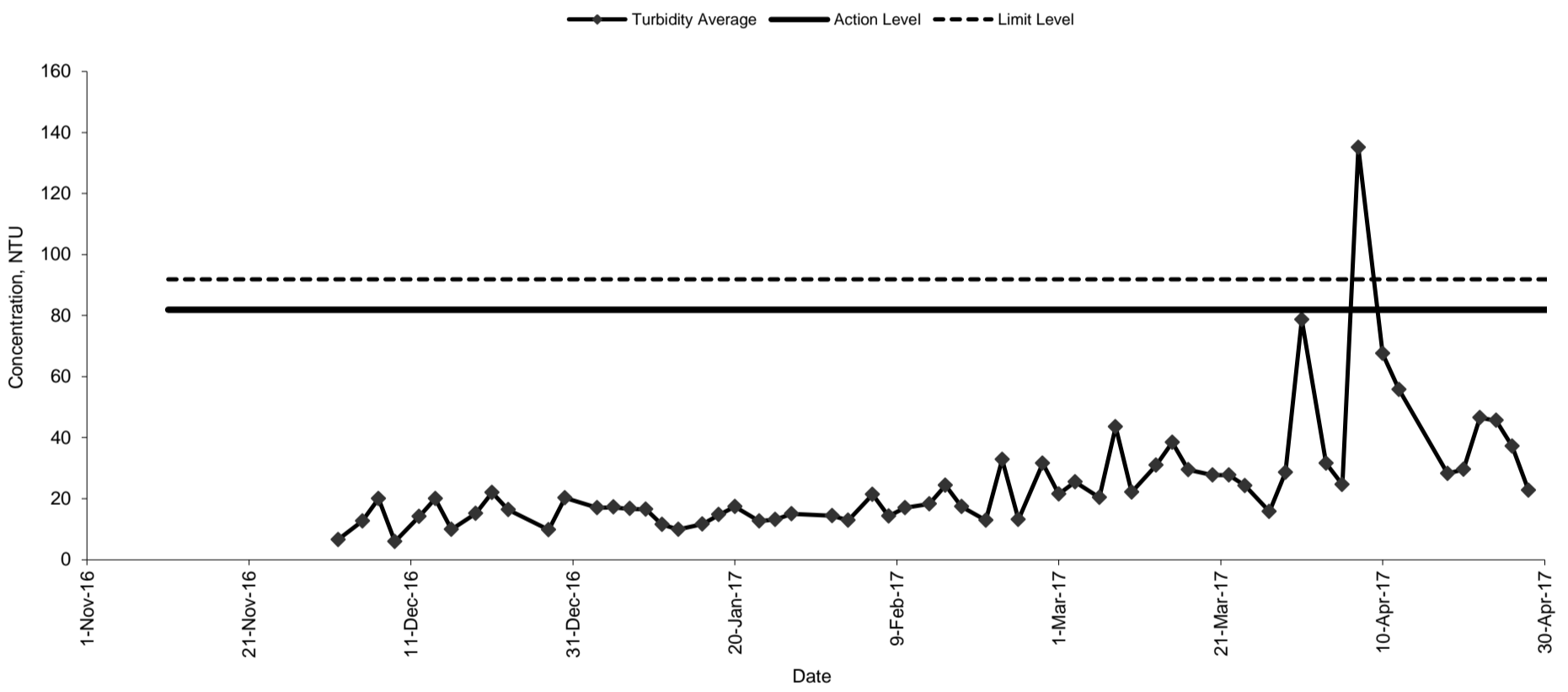


# Turbidity

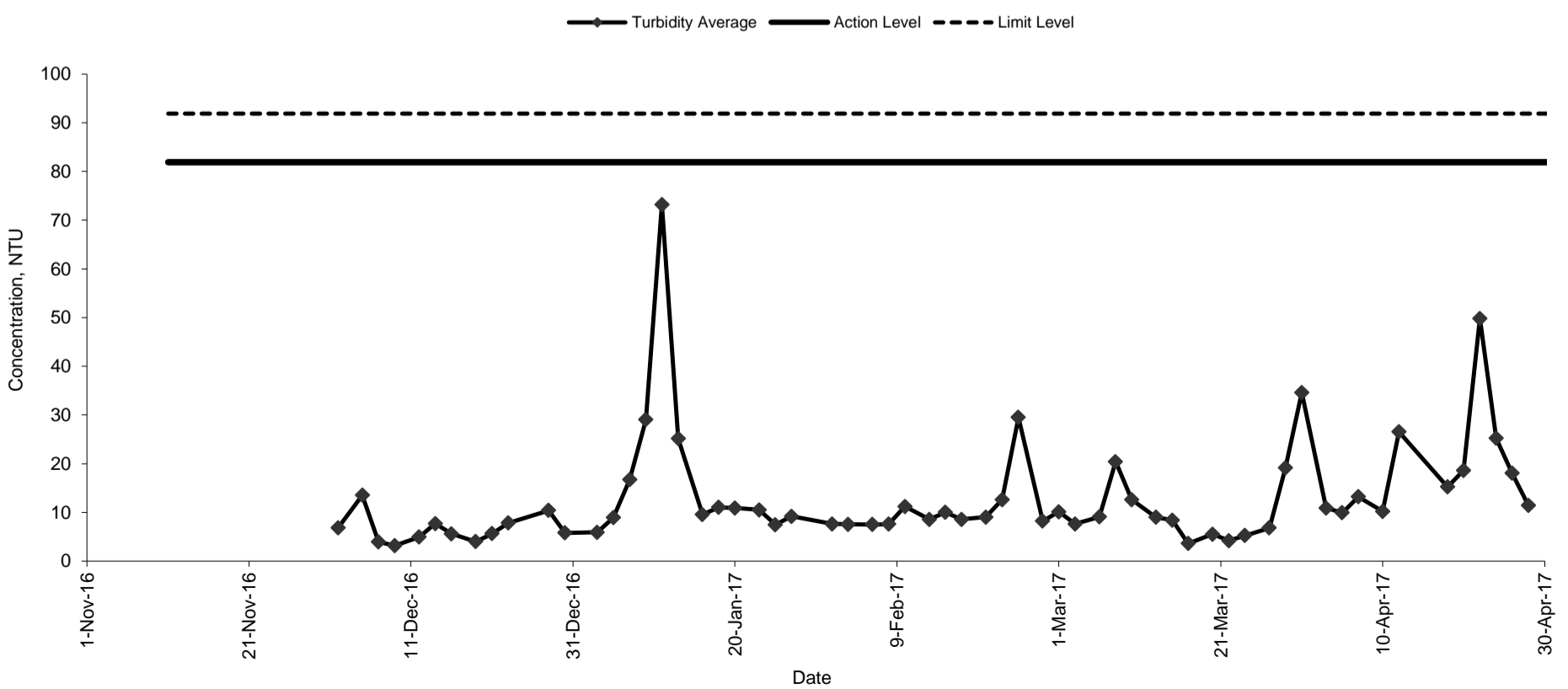
## I5



## C3a

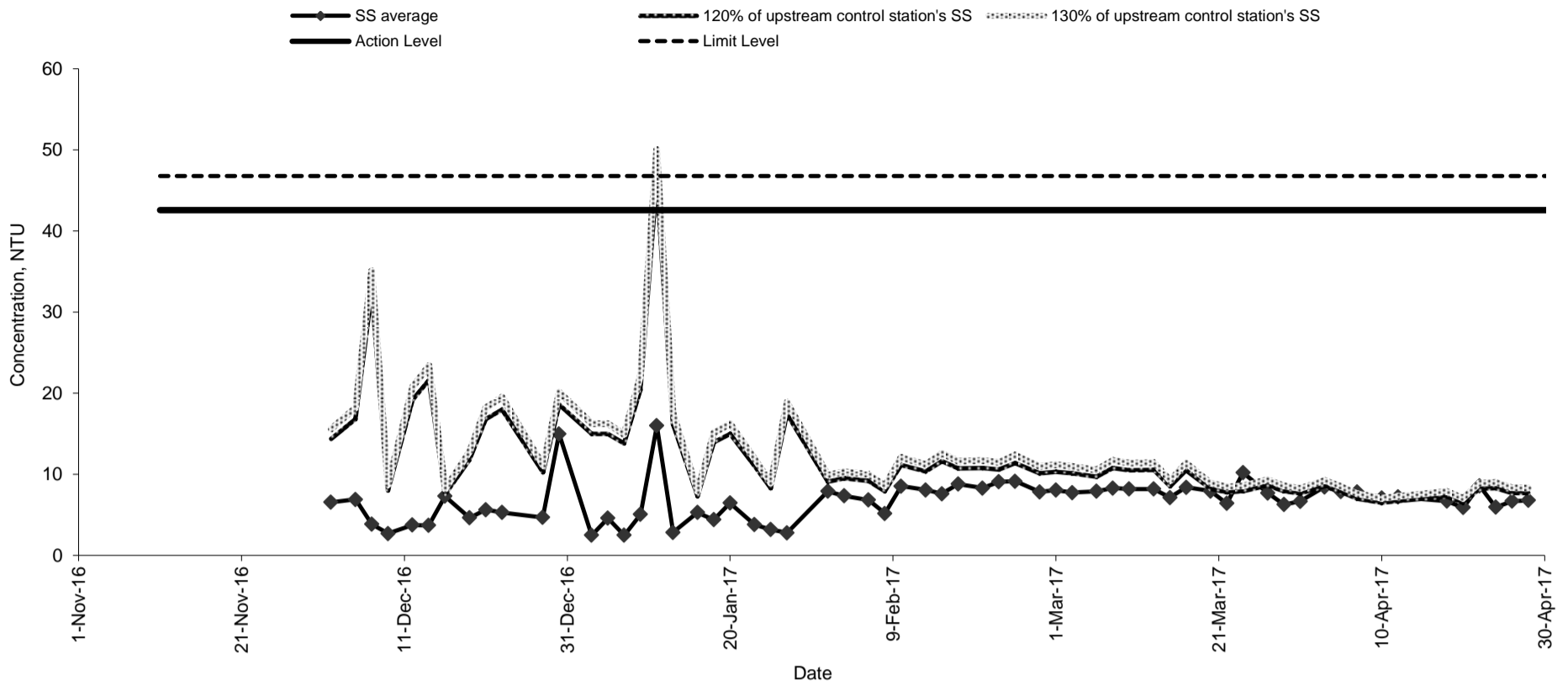


## C3b

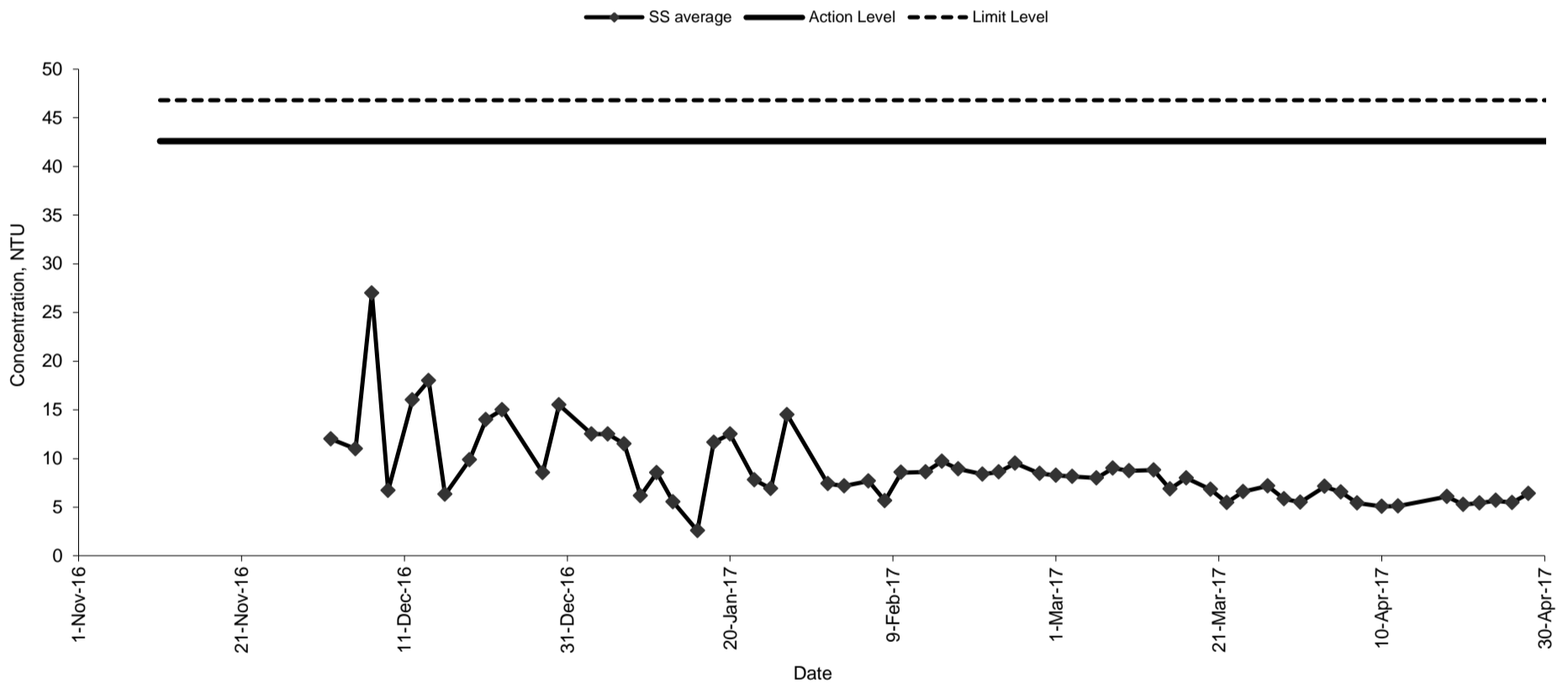


# Suspended Solid

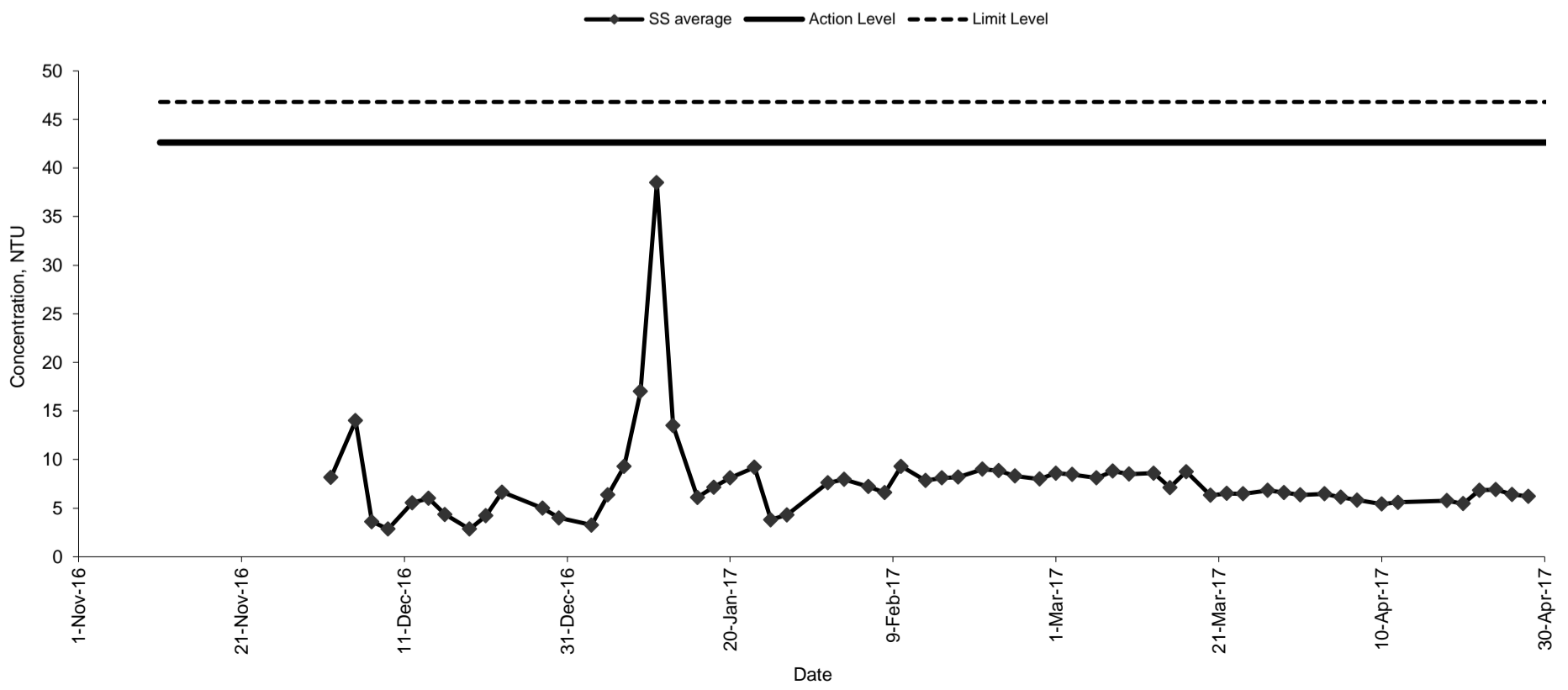
## I5



## C3a



## C3b



# **Appendix G Statistics on Complaints, Notifications of Summons and Successful Prosecutions**



**Cumulative Complaint Log**

Complaint Log No.	Date of Complaint	Received From and Received By	Location of Complainant	Nature of Complaint	Outcome	Status
C131126	26, November, 2013	Mr. Tony Hung from WWF	Mat Wat River (works sites for box culvert extension)	Suspected unauthorised discharge of water from a construction site to Ma Wat River, Tai Wo Service Road East, Tai Po	<p>It was found that the water leaving the end of the steel pipes was the diverted water from the upstream of the existing box culverts, instead of being discharged from the construction works sites.</p> <p>An EM&amp;A Programme is being undertaken to monitoring the environmental performance of the construction works, and the Contractor has also implemented appropriate mitigation measures to avoid silt-laden runoff discharging from the works sites into the river.</p> <p>The complaint is considered an invalid complaint under this Project.</p>	Completed

Complaint Log No.	Date of Complaint	Received From and Received By	Location of Complainant	Nature of Complaint	Outcome	Status
C141120	20 November, 2014	EPD	Ng Tung River and Ma Wat River nearby the site of the Liantang/ Heung Yuen Wai BCP Project (Contract Number CV/2012/09)	At Bridge NF426 in Fanling, the whole Ng Tung River showed milky and suspected illegal discharge by nearby factory has undertaken. (粉嶺近天橋編號 NF426 梧桐河整條河河水呈奶白色懷疑附近有工廠非法排放污水)	<p>Water Supplies Department (WSD) conducted a washout procedure on 20 November 2014 at about 9:30am to flush the newly installed water pipe of diameter of 1400mm which has recently finished disinfection. It is understood that the procedure has lasted for about 1 hour and large amount of freshwater has been discharged into the Ma Wat River through a washout port.</p> <p>Although water was observed seeping from the gantry switch and flew into the works sites, the area is a sump pit and the water was unlikely to run off and entered the river directly. As such, it is anticipated that only freshwater has been discharged into Ma Wat River through the washout port.</p> <p>Both site inspections conducted by the ET before the complaint (19 November 2014), and after the complaint (24 November 2014) did not identify any deficiencies on environmental mitigation measures. Also, there were no rains during the period and the risk of construction site run-off is considered minimal.</p>	Completed

Complaint Log No.	Date of Complaint	Received From and Received By	Location of Complainant	Nature of Complaint	Outcome	Status
					<p>The water from the Ma Wat Channel adjoins the Ng Tung River before passing through the complaint location, so other pollution sources may also occur at upstream of Ng Tung River</p> <p>The complaint is considered unlikely due to the construction works of this project.</p>	