MTR Corporation Limited

ROAD WORKS at WEST KOWLOON

(No. EP-366/2009/A)

Final Environmental Monitoring and Audit Report

Verified by : _____

(Mr. Eric CHING)

Position : Independent Environmental Checker

Date : 12 Apr. 19

MTR Corporation Limited

ROAD WORKS at WEST KOWLOON

(No. EP-366/2009/A)

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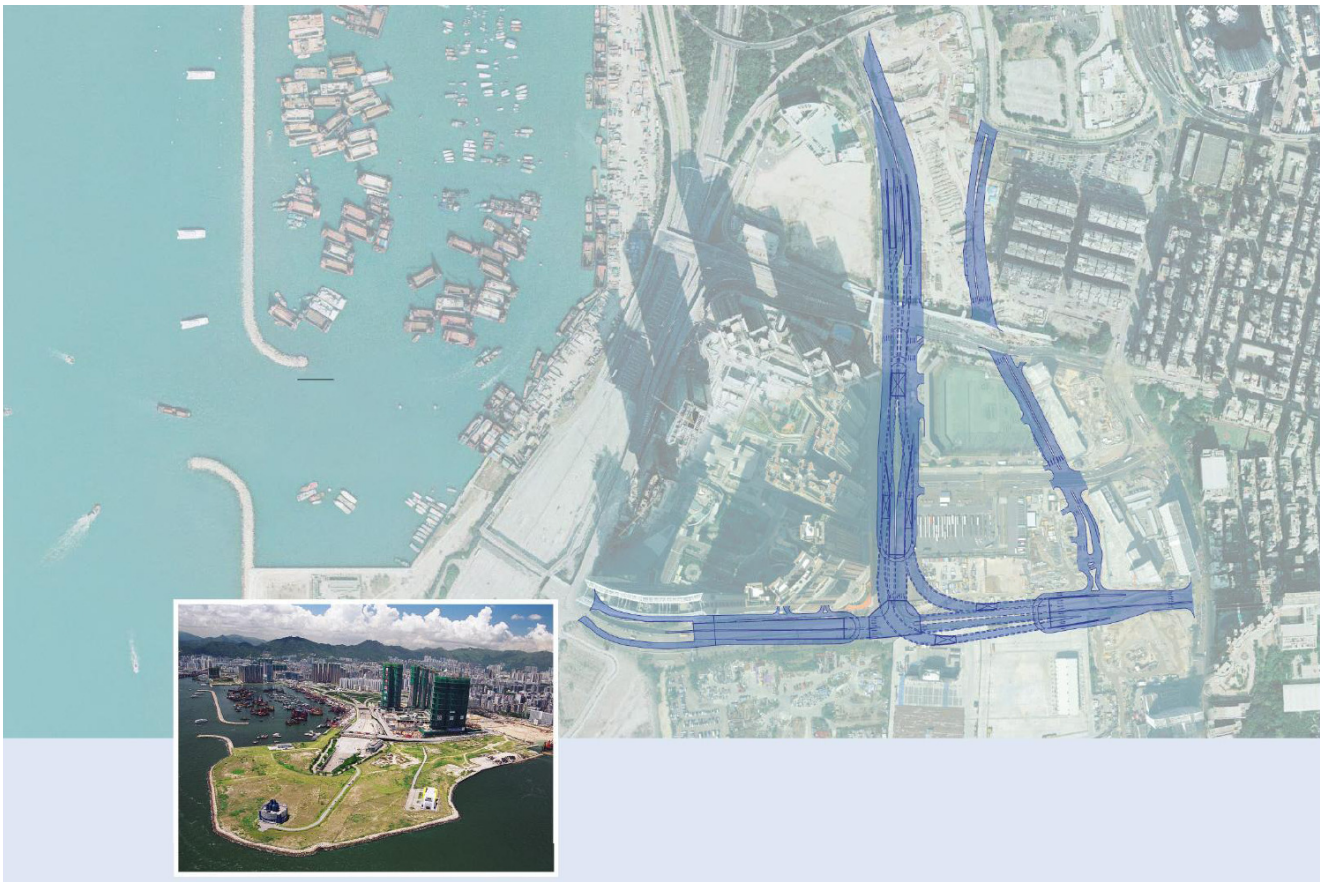
Certified by	:	(Mr. Raymond WONG)
Position	:	Environmental Team Leader
Date	:	12 April 2019

ROADWORKS
AT WEST KOWLOON



Final Environmental Monitoring and Audit Report

EXECUTIVE SUMMARY

The Road Works at West Kowloon (hereinafter referred to "the Roadworks" or "the Project") was awarded to respective contractors in May 2011 and the construction works have been commenced from July 2011. Hence, the Environmental Monitoring and Audit (EM&A) programme for the Roadworks commenced in the same time, i.e. July 2011.

In April 2008, the Government of Hong Kong Special Administrative Region (HKSAR) requested MTR Corporation Limited (MTRCL) to proceed with further planning and design of the Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link (a.k.a. the High Speed Rail), which runs from the Hong Kong West Kowloon Station (WEK) to the boundary at Huanggang.

Upon the opening of West Kowloon Station (WEK) of the High Speed Rail (HSR) and the development of the West Kowloon Cultural District (WKCD), additional road traffic capacity and network restructuring would be required through and within the West Kowloon Reclamation Area (WKRA). Roads namely D1A, D1, Lin Cheung Road – Austin Road West Underpass and upgrading of Austin Road West would be used to accommodate the anticipated increase in road traffic.

As all the related construction works that have the potential to cause significant environmental impact from the Project, have been completed before 30 March 2019, all relevant dust and noise monitoring works have been terminated on 30 March 2019.

This Final Environmental Monitoring and Audit (EM&A) Report presenting the results of EM&A works undertaken during the period from July 2011 to 30 March 2019 in accordance with the EM&A Manual and the requirement under Environmental Permit (EP) No. EP-366/2009/A, which is the latest version issued on 18 June 2012.

Air Quality

Impact air quality monitoring was conducted for 24-hour Total Suspended Particulates (TSP) at 3 air quality monitoring locations in the vicinity of Works Area in West Kowloon in a frequency of once in every six days throughout the reporting period in accordance with the EM&A Manual.

The total no. of exceedance for 24-hour TSP in the reporting period has been summarized in the section "Environmental Complaints / Exceedance / Non-compliance / Summons and Prosecution" below.

Air-borne Noise

Impact air-borne noise was measured in terms of $L_{Aeq(30min)}$ dB(A) with L_{10} and L_{90} measurements as reference at four noise monitoring locations in the vicinity of Works Area in West Kowloon in the interval of once in every week throughout the reporting period in accordance with the EM&A Manual. However one of the noise monitoring locations (CNM-2) has been suspended since August 2014 due to the objection from the Owners' Corporation (OC) of Sorrento.

For the total no. of air-borne noise exceedances in the reporting month, please refer to the section "Environmental Complaints/ Exceedance/ Non-compliance/ Summons and Prosecution" below.

Landscape and Visual

Regular inspections and audits have been conducted by certified Arborist throughout the whole construction period, and it is concluded that the tree protection works being carried out by the civil works contractors and transplanting work contractor are in accordance with the requirements of EP and EIA.

No significant observations have been made throughout the whole construction period.

Environmental Audits

In the reporting period, regular site inspections attended by representative from MTRCL and Contractors were carried out at 810A, 810B and 811B in West Kowloon. In addition to the regular site inspections, IEC environmental audits attended by IEC, MTRCL and Contractors were held on monthly basis. The findings in the inspections and audits have been raised to related Contractors for reference and/or action. Contractors' performances on environmental matters were found in an acceptable manner, it could conclude that the environmental protection and pollution control works have been implemented satisfactorily.

Environmental Complaints / Exceedance / Non-compliance / Summons and Prosecution

In total of 43 environmental complaints related to the Roadworks were referred from EPD since the commencement of the Project. The complaints were handled in accordance with the complaint handling procedure in the EM&A Manual and relevant parties including the Engineer's Representative (ER) and Independent Environmental Checker (IEC).

2 nos. of exceedance of 24-hour TSP Action Levels and 1 no. of exceedance of 24-hour TSP Limit Levels was recorded in the 3 air quality monitoring stations in the whole reporting

period. Finding from the investigations showed that the exceedances were not related to the Project.

15 nos. of exceedance of air-borne noise Action Levels and 99 nos. of exceedance of air-borne Limit Levels were recorded in the whole reporting period. Actions were taken by the Contractors to reduce the noise impact in accordance with the recommendations in EIA and EM&A Manual.

In the whole reporting period, no environmental incident/event and no non-compliances related to the Roadworks was received. Besides, no summons and no prosecutions related to Roadworks for MTRCL and/or the Contractors of 810A, 810B and 811B was received throughout the whole reporting period.

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1. INTRODUCTION

1.1 Project Background

In April 2008, the Government of Hong Kong Special Administrative Region (HKSAR) requested MTR Corporation Limited (MTRCL) to proceed with further planning and design of the Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link (a.k.a. the High Speed Rail), which runs from the Hong Kong West Kowloon Station (WEK) to the boundary at Huanggang.

Upon the opening of WEK of the High Speed Rail (HSR) and the development of the West Kowloon Cultural District (WKCD), additional road traffic capacity and network restructuring would be required through and within the West Kowloon Reclamation Area (WKRA). Roads namely D1A, D1, Lin Cheung Road – Austin Road West Underpass and upgrading of Austin Road West would be used to accommodate the anticipated increase in road traffic.

1.2 Project Programe

The Road Works at West Kowloon (hereinafter referred to "the Roadworks" or "the Project") was awarded to the respective Contractors: Leighton-Gammon Joint Venture (LGJV); Laing O'Rourke-Hsin Chong-Paul Y. Joint Venture (LHPJV) and Gammon-Leighton Joint Venture (GLJV) for the construction late June 2011.

The commencement of construction was on 8 July 2011. All the construction works for the road network within the WKRA have been completed and opened for public use by phases from September 2017 to January 2019.

1.3 Coverage

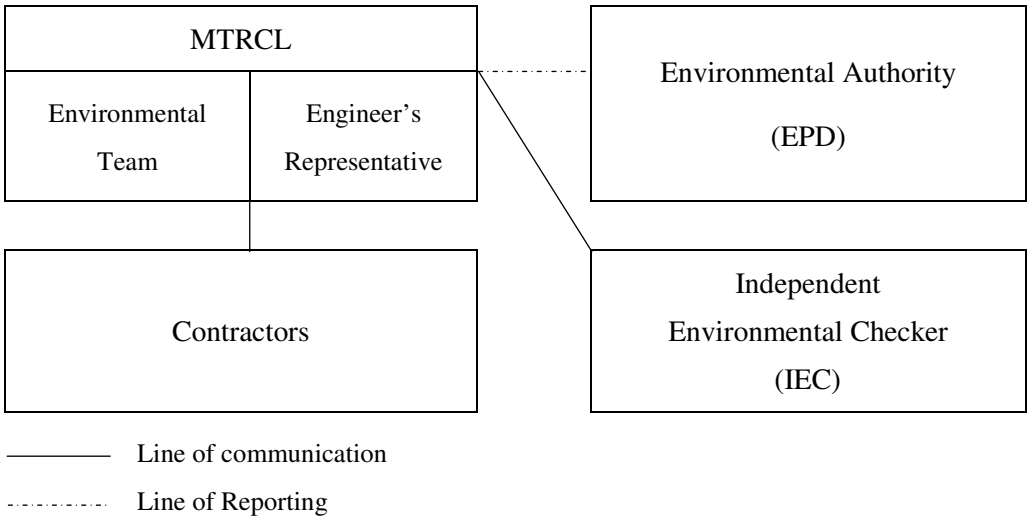
As the construction activities that have the potential to result in significant environment impact are completed, relevant local communities are consulted, IEC, ER and Project Proponent have endorsed for the termination of the EM&A program, and EPD has no objection on the termination. This Final Environmental Monitoring and Audit (EM&A) Report presents the results of EM&A works undertaken in the period from July 2011 to March 2019 for the Road Works in accordance with the EM&A Manual and the requirement under Environmental Permit No. EP-366/2009/A issued on 18 June 2012.

2. PROJECT INFORMATION

2.1 Project Management Organisation and Management Structure

The project management organisation chart is presented in Figure 2-1. Contacts of key personnel are shown in Appendix B.

Figure 2-1 Project Organisation



2.2 Project Works Areas and Environmental Monitoring Locations

The Project Works Areas in West Kowloon are shown in Appendix A and the locations of environmental monitoring stations are presented in Table 2-1 and indicated in Appendix D.

Table 2-1 Summary of Impact Air Quality and Noise Monitoring Stations

Monitoring Station ID	Monitoring Location Description
Air Quality	
CAM-1	Podium Floor between Sorrento and The Waterfront
CAM-2	Podium next to Tower 3, The Waterfront
CAM-3	Roof of Lift Building of The Victoria Towers
Noise	
CNM-1	Man Cheong Street Refuse Station
CNM-2 [1]	Tower 6, Sorrento
CNM-3	Podium next to Tower 3, The Waterfront
CNM-4	Tower 2, The Harbourside

Notes: [1] Impact monitoring at Tower 6, Sorrento (CNM-2) has been suspended from August 2014 due to the objection from the OC of Sorrento.

2.3 Summary of EM&A Requirements

The EM&A programme mainly requires environmental monitoring for air quality, noise, water quality and waste management as specified in the EM&A Manual.

A summary of impact EM&A requirements as applicable to this EM&A Report is presented in Table 2-2.

Table 2-2 Summary of Impact EM&A Requirements

Parameters	Description	Locations	Monitoring Frequency	Duration
Air Quality	24-hr TSP	Shown in Table 2-1	Once in every 6 days	Construction Stage
Noise	$L_{Aeq(30min)}$	Shown in Table 2-1	Once a week	Construction Stage
Waste	On-site Audit	Active works areas	Weekly	Construction Stage
Water Quality	On-site Audit	Active works areas	Weekly and in accordance to the requirement under discharge licences	Construction Stage
Landscape and Visual	On-site Audit	Active works areas	Bi-weekly	Construction Stage
General Site Conditions	Environmental Site Inspection and Audit	Active works areas	Weekly (ET) & Monthly (IEC)	Construction Stage

Environmental Quality Performance Limits for air quality and noise are shown in Appendix E. The Event Action Plan for air quality and noise are shown in Appendix F.

2.4 Implementation of Environmental Mitigation Measures

The Project Civil Works Contractors are required to implement the mitigation measures as specified in the EP, EIA Report and EM&A Manual. During regular environmental site inspections, the Contractors' implementation of mitigation measures were inspected and reviewed. A schedule of the implementation of mitigation measures identified in the Project EIA is given in Appendix C.

3. IMPACT MONITORING AND RESULTS

3.1 Air Quality

3.1.1 24-hour TSP Levels Monitoring

The sampling procedure follows to that described Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the U.S. Environmental Protection Agency. TSP is sampled by drawing air through a conditioned, pre-weighed filter paper inside the high volume sampler at a controlled rate. After 24-hour sampling the filter paper with retained particles shall be collected and returned to HOKLAS accredited laboratory (ALS Technichem (HK) Pty Ltd) for drying in a desiccators followed by accurate weighing. TSP levels are calculated from the ratio of the mass of particulate retained on the filter paper to the total volume of air sampled.

The samplers shall be properly maintained. Prior to dust monitoring commencing, appropriate checks shall be made to ensure that all equipment and necessary power supply are in good working condition.

3.1.2 Monitoring Methodology and Calibration

Monitoring was undertaken to establish for 24-hour Total Suspended Particulates (TSP) at the monitoring locations in the vicinity of the Works Areas as shown in Section 2.2 above by using a high volume sampler (HVS) according to Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the U.S. EPA.

The flow rate of the high volume sampler with mass flow controller was calibrated using an orifice calibrator. Initial calibration (five points) was conducted upon installation and prior to commissioning. Calibration was carried out every six months.

3.1.3 Monitoring Results

Monitoring results of 24-hour TSP are presented in Appendix G as graphical plot. The statistical analyses of air quality monitoring data for the dust monitoring stations within the reporting periods are summarized in Table 3-1 below.

Table 3-1 Statistical Analysis of Air Quality Monitoring Data

Number of measurement	Average Level (μg/m^3)	Maximum Level (μg/m^3)	Minimum Level (μg/m^3)	Action Level (μg/m^3)	Limit level (μg/m^3)
CAM-1 - Podium Floor between Sorrento and The Waterfront					
495	52.5	186.2	8.8	168.8	260.0
CAM-2 - Podium next to Tower 3, The Waterfront					
495	55.6	153.7	7.3	155.9	260.0
CAM-3 - Roof of Lift Building of The Victoria Towers					
495	56.9	338.3	4.0	179.3	260.0

2 nos. of 24-hour TSP Action Levels and 1 no. of 24-hour TSP Limit Levels exceedances were recorded in the reporting period. Investigations showed that none of the exceedances was related to the Project, hence it could be concluded that the construction activities did not have noticeable adverse effect on the general air quality from the Roadworks.

3.2 Air-borne Noise

3.2.1 Noise Monitoring

Sound level meters - B&K 2250 which in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications, as referred to the Technical Memorandum (TM) issued under the NCO were used for carrying out the impact air-borne noise monitoring in the construction stage.

The B&K 2250 sound level meters and calibrator B&K 4231 are verified by the certified laboratory or manufacturer at a biennial interval to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications.

3.2.2 Monitoring Methodology and Calibration

Immediately prior to and after each series of measurements, the accuracy of the sound level meter was checked by using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the difference between calibration levels obtained before and after the noise measurement is less than 1.0 dB.

Periods of prolonged or repeated overloading of the sound level meter detector were avoided by setting the meter with adequate headroom prior to commencing measurements. Measurements were recorded to the nearest whole dB, with values of 0.5 or more being rounded up.

3.2.3 Monitoring Results

Impact air-borne noise monitoring of $L_{Aeq(30min)}$ was undertaken during the construction stage in accordance with the EM&A Manual at the noise monitoring stations shown in Section 2.2 above between 0700 and 1900 hours on normal weekdays at a frequency of once per week when construction activities were underway.

Monitoring results of measured air-borne noise are presented in Appendix H as graphical presentations. The statistical analyses of measured noise levels data for the noise monitoring stations within the reporting periods are summarized in Table 3-2 below.

Table 3-2 Statistical Analysis of Construction Noise Monitoring Data

Number of measurement	Average Noise Level (dB(A))	Maximum Noise Level (dB(A))	Minimum Noise Level (dB(A))	Limit level (dB(A))
CNM-1 - Man Cheong Street Refuse Station				
401	67.9	76.0	60.0	75.0
CNM-2 - Tower 6, Sorrento				
162	73.5	77.0	63.0	75.0
CNM-3 - Podium next to Tower 3, The Waterfront				
403	74.8	85.0	61.0	75.0
CNM-4 - Tower 2, The Harbourside				
401	69.0	82.0	49.0	75.0

3.3 Action taken in Event of Exceedance

In total, there were 15 nos. of exceedance of air-borne noise Action Levels and 99 nos. of exceedance of air-borne Limit Levels were recorded. Investigations of exceedances were reported in respective monthly EM&A reports. Relevant actions were taken by the Contractors to reduce noise impact in accordance with the recommendations in EIA and EM&A Manual.

3.4 Operational Traffic Noise Monitoring

Under EP-366/2009/A Condition 3.1, during the operation phase, road traffic noise shall be monitored at representative noise sensitive receivers as described in the approved EIA report (AEIAR-141/2009) during the first year after road openings. Also in accordance with Section 2.2 of the EM&A Manual, a traffic noise monitoring plan (TNMP) should be prepared.

The TNMP was submitted to EPD in March 2018. Traffic noise levels shall be measured in terms of $L_{10(30min)}$ dB(A) over three half hour periods at each of the selected noise monitoring location during both morning peak hours (i.e. 07:30 - 09:30) and evening peak hours (i.e. 17:30 - 19:30) on normal weekdays. The traffic noise levels shall be measured at a 6-month interval within the first year upon completion of the Project.

All major roads under the Project had been in operation since September 2018 (road openings detail refers to Section 10.2.1); the first traffic noise monitoring has been conducted in March 2019, while the second traffic noise monitoring would be undertaken in September 2019 tentatively. The traffic noise monitoring report would be deposited within one month after the completion of all monitoring.

4. WASTE MANAGEMENT

4.1 Inert and Non-inert C&D Waste

Mitigation measures on waste management had been implemented in accordance with the requirements of the EM&A Manual. Suitable C&D materials were reused on-site or in other projects such as Andersen Road Quarry while the remaining C&D materials and non-inert wastes were disposed to the public filling reception facilities and the landfills respectively. The quantities disposed during construction period are summarized in the following Table 4-1.

Table 4-1 Statistical Analysis of construction waste generated and disposed of

Amount of Construction Waste Disposed				
Reporting Period	**Inert C&D [1] Materials to Public Fill (tonnes)**	**Non-inert C&D [2] Materials to Landfill (tonnes)**	**Chemical Waste to designated treatment facility (Litre)**	**Chemical Waste to designated treatment facility (kg)**
Contract 810A (Contract completed in March 2019)				
Jul - Sep 2011	0	0	0	0
Oct - Dec 2011	0	0	0	0
Jan - Mar 2012	210.80	0	0	0
Apr - Jun 2012	3976.30	0	400	0
Jul - Sep 2012	1036.70	0	881	0
Oct - Dec 2012	1435.20	0	410	0
Jan - Mar 2013	662.10	0	217	0
Apr - Jun 2013	603.70	0	12	0
Jul - Sep 2013	2999.00	0	0	0
Oct - Dec 2013	109.20	0	275	15
Jan - Mar 2014	44.40	0	0	20
Apr - Jun 2014	0	0	0	0
Jul - Sep 2014	0	0	0	0
Oct - Dec 2014	199.10	0	0	0
Jan - Mar 2015	65.60	0	0	0
Apr - Jun 2015	221.32	0	0	0
Jul - Sep 2015	112.40	0	0	0
Oct - Dec 2015	0	0	0	0
Jan - Mar 2016	30.50	0	0	0

Amount of Construction Waste Disposed				
Reporting Period	**Inert C&D [1] Materials to Public Fill (tonnes)**	**Non-inert C&D [2] Materials to Landfill (tonnes)**	**Chemical Waste to designated treatment facility (Litre)**	**Chemical Waste to designated treatment facility (kg)**
Apr - Jun 2016	0	0	0	0
Jul - Sep 2016	0	0	0	0
Oct - Dec 2016	0	0	0	0
Jan - Mar 2017	0	0	0	0
Apr - Jun 2017	0	0	0	0
Jul - Sep 2017	0	0	0	0
Oct - Dec 2017	0	0	0	0
Jan - Mar 2018	0	0	0	0
Apr - Jun 2018	0	0	0	0
Jul - Sep 2018	0	0	0	0
Oct - Dec 2018	113.82	392.25	0	0
Jan - Mar 2019	164.31	343.37	0	0
Cumulative	11984.50	735.65	2195	35
Contract 810B (Contract completed in March 2019)				
Jul - Sep 2011	206.60	28.00	120	0
Oct - Dec 2011	5111.00	62.70	200	0
Jan - Mar 2012	1329.00	31.50	200	0
Apr - Jun 2012	604.00	145.10	0	0
Jul - Sep 2012	928.00	56.30	0	0
Oct - Dec 2012	1612.00	125.00	360	0
Jan - Mar 2013	1057.00	71.20	0	0
Apr - Jun 2013	334.00	81.30	0	0
Jul - Sep 2013	233.00	110.00	0	0
Oct - Dec 2013	1729.00	178.60	0	0
Jan - Mar 2014	1183.00	154.90	0	0
Apr - Jun 2014	48.00	186.50	0	0
Jul - Sep 2014	184.40	276.60	0	0
Oct - Dec 2014	514.30	331.85	0	0
Jan - Mar 2015	782.00	363.00	0	0
Apr - Jun 2015	356.06	432.74	0	0
Jul - Sep 2015	312.27	357.17	0	0

Amount of Construction Waste Disposed				
Reporting Period	**Inert C&D [1] Materials to Public Fill (tonnes)**	**Non-inert C&D [2] Materials to Landfill (tonnes)**	**Chemical Waste to designated treatment facility (Litre)**	**Chemical Waste to designated treatment facility (kg)**
Oct - Dec 2015	1098.60	1082.00	0	0
Jan - Mar 2016	594.11	454.53	0	0
Apr - Jun 2016	1126.57	726.45	0	0
Jul - Sep 2016	380.92	997.04	0	0
Oct - Dec 2016	1442.70	228.40	0	0
Jan - Mar 2017	716.07	422.30	0	0
Apr - Jun 2017	1940.62	360.83	0	0
Jul - Sep 2017	1171.55	296.41	0	0
Oct - Dec 2017	5205.00	674.57	0	0
Jan - Mar 2018	9300.66	606.18	0	0
Apr - Jun 2018	843.75	103.26	0	0
Jul - Sep 2018	0	0	0	0
Cumulative	40,344.18	8,944.44	880	0
Contract 811B (Contract completed in June 2018)				
Jul - Sep 2011	0	0	0	0
Oct - Dec 2011	0	0	0	0
Jan - Mar 2012	2477.50	0	0	0
Apr - Jun 2012	759.50	0	0	0
Jul - Sep 2012	815.00	0	0	0
Oct - Dec 2012	1200.00	360.00	0	0
Jan - Mar 2013	1020.00	0	0	0
Apr - Jun 2013	550.00	0	0	0
Jul - Sep 2013	130.00	0	0	280
Oct - Dec 2013	8966.00	0	0	0
Jan - Mar 2014	0	0	0	0
Apr - Jun 2014	0	0	0	0
Jul - Sep 2014	0	0	0	0
Oct - Dec 2014	0	0	0	0
Jan - Mar 2015	0	0	0	0
Apr - Jun 2015	200.88	0	0	0
Jul - Sep 2015	1708.00	154.88	0	0

Amount of Construction Waste Disposed				
Reporting Period	**Inert C&D [1] Materials to Public Fill (tonnes)**	**Non-inert C&D [2] Materials to Landfill (tonnes)**	**Chemical Waste to designated treatment facility (Litre)**	**Chemical Waste to designated treatment facility (kg)**
Oct - Dec 2015	2115.48	122.20	0	0
Jan - Mar 2016	0	0	0	0
Apr - Jun 2016	0	0	0	0
Jul - Sep 2016	0	0	0	0
Oct - Dec 2016	150.90	0	0	0
Jan - Mar 2017	0	0	0	0
Apr - Jun 2017	0	0	0	0
Jul - Sep 2017	0	0	0	0
Oct - Dec 2017	0	0	0	0
Jan - Mar 2018	0	0	0	0
Apr - Jun 2018	0	0	0	0
Jul - Sep 2018	0	0	0	0
Oct - Dec 2018	1416.20	333.95		
Jan - Mar 2019	514.72	60.46		
Cumulative	22,024.18	1,031.49	0	280

Notes:

1. Inert C&D materials include bricks, concrete, building debris, rubble and excavated soil.
2. Non-inert C&D materials include steel, paper / cardboard packaging waste, plastics and other wastes such as general refuse.

5. WATER QUALITY

5.1 Water Quality Monitoring

Monitoring of the implementation of the water quality mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

5.2 Monitoring Requirement

Weekly site inspection was conducted throughout the construction stage covering the entire project site areas to ensure the recommended mitigation measures are properly implemented.

5.3 Audit Result

In the reporting period, the water quality mitigation measures were implemented in accordance with the requirements as stipulated in the EM&A Manual and found in an acceptable manner.

6. LANDSCAPE AND VISUAL

6.1 Landscape and Visual Monitoring

Landscape and visual monitoring and auditing have been conducted in accordance with the requirement in Section 6.3 of the EM&A Manual throughout the construction stage.

6.2 Monitoring Requirement

Bi-weekly site inspection was conducted throughout the construction stage covering the entire project site areas to ensure that the tree protection works being carried out by the civil works and transplanting contractors had been in accordance with EP/EIA.

6.3 Audit Result

The landscape and visual mitigation measures were implemented in accordance with the requirements as stipulated in the EM&A Manual and no non-compliance had been recorded in the whole reporting period.

7. RECORD OF ENVIRONMENTAL COMPLAINTS

A total of 43 environmental complaints related to the Roadworks were received from EPD in the reporting period of the Project.

The complaints have been handled in accordance with the complaint handling procedure in the EM&A Manual. The ET has provided feasible solutions to the Engineer's Representative (ER) and Contractors in mitigating the environmental disturbances/concerns lodged by the complainants. All complaint cases had been resolved satisfactorily and closed. Details of the environmental complaints including investigation and follow-up actions can be referenced in the respective Monthly EM&A Reports. A complaint summary for the Project is shown in Table 7-1 below.

Table 7-1 Summary of Environmental Complaints

Reporting Period	Contract	Frequency	Cumulative	Nature	Status
Invalid Complaint					
Jul 2011	-	0	0	-	-
Aug 2011	-	0	0	-	-
Sep 2011	-	0	0	-	-
Oct 2011	-	0	0	-	-
Nov 2011	-	0	0	-	-
Dec 2011	-	0	0	-	-
Jan 2012	-	0	0	-	-
Feb 2012	811B	1	1	1 no. - Air	Cases closed
Apr 2012	810A	1	2	1 no. - Air	Cases closed
May 2012	810A	2	4	2 nos. - Noise/Air	Cases closed
Jun 2012	810A/810B	1	5	1 no. - Noise/Air	Cases closed
Jul 2012	-	0	5	-	-
Aug 2012	810A	1	6	1 no. - Water	Cases closed
Oct 2012	810A/811B	2	8	2 nos. - Noise	Cases closed
Nov 2012	810A/810B/ 811B	3	11	1 no. - Air 1 no. - Water 1 no. - Noise/Air	Cases closed
Jan 2013	810A/810B/ 811B	2	13	1 no. - Noise 1 no. - Air	Cases closed
Feb 2013	-	0	13	-	-
Mar 2013	-	0	13	-	-
Apr 2013	810B	1	14	1 no. - Water	Cases closed

Reporting Period	Contract	Frequency	Cumulative	Nature	Status
May 2013	810A	0	14	-	-
Jun 2013	810A	0	14	-	-
Jul 2013	810A	0	14	-	-
Aug 2013	810A/811B	1	15	1 no. - Noise	Cases closed
Sep 2013	810A/811B	2	17	1 no. - Air 1 no. - Noise/Air	Cases closed
Oct 2013	-	0	17	-	-
Nov 2013	-	0	17	-	-
Dec 2013	810A/811B	2	19	1 no. - Noise 1 no. - Air	Cases closed
Jan 2014	810A	1	20	1 no. - Water	Cases closed
Feb 2014	-	0	20	-	-
Mar 2014	-	0	20	-	-
Apr 2014	-	0	20	-	-
May 2014	-	0	20	-	-
Jun 2014	810B	1	21	1 no. - Noise	Cases closed
Jul 2014	810A/811B	2	23	2 nos. - Air	Cases closed
Aug 2014	-	0	23	-	-
Sep 2014	-	0	23	-	-
Oct 2014	-	0	23	-	-
Nov 2014	-	0	23	-	-
Dec 2014	-	0	23	-	-
Jan 2015	-	0	23	-	-
Feb 2015	-	0	23	-	-
Mar 2015	-	0	23	-	-
Apr 2015	-	0	23	-	-
May 2015	-	0	23	-	-
Jun 2015	810A/810B	1	24	1 no. - Noise	Cases closed
Aug 2015	-	0	24	-	-
Sep 2015	-	0	24	-	-
Oct 2015	-	0	24	-	-
Nov 2015	-	0	24	-	-
Dec 2015	810A/810B	1	25	1 no. - Air	Cases closed
Jan 2016	-	0	25	-	-
Feb 2016	-	0	25	-	-
Mar 2016	-	0	25	-	-
Apr 2016	-	0	25	-	-
May 2016	-	0	25	-	-

Reporting Period	Contract	Frequency	Cumulative	Nature	Status
Jun 2016	-	0	25	-	-
Jul 2016	811B	1	26	1 no. - Noise	Cases closed
Aug 2016	-	0	26	-	-
Sep 2016	-	0	26	-	-
Oct 2016	-	0	26	-	-
Nov 2016	810A	1	27	1 no. - Noise	Cases closed
Dec 2016	-	0	27	-	-
Jan 2017	-	0	27	-	-
Feb 2017	-	0	27	-	-
Mar 2017	-	0	27	-	-
Apr 2017	-	0	27	-	-
May 2017	-	0	27	-	-
Jun 2017	-	0	27	-	-
Jul 2017	-	0	27	-	-
Aug 2017	-	0	27	-	-
Sep 2017	810A/811B	1	28	1 no. - Noise	Cases closed
Oct 2017	810A	1	29	1 no. - Noise	Cases closed
Nov 2017	810A/811B	1	30	1 no. - Noise	Cases closed
Dec 2017	811B	1	31	1 no. - Noise	Cases closed
Jan 2018	-	0	31	-	-
Feb 2018	-	0	31	-	-
Mar 2018	810A	1	32	1 no. - Noise	Cases closed
Apr 2018	810A/811B	2	34	2 nos. - Noise	Cases closed
May 2018	811B	1	35	1 no. - Air	Cases closed
Jun 2018	-	0	35	-	-
Jul 2018	-	0	35	-	-
Aug 2018	-	0	35	-	-
Sep 2018	-	0	35	-	-
Oct 2018	-	0	35	-	-
Nov 2018	-	0	35	-	-
Dec 2018	-	0	35	-	-
Jan 2019	-	0	35	-	-
Feb 2019	-	0	35	-	-
Mar 2019	-	0	35	-	-
Valid Complaint					
Feb 2012	810A/811B	1	1	1 no. - Noise	Cases closed
Mar 2012	810A	1	2	1 no. - Noise	Cases closed

Reporting Period	Contract	Frequency	Cumulative	Nature	Status
Jun 2012	810A/810B	1	3	1 no. - Noise/Air	Cases closed
Sep 2012	810A	1	4	1 no. - Water	Cases closed
Dec 2012	810A/811B	1	5	1 no. - Water	Cases closed
Jun 2015	810A/810B	2	7	2 nos. - Noise	Cases closed
Jul 2015	810A/810B	1	8	1 no. - Noise	Cases closed

8. RECORD OF NON-COMPLIANCES

8.1 Summary of Exceedances

In the reporting periods, 2 nos. of exceedance of 24-hour TSP Action Levels and 1 no. of exceedance of 24-hour TSP Limit Levels was recorded in three air quality monitoring stations.

15 nos. of exceedance of air-borne noise Action Levels and 99 nos. of exceedance of air-borne Limit Levels were recorded in the whole reporting period. Details should be referred to Section 3.

8.2 Summary of Environmental Warnings from EPD

No environmental warnings related to the Roadworks from EPD had been received in the whole reporting period.

8.3 Summary of Non-compliance and Corrective Actions

There were no non-compliances related to the Roadworks had been identified in the whole reporting period.

8.4 Summary of Notification of Summons and Prosecutions

No notification of summons and no prosecutions had been received related to the Roadworks in the whole reporting period.

9. STATUS OF STATUTORY SUBMISSIONS

9.1 Submissions required under Environmental Permit

A summary of the status of submissions required under the Road Works at West Kowloon Environmental Permits as of March 2019 is shown below:

Table 9-1 Summary of Submissions in accordance with EP conditions

EP-366/2009 Clause No.	Document Title	Status
2.1	Establishment of ET	Established
2.2	Employment of IEC	Established
2.5	Works Schedule	Deposited on 7 Apr 2011
2.7	Review Report	Submitted on 27 Apr 2011
2.3	Management Organisation of Main Construction Companies	Submitted on 9 Jun 2011
2.6	Location Plans	Deposited on 24 Jun 2011
3.2	Baseline Monitoring Report	Submitted on 6 Jun 2011
2.6	Location Plan (Revision B)	Deposited on 9 Aug 2011
3.4	Monthly EM&A Reports	Submitted within 10 days after the end of each reporting month
2.7	Review Report (Revision B)	Submitted on 25 May 2012

EP-366/2009/A Clause No.	Document Title	Status
2.7	Review Report (Revision C)	Submitted on 8 Jun 2012
2.6	Location and Layout Plans	Submitted on 28 Jun 2012
3.4	Monthly EM&A Reports	Submitted within 10 days after the end of each reporting month
2.13	Landscape Plan (Revision 3)	Submitted on 29 Jan 2018; The first Landscape Plan was submitted on 22 May 2017
3.1	Operational Noise Monitoring Plan	Submitted on 26 Mar 2018
2.6	Location and Layout Plans	Submitted on 4 Jun 2018

9.2 Statutory Permits and Licenses

Other than Environmental Permit, relevant environmental permits and licenses had been applied in the reporting period of the Project by the Contractors in accordance with relevant legislative ordinances and regulations, including wastewater discharge licenses, registration as Chemical Waste Producer, billing account for disposal of Construction Waste, Construction Noise Permits and etc. Details of these permits and licenses can be referenced in the respective Monthly EM&A Reports.

10. SITE INSPECTIONS

10.1 Observations

Regular site inspections were undertaken by the ET and respective Contractors in accordance with the EM&A Manual. The Contractors' performances on environmental matters were assessed and found in an acceptable manner. The inspection findings and the associated recommendations on improvement to the environmental protection and pollution control works were raised to the Contractors for reference and/or action. Though some of the actions had not been taken in the agreed time, it could be still concluded that the environmental protection and pollution control works had been implemented satisfactorily.

10.2 Other Notable Events

10.2.1 Opening of Road Works at West Kowloon

The road works at West Kowloon had been opened to public by phases. The first and second phases had been opened in September 2017 and December 2017 respectively. The roads in third phase had been opened for public in use in May 2018 and the remaining roads had been opened in the same time as West Kowloon Station opening, i.e. September 2018. In addition, a portion of at grade road of Austin Road West which adjacent Xiqu Centre has been in place in January 2019, in connection to the opening of the Centre.

10.2.2 IEC Site Inspections

The IEC conducted site inspections for the Roadworks Project Works Areas on monthly basis. Observations and reminders were made during the site inspections, and the respective Contractors had followed up and satisfactorily rectified the issues.

10.2.3 Remaining Works

After the road network opened for public use in January 2019, the remaining works for the Project would be correcting the defects wherever necessary. As the works would be minor and have no potential to result in significant environmental impact, no impact monitoring would be expected with reference to the EM&A Manual.

10.2.4 Termination of Roadworks EM&A programme

As all the major civil works have been completed for the Roadworks, this final Environmental Monitoring and Audit (EM&A) Report presented the results of EM&A works and the construction impact monitoring during July 2011 to March 2019.

In view of the completion of construction works that have potential to cause significant environmental impact for the Project, all relevant dust and noise monitoring works have been terminated on or before 30 March 2019.

11. REVIEW AND CONCLUSIONS

11.1 Effectiveness and Efficiency of Mitigation Measures

The environmental impact hypotheses with respect to construction air quality and construction noise detailed in the Roadworks EIA Report had been tested throughout the construction stage of the Project by the regular construction impact monitoring. The environmental impact hypotheses are found to be in order generally throughout the construction period of the Project.

Based on the environmental monitoring results of the construction stage of the Project, the effectiveness and efficiency of the implemented mitigation measures were found satisfactory. It concludes that the environmental mitigation measures as recommended in the approved Road Works at West Kowloon Project EIA Report had been implemented satisfactorily.

11.2 Review of the Roadworks EIA Predictions

Based on the findings of the regular construction impact monitoring, the validity of the Roadworks EIA predictions can be concluded. In conclusion, the current practices regarding the performance of the environmental management system are found to be satisfactory and should be maintained.

11.3 Conclusions

The Final Environmental Monitoring and Audit (EM&A) Report presents the results of EM&A works and the impact monitoring for the construction works of the Roadworks undertaken during the period of July 2011 to March 2019.

Impact monitoring for air quality and air-borne noise were conducted in accordance with the EM&A Manual in the reporting period. 7 nos. of 24-hour TSP Action Levels and 1 no. of 24-hour TSP Limit Levels exceedances were recorded in the reporting period. However, most of them were found non-Project related after the investigations and excavation and breaking might be the potential cause of exceedances according to the findings from investigations for the rest of records, relevant actions have been taken by the Contractors to minimize the dust nuisance in accordance with the recommendations in EIA and EM&A Manual. As a result, this could conclude that the construction activities did not have a noticeable adverse effect on the general air quality.

15 nos. of exceedance of air-borne noise Action Levels and 99 nos. of exceedance of air-borne Limit Levels were recorded in the reporting period. Operation of heavy powered mechanical plants for foundation works might be the possible cause of exceedances; relevant actions have been taken by the Contractors to control the noise impact in accordance with the recommendations in EIA and EM&A manual

In the reporting period, 43 nos. environmental complaints related to the Roadworks had been referred from EPD. The complaints were handled in accordance with the procedures stipulated in the EM&A Manual; detailed investigations have been reported in the respective monthly EM&A Reports.

There was no successful environmental prosecution in the reporting period. No warnings/non-compliances and no summons related to the Roadworks was received in the reporting period.

Site inspections were conducted by the Environmental Team (ET) on a weekly basis to monitor proper implementation of environmental pollution control and mitigation measures for the Project.

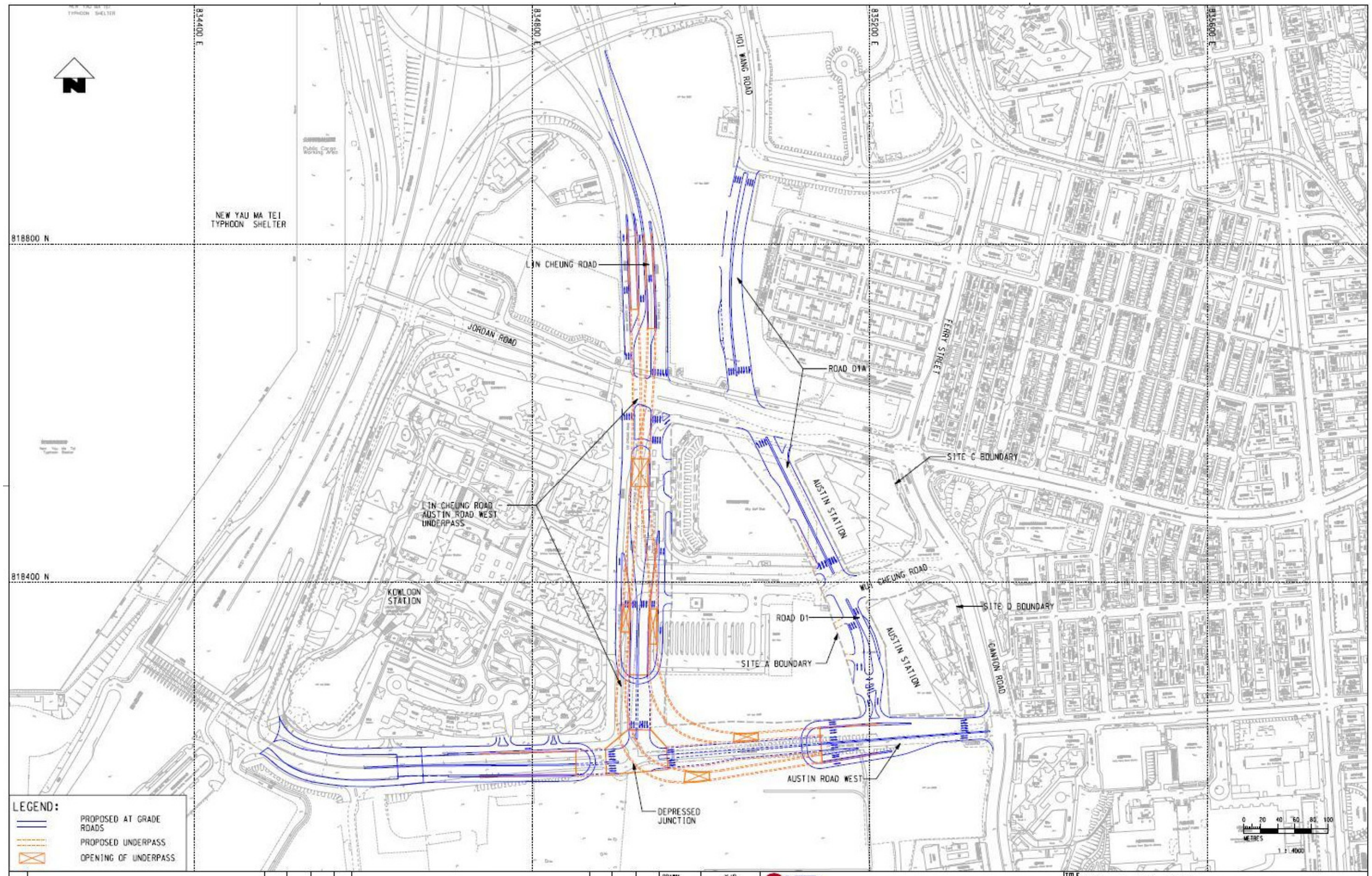
The Environmental Permit (EP-366/2009/A) issued by EPD on 18 June 2012 is used for the Road Works at West Kowloon Project.

It is concluded from the environmental monitoring and audit works for the Road Works at West Kowloon Project that the construction works were undertaken in an appropriately environmentally sensitive manner. The environmental protection and pollution control measures provided by the Contractors were generally acceptable apart from some minor irregularities which were rectified timely by the respective civil works contractors.

The ET would continue the implementation of the environmental monitoring and audit programme in accordance to the EM&A Manual and to a level consistent with MTRCL's Corporate Sustainability Policy.

Appendix A

Project Works Area



DRAWN	YJP
DESIGNED	TWF
CHECKED	KCC
APPROVED	PL
DATE	11/MAR./2009

MTR

ROAD WORKS AT WEST KOWLOON

ORIGINATOR: PROJECT DIVISION

CADD REF. NOL_ERL_300_C_WKT_ENS_M62_001A.dgn

TITLE: PROPOSED ROAD WORKS AT WEST KOWLOON

SCALE 1 : 4000 (A3) | FIGURE NO. NOL/ERL/300/C/WKT/ENS/M62/001 | REV. A

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

WORKS AREA for ROAD WORKS

Appendix B

Project Management Organization and Contacts of Key Personnel

Title	Name	Telephone
Engineer's Representative		
Construction Manager (Contracts 810A, 810B & 811B)	Mr. Edmond SO	2926 9062
Independent Environmental Checker		
Independent Environmental Checker	Mr. Eric CHING	2828 5825
Environmental Team		
Environmental Team Leader	Mr. Raymond WONG	2688 1094
Contractors		
Contract 810A		
Principle Project Director	Mr. Adrian CLAMP	3759 9810
Senior Environmental Officer	Mr. Dominic FUNG	3759 9796
Contract 810B		
Project Director	Mr. Jeremy MATTERSON	2472 8050
Environmental Officer	Ms. Diana LEE	2472 9509
Contract 811B		
Project Construction Manager	Mr. Alan TANG	3759 9753
Environmental Officer	Ms. Kiwi CHAN	3759 9729

Appendix C

Implementation of Environmental Mitigation Measures

Appendix C IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
Noise Control					
3.53 – 3.54	The following quiet PME should be used: • Pneumatic breaker (SWL=110dB(A)) • Tracked Excavator Fitted with Hydraulic Breaker (SWL=110dB(A)) • Truck Mixer (SWL=100dB(A)) • Tracked Crane (SWL=101dB(A)) • Dump Truck (SWL=103dB(A)) • Tracked Excavator/Loader (SWL=105dB(A)) • Dozer (SWL=111dB(A)) • Road Roller (SWL=101dB(A))	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implement as per the construction programme.
3.55	Use of movable noise barriers, acoustic mats and acoustic sheds for excavator, hand-held pneumatic chipper and etc.	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Movable noise barriers have been made and placed at the excavation zone or the works areas that will generate noise nuisance, if applicable.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
3.57	Good Site Practice: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program; • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme; • Mobile plant, if any, should be sited as far from noise sensitive receivers (NSRs) as possible; • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and • Material stockpiles and other structures should be effectively utilized, wherever practicable, in	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented as per construction programme.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
3.57	screening noise from on-site construction activities	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented as per construction programme.
Air Quality Control					
Table 4.6	The excavation and sandfill areas limited to 30% actively operating and complete watering coverage of these active areas eight times a day as recommended.	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented as per construction programme.
4.77	Implementation of dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation. • Skip hoist for material transport should be totally enclosed by impervious sheeting. • Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction site. • The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcore.	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
4.77	• Where a site boundary adjoins a road, streets or other accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length except for a site entrance or exit. • Every stack of more than 20 bags of cement should be placed in an area sheltered on the top and the 3 sides and be covered entirely by impervious sheeting. • All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet. • The height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from falling and landing. • The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
4.77	ensure dust materials do not spread from the vehicle. • Investigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.	To reduce the construction air-borne noise impact.	Contractor	Throughout the whole construction phase	Implemented.
Water Quality Control					
5.30 -5.42	General Construction Activities and Construction site run-off:: • The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable.	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
5.43	Effluent Discharge • There is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality should meet the requirements specified in the discharge licence. Minimum distances of 100 m should be maintained between the discharge points of construction site	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
5.43	effluent and the existing seawater intakes. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the relevant WPCO licence which is under the ambit of regional office (RO) of EPD.	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
5.44	Groundwater • No contaminated groundwater is anticipated in the works areas. Appropriate measures will be deployed to minimize the intrusion of groundwater into excavation works areas. In case seepage of uncontaminated groundwater occurs, groundwater should be pumped out from the works areas and discharged into the storm system via silt removal facilities. Ground water from dewatering process should also be discharged into the storm system via silt traps.	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented as per construction programme.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
5.45 -5.47	Accidental Spillage • Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes. • Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges. • Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance.	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
5.45 -5.47	The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: ➢ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. ➢ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. ➢ Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
5.48 -5.49	Sewage Effluent from Construction Workforce • Sufficient chemical toilets should be provided in the works areas. A licensed	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
5.48 -5.49	waste collector should be deployed to clean the chemical toilets on a regular basis. • Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment. Regular environmental audit of the construction site will provide an effective control of any malpractices and can encourage continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the project would not cause water pollution problem after undertaking all required measures.	To control water quality impact from construction site runoff and general construction activities.	Contractor	Throughout the whole construction phase	Implemented.
Waste Management					
6.47	All waste materials should be segregated into categories covering: • Excavated materials suitable for reuse; • Inert C&D materials for disposal off-site;	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.47	• Non-inert C&D materials for disposal at landfills; • Chemical waste; and • General refuse.	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste.	Contractor	Throughout the whole construction phase	Implemented.
6.50	Recommendations for good site practices during the construction activities include: • Training of site personnel in, site cleanliness, proper waste management and chemical handling procedures; • Provision of sufficient waste disposal points and regular collection of waste; • Appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; and • Separation of chemical wastes for special handling and appropriate treatment.	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste.	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.51	Recommendations for waste reduction measures include: • Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.); • Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce; • Proper storage and site practices to minimize the potential for damage or contamination of construction materials; • Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste.	Contractor	Throughout the whole construction phase	Implemented as per construction programme.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.51	generation of waste; and • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste.	Contractor	Throughout the whole construction phase	Implemented as per construction programme.
6.52	The Contractor should prepare and implement a Waste Management Plan (WMP) as a part of the Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities.	To keep trace of the generation, minimization, reuse and disposal of C&D materials in the Project	Contractor	Throughout the whole construction phase	Implemented as per construction programme.
6.58	Wheel wash facilities have to be provided before the trucks leave the works area. This can reduce the introduction of dust to the public road network.	To minimise the dust impact	Contractor	Throughout the whole construction phase	Implemented.
6.60	The waste delivered to landfill should not contain any free water or have water content more than 70% by weight. Concerning the requirement on the truck load of waste to	To meet the requirement for disposal at landfill	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.60	landfill, the haulier must ensure suitable amount of waste would be loaded on different types of trucks used.	To meet the requirement for disposal at landfill	Contractor	Throughout the whole construction phase	Implemented.
6.56	In order to monitor the disposal of C&D materials and to control fly-tipping at PFRFs or landfills, a trip-ticket system should be established in accordance with ETWB TCW No. 31/2004. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up and close-circuited television should be installed at the vehicular accesses to remind the designated disposal sites and prevent fly-tipping.	To monitor disposal of waste and control fly-tipping	Contractor	Throughout the whole construction phase	Implemented.
6.59	Wet spoil generated from the construction of pipe pile and diaphragm wall should be treated before disposal at PFRFs. With the agreement from Fill Management Department (FMD) of CEDD, wet spoil would be mixed with dry materials to reduce water content to less than 25% dry density before disposal, which reduce the impacts to the reception facilities.	To meet the requirement for disposal at landfill	Contractor	Throughout the whole construction phase	Implemented.
6.61	If chemical wastes are produced at the construction site, the Contractor would be	To properly store the chemical waste within works areas	Contractor	Throughout the whole construction phase	Implemented.

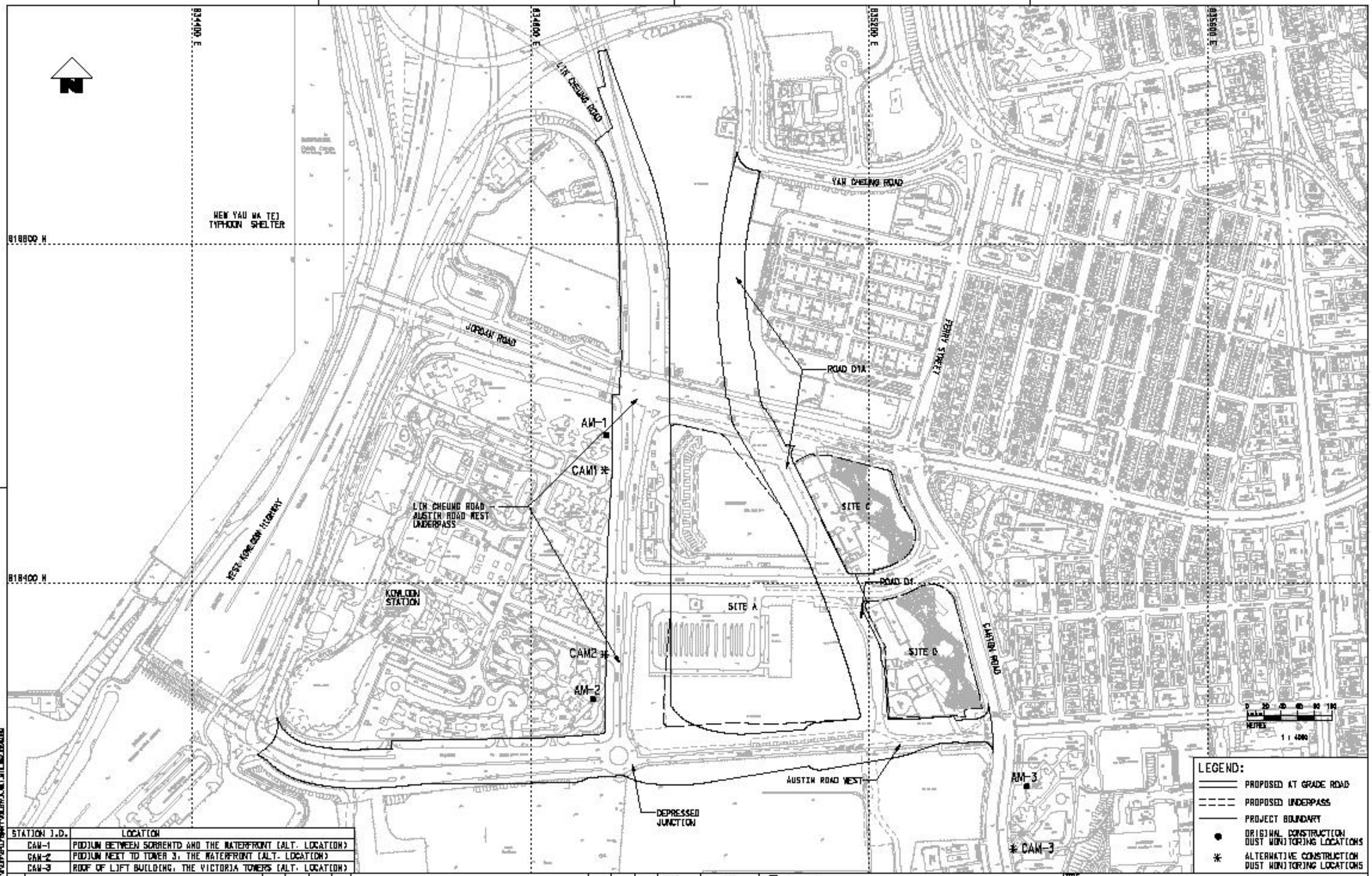
EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.61	required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*.	To properly store the chemical waste within works areas	Contractor	Throughout the whole construction phase	Implemented.
6.64	A trip-ticket system should be operated in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation* to monitor all movements of chemical waste. The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the approved CWTC at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	To monitor the generation, reuse and disposal of chemical waste	Contractor	Throughout the whole construction phase	Implemented.
6.65	General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical waste. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D materials and chemical wastes. Preferably, an enclosed and covered area should be provided to reduce the occurrence of wind blown light material.	To properly store and separate from other C&D materials for subsequent collection and disposal	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
6.66	The recyclable component of general refuse, such as aluminium cans, paper and cleansed plastic containers should be separated from other waste. Provision and collection of recycling bins for different types of recyclable waste should be set up by the Contractor. The Contractor should also be responsible for arranging recycling companies to collect these materials. The non-recyclable components should be collected by licensed collectors employed by the Contractor on daily basis to avoid any adverse impacts on storage of refuse, which would be disposed of at designated landfills.	To facilitate recycling of recyclable portions of refuse	Contractor	Throughout the whole construction phase	Implemented.
6.67	The Contractor should carry out an education programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided in the sites as reminders.	To raise workers' awareness on recycling issue	Contractor	Throughout the whole construction phase	Implemented.
Landscape and Visual Management					
Table 7.4	• Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works.	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.

EIA Ref #	Environmental Protection Measures / Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	When to implement the measures?	Implementation Status
Table 7.4	• Existing trees to be retained on site should be carefully protected during construction. • Tree unavoidably to be affected by the works should be considered for transplanting in accordance with ETWB TCW No. 3/2006 - Tree Preservation and maintained until end of the establishment period. Detailed tree transplanting proposal should be submitted to seek relevant government department's approval in detailed design stage. • Compensatory tree planting provided to compensate for felled trees and maintained until end of the establishment period. • Control of night-time lighting glare • Erection of decorative screen hoarding compatible with the surrounding setting.	To minimize landscape and visual impacts during construction phase	Contractor	Throughout the whole construction phase	Implemented.

Appendix D

Monitoring Locations



STATION I.D.	LOCATION
CAM-1	PODIUM BETWEEN SORRENTO AND THE WATERFRONT (ALT. LOCATION)
CAM-2	PODIUM NEXT TO TOWER 3, THE WATERFRONT (ALT. LOCATION)
CAM-3	ROOF OF LIFT BUILDING, THE VICTORIA TOWERS (ALT. LOCATION)

REV	DESCRIPTION	BY	DATE	APPROVED
A1	FIRST DRAFT	YCC	18MAY11	—

DRAWN: YCC
DESIGNED:
CHECKED: MC
APPROVED:
DATE: 03/MAY/2011

MTR

EXPRESS RAIL LINK

DESIGNED BY: PROJECTS DIVISION | SUSTAINABILITY DEVELOPMENT DEPARTMENT

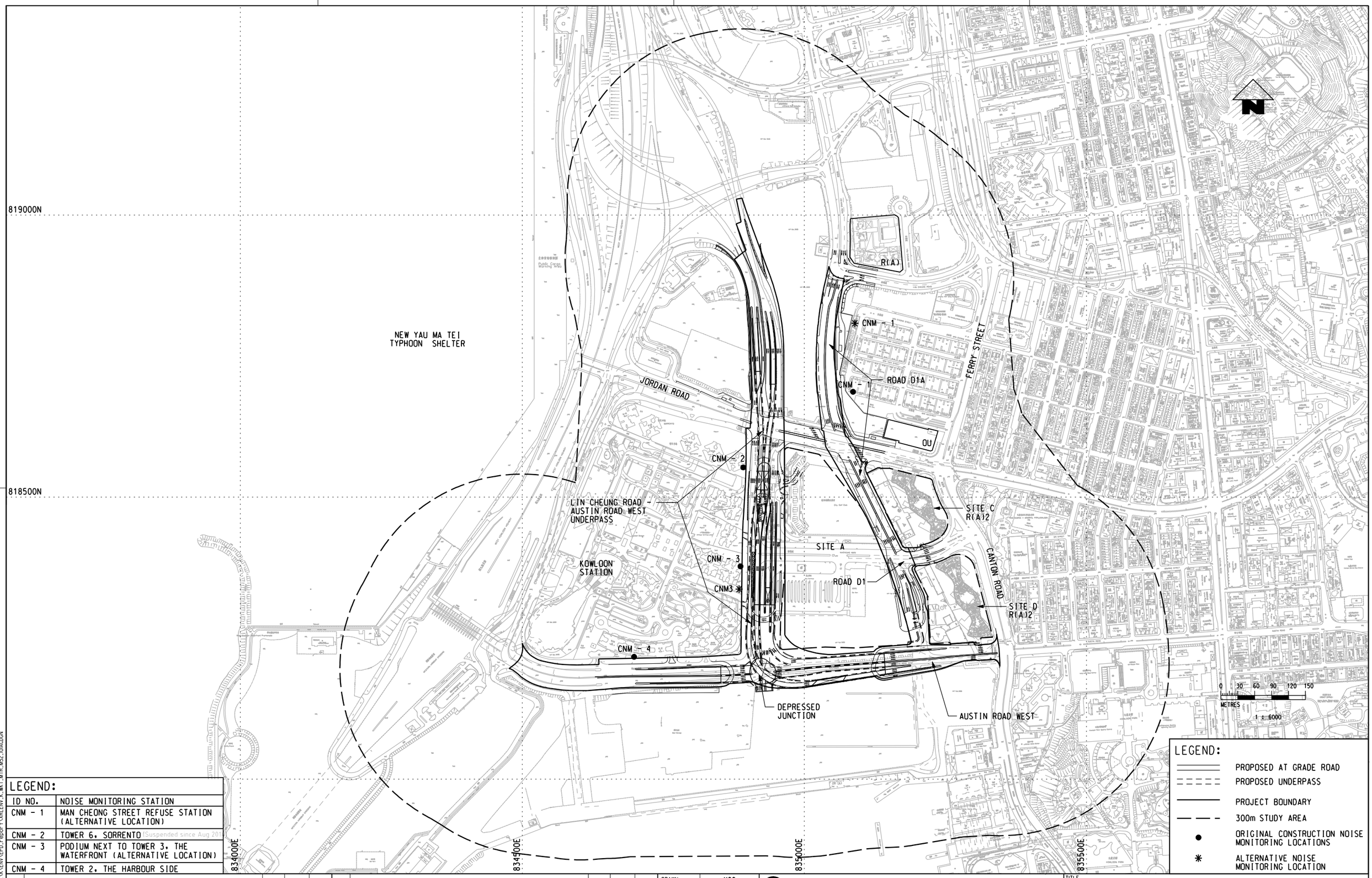
CADD REF. XRLENV_L_WKT_MTR_M62_102A1.DGN

TITLE: ROADWORKS AT WEST KOWLOON
LOCATIONS OF CONSTRUCTION DUST MONITORING STATIONS

SCALE: 1:4000 @ A1

DRAWING NO. XRLENV/K/WKT/MTR/M62/102

REV. A1



LEGEND:

ID NO.	NOISE MONITORING STATION
CNM - 1	MAN CHEONG STREET REFUSE STATION (ALTERNATIVE LOCATION)
CNM - 2	TOWER 6, SORRENTO (Suspended since Aug 201
CNM - 3	PODIUM NEXT TO TOWER 3, THE WATERFRONT (ALTERNATIVE LOCATION)
CNM - 4	TOWER 2, THE HARBOUR SIDE

REV	DESCRIPTION	BY	DATE	APPROVED
A1	FIRST DRAFT	YCC	05MAY11	-

DRAWN	YCC
DESIGNED	
CHECKED	MC
APPROVED	
DATE	03/MAY/2011

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EXPRESS RAIL LINK

ORIGINATOR

PROJECTS DIVISION | SUSTAINABILITY DEVELOPMENT DEPARTMENT

CADD REF. XRLENV_K_WKT_MTR_M52_101A1.DGN

TITLE

ROADWORK AT WEST KOWLOON
LOCATION OF CONSTRUCTION NOISE MONITORING STATION

SCALE 1:6000 @ A3

DRAWING NO. XRLENV/K/WKT/MTR/M52/101

REV. A1

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PRINTED BY: ck506179 05/05/11 12:07:41

Appendix E

Environmental Quality Performance Limits

Action and Limits Levels for Construction Dust Monitoring

Monitoring Station	Location	1-hour TSP (for complaint handling)		24-hour TSP	
		Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
CAM-1	Podium between Sorrento and The Waterfront	298.4	500	168.8	260
CAM-2	Podium next to Tower 3, The Waterfront	295.6	500	155.9	260
CAM-3	Roof of Lift Building, The Victoria Towers	319.4	500	179.3	260

Action and Limits Levels for Construction Noise Monitoring

Time Period	Action Level	Limit Level, $L_{eq(30min)}$, dB(A)
0700-1900 hours on normal weekdays	When one documented complaint is received	75 dB(A) for residential premises
		70 dB(A) for school and 65 dB(A) during examination period

Appendix F

Event Action Plans

Event and Action Plan for Air Quality Monitoring

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

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC, ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and ER (together with the Contractor) on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to ER with a copy to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to ER with a copy to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Revise and resubmit proposals if problem still not under

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.		what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

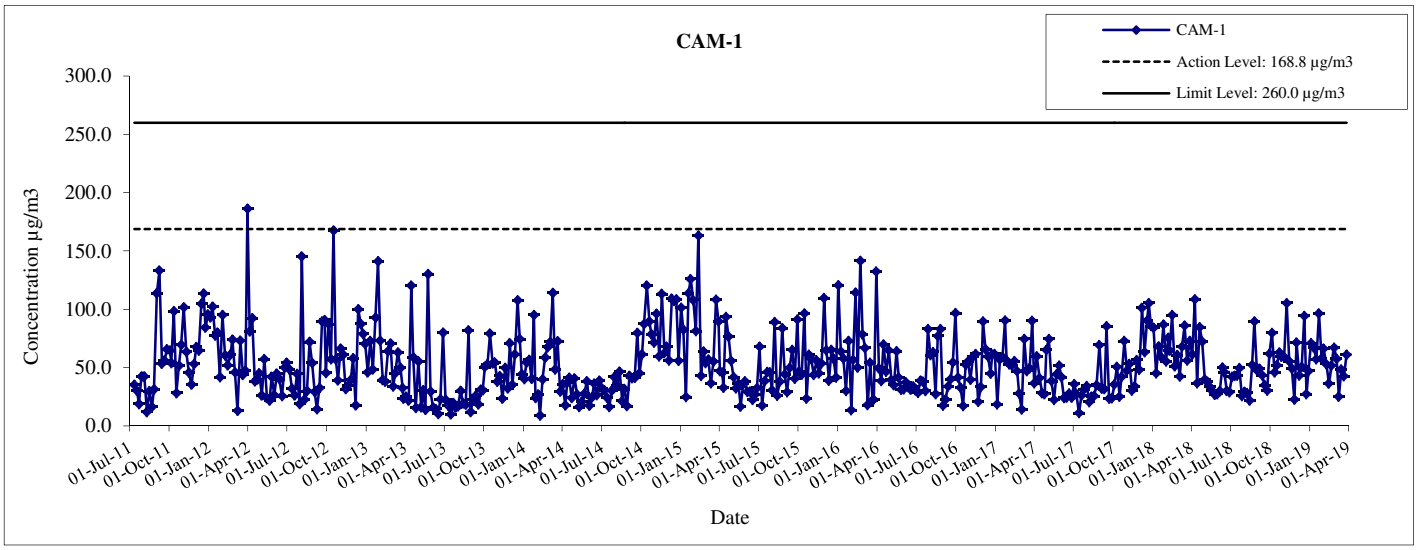
Event and Action Plan for Construction Noise Monitoring

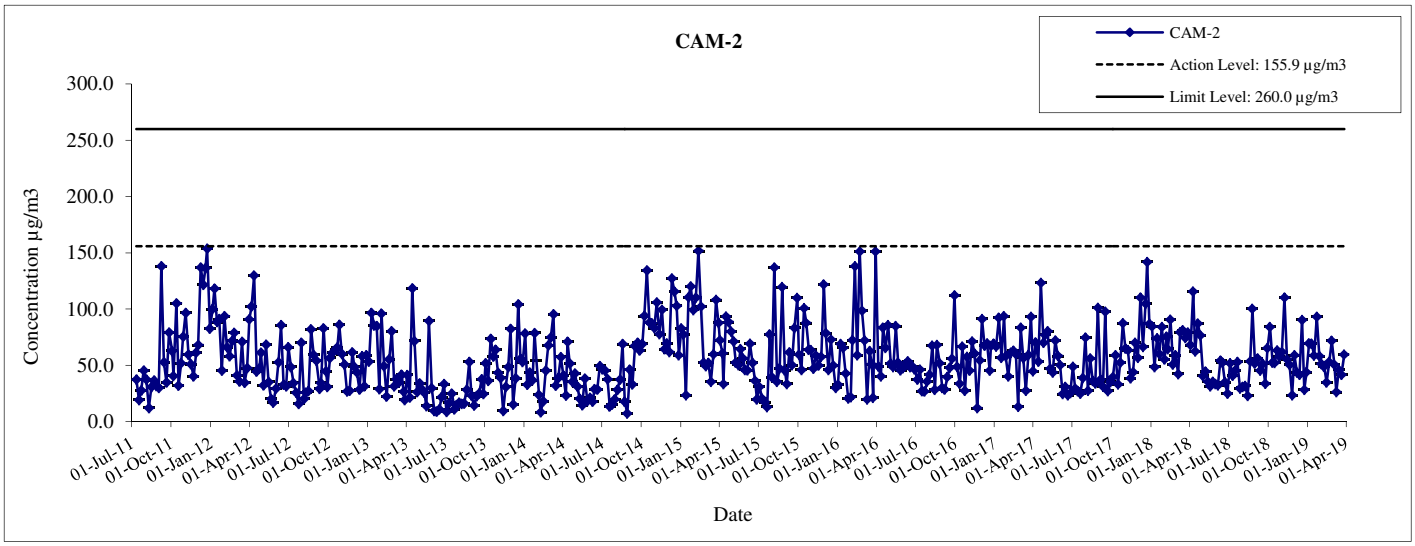
EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC, ER and Contactor 2. Carry out investigation 3. Report the results of investigation to the IEC, ER and Contactor 4. Discuss jointly with the ER and Contractor and formulate remedial measures 5. Increase monitoring frequency to check mitigation effectiveness	1. Review the analysed results submitted by the ET 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to ER with copy to IEC and ET 2. Implement noise mitigation proposals
Limit Level	1. Notify IEC, ER, EPD and Contractor 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 6. Inform IEC, ER, EPD the causes and actions taken for the exceedances	1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to ER with copy to IEC and ET 3. Implement the agreed proposals 4. Revise and resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER

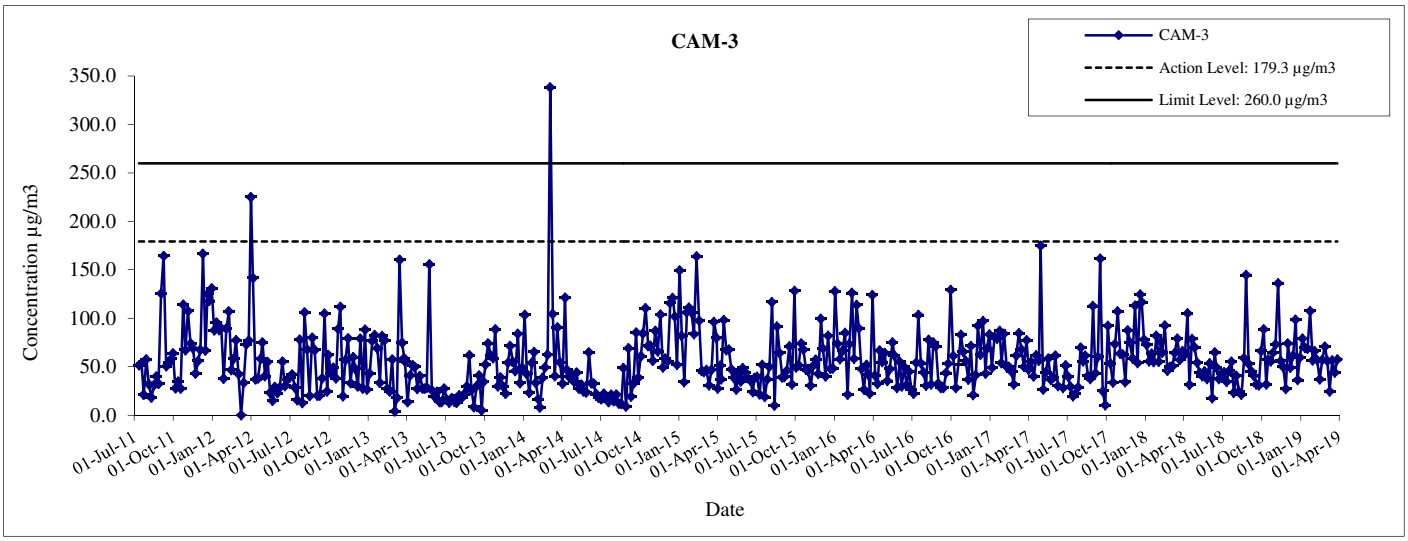
EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Limit Level	7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring		Contractor to stop that portion of work until the exceedance is abated	until the exceedance is abated

Appendix G

Graphical Plots of Impact Monitoring Results (Air Quality)







Annotation

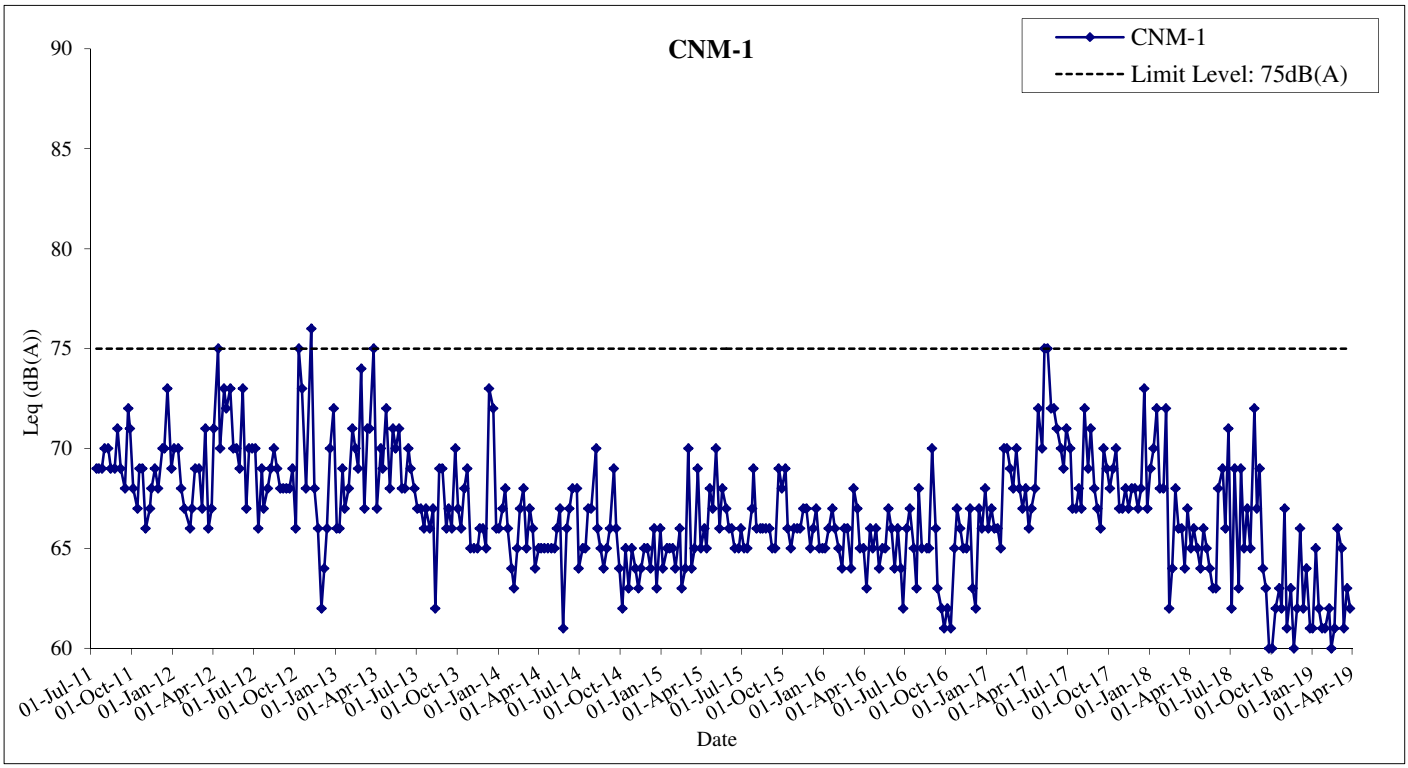
Major Construction Activities:
a. Sheet Piling and Excavation (July 2011 - Aug 2012)
b. Utilities diversion and re-construction (Aug 2012 - Dec 2015)
c. Road diversion and underpass construction (Feb 2013 - Dec 2017)
d. Surface laying and Road markings (Oct 2017 - Dec 2018)
e. Reinstatement and Rectification (Jan 2019 - Mar 2019)

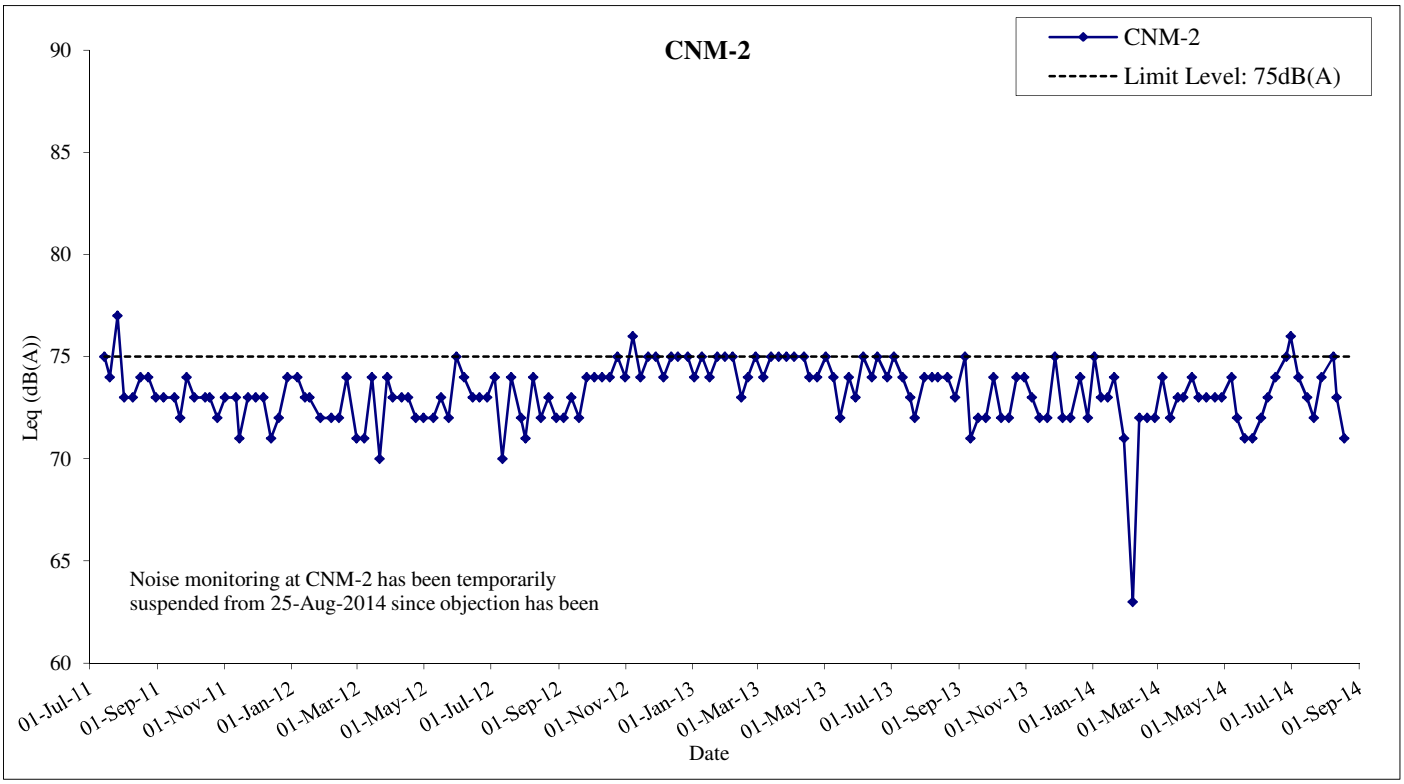
Weather Conditions: Typical fine and occassionally raining during the monitoring periods

MTR	Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link **Graphical Presentation of 24-hour TSP Monitoring Results for Location CAM-1, CAM-2 and CAM-3**	**DATE**	**2011 - 2019**
		APPENDIX	**G**

Appendix H

Graphical Plots of Impact Monitoring Results (Construction Noise)





Annotation

Major Construction Activities:

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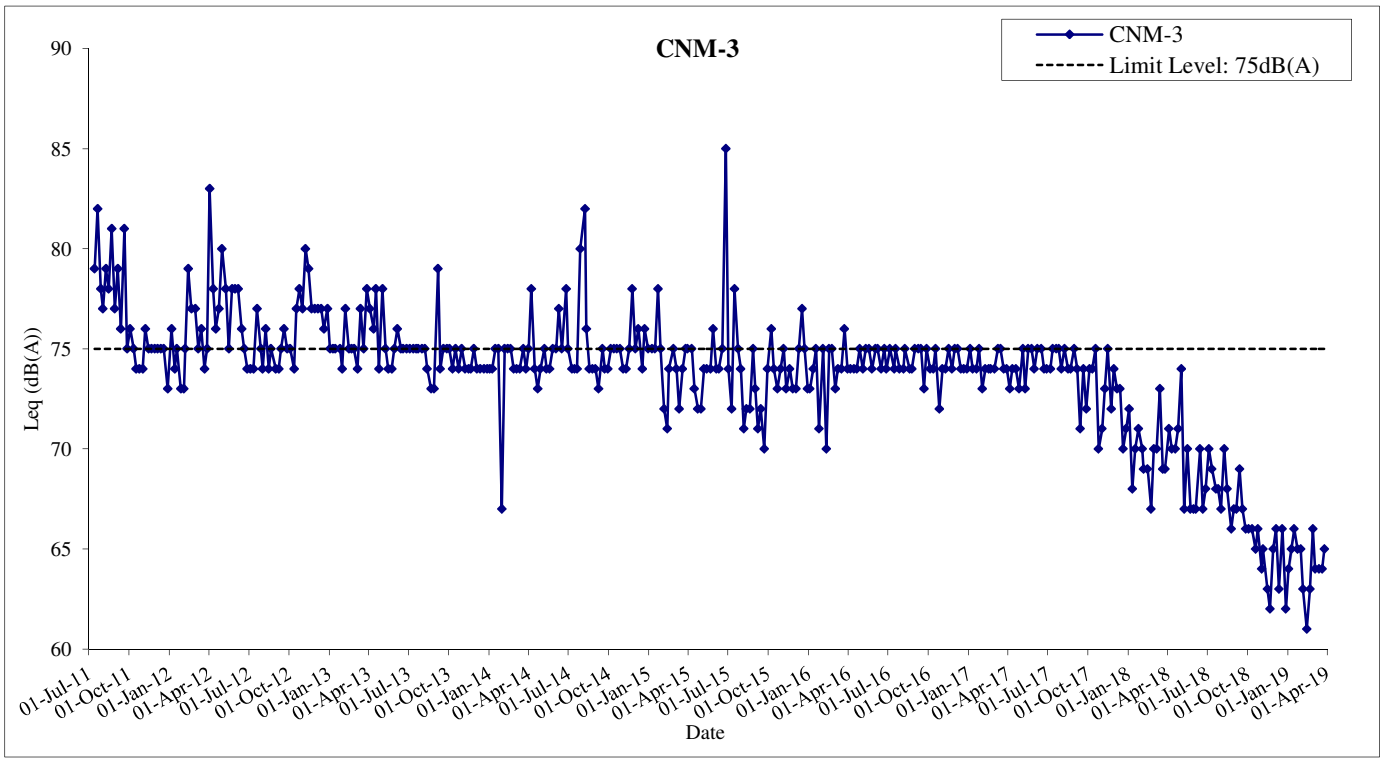
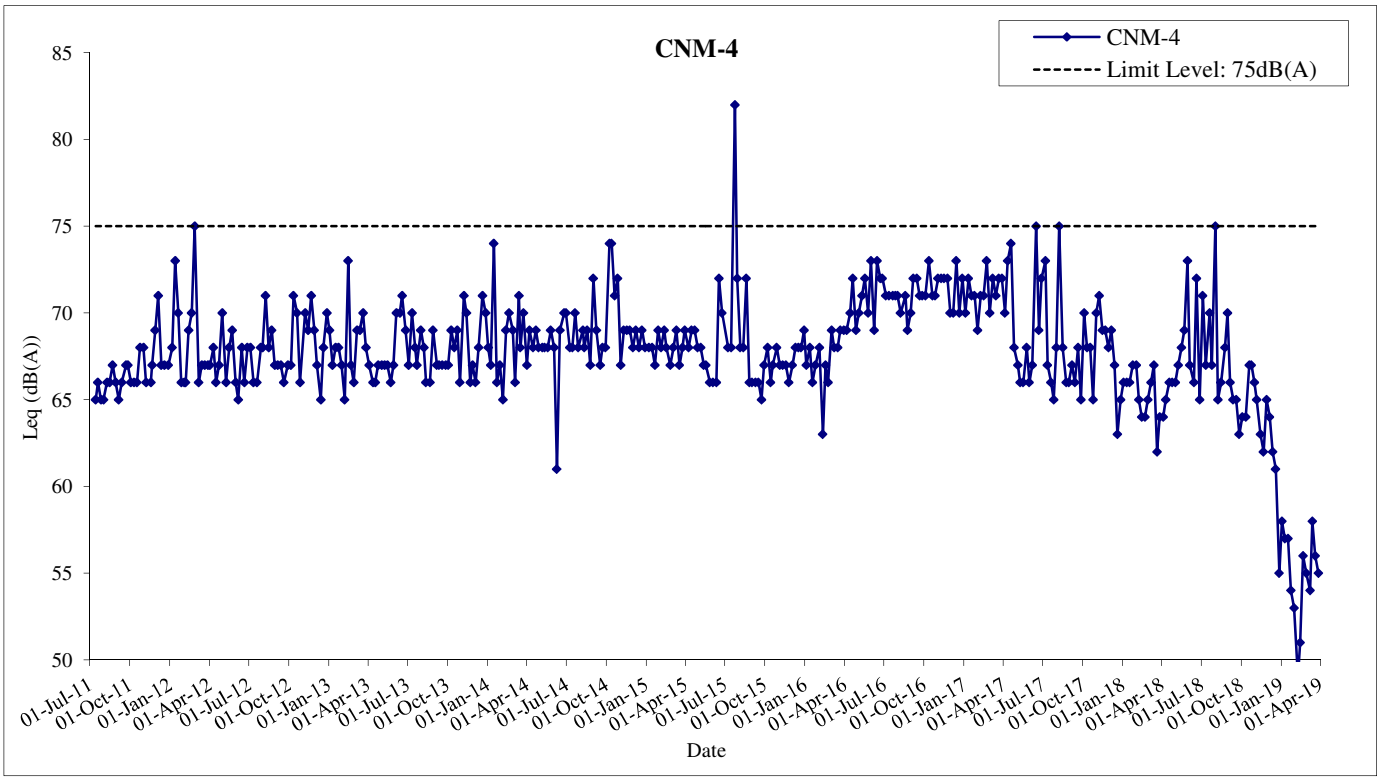
d. Surface laying and Road markings (Oct 2017 - Aug 2018)
e. Reinstatement and Rectification (Jan 2019 - Mar 2019)

Weather Conditions: Typical fine and occassionally raining during the monitoring periods





Annotation

Major Construction Activities:
a. Sheet Piling and Excavation (July 2011 - Aug 2012)
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