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TEST REPORT

China Harbour – China State Joint Venture

CONTRACT NO. CV/2009/02

HANDLING OF SURPLUS PUBLIC FILL

TSEUNG KWAN O AREA 137 FILL BANK

MONTHLY EM&A REPORT NO.1

(14 TO 31 DECEMBER 2009)

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Agreement No. CE 9/2005 (EP)

Subject Tseung Kwan O Area 137 Fill Bank – Monthly Environmental Monitoring & Audit Report for 14 to 31 December 2009 (under Contract No.: CV/2009/02)

We refer to the revised 1st Monthly EM&A Report for 14 to 31 December 2009 (under Contract No.: CV/2009/02) that we received through email on 19th January 2010 and are pleased to confirm we have no further comment on the report.

Should you require further information, please feel free to contact us.

Best regards,



Joseph Poon
Independent Environmental Checker

JP/by

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EXECUTIVE SUMMARY

This monthly Environmental Monitoring and Audit (EM&A) report No.1 was prepared by ETS-Testconsult Ltd (ET) for the "Contract No: CV/2009/02 – Handling of Surplus Public Fill – Tseung Kwan O Area 137 Fill Bank" (The Project).

This report documented the findings of EM&A Works conducted during the operation phase of Fill Bank at Tseung Kwan O Area 137 from 14 to 31 December 2009.

Construction Progress

As informed by the Contractor, the construction activities in this reporting month were as below:

- Removal & delivery of public fill stockpiled material to Mainland
- Operation of the road water lorries and the road sweeper
- Maintenance of haul road within fill bank area
- Delivery of public fill received at the Chai Wan Public Fill Barging Point to TKO fill bank
- Operation of the tipping hall (A1, A2 & A3)
- Operation at the queuing area for public truck lorries

Environmental Monitoring Progress

The summary of the monitoring activities in this monitoring month is listed below:

- Noise Monitoring (Day-time): 1 Occasion at 1 designated location
- 24-hour TSP Monitoring: 4 Occasions at 2 designated locations
- 1-hour TSP Monitoring: 10 Occasions at 2 designated locations
- Marine Water Quality Monitoring: 7 Occasions at 2 designated locations
- Weekly-site inspection: 3 Occasions

Noise Monitoring

No exceedances of Action and Limit levels for noise monitoring were recorded in the reporting month.

Air Monitoring

No exceedances of Action and Limit levels were recorded for 24-hr and 1-hr TSP monitoring in the reporting month.

Marine Water Quality Monitoring

No exceedances of Action and Limit levels were recorded for water quality monitoring in the reporting month.

Site Inspection

Environmental site inspections conducted in this reporting month are presented as follows:

<u>Concerned Parties</u>	<u>Dates of Audit / Inspection</u>
ET Weekly site inspection	16, 23 and 30
IEC site inspection	22

In general, performance on environmental mitigation measures implemented was found to be satisfactory in this reporting month. The major findings observed during site inspections are presented in the Section 7.0.

Landscape and Visual

The germination rate on the panels was satisfactory in this reporting month. The Contractor should properly maintain the hydroseeded panels.

Environmental Complaints, Notification of summons and successful prosecutions

No complaints, notification of summons and prosecutions with respect to environmental issues were received in this monitoring month.



Future Key Issues

Based on the site inspections and forecast of engineering works in the coming month, key issues to be considered are as follows:

- *Noise and air quality impact due to construction works;*
- *Maintain wheel washing facilities properly;*
- *Maintain all drainage and desilting facilities properly;*
- *Use and maintain silt curtain properly;*
- *Clean up the fill material on concrete pavement along the BHA frequently;*
- *Watering, hydroseeding or covering all opening slopes and stockpiles with tarpaulin to avoid wind and water erosion;*
- *Sufficient drip trays for all oil drums / chemical containers;*
- *Implement all necessary preventive measures to avoid oil leakage. In the event an oil leakage happens, the Contractor should properly remove the leaked oil and handle the contaminated soil and all materials using for this cleaning works as chemical waste;*
- *Maintain good site practice and waste management to minimize environmental impacts at the site; and*
- *Follow-up improvements on waste management issues.*



1.0 INTRODUCTION

China Harbour – China State Joint Venture (CHCSJV) appointed Environmental Team (ET) of ETS-Testconsult Limited (ETL) to undertake the Environmental Monitoring and Audit (EM&A) for the "Contract No: CV/2009/02 –Handling of Surplus Public Fill – Tseung Kwan O Area 137 Fill Bank" (The Project).

In accordance with the Environmental Permit (No.: EP-134/2002/H) (the EP), an EM&A programme should be implemented in accordance with the procedures and requirements in the EM&A Manual of the approved EIA report (Registration No. AEIAR-060/2002). The EM&A programme for this study as stated in Section 2.3.1 of the EM&A Manual covers the following environmental aspects during the establishment, operation and removal phases of the Fill Bank at Tseung Kwan O Area 137:

- *Fugitive Dust;*
- *Noise generation from onsite activities;*
- *Water Quality; and*
- *Landscape and Visual.*

The EM&A programme requires environmental monitoring for air quality, noise and water quality and environmental site inspections for air quality, noise, water quality, landscape and visual, and waste management. The EM&A requirements for each parameter described in the following sections include:

- *All monitoring parameters;*
- *Monitoring schedules for the reporting month and forthcoming months;*
- *Action and Limit levels for all environmental parameters;*
- *Event/Action Plans;*
- *Environmental mitigation measures, as recommended in the Project EIA study final report; and*
- *Environmental requirements in contract documents.*

Baseline monitoring was completed in August and September 2002 by Materialab. Action and Limit Levels were established for air and water quality parameters based on the baseline monitoring results.

This report documented the findings of EM&A Works conducted during the operation phase of Fill Bank at Tseung Kwan O Area 137 from 14 to 31 December 2009.

2.0 PROJECT INFORMATION

2.1 Scope of the Project

The scale and scope of the Project as stated in the EP include:

- Site clearance;
- Construction of a temporary storm water system;
- Stockpiling of 6 million m³ of public fill;
- Setting up two barging points: one at the Tseung Kwan O Basin (TKO Basin) and one at the Construction and Demolition Material Sorting Facility (C&DMSF) for transporting the stockpiled public fill by barges;
- Setting up a temporary barging point at the existing Explosive Off-loading Barging Point located in the south-eastern part of Area 137 for the period of May 2004 to December 2004 for transporting the stockpiled public fill by barge;
- Construction and operation of a Construction and Demolition Material Sorting Facility (C&DMSF);
- Setting up a Construction and Demolition Material Crushing Facility at the TKO Basin; and
- Remove the temporary fill bank.



2.2 Site Description

Tseung Kwan O Area 137 is located at the southern end of Wan Po Road. In the vicinity of the site are other industrial uses such as SENT landfill, TKO Industrial Estate, etc. Both Island Resort and Fullview Garden are also situated at more than 1.8km from the site. Other existing ASRs and NSRs, including resident developments and schools, are located at a further distance away from TKO Area 137.

2.3 Construction Programme

Details of construction programme are shown in Appendix G.

2.4 Project Organization and Management Structure

The organization chart and lines of communication with respect to the on-site environmental management and monitoring program are shown in Appendix A.

2.5 Contact Details of Key Personnel

The key personnel contact names and telephone numbers are shown in Table 2.1.

Table 2.1 Contact Details of Key Personnel

Organization	Name of Key Staff	Project Role	Tel. No.	Fax No.
CEDD	Mr. P Y LU, Mr. Lawrence NG, Mr. Thomas WONG	Engineer's Representative	2760 5835	2714 0113
IEC (Materialab)	Mr Joseph POON	IEC	2450 8238	2450 6138
Contractor (CHCSJV)	Mr. Wah Fung Lok	Contractor's Agent	9772 7055	2243 4089
ET (ETL)	Mr C. L. Lau	ET Leader	2946 7791	2695 3944

3.0 CONSTRUCTION PROGRESS IN THIS REPORTING MONTH

As informed by the Contractor, the activities in the reporting month include:

- Removal & delivery of public fill stockpiled material to Mainland
- Operation of the road water lorries and the road sweeper
- Maintenance of haul road within fill bank area
- Delivery of public fill received at the Chai Wan Public Fill Barging Point to TKO fill bank
- Operation of the tipping hall (A1, A2 & A3)
- Operation at the queuing area for public truck lorries

4.0 AIR QUALITY MONITORING

4.1 Monitoring Requirement

TSP levels were monitored in the reporting month in accordance with the EM&A Manual. Table 4.5 shows the Action and Limit Levels for the environmental monitoring works.

4.2 Monitoring Equipment

Both 1-hour and 24-hour TSP air quality monitoring was performed using a GMWS2310 High Volume Air Sampler (HVS) located at each of the designated monitoring station. Table 4.1 summarizes the equipment used in the air quality monitoring programme. A copy of the calibration certificates for the HVS and calibrator are attached in Appendix B1.



Table 4.1 Air Quality Monitoring Equipment

<i>Equipment</i>	<i>Model and Make</i>
HVS	Greasby GMWS2310
Calibrator	Tisch TE-5025A
Wind Data Logger	Davis Weather Monitor II

4.3 Monitoring Parameters, Frequency and Duration

Table 4.2 summarizes the monitoring parameters, monitoring duration and frequencies of air quality monitoring.

Table 4.2 Monitoring parameters, duration, frequency of air quality monitoring

<i>Parameter</i>	<i>Duration</i>	<i>Frequency</i>
24-hr TSP	24 hr	Once every six days
1-hr TSP	1 hr	Three times per day every six days

4.4 Monitoring Locations

Table 4.3 tabulates the air quality monitoring locations of this project.

Table 4.3 Air quality monitoring locations

<i>Monitoring station</i>	<i>Location</i>
TKO-A1	Outside CEDD Site Office
TKO-A2	Site Egress

4.5 Monitoring Methodology

Both 1-hr and 24-hr air quality monitoring (High Volume Sampler)

Instrumentation

High volume sampler, as HVS, (Greasby GMWS2310) complete with appropriate sampling inlets were employed for both 1-hour and 24-hour TSP monitoring. The sampler is composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with that required by USEPA standard Title 40, Code of Federation Regulations Chapter 1 (Part 50).

Installation

The installation of HVS refers to the requirement stated in EM&A Manual.

Operation/Analytical Procedures

Operating/analytical procedures for the operation of HVS are as below:

- Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 0.6m³/min and 1.7m³/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50. The flow rate was indicated on the flow rate chart.
- For TSP sampling, fiberglass filters (GA-55) were used.
- The power supply was checked to ensure the sampler worked properly.
- On sampling, the sampler was operated 5 minutes to establish thermal equilibrium before placing any filter media at designated air monitoring station.
- The filter holding frame was then removed by loosening the four nuts and carefully a weighted and conditioned filter was centered with the stamped number upwards, on a supporting screen.
- The filter was aligned on the screen so that the gasket formed an air-tight seal on the outer edges of the filter. Then the filter holder frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.
- The programmable timer will be set for a sampling period of 1 hour or 24 hours. Information was recorded on the record sheet, which included the starting time, the weather condition and the filter number (the initial weight of the filter paper can be found out by using the filter number.).
- After sampling, the filter was transferred from the filter holder of the HVS to a sealed plastic bag and sent to the laboratory for weighting. The elapsed time was also recorded.



- Before weighting, all filters were equilibrated in a desiccator for 24 hour with the temperature of $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and the relative humidity (RH) $<50\% \pm 5\%$.
- All measurement procedures in Section 2.3 of the EM&A Manual were followed during the reporting month.

Maintenance & Calibration

- HVS and their accessories should be maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- HVS should be calibrated at bi-monthly intervals.

Wind Data Monitoring

Measuring Procedure

Upon installation of the wind data logger on site, temperature, wind speed and direction was automatically stored in the logger. Regular downloading of the information was carried out weekly.

Maintenance

Cleaning was provided for all the rotational parts of the wind data logger regularly. Replacement of battery was carried out weekly. The wind data logger was checked once per week and no calibration was required for the equipment as instructed by the manufacturer.

4.6 Action and Limit Levels

Table 4.4 shows the Action and Limit levels for 24-hr TSP and 1-hr TSP monitoring.

Table 4.4 Action and Limit Levels for 24-hr TSP and 1-hr TSP

Monitoring Location	24-hr TSP ($\mu\text{g}/\text{m}^3$)		1-hr TSP ($\mu\text{g}/\text{m}^3$)	
	Action Level	Limit Level	Action Level	Limit Level
TKO-A1	210	260	376	500
TKO-A2	210	260	376	500

4.7 Event-Action Plans

Please refer to Appendix F for details.

4.8 Results and Observation

4.8.1 1-hour and 24-hour TSP Monitoring results

Monitoring data of both 1-hour and 24-hour TSP monitoring carried out in this reporting month are summarized in Appendix B2. Graphical presentation of 1-hour and 24-hour TSP monitoring results for the reporting month is shown in Appendix B3. Wind data, including wind speed and wind direction, are annexed in Appendix E. Table 4.5 summarizes 1-hr TSP and 24-hr TSP monitoring results.



Table 4.5 Summary of 1-hr TSP and 24-hr TSP Monitoring Results

Air quality monitoring Stations	Location	Monitoring Period						
		24-hr TSP			1-hr TSP			
		Date	Result ($\mu\text{g}/\text{m}^3$)	Exceedance #	Date	Start Time	Result ($\mu\text{g}/\text{m}^3$)	Exceedance #
TKO-A1	Outside CEDD Site 2ffice	14/12/09	146	X	14/12/09	10:00	243	X
					16/12/09	09:00	301	X
					18/12/09	09:00	336	X
		19/12/09	155	X	19/12/09	09:00	270	X
					21/12/09	13:02	229	X
					23/12/09	09:00	269	X
		24/12/09	132	X	24/12/09	10:10	224	X
					28/12/09	13:08	301	X
					30/12/09	14:00	254	X
		31/12/09	134	X	31/12/09	09:00	310	X
					---	---	---	---
					---	---	---	---
TKO-A2	Site Egress	14/12/09	140	X	14/12/09	10:10	230	X
					16/12/09	09:00	265	X
					18/12/09	09:00	314	X
		19/12/09	149	X	19/12/09	09:00	268	X
					21/12/09	13:08	265	X
					23/12/09	09:00	283	X
		24/12/09	138	X	24/12/09	10:19	250	X
					28/12/09	13:18	333	X
					30/12/09	14:00	253	X
		31/12/09	144	X	31/12/09	09:00	345	X
					---	---	---	---
					---	---	---	---

Remark (*): L=Limit Level exceedance, A=Action Level exceedance and X=not an exceedance

No exceedances of Action and Limit Level of both 1-hour and 24-hour TSP monitoring results were recorded during the reporting month.

4.8.2 Observation

Generally, the Contractor implemented sufficient dust mitigation measures, including operation of the mist spraying systems at the CEDD Combined Reception Office and the site egress area, wheel washing facilities, road dampening by water bowsers and automatic water sprinklers on the main haul roads. Furthermore, hydroseeded slopes on the stockpiling areas was maintained properly in order to prevent dust generation from wind erosion of the exposed surfaces. Other dust sources near TKO Area 137 also included operation of the C&DMSF at the PBR2 Project site, the temporary C&DMSF at Portion K and dumping activities at the SENT Landfill.

5.0 Noise Monitoring

5.1 Monitoring Requirements

Noise monitoring was conducted at 1 monitoring station as specified in the approved EM&A Monitoring Proposal for good site practice. The equipment, parameter, frequency, duration, methodology, calibration details, results and observations of the noise monitoring for the reporting month are presented in this section.



5.2 Monitoring Equipment

An Integrating Sound Level Meter was used for noise monitoring. It was a Type 1 sound level meter capable of giving a continuous readout of the noise level reading including equivalent continuous sound pressure level (L_{eq}) and percentile sound pressure level (L_x). It complies with International Electro Technical Commission Publications 651:1979 (Type1) and 804:1985 (Type1), and speed in m/s was used to monitor the wind speed.

Table 5.1 summarizes noise monitoring equipment model being used. A copy of the calibration certificate for noise meter and calibrator are attached in Appendix C1.

Table 5.1 Noise Monitoring Equipment

<i>Equipment</i>	<i>Model</i>
<i>Integrating Sound Level Meter</i>	<i>Rion NL-31 Sound Level Meter</i>
<i>Calibrator</i>	<i>Rion NC-73 Sound Level Calibrator</i>
<i>Portable Wind Speed Indicator</i>	<i>TSI Model 8340-M Air Velocity Meter</i>

5.3 Monitoring Parameters, Duration and Frequency

Duration, frequencies and parameters of noise measurement are presented in Table 5.2.

Table 5.2 Duration, Frequencies and Parameters of Noise Monitoring

<i>Time period</i>	<i>Duration/min</i>	<i>Parameters</i>	<i>Frequency</i>
<i>Day-time: 0700-1900 hrs on normal weekday</i>	30	L_{eq} , L_{10} , L_{90}	Once per month

5.4 Monitoring Locations

One Noise monitoring was conducted at the noise monitoring location, TKO-N1 as shown in Figure 2 during the reporting month. Table 5.3 describes the location of the monitoring station.

Table 5.3 Noise Monitoring Locations

<i>Monitoring station</i>	<i>Location</i>	<i>Type of Measurement</i>
<i>TKO-N1</i>	<i>Outside site Egress along Wan Po Road</i>	<i>Free Field</i>

5.5 Monitoring Procedures and Calibration Details

Operation/Analysis Procedures

- The Sound Level Meter was set on a tripod at a height of 1.2m above the ground.
- For free field measurement, the meter was positioned away from any nearby reflective surfaces.
- 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 mins*
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000HZ. If the difference in the calibration level before and after measurement was more than 1dB(A), the measurement would be considered invalid and repeat measurement would be required after re-calibration or repair of the equipment.
- The wind speed was frequently checked with a portable wind meter.
- During the monitoring period, the L_{eq} , L_{10} and L_{90} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Free Field correction to the measurements should be made. Correction factor of +3dB(A) should be made to the free Field measurements.
- Noise monitoring would be cancelled in the presence of fog, rain, wind with a steady speed exceeding 5m/s, or wind gusts exceeding 10m/s.

Maintenance and Calibration



- The microphone head of the sound level meter and calibrator are cleaned with soft cloth in quarterly intervals.
- The meter is sent to the supplier or HOKLAS laboratory to check and calibrated in yearly intervals.

5.6 Action and Limit Levels

The Action and Limit levels for noise levels derived as illustrated in Table 5.4.

Table 5.4 Action and Limit Levels for noise monitoring

Time Period	Time Period	Action	Limit
Normal hours	0700-1900 hrs on normal weekdays	When one documented complaint is received	75 dB(A)

5.7 Event-Action Plans

Please refer to the Appendix F for details.

5.8 Results and Observation

5.8.1 Results

Only Day-time noise monitoring was carried out at monitoring station TKO-N1 in this reporting month. The detail of the noise monitoring is provided in Appendix C2. Graphical presentation of the monitoring result for the reporting month is shown in Appendix C3. A summary of the monitoring result is presented in Table 5.5.

Table 5.5 Summary of Impact Noise Level

Date	Start Sampling Time (hh:mm)	Noise Level dB (A)		
		$L_{eq(30min)}$	L_{10}	L_{90}
31/12/09	11:00	62.4	66.0	59.6

Since no documented complaints on noise issue were received in this reporting month, no Action Level exceedances were recorded. Besides, no exceedances in Limit Level were recorded according to the result from Day-time noise monitoring.

5.8.2 Observation

The major noise source during the monitoring event was the dump truck traffic. Operation of the Fill Bank was from 08:00 to 21:00 from Monday to Sunday in the reporting month. Whereas the operation hours for barge activities in the TKO Basin was from 08:00 to 23:00. The monitoring result complied with the noise limit of 75dB(A).

6.0 MARINE WATER QUALITY MONITORING

6.1 Monitoring Requirements

In accordance with the EM&A Manual, impact marine water quality monitoring was conducted three days per week. Measurements were taken at both mid-flood and mid-ebb tides at three depths (i.e. 1m below surface, mid depth and 1m from seabed) at Control Station, C1 and Monitoring Station, M4.

6.2 Monitoring Locations

For the Reclamation Project, there were 4 Designated Monitoring Stations and 2 Designated Control Stations specified in the EM&A Manual. Upon the completion of the monitoring programme under Stage 2 reclamation works, the ET started monitoring events at the impact station M4 and the control station C1 from 18 May 2004 onwards. Figure 1 shows the location of the marine water quality monitoring stations. Table 6.1 describes the locations of the monitoring stations in the reporting month.



Table 6.1 Locations of Marine Water Monitoring Stations

Station Description	Code	HK Metric Grid E	HK Metric Grid N
Control Station (Ebb tide)	TKO-C1	844 740.208	815 371.502
Monitoring Station, Tung Lung Chau Fish Culture Zone	TKO-M4	847 741.029	812 977.878

6.3 Monitoring Parameters

Monitoring of the marine water quality parameters are listed in Table 6.2.

Table 6.2 Marine Water Quality Monitoring Parameters

In-situ measurement	Laboratory analysis
Depth (m)	Suspended solids (mg/L)
Temperature (°C)	
Dissolved Oxygen (mg/L and % saturation)	
Turbidity (NTU)	
Salinity (ppt)	

6.4 Monitoring Frequency

The monitoring frequency of the marine water monitoring is summarized in Table 6.3.

Table 6.3 Monitoring frequency of the marine water

Parameter	Frequency	No. of Location	No. of Depths
Temperate	3 days/week, 2 tides/day	2 (TKO-C1 and TKO-M4)	3 (Surface, mid-depth & bottom)
Salinity			
DO			
Turbidity			
Suspended solids			

6.5 Monitoring Methodology and Equipment Used

For Location of the monitoring stations

Global Positioning System (GPS)

A hand-held digital GPS was used to identify the designated monitoring stations prior to water sampling.

For Water Depth measurement

Echo Sounder

A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring station.

For In-situ Water Quality Measurement

All in-situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals or sometimes longer throughout all stages of the water quality monitoring.

Dissolved Oxygen (DO) and temperature measuring equipment

A portable, weatherproof DO-measuring meter with built-in salinity compensation (YSI model 95) was used in the impact monitoring. It can be capable for measuring:

- a dissolved oxygen level in the range of 0-20 mg/L and 0-200 % saturation; and
- a temperature of 0-45 degree Celsius

This type of DO-measuring meter has a membrane electrode with automatic temperature compensation complete with a 50-feet cable. Wet bulb calibration for a DO meter was carried out before the start of measurement.



Turbidity Measurement Instrument

A 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.

Salinity Meter

A portable salinity meter capable of measuring salinity in the range 0-40 ppt (YSI Model 30M) was provided for measuring salinity of the water at each monitoring location. It was checked with standard 30 ppt Salinity solutions before the start of measurement.

For Water Sampling and Sample Analysis

In-situ monitoring was carried out at three depths: 1 meter below water surface, at mid-depth and 1 meter above the seabed. If the water depth is less than 6 m, the mid-depth station shall be omitted and if the water depth is below 3 m, only the mid depth station shall be monitored.

Water Sampler

A water sampler comprising a transparent PVC cylinder, with a capacity of not less than 2 liters, was lowered into the water body at the predetermined depth. The both opening ends of the sampler were then closed accordingly by dead weight and water samples were collected.

Water Container

The sample container, made by high-density polythene, 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 (Environmental Laboratory, ETS-Testconsult Ltd, HOKLAS Registration No. 022) on the same day for analysis.

The summary of testing method of testing parameter as recommended by EIA or required by EPD, with the QA/QC results in accordance with the requirement of HOKLAS or international accredited scheme is shown in Table 6.4.

Table 6.4 Summary of testing procedures

Laboratory Analysis	Testing Procedure	Detection Limit
Total suspended solids	In house method based on APHA 19 th ed 2540D	1.0 mg/L

In-situ measurement

All in-situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibration for a DO meter was carried out before the start of measurement.

At each measurement/sampling depth, two consecutive measurements of dissolved oxygen (DO), dissolved oxygen saturation (DOS), turbidity and salinity were taken. For turbidity measurement, the sample was collected by using sampler and then transferred to the cell. The reading of turbidity of the sample was directly recorded from the Turbidimeter (HACH 2100P) after inserting the cell to the Turbidimeter. For DO, DOS and Salinity, duplicate measurements were performed by dropping the calibrated probes of the corresponding monitoring equipments to the designated depths of the water column and taking readings after stabilized. The duplicate measurements were averaged if the difference was not greater than 25%. If the difference is greater than 25%, repeat measurement will be required.

Table 6.5 shows the equipment used for in-situ monitoring of water quality. The calibration certificates are attached in Appendix D1.



Table 6.5 Details of Marine Water Quality Monitoring Equipment (In-site measurement)

Parameter	Model	Date of Calibration	Due Date	Equipment No.
Coordinate of Monitoring stations	MLR GPS Navigator, SP24	-----	-----	ET/EW/005/01*
Dissolved Oxygen (Saturation), Temperature, Salinity	YSI Dissolved Oxygen, Salinity & Temperature Meter, YSI 85	26/11/09	25/02/10	ET/EW/008/002*
Turbidity	HACH Model 2100P Turbid Meter	09/11/09	08/02/10	ET/0505/006
Water Depth	EAGLE Strata 128 Sonar	-----	-----	EW/002/02

Remark: (*) indicates the instrument should be calibrated on use.

6.6 Action and Limit Level

The water quality criteria, namely Action and Limit (A/L) levels are presented in the table below.

Table 6.6 Water Quality Action and Limit Levels

Parameter	Action Level	Limit Level
DO (mg/L)	<u>Surface & Middle</u> <5.45 mg/L (5%-ile of baseline data) <u>Bottom</u> <4.72 mg/L (5%-ile of baseline data)	<u>Surface & Middle</u> <5.10 mg/L (1%-ile of baseline data) <u>Bottom</u> <2.00 mg/L
SS (mg/L) (Depth-averaged)	>6.74 mg/L (95%-ile of baseline data) or >120% of the upstream control station's SS at the same tide on the same day	>7.67 mg/L (99%-ile of baseline data) or >130% of the upstream control station's SS at the same tide on the same day
Turbidity (NTU) (Depth-averaged)	>4.28 NTU (95%-ile of Impact data) or >120% of the upstream control station's turbidity at the same tide on the same day	>4.58 NTU (99%-ile of Impact data) or >130% of the upstream control station's turbidity at the same tide on the same day

6.7 Event and Action Plan

Please refer to the Appendix F for details.

6.8 Monitoring Duration and Period in this reporting month

Below is the time schedule for the water quality monitoring events that were conducted in this reporting month:

Table 6.7 Time Schedule of Impact Marine Water Quality Monitoring

December 2009						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
13	14	15	16	17	18	19
	▼		▼		▼	
20	21	22	23	24	25	26
	▼		▼		Holiday	Holiday
27	28	29	30	31		
	▼		▼			

Remarks: (▼) = Marine water quality monitoring carried out by ET.

The daily marine water quality monitoring duration are detailed in Appendix D2.

6.9 Marine Water Quality Monitoring Results

The impact water quality measurement results are detailed in Appendix D2. Appendix D3 presents the water quality monitoring data and graphical presentations of monitoring results respectively.

The summary of marine water quality exceedances is shown in Table 6.8.



Table 6.8 Summary of Impact Marine Water Quality Exceedances in this reporting month

Station	Exceedance Level	DO		Turbidity		SS		Total	
		Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
TKO-C1	Action	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0
TKO-M4	Action	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0

No exceedances for water monitoring were recorded in this reporting month.

7.0 IEC SITE AUDIT AND WEEKLY ET SITE INSPECTIONS

7.1 IEC Site Audit

7.1.1 During this reporting period, the IEC team conducted one independent site audit of the Contract CV/2009/02 site (TKO Area 137 Fill Bank).

7.1.2 Findings of the site audit have been recorded on site checklists, copies of which were submitted to the Contractor for their further action as appropriate, and to the Client for their records. Key issues were highlighted to the Contractor's representative at the completion of each site audit to ensure that they were aware of the problem(s) identified and where necessary, to take immediate corrective actions. A copy of the completed checklists are appended to this report in Appendix H.

Table 7.1 Dates of IEC Site Audits in this reporting month

Date of Audit	Work Period	Site Audit Checklist Submitted Under IEC's Ref No.
23 December 2009	Operation of TKO Area 137 Fill Bank	MCLF 2622

7.1.3 The major findings recorded during the site audit conducted during this reporting period are summarized below. Full details are provided in the site audit checklists presented in Appendix H.

Table 7.2 Key Findings of IEC Site Audits in this reporting month

Date	Key Findings	Action Taken recommended by IEC
09 December 2009	• The containers inside Chemical Waste Storage were not labeled properly.	• To label all the chemical waste.
23 December 2009	• The containers inside Chemical Waste Storage were not labeled properly. (Rectified)	• To label all the chemical waste

7.2 Weekly ET Site Inspections

Weekly ET site inspections were carried out by ET to monitor the timely implementation of proper environmental pollution control and mitigation measures for the Project. In this reporting month, three weekly site inspections were conducted (16, 23 and 30 December 2009).

After each site inspection, a site inspection report detailing the environmental observations had also been prepared by the ET and submitted to RE, IEC and Contractor to notify of the ET's observations and recommendations. The weekly site inspection reports in this reporting month are attached in Appendix I. Summaries of the weekly site inspection findings in this month are described as follows:

Air Quality

- The major dust sources were dump truck movement on the unpaved haul roads and loading & unloading activities on various working platforms in the Fill Bank. The Contractor deployed water bowsers to dampen the haul roads and the working platforms;
- Unpaved haul road at stockpile area was noted to be wet and no fugitive dust was observed;



- Several automatic sprinklers served to dampen the haul roads outside the site office and on the ramp to the stockpiling area. The contractor was advised to keep it in proper operation all the time especially during dry season to avoid dust generation by vehicles passing by;
- Water spraying at Tipping Halls were operated properly in this reporting month. The Contractor was reminded to repair and maintain the water spraying system properly;
- Tipping halls were found operated and maintain properly in the reporting period;
- Wheel washing facilities were operating during weekly site inspections. Besides, the Contractor operated several mist spraying systems at the site egress and weighbridge respectively. The truckloads were dampened during inspection of fill material at CEDD Reception Office;
- The dump trucks were operating below the speed limit in the Fill Bank. There were sufficient speed limit signs on site to advise the drivers;
- The fill material was usually dampened on the barge. Dust impact was minimal from the barge delivery and unloading activity at the BHA;
- No black smoke was found emitted from the Powered Mechanical Equipment (PME) in this reporting month. However, the Contractor was still reminded to maintain all PME regularly and properly in order to avoid black smoke emission; and
- Other than the Fill Bank operation, dust sources also included road paving works of Wan Po Road outside the site egress, operation of PBR2 at Portion J of the Fill Bank, temp C&DMSF at Portion K, delivery of rock fill material from the SENT Landfill to the EPD's barging point and associated dumping activity, operation of the SENT Landfill, vehicular movement and wind erosion on Wan Po Road.

Noise

- The major noise source was dump truck traffic in the Fill Bank. Since the nearby NSR were remote from the Fill Bank, the noise impact was minimal. There was no specific observation noted regarding noise issue.

Water Quality

- The silt curtain at BHA was operated and maintained properly during the reporting period;
- Rain water was noted accumulated inside a drip tray of a generator at water filling station B during the weekly site inspection on 30 December 2009. The Contractor was reminded to drain the accumulated rain water out and treat as chemical waste. Since the finding was observed at the last weekly site inspection in this reporting month, it will be verified in the coming month; and
- Algae, mud and silt were found accumulated inside the nullah near the explosive storage area during the weekly site inspection on 30 December 2009. The Contractor was reminded to clean up the mud and silt and maintain the nullah properly. Since the finding was observed at the last weekly site inspection in this reporting month, it will be verified in the coming month.

Chemical and Waste Management

- The Contractor provided waste skips to collect general refuse and disposal of them regularly to the SENT Landfill. In this reporting month, no C&D waste was disposed to SENT Landfill and 840kg chemical wastes were collected by licensed waste collector;
- The chemical waste was stored in the Chemical Waste Storage Area (CWSA). The Contractor should dispose chemical wastes regularly to avoid over accumulation of chemical waste on site;
- The door of CWSA was found locked properly during weekly site inspections in this month; and
- Oil leakage was observed from the hole of drip tray at car parking area during the weekly site inspection on 30 December 2009. The Contractor was reminded to clean up and treat the contaminated solids as chemical waste. Besides, the Contractor was also reminded to repair the damaged part of drip tray to avoid the oil leakage. Since the finding was observed at the last weekly site inspection in this reporting month, it will be verified in the coming month.

Landscape and Visual

- Germination rate on the hydroseeded panels were observed to be satisfactory in this reporting month. The Contractor was still advised to maintain the hydroseeded panels properly; and
- Sufficient lighting was provided for the Fill Bank operation in the evening.



Site Practices

- Rubbish was noted accumulated inside the nullah near TVB during the weekly site inspection on 16 December 2009. The Contractor was reminded to clean up the rubbish and maintain the nullah properly. During the subsequent weekly sit inspection on 23 December 2009, the accumulated rubbish was cleaned up; and
- A plastic bucket at car parking area was found without cover during the weekly site inspection on 30 December 2009. The Contractor was reminded to provide appropriate cover for the plastic bucket or store it in an appropriate storage area. Since the finding was observed at the last weekly site inspection in this reporting month, it will be verified in the coming month.

Landfill Gas Monitoring

- Landfill gas monitoring (oxygen, carbon dioxide and methane) was carried out once per week for each site office in this reporting month;
- Equipments used in the monitoring have been calibrated for all these three parameters; and
- All the monitoring results were satisfactory.

7.3 Review of Environmental Monitoring Procedures

The monitoring works conducted by the Environmental Team were inspected regularly. The observations for the monitoring works were recorded and summarized as follows:

Air Quality Monitoring

- The monitoring team recorded the observations around the monitoring stations within and outside of the construction site.
- The monitoring team recorded the temperature, air pressure and general weather condition on the monitoring day.

Noise Monitoring

- The monitoring team recorded the observations around the monitoring station, which might affect the results.
- Major noise sources were identified and recorded.

Water Quality Monitoring

- The monitoring team recorded the observations around the monitoring stations, which might affect the results.

7.4 Assessment of Environmental Monitoring Results

All monitoring results were audited against the Action and Limit levels and any exceedances would be validated.

No exceedances were recorded in water quality, air quality and noise monitoring in this month.

The monitoring results in this reporting period were comparable with those of baseline period. Detailed discussions were given in Section 2, 3 and 4 of this Report.

7.5 Advice on the Solid and Liquid Waste Management Status

The Contractor should provide sufficient preventive measures during equipment maintenance works so as to avoid oil leakage on the ground. In the event of any oil leakage, the Contractor should clean up the polluted soil and handle all the materials used for this cleaning works as chemical waste.

Concrete bunding has erected outside the CEDD combined reception office and near the automatic wheel washing facilities for storing generator sets and oil drums. The drain outlet of all the banded areas should be plugged properly. Besides, pre-cast drip trays were provided for oil drums at several areas, such as workshop and chemical storage area. The Contractor should collect and dispose of any stagnant water accumulated in the concrete bunding and drip trays and handle them as chemical waste.



The Contractor should use suitable containers with proper labels to store chemical wastes in accordance with Code of Practice on the Packaging, Labeling and Storage of Chemical Waste. The Contractor should also advise their workers of the proper procedures in handling the chemical waste. All the trip tickets for chemical waste disposal were properly kept in the site office. No chemical waste disposal was undertaken in the reporting month.

The Contractor was reminded to increase the frequency of inspection and cleaning of the site drainage system, including permanent desilting chambers, desilting facilities, oil interceptor bypass tank, DP3 and DP4 and all the trapezoidal channels. Moreover, the Contractor should apply approved pesticides in the stagnant water ponds.

All the runoff from the parking area should be pumped to the desilting facilities and oil interceptors to remove suspended solids and oil & grease prior to discharge.

8.0 Status of Environmental Licensing and Permitting

All permits/licenses valid in this reporting month are summarized in Table 8.1.

Table 8.1 Summary of environmental licensing and permit status

Description	Permit No.	Valid Period		Section
		From	To	
Amended Environmental Permit	EP-134/2002/H	04/12/08	---	(Valid) <ul style="list-style-type: none"> ▪ Site clearance ▪ Construction of a temporary storm water system ▪ Stockpiling of 6 million m3 of public fill ▪ Setting up two barging points for transporting the stockpiled public fill by barges ▪ Setting up a temporary barging point at the existing Explosive Off-loading Barging Point for the period of May 2004 to December 2004 for transporting the stockpiled public fill by barge ▪ Construction of operation of a construction and Demolition Material Sorting Facility (C&DMSF) ▪ Setting up a Construction and Demolition Material Crushing Facility at the TKO Basin ▪ Remove the temporary fill bank
Effluent Discharge License	RE/D1185/839/2	29/09/08	31/07/12	<ul style="list-style-type: none"> ▪ Wastewater arising from the wheel washing bay, Sedimentation Tank & Desilting Tank ▪ Wastewater arising from workshop for maintenance of site vehicles, plants and petrol interceptor.
Chemical Waste Producer	5123-839-C1186-05	04/01/07	---	Spent Lubricating oil / Spent Flammable Liquid / Spent Battery / Surplus Paint

9.0 ENVIRONMENTAL NON-CONFORMANCE

9.1 Summary of air quality, noise and marine water quality

No exceedances of Action and Limit Level of 24-hour and 1-hour TSP monitoring results were recorded during the reporting month.

No day-time noise level measured at the monitoring station exceeded the Action and Limit Level in the reporting month.

No exceedances of Action and Limit Level of water quality monitoring results were recorded during the reporting month.

9.2 Summary of Environmental Complaints

There was no complaint received in this reporting month.

9.3 Summary of Notification of Summons and Prosecution

There was no notification of summons respect to environmental issues registered in this reporting month.



10.0 IMPLEMENTATION STATUS

10.1 Implementation Status of Environmental Mitigation Measures

An updated summary of the Environmental Mitigation Implementation Schedule (EMIS) is presented in Appendix J. Most of the necessary mitigation measures were implemented properly. Any deficiencies were noted in the remarks of the schedule.

10.2 Implementation Status of Event and Action Plan

There was no exceedance on air quality and noise monitoring parameters recorded in this monitoring month. Hence no further actions were required.

No exceedances of Action and Limit Level of water quality monitoring results were recorded during the reporting month.

10.3 Implementation Status of Environmental Complaint, Notifications of Summons and Successful Prosecutions Handling

No complaints, notifications of summons and successful prosecutions were received in this reporting month. A summary of environmental complaints, notifications of summons and successful prosecutions was given in Table 10.1.

Table 10.1 Summary of Environmental Complaints and Prosecutions

<i>Complaints logged</i>		<i>Summons served</i>		<i>Successful prosecution received</i>	
<i>December 2009</i>	<i>Cumulative</i>	<i>December 2009</i>	<i>Cumulative</i>	<i>December 2009</i>	<i>Cumulative</i>
0	0	0	0	0	0

11.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Impact monitoring of air quality, noise and water quality were carried out at designated locations in accordance with the EM&A Manual in this reporting month.

According to the summary of air monitoring results, no exceedances of Action and Limit Level of 24-hour and 1-hour TSP monitoring results were recorded during the reporting month.

The noise level measured at the monitoring station complied with the Limit Level of 75dB(A). No complaint was received regarding noise issue in this reporting month.

No exceedances of Action and Limit Level of water quality monitoring results were recorded during the reporting month.

According to the ET weekly site inspections and IEC site audits carried out in this reporting month, the Contractor generally implemented sufficient dust mitigation measures, including operation of the mist spraying systems and automatic wheel washing facilities, dampening of haul roads and stockpiling areas.

No complaints, prosecutions or notifications of summons were received in this reporting month.

Recommendations

According to the environmental site inspections performed in the reporting month, the following recommendations were provided:



Air Quality

- Ensure the frequency of water spraying on haul roads, unloading areas and stockpiles to be sufficient to suppress the dust sources;
- Provide proper maintenance for the powered mechanical equipment and barges to avoid emission of dark smoke;
- Provide water spraying onto the truckloads during inspection of fill material;
- Conduct road sweeping on all paved haul roads and public roads especially outside and near the site egress by the road sweeper. Undertake water spraying on stockpiling area by water bowlers;
- Erect adequate speed limit signs to advise the truck drivers of the speed limit;
- Operate mist spraying systems and automatic water sprinklers in the Fill Bank;
- Implement the dust mitigation measures for the construction activities;
- Designate proper haul roads to ensure effective water spraying; and
- Ensure all vehicles to be washed before leaving the site egress by provision, operation and maintenance of automatic wheel washing facilities.

Noise

- Conduct noisy activities at a farther location from the NSRs.

Water Quality

- Maintain the drainage system, including the trapezoidal channels, permanent desilting chambers, DP3 & DP4 regularly;
- Operate and maintain the silt curtains regularly;
- Operate the cleaning vessel within the TKO Basin regularly;
- Provide proper treatment for the oil discharge from the area near air monitoring station TKO-A1;
- Clean up the fill material on the concrete pavement at BHA frequently; and
- Remove the stagnant water or provide approved pesticides for the stagnant water in the permanent desilting chambers, if any.

Chemical and Waste Management

- Remove waste materials from the site to avoid accumulation regularly;
- Handle and store chemical wastes properly;
- Remove unwanted material in the existing stockpiles and avoid further dumping of such material;
- Provide and maintain sufficient drip trays for diesel drums, chemical containers, chemical waste storage drums and diesel operated generator set;
- Maintain mesh screen on top of the additional drainage, DP3 to avoid improper dumping of rubbish;
- Maintain good housekeeping at the workshop area;
- Ensure sufficient tarpaulin sheets are provided to cover drip trays; and
- Avoid soil being polluted during oil filling and equipment maintenance; hence, properly remove and store the contaminated soil, if any.

Landscape and Visual

- Provide hydroseeding on the exposed slopes, on which the final profile has been formed;
- Erect all the site hoarding/chaining fences in accordance with agreed design at proper location; and
- Maintain the hydroseeded slopes in accordance with the Landscape Plan.

12.0 FUTURE KEY ISSUES

12.1 Construction Programme for the Coming Month

As informed by the Contractor, the activities to be conducted by them in the next month included:

- *Removal & delivery of public fill stockpiled material to Mainland*
- *Maintenance of haul road within fill bank area.*
- *Operation of the queuing area for public truck lorries*
- *Operation of the tipping hall (A1, A2 & A3)*
- *Operation of the road water lorries and the road sweeper*
- *Delivery of public fill received at the Chai Wan Public Fill Barging Point to TKO fill bank.*



12.2 Key Issues for the Coming Month

Key issues to be considered in the coming month include:

- Chemical and waste management;
- Treatment of runoff and wastewater prior to discharge;
- Dust generated from loading and unloading activities; and
- Dust generated from dump trucks traffic.

Mitigation measures to be required in the coming month:

Air Quality Impact

- To provide adequate water spraying on haul roads and working platform;
- To operate and maintain automatic wheel washing facilities properly;
- To dampen the fill material prior to unloading or movement;
- To provide road sweeping on the haul road near site egress and the public roads outside site egress;
- To ensure implementation of the dust mitigation measures for the construction activities;
- To maintain proper operation of the mist spraying system;
- To provide proper maintenance for vehicles and machines on site; and
- To investigate any other dust sources around the air sensitive receivers

Noise

- To switch off equipment if not in use;
- To operate silent equipment;
- To identify the noise sources inside and outside of the site;
- To follow up any exceedance caused by the Fill Bank operation; and
- To re-schedule the work activities in the event of valid noise exceedance.

Water Quality Impact

- To maintain the drainage system in the Fill Bank;
- To ensure the cleanliness of oil interceptor bypass tanks and all the drainage channels;
- To maintain the existing silt trap to ensure good efficiency of wheel wash facilities;
- To repair, inspect and maintain the silt curtains regularly;
- To provide covers for the drip trays to avoid stagnant water pond due to rainfall;
- To provide proper treatment for oily water discharged from the area around air monitoring station TKO-A1;
- To deploy a cleaning vessel to remove floating rubbish in the TKO Basin;
- To clean up the concrete paved area at Portion I every night to avoid fill materials from being washed into the sea; and
- To avoid any stagnant water or provide insecticide to avoid mosquito breeding in the Fill Bank.

Chemical and Waste Management

- To remove waste from the site regularly;
- To properly store and handle chemical wastes on site;
- To implement trip ticket system for all the imported public fill and general refuse disposal;
- To provide and manage sufficiently sized drip trays for diesel drums or chemical containers;
- To remove existing unwanted material in the stockpiles and avoid improper disposal at the Fill Bank through inspection of imported truckloads;
- To maintain proper housekeeping at the workshop area;
- To remove the oil stains in the event of leakage and handle all materials using for this cleaning works as chemical waste;
- To maintain mesh screen on top of the additional drainage, DP3 opening to avoid improper dumping of rubbish into this channel; and
- To identify C&D material by packaging, labeling, storage, transportation and disposal in accordance with statutory regulations.

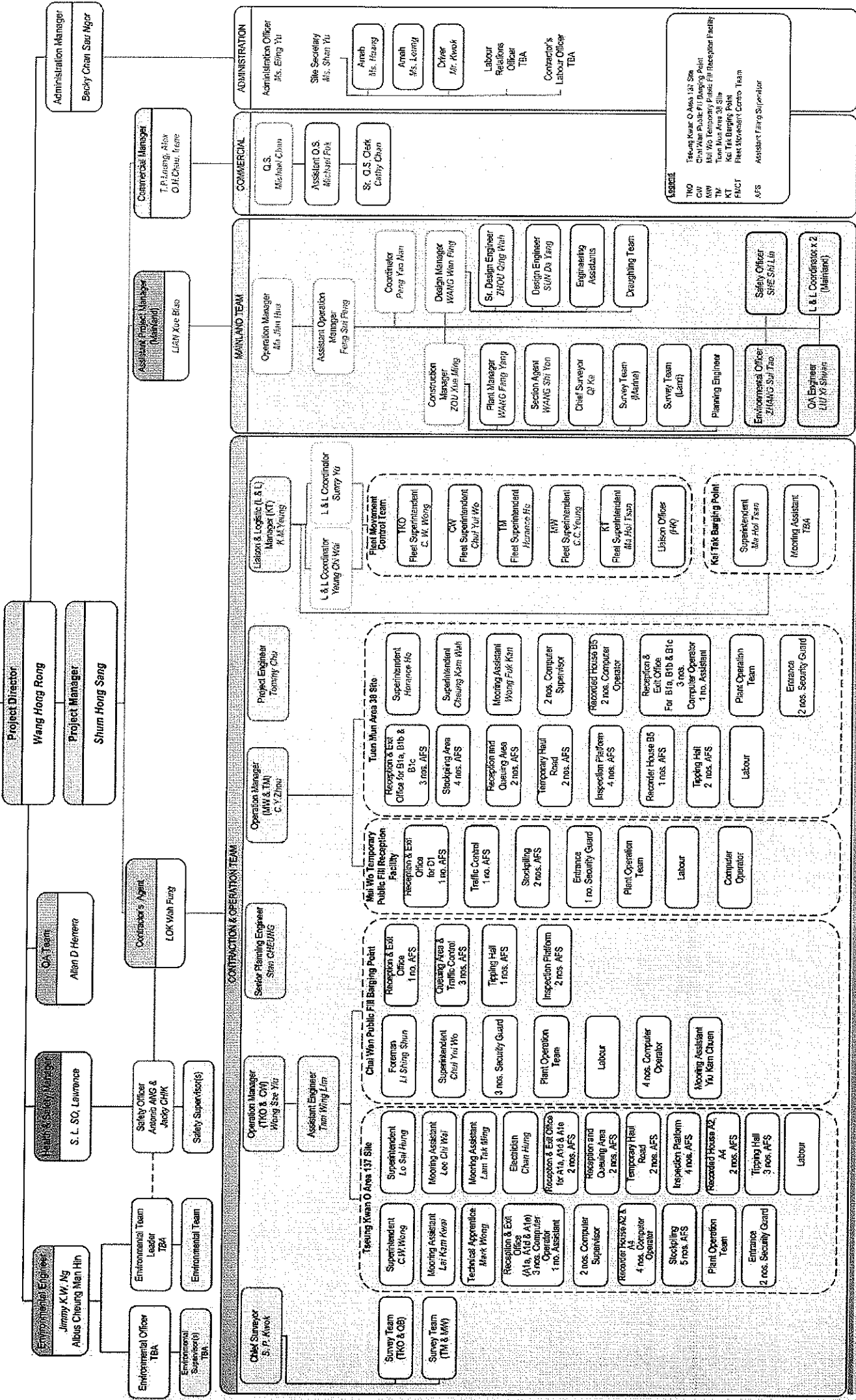
12.3 Monitoring Schedule for the Coming Month

The proposed EM&A program of the coming month is attached in Appendix L.

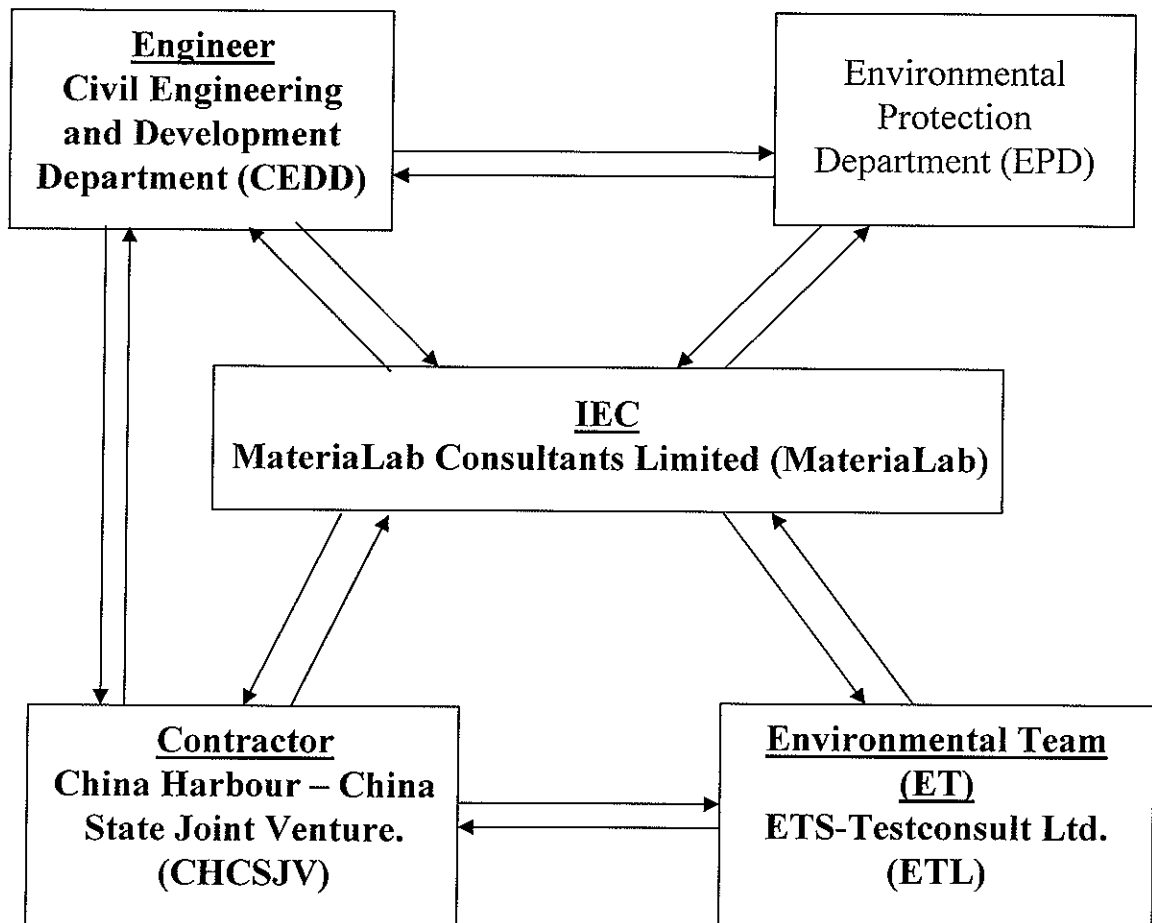
Appendix A

Organization Chart and Lines of Communication

JOINT VENTURE MANAGEMENT BOARD
CHEN Fan Jia, WANG Yan, CHAN Man, PAN Shu Jie, George CHAN



Lines of Communication





Appendix B1

Calibration Certificates for Impact Air Quality Monitoring Equipment



東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong
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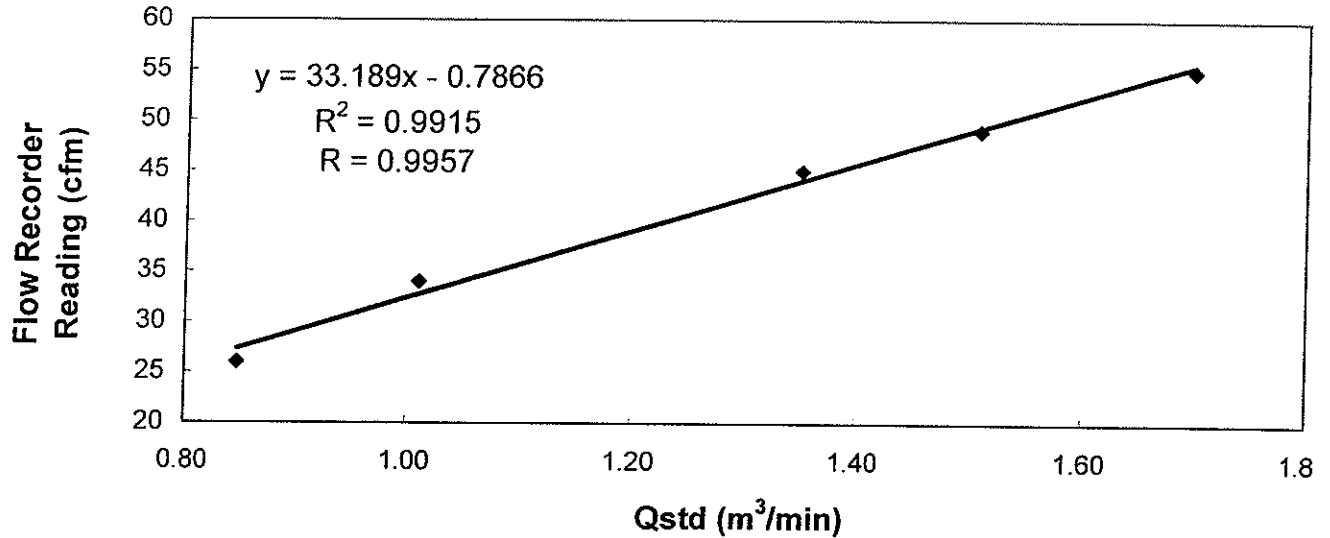
TEST REPORT

**Calibration Report
of
High Volume Air Sampler**

Manufacturer : Graseby GMW Date of Calibration : 02 December 2009
Serial No. : 10347 (ET / EA / 003 / 06) Calibration Due Date : 01 February 2010
Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results	Flow recorder reading (cfm)	55	49	45	34	26
	Qstd (Actual flow rate, m ³ /min)	1.70	1.51	1.35	1.01	0.85
	Pressure :	756.06 mm Hg		Temp. :	298 K	

**Sampler 10347 Calibration Curve
Site: Tseung Kwan O (A-1)**

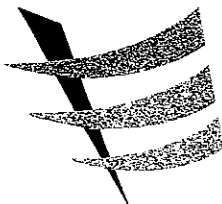


Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / does not comply* with the specified requirements and is deemed acceptable*/ unacceptable* for use.

Calibrated by : Dany
WONG, Kwong Hung
(Site Technician)

Approved by : Lau Sau Yee
LAW, Sau Yee
(Senior Environmental Officer)



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TEST REPORT

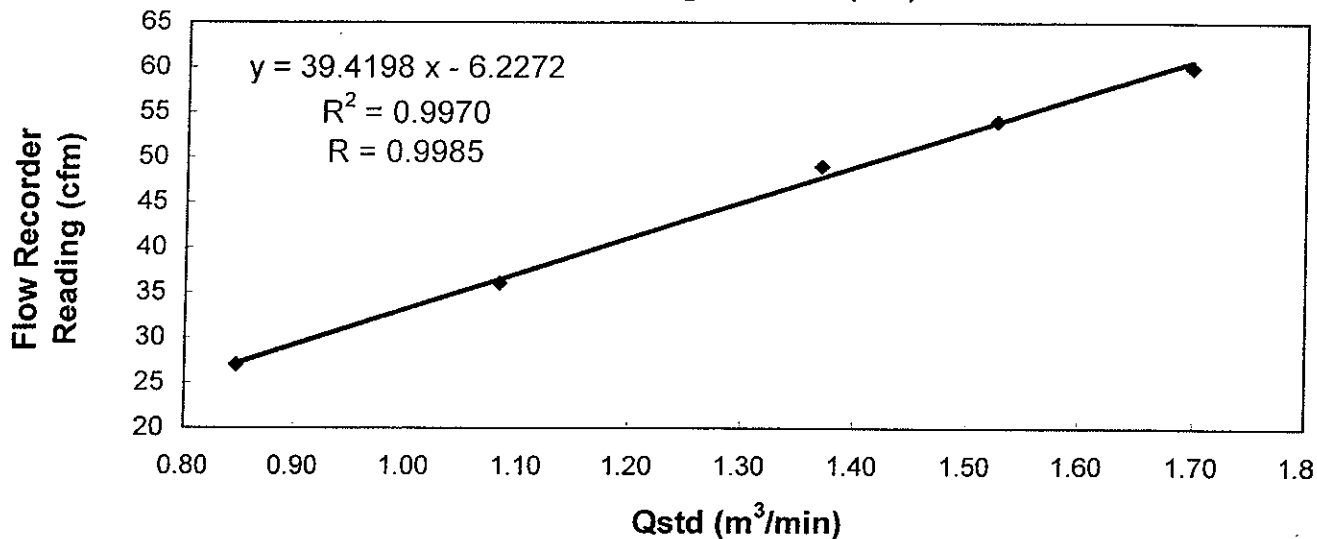
**Calibration Report
of
High Volume Air Sampler**

Manufacturer : Graseby GMW Date of Calibration : 02 December 2009
Serial No. : 1176 (ET / EA / 003 / 05) Calibration Due Date : 01 February 2010
Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	60	54	49	36	27
Qstd (Actual flow rate, m ³ /min)	1.70	1.53	1.37	1.08	0.85
Pressure :	756.06 mm Hg			Temp. :	298 K

**Sampler 1176 Calibration Curve
Site: Tseung Kwan O (A-2)**



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration

The high volume sampler complies* / ~~does not comply*~~ with the specified requirements and is deemed acceptable* / ~~unacceptable*~~ for use.

Calibrated by : *Dany*
WONG, Kwong Hong
(Site Technician)

Approved by : *Sau Yee Law*
LAW, Sau Yee
(Senior Environmental Officer)



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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 18, 2009 Rootsmeter S/N 9833620 Ta (K) - 293
 Operator Tisch Orifice I.D. - 1560 Pa (mm) - 765.81

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.4310	3.2	2.00
2	NA	NA	1.00	1.0060	6.3	4.00
3	NA	NA	1.00	0.8990	7.9	5.00
4	NA	NA	1.00	0.8580	8.7	5.50
5	NA	NA	1.00	0.7070	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0205	0.7132	1.4317	0.9958	0.6959	0.8748
1.0164	1.0104	2.0247	0.9918	0.9859	1.2371
1.0142	1.1281	2.2637	0.9896	1.1008	1.3831
1.0132	1.1809	2.3742	0.9886	1.1522	1.4506
1.0078	1.4255	2.8633	0.9834	1.3909	1.7495
Qstd slope (m) = 2.01170			Qa slope (m) = 1.25969		
intercept (b) = -0.00455			intercept (b) = -0.00278		
coefficient (r) = 0.99998			coefficient (r) = 0.99998		
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

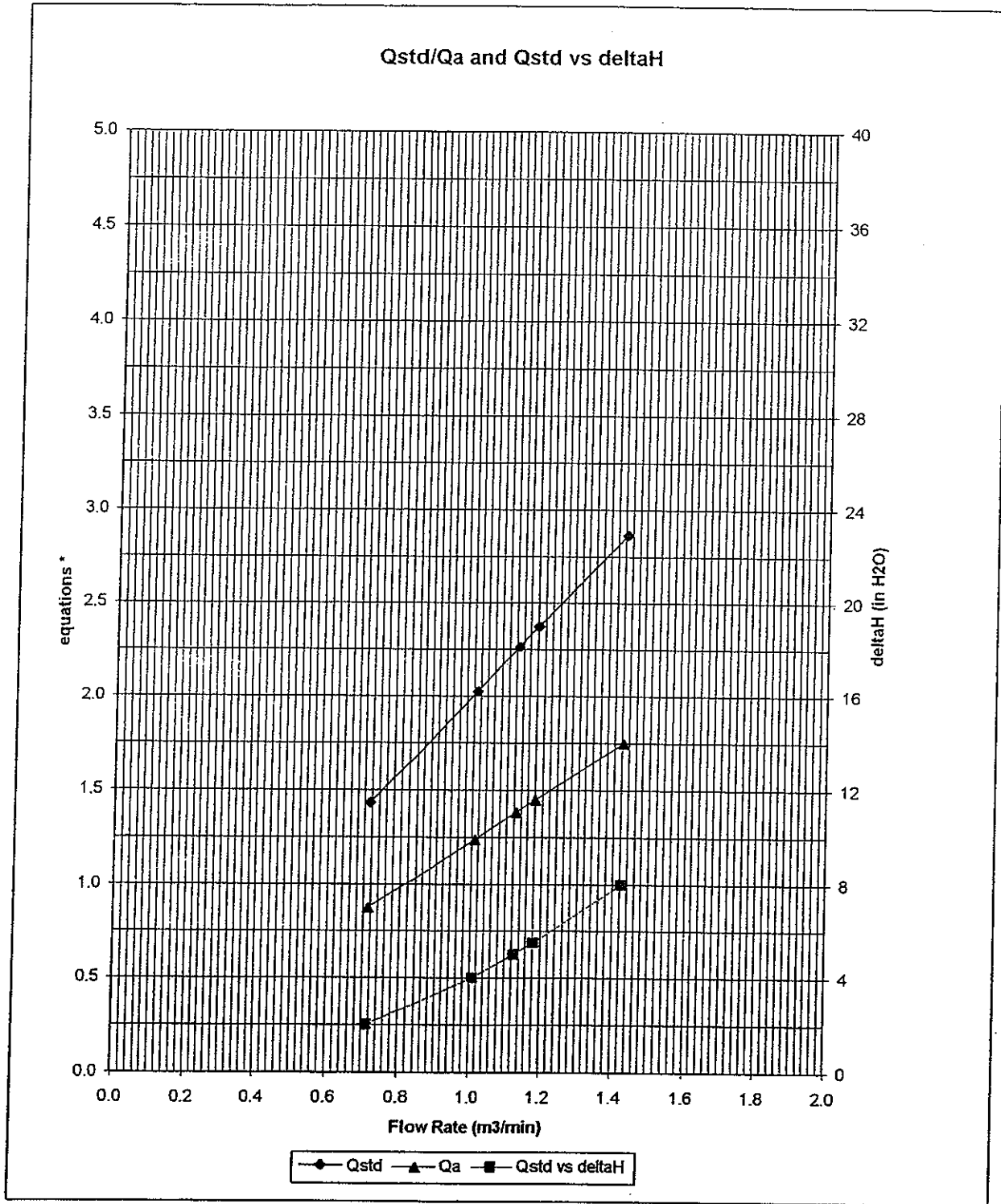
For subsequent flow rate calculations:

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



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AIR POLLUTION MONITORING EQUIPMENT



* y-axis equations:

Qstd series:
$$\sqrt{\Delta H \left(\frac{P_a}{P_{std}} \right) \left(\frac{T_{std}}{T_a} \right)}$$

Qa series:
$$\sqrt{(\Delta H (T_a / P_a))}$$

1560



Appendix B2

Impact Air Quality Monitoring Results

Summary of 24-hr TSP Monitoring Results

Monitoring Station : TKO-A1
 Location : Outside CEDD Site Office

Date	Start Time	Finish		Elapse Time		Sampling Time (hrs)	Flow Rate (m ³ /min.)		Average (m ³ /min.)	Filter Weight (g)		Conc. (µg/m ³)
		Date	Time	Initial	Final		Initial	Final		Initial	Final	
14/12/09	15:00	15/12/09	15:00	14976.54	15000.54	24.00	Initial: 1.0481 Final: 1.0481	1.0481	2.8772	3.0976	146	
19/12/09	13:00	20/12/09	14:00	15003.54	15027.54	24.00	Initial: 1.0481 Final: 1.0481	1.0481	2.8219	3.0562	155	
24/12/09	12:08	25/12/09	12:08	15030.54	15054.54	24.00	Initial: 1.0481 Final: 1.0481	1.0481	2.8189	3.0177	132	
31/12/09	13:00	01/01/10	13:00	15057.54	15081.54	24.00	Initial: 1.0481 Final: 1.0481	1.0481	2.8202	3.0219	134	

Monitoring Station : TKO-A2
 Location : Site Egress

Date	Start Time	Finish		Elapse Time		Sampling Time (hrs)	Flow Rate (m ³ /min.)		Average (m ³ /min.)	Filter Weight (g)		Conc. (µg/m ³)
		Date	Time	Initial	Final		Initial	Final		Initial	Final	
14/12/09	15:00	15/12/09	15:00	14500.60	14524.60	24.00	Initial: 1.0205 Final: 1.0205	1.0205	2.8435	3.0492	140	
19/12/09	13:05	20/12/09	14:05	14527.60	14551.60	24.00	Initial: 1.0205 Final: 1.0205	1.0205	2.8287	3.0482	149	
24/12/09	12:15	25/12/09	12:15	14554.60	14578.60	24.00	Initial: 1.0205 Final: 1.0205	1.0205	2.8508	3.0543	138	
31/12/09	13:05	01/01/10	13:05	14581.60	14605.60	24.00	Initial: 1.0205 Final: 1.0205	1.0205	2.8196	3.0311	144	

Summary of 1-hr TSP Monitoring Results

Monitoring Station : TKO-A1
 Location : Outside CEDD Site Office

Date	Time		Elapsed Time		Sampling Time (hrs)	Flow Rate (m ³ /min.)		Average (m ³ /min.)	Filter Weight (g)		Conc. (µg/m ³)
	Start	Finish	Initial	Final		Initial	Final		Initial	Final	
14/12/09	10:00	11:00	14975.54	14976.54	1.00	1.0481	1.0481	1.0481	2.8864	2.9017	243
16/12/09	09:00	10:00	15000.54	15001.54	1.00	1.0481	1.0481	1.0481	2.8011	2.8200	301
18/12/09	09:00	10:00	15001.54	15002.54	1.00	1.0481	1.0481	1.0481	2.8422	2.8633	336
19/12/09	09:00	10:00	15002.54	15003.54	1.00	1.0481	1.0481	1.0481	2.8402	2.8572	270
21/12/09	13:02	14:02	15027.54	15028.54	1.00	1.0481	1.0481	1.0481	2.8539	2.8683	229
23/12/09	09:00	10:00	15028.54	15029.54	1.00	1.0481	1.0481	1.0481	2.8205	2.8374	269
24/12/09	10:10	11:10	15029.54	15030.54	1.00	1.0481	1.0481	1.0481	2.8298	2.8439	224
28/12/09	13:08	14:08	15054.54	15055.54	1.00	1.0481	1.0481	1.0481	2.8255	2.8444	301
30/12/09	14:00	15:00	15055.54	15056.54	1.00	1.0481	1.0481	1.0481	2.8223	2.8383	254
31/12/09	09:00	10:00	15056.54	15057.54	1.00	1.0481	1.0481	1.0481	2.8115	2.8310	310

Monitoring Station : TKO-A2
 Location : Site Egress

Date	Time		Elapsed Time		Sampling Time (hrs)	Flow Rate (m ³ /min.)		Average (m ³ /min.)	Filter Weight (g)		Conc. (µg/m ³)
	Start	Finish	Initial	Final		Initial	Final		Initial	Final	
14/12/09	10:10	11:10	14499.60	14500.60	1.00	1.0205	1.0205	1.0205	2.8617	2.8758	230
16/12/09	09:00	10:00	14524.60	14525.60	1.00	1.0205	1.0205	1.0205	2.8564	2.8726	265
18/12/09	09:00	10:00	14525.60	14526.60	1.00	1.0205	1.0205	1.0205	2.8441	2.8633	314
19/12/09	09:00	10:00	14526.60	14527.60	1.00	1.0205	1.0205	1.0205	2.8315	2.8479	268
21/12/09	13:08	14:08	14551.60	14552.60	1.00	1.0205	1.0205	1.0205	2.8411	2.8573	265
23/12/09	09:00	10:00	14552.60	14553.60	1.00	1.0205	1.0205	1.0205	2.8358	2.8531	283
24/12/09	10:19	11:19	14553.60	14554.60	1.00	1.0205	1.0205	1.0205	2.8318	2.8471	250
28/12/09	13:18	14:18	14578.60	14579.60	1.00	1.0205	1.0205	1.0205	2.8304	2.8503	333
30/12/09	14:00	15:00	14579.60	14580.60	1.00	1.0205	1.0205	1.0205	2.8079	2.8234	253
31/12/09	09:00	10:00	14580.60	14581.60	1.00	1.0205	1.0205	1.0205	2.8206	2.8412	345

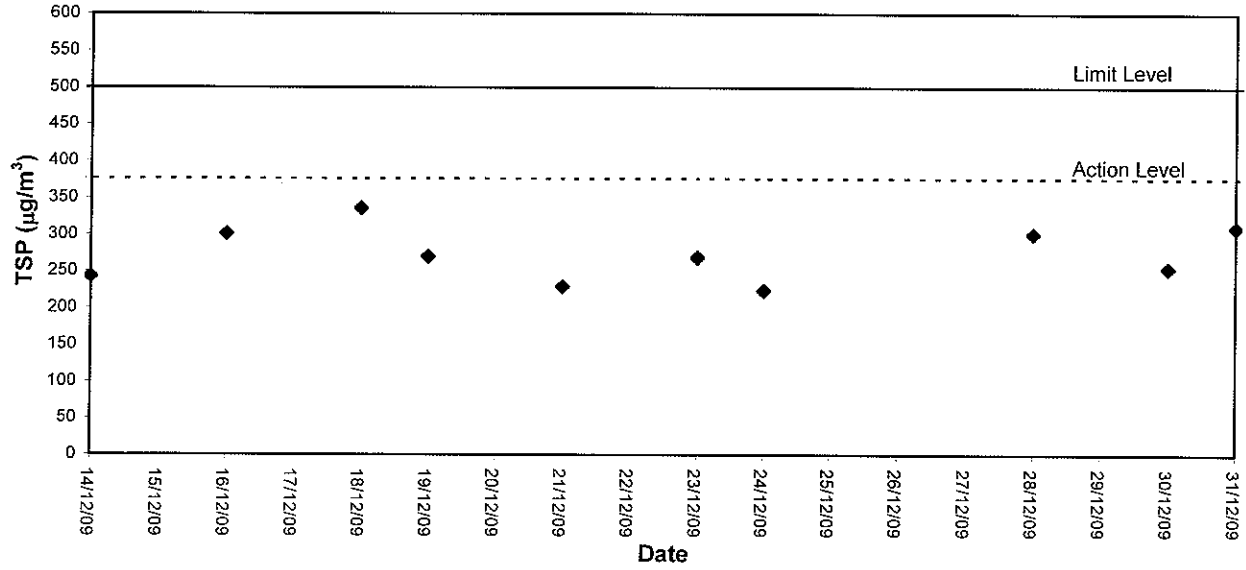


Appendix B3

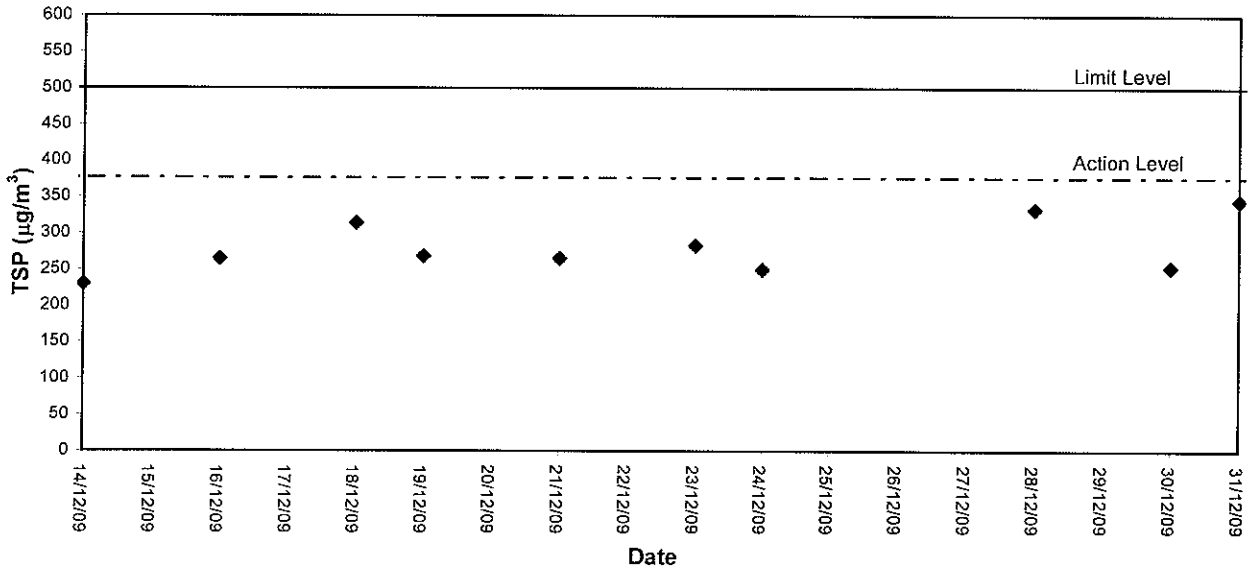
Graphical Plots of Impact Air Quality Monitoring Data



1-hour TSP level at TKO-A1 (Outside CEDD Site Office)

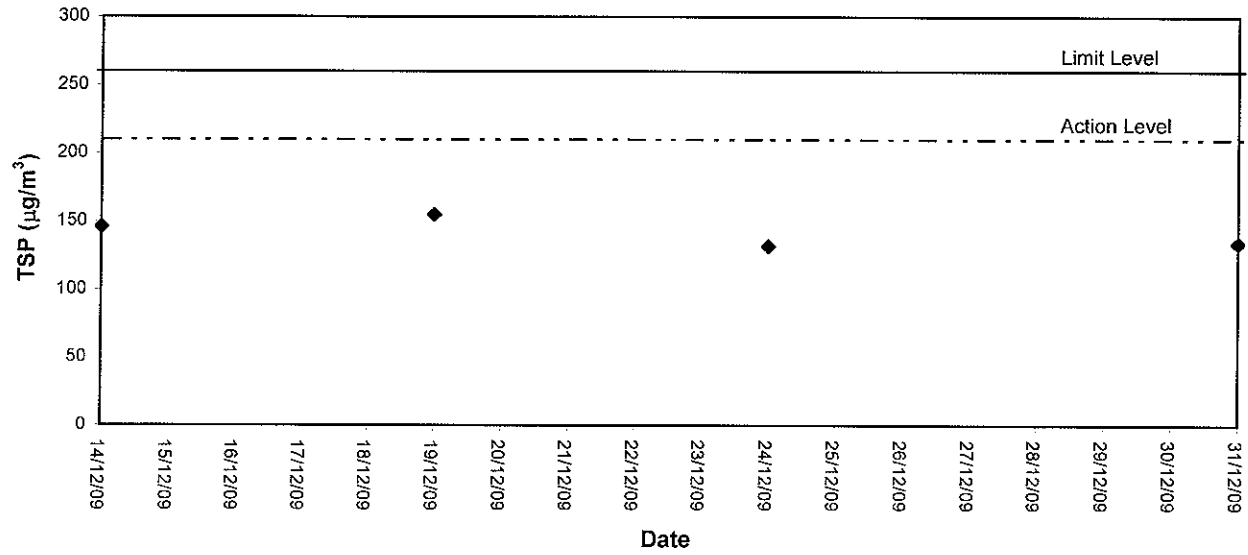


1-hour TSP level at TKO-A2 (Site Egress)

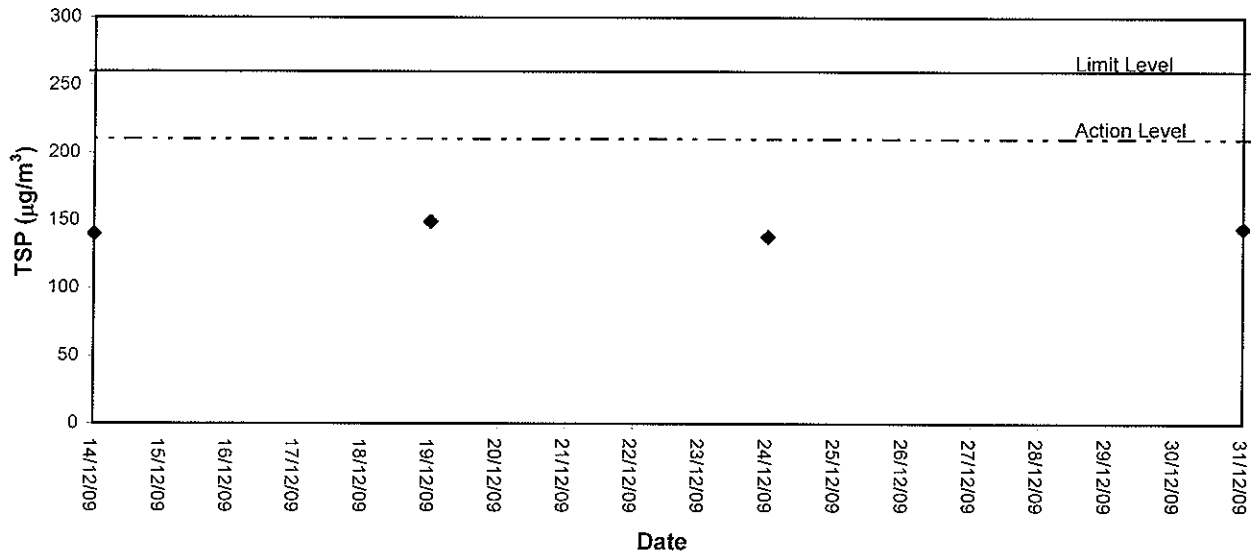




24-hour TSP level at TKO-A1 (Outside CEDD Site Office)



24-hour TSP level at TKO-A2 (Site Egress)





Appendix C1

Calibration Certificates for Impact Noise Monitoring Equipment



Calibration Certificate

Certificate No. **91496**

Page 1 of 2 Pages

Customer : ETS-Testconsult Limited

Address : 8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan St., Fotan, Hong Kong.

Order No. : Q90663

Date of receipt : 1-Apr-09

Item Tested

Description : Acoustic Calibrator

Manufacturer : Castle

Model : GA607

Serial No. : 038641

Test Conditions

Date of Test : 15-Apr-09

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F06, F20, Z02.

Test Results

All results were within the IEC 942 Class 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

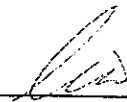
<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	83240	30-Jun-09	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	82926	16-Jul-09	NIM-PRC & SCL-HKSAR
S041	Universal Counter	84077	22-Aug-09	SCL-HKSAR
S206	Sound Level Meter	83964	13-Aug-09	SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by :


P.F. Wong

Approved by :


Dorothy Cheuk

Date: 16-Apr-09

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 6B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646



Calibration Certificate

Certificate No. 91496

Page 2 of 2 Pages

Results :

1. Level Accuracy (at 1 kHz)

UUT Setting (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	93.92	± 0.3 dB

Uncertainty : ± 0.1 dB

2. Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	IEC 942 Class 1 Spec.
1	1.001	± 2 %

Uncertainty : $\pm 3.6 \times 10^{-6}$

3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 2.8 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of rdg.

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurements.

3. The uncertainty claimed is for a confidence probability of not less than 95%.

4. Atmospheric Pressure : 1 002 hPa

----- END -----



Calibration Certificate

Certificate No. 91495

Page 1 of 4 Pages

Customer : ETS-Testconsult Limited

Address : 8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan St., Fotan, Hong Kong.

Order No. : Q90663

Date of receipt : 1-Apr-09

Item Tested

Description : Precision Integrating Sound Level Meter

Manufacturer : Rion

Model : NL-31

Serial No. : 00110024

Test Conditions

Date of Test : 15-Apr-09

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : Z01.

Test Results

All results were within the IEC 651 Type 1 & IEC 804 Type 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

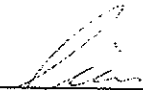
<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceable to</u>
S017A	Multi-Function Generator	86228	11-Dec-09	SCL-HKSAR
S024	Sound Level Calibrator	82926	16-Jul-09	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by :


P.F. Wong

Approved by :


for Dorothy Cheuk

Date: 16-Apr-09

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646



Calibration Certificate

Certificate No. 91495

Page 2 of 4 Pages

Results :

1. SPL Accuracy

UUT Setting			Applied Value (dB)	UUT Reading (dB)
Level Range (dB)	Weight	Response		
20 – 100	L _A	Fast	94.03	93.7
		Slow		93.7
	L _C L _p	Fast		93.7
		Fast		93.7
		Fast		93.7
30 – 120	L _A	Fast	94.03	93.6
		Slow		93.6
	L _C L _p	Fast		93.6
		Fast		93.6
30 – 120	L _A	Fast	113.97	113.6
		Slow		113.6
	L _C L _p	Fast		113.6
		Fast		113.6

IEC Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB

Uncertainty : ± 0.01 dB



Calibration Certificate

Certificate No. 91495

Page 3 of 4 Pages

3. Linearity

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
130	114.0	113.8	+0.2	± 0.7 dB
130	104.0	103.7	+0.1	
120	94.0	93.6 (Ref.)	--	
110	84.0	83.6	0.0	
100	74.0	73.6	0.0	
90	64.0	63.7	+0.1	
80	54.0	53.8	+0.2	

Uncertainty : ± 0.1 dB

3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	83.7	+0.1	± 0.4 dB
	94.0	93.6 (Ref.)	--	
	95.0	94.7	+0.1	± 0.2 dB
	104.0	103.6	0.0	± 0.3 dB
	105.0	104.6	0.0	± 1.0 dB

Uncertainty : ± 0.1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.8	- 39.4 dB, ± 1.5 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.5	- 16.1 dB, ± 1 dB
250 Hz	-8.9	- 8.6 dB, ± 1 dB
500 Hz	-3.4	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref.)	0 dB, ± 1 dB
2 kHz	+1.5	+ 1.2 dB, ± 1 dB
4 kHz	+1.4	+ 1.0 dB, ± 1 dB
8 kHz	-0.8	- 1.1 dB, + 1.5 dB ~ - 3 dB
16 kHz	-6.4	- 6.6 dB, + 3 dB ~ ∞

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 91495

Page 4 of 4 Pages

5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.8	± 0.5 dB
1/10 ²	40.0	39.8	
1/10 ³	40.0	40.0	± 1.0 dB
1/10 ⁴	40.0	40.3	

Uncertainty : ± 0.1 dB

Remark : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1 002 hPa.

----- END -----



Appendix C2

Impact Noise Monitoring Results



Day-time Noise Monitoring

Monitoring Location: TKO-N1 (Site Egress)

Date	Start Sampling Time (hh:mm)	Noise Level dB (A)			Wind Speed (m/s)	Weather Condition
		L _{eq(30min)}	L ₁₀	L ₉₀		
31/12/09	11:00	62.4	66.0	59.6	1.4	Cloudy

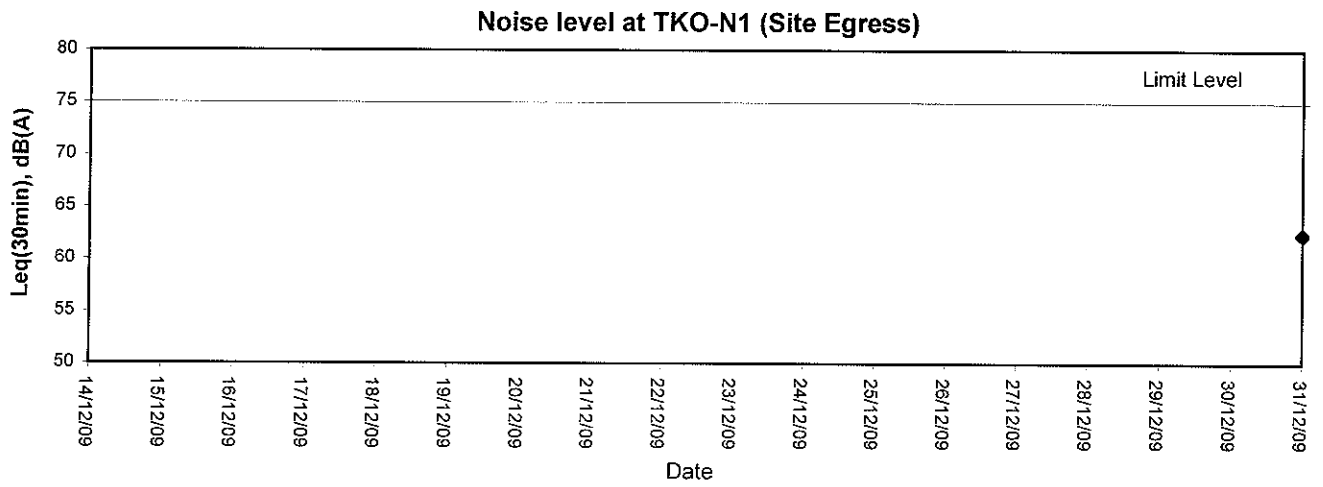


Appendix C3

Graphical Plots of Impact Noise Monitoring Data



Noise Monitoring (Day-time)





Appendix D1

Calibration Certificates for Impact Marine Water Quality Monitoring Equipments



Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : FATEW 1008/002 Manufacturer : YSI.
 Model No. : 85 Serial No. : 06C 1998AD
 Date of Calibration : 26/11/09 Calibration Due Date : 26/12/10.

Ref. No. of Reference Thermometer : BT10521/001
 Ref. No. of Potassium Dichromate : BT10520/003/09

Temperature Verification

	Temperature (°C)
Thermometer reading	<u>22.0</u>
Meter reading	<u>22.0</u>

Linearity Checking

Purging time, min	DO meter reading, mg/L			Winkler Titration result, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	<u>7.91</u>	<u>7.88</u>	<u>7.90</u>	<u>7.77</u>	<u>7.75</u>	<u>7.76</u>	<u>1.79</u>
5	<u>6.52</u>	<u>6.54</u>	<u>6.53</u>	<u>6.32</u>	<u>6.34</u>	<u>6.33</u>	<u>3.11</u>
10	<u>5.06</u>	<u>5.04</u>	<u>5.05</u>	<u>4.81</u>	<u>4.83</u>	<u>4.82</u>	<u>2.61</u>
Linear regression coefficient				<u>0.9993</u>			

Zero Point Checking

DO meter reading, mg/L	<u>0.00</u>
------------------------	-------------

Salinity Checking

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	<u>7.61</u>	<u>7.59</u>	<u>7.60</u>	<u>7.44</u>	<u>7.46</u>	<u>7.45</u>	<u>1.09</u>
30	<u>6.84</u>	<u>6.82</u>	<u>6.83</u>	<u>6.66</u>	<u>6.64</u>	<u>6.65</u>	<u>2.67</u>

Acceptance Criteria

- (1) Difference between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : > 0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : within ± 5%

The equipment complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use.

* Delete as appropriate

Calibrated by : [Signature]

Approved by : [Signature]



Performance Check of Salinity Meter

Equipment Ref. No. : ET7BW/008/002 Manufacturer : YSI
Model No. : 85 Serial No. : 06C 1998 AD
Date of Calibration : 26/11/09 Due Date : 26/2/10

Ref. No. of Salinity Standard used (30ppt)

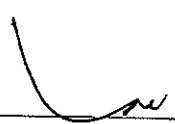
J351


Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30	<u>29.3</u>	<u>2.36%</u>

Acceptance Criteria

Difference : <10 %

The salinity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Checked by : 

Approved by : 



Performance Check of Turbidimeter

Equipment Ref. No. : ET10505/006 Manufacturer : HACH
Model No. : 2100P Serial No. : 060700018334
Date of Calibration : 9/11/09 Due Date : 8/2/10

Gelex Vial Std	Theoretical Value (NTU)	Measured Value (NTU)	Difference %
0-10 NTU	5.34	5.30	0.8
10-100 NTU	56.6	56.1	0.9
100-1000 NTU	547	543	0.7

Acceptance Criteria

Difference : <5 %

The salinity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Checked by : *[Signature]* Approved by : *[Signature]*



Appendix D2

Impact Marine Water Quality Monitoring Results

Mid-Flood Tide

Monitoring Station : TKO-C1

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)	Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen Saturation (%)			Turbidity (NTU)			Suspended Solids (mg/L)		
					Value	Average	Value	Average	Depth-average	Value	Average	Value	Average	Depth-average	Value	Average	Depth-average	
14/12/09	1530-1545	21/Cloudy	Surface	22.0	30.6	30.6	6.40	6.39	6.29	91.7	91.6	3.52	3.54	3.5	3.4			
			Middle	22.4	31.4	31.4	6.21	6.19	89.0	88.7	3.56	3.69	3.5					
			Bottom	22.8	31.8	31.8	6.17	6.02	88.4	86.3	3.67	3.71	3.5					
16/12/09	0745-0800	12/Rainy	Surface	14.5	26.2	26.2	6.03	6.58	6.02	86.1	91.2	3.40	3.92	4.0	3.9			
			Middle	14.0	28.9	28.8	6.36	6.34	90.0	90.0	3.93	3.90	3.8					
			Bottom	13.2	29.0	29.1	6.32	6.18	89.9	88.5	3.97	3.98	3.8					
18/12/09	0820-0834	11/Cloudy	Surface	17.5	25.1	25.1	6.48	6.49	6.36	85.5	85.7	3.55	3.56	3.5	3.6			
			Middle	18.2	25.9	25.9	6.25	6.23	85.8	82.2	3.57	3.45	3.5					
			Bottom	18.0	26.3	26.5	6.20	5.90	81.8	77.8	3.49	4.19	3.2					
21/12/09	1000-1015	14/Cloudy	Surface	18.2	28.3	28.3	5.89	6.48	6.33	77.7	90.1	4.17	3.41	4.0	3.1			
			Middle	18.6	29.7	29.7	6.52	6.18	89.5	85.9	3.42	3.37	3.2					
			Bottom	19.3	30.3	30.2	6.44	6.00	86.3	83.4	3.37	3.11	3.0					
23/12/09	1050-1102	20/Fine	Surface	20.9	31.4	31.4	7.05	7.07	6.00	84.0	94.1	3.11	3.96	4.0	3.9			
			Middle	20.5	32.0	32.0	7.09	6.51	85.5	86.5	3.95	3.85	3.8					
			Bottom	19.1	32.3	32.4	6.53	6.13	82.8	81.5	3.85	4.08	3.0					
28/12/09	1630-1642	11/Cloudy	Surface	16.3	29.2	29.2	6.15	6.81	6.13	81.1	90.6	4.08	4.01	4.0	4.3			
			Middle	16.5	29.4	29.4	6.81	6.45	90.6	85.9	4.00	3.85	4.2					
			Bottom	16.0	30.0	30.0	6.45	6.02	85.9	80.1	3.81	4.04	4.3					
30/12/09	1649-1705	15/Dizzle	Surface	18.4	25.7	25.7	6.02	6.82	6.02	80.1	92.6	4.06	2.93	4.5	3.5			
			Middle	18.9	26.0	26.0	6.80	6.71	92.7	91.0	2.94	3.00	4.4					
			Bottom	18.0	26.2	26.1	6.70	6.61	91.1	90.3	2.99	2.95	3.3					

Mid-Flood Tide

Monitoring Station : TKO-M4

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)	Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)		Dissolved Oxygen Saturation (%)		Turbidity (NTU)			Suspended Solids (mg/L)		
					Value	Average	Value	Average	Value	Average	Value	Average	Depth-average	Value	Average	Depth-average
14/12/09	1615-1630	21/Cloudy	Surface	21.9	30.4	30.4	6.60	6.62	94.6	94.9	3.37	3.38	3.2	3.2		
			Middle	22.3	31.2	6.27	6.28	89.8	90.0	3.39	3.24	3.2				
			Bottom	22.6	31.5	6.29	6.42	90.1	91.9	3.25	3.53	3.0	3.5			
16/12/09	0825-0840	12/Rainy	Surface	14.8	26.0	26.0	6.88	6.89	92.0	92.0	3.52	3.53	3.5	3.5		
			Middle	14.4	27.1	27.2	6.75	6.76	90.4	90.6	3.54	3.34	3.5			
			Bottom	14.0	28.9	28.8	6.70	6.72	90.8	90.1	3.36	3.28	3.2		3.2	
18/12/09	0900-0914	11/Cloudy	Surface	17.2	27.8	27.8	6.68	6.64	88.2	87.7	3.45	3.47	3.2	3.2		
			Middle	17.4	29.1	29.2	6.60	6.33	83.2	83.5	3.49	3.88	3.2			
			Bottom	17.8	29.2	29.7	6.35	6.26	83.8	82.7	3.85	3.94	3.8		3.8	
21/12/09	1045-1101	14/Cloudy	Surface	17.9	29.6	29.6	6.26	6.41	82.7	89.1	3.94	3.21	3.0	3.0		
			Middle	18.1	30.1	30.1	6.44	6.15	89.5	85.5	3.21	3.10	3.0			
			Bottom	18.3	30.5	30.5	6.19	5.95	86.0	82.7	3.10	3.07	3.0		2.7	
23/12/09	1132-1145	20/Fine	Surface	20.9	32.8	32.8	5.92	6.95	82.3	92.3	3.06	3.67	3.5	3.5		
			Middle	20.8	32.6	32.6	6.94	6.55	92.2	87.2	3.69	3.72	3.5			
			Bottom	20.6	33.1	33.1	6.56	6.41	87.4	85.2	3.71	3.79	3.5		3.5	
28/12/09	1710-1724	11/Cloudy	Surface	16.4	29.5	29.7	6.41	6.72	85.3	89.2	3.78	3.85	4.0	4.1		
			Middle	16.6	29.9	29.9	6.73	6.57	89.0	87.3	3.85	3.99	4.1			
			Bottom	16.4	30.2	30.3	6.60	6.27	87.6	83.3	3.98	4.02	4.2		4.4	
30/12/09	1618-1630	15/Dizzle	Surface	19.0	25.5	25.5	6.25	6.91	83.1	92.6	4.02	2.84	3.0	3.1		
			Middle	18.2	25.2	25.4	6.28	6.91	83.5	94.1	4.4	2.87	3.0			
			Bottom	18.4	25.6	25.7	6.90	6.52	91.7	93.6	2.84	2.95	3.2		3.2	

Mid-Ebb Tide

Monitoring Station : TKO-C1

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)	Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen Saturation (%)			Turbidity (NTU)			Suspended Solids (mg/L)		
					Value	Average	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
14/12/09	1030-1045	21/Cloudy	Surface	21.8	30.4	30.4	6.32	6.34	6.21	90.5	90.8	3.23	3.24	3.0	3.0	3.2		
			Middle	22.2	31.2	31.2	6.10	6.08	6.21	91.1	87.1	3.25	3.47	3.0	3.2			
			Bottom	22.6	31.6	31.6	6.06	5.83	5.83	86.8	83.6	3.48	3.58	3.2	3.5			
16/12/09	1115-1130	12/Rainy	Surface	15.0	25.5	25.5	5.82	6.55	6.45	83.4	90.5	3.60	3.90	3.8	3.8	3.8		
			Middle	14.7	28.3	28.3	6.32	6.36	6.45	90.3	89.9	3.90	3.96	3.8	3.8			
			Bottom	14.0	29.0	29.0	6.15	6.16	6.16	90.7	86.1	3.96	3.92	3.8	3.8			
18/12/09	1300-1317	12/Cloudy	Surface	17.6	27.0	26.6	6.42	6.43	6.37	86.0	84.8	3.88	3.63	3.5	3.5	3.6		
			Middle	17.9	27.5	27.4	6.43	6.31	6.37	84.7	83.2	3.63	3.59	3.5	3.5			
			Bottom	17.4	28.2	28.1	6.30	5.78	5.78	83.1	76.3	3.56	3.95	3.5	3.8			
21/12/09	1500-1515	14/Cloudy	Surface	17.9	29.1	29.2	6.48	6.44	6.33	76.0	89.6	4.03	3.36	3.3	3.3	3.0		
			Middle	18.4	29.9	29.8	6.18	6.22	6.33	89.0	86.5	3.35	3.21	3.3	3.0			
			Bottom	18.8	30.5	30.4	6.26	5.99	5.99	85.9	83.3	3.20	3.08	3.0	2.8			
23/12/09	1700-1714	19/Fine	Surface	20.6	31.5	31.5	7.01	7.01	6.76	82.7	93.2	3.09	3.91	3.8	3.8	3.8		
			Middle	20.0	32.0	32.0	6.51	6.51	6.76	93.2	86.6	3.91	3.94	3.8	3.8			
			Bottom	19.2	32.5	32.5	6.18	6.17	6.17	86.6	82.2	3.93	4.00	3.8	3.8			
28/12/09	1010-1023	10/Cloudy	Surface	16.1	29.3	29.3	6.85	6.83	6.67	82.0	90.8	4.00	4.09	4.2	4.3	4.3		
			Middle	16.4	29.6	29.6	6.52	6.51	6.67	91.1	86.5	4.00	3.95	4.3	4.1			
			Bottom	15.9	29.9	29.9	6.50	5.96	5.96	86.3	79.3	3.97	4.14	4.1	4.5			
30/12/09	1230-1243	13/Dizzle	Surface	17.0	26.5	26.5	5.94	6.60	6.45	79.0	90.4	4.13	4.14	3.0	3.0	3.1		
			Middle	17.0	27.1	26.9	6.29	6.31	6.45	90.6	88.9	2.82	2.90	3.0	3.1			
			Bottom	15.2	27.8	27.2	6.32	6.24	6.24	90.2	87.2	2.90	2.91	3.0	3.2			

Mid-Ebb Tide

Monitoring Station : TKO-M/4

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)		Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen Saturation (%)			Turbidity (NTU)			Suspended Solids (mg/L)		
			Surface	Bottom		Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
14/12/09	1115-1130	21/Cloudy	Surface	1.0	21.6	30.3	30.3	6.54	6.56	93.7	94.0	3.45	3.46	3.2	3.1	3.1			
			Middle	4.6	22.0	31.0	31.0	6.33	6.32	94.3	90.6	3.47	3.24	3.0	3.0				
			Bottom	8.2	22.5	31.3	31.3	6.31	6.02	90.4	86.3	3.23	3.42	3.0	3.1				
16/12/09	1152-1210	12/Rainy	Surface	1.0	14.9	25.0	25.0	6.00	6.91	86.5	91.5	3.41	3.37	3.2	3.1	3.2			
			Middle	4.3	14.8	27.9	27.9	6.90	6.78	91.7	90.8	3.36	3.53	3.0	3.5				
			Bottom	7.6	14.7	27.9	27.9	6.92	6.71	91.3	90.2	3.38	3.42	3.0	3.1				
18/12/09	1345-1359	12/Cloudy	Surface	1.0	17.5	28.0	28.4	6.71	6.59	90.1	87.0	3.40	3.51	3.5	3.5	3.6			
			Middle	4.8	17.3	29.1	29.1	6.59	6.39	90.3	84.5	3.43	3.82	3.5	3.5				
			Bottom	8.6	17.4	29.1	29.1	6.38	6.35	87.0	83.7	3.79	3.92	3.5	3.9				
21/12/09	1545-1600	14/Cloudy	Surface	1.0	16.8	29.5	29.5	6.40	6.41	84.6	89.1	3.84	3.37	3.8	3.1	3.0			
			Middle	5.1	16.4	29.9	29.9	6.35	6.21	83.7	86.4	3.91	3.25	4.0	3.0				
			Bottom	9.1	16.1	30.1	30.2	6.45	6.02	88.5	83.7	3.92	3.16	3.0	3.0				
23/12/09	1743-1758	19/Fine	Surface	1.0	20.7	32.3	32.4	5.98	6.92	83.1	91.9	3.16	3.72	3.5	3.5	3.5			
			Middle	5.5	20.4	32.8	32.9	6.92	6.61	91.9	87.9	3.71	3.82	3.5	3.5				
			Bottom	10.0	20.2	32.6	32.6	6.61	6.32	88.0	84.2	3.81	3.90	3.5	3.5				
28/12/09	1053-1106	10/Cloudy	Surface	1.0	16.3	29.9	29.9	6.32	6.78	84.1	90.0	3.89	3.89	4.0	4.1	4.2			
			Middle	4.6	16.5	29.8	29.8	6.78	6.61	90.0	87.8	3.71	3.93	4.0	4.2				
			Bottom	8.2	16.7	30.1	30.1	6.60	6.33	87.7	84.1	3.94	3.99	4.3	4.5				
30/12/09	1306-1318	13/Dizzle	Surface	1.0	17.1	26.4	26.3	6.30	6.62	84.2	92.5	3.91	2.86	4.5	3.0	3.2			
			Middle	4.2	17.0	26.2	26.1	6.60	6.54	92.5	91.5	3.98	2.78	3.0	3.1				
			Bottom	7.4	16.8	26.8	26.9	6.30	6.42	83.8	90.1	3.99	2.95	3.0	3.4				

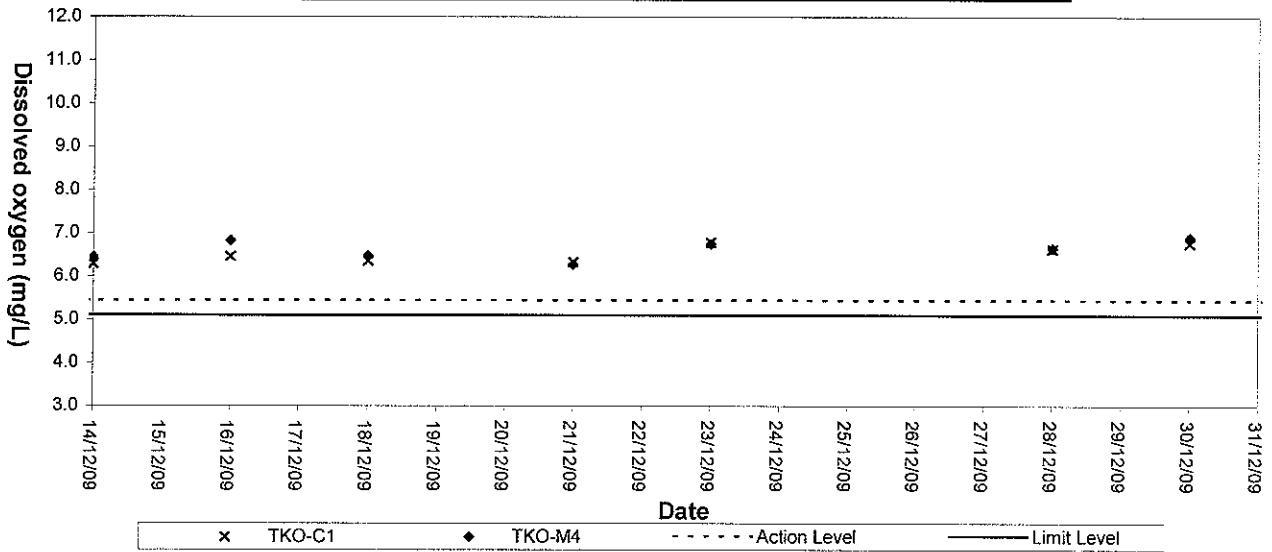


Appendix D3

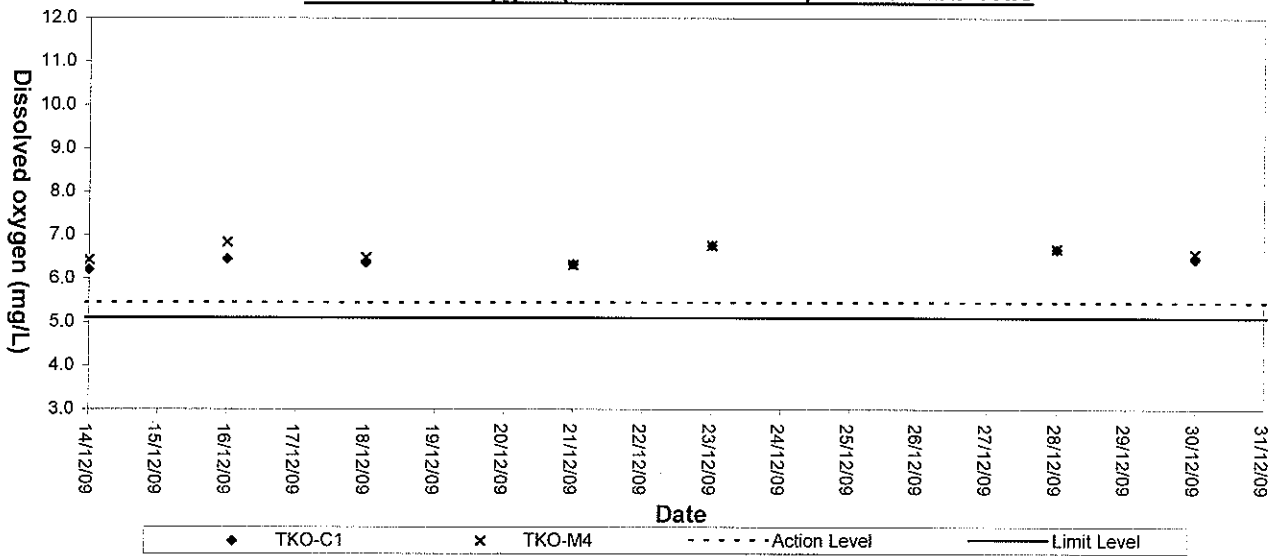
Graphical Plots of Impact Marine Water Quality Monitoring Data



Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

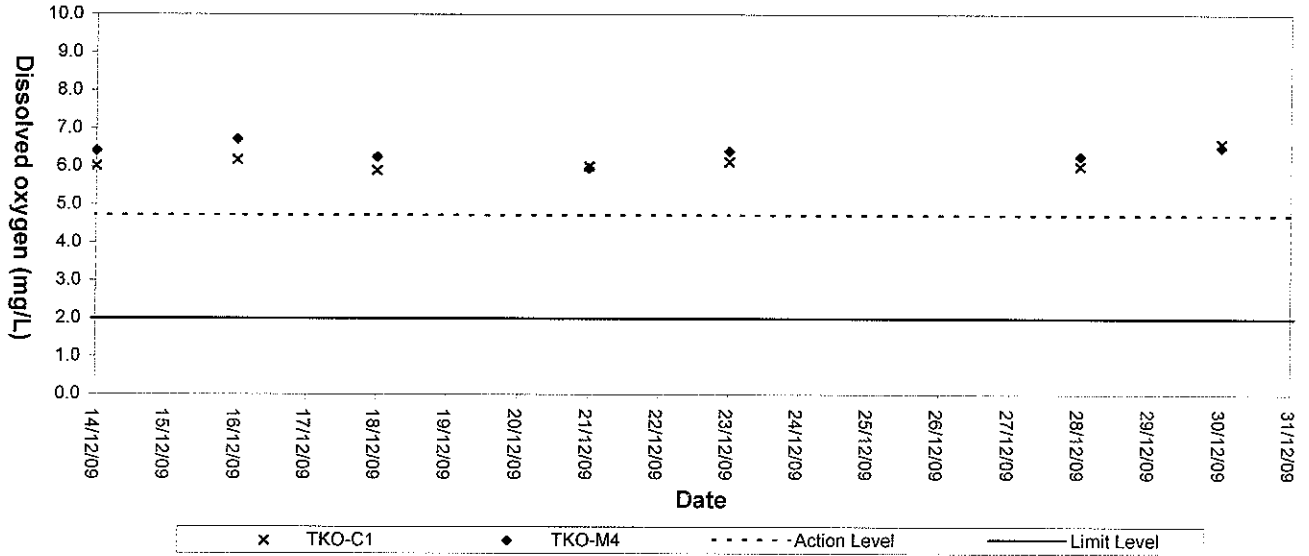


Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

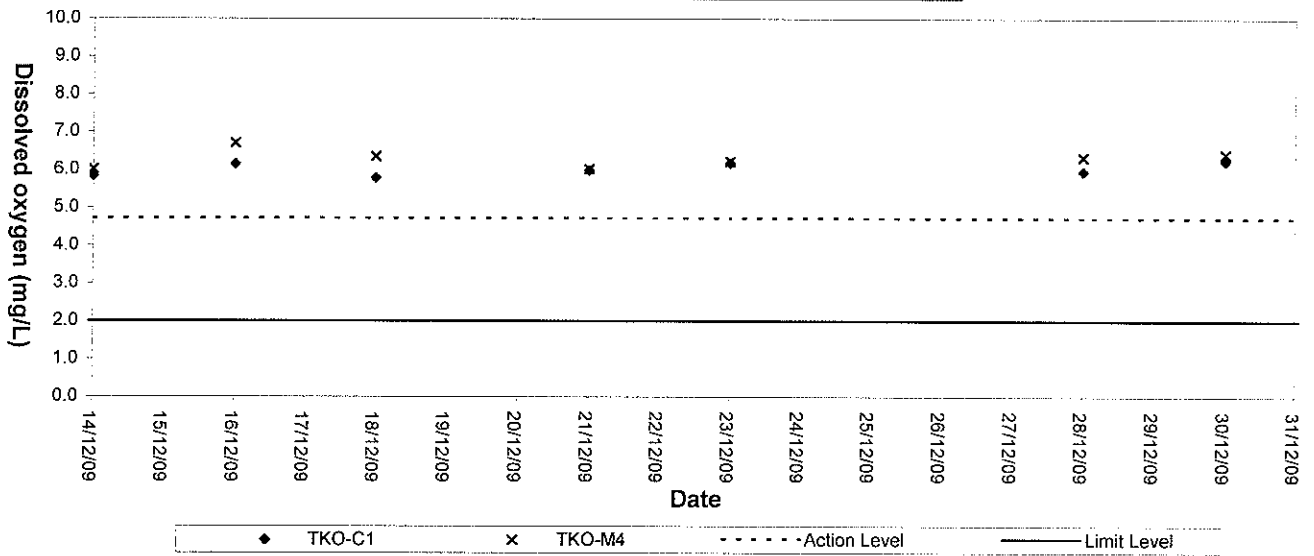




Dissolved Oxygen (Bottom) at Mid-Flood Tide

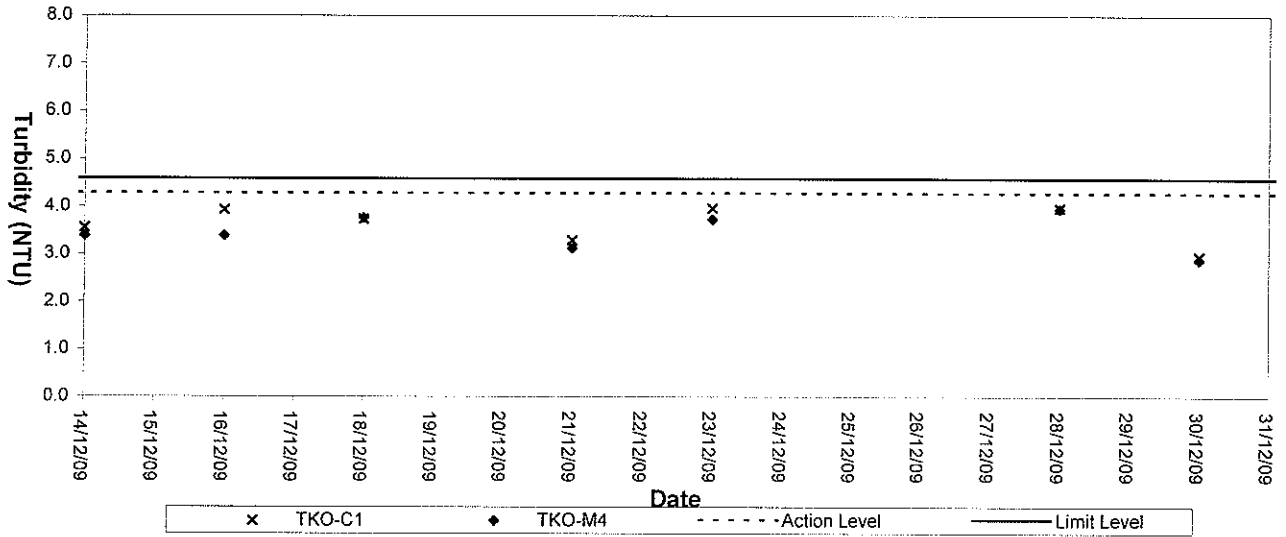


Dissolved Oxygen (Bottom) at Mid-Ebb Tide

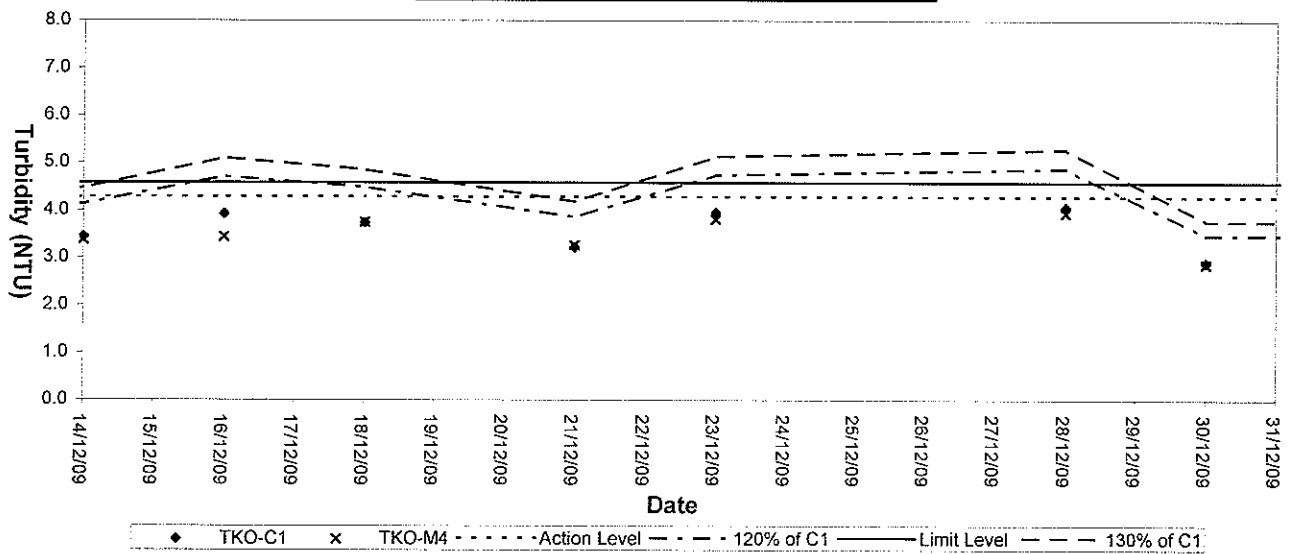




Turbidity (Depth-average) at Mid-Flood Tide

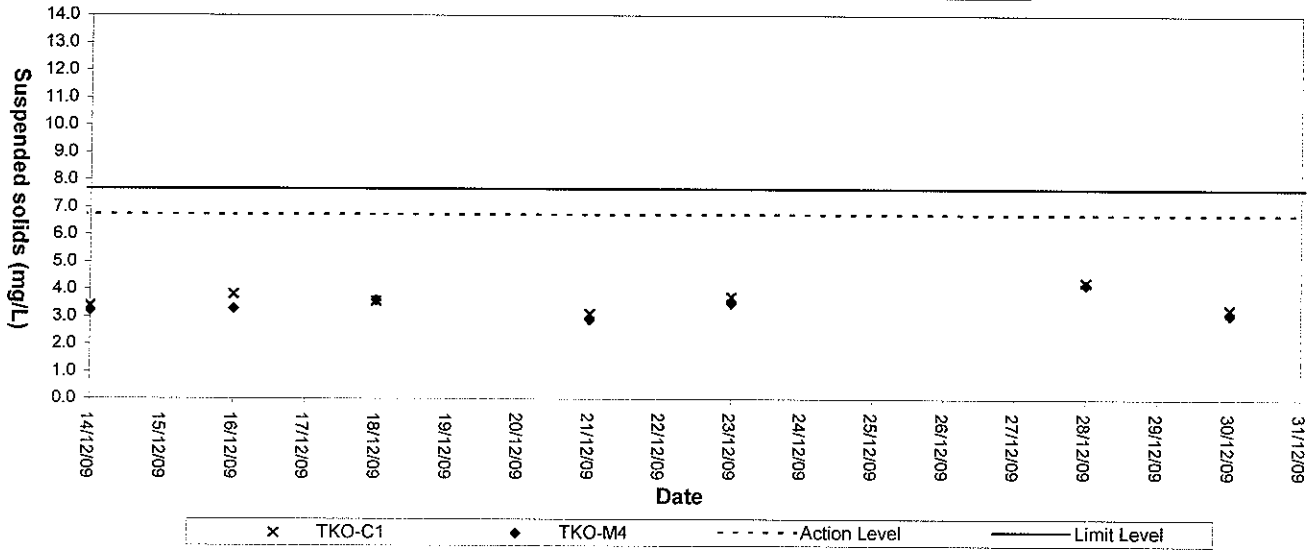


Turbidity(Depth-average) at Mid-Ebb Tide

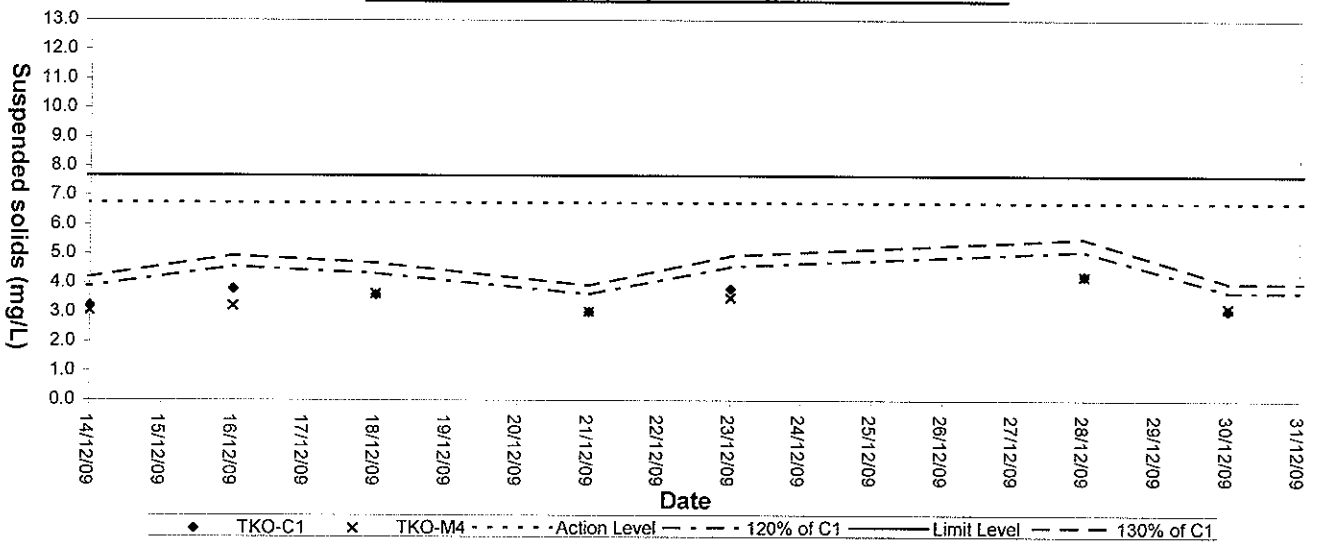




Suspended solids (Depth-average) at Mid-Flood Tide



Suspended Solids (Depth-average) at Mid-Ebb Tide





Appendix E

Weather Condition



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
14/12/2009	12:00 AM	18.0	18.1	18.0	1.0	2.1	NWN	30
14/12/2009	12:30 AM	18.0	18.1	17.8	1.6	3.6	NEN	30
14/12/2009	1:00 AM	18.2	18.5	17.9	2.2	2.8	NEN	30
14/12/2009	1:30 AM	18.6	18.8	18.4	2.2	3.2	NEE	30
14/12/2009	2:00 AM	18.5	18.5	18.4	1.2	2.6	NEE	30
14/12/2009	2:30 AM	17.8	18.1	17.8	0.4	1.3	NEE	30
14/12/2009	3:00 AM	17.4	17.5	17.3	1.0	2.7	NEE	30
14/12/2009	3:30 AM	17.3	17.4	17.2	1.0	2.8	NEE	30
14/12/2009	4:00 AM	17.9	18.2	17.9	0.5	1.8	NEE	30
14/12/2009	4:30 AM	18.0	18.1	18.0	1.6	2.6	NEE	30
14/12/2009	5:00 AM	17.9	18.1	17.7	1.7	2.7	NEE	30
14/12/2009	5:30 AM	17.9	18.0	17.7	1.0	1.8	NEE	30
14/12/2009	6:00 AM	17.9	18.1	17.6	1.0	1.3	NEN	30
14/12/2009	6:30 AM	18.1	18.4	18.0	0.7	1.4	NEN	30
14/12/2009	7:00 AM	18.5	18.8	18.3	0.5	2.0	SEE	30
14/12/2009	7:30 AM	18.6	18.7	18.4	2.6	3.8	NEN	30
14/12/2009	8:00 AM	19.0	19.3	18.9	2.8	3.4	NEN	30
14/12/2009	8:30 AM	19.1	19.2	18.8	2.4	3.5	NEN	30
14/12/2009	9:00 AM	19.5	19.8	19.3	2.7	3.9	NEE	30
14/12/2009	9:30 AM	19.4	19.7	19.2	2.7	3.3	SEE	30
14/12/2009	10:00 AM	19.8	20.0	19.7	2.7	3.0	NEE	30
14/12/2009	10:30 AM	19.6	19.6	19.5	3.2	5.2	NEE	30
14/12/2009	11:00 AM	19.8	19.9	19.7	2.7	4.5	NEE	30
14/12/2009	11:30 AM	20.0	20.1	19.8	2.3	3.8	SEE	30
14/12/2009	12:00 PM	20.0	20.1	20.0	2.7	3.5	NEN	30
14/12/2009	12:30 PM	19.9	20.1	19.6	3.5	3.7	NEE	30
14/12/2009	1:00 PM	19.9	20.0	19.6	2.8	3.7	SEE	30
14/12/2009	1:30 PM	19.5	19.6	19.3	3.4	4.7	F	30
14/12/2009	2:00 PM	19.7	19.9	19.7	2.8	4.1	NEE	30
14/12/2009	2:30 PM	19.9	20.0	19.7	2.8	4.6	SEE	30
14/12/2009	3:00 PM	20.1	20.1	20.0	2.1	2.6	NEE	30
14/12/2009	3:30 PM	20.0	20.1	19.7	1.1	3.0	NEE	30
14/12/2009	4:00 PM	20.0	20.0	19.9	1.3	2.3	NEE	30
14/12/2009	4:30 PM	19.7	19.9	19.6	2.7	3.8	NEE	30
14/12/2009	5:00 PM	19.6	19.8	19.6	2.2	4.4	NEN	30
14/12/2009	5:30 PM	19.4	19.4	19.3	3.1	5.3	NEN	30
14/12/2009	6:00 PM	19.3	19.5	19.1	2.0	3.8	NEE	30
14/12/2009	6:30 PM	19.1	19.2	18.9	1.6	1.8	SEE	30
14/12/2009	7:00 PM	19.1	19.3	18.8	1.5	2.4	SEE	30
14/12/2009	7:30 PM	19.3	19.5	19.1	2.1	3.1	SES	30
14/12/2009	8:00 PM	19.3	19.4	19.0	2.4	3.9	SEF	30
14/12/2009	8:30 PM	19.3	19.6	19.2	1.6	3.7	NEE	30
14/12/2009	9:00 PM	19.3	19.3	19.2	2.8	4.3	NEE	30
14/12/2009	9:30 PM	18.8	19.0	18.8	1.6	3.0	NEE	30
14/12/2009	10:00 PM	18.4	18.5	18.2	1.4	1.6	NEN	30
14/12/2009	10:30 PM	18.2	18.4	18.1	1.3	2.0	NEN	30
14/12/2009	11:00 PM	18.1	18.2	17.8	2.3	4.5	NEE	30
14/12/2009	11:30 PM	18.1	18.2	17.9	1.8	2.9	NEN	30
15/12/2009	12:00 AM	18.0	18.2	17.8	2.3	3.9	NEE	30
15/12/2009	12:30 AM	18.2	18.2	18.0	1.6	2.9	NEN	30
15/12/2009	1:00 AM	18.2	18.4	17.9	2.6	3.4	NE	30
15/12/2009	1:30 AM	18.2	18.4	18.2	2.2	3.4	NEN	30
15/12/2009	2:00 AM	18.2	18.4	17.9	2.7	2.8	NEN	30
15/12/2009	2:30 AM	18.3	18.3	18.2	2.3	4.1	NEN	30
15/12/2009	3:00 AM	18.5	18.5	18.3	2.4	2.8	NEN	30
15/12/2009	3:30 AM	18.3	18.4	18.3	3.4	4.3	NEN	30
15/12/2009	4:00 AM	18.4	18.7	18.3	2.7	2.8	NEE	30
15/12/2009	4:30 AM	18.5	18.6	18.3	2.2	2.7	NEE	30
15/12/2009	5:00 AM	18.4	18.5	18.2	2.2	3.3	NEN	30
15/12/2009	5:30 AM	18.3	18.6	18.0	2.5	2.6	NEE	30
15/12/2009	6:00 AM	18.3	18.4	18.3	1.7	1.8	NE	30
15/12/2009	6:30 AM	18.5	18.5	18.4	2.7	4.6	NEN	30
15/12/2009	7:00 AM	18.5	18.7	18.4	1.4	1.5	NEE	30
15/12/2009	7:30 AM	18.5	18.6	18.4	2.4	2.5	NEN	30
15/12/2009	8:00 AM	18.6	18.8	18.5	2.4	3.3	NEE	30
15/12/2009	8:30 AM	18.3	18.4	18.2	0.6	1.2	SES	30
15/12/2009	9:00 AM	18.2	18.2	18.0	1.9	2.4	NEE	30
15/12/2009	9:30 AM	18.5	18.7	18.3	2.5	2.9	NEE	30
15/12/2009	10:00 AM	18.5	18.6	18.5	2.7	4.0	NEE	30
15/12/2009	10:30 AM	18.5	18.7	18.3	1.4	2.2	NEE	30
15/12/2009	11:00 AM	18.8	19.0	18.7	1.3	1.9	NWN	30
15/12/2009	11:30 AM	18.9	18.9	18.7	2.4	3.9	NEN	30
15/12/2009	12:00 PM	18.9	19.1	18.6	1.6	3.4	NWN	30
15/12/2009	12:30 PM	18.9	19.0	18.8	1.6	1.8	NEN	30
15/12/2009	1:00 PM	18.9	18.9	18.7	1.3	3.1	NEN	30
15/12/2009	1:30 PM	19.0	19.1	18.8	1.8	2.7	NEN	30
15/12/2009	2:00 PM	19.1	19.4	19.0	1.8	2.0	NEN	30
15/12/2009	2:30 PM	19.1	19.4	19.0	1.8	2.5	NWN	30
15/12/2009	3:00 PM	19.1	19.3	18.9	1.1	1.7	NEN	30
15/12/2009	3:30 PM	19.1	19.2	19.0	0.7	1.2	NEN	30
15/12/2009	4:00 PM	19.1	19.2	18.8	1.0	2.4	NEE	30
15/12/2009	4:30 PM	19.0	19.1	18.9	1.6	3.7	NEN	30
15/12/2009	5:00 PM	19.0	19.2	19.0	0.9	1.8	NEE	30
15/12/2009	5:30 PM	19.0	19.3	18.8	1.6	2.2	NEN	30
15/12/2009	6:00 PM	19.0	19.0	18.8	1.2	3.1	NWN	30
15/12/2009	6:30 PM	18.9	19.1	18.7	1.8	4.1	NEN	30
15/12/2009	7:00 PM	19.0	19.2	19.0	1.1	2.1	NWN	30
15/12/2009	7:30 PM	18.9	19.0	18.8	0.4	1.4	NWWW	30
15/12/2009	8:00 PM	18.8	19.0	18.8	0.5	1.9	SEE	30
15/12/2009	8:30 PM	18.6	18.7	18.6	3.2	5.3	NEE	30
15/12/2009	9:00 PM	17.0	17.0	17.0	2.7	3.9	NEE	30
15/12/2009	9:30 PM	16.0	16.0	16.0	1.6	1.9	NEN	30
15/12/2009	10:00 PM	15.7	15.8	15.5	1.6	3.4	NWN	30
15/12/2009	10:30 PM	14.9	15.1	14.8	2.2	3.1	NEN	30
15/12/2009	11:00 PM	14.6	14.7	14.3	3.0	4.5	NWN	30
15/12/2009	11:30 PM	14.6	14.8	14.5	1.6	3.3	NEE	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
16/12/2009	12:00 AM	14.6	14.6	14.4	3.3	3.4	NEE	30
16/12/2009	12:30 AM	14.2	14.5	14.1	2.3	3.6	NWN	30
16/12/2009	1:00 AM	14.0	14.2	14.0	2.7	4.2	NWN	30
16/12/2009	1:30 AM	14.0	14.1	13.9	3.3	4.4	NEN	30
16/12/2009	2:00 AM	13.8	14.0	13.5	3.5	3.9	NEE	30
16/12/2009	2:30 AM	13.8	14.0	13.7	2.7	3.4	NEN	30
16/12/2009	3:00 AM	13.8	13.8	13.5	2.4	4.4	NWN	30
16/12/2009	3:30 AM	13.3	13.4	13.3	1.7	3.2	NWN	30
16/12/2009	4:00 AM	13.1	13.2	12.9	2.3	4.4	NEE	30
16/12/2009	4:30 AM	13.1	13.1	13.1	2.2	4.4	NWN	30
16/12/2009	5:00 AM	13.0	13.0	12.9	2.3	3.6	NWN	30
16/12/2009	5:30 AM	12.9	12.9	12.9	1.2	1.6	NEE	30
16/12/2009	6:00 AM	12.9	13.0	12.7	2.8	3.3	NEE	30
16/12/2009	6:30 AM	12.8	13.1	12.7	1.6	3.2	NEN	30
16/12/2009	7:00 AM	12.0	12.0	11.8	2.0	3.5	NWN	30
16/12/2009	7:30 AM	11.9	12.1	11.8	0.6	1.1	NEN	30
16/12/2009	8:00 AM	12.1	12.2	12.1	1.7	1.7	NWN	30
16/12/2009	8:30 AM	12.1	12.4	11.8	0.5	0.5	NEE	30
16/12/2009	9:00 AM	12.5	12.8	12.4	2.7	3.3	NEE	30
16/12/2009	9:30 AM	12.6	12.9	12.5	2.3	3.3	NEE	30
16/12/2009	10:00 AM	12.8	12.9	12.7	2.4	2.6	NEE	30
16/12/2009	10:30 AM	13.0	13.2	13.0	2.5	4.6	NEE	30
16/12/2009	11:00 AM	13.1	13.2	13.1	3.3	5.5	NEE	30
16/12/2009	11:30 AM	13.4	13.7	13.2	2.7	3.8	NEE	30
16/12/2009	12:00 PM	13.5	13.7	13.4	2.6	3.0	NEE	30
16/12/2009	12:30 PM	13.6	13.7	13.4	2.6	4.5	NEE	30
16/12/2009	1:00 PM	13.5	13.7	13.2	3.3	4.9	NEE	30
16/12/2009	1:30 PM	13.9	14.0	13.8	2.2	3.5	NE	30
16/12/2009	2:00 PM	13.9	14.2	13.7	2.2	4.5	NEN	30
16/12/2009	2:30 PM	13.9	14.2	13.8	3.0	5.0	NEE	30
16/12/2009	3:00 PM	13.8	13.9	13.5	2.2	4.2	NEE	30
16/12/2009	3:30 PM	13.7	13.7	13.5	3.8	4.5	NEE	30
16/12/2009	4:00 PM	13.4	13.6	13.4	2.2	4.3	NEN	30
16/12/2009	4:30 PM	13.3	13.6	13.1	1.1	2.7	NWN	30
16/12/2009	5:00 PM	13.1	13.3	12.9	1.9	3.4	NEN	30
16/12/2009	5:30 PM	13.1	13.2	13.0	2.7	4.2	NEE	30
16/12/2009	6:00 PM	13.0	13.0	12.9	1.6	2.0	NEN	30
16/12/2009	6:30 PM	12.9	12.9	12.7	1.3	1.5	NEE	30
16/12/2009	7:00 PM	12.9	13.1	12.8	1.6	3.7	NEE	30
16/12/2009	7:30 PM	12.9	13.1	12.8	1.5	3.3	NEN	30
16/12/2009	8:00 PM	12.9	13.0	12.7	1.8	2.7	NEE	30
16/12/2009	8:30 PM	13.0	13.0	12.9	1.6	2.0	NEE	30
16/12/2009	9:00 PM	12.9	13.2	12.7	1.7	3.5	NEN	30
16/12/2009	9:30 PM	12.9	12.9	12.7	1.6	2.2	NEN	30
16/12/2009	10:00 PM	12.5	12.5	12.3	1.6	3.4	NEE	30
16/12/2009	10:30 PM	12.3	12.6	12.1	2.0	3.2	NEN	30
16/12/2009	11:00 PM	12.3	12.4	12.2	1.6	1.7	NEE	30
16/12/2009	11:30 PM	12.2	12.4	12.0	1.8	2.1	NWN	30
17/12/2009	12:00 AM	12.3	12.6	12.1	2.1	3.0	NWN	30
17/12/2009	12:30 AM	12.3	12.6	12.2	0.7	1.0	NEN	30
17/12/2009	1:00 AM	12.3	12.4	12.3	1.6	3.5	NWN	30
17/12/2009	1:30 AM	12.3	12.3	12.1	1.1	2.0	NWN	30
17/12/2009	2:00 AM	12.3	12.6	12.2	1.3	1.6	NEE	30
17/12/2009	2:30 AM	12.3	12.4	12.0	1.1	2.2	NEE	30
17/12/2009	3:00 AM	12.3	12.6	12.2	0.5	1.5	NEN	30
17/12/2009	3:30 AM	12.2	12.4	12.0	1.6	2.4	NEN	30
17/12/2009	4:00 AM	11.9	12.2	11.9	0.8	1.9	NEE	30
17/12/2009	4:30 AM	11.9	12.0	11.7	0.7	2.1	NEE	30
17/12/2009	5:00 AM	11.8	11.8	11.6	1.7	3.7	NEE	30
17/12/2009	5:30 AM	11.7	12.0	11.6	2.7	2.8	NEE	30
17/12/2009	6:00 AM	11.8	11.9	11.7	1.6	3.0	NEE	30
17/12/2009	6:30 AM	11.7	11.8	11.7	1.2	2.9	NWN	30
17/12/2009	7:00 AM	11.2	11.5	11.0	1.6	2.1	NWN	30
17/12/2009	7:30 AM	11.0	11.2	10.7	1.5	1.7	NEE	30
17/12/2009	8:00 AM	11.1	11.3	11.1	1.8	3.2	NWN	30
17/12/2009	8:30 AM	11.2	11.5	10.9	1.2	1.8	NWN	30
17/12/2009	9:00 AM	11.1	11.1	10.9	1.7	3.4	NWN	30
17/12/2009	9:30 AM	11.1	11.2	10.9	1.8	2.3	NWN	30
17/12/2009	10:00 AM	11.0	11.1	10.9	1.6	3.5	NWN	30
17/12/2009	10:30 AM	10.8	10.9	10.6	2.2	3.2	NWN	30
17/12/2009	11:00 AM	11.1	11.4	10.8	1.2	3.1	NWN	30
17/12/2009	11:30 AM	11.5	11.5	11.3	2.0	3.7	NWN	30
17/12/2009	12:00 PM	11.9	12.1	11.6	1.7	1.9	NWN	30
17/12/2009	12:30 PM	12.2	12.5	11.9	1.3	1.5	N	30
17/12/2009	1:00 PM	12.6	12.7	12.5	1.4	3.4	NEN	30
17/12/2009	1:30 PM	13.0	13.2	12.8	1.6	2.3	NWN	30
17/12/2009	2:00 PM	13.1	13.3	12.8	1.2	2.2	NWN	30
17/12/2009	2:30 PM	13.6	13.7	13.5	1.8	2.7	NEE	30
17/12/2009	3:00 PM	14.0	14.1	13.8	1.2	2.1	NEE	30
17/12/2009	3:30 PM	14.4	14.7	14.3	2.1	2.2	NEE	30
17/12/2009	4:00 PM	13.9	14.1	13.7	1.6	1.8	NWN	30
17/12/2009	4:30 PM	13.5	13.8	13.4	1.5	1.6	NWN	30
17/12/2009	5:00PM	13.2	13.3	13.1	2.3	3.6	NWN	30
17/12/2009	5:30 PM	13.1	13.3	13.0	1.3	3.3	NWN	30
17/12/2009	6:00PM	12.9	13.2	12.6	1.6	3.5	NWN	30
17/12/2009	6:30 PM	12.9	13.1	12.8	2.8	3.4	NEE	30
17/12/2009	7:00PM	12.6	12.7	12.6	2.6	4.4	NEE	30
17/12/2009	7:30 PM	12.3	12.4	12.0	1.5	3.4	NEN	30
17/12/2009	8:00PM	12.1	12.2	12.0	2.1	3.2	NEE	30
17/12/2009	8:30 PM	12.1	12.4	12.0	3.3	4.4	NEE	30
17/12/2009	9:00PM	12.0	12.2	11.9	1.3	1.7	NEN	30
17/12/2009	9:30 PM	11.9	12.1	11.7	3.2	3.8	NEE	30
17/12/2009	10:00PM	11.9	12.0	11.6	0.7	2.0	NEN	30
17/12/2009	10:30 PM	11.7	12.0	11.7	2.4	2.7	NEE	30
17/12/2009	11:00PM	11.6	11.7	11.3	2.1	2.8	NEE	30
17/12/2009	11:30 PM	11.2	11.5	11.0	1.6	2.3	NEE	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
18/12/2009	12:00AM	11.1	11.4	11.0	1.7	3.9	NWN	30
18/12/2009	12:30 AM	11.1	11.1	11.0	1.6	2.3	NWN	30
18/12/2009	1:00AM	11.1	11.3	11.0	0.5	2.2	NEN	30
18/12/2009	1:30 AM	11.1	11.4	10.9	0.8	1.3	NEE	30
18/12/2009	2:00AM	11.1	11.2	11.0	1.6	2.4	NEE	30
18/12/2009	2:30 AM	11.2	11.3	11.1	1.4	3.3	NEE	30
18/12/2009	3:00AM	11.1	11.2	11.0	1.6	2.6	NWN	30
18/12/2009	3:30 AM	11.1	11.3	10.9	0.5	2.3	N	30
18/12/2009	4:00AM	11.1	11.3	10.9	1.6	3.4	NEE	30
18/12/2009	4:30 AM	11.1	11.2	11.1	2.6	2.6	NEE	30
18/12/2009	5:00AM	10.9	11.0	10.8	3.0	5.0	NEN	30
18/12/2009	5:30 AM	10.9	11.2	10.6	1.7	2.9	NWN	30
18/12/2009	6:00AM	11.1	11.2	10.9	1.1	1.1	NEE	30
18/12/2009	6:30 AM	11.1	11.2	10.8	2.8	4.2	NEE	30
18/12/2009	7:00AM	11.1	11.3	11.1	1.5	2.2	NEE	30
18/12/2009	7:30 AM	11.1	11.2	11.0	2.6	4.4	NEE	30
18/12/2009	8:00AM	11.1	11.3	10.8	1.1	2.7	NWN	30
18/12/2009	8:30 AM	11.1	11.3	10.9	3.3	4.4	NEE	30
18/12/2009	9:00AM	11.3	11.6	11.2	1.6	2.6	NEE	30
18/12/2009	9:30 AM	11.3	11.5	11.0	1.0	2.3	NE	30
18/12/2009	10:00AM	11.4	11.6	11.1	2.8	4.7	NEE	30
18/12/2009	10:30 AM	11.5	11.7	11.3	1.2	2.7	NWN	30
18/12/2009	11:00AM	12.0	12.1	11.8	2.3	3.1	NEE	30
18/12/2009	11:30 AM	12.3	12.5	12.1	1.1	1.6	NEE	30
18/12/2009	12:00NN	12.8	13.1	12.5	3.7	5.5	NEE	30
18/12/2009	12:30 PM	13.2	13.4	13.1	2.7	3.9	E	30
18/12/2009	1:00 PM	13.2	13.2	13.0	2.9	3.5	NEE	30
18/12/2009	1:30 PM	13.5	13.7	13.3	3.6	5.2	NEE	30
18/12/2009	2:00 PM	13.1	13.3	13.1	3.2	3.2	NEE	30
18/12/2009	2:30 PM	13.0	13.1	12.7	3.4	3.9	NEE	30
18/12/2009	3:00 PM	12.9	13.1	12.8	3.4	3.6	NEE	30
18/12/2009	3:30 PM	12.2	12.4	12.2	2.2	4.1	N	30
18/12/2009	4:00 PM	12.1	12.2	12.1	1.6	1.9	NEE	30
18/12/2009	4:30 PM	12.0	12.1	11.7	2.1	2.2	NEE	30
18/12/2009	5:00 PM	11.9	12.2	11.8	1.5	2.0	NEN	30
18/12/2009	5:30 PM	11.9	11.9	11.6	2.8	4.7	NEE	30
18/12/2009	6:00 PM	11.9	12.0	11.7	1.3	2.8	NEN	30
18/12/2009	6:30 PM	11.1	11.1	10.9	1.6	3.0	NWN	30
18/12/2009	7:00 PM	10.6	10.7	10.3	1.6	1.9	NE	30
18/12/2009	7:30 PM	10.5	10.7	10.5	2.0	3.7	NWN	30
18/12/2009	8:00 PM	10.9	11.0	10.8	1.6	3.3	NWN	30
18/12/2009	8:30 PM	11.1	11.1	11.0	1.3	3.0	NEN	30
18/12/2009	9:00 PM	11.1	11.2	11.1	1.7	2.0	NWN	30
18/12/2009	9:30 PM	11.3	11.4	11.3	3.0	3.2	NE	30
18/12/2009	10:00 PM	11.4	11.5	11.1	2.2	4.1	NEE	30
18/12/2009	10:30 PM	11.4	11.7	11.4	2.4	3.9	NEE	30
18/12/2009	11:00 PM	11.2	11.4	11.1	2.3	3.0	NEE	30
18/12/2009	11:30 PM	11.2	11.3	11.1	3.8	5.3	NEE	30
19/12/2009	12:00 AM	11.1	11.4	11.0	2.9	4.0	NEE	30
19/12/2009	12:30 AM	11.1	11.4	10.8	1.7	3.5	NWN	30
19/12/2009	1:00 AM	11.0	11.0	11.0	3.8	5.5	NEE	30
19/12/2009	1:30 AM	11.0	11.1	10.8	3.8	5.5	NEE	30
19/12/2009	2:00 AM	11.0	11.1	10.8	3.8	4.8	NEE	30
19/12/2009	2:30 AM	11.0	11.3	11.0	2.4	4.3	NEE	30
19/12/2009	3:00 AM	11.0	11.2	11.0	2.7	4.8	NE	30
19/12/2009	3:30 AM	10.9	11.0	10.8	2.3	3.3	NEN	30
19/12/2009	4:00 AM	10.9	11.1	10.8	3.3	3.6	NEE	30
19/12/2009	4:30 AM	10.9	11.0	10.6	3.5	5.7	NEE	30
19/12/2009	5:00 AM	10.9	11.1	10.7	1.3	3.2	NEN	30
19/12/2009	5:30 AM	10.9	11.2	10.8	1.7	3.1	NWN	30
19/12/2009	6:00 AM	10.8	11.0	10.6	1.6	2.1	NWN	30
19/12/2009	6:30 AM	10.7	10.9	10.5	1.1	1.6	NWN	30
19/12/2009	7:00 AM	10.8	11.1	10.8	1.1	2.7	NWN	30
19/12/2009	7:30 AM	10.9	11.0	10.8	1.3	3.2	NEN	30
19/12/2009	8:00 AM	11.0	11.2	10.9	1.2	1.7	NEE	30
19/12/2009	8:30 AM	12.3	12.4	12.1	1.6	2.9	NEE	30
19/12/2009	9:00 AM	11.7	11.8	11.7	1.5	1.6	NEN	30
19/12/2009	9:30 AM	12.0	12.1	11.8	1.6	2.2	NEE	30
19/12/2009	10:00 AM	12.1	12.2	12.0	1.5	1.5	NEE	30
19/12/2009	10:30 AM	12.3	12.5	12.1	1.6	1.9	NEE	30
19/12/2009	11:00 AM	12.6	12.9	12.5	1.6	1.7	NEE	30
19/12/2009	11:30 AM	12.7	13.0	12.6	1.7	1.8	NEE	30
19/12/2009	12:00 PM	13.0	13.2	12.9	2.4	3.9	NEE	30
19/12/2009	12:30 PM	13.5	13.8	13.3	2.0	2.2	NE	30
19/12/2009	1:00 PM	14.0	14.1	14.0	1.6	2.5	NEE	30
19/12/2009	1:30 PM	14.2	14.4	14.0	2.0	3.6	NEE	30
19/12/2009	2:00 PM	15.0	15.2	14.7	2.1	2.8	E	30
19/12/2009	2:30 PM	14.9	15.0	14.8	2.5	4.4	NEE	30
19/12/2009	3:00 PM	14.9	14.9	14.7	2.1	3.0	NEE	30
19/12/2009	3:30 PM	14.9	15.2	14.9	1.6	2.4	NWN	30
19/12/2009	4:00 PM	14.8	15.0	14.8	1.9	3.8	NEN	30
19/12/2009	4:30 PM	14.5	14.7	14.2	1.0	2.9	NW	30
19/12/2009	5:00 PM	14.1	14.3	14.1	1.5	2.3	NWN	30
19/12/2009	5:30 PM	13.9	13.9	13.6	0.8	2.9	NEE	30
19/12/2009	6:00 PM	13.5	13.6	13.4	0.7	2.3	NWN	30
19/12/2009	6:30 PM	13.3	13.6	13.0	1.1	1.8	NEE	30
19/12/2009	7:00 PM	13.4	13.6	13.3	1.7	4.0	NEE	30
19/12/2009	7:30 PM	13.2	13.3	12.9	2.0	2.2	NEE	30
19/12/2009	8:00 PM	13.2	13.5	13.1	0.9	2.3	NEE	30
19/12/2009	8:30 PM	13.0	13.1	12.8	0.9	2.2	NEE	30
19/12/2009	9:00 PM	13.0	13.2	12.8	1.6	3.5	NEN	30
19/12/2009	9:30 PM	13.1	13.4	12.9	1.8	3.0	NEN	30
19/12/2009	10:00 PM	13.0	13.2	12.9	1.5	3.3	NEE	30
19/12/2009	10:30 PM	12.5	12.5	12.4	1.6	3.3	N	30
19/12/2009	11:00 PM	12.3	12.3	12.1	1.0	2.3	SEE	30
19/12/2009	11:30 PM	12.5	12.5	12.5	1.6	3.8	N	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
20/12/2009	12:00 AM	12.5	12.6	12.3	1.4	3.3	NWN	30
20/12/2009	12:30 AM	12.2	12.2	12.2	1.8	2.3	NEE	30
20/12/2009	1:00 AM	12.0	12.0	11.9	1.5	3.5	NEN	30
20/12/2009	1:30 AM	11.7	11.8	11.6	2.3	3.6	NWN	30
20/12/2009	2:00 AM	11.7	12.0	11.4	1.5	3.2	NWN	30
20/12/2009	2:30 AM	11.4	11.5	11.4	1.6	2.5	NWN	30
20/12/2009	3:00 AM	11.0	11.2	10.8	2.4	4.6	NWN	30
20/12/2009	3:30 AM	11.1	11.3	11.0	1.1	2.0	NEN	30
20/12/2009	4:00 AM	11.2	11.4	11.0	0.9	1.2	NEE	30
20/12/2009	4:30 AM	11.0	11.1	11.0	0.8	3.0	NWN	30
20/12/2009	5:00 AM	10.4	10.5	10.2	0.2	0.7	NWN	30
20/12/2009	5:30 AM	10.3	10.4	10.1	0.9	2.6	NEN	30
20/12/2009	6:00 AM	10.0	10.1	9.9	1.8	4.0	NEE	30
20/12/2009	6:30 AM	9.6	9.8	9.6	2.6	3.9	NEE	30
20/12/2009	7:00 AM	9.4	9.6	9.2	1.8	2.8	NEE	30
20/12/2009	7:30 AM	10.0	10.1	9.8	3.3	4.2	NEE	30
20/12/2009	8:00 AM	11.0	11.0	10.8	4.2	5.5	NEE	30
20/12/2009	8:30 AM	12.2	12.5	12.0	3.1	3.3	NEE	30
20/12/2009	9:00 AM	12.7	12.8	12.6	5.0	6.2	NEE	30
20/12/2009	9:30 AM	13.5	13.6	13.5	3.1	5.1	NEE	30
20/12/2009	10:00 AM	14.2	14.4	14.0	3.4	5.2	NEE	30
20/12/2009	10:30 AM	14.9	15.1	14.8	4.0	5.3	NEE	30
20/12/2009	11:00 AM	15.3	15.5	15.1	3.1	3.1	NEE	30
20/12/2009	11:30 AM	16.0	16.2	15.8	3.4	3.6	NEE	30
20/12/2009	12:00 PM	16.5	16.6	16.3	2.6	4.5	NEE	30
20/12/2009	12:30 PM	17.0	17.2	16.9	3.4	3.9	NEE	30
20/12/2009	1:00 PM	17.1	17.2	17.1	3.2	4.2	NEE	30
20/12/2009	1:30 PM	17.9	18.1	17.8	3.2	3.4	NEE	30
20/12/2009	2:00 PM	17.3	17.5	17.0	1.7	3.5	NEE	30
20/12/2009	2:30 PM	17.3	17.6	17.1	2.5	2.6	NEE	30
20/12/2009	3:00 PM	16.7	17.0	16.6	3.3	3.5	NEE	30
20/12/2009	3:30 PM	16.4	16.5	16.2	2.5	4.5	NEE	30
20/12/2009	4:00 PM	16.0	16.2	15.8	2.7	3.8	NEE	30
20/12/2009	4:30 PM	15.7	15.9	15.6	1.0	1.1	NEN	30
20/12/2009	5:00 PM	15.5	15.6	15.3	1.6	2.4	NEN	30
20/12/2009	5:30 PM	14.0	14.1	13.9	0.9	1.5	NWN	30
20/12/2009	6:00 PM	13.0	13.3	12.8	0.8	3.0	NEN	30
20/12/2009	6:30 PM	13.4	13.7	13.1	2.1	2.6	NEE	30
20/12/2009	7:00 PM	13.2	13.3	13.2	0.8	2.0	NWN	30
20/12/2009	7:30 PM	12.9	13.0	12.7	1.5	2.3	NWN	30
20/12/2009	8:00 PM	13.7	13.9	13.6	2.4	4.0	NEN	30
20/12/2009	8:30 PM	13.3	13.3	13.3	1.6	2.0	NWN	30
20/12/2009	9:00 PM	13.0	13.0	13.0	0.7	1.8	N	30
20/12/2009	9:30 PM	13.2	13.4	13.2	0.9	3.0	NWN	30
20/12/2009	10:00 PM	13.2	13.3	13.0	0.4	2.2	NW	30
20/12/2009	10:30 PM	13.2	13.4	12.9	1.6	1.6	NWN	30
20/12/2009	11:00 PM	13.4	13.7	13.4	0.4	1.9	N	30
20/12/2009	11:30 PM	13.5	13.5	13.3	1.6	1.6	NWN	30
21/12/2009	12:00 AM	13.6	13.8	13.4	1.7	1.9	NEN	30
21/12/2009	12:30 AM	13.0	13.3	12.8	1.6	3.9	NWN	30
21/12/2009	1:00 AM	13.0	13.2	12.9	1.9	2.8	NWN	30
21/12/2009	1:30 AM	13.5	13.8	13.2	2.5	3.1	NWN	30
21/12/2009	2:00 AM	13.3	13.5	13.2	1.6	2.3	NWN	30
21/12/2009	2:30 AM	13.0	13.1	12.8	2.4	2.5	NWN	30
21/12/2009	3:00 AM	12.9	12.9	12.6	1.6	2.1	NWN	30
21/12/2009	3:30 AM	12.7	12.9	12.5	1.0	1.0	NWN	30
21/12/2009	4:00 AM	12.7	12.8	12.5	1.7	3.6	NWN	30
21/12/2009	4:30 AM	12.4	12.7	12.2	0.8	1.4	NEN	30
21/12/2009	5:00 AM	12.2	12.3	12.0	1.6	2.1	NEE	30
21/12/2009	5:30 AM	12.7	12.8	12.6	0.4	1.8	NEN	30
21/12/2009	6:00 AM	12.1	12.4	12.0	0.8	2.5	NEE	30
21/12/2009	6:30 AM	12.0	12.3	11.7	0.8	2.7	NWN	30
21/12/2009	7:00 AM	12.0	12.3	11.9	1.6	2.7	NEE	30
21/12/2009	7:30 AM	12.0	12.1	11.7	0.8	2.6	N	30
21/12/2009	8:00 AM	12.8	12.8	12.7	3.2	4.9	NEE	30
21/12/2009	8:30 AM	13.0	13.1	12.8	1.7	3.2	NEE	30
21/12/2009	9:00 AM	13.3	13.5	13.2	1.9	2.2	NEE	30
21/12/2009	9:30 AM	13.4	13.7	13.4	2.0	2.9	NEE	30
21/12/2009	10:00 AM	13.8	14.0	13.7	1.2	3.4	SEE	30
21/12/2009	10:30 AM	14.2	14.3	14.2	1.2	3.3	SES	30
21/12/2009	11:00 AM	14.9	15.1	14.7	0.9	2.8	SEE	30
21/12/2009	11:30 AM	15.6	15.9	15.4	1.1	2.5	NEE	30
21/12/2009	12:00 PM	16.2	16.4	16.1	1.7	2.6	SEE	30
21/12/2009	12:30 PM	16.8	17.0	16.6	1.4	2.1	SEE	30
21/12/2009	1:00 PM	17.4	17.5	17.2	1.9	3.9	SES	30
21/12/2009	1:30 PM	17.3	17.4	17.0	1.7	2.7	SES	30
21/12/2009	2:00 PM	17.0	17.1	17.0	1.8	2.0	SES	30
21/12/2009	2:30 PM	16.9	17.0	16.8	2.0	4.2	SES	30
21/12/2009	3:00 PM	17.9	17.9	17.7	1.9	4.2	SEE	30
21/12/2009	3:30 PM	16.0	16.2	16.0	1.7	3.3	SES	30
21/12/2009	4:00 PM	15.7	15.7	15.7	2.1	3.7	SES	30
21/12/2009	4:30 PM	15.2	15.5	15.2	1.5	3.0	SES	30
21/12/2009	5:00 PM	15.2	15.2	15.0	0.7	0.9	SES	30
21/12/2009	5:30 PM	14.8	15.0	14.5	0.2	1.4	N	30
21/12/2009	6:00 PM	13.0	13.2	12.9	0.4	2.5	NWW	30
21/12/2009	6:30 PM	12.0	12.2	11.7	0.2	1.0	SWS	30
21/12/2009	7:00 PM	11.5	11.6	11.2	0.3	1.8	NWW	30
21/12/2009	7:30 PM	11.1	11.2	11.0	0.4	1.3	NWW	30
21/12/2009	8:00 PM	11.1	11.2	10.9	0.5	1.1	NWN	30
21/12/2009	8:30 PM	11.1	11.2	11.1	0.1	0.4	NWN	30
21/12/2009	9:00 PM	11.5	11.7	11.3	0.1	1.7	NWN	30
21/12/2009	9:30 PM	11.9	12.2	11.7	0.1	0.8	NWW	30
21/12/2009	10:00 PM	12.5	12.7	12.3	0.5	0.7	NWN	30
21/12/2009	10:30 PM	13.0	13.1	12.9	0.1	0.9	NWN	30
21/12/2009	11:00 PM	13.9	14.1	13.8	1.1	1.5	NEN	30
21/12/2009	11:30 PM	14.4	14.5	14.2	1.1	1.8	SEE	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
22/12/2009	12:00 AM	14.1	14.1	14.1	1.2	2.3	SEE	30
22/12/2009	12:30 AM	14.0	14.1	13.8	0.3	1.3	SES	30
22/12/2009	1:00 AM	13.9	14.0	13.6	0.5	0.9	SES	30
22/12/2009	1:30 AM	14.4	14.7	14.2	1.0	1.8	NEN	30
22/12/2009	2:00 AM	14.3	14.6	14.3	2.7	3.8	NEN	30
22/12/2009	2:30 AM	14.1	14.4	14.0	2.1	3.9	NEN	30
22/12/2009	3:00 AM	14.7	14.8	14.6	2.0	2.8	E	30
22/12/2009	3:30 AM	14.2	14.4	14.0	3.1	4.4	NEN	30
22/12/2009	4:00 AM	14.0	14.0	13.8	3.7	5.1	NEN	30
22/12/2009	4:30 AM	14.0	14.1	13.7	3.3	3.3	NEN	30
22/12/2009	5:00 AM	14.0	14.0	13.7	2.7	3.4	NEN	30
22/12/2009	5:30 AM	14.0	14.2	13.9	1.8	3.1	NEN	30
22/12/2009	6:00 AM	13.1	13.1	12.9	2.7	3.7	NEN	30
22/12/2009	6:30 AM	13.1	13.1	13.1	2.9	4.8	NEN	30
22/12/2009	7:00 AM	13.0	13.1	12.9	2.3	2.8	NEN	30
22/12/2009	7:30 AM	13.5	13.5	13.3	1.6	3.6	NEN	30
22/12/2009	8:00 AM	14.2	14.5	13.9	2.2	4.1	NEE	30
22/12/2009	8:30 AM	15.1	15.2	15.1	2.7	4.6	NEE	30
22/12/2009	9:00 AM	15.7	15.9	15.6	2.6	2.6	NEE	30
22/12/2009	9:30 AM	16.2	16.3	15.9	2.7	3.2	NEE	30
22/12/2009	10:00 AM	16.6	16.8	16.3	3.2	3.5	NEE	30
22/12/2009	10:30 AM	17.0	17.2	17.0	2.8	4.5	NE	30
22/12/2009	11:00 AM	17.5	17.7	17.4	3.3	3.8	NEE	30
22/12/2009	11:30 AM	17.9	17.9	17.7	2.5	4.7	NEE	30
22/12/2009	12:00 PM	18.2	18.3	17.9	2.7	4.1	NEE	30
22/12/2009	12:30 PM	17.9	18.0	17.7	2.1	3.9	SEE	30
22/12/2009	1:00 PM	18.2	18.4	17.9	2.3	2.8	NEN	30
22/12/2009	1:30 PM	18.2	18.3	18.0	1.6	2.2	SEE	30
22/12/2009	2:00 PM	18.6	18.6	18.4	3.0	4.2	NEE	30
22/12/2009	2:30 PM	18.2	18.3	17.9	2.6	3.6	NEE	30
22/12/2009	3:00 PM	18.0	18.0	17.9	2.5	4.2	NEE	30
22/12/2009	3:30 PM	16.6	16.6	16.3	2.2	2.3	SES	30
22/12/2009	4:00 PM	16.7	16.8	16.5	2.3	2.7	NEE	30
22/12/2009	4:30 PM	16.0	16.2	15.8	2.1	3.2	NEE	30
22/12/2009	5:00 PM	15.9	16.0	15.8	1.2	2.9	SES	30
22/12/2009	5:30 PM	15.7	15.9	15.5	1.2	2.8	SES	30
22/12/2009	6:00 PM	14.7	14.7	14.4	0.5	1.7	SES	30
22/12/2009	6:30 PM	13.5	13.7	13.3	0.1	2.1	NW	30
22/12/2009	7:00 PM	13.0	13.2	12.9	0.3	0.6	NW	30
22/12/2009	7:30 PM	12.9	13.0	12.7	0.1	0.9	NWN	30
22/12/2009	8:00 PM	13.0	13.1	12.8	0.1	1.4	SWW	30
22/12/2009	8:30 PM	13.0	13.2	12.8	0.1	0.8	N	30
22/12/2009	9:00 PM	12.8	13.0	12.8	0.1	0.3	N	30
22/12/2009	9:30 PM	12.9	13.2	12.9	0.1	1.1	N	30
22/12/2009	10:00 PM	13.1	13.3	13.0	0.1	1.6	N	30
22/12/2009	10:30 PM	13.5	13.6	13.4	0.1	2.1	N	30
22/12/2009	11:00 PM	13.9	13.9	13.6	0.1	0.6	N	30
22/12/2009	11:30 PM	14.1	14.1	14.0	0.5	0.5	NEN	30
23/12/2009	12:00 AM	14.1	14.3	14.0	0.1	0.8	SEE	30
23/12/2009	12:30 AM	14.5	14.7	14.2	0.4	0.7	NW	30
23/12/2009	1:00 AM	14.9	15.0	14.8	1.5	2.7	NEN	30
23/12/2009	1:30 AM	15.0	15.2	14.9	1.1	1.2	NEN	30
23/12/2009	2:00 AM	15.0	15.0	15.0	1.6	1.9	NEN	30
23/12/2009	2:30 AM	15.0	15.0	14.9	1.6	3.4	NEN	30
23/12/2009	3:00 AM	15.0	15.1	14.9	1.6	2.1	NEN	30
23/12/2009	3:30 AM	15.2	15.2	15.2	2.7	3.8	NEN	30
23/12/2009	4:00 AM	15.1	15.3	15.0	2.2	2.8	NEN	30
23/12/2009	4:30 AM	15.1	15.2	15.0	1.7	2.2	NEN	30
23/12/2009	5:00 AM	15.1	15.2	15.1	1.6	2.8	NEN	30
23/12/2009	5:30 AM	15.2	15.3	15.0	1.2	1.5	NEN	30
23/12/2009	6:00 AM	15.0	15.0	14.9	1.5	2.9	NE	30
23/12/2009	6:30 AM	14.9	15.0	14.7	1.2	2.9	NEE	30
23/12/2009	7:00 AM	15.0	15.2	14.8	0.5	0.7	NEN	30
23/12/2009	7:30 AM	15.3	15.4	15.3	0.6	1.0	NEN	30
23/12/2009	8:00 AM	15.6	15.9	15.3	1.0	3.1	NEN	30
23/12/2009	8:30 AM	16.1	16.2	15.9	1.1	1.2	NWN	30
23/12/2009	9:00 AM	17.5	17.6	17.2	1.2	1.6	N	30
23/12/2009	9:30 AM	18.4	18.5	18.1	0.7	1.7	NWN	30
23/12/2009	10:00 AM	18.5	18.7	18.3	2.1	3.1	NEN	30
23/12/2009	10:30 AM	18.3	18.5	18.2	2.8	4.1	NE	30
23/12/2009	11:00 AM	20.0	20.1	19.9	1.6	2.0	NEE	30
23/12/2009	11:30 AM	20.0	20.3	20.0	2.7	2.7	NEE	30
23/12/2009	12:00 PM	19.5	19.8	19.5	3.3	4.8	NEE	30
23/12/2009	12:30 PM	19.2	19.4	19.1	2.5	4.0	NEN	30
23/12/2009	1:00 PM	19.5	19.6	19.3	2.4	4.6	NEE	30
23/12/2009	1:30 PM	19.1	19.3	18.9	1.3	1.4	NEE	30
23/12/2009	2:00 PM	19.0	19.1	18.7	1.6	3.3	NEE	30
23/12/2009	2:30 PM	19.1	19.1	18.8	1.8	3.3	NEE	30
23/12/2009	3:00 PM	19.1	19.2	18.9	1.1	2.0	SEE	30
23/12/2009	3:30 PM	19.2	19.3	19.0	1.6	2.0	NEN	30
23/12/2009	4:00 PM	19.3	19.6	19.0	1.4	2.4	NEN	30
23/12/2009	4:30 PM	19.1	19.3	18.9	1.2	2.6	NWN	30
23/12/2009	5:00 PM	18.9	18.9	18.9	2.0	2.5	NEE	30
23/12/2009	5:30 PM	18.2	18.3	18.0	1.2	2.4	NEE	30
23/12/2009	6:00 PM	18.2	18.3	18.0	1.0	3.3	NEN	30
23/12/2009	6:30 PM	18.0	18.0	17.7	2.7	4.6	NEN	30
23/12/2009	7:00 PM	18.0	18.2	17.7	2.0	4.2	NEN	30
23/12/2009	7:30 PM	18.1	18.2	18.0	2.5	3.1	NEN	30
23/12/2009	8:00 PM	18.0	18.2	17.7	3.0	4.8	NEN	30
23/12/2009	8:30 PM	18.0	18.1	17.8	1.6	3.3	NEN	30
23/12/2009	9:00 PM	18.0	18.0	17.9	1.2	2.0	NWN	30
23/12/2009	9:30 PM	18.0	18.1	17.8	0.4	1.5	NEN	30
23/12/2009	10:00 PM	18.2	18.2	18.2	1.4	1.6	NEN	30
23/12/2009	10:30 PM	18.1	18.4	17.9	1.6	1.7	NWN	30
23/12/2009	11:00 PM	18.1	18.3	17.9	1.2	3.4	NEE	30
23/12/2009	11:30 PM	18.0	18.3	17.9	2.2	2.8	NEN	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
24/12/2009	12:00 AM	18.0	18.1	17.9	2.4	3.9	NEN	30
24/12/2009	12:30AM	17.9	18.0	17.8	2.7	2.9	NEN	30
24/12/2009	1:00 AM	17.6	17.7	17.5	1.1	2.5	NEN	30
24/12/2009	1:30 AM	17.1	17.4	17.0	0.7	1.3	NWN	30
24/12/2009	2:00 AM	17.0	17.0	16.8	0.1	1.6	NWN	30
24/12/2009	2:30 AM	17.0	17.1	16.8	1.1	2.6	NWN	30
24/12/2009	3:00 AM	17.0	17.0	16.8	0.4	1.0	NWN	30
24/12/2009	3:30 AM	16.6	16.9	16.4	0.5	2.3	NWN	30
24/12/2009	4:00 AM	16.5	16.7	16.3	0.1	1.2	NEE	30
24/12/2009	4:30 AM	16.5	16.6	16.5	0.1	0.9	N	30
24/12/2009	5:00 AM	16.6	16.7	16.6	0.5	2.5	NWN	30
24/12/2009	5:30 AM	16.6	16.7	16.6	0.1	2.0	NWN	30
24/12/2009	6:00 AM	16.3	16.5	16.1	0.1	2.1	N	30
24/12/2009	6:30 AM	16.2	16.3	16.1	0.5	1.4	NWN	30
24/12/2009	7:00 AM	16.5	16.6	16.4	0.4	1.4	SEE	30
24/12/2009	7:30 AM	16.8	17.0	16.6	0.1	0.9	NWN	30
24/12/2009	8:00 AM	17.4	17.5	17.2	0.2	2.4	N	30
24/12/2009	8:30 AM	19.5	19.8	19.4	0.8	1.1	NEN	30
24/12/2009	9:00 AM	21.0	21.0	20.9	1.1	1.2	NEE	30
24/12/2009	9:30 AM	21.9	22.0	21.7	1.8	3.0	SEE	30
24/12/2009	10:00 AM	22.0	22.1	21.7	1.4	2.3	NEE	30
24/12/2009	10:30 AM	22.7	23.0	22.4	1.4	2.9	NEN	30
24/12/2009	11:00 AM	23.5	23.7	23.4	1.7	3.9	NEE	30
24/12/2009	11:30 AM	24.0	24.2	24.0	1.9	3.3	NEE	30
24/12/2009	12:00 PM	24.0	24.3	24.0	2.6	4.1	E	30
24/12/2009	12:30 PM	23.0	23.1	22.9	2.7	4.9	NEN	30
24/12/2009	1:00 PM	24.2	24.3	24.0	2.4	4.6	NEE	30
24/12/2009	1:30 PM	23.9	24.0	23.8	2.9	4.2	NEE	30
24/12/2009	2:00 PM	23.9	24.2	23.7	2.4	2.4	NEE	30
24/12/2009	2:30 PM	24.0	24.0	23.8	2.1	2.4	SEE	30
24/12/2009	3:00 PM	23.9	24.1	23.6	1.1	2.7	SES	30
24/12/2009	3:30 PM	22.5	22.8	22.3	1.4	3.1	SWS	30
24/12/2009	4:00 PM	21.3	21.5	21.1	1.5	2.7	SWS	30
24/12/2009	4:30 PM	20.9	21.2	20.6	1.7	4.0	SWS	30
24/12/2009	5:00 PM	20.1	20.2	20.1	1.5	2.1	SWS	30
24/12/2009	5:30 PM	19.1	19.1	18.9	1.0	3.0	SWS	30
24/12/2009	6:00 PM	18.5	18.6	18.4	0.5	1.1	SW	30
24/12/2009	6:30 PM	17.9	17.9	17.7	0.1	1.1	NWW	30
24/12/2009	7:00 PM	17.7	17.7	17.6	0.1	0.7	N	30
24/12/2009	7:30 PM	17.0	17.0	16.7	0.1	2.1	N	30
24/12/2009	8:00 PM	17.0	17.2	16.9	0.4	1.5	NW	30
24/12/2009	8:30 PM	16.9	17.1	16.7	0.2	1.0	NWN	30
24/12/2009	9:00 PM	16.8	17.0	16.6	0.1	0.7	NW	30
24/12/2009	9:30 PM	16.5	16.5	16.3	0.2	1.3	NWW	30
24/12/2009	10:00 PM	16.1	16.3	16.0	0.2	0.6	NWN	30
24/12/2009	10:30 PM	16.1	16.2	16.0	0.1	2.2	NWN	30
24/12/2009	11:00 PM	16.1	16.2	15.9	0.4	1.2	NWN	30
24/12/2009	11:30 PM	16.0	16.2	15.7	0.2	0.5	NWN	30
25/12/2009	12:00 AM	16.0	16.3	15.8	0.1	0.7	NWN	30
25/12/2009	12:30 AM	16.0	16.0	15.9	0.3	2.2	NWN	30
25/12/2009	1:00 AM	15.9	16.2	15.8	0.4	1.9	NWN	30
25/12/2009	1:30 AM	15.9	16.0	15.6	0.2	1.3	NWN	30
25/12/2009	2:00 AM	15.9	16.1	15.7	0.6	1.2	N	30
25/12/2009	2:30 AM	15.8	16.0	15.7	0.1	2.2	NWN	30
25/12/2009	3:00 AM	15.9	16.1	15.7	0.1	2.0	N	30
25/12/2009	3:30 AM	15.9	16.0	15.8	0.2	0.9	NEN	30
25/12/2009	4:00 AM	15.9	16.0	15.9	0.1	2.2	NEN	30
25/12/2009	4:30 AM	15.9	16.2	15.8	0.1	0.6	NWN	30
25/12/2009	5:00 AM	15.9	16.0	15.7	0.1	0.5	N	30
25/12/2009	5:30 AM	15.9	16.1	15.6	0.1	0.2	N	30
25/12/2009	6:00 AM	15.6	15.8	15.5	0.1	0.7	N	30
25/12/2009	6:30 AM	15.5	15.7	15.4	0.1	0.7	NWN	30
25/12/2009	7:00 AM	15.6	15.7	15.6	0.2	2.1	N	30
25/12/2009	7:30 AM	16.0	16.1	15.9	0.1	1.1	NEN	30
25/12/2009	8:00 AM	16.9	17.0	16.8	0.1	0.4	N	30
25/12/2009	8:30 AM	17.7	17.8	17.6	0.1	1.3	NEE	30
25/12/2009	9:00 AM	18.8	19.1	18.8	0.2	1.0	SES	30
25/12/2009	9:30 AM	19.8	20.0	19.7	1.9	3.2	NEE	30
25/12/2009	10:00 AM	20.5	20.7	20.2	2.3	3.5	NEE	30
25/12/2009	10:30 AM	21.3	21.5	21.0	2.1	2.9	E	30
25/12/2009	11:00 AM	22.0	22.1	21.8	2.1	2.9	SEE	30
25/12/2009	11:30 AM	23.0	23.2	22.9	2.1	2.3	SEE	30
25/12/2009	12:00 PM	24.0	24.1	23.9	1.5	2.6	SEE	30
25/12/2009	12:30 PM	24.2	24.3	24.1	1.7	3.1	S	30
25/12/2009	1:00 PM	23.9	24.2	23.8	1.6	3.4	SES	30
25/12/2009	1:30 PM	23.5	23.7	23.4	0.7	2.5	SWS	30
25/12/2009	2:00 PM	23.0	23.3	23.0	1.6	1.9	SWS	30
25/12/2009	2:30 PM	22.8	23.0	22.8	0.3	1.3	SWS	30
25/12/2009	3:00 PM	22.2	22.3	22.1	1.6	3.4	SWS	30
25/12/2009	3:30 PM	22.5	22.8	22.4	0.5	2.6	SWS	30
25/12/2009	4:00 PM	22.4	22.7	22.2	0.1	0.7	SWS	30
25/12/2009	4:30 PM	21.9	22.1	21.6	1.6	3.1	NEE	30
25/12/2009	5:00 PM	21.3	21.5	21.0	1.9	3.3	NEE	30
25/12/2009	5:30 PM	20.6	20.8	20.5	1.5	3.3	NEE	30
25/12/2009	6:00 PM	20.2	20.2	20.0	1.0	1.2	NEN	30
25/12/2009	6:30 PM	20.2	20.4	20.1	2.0	4.2	NEE	30
25/12/2009	7:00 PM	18.9	19.1	18.6	1.0	1.8	NEN	30
25/12/2009	7:30 PM	19.0	19.1	18.8	0.7	2.5	NWN	30
25/12/2009	8:00 PM	19.1	19.2	19.0	1.1	1.4	NEE	30
25/12/2009	8:30 PM	19.0	19.0	18.9	1.3	1.7	NWN	30
25/12/2009	9:00 PM	18.6	18.7	18.5	1.0	3.0	SEE	30
25/12/2009	9:30 PM	17.6	17.9	17.4	1.2	3.4	SEE	30
25/12/2009	10:00 PM	17.7	17.8	17.5	1.6	1.7	SEE	30
25/12/2009	10:30 PM	17.2	17.4	16.9	1.0	1.2	NEE	30
25/12/2009	11:00 PM	17.0	17.2	16.9	0.5	1.2	SWS	30
25/12/2009	11:30 PM	16.7	16.9	16.5	0.5	1.3	E	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
26/12/2009	12:00 AM	16.0	16.2	15.8	0.8	1.9	SE	30
26/12/2009	12:30 AM	16.0	16.2	15.9	1.2	2.5	SEE	30
26/12/2009	1:00 AM	15.9	16.1	15.7	0.5	2.0	SEE	30
26/12/2009	1:30 AM	16.0	16.2	15.7	0.6	2.7	NWW	30
26/12/2009	2:00 AM	16.0	16.2	16.0	0.5	2.2	SWS	30
26/12/2009	2:30 AM	15.9	15.9	15.8	0.9	3.0	SEE	30
26/12/2009	3:00 AM	16.0	16.1	15.7	2.0	3.9	E	30
26/12/2009	3:30 AM	15.4	15.5	15.3	0.5	2.0	NWN	30
26/12/2009	4:00 AM	16.0	16.2	15.8	1.7	2.6	NEE	30
26/12/2009	4:30 AM	16.3	16.5	16.1	2.5	4.6	NEE	30
26/12/2009	5:00 AM	16.5	16.6	16.5	1.3	1.6	NEE	30
26/12/2009	5:30 AM	16.3	16.3	16.1	1.5	2.6	E	30
26/12/2009	6:00 AM	16.3	16.5	16.1	0.9	2.8	NEN	30
26/12/2009	6:30 AM	16.6	16.9	16.3	2.2	3.0	NEN	30
26/12/2009	7:00 AM	16.7	16.7	16.5	3.3	4.2	NEN	30
26/12/2009	7:30 AM	16.9	17.1	16.7	2.8	4.5	NEN	30
26/12/2009	8:00 AM	17.1	17.4	16.9	2.1	2.9	NEE	30
26/12/2009	8:30 AM	17.3	17.5	17.1	2.3	4.0	NEE	30
26/12/2009	9:00 AM	17.6	17.7	17.6	1.9	2.7	SEE	30
26/12/2009	9:30 AM	18.0	18.1	17.9	2.2	2.7	NEE	30
26/12/2009	10:00 AM	17.8	18.0	17.6	3.4	5.1	NEE	30
26/12/2009	10:30 AM	18.0	18.2	17.8	2.3	2.6	NEE	30
26/12/2009	11:00 AM	18.0	18.2	17.7	3.8	4.7	SEE	30
26/12/2009	11:30 AM	18.0	18.2	18.0	2.0	2.2	NEE	30
26/12/2009	12:00 PM	17.9	18.1	17.8	2.2	2.6	NEE	30
26/12/2009	12:30 PM	18.0	18.0	18.0	2.7	4.0	NEE	30
26/12/2009	1:00 PM	18.1	18.3	17.9	2.2	2.6	NEE	30
26/12/2009	1:30 PM	18.4	18.4	18.3	2.3	2.7	NEE	30
26/12/2009	2:00 PM	18.6	18.7	18.6	2.8	3.5	NEE	30
26/12/2009	2:30 PM	18.2	18.3	17.9	2.3	2.7	N	30
26/12/2009	3:00 PM	18.1	18.1	18.0	1.7	2.6	E	30
26/12/2009	3:30 PM	18.0	18.2	17.8	2.7	4.3	NEN	30
26/12/2009	4:00 PM	17.9	17.9	17.7	3.1	3.4	NEE	30
26/12/2009	4:30 PM	17.9	18.0	17.7	2.2	4.3	NEE	30
26/12/2009	5:00 PM	17.6	17.6	17.4	2.8	3.2	NEN	30
26/12/2009	5:30 PM	17.5	17.6	17.4	3.2	4.9	NEN	30
26/12/2009	6:00 PM	17.5	17.5	17.3	2.7	3.9	NE	30
26/12/2009	6:30 PM	17.5	17.8	17.4	2.3	3.1	NEN	30
26/12/2009	7:00 PM	17.5	17.7	17.2	2.8	4.8	NE	30
26/12/2009	7:30 PM	17.4	17.5	17.2	3.3	3.7	NEE	30
26/12/2009	8:00 PM	17.3	17.4	17.2	3.3	4.8	NEE	30
26/12/2009	8:30 PM	17.1	17.4	16.8	2.2	2.7	NE	30
26/12/2009	9:00 PM	17.0	17.1	16.8	2.7	3.5	NEE	30
26/12/2009	9:30 PM	17.0	17.1	16.9	2.5	4.0	NEE	30
26/12/2009	10:00 PM	17.0	17.1	16.9	2.6	4.1	NEE	30
26/12/2009	10:30 PM	17.0	17.2	16.7	2.1	3.4	NEN	30
26/12/2009	11:00 PM	17.0	17.2	17.0	2.4	3.7	NE	30
26/12/2009	11:30 PM	17.0	17.2	17.0	3.2	4.5	NEN	30
27/12/2009	12:00 AM	16.9	17.0	16.8	2.7	4.1	NE	30
27/12/2009	12:30 AM	17.0	17.1	16.7	2.5	3.0	NEN	30
27/12/2009	1:00 AM	16.9	17.0	16.8	0.8	1.1	NEN	30
27/12/2009	1:30 AM	16.7	16.9	16.6	2.2	2.5	N	30
27/12/2009	2:00 AM	16.4	16.5	16.3	1.2	1.2	N	30
27/12/2009	2:30 AM	16.7	16.7	16.4	1.6	3.4	N	30
27/12/2009	3:00 AM	16.8	17.1	16.6	1.6	2.1	NEE	30
27/12/2009	3:30 AM	16.9	17.1	16.8	1.0	1.3	NEE	30
27/12/2009	4:00 AM	16.9	17.2	16.6	2.2	3.6	NEN	30
27/12/2009	4:30 AM	16.8	17.1	16.6	2.3	3.8	NEE	30
27/12/2009	5:00 AM	16.8	16.8	16.6	2.2	4.2	NEE	30
27/12/2009	5:30 AM	16.8	16.9	16.6	2.2	3.9	NEE	30
27/12/2009	6:00 AM	16.8	16.8	16.6	1.6	3.9	SES	30
27/12/2009	6:30 AM	16.9	17.1	16.7	1.5	2.6	SES	30
27/12/2009	7:00 AM	16.8	16.8	16.6	2.2	2.5	NEE	30
27/12/2009	7:30 AM	16.8	17.1	16.7	1.2	2.4	NEE	30
27/12/2009	8:00 AM	16.9	17.0	16.9	2.2	4.2	NEE	30
27/12/2009	8:30 AM	16.9	17.0	16.8	2.7	3.8	NEE	30
27/12/2009	9:00 AM	17.0	17.3	16.9	2.4	3.9	NEE	30
27/12/2009	9:30 AM	17.1	17.3	16.8	2.4	2.5	NEE	30
27/12/2009	10:00 AM	17.1	17.3	17.0	2.4	4.0	NE	30
27/12/2009	10:30 AM	17.0	17.1	16.8	2.4	3.7	NEE	30
27/12/2009	11:00 AM	17.0	17.3	16.8	1.7	3.8	NEN	30
27/12/2009	11:30 AM	17.0	17.2	16.7	2.4	2.5	NEN	30
27/12/2009	12:00 PM	17.1	17.1	17.0	0.8	1.6	SEE	30
27/12/2009	12:30 PM	17.0	17.3	16.8	2.5	4.7	NEE	30
27/12/2009	1:00 PM	17.2	17.2	17.1	2.4	4.0	NEE	30
27/12/2009	1:30 PM	17.3	17.5	17.3	1.9	3.6	NEN	30
27/12/2009	2:00 PM	17.0	17.1	17.0	2.3	2.5	NWN	30
27/12/2009	2:30 PM	16.8	16.9	16.8	2.3	3.4	NEE	30
27/12/2009	3:00 PM	15.9	16.0	15.8	2.4	3.5	NEE	30
27/12/2009	3:30 PM	15.0	15.3	14.8	3.2	3.3	NEE	30
27/12/2009	4:00 PM	14.1	14.2	13.8	2.5	2.7	NEE	30
27/12/2009	4:30 PM	13.5	13.7	13.3	3.8	5.7	NEE	30
27/12/2009	5:00 PM	12.9	13.0	12.7	3.1	3.5	NEE	30
27/12/2009	5:30 PM	12.7	12.7	12.4	2.8	2.9	NEE	30
27/12/2009	6:00 PM	12.0	12.2	11.8	2.6	4.8	NEE	30
27/12/2009	6:30 PM	11.5	11.5	11.3	0.9	1.3	SEE	30
27/12/2009	7:00 PM	11.0	11.2	10.9	1.5	2.6	N	30
27/12/2009	7:30 PM	10.9	11.2	10.8	1.6	2.4	NWW	30
27/12/2009	8:00 PM	10.9	11.2	10.9	0.9	2.7	NEE	30
27/12/2009	8:30 PM	10.9	11.1	10.8	1.1	2.6	NEN	30
27/12/2009	9:00 PM	10.9	10.9	10.8	2.3	2.7	NWN	30
27/12/2009	9:30 PM	10.0	10.1	9.9	2.6	4.4	NWN	30
27/12/2009	10:00 PM	10.0	10.1	9.9	2.1	4.1	NWN	30
27/12/2009	10:30 PM	10.0	10.0	9.8	1.1	2.3	NWN	30
27/12/2009	11:00 PM	10.0	10.2	9.8	0.8	2.3	NEE	30
27/12/2009	11:30 PM	9.8	9.8	9.7	2.5	4.3	NWN	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
28/12/2009	12:00 AM	9.5	9.7	9.4	1.8	2.3	NWN	30
28/12/2009	12:30 AM	9.1	9.2	9.1	1.9	4.0	NWN	30
28/12/2009	1:00 AM	9.0	9.3	9.0	1.9	3.0	NEN	30
28/12/2009	1:30 AM	9.0	9.3	8.7	0.8	2.0	NWN	30
28/12/2009	2:00 AM	8.9	9.2	8.7	0.9	2.1	NWN	30
28/12/2009	2:30 AM	9.0	9.2	8.8	1.6	2.3	NEE	30
28/12/2009	3:00 AM	9.0	9.2	8.9	0.9	2.3	NEE	30
28/12/2009	3:30 AM	9.0	9.0	8.7	0.9	2.9	NEN	30
28/12/2009	4:00 AM	9.0	9.1	9.0	1.6	2.4	NEN	30
28/12/2009	4:30 AM	8.6	8.9	8.4	1.9	3.5	NEE	30
28/12/2009	5:00 AM	8.7	8.8	8.7	0.7	1.4	NEN	30
28/12/2009	5:30 AM	8.2	8.3	8.0	1.6	2.5	NEE	30
28/12/2009	6:00 AM	8.2	8.4	8.2	1.2	3.2	NEN	30
28/12/2009	6:30 AM	8.2	8.2	8.0	2.5	4.3	NWN	30
28/12/2009	7:00 AM	8.6	8.8	8.4	1.5	2.4	NWN	30
28/12/2009	7:30 AM	8.9	9.0	8.7	1.1	3.3	NWN	30
28/12/2009	8:00 AM	9.1	9.3	8.9	0.4	2.4	NE	30
28/12/2009	8:30 AM	9.5	9.5	9.4	0.1	1.6	SEE	30
28/12/2009	9:00 AM	9.9	10.0	9.8	1.3	2.2	SEE	30
28/12/2009	9:30 AM	10.7	10.7	10.6	0.5	0.9	SEE	30
28/12/2009	10:00 AM	11.3	11.4	11.3	1.9	3.3	SEE	30
28/12/2009	10:30 AM	12.1	12.2	12.1	2.7	3.0	NEE	30
28/12/2009	11:00 AM	12.6	12.7	12.4	1.9	2.8	NEE	30
28/12/2009	11:30 AM	12.6	12.7	12.5	2.3	3.4	NEE	30
28/12/2009	12:00 PM	12.6	12.9	12.5	2.2	4.0	NEE	30
28/12/2009	12:30 PM	13.0	13.2	12.8	1.5	1.8	SEE	30
28/12/2009	1:00 PM	13.2	13.3	13.0	2.2	4.1	NEN	30
28/12/2009	1:30 PM	13.2	13.4	13.2	2.3	4.6	NEE	30
28/12/2009	2:00 PM	13.0	13.2	13.0	2.2	3.5	NEE	30
28/12/2009	2:30 PM	13.0	13.2	12.7	2.7	3.3	NEE	30
28/12/2009	3:00 PM	13.2	13.3	13.0	2.7	3.2	NEE	30
28/12/2009	3:30 PM	13.0	13.1	12.8	1.2	2.3	NEE	30
28/12/2009	4:00 PM	13.0	13.1	12.9	1.6	1.7	NEE	30
28/12/2009	4:30 PM	12.9	13.0	12.8	1.7	1.9	NEE	30
28/12/2009	5:00 PM	12.6	12.8	12.4	3.3	5.2	NEN	30
28/12/2009	5:30 PM	12.5	12.5	12.3	2.3	4.5	NE	30
28/12/2009	6:00 PM	12.3	12.5	12.2	3.4	5.1	NEN	30
28/12/2009	6:30 PM	12.3	12.6	12.1	2.3	2.7	NEE	30
28/12/2009	7:00 PM	12.2	12.5	12.1	2.1	3.5	NEN	30
28/12/2009	7:30 PM	12.0	12.2	12.0	1.1	1.7	NEN	30
28/12/2009	8:00 PM	12.0	12.2	11.8	0.5	1.0	N	30
28/12/2009	8:30 PM	12.0	12.0	11.9	1.2	1.4	NEN	30
28/12/2009	9:00 PM	12.0	12.1	11.9	1.1	3.0	NEE	30
28/12/2009	9:30 PM	12.1	12.2	12.1	1.6	1.9	NWN	30
28/12/2009	10:00 PM	12.2	12.4	12.1	1.5	1.7	NEN	30
28/12/2009	10:30 PM	12.3	12.6	12.1	0.7	1.8	NWN	30
28/12/2009	11:00 PM	12.4	12.5	12.3	1.6	3.6	NEN	30
28/12/2009	11:30 PM	12.5	12.5	12.3	1.0	1.0	NWN	30
29/12/2009	12:00 AM	12.6	12.7	12.6	1.6	2.0	NWN	30
29/12/2009	12:30 AM	12.7	13.0	12.6	2.0	2.1	NWN	30
29/12/2009	1:00 AM	12.8	13.1	12.6	2.0	3.7	NWN	30
29/12/2009	1:30 AM	13.0	13.0	12.8	1.6	1.9	NEN	30
29/12/2009	2:00 AM	13.0	13.0	12.7	2.1	2.9	NE	30
29/12/2009	2:30 AM	13.1	13.2	13.1	2.2	3.7	NEN	30
29/12/2009	3:00 AM	13.3	13.4	13.3	2.2	2.4	NEN	30
29/12/2009	3:30 AM	13.2	13.3	13.0	2.2	3.9	NEN	30
29/12/2009	4:00 AM	13.4	13.5	13.2	2.3	4.3	NEN	30
29/12/2009	4:30 AM	13.6	13.8	13.5	1.5	3.0	NWN	30
29/12/2009	5:00 AM	13.9	14.0	13.8	2.0	4.3	NEN	30
29/12/2009	5:30 AM	14.0	14.0	14.0	2.2	4.2	NEN	30
29/12/2009	6:00 AM	13.9	13.9	13.8	1.6	2.3	NWN	30
29/12/2009	6:30 AM	14.7	14.7	14.4	1.6	1.9	NEN	30
29/12/2009	7:00 AM	14.9	15.0	14.6	2.4	2.5	NEN	30
29/12/2009	7:30 AM	14.0	14.1	13.7	1.7	2.1	NEE	30
29/12/2009	8:00 AM	14.0	14.1	14.0	1.7	2.7	NEN	30
29/12/2009	8:30 AM	14.0	14.1	14.0	1.1	1.7	NEN	30
29/12/2009	9:00 AM	14.1	14.1	13.9	2.5	4.0	NEN	30
29/12/2009	9:30 AM	14.5	14.8	14.4	1.7	2.6	NEE	30
29/12/2009	10:00 AM	14.6	14.6	14.6	1.8	2.2	NEN	30
29/12/2009	10:30 AM	14.8	14.8	14.6	1.5	2.0	NEN	30
29/12/2009	11:00 AM	15.0	15.3	15.0	1.7	2.2	NEN	30
29/12/2009	11:30 AM	15.0	15.3	14.9	1.7	2.4	NEN	30
29/12/2009	12:00 PM	15.0	15.0	14.9	1.6	3.2	NEN	30
29/12/2009	12:30 PM	15.0	15.2	14.8	2.0	2.8	NEN	30
29/12/2009	1:00 PM	15.0	15.1	14.8	1.2	2.1	NWN	30
29/12/2009	1:30 PM	15.0	15.0	14.9	1.7	3.5	NWN	30
29/12/2009	2:00 PM	15.0	15.1	14.9	1.2	1.9	NEN	30
29/12/2009	2:30 PM	15.0	15.2	14.7	1.5	3.7	NEN	30
29/12/2009	3:00 PM	15.1	15.2	14.9	1.5	2.7	NEE	30
29/12/2009	3:30 PM	15.1	15.4	14.9	1.5	3.5	NEN	30
29/12/2009	4:00 PM	15.3	15.5	15.1	1.0	2.3	NEN	30
29/12/2009	4:30 PM	15.4	15.6	15.3	1.3	2.4	NWN	30
29/12/2009	5:00 PM	15.5	15.7	15.3	1.5	2.4	NWN	30
29/12/2009	5:30 PM	15.5	15.7	15.5	1.6	3.5	NWN	30
29/12/2009	6:00 PM	15.6	15.9	15.4	1.5	2.4	NWN	30
29/12/2009	6:30 PM	15.7	15.9	15.6	0.9	2.0	NWN	30
29/12/2009	7:00 PM	15.8	16.0	15.6	1.1	2.8	NEN	30
29/12/2009	7:30 PM	16.0	16.3	15.8	1.1	2.5	NEN	30
29/12/2009	8:00 PM	16.0	16.0	15.9	1.0	2.8	N	30
29/12/2009	8:30 PM	16.1	16.3	16.0	1.0	2.1	N	30
29/12/2009	9:00 PM	16.1	16.4	15.9	1.1	2.1	NEN	30
29/12/2009	9:30 PM	16.1	16.1	16.0	1.0	2.2	NEN	30
29/12/2009	10:00 PM	16.0	16.0	15.9	1.1	1.5	NEE	30
29/12/2009	10:30 PM	16.1	16.4	15.9	1.2	2.8	NEN	30
29/12/2009	11:00 PM	16.1	16.3	15.9	1.3	1.7	NE	30
29/12/2009	11:30 PM	16.1	16.3	16.1	1.7	2.7	NEE	30



Weather information in December 2009

Date (DMY)	Time	Average	Hi	Low	Wind Speed (m/s)		Wind	Period
		Temp	Temp	Temp	Average	Hi	Direction	
30/12/2009	12:00 AM	16.1	16.4	15.9	0.5	2.0	SEE	30
30/12/2009	12:30 AM	16.0	16.2	15.9	0.5	0.9	NEN	30
30/12/2009	1:00 AM	16.0	16.2	16.0	1.2	1.3	NEN	30
30/12/2009	1:30 AM	16.0	16.1	15.9	1.0	2.0	NEE	30
30/12/2009	2:00 AM	16.0	16.2	15.9	0.6	2.1	NEN	30
30/12/2009	2:30 AM	15.9	16.0	15.8	0.1	1.9	NWN	30
30/12/2009	3:00 AM	16.0	16.0	15.7	0.5	2.4	NWN	30
30/12/2009	3:30 AM	16.1	16.3	15.9	0.5	2.0	SEE	30
30/12/2009	4:00 AM	16.1	16.2	16.0	2.2	3.7	NEE	30
30/12/2009	4:30 AM	16.1	16.4	15.9	1.0	1.7	NEN	30
30/12/2009	5:00 AM	16.1	16.2	16.1	0.6	1.7	NEN	30
30/12/2009	5:30 AM	16.2	16.3	16.2	1.3	3.0	NEE	30
30/12/2009	6:00 AM	16.2	16.3	16.1	1.6	1.9	NEN	30
30/12/2009	6:30 AM	15.9	16.2	15.7	3.0	4.6	NWN	30
30/12/2009	7:00 AM	15.9	16.1	15.6	1.2	2.7	NEE	30
30/12/2009	7:30 AM	15.9	16.1	15.7	0.6	1.5	SEE	30
30/12/2009	8:00 AM	15.9	16.1	15.7	1.5	3.8	NEN	30
30/12/2009	8:30 AM	15.9	16.0	15.6	1.0	1.3	SEE	30
30/12/2009	9:00 AM	16.0	16.0	15.8	2.0	3.1	NEE	30
30/12/2009	9:30 AM	16.0	16.1	15.8	2.1	2.4	NEE	30
30/12/2009	10:00 AM	16.2	16.3	16.0	1.1	1.6	NEE	30
30/12/2009	10:30 AM	16.7	16.8	16.4	0.9	1.6	SEE	30
30/12/2009	11:00 AM	16.9	16.9	16.9	1.1	1.9	NEE	30
30/12/2009	11:30 AM	16.7	16.9	16.6	1.1	1.7	NEN	30
30/12/2009	12:00 PM	16.6	16.8	16.5	1.8	2.1	NEN	30
30/12/2009	12:30 PM	16.9	17.2	16.8	1.5	3.1	NEN	30
30/12/2009	1:00 PM	17.0	17.2	16.7	1.2	1.9	NEN	30
30/12/2009	1:30 PM	17.0	17.1	16.8	1.5	3.1	NEN	30
30/12/2009	2:00 PM	17.0	17.1	16.8	1.1	1.5	NNE	30
30/12/2009	2:30 PM	17.4	17.4	17.3	0.5	2.5	NEE	30
30/12/2009	3:00 PM	17.2	17.4	17.1	1.6	1.9	NE	30
30/12/2009	3:30 PM	17.1	17.4	16.8	1.5	2.1	NEN	30
30/12/2009	4:00 PM	17.0	17.2	17.0	1.3	1.7	NEE	30
30/12/2009	4:30 PM	16.9	17.0	16.9	1.5	2.7	NEE	30
30/12/2009	5:00 PM	16.7	16.8	16.4	2.2	3.2	NE	30
30/12/2009	5:30 PM	16.5	16.8	16.4	1.7	3.4	NEN	30
30/12/2009	6:00 PM	16.3	16.4	16.0	0.5	0.8	NWN	30
30/12/2009	6:30 PM	16.3	16.5	16.2	0.9	1.3	NEN	30
30/12/2009	7:00 PM	16.3	16.6	16.1	3.2	4.2	NEN	30
30/12/2009	7:30 PM	16.2	16.3	16.1	0.4	0.6	NEE	30
30/12/2009	8:00 PM	16.1	16.3	16.1	1.2	2.8	NEE	30
30/12/2009	8:30 PM	16.2	16.3	16.2	0.1	0.3	SEE	30
30/12/2009	9:00 PM	16.2	16.4	16.1	1.2	2.6	NWN	30
30/12/2009	9:30 PM	16.2	16.3	16.2	1.6	2.0	NEN	30
30/12/2009	10:00 PM	16.2	16.3	16.0	1.5	1.9	NEE	30
30/12/2009	10:30 PM	16.2	16.4	16.0	1.6	2.7	NEN	30
30/12/2009	11:00 PM	16.2	16.2	16.0	1.6	2.8	NEE	30
30/12/2009	11:30 PM	16.0	16.3	15.8	1.1	2.7	NEE	30
31/12/2009	12:00 AM	16.0	16.2	15.8	1.2	2.0	NEN	30
31/12/2009	12:30 AM	16.0	16.2	16.0	1.6	3.6	NWN	30
31/12/2009	1:00 AM	16.0	16.2	16.0	0.7	1.7	NWN	30
31/12/2009	1:30 AM	16.0	16.3	15.9	2.2	3.8	NEE	30
31/12/2009	2:00 AM	16.0	16.2	15.8	2.2	4.4	NEN	30
31/12/2009	2:30 AM	15.9	16.1	15.9	1.8	4.0	NEE	30
31/12/2009	3:00 AM	15.7	15.8	15.6	1.3	2.7	NEE	30
31/12/2009	3:30 AM	15.4	15.7	15.4	2.3	4.3	NEE	30
31/12/2009	4:00 AM	15.1	15.3	14.8	1.9	3.0	NEE	30
31/12/2009	4:30 AM	15.1	15.2	15.0	1.2	3.4	NEE	30
31/12/2009	5:00 AM	15.0	15.2	14.8	2.7	3.5	NEE	30
31/12/2009	5:30 AM	14.9	15.2	14.8	1.6	3.4	NEE	30
31/12/2009	6:00 AM	14.9	15.2	14.7	0.7	2.3	N	30
31/12/2009	6:30 AM	15.0	15.1	15.0	2.7	5.0	NEN	30
31/12/2009	7:00 AM	15.1	15.2	15.0	3.0	4.2	NEE	30
31/12/2009	7:30 AM	15.0	15.2	14.8	2.7	4.0	NEE	30
31/12/2009	8:00 AM	14.9	15.0	14.8	1.7	3.3	NEN	30
31/12/2009	8:30 AM	14.9	14.9	14.8	2.5	3.2	SEE	30
31/12/2009	9:00 AM	15.0	15.3	14.8	2.4	4.0	SEE	30
31/12/2009	9:30 AM	15.0	15.3	14.8	3.4	5.0	NEE	30
31/12/2009	10:00 AM	14.9	15.1	14.9	2.4	3.9	SEE	30
31/12/2009	10:30 AM	14.8	14.9	14.7	1.4	3.1	SES	30
31/12/2009	11:00 AM	14.7	14.8	14.6	1.8	3.6	N	30
31/12/2009	11:30 AM	14.9	15.2	14.9	1.2	1.6	NEN	30
31/12/2009	12:00 PM	15.0	15.2	14.8	3.3	4.0	NEE	30
31/12/2009	12:30 PM	15.3	15.5	15.0	3.5	4.4	SEE	30
31/12/2009	1:00 PM	15.9	16.2	15.7	3.3	4.1	SEE	30
31/12/2009	1:30 PM	16.0	16.2	15.9	3.4	4.1	NEE	30
31/12/2009	2:00 PM	16.0	16.2	15.9	3.3	4.2	NEE	30
31/12/2009	2:30 PM	16.0	16.0	15.8	2.1	4.2	SEE	30
31/12/2009	3:00 PM	15.9	16.0	15.8	2.2	4.0	NEN	30
31/12/2009	3:30 PM	16.6	16.7	16.5	2.6	3.9	NEN	30
31/12/2009	4:00 PM	16.8	16.8	16.7	1.5	3.1	SEE	30
31/12/2009	4:30 PM	16.5	16.6	16.3	2.4	2.6	NEE	30
31/12/2009	5:00 PM	16.6	16.7	16.5	2.2	3.4	NEE	30
31/12/2009	5:30 PM	16.5	16.7	16.4	1.1	1.7	SEE	30
31/12/2009	6:00 PM	16.5	16.5	16.5	2.2	2.4	NEE	30
31/12/2009	6:30 PM	16.5	16.8	16.2	2.5	2.9	NEN	30
31/12/2009	7:00 PM	15.9	16.2	15.8	2.2	3.8	NEE	30
31/12/2009	7:30 PM	16.0	16.2	15.8	2.5	2.6	NEN	30
31/12/2009	8:00 PM	15.9	16.0	15.8	2.8	4.6	NEE	30
31/12/2009	8:30 PM	15.9	15.9	15.8	2.8	4.8	SEE	30
31/12/2009	9:00 PM	15.9	16.1	15.7	1.2	3.0	N	30
31/12/2009	9:30 PM	15.9	16.1	15.8	1.5	3.7	N	30
31/12/2009	10:00 PM	15.9	16.1	15.8	1.6	2.8	NEN	30
31/12/2009	10:30 PM	15.5	15.6	15.3	1.1	2.2	N	30
31/12/2009	11:00 PM	15.5	15.8	15.4	1.3	3.5	SES	30
31/12/2009	11:30 PM	15.9	16.2	15.8	1.7	3.9	NEE	30



Appendix F

Event-Action Plans

EVENT/ACTION PLAN FOR AIR QUALITY EXCEEDANCE

ACTION

	ET Leader	IC(E)	ER	Contractor
	ACTION LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Inform ER, IC(E) and Contractor 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET 2. Check contractor's working method 	<ol style="list-style-type: none"> 1. Notify Contractor 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practise 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Inform IC(E) and Contractor 3. Repeat measurements to confirm finding 4. Increase monitoring frequency to daily 5. Discuss with IC(E) and Contractor on remedial actions 6. If exceedance continues, arrange meeting with IC(E) and ER. 7. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET 2. Check Contractor's working method 3. Discuss with ET and Contractor on possible remedial measures 4. Advise the ER on the effectiveness of the proposed remedial measures 5. Supervise implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify the Contractor 3. Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> 1. Submit proposals for remedial actions to IC(E) within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate
	LIMIT LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Inform ER, Contractor and EPD 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Assess the effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET 2. Check Contractor's working method 3. Discuss with ET and Contractor on possible remedial measures 4. Advise the ER on the effectiveness of the proposed remedial measures 5. Supervise implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify the Contractor 3. Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate.

EVENT/ACTION PLAN FOR AIR QUALITY EXCEEDANCE

EVENT	ACTION			Contractor
	E.T. Leader	IC(E)	ER	
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Notify IC(E), ER, EPD and Contractor 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Carry out analysis of contractor's working procedures to determine possible mitigation to be implemented 6. Arrange meeting with IC(E) and ER to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consultation with the IC(E), agree with the Contractor on the remedial measures to be implemented 4. Ensure remedial measures are properly implemented 5. If exceedances continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedances 2. Submit proposals for remedial actions to IC(E) 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

EVENT/ACTION PLAN FOR NOISE EXCEEDANCE

EVENT	ACTION			
	ET Leader	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify the IC(E) and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IC(E) and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IC(E). 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Notify the IC(E), the ER, the EPD and the Contractor. 2. Identify source. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform the IC(E), the ER and the EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of Contractor's remedial actions and keep the IC(E), the EPD and the ER informed of the results 8. If exceedance due to the construction works stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst the ER, the 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 the ER accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedances continue, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedances is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) 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 exceedances is abated.

EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION		
ET Leader	Contractor	ER	IEC
<p>Action level being exceeded by one sampling day</p> <ol style="list-style-type: none"> 1. Identify source(s) of impact; 2. Repeat in-situ measurement to confirm findings; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with Contractor if exceedance is due to the construction works within 4 working days 8. Repeat measurement on next day of exceedance if exceedance is due to the construction works 	<ol style="list-style-type: none"> 1. Notify the ER and IEC in writing within 24 hours of identification of exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance 5. Consider changes of working method if exceedance is due to the construction works 6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER if exceedance is due to the construction works within 4 working days of identification of an exceedance 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Require contractor to propose remedial measures for the analysed problem if related to the construction works 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measure 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures 4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly 5. Supervise the implementation of mitigation measures

EVENT AND ACTION PLAN FOR WATER QUALITY

	ACTION		
Event	ET Leader	Contractor	ER
<p>Action level being exceeded by more than one consecutive sampling days</p>	<ol style="list-style-type: none"> 1. Identify source(s) of impact; 2. Repeat in-situ measurement to confirm findings 3. Notify Contractor in writing within 24 hours of identification 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IEC and Contractor within 4 working of identification of an exceedance 8. Ensure mitigation measures are implemented; 9. Prepare to increase the monitoring frequency to daily; 10. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> 1. Notify IEC and ER in writing within 24 hours of identification of exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance 6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of identification of an exceedance 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Require contractor to propose remedial measures for the analysed problem if related to the construction works 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measure
			<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures. 4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly 5. Assess the effectiveness of the implemented mitigation measures.

EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION		
	ET Leader	Contractor	ER
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IEC, ER and Contractor within 4 working of identification of an exceedance 8. Ensure mitigation measures are implemented; 9. Increase the monitoring frequency to daily until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Notify IEC and ER in writing; within 24 hours of the identification of the exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance 6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of the identification of an exceedance 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the implemented mitigation measures.
			<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures. 4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly. 5. Assess the effectiveness of the implemented mitigation measures

EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION			IEC
	ET Leader	Contractor	ER	
Limit Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IEC, ER and Contractor; 8. Ensure mitigation measures are implemented; 9. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days. 	<ol style="list-style-type: none"> 1. Notify ER and IEC in writing within 24 hours of the identification of the exceedance and 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 8. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days; 6. Implement the agreed mitigation measures within reasonable time scale 7. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities. 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 6. Ensure remedial measures are properly implemented 4. Assess the effectiveness of the implemented mitigation measures; 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. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ER, ET and Contractor on the mitigation measures. 4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly. 5. Assess the effectiveness of the implemented mitigation measures.



Appendix G

Construction Programme

Project Activities at Tseung Kwan O Area 137 December 2009 to March 2010)

Activity ID	Activity description	Original duration	Start	Finish
EOA1A200	A1a Servicing	1127	16/11/06A	31/12/2009
EOA1A400	Measurement System O&M for A1a	1124	01/12/06A	31/12/2009
EOA1D200	A1b Servicing 22mths stg 2	1066	01/02/07A	31/12/2009
EOA1E200	A1e Servicing 22mths	976	21/04/07A	31/12/2009
EOA1E400	Measurement System O&M for A1e	976	21/04/07A	31/12/2009
HK021000	Maintenance of RealTime Tracking	788	03/07/07A	31/12/2009
HK030200	Sorting of Stockpiled Public Fill	1127	01/12/06A	31/12/2009
HK030300	Removal of Stockpiled Public Fill	1127	01/12/06A	31/12/2009
HK030500	Disposal of Unsuitable Material	1127	01/12/06A	31/12/2009
HK030600	Compaction of Public Fill	1127	01/12/06A	31/12/2009
HK110200	TKO Tipping Halls Operation	1127	10/12/06A	31/12/2009
RHA20200	Record House A2 Servicing	1127	01/12/06A	31/12/2009
RHA40200	Record House A4 Servicing	1035	01/03/07A	31/12/2009
SOA10200	RE Principal Office Servicing (A1)	1096	01/02/07A	31/12/2009
TACA0200	Servicing	1127	01/12/06A	31/12/2009



Appendix H

IEC's Site Audit Records

MATERIALAB CONSULTANTS LIMITED

Fugro Development Centre

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Materialab**FAX MESSAGE**Priority normal / urgentTo Civil Engineering and Development
Department (CEDD)

Ref. No. MCLF2622

Country

Fax No. 2714 0113

Attn. Mr C. H. So / Mr P. Y. Lu

Date 31 December 2009

From Joseph Poon

No. of Pages 5 (Incl. this page)

C.c. To Mr S. K. Cheung (CEDD)

Fax No. 2623 9122

Mr W. F. Lok / Mr Albus Cheung
(China Harbour Engineering Co. Ltd.)

Fax No. 2247 4108

Mr C. L. Lau / Ms Linda Law
(ETS - Testconsult Ltd.)

Fax No. 2695 3944

Subject Agreement No. CE 9/2005 (EP)
Tseung Kwan O Area 137 Fill Bank - Site Audit

A site audit was jointly conducted with representatives of the Engineer, the ET and the Contractor on 22nd December 2009 for the captioned project site. Please find enclosed herewith our site audit findings for your reference.

Should you require further information, please feel free to contact us.

Best regards,


Joseph Poon
Independent Environmental Checker

JP/cwl

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Materialab

**Agreement No.: CE 9/2005 (EP) Independent Environmental Checker for
Public Fill Reception Facilities and Construction Waste Sorting Facilities – Investigation**

Site Audit Checklist - Tseung Kwan O Area 137 Fill Bank

Date of Site Audit:	22/12/2009	Time of Site Audit:	2:00 P.M.	
Site Auditor:	Leung Cheuk Wai	Phase of Works:	Operation	
Weather Condition:	Sunny	Temperature:	15°C	Wind: Light

Description	N.A.	Yes	No	Remarks
Fugitive Dust Emission				
Have the dust control/mitigation measures been implemented to ensure full protection of the nearby ASRs?		✓		
Are all installed air pollution control systems and measures operated and/or implemented in accordance with their design merits?		✓		
Have frequent mist spraying been applied on dusty areas and without over-watering?		✓		
Have all delivery trucks entering or leaving the fill bank followed the paved haul roads?		✓		
Have water lorries and/or road sweepers being used for dust suppression?		✓		
Is the frequency of watering at least 4 times a day in the reception and queuing areas, access roads and haul road of the Public Fill Reception Facility?		✓		
Are the public roads around the site entrance kept clean and free from dust?		✓		
Is the designated main haul roads kept sufficiently dampened?		✓		
Is truck speed limited within 10 km/hr?		✓		
Do the trucks using the fill bank have a valid dumping license?		✓		
Are all dusty fill material sprayed with water or a dust suppression chemical prior to loading, unloading or transfer? (Except for situations where the moisture content of the dusty material is a matter of concern).		✓		
Have the work sites with active dusty operations been frequently watered (at least three times per day)? And has frequency been increased when the weather is dry?		✓		
To minimise dust emission from dry material, are the materials landing points sprayed with water when public fills are delivered by barges to the site?		✓		
To ensure dust control measures are being used, are the vehicle washing facilities equipped with a high-pressure water jet and maintained and operated by designated staff?		✓		
Has every vehicle been washed to remove any dusty materials from its body and wheels before leaving?		✓		
Is a water sprinkler provided for vehicles entering the site?		✓		
Has a buffer zone of at least 100 m been maintained between the edge of the public fill stockpiling area of the fill bank and the nearest air sensitive receivers at the TKO Industrial Estate?		✓		
Are there any dusty materials stockpiled or loading/unloading or similar activities being conducted in the above buffer zone?			✓	
Have public fills at the stockpiling area been handled to avoid segregation, deterioration, erosion or instability of the material, especially for the stockpiling surface facing to the ASRs?		✓		

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Site Audit Checklist - Tseung Kwan O Area 137 Fill Bank

Description	N.A.	Yes	No	Remarks
Have the temporary slope surfaces been covered with tarpaulin sheeting or other impermeable sheeting, or sprayed with water or a dust suppression chemical or protected by other methods as approved by CEDD?		✓		Finished slopes in Portions A, B, G, H and I have been hydroseeded.
Are final slope surfaces treated by compaction, followed by hydroseeding, vegetation planting or other suitable surface stabiliser approved by CEDD to prevent the washing away of stockpiled material?		✓		Finished slopes in Portions A, B, G, H and I have been hydroseeded.
Are belt conveyor systems used for transfer of dusty materials provided a 3-sided roofed enclosure?		✓		
Is every transfer point between two conveyors totally enclosed?		✓		
Is the belt scraper installed at the head pulley of every belt conveyor effective in dislodging fine particles that may adhere to the belt surface, and reducing carrying back of fine particles on the return belt?		✓		
Fixed Noise Impact				
Have the noise standards specified in the Technical Memorandum for the Assessment of Noise From Places Other Than Domestic Premises, Public Places or Construction Sites been met?		✓		
Have the approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) been adopted?		✓		
Water Quality				
Have trapezoidal surface channels used for intercepting polluted surface runoff been equipped with sand/de-silting traps?		✓		
Is stockpiling of fill material at least 100 m away from the waterfront?		✓		
Does the effluent discharged from the site meet the relevant discharge limits specified in the Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters?	✓			Not observed during site audit.
Are wastewater collected from canteen kitchens, including that from basins, sinks and floor drains discharged into public sewers via grease traps?	✓			
Has the pathway of loading and unloading of public fill to and from barges been prevented from being directly on top of marine water?		✓		
Have sand and silt in the wheel washing bay been settled out or removed before reused or discharged into storm drains?		✓		
Is sewage being discharged into foul sewer or chemical toilets?		✓		
If chemical toilets are used, are they provided by a licensed contractor, who will be responsible for disposal and maintenance of these facilities?		✓		
Are materials properly covered when there is any chance for the materials to be washed away?		✓		
Are temporary slope surfaces covered as far as practicable with tarpaulin sheets or other impermeable sheeting or protected by other methods approved by CEDD especially when a rainstorm is imminent or forecast?		✓		Finished slopes in Portions A, B, G, H and I have been hydroseeded.

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Site Audit Checklist - Tseung Kwan O Area 137 Fill Bank

Description	N.A.	Yes	No	Remarks
Have the catchpits, sand and silt removal facilities and intercepting channels provided onsite been maintained to ensure proper functioning?		✓		
Have the deposited silt and grit been removed weekly at the onset of and after each rainstorm to ensure that these facilities are functioning at all times?		✓		
Is the section of construction road between the wheel washing bay and the public road paved with concrete, bituminous materials or hardcores to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains?		✓		
The drainage system provided at car parking areas should be installed with oil interceptors in addition to sand/silt removal facilities. Has regular cleaning of the system been carried out?		✓		
Has disturbance to seabed sediments and undue turbidity from vessel movement or propeller wash been minimised?		✓		
Are barges filled to a level to prevent any overflow of material during loading or transportation?		✓		
Are barge effluents properly collected and treated before disposal?	✓			Not observed during site audit.
Is foam, oil, grease, scum, litter or other objectionable matters presented on the water in the vicinity of the barging point? Are these due to work activities?			✓	
Have silt curtain been provided at the outward side of the basin near the barging point throughout the operational phase when there is public fill intake by barges.		✓		
Has a waste collection vessel been deployed to remove floating debris on the sea near the fill bank for proper disposal?	✓			Not observed during site audit.
Landfill Gas Hazard				
Are gas detection equipment and appropriate breathing apparatus available and used when workers entering confined spaces or trenches deeper than 2 m?	✓			Not observed during site audit.
Has the Safety Officer/Supervisor been provided with an intrinsically safe portable instrument(s), appropriately calibrated and capable of measuring the gases in the ranges as recommended in the Project Profile/Contractor's Contract Particular Specification?		✓		
Has a LFG monitoring programme been formulated by the Safety Officer/Supervisor or by a qualified person?		✓		
Has periodic/routine monitoring been conducted during ground-works, in all excavations, and works at confined spaces, if any?	✓			Not observed during site audit.
Landscape and Visual				
Are hydroseeding or coloured geo-textile matting (dark green/brown) provided on the slopes of the fill bank along the eastern, northern and western sides of the fill bank as the slopes of each layer of platform are formed?		✓		
Are the surface colour of structures at fill bank an earthy tone with strong natural qualities in green, grey or brown colour and the use of bold colour schemes been avoided?		✓		
Is the maximum stockpiling height at the fill bank limited to a maximum of +35.2 mPD?		✓		

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**Agreement No.: CE 9/2005 (EP) Independent Environmental Checker for
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Site Audit Checklist - Tseung Kwan O Area 137 Fill Bank

Description	N.A.	Yes	No	Remarks
Are Government approved landscape contractors hired to undertake and maintain the hydroseeding and tree planting works?		✓		
Is existing 2.4 m high site hoarding located along the entire boundary of the site to help screening of the fill bank?		✓		
Except the southern portion of stockpiling area, is the fill bank operated between 11:00 p.m. and 8:00 a.m. on the following day?			✓	

Other Main Observations

Issue	Action
Previous Observations	
The containers inside Chemical Waste Storage were not labelled properly (Rectified).	To label all the chemical waste.
New Observations	
NIL	NIL

Date of Audit: 22 Dec 2009





Appendix I

Weekly ET's Site Inspection Record



CEDD Contract No.: CV/2009/02
Handling of Surplus Public Fill - Tseung Kwun O Fill Bank

Inspection Date : 16/12/09
Time : 13:45
Weather : Sunny / Fine / Cloudy / Overcast / Drizzle / Rain / Storm / Hazy
Wind : Calm / Light / Breeze / Strong
Temperature : 14°C
Humidity : High / Moderate / Low

Inspected by	CEDD	Contractor / Sub-Contractor	ET
Signature:		John S. K. T. H. 鄭志	
Name:	C. K. Wong	M. H. Cheng S. K. A. T. H. 鄭志	C. K. Li
Title	Attd	Env Engineer S.S. 鄭志	E.T.



Environmental Checklist	Implementation Stages*		Remark
	Yes	No / N/A	
Fugitive Dust Emission			
▪ Dust control / mitigation measures shall be provided to prevent dust nuisance.	✓		
▪ A buffer zone of at least 100m shall be maintained between the edge of the stockpiling area and the nearest ASRs at the TKO Industrial Estate. Within the buffer zone, no dusty material shall be stockpiled and no loading / unloading and similar activities should be allowed.	✓		
▪ Water sprays shall be provided and used to dampen materials.	✓		
▪ Regular cleaning and watering the site shall be provided to minimize the fugitive dust emissions.	✓		
▪ All vehicles shall be restrict to a maximum speed of 10 km per hour.	✓		
▪ Any vehicle with open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards. Material having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.	✓		
▪ The designated site main haul road shall be paved or regular watering.	✓		
▪ Frequent watering of work site shall be at least three times per day.	✓		
▪ Wheel washing facilities including high-pressure water jet shall be provided at the entrance of work site.	✓		
▪ Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the fill bank.	✓		
▪ All plant and equipment should be well maintained e.g. without black smoke emission.	✓		
▪ Open burning should be prohibited.	✓		
▪ The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	✓		
▪ Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shot concrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	✓		
▪ When fill material is transfer by belt conveyor systems, the conveyors shall be enclosed on top and 2 sides.	✓		
▪ The belt scraper shall be equipped with bottom plates or other similar means to prevent falling of material from the return belt.	✓		
▪ The level of stockpiling belt conveyor shall be adjustable such that the vertical distance between the belt conveyor and the material landing point is maintained at no more than 1m.	✓		
Noise Impact			
▪ The approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) shall be adapted.	✓		
▪ Only well maintained plant should be operated on-site and plant should be serviced regularly during the construction works.	✓		
▪ Powered mechanical equipment (PME) should be covered or shielded by appropriate acoustic materials.	✓		
▪ Air compressors and hand held breakers should have noise labels.	✓		
▪ Machines and plants that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.	✓		
▪ Noisy equipment and mobile plant shall always be site away from NSRs.	✓		



Environmental Checklist		Implementation Stages*		Remark
		Yes	No	
Water Quality				
<input type="checkbox"/>	Drainage system should be adequate and well maintained to prevent flooding and overflow, especially after rain storms.	✓		
<input type="checkbox"/>	The permanent drainage channels should have sediment basin, traps and baffles and maintain properly.	✓		
<input type="checkbox"/>	Temporary intercepting drains should be used at the stockpiling area to divert polluted stormwater to the intercepting channels. Earth bunds and sand bay barriers shall be used to assist the diversion of polluted stormwater to the intercepting channels.	✓		
<input type="checkbox"/>	Manholes should be covered and sealed.	✓		
<input type="checkbox"/>	Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding.	✓		
<input type="checkbox"/>	A buffer distance of at least 100m shall be maintained between the boundary of the public fill stockpiling area and the sea front.	✓		
<input type="checkbox"/>	A buffer distance of at least 20m shall be maintained between the boundary of the C&DMSF and the seafront.	✓		
<input type="checkbox"/>	The stormwater intercepting system shall be effective to collect of runoff and remove suspended solids before discharge.	✓		
<input type="checkbox"/>	The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	✓		
<input type="checkbox"/>	Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shotcrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	✓		
<input type="checkbox"/>	Existing and newly constructed Catchpits, sand and silt removal facilities and intercepting channels shall be maintained, and the deposited silt and grit shall be removed weekly and on a need basis especially at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.	✓		
<input type="checkbox"/>	A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains.	✓		
<input type="checkbox"/>	The section of construction road between wheel washing bay and the public road shall be paved with concrete, bituminous materials or hardcores to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.	✓		
<input type="checkbox"/>	Sewage from toilets shall be discharged in to a foul sewer, or chemical toilets shall be provided. The chemical toilets (if use) shall be provided by a licensed contractor, who will be responsible for disposal and maintenance of these facilities.	✓		
<input type="checkbox"/>	Oil intercept in addition of sand / silt removal facilities shall be provided at the car parking areas.	✓		
<input type="checkbox"/>	Oil interceptor shall be provided at work shop.	✓		
<input type="checkbox"/>	Tipping halls enclosed with top and 3-side to prevent spillage of material into marine water.	✓		
<input type="checkbox"/>	The barges shall be in right size such that adequate clearance is maintained between the vessels and the seabed at all states of the tide to ensure the undue turbidity is not generated by turbulence from vessel movement or propeller wash.	✓		
<input type="checkbox"/>	All vessels used for transportation of fill material shall have tight fitting seals to their bottom openings to prevent leakage of material during transport.	✓		
<input type="checkbox"/>	Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer.	✓		
<input type="checkbox"/>	Barges shall not be filled to a level which may cause the overflow of material during loading or transportation. Barge effluents shall be properly collected and treated before disposal.	✓		
<input type="checkbox"/>	The work activities shall not cause any visible foam, oil, grease, scum, litter or other objectionable matters to be present on the water in the vicinity of the barging facilities.	✓		
<input type="checkbox"/>	Existing silt curtain at the outward side of the basin near the Barging Handling Area throughout the period shall be repair, maintain and service when there is public fill intake by barges to the Fill Bank in accordance with PS Clause 1.68. The total length of the silt curtains shall not be less than 160m, and a gap of about 80m shall be left open for access of barges. The silt curtain shall be properly maintained such that it can also serve the function of refuse containment boom to confine floating refuse.	✓		
<input type="checkbox"/>	A waste collection vessel shall be deployed to remove floating debris.	✓		




Environmental Checklist		Implementation Stages*		Remark
		Yes	No	
Landscape and Visual				
▪	The design of the fill bank and platform heights adopted should allow the fill bank to fit into the general topography of the surrounding land. Straight edged slopes should be avoided.	√		
▪	The maximum stockpiling height at the fill bank shall be limited to a maximum of +35.2mPD.	√		
▪	Surface of outer slopes of the fill bank shall preferably be hydroseeded or covered with geo-textile matting of appropriate colour (e.g. dark green / brown) once completed.	√		
▪	The barging point and the C&DMSF at the fill bank shall not be in operation from 07:00 pm to 08:00 am daily to avoid potential visual impact from glare.	√		
Other Environmental Factors				
▪	C&D waste sorted from mixed C&D material shall be removed from the temporary buffer storage area on a daily basis and transfer to SENT landfill for disposal.	√		
▪	Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.	√		
▪	Any unused materials or those with remaining functional capacity should be recycled and stored properly.	√		
▪	All generators, fuel and oil storage are within bundle areas.	√		
▪	Oil leakage from machinery, vehicle and plant is prevented.	√		
▪	The Environmental Permit should be displaced conspicuously on site.	√		
▪	Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment.	√		Item 4
▪	To encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the workforce.	√		

Summary of the Weekly Site Inspection:

Item	Details of defective works or observations	Proposed Follow Up Action	Photo Ref.	Further Action Required (Yes/No)	Target Completion Date
1	Follow up action to the previous site inspection item 1 on 09/12/09, the 25L bucket was removed and no standing water was found.	---	091216_001	No	---
2	Follow up action to the previous site inspection item 2 on 09/12/09, appropriated chemical labels were applied for the chemicals at chemical waste storage area.	---	091216_002	No	---
3	Follow up action to the previous site inspections item 2 on 02/12/09 and item 4 on 09/12/09, the left side of the silt curtain at BHA was repaired properly.	---	091216_003	No	---
4	Rubbish was noted accumulated in the nullah near TVB.	To clean up the accumulated rubbish.	091216_004	Yes	23/12/09

Remark

	Name	Title	Signature	Date
Checked by	Linda Law	Senior Environmental Officer		16 December 2009

Photos

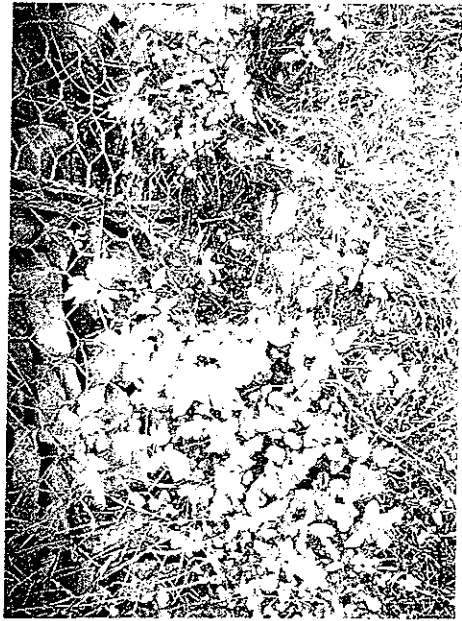


Photo 091216_001

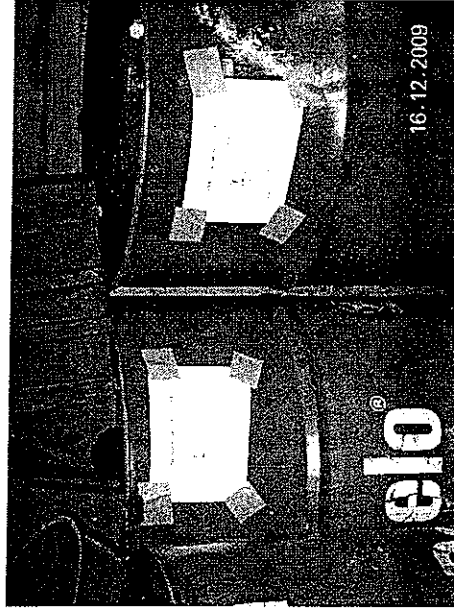


Photo 091216_002

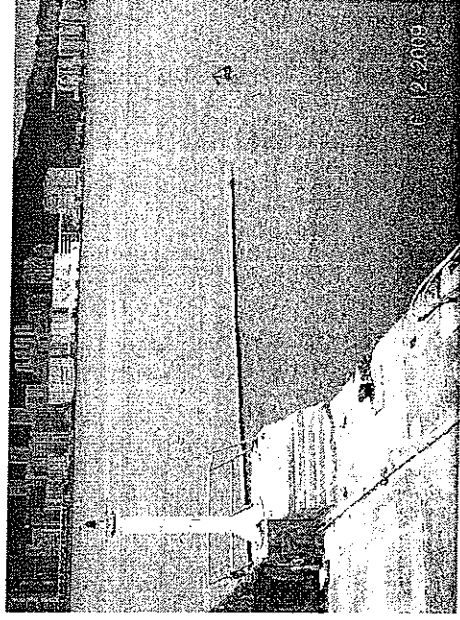



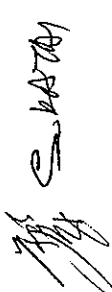

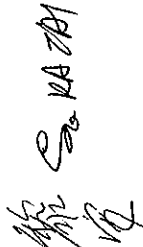

Photo 091216_003



Photo 091216_004



Inspection Date : 23 December 09
 Time : 15:00
 Weather : Sunny / (Fine) Cloudy / Overcast / Drizzle / Rain / Storm / Hazy
 Wind : Calm / (Light) Breeze / Strong
 Temperature : 20°C
 Humidity : High / Moderate / (Low)

Inspected by	CEDD	Contractor / Sub-Contractor	ET
Signature:		 M.H. Cheung	
Name:	C. K. Woo	 W.L. Li	W.L. Li
Title	A104/P3	Env Engineer  P.I.S.S	E.T.



Implementation Stages*		Remark
Environmental Checklist		
Fugitive Dust Emission		
<input checked="" type="checkbox"/>		Dust control / mitigation measures shall be provided to prevent dust nuisance.
<input checked="" type="checkbox"/>		A buffer zone of at least 100m shall be maintained between the edge of the stockpiling area and the nearest ASRs at the TKO Industrial Estate. Within the buffer zone, no dusty material shall be stockpiled and no loading / unloading and similar activities should be allowed.
<input checked="" type="checkbox"/>		Water sprays shall be provided and used to dampen materials.
<input checked="" type="checkbox"/>		Regular cleaning and watering the site shall be provided to minimize the fugitive dust emissions.
<input checked="" type="checkbox"/>		All vehicles shall be restricted to a maximum speed of 10 km per hour.
<input checked="" type="checkbox"/>		Any vehicle with open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards. Material having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.
<input checked="" type="checkbox"/>		The designated site main haul road shall be paved or regular watering.
<input checked="" type="checkbox"/>		Frequent watering of work site shall be at least three times per day.
<input checked="" type="checkbox"/>		Wheel washing facilities including high-pressure water jet shall be provided at the entrance of work site.
<input checked="" type="checkbox"/>		Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the fill bank.
<input checked="" type="checkbox"/>		All plant and equipment should be well maintained e.g. without black smoke emission.
<input checked="" type="checkbox"/>		Open burning should be prohibited.
<input checked="" type="checkbox"/>		The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.
<input checked="" type="checkbox"/>		Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shot concrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.
<input checked="" type="checkbox"/>		When fill material is transfer by belt conveyor systems, the conveyors shall be enclosed on top and 2 sides.
<input checked="" type="checkbox"/>		The belt scraper shall be equipped with bottom plates or other similar means to prevent falling of material from the return belt.
<input checked="" type="checkbox"/>		The level of stockpiling belt conveyor shall be adjustable such that the vertical distance between the belt conveyor and the material landing point is maintained at no more than 1m.
Noise Impact		
<input checked="" type="checkbox"/>		The approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) shall be adapted.
<input checked="" type="checkbox"/>		Only well maintained plant should be operated on-site and plant should be serviced regularly during the construction works.
<input checked="" type="checkbox"/>		Powered mechanical equipment (PME) should be covered or shielded by appropriate acoustic materials.
<input checked="" type="checkbox"/>		Air compressors and hand held breakers should have noise labels.
<input checked="" type="checkbox"/>		Machines and plants that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.
<input checked="" type="checkbox"/>		Noisy equipment and mobile plant shall always be site away from NSRs.


Environmental Checklist		Implementation Stages*		Remark
		Yes	No	
Water Quality				
<input checked="" type="checkbox"/>	Drainage system should be adequate and well maintained to prevent flooding and overflow, especially after rain storms.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	The permanent drainage channels should have sediment basin, traps and baffles and maintain properly.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Temporary intercepting drains should be used at the stockpiling area to divert polluted stormwater to the intercepting channels. Earth bunds and sand bay barriers shall be used to assist the diversion of polluted stormwater to the intercepting channels.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Manholes should be covered and sealed.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	A buffer distance of at least 100m shall be maintained between the boundary of the public fill stockpiling area and the sea front.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	A buffer distance of at least 20m shall be maintained between the boundary of the C&DMSF and the seafront.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	The stormwater intercepting system shall be effective to collect runoff and remove suspended solids before discharge.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shotcrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Existing and newly constructed Catchpits, sand and silt removal facilities and intercepting channels shall be maintained, and the deposited silt and grit shall be removed weekly and on a need basis especially at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	The section of construction road between wheel washing bay and the public road shall be paved with concrete, bituminous materials or hardcores to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Sewage from toilets shall be discharged in to a foul sewer, or chemical toilets shall be provided. The chemical toilets (if use) shall be provided by a licensed contractor, who will be responsible for disposal and maintenance of these facilities.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Oil intercept in addition of sand / silt removal facilities shall be provided at the car parking areas.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Oil interceptor shall be provided at work shop.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Tipping halls enclosed with top and 3-side to prevent spillage of material into marine water.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	The barges shall be in right size such that adequate clearance is maintained between the vessels and the seabed at all states of the tide to ensure the undue turbidity is not generated by turbulence from vessel movement or propeller wash.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	All vessels used for transportation of fill material shall have tight fitting seals to their bottom openings to prevent leakage of material during transport.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Barges shall not be filled to a level which may cause the overflow of material during loading or transportation. Barge effluents shall be properly collected and treated before disposal.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	The work activities shall not cause any visible foam, oil, grease, scum, litter or other objectionable matters to be present on the water in the vicinity of the barging facilities.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	Existing silt curtain at the outward side of the basin near the Barging Handling Area throughout the period shall be repair, maintain and service when there is public fill intake by barges to the Fill Bank in accordance with PS Clause 1.68. The total length of the silt curtains shall not be less than 160m, and a gap of about 80m shall be left open for access of barges. The silt curtain shall be properly maintained such that it can also serve the function of refuse containment boom to confine floating refuse.	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	A waste collection vessel shall be deployed to remove floating debris.	<input checked="" type="checkbox"/>		

Environmental Checklist	Implementation Stages*			Remark
	Yes	No	N/A	
Landscape and Visual				
▪ The design of the fill bank and platform heights adopted should allow the fill bank to fit into the general topography of the surrounding land. Straight edged slopes should be avoided.	✓			
▪ The maximum stockpiling height at the fill bank shall be limited to a maximum of +35.2mPD.	✓			
▪ Surface of outer slopes of the fill bank shall preferably be hydroseeded or covered with geo-textile matting of appropriate colour (e.g. dark green / brown) once completed.	✓			
▪ The barging point and the C&DMSF at the fill bank shall not be in operation from 07:00 pm to 08:00 am daily to avoid potential visual impact from glare.	✓			
Other Environmental Factors				
▪ C&D waste sorted from mixed C&D material shall be removed from the temporary buffer storage area on a daily basis and transfer to SENT landfill for disposal.	✓			
▪ Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.	✓			
▪ Any unused materials or those with remaining functional capacity should be recycled and stored properly.	✓			
▪ All generators, fuel and oil storage are within bundle areas.	✓			
▪ Oil leakage from machinery, vehicle and plant is prevented.	✓			
▪ The Environmental Permit should be displaced conspicuously on site.	✓			
▪ Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment.	✓			
▪ To encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the workforce.	✓			

Summary of the Weekly Site Inspection:

Item	Details of defective works or observations	Proposed Follow Up Action	Photo Ref.	Further Action Required (Yes/No)	Target Completion Date
1	Follow up action to the previous site inspection item 4 on 16/12/09, rubbish was accumulated in the nullah near TVB was cleaned up.	---	091223_001	No	---

Remark

Name	Title	Signature	Date
Linda Law	Senior Environmental Officer		23 December 2009

Photos

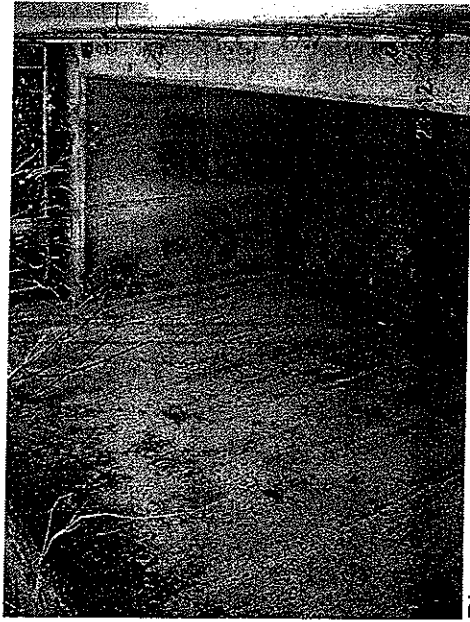
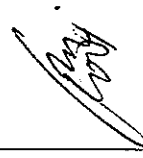

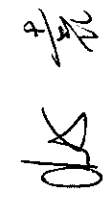
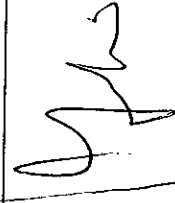


Photo 091223_001

Inspection Date : 30/12/09
 Time : 10:30
 Weather : Sunny / Fine / Cloudy / Overcast / ~~Drizzle~~ Rain / Storm / Hazy
 Wind : Calm / Light / Breeze / Strong
 Temperature : 15°C
 Humidity : High / Moderate / Low

Inspected by	CEDD	Contractor / Sub-Contractor		ET
Signature:				
Name:	C. K. Lou	Kou Tam C.Y. Works	M.H. Cheung	C.K. Li
Title	Asst	Contractor Manager	Env Engineer	E-T.



Environmental Checklist		Implementation Stages*			Remark
		Yes	No	N/A	
Fugitive Dust Emission					
<input checked="" type="checkbox"/>	Dust control / mitigation measures shall be provided to prevent dust nuisance.				
<input checked="" type="checkbox"/>	A buffer zone of at least 100m shall be maintained between the edge of the stockpiling area and the nearest ASRs at the TKO Industrial Estate. Within the buffer zone, no dusty material shall be stockpiled and no loading / unloading and similar activities should be allowed.				
<input checked="" type="checkbox"/>	Water sprays shall be provided and used to dampen materials.				
<input checked="" type="checkbox"/>	Regular cleaning and watering the site shall be provided to minimize the fugitive dust emissions.				
<input checked="" type="checkbox"/>	All vehicles shall be restrict to a maximum speed of 10 km per hour.				
<input checked="" type="checkbox"/>	Any vehicle with open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards. Material having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.				
<input checked="" type="checkbox"/>	The designated site main haul road shall be paved or regular watering.				
<input checked="" type="checkbox"/>	Frequent watering of work site shall be at least three times per day.				
<input checked="" type="checkbox"/>	Wheel washing facilities including high-pressure water jet shall be provided at the entrance of work site.				
<input checked="" type="checkbox"/>	Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the fill bank.				
<input checked="" type="checkbox"/>	All plant and equipment should be well maintained e.g. without black smoke emission.				
<input checked="" type="checkbox"/>	Open burning should be prohibited.				
<input checked="" type="checkbox"/>	The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.				
<input checked="" type="checkbox"/>	Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shot concrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.				
<input checked="" type="checkbox"/>	When fill material is transfer by belt conveyor systems, the conveyors shall be enclosed on top and 2 sides.				
<input checked="" type="checkbox"/>	The belt scraper shall be equipped with bottom plates or other similar means to prevent falling of material from the return belt.				
<input checked="" type="checkbox"/>	The level of stockpiling belt conveyor shall be adjustable such that the vertical distance between the belt conveyor and the material landing point is maintained at no more than 1m.				
Noise Impact					
<input checked="" type="checkbox"/>	The approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) shall be adapted.				
<input checked="" type="checkbox"/>	Only well maintained plant should be operated on-site and plant should be serviced regularly during the construction works.				
<input checked="" type="checkbox"/>	Powered mechanical equipment (PME) should be covered or shielded by appropriate acoustic materials.				
<input checked="" type="checkbox"/>	Air compressors and hand held breakers should have noise labels.				
<input checked="" type="checkbox"/>	Machines and plants that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.				
<input checked="" type="checkbox"/>	Noisy equipment and mobile plant shall always be site away from NSRs.				

Implementation Stages*		Remark
Water Quality		
Drainage system should be adequate and well maintained to prevent flooding and overflow, especially after rain storms.	✓	Item 4
The permanent drainage channels should have sediment basin, traps and baffles and maintain properly.	✓	
Temporary intercepting drains should be used at the stockpiling area to divert polluted stormwater to the intercepting channels. Earth bunds and sand bay barriers shall be used to assist the diversion of polluted stormwater to the intercepting channels.	✓	
Manholes should be covered and sealed.	✓	
Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding.	✓	
A buffer distance of at least 100m shall be maintained between the boundary of the public fill stockpiling area and the sea front.	✓	Item 3
A buffer distance of at least 20m shall be maintained between the boundary of the C&DMSF and the seafront.	✓	
The stormwater intercepting system shall be effective to collect of runoff and remove suspended solids before discharge.	✓	
The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	✓	
Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shotcrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	✓	
Existing and newly constructed Catchpits, sand and silt removal facilities and intercepting channels shall be maintained, and the deposited silt and grit shall be removed weekly and on a need basis especially at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.	✓	
A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains.	✓	
The section of construction road between wheel washing bay and the public road shall be paved with concrete, bituminous materials or hardcore to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.	✓	
Sewage from toilets shall be discharged in to a foul sewer, or chemical toilets shall be provided. The chemical toilets (if use) shall be provided by a licensed contractor, who will be responsible for disposal and maintenance of these facilities.	✓	
Oil intercept in addition of sand / silt removal facilities shall be provided at the car parking areas.	✓	
Oil interceptor shall be provided at work shop.	✓	
Tipping halls enclosed with top and 3-side to prevent spillage of material into marine water.	✓	
The barges shall be in right size such that adequate clearance is maintained between the vessels and the seabed at all states of the tide to ensure the undue turbidity is not generated by turbulence from vessel movement or propeller wash.	✓	
All vessels used for transportation of fill material shall have tight fitting seals to their bottom openings to prevent leakage of material during transport.	✓	
Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer.	✓	
Barges shall not be filled to a level which may cause the overflow of material during loading or transportation. Barge effluents shall be properly collected and treated before disposal.	✓	
The work activities shall not cause any visible foam, oil, grease, scum, litter or other objectionable matters to be present on the water in the vicinity of the barging facilities.	✓	
Existing silt curtain at the outward side of the basin near the Barging Handling Area throughout the period shall be repair, maintain and service when there is public fill intake by barges to the Fill Bank in accordance with PS Clause 1.68. The total length of the silt curtains shall not be less than 160m, and a gap of about 80m shall be left open for access of barges. The silt curtain shall be properly maintained such that it can also serve the function of refuse containment boom to confine floating refuse.	✓	
A waste collection vessel shall be deployed to remove floating debris.	✓	

Implementation Stages*		Remark	
			Yes
Landscape and Visual			
<ul style="list-style-type: none"> The design of the fill bank and platform heights adopted should allow the fill bank to fit into the general topography of the surrounding land. Straight edged slopes should be avoided. 	√		
<ul style="list-style-type: none"> The maximum stockpiling height at the fill bank shall be limited to a maximum of +35.2mPD. 	√		
<ul style="list-style-type: none"> Surface of outer slopes of the fill bank shall preferably be hydroseeded or covered with geo-textile matting of appropriate colour (e.g. dark green / brown) once completed. 	√		
<ul style="list-style-type: none"> The barging point and the C&DMSF at the fill bank shall not be in operation from 07:00 pm to 08:00 am daily to avoid potential visual impact from glare. 	√		
Other Environmental Factors			
<ul style="list-style-type: none"> C&D waste sorted from mixed C&D material shall be removed from the temporary buffer storage area on a daily basis and transfer to SENT landfill for disposal. 	√		
<ul style="list-style-type: none"> Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste. 	√		
<ul style="list-style-type: none"> Any unused materials or those with remaining functional capacity should be recycled and stored properly. 	√		
<ul style="list-style-type: none"> All generators, fuel and oil storage are within bundle areas. 	√		
<ul style="list-style-type: none"> Oil leakage from machinery, vehicle and plant is prevented. 	√		
<ul style="list-style-type: none"> The Environmental Permit should be displaced conspicuously on site. 	√		Item 1 and 2
<ul style="list-style-type: none"> Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment. 	√		
<ul style="list-style-type: none"> To encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the workforce. 	√		

Summary of the Weekly Site Inspection:

Item	Details of defective works or observations	Proposed Follow Up Action	Photo Ref.	Further Action Required (Yes/No)	Target Completion Date
1	The drip tray for a generator at water filling station B was found full of rain water. Besides, the oil-contaminated rain water was noted overflowed from the drip tray to the ground nearby.	To drain and treat the rain water as chemical waste. Besides, cover the drip tray by using generator dress to avoid accumulation of rain water.	091230_001	Yes	06/01/10
2	Oil leakage from the hole of the drip tray at car parking area was observed.	To repair the leak part of the drip tray to avoid any leakage and clean up the contaminated soil as chemical waste.	091230_002	Yes	06/01/10
3	A plastic bucket at car parking area was without cover.	To provide an appropriate cover for the plastic bucket or store it in an appropriate storage area in order to avoid accumulated of rain water.	091230_003	Yes	06/01/10
4	Algae, mud and silt were noted accumulated inside the nullah near explosive storage area.	To clean up the accumulated mud and silt.	091230_004	Yes	06/01/10

Remark

--

	Name	Title	Signature	Date
Checked by	Linda Law	Senior Environmental Officer	<i>Linda Law</i>	30 December 2009



Photos



Photo 091230_001

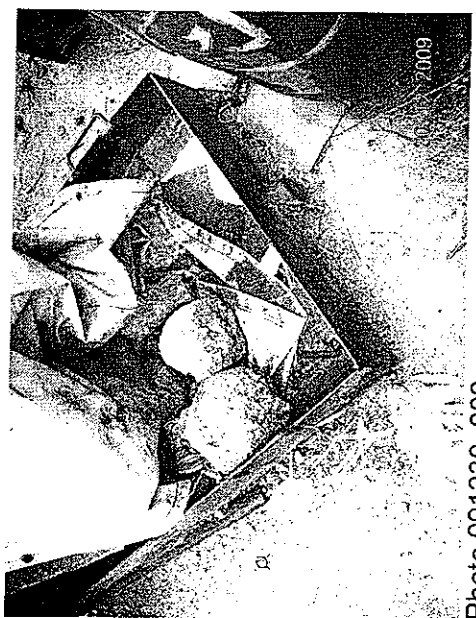


Photo 091230_002



Photo 091230_003



Photo 091230_004



Appendix J

Implementation Schedule of Mitigation Measures



	Location	Implementation Status				
		Implemented	Partially implemented	Not implemented	Not Applicable	
Environmental Protection Measures						
Water Quality						
<ul style="list-style-type: none"> ▪ Drainage system should be adequate and well maintained to prevent flooding and overflow, especially after rain storms. ▪ Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding. ▪ The existing / realigned intercepting channels and the sand / silt removal facilities shall be used and maintained regularly. ▪ A buffer distance of at least 100m shall be maintained between the boundary of the public fill stockpiling area and the sea front. ▪ A buffer distance of at least 20m shall be maintained between the boundary of the C&DMSF and the seafront. ▪ The stormwater intercepting system shall be effective to collect of runoff and remove suspended solids before discharge. ▪ The material shall be properly covered to prevent washed away especially before rainstorm. ▪ The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEED. ▪ A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains. ▪ Obtain Discharge License ▪ Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer. ▪ The work activities shall not cause any visible foam, oil, grease, scum, litter or other objectionable matters to be present on the water in the vicinity of the barging facilities. ▪ A waste collection vessel shall be deployed to remove floating debris. 						
Landscape and Visual						
<ul style="list-style-type: none"> • Construction of lighting to avoid spillage and glare • Hydroseeding • Hoarding erection • Damage to surrounding area avoided 						
Other Environmental Factors						
<ul style="list-style-type: none"> • C&D waste sorted from mixed C&D material shall be transfer to SENT landfill for disposal. • Plan and stock construction materials carefully to minimise generation of waste. • Any unused materials or those with remaining functional capacity should be recycled. • All generators, fuel and oil storage are within bunded areas. • Oil leakage from machinery, vehicle and plant is prevented. • Bund chemical storage area to 110% capacity. • Prevent disposal of hazardous materials to air, soil and water body. • Provide rubbish skips at all work areas • Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment. 						



Appendix K

Site General Layout plan



Appendix L

Monitoring Schedule for the Coming Month



Contract No. CV/2009/02
Handling of Surplus Public Fill

Tseung Kwan O Area137

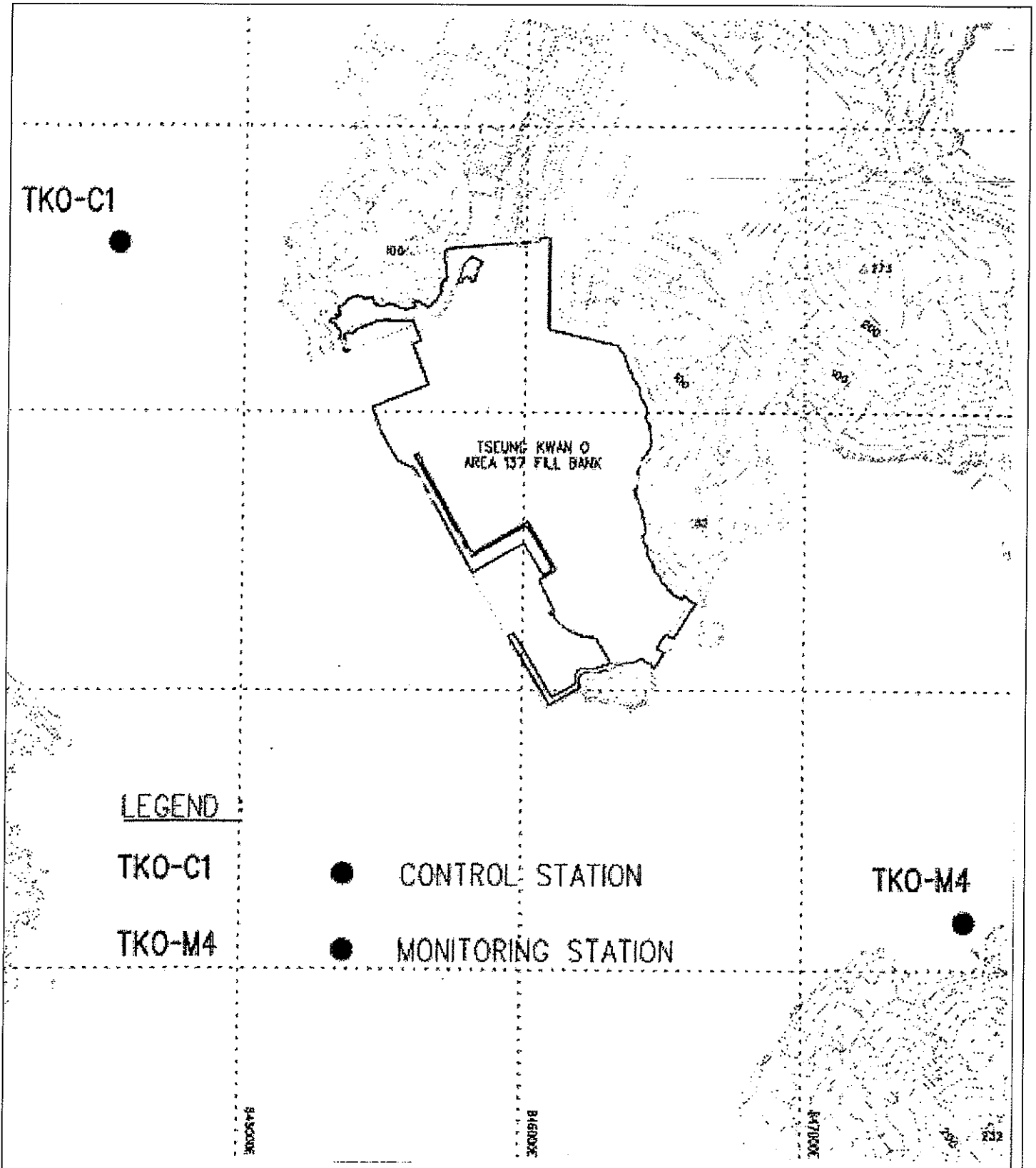
Time Schedule for Impact Water Quality Monitoring (WQM), Impact Air Monitoring (1-hr TSP & 24-hr TSP), Weekly Site Inspection (Weekly SI) and Impact Noise Monitoring (NM)

January 2010

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1 Holiday	2 <u>1-hr TSP</u>
3	4 <u>1-hr TSP</u> <u>WQM</u> Mid-flood (09:00-10:00) Mid-ebb (14:30-15:30)	5	6 <u>Weekly SI</u> <u>1-hr & 24-hr TSP</u> <u>WQM</u> Mid-flood (10:30-11:30) Mid-ebb (16:30-17:30)	7	8 <u>1-hr TSP</u> <u>NM</u> <u>WQM</u> Mid-flood (12:00-13:00) Mid-ebb (17:30-18:30)	9
10	11 <u>1-hr TSP</u> <u>WQM</u> Mid-ebb (09:30-10:30) Mid-flood (14:00-15:00)	12 <u>24-h TSP</u> <u>1-hr TSP</u>	13 <u>Weekly SI</u> <u>1-hr TSP</u> <u>WQM</u> Mid-ebb (11:00-12:00) Mid-flood (16:00-17:00)	14	15 <u>1-hrTSP</u> <u>WQM</u> Mid-flood (07:30-08:30) Mid-ebb (12:00-13:00)	16
17	18 <u>1-hr & 24-hr TSP</u> <u>WQM</u> Mid-flood (08:30-09:30) Mid-ebb (14:00-15:00)	19	20 <u>Weekly SI</u> <u>1-hr TSP</u> <u>WQM</u> Mid-flood (09:00-10:00) Mid-ebb (15:00-16:00)	21	22 <u>1-hr TSP</u> <u>WQM</u> Mid-flood (10:15-11:15) Mid-ebb (16:30-17:30)	23 <u>24-h TSP</u> <u>1-hr TSP</u>
24 / 31	25 <u>1-hr TSP</u> <u>WQM</u> Mid-flood (12:00-13:00) Mid-ebb (17:30-18:30)	26	27 <u>Weekly SI</u> <u>1-hr TSP</u> <u>WQM</u> Mid-ebb (09:30-10:30) Mid-flood (14:00-15:00)	28	29 <u>1-hr & 24-hr TSP</u> <u>WQM</u> Mid-ebb (11:00-12:00) Mid-flood (16:30-17:30)	30



Figures



LEGEND

- TKO-C1 ● CONTROL STATION
- TKO-M4 ● MONITORING STATION

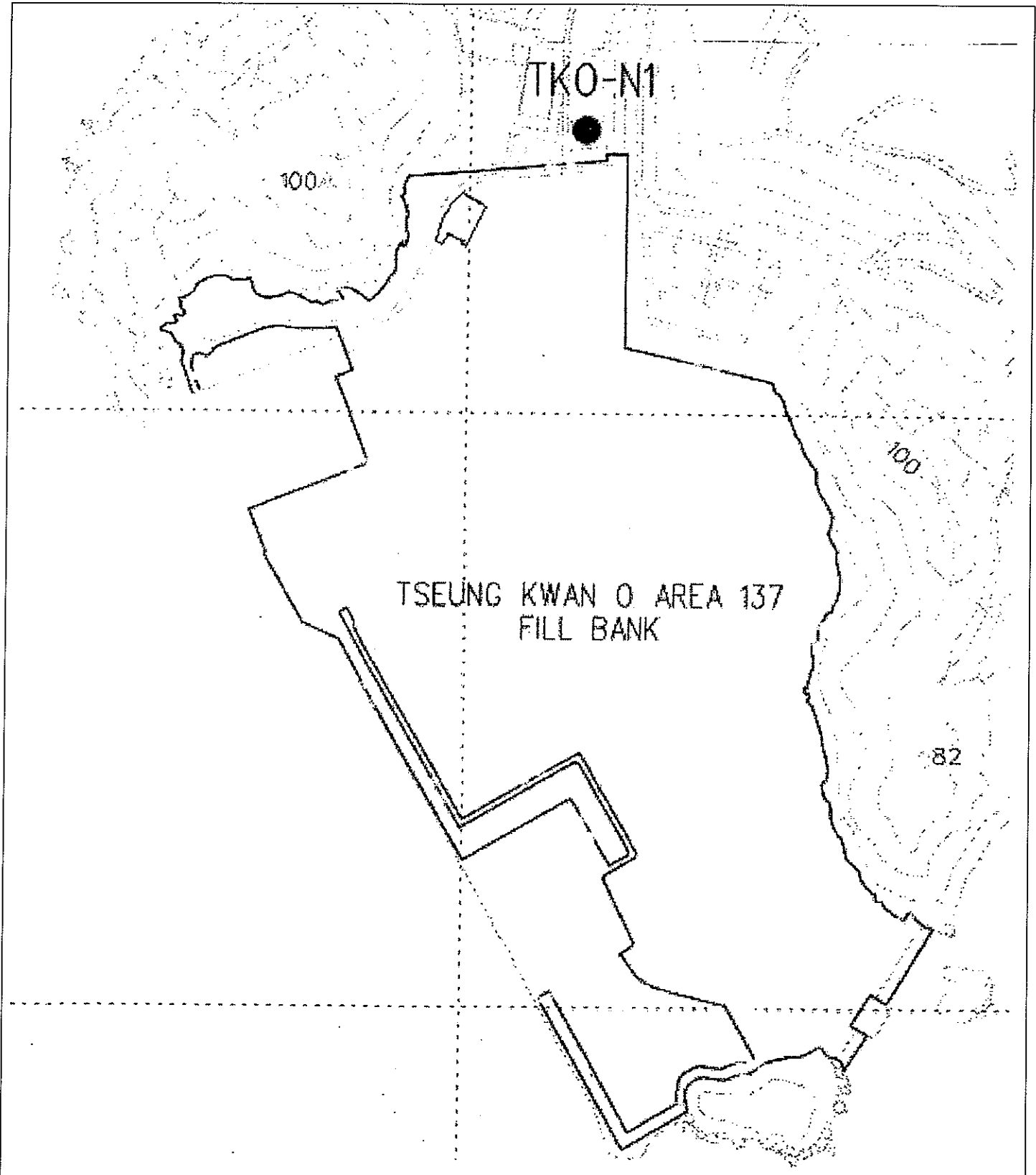
TKO-M4

Contract No. CV/2009/02
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Figure 1
 Locations of Water Quality Monitoring Stations –
 Tseung Kwan O Area 137 Fill Bank



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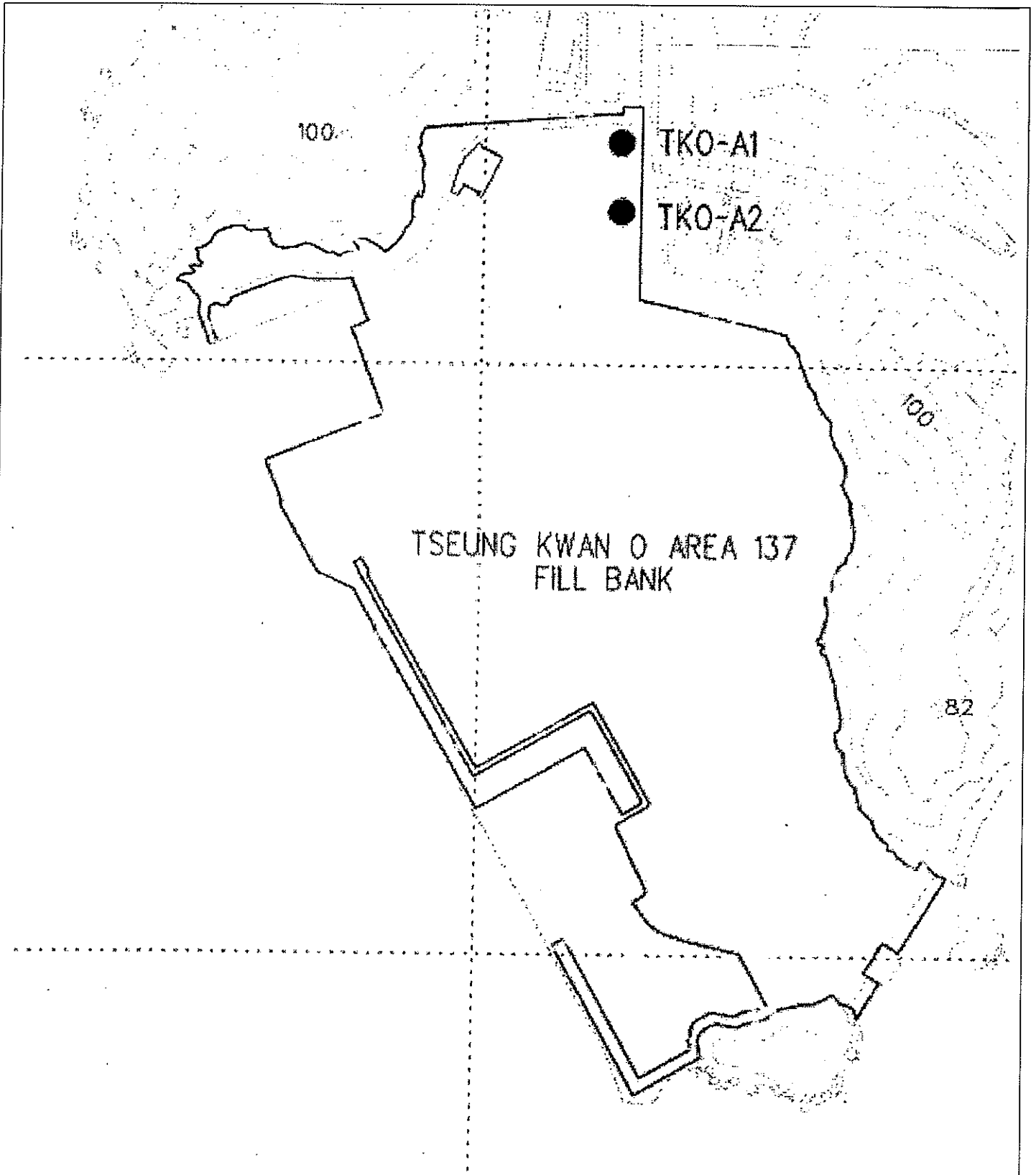


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Figure 2
 Locations of Noise Monitoring Station –
 Tseung Kwan O Area 137 Fill Bank



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Figure 3
Locations of Air Quality Monitoring Stations –
Tseung Kwan O Area 137 Fill Bank



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