



CONTRACT NO. DC/2011/06

**REPROVISIONING OF BOUNDARY PATROL ROAD AND
ASSOCIATED SECURITY FACILITIES BETWEEN PING
YUEN RIVER AND PAK FU SHAN AND DRAINAGE
WORKS IN NORTH DISTRICT**

**BASELINE MONITORING REPORT FOR
RIVER MODIFICATION WORKS UNDER EP-430/2011**

**PREPARED FOR
SANG HING CIVIL CONSTRUCTORS CO., LTD.**

Quality Index

Date	Reference No.	Prepared By	Approval By
8 April 2013	TCS00599/12/600/R0087(v1)	 F. N. Wong Senior Environmental Consultant	 T. W. Tam Environmental Team Leader

Version	Date	Description
1	8 April 2013	First submission
2	13 April 2013	Amended against IEC's comments dated 10 April 2013.
3	19 April 2013	Amended against IEC's comments dated 18 April 2013.

This report has been prepared by Action-United Environmental Services & Consulting with all reasonable skill, care and diligence within the terms of the Agreement with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

Ref.: DSDBPRNDEM00_0_0138L.13

16 May 2013
By Post and Fax (2959 6079)

Action-United Environmental Services & Consulting
Unit A, 20/F,
Gold King Industrial Building,
New Territories, Hong Kong

Attention: Mr. T.W. Tam

Dear Sir,

**Re: Contract No. DC/2011/06
Reprovisioning of Boundary Patrol Road and Associated Security Facilities
between Ping Yuen River and Pak Fu Shan and Drainage Works in North
District
Baseline Monitoring Report for River Modification Works under EP-
430/2011**

Reference is made to the Environmental Team's submission of the captioned report (Version 3) dated 19 April 2013 received through E-mail on 22 April 2013 for our review and comment.

Please be informed that we have no adverse comment on the captioned submission. Since the captioned report was prepared according to the Updated Environmental Monitoring and Audit Manual for Advanced Works under EP-430/2011 (v10) (DSD letter ref no. () in DP 8/5018GB/DC1106/88 dated 10 May 2013) which is currently under review by EPD, please note that the captioned report may be subjected to revision shall amendment to the updated EM&A Manual is required by EPD.

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

Yours sincerely,



Roger Leung
Independent Environmental Checker

c.c.	DSD	Mr. Eric Y.M. Cheng	by fax: 2827 8700
	SHCCCL	Mr. Raymond W.M. Yau	by fax: 2403 1162

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EXECUTIVE SUMMARY

ES.01 Since April 2012, DSD Contract No. DC/2011/06 – *Reprovisioning of Boundary Patrol Road and Associated Security Facilities between Ping Yuen River and Pak Fu Shan and Drainage Works in North District* has been awarded to the Contractor, Sang Hing Civil Contractors Company Limited. The Contract No DC/2011/06 comprises:

- 1) *Reprovisioning of Boundary Patrol Road and Associated Security Facilities between Ping Yuen River and Pak Fu Shan*, i.e. the Advanced Works under EP-430/2011; and
- 2) *Drainage Works in North District*, including a non-designated project of drainage works at Ma Wat Wai and a designated project of drainage works at Man Uk Pin to be implemented under Environmental Permit No. EP-277/2007/A.

ES.02 The ET for the Contract No DC/2011/06, Action-United Environmental Services & Consulting (AUES), is required to conduct the baseline environmental monitoring for the River Modification Works.

ES.03 According to the Approved EM&A Manual, air quality, noise and water quality monitoring should be required to be monitored during the construction phase of the River Modification Works within the HKSAR. Therefore, baseline monitoring including air quality, noise and water quality was undertaken in between December 2012 and March 2013 by the ET. In the time periods of Baseline monitoring, the ET observed that no construction activities under the Contract was carried out nearby monitoring locations.

ES.04 This report summarizes the key findings and presents the process and rationale behind determining a set of Action and Limit Levels (A/L Levels) of air quality, construction noise and water quality based on the baseline data. These A/L Levels will serve as the yardsticks for assessing the acceptability of the environmental impact during the construction phase of the River Modification Works impact monitoring. They are statistical in nature and derived according to the criteria set out in the Approved EM&A Manual.

ES.05 The recommended Action and Limit Levels for air quality, construction noise and water quality are as follows.

Action and Limit Levels of Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM1/AM1a	299	177	500	260
AM2	294	174	500	260

Action and Limit Levels of Construction Noise Monitoring

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NM1	When one or more documented complaints are received	75 dB(A) ^{Note 1}
NM2		

Note 1: Acceptable Noise Levels for Area Sensitivity Rating of A/B/C. Limit Level is reduced to 70 dB(A) for schools and 65dB(A) during school examination periods.

Note 2: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

Action and Limit Levels of Water Quality Monitoring

Location	Performance criteria	DO (mg/L)	Turbidity (NTU)	SS (mg/L)
WM1a	Action Level	5.4	19.9	19
	Limit Level	2.0	22.7	21
WM2	Action Level	3.3	51.6	49
	Limit Level	2.0	52.0	53
WM3a	Action Level	3.2	50.4	49
	Limit Level	2.0	50.8	53
WM4a	Action Level	4.9	21.9	31
	Limit Level	2.0	22.0	33

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1 BRIEF PROJECT BACKGROUND INFORMATION

1.1 REGULATION OF SHENZHEN RIVER STAGE 4

1.1.1 *Regulation of Shenzhen River Stage 4* (hereinafter “the Project”) is a construction project within both the Hong Kong Special Administrative Region (hereinafter “the HKSAR”) and the Shenzhen Municipality, comprising:

- 1) Improvement of an approximately 4.5 km long section of Shenzhen River;
- 2) Re-provision of the boundary patrol road and about 4.5 km of boundary fence affected by the Project;
- 3) Dry weather flow interception of the sewage discharging from Shenzhen side into the Project area; and
- 4) The associated landscaping works.

1.1.2 The layout plan of the Project is shown in **Annex A**. The Project is to be constructed under two separate contracts namely the Advanced Works within the HKSAR and the River Modification Works within both HKSAR and the Shenzhen Municipality.

1.1.3 The part of the Project within HKSAR, i.e. the Advanced Works within the HKSAR (hereinafter “the Advanced Works”) and the River Modification Works within the HKSAR (hereinafter “the River Modification Works”) is to be implemented by Drainage Services Department of the HKSAR Government (hereinafter “DSD” or “the Engineer”) under Environmental Permit No. EP-430/2011 (hereinafter “the EP-430/2011” or “the EP”).

1.2 DSD CONTRACT NO. DC/2011/06

1.2.1 The Advanced Works of the Project form a part of DSD Contract No. DC/2011/06 – *Reprovisioning of Boundary Patrol Road and Associated Security Facilities between Ping Yuen River and Pak Fu Shan and Drainage Works in North District* (hereinafter “the Contract”). Location of the Advanced Works as under the Contract shows **Annex B**.

1.2.2 The Contract has been awarded to Sang Hing Civil Contractors Company Limited (hereinafter “SHCCC” or “the Contractor”), who commissions Action-United Environmental Services & Consulting as the Environmental Team (hereinafter “AUES” or “the ET”) of the Contract.

1.2.3 As required under *General Condition 2.10* of the EP, an updated EM&A Manual, namely the *Up-Dated EM&A Manual for Advanced Works under EP-430/2011* (hereinafter “the Updated EM&A Manual”), has been submitted to the DEP upon certification by the Environmental Team Leader (hereinafter “the ETL”) and verification by the Independent Environmental Checker (hereinafter “the IEC”).

1.2.4 In order to establish the environmental quality performance criteria, i.e. Action/Limit Levels (hereinafter “the A/L Levels”), for the EM&A during construction of the River Modification, baseline environmental monitoring was conducted following the methodology stipulated in the Updated EM&A Manual as well as the original EM&A Manual enclosed in the EP-430/2011. Also, Baseline Monitoring Report shall be submitted to the DEP, as presenting the baseline environmental monitoring and the monitoring results as well as the environmental quality criteria i.e. Action / Limit Levels (hereinafter “the A/L Levels”).

1.2.5 This is the Baseline Monitoring Report, presenting the baseline environmental monitoring results and the established environmental quality criteria i.e. Action / Limit Levels.

2 AIR QUALITY

2.1 AIR QUALITY MONITORING PARAMETERS

2.1.1 The parameters to be monitored are as follows:

- 1) 1-Hour Total Suspended Particulates (hereinafter “the 1-Hr TSP”); and
- 2) 24-Hour Total Suspended Particulates (hereinafter “the 24-Hr TSP”).

2.1.2 All relevant data shall be recorded, including general meteorological conditions e.g. temperature, pressure, weather conditions, monitoring data e.g. elapsed-time i.e. the start and stop time of the meter readings, identification and weight of the filter paper, and any other special phenomena e.g. notes regarding any significant dust sources generated from the areas adjacent to the monitoring locations, as well as work progress of the concerned site, etc.

2.2 DESIGNATED AIR QUALITY MONITORING LOCATION

2.2.1 The Air Sensitive Receivers (hereinafter “ASR”) designated in the *Updated EM&A Manual* are illustrated in *Appendix C* and detailed as follows:

<u>Location ID</u>	<u>Description</u>
AM1	Ta Kwu Ling Village
AM2	Tsung Yuen Ha

2.2.1 When alternative monitoring location is proposed, the following criteria shall be followed as far as practicable:

- 1) At the site boundary or such locations close to the major dust emission source;
- 2) Close to the sensitive receptors;
- 3) Take into account the prevailing meteorological conditions;
- 4) For monitoring location located in the vicinity of the ASRs, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- 5) When positioning the high volume air sampler (hereinafter “the HVAS”), the following points shall be noted:
 - a.) a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
 - b.) no two samplers shall be placed less than 2m apart;
 - c.) the distance between the HVAS and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the HVAS;
 - d.) a minimum of 2 m separation from walls, parapets and penthouses is required for HVAS at the rooftop;
 - e.) a minimum of 2 m separation from any supporting structure, measures horizontally is required;
 - f.) no furnace or incinerator flue is nearby;
 - g.) airflow around the sampler is unrestricted;
 - h.) the HVAS is more than 20 m from the dripline;
 - i.) any wire fence and gate to protect the HVAS, shall not cause any obstruction during monitoring;
 - j.) permission must be obtained to set up the HVAS and to obtain access to the monitoring stations; and
 - k.) a secured supply of electricity is needed to operate the HVAS.

2.3 BASELINE AIR QUALITY MONITORING FREQUENCY AND DURATION

2.3.1 Continuous 24-Hr TSP monitoring and 3 sets of 1-Hr TSP monitoring shall be carried out daily for a period of at least two weeks.

2.3.2 During the baseline monitoring, there shall not be any construction or dust generating activities in the vicinity of the monitoring stations.

- 2.3.3 In case the baseline environmental monitoring could not be carried out at the designated monitoring location during the baseline environmental monitoring period, the ET shall carry out the monitoring at alternative locations which could effectively represent the baseline conditions at the impact monitoring locations. The alternative monitoring location shall be agreed with the Engineer, IEC and EPD.
- 2.3.4 In exceptional cases, when insufficient baseline environmental monitoring data or questionable results are obtained, the ET shall liaise with the Engineer, IEC and EPD to agree on an appropriate set of data to be used as a baseline reference.
- 2.3.5 The baseline environmental monitoring shall provide data for determination of the appropriate A/L Levels set against statutory or otherwise agreed limits.

2.4 MONITORING EQUIPMENT

1-HR TSP

- 2.4.1 A portable direct-reading dust meter capable of reading TSP within the range 0.1 – 100 mg/m³ is used to be carried out 1-Hr TSP monitoring.

24-HR TSP

- 2.4.2 An HVAS which complies with the following specifications of *USEPA Standards Title 40, Code of Federal Regulations Chapter 1 (Part 50)*:
- 1) 0.6-1.7 m³/min (20-60 SCFM) adjustable flow range;
 - 2) equipped with a timing /control device with ± 5 minutes accuracy for 24 hours operation;
 - 3) installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
 - 4) capable of providing a minimum exposed area of 406 cm² (63 in²);
 - 5) flow control accuracy: ±2.5 % deviation over 24-hr sampling period;
 - 6) equipped with a shelter to protect the filter and sampler;
 - 7) incorporated with an electronic mass flow rate controller or other equivalent devices;
 - 8) equipped with a flow recorder for continuous monitoring;
 - 9) provided with a peaked roof inlet;
 - 10) incorporated with a manometer;
 - 11) able to hold and seal the filter paper to the sampler housing at horizontal position;
 - 12) easy to change the filter; and
 - 13) capable of operating continuously for 24-hour period.
- 2.4.3 The ET shall provide the monitoring equipment, and ensure that sufficient number of HVAS with appropriate calibration kit is available for carrying out the baseline, regular impact monitoring and ad-hoc monitoring. The HVAS shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals, in accordance with requirements stated in the manufacturers operating manual. All the equipment, calibration kit, filter papers, etc, shall be clearly labeled.
- 2.4.4 The flow rate of each HVAS with mass flow controller shall be calibrated using an orifice calibrator. Initial calibration of the dust monitoring equipment shall be conducted upon installation and prior to commissioning. Five-point calibration shall be carried out every two months. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually.
- 2.4.5 The calibration data shall be properly documented for future reference. All the data shall be converted into standard temperature and pressure condition.
- 2.4.6 The flow-rate of the HVAS before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded on the data sheet.

2.4.7 If the ET proposes to use a direct reading dust meter to measure 1-Hr TSP, sufficient information shall be provided to the Engineer and IEC to prove that the instrument is capable of achieving a comparable result to the HVAS. The instrument shall also be calibrated regularly, and the 1-Hr TSP sampling shall be determined periodically by the HVAS to check the validity and accuracy of the results measured by direct reading method.

2.5 LABORATORY MEASUREMENT / ANALYSIS

2.5.1 A clean laboratory with constant temperature and humidity control, and equipped with the necessary measuring and conditioning instruments to handle the dust samples, shall be available for sample analysis and equipment calibration and maintenance. The laboratory shall be either a HOKLAS accredited or an internationally accredited laboratory.

2.5.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER and the measurement procedures shall be witnessed by the IEC.

2.5.3 Any measurement performed by the laboratory shall be demonstrated to the satisfaction of the Engineer and IEC. IEC shall regularly audit the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the Engineer with one copy of the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50) Appendix B* for his reference.

2.5.4 Filter paper of size 8”x10” shall be labelled before sampling. It shall be a clean filter paper with no pin holes, and shall be conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

2.5.5 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper is then returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

2.5.6 All the collected samples shall be kept in a good condition for 6 months before disposal.

2.6 METEOROLOGICAL INFORMATION

2.6.1 Meteorological information extracted from the closest weather station under Hong Kong Observatory will be used for reference, in addition to in-situ observation on the weather conditions, including wind direction, wind speed, humidity, rainfall, air pressure and temperature, etc.

2.7 ACTION /LIMIT LEVELS AND EVENT ACTION PLAN

ACTION /LIMIT LEVELS

2.7.1 The baseline monitoring results form the basis for determining the A/L Levels for the impact monitoring. The requirements for setting the A/L Levels are summarized in **Table 2-7-1**.

Table 2-7-1 Requirements for Setting A/L Levels of 24-Hr TSP and 1-Hr TSP, $\mu\text{g M}^{-3}$

Parameter	Action Level	Limit Level
24-Hr TSP	<ul style="list-style-type: none"> • For baseline level ≤ 200: Action Level = $[(\text{Baseline Level} \times 1.3) + \text{Limit Level}] \div 2$ • For baseline level >200: Action Level = Limit Level 	260
1-Hr TSP	<ul style="list-style-type: none"> • For baseline level ≤ 384: Action Level = $[(\text{Baseline Level} \times 1.3) + \text{Limit Level}] \div 2$ • For baseline level >384: Action Level = Limit Level 	500

EVENT ACTION PLAN

- 2.7.2 The ET shall compare the impact monitoring results of the 1-Hr TSP and 24-Hr TSP against the established A/L Levels. Should non-compliance or exceedance of the A/L Levels occur, actions in accordance with Event Action Plan in ***Annex D*** shall be taken.

3 CONSTRUCTION NOISE

3.1 NOISE MONITORING PARAMETER

- 3.1.1 Noise measurement should be carried out in accordance with the guidelines given in *Annex – General Calibration and Measurement Procedures of Technical Memorandum on Noise from Construction Work other than Percussive Piling* (hereinafter “the GWTM”).
- 3.1.2 Whilst the *Noise Control Ordinance* (hereinafter “the NCO”) does not provide for the statutory control of construction activities occurring on weekdays during normal working hours (i.e. 0700-1900 hours, Monday to Saturday inclusive), the daytime standard of $L_{eq}(30min)$ of 75dB(A) as stipulated in *Annex 5 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)* will be adopted as the noise criterion for all residential dwellings, whereas the daytime standard of $L_{eq}(30min)$ of 70dB(A) will be adopted for all educational institutions during normal school days and $L_{eq}(30min)$ of 65dB(A) during examination periods.
- 3.1.3 For both baseline and construction impact monitoring, the construction noise levels will be measured in terms of A-weighted equivalent continuous sound pressure level (hereinafter “Leq”) measured in decibels (dB(A)).
- 3.1.4 $L_{eq}(30min)$ should be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays.
- 3.1.5 Supplementary information for data auditing, two statistical sound levels L_{10} and L_{90} , i.e. the levels exceeded for 10 and 90 percent of the time respectively, should also be recorded during the monitoring for reference. A sample data record sheet is shown in Annex E for reference.
- 3.1.6 Noise measurement should generally not be made in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed should be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

3.2 DESIGNATED CONSTRUCTION NOISE MONITORING LOCATION

- 3.2.1 The following two locations, namely NM1 and NM2, are designated for both baseline environmental monitoring and construction impact monitoring of construction noise. They are illustrated in *Annex C* and detailed as follows:

<u>Location ID</u>	<u>Description</u>
NM1	As located Ta Kwu Ling Village
NM2	As located Kaw Liu Village

- 3.2.1 The status and monitoring locations may change after issuing this Manual and the location of the noise monitoring station may need to be adjusted accordingly. If such changes occur, the ET should propose an updated monitoring location for the agreement from the Engineer, IEC and EPD.
- 3.2.2 When alternative monitoring location is proposed, the following criteria should be followed, as far as practicable:
- 1) At locations close to the major site activities which are likely to have noise impacts;
 - 2) Close to the NSRs; and
 - 3) For monitoring locations located in the vicinity of the NSRs, care should be taken to minimize disturbance to the occupants during monitoring.
- 3.2.3 The monitoring station will normally be at a point 1 m from the exterior of the NSR building façade and at a height of approximately 1.2 m above ground or at the height that has the least obstructed view of the construction activities in relation to the NSR. If access to the normal monitoring position cannot be obtained, an alternative position will be chosen, and a correction to the measurements should be made, as appropriate. For instance, a correction of +3 dB(A) should be made to free-field measurements.

- 3.2.4 The ET should agree with the Engineer, IEC, EPD and the owners/occupants of the premises on the monitoring position. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring should be carried out at the same positions.

3.3 MONITORING EQUIPMENT

- 3.3.1 Referring to the GW-TM, sound level meters in compliance with the *International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) Specifications* should be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement, the accuracy of the sound level meter should be checked using an acoustic calibrator generating a known sound pressure level at a known frequency.
- 3.3.2 Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0dB.
- 3.3.3 The ET should ensure that the equipment is maintained in a good working order in accordance with the manufacturer's recommendations with sufficient spare equipment available in the event of breakdown to maintain the planned monitoring programme. In addition, the sound level meter and the acoustic calibrator should be calibrated annually.
- 3.3.4 The ET is responsible for provision of the monitoring equipment and will ensure that sufficient noise measuring equipment and the associated instrumentation are available for carrying out construction noise baseline monitoring and impact monitoring.
- 3.3.5 All the equipment and the associated instrumentation will be clearly labeled.

3.4 BASELINE NOISE MONITORING FREQUENCY AND DURATION

- 3.4.1 The noise monitoring shall be measured for a continuous period of at least 14 consecutive days with a minimum logging interval of 30 minutes for day-time and 15 minutes (as three consecutive $L_{eq(5min)}$ readings) for evening, holidays and night-time.
- 3.4.2 During the baseline environmental monitoring, there should not be any construction activities in the vicinity of the monitoring stations. Any non-Project related construction activities in the vicinity of the stations during the baseline monitoring should be noted and the source(s) and location(s) be recorded.
- 3.4.3 In case the baseline environmental monitoring could not be carried out at any of the designated monitoring locations during the baseline monitoring period, the ET shall carry out the monitoring at alternative location which could effectively represent the baseline conditions at the monitoring locations. The alternative baseline environmental monitoring locations shall be agreed with the Engineer, Contractor and IEC and approved by EPD.
- 3.4.4 In exceptional cases, when insufficient baseline environmental monitoring data or questionable results are obtained, the ET shall liaise with the Engineer, IEC and EPD to agree on an appropriate set of data to be used as a baseline reference.

3.5 ACTION/LIMIT LEVELS AND EVENT/ACTION PLAN

Action/Limit Levels

- 3.5.1 A/L Levels provide an appropriate framework for the interpretation of monitoring results which is undertaken through checking them against the A/L Levels as defined in *Table 3-5-1* below:

Table 3-5-1 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NM1	When one or more documented complaints are received	75 dB(A) ^{Note 1}
NM2		

Note 1: Acceptable Noise Levels for Area Sensitivity Rating of A/B/C. Limit Level is reduced to 70 dB(A) for schools and 65dB(A) during school examination periods.

Note 2: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

- 3.5.2 To account for cases where ambient noise levels, as identified by baseline monitoring, approach or exceed the stipulated Limit Level prior to commencement of construction, a Maximum Acceptable Impact Level, which incorporates the baseline noise level and the identified construction noise Limit Level (hereinafter “the LMAIL”, might be defined upon agreement with the EPD. This amended level will, therefore, be greater than 75dB(A) and will represent the maximum acceptable noise level at a specific monitoring station.
- 3.5.3 For compliance checking, after taking into account any adjustments agreed with EPD, comparison with either the LMAIL will represent the governing criteria for noise impact assessment during impact monitoring.

EVENT ACTION PLAN

- 3.5.4 The ET should compare the impact monitoring results with the noise criteria as defined in **Table 3-5-1**. In cases where exceedance of these criteria occurs, actions should be carried out in accordance with the EAP as shown in **Annex D**.

4 WATER QUALITY

4.1 WATER QUALITY MONITORING PARAMETER

4.1.1 The following parameters will be monitored for both baseline environmental monitoring and construction impact monitoring of water quality:

In-Situ Measurement

- Dissolved Oxygen in mg /L (hereinafter “the DO”);
- pH Value in pH unit (hereinafter “the pH”); and
- Turbidity (NTU).

Laboratory Analysis

- Suspended Solids in mg/L (hereinafter “the SS”).

4.1.2 Duplicate water samples and in situ measurements of the above parameters will be taken at mid-depth of each station during each sampling survey.

4.1.3 In addition to the above water quality parameters, other relevant data, including the location of the sampling stations, water depth, time, weather conditions, special phenomena and work activities undertaken around the monitoring and works area that may influence the monitoring results, will also be measured and recorded.

4.2 DESIGNATED WATER QUALITY MONITORING LOCATION

4.2.1 The following four locations, namely WM1, WM2, WM3 and WM4, are designated for both baseline environmental monitoring and construction impact monitoring of water quality. They are illustrated in *Annex C* and detailed as follows:

<u>Location ID</u>	<u>Description</u>
WM1	500 m upstream of Work Area I
WM2	1,000 m downstream of Work Area II
WM3	500 m upstream of Work Area III
WM4	1,000 m downstream of Work Area IV

4.3 BASELINE WATER QUALITY MONITORING FREQUENCY AND DURATION

4.3.1 Baseline environmental monitoring will be conducted at intervals of three times a week at all stations for consecutive four weeks.

4.3.2 The interval between two sampling surveys will not be less than 36 hours.

4.4 MONITORING EQUIPMENT

Positioning Device

4.4.1 A hand-held digital global positioning system (hereinafter “the GPS”) with way point bearing indication or other equivalent instrument of similar accuracy will be provided and used during monitoring to ensure the monitoring team is at the correct location before taking measurements.

Dissolved Oxygen and Temperature Measuring Equipment

4.4.2 The instrument will be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and will be operable from a DC power source. It will be capable of measuring DO levels in the range of 0 - 20 mg/L and 0 - 200% saturation; and a temperature of 0 - 45 degrees Celsius (hereinafter “°C”). It will have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables will be available for replacement where necessary (for example, YSI Model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

Turbidity Measurement Equipment

- 4.4.3 The instrument will be a portable, weatherproof turbidity-measuring unit complete with cable, sensor and comprehensive operation manuals. The equipment will be operated from a DC power source, it will have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU (Hach 2100P or an approved similar instrument).

pH Meter

- 4.4.4 A portable pH meter capable of measuring a range of pH value between 0.0 and 14.0 will be provided to measure pH in river water.

Water Sampler

- 4.4.5 A water sampler e.g. Kahlsico Water Sampler, which is a transparent PVC cylinder with capacity not less than 2 litres and can be effectively sealed with latex cups at both ends, will be used for water sampling. The sampler will have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.

Sampling Bottles

- 4.4.6 Water samples for laboratory measurement of SS will be collected in high density polythene bottles, packed in ice (cooled to 4 °C without being frozen), and delivered to the laboratory in the same day as the samples were collected.

Water Depth Gauge

- 4.4.7 A portable, battery-operated echo sounder will be used for the determination of water depth at each designated monitoring station as appropriate.

4.5 IN-SITU TESTING PROTOCOLS

- 4.5.1 All in-situ monitoring instruments will be checked, calibrated and certified and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality baseline environmental monitoring, or as required by the manufactures specification. Certificate(s) of calibration specifying the instrument will be attached to the baseline environmental monitoring reports.
- 4.5.2 Responses of sensors and electrodes will be checked with certified standard solutions before each use. On-site calibration of field equipment will follow *British Standards BS 1427: 1993 - the Guide to Field and On-Site Test Methods for the Analysis of Waters*.
- 4.5.3 Sufficient stocks of spare parts will be maintained for replacements when necessary. Backup monitoring equipment will also be made available so that monitoring can be proceeded smoothly even when equipment is under maintenance or calibration etc.

4.6 LABORATORY ANALYTICAL PROCEDURES

- 4.6.1 The analytical techniques to be adopted for water quality baseline environmental monitoring must conform to HOKLAS or equivalent overseas accreditation. Using the laboratory's *Chain of Custody Forms* (hereinafter "COC Form"), all the collected water samples will be transferred directly to the laboratory for immediate processing.
- 4.6.2 Laboratory analysis for SS will be started within 24 hours after collection of water samples.

4.7 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

- 4.7.1 In situ measured data will be digitally recorded from the instruments and converted into Microsoft Excel format, or manually noted. Both disc copy and hard copy will be retained for the file records. Any deviation from the standard procedure will be noted in the log and the reason for the deviation recorded. In addition, field logs will contain notes of events or activities in the vicinity of the monitoring location which might give rise to anomalous data being recorded.

- 4.7.2 The ET will record in the Field Log all data acquired from in-situ testing and any laboratory analysis.
- 4.7.3 Water samples for SS measurement will be contained in high density polythene bottles, packed in ice (cooled to 4° C without being frozen), and delivered to a HOKLAS laboratory as soon as possible after collection.
- 4.7.4 Each sample will be labeled with indelible ink directly on the container using proper numbering system with unique codes of date/time/location/depth/sample-type, etc.
- 4.7.5 In order to avoid contamination of the samples, all containers will be new and unused and of analytical grade quality. Sources of contamination will be isolated from the working area and any sample contaminated by local material will be discarded and the sampling repeated.

Sample Transportation

- 4.7.6 In order to ensure that samples are analyzed for the correct parameters and suitable time is provided to the analytical laboratory for provision of resources required for the analyses, the laboratory’s QA/QC system will be strictly observed: Each sample transferred to the laboratory for analysis shall be accompanied by the laboratory’s COC Forms to record the number of samples, the parameters to be tested and the time of delivery, etc.
- 4.7.7 The ET Leader shall be notified should any missing or damaged samples occur.

4.8 ACTION / LIMIT LEVELS AND EVENT ACTION PLAN

ACTION /LIMIT LEVELS

- 4.8.1 The baseline monitoring results form the basis for determining the A/L Levels for the impact monitoring. The requirements for setting the A/L Levels are summarized in **Table 4-8-1**.

Table 4-8-1 Requirements for Setting Water Quality A/L Levels

Parameter	Action Level	Limit Level
Suspended Solids	The average value measured at the monitoring station are >120% of baseline data	The average value measured at the monitoring station are >130% of baseline data
Turbidity	The average value measured at the monitoring station are >95%ile of baseline data	The average value measured at the monitoring station are >99% of baseline data
Dissolved Oxygen	The average value measured at the monitoring station are <5%-ile of baseline data	The average value measured at the monitoring station are <1%-ile of baseline data

- 4.8.1 The ET shall compare the impact monitoring results of the water quality against the established corresponding A/L Levels. Should non-compliance or exceedance of the A/L Levels occur, actions in accordance with the EAP in **Annex D** shall be to take.

5 BASELINE ENVIRONMENTAL MONITORING RESULT

5.1 AIR QUALITY

- 5.1.1 1-Hr TSP of baseline air quality monitoring conducted at AM1 Ta Kwu Ling Village is nearby Village House No. 9. Due to the villagers rejected High Volume Air Sampler for installation and operation. As agreed by the Engineer and IEC, 24-Hr TSP of baseline air monitoring of AM1 Ta Kwu Ling Village therefore was conducted at Ta Kwu Ling Sub-division Police Station. For easily to refer, Ta Kwu Ling Village House No. 9 and Ta Kwu Ling Sub-division Police Station are respectively named **AM1** and **AM1a** below sub-section. In *Annex C*, both air quality monitoring locations has showed. Moreover, the detailed of all air quality monitoring locations as follows:

<u>Location ID</u>	<u>Description</u>	<u>Air Quality Parameters</u>
AM1	Ta Kwu Ling Village House No. 9	1-Hr TSP
AM1a	Ta Kwu Ling Sub-division Police Station	24-Hr TSP
AM2	Tsung Yuen Ha	1-Hr and 24-Hr TSP

1-HR TSP

- 5.1.2 Baseline environmental monitoring for 1-Hr TSP was conducted from 8 to 21 December 2012 at AM1 and AM2. Monitoring results are presented respectively in *Table 5-1-1* and *Table 5-1-2* below:

Table 5-1-1 1-Hr TSP Baseline Monitoring Results (AM1)

Date		Start Time	Reading, μgM^{-3}			
			1st	2nd	3rd	Average
8-Dec-2012	Saturday	10:13	85	89	85	86
9-Dec-2012	Sunday	11:40	55	56	59	57
10-Dec-2012	Monday	10:23	157	138	154	150
11-Dec-2012	Tuesday	14:10	170	156	147	158
12-Dec-2012	Wednesday	13:25	71	69	60	67
13-Dec-2012	Thursday	15:30	65	67	70	67
14-Dec-2012	Friday	13:56	45	48	53	49
15-Dec-2012	Saturday	9:40	92	37	30	53
16-Dec-2012	Sunday	11:15	70	61	62	64
17-Dec-2012	Monday	10:30	50	39	41	43
18-Dec-2012	Tuesday	13:20	17	25	30	24
19-Dec-2012	Wednesday	14:30	76	88	80	81
20-Dec-2012	Thursday	12:30	79	80	86	82
21-Dec-2012	Friday	10:10	82	77	89	83
Max			170			
Mean			76			
Min			17			

Table 5-1-2 1-Hr TSP Baseline Monitoring Results (AM2)

Date		Start Time	Reading, μgM^{-3}			
			1st	2nd	3rd	Average
8-Dec-2012	Saturday	10:20	82	82	81	82
9-Dec-2012	Sunday	12:00	59	57	57	58
10-Dec-2012	Monday	10:40	114	118	104	112
11-Dec-2012	Tuesday	14:15	151	134	136	140
12-Dec-2012	Wednesday	13:28	66	62	63	64
13-Dec-2012	Thursday	15:35	62	65	63	63
14-Dec-2012	Friday	13:52	39	42	43	41
15-Dec-2012	Saturday	9:45	99	35	29	54
16-Dec-2012	Sunday	12:30	51	52	49	51
17-Dec-2012	Monday	10:35	45	38	37	40
18-Dec-2012	Tuesday	13:25	21	29	32	27
19-Dec-2012	Wednesday	14:30	75	72	69	72
20-Dec-2012	Thursday	12:25	75	74	80	76
21-Dec-2012	Friday	10:15	78	73	83	78
Max			151			
Mean			68			
Min			21			

- 5.1.3 As shown in above *Table 5-1-1* and *Table 5-1-2*, the baseline monitoring results of 1-Hr TSP fluctuated from $17\mu\text{gM}^{-3}$ to $170\mu\text{gM}^{-3}$ with a mean of $76\mu\text{gM}^{-3}$ at AM1, and from $21\mu\text{gM}^{-3}$ to $151\mu\text{gM}^{-3}$ with a mean of $68\mu\text{gM}^{-3}$ at AM2.

24-HR TSP

- 5.1.4 Baseline environmental monitoring for 24-Hr TSP was conducted during the period from 13 to 26 March 2013 at AM1a and AM2. Monitoring results are presented in *Table 5-1-3* and data shown in *Annex F*.

Table 5-1-3 24-Hr TSP Baseline Monitoring Results for AM1a &AM2

Date		Result, μgM^{-3}	
		AM1a	AM2
13-Mar-13	Wed	76	69
14-Mar-13	Thu	81	83
15-Mar-13	Fri	82	76
16-Mar-13	Sat	79	66
17-Mar-13	Sun	87	62
18-Mar-13	Mon	78	72
19-Mar-13	Tue	70	66
20-Mar-13	Wed	66	71
21-Mar-13	Thu	63	73
22-Mar-13	Fri	66	64
23-Mar-13	Sat	63	68
24-Mar-13	Sun	72	60
25-Mar-13	Mon	67	56
26-Mar-13	Tue	69	61
Max		87	83
Mean		73	68
Min		63	56

- 5.1.5 As shown in **Table 5-1-3**, the baseline monitoring results of 24-Hr TSP fluctuated from $63\mu\text{gM}^{-3}$ to $87\mu\text{gM}^{-3}$ with a mean of $73\mu\text{gM}^{-3}$ at AM1a and from $56\mu\text{gM}^{-3}$ to $83\mu\text{gM}^{-3}$ with a mean of $68\mu\text{gM}^{-3}$ at AM2.

ACTION AND LIMIT LEVELS

- 5.1.6 According to the requirements for setting A/L Levels of 1-Hr TSP and 24-Hr TSP in **Table 2-8-1**, the Action and Limit Levels are established as follows:

Table 5-1-4 Action and Limit Levels for Air Quality Monitoring (1-Hr TSP & 24-Hr TSP)

Monitoring Stations	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-Hour	24-Hour	1-Hour	24-Hour
AM1/AM1a	299	177	500	260
AM2	294	174	500	260

- 5.1.7 Valid of calibration certificates of air monitoring equipment show in **Annex E**.

5.2 CONSTRUCTION NOISE

- 5.2.1 Baseline environmental monitoring for daytime noise was conducted during the period from 8 to 21 December 2012 at NM1 and NM2, which are designated Noise Sensitive Receivers in the Approved EM&A Manual and the Updated EM&A Manual. The detailed of noise monitoring locations as follows:

<u>Location ID</u>	<u>Description</u>
NM1	Ta Kwu Ling Village House No. 9
NM2	Kaw Liu Village

- 5.2.2 Baseline noise measurement was carried out free-field at NM1 and NM2, so a correction of 3dB has been added in accordance with the acoustical principles and EPD guidelines and the results are highlighted (by (*)) in the column of ‘Corrected Leq30’ or ‘Corrected Leq15’ as appropriate.
- 5.2.3 Although the HKO meteorological data on some of the days during baseline environmental monitoring of construction noise recorded rainfall ranged from 0.3 to 18.2 mm, no conditions mentioned in previous Section 3.16, including the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s, were encountered during construction noise baseline monitoring. This is considered due to the difference of the weather conditions between the HKO reporting area and the much localized NM1 and NM2 during the above monitoring time.
- 5.2.4 Daytime noise monitoring results are presented respectively in **Table 5-2-1, Table 5-2-2 and Table 5-2-3**.

Table 5-2-1 Baseline Noise Monitoring Results - Daytime (07:00–19:00) in Normal Weekday (NM1)

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	Leq30	Corrected* Leq30	
8-Dec-12	Sat	10:43	48.4	49.3	49.3	46.5	47.4	47.0	48	51
10-Dec-12	Mon	10:57	56.1	57.7	61.7	57.3	57.3	53.7	58	61
11-Dec-12	Tue	15:20	63.2	61.2	60.8	63.8	65.1	64.7	63	66
12-Dec-12	Wed	14:11	54.4	52.4	54.7	58.6	52.5	58.2	56	59
13-Dec-12	Thu	15:45	59.5	56.7	59.5	62.1	61.0	63.4	61	64
14-Dec-12	Fri	14:36	60.4	54.0	51.7	55.6	55.5	57.6	57	60
15-Dec-12	Sat	10:50	63.5	67.6	59.5	69.0	65.1	55.7	65	68
17-Dec-12	Mon	11:25	62.7	59.2	63.5	63.3	58.2	58.4	61	64
18-Dec-12	Tue	14:23	62.1	59.5	60.3	56.1	61.0	58.0	60	63
19-Dec-12	Wed	14:51	58.9	55.5	57.1	58.2	58.0	55.6	57	60
20-Dec-12	Thu	13:16	58.5	55.6	57.6	57.7	60.0	60.1	59	62
21-Dec-12	Fri	11:15	55.3	58.1	57.8	52.4	58.5	57.2	57	60
Mean (Min – Max)		62 (51 – 68)								

Table 5-2-2 Baseline Noise Monitoring Results - Daytime (07:00-19:00) in Normal Weekday (NM2)

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	Leq30	Corrected* Leq30	
8-Dec-12	Sat	11:21	62.0	51.9	59.0	56.6	63.0	58.1	60	63
10-Dec-12	Mon	10:24	47.0	45.6	45.9	46.6	50.7	45.4	47	50
11-Dec-12	Tue	14:25	48.6	49.9	45.6	48.0	45.3	46.9	48	51
12-Dec-12	Wed	13:33	46.2	51.4	47.9	55.8	56.5	52.6	53	56
13-Dec-12	Thu	15:00	52.1	49.9	46.8	48.6	52.0	67.7	60	63
14-Dec-12	Fri	14:00	49.1	46.1	55.5	48.0	44.0	45.6	50	53
15-Dec-12	Sat	10:10	53.9	65.7	48.5	50.9	44.8	51.6	59	62
17-Dec-12	Mon	10:45	72.1	54.1	46.5	48.0	54.1	52.3	65	68
18-Dec-12	Tue	13:51	52.0	50.0	53.0	47.5	58.5	56.6	54	57
19-Dec-12	Wed	14:40	47.0	45.5	49.9	48.3	46.0	54.4	50	53
20-Dec-12	Thu	13:52	55.7	59.7	54.7	53.5	56.5	52.0	56	59
21-Dec-12	Fri	10:35	55.3	53.3	45.5	45.7	46.6	48.7	51	54
Mean (Min – Max)		57 (50 – 68)								

Table 5-2-3 Baseline Noise Monitoring Results- Daytime (07:00-19:00) on Public Holiday

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	Leq15	*Corrected Leq15
NM1- Ta Kwu Ling Village House No. 9						
9-Dec-12	Sun	11:43	60.3	57.0	57.3	61
16-Dec-12	Sun	11:17	51.3	49.6	49.2	53
NM2 - Kaw Liu Village						
9-Dec-12	Sun	12:03	46.1	54.1	51.5	55
16-Dec-12	Sun	11:37	45.0	47.0	50.1	51

5.2.5 Baseline environmental monitoring for the evening and mid-night noise was conducted during the period from 13 to 26 March 2013 at NM1 and NM2.

5.2.6 Evening and midnight noise monitoring results are presented in *Table 5-2-4, Table 5-2-5, Table 5-2-6* and *Table 5-2-7*.

Table 5-2-4 Evening (19:00 – 23:00) Baseline Noise Monitoring Results (NM1)

Date		Start Time	1st Leq5	2nd Leq5	3rd Leq5	Leq15	Corrected * Leq15
13-Mar-13	Wed	22:25	54.0	53.7	55.2	54	57
14-Mar-13	Thu	22:44	52.2	41.9	53.8	51	54
15-Mar-13	Fri	22:09	40.7	39.9	52.9	49	52
16-Mar-13	Sat	22:13	51.0	50.1	53.6	52	55
17-Mar-13	Sun	21:34	58.5	57.3	57.6	58	61
18-Mar-13	Mon	21:46	57.6	53.3	51.6	55	58
19-Mar-13	Tue	22:03	55.6	45.4	52.3	53	56
20-Mar-13	Wed	21:56	43.1	43.6	54.3	50	53
21-Mar-13	Thu	22:11	44.7	53.1	52.0	51	54
22-Mar-13	Fri	22:28	43.3	54.0	47.4	50	53
23-Mar-13	Sat	22:26	56.5	57.3	58.7	58	61
24-Mar-13	Sun	21:58	50.0	50.9	55.6	53	56
25-Mar-13	Mon	22:01	52.8	41.9	49.4	50	53
26-Mar-13	Tue	22:46	54.5	58.6	55.5	57	60
Range (Min – Max)			56 (52 – 61)				

Table 5-2-5 Evening (19:00 – 23:00) Baseline Noise Monitoring Results (NM2)

Date		Start Time	1st Leq5	2nd Leq5	3rd Leq5	Leq15	Corrected * Leq15
13-Mar-13	Wed	22:42	41.3	43.0	39.9	42	45
14-Mar-13	Thu	22:24	47.0	47.8	39.7	46	49
15-Mar-13	Fri	22:24	40.6	41.1	40.3	41	44
16-Mar-13	Sat	22:42	46.4	47.5	46.0	47	50
17-Mar-13	Sun	21:50	43.1	56.1	57.6	55	58
18-Mar-13	Mon	22:05	57.2	41.9	59.5	57	60
19-Mar-13	Tue	22:21	42.1	44.6	45.2	44	47
20-Mar-13	Wed	22:14	39.7	42.6	45.3	43	46
21-Mar-13	Thu	22:28	47.2	48.9	45.2	47	50
22-Mar-13	Fri	22:44	43.8	49.0	40.3	46	49
23-Mar-13	Sat	22:45	53.7	41.0	45.1	50	53
24-Mar-13	Sun	22:18	41.2	57.3	42.2	53	56
25-Mar-13	Mon	22:21	55.3	51.4	50.3	53	56
26-Mar-13	Tue	22:18	50.4	52.7	47.3	51	54
Range (Min – Max)			51 (44 – 60)				

Table 5-2-6 Night Time (23:00-07:00 next day) Baseline Noise Monitoring Results (NM1)

Date		Start Time	1st Leq5	2nd Leq5	3rd Leq5	Leq15	Corrected * Leq15
13-Mar-13	Wed	23:16	48.0	45.3	42.2	46	49
14-Mar-13	Thu	23:00	50.9	48.5	47.9	49	52
15-Mar-13	Fri	23:06	52.7	48.7	51.2	51	54
16-Mar-13	Sat	23:35	48.2	51.8	49.5	50	53
17-Mar-13	Sun	23:03	57.1	46.6	59.0	57	60
18-Mar-13	Mon	23:24	47.1	58.3	56.1	56	59
19-Mar-13	Tue	23:28	58.7	54.0	57.7	57	60
20-Mar-13	Wed	23:03	47.1	53.6	48.0	51	54
21-Mar-13	Thu	23:06	59.7	57.5	49.6	57	60
22-Mar-13	Fri	23:28	57.4	46.6	50.3	54	57
23-Mar-13	Sat	23:22	51.9	57.9	52.1	55	58
24-Mar-13	Sun	23:23	53.0	54.7	58.7	56	59
25-Mar-13	Mon	23:04	46.0	52.6	56.3	53	56
26-Mar-13	Tue	23:06	56.7	58.7	60.9	59	62
Range (Min – Max)			57 (49 – 62)				

Table 5-2-7 Night Time (23:00-07:00 next day) Baseline Noise Monitoring Results (NM2)

Date		Start Time	1st Leq5	2nd Leq5	3rd Leq5	Leq15	Corrected * Leq15
13-Mar-13	Wed	23:00	40.9	45.3	43.1	43	46
14-Mar-13	Thu	23:19	45.4	44.7	40.2	44	47
15-Mar-13	Fri	23:27	45.5	47.4	44.5	46	49
16-Mar-13	Sat	23:03	43.8	47.5	45.3	46	49
17-Mar-13	Sun	23:35	52.0	45.2	46.3	49	52
18-Mar-13	Mon	23:04	41.9	46.4	41.0	44	47
19-Mar-13	Tue	23:07	43.4	49.3	43.3	46	49
20-Mar-13	Wed	23:26	41.6	48.3	40.5	45	48
21-Mar-13	Thu	23:31	40.8	48.9	42.7	46	49
22-Mar-13	Fri	23:00	52.1	46.5	44.5	49	52
23-Mar-13	Sat	23:00	52.5	49.0	48.0	50	53
24-Mar-13	Sun	23:05	44.0	45.9	40.8	44	47
25-Mar-13	Mon	23:27	52.6	43.9	43.2	49	52
26-Mar-13	Tue	23:25	40.5	40.0	47.3	44	47
Range (Min – Max)			49 (46 – 53)				

- 5.2.7 As show in **Tables 5-2-1 and 5-2-2**, the baseline noise level at daytime (07:00 to 19:00) in normal weekday fluctuated at NM1 from 51 to 68 dB(A) with a mean of 62dB(A) and from 50 to 68 dB(A) with a mean of 57 dB(A) at NM2.
- 5.2.8 As show in **Tables 5-2-4 and 5-2-5**, the baseline noise level at evening hours (19:00 to 23:00) in all days fluctuated at NM1 from 52 to 61 dB(A) with a mean of 56dB(A) and from 44 to 60 dB(A) with a mean of 51 dB(A) at NM2.
- 5.2.9 As show in **Tables 5-2-6 and 5-2-7**, the baseline noise at mid-night hours (23:00 to 07:00 next day) fluctuated at NM1 from 49 to 62 dB(A) with a mean of 57dB(A) and from 46 to 53 dB(A) with a mean of 49 dB(A) at NM2.

ACTION AND LIMIT LEVEL

5.2.10 According to the requirements for setting A/L Levels construction noise *Table 3-5-1*, the A/L Levels at NM1 and NM2 are summarized as in *Table 5-2-8* below:

Table 5-2-8 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NM1	When one or more documented complaints are received	75 dB(A) ^{Note 1}
NM2		

Note 1: Acceptable Noise Levels for Area Sensitivity Rating of A/B/C. Limit Level is reduced to 70 dB(A) for schools and 65dB(A) during school examination periods.

Note 2: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

5.2.11 Calibration certificates of the acoustic calibrator and sound level meter are shown in *Annex E*.

5.3 WATER QUALITY

5.3.1 Baseline environmental monitoring for water quality was conducted during the period from 30 November to 27 December 2012. It was noted that there existed uncertainties in safety of the water sampling and in-situ measurement at the monitoring locations WM1, WM3 and WM4 designated in the original EM&A Manual enclosed in the EP-430/2011 and the Updated EM&A Manual. Due to safety reasons, the actual monitoring locations were agreed among the Engineer, IEC, ET and the Contractor to be shifted up and down stream to the nearest safer locations, namely WM1a, WM3a and WM4a. They are detailed as follows:

Location ID	Description	Duration of the Works
WM1a	Approx. 750m upstream of the Work Area I	Foundation pit drainage and cofferdam demolition at Work Area I and II
WM2	1000m downstream of the Work Area II	
WM3a	Approx. 800m upstream of the Work Area III	Foundation pit drainage and cofferdam demolition at Work Area III and IV
WM4a	Approx. 450m downstream of the Work Area IV	

5.3.2 Monitoring results are presented in *Table 5-3-1* to *Table 5-3-4* and the detailed water quality monitoring results attached in *Annex F*.

Table 5-3-1 Water Quality Baseline Environmental Monitoring Results (DO)

Date	WM1a		WM2		WM3a		WM4a	
	mg/L	%	mg/L	%	mg/L	%	mg/L	%
30-Nov-12	8.2	96.3	5.5	63.7	7.3	83.9	5.2	60.4
3-Dec-12	7.3	82.0	7.0	78.0	6.8	73.7	7.6	83.8
6-Dec-12	8.7	96.8	7.8	86.9	8.3	91.2	9.8	107.1
8-Dec-12	6.6	78.6	7.1	84.5	7.1	84.5	6.7	79.0
10-Dec-12	7.6	90.4	6.8	80.0	7.5	88.8	6.8	80.9
12-Dec-12	6.3	71.4	5.2	59.7	5.8	65.8	6.7	76.0
14-Dec-12	5.8	69.8	4.8	54.8	5.1	60.8	6.4	75.1
18-Dec-12	7.7	83.7	7.3	80.5	7.4	81.5	8.0	89.3
20-Dec-12	6.9	79.4	6.3	70.1	5.6	63.8	7.0	78.6
22-Dec-12	5.8	68.3	3.6	42.2	3.3	39.5	5.2	61.1
24-Dec-12	5.2	60.5	3.3	38.2	3.0	35.0	4.7	55.0
27-Dec-12	5.6	63.0	3.4	38.2	3.8	42.6	5.5	61.7
Minimum	5.2	60.5	3.3	38.2	3.0	35.0	4.7	55.0
Average	6.8	78.3	5.7	64.7	5.9	67.6	6.6	75.7
Maximum	8.7	96.8	7.8	86.9	8.3	91.2	9.8	107.1

5.3.3 As show in *Table 5-3-1*, DO baseline levels of upstream fluctuated from 5.2 mg/L to 8.7 mg/L with a mean of 6.8 mg/L at WM1a and from 3.0 mg/L to 8.3 mg/L with a mean of 5.9 mg/L at WM3a; whereas DO baseline levels of downstream fluctuated from 3.3 mg/L to 7.8 mg/L with a mean of 5.7 mg/L at WM2 and from 4.7 mg/L to 9.8 mg/L with a mean of 6.6 mg/L at WM4a.

Table 5-3-2 Water Quality Baseline Environmental Monitoring Results (Turbidity)

Date	WM1a	WM2	WM3a	WM4a
30-Nov-12	8	10	47	2
3-Dec-12	23	52	50	4
6-Dec-12	17	26	27	14
8-Dec-12	5	31	44	22
10-Dec-12	5	27	29	19
12-Dec-12	3	19	18	5
14-Dec-12	3	31	33	3
18-Dec-12	3	51	51	22
20-Dec-12	6	38	43	14
22-Dec-12	6	26	26	7
24-Dec-12	4	8	13	7
27-Dec-12	3	26	29	11
Minimum	3	8	13	2
Average	7	29	34	11
Maximum	23	52	51	22

- 5.3.4 As show in **Table 5-3-2**, Turbidity baseline levels of upstream fluctuated from 3 to 23 with a mean of 7 NTU at WM1a and from 13 to 51 with a mean of 34 NTU at WM3a; whereas Turbidity baseline levels of downstream fluctuated from 8 to 52 with a mean of 29 NTU at WM2 and from 2 to 22 with a mean of 11 NTU at WM4a.

Table 5-3-3 Water Quality Baseline Environmental Monitoring Results (pH Value)

Date	WM1a	WM2	WM3a	WM4a
30-Nov-12	8.4	7.8	8.3	7.8
3-Dec-12	8.3	8.0	7.9	8.2
6-Dec-12	8.6	8.4	8.2	8.0
8-Dec-12	7.9	7.8	7.7	7.6
10-Dec-12	8.2	8.0	8.3	7.7
12-Dec-12	8.4	8.1	8.3	8.5
14-Dec-12	8.3	8.1	8.2	8.6
18-Dec-12	7.9	7.7	7.8	7.7
20-Dec-12	8.0	7.8	7.7	7.8
22-Dec-12	8.2	7.7	7.6	7.8
24-Dec-12	7.8	7.8	7.7	7.6
27-Dec-12	8.6	8.1	8.1	7.5
Minimum	7.8	7.7	7.6	7.5
Average	8.2	7.9	8.0	7.9
Maximum	8.6	8.4	8.3	8.6

- 5.3.5 As show in **Table 5-3-3**, pH value baseline levels of upstream fluctuated from 7.8 to 8.6 with a mean of 8.2 pH unit at WM1a and from 7.6 to 8.3 with a mean of 8.0 pH unit at WM3a; whereas pH value baseline levels of downstream fluctuated from 7.7 to 8.4 with a mean of 7.9 pH unit at WM2 and from 7.5 to 8.6 with a mean of 7.9 pH unit at WM4a.

Table 5-3-4 Water Quality Baseline Environmental Monitoring Results (SS)

Date	WM1a	WM2	WM3a	WM4a
30-Nov-12	9	71	75	19
3-Dec-12	2	86	85	24
6-Dec-12	120	17	16	12
8-Dec-12	4	46	45	40
10-Dec-12	5	40	33	17
12-Dec-12	4	25	25	61
14-Dec-12	6	57	50	10
18-Dec-12	3	45	46	67
20-Dec-12	26	35	36	22
22-Dec-12	7	31	31	16
24-Dec-12	3	13	16	15
27-Dec-12	4	29	31	8
Minimum	2	13	16	8
Average	16	41	41	26
Maximum	120	86	85	67

- 5.3.6 As show in **Table 6-3-4**, SS baseline levels of upstream fluctuated from 2 to 120 with a mean of 16 mg/L at WM1a and from 16 to 85 with a mean of 41 mg/L at WM3a; whereas the SS baseline levels of downstream fluctuated from 13 to 86 with a mean of 41 mg/L at WM2 and from 8 to 67 with a mean of 26 mg/L at WM4a.

ACTION AND LIMIT LEVEL

- 5.3.7 No significant difference is apparent in comparison of the average and range of the overall upstream and downstream baseline levels including parameters DO, Turbidity, pH value and Suspended Solid.
- 5.3.8 According to the requirements for setting water quality A/L Levels in **Table 4-8-1**, the calculated A/L Levels at WM1 to WM4 are summarized in **Table 5-3-5** below:

Table 5-3-5 Statistics of Baseline Monitoring Environmental Results-Percentile (%-ile) & Percentage (%)

Parameter	Percentile or Percentage	Location ID			
		W1a	W2	W3a	W4a
Dissolved Oxygen (mg/L)	5%-ile	5.38	3.35	3.17	4.94
	1%-ile	5.20	3.29	3.01	4.72
Turbidity (NTU)	95%-ile	19.9	51.6	50.4	21.9
	99%-ile	22.7	52.0	50.8	22.0
Suspended Solids (mg/L)	120% of mean	19	49	49	31
	130% of mean	21	53	53	33

- 5.3.9 DO in Shenzhen River conspicuously fluctuates constantly according to the weather, differences of the DO in the first decimal place of mg/L, particularly those between the Action and Limit Levels as shown in **Table 5-3-5**, do not carry environmental significance. DO of 2 mg/L is therefore recommended to be set as the Limit Level for all monitoring locations e.g. WM1 to WM4.

5.3.10 In summary, the water quality A/L Levels at WM1 to WM4 are recommended as follows:

Table 5-3-6 Recommended A/L Levels for Water Quality

Location	Performance criteria	DO (mg/L)	Turbidity (NTU)	SS (mg/L)
WM1a	Action Level	5.4	19.9	19
	Limit Level	2.0	22.7	21
WM2	Action Level	3.3	51.6	49
	Limit Level	2.0	52.0	53
WM3a	Action Level	3.2	50.4	49
	Limit Level	2.0	50.8	53
WM4a	Action Level	4.9	21.9	31
	Limit Level	2.0	22.0	33

5.3.11 Calibration certificates of water quality monitoring equipment show in *Annex E*.

6 CONCLUSIONS AND RECOMMENDATIONS

- 6.1.1 The baseline environmental monitoring for River Modification, including air quality, noise and water quality, was conducted by the ET under Contract No. DC/2011/06 in December 2012 and March 2013 at the locations designated in the Updated EM&A Manual or alternative locations agreed among the Engineer, IEC, ET and Contractor. During the baseline environmental monitoring, no construction activities under the Contract DC/2011/06, which might adversely affect the baseline environmental monitoring results, were observed nearby the monitoring locations.
- 6.1.2 The environmental performance criteria, i.e. A/L Levels for air quality, construction noise and water quality, which are recommended by the ET under DC/2011/06 to be used for EM&A during construction of the River Modification, are as follows:

Proposed Action and Limit Levels of Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM1/AM1a	299	177	500	260
AM2	294	174	500	260

Proposed Action and Limit Levels of Construction Noise Monitoring

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NM1	When one or more documented complaints are received	75 dB(A) ^{Note 1}
NM2		

Note 1: Acceptable Noise Levels for Area Sensitivity Rating of A/B/C. Limit Level is reduced to 70 dB(A) for schools and 65dB(A) during school examination periods.

Note 2: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

Proposed Action and Limit Levels of Water Quality Monitoring

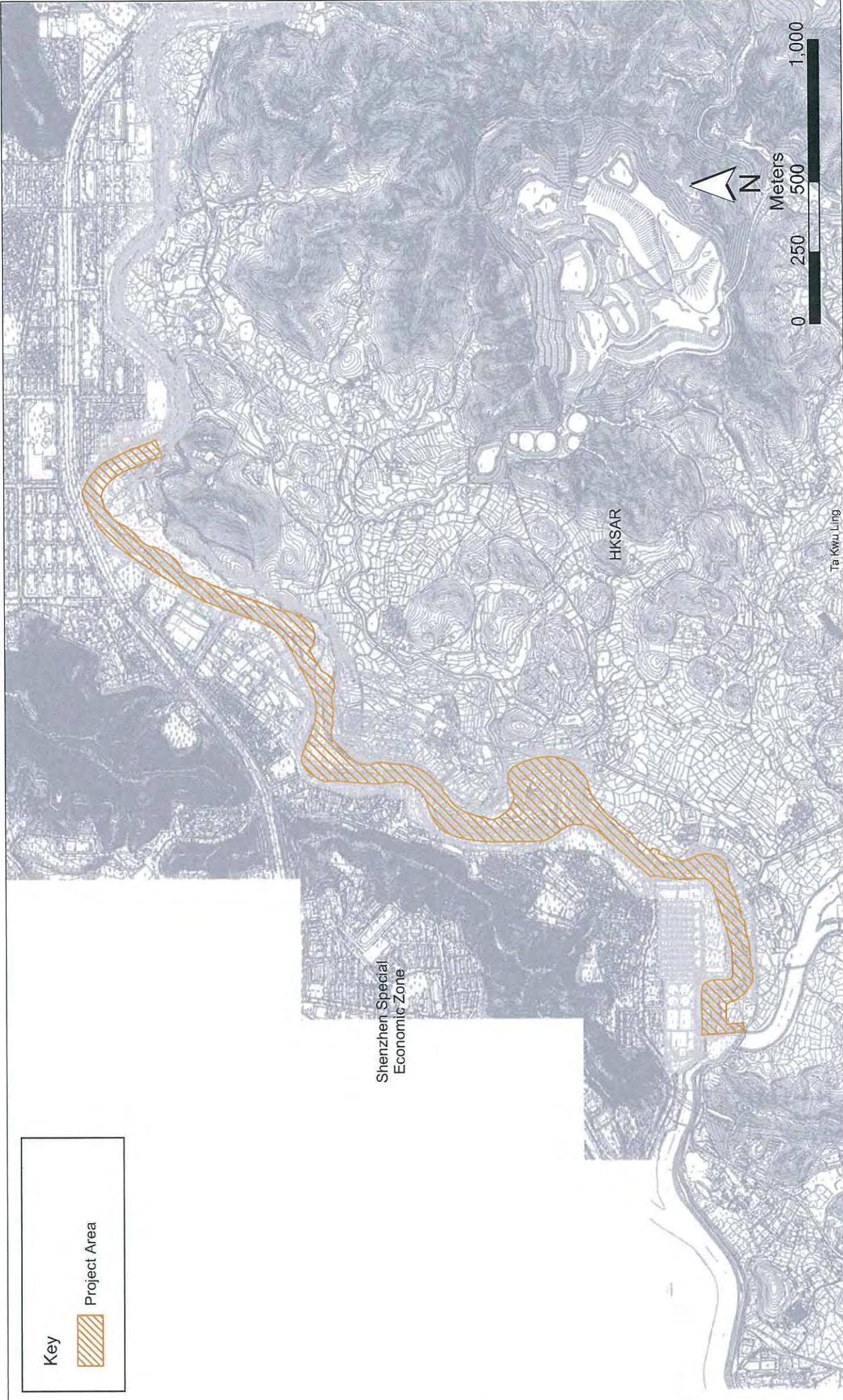
Location	Performance criteria	DO (mg/L)	Turbidity (NTU)	SS (mg/L)
WM1a	Action Level	5.4	19.9	19
	Limit Level	2.0	22.7	21
WM2	Action Level	3.3	51.6	49
	Limit Level	2.0	52.0	53
WM3a	Action Level	3.2	50.4	49
	Limit Level	2.0	50.8	53
WM4a	Action Level	4.9	21.9	31
	Limit Level	2.0	22.0	33

6.2 RECOMMENDATION

- 6.2.1 The baseline environmental monitoring of air quality, construction noise and water quality was conducted by the ET under Contract DC/2011/06 during typical dry season (November to March next year) in Hong Kong. It is important to taken into account the influence of seasonal changes when interpreting monitoring data obtained during wet season. Review of the baseline conditions may need to be conducted regularly, in particular during seasonal changes. If the changes in baseline conditions are evident, the environmental performance criteria should be re-established upon agreement of the ER and IEC and EPD.
- 6.2.2 Although no requirements are set for pH value, the parameter is recommended to be included in the water quality monitoring with the widely used acceptable pH range of 6 – 9 pH units.

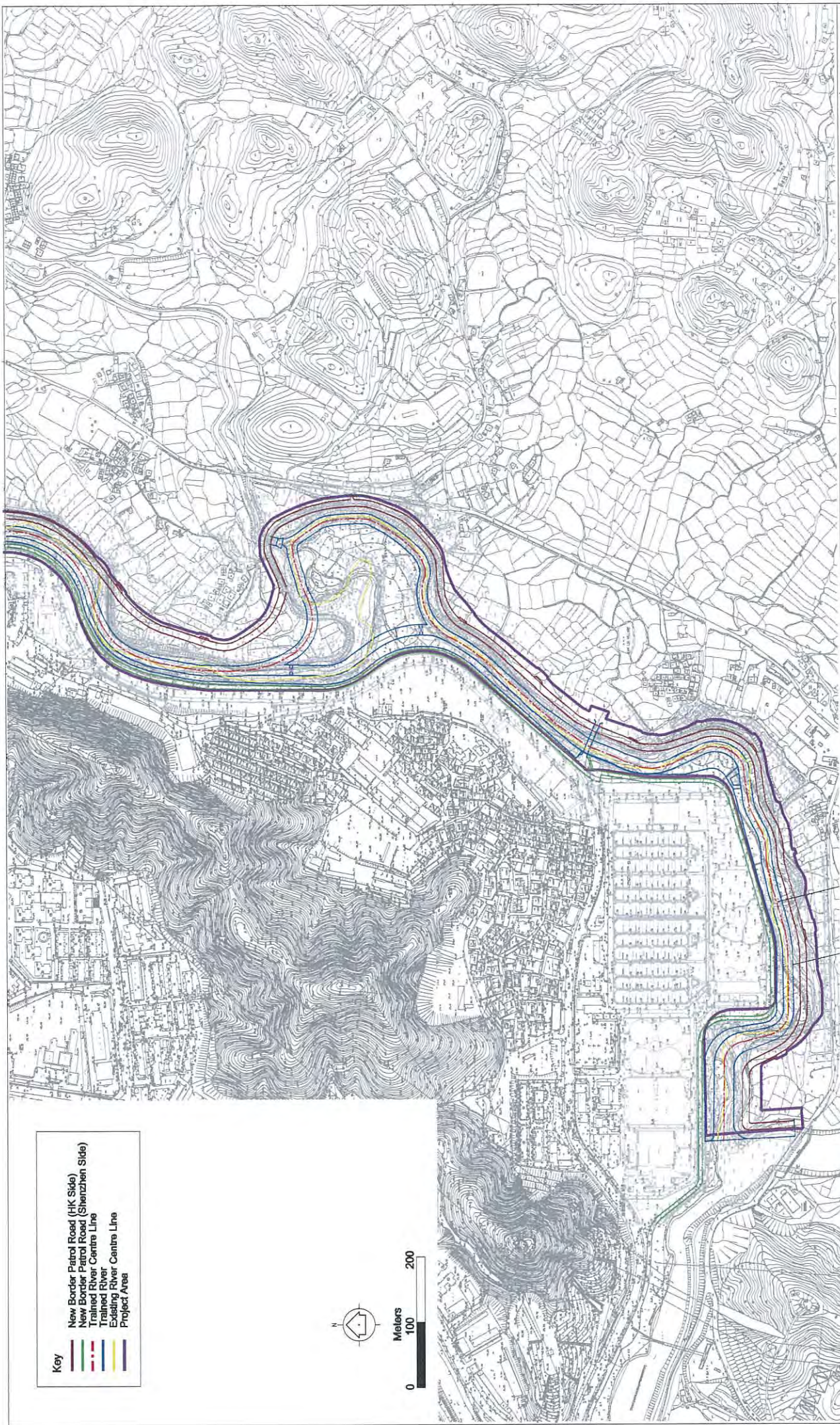
ANNEX A

**LAYOUT PLAN FOR
REGULATION OF SHENZHEN RIVER STAGE 4**



Location of Project Site

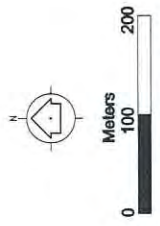
Figure A1-1

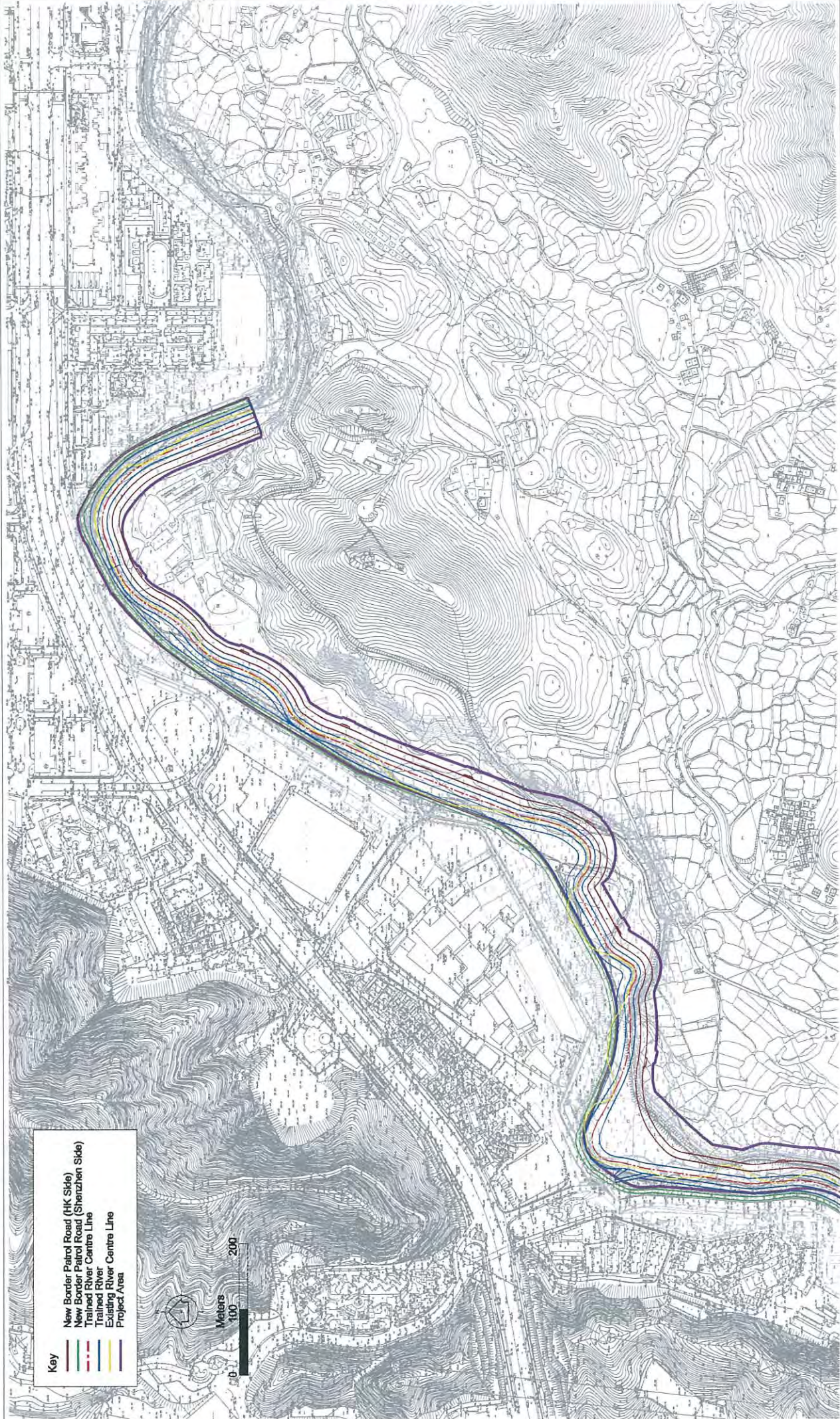


General Layout and Extent of the Trained River
(1 of 2)






Figure A1-2

- Key**
-  New Border Patrol Road (HK Side)
 -  New Border Patrol Road (Shenzhen Side)
 -  Trained River Centre Line
 -  Existing River Centre Line
 -  Project Area





Key

-  New Border Patrol Road (HK Side)
-  New Border Patrol Road (Shenzhen Side)
-  Trained River Centre Line
-  Existing River Centre Line
-  Project Area



General Layout and Extent of the Trained River
(2 of 2)

Figure A1-2

ANNEX B

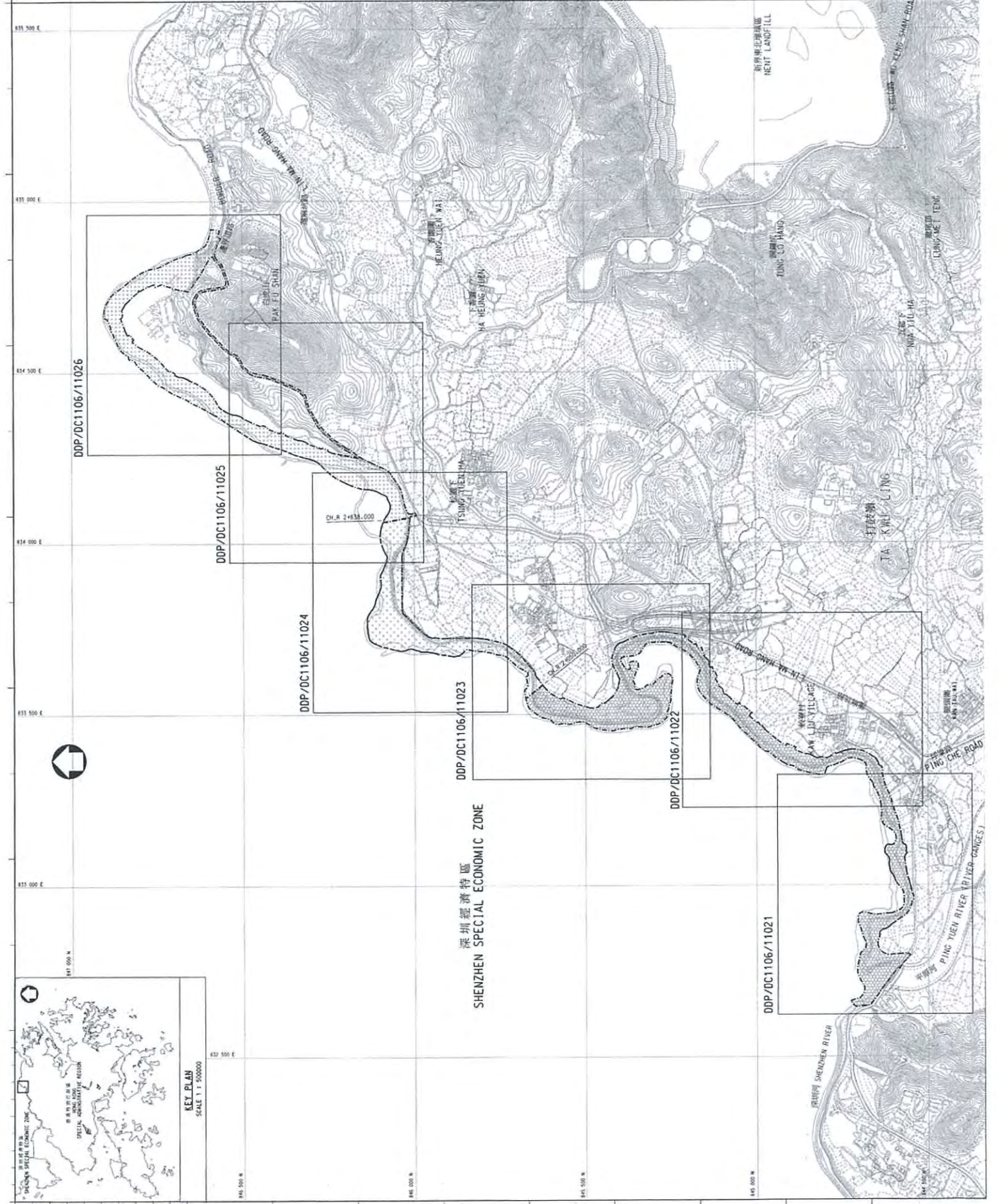
LOCATION PLAN FOR THE ADVANCED WORKS UNDER DC/2011/06

- NOTES:**
- GRID LINES ARE NORTH-KING GRID 1985.
 - ALL LEVELS ARE IN METRES AND REFERRED TO MEAN SEA LEVEL.
 - FOR SETTING OUT DETAILS OF SITE LIMITS, REFER TO DRAWING NO. DDP/DC1106/11011 TO DDP/DC1106/11022.
 - FOR DETAILS OF AREAS B1, B2, B3 & B4 REFER TO DRAWING NO. DDP/DC1106/11022.

LEGEND:

- LIMIT OF THE SITE
- PROTION A
- PROTION B
- AREA B1
- AREA B2
- AREA B3
- AREA B4
- PROTION C

OR A PROVISION CHANGING FOR BORDER ROAD



KEY PLAN
SCALE 1 : 50000

深圳經濟特區
SHENZHEN SPECIAL ECONOMIC ZONE

NO.	DATE	DESCRIPTION	INITIALS
1		DESIGNED	
2		DRAWN	
3		CHECKED	
4		VERIFIED	
5		APPROVED	

Ag. Chief Engineer
A. L. TANG
Date

contract no. DC/2011/06
file no. DP/8/5018GB
project no. 5018GB

PREPROVISIONING OF BOUNDARY PATROL ROAD AND ASSOCIATED SECURITY FACILITIES BETWEEN PING YUEN RIVER AND PAK FU SHAN AND DRAINAGE WORKS IN NORTH DISTRICT

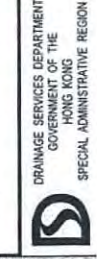
drawing title

SCOPE OF WORKS AT PORTION A, B AND C OF THE SITE

SHEET 1 OF 2
drawing no. DDP/DC1106/11011
scale 1 : 5 000

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NOTES:

- GRID LINES ARE USING KING GRID 1980.
- ALL LEVELS ARE IN METRES AND REFERRED TO M.S.P.O.
- FOR GETTING OUT DETAILS OF SITE LIMIT, REFER TO DRAWING NO. DDP/DC1106/11011 TO DDP/DC1106/11012.
- FOR DETAILS OF AREAS A1, B1, B3 & B4 REFER TO DRAWING NO. DDP/DC106/11012.

LEGEND:

- LIMIT OF THE SITE
- PROTION A
- PROTION B
- AREA B1
- AREA B2
- AREA B3
- AREA B4
- PROTION C

DATE 14/05/2008 CHAIRMAN FOR BORDER ROAD

NO.	DATE	DESCRIPTION	INITIAL
DESIGNED	18 NOV 2011	K. K. LI	
DRAWN	18 NOV 2011	K. K. LI	
CHECKED	18 NOV 2011	K. H. POH	
VERIFIED	18 NOV 2011	T. C. LAU	
APPROVED			

Ag. Chief Engineer
K. L. YUANG
Date

contract no. DC/2011/06
file no. DP/8/501808
project no. 501808

REPROVISIONING OF BOUNDARY PATROL ROAD AND ASSOCIATED SECURITY FACILITIES BETWEEN PING YUEN RIVER AND PAK FU SHAN AND DRAINAGE WORKS IN NORTH DISTRICT

drawing title

SCOPE OF WORKS AT PORTION A, B AND C OF THE SITE

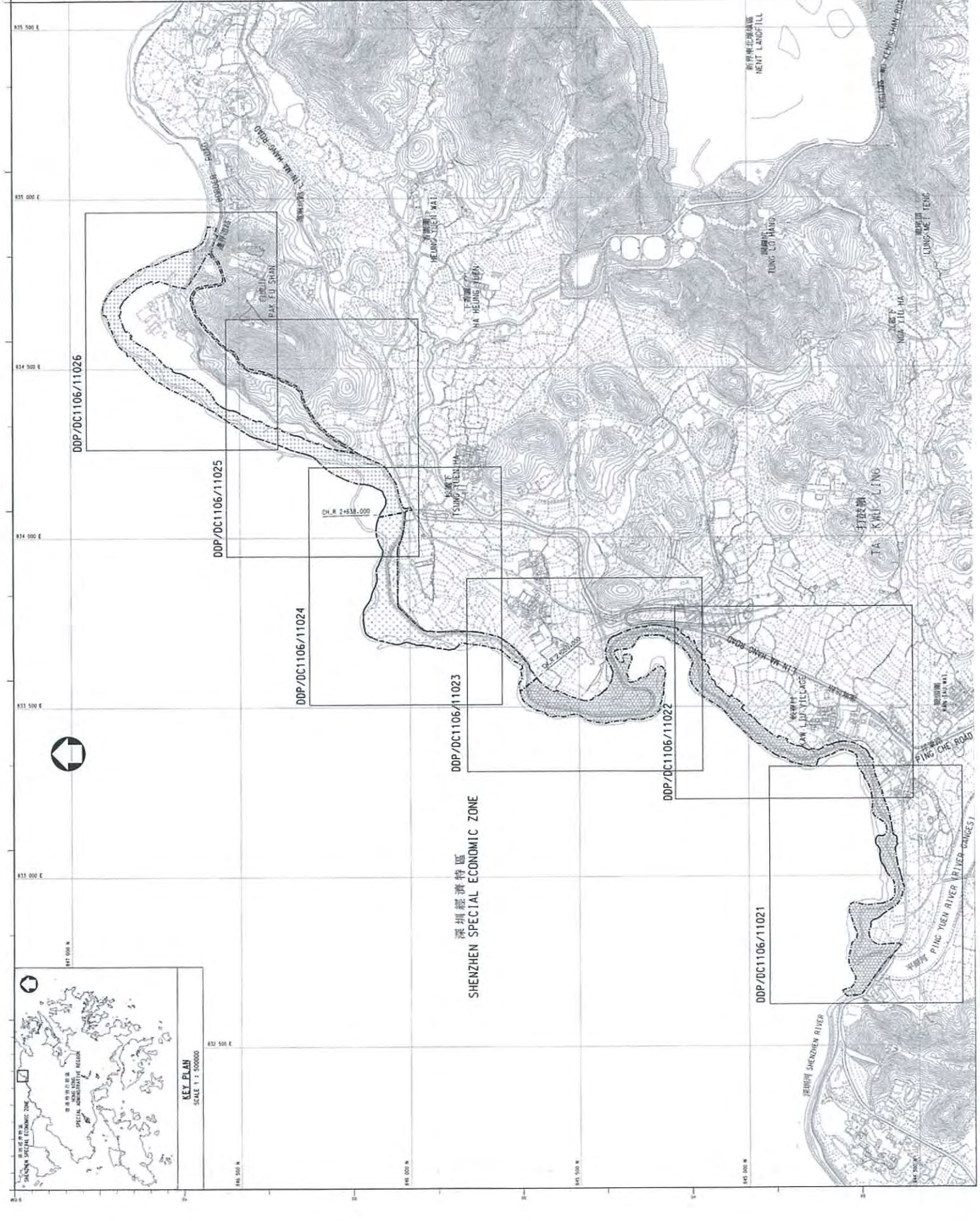
SHEET 1 OF 21

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scale 1 : 5,000

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SPECIAL ADMINISTRATIVE REGION



KEY PLAN
SCALE 1 : 50000

深圳經濟特區
SHENZHEN SPECIAL ECONOMIC ZONE

DDP/DC1106/11021

DDP/DC1106/11023

DDP/DC1106/11024

DDP/DC1106/11025

DDP/DC1106/11026

CH. R. 24534.000

SHENZHEN RIVER

PING YUEN RIVER (RIVER CHANNELS)

RENT LANDFILL

TUNG LO HAKO

TA. KWU LING

NGA TUI HA

LINGSANG TEUC

WU SHAN ROAD

PING CHE ROAD

WU SHAN ROAD

WU SHAN ROAD

WU SHAN ROAD

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WU SHAN ROAD

WU SHAN ROAD

WU SHAN ROAD

WU SHAN ROAD

NOTES:

- GRID LINES ARE HONG KONG GRID 1980.
- ALL LEVELS ARE IN METRES AND REFERRED TO M.A.S.P.D.

LEGEND :

- LIMIT OF THE SITE
- EXISTING BOUNDARY PATROL ROAD TO BE RECONSTRUCTED
- PROPOSED BOUNDARY PATROL ROAD
- PROPOSED VIN MESH PRIMARY BOUNDARY FENCE
- PROPOSED VIN MESH SECONDARY BOUNDARY FENCE
- EXISTING BOUNDARY FENCE AND ASSOCIATED LAMP POST AND PILLAR BOX
- EXISTING BOUNDARY FENCE AND ASSOCIATED LAMP POST AND PILLAR BOX TO BE DEMOLISHED UPON SATISFACTORY COMPLETION OF WORK WITH INSTRUCTIONS FROM THE ENGINEER
- EXISTING VIN MESH PRIMARY BOUNDARY FENCE TO BE MODIFIED
- EXISTING CHAIN LINK FENCE TO BE DEMOLISHED
- PROPOSED CUT SLOPE
- PROPOSED FILL SLOPE
- CHAIN LINK FENCE (FOR BOUNDARY ROAD)
- PROPOSED VEHICULAR AND PEDESTRIAN GATE (VPG)
- PROPOSED VEHICULAR GATE (VGT)
- PROPOSED PEDESTRIAN GATE (PG)
- EXISTING GATE
- EXISTING GATE TO BE DEMOLISHED
- PILLAR BOX
- SWITCH ROOM

NO.	DATE	DESCRIPTION	INITIAL	DATE
DESIGNED		C. F. CHAN		28 NOV 2011
DRAWN		L. N. LEE		28 NOV 2011
CHECKED		T. C. LAM		28 NOV 2011
APPROVED				28 NOV 2011

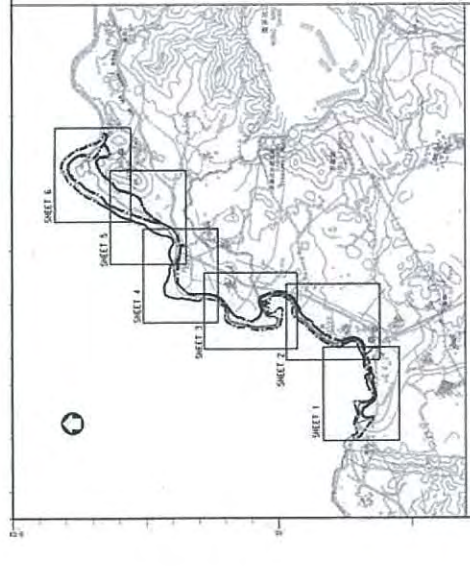
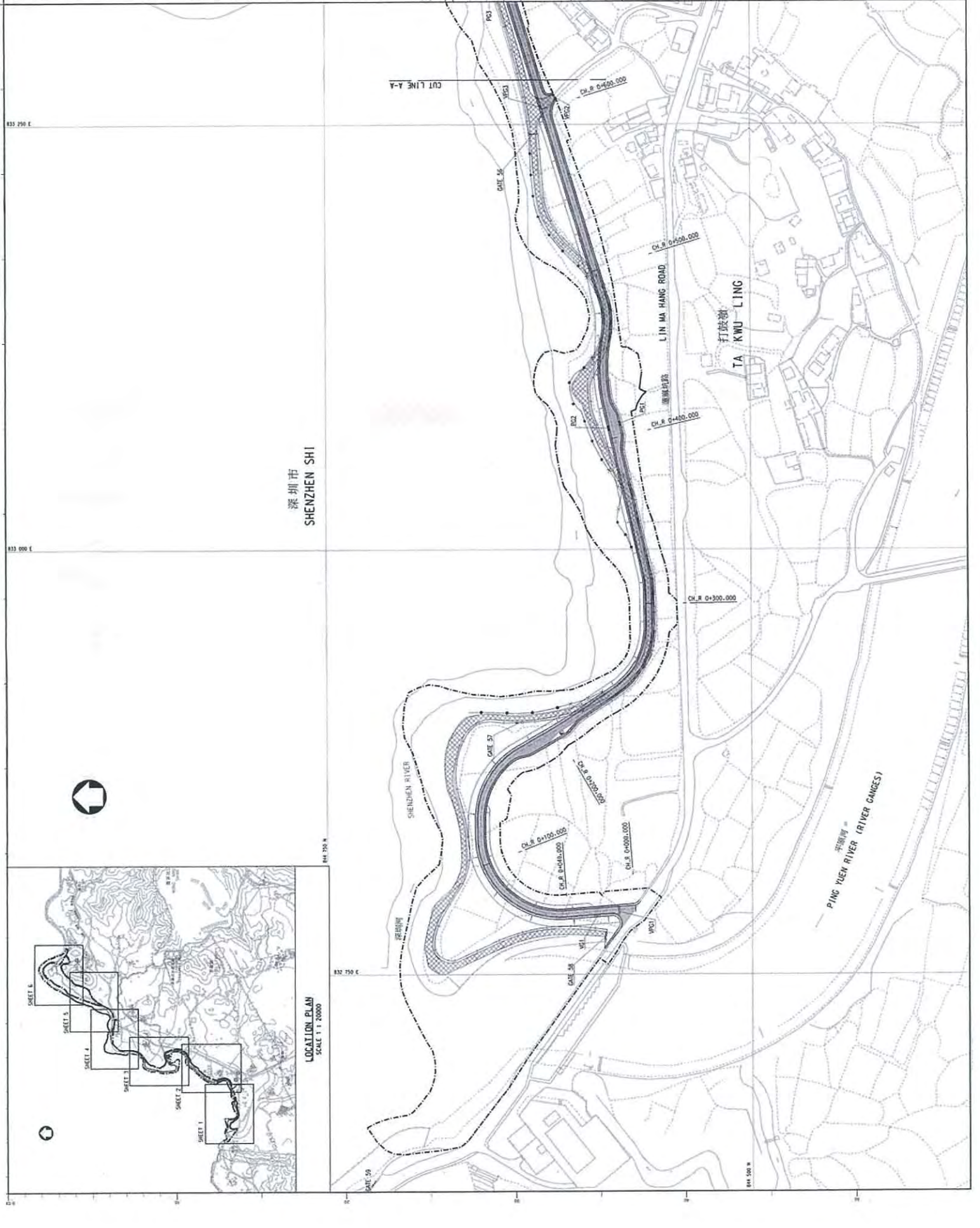
Ag. Chief Engineer
 K. L. TAM
 DATE

contract no. DC/2011/05
 file no. DP/8/5018GB
 project no. 5018GB
 contract

REPROVISIONING OF BOUNDARY PATROL ROAD AND ASSOCIATED SECURITY FACILITIES BETWEEN PING YUEN RIVER AND PAK FU SHAN AND DRAINAGE WORKS IN NORTH DISTRICT

drawing title
 GENERAL LAYOUT
 (SHEET 1 OF 5)
 drawing no. DDP/OC1106/11021
 scale 1 : 1 : 1 000

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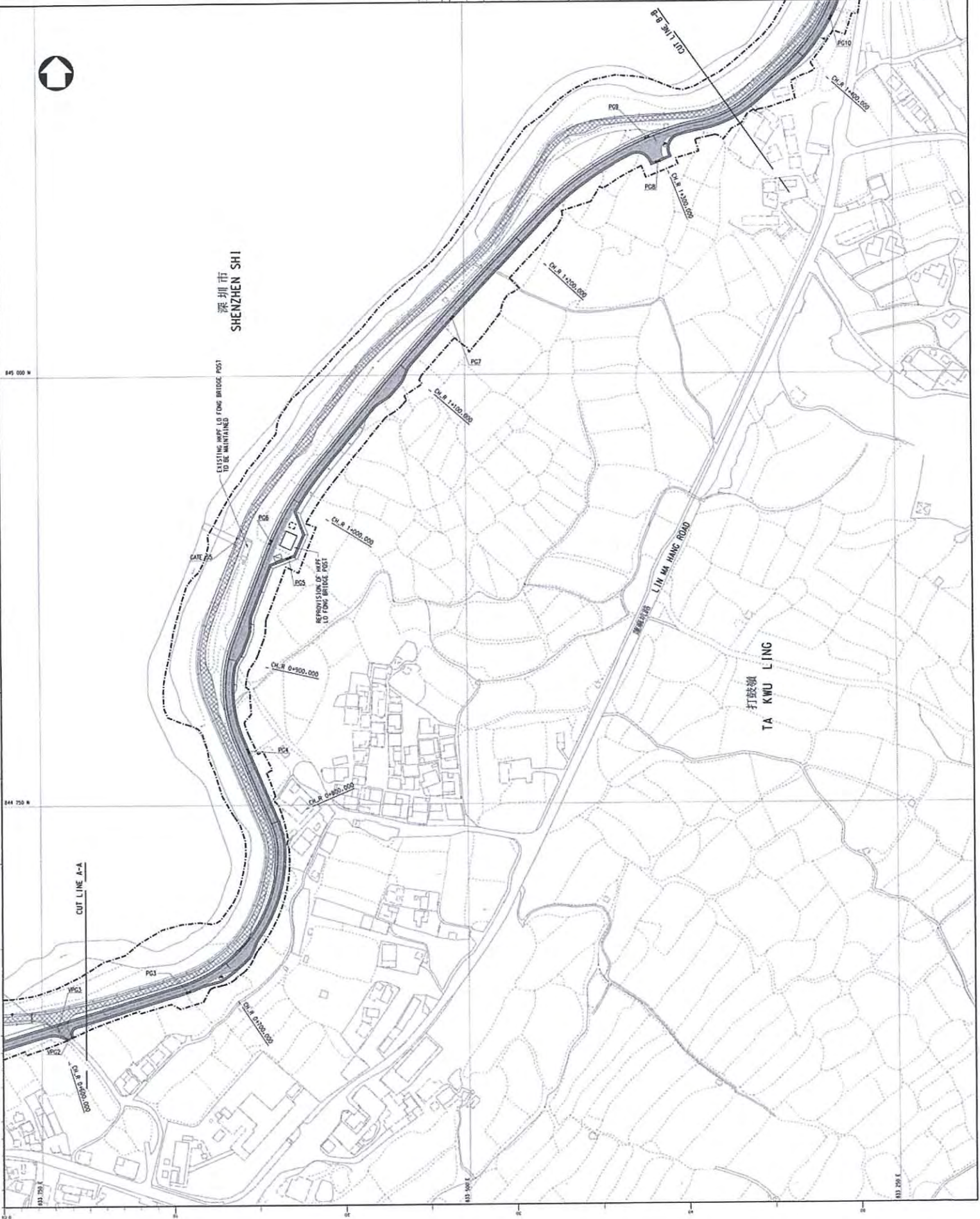


深圳市
 SHENZHEN SHI

LOCATION PLAN
 SCALE 1 : 20000

NOTES:

1. FOR GENERAL NOTES & LEGEND, REFER TO Dwg. No. DP/ACT/01/01/01.



NO.	DATE	DESCRIPTION	INITIAL
REVISION			
DESIGNED	28 NOV 2011	C. F. DAN	
DRAWN	28 NOV 2011	T. M. LEE	
CHECKED	28 NOV 2011	N. H. POH	
VALIDATED	28 NOV 2011	T. C. LAI	
APPROVED			

Ag. Chief Engineer
 L. L. YUNG
 28 NOV 2011
 Date

contract no. DP/2011/06
 file no. DP/8/5018CB
 project no. 5018CB
 contract

REPROVISIONING OF BOUNDARY PATROL ROAD AND ASSOCIATED SECURITY FACILITIES BETWEEN PING TIEN RIVER AND LIN MA HANG ROAD IN NORTH DISTRICT

drawing title
GENERAL LAYOUT

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NOTES:

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REV. NO.	DESCRIPTION	DATE
DESIGNED	F. CHAN	28 MAY 2011
DRAWN	L. W. LEE	28 MAY 2011
CHECKED	K. W. POON	28 MAY 2011
VERIFIED	T. C. LAU	28 MAY 2011
APPROVED		

E. L. TSANG
 AG Chief Engineer
 Date: 28 MAY 2011

contract no. DC/2011/05
 file no. DP/8/501808
 project no. 501808
 contract

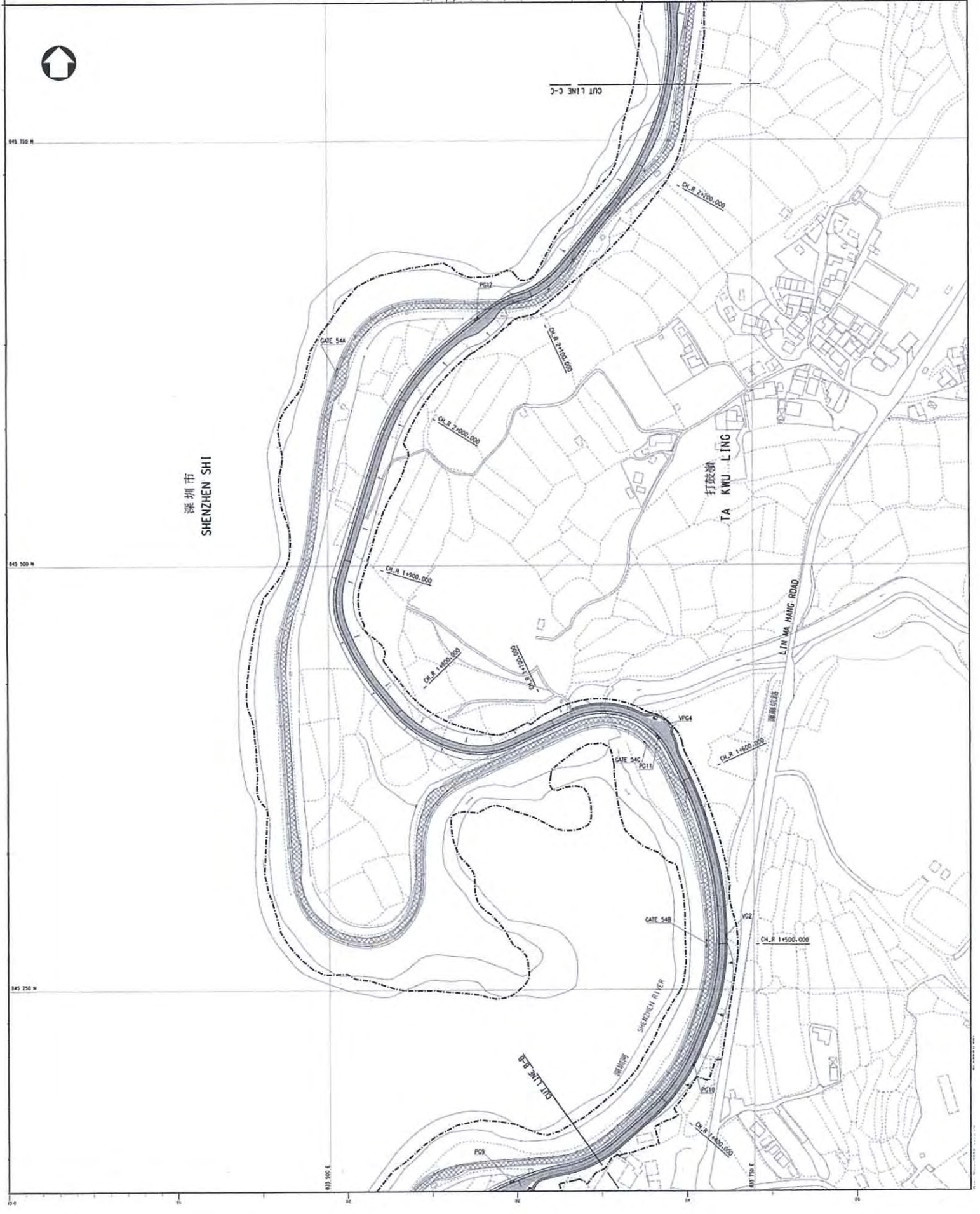
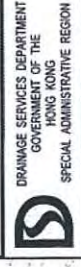
REPROVISIONING OF BOUNDARY PATROL ROAD
 AND ASSOCIATED SECURITY FACILITIES
 BETWEEN PING YUEN RIVER
 AND PAK FU SHAN AND DRAINAGE WORKS
 IN NORTH DISTRICT

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 GENERAL LAYOUT

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深圳市
 SHENZHEN SHI

打鼓嶼
 TA KWU LING

蓮花路
 LIN MA HANG ROAD

WFC4

GATE 54C
 PC11

GATE 54B

V02

V03

V04

PC10

PC11

CUT LINE C-C

CH_R 21000.000

CH_R 21000.000

CH_R 21000.000

CH_R 21000.000

CH_R 21000.000

CH_R 21000.000

CH_R 21000.000

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NOTES:

1. FOR GENERAL NOTES & LEGEND, REFER TO
 G.M.C. No. DDP/DC1106/11024.

NO.	DATE	DESCRIPTION	INITIAL
REVISION			
DESIGNED		E. F. CHAN	28 NOV 2011
DRAWN		T. W. LEE	28 NOV 2011
CHECKED		W. H. POON	28 NOV 2011
VERIFIED		T. C. LAU	28 NOV 2011
APPROVED			

Ag. Chief Engineer
 L. TAM, 28 NOV 2011
 Date

contract no. DC/2011/06
 file no. DP/8/501808
 project no. 501808
 contract

REPROVISIONING OF BOUNDARY PATROL ROAD
 AND ASSOCIATED SECURITY FACILITIES
 BETWEEN PING YUEN RIVER
 AND PAK FU SHAN AND DRAINAGE WORKS
 IN NORTH DISTRICT

drawing title

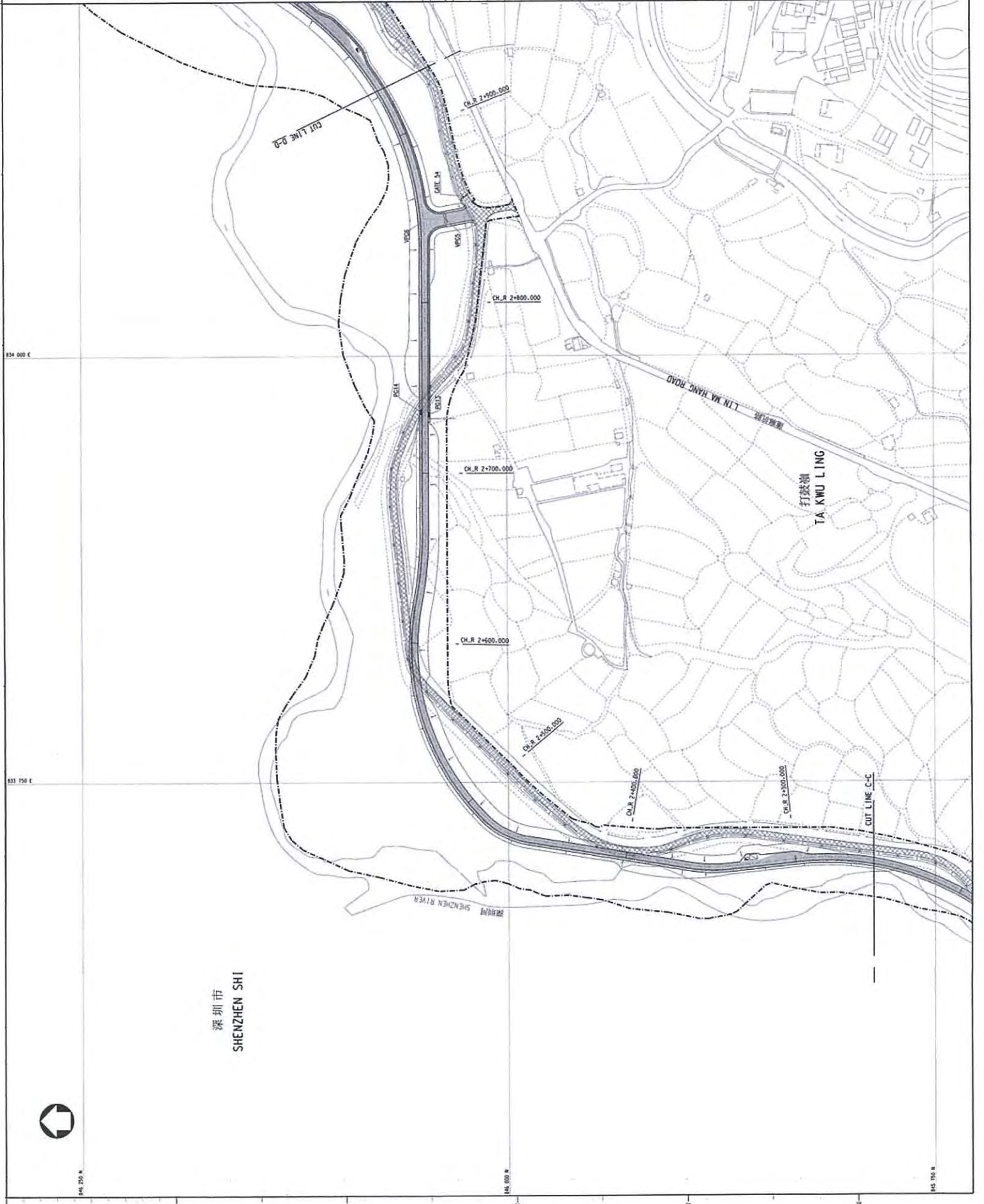
GENERAL LAYOUT

SHEET 4 OF 6
 drawing no. DDP/DC1106/11024
 scale 1 : 1 000

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DRAINAGE PROJECTS DIVISION

DRAINAGE SERVICES DEPARTMENT
 GOVERNMENT OF THE
 HONG KONG
 SPECIAL ADMINISTRATIVE REGION



NOTES:

1. FOR GENERAL NOTES & LEGEND, REFER TO Dwg. No. DDP/DC1106/11021.

NO.	DATE	DESCRIPTION	INITIALS
REVISION			
1	28 May 2011	DESIGNED	C. F. CHAN
2	28 May 2011	DRAWN	T. W. LEE
3	28 May 2011	CHECKED	W. H. TOON
4	28 May 2011	VELLED	T. T. LAU
5	28 May 2011	APPROVED	[Signature]

Ag. Chief Engineer
 L. T. TAM, 28 May 2011
 Date

contract no. DC/2011/06
 file no. DP/8/501808
 project no. 501808
 contract

REPROVISIONING OF BOUNDARY PATROL ROAD AND ASSOCIATED SECURITY FACILITIES BETWEEN PING YUEN RIVER AND PAK FU SHAN AND DRAINAGE WORKS IN NORTH DISTRICT

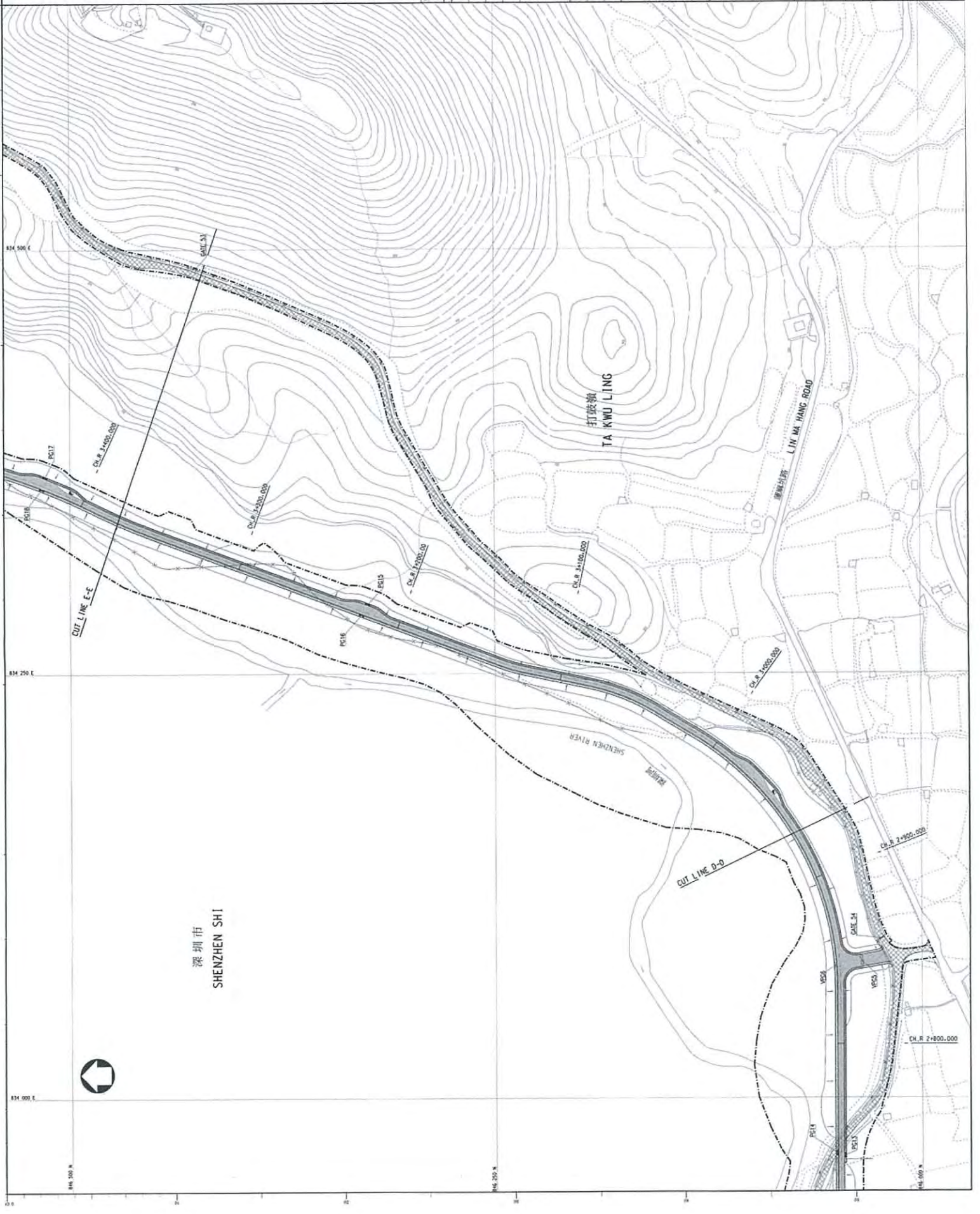
drawing title
GENERAL LAYOUT

(SHEET 5 OF 6)
 drawing no. DDP/DC1106/11025
 scale 1 : 1 000

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深圳市
 SHENZHEN SHI

NOTES:

1. FOR GENERAL NOTES & LEGEND, REFER TO Dwg. No. DDP/DC1106/11026.

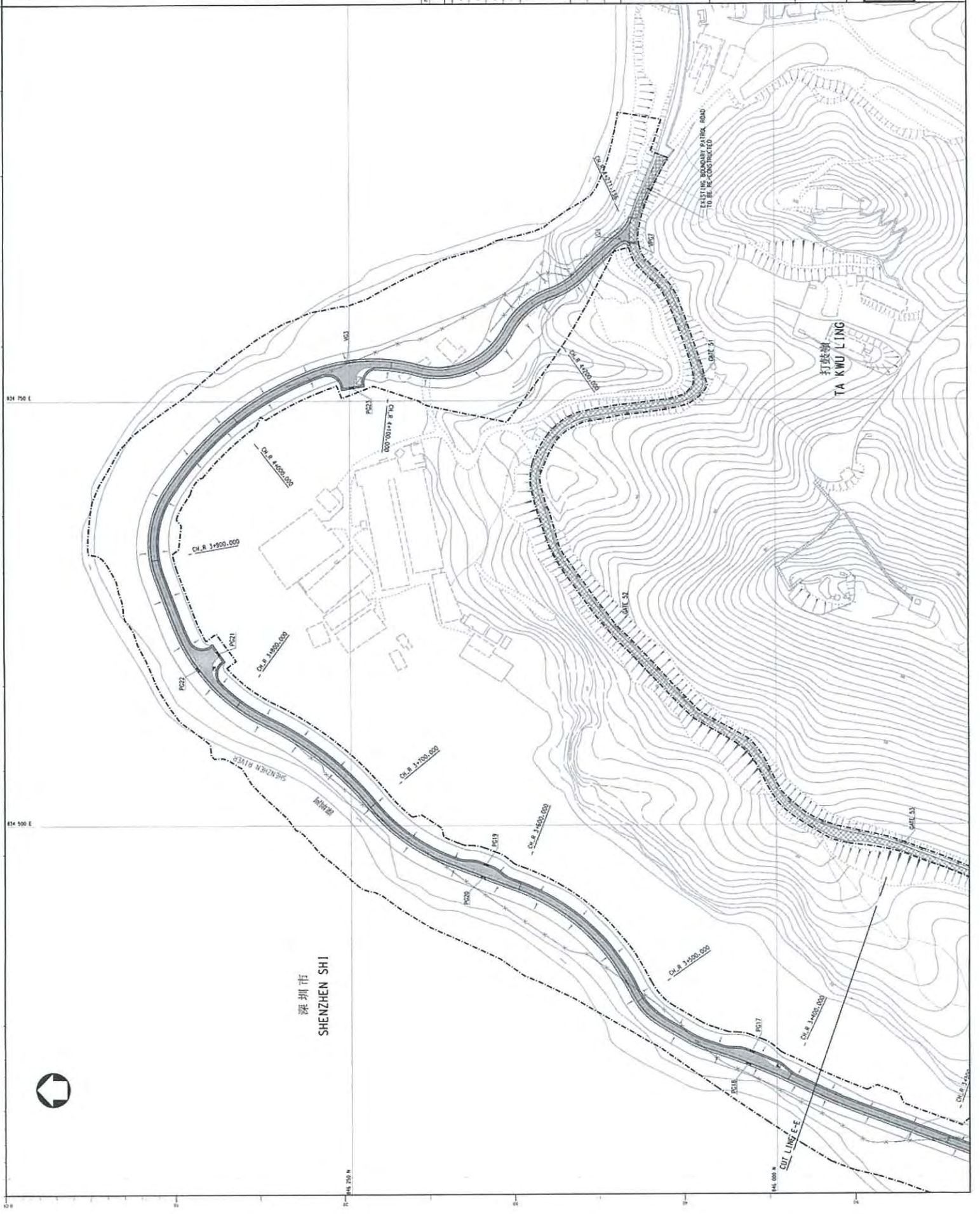
no.	date	description	initial
REVISION			
designed	C. F. DAI	28 NOV 2011	
drawn	T. W. LEE	28 NOV 2011	
checked	H. H. YOUNG	28 NOV 2011	
valied	T. C. LIAO	28 NOV 2011	
approved	<i>[Signature]</i>	28 NOV 2011	

contract no. DC/2011/06
 file no. DP/8/501808
 project no. 501808
 contract

REPROVISIONING OF BOUNDARY PATROL ROAD AND ASSOCIATED SECURITY FACILITIES BETWEEN PING YUEN RIVER AND PAK FU SHAN AND DRAINAGE WORKS IN NORTH DISTRICT

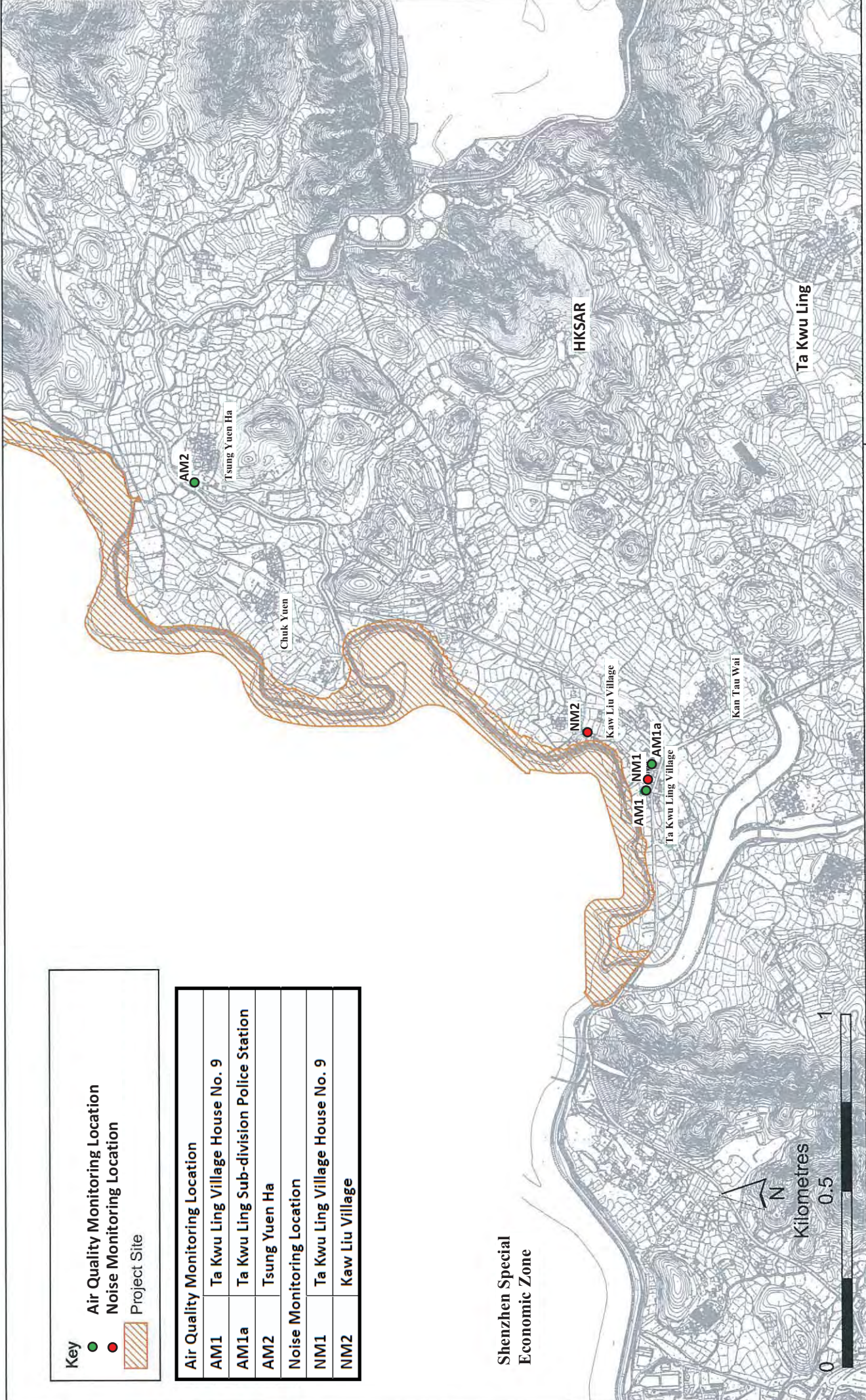
drawing title
GENERAL LAYOUT
 SHEET 6 OF 6/1
 drawing no. DDP/DC1106/11026
 scale 1 : 1 000

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 DRAINAGE SERVICES DEPARTMENT
 GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION



ANNEX C

MONITORING LOCATIONS FOR AIR QUALITY, CONSTRUCTION NOISE AND WATER QUALITY



Key

- Air Quality Monitoring Location
- Noise Monitoring Location
- Project Site

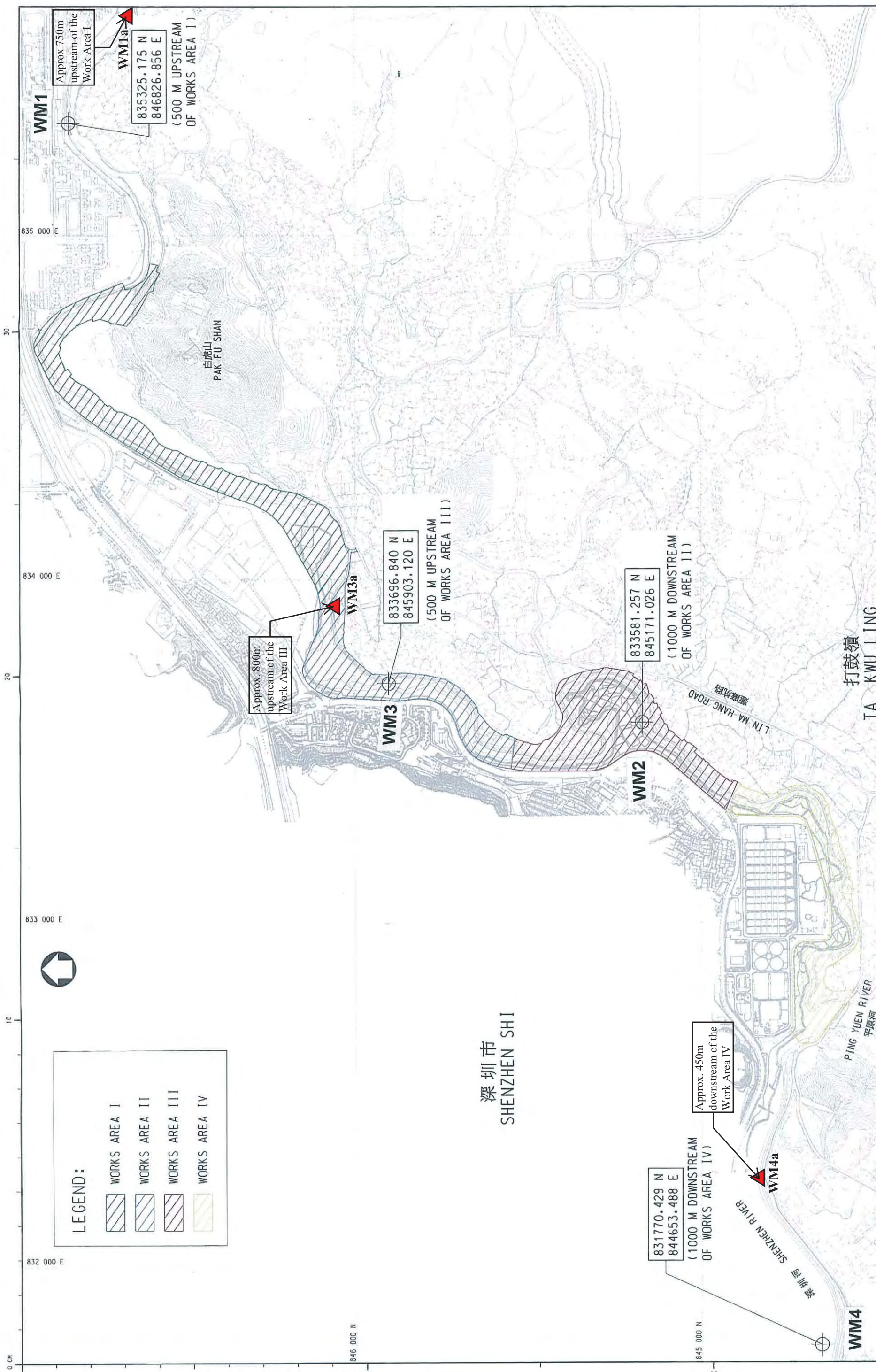
Air Quality Monitoring Location	
AM1	Ta Kwu Ling Village House No. 9
AM1a	Ta Kwu Ling Sub-division Police Station
AM2	Tsung Yuen Ha
Noise Monitoring Location	
NM1	Ta Kwu Ling Village House No. 9
NM2	Kaw Liu Village

Shenzhen Special Economic Zone

Figure 3.1

Locations of Construction Dust and Noise Monitoring Stations

File: Final\01\1756_construction dust and noise monitoring station.mxd
Date: 03/09/2010



LEGEND:

- WORKS AREA I
- WORKS AREA II
- WORKS AREA III
- WORKS AREA IV

深圳市
SHENZHEN SHI

打鼓嶺
TA KWU LING

圖則名稱 drawing title		圖則編號 drawing no.	比例 scale
工務工程計劃編號 13GB (部分)		SK-T2-12-053	1:10000
蓮塘/香園圍口岸與相關工程：重置邊界巡邏通路和相關保安設施		保留版權 COPYRIGHT RESERVED	
PWP PROJECT NO.13GB (PART)		香港特別行政區政府渠務署	
LIANTANG / HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS:		DRAINAGE SERVICES DEPARTMENT	
REPROVISIONING OF BOUNDARY PATROL ROAD AND ASSOCIATED SECURITY FACILITIES		HONG KONG GOVERNMENT OF THE	
		SPECIAL ADMINISTRATIVE REGION	
繪圖 drawn	日期 date	日期 date	日期 date
核對 checked			
批准 approved			
部門 office	排水工程 部		
	DRAINAGE PROJECTS DIVISION		

ANNEX D

EVENT/ACTION PLAN

Event and Action Plan for Construction Dust Monitoring

Event	Action			Contractor(s)
	ET	IEC	ER	
Action Level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s), the ER, IEC and EPD within 24 hours; 4. Check monitoring data, plant, equipment and the Contractor(s)'s working methods; 5. Repeat measurement to confirm finding; 6. Discuss mitigation measures with the Contractor(s); 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Discuss with the Contractor on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented. 	<ol style="list-style-type: none"> 1. Rectify unacceptable practice; 2. Check working methods, plant and equipment; 3. Consider changes of working methods; 4. Discuss with the ET and propose mitigation measures to the ER; 5. Implement the agreed mitigation measures.
Action Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s), the ER, IEC and EPD; 4. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 5. Repeat measurement to confirm finding; 6. Discuss mitigation measures with the Contractor(s); 7. Confirm mitigation measures are implemented; 8. If exceedance continues, arrange meeting with IEC and RE. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Discuss with the ET on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> 1. Rectify unacceptable practice; 2. Check working methods, plant and equipment; 3. Consider changes of working methods; 4. Discuss with the ET and propose mitigation measures to the ER within 3 working days; 5. Implement the agreed mitigation measures.

Event	Action				Contractor(s)
	ET	IEC	ER		
Limit Level being exceeded by one consecutive sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s), the ER, IEC and EPD; 4. Check monitoring data, plant, equipment and the Contractor(s)'s working methods; 5. Repeat measurement to confirm finding; 6. Discuss mitigation measures with the ER and the Contractor(s); 7. Confirm mitigation measures are implemented; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Discuss with the ET and the Contractor(s) on the proposed mitigation measures; 2. Request the Contractor(s) to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Immediate stoppage of works; 2. Confirm notification of the exceedance in writing; 3. Rectify unacceptable practice; 4. Check plant and equipment; 5. Consider changes of working methods; 6. Discuss with the ET, the ER and propose mitigation measures to the ER within 3 working days; 7. Implement the agreed mitigation measures. 	
Limit Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the Contractor(s), the ER, IEC and EPD; 4. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 5. Repeat measurement to confirm finding; 6. Discuss mitigation measures with the ER and the Contractor(s); 7. Confirm mitigation measures are implemented; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss amongst the ER, ET and Contractor on possible remedial measures; 4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Discuss with the ET and the Contractor(s) on the proposed mitigation measures; 2. Request Contractor(s) to critically review working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor(s) to slow down or to stop all or part of the marine work until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Immediate stoppage of works; 2. Confirm notification of the exceedance in writing; 3. Rectify unacceptable practice; 4. Check plant and equipment; 5. Consider changes of working methods; 6. Discuss with the ET and the ER and propose mitigation measures to the ER within 3 working days; 7. Implement the agreed mitigation measures; 8. As directed by the ER, slow down or stop all or part of the construction activities. 	

Event and Action Plan for Construction Noise

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

Water Quality Event and Action Plan

Event	ET Leader	IEC	ER	Contractor
Action level being exceeded by one sampling day	<ul style="list-style-type: none"> Repeat <i>in-situ</i> measurement to confirm findings; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Repeat measurement on next day of exceedance. 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented. 	<ul style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER; Implement the agreed mitigation measures.
Action level being exceeded by more than one consecutive sampling days	<ul style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; Repeat measurement on next day of exceedance. 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	<ul style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC, contractor and EPD; Check monitoring data, all plant, 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 	<ul style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; 	<ul style="list-style-type: none"> Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment;

Event	ET Leader	IEC	ER	Contractor
	<ul style="list-style-type: none"> equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level. 	<ul style="list-style-type: none"> Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Consider changes of working methods; Discuss with ET , IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling days	<ul style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC, contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures; Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the works until no exceedance of Limit level. 	<ul style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET , IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures; As directed by the Engineer, to slow down or to stop all or part of the works or construction activities..

ANNEX E

CALIBRATION CERTIFICATES FOR MONITORING EQUIPMENT

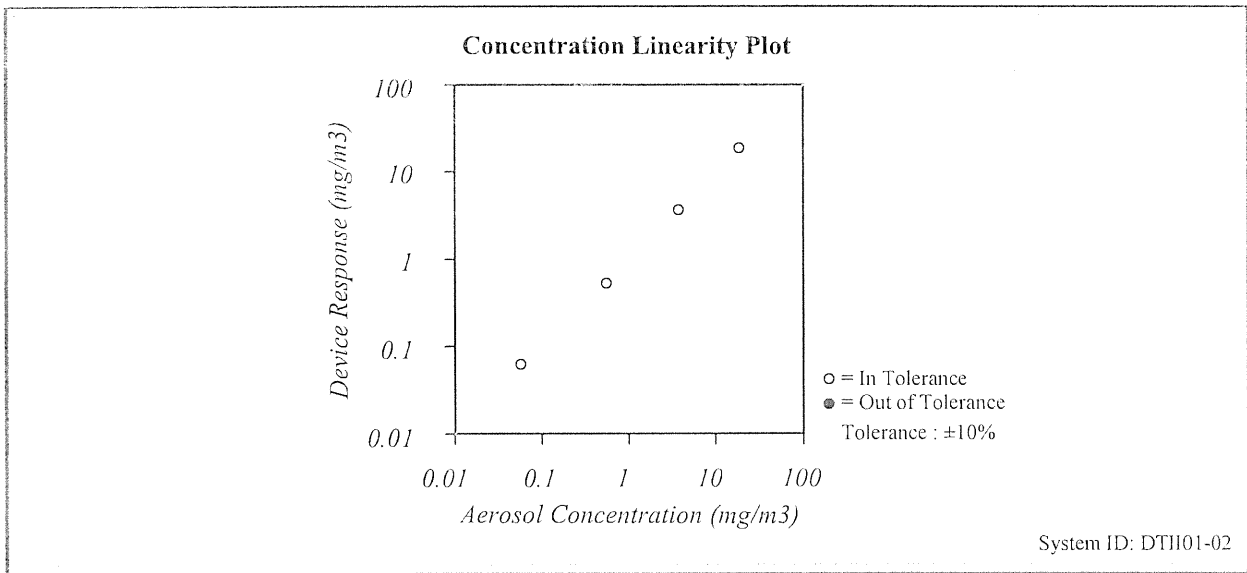


CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
 Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 <http://www.tsi.com>

Environment Condition			Model	AM510
Temperature	70.5 (21.4)	°F (°C)		
Relative Humidity	55	%RH	Serial Number	11008018
Barometric Pressure	28.91 (979.0)	inHg (hPa)		

<input checked="" type="checkbox"/> As Left	<input checked="" type="checkbox"/> In Tolerance
<input type="checkbox"/> As Found	<input type="checkbox"/> Out of Tolerance



TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass of standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Barometric Pressure	E003733	02-25-12	02-25-13	Temperature	E002873	11-14-11	11-14-12
Humidity	E002873	11-14-11	11-14-12	DC Voltage	E003314	01-03-12	01-03-13
DC Voltage	E003315	01-03-12	01-03-13	Photometer	E003319	07-26-12	01-26-13
Microbalance	M001324	01-04-11	01-04-13	Pressure	E003511	11-11-11	11-11-12
Flowmeter	E002006	03-06-12	03-06-13				

Carlson Johnson

 Calibrated

Final Function
 Check

August 16, 2012

 Date



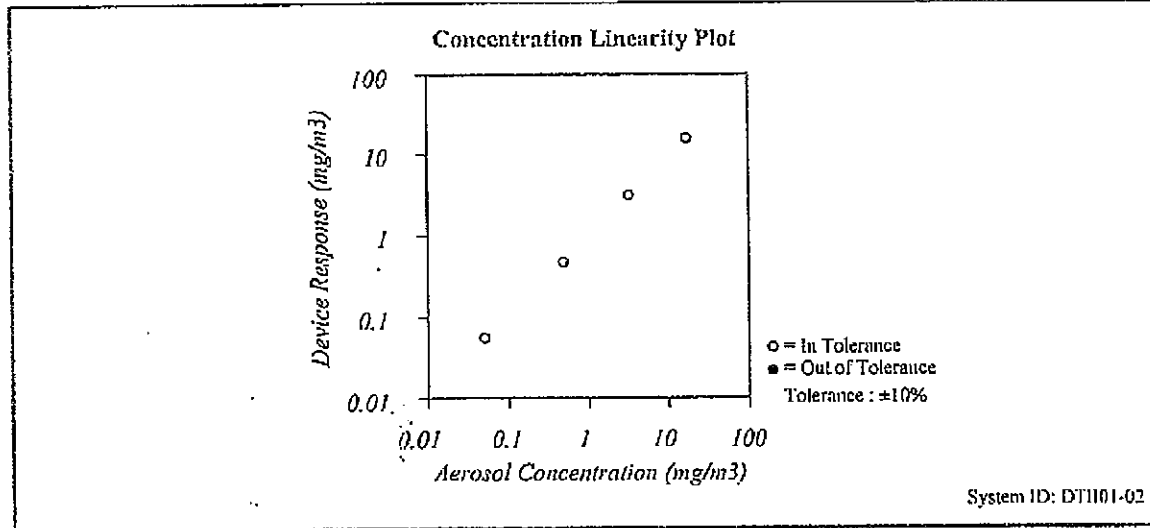
CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 <http://www.tsi.com>

Environment Condition			Model	AM510
Temperature	68.4 (20.2)	°F (°C)	Serial Number	11008017
Relative Humidity	59	%RH		
Barometric Pressure	28.97 (981.0)	inHg (hPa)		

As Left
 In Tolerance

As Found
 Out of Tolerance



TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass of standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Barometric Pressure	E003733	02-25-12	02-25-13	Temperature	E002875	11-14-11	11-14-12
Humidity	E002873	11-14-11	11-14-12	DC Voltage	E003314	01-03-12	01-03-13
DC Voltage	E003315	01-03-12	01-03-13	Photometer	E003319	07-26-12	01-26-13
Microbalance	M001324	01-04-11	01-04-13	Pressure	E003511	11-11-11	11-11-12
Flowmeter	E002006	03-06-12	03-06-13				

 Verified

Final Function Check _____
 Date: August 9, 2012



TISCH ENVIRONMENTAL, INC.
 145 SOUTH MIAMI AVE.
 VILLAGE OF CLEVELAND, OH 45002
 513.467.9000
 877.263.7610 TOLL FREE
 513.467.9009 FAX
 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 17, 2012 Rootsometer S/N 0438320 Ta (K) - 294
 Operator Tisch Orifice I.D. - 1483 Pa (mm) - 754.38

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.4140	3.2	2.00
2	NA	NA	1.00	0.9960	6.4	4.00
3	NA	NA	1.00	0.8910	7.9	5.00
4	NA	NA	1.00	0.8510	8.7	5.50
5	NA	NA	1.00	0.7020	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0018	0.7085	1.4185	0.9957	0.7042	0.8829
0.9976	1.0016	2.0061	0.9915	0.9955	1.2486
0.9955	1.1173	2.2429	0.9894	1.1105	1.3959
0.9945	1.1686	2.3524	0.9884	1.1615	1.4641
0.9890	1.4088	2.8371	0.9830	1.4003	1.7657
Qstd slope (m) = 2.02742			Qa slope (m) = 1.26953		
intercept (b) = -0.02027			intercept (b) = -0.01262		
coefficient (r) = 0.99996			coefficient (r) = 0.99996		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol}[(Pa - \text{Diff. Hg})/760] (298/Ta)$$

$$Qstd = Vstd/Time$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg})/Pa]$$

$$Qa = Va/Time$$

For subsequent flow rate calculations:

$$Qstd = 1/m\{[\text{SQRT}(H2O(Pa/760) (298/Ta))]\} - b\}$$

$$Qa = 1/m\{[\text{SQRT} H2O(Ta/Pa)] - b\}$$

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Village Police Station	Date of Calibration: 12-Mar-13
Location ID : AM1	Next Calibration Date: 12-Jun-13
	Technician: Mr. Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1015.8	Corrected Pressure (mm Hg)	761.85
Temperature (°C)	21.4	Temperature (K)	294

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.00279
Model-> 5025A	Qstd Intercept ->	-0.00494
Serial # -> 1483		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 49.6896 Intercept = -32.1027 Corr. coeff. = 0.9967
18	5.4	5.4	10.8	1.655	51	51.69	
13	4.4	4.4	8.8	1.494	40	40.54	
10	3.7	3.7	7.4	1.371	35	35.47	
7	2.9	2.9	5.8	1.214	28	28.38	
5	1.6	1.6	3.2	0.902	13	13.17	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

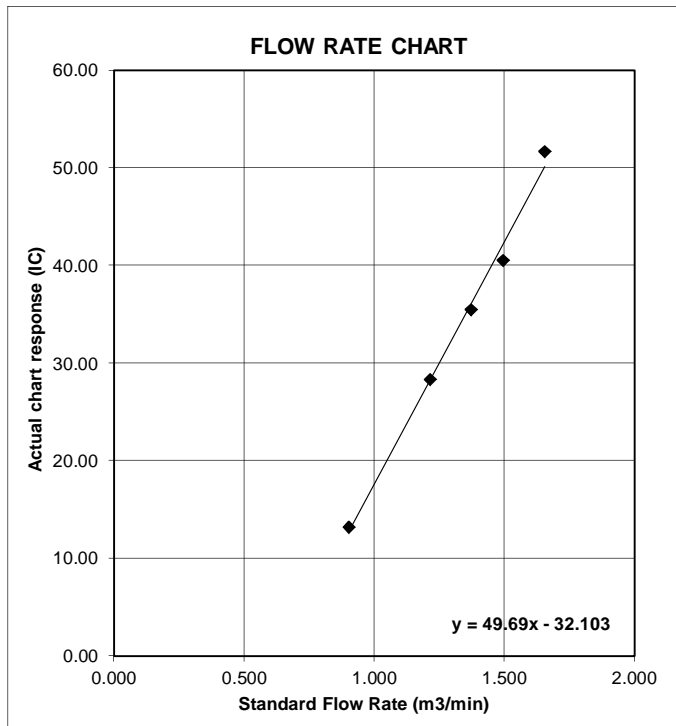
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Tsung Yuen Ha Tsuen	Date of Calibration: 12-Mar-13
Location ID : AM2	Next Calibration Date: 12-Jun-13
	Technician: Mr. Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1015.8	Corrected Pressure (mm Hg)	761.85
Temperature (°C)	21.4	Temperature (K)	294

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.00279
Model-> 5025A	Qstd Intercept ->	-0.00494
Serial # -> 1483		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 46.0633 Intercept = -25.9442 Corr. coeff. = 0.9929
18	5.9	5.9	11.8	1.730	55	55.74	
13	4.5	4.5	9.0	1.511	42	42.57	
10	3.4	3.4	6.8	1.314	33	33.44	
7	2.7	2.7	5.4	1.171	26	26.35	
5	1.5	1.5	3.0	0.874	16	16.22	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

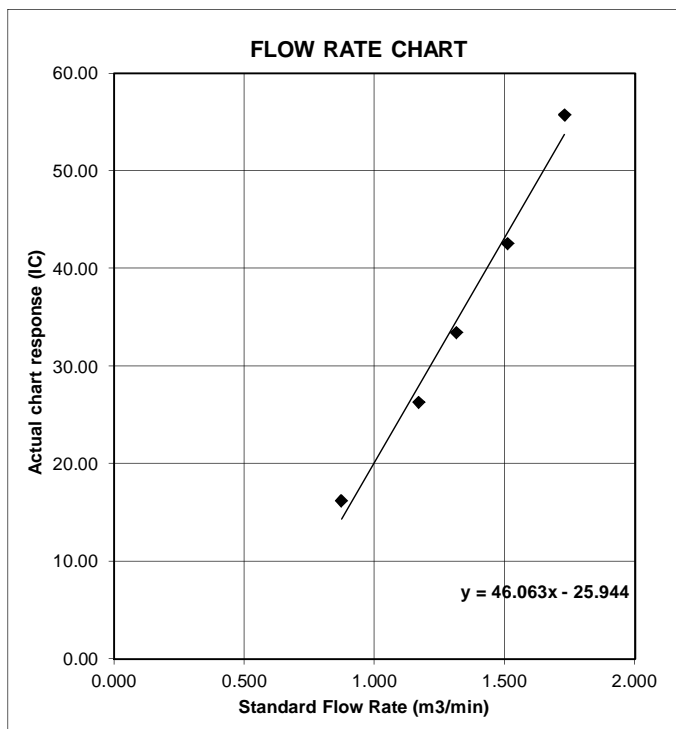
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure





Certificate of Calibration 校正證書

Certificate No. : C122712
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-0960)

Description / 儀器名稱 : Acoustical Calibrator (EQ081)
Manufacturer / 製造商 : Bruel & Kjaer
Model No. / 型號 : 4231
Serial No. / 編號 : 2326408
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 May 2012

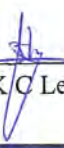
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By : 
測試 : L K Yeung

Certified By : 
核證 : K C Lee

Date of Issue : 8 May 2012
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Certificate of Calibration

校正證書

Certificate No. : C122712
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C113350
CL281	Multifunction Acoustic Calibrator	DC110233
TST150A	Measuring Amplifier	C120886

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.



Certificate of Calibration

校正證書

Certificate No. : C122427
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-0960)

Description / 儀器名稱 : Integrating Sound Level Meter (EQ010)
Manufacturer / 製造商 : Bruel & Kjaer
Model No. / 型號 : 2238
Serial No. / 編號 : 2285721
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 20 April 2012

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Precision Measurement Ltd., UK
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By : 
測試 : L K Yeung

Certified By : 
核證 : K C Lee

Date of Issue : 23 April 2012
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C122427
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using the B & K Acoustic Calibrator 4231, S/N : 2713428 was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C120016
CL281	Multifunction Acoustic Calibrator	DC110233

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	± 0.7

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	Ref.
	L _{ASP}		S			94.0	± 0.1
	L _{AIP}		I			94.1	± 0.1

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準 - 局部複印本證書需先獲本實驗室所書面批准 -

Certificate of Calibration

校正證書

Certificate No. : C122427

證書編號

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L _{ASP}	S	Continuous		106.0	Ref.	
	L _{ASMax}		500 ms		101.9	-4.1 ± 1.0	

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	54.6	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.1	-3.0 ± 1.5
					63 Hz	93.3	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。

Certificate of Calibration

校正證書

Certificate No. : C122427
證書編號

6.4 Time Averaging

UUT Setting				Applied Value					UUT	IEC 60804
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)	Reading (dB)	Type 1 Spec. (dB)
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
			60 sec.			1/10 ²		90	89.6	± 0.5
			5 min.			1/10 ³		80	79.8	± 1.0
						1/10 ⁴		70	69.8	± 1.0

Remarks : - Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB : 31.5 Hz - 125 Hz	: ± 0.40 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz	: ± 0.40 dB
4 kHz	: ± 0.50 dB
8 kHz	: ± 0.70 dB
12.5 kHz	: ± 1.20 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level	: ± 0.2 dB (Ref. 110 dB continuous sound level)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRO SERVICES
ADDRESS: RM A 20/F., GOLDEN KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG.

WORK ORDER: HK1228210
LABORATORY: HONG KONG
DATE RECEIVED: 19/10/2012
DATE OF ISSUE: 29/10/2012

PROJECT: --

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Turbidity
Description: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 29 October, 2012

NOTES

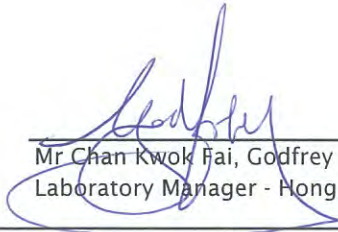
This is the Final Report and supersedes any preliminary report with this batch number. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd
11/F Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
Fax: 852-2610 2021
Email: hongkong@alsglobal.com


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1228210
Date of Issue: 29/10/2012
Client: ACTION UNITED ENVIRO SERVICES



Description: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 29 October, 2012 **Date of next Calibration:** 29 January, 2013

Parameters:

Turbidity

Method Ref: ALPHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.58	--
4	3.73	-6.75
40	39.0	-2.50
80	79.2	-1.00
400	384	-4.00
800	769	-3.88
	Tolerance Limit (±%)	10.0



 Mr. Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRO SERVICES
ADDRESS: RM A 20/F., GOLDEN KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG.

WORK ORDER: HK1227052
LABORATORY: HONG KONG
DATE RECEIVED: 10/10/2012
DATE OF ISSUE: 16/10/2012

PROJECT: --

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Dissolved Oxygen, pH, Salinity and Temperature
Description: YSI Professional Plus
Brand Name: YSI
Model No.: YSI Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 15 October, 2012

NOTES

This is the Final Report and supersedes any preliminary report with this batch number. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd
11/F Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
Fax: 852-2610 2021
Email: hongkong@alsglobal.com


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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Page 1 of 2

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ALS TECHNICHEM (HK) PTY LTD Part of the ALS Laboratory Group A Campbell Brothers Limited Company

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1227052
Amendment: 1
Date of Issue: 16/10/2012
Client: ACTION UNITED ENVIRO SERVICES



Description: YSI Professional Plus
Brand Name: YSI
Model No.: YSI Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 15 October, 2012 **Date of next Calibration:** 15 January, 2013

Parameters:

Dissolved Oxygen Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.12	3.10	-0.02
5.97	5.89	-0.08
7.96	7.95	-0.01
Tolerance Limit (±mg/L)		0.20

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.97	-0.03
7.0	7.02	0.02
10.0	10.00	0.00
Tolerance Limit (±unit)		0.20

Salinity

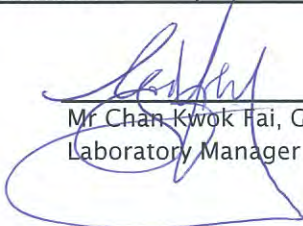
Method Ref: APHA (21st edition), 2520B

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0	0.00	--
10	10.06	0.6
20	20.30	1.5
30	30.11	0.4
Tolerance Limit (±%)		10.0

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
9.0	9.3	0.3
24.5	24.6	0.1
41.0	40.8	-0.2
Tolerance Limit (°C)		2.0


 Mr Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong

ANNEX F

BASELINE ENVIRONMENTAL MONITORING RESULTS (24-HR TSP AND WATER QUALITY)

I) Air Quality – 24-Hr TSP Monitoring Results (AM1a)

Monitoring Location		AM1a - Ta Kwu Ling Sub-division Police Station													
DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG PRESS	STANDARD FLOW RATE	AIR VOLUME	TESING FILTER PAPER WEIGHT (g)		WEIGHT DUST COLLECTED	24-Hr TSP
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(°C)	(hPa)	(m3/min)	(std m3)	INITIAL	FINAL	(g)	(µg/m3)
13-Mar-13	025416	3504.26	3527.30	1382.40	46	49	47.5	22.8	1014.5	1.6061	2220.27	3.5897	3.7604	0.1707	76
14-Mar-13	025411	3527.30	3551.04	1424.40	44	45	44.5	19.9	1019.2	1.5520	2210.67	3.5922	3.7727	0.1805	81
15-Mar-13	025414	3551.04	3574.43	1403.40	44	47	45.5	19.2	1021.3	1.5744	2209.54	3.5894	3.7711	0.1817	82
16-Mar-13	025409	3574.43	3597.92	1409.40	42	45	43.5	20.0	1019.4	1.5316	2158.61	3.5855	3.7577	0.1722	79
17-Mar-13	025407	3597.92	3621.25	1399.80	41	44	42.5	21.2	1013.7	1.5070	2109.55	3.5871	3.7716	0.1845	87
18-Mar-13	025406	3621.25	3645.22	1438.20	42	44	43.0	23.6	1010.6	1.5123	2175.00	3.5881	3.7594	0.1713	78
19-Mar-13	025403	3645.22	3669.06	1430.40	43	44	43.5	24.3	1010.8	1.5214	2176.26	3.5888	3.7428	0.1540	70
20-Mar-13	025434	3669.06	3692.70	1418.40	42	43	42.5	25.1	1012.1	1.5007	2128.61	3.5931	3.7337	0.1406	66
21-Mar-13	025438	3692.70	3716.06	1401.60	40	42	41.0	20.8	1013.8	1.4773	2070.52	3.6042	3.7348	0.1306	63
22-Mar-13	025441	3716.06	3740.03	1438.20	42	43	42.5	21.5	1013.3	1.5064	2166.55	3.6037	3.7470	0.1433	66
23-Mar-13	025440	3740.03	3763.58	1413.00	43	45	44.0	23.3	1011.5	1.5333	2166.55	3.6044	3.7426	0.1382	63
24-Mar-13	025437	3763.58	3787.37	1427.40	41	44	42.5	23.4	1010.4	1.5024	2144.58	3.5977	3.7532	0.1555	72
25-Mar-13	025451	3787.37	3810.95	1414.80	42	44	43.0	21.2	1012.0	1.5164	2145.45	3.6113	3.7557	0.1444	67
26-Mar-13	025449	3810.95	3835.17	1453.20	42	44	43.0	19.0	1011.4	1.5195	2208.06	3.5955	3.7490	0.1535	69

II) Air Quality – 24-Hr TSP Monitoring Results (AM2)

Monitoring Location		AM2 - Tsung Yuen Ha													
DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG PRESS	STANDARD FLOW RATE	AIR VOLUME	TESING FILTER PAPER WEIGHT (g)		WEIGHT DUST COLLECTED	24-Hr TSP
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(°C)	(hPa)	(m3/min)	(std m3)	INITIAL	FINAL	(g)	(µg/m3)
13-Mar-13	025415	1896.07	1919.57	1410.00	38	40	39.0	22.8	1014.5	1.4135	1993.07	3.5901	3.7274	0.1373	69
14-Mar-13	025412	1919.57	1942.80	1393.80	37	39	38.0	19.9	1019.2	1.3977	1948.17	3.5866	3.7476	0.1610	83
15-Mar-13	025413	1942.80	1966.15	1401.00	39	41	40.0	19.2	1021.3	1.4436	2022.51	3.5926	3.7459	0.1533	76
16-Mar-13	025410	1966.15	1989.83	1420.80	40	42	41.0	20.0	1019.4	1.4636	2079.42	3.5956	3.7332	0.1376	66
17-Mar-13	025408	1989.83	2012.89	1383.60	39	43	41.0	21.2	1013.7	1.4592	2018.95	3.5938	3.7186	0.1248	62
18-Mar-13	025405	2012.89	2036.33	1406.40	40	43	41.5	23.6	1010.6	1.4651	2060.47	3.5860	3.7341	0.1481	72
19-Mar-13	025404	2036.33	2059.67	1400.40	41	43	42.0	24.3	1010.8	1.4749	2065.52	3.5886	3.7245	0.1359	66
20-Mar-13	025433	2059.67	2083.34	1420.20	39	41	40.0	25.1	1012.1	1.4309	2032.20	3.6029	3.7472	0.1443	71
21-Mar-13	025415	1896.07	1919.57	1410.00	38	40	39.0	22.8	1014.5	1.4135	1993.07	3.5901	3.7274	0.1373	69
22-Mar-13	025412	1919.57	1942.80	1393.80	37	39	38.0	19.9	1019.2	1.3977	1948.17	3.5866	3.7476	0.1610	83
23-Mar-13	025413	1942.80	1966.15	1401.00	39	41	40.0	19.2	1021.3	1.4436	2022.51	3.5926	3.7459	0.1533	76
24-Mar-13	025410	1966.15	1989.83	1420.80	40	42	41.0	20.0	1019.4	1.4636	2079.42	3.5956	3.7332	0.1376	66
25-Mar-13	025408	1989.83	2012.89	1383.60	39	43	41.0	21.2	1013.7	1.4592	2018.95	3.5938	3.7186	0.1248	62
26-Mar-13	025405	2012.89	2036.33	1406.40	40	43	41.5	23.6	1010.6	1.4651	2060.47	3.5860	3.7341	0.1481	72

III) Water Quality Monitoring Results (WM1a to WM4a)

Monitoring Date		30 November 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	11:35	0.3	22.3	22.2	8.24	8.2	97.10	96.3	7.89	7.7	8.70	8.4	3.00	8.5
			22.1		8.16		95.40		7.56		8.10		14.00	
WM2	12:20	0.5	24.5	24.4	5.54	5.5	64.30	63.7	10.01	9.8	7.80	7.8	89.00	71.0
			24.3		5.41		63.10		9.58		7.80		53.00	
WM3a	12:12	0.5	22.8	22.8	7.33	7.3	84.60	83.9	47.70	47.1	8.37	8.3	92.00	74.5
			22.8		7.35		83.10		46.50		8.17		57.00	
WM4a	13:30	0.3	22.1	22.3	5.26	5.2	60.70	60.4	2.25	2.0	7.82	7.8	20.00	18.5
			22.4		5.14		60.10		1.78		7.78		17.00	

Monitoring Date		03 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	16:17	0.3	23.4	23.4	7.33	7.3	82.20	82.0	23.40	23.4	8.40	8.2	2.00	2.0
			23.4		7.26		81.70		23.40		8.09		2.00	
WM2	16:00	0.5	22.0	22.0	7.03	7.0	78.50	78.0	51.90	52.1	8.04	8.0	80.00	86.0
			22.0		6.94		77.40		52.30		7.98		92.00	
WM3a	15:50	0.5	21.7	21.6	6.80	6.8	74.20	73.7	50.80	50.0	7.96	7.9	86.00	84.5
			21.5		6.71		73.10		49.10		7.89		83.00	
WM4a	15:20	0.3	21.7	21.6	7.68	7.6	84.50	83.8	3.75	3.7	8.17	8.2	25.00	23.5
			21.4		7.60		83.00		3.70		8.16		22.00	

Monitoring Date		06 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	13:45	0.3	21.8	21.8	8.73	8.7	96.50	96.8	18.20	17.0	8.64	8.6	118.00	120.0
			21.7		8.69		97.00		15.70		8.60		122.00	
WM2	14:15	0.2	21.3	21.3	7.84	7.8	87.30	86.9	27.00	26.5	8.38	8.4	18.00	17.0
			21.3		7.69		86.40		25.90		8.32		16.00	
WM3a	14:20	0.2	20.9	20.9	8.28	8.2	91.60	91.2	27.70	26.8	8.17	8.2	16.00	15.5
			20.8		8.21		90.80		25.80		8.14		15.00	
WM4a	14:35	0.4	21.3	21.3	9.81	9.8	107.80	107.1	13.80	14.1	8.02	8.0	12.00	12.0
			21.3		9.78		106.40		14.30		8.01		12.00	

Monitoring Date		08 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	12:00	0.3	25.0	24.5	6.64	6.6	79.00	78.6	5.45	5.3	7.92	7.9	4.00	3.5
			23.9		6.58		78.10		5.23		7.88		3.00	
WM2	11:30	0.2	22.9	23.4	7.19	7.1	85.60	84.5	30.20	31.3	7.82	7.8	45.00	46.0
			23.9		7.07		83.30		32.30		7.80		47.00	
WM3a	11:35	0.2	22.8	23.4	7.18	7.1	85.50	84.5	38.90	43.6	7.88	7.7	44.00	44.5
			24.0		7.07		83.40		48.30		7.60		45.00	
WM4a	10:55	0.3	23.9	23.5	6.70	6.7	79.60	79.0	21.60	22.0	7.57	7.6	40.00	39.5
			23.1		6.62		78.30		22.40		7.53		39.00	

Monitoring Date		10 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	11:45	0.2	23.1	23.6	7.55	7.6	90.00	90.4	4.34	4.7	8.18	8.2	5.00	5.0
			24.1		7.62		90.80		5.01		8.12		5.00	
WM2	10:35	0.2	22.7	23.3	6.78	6.8	80.70	80.0	26.40	27.3	8.00	8.0	41.00	39.5
			23.9		6.72		79.20		28.10		7.94		38.00	
WM3a	10:30	0.3	23.0	23.5	6.99	7.5	83.10	88.8	30.20	29.3	8.30	8.3	32.00	33.0
			23.9		7.94		94.40		28.30		8.22		34.00	
WM4a	11:30	0.2	22.5	23.3	6.86	6.8	81.60	80.9	19.30	19.3	7.75	7.7	17.00	17.0
			24.0		6.78		80.20		19.20		7.70		17.00	

Monitoring Date		12 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	14:45	0.2	21.9	21.9	6.34	6.3	71.80	71.4	2.75	2.7	8.40	8.4	4.00	3.5
			21.9		6.27		70.90		2.67		8.30		3.00	
WM2	14:10	0.3	21.6	21.6	5.24	5.2	60.10	59.7	19.10	19.0	8.10	8.1	26.00	25.0
			21.5		5.17		59.30		18.90		8.00		24.00	
WM3a	14:00	0.2	21.9	21.9	5.79	5.8	66.40	65.8	18.00	18.2	8.30	8.3	25.00	25.0
			21.9		5.74		65.10		18.30		8.20		25.00	
WM4a	13:45	0.2	21.5	21.5	6.74	6.7	76.90	76.0	4.92	5.0	8.50	8.5	60.00	61.0
			21.5		6.62		75.10		5.13		8.40		62.00	

Monitoring Date		14 December 2012													
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L		
WM1a	15:20	0.3	24.2	24.8	5.89	5.8	70.10	69.8	3.52	3.4	8.35	8.3	5.00	5.5	
			25.4		5.79		69.40		3.36		8.31		6.00		
WM2	14:30	0.2	24.0	24.5	4.88	4.8	55.40	54.8	30.70	30.8	8.11	8.1	56.00	56.5	
			25.0		4.78		54.10		30.80		8.07		57.00		
WM3a	14:25	0.2	24.3	24.7	5.16	5.1	61.20	60.8	34.70	33.2	8.20	8.2	50.00	49.5	
			25.1		5.09		60.40		31.60		8.17		49.00		
WM4a	14:10	0.3	24.2	24.2	6.40	6.4	75.80	75.1	3.42	3.4	8.61	8.6	11.00	10.0	
			24.2		6.31		74.30		3.32		8.54		9.00		

Monitoring Date		18 December 2012													
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L		
WM1a	13:35	0.3	18.9	19.1	7.67	7.7	83.20	83.7	2.68	2.5	7.94	7.9	3.00	2.5	
			19.3		7.76		84.20		2.32		7.86		2.00		
WM2	14:00	0.2	19.1	19.5	7.37	7.3	81.00	80.5	51.30	51.1	7.76	7.7	44.00	45.0	
			19.9		7.28		79.90		50.90		7.70		46.00		
WM3a	13:05	0.2	20.0	19.7	7.45	7.4	82.20	81.5	51.10	50.9	7.86	7.8	45.00	46.0	
			19.3		7.34		80.70		50.70		7.81		47.00		
WM4a	14:50	0.3	19.8	20.4	7.99	8.0	89.40	89.3	19.60	21.8	7.74	7.7	48.00	66.5	
			20.9		7.96		89.20		23.90		7.69		85.00		

Monitoring Date		20 December 2012													
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L		
WM1a	14:35	0.3	22.5	22.1	6.93	6.9	80.40	79.4	5.34	5.9	8.07	8.0	19.00	26.0	
			21.7		6.84		78.30		6.53		8.00		33.00		
WM2	13:55	0.2	21.7	22.2	6.17	6.3	67.00	70.1	38.30	37.6	7.86	7.8	40.00	35.0	
			22.6		6.38		73.10		36.90		7.81		30.00		
WM3a	14:00	0.2	22.6	22.2	5.44	5.6	61.10	63.8	43.40	43.3	7.75	7.7	39.00	36.0	
			21.7		5.77		66.50		43.20		7.71		33.00		
WM4a	13:45	0.3	22.6	22.1	6.74	6.9	74.40	78.6	14.90	14.1	7.82	7.8	23.00	22.0	
			21.6		7.15		82.80		13.20		7.78		21.00		

Monitoring Date		22 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	11:00	0.2	23.1	23.5	5.67	5.8	67.10	68.3	5.22	5.7	8.20	8.2	7.00	6.5
			23.8		5.87		69.50		6.13		8.15		6.00	
WM2	11:15	0.2	23.8	23.4	3.65	3.6	42.90	42.2	25.50	25.6	7.72	7.7	30.00	30.5
			23.0		3.48		41.40		25.70		7.63		31.00	
WM3a	11:20	0.2	23.0	23.5	3.38	3.3	40.00	39.5	27.50	25.5	7.62	7.6	31.00	30.5
			23.9		3.30		39.00		23.50		7.58		30.00	
WM4a	11:30	0.2	23.8	23.4	5.20	5.2	61.40	61.1	6.97	6.5	7.80	7.8	16.00	15.5
			22.9		5.12		60.70		6.05		7.70		15.00	

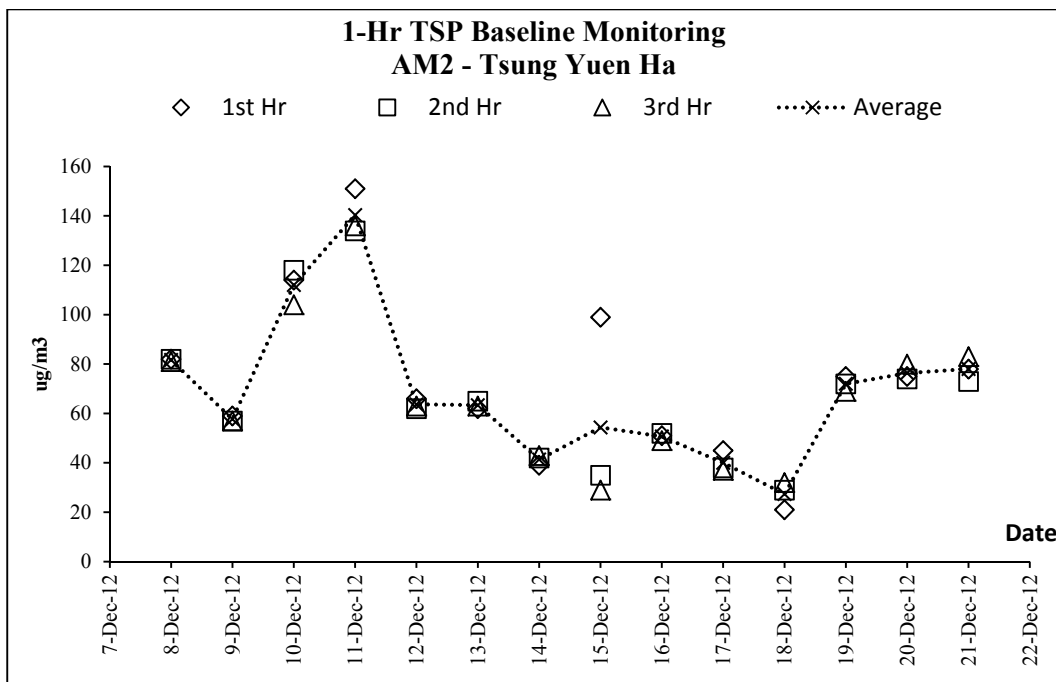
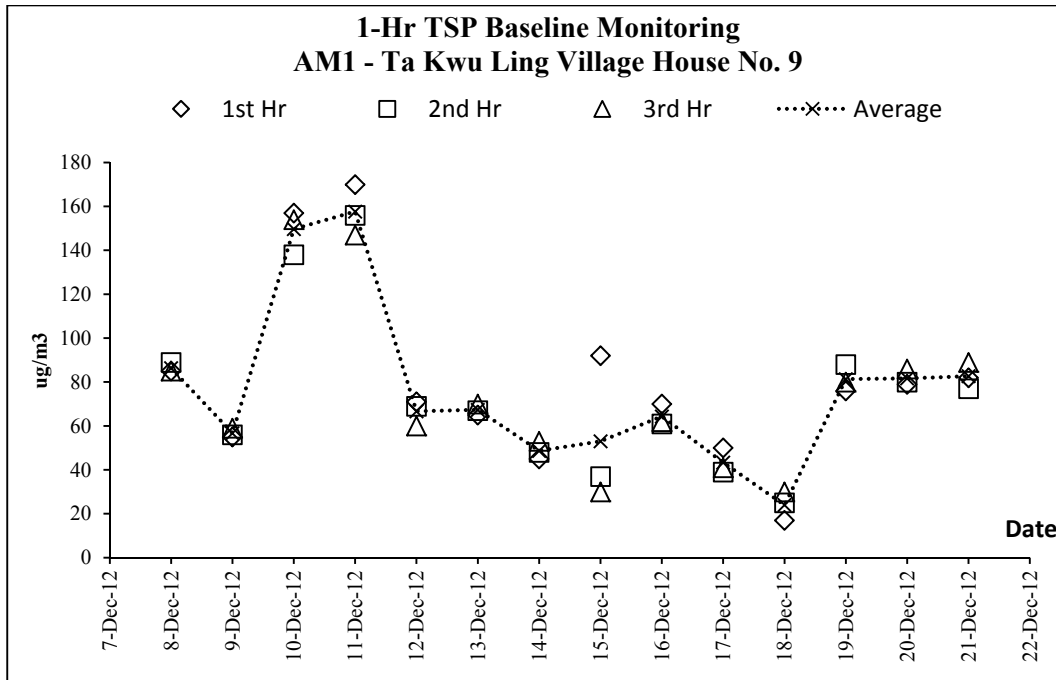
Monitoring Date		24 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	14:30	0.3	23.0	23.4	5.21	5.1	61.50	60.5	2.92	3.6	7.78	7.8	4.00	3.0
			23.8		5.08		59.50		4.18		7.72		2.00	
WM2	14:10	0.2	22.9	23.3	3.14	3.3	37.10	38.2	8.01	7.5	7.82	7.8	12.00	12.5
			23.7		3.39		39.30		7.05		7.70		13.00	
WM3a	14:15	0.2	22.9	23.4	3.03	3.0	35.30	35.0	10.00	13.1	7.70	7.7	16.00	15.5
			23.8		2.91		34.70		16.20		7.66		15.00	
WM4a	14:00	0.3	23.0	23.5	4.72	4.7	55.60	55.0	8.66	6.9	7.65	7.6	15.00	14.5
			23.9		4.59		54.40		5.12		7.60		14.00	

Monitoring Date		27 December 2012												
Location	Time	Depth (m)	Temp (°C)		DO, mg/L		DOS, (%)		Turbidity, NTU		pH, pH Value		SS, mg/L	
WM1a	13:15	0.3	20.8	21.1	5.35	5.6	60.50	63.0	3.02	2.8	8.65	8.6	4.00	4.0
			21.3		5.79		65.50		2.53		8.52		4.00	
WM2	13:30	0.2	20.4	20.7	3.43	3.4	38.60	38.2	26.20	26.4	8.12	8.1	28.00	29.0
			21.0		3.38		37.70		26.60		8.06		30.00	
WM3a	13:35	0.2	20.3	20.7	3.90	3.8	43.80	42.6	29.00	29.1	8.12	8.1	32.00	31.0
			21.0		3.70		41.40		29.20		7.99		30.00	
WM4a	14:00	0.2	20.5	20.9	5.54	5.5	62.70	61.7	11.00	10.6	7.98	7.5	8.00	8.0
			21.3		5.38		60.70		10.10		7.00		8.00	

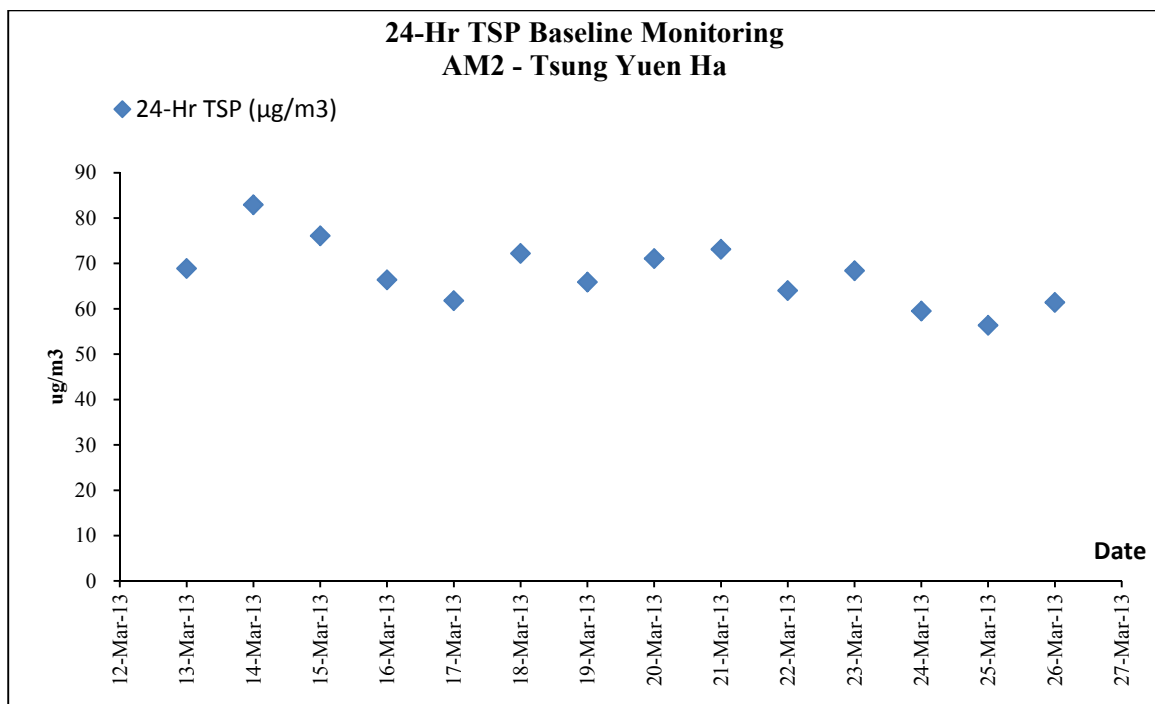
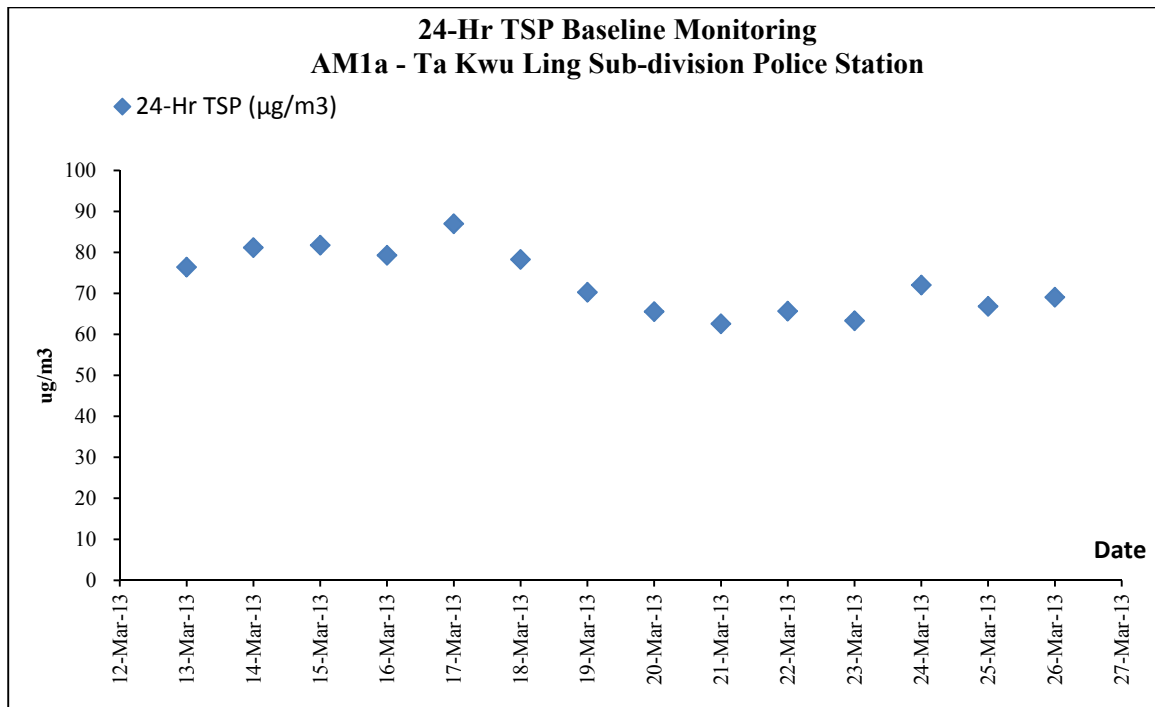
ANNEX G

**GRAPHIC PLOT OF THE
BASELINE ENVIRONMENTAL MONITORING RESULTS**

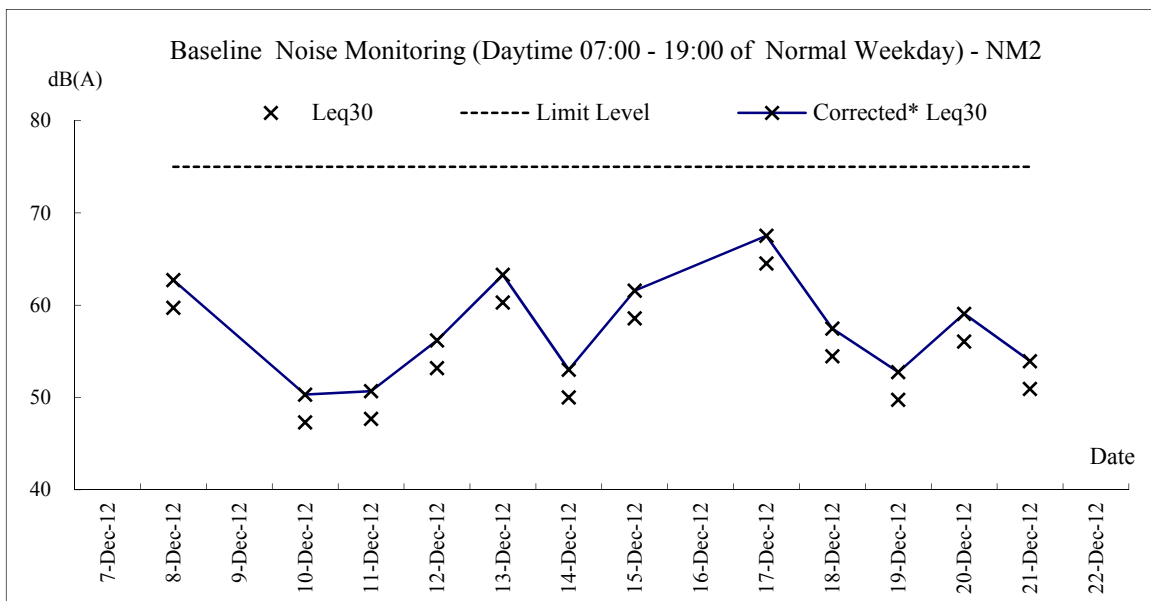
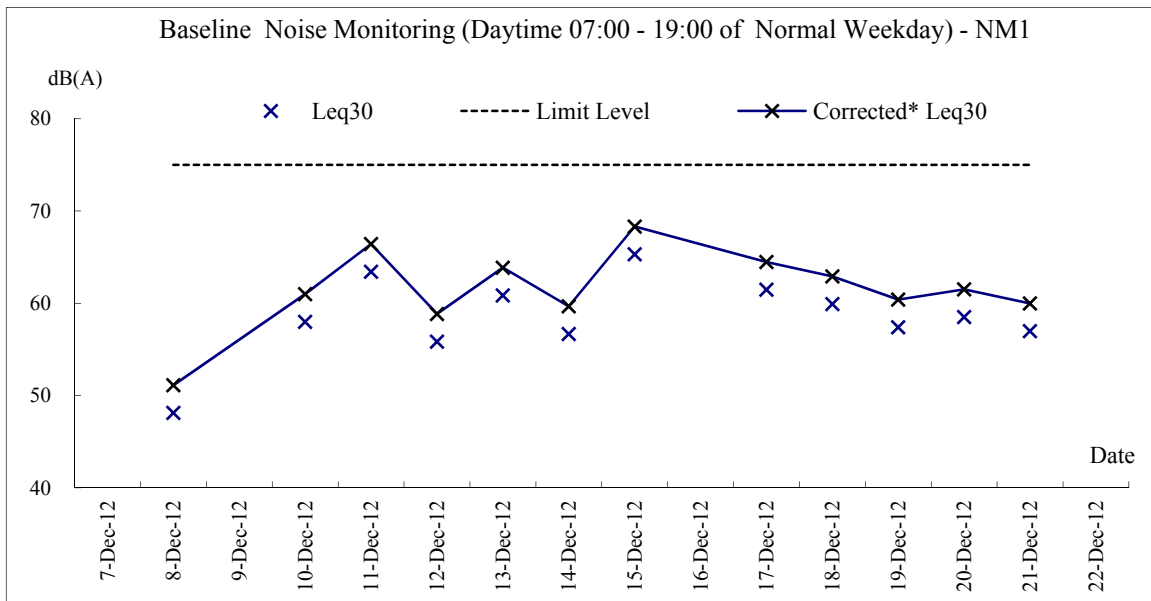
I) Air Quality – One Hour TSP



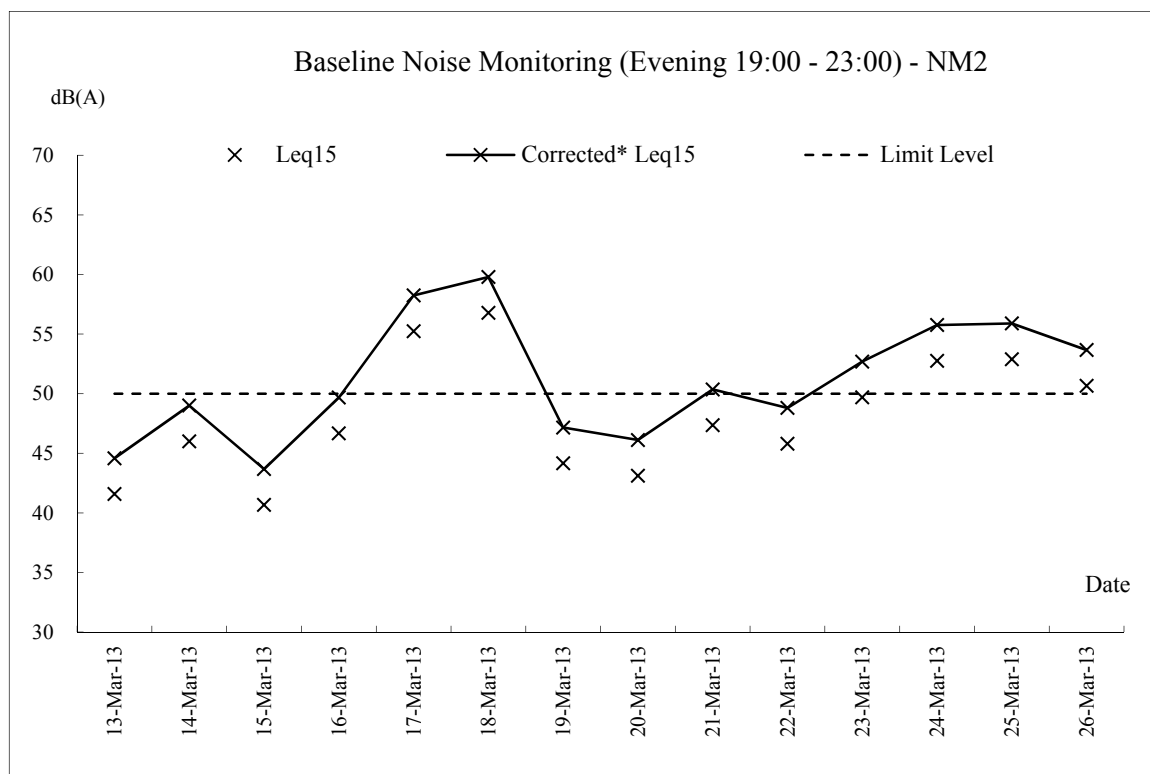
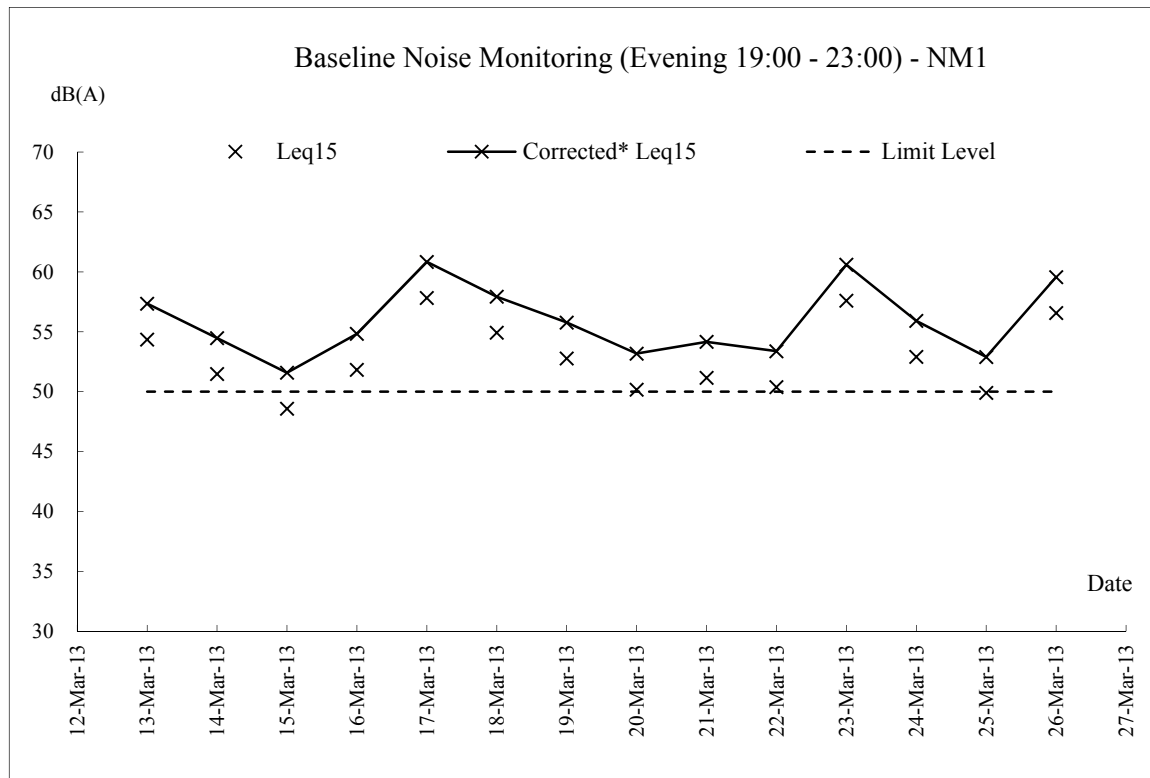
II) Air Quality – 24-Hour TSP



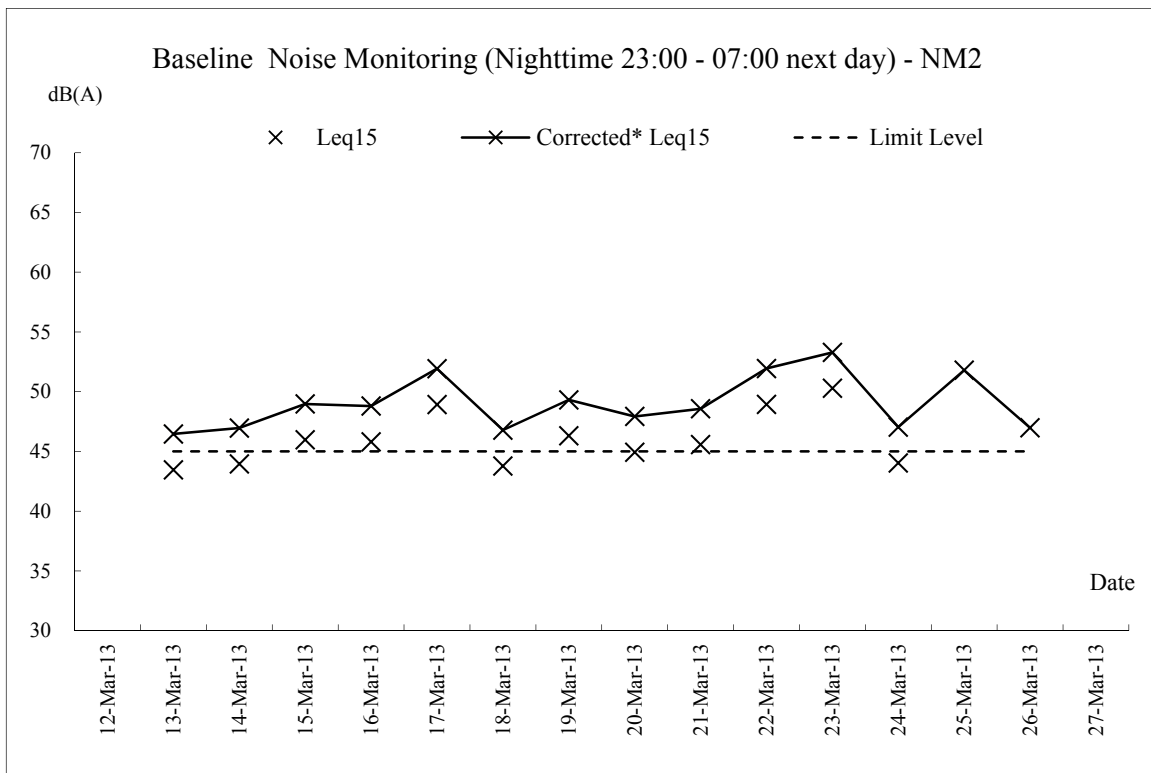
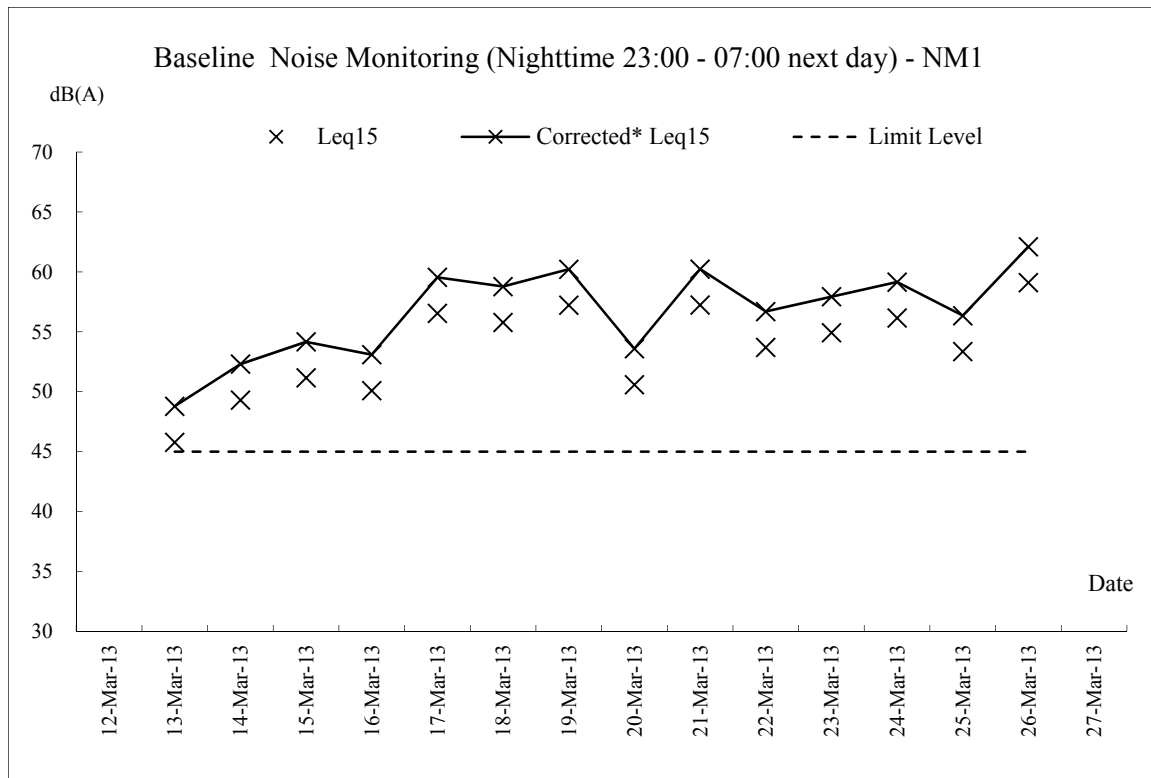
III) Noise – Daytime of Normal Weekday



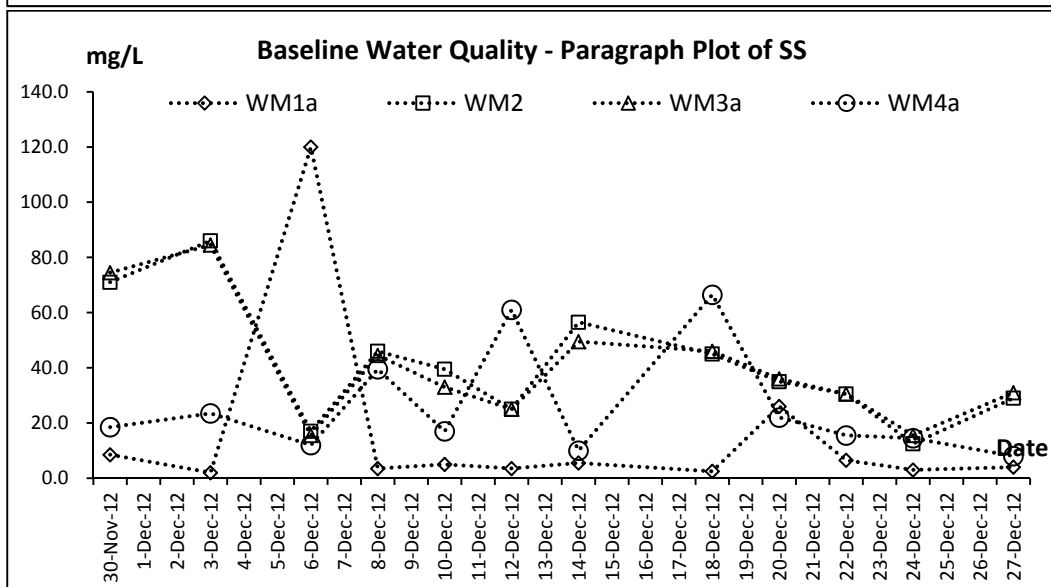
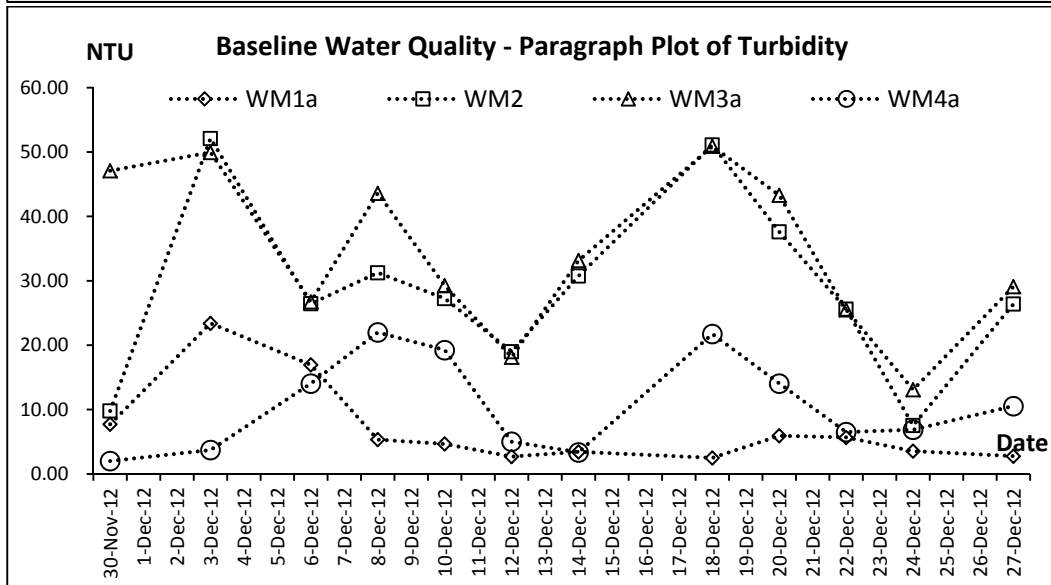
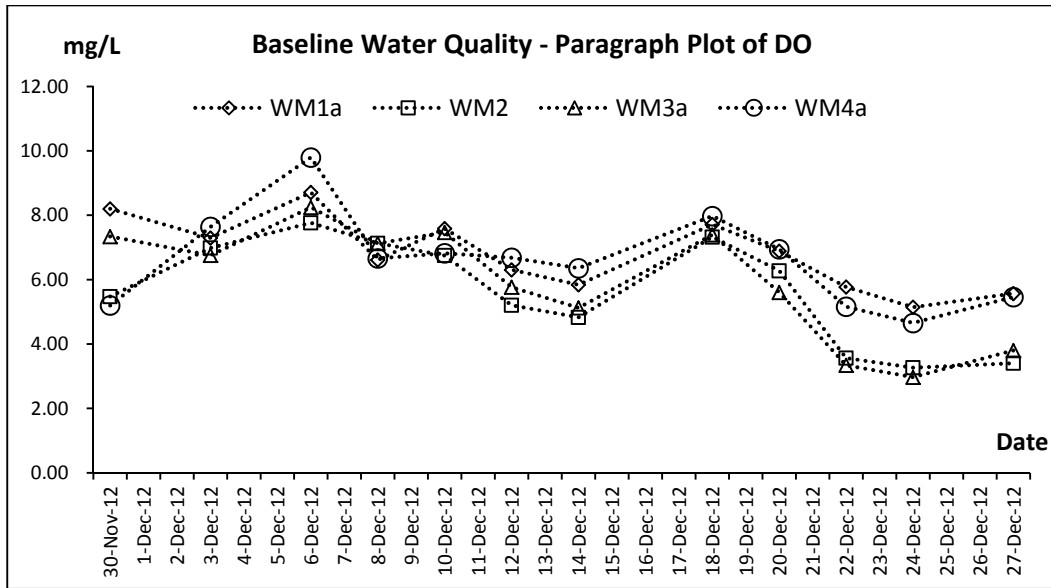
IV) Noise – Evening Time



V) Noise – Night Time



VI) Water Quality



ANNEX H

BASELINE MONITORING SCHEDULE

I) Baseline River Quality Monitoring Schedule

Week	<u>Date/Day</u>	
The First Week	30 November 2012	Friday
	3 December 2012	Monday
	6 December 2012	Thursday
The Second Week	8 December 2012	Saturday
	10 December 2012	Monday
	12 December 2012	Wednesday
The Third Week	14 December 2012	Friday
	18 December 2012	Tuesday
	20 December 2012	Thursday
The Forth Week	22 December 2012	Saturday
	24 December 2012	Monday
	27 December 2012	Thursday

Remark

Water quality monitoring Location:

- WM1a Approx. 750m upstream of the Work Area 1;
- WM2 1000m downstream of the Work Area 2;
- WM3a Approx. 800m upstream of the Work Area 3; and
- WM4a Approx. 450m upstream of the Work Area 4

II) Air (1-Hr TSP) and Noise (Daytime) Baseline Monitoring Schedule

<u>Date/Day</u>		<u>Construction Noise</u>	<u>Air Quality</u>
			<u>1-Hr TSP</u>
8-Dec-12	Saturday	✓	✓
9-Dec-12	Sunday	✓	✓
10-Dec-12	Monday	✓	✓
11-Dec-12	Tuesday	✓	✓
12-Dec-12	Wednesday	✓	✓
13-Dec-12	Thursday	✓	✓
14-Dec-12	Friday	✓	✓
15-Dec-12	Saturday	✓	✓
16-Dec-12	Sunday	✓	✓
17-Dec-12	Monday	✓	✓
18-Dec-12	Tuesday	✓	✓
19-Dec-12	Wednesday	✓	✓
20-Dec-12	Thursday	✓	✓
21-Dec-12	Friday	✓	✓

Remarks:

Noise monitoring Location:

- **NM1** Ta Kwu Ling Village
- **NM2** Kaw Liu Village

1-hour TSP monitoring Location:

- **AM1** Ta Kwu Ling Village House No. 9
- **AM2** Tsung Yuen Ha

III) Air (24-Hr TSP) and Noise (Evening & Nighttime) Baseline Monitoring Schedule

Date / Day		Noise	Air Quality
		Evening / Nighttime	(24-Hr TSP)
13-Mar-13	Wednesday	✓	✓
14-Mar-13	Thursday	✓	✓
15-Mar-13	Friday	✓	✓
16-Mar-13	Saturday	✓	✓
17-Mar-13	Sunday	✓	✓
18-Mar-13	Monday	✓	✓
19-Mar-13	Tuesday	✓	✓
20-Mar-13	Wednesday	✓	✓
21-Mar-13	Thursday	✓	✓
22-Mar-13	Friday	✓	✓
23-Mar-13	Saturday	✓	✓
24-Mar-13	Sunday	✓	✓
25-Mar-13	Monday	✓	✓
26-Mar-13	Tuesday	✓	✓

Remarks:

Noise monitoring Location:

- **NM1** Ta Kwu Ling Village
- **NM2** Kaw Liu Village

24-hour TSP monitoring Location:

- **AM1a** Ta Kwu Ling Sub-division Police Station
- **AM2** Tsung Yuen Ha

ANNEX I

HKO METEOROLOGICAL DATA DURING THE BASELINE ENVIRONMENTAL MONITORING PERIOD

**I) HKO Meteorological data during the Baseline Environmental Monitoring Period
(1-Hr TSP) and Noise (Daytime) Monitoring**

Date	Weather	Total Rainfall (mm)	Ta Kwu Ling				
			Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction	
30-Nov-12	Fri	Cloudy, rain, cool, moderate north to northeasterly winds	1.9	20.1	8.5	93.5	E/SE
1-Dec-12	Sat	Cool, fine, moderate to fresh east to northeasterly winds	0.3	21	8	82	N/NW
2-Dec-12	Sun	Cloudy, rain, moderate to fresh east to northeasterly winds	3.2	17.2	7.5	85.2	NW
3-Dec-12	Mon	Cloudy, rain, moderate north to northeasterly winds	10.9	14.9	6.6	86	N
4-Dec-12	Tue	Cloudy, rain, moderate to fresh east to northeasterly winds	8.7	14.4	3.5	84.7	N/NW
5-Dec-12	Wed	Cloudy, rain, moderate to fresh northerly winds	6.5	14.7	12	77.5	N
6-Dec-12	Thu	Cool, fine, moderate to fresh east to northeasterly winds	0	13.8	6.5	74.5	E
7-Dec-12	Fri	Sunny intervals, cloudy, moderate northeasterly winds.	Trace	17.4	5.7	74.7	N/NW
8-Dec-12	Sat	Sunny periods, cloudy, fresh easterly winds	0.9	18.8	7	70.2	N/NW
9-Dec-12	Sun	Cloudy, rain, sunny intervals, moderate northeasterly winds	0	18.4	10.7	63.7	E
10-Dec-12	Mon	Sunny periods, cloudy, fresh easterly winds	0	18.5	10.1	66.5	E/NE
11-Dec-12	Tue	Cloudy, rain, sunny intervals, moderate northeasterly winds	0	17.7	7.1	72.2	N
12-Dec-12	Wed	Cloudy, sunny periods, moderate to fresh easterly winds	0	16.3	7.5	70	E/NE
13-Dec-12	Thu	Cloudy, sunny periods, moderate to fresh easterly winds	0	17.3	8.2	76.5	E
14-Dec-12	Fri	Cloudy, rain, sunny intervals, moderate northeasterly winds	0	21	6.7	77.5	E
15-Dec-12	Sat	Cloudy, rain, sunny intervals, moderate northeasterly winds	0	22.2	5.5	82.7	SE
16-Dec-12	Sun	Cloudy, rain, sunny intervals, moderate northeasterly winds	0	24	6.6	78.7	W/SW
17-Dec-12	Mon	Sunny intervals, cloudy, moderate northeasterly winds.	0	21.1	7.9	86.7	E/SE
18-Dec-12	Tue	Cloudy, rain, fresh northerly winds	2.3	15.2	11.7	74.7	N
19-Dec-12	Wed	Sunny periods, cloudy, fresh easterly winds	1.1	12.8	9.4	72.5	E/NE
20-Dec-12	Thu	Cloudy, rain, moderate to fresh east to northeasterly winds	0	17.4	15.9	78.7	E
21-Dec-12	Fri	Cloudy, sunny periods, moderate to fresh easterly winds	Trace	22.3	11.1	79.5	E
22-Dec-12	Sat	Cloudy, rain, fresh northerly winds	0	16	13.5	50.7	N
23-Dec-12	Sun	Fine, dry, cloudy, moderate northeasterly winds, fresh offshore.	0	11.6	17.7	49	N
24-Dec-12	Mon	Fine, dry, cloudy, moderate northeasterly winds, fresh offshore.	0	11	6.5	66.2	N
25-Dec-12	Tue	Cloudy, rain, fresh northerly winds	0	13.7			
26-Dec-12	Wed	Fine, dry, cloudy, moderate northeasterly winds, fresh offshore.	Trace	17.7			
27-Dec-12	Thu	Fine, dry, cloudy, moderate northeasterly winds, fresh offshore.	Trace	16.4	7.2	79	N/NW

II) HKO Meteorological Information During the Environmental Monitoring Period (24-Hr TSP) and Noise (Evening & Nighttime) Monitoring

Date	Weather	Total Rainfall (mm)	Ta Kwu Ling				
			Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction	
13-Mar-13	Wed	Cloudy, rain, fresh easterly winds	Trace	23.5	5	73.7	W/SW
14-Mar-13	Thu	Cloudy, sunny intervals, moderate easterly winds.	Trace	18.4	6.4	89.7	E/SE
15-Mar-13	Fri	Cloudy, sunny intervals, moderate easterly winds.	0	19.8	7	73.5	E/NE
16-Mar-13	Sat	Cloudy, sunny intervals, moderate easterly winds.	0	20.1	8.5	73.7	E
17-Mar-13	Sun	Cloudy, rain, fresh easterly winds	0	21.5	6.9	78	E
18-Mar-13	Mon	Cloudy, sunny intervals, moderate easterly winds.	0	23.6	5.5	80.5	W/SW
19-Mar-13	Tue	Amber Rainstorm Warning Signal Special Announcement issued at 3:50p.m	18.2	24.4	9.5	81	E/SE
20-Mar-13	Wed	Cloudy, mist, rain, moderate to fresh easterly winds	Trace	Maintenance	6.7	Maintenance	W/NW
21-Mar-13	Thu	Cloudy, mist, rain, moderate to fresh easterly winds	0.8	Maintenance	8.8	Maintenance	E/SE
22-Mar-13	Fri	Cloudy, fog, moderate southeasterly winds	0	22.7	12.1	78.5	E
23-Mar-13	Sat	Cloudy, fog, moderate southeasterly winds	0	23.9	10.6	75	E/SE
24-Mar-13	Sun	Cloudy, mist, rain, fresh to strong easterly winds.	1.1	22.9	8.2	79.5	E/SE
25-Mar-13	Mon	Cloudy, mist, rain, fresh to strong easterly winds.	0.9	21.2	13.5	84.5	E/SE
26-Mar-13	Tue	Cloudy, rain, squally thunderstorms, fog, fresh easterly winds	13.6	18.9	16	92	E