Proposed Comprehensive Development at Wo Shang Wai, Yuen Long

Monthly EM&A Report for Nov 2010 (Rev. B)

December 2010

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Mott MacDonald

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Pursuant to Condition 4.5 of Environmental Permit No. EP-311/2008/B,

this Monthly EM&A Report for Nov 10 has been reviewed, certified by Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC)

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Executive Summary

Mott MacDonald Hong Kong Ltd. ("MMHK") has been commissioned by Heng Shung Construction Co. Ltd. to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for both pre-construction and construction phases of the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long.

This is the 7th EM&A report submitted under the Condition 4.5 of Environmental Permit No. EP-311/2008/B. This report summarises the findings on EM&A during the period from 1 November to 30 November 2010.

On 12 November 2010, the Contractor issued a letter on completion of construction of WRA with reference to the EP Condition 3.3 to 3.5. In accordance with EP Condition 3.6, the evidence of completion has been certified by the ET Leader and verified by the IEC before submitting to the Director of Environmental Protection (the Director).

Exceedance of Action and Limit Levels

There was no breach of Action or Limit levels for Air Quality (1-hr TSP and 24-hr TSP) and Noise level (as L_{eq}) in the reporting month.

Exceedances of Action and Limit Levels were recorded for Water Quality at MP1, MP2, MP3, MP4, MP5 and MP6 on different monitoring dates.

Exceedances of pH and turbidity were observed during the reporting period. For MP1 to MP3, there were frequent exceedances of action level for pH (though there was one occasion of limit level exceedance at MP3). For MP4 to MP6 located at the ditch at the north of the site, few exceedances of pH were recorded for MP4 and MP6. There was only one turbidity exceedance recorded at MP5 on 24 November 2010. The summary of measured water quality is presented in **Section 3.2.3**.

Investigations have been carried out to identify the causes of exceedance. From investigation, the Contractor has implemented water quality mitigation measures as recommended in the EIA report. With external factors affect the adjacent environments, including natural variations and other unknown source of runoff directly contributing to the exceedance, the exceedances were considered not due to construction works.

Implementation of mitigation measures

Site audits were carried out on 3, 10, 19 and 26 November 2010 to confirm the implementation measures undertaken by the Contractor in the reporting month. The outcomes are presented in **Section 6** and the status of implementation of mitigation measures in the site is shown in **Appendix K**.

Record of Complaints

There was no record of complaints received in the reporting month.

Record of Notification of summons and successful prosecution

There was no record of Notification of summons and successful prosecution in the reporting month.

Reporting Changes

There are no changes to be reported the reporting month.

Future Key Issues

The major site works to be commissioned in the coming month include Installation of Band Drain; and Trial Embankment for Ground Improvement. Potential environmental impacts due to the construction activities, including air quality, noise, water quality, ecology and landscape and visual, will be monitored.

Environmental mitigation measures will be implemented on site as recommended and weekly site audits will be carried out to ensure that the environmental conditions are acceptable.

1. Introduction

1.1 Background

In March 2005, the Project Proponent, Profit Point Enterprises Limited, acquired the development site in Yuen Long at Wo Shang Wai. An Environmental Impact Assessment (EIA) was carried out under the EIA Ordinance (EIAO) since then and the Environmental Permit (EP-311/2008B) for construction of the comprehensive development in Wo Shang Wai was granted by EPD on 29 July 2010. The Project involves the residential development and associated infrastructure and wetland restoration area and linear landscape area. The construction works under the Environmental Permit commenced on 12 May 2010.

Heng Shung Construction Co. Ltd. was commissioned as the Contractor for the Project. Mott MacDonald Hong Kong Ltd. ("MMHK") has been commissioned by Heng Shung Construction Co. Ltd. to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for both pre-construction and construction phases of the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long.

According to the EP Condition 4.5, the monthly EM&A Report shall be submitted to the Director within 2 weeks after the end of the reporting month. This report summarises the findings during the period from 1 November to 30 November 2010.

1.2 Project Organization

The organisation chart and lines of communication with respect to the on-site environmental management structure together with the contact information of the key personnel are shown in **Appendix A**.

1.3 Environmental Status in the reporting period

During the reporting period, construction works of the Project undertaken include:

- Site formation for Wetland Restoration Area (WRA) (up to 15 Nov 2010);
- Band drain work preparation; and
- Temporary drainage work

The Construction Works Programme of the Project is provided in **Appendix B**. The general layout plan of the Project site is shown in **Figure 1.1**.

On 12 November 2010, the Contractor issued a letter on completion of construction of WRA with reference to the EP Condition 3.3 to 3.5. In accordance with EP Condition 3.6, the evidence of completion has been certified by the ET Leader and verified by the IEC before submitting to the Director.

1.4 Summary of EM&A Requirements

The EM&A programme requires environmental monitoring of air quality, noise, water quality, ecology and landscape and visual as specified in the approved EM&A Manual.

A summary of impact EM&A requirements is presented in **Table 1.1**:

Table 1.1: Summary of Impact EM&A Requirements

Parameters	Descriptions	Locations	Frequencies
Air Quality	24-Hour TSP	ASR1, ASR2A, ASR3, ASR4	Once every 6 days
	1-Hour TSP	ASR1, ASR2A, ASR3, ASR4	3 times every 6 days
Noise	L_{eq}, 30min	NSR1, NSR3, NSR5, NSR7	Weekly
Water Quality	Dissolved Oxygen (DO), temperature, pH, suspended solids (SS) and Biological Oxygen Demand (BOD)	MP1 to MP6	3 days per week
Ecology	Birds	Within the Project Area and Assessment Area of 500m	Weekly
	Dragonflies and Butterflies	Within the Project Area and Assessment Area of 500m	Once per month during Mar and Sep to November, and twice per month during Apr to Aug
	Herpetofauna	Within the Project Area and Assessment Area of 500m	Once per month during Apr to Nov
	Water quality of WRA	Wetland Restoration Area	After filling of WRA with water, monthly for in situ water quality and every size months (end of wet season and end of dry season) for laboratory testing
	Site Inspections	Within the Project Area and Assessment Area of 500m	Weekly
Landscape and Visual	Auditing of protection of existing trees, the transplanting of existing trees, the creation of new wetland, the planting of new trees and shrubs and other landscape and visual mitigation measures	CM1 to CM10 and OM1 to OM7 within the Project Area	Site inspections once every two weeks during construction phase; once every two months during operational phase

The Environmental Quality Performance Limits for air quality, noise and water quality are shown in **Appendix C**.

The Event and Action Plan for air quality, noise and water quality are shown in **Appendix D**.

The monitoring schedule for the reporting month is shown in **Table 1.2** below:

Table 1.2: Environmental Monitoring and Audit Schedule for November 2010

Environmental Monitoring and Audit Schedule for Nov 2010

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 Water	2 Bird	3 Water 24-hr TSP 1-hr TSP Noise Monitoring *	4	5 Water	6
7	8 Water	9 24-hr TSP 1-hr TSP Noise Monitoring	10 Water *	11	12 Water Bird @	13
14	15 Water 24-hr TSP 1-hr TSP Noise Monitoring	16	17 Water	18	19 Water 24-hr TSP 1-hr TSP *	20 Bird
21	22 Water	23 Bird Dragonfly & Butterfly Herpetofauna	24 Water	25 24-hr TSP 1-hr TSP Noise Monitoring Bird	26 Water *	27
28	29 Water	30				

- Air Quality Monitoring (1-hr)
- Air Quality Monitoring (24-hr)
- Noise Monitoring
- Water Quakity Monitoring
- * Site Audit by Mott MacDonald (MM)
- @ Report Submission (EM&A Report)
- Bird Survey
- Insect Survey
- Herpetofauna Survey

2. Impact Monitoring Methodology

2.1 Introduction

For air quality, construction noise and water quality, ecology, landscape and visual monitoring methodology, including the monitoring locations, monitoring equipments used, monitoring parameters, and frequency and duration etc., are detailed in this Chapter.

2.2 Air Quality

2.2.1 Monitoring Parameters, Frequency and Duration

In accordance with the EM&A Manual, 1-hour and 24-hour TSP levels monitoring are to be conducted during the construction phase. **Table 2.1** summarizes the monitoring parameters, frequency and duration of air quality monitoring.

Table 2.1: Air Quality Monitoring Parameters, Frequency and Duration

Monitoring Stations	Parameter	Frequency and Duration
ASR1, ASR2A, ASR3 & ASR4	24-hour TSP	At least once in every six-days
	1-hour TSP	3 times every six-days

2.2.2 Monitoring Locations

The 4 air quality monitoring stations were established in the EM&A manual and were slightly adjusted during the baseline monitoring phase. Locations of the agreed air quality monitoring stations are listed in **Table 2.2** and as shown in **Figure 2.1**.

Table 2.2: Air monitoring stations

Monitoring Stations	Locations
ASR1	Works Site Boundary
ASR2A	At the rooftop of refuse collection point, which is located at the southwest of the project area
ASR3	At the commercial centre at Palm Springs, which is located at the south of the project area
ASR4	Works Site Boundary

2.2.3 Monitoring Equipments

Continuous 24-hour TSP air quality monitoring is conducted using High Volume Sampler (HVS) (Model: GMWS-2310 Accu-vol). The HVS meets all the requirements of the EM&A Manual. Portable direct reading dust meters were used to carry out the 1-hour TSP monitoring. **Table 2.3** summarizes the equipment used in the impact air quality monitoring.

Table 2.3: TSP Monitoring Equipment

Equipment	Model
24-hr TSP monitoring	
High Volume Sampler	GMWS 2310 Accu-vol
Calibrator	GMW 25
1-hr TSP monitoring	
Portable direct reading dust meter	8520 Dust Track Aerosol Monitor (1 Nov 2010 to 14 Nov 2010) AM510 SidePak Personal Aerosol Monitor (from 15 Nov 2010 onward)

2.2.4 Monitoring Methodology

24-hour TSP Monitoring

Installation

The HVS was installed in the vicinity of the air sensitive receiver. The following criteria were considered in the installation of the HVS.

- A horizontal platform with appropriate support to secure the sampler against gusty wind was provided.
- The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
- A minimum of 2 meters separation from walls, parapets and penthouse was required for rooftop sampler.
- A minimum of 2 meters separation from any supporting structure, measured horizontally was required.
- No furnace or incinerator flues or building vent were nearby.
- Airflow around the sampler was unrestricted.
- The sampler has been more than 20 metres from any drip line.
- Permission was obtained to set up the samplers and to obtain access to the monitoring stations.
- A secured supply of electricity is needed to operate the samplers.

Preparation of Filter Papers

- Glass fibre filters, were labelled and sufficient filters that were clean and without pinholes were selected.
- All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 ℃ and not variable by more than ±3 ℃ with relative humidity (RH) < 50% and was not variable by more than ±5 %. A convenient working RH was 40%.

Field Monitoring

- The power supply was checked to ensure the HVS works properly.
- The filter holder and the area surrounding the filter were cleaned.

- The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.
- The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied should be sufficient to avoid air leakage at the edges.
- The shelter lid was closed and was secured with the aluminium strip.
- The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- A new flow rate record sheet was set into the flow recorder.
- The flow rate of the HVS was checked and adjusted at around 1.1 m^3/min. The range specified in the EM&A Manual was between 0.6-1.7 m^3/min.
- The programmable timer was set for a sampling period of 24 hrs + 1 hr, and the starting time, weather condition and the filter number were recorded.
- The initial elapsed time was recorded.
- At the end of sampling, the sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.
- It was then placed in a clean plastic envelope and sealed.
- All monitoring information was recorded on a standard data sheet.
- Filters were sent to a HOKLAS accredited laboratory for analysis.

Maintenance and Calibration

- The HVS and its accessories are maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- HVSs were calibrated prior to the commencement of baseline monitoring.
- Calibration records for HVSs are shown in **Appendix E**.

1-hour TSP Monitoring

Field Monitoring

The measuring procedures of the 1-hour dust meter are in accordance with the Manufacturer's Instruction Manual as follows:

- Set POWER to "ON", push BATTERY button, make sure that the meter's indicator is in the range with a red line and allow the instrument to stand for about 3 minutes (Then, the air sampling inlet has been capped).
- Push the knob at MEASURE position.
- Push "O-ADJ" button. (Then meter's indication is 0).
- Push the knob at SENSI ADJ position and set the meter's indication to S value described on the Test Report using the trimmer for SENSI ADJ.
- Pull out the knob and return it to MEASURE position.

- Push “START” button.

Maintenance and Calibration

- The 1-hour dust meter would be checked at 3-month intervals and calibrated at 1-year intervals throughout all stages of the air quality baseline monitoring.
- Calibration records for direct dust meters are shown in **Appendix E**.

2.3 Construction Noise

2.3.1 Monitoring Parameters, Frequency and Duration

Following the requirements in the EM&A Manual for noise, noise monitoring has to be carried out during the construction phase. Continuous noise monitoring for the A-weighted levels L_{eq}, L_{10} and L_{90} is undertaken once per every week.

Table 2.4 summarizes the monitoring parameters, frequency and duration of air quality monitoring.

Table 2.4: Noise Monitoring Parameters, Frequency and Duration

Monitoring Stations	Parameter	Frequency and Duration
NSR1, NSR3, NSR5, NSR7	L_{eq}, L_{90} & L_{10}	Once every week

2.3.2 Monitoring Locations

The 4 noise quality monitoring stations were established in the EM&A manual and were slightly adjusted during the baseline monitoring phase. Locations of the agreed noise quality monitoring stations are listed in **Table 2.5** and as shown in **Figure 2.2**.

Table 2.5: Noise monitoring stations

Monitoring Stations	Locations	Type of measurement
NSR1	Noise monitoring equipment was set up near the boundary wall at Palm Springs.	Free-field
NSR3	The monitoring station was located next to the guard house at Palm Springs.	Facade
NSR5	The monitoring station was located within the work site boundary.	Free-field
NSR7	The monitoring station was located near the boundary wall of the house of Mai Po San Tsuen.	Free-field

2.3.3 Monitoring Equipments

Integrating Sound Level Meter will be used for noise monitoring. It is a Type 1 sound level meter capable of giving a continuous readout of the noise level readings including equivalent continuous sound pressure level (L_{eq}) and percentile sound pressure level (L_x). They comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). **Table 2.6** summarizes the noise monitoring equipment model being used.

Table 2.6: Noise Monitoring Equipment

Monitoring locations	Equipment Model	
	Integrating Sound Level Meter	Calibrator
NSR1	Rion NL-31	BK Type 4231
NSR3		
NSR5		
NSR7		

2.3.4 Monitoring Methodology

Field Monitoring

- The Sound Level Meter was set on a tripod at a height of at least 1.2 m above the ground.
- Façade and free-field measurements were made at the monitoring locations.
- The battery condition was checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
  - frequency weighting: A
  - time weighting: Fast
  - time measurement: 30 minutes intervals (between 0700 and 1900)
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1 kHz. If the difference in the calibration level before and after measurement was more than 1 dB, the measurement would be considered invalid has to be repeated after re-calibration or repair of the equipment.
- During the monitoring period, the L_{eq}, L_{10} and L_{90} were recorded. In addition, any site observations and noise sources were recorded on a standard record sheet.

Maintenance and Calibration

- The microphone head of the sound level meter and calibrator is cleaned with soft cloth at quarterly intervals.
- The meter and calibrator are sent to the supplier or HOKLAS laboratory to check and calibrate at yearly intervals.
- Calibration records are shown in **Appendix E**.

2.4 Water Quality

2.4.1 Monitoring Parameters, Frequency and Duration

In accordance with the requirements in the EM&A Manual for water quality, water quality parameters including Dissolved Oxygen (DO), temperature, pH, turbidity, suspended solids (SS) and Biochemical Oxygen Demand (BOD) have to be monitored at designated monitoring stations during construction of the Project. DO, temperature and pH were measured in-situ whereas SS and BOD were analysed in a laboratory. The measurements should be taken at all designated monitoring stations, 3 days per week. The

interval between any two sets of monitoring was not less than 36 hours. **Table 2.7** summarizes the monitoring parameters, frequency and duration of water quality monitoring.

Table 2.7: Water Quality Monitoring Parameters, Frequency and Duration

Monitoring Stations	Parameter	Frequency and Duration
MP1, MP2, MP3, MP4, MP5 & MP6	DO, temperature, pH, SS, turbidity, BOD	Three days every week

2.4.2 Monitoring Locations

The 6 water quality monitoring stations were established in the EM&A manual. Locations of the agreed water quality monitoring stations are listed in **Table 2.8** and as shown in **Figure 2.3**.

Table 2.8: Water quality monitoring stations

Monitoring Stations	Easting	Northing
MP1	838 730.50	822 862.25
MP2	838 933.26	823 247.41
MP3	839 107.17	823 596.84
MP4	839 286.14	823 638.55
MP5	839 134.35	823 722.99
MP6	839 063.02	823 842.25

2.4.3 Monitoring Equipments

The Water Quality Monitoring Equipments and Analytical Methods applied to Water Quality Samples are given in **Table 2.9** and **Table 2.10** respectively. Details of which are discussed below.

Table 2.9: Water Quality Monitoring Equipments

Equipment	Model	Equipment /Serial Number
Dissolved oxygen, temperature & pH Measuring Meter	YSI Professional Plus	09K100735 / 10D101566
Turbidimeter	Hach 2100Q	09120C000514
Global Positioning System (GPS)	Garmin eTrex Vista	ENO 007

Table 2.10: Analytical Methods applied to Water Quality Samples

Determinant, unit	Standard Method
Total Suspended Solids, mg/L	In house method based on APHA 2540D; ALS Method Code: EA-025
Biochemical Oxygen Demand (BOD), mg/L	In house method based on APHA 5210B; ALS Method Code: EP-030

All in-situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use.

Dissolved Oxygen (DO), temperature and pH measuring equipment

A portable, weatherproof multiparameter instrument YSI 556 MPS was used in the baseline monitoring. It can be capable for measuring dissolved oxygen (DO), pH, and temperature simultaneously with the following limits:

- a dissolved oxygen level in the range of 0-50 mg/L and 0-500 % saturation;
- a temperature of -5 to 45 degree Celsius; and
- pH value of 0-14 with 0.1 as the base unit.

Turbidity Measurement Instrument

Portable and weatherproof turbidity meter (HACH model 2100P) was used during impact monitoring. It has a photoelectric sensor capable of measuring turbidity between 0-1000 NTU. Response of the sensor was checked with certified standard turbidity solutions before the start of measurement.

Global Positioning System

A hand-held GPS navigator (Garmin eTrex Vista) was used to identify the designated monitoring stations prior to water sampling.

Suspended Solids and BOD Measurements (Sample Containers and Storage)

Water samples for SS analysis were stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen), delivered to the laboratory, and analysed as soon as possible after collection. Analysis was carried out in a HOKLAS accredited laboratory.

Detection Limit

The limits of detection for the in-situ and laboratory measurements are shown in **Table 2.11**.

Table 2.11: Detection Limits for Water Quality Determinants

Determinant	Limit of Detection
Dissolved Oxygen	0.1 mg/L
Temperature	0.1 degree Celsius
pH	0.01 unit
Turbidity	0.1 NTU
Suspended Solids	1 mg/L
BOD	2 mg/L

2.4.4 Monitoring Methodology

In situ measurement

All pH meters, DO/ temperature meters had been checked and calibrated prior to use. Standard buffer solution of at least 2 pH levels (either pH 4 and pH 7 or pH 7 and pH 10) had been used for calibration of the instrument before and after use.

DO meters had been calibrated by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes had been checked with certified standard solutions before each use. Wet bulb calibrations for all DO meters had been carried out before measurement at each monitoring location. For the on site calibration of field equipment, BS 127:1993, "Guide to field and on-site test methods for the analysis of waters" had been observed.

Measurements shall be at 3 water depths, namely, 1m below water surface, mid-depth and 1m above stream bed/pond bed, except where the water depth less that 6m, the mid-depth station maybe omitted. Should the water depth be less than 3m, only the mid-depth station will be monitored.

Replicates in-situ measurements and samples collected from each independent monitoring event are required for all parameters to ensure a robust statistically interpretable dataset.

Water Samples Preparation and Analysis

For collection of water sampling within the water courses, a 500ml clean plastic beaker was used. After collection, the water samples were stored in high-density polythene bottles. The sample container was rinsed with a portion of the water sample. The water sample was then transferred to the container, labelled with a unique sample ID and sealed with a screw cap. The water samples were stored in a cool box maintained at 4°C. The water samples were then delivered to a local HOKLAS-accredited laboratory (ALS) on the same day for analysis.

The testing methods of testing parameters as recommended by EIA or required by EPD, with the QA/QC results are in accordance with the requirement of HOKLAS or international accredited scheme.

The calibration certificates for equipments used for in-situ monitoring of water quality are attached in **Appendix E**.

2.5 Ecology

2.5.1 Monitoring Parameters, Frequency and Duration

Target species and certain other fauna will be monitored within the Project Area and Assessment Area during the wetland and residential construction phase. This will be important to ensure that any unexpected events or impacts either on- or off-site are quickly identified so that remedial action can be taken. The groups to be monitored and frequency of monitoring are shown in **Table 2.12**.

Table 2.12: Summary of Construction Phase Ecological Monitoring for the Wo Shang Wai WRA

	Construction Phase Ecological Monitoring
Birds	Weekly (including Assessment Area).
Dragonflies and Butterflies	Once per month during March and September to November, and twice per month during April to August.
Herpetofauna	Once per month during April to November.
Water Quality	After filling of WRA with water, monthly for *in situ* water quality and every six months (end of the wet season and end of the dry season) for laboratory testing.
Site Inspections	Weekly.

2.5.2 Monitoring Locations and Methodology

Ecological monitoring locations during construction phase are shown in **Figure 4.1** and the methodology for ecological monitoring is detailed in **Section 4**.

2.6 Landscape and Visual

2.6.1 Monitoring Parameters, Frequency and Duration

All measures undertaken by both the Contractor and the specialist Landscape Sub-Contractor during the construction phase and first year of the operational phase shall be audited by a Registered Landscape Architect, as a member of the ET, on a regular basis to ensure compliance with the intended aims of the measures. Site inspections should be undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase.

The broad scope of audit is detailed below but should also be undertaken with reference to the more specific checklist provided in **Table 2.13** below. Operational phase auditing will be restricted to the last 12 months of the establishment works of the landscaping proposals and thus only the items below concerning this period are relevant to the operational phase.

- The extent of the agreed works area should be regularly checked during the construction phase. Any trespass by the Contractor outside the limit of the works, including any damage to existing trees and woodland shall be noted;
- The progress of the engineering works should be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken;
- All existing vegetation, streams and other features within the study area which are not directly affected by the works are retained and protected;
- The methods of protecting existing vegetation proposed by the Contractor are acceptable and enforced;
- Preparation, lifting transport and re-planting operations for any transplanted trees;
- The layout, design and construction of buildings conforms to requirements specified in the EIA report;
- All landscaping works are carried out in accordance with the EIA recommendations and with specifications;
- The planting of new trees, shrubs, groundcover, climbers, grasses and other plans, together with the replanting of any transplanted trees are carried out properly and within the right season;
- All necessary horticultural operations and replacement planting are undertaken throughout the Establishment Period to ensure the healthy establishment and growth of both transplanted trees and all newly establishment plants.

Table 2.13: Construction and Operation Phase Audit Checklist

Area of Works	Items to be Monitored
Works Area	Check the extent of the Works to ensure that the Works Area is not exceeded
Protection of all trees and woodland blocks to be retained	Identification and demarcation of trees / vegetation to be retained, erection of physical protection (e.g. fencing), monitoring against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Streams	Ensure no run-off into existing streams
Clearance of existing vegetation	Identification and demarcation of trees / vegetation to be cleared, checking of extent of works to minimize damage, monitoring of adjacent areas against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Transplanting of trees	Identification and demarcation of trees / vegetation to be transplanted, monitoring of extent of pruning / lifting works to minimize damage, timing of operations implementation of all stages of preparatory and translocation works, and maintenance of transplanted vegetation, etc.
Topsoil stripping	Ensuring existing topsoil is stripped and stored under recognized good practice and is hydroseeded and regularly turned to prevent anaerobic conditions
New buildings	Ensure that building finishes accord with mitigation proposals with regard to colour and albedo.
Boundaries	Ensuring hoarding are erected as required
Noise Barrier	Ensure noise barrier design accords with the mitigation proposals with regard to location, materials and finishes.
Night-time lighting	Ensuring night-time lighting is directional, hooded and shielded away from VSRs
Plant supply	Monitoring of operations relating to the supply of specialist plant material (including the collecting, germination and growth of plants from seed) to ensure that plants will be available in time to be used within the construction works.
Landscape and wetland treatments generally	Check that wetland, and hard / soft landscape designs conform to intent of mitigation measures and agreed designs
Soiling, planting, etc.	Monitoring of implementation and maintenance of soiling and planting works against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Establishment Works	Monitoring of implementation of maintenance operation during Establishment Period

2.6.2 Monitoring Locations

The monitoring locations should check against the mitigation measures proposed under the approved Environmental Impact Assessment, which are summarised as follows:

Table 2.14: Proposed Construction Phase Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
CM1	The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.
CM2	Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colours, to screen Works.
CM3	Reduction of construction period to practical minimum.
CM4	Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where the soil material meets acceptable criteria and where practical. The Contract Specification shall include storage and reuse of topsoil as appropriate.
CM5	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone).
CM6	Advance screen planting to noise barriers.
CM7	Control night-time lighting and glare by hooding all lights.
CM8	Ensure no run-off into streams adjacent to Project Area.
CM9	Protection of existing trees on boundary of project area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at S16 and Tree Removal Application stage).
CM10	Trees unavoidably affected by the works shall be transplanted where practical. Trees should be transplanted straight to their destinations and not held in a nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.

Table 2.15: Proposed Operation Phase Mitigation Measures

ID No.	Landscape Mitigation Measure
OM1	Compensatory Tree Planting for all felled trees shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006.
OM2	A continuous belt of screen planting along southern perimeter of project area with fast growing tree species. At least 450 trees capable of reaching a height > 10m within 10 years should be planted. Planting of the belt of trees shall be carried out as advance works ahead of other site formation and building works.
OM3	Maximise soft landscape and amenity water bodies in residential areas of the development. Approximately 750 of trees (of Heavy Standard size) should be planted. Where space permits, roadside berms should be created. Street trees should be of species that reach a mature height of no less than 15m.
OM4	Maximise freshwater habitat wetland creation consistent with achieving other parameters. Min 4.74 ha to be provided. Wetlands must have natural edge profiles with >1m wide emergent zone. No access to the wetland by residents and all wetlands must be screened from residential development by a continuous tree screen at interface with residential development or earth mounding such that disturbance is minimised. Implementation of the wetland shall be carried out as advance works.
OM5	Use appropriate (visually unobtrusive and non-reflective) building materials and colours in built structures.
OM6	During detailed design, refine building layout to create a min 10m wide gap between

ID No.	Landscape Mitigation Measure
	buildings north of Wo Shang Wai pond and also two min 10m wide gaps in the row of buildings adjacent to Royal Palms.
OM7	Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the local context, and minimises potential negative landscape and visual impacts. Lighting units should be directional and minimise unnecessary light spill.

3. Monitoring Results

3.1 Impact Monitoring Schedule

Impact monitoring for air quality (dust), noise and water quality due to the construction work were undertaken during the reporting month in compliance with the EM&A manual in the reporting period. Regular site inspections were carried out on 3, 10, 19 and 26 November 2010 in the reporting month to assess the compliance with environmental requirements.

3.2 Result of Impact Monitoring

3.2.1 Air Quality Monitoring

3.2.1.1 1-hr TSP

Results of 1-hour TSP at the four monitoring locations are summarised in **Table 3.1**. Graphical plots of the monitoring results are shown in **Appendix F**.

Table 3.1: Summary of 1-hour TSP monitoring results

Monitoring Date	Start Time	1-hr TSP (μg/m³)			Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
		1st Result	2nd Result	3rd Result			
ASR1							
3-Nov-10	8:58	277	319	299	169 - 319	378	500
9-Nov-10	9:21	185	174	177			
15-Nov-10	9:21	248	259	242			
19-Nov-10	9:18	223	222	214			
25-Nov-10	9:18	190	172	169			
ASR2A							
3-Nov-10	13:24	188	194	181	126 - 211	357	500
9-Nov-10	13:32	133	137	126			
15-Nov-10	13:20	155	147	144			
19-Nov-10	13:27	206	202	211			
25-Nov-10	13:30	154	151	146			
ASR3							
3-Nov-10	13:08	225	198	208	128 - 238	358	500
9-Nov-10	13:17	128	150	139			
15-Nov-10	13:05	165	175	168			
19-Nov-10	13:13	238	227	221			
25-Nov-10	13:16	146	132	166			
ASR4							
3-Nov-10	8:52	320	305	288	180 - 320	372	500
9-Nov-10	9:12	180	183	182			
15-Nov-10	9:06	224	204	219			
19-Nov-10	9:11	269	258	268			
25-Nov-10	9:13	210	215	199			

3.2.1.2 24-hr TSP

Results of 24-hour TSP at the four monitoring locations are summarised in **Table 3.2**. Graphical plots of the monitoring results are shown in **Appendix F**.

Table 3.2: Summary of 24-hour TSP monitoring results

Monitoring Date	Monitoring Results (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
ASR1				
3-Nov-10	87	83 - 127	226	260
9-Nov-10	85			
15-Nov-10	83			
19-Nov-10	85			
25-Nov-10	127			
ASR2A				
3-Nov-10	73	65 - 84	213	260
9-Nov-10	77			
15-Nov-10	73			
19-Nov-10	65			
25-Nov-10	84			
ASR3				
3-Nov-10	78	72 - 81	205	260
9-Nov-10	73			
15-Nov-10	81			
19-Nov-10	72			
25-Nov-10	81			
ASR4				
3-Nov-10	94	84 - 94	237	260
9-Nov-10	91			
15-Nov-10	84			
19-Nov-10	94			
25-Nov-10	84			

No exceedance of 1-hour and 24-hour TSP (Action or Limit Level) was recorded in the reporting period.

The weather conditions in the reporting period are provided in **Appendix G**.

3.2.2 Construction Noise Monitoring

The construction noise monitoring results are summarized in **Table 3.3**. Graphical plots of the monitoring data are shown in **Appendix F**.

Table 3.3: Summary of Construction noise monitoring results

Monitoring Date	Start Time	Mean & Range of Noise Levels, dB(A)			Limit Level for L_{eq} (dB)
		L_{eq}	L_{10}	L_{90}	
NSR1					> 75
3-Nov-10	13:29	50	52	47	
9-Nov-10	13:37	50	50	45	
15-Nov-10	13:27	50	51	48	
25-Nov-10	13:36	50	52	45	
NSR3					

Monitoring Date	Start Time	Mean & Range of Noise Levels, dB(A)			Limit Level for L_{eq} (dB)
		L_{eq}	L_{10}	L_{90}	
3-Nov-10	14:31	52	53	50	> 75
9-Nov-10	14:39	50	51	47	
15-Nov-10	14:29	51	52	47	
25-Nov-10	14:38	50	52	46	
NSR5					
3-Nov-10	9:03	57	60	54	
9-Nov-10	9:22	56	58	51	
15-Nov-10	9:13	57	58	53	
25-Nov-10	9:20	55	57	52	
NSR7					
3-Nov-10	10:17	65	68	63	
9-Nov-10	10:34	64	66	61	
15-Nov-10	10:30	64	66	61	
25-Nov-10	10:26	64	66	61	

No exceedance (Action/Limit Level) of construction noise was recorded in the reporting period.

3.2.3 Water Quality Monitoring

The water quality monitoring results are summarized in **Table 3.4**. Graphical plots of the monitoring data are shown in **Appendix F**.

Table 3.4: Summary of Water quality monitoring results

Monitoring Date	Temp (°C)	pH	Dissolved Oxygen (mg/L)	DOS (%)	Turbidity (NT)	BOD (mg/L)	Suspended Solids (mg/L)
MP1							
1/11/2010	23.9	**7.6**	5.2	63.2	16.3	2	10.5
3/11/2010	23.1	**7.7**	5.0	59.3	15.0	2.5	11.5
5/11/2010	20.8	**7.8**	5.5	62.7	29.6	2.5	24
8/11/2010	23.7	**7.7**	4.8	56.8	95.9	3	103.5
10/11/2010	24.4	**7.8**	6.7	80.9	45.8	3	36.5
12/11/2010	23.1	**7.8**	7.6	88.3	84.9	6	93
15/11/2010	23.8	**7.9**	7.2	84.6	80.0	6.5	80
17/11/2010	23.8	**8.0**	6.3	74.1	15.9	<2	10
19/11/2010	24.4	**7.8**	5.8	70.2	40.3	2	33.5
22/11/2010	23.4	7.5	6.1	73.5	94.4	4.5	113.5
24/11/2010	22.7	**7.9**	5.9	67.7	63.7	4	75
26/11/2010	21.6	7.5	4.7	53.8	21.1	2.5	20
29/11/2010	22.5	**7.6**	4.7	54.8	21.9	<2	17.5
Action Level	-	<5.5 or >7.5	<1.23	-	>173	-	>231
Limit Level	-	<4.0 or >8.0	<1.17	-	>177	-	>299
MP2							
1/11/2010	23.2	**7.6**	5.6	66.7	7.3	<2	5.5
3/11/2010	23.4	7.5	5.7	67.9	14.3	2	10.5
5/11/2010	21.5	7.5	5.5	63.6	35.1	2	33
8/11/2010	23.9	**7.6**	5.9	69.9	80.8	3.5	87
10/11/2010	24.2	**7.8**	6.8	80.2	82.1	3.5	69.5
12/11/2010	23.0	**7.7**	7.5	86.5	72.0	5	83

Monitoring Date	Temp (°C)	pH	Dissolved Oxygen (mg/L)	DOS (%)	Turbidity (NT)	BOD (mg/L)	Suspended Solids (mg/L)
15/11/2010	24.1	**7.7**	7.2	84.9	75.8	6	57
17/11/2010	23.1	**7.9**	6.6	76.9	29.0	<2	23.5
19/11/2010	23.6	**7.7**	6.2	73.2	65.4	4	63.5
22/11/2010	23.3	7.4	6.6	77.6	71.6	4	78
24/11/2010	23.0	**7.7**	6.5	75.0	61.2	3	64.5
26/11/2010	21.7	7.5	4.8	55.4	32.3	2.5	29
29/11/2010	22.6	**7.6**	5.9	69.0	16.3	<2	15.5
Action Level	-	<5.5 or >7.5	<1.04	-	>132	-	>170
Limit Level	-	<4.0 or >8.0	<0.89	-	>163	-	>209
MP3							
1/11/2010	19.9	**7.8**	8.1	89.3	13.0	4	12
3/11/2010	20.9	**7.8**	8.2	91.4	16.2	5	14
5/11/2010	20.0	**7.7**	7.1	79.0	19.0	6	13.5
8/11/2010	21.4	7.4	7.8	87.8	25.8	5.5	16
10/11/2010	22.9	7.5	8.4	98.0	22.3	5	12.5
12/11/2010	22.7	7.4	8.0	93.1	29.7	6	25
15/11/2010	23.9	7.4	8.2	97.1	30.3	6	25.5
17/11/2010	22.9	**7.7**	9.1	106.2	30.9	6	23
19/11/2010	23.7	**7.6**	8.3	98.1	34.8	8	33
22/11/2010	22.4	**7.6**	8.4	98.6	33.6	7.5	35.5
24/11/2010	22.0	7.5	7.5	86.2	39.0	10	37
26/11/2010	20.7	**7.6**	8.1	90.0	38.5	10	33
29/11/2010	22.5	**8.6**	10.7	126.7	41.5	7.5	42
Action Level	-	<5.5 or >7.5	<6.85	-	>64	-	>65
Limit Level	-	<4.0 or >8.0	<6.65	-	>67	-	>66
MP4							
1/11/2010	22.4	7.5	7.0	80.0	40.4	2	29.5
3/11/2010	21.7	7.4	5.1	58.0	53.9	2.5	39
5/11/2010	20.1	7.5	5.8	63.7	28.2	3	15
8/11/2010	23.6	7.3	5.6	65.2	38.1	2	22.5
10/11/2010	24.3	7.4	6.6	78.8	29.2	2	15.5
12/11/2010	24.4	7.5	7.3	87.2	30.8	3	18.5
15/11/2010	25.1	7.2	6.4	77.0	34.9	4	23
17/11/2010	22.9	7.4	5.5	63.8	42.5	<2	26
19/11/2010	24.6	7.4	6.4	75.9	46.8	3.5	34
22/11/2010	22.6	7.5	5.2	62.3	32.7	2	24
24/11/2010	22.5	7.4	6.4	73.7	42.9	4	30.5
26/11/2010	20.5	7.5	6.6	72.9	35.6	3	23.5
29/11/2010	22.8	**7.9**	7.4	85.5	32.7	2	23
Action Level	-	<5.5 or >7.5	<3.91	-	>60	-	>50
Limit Level	-	<4.0 or >8.0	<3.82	-	>64	-	>53
MP5							
1/11/2010	21.8	7.2	7.4	84.3	43.3	2	30.5
3/11/2010	21.4	7.3	7.0	80.0	32.5	3.5	22.5
5/11/2010	19.8	7.2	6.6	72.1	31.9	6	19.5
8/11/2010	23.5	7.3	5.9	69.6	40.4	<2	20
10/11/2010	23.8	7.3	7.0	83.7	27.3	2	15
12/11/2010	23.5	7.4	8.0	95.1	32.1	2	21.5
15/11/2010	24.9	7.5	8.8	106.1	35.5	2	20.5

Monitoring Date	Temp (°C)	pH	Dissolved Oxygen (mg/L)	DOS (%)	Turbidity (NT)	BOD (mg/L)	Suspended Solids (mg/L)
17/11/2010	22.9	7.4	7.3	84.8	30.8	<2	16.5
19/11/2010	24.9	7.2	6.6	79.8	31.6	2	20.5
22/11/2010	22.4	7.4	7.2	83.7	48.9	5	38.5
24/11/2010	22.1	7.4	6.2	71.1	**83.4**	4	50
26/11/2010	20.2	7.3	7.1	78.3	55.8	2	35.5
29/11/2010	22.9	7.4	5.3	61.7	33.9	3.5	25
Action Level	-	<5.5 or >7.5	<4.13	-	>81	-	>66
Limit Level	-	<4.0 or >8.0	<3.87	-	>84	-	>69
MP6							
1/11/2010	21.6	7.3	7.3	83.9	35.9	2	25.5
3/11/2010	21.1	7.4	7.4	83.7	40.5	3	29
5/11/2010	19.5	7.3	6.5	71.8	38.8	6	27.5
8/11/2010	23.4	7.4	6.3	73.5	59.4	2	34.5
10/11/2010	23.9	7.4	6.9	82.2	37.2	3	21.5
12/11/2010	22.8	7.5	8.7	101.7	60.0	2	39.5
15/11/2010	24.3	**7.7**	10.1	122.8	42.0	3	27.5
17/11/2010	22.6	7.3	7.1	82.9	41.3	<2	23.5
19/11/2010	24.5	7.3	7.5	90.8	42.6	2	28.5
22/11/2010	22.8	7.5	7.3	83.8	55.9	6.5	43.5
24/11/2010	22.0	7.5	6.5	75.0	78.6	7	49
26/11/2010	20.0	7.3	6.4	70.1	63.6	2	40
29/11/2010	21.3	7.5	5.7	65.1	42.6	2	30.5
Action Level	-	<5.5 or >7.5	<4.61	-	>94	-	>75
Limit Level	-	<4.0 or >8.0	<4.52	-	>96	-	>75

Notes:

Values **Bold** indicate Action Level exceedance.

Values **Underlined and Bold** indicate Limit Level exceedance.

Exceedances of pH and turbidity were observed during the reporting period. For MP1 to MP3, there were frequent exceedances of action level for pH (though there was one occasion of limit level exceedance at MP3). For MP4 to MP6 located at the ditch at the north of the site, few exceedances of pH were recorded at MP4 and MP6. There was only one turbidity exceedance recorded at MP5 on 24 November 2010.

The Event and Action Plan in **Appendix D** was followed under these cases of exceedances.

From investigation, construction activities during the period of exceedance included mainly site formation and drainage work for WRA construction, band drain installation and trial embankment. It was observed that the Contractor has implemented water quality mitigation measures as recommended in the EIA report, including the provision of temporary drainage facility and associated treatment facility. Sand bags are in place in the temporary drainage channel to enhance the desilting efficiency. The Contractor further enhanced the water quality mitigation measures by erecting several segments of rock bunds at the discharge outlet to avoid site runoff draining directly to the northern ditches.

Most of the pH exceedances during the period were found at MP1 to MP3. There was no direct discharge from the site to the ditch where MP1 and MP2 are located whereas the fish pond (MP3) was being separated from the construction site by the WRA. The exceedances may be due to the natural variation and other unknown factors. There was also only small amount of site runoff generated and discharged in November.

Exceedance of action level of turbidity was observed at MP5 on 24 November. From site observations, there was also only small amount of site runoff generated and discharged in November. In addition, there was no exceedance of SS at MP5 on the same day. The increase in turbidity at MP5 may be due to some unknown factors.

Due to these factors and taking into account the mitigation measures implemented, the exceedances were considered not due to construction works.

4. Ecological Monitoring

4.1 Introduction

This report documents surveys conducted in the Survey Area between 1 November and 30 November 2010. The Wetland Restoration Area (hereafter WRA) is also surveyed as the area now is accessible and site formation works are nearing completion. The updated survey transect is provided in **Figure 4.1**. Dates and ecological surveys conducted during this period are summarised in **Appendix H**.

4.2 Monitoring of Birds

Monitoring was undertaken following the survey methodology in the EM&A Manual. In addition, low intensity monitoring of the WRA was undertaken (on a monthly basis) to monitor faunal usage of the newly formed cells; monitoring intensity will follow that outlined in the EM&A Manual at the completion of the WRA. A transect was followed in the bird surveys (see **Figure 4.1**). All bird species of conservation importance and/or wetland dependent were identified and enumerated. Flying birds were not recorded unless they were foraging and associated with the habitat (such as swifts). Further, notable bird observations during other surveys were also recorded.

Bird surveys were conducted on a weekly basis. A total of 42 bird species of conservation importance and/or wetland-dependence were recorded within 500 m of the Project Site while 30 bird species were recorded in the Wetland Restoration Area (WRA). Of the 30 species recorded within the WRA, 17 of them were species of conservation importance and/or wetland-dependent species. A summary of survey data is provided in **Appendix I**.

Species and numbers recorded in this survey period are typical of fish pond areas in early winter indicating that birds in the area are not presently being adversely affected by the construction of the Wetland Restoration Area.

4.3 Monitoring of Herpetofauna

One day-time herpetofauna survey was conducted. No amphibian species or reptile species were recorded in the survey period.

One Red-eared Slider *Trachemys scripta* was found in the ponds within the survey area during the bird survey conducted on the 20 November. This species is widely disturbed in Hong Kong and is exotic to Hong Kong.

4.4 Monitoring of Dragonfly and Butterfly

Monitoring of dragonflies and butterflies was conducted on a monthly basis. A total of nine dragonfly species and ten butterfly species were recorded, and eight dragonfly species and four butterfly species were recorded in the WRA. All species recorded were common and widespread and recorded in low to very low numbers. A summary of the survey findings is provided in **Appendix J**.

4.5 Monitoring of Mammal

Monitoring of mammals was conducted concurrently with other surveys. No mammals were recorded in the survey period.

4.6 Summary

Ecological monitoring during November 2010 was carried out following the survey methodology and frequency outlined in the EM&A Manual.

A total of 42 bird species, 9 dragonfly species and 10 butterfly species were recorded in the survey area. Survey findings indicate that the ponds within the Survey Area supported numbers and diversity of wetland-dependent birds and other species of conservation importance typical of fish pond areas in the autumn months.

30 bird species, 8 dragonfly species and 4 butterfly species were recorded in the WRA. These findings indicate that the WRA is already starting to support wetland-dependent birds and other species of conservation importance.

5. Landscape and Visual

5.1 Site Inspection

The EM&A programme for Landscape and Visual impact due to the construction commenced in May 2010 and was continued during the reporting period. Site inspections were carried out on 3, 10, 19 and 26 November 2010 to confirm the implementation of mitigation measures at construction stage.

5.2 Construction Phase Audit Summary

The audit was undertaken with references to the specific checklists provided in **Tables 2.13 – 2.15** and audit results are summarized as below:

Table 5.1: Construction and Operation Phase Audit Summary

Area of Works	Items to be Monitored
Works Area	The boundaries of the works area have been established on site in accordance with the contract documents and approved plans (EP), and the limit of current heavy construction activity is now confined to within the site hoardings (North side of the site / access road) and the noise barriers (other sides of the site). Minor works such as horticultural maintenance of the planting and transplanted trees, and boundary fence repair was proceeding along the Royal Palms - Palm Springs boundary. No construction works were observed to have exceeded the site boundaries. Moreover, no construction was carried out at the wetland restoration area after 15 November 2010.
Protection of all trees and woodland blocks to be retained	Trees to be retained are located northeast of the WRA and protected by site hoardings. One of the trees (T624) is found in very poor condition and repair work needs to be carried out in accordance with the detailed tree protection specification provided in the Contract Specification.
Streams	The works site is encircled by a berm to intercept surface water and prevent it from washing off into any of the neighboring sites. Surface water is collected within the site in a temporary drainage channel. Gravels beds and barriers have been installed to filter site runoff, sedimentation tanks provided to enable primary treatment before discharge to mains drains.
Clearance of existing vegetation	Site clearance was completed prior to the commencement of construction. A bed of existing *Phragmites* reeds which had been retained within a fenced off area at the centre of the site, is now being reused in the vegetation of the wetland restoration areas.
Transplanting of trees	Tree transplanting has been completed, with the trees relocated to various points within the planting strip along the southern boundary of the site, outside the noise barrier. The trees continue to re-establish well.

Topsoil stripping	Suitable pond bund and pond bottom material excavated and stockpiled from the original site has now been re-used in the formation of the wetland areas. Active dust suppression measures are still being adopted along internal site access tracks.
New buildings	No new permanent buildings have yet been constructed on site
Boundaries	Hoardings have been erected along most of the boundaries of the site. Installation of new fence between the future residential sites and the constructed wetland areas is complete. Fence has been being painted green to match with the surrounding vegetated environment.
Noise Barrier	Noise barriers have been installed along the southern and western boundaries of the site in accordance with the contract requirements The noise barrier design complies with the mitigation requirements, with upper 6 to 7m portion of the barrier being made from a translucent material with green tinted (to match with the environment). Supporting GMS structure, likewise, has been painted green.
Night-time lighting	No night-time works were reported to have been carried out during the monitoring period
Landscape and wetland treatments	The screen planting Advance Planting Strip along the southern and western boundaries of the site has been completed and the wetland restoration area is under construction. Rain water has partially filled the western wetland habitat. Few clumps of *Phragmites australis* have been successively translocate to the edge of the ponds from on-site nursery. Aggressive self seeded weed species are beginning to establish the wetland restoration ponds from neighboring areas, and need to be removed. No construction was carried out at the wetland restoration area after 15 November 2010.
Soiling	The soiling for the advance planting strip has been completed. Some bricks have been installed to create a stronger edge of planting bed and to prevent soil erosion. The soil placement and grading for the wetland restoration areas is complete.
Plant supply	The plant material used for the Advance Planting Strip along the southern and western boundaries of the site are all common species and came from commercial sources. Details of the procurement of special plant material for the wetland areas are still to be provided.

Planting	The total number of trees in the advance planting (some 494no.), and their height are in accordance with the contract requirements. The tree species are all from the approved list. This planting should achieve the required screening effect. Dead trees within the advance planting strip have been removed, and are in the process of being replaced (some 36 no. still be replaced)with approved species Overhanging trees from adjacent properties have been cut back, and will need to be pruned regularly if situation is allowed. These have been reducing the light available to the shrubs within the Advance Planting Strip, adversely affecting their growth.
Establishment Works	The advance planting, the compensatory planting and the transplanted trees have not yet been hand over for maintenance, the planting works are under supervision onsite to ensure that the requirements of the approved planting proposal are met. The advance planting is currently being maintained by the landscape sub-contractor.

6. Environmental Site Inspection and Audit

6.1 Site Inspection

The ET had carried out construction phase weekly site inspections on 3, 10, 19 and 26 November 2010. All observations have been recorded in the site inspection checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary. The key observations from site inspections and associated recommendations are summarized in **Table 6.1**.

Table 6.1: Summary of Site Inspections and Recommendations

Key Observations	ET Recommendation	Contractor's Responses / Action(s) Undertaken	Close-out (Date)
Chemical bottles without drip trays and warning labels	To provide drip trays for chemical bottles in the site	Agreed and action taken	11 Nov 2010
Gaps found at site hoardings	To seal all the gaps found	Agreed and action taken	19 Nov 2010

6.2 Advice on the Solid and Liquid Waste Management Status

The Contractor has been registered as a chemical waste producer for the Project. Construction and demolition (C&D) material sorting was carried out on site. A sufficient number of receptacles were available for general refuse collection.

As advised by the Contractor, 0 tonnes of C&D material were generated on site during the period. No metals was generated and collected by registered recycling collector. No paper cardboard packing and plastic were generated on site and collected by registered recycling collector. No chemical waste was generated and collected by licensed chemical waste collector. 13.1 tonnes of other types of wastes (e.g. general refuse) was generated on site and disposed of at public landfill facility.

The Contractor is advised to maintain on site waste sorting and recording system and maximize reuse/recycling of C&D wastes.

6.3 Status of Environmental Licenses and Permits

The environmental permits, licenses, and/or notifications on environmental protection for this Project which were valid during the period is summarised in **Table 6.2**.

Table 6.2: Status of Environmental Submissions, Licenses and Permits

Statutory Reference	Description	Permit /Reference No.	Status
EIAO	Environmental Permit	EP-311/2008B	Valid
APCO	Notification of Construction Work under APCO	316688 (27 Apr 2010)	Valid
WPCO	Discharge License	WT00007442-2010 (2 Nov 2010)	Valid
WDO	Registration as Chemical Waste Producer	WPN0000-542-H3083-04	Valid
WDO	Bill Account for disposal	700945423	Valid

Legend: EIAO – Environmental Impact Assessment Ordinance
APCO – Air Pollution Control Ordinance
WPCO – Water Pollution Control Ordinance
WDO – Waste Disposal Ordinance

6.4 Recommended Mitigation Measures

The EM&A programme followed the recommended mitigation measures in the EM&A manual. The EM&A requirements as well as the summary of implementation status of the environmental mitigation measures are provided in **Appendix K**. In particular, the following mitigation measures were brought to attention during the site audits:

Air Quality

- All stockpiles should be covered by tarpaulin or kept wet by water spraying;
- All vehicles should be washed to remove any dusty materials before leaving the construction sites;
- the portion of road leading the construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials;
- During the dry season, sufficient water spraying should be provided at haul road to reduce dust emission; and
- Ensure proper functioning of the wheel wash facility.

Noise

- Mobile plant should be sited as far away from NSRs as possible;
- Plant known to emit noise strongly in one direction should be orientated to direct noise away from the NSRs; and
- The construction activities should be better scheduled to reduce noise nuisance.

Water Quality

- Water accumulated in the site (including water inside drip trays) should be cleared frequently;
- Ensure proper functioning of the wastewater treatment facility; and
- Silt and debris should be removed from the temporary drainage channel regularly.

Waste management

- Reuse the excavated materials as far as practical to reduce the amount of waste disposal;
- Ensure drip trays are provided for chemical containers to prevent leakage or soil contamination;
- All plants and vehicles should be properly maintained to prevent oil leakage;
- Oil stains on soil should be cleared by disposal of contaminated soil; and

7. Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

7.1 Record on Non-compliance of Action and Limit Levels

There is no breach of Action or Limit Levels for Air Quality and Noise monitoring in the reporting month.

Exceedances of Action and Limit Levels were recorded for Water Quality at MP1, MP2, MP3, MP4, MP5 and MP6 on different monitoring dates.

Exceedances of pH and turbidity were observed during the reporting period. For MP1 to MP3, there were frequent exceedances of action level for pH (though there was one occasion of limit level exceedance at MP3). For MP4 to MP6 located at the ditch at the north of the site, few exceedances of pH were recorded at MP4 and MP6. There was only one turbidity exceedance recorded at MP5 on 24 November 2010.

Table 7.1: Summary of exceedances in Water Quality

Monitoring Date	pH	Dissolved Oxygen (mg/L)	Turbidity (NT)	Suspended Solids (mg/L)
MP1				
1/11/2010	**7.6**	5.2	16.3	10.5
3/11/2010	**7.7**	5.0	15.0	11.5
5/11/2010	**7.8**	5.5	29.6	24
8/11/2010	**7.7**	4.8	95.9	103.5
10/11/2010	**7.8**	6.7	45.8	36.5
12/11/2010	**7.8**	7.6	84.9	93
15/11/2010	**7.9**	7.2	80.0	80
17/11/2010	**8.0**	6.3	15.9	10
19/11/2010	**7.8**	5.8	40.3	33.5
24/11/2010	**7.9**	5.9	63.7	75
29/11/2010	**7.6**	4.7	21.9	17.5
Action Level	<5.5 or >7.5	<1.23	>173	>231
Limit Level	<4.0 or >8.0	<1.17	>177	>299
MP2				
1/11/2010	**7.6**	5.6	7.3	5.5
8/11/2010	**7.6**	5.9	80.8	87
10/11/2010	**7.8**	6.8	82.1	69.5
12/11/2010	**7.7**	7.5	72.0	83
15/11/2010	**7.7**	7.2	75.8	57
17/11/2010	**7.9**	6.6	29.0	23.5
19/11/2010	**7.7**	6.2	65.4	63.5
24/11/2010	**7.7**	6.5	61.2	64.5
29/11/2010	**7.6**	5.9	16.3	15.5
Action Level	<5.5 or >7.5	<1.04	>132	>170
Limit Level	<4.0 or >8.0	<0.89	>163	>209
MP3				
1/11/2010	**7.8**	8.1	13.0	12
3/11/2010	**7.8**	8.2	16.2	14
5/11/2010	**7.7**	7.1	19.0	13.5

Monitoring Date	pH	Dissolved Oxygen (mg/L)	Turbidity (NT)	Suspended Solids (mg/L)
17/11/2010	**7.7**	9.1	30.9	23
19/11/2010	**7.6**	8.3	34.8	33
22/11/2010	**7.6**	8.4	33.6	35.5
26/11/2010	**7.6**	8.1	38.5	33
29/11/2010	**8.6**	10.7	41.5	42
Action Level	<5.5 or >7.5	<6.85	>64	>65
Limit Level	<4.0 or >8.0	<6.65	>67	>66
MP4				
29/11/2010	**7.9**	7.4	32.7	23
Action Level	<5.5 or >7.5	<3.91	>60	>50
Limit Level	<4.0 or >8.0	<3.82	>64	>53
MP5				
24/11/2010	7.4	6.2	**83.4**	50
Action Level	<5.5 or >7.5	<4.13	>81	>66
Limit Level	<4.0 or >8.0	<3.87	>84	>69
MP6				
15/11/2010	**7.7**	10.1	42.0	27.5
Action Level	<5.5 or >7.5	<4.61	>94	>75
Limit Level	<4.0 or >8.0	<4.52	>96	>75

Notes:

Values **Bold** indicate Action Level exceedance.

Values **Underlined and Bold** indicate Limit Level exceedance.

7.2 Record on Environmental Complaints received

No environmental complaint was received the reporting month.

7.3 Record on Notifications of Summons and Successful Prosecution

No notifications of summons or successful prosecution were received the reporting month.

7.4 Review of reasons for and implications of non-compliance, complaints, summons and prosecutions

Investigations have been carried out to identify the causes of exceedance.

From investigation, construction activities during the period of exceedance included mainly site formation and drainage work for WRA construction, band drain installation and trial embankment. It was observed that the Contractor has implemented water quality mitigation measures as recommended in the EIA report, including the provision of temporary drainage facility and associated treatment facility. Sand bags are in place in the temporary drainage channel to enhance the desilting efficiency. The Contractor further enhanced the water quality mitigation measures by erecting several segments of rock bunds at the discharge outlet to avoid site runoff draining directly to the northern ditches.

With external factors affect the adjacent environments, including natural variations and other unknown factors directly contributing to the exceedance, the exceedances were considered not due to construction works.

7.5 Follow-up actions taken

As non-compliances have been recorded, the Event and Action Plan has been followed. Although it is considered that the exceedances were not related to the Project, the Contractor was reminded to implement the water quality mitigation measures in accordance with the recommendation stated in Section 5.6.1 – 5.6.4 of the EIA Report as far as practicable and regular spot check would be conducted on the nearby discharge by Contractor and inform ET for investigation.

To cater for the site runoff in the previous months, the Contractor has further enhanced the water quality mitigation measures by erecting several segments of rock bunds at the discharge outlet to avoid site runoff draining directly to the northern ditches.

It was also advised that the operation condition of the Wastewater Treatment Facilities should be checked regularly to ensure proper functioning of the plant and good quality of effluent discharge.

7.6 Cumulative statistics for complaints, notifications of summons and successful prosecutions

Cumulative statistics for complaints, notifications of summons and successful prosecutions for the Project account for period starting from the date of commencement of construction (i.e. 12 May 2010) to the end of the reporting month and are summarized in the **Table 7.2** below.

Table 7.2: Statistics for complaints, notifications of summons and successful prosecutions

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of summons	Successful prosecutions
This reporting month (Nov 2010)	0	0	0
From 12 May 2010 to end of the reporting month (Nov 2010)	0	0	0

8. Future key Issue

8.1 Site Preparatory Works and Construction Works for the Coming Month

The major site works to be commissioned in the coming month include:

- Installation of Band Drain; and
- Trial Embankment for Ground Improvement

8.2 Key Issues for the Coming Month

Key issues to be considered in the coming month include:

- Generation of dust from activities on-site (esp. stockpiling for Trial Embankment) during dry weather condition;
- Noise impact from operating equipment and machinery on-site;
- Generation of site surface runoffs and wastewater from activities on-site;
- Sorting, recycling, storage and disposal of general refuse and construction waste from activities on-site; and
- Management of chemicals and avoidance of oil spillage on-site and to the drainage.

8.3 Monitoring Schedule for the Coming Month

The environmental site inspection and environmental monitoring will be continued in the coming month. Impact monitoring for air, noise, water quality, ecology and landscape and visual in accordance with the approved EM&A Manual has commenced since 12 May 2010. The tentative monitoring schedule for December 2010 is shown in the **Table 8.1**.

Table 8.1: Tentative Environmental Monitoring and Audit Schedule for December 2010

Tentative Environmental Monitoring and Audit Schedule for Dec 2010

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 Water 24-hr TSP 1-hr TSP Noise Monitoring *	2 Bird	3 Water	4
5	6 Water Bird	7 24-hr TSP 1-hr TSP Noise Monitoring	8 Water *	9	10 Water	11
12	13 Water 24-hr TSP 1-hr TSP Noise Monitoring	14 @ Bird	15 Water *	16	17 Water 24-hr TSP 1-hr TSP	18
19	20 Water Bird	21	22 Water *	23 24-hr TSP 1-hr TSP Noise Monitoring	24 Water	25 Christmas Day
26	27 The first weekday after Christmas Day	28 Water Bird	29 24-hr TSP 1-hr TSP Noise Monitoring *	30 Water	31	

Air Quality Monitoring (1-hr)
Air Quality Monitoring (24-hr)
Noise Monitoring
Water Quakity Monitoring
* Site Audit by Mott MacDonald (MM)
@ Report Submission (EM&A Report)

Bird Survey
Insect Survey
Herpetofauna Survey

Note: Only two monitoring sessions will be available for the week from 27 Dec 2010 to 1 Jan 2011. The Contractor has confirmed that there will be no works on site on 27 Dec 2010 and 1 Jan 2011.

8.4.1 Conclusions

The EM&A programme as recommended in the EM&A manual has been undertaken in the reporting month since 12 May 2010.

Monitoring of Air Quality, Noise, Water Quality, Ecology and Landscape and Visual impacts due to the Project was under way. In particular, the 1-hr TSP, 24-hr TSP, noise level (as L_{eq}) and water quality parameters (such as pH, DO and SS) under monitoring have been checked against established Action and Limit levels.

There was no breach of Action and Limit Levels for 1-hr TSP, 24-hr TSP and noise in the reporting month.

Action and Limit Level exceedances of pH, DO, turbidity and SS were recorded at water quality monitoring stations including MP1, MP2, MP3, MP4, MP5 and MP6. However, Investigations on the exceedance showed that the exceedances were not related to the Project and may have been due to external factors including natural variations and other unknown factors contributing to the exceedance.

8.4.2 Recommendations

With considerations on the construction activities and environment, the following recommendations were provided:

Air Quality

- All stockpiles should be covered by tarpaulin or kept wet by water spraying;
- All vehicles should be washed to remove any dusty materials before leaving the construction sites;
- the portion of road leading the construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials;
- Sufficient water spraying should be provided at haul road to reduce dust emission, especially during dry weather conditions; and
- Ensure proper functioning of the wheel wash facility.

Noise

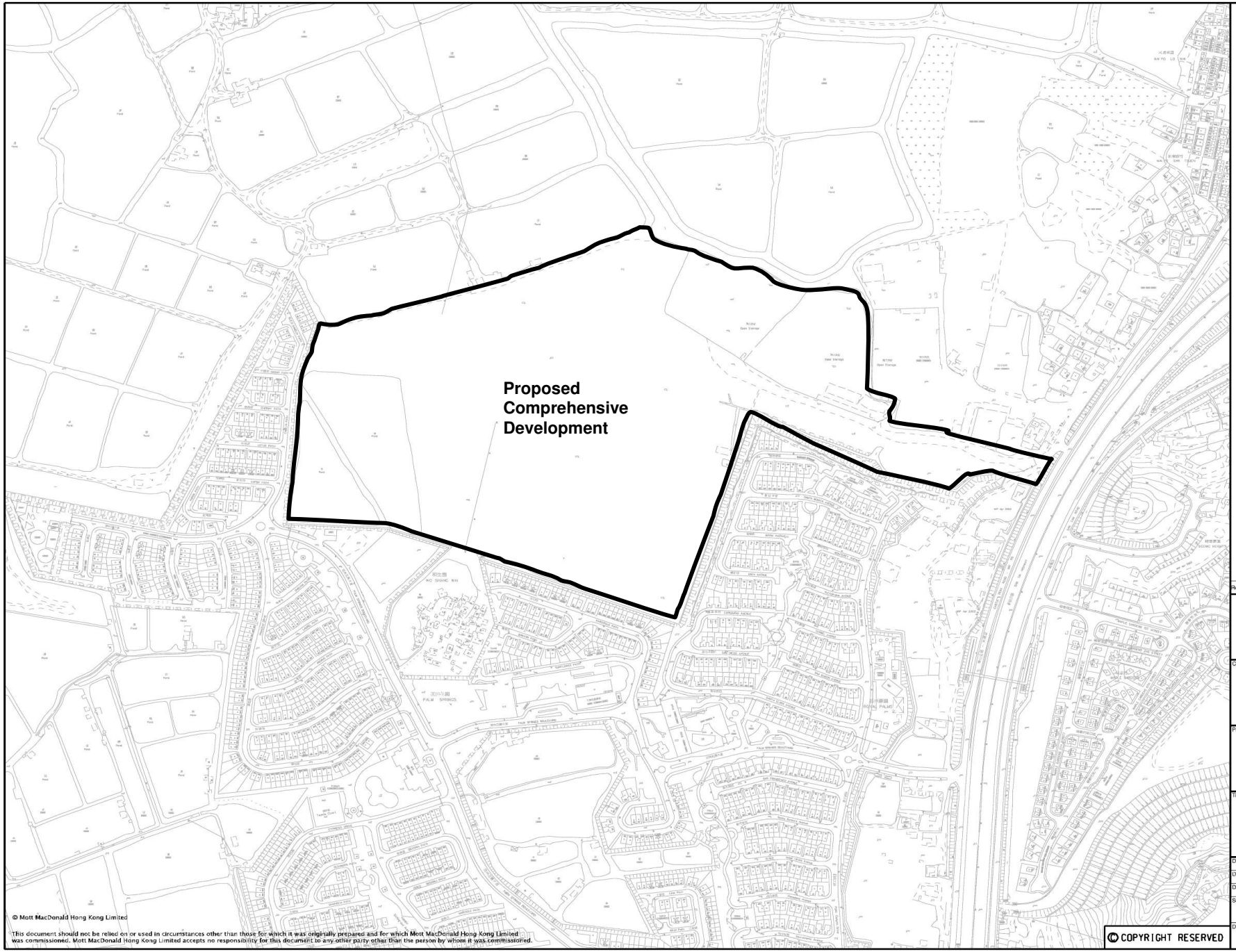
- Mobile plant should be sited as far away from NSRs as possible;
- Plant known to emit noise strongly in one direction should be orientated to direct noise away from the NSRs; and
- The construction activities should be better scheduled to reduce noise nuisance.

Water Quality

- Water accumulated in the site (including water inside drip trays) should be cleared frequently;
- Ensure proper functioning of the wastewater treatment facility; and
- Silt and debris should be removed from the temporary drainage channel regularly.

Waste management

- Reuse the excavated materials as far as practical to reduce the amount of waste disposal;
- Ensure drip trays are provided for chemical containers to prevent leakage or soil contamination;
- All plants and vehicles should be properly maintained to prevent oil leakage;
- Oil stains on soil should be cleared by disposal of contaminated soil;



Legend:

Site Boundary

Rev	Date	Drawn	Description	Ch'k'd	App'd

Mott MacDonald

Mott MacDonald Hong Kong Ltd
7th Floor
West Wing Office Building
New World Centre
20 Salisbury Road
Tsim Sha Tsui, Kowloon
Hong Kong

Tel 2828 5757
Fax 2827 1823
Web www.mottmac.com.hk

Client

HENG SHUNG CONSTRUCTION CO. LTD

Project

PROPOSED COMPREHENSIVE DEVELOPMENT AT WO SHANG WAI, YUEN LONG

Title

General Layout Plan of the Project Site

Designed			Eng.Chk.		
Drawn			Coordination		
Dwg.Chk.			Approved		
Scale		Project		Status	
		CAD File J:\22005\REPORT\ENV\EN&A_manual\080430\BaseMap.dgn			
Drawing No.				Rev	

Figure 1.1

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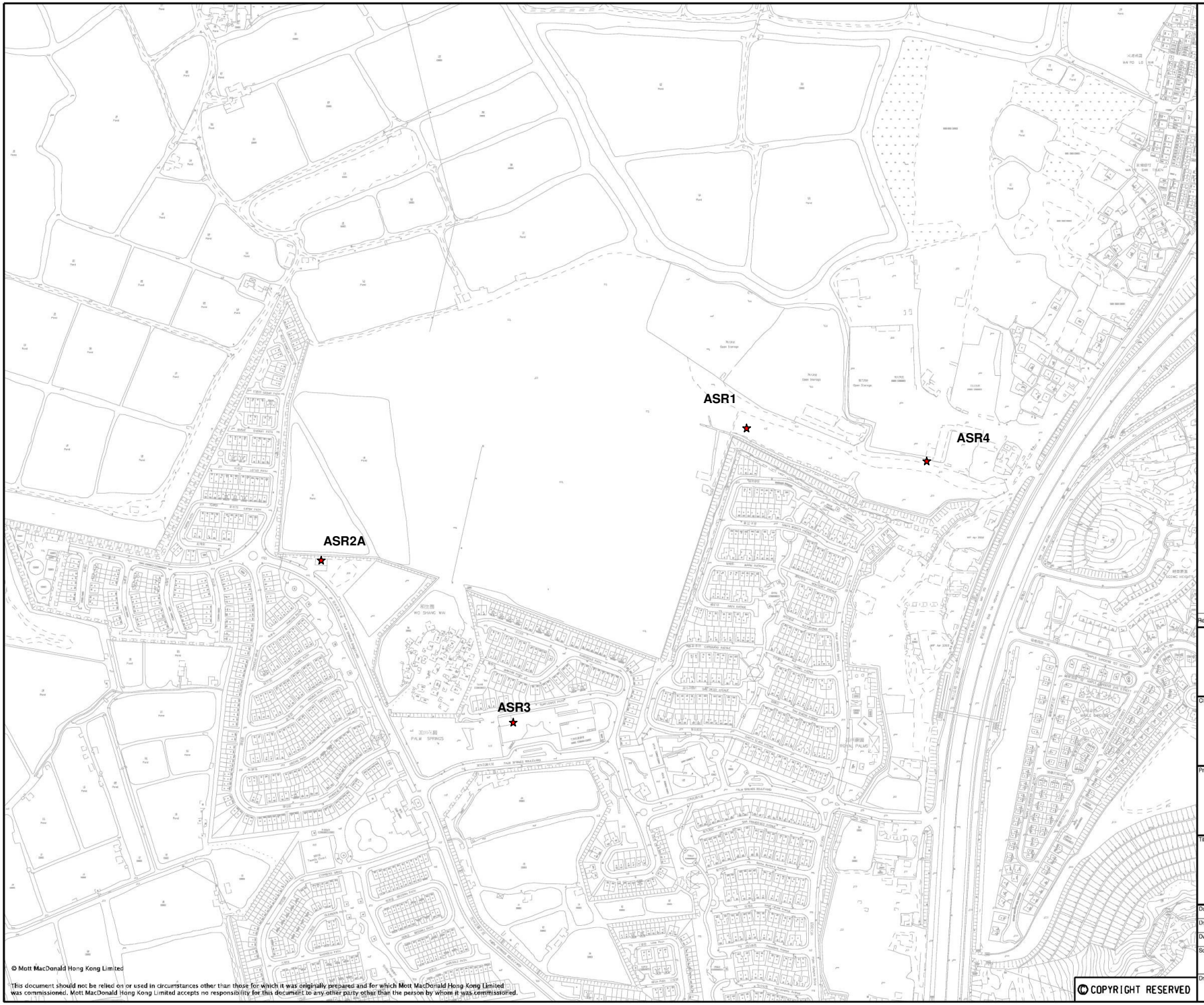

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★ Indicative Air Quality Monitoring Locations

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Mott MacDonald Hong Kong Ltd
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Client

HENG SHUNG CONSTRUCTION CO. LTD

Project

PROPOSED COMPREHENSIVE DEVELOPMENT AT WO SHANG WAI, YUEN LONG

Title

Locations of Air Quality Monitoring Stations

Designed			Eng.Chk.		
Drawn			Coordination		
Dwg.Chk.			Approved		
Scale		Project		Status	
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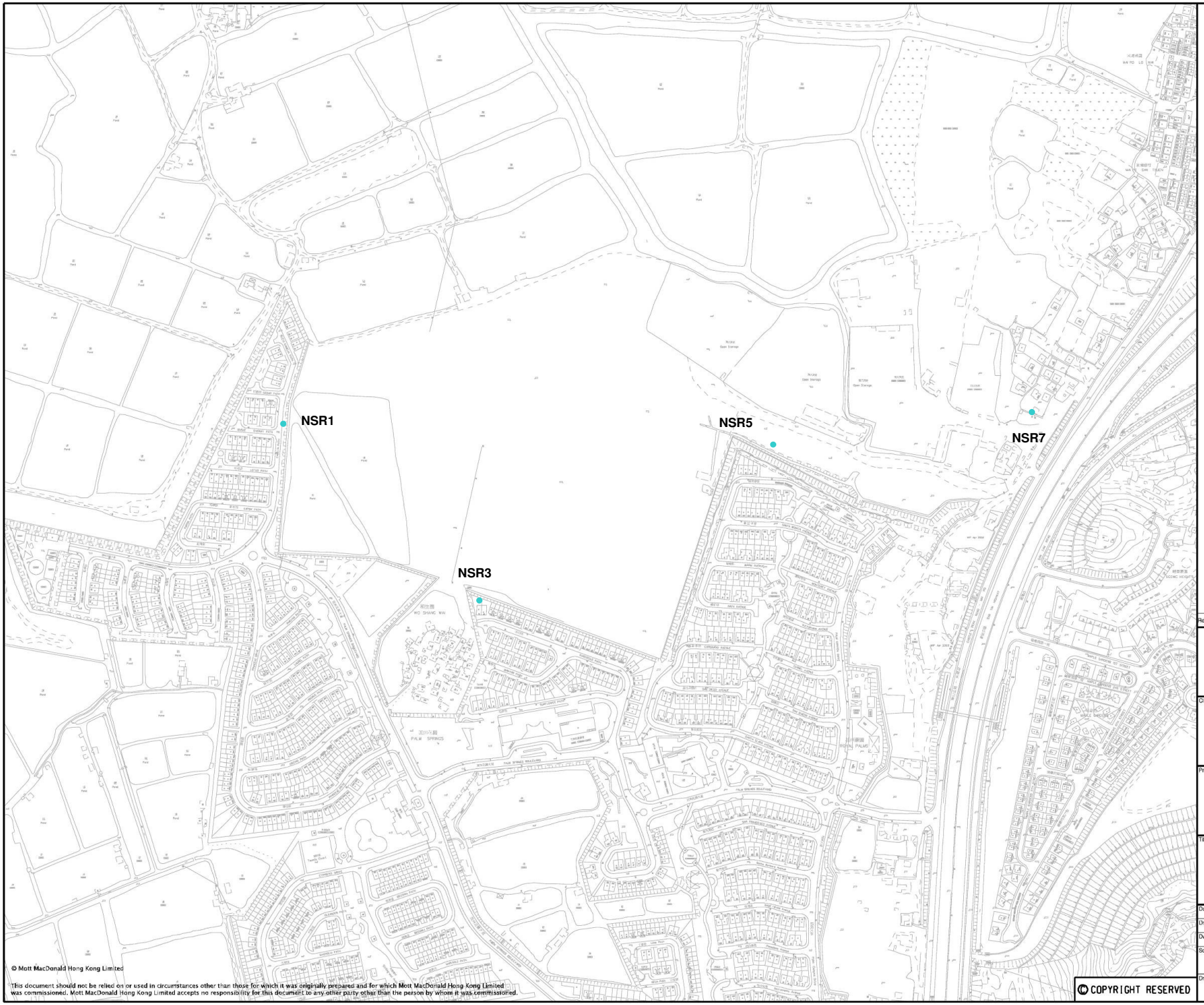
Drawing No. Figure 2.1 Rev



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- Indicative Baseline Noise Monitoring Stations

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Client

HENG SHUNG CONSTRUCTION CO. LTD

Project

PROPOSED COMPREHENSIVE DEVELOPMENT AT WO SHANG WAI, YUEN LONG

Title

Locations of Noise Monitoring Stations

Designed			Eng.Chk.		
Drawn			Coordination		
Dwg.Chk.			Approved		
Scale		Project		Status	
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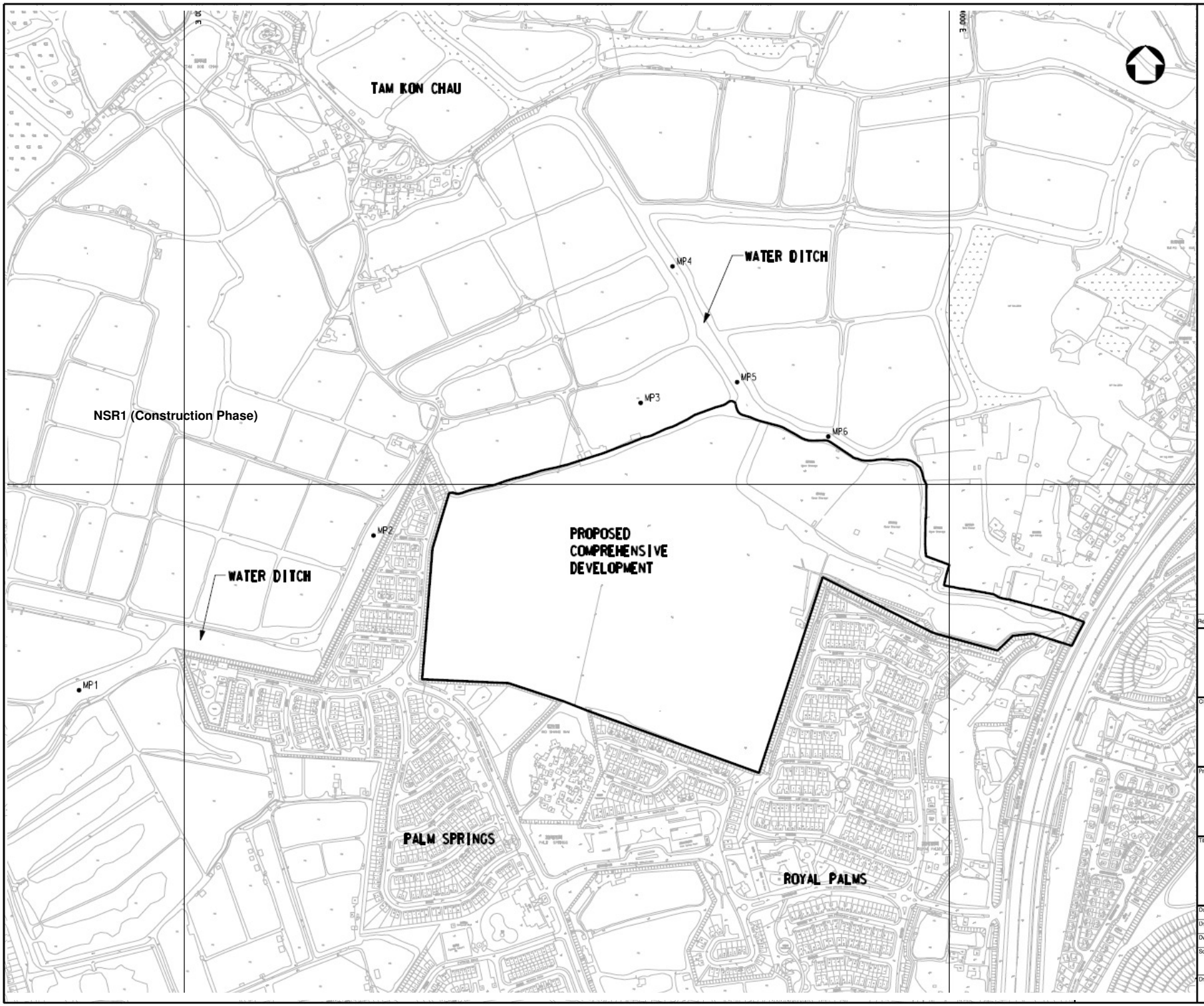

Legend:

- Water Quality Sampling Stations

Rev	Date	Drawn	Description	Ch'k'd	App'd

Mott MacDonald

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Client

HENG SHUNG CONSTRUCTION CO. LTD

Project

PROPOSED COMPREHENSIVE DEVELOPMENT
AT WO SHANG WAI, YUEN LONG

Title

Locations of Water Quality Monitoring Stations

Designed			Eng.Chk.		
Drawn			Coordination		
Dwg.Chk.			Approved		
Scale		Project		Status	
		CAD File			

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Figure 2.3

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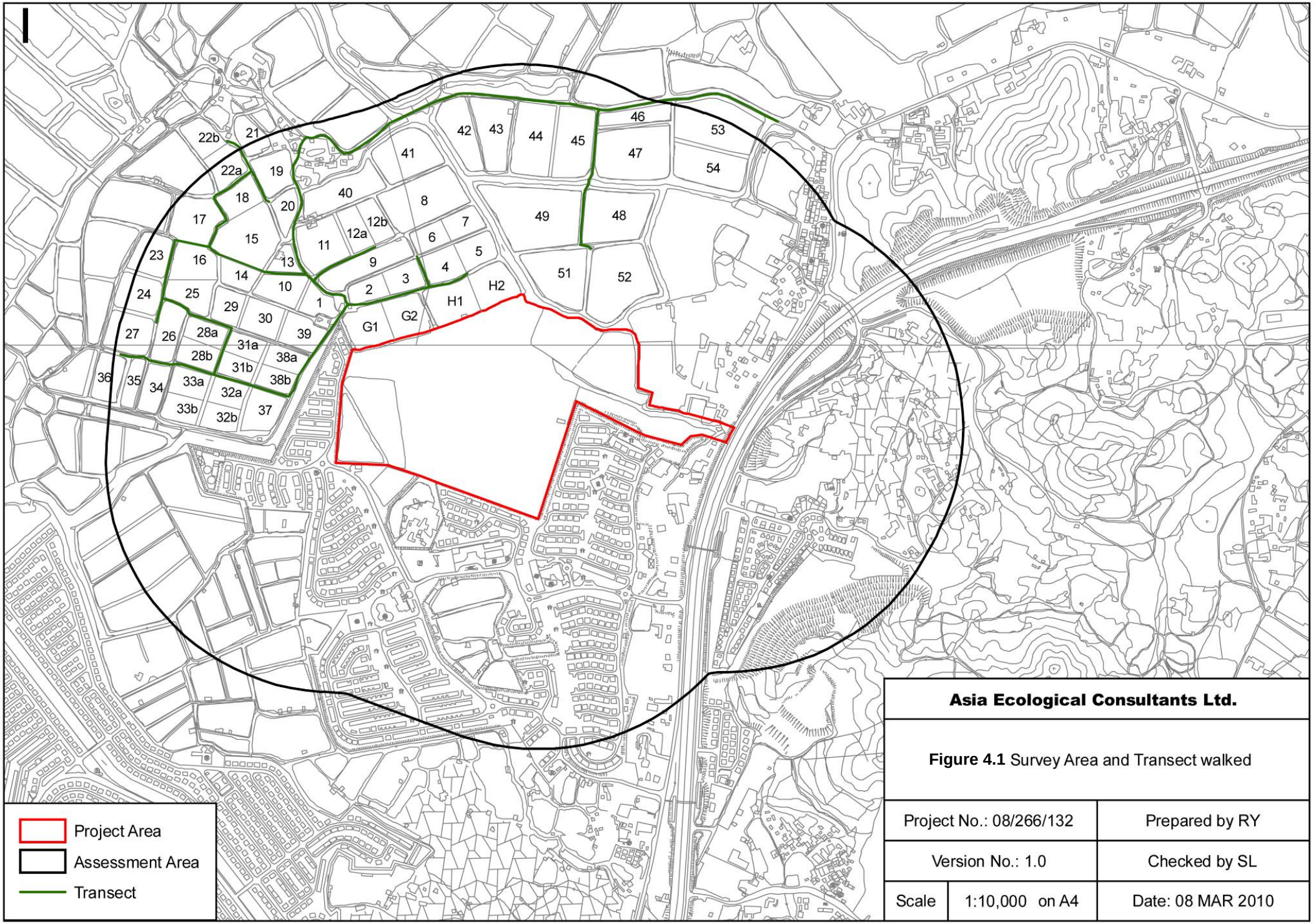
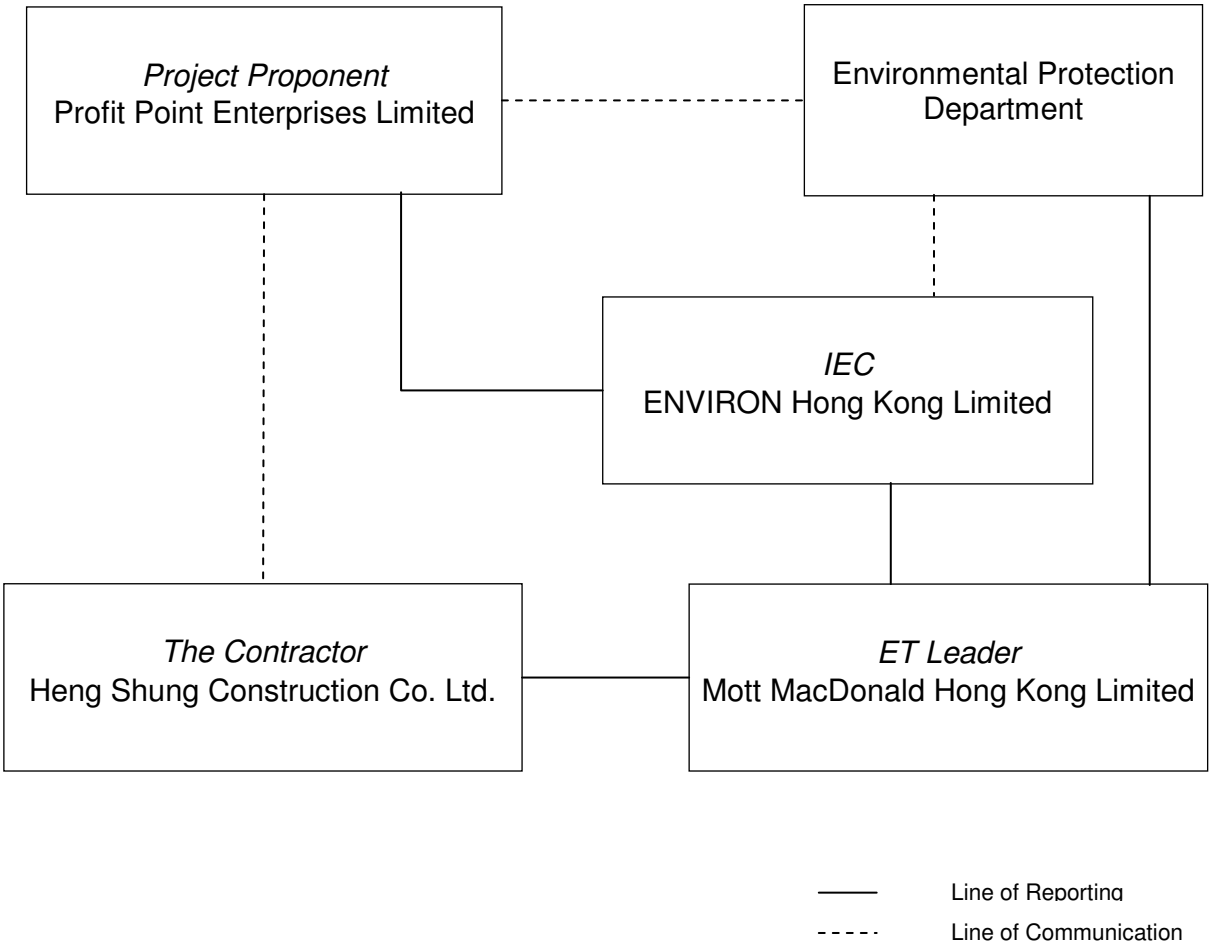


Asia Ecological Consultants Ltd.

Figure 4.1 Survey Area and Transect walked

Project No.: 08/266/132		Prepared by RY
Version No.: 1.0		Checked by SL
Scale	1:10,000 on A4	Date: 08 MAR 2010

Appendix A. Project Organization Chart



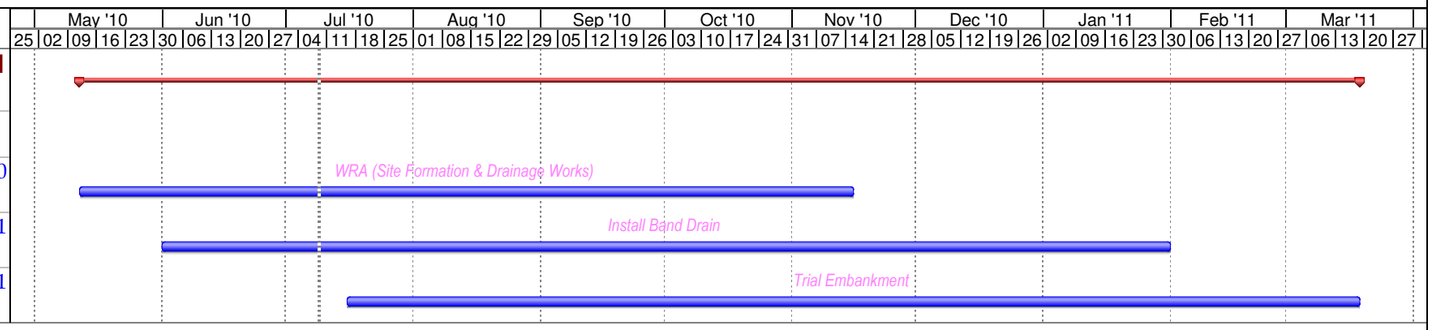
Contact information:

Company	Position	Name	Telephone / Mobile
Heng Shung Construction Co. Ltd. (The Contractor)	Assistant Construction Manager	Ms Lynne Hung	2908 2391
Heng Shung Construction Co. Ltd. (The Contractor)	Site Agent	Mr Poon Man Ho	9426 3533
Heng Shung Construction Co. Ltd. (The Contractor)	Environmental Officer	Mr. Lun Ho Yin	9866 7497
ENVIRON Hong Kong Ltd (IEC)	Independent Environmental Checker	Mr David Yeung	3743 0788
Mott MacDonald Hong Kong Ltd. (ET)	ET Team Leader	Ms Florence Yuen	2828 5768

Appendix B. Tentative Construction Programme

Wo Shang Wai Preparatory Works Programme

ID	Task Name	Working	Start	Finish
0	**Wo Shang Wai Preparatory Works Construction Period**	**250 days**	**Wed 12/05/10**	**Fri 18/03/11**
1				
2	WRA (Site Formation & Drainage Works)	154 days	Wed 12/05/10	Mon 15/11/10
3	Install Band Drain	201 days	Tue 01/06/10	Mon 31/01/11
4	Trial Embankment	197 days	Fri 16/07/10	Fri 18/03/11



Project : Wo Shang Wai
Revision : E
Print Date : Fri 09/07/10

Task Milestone Summary

Appendix C. Action and Limit Levels for Construction Phase

Air Quality

Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level (µg/m^3)	Limit Level (µg/m^3)
ASR1	226	260
ASR2A	213	260
ASR3	205	260
ASR4	237	260

Action and Limit Levels for 1-hour TSP

Monitoring Station	Action Level (µg/m^3)	Limit Level (µg/m^3)
ASR1	378	500
ASR2A	357	500
ASR3	358	500
ASR4	372	500

Noise

Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
NSR1, NSR3, NSR5, NSR7		
0700 – 1900 hours on normal weekdays	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)

Water Quality

Action and Limit Levels for Water Quality

Parameters	DO in mg/L		Turbidity in NTU		SS in mg/L		pH	
	Action Level	Limit Level	Action Level	Action Level	Action Level	Limit Level	Action Level	Limit Level
MP1	1.23	1.17	173	177	231	299	< 5.5 or > 7.5	< 4.0 or > 8.0
MP2	1.04	0.89	132	163	170	209		
MP3	6.85	6.65	64	67	65	66		
MP4	3.91	3.82	60	64	50	53		
MP5	4.13	3.87	81	84	66	69		
MP6	4.61	4.52	94	96	75	75		

Appendix D. Event and Action Plan for Air Quality, Noise, Water Quality, Ecology and Landscape & Visual

Air Quality

Event	Action ET Leader	IEC	ER	Contractor
Action Level				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform IEC and ER. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET. 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice. 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify the source. 2. Inform IEC and ER. 3. Advise ER on the effectiveness of the proposed remedial measures 4. Repeat measurements to confirm findings. 5. Increase monitoring frequency to daily. 6. Discuss with IEC and the Contractor on remedial actions required. 7. If exceedance continues, arrange meeting with IEC and ER. 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET. 2. Check the Contractor's working method. 3. Discuss with ET Leader and the Contractor on possible remedial measures. 4. Advise ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial actions to IEC within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposal if appropriate.
Limit Level				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform ER and EPD. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET. 2. Check the Contractor's working method. 3. Discuss with ET Leader and the Contractor on possible remedial measures. 4. Advise ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, EPD and the Contractor. 2. Identify the source. 3. Repeat measurements to confirm findings.	1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to

Event	Action			
	ET Leader	IEC	ER	Contractor
	4. Increase monitoring frequency to daily. 5. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 6. Arrange meeting IEC and ER to discuss the remedial actions to be taken. 7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	2. Review the Contractor's remedial actions whenever necessary and advise ER accordingly. 3. Supervise the implementation of remedial measures.	Contractor. 3. In consultation with IEC, agree with the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	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 activity of works as determined by ER until the exceedance is abated.

Construction Noise

Event	Action ET Leader	IEC	ER	Contractor
Action Level	1. Notify IEC and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to IEC and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation measures.	1. Review with analysed results submitted by ET. 2. Review the proposed remedial measures by the Contractor and advise ER accordingly. 3. Supervise the implement of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC. 2. Implement noise mitigation proposals.
Limit Level	1. Identify the source. 2. Notify IEC, ER, EPD and the Contractor. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform IEC, ER, and EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	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 activity of works as determined by the ER until the exceedance is abated.

Water Quality

Event	Action ET Leader	IEC	ER	Contractor
Action Level				
1. Exceedance for one sample	1. Repeat in-situ measurement to confirm finding; 2. Identify source(s) of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; and 6. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER; and 6. Implement the agreed mitigation measures.
2. Exceedance for two or more consecutive samples	1. Repeat in-situ measurement to confirm finding; 2. Identify source(s) of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; and 8. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; and 6. Implement the agreed mitigation measures.
Limit Level				
1. Exceedance for one sample	1. Repeat in-situ measurement to confirm finding; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; and	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; and 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; and 4. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days; and

Event	Action			
	ET Leader	IEC	ER	Contractor
	7. Increase the monitoring frequency to daily until no exceedance of Limit level.			6. Implement the agreed mitigation measures.
2. Exceedance for two or more consecutive samples	1. Repeat in-situ measurement to confirm finding; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; and 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; and 2. Request Contractor 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; and 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures; and 7. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities.

Appendix E. Calibration certificates

Appendix E
Calibration Record
(Air Quality Monitoring)

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

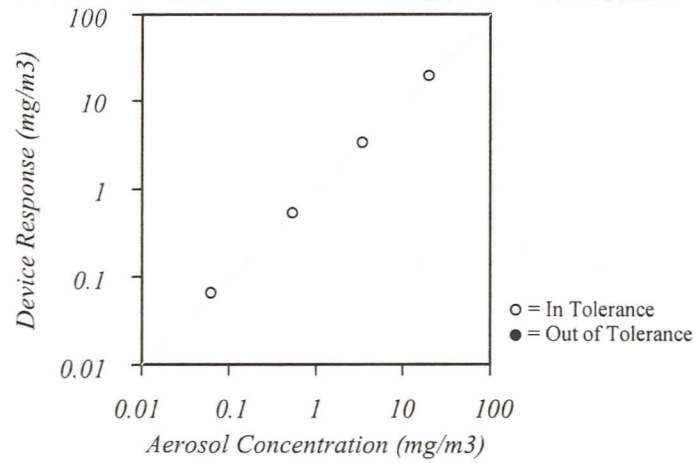
Environment Condition		
Temperature	74.7 (23.7)	°F (°C)
Relative Humidity	35	%RH
Barometric Pressure	28.87 (977.7)	inHg (hPa)

Model	**8520**
Serial Number	**22378**

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-02

Zero Stability Results

Average:	Minimum:	Maximum:	Time:
0.000 :mg/m³	0.000 :mg/m³	0.001 :mg/m³	4.00 :hrs.

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 adusted 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
Barometric Pressure	E001329	04-23-09	04-23-10
Humidity	E002873	02-24-09	02-24-10
DC Voltage	E003315	01-06-09	01-06-10
Microbalance	E003403	06-25-09	06-25-10
Pressure	E003511	11-12-09	11-12-10

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E002873	02-24-09	02-24-10
DC Voltage	E003314	01-06-09	01-06-10
Photometer	E003319	07-02-09	01-02-10
Flow and Temperature	E003512	02-16-09	02-16-10

Tom Day
Calibrated

☒ Final Function Check

November 24, 2009
Date

Litho. in U.S.A.
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TISCH ENVIROMENTAL, INC.
145 SOUTH MIAMI AVE.
VILLAGE OF CLEVES, 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 10, 2010 Rootsmeter S/N 9833620 Ta (K) - 296
Operator Tisch Orifice I.D. - 1785 Pa (mm) - 750.57

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3960	3.2	2.00
2	NA	NA	1.00	0.9840	6.4	4.00
3	NA	NA	1.00	0.8790	7.9	5.00
4	NA	NA	1.00	0.8390	8.7	5.50
5	NA	NA	1.00	0.6940	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9900	0.7092	1.4102		0.9957	0.7133	0.8881
0.9858	1.0018	1.9943		0.9915	1.0076	1.2560
0.9837	1.1191	2.2296		0.9894	1.1256	1.4042
0.9827	1.1713	2.3385		0.9884	1.1781	1.4728
0.9774	1.4084	2.8203		0.9830	1.4165	1.7762
Qstd slope (m) =	2.01637			Qa slope (m) =	1.26262	
intercept (b) =	-0.02316			intercept (b) =	-0.01458	
coefficient (r) =	0.99996			coefficient (r) =	0.99996	
y axis = SQRT[H2O(Pa/760)(298/Ta)]				y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol[(Pa-Diff. Hg)/760](298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

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

TISCH ENVIROMENTAL, INC.
145 SOUTH MIAMI AVE.
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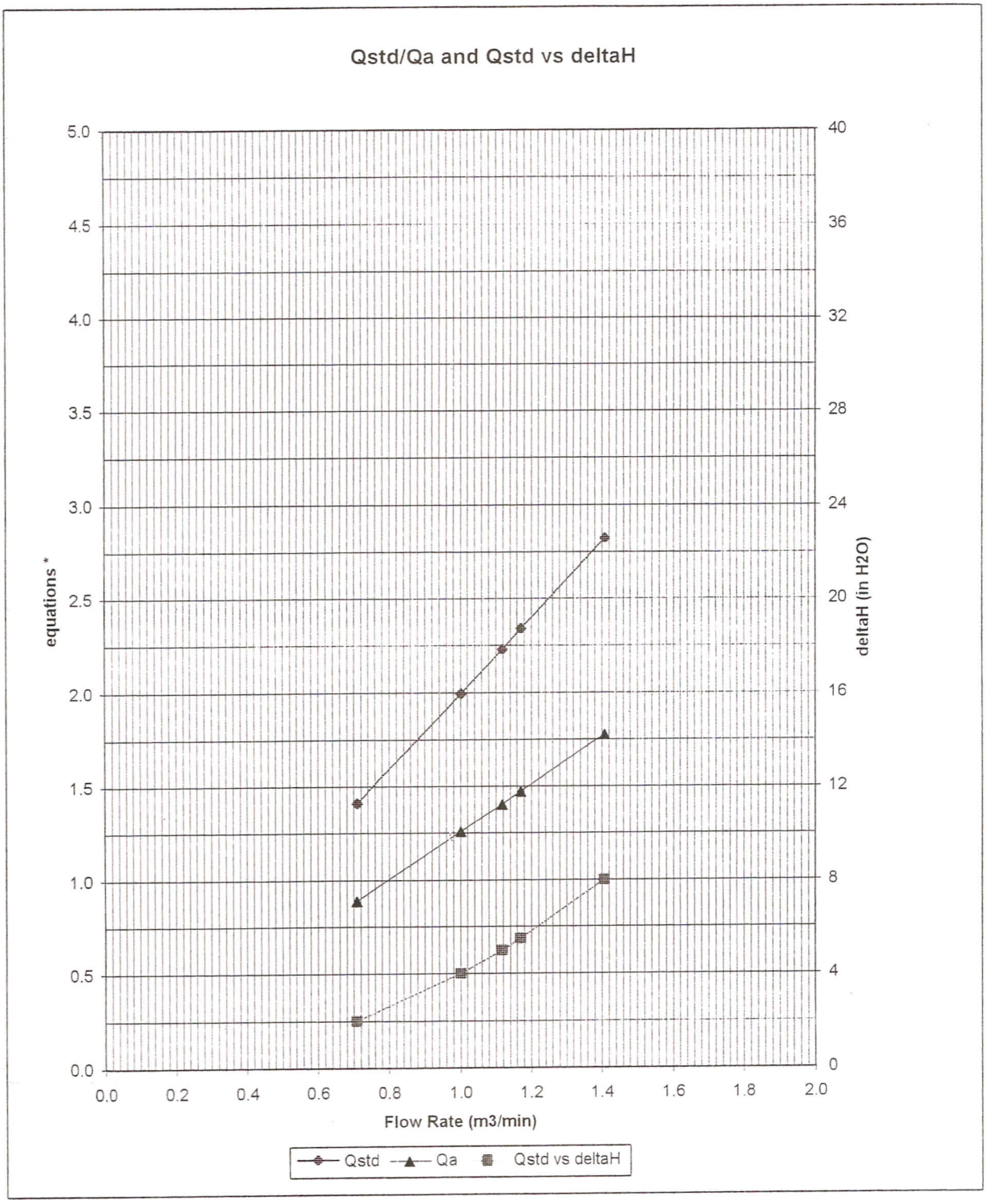
513.467.9009 FAX
WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT



* y-axis equations:

Qstd series: $\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$

Qa series: $\sqrt{(\Delta H\ (Ta\ /\ Pa))}$

#1785

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

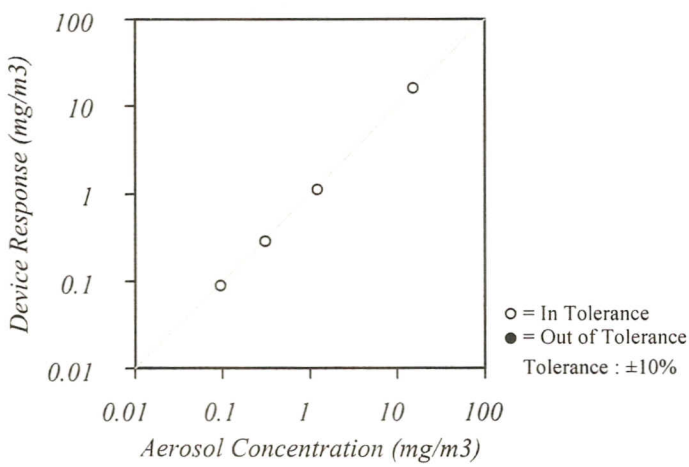
Environment Condition		
Temperature	78.3 (25.7)	°F (°C)
Relative Humidity	25	%RH
Barometric Pressure	28.72 (972.6)	inHg (hPa)

Model	**AM510**
Serial Number	**11011005**

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-01

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 adusted 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
Photometer	E003433	11-11-10	05-11-11	Flow and temperature	E003434	04-21-10	04-21-11
DC Voltage(Keithley)	E002859	01-05-10	01-05-11	Microbalance	E003403	01-07-10	01-07-11
Barometric Pressure	E003733	12-26-09	12-26-10	Temperature	E002873	02-23-10	02-23-11
Humidity	E002873	02-23-10	02-23-11	Pressure	E003440	08-24-10	08-24-11

Patricia McCarty
Calibrated

☑ Final Function Check

November 15, 2010
Date

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High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR1
Calibrated by : P.F.Yeung
Date : 10/09/2010

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 1806

Calibration Orfice and Standard Calibration Relationship
Serial Number : 1785
Service Date : 10 May 2010
Slope (m) : 2.01637
Intercept (b) : -0.02316
Correlation Coefficient(r) : 0.99996

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1008
Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	11.0	3.281	1.639	54	53.4
2	13 holes	9.6	3.065	1.532	51	50.5
3	10 holes	7.4	2.691	1.346	45	44.5
4	7 holes	4.4	2.075	1.041	35	34.6
5	5 holes	2.0	1.400	0.705	25	24.7

Sampler Calibration Relationship

Slope(m):31.058 Intercept(b): 2.650 Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan Date: 15/09/2010

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR2A
Calibrated by	:	P.F.Yeung
Date	:	10/09/2010

Sampler

Model	:	GMWS-2310 ACCU-VOL
Serial Number	:	S/N 1061

Calibration Orfice and Standard Calibration Relationship

Serial Number	:	1785
Service Date	:	10 May 2010
Slope (m)	:	2.01637
Intercept (b)	:	-0.02316
Correlation Coefficient(r)	:	0.99996

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1008
Ta(K)	:	303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	10.4	3.186	1.591	48	47.4
2	13 holes	8.2	2.829	1.414	42	41.5
3	10 holes	6.4	2.499	1.251	36	35.6
4	7 holes	4.1	2.024	1.015	28	27.7
5	5 holes	2.5	1.562	0.786	20	19.8

Sampler Calibration Relationship

Slope(m):34.397 Intercept(b): -7.230 Correlation Coefficient(r): 0.9999

Checked by: Magnum Fan Date: 15/09/2010

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR3
Calibrated by : K.T.Ho
Date : 10/09/2010

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 7577

Calibration Orfice and Standard Calibration Relationship
Serial Number : 1785
Service Date : 10 May 2010
Slope (m) : 2.01637
Intercept (b) : -0.02316
Correlation Coefficient(r) : 0.99996

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1008
Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	11.8	3.398	1.697	54	53.4
2	13 holes	9.4	3.033	1.516	48	47.5
3	10 holes	7.2	2.654	1.328	42	41.5
4	7 holes	4.6	2.122	1.064	34	33.6
5	5 holes	2.6	1.595	0.803	26	25.7

Sampler Calibration Relationship

Slope(m):30.860 Intercept(b): 0.820 Correlation Coefficient(r): 0.9999

Checked by: Magnum Fan Date: 15/09/2010

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR4
Calibrated by : P.F.Yeung
Date : 10/09/2010

Sampler

Model	:	GMWS-2310 ACCU-VOL
Serial Number	:	S/N 1273

Calibration Orfice and Standard Calibration Relationship

Serial Number	:	1785
Service Date	:	10 May 2010
Slope (m)	:	2.01637
Intercept (b)	:	-0.02316
Correlation Coefficient(r)	:	0.99996

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1008
Ta(K)	:	303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	10.0	3.128	1.563	55	54.4
2	13 holes	8.0	2.798	1.399	49	48.5
3	10 holes	6.0	2.423	1.213	43	42.5
4	7 holes	3.8	1.928	0.968	34	33.6
5	5 holes	2.3	1.500	0.756	27	26.7

Sampler Calibration Relationship

Slope(m):34.333 Intercept(b): 0.649 Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan Date: 15/09/2010

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR1
Calibrated by : P.F.Yeung
Date : 10/11/2010

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 1806

Calibration Orfice and Standard Calibration Relationship
Serial Number : 1785
Service Date : 10 May 2010
Slope (m) : 2.01637
Intercept (b) : -0.02316
Correlation Coefficient(r) : 0.99996

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1011
Ta(K) : 297

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	11.7	3.440	1.717	56	56.3
2	13 holes	9.3	3.067	1.532	49	49.3
3	10 holes	7.2	2.698	1.350	43	43.2
4	7 holes	4.7	2.180	1.093	34	34.2
5	5 holes	2.7	1.652	0.830	25	25.1

Sampler Calibration Relationship

Slope(m):34.976 Intercept(b): -3.998 Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan Date: 15/11/2010

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR2A
Calibrated by : P.F.Yeung
Date : 10/11/2010

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 1061

Calibration Orfice and Standard Calibration Relationship
Serial Number : 1785
Service Date : 10 May 2010
Slope (m) : 2.01637
Intercept (b) : -0.02316
Correlation Coefficient(r) : 0.99996

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1011
Ta(K) : 297

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.2	3.512	1.753	50	50.3
2	13 holes	9.6	3.116	1.557	44	44.2
3	10 holes	7.4	2.735	1.368	39	39.2
4	7 holes	4.8	2.203	1.104	32	32.1
5	5 holes	2.6	1.621	0.816	24	24.1

Sampler Calibration Relationship

Slope(m):27.613 Intercept(b): 1.573 Correlation Coefficient(r): 0.9997

Checked by: Magnum Fan Date: 15/11/2010

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR3
Calibrated by : K.T.Ho
Date : 10/11/2010

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 7577

Calibration Orfice and Standard Calibration Relationship
Serial Number : 1785
Service Date : 10 May 2010
Slope (m) : 2.01637
Intercept (b) : -0.02316
Correlation Coefficient(r) : 0.99996

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1011
Ta(K) : 297

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	11.8	3.454	1.725	57	57.3
2	13 holes	9.3	3.067	1.532	50	50.3
3	10 holes	7.2	2.698	1.350	43	43.2
4	7 holes	4.7	2.180	1.093	34	34.2
5	5 holes	2.7	1.652	0.831	25	25.1

Sampler Calibration Relationship

Slope(m):36.064 Intercept(b): -5.068 Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan Date: 15/11/2010

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR4
Calibrated by : P.F.Yeung
Date : 10/11/2010

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 1273

Calibration Orfice and Standard Calibration Relationship
Serial Number : 1785
Service Date : 10 May 2010
Slope (m) : 2.01637
Intercept (b) : -0.02316
Correlation Coefficient(r) : 0.99996

Standard Condition
Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition
Pa (hpa) : 1011
Ta(K) : 297

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	10.6	3.269	1.663	55	55.2
2	13 holes	8.0	2.840	1.420	48	48.2
3	10 holes	6.0	2.460	1.231	42	42.2
4	7 holes	3.8	1.957	0.982	34	34.1
5	5 holes	2.2	1.489	0.750	26	26.1

Sampler Calibration Relationship

Slope(m):32.826 Intercept(b): 1.669 Correlation Coefficient(r): 0.9999

Checked by: Magnum Fan Date: 15/11/2010

Appendix E
Calibration Record
(Noise Monitoring)

Calibration Chart

Brüel & Kjær

Type 4231 Serial No. 2699361

Sound Pressure Level: 94.00 or 114.00 dB ±0.20 dB
(re 20 μPa at reference conditions)

Frequency: 1000 Hz ±0.1%

Distortion: <1%

Reference Conditions:

Temperature:	23°C
Pressure:	101.325 kPa
Humidity:	50% RH
Load:	0.25 cm^3 (½" Brüel & Kjær Mic.)

Date: 29-12-9 Signed:

Sound Calibrator Type 4231

Brüel & Kjær

Levels for Brüel & Kjær ½" Microphones:

Equivalent Free Field:	93.85 dB or 113.85 dB
Equivalent Diffuse Field:	94.00 dB or 114.00 dB
Pressure Field:	94.00 dB or 114.00 dB

Frequency: 1000 Hz

Conforms to:
ANSI S1.40–1984 and IEC 60942 (2003) Class 1 & LS

Ambient Conditions:

Temperature:	–10° to 50°C, Class LS +16° to 30°C
Pressure:	65 kPa to 108 kPa
Humidity:	25% to 90% RH

For further information refer to the User Manual

BC0210–12

Brüel & Kjær

Packing Note

Item	Description
-4231---	Sound Calibrator Class 1 and LS, 94 and 114 dB, 1 kHz Akustischer Kalibrator der Klasse 1 - 94 dB / 1 kHz und 114 dB / 1 kHz - Bauartgeprüft und eichfähig Calibreur acoustique de classe 1 (94 et 114 dB à 1kHz)

Item	Qty	Description
BA-5341---	1	Trilingual Manual Pack for Type 4231 Trilingual Manual Pack for Type 4231 Trilingual Manual Pack for Type 4231
BC-0210---	1	Calibration Chart Type 4231 Calibration Chart Type 4231 Calibration Chart Type 4231
KE-0317---	1	Leather Case for 4231 Teilverpackung Leather Case for 4231
QB-0013---	2	Battery 1,5V Alkaline, Non-Rechargeable, size AA (LR6) ø14,5x 50,5mm Battery 1,5V Alkaline, Non-Rechargeable, size AA (LR6) ø14,5x 50,5mm Battery 1,5V Alkaline, Non-Rechargeable, size AA (LR6) ø14,5x 50,5mm

QI
Performed by:

If the accessories included in the Product Data Sheet or Manual differ from the items supplied, the items mentioned on the Packing Note/List are valid.

A27111

Brüel & Kjær
Incorporating LDS and Lochard

Packing List

Delivery Number	Ship Date (DD-MM-YYYY)	Page
2314552	05-02-2010	1/1

Ship To

Spectris China Ltd.
Attn. Jacky Leung
132 Nathan Road
Unit 706, 7/F Miramar Tower
Tsimshatsui
Kowloon
Hong Kong

Forwarder	**Geodis Wilson / Airfreight**
Sales Order Number	**6551240**
Your Reference	**SR# 1-201034558**
Our Reference	

No. of Colli **1** Gross Weight **1 kg** Net Weight **0.45 kg** Volume **0.006 m³**

Colli	B&K Item No.	QTY	Net Weight	Serial No.	Description	Included in Item
1	-4231---	1	0.45 kg	2699361	Sound Calibrator Class 1 and LS, 94 and 114 dB, 1 kHz	

Note

If the accessories included specified in the Product Data Sheet or Manual differ from the items supplied, the items mentioned on the Packing Slip are valid.
In case of any question, please contact your local Brüel & Kjær office.

55258809

Brüel & Kjær Sound & Vibration Measurement A/S
Skodsborgvej 307 • DK-2850 Nærum • Denmark
CVR : 23 95 84 14 • VAT : DK11 94 84 56
Tel : +45 77 41 20 00 • Fax : +45 45 80 14 05
E-mail : info@bksv.com
Website : www.bksv.com

Danske bank : Account : 3001-3015 081260
Swift address : DABADKKK
IBAN nos :
(DKK) DK 75 3000 3015081260
(EUR) DK 25 3000 3001963589
(USD) DK 26 3000 4451045504

輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C095683

Certificate of Calibration

This is to certify that the equipment

Description : Sound Level Meter

Manufacturer : Rion

Model No. : NL-31

Serial No. : 00983400

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C095683.

The equipment is supplied by

Co. Name : Envirotech Services Co.

Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road, Hong Kong

Date of Issue : 23 October 2009

Certified by : K C Lee

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C105886

Certificate of Calibration

This is to certify that the equipment

Description : Sound Level Meter

Manufacturer : Rion

Model No. : NL-31

Serial No. : 00983400

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C105886.

The equipment is supplied by

Co. Name : Envirotech Services Co.

Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road, Hong Kong

Date of Issue : 26 October 2010

Certified by : K C Lee

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C105886

Calibration Report

ITEM TESTED

DESCRIPTION : Sound Level Meter
MANUFACTURER : Rion
MODEL NO. : NL-31
SERIAL NO. : 00983400

TEST CONDITIONS

AMBIENT TEMPERATURE : (23 ± 2)°C RELATIVE HUMIDITY : (55 ± 20)%
LINE VOLTAGE : ---

TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 25 October 2010 ***JOB NO.*** : IC10-2726

TEST RESULTS

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested by : *L L Cheung* *Date : 26 October 2010*

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Report No. : C105886

Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C100067
CL281	Multifunction Acoustic Calibrator	C1006860

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 120	L_A	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.1

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	94.0	Ref.
			Slow			93.9	± 0.3

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Report No. : C105886

Calibration Report

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_A	A	Fast	94.00	63 Hz	67.6	-26.2 ± 1.5
					125 Hz	77.7	-16.1 ± 1.5
					250 Hz	85.2	-8.6 ± 1.4
					500 Hz	90.7	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.3	+1.2 ± 1.6
					4 kHz	95.1	+1.0 ± 1.6
					8 kHz	93.0	-1.1 (+2.1 ; -3.1)
					12.5 kHz	90.1	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_C	C	Fast	94.00	63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.9	-0.2 ± 1.6
					4 kHz	93.4	-0.8 ± 1.6
					8 kHz	91.1	-3.0 (+2.1 ; -3.1)
					12.5 kHz	88.3	-6.2 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Report No. : C105886

Calibration Report

Remarks : - Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	:	63 Hz - 125 Hz	: ± 0.35 dB
		250 Hz - 500 Hz	: ± 0.30 dB
		1 kHz	: ± 0.20 dB
		2 kHz - 4 kHz	: ± 0.35 dB
		8 kHz	: ± 0.45 dB
		12.5 kHz	: ± 0.70 dB
104 dB	:	1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	:	1 kHz	: ± 0.10 dB (Ref. 94 dB)

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

Note :
The values given in this Calibration Report 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.

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Appendix E
Calibration Record
(Water Quality Monitoring)

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
ALS TECHNICHEM (HK) Pty Ltd
Environmental Division

CERTIFICATE OF ANALYSIS

CONTACT:	MR THOMAS WONG	**Batch:**	HK1022392
CLIENT:	ENOVATIVE ENVIRONMENTAL TECHNOLOGY COMPANY	**LABORATORY:**	HONG KONG
ADDRESS:	RM 3704, SIK MAN HOUSE, HOMANTIN ESTATE, KOWLOON, HONG KONG.	**DATE RECEIVED:**	01/09/2010
		DATE OF ISSUE:	07/09/2010
		SAMPLE TYPE:	EQUIPMENT
ORDER No.:		**No. of SAMPLES:**	1

COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

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@alsenviro.com

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

Other ALS Environmental Laboratories

AUSTRALIA		*AMERICAS*
Brisbane	*Hong Kong*	*Vancouver*
Melbourne	*Singapore*	*Santiago*
Sydney	*Kuala Lumpur*	*Amtofagasta*
Newcastle	*Bogor*	*Lima*

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Abbreviations: *% SPK REC denotes percentage spike recovery*
CHK denotes duplicate check sample
LOR denotes limit of reporting
LCS % REC denotes Laboratory Control Sample percentage recovery

CERTIFICATE OF ANALYSIS

Batch: HK1022392
Date of Issue: 07/09/2010
Client: ENOVATIVE ENVIRONMENTAL TECHNOLOGY COMPANY
Client Reference:

Calibration of Turbidimeter

Item :	Hach Turbidimeter	Serial No.:	09120C000514
Model No.:	2100Q	Equipment No.:	N/A
ALS Lab ID:	HK1022392 -001	Date of Calibration:	01 September, 2010

Testing Results :

Turbidimeter

Expected Reading	Recording Reading
4.00 NTU	3.60 NTU
16.0 NTU	15.2 NTU
80.0 NTU	80.0 NTU
400 NTU	376 NTU
Allowing Deviation	±10%

Testing Method:

APHA (20th edition), 2130 B

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

ALS Technichem (HK) Pty Ltd
Environmental Division

CERTIFICATE OF ANALYSIS

CONTACT:	MR THOMAS WONG	**WORK ORDER:**	HK1025275
CLIENT:	ENOVATIVE ENVIRONMENTAL TECHNOLOGY COMPANY	**AMENDMENT:**	1
ADDRESS:	RM 3704, SIK MAN HOUSE, HOMANTIN ESTATE, KOWLOON, HONG KONG.	**LABORATORY:**	HONG KONG
		DATE RECEIVED:	21/10/2010
		DATE OF ISSUE:	12/11/2010
		SAMPLE TYPE:	EQUIPMENT
ORDER No.:		**No. of SAMPLES:**	2

COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

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@alsenviro.com

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

Other ALS Environmental Laboratories

AUSTRALIA		*AMERICAS*
Brisbane	*Hong Kong*	*Vancouver*
Melbourne	*Singapore*	*Santiago*
Sydney	*Kuala Lumpur*	*Amtofagasta*
Newcastle	*Bogor*	*Lima*

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

Abbreviations: *% SPK REC denotes percentage spike recovery*
CHK denotes duplicate check sample
LOR denotes limit of reporting
LCS % REC denotes Laboratory Control Sample percentage recovery

CERTIFICATE OF ANALYSIS

Work Order: HK1025275
Amendment: 1
Date of Issue: 12/11/2010
Client: ENOVATIVE ENVIRONMENTAL TECHNOLOGY COMPANY
Client Reference:

Calibration of Mulitimeter

Item :	YSI Multimeter	Serial No.:	10D101566
Model No.:	YSI Professional Plus	Equipment No.:	N/A
ALS Lab ID:	HK1025275-001	Date of Calibration:	21 October, 2010

Testing Results :

Conductivity

Expected Reading	Recording Reading
146.7 uS/cm	154.8 uS/cm
6667 uS/cm	6516 uS/cm
12890 uS/cm	12438 uS/cm
58670 uS/cm	57246 uS/cm
Allowing Deviation	± 10%

Testing Method:
APHA (20th edition), 2510B

Salinity

Expected Reading	Recording Reading
10.0 g/L	9.9 g/L
20.0 g/L	20.0 g/L
30.0 g/L	30.3 g/L
Allowing Deviation	± 10%

Testing Method:
APHA (20th edition), 2520 A and B

Dissolved Oxygen

Expected Reading	Recording Reading
3.4 mg/L	3.5 mg/L
5.0 mg/L	5.1 mg/L
7.8 mg/L	7.8 mg/L
Allowing Deviation	± 0.2 mg/L

Testing Method:
APHA (20th edition), 4500-OC & G

pH

Expected Reading	Recording Reading
4.00	4.01
7.00	7.00
10.0	9.90
Allowing Deviation	± 0.2 unit

Testing Method:
APHA (20th edition), 4500-H^+B

Temperature

Expected Reading	Recording Reading
7.8 °C	8.2 °C
23.0 °C	22.8 °C
Allowing Deviation	±2.0 °C

Testing Method:
In House Method

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

CERTIFICATE OF ANALYSIS

Work Order: HK1025275
Amendment: 1
Date of Issue: 12/11/2010
Client: ENOVATIVE ENVIRONMENTAL TECHNOLOGY COMPANY
Client Reference:

Calibration of Mulitimeter

Item :	YSI Multimeter	Serial No.:	09K100735
Model No.:	YSI Professional Plus	Equipment No.:	N/A
ALS Lab ID:	HK1025275-002	Date of Calibration:	21 October, 2010

Testing Results :

Conductivity

Expected Reading	Recording Reading
146.7 uS/cm	152.9 uS/cm
6667 uS/cm	6480 uS/cm
12890 uS/cm	12425 uS/cm
58670 uS/cm	55301 uS/cm
Allowing Deviation	± 10%

Testing Method:

APHA (20th edition), 2510B

Salinity

Expected Reading	Recording Reading
10.0 g/L	9.8 g/L
20.0 g/L	19.9 g/L
30.0 g/L	30.0 g/L
Allowing Deviation	± 10%

Testing Method:

APHA (20th edition), 2520 A and B

Dissolved Oxygen

Expected Reading	Recording Reading
3.4 mg/L	3.5 mg/L
5.0 mg/L	5.0 mg/L
7.8 mg/L	7.6 mg/L
Allowing Deviation	± 0.2 mg/L

Testing Method:

APHA (20th edition), 4500-OC & G

pH

Expected Reading	Recording Reading
4.00	4.00
7.00	7.00
10.0	10.0
Allowing Deviation	± 0.2 unit

Testing Method:

APHA (20th edition), 4500-H^+B

Temperature

Expected Reading	Recording Reading
7.8 °C	8.2 °C
23.0 °C	22.9 °C
Allowing Deviation	±2.0 °C

Testing Method:

In House Method

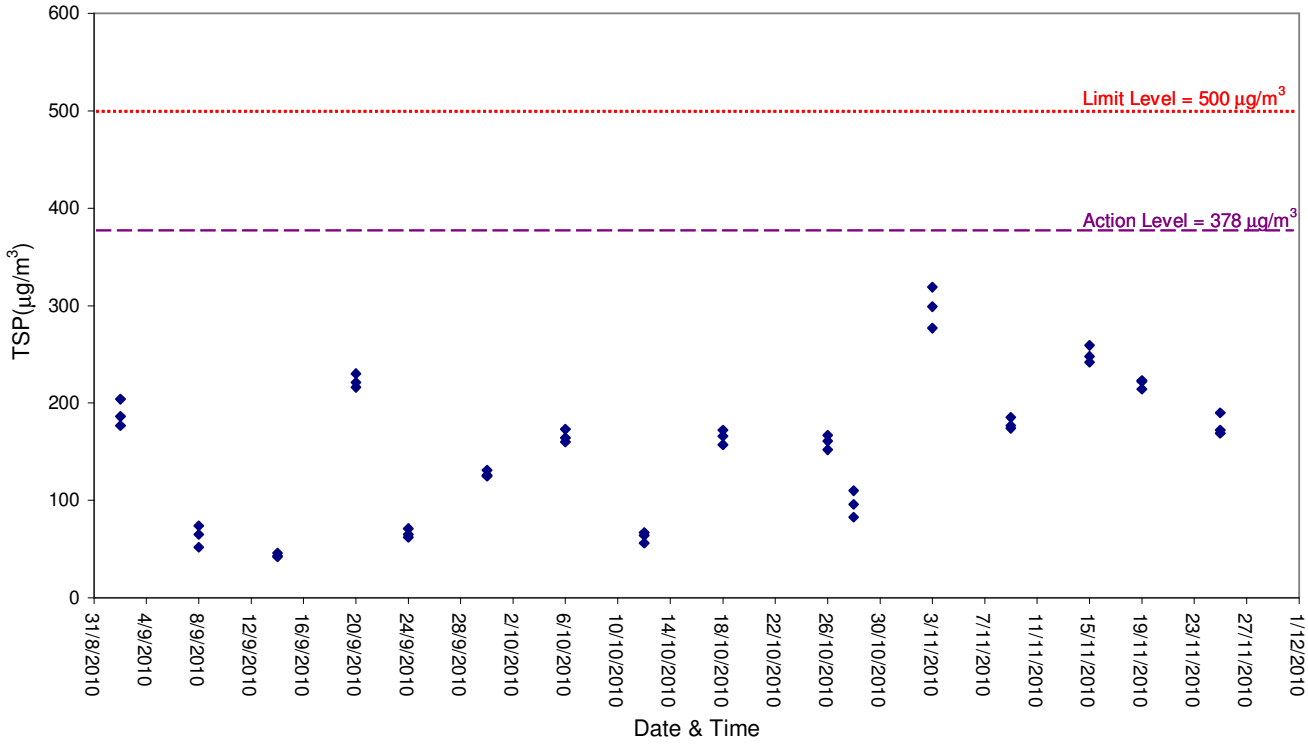
Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

ALS Technichem (HK) Pty Ltd
ALS Environmental

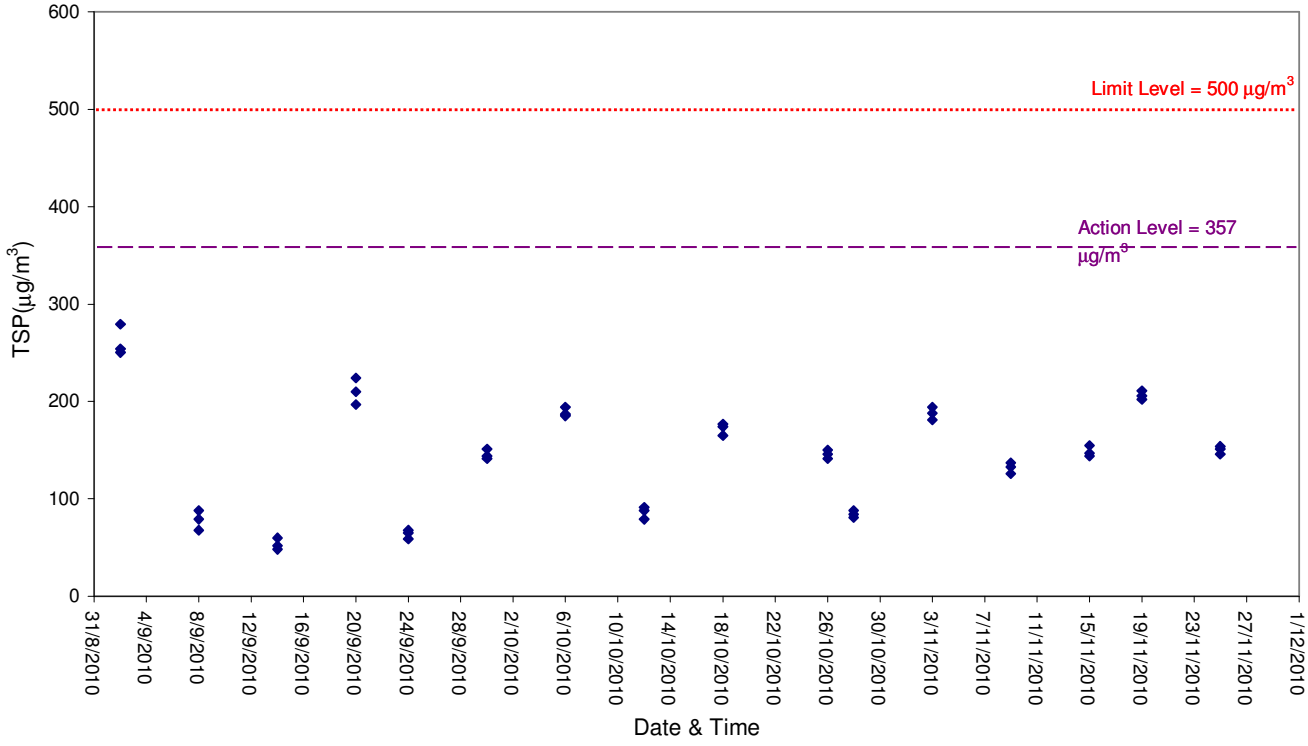
Appendix F. Graphical plots of the monitoring results

Air Quality

1-hour TSP Level at ASR1

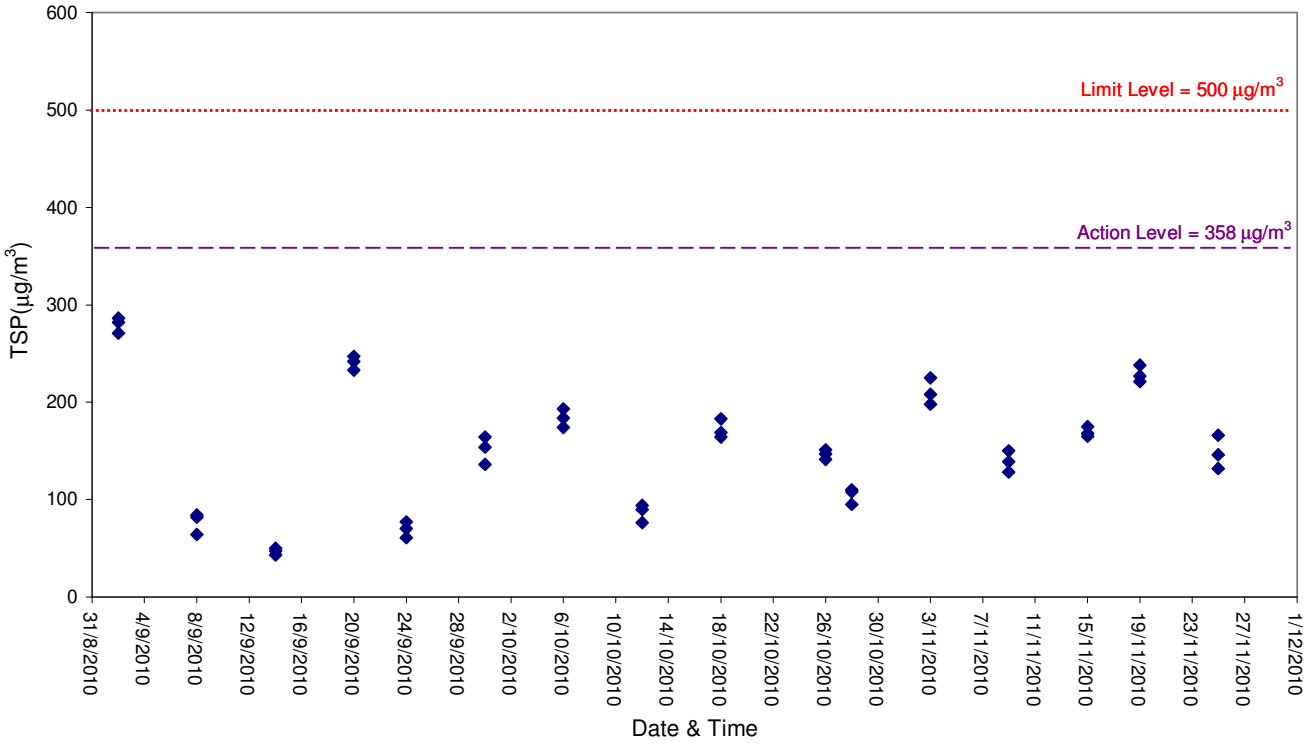


1-hour TSP Level at ASR2A

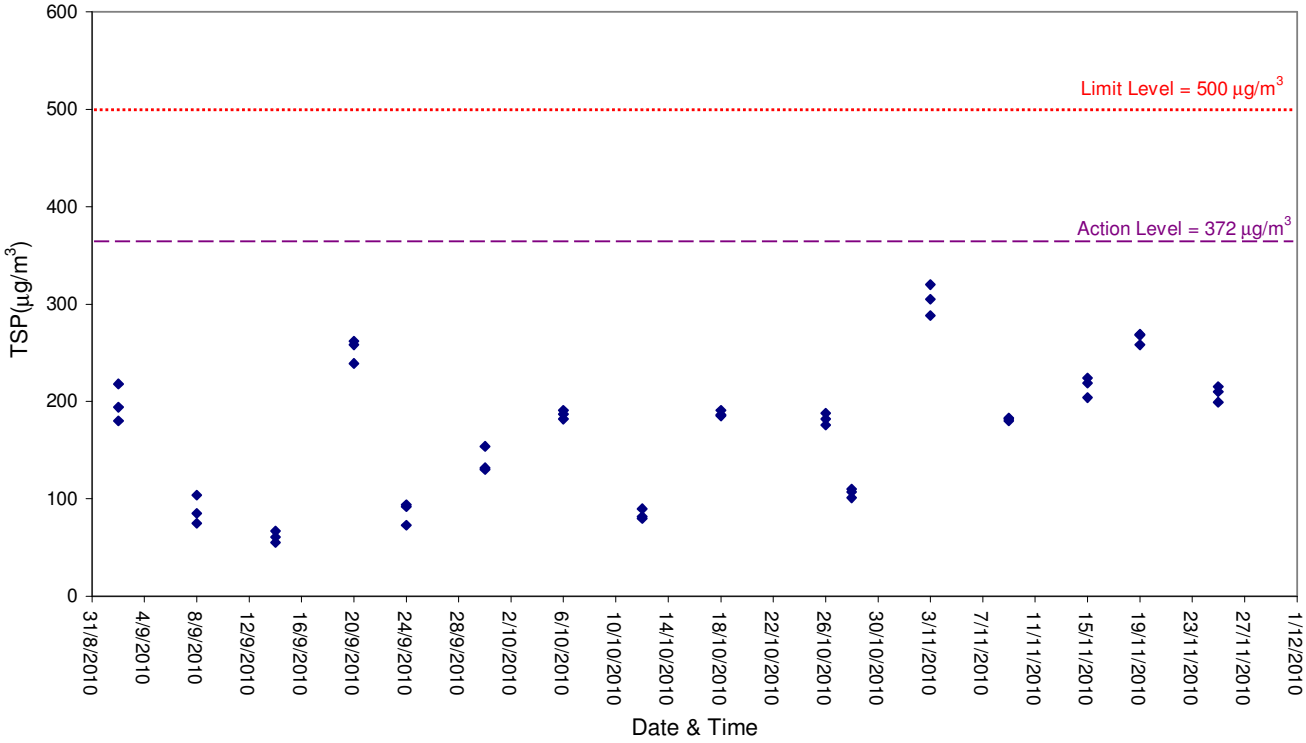


Air Quality

1-hour TSP Level at ASR3

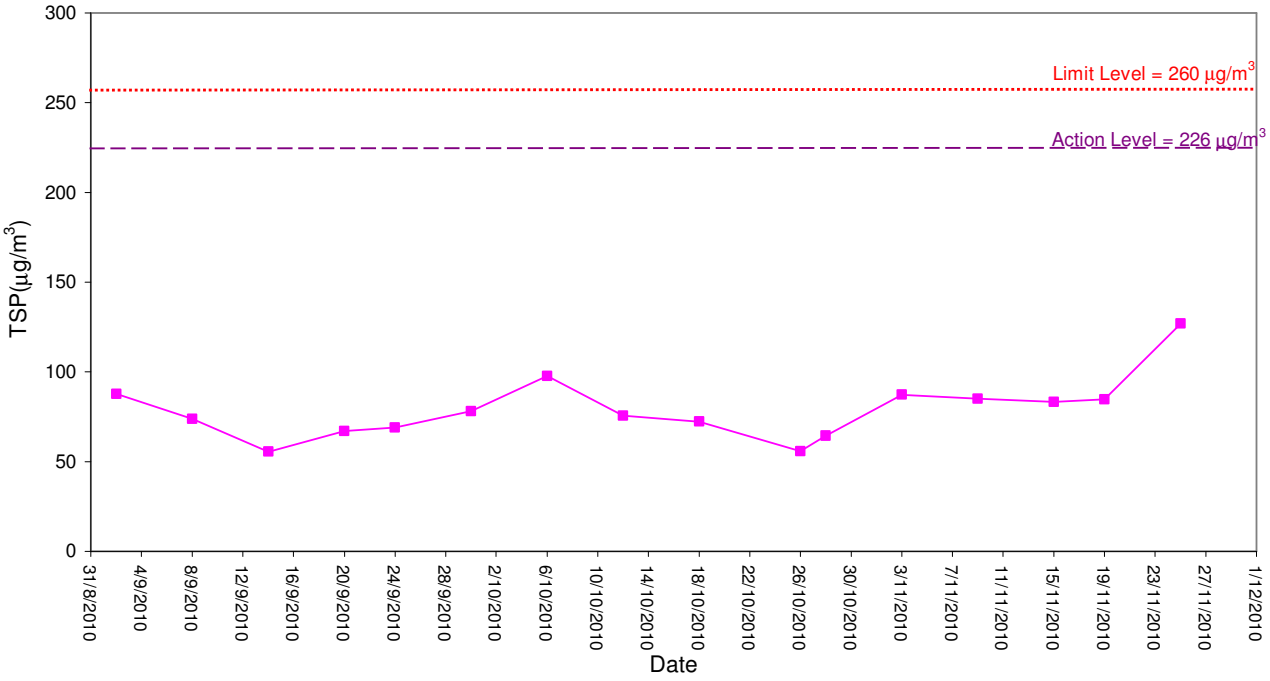


1-hour TSP Level at ASR4

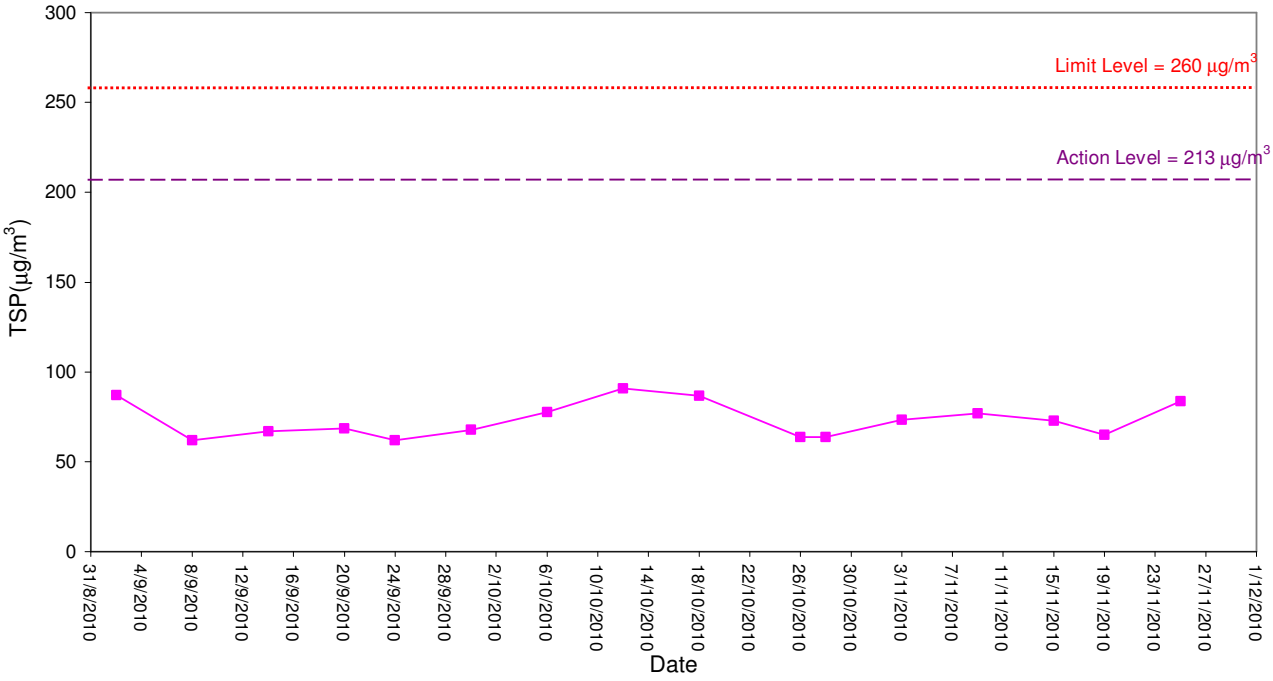


Air Quality

24-hour TSP Level at ASR1

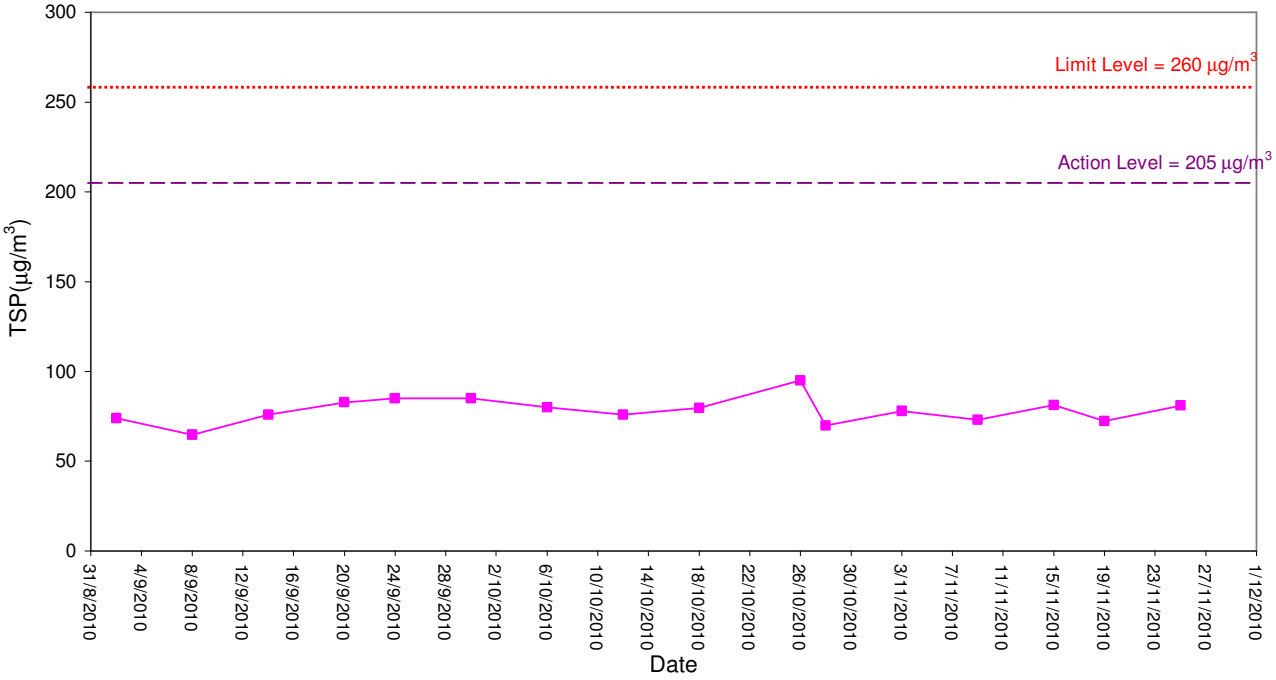


24-hour TSP Level at ASR2A

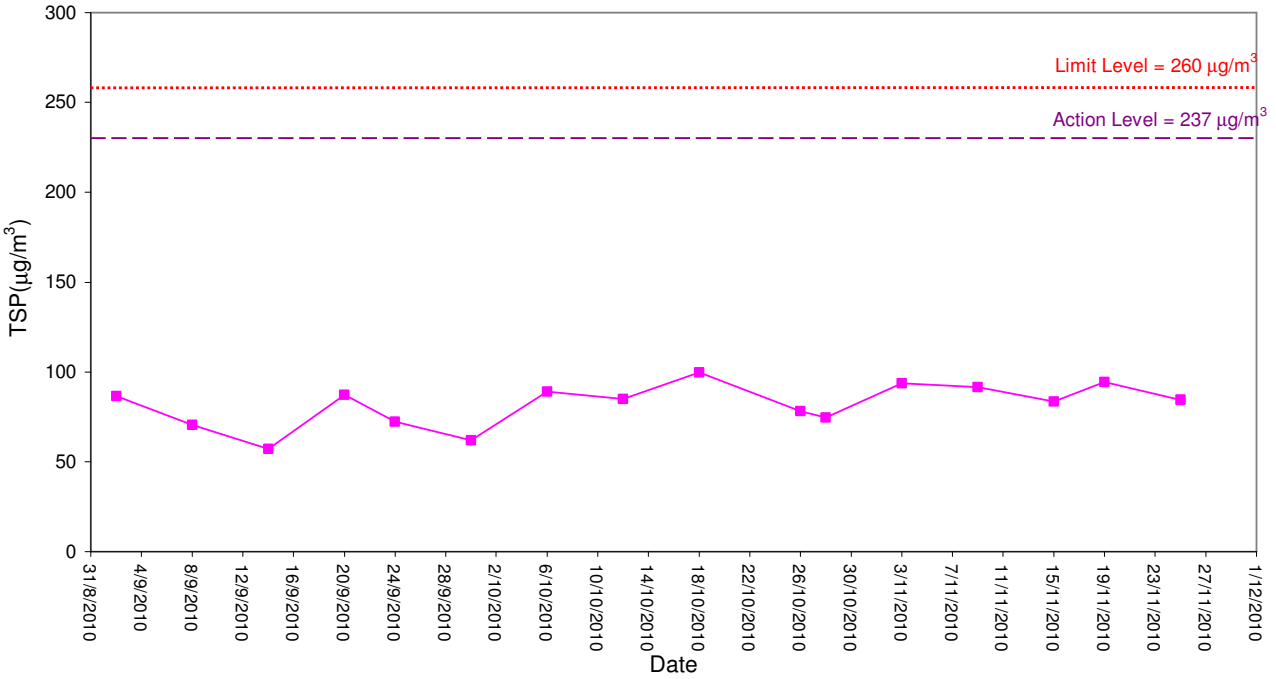


Air Quality

24-hour TSP Level at ASR3

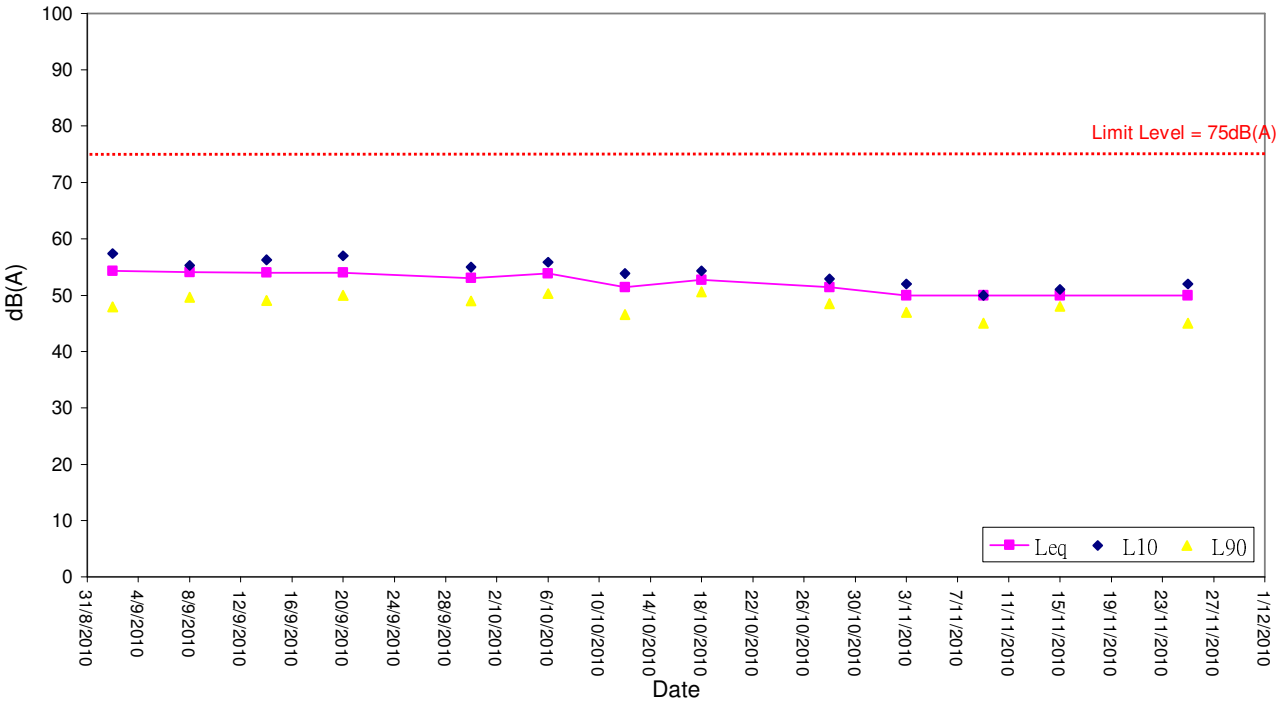


24-hour TSP Level at ASR4

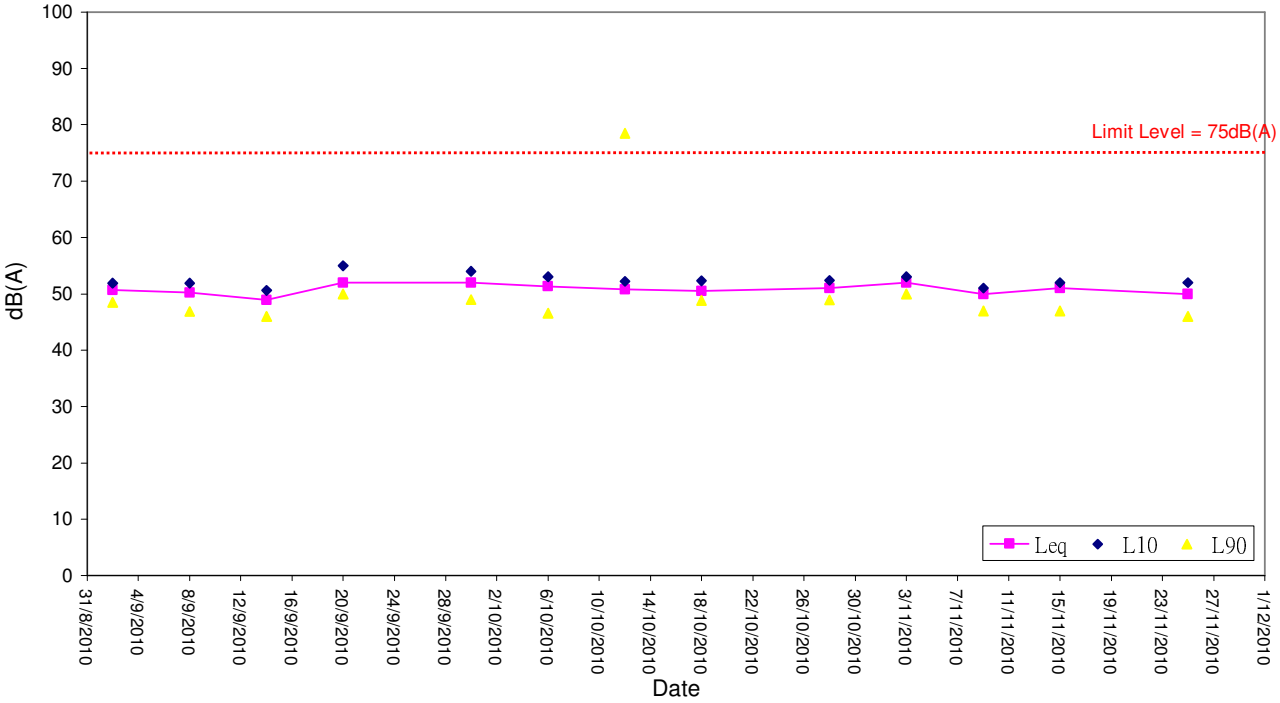


Noise

Noise Level for 30 min, dB(A), at NSR1

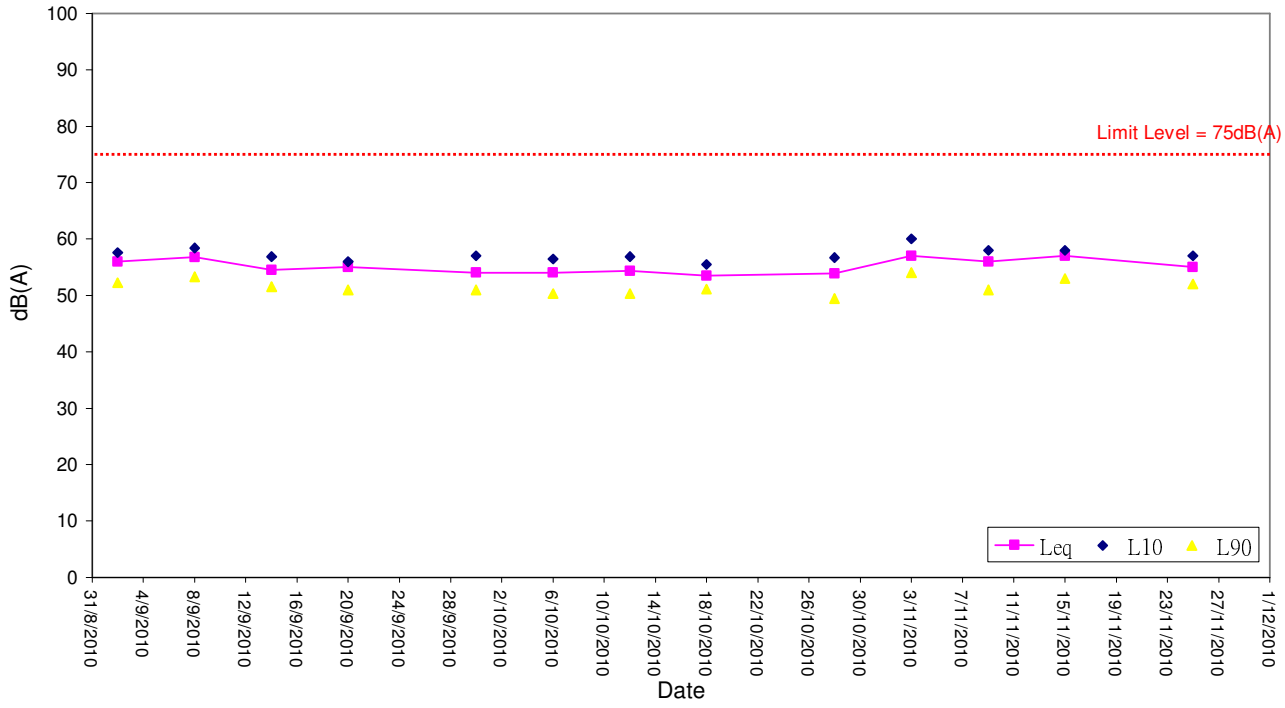


Noise Level for 30 min, dB(A), at NSR3

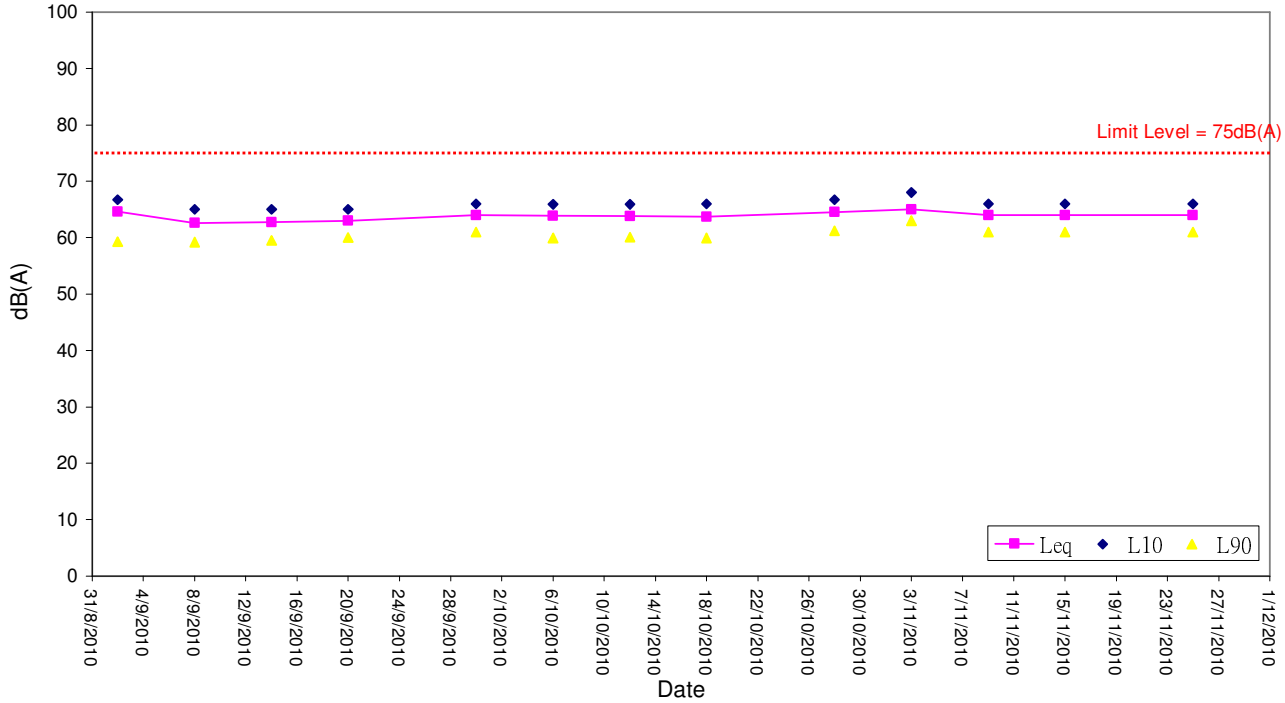


Noise

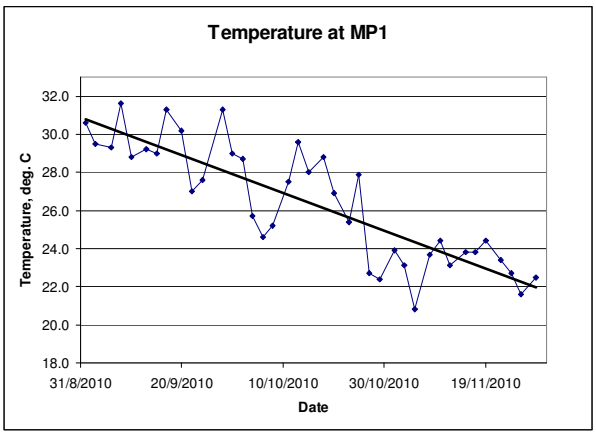
Noise Level for 30 min, dB(A), at NSR5

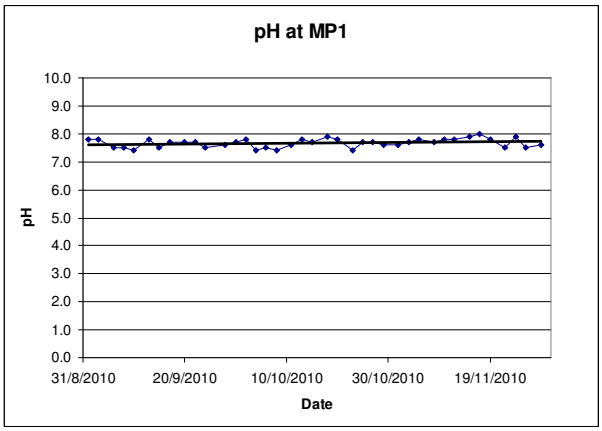


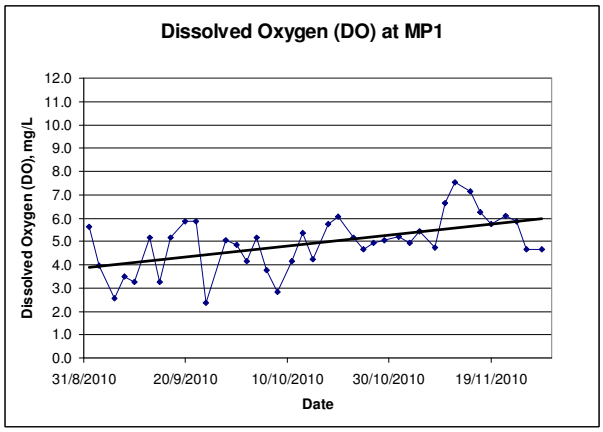
Noise Level for 30 min, dB(A), at NSR7

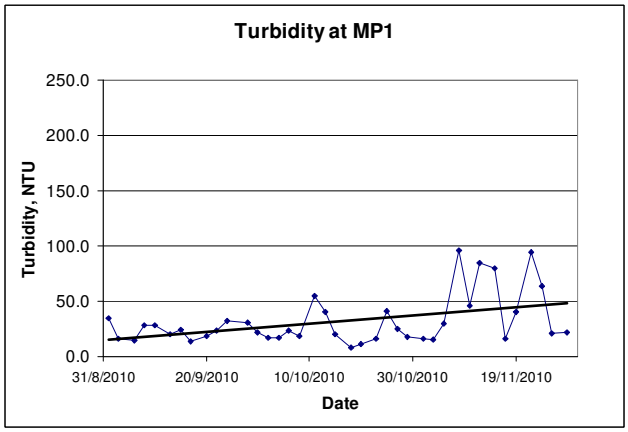


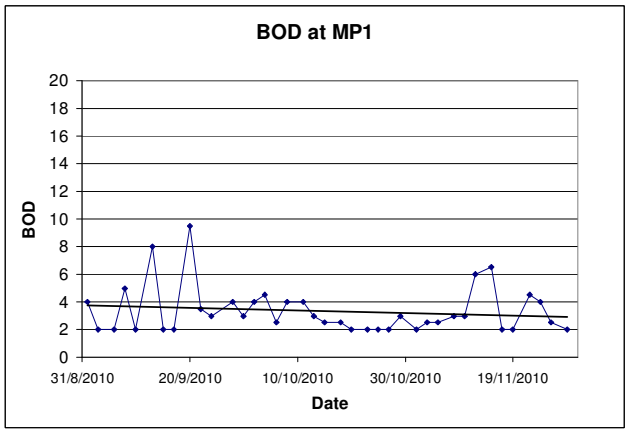
Water Quality

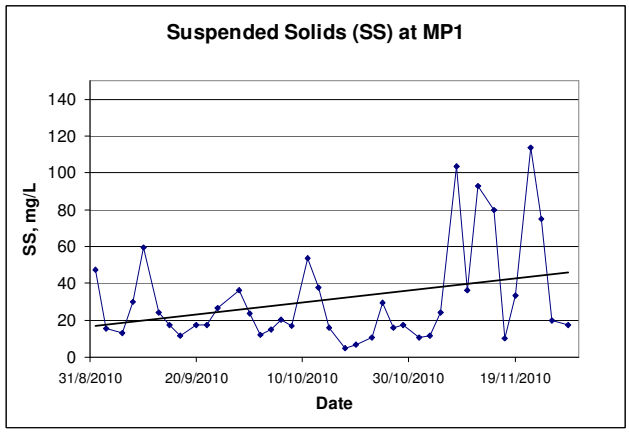












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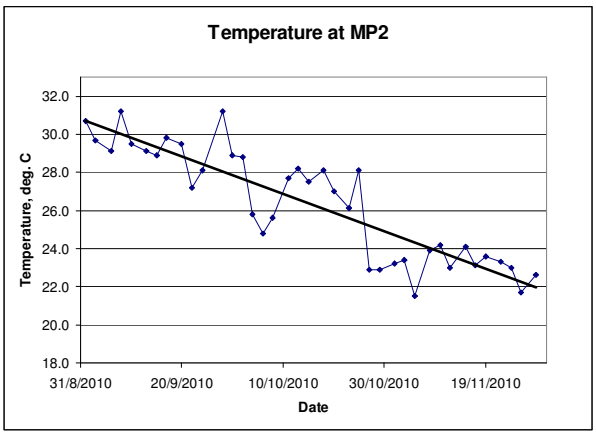
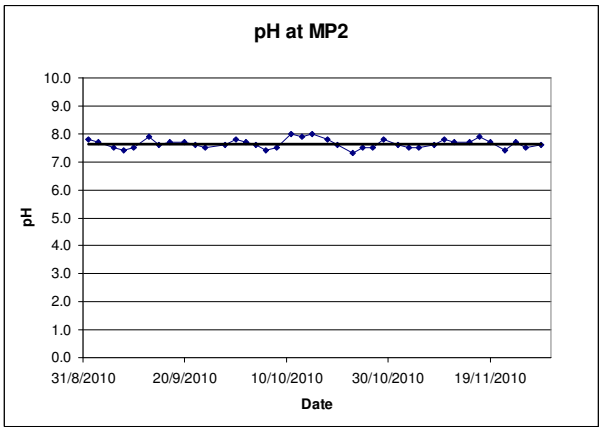
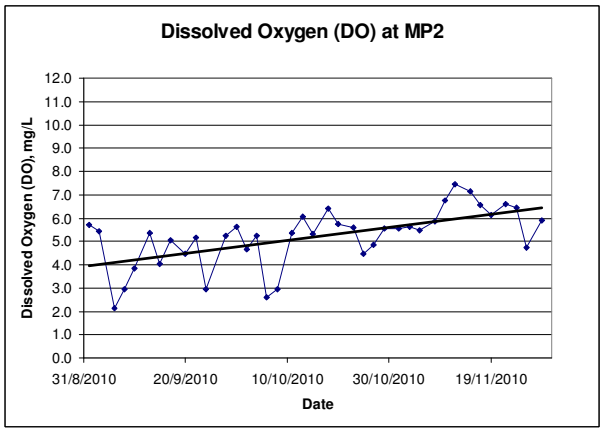
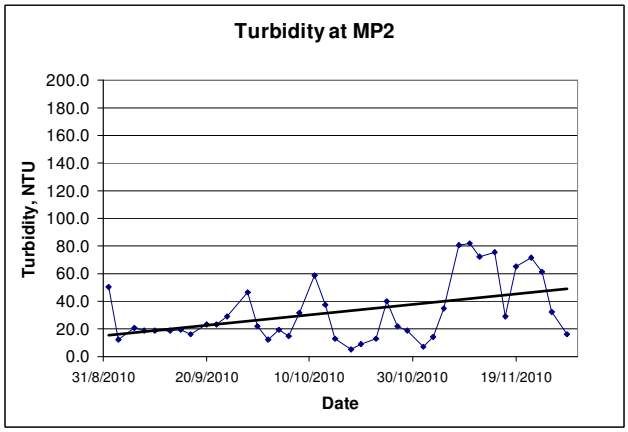
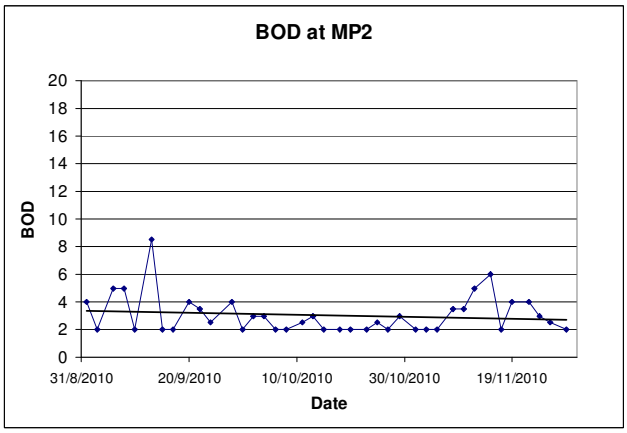
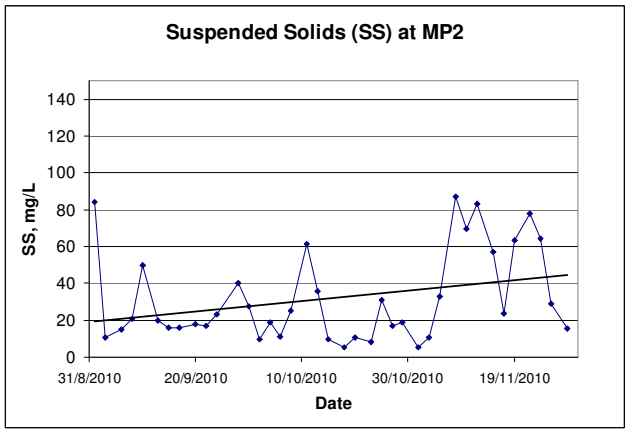




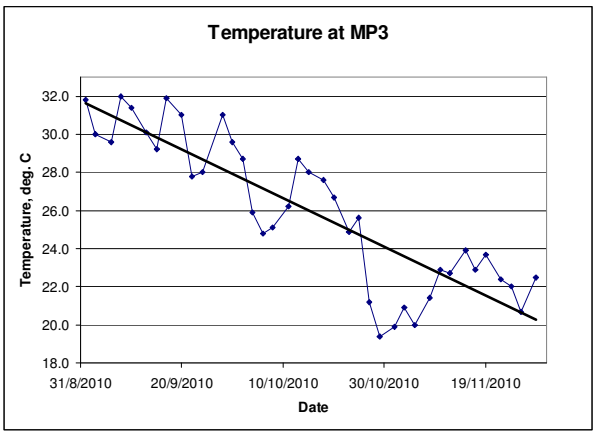


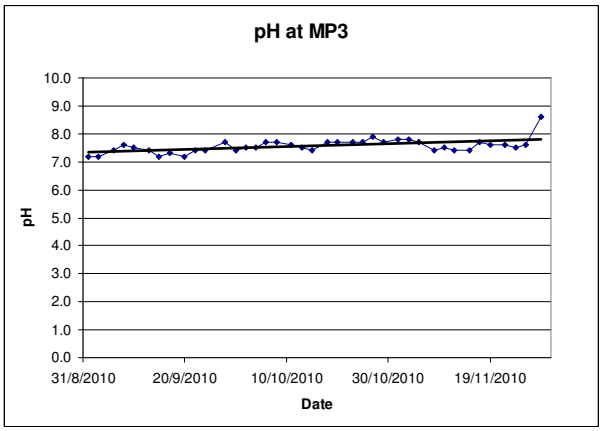


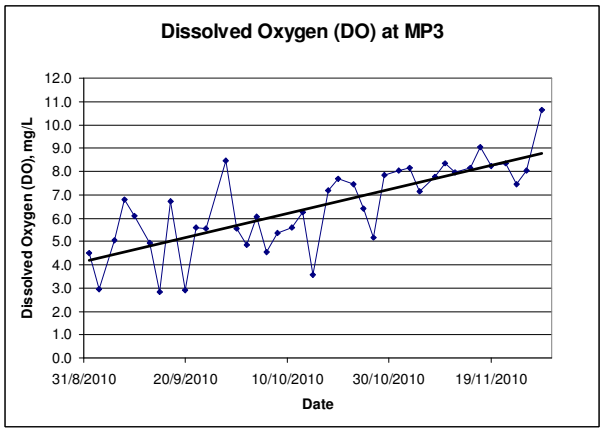


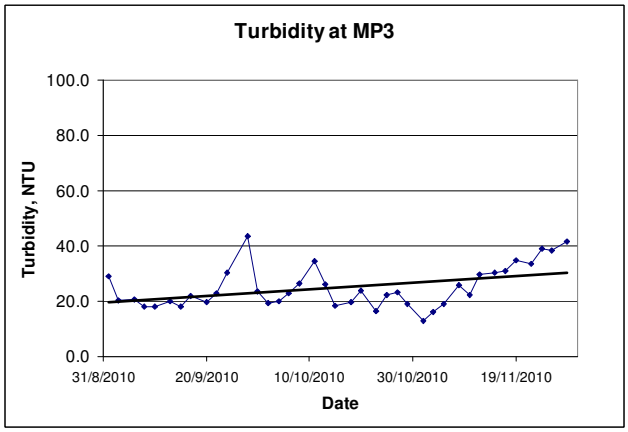


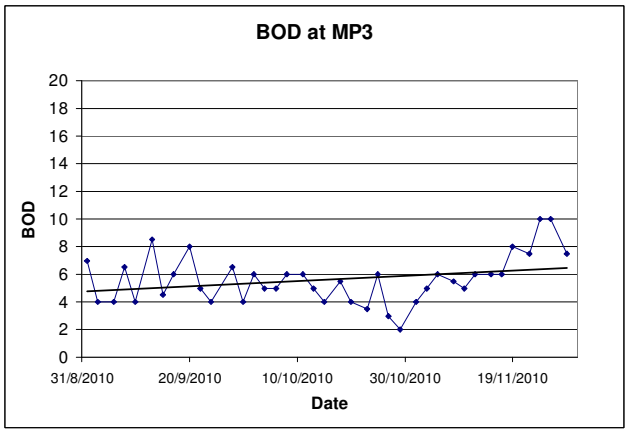
Water Quality

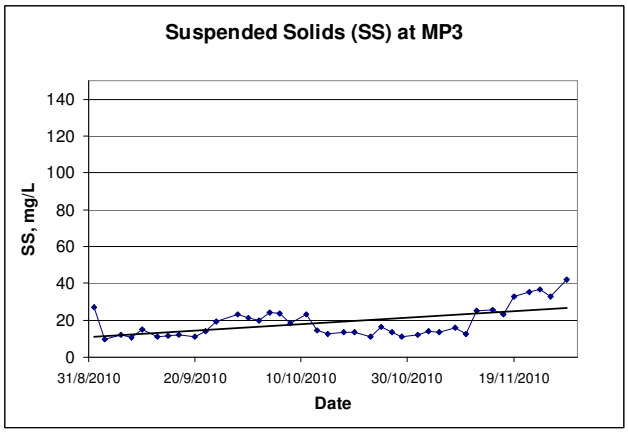




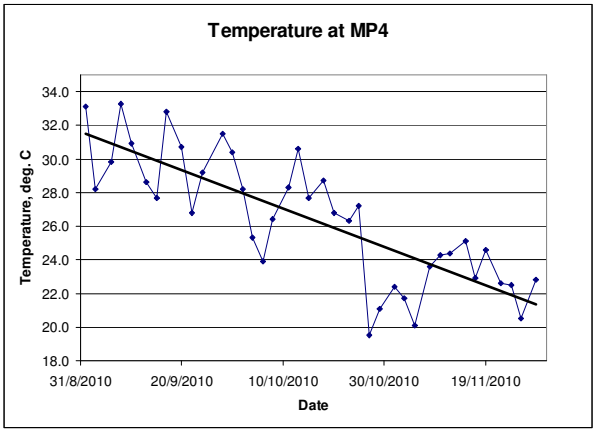


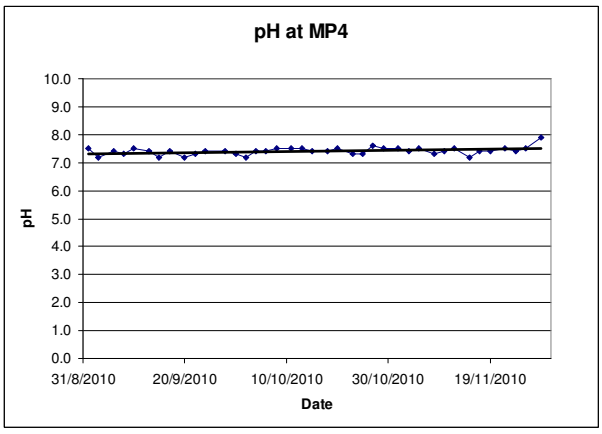


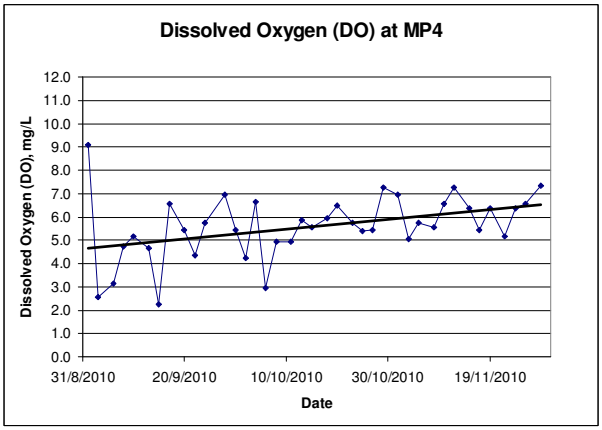


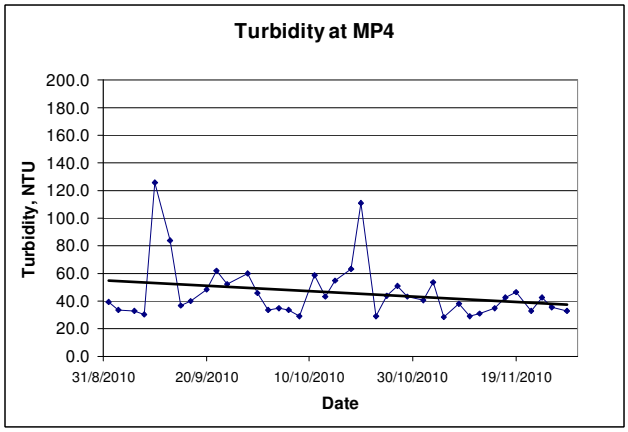


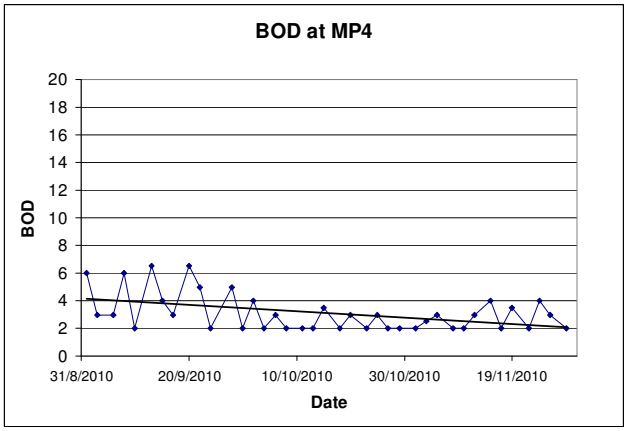
Water Quality

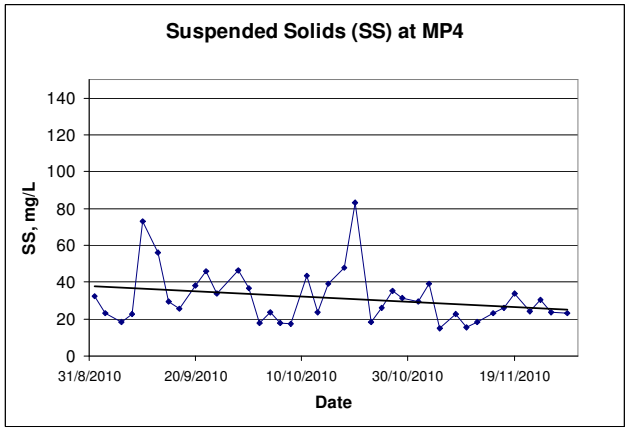




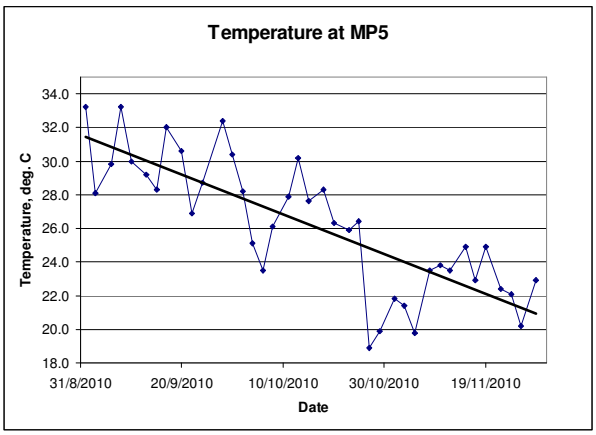


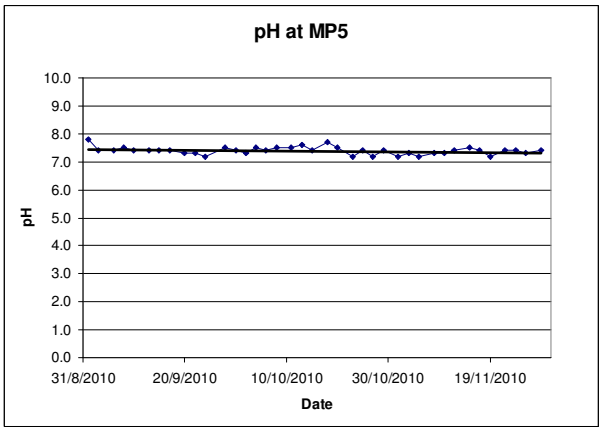


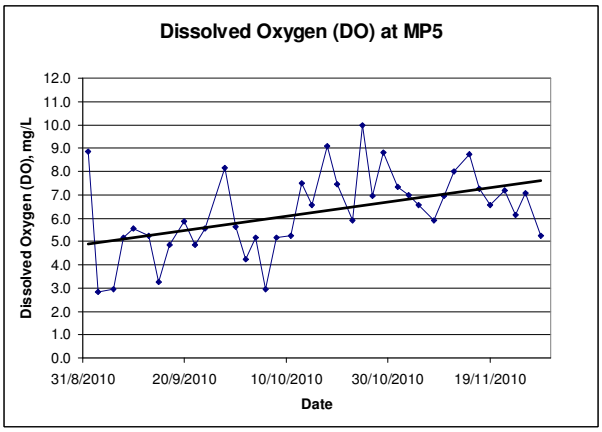


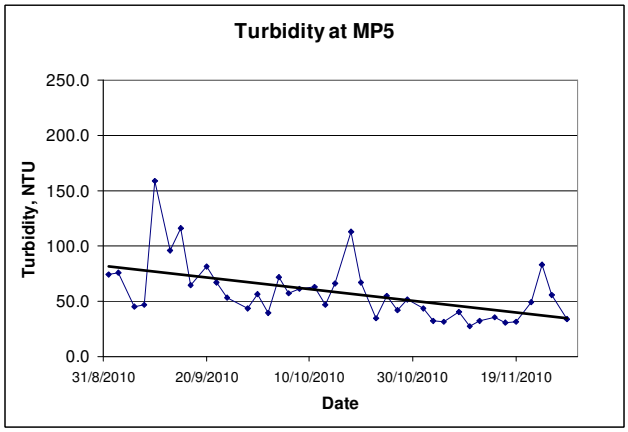


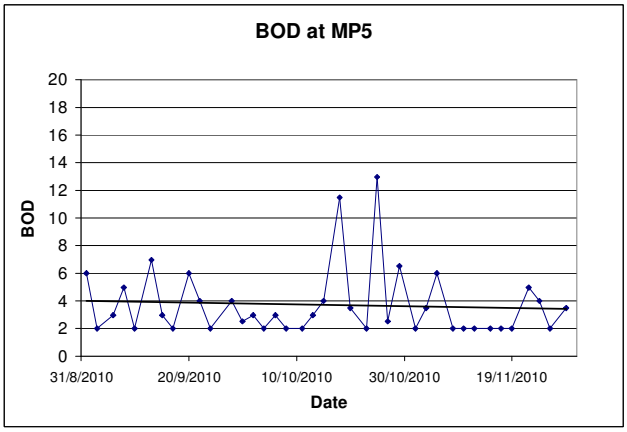
Water Quality

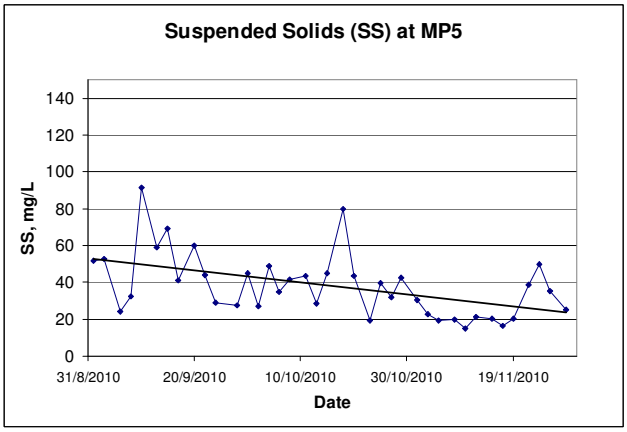




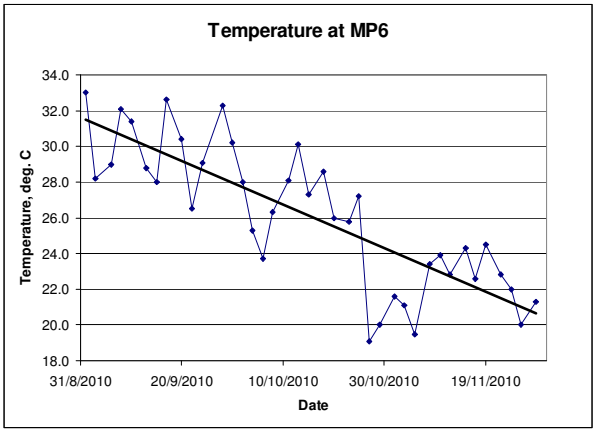


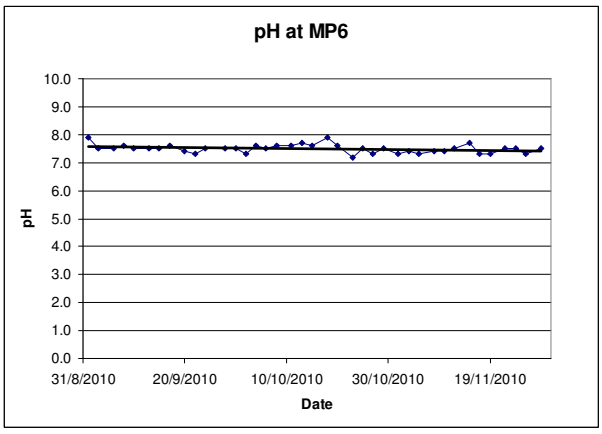


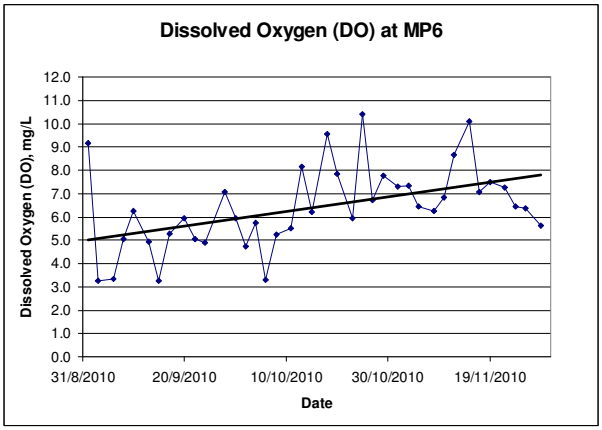


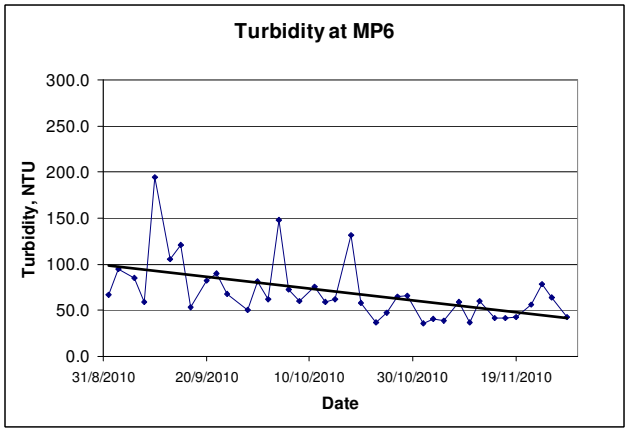


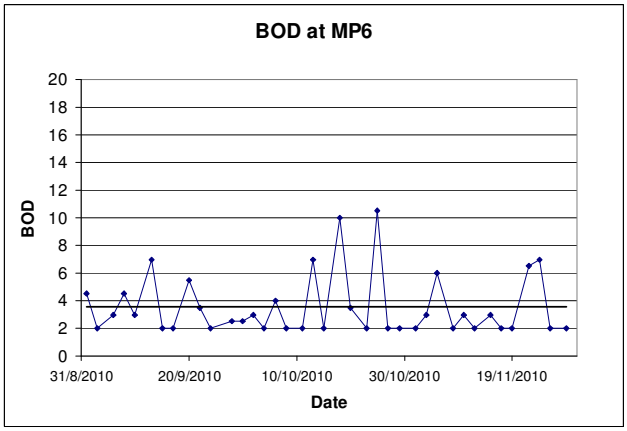
Water Quality

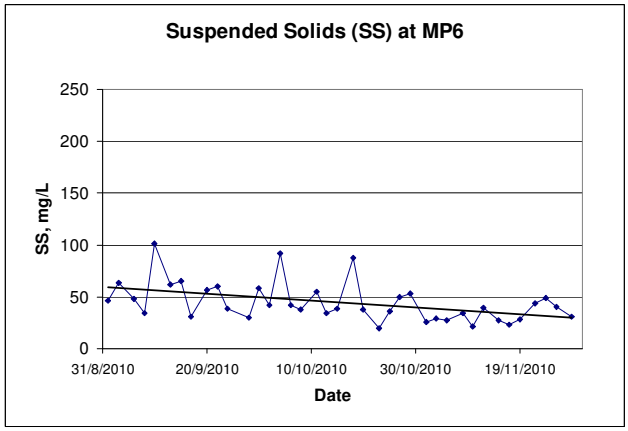








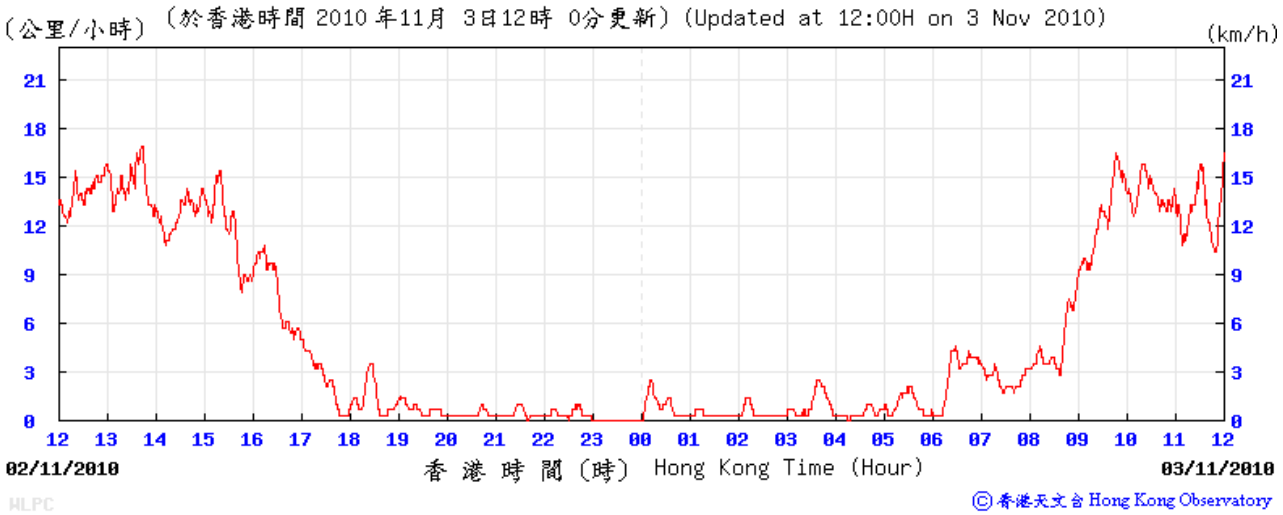


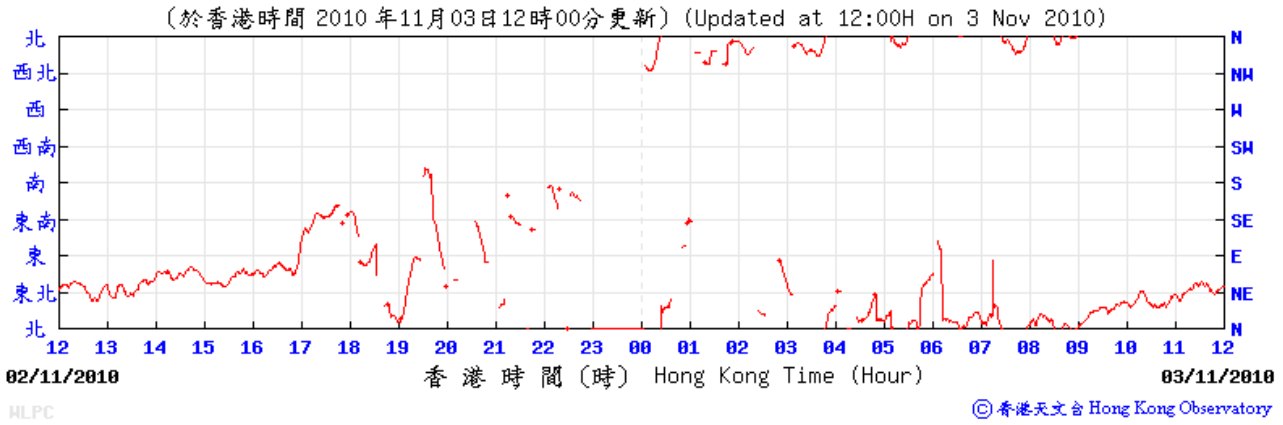


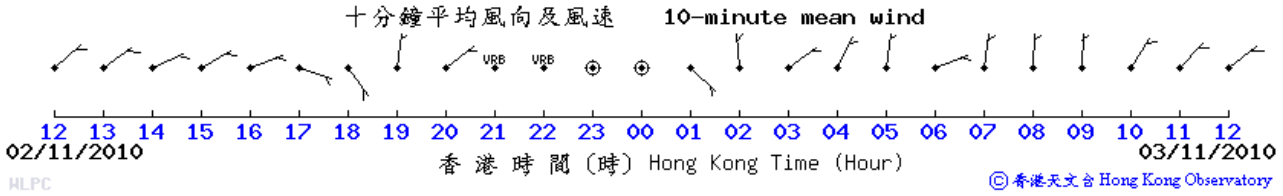
Appendix G. Weather conditions during the monitoring period

Wind Data for Wetland Park

3 November 2010

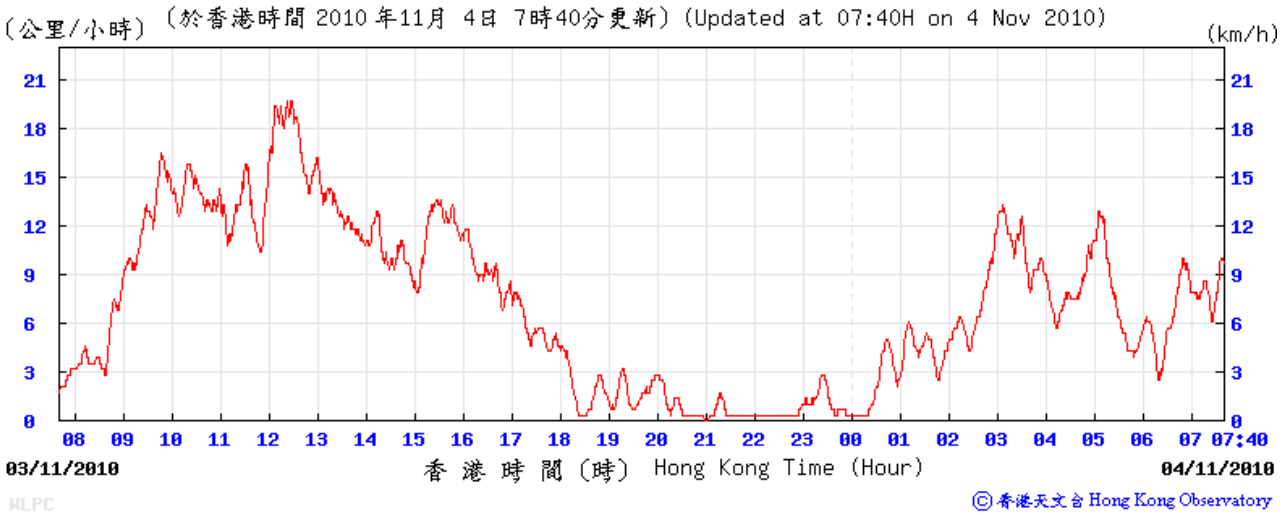


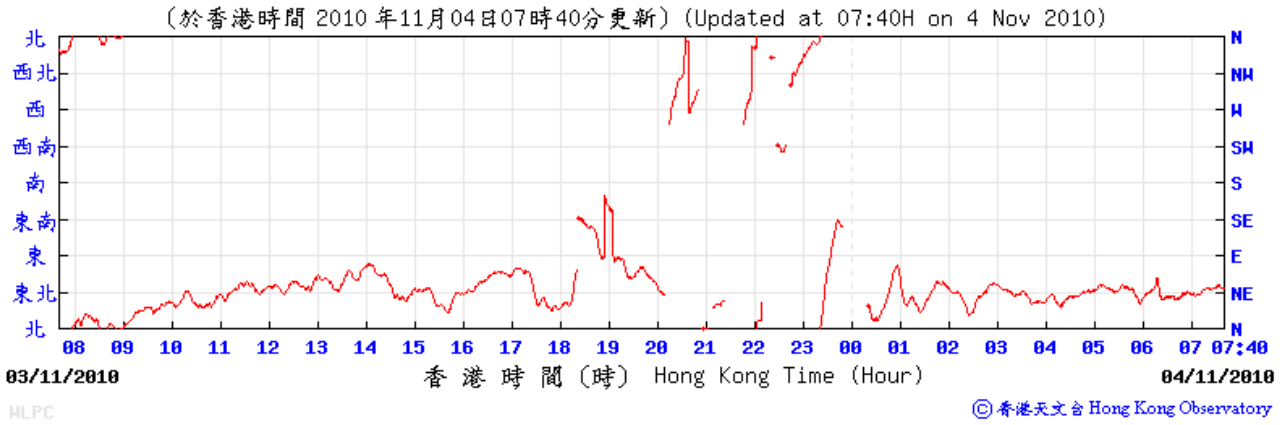


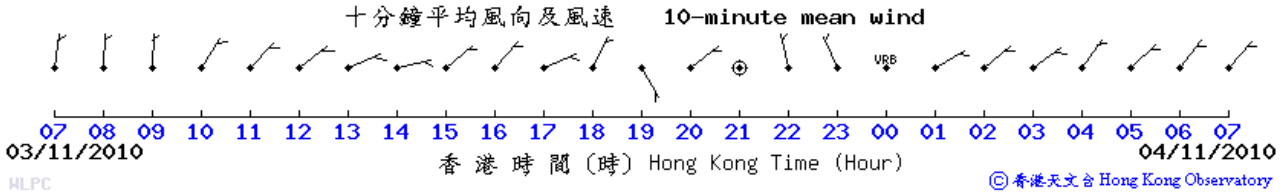


Wind Data for Wetland Park

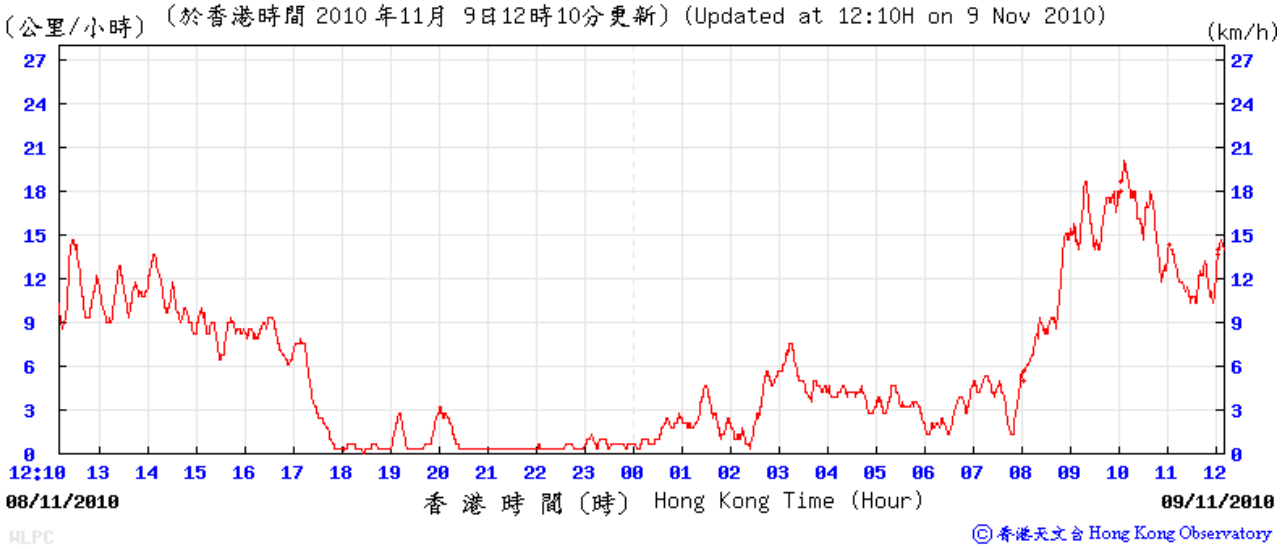
4 November 2010

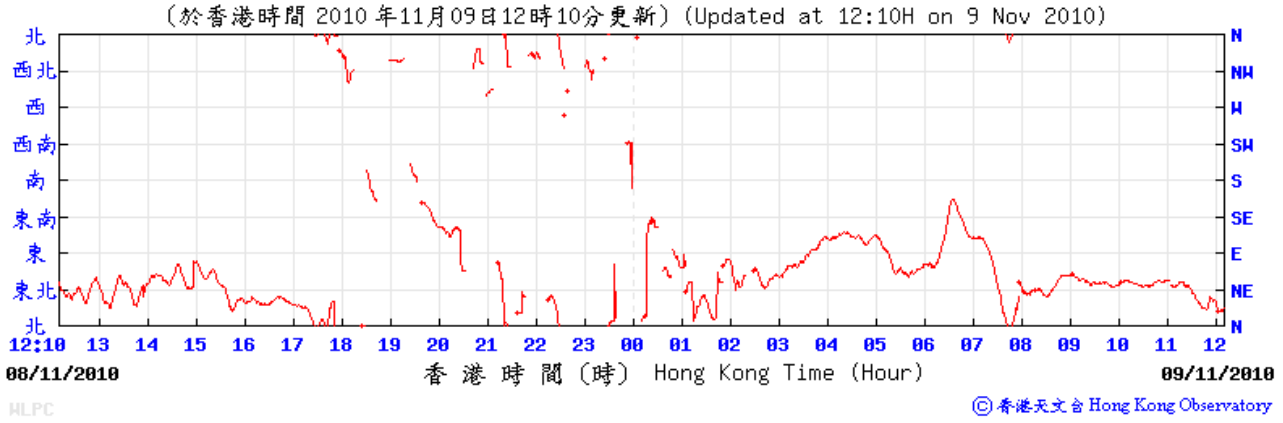


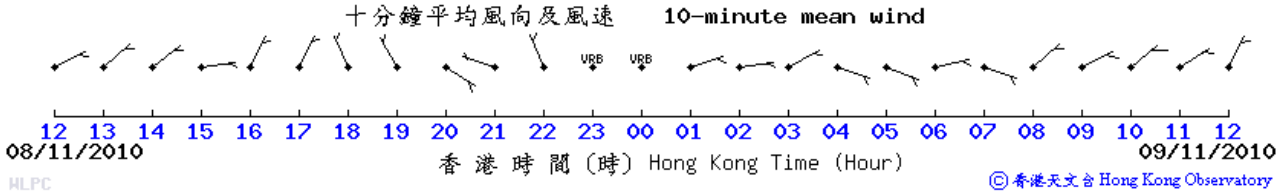




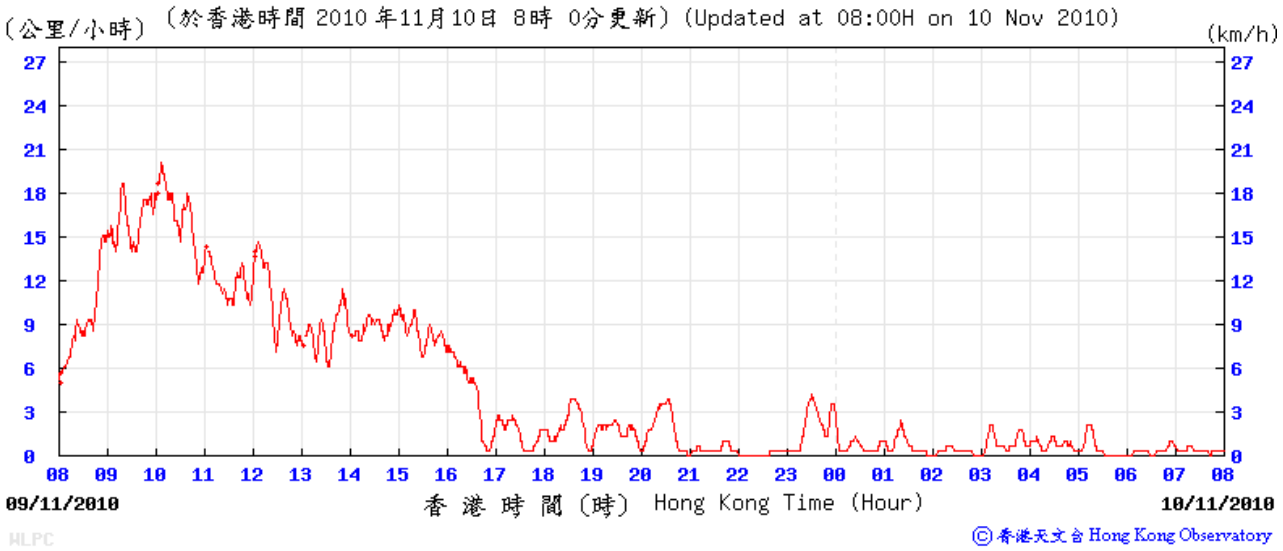
Wind Data for Wetland Park
9 November 2010

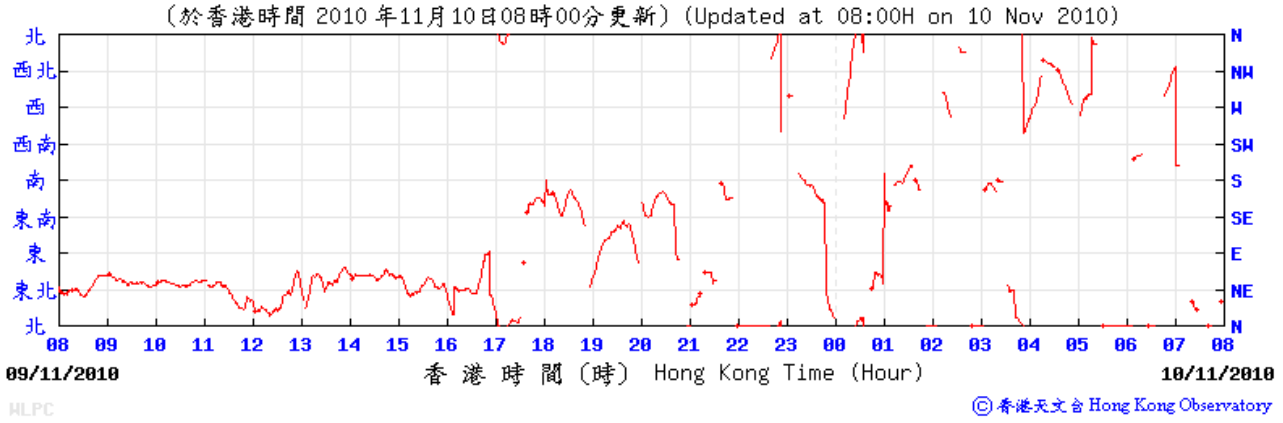


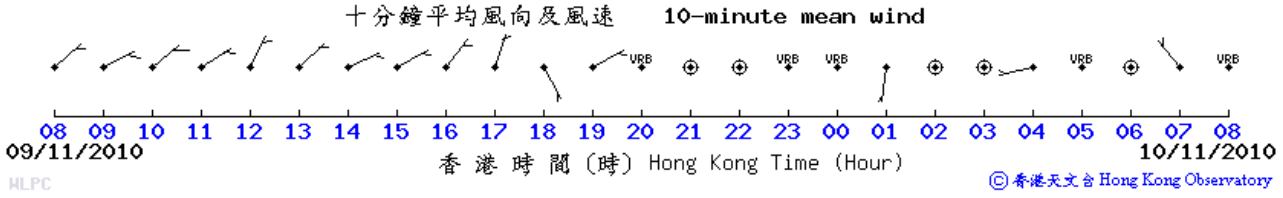




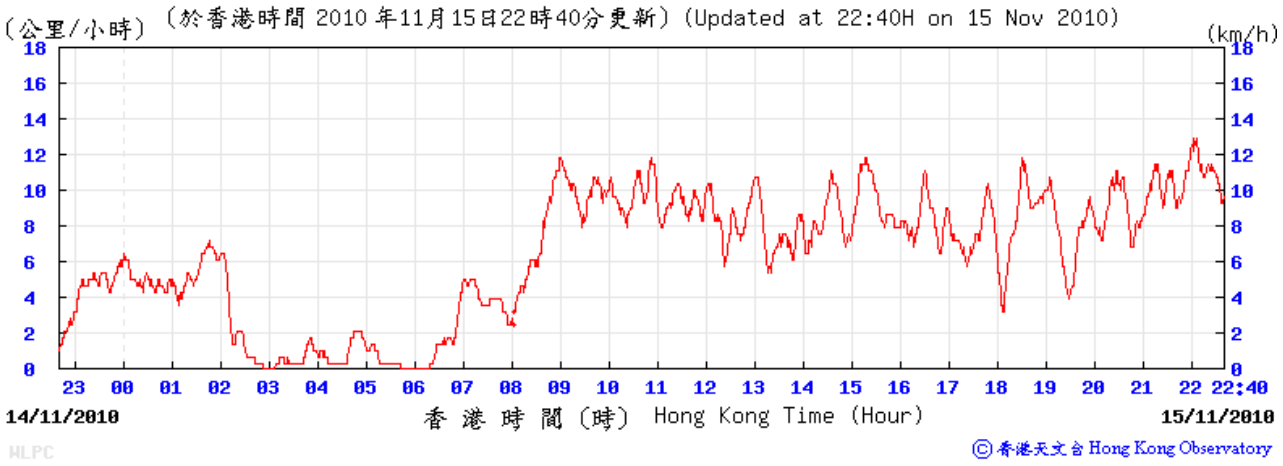
Wind Data for Wetland Park
10 November 2010

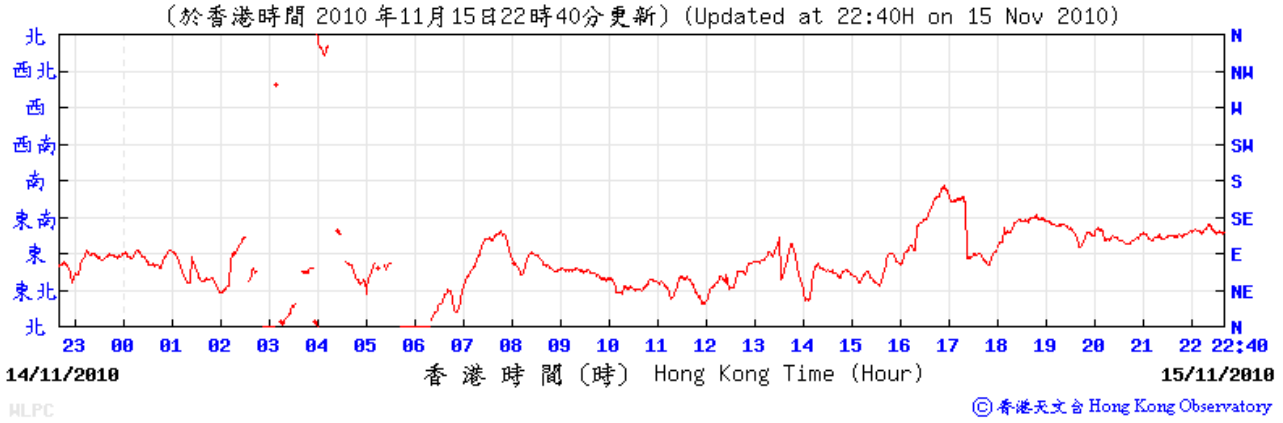


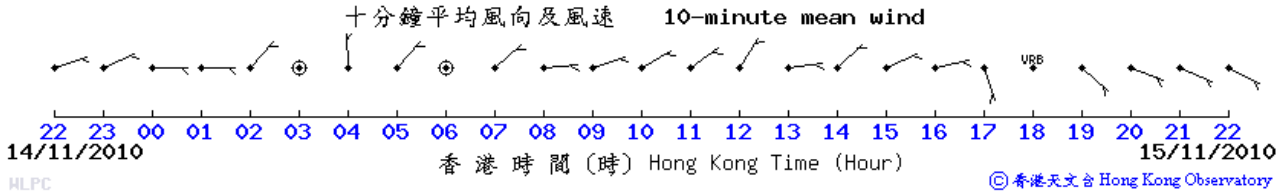




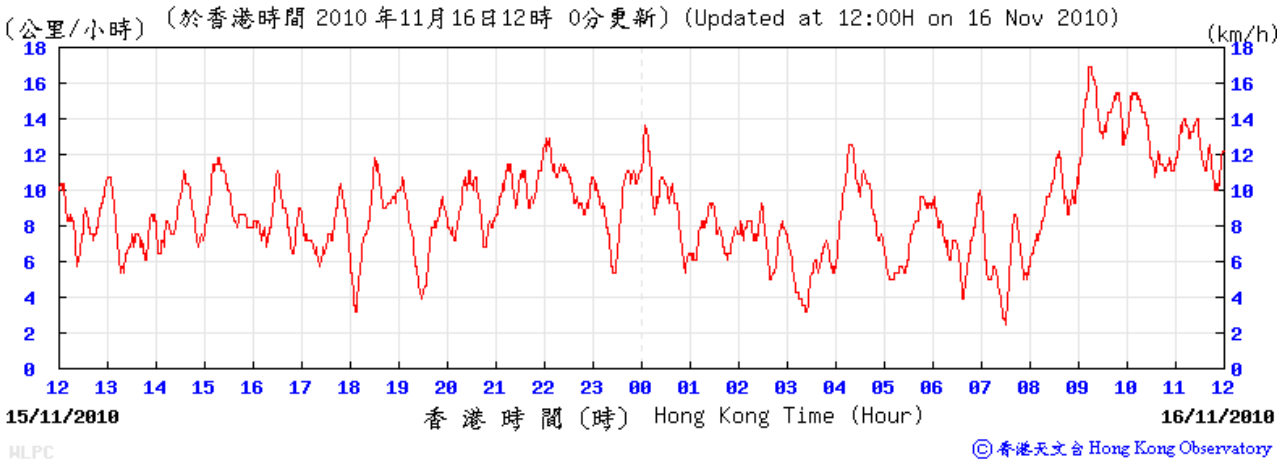
Wind Data for Wetland Park
15 November 2010

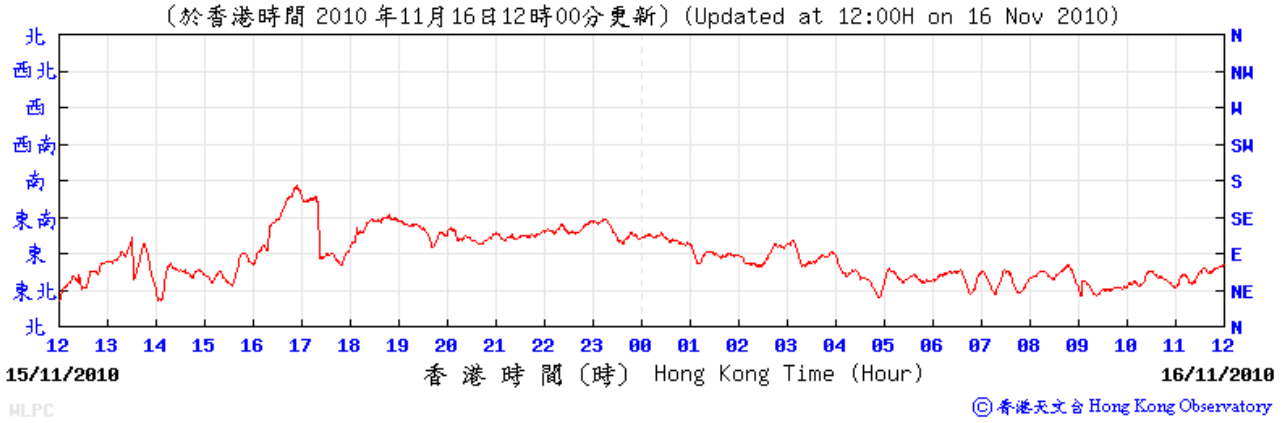


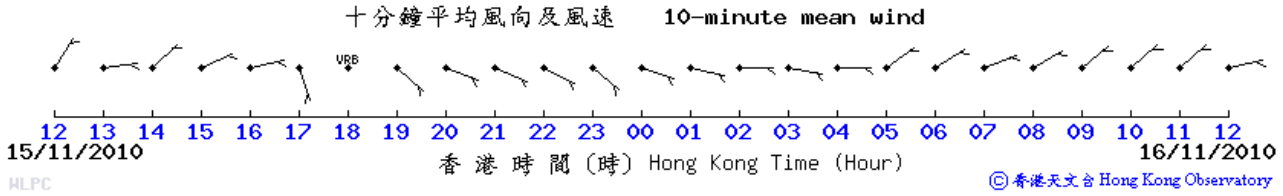




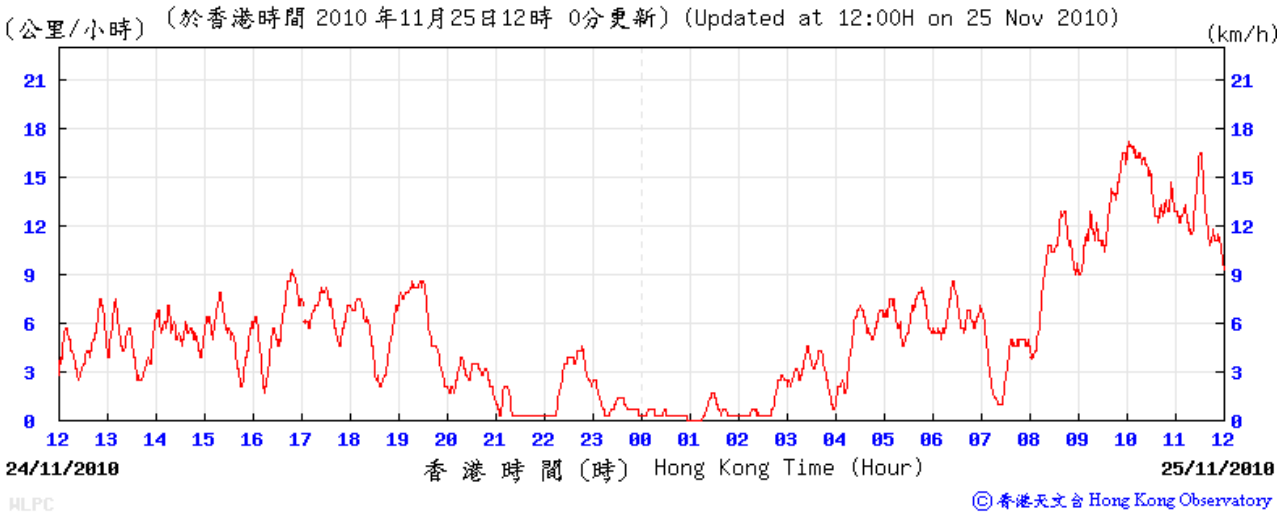
Wind Data for Wetland Park
16 November 2010

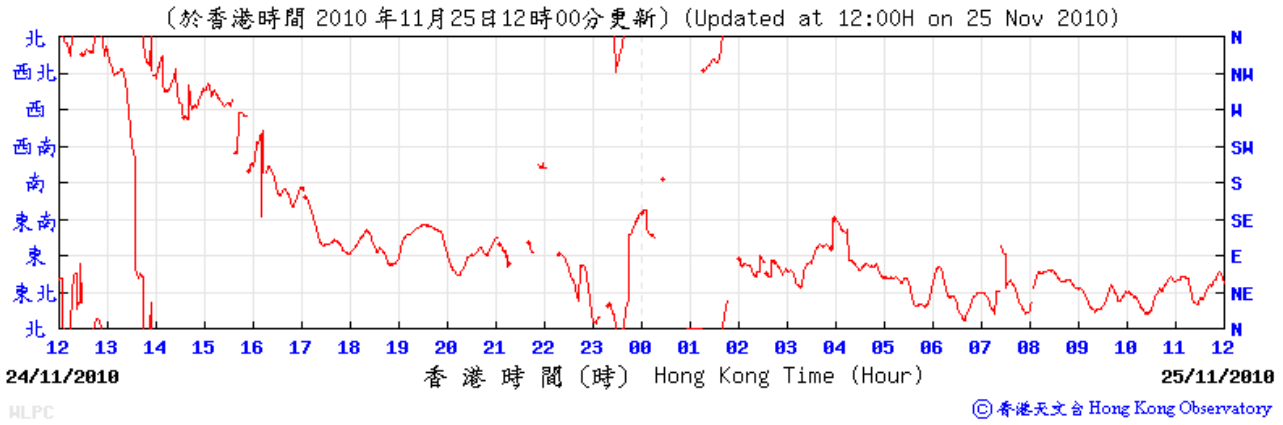


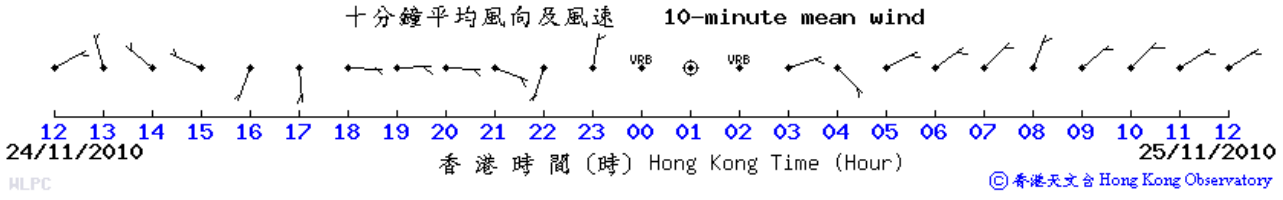




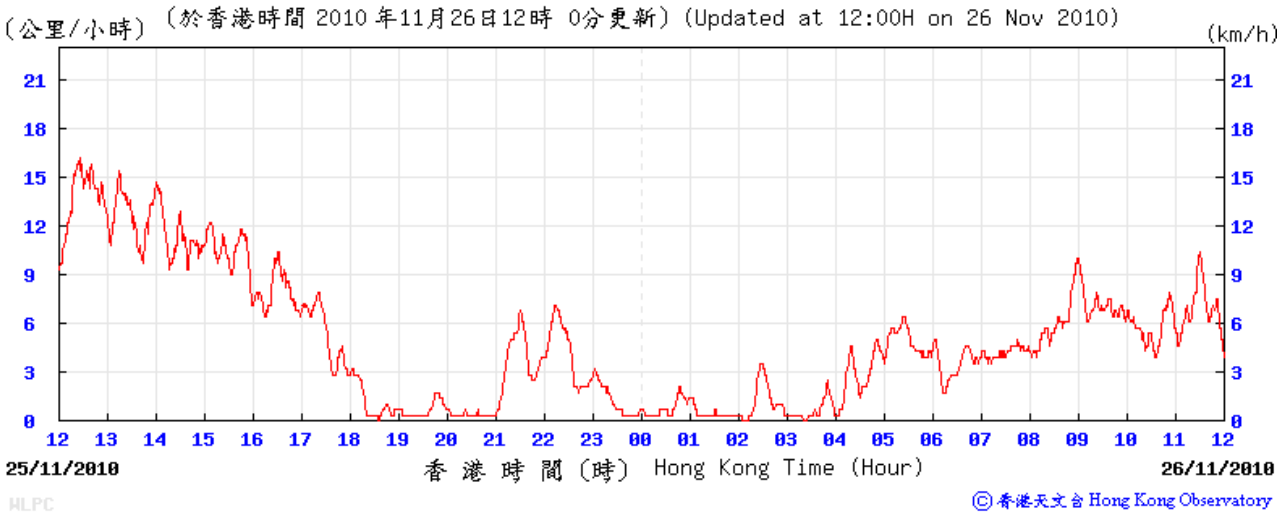
Wind Data for Wetland Park
25 November 2010

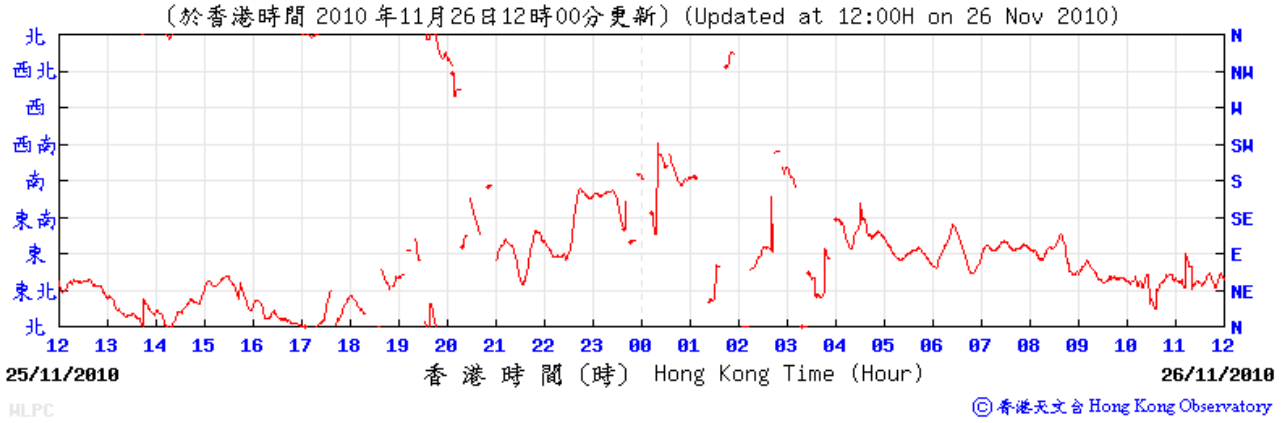


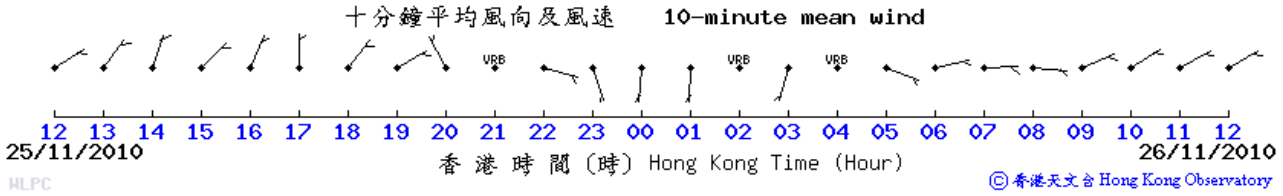




Wind Data for Wetland Park
26 November 2010







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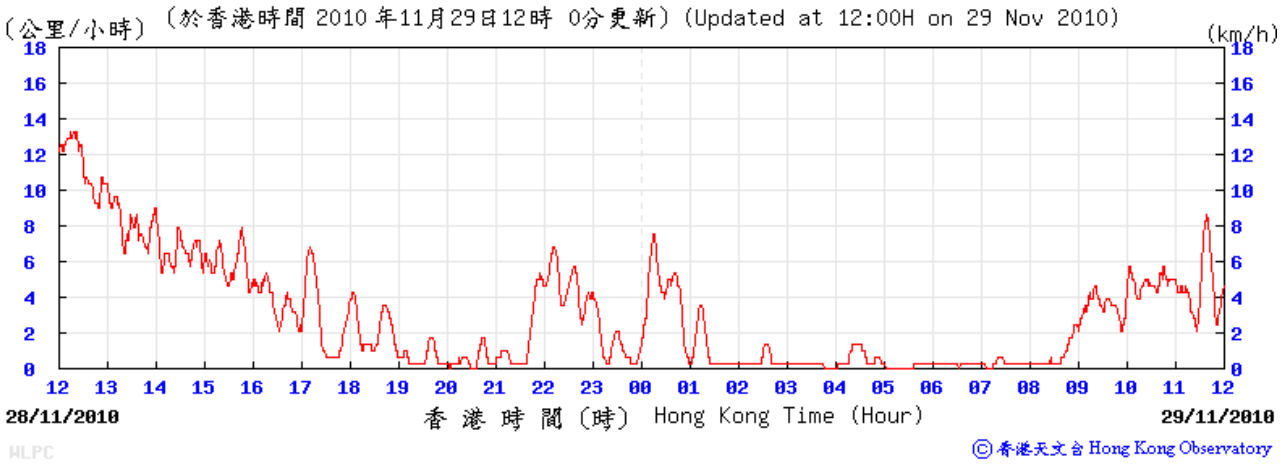

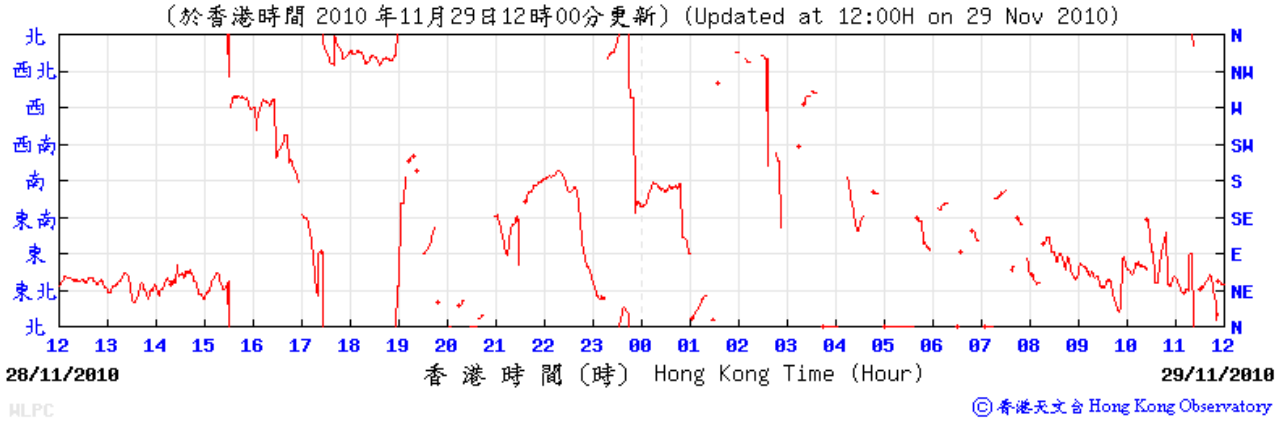

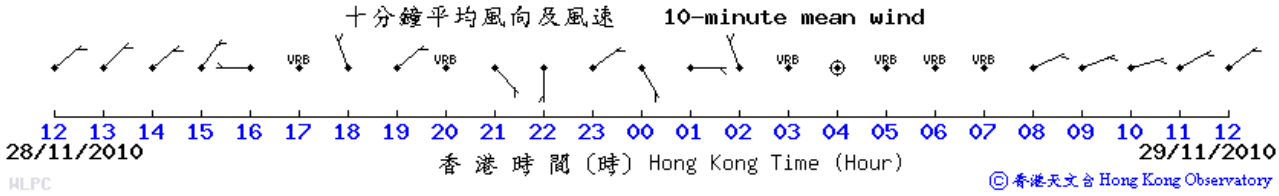

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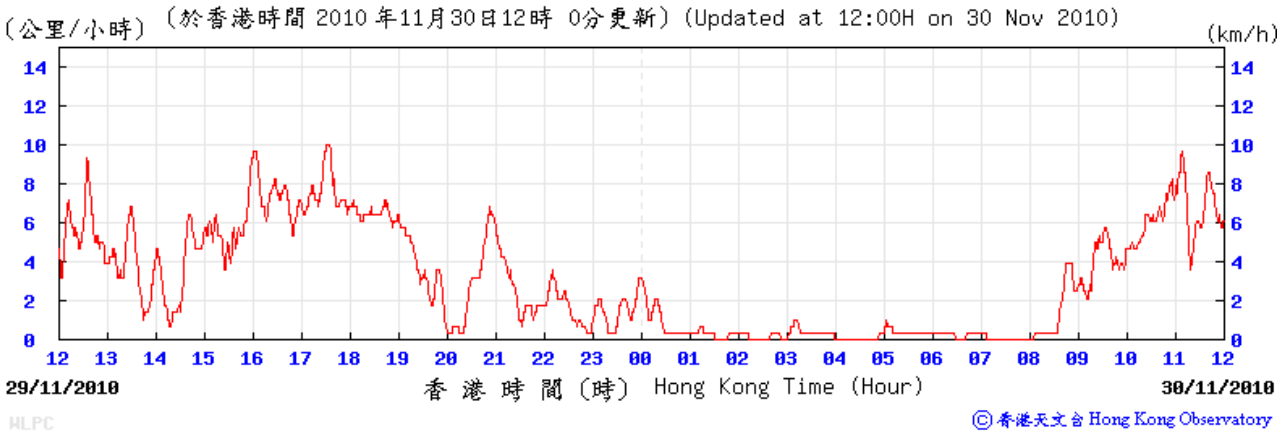
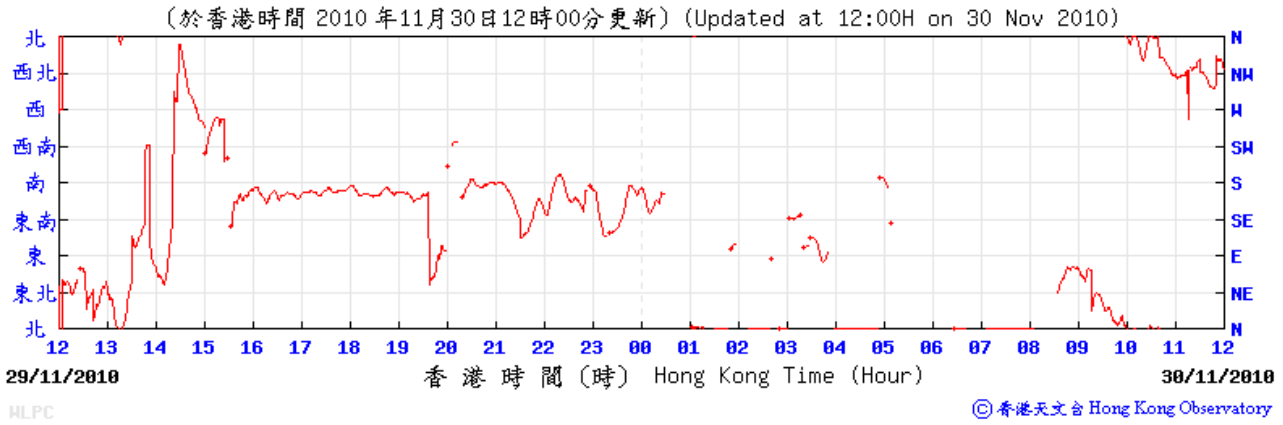
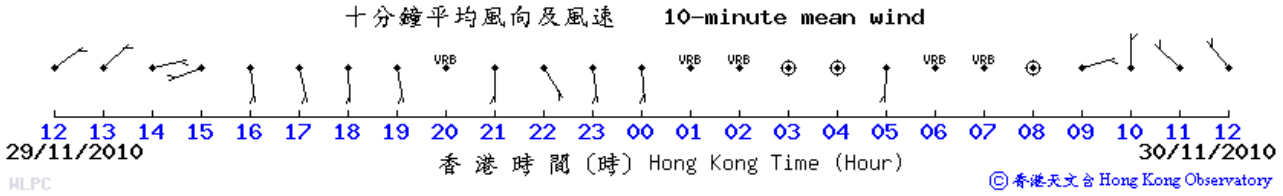
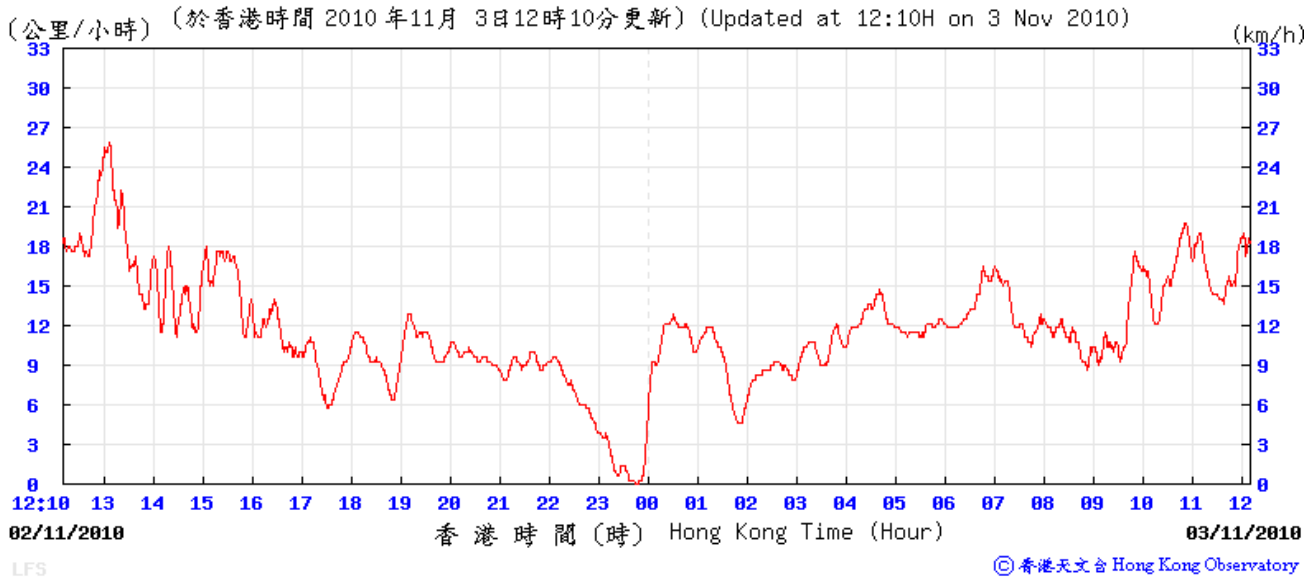
30 November 2010

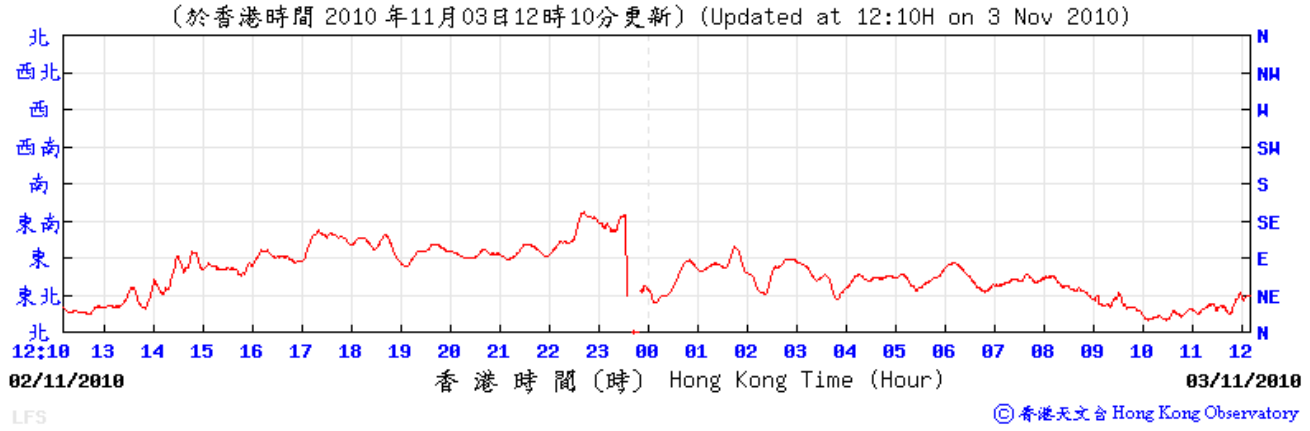


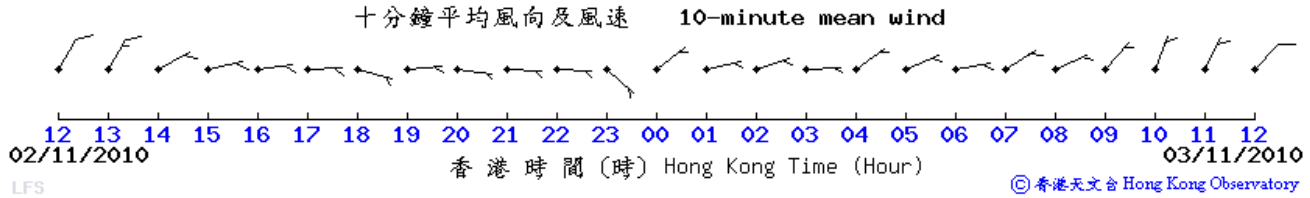




Wind Data for Lau Fau Shan
3 November 2010

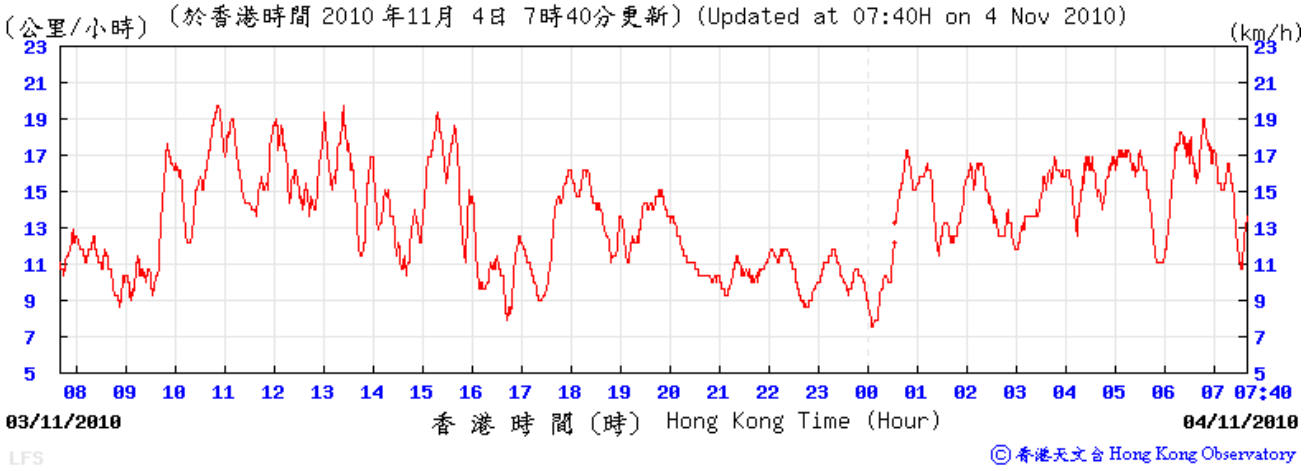


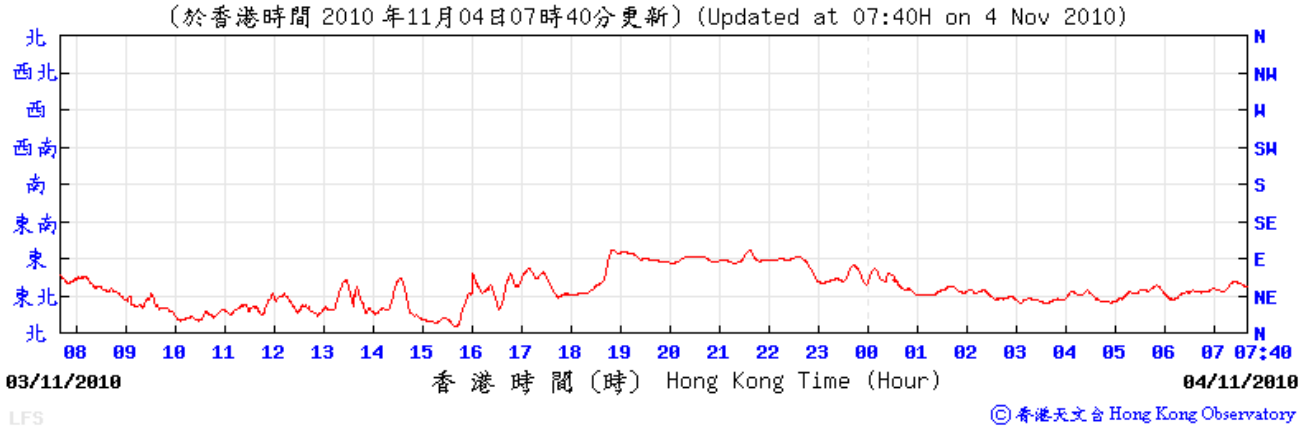


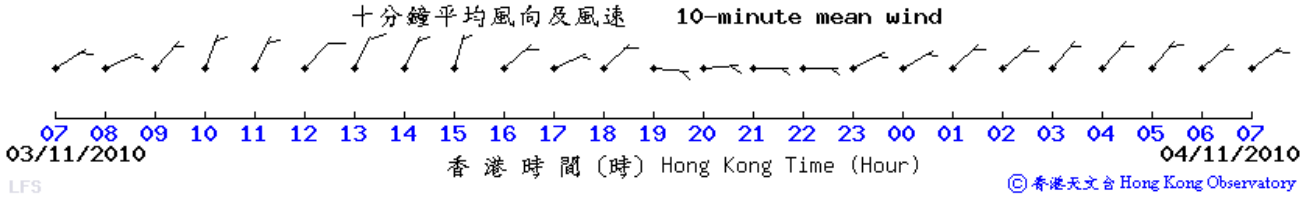


Wind Data for Lau Fau Shan

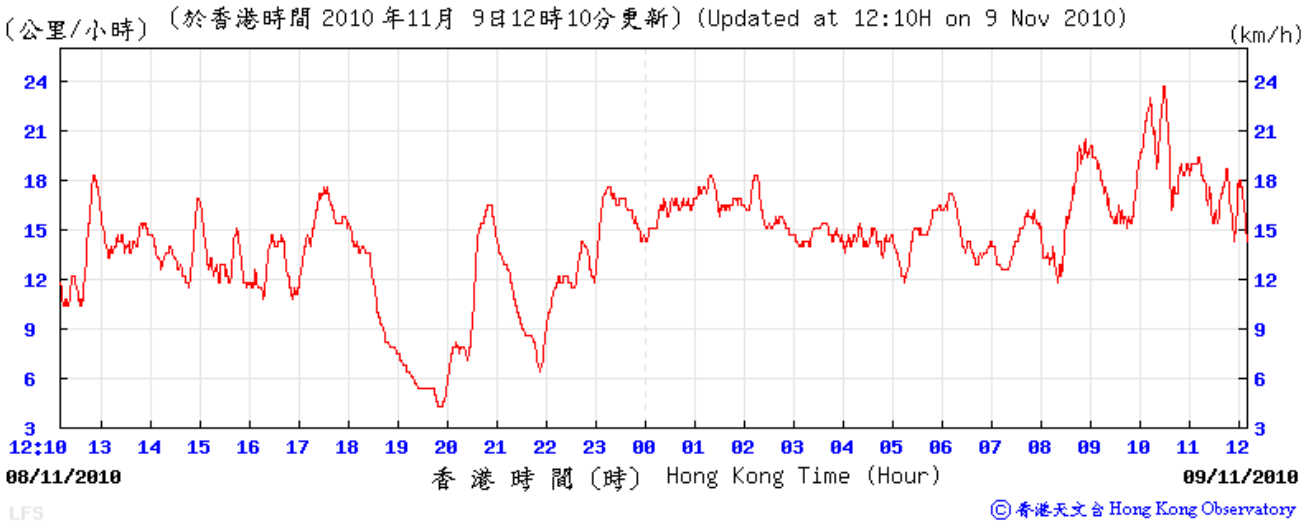
4 November 2010

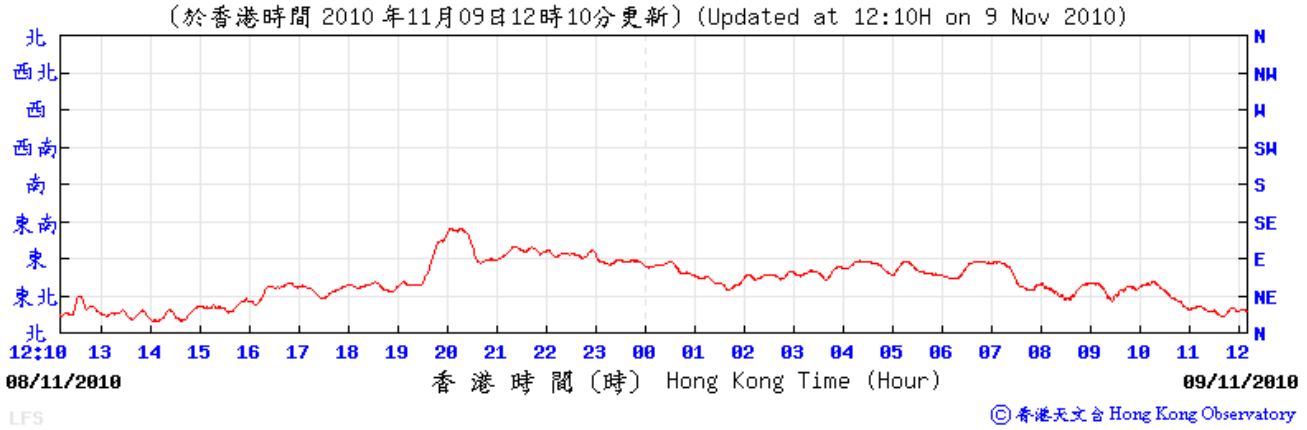


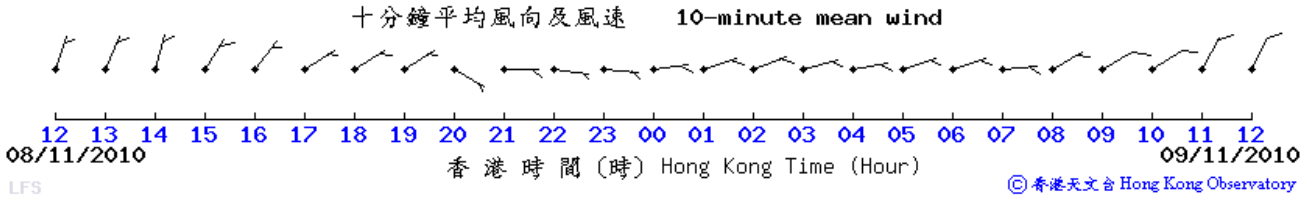




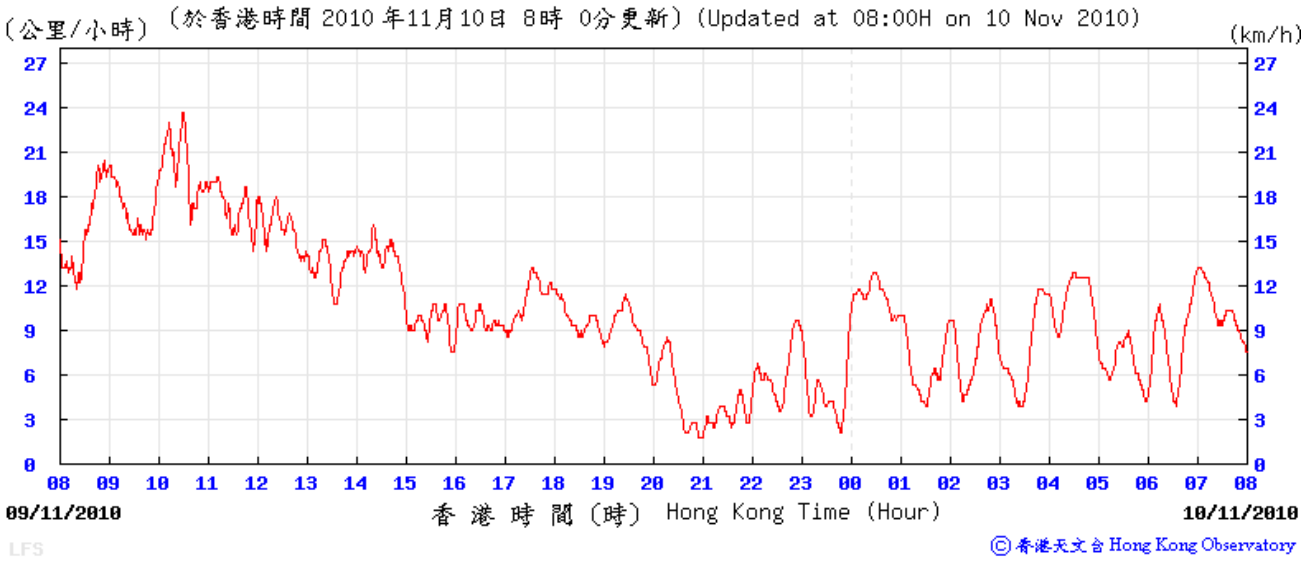
Wind Data for Lau Fau Shan
9 November 2010

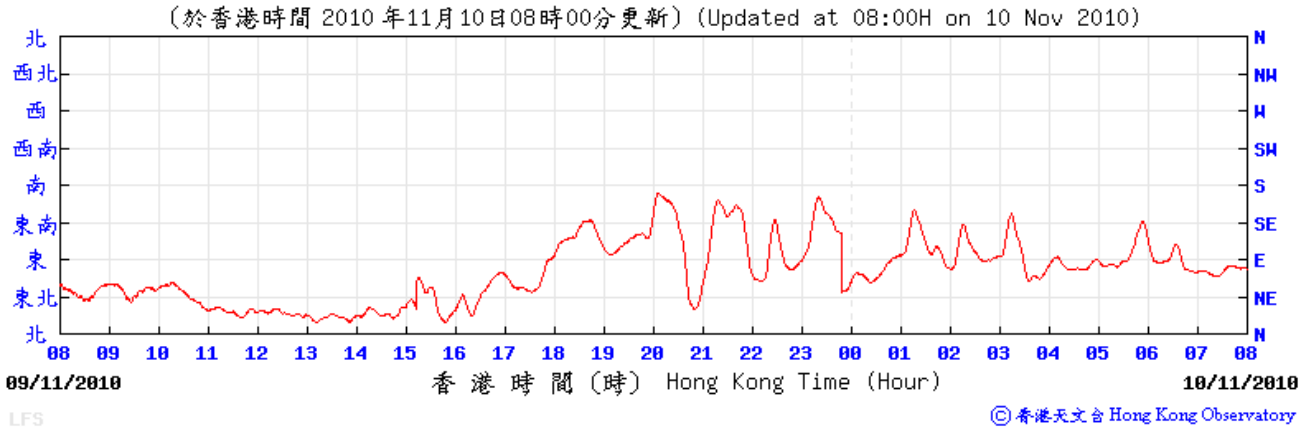


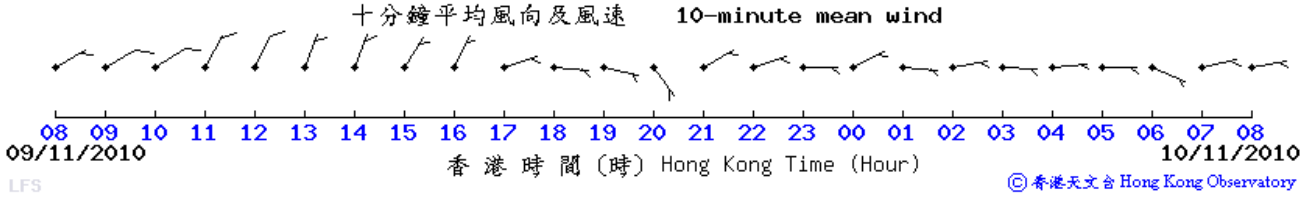




Wind Data for Lau Fau Shan
10 November 2010







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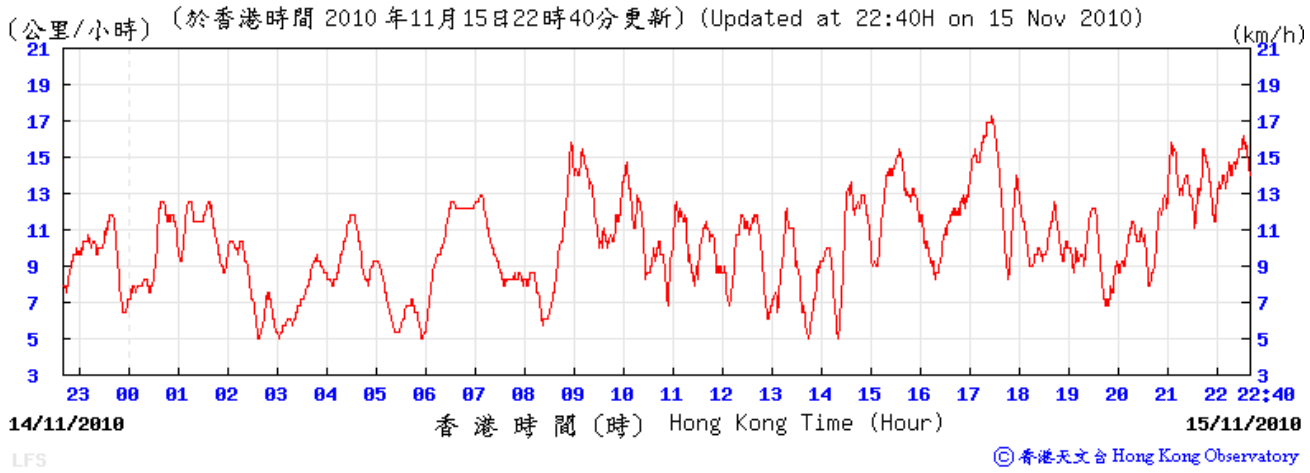

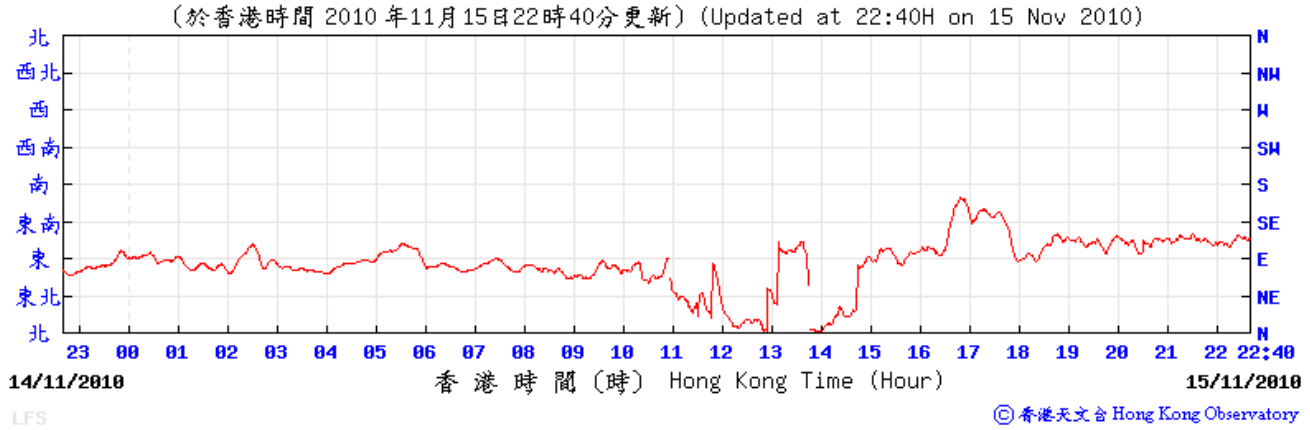

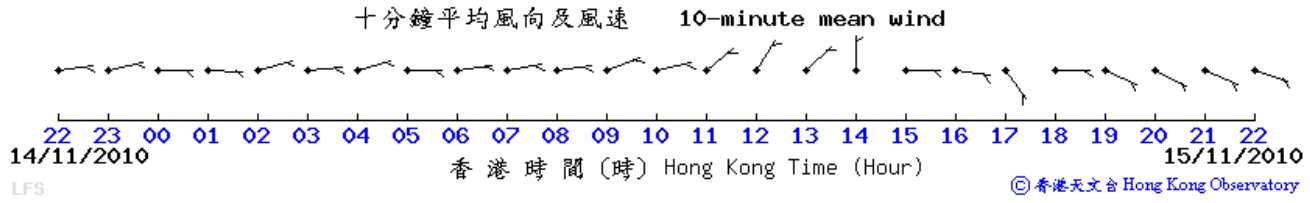

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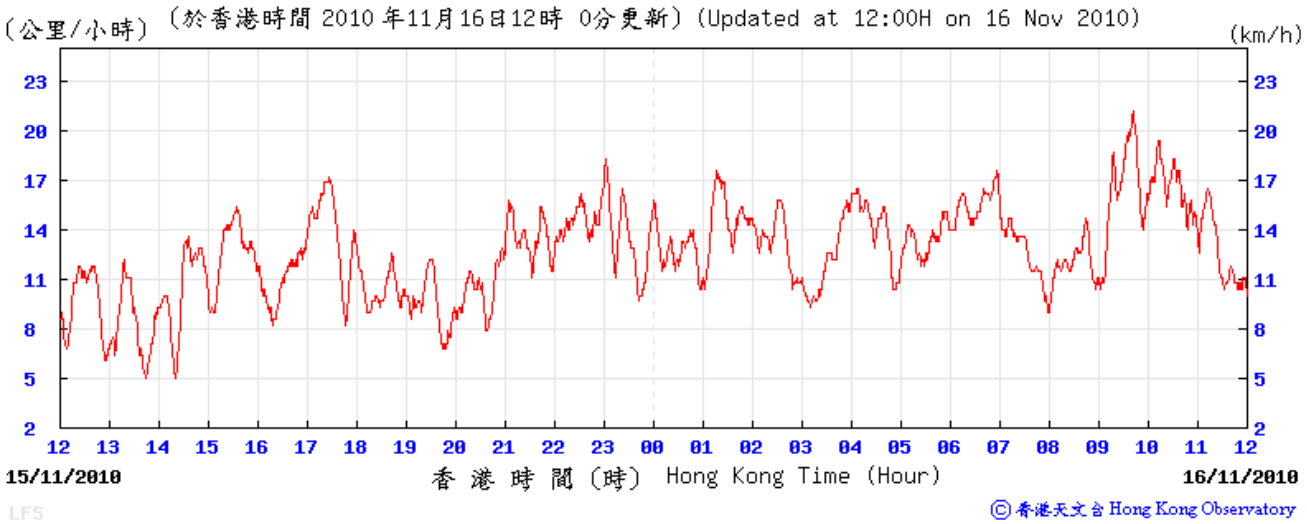

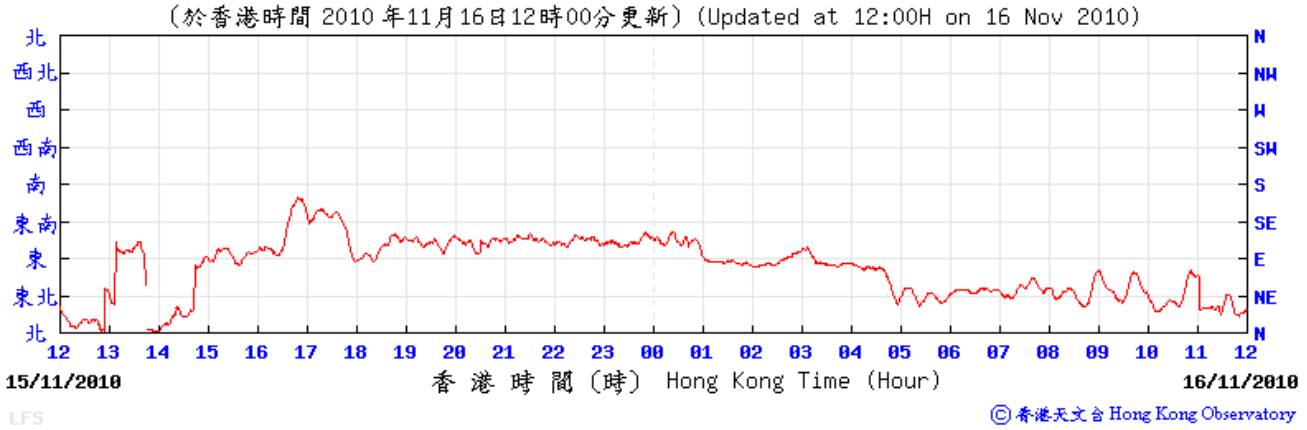

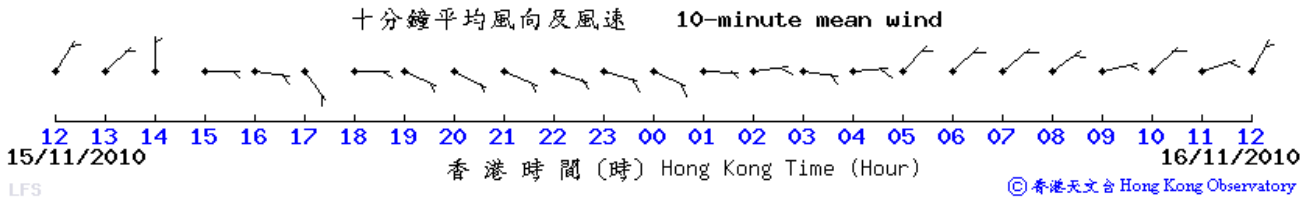

Wind Data for Lau Fau Shan
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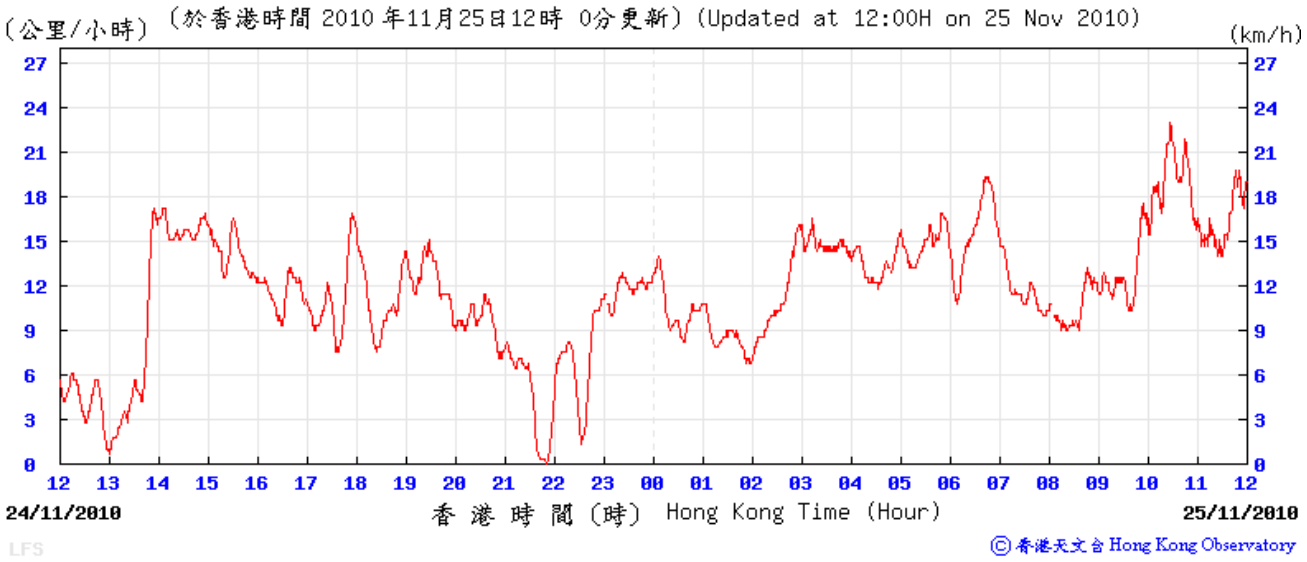
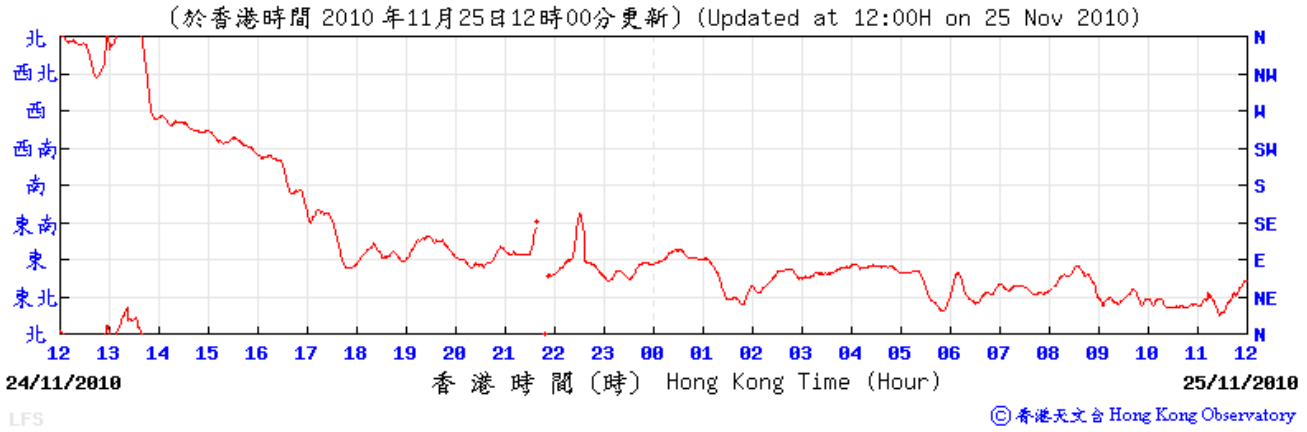
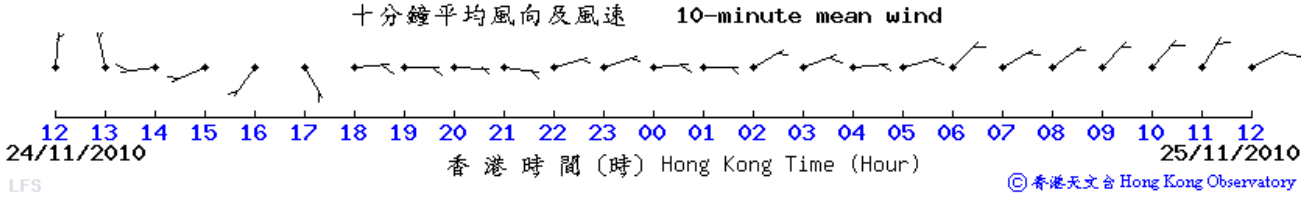
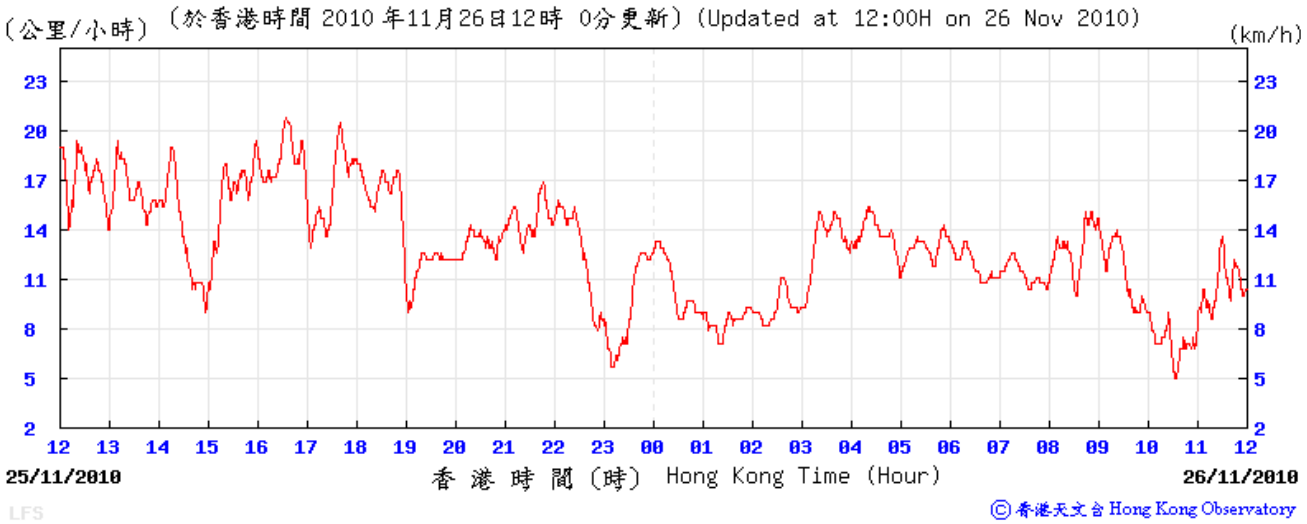
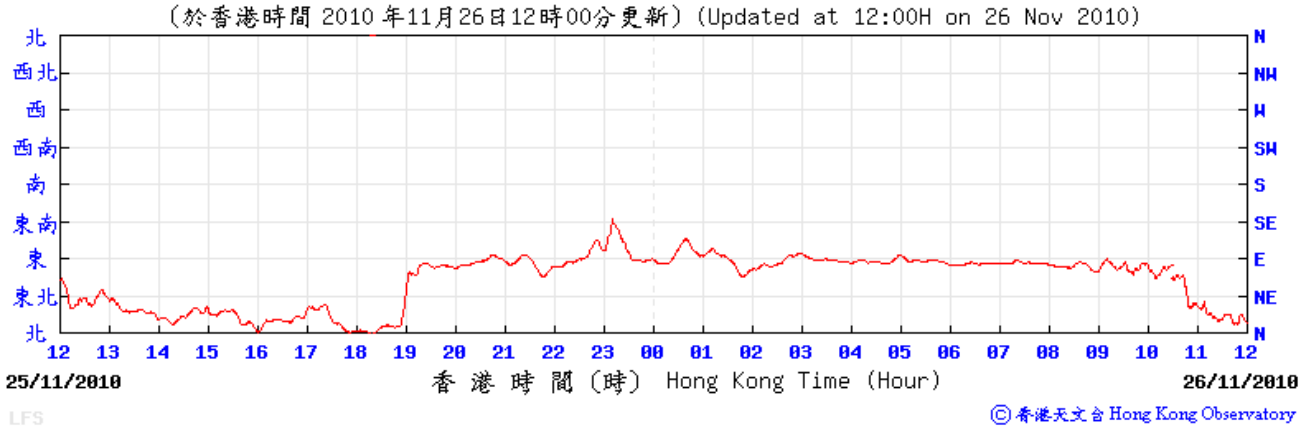


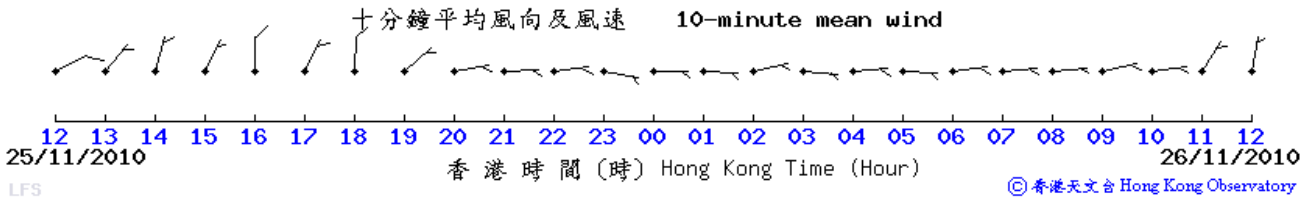




Wind Data for Lau Fau Shan
26 November 2010







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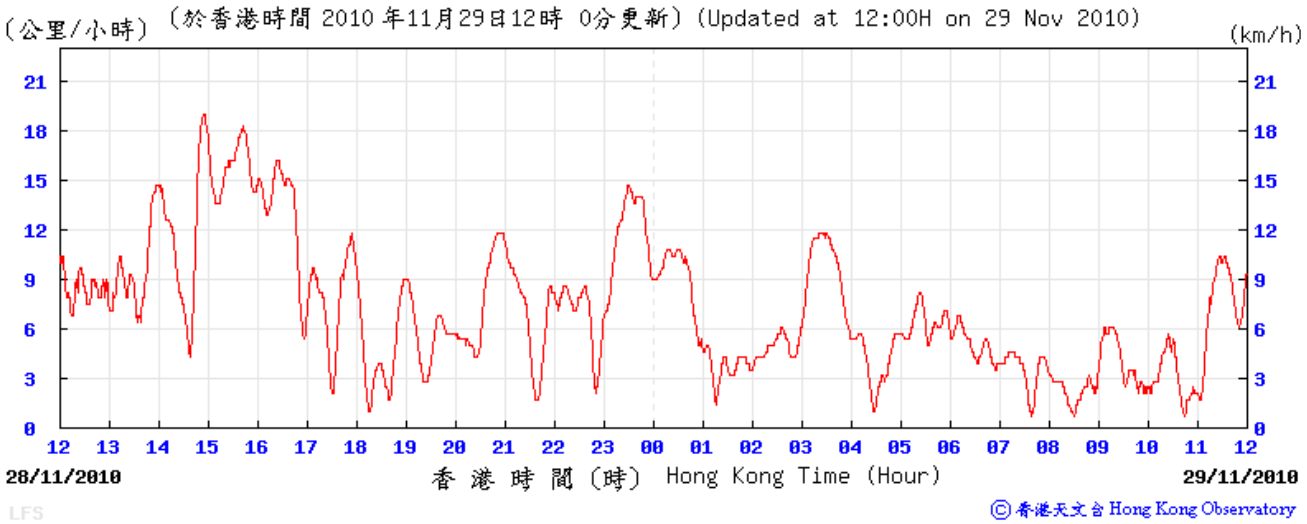

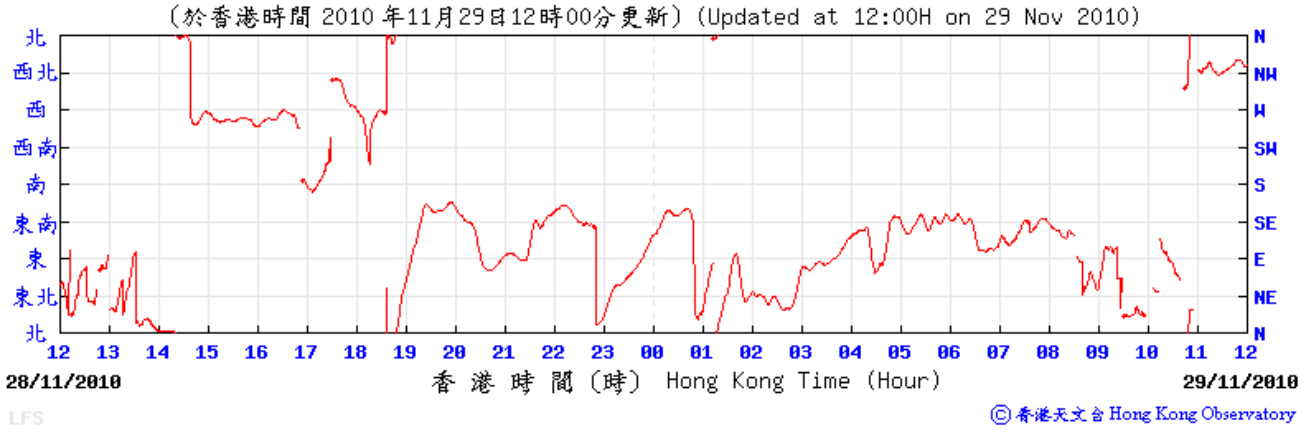

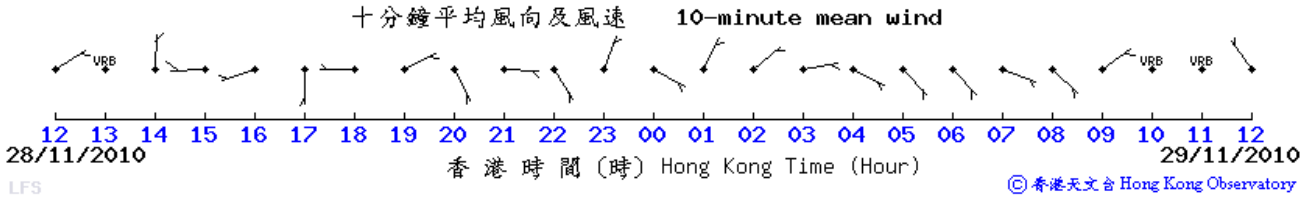

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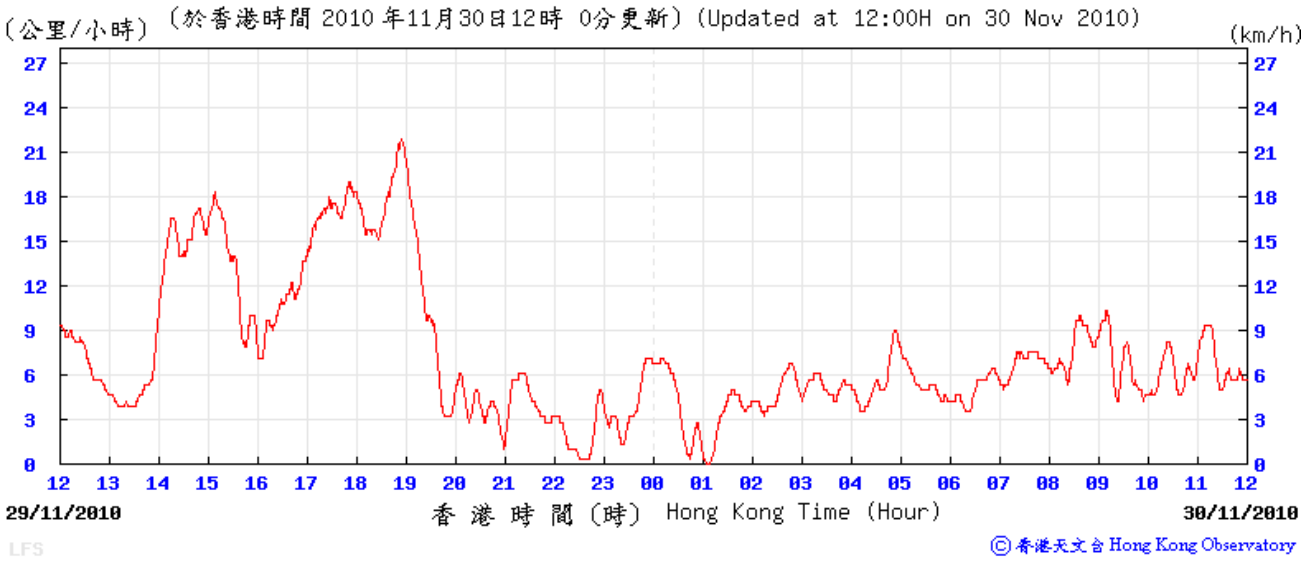

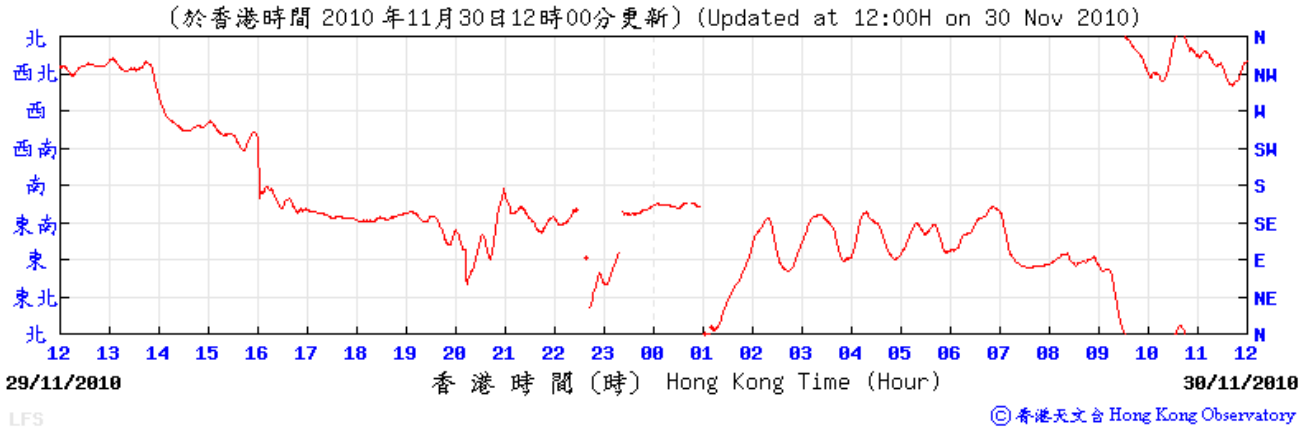

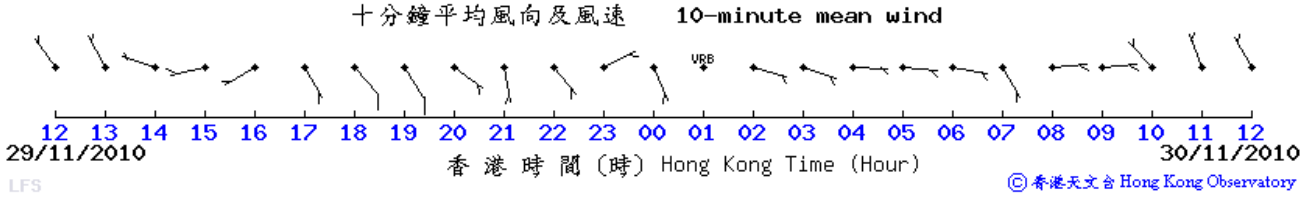

Appendix H. Ecological Monitoring conducted

November 2010	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mammals		✓										✓			
Birds		✓										✓			
Herpetofauna															
Dragonflies & butterflies															
Inspection Visits		✓								✓		✓			

November 2010	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Mammals					✓					✓					
Birds					✓			✓		✓					
Herpetofauna								✓							
Dragonflies & butterflies								✓							
Inspection Visits					✓			✓		✓					

Note:

* Light grey cells indicated public holidays or Sundays.

Appendix I. Summary of Bird Surveys conducted

Table I1. Summary of bird monitoring in the Survey Area

Species Name	*Scientific Name*	Conservation Status [2]	Nov	
			Survey[3]	Mean[4]
Little Grebe	*Tachybaptus ruficollis*	LC, (1)	4	43.3
Great Cormorant	*Phalacrocorax carbo*	PRC, (1)	4	10.0
Grey Heron	*Ardea cinerea*	PRC, (1)	4	18.0
Great Egret	*Egretta alba*	PRC, (1)	4	10.0
Intermediate Egret	*Egretta intermedia*	RC, (1)	3	1.3
Little Egret	*Egretta garzetta*	PRC, (1)	4	41.3
Chinese Pond Heron	*Ardeola bacchus*	PRC, (1)	4	36.3
Black-crowned Night Heron	*Nycticorax nycticorax*	LC, (1)	1	0.3
Black-faced Spoonbill	*Platalea minor*	PGC, (1)	3	5.3
Northern Shoveler	*Anas clypeata*	RC, (1)	4	1.5
Besra	*Accipiter virgatus*	-	1	0.3
Common Buzzard	*Buteo buteo*	-	1	0.3
White-breasted Waterhen	*Amaurornis phoenicurus*	(1)	4	2.5
Common Moorhen	*Gallinula chloropus*	(1)	4	19.0
Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	LC, (1)	1	0.3
Greater Painted-Snipe	*Rostratula benghalensis*	LC, (1)	1	0.3
Black-winged Stilt	*Himantopus himantopus*	RC, (1)	4	5.8
Little Ringed Plover	*Charadrius dubius*	LC, (1)	4	9.8
Kentish Plover	*Charadrius alexandrinus*	RC, (1)	1	0.3
Spotted Redshank	*Tringa erythropus*	RC, (1)	1	0.3
Common Redshank	*Tringa totanus*	RC, (1)	1	0.3
Marsh Sandpiper	*Tringa stagnatilis*	RC, (1)	3	2.5
Common Greenshank	*Tringa nebularia*	RC, (1)	4	3.5
Green Sandpiper	*Tringa ochropus*	(1)	4	7.3
Wood Sandpiper	*Tringa glareola*	LC, (1)	4	8.3
Common Sandpiper	*Actitis hypoleucos*	(1)	4	20.5
Common Snipe	*Gallinago gallinago*	(1)	2	1.0
Temminck's Stint	*Calidris temminckii*	LC, (1)	3	3.3
Pied Kingfisher	*Ceryle rudis*	(LC), (1)	1	0.3
Common Kingfisher	*Alcedo atthis*	(1)	4	7.8
White-throated Kingfisher	*Halcyon smyrnensis*	(LC)	4	2.0
Pale Martin	*Riparia diluta*	-	1	0.5
Yellow Wagtail	*Motacilla flava*	(1)	4	23.5
Grey Wagtail	*Motacilla cinerea*	(1)	1	0.5
Richard's Pipit	*Anthus richardi*	-	4	8.0
Red-throated Pipit	*Anthus cervinus*	LC	3	1.3
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	-	1	0.8
Oriental Reed Warbler	*Acrocephalus orientalis*	-	1	0.3
Zitting Cisticola	*Cisticola juncidis*	LC	4	2.8
Red-billed Starling	*Sturnus sericeus*	GC	4	46.8
White-cheeked Starling	*Sturnus cineraceus*	PRC	2	2.8
Collared Crow	*Corvus torquatus*	LC, NT	3	1.5
No. of Species Recorded			**42**	

(1) indicates wetland-dependant or -associated species.
(2) Conservation status follows that of Fellowes *et al.* (2002) and BirdLife International listing (2010).
(3) indicates number of surveys recorded within the survey period.
(4) equals the average number of individual species surveyed in each survey (i.e. total counts in all surveys divided by number of surveys

Table I2. Summary of bird monitoring in the WRA

Species Name	*Scientific Name*	Conservation Status [2]	Nov		Records outside survey[5]
			Survey[3]	Total[4]	
Grey Heron	*Ardea cinerea*	PRC, (1)	2	1.0	
Great Egret	*Egretta alba*	PRC, (1)	-	-	✓
Intermediate Egret	*Egretta intermedia*	RC, (1)	-	-	✓
Little Egret	*Egretta garzetta*	PRC, (1)	-	-	✓
Chinese Pond Heron	*Ardeola bacchus*	PRC, (1)	1	1.0	✓
Black Kite	*Milvus migrans*	(RC)	-	-	✓
Common Kestrel	*Falco tinnunculus*	-	2	1.0	
Black-winged Stilt	*Himantopus himantopus*	RC, (1)	-	-	✓
Little Ringed Plover	*Charadrius dubius*	LC, (1)	2	24.5	✓
Common Greenshank	*Tringa nebularia*	RC, (1)	1	0.5	✓
Green Sandpiper	*Tringa ochropus*	(1)	1	1.0	
Wood Sandpiper	*Tringa glareola*	LC, (1)	-	-	✓
Common Sandpiper	*Actitis hypoleucos*	(1)	1	0.5	
Pintail/Swinhoe's Snipe	*Gallinago stenura/ Gallinago megala*	(1)	1	0.5	
Common Snipe	*Gallinago gallinago*	(1)	-	-	✓
Temminck's Stint	*Calidris temminckii*	LC, (1)	1	0.5	✓
Pied Kingfisher	*Ceryle rudis*	(LC), (1)	-	-	✓
White-throated Kingfisher	*Halcyon smyrnensis*	(LC)	-	-	✓
Yellow Wagtail	*Motacilla flava*	(1)	2	14.5	✓
White Wagtail	*Motacilla alba*	-	0	0.0	✓
Richard's Pipit	*Anthus richardi*	-	2	1.5	✓
Olive-backed Pipit	*Anthus hodgsoni*	-	1	0.5	
Red-throated Pipit	*Anthus cervinus*	LC	2	2.5	
Buff-bellied Pipit	*Anthus rubescens*	LC	2	1.5	
Common Stonechat	*Saxicola torquata*	-	1	0.5	✓
Plain Prinia	*Prinia inornata*	-	-	-	✓
Dusky Warbler	*Phylloscopus fuscatus*	-	-	-	✓
Little Bunting	*Emberiza pusilla*	-	1	0.5	
Scaly-breasted Munia	*Lonchura punctulata*	-	-	-	✓
Eurasian Tree Sparrow	*Passer montanus*	-	-	-	✓
No. of Species Recorded			**30**		

(1) indicates wetland-dependant or -associated species.
(2) Conservation status follows that of Fellowes *et al.* (2002) and BirdLife International listing (2010).
(3) indicates number of surveys recorded within the survey period.
(4) refers to the total number of individuals recorded in the survey
(5) includes observations during other surveys and/or site visits.

Appendix J. Summary of Herpetofauna, and Insects Surveys conducted

Table J1. Summary of herpetofauna surveys conducted

Species Name	*Scientific Name*	Conservation Status[1]	Nov	
			Survey[2]	Mean[3]
Amphibians				
(No Records in Nov 2010)				
			Survey[2]	Mean[3]
Reptiles				
(No Records in Nov 2010)				

(1) Conservation status follows that of Fellowes *et al.* (2002), Chan *et al.* (2005) and Karsen *et al.* (1998).
(2) indicates number of surveys recorded within the survey period.
(3) equals the average number of individual species surveyed in each survey (i.e. total counts in all surveys divided by number of surveys)

Table J2. Summary of mammals observed conducted

Species Name	*Scientific Name*	Conservation Status(1)	Nov
(No Records in Nov 2010)			

Table J3. Summary of insect surveys conducted in the nearby fish ponds

Common Name	*Scientific Name*	Conservation Status[1]	Nov	
			Survey[2]	Mean[3]
Odonate			**5**	
Common Bluetail	*Aschnura senegalensis*	-	1	1
Crimson Darter	*Crocothemis servilia*	-	1	1
Green Skimmer	*Orthetrum sabina*	-	1	4
Wandering Glider	*Pantala flavescens*	-	1	6
Saddlebag Glider	*Tramea virginia*	-	1	3
Butterfly			**8**	
Unidentified Swift	*Pelopidas* sp.	-	1	1
Red-base Jezebel	*Delias pasithoe*	-	1	1
Indian Cabbage White	*Pieris canidia*	-	1	17
Common Grass Yellow	*Eurema hecabe*	-	1	6
Unidentified Cerulean	*Jamides* sp.	-	1	2
Pale Grass Blue	*Zizeeria maha*	-	1	7
Common Tiger	*Danaus genutia*	-	1	1
Blue-Spotted Crow	*Euploea midamus*	-	1	1

(1) Conservation status follows that of Fellowes *et al.* (2002), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).
(2) indicates number of surveys recorded within the survey period.
(3) equals the average number of individual species surveyed in each survey (i.e. total counts in all surveys divided by number of surveys)

Table J4. Summary of insect surveys conducted in the WRA

Common Name	*Scientific Name*	Conservation	Nov

			Survey[2]	Mean[3]
Odonate			**8**	
Common Bluetail	*Aschnura senegalensis*	-	1	8
Pale-spotted Emperor	*Anax guttatus*	-	1	1
Lesser Emperor	*Anax parthenope*	-	1	1
Crimson Darter	*Crocothemis servilia*	-	1	3
Blue Percher	*Diplacodes trivialis*	-	1	2
Common Red Skimmer	*Orthetrum pruinosum*	-	1	1
Green Skimmer	*Orthetrum sabina*	-	1	30
Wandering Glider	*Pantala flavescens*	-	1	25
Butterfly			**4**	
Common Straight Swift	*Parnara guttatus*	-	1	1
Lemon Emigrant	*Catopsilia pomona*	-	1	1
Common Grass Yellow	*Eurema hecabe*	-	1	4
Blue-Spotted Crow	*Euploea midamus*	-	1	2

(1) Conservation status follows that of Fellowes *et al.* (2002), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).
(2) indicates number of surveys recorded within the survey period.
(3) equals the average number of individual species surveyed in each survey (i.e. total counts in all surveys divided by number of surveys)

Appendix K. Environmental Mitigation Measures - Implementation Status

Mott MacDonald

Environmental Mitigation Measures - Implementation Status

Air Quality – Recommended Mitigation Measures

Air Quality Mitigation Measures during construction	Implementation Status
• use of effective dust screens, sheeting or netting to be provided to enclose dry scaffolding which may be provided from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level (maximum four floors for this Project) of the scaffolding where scaffolding is erected around the perimeter of a building under construction;	N/A
• dump trucks for material transport should be totally enclosed using impervious sheeting;	✓
• any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated within 24 hours of the excavation or unloading;	N/A
• dusty materials remaining after a stockpile is removed should be wetted with water;	✓
• the area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with e.g. concrete, bituminous materials or hardcore or similar;	✓
• the portion of road leading only to a construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials;	✓
• stockpile of dusty materials to be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet;	N/A
• all dusty materials to be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;	✓
• vehicle speed to be limited to 10 kph except on completed access roads;	✓
• every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites;	✓
• the load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle;	✓
• the working area of excavation should be sprayed with water immediately before, during and immediately after (as necessary) the operations so as to maintain the entire surface wet;	✓
Odour mitigation measures	
• all malodorous excavated material should be placed as far as possible from any ASRs;	N/A
• the stockpiled malodorous material should be removed from site as soon as possible; and	N/A
• the stockpiled malodorous material should be covered entirely by plastic tarpaulin sheets.	N/A

Noise – Recommended Mitigation Measures

Noise Mitigation Measures during construction	Implementation Status
• only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction works;	✓
• machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;	✓
• plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs;	✓
• silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction period;	✓
• mobile plant should be sited as far away from NSRs as possible;	✓

Environmental Mitigation Measures - Implementation Status

• material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities; and	✓
• The Contractor shall at all times comply with all current statutory environmental legislation.	✓
Selection of quieter plant and working methods The Contractor shall obtain particular models of plant that are quieter than standards given in GW-TM. The list of assumed quieter plants can be found in the **Table 4–14** of the EIA report. The Contractor shall select from the available models achieving the assumed sound levels while making reference to the GW-TM and BS5228: Part 1: 1997	N/A
Use of Noise Barriers Noise barriers are proposed along the site boundary to block the direct line of sight from the most affected NSRs to the major noise contribution construction phases. The height of the noise barriers ranged from 9-10m. The noise barriers shall be built before the commencement of construction works in order to ensure protection to nearby NSRs. The noise barrier should have a surface density of at least 10kg/m^2 or material providing equivalent transmission loss. The noise barriers and hoardings should have no gaps and openings to avoid noise leakage.	P

Water Quality – Recommended Mitigation Measures

Water Quality Mitigation Measures during construction	Implementation Status
• The site should be confined to avoid silt runoff to the site.	✓
• No discharge of silty water into the storm drain and drainage channel within and the vicinity of the site.	✓
• Any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials.	✓
• Stockpiles to be covered by tarpaulin to avoid spreading of materials during rainstorms;	N/A
• Suitable containers shall be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport;	✓
• Chemical waste containers shall be labelled with appropriate warning signs in English and Chinese to avoid accidents. there shall also be clear instructions showing what action to take in the event of an accidental;	✓
• Storage areas shall be selected at safe locations on site and adequate space shall be allocated to the storage area;	✓
• Any construction plant which causes pollution to the water system due to leakage of oil or fuel shall be removed off-site immediately;	✓
• Spillage or leakage of chemical waste to be controlled by using suitable absorbent materials;	✓
• Chemicals will always be stored on drip trays or in bunded areas where the volume is 110% of the stored volume;	P
• Regular clearance of domestic waste generated in the temporary sanitary facilities to avoid waste water spillage.	✓
• Temporary sanitary facilities to be provided for on-site workers during construction.	✓
• Temporary drainage channel and associated facilities will be provided to collect the surface runoff generated within the Project Area during the construction phase.	✓
• Sandbags or silt traps will need to be placed to avoid silt runoff to the drainage channel draining the water in the northern ditch. Draining of the ditches should avoid rainy weather.	✓
• Excavated soil which needs to be temporarily stockpiled should be stored in a specially designated area and provided with a tarpaulin cover to avoid runoff into the drainage channels.	✓

Environmental Mitigation Measures - Implementation Status

Waste Management – Recommended Mitigation Measures

Waste Management Mitigation Measures during construction	Implementation Status
Site Clearance Waste • The major construction works of Wo Shang Wai is in the development of residential buildings and other associated facilities (club house, tennis courts, etc). The amount of site clearance works will be limited with the exception of the excavated materials. The thin layer of vegetation removed can be stored and reused for landscaping.	✓
Excavated Materials The intention is to maximize the reuse of the excavated materials on-site as fill materials.	✓
Imported Filling Material The excavated/imported filling material may have to be temporarily stockpiled on-site for the construction of road embankment and foundation of viaduct substructure. Control measures should be taken at the stockpiling area to prevent the generation of dust and pollution of stormwater channels. However, to eliminate the risk of blocking drains in the wet season, it is recommended that stockpiling of excavated materials at during wet season should be avoided as far as practicable.	N/A
Construction and Demolition Materials Careful design, planning and good site management can minimise over-ordering and generation of waste materials such as concrete, mortars and cement grouts. The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork of plastic facing should be considered to increase the potential for reuse.	✓
The Contractor should reuse any C&D material on-site. C&D waste should be segregated and stored in different containers to other wastes to encourage the re-use or recycling of materials and their proper disposal.	✓
Chemical Waste For those processes which generate chemical waste, it may be possible to find alternatives which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste.	N/A
Containers used for the storage of chemical wastes should:	
• be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed:	✓
• have a capacity of less than 450 litres unless the specification have been approved by the EPD; and	✓
• display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations,	✓
The storage area for chemical wastes should:	
• be clearly labelled and used solely for the storage of chemical waste;	✓
• be enclosed on at least 3 sides;	✓
• have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area whichever is the greatest;	✓
• have adequate ventilation;	✓
• be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and	✓
• be arranged so that incompatible materials are adequately separated.	✓
Disposal of chemical waste should:	
• be via a licensed waste collector; and	✓
• be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers, or	N/A
• to be reuser of the waste, under approval from the EPD.	N/A

Environmental Mitigation Measures - Implementation Status

General Refuse Should be stored in enclosed bins or compaction units separate from C&D and chemical wastes. The Contractor should employ a reputable waste collector to remove general refuse from the site, separate from C&D and chemical wastes, on a regular basis to minimise odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law.	✓
Disposal of Excavated Sediment at Sea	
The requirements and procedures for excavated sediment disposal are specified under the ETWB TCW No. 34/2002 and PNAP 252. The management of the excavation, use and disposal of sediment is monitored by Fill Management Committee, whilst the licensing of marine dumping is the responsibility of the Director of Environmental Protection (DEP).	N/A
The excavated sediment would be loaded onto barges or other appropriate vessel and transported to the designated marine disposal site. Category L sediment and Category M sediment passing the biological test would be suitable for disposal at a gazetted open sea disposal ground. Category M sediment failing the biological test and Category H sediment passing the biological test would require confined marine disposal.	N/A
During transportation and disposal of the dredged sediment, the following measures should be taken to minimize potential impacts on water quality: -	N/A
• Bottom opening transport vessels should be fitted with tight fitting seals to prevent leakage of material. Excess material should be cleaned from the decks and exposed fittings of vessels before the vessel is moved.	N/A
• Monitoring of the barge loading should be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels should be equipped with automatic self-monitoring devices as specified by the DEP.	N/A

Ecology – Recommended Mitigation Measures

Ecology Mitigation Measures during construction	Implementation Status
Clear Definition of Site Limit	
Clear definition of the site limit should be provided in order to minimize and confine the disturbance during the construction period, especially the northern limit of the Site which is adjacent to fishponds within the Conservation Area (CA) zone and are considered to be ecological sensitive receivers. During wetland construction stage the WRA boundary will be delineated using a temporary hoarding in order to reduce disturbance to off-site habitats and wildlife. During the establishment phase this hoarding will be replaced with a 1 m high chain-link fence in order to reduce disturbance to the WRA through access by humans and dogs, and a hoarding will be established around the residential construction site.	✓
Dust and Noise Suppression and Avoidance of Water Pollution	
Good site practices of dust and noise suppression should be strictly implemented to ensure that disturbance is minimized to acceptable levels. Mitigation measures for the off-site disturbance impacts on the fishponds in the CA include hoarding at the northern site boundary during construction of the WRA to reduce noise and dust impacts to the adjacent habitats. Through the use of quieter plant and temporary/movable noise barriers, the noise level would be reduced significantly to an acceptable level. Hoarding at the northern boundary should be replaced with a 1 m high chain-link fence following construction and the WRA will then act as a buffer between the existing wetland areas and the residential part of the site until construction is completed. Hoarding will be retained between the WRA and ongoing construction work to avoid visual disturbance and reduce noise and dust emissions. Pollution of watercourses and sedimentary runoff will be minimized by good site practice, especially the containment of water and sediment within the site for removal. These standard noise and air and water quality site practices are considered to be effective measures for minimizing the disturbance impact during the construction period.	✓
Planning of Construction Schedule	

Environmental Mitigation Measures - Implementation Status

The construction of the proposed project should be scheduled in phases. Because mitigation is preferably carried out in advance of the main works rather than after the completion of works, the construction of the WRA will commence at the start of the project. Construction work within the WRA is scheduled to take place in a single wet season, followed by 1.5 years of wetland establishment. During the wetland establishment period no noisy work will be undertaken within the WRA to minimize the disturbance to off-site habitats and wildlife.	✓
Reusing Onsite Materials	
Soil and plants on-site should be reused (e.g. used as fill material) as far as practical. Stock piles of these reusable materials should be stored in an appropriate area on-site. In particular, the re-use of the wetland soils and topsoil should be considered.	✓
Construction of the Wetland Restoration Area The WRA will be operational within 2.5 yrs from the commencement of construction (1 year for site formation and 1.5 years for establishment) and will compensate for the predicted ecological impacts of the proposed development.	✓

Landscape and Visual – Recommended Mitigation Measures

Landscape and Visual Mitigation Measures during construction	Implementation Status
CM1- The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.	✓
CM2 - Screening of construction works by hoarding / noise barriers.	✓
CM3 - Reduction of construction period to practical minimum.	✓
CM4 - Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where the soil material meets acceptable criteria and where practical. The Contract Specification shall include storage and reuse of topsoil as appropriate.	✓
CM5 - Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone).	✓
CM6 – Advance screen planting of noise barriers	✓
CM7 - Control night-time lighting and glare by hooding all lights.	✓
CM8 - Ensure no run-off into streams adjacent to the Project Area.	✓
CM9 - Protection of existing trees on boundary of site shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at S16 and Tree Removal Application stage).	✓
CM10 - Trees unavoidably affected by the works shall be transplanted where practical. Trees should be transplanted straight to their destinations and not held in a nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.	✓

Legend:

✓	Implemented
×	Not implemented
P	Partially implemented
N/A	Not applicable