

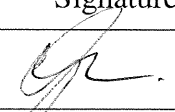
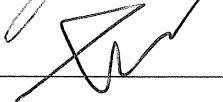
China State- Shanghai Tunnel Joint Venture

Contract No. DC/2009/05

**Harbour Area Treatment Scheme
Stage 2A,
Construction of Interconnection Tunnel and
Diaphragm Wall for
Main Pumping Station at
Stonecutters Island
Sewage Treatment Works**

Baseline Monitoring Report

January 2010

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EXECUTIVE SUMMARY

The proposed construction of interconnection tunnel and diaphragm wall for main pumping station at Stonecutters Island Sewage Treatment Works (SCISTW) (the Project) is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO) and is governed by an Environmental Permit (EP-322/2008/B). The Project comprises the construction of Interconnection Tunnel between the Inlet Chamber of the Main Pumping Station and the existing Riser Shaft and diaphragm wall for the Main Pumping Station

In accordance with the Environmental Monitoring and Audit Manual (EM&A Manual) of the Project, baseline monitoring of air quality and noise is required prior to commencement of construction of the Project. As accesses to some of the proposed monitoring stations as stipulated in the EM&A manual have been rejected by other parties or found to be not available or not suitable, a Monitoring Proposal, presenting the alternative monitoring stations, requirements and methodologies for the monitoring, was submitted.

This report documents the baseline monitoring of air quality at 1 monitoring station and noise monitoring at 1 monitoring station as described in the Monitoring Proposal. For monitoring station at Block A of Government Dockyard mentioned in the Monitoring Proposal, as monitoring station will be established by the Contract DE/2009/02 (Provision of Covers and Deodourisation Facilities to the Existing Sedimentation Tanks at SCISTW), so baseline monitoring details at this station are not mentioned in this report.

The baseline monitoring of both air quality and noise was carried out between 23 November 2009 and 6 December 2009. Air quality was recorded in terms of 1-hour Total Suspended Particulates (TSP) and 24-hour TSP. The weather during the monitoring period was mainly sunny. For baseline noise levels, $L_{eq(30\text{-minute})}$ were recorded for non-restricted hours (07:00 – 19:00 on normal weekdays) and $L_{eq(5\text{-minute})}$ were recorded for restricted hours (19:00 – 23:00 and 23:00 – 07:00 of next day on normal weekdays, whole day on General Holidays and Sundays).

The averaged 1-hour TSP levels and 24-hour TSP levels at AM7 are summarized as follows:

Air quality monitoring location	AM7
Averaged 1-hr TSP ($\mu\text{g}/\text{m}^3$)	110
Averaged 24-hr TSP ($\mu\text{g}/\text{m}^3$)	119

The averaged baseline noise levels are summarized in the following table:

Noise monitoring location	NM6
Averaged baseline noise level during daytime on normal weekdays ($L_{eq(30\text{ min})}$, dB(A))	76.5
Averaged baseline noise level during evening on normal weekdays ($L_{eq(5\text{ min})}$, dB(A))	60.4
Averaged baseline noise level during daytime and evening on General Holidays and Sundays ($L_{eq(5\text{ min})}$, dB(A))	61.5
Averaged baseline noise level during night-time on all days ($L_{eq(5\text{ min})}$, dB(A))	59.6

1 INTRODUCTION

1.1. Background

1.1.1. China State - Shanghai Tunnel Joint Venture was awarded the Contract No. DC/2009/05 Harbour Area Treatment Scheme (HATS) Stage 2A – Construction of Interconnection Tunnel and Diaphragm Wall for Main Pumping Station at Stonecutters Island Sewage Treatment Works (SCISTW) (the Project) from Drainage Services Department (DSD) of the Government of the Hong Kong Special Administrative Region. The Project comprises the construction of Interconnection Tunnel between the Inlet Chamber of the Main Pumping Station and the existing Riser Shaft and diaphragm wall for the Main Pumping Station. The site layout plan and the Works site boundary are shown in **Figure 1.1**.

1.1.2. The Project is a designated project and is governed by an Environmental Permit (EP-322/2008/B).

1.1.3. The scope of the Project comprises mainly:

- Construction of Interconnection Tunnel with concrete lining between the Inlet Chamber of the Main Pumping Station and the existing Riser Shaft;
- Construction of diaphragm wall, base slab and pile cap for the Main Pumping Station and its Inlet Chamber;
- Excavation within the diaphragm walls for the Main Pumping Station and its Inlet Chamber to founding levels;
- Piling works for the Main Pumping Stations;
- Utilities upgrading and diversion works;
- Temporary launching shaft to be handed over to MPS Contractor;
- Carrying out ground monitoring and instrumentation works;
- Carrying out pumping test;
- Miscellaneous building, civil and electrical and mechanical works; and
- Landscape works.

1.1.4. In accordance with the EM&A Manual of the Project, environmental baseline conditions were established by the ET prior to the commencement of construction of the Project.

1.1.5. As accesses to some of the proposed monitoring stations as stipulated in the EM&A manual have been rejected by other parties or found to be not available or not suitable, a Monitoring Proposal, presenting the alternative monitoring stations, requirements and methodologies for the monitoring, was submitted.

1.1.6. Baseline monitoring was undertaken and baseline monitoring report was prepared prior to commencement of construction of the Project.

1.2. Purpose of the Baseline Monitoring Report

1.2.1. The purpose of this report is to review the baseline conditions of the Project site and to establish baseline levels for air and noise in accordance with the EM&A Manual and Monitoring Proposal. These levels would be used as the basis for assessing environmental impact and compliance during construction of the Project.

1.2.2. This baseline monitoring report presents the baseline monitoring requirements, methodologies and monitoring results of air quality and noise conducted at 1 air quality monitoring station and 1 noise monitoring station described in the Monitoring Proposal.

2 AIR QUALITY MONITORING

2.1 Monitoring Requirements

2.1.1 In accordance with the EM&A Manual and the Monitoring Proposal, baseline 1-hour and 24-hour TSP levels at 2 air quality monitoring stations should be established by conducting baseline 1-hour and 24-hour TSP monitoring for at least 14 days.

2.2 Monitoring Equipment

2.2.1 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) located at designated monitoring station. The HVS meets all the requirements of the EM&A Manual. Portable direct reading dust meter was used to carry out the 1-hour TSP monitoring at designated monitoring station. Brand and model of the equipment is given in **Table 2.1**.

Table 2.1 Air Quality Monitoring Equipment

Equipment	Brand and Model
Portable direct reading dust meter	Sibata Digital Dust Monitor (Model No. LD-3 & LD-3B)
High Volume Sampler	Graseby Andersen Total Suspended Particulate Mass Flow Controlled Sampling System (Model No. GMWS2310)

2.3 Monitoring Locations

2.3.1 Monitoring location at Block A of Government Dockyard stated in the Monitoring Proposal, which monitoring station had been set up at the proposed location by the other contract (HATS Stage 2A – Provision of Advanced Disinfection Facilities (ADF) at SCISTW) in the Year 2008, will be established by the Contract DE/2009/02 (Provision of Covers and Deodourisation Facilities to the Existing Sedimentation Tanks at SCISTW). Therefore, no baseline monitoring details at this station are mentioned in this report.

2.3.2 Monitoring location AM7 was set up at the proposed location in accordance with the Monitoring Proposal and as agreed by the ER and the IEC. **Figure 2.1** shows the location of monitoring station. **Table 2.2** describes the details of the monitoring stations.

Table 2.2 Locations of Baseline Air Monitoring Stations

Monitoring Station	Location	Description
AM7	West Kowloon No. 2 Sewage Pumping Station	Rooftop of the premise

2.4 Monitoring Parameters, Frequency and Duration

2.4.1 **Table 2.3** summarizes the monitoring parameters, frequency and duration of baseline TSP monitoring.

Table 2.3 Air Quality Monitoring Parameters, Frequency and Duration

Parameter	Frequency and Duration
1-hour TSP	3 times (at three consecutive hours) per day while the highest dust impact was expected, for 14 days
24-hour TSP	Daily, for 14 days

2.5 Monitoring Methodology

2.5.1 24-Hr TSP Monitoring

- (a) The HVS was installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.
- (i) A horizontal platform with appropriate support to secure the sampler against gusty wind to be provided.
 - (ii) The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
 - (iii) A minimum of 2 meters separation from walls, parapets and penthouse for rooftop sampler.
 - (iv) A minimum of 2 meters separation from any supporting structure, measured horizontally is required;
 - (v) No furnace or incinerator flues nearby.
 - (vi) Airflow around the sampler to be unrestricted.
 - (vii) Permission to be obtained to set up the samplers and access to the monitoring stations.
 - (viii) A secured supply of electricity to be obtained to operate the samplers.
 - (ix) The sampler should be located more than 20 meters from any dripline.
 - (x) Any wire fence and gate, required to protect the sampler, should not obstruct the monitoring process.
 - (xi) Flow control accuracy was kept within $\pm 2.5\%$ deviation over 24-hour sampling period.
- (b) Preparation of Filter Papers
- (i) Glass fibre filters, G810 were labelled and sufficient filters that were clean and without pinholes were selected.
 - (ii) All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ± 3 °C; the relative humidity (RH) was < 50% and not variable by more than $\pm 5\%$. A convenient working RH was 40%.
 - (iii) All filter papers were prepared and analysed by ALS Technichem (HK) Pty Ltd., which is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes.
- (c) Field Monitoring
- (i) The power supply was checked to ensure the HVS works properly.
 - (ii) The filter holder and the area surrounding the filter were cleaned.
 - (iii) The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
 - (iv) The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.

- (v) The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied was sufficient to avoid air leakage at the edges.
 - (vi) Then the shelter lid was closed and was secured with the aluminum strip.
 - (vii) The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
 - (viii) A new flow rate record sheet was set into the flow recorder.
 - (ix) On site temperature and atmospheric pressure readings were taken and the flow rate of the HVS was checked and adjusted at around 1.1 m³/min, and complied with the range specified in the updated EM&A Manual (i.e. 0.6-1.7 m³/min).
 - (x) The programmable digital timer was set for a sampling period of 24 hrs, and the starting time, weather condition and the filter number were recorded.
 - (xi) The initial elapsed time was recorded.
 - (xii) At the end of sampling, on site temperature and atmospheric pressure readings were taken and the final flow rate of the HVS was checked and recorded.
 - (xiii) The final elapsed time was recorded.
 - (xiv) The sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.
 - (xv) It was then placed in a clean plastic envelope and sealed.
 - (xvi) All monitoring information was recorded on a standard data sheet.
 - (xvii) Filters were then sent to ALS Technichem (HK) Pty Ltd. for analysis.
- (d) Maintenance and Calibration
- (i) The HVS and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
 - (ii) HVSs were calibrated using TE-5025A Calibration Kit prior to the commencement of baseline monitoring.
 - (iii) Calibration certificate of the TE-5025A Calibration Kit and the HVSs are provided in **Appendix A**.

2.5.2 1-hour TSP Monitoring

(a) Measuring Procedures

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

- (i) Turn the power on.
- (ii) Close the air collecting opening cover.
- (iii) Push the "TIME SETTING" switch to [BG]
- (iv) Push "START/STOP" switch to perform background measurement for 6 seconds.
- (v) Turn the knob at SENSI ADJ position to insert the light scattering plate.
- (vi) Leave the equipment for 1 minute upon "SPAN CHECK" is indicated in the display.
- (vii) Push "START/STOP" switch to perform automatic sensitivity adjustment. This measurement takes 1 minute.
- (viii) Pull out the knob and return it to MEASURE position.
- (ix) Push the "TIME SETTING" switch the time set in the display to 3 hours.
- (x) Lower down the air collection opening cover.
- (xi) Push "START/STOP" switch to start measurement.

(b) Maintenance and Calibration

- (i) The 1-hour TSP meter was calibrated at 1-year intervals against a continuous particulate TEOM Monitor, Series 1400ab. Calibration certificates of the Laser Dust Monitors are provided in **Appendix A**.

2.6 Results and Observations

- 2.6.1 The baseline monitoring at the Monitoring Station AM7 was carried out between 23 November 2009 and 6 December 2009, during which, the weather was mostly sunny. Although construction works from other contract, about 280m away from the Monitoring Station AM7, were being carried out during some days in the monitoring period (from 1 Dec 2009 to 5 Dec 2009), the construction works was considered not contributing to major dust emissions as the construction works during the abovementioned 5 days included only diaphragm wall construction by hydromill method and removal of excavated materials including marine deposit generated from the diaphragm wall construction.
- 2.6.2 Baseline 1-hour TSP and 24-hour TSP monitoring for the Monitoring Station AM7 was carried out from 23 November 2009 to 6 December 2009 for consecutively 14 days.
- 2.6.3 The baseline monitoring results for 1-hour TSP and 24-hour TSP are summarized in **Table 2.4** and **2.5** respectively. Detailed air quality monitoring results for Monitoring Station AM7 are presented in **Appendix B**.

Table 2.4 Summary of 1-hour TSP Baseline Monitoring Results

	AM7
Average ($\mu\text{g}/\text{m}^3$)	110
Range ($\mu\text{g}/\text{m}^3$)	73 - 225

Table 2.5 Summary of 24-hour TSP Baseline Monitoring Results

	AM7
Average ($\mu\text{g}/\text{m}^3$)	119
Range ($\mu\text{g}/\text{m}^3$)	66 - 190

2.7 Action and Limit Levels

- 2.7.1 The air quality monitoring results, in terms of 1-hour TSP and 24-hour TSP were below the Limit Level set out in the Air Quality Objective (AQO) at both monitoring locations.
- 2.7.2 The Action and Limit Levels for air quality impact monitoring were based on the criteria adopted from the EM&A Manual as presented in **Table 2.6**.

Table 2.6 Derivation of Action and Limit Levels for Air Quality

Parameter	Action Level	Limit Level
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	For Baseline Level $<384 \mu\text{g}/\text{m}^3$, Action Level = $(130\% \text{ of baseline level} + \text{Limit level}) \div 2$ For Baseline Level $> 384 \mu\text{g}/\text{m}^3$, Action Level = Limit Level	500
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	For Baseline Level $<200 \mu\text{g}/\text{m}^3$, Action Level = $(130\% \text{ of baseline level} + \text{Limit level}) \div 2$ For Baseline Level $> 200 \mu\text{g}/\text{m}^3$, Action Level = Limit Level	260

2.7.3 **Table 2.7** shows the derived Action and Limit Levels for air quality impact monitoring for the Project.

Table 2.7 Action and Limit Levels for Air Quality

Parameter	Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	AM7	322	500
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	AM7	207	260

3 NOISE MONITORING

3.1 Monitoring Requirements

3.1.1 In accordance with the EM&A Manual and the Monitoring Proposal, baseline noise levels at 1 monitoring station should be established by conducting daily noise monitoring for 2 weeks.

3.2 Monitoring Equipment

3.2.1 Noise monitoring was performed using sound level meter at each designated monitoring station. The sound level meters deployed comply with the International Electrotechnical Commission Publications (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator was deployed to check the sound level meters at a known sound pressure level. Brand and model of the equipment is given in **Table 3.1**.

Table 3.1 Noise Monitoring Equipment

Equipment	Brand and Model
Integrated Sound Level Meter	B&K (Model No. 2238, 2250L and 2270)
Acoustic Calibrator	B&K (Model No. 4231)

3.3 Monitoring Locations

3.3.1 Monitoring station NM6 was set up at the proposed locations in accordance with the Monitoring Proposal. **Figure 3.1** shows the location of the monitoring station. **Table 3.2** describes the details of the monitoring station.

Table 3.2 Locations of Baseline Noise Monitoring Station

Monitoring Station	Location	Description
NM6	Customs' Marine Base	1m from the exterior of the roof façade of Block H of Government Dockyard

3.4 Monitoring Parameters, Frequency and Duration

3.4.1 **Table 3.3** summarizes the monitoring parameters, frequency and duration of baseline noise monitoring.

Table 3.3 Noise Monitoring Parameters, Frequency and Duration

Time Period	Duration, min	Parameters
Daytime: 0700-1900 hrs on normal weekdays	30 ($L_{eq(30-min)}$)	L_{eq} , L_{90} & L_{10}
Evening: 1900-2300 hrs on normal weekdays	15 (3 consecutive $L_{eq(5-min)}$)	
General Holidays and Sundays: 0700-2300 hrs		
Night-time: 2300-0700 hrs of next day on all days		

3.5 Monitoring Methodology

3.5.1 Monitoring Procedure

- (a) Façade measurements (i.e. 1m from the exterior of the building façade) were made at all monitoring locations.
- (b) The battery condition was checked to ensure the correct functioning of the meter.
- (c) Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
 - (i) frequency weighting: A
 - (ii) time weighting: Fast
 - (iii) time measurement: $L_{eq(30-minutes)}$ during non-restricted hours i.e. 07:00 – 1900 on normal weekdays; $L_{eq(5-minutes)} \times 3$ during restricted hours i.e. 19:00 – 23:00 and 23:00 – 07:00 of normal weekdays, whole day of Sundays and Public Holidays
- (d) Prior to and after each noise measurement, the meter was calibrated using the acoustic calibrator for 94dB(A) at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- (e) 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.
- (f) Noise measurement was paused during periods of high intrusive noise (e.g. dog barking, helicopter noise) if possible. Observations were recorded when intrusive noise was unavoidable.
- (g) Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5m/s, or wind with gusts exceeding 10m/s.

3.5.2 Maintenance and Calibration

- (a) The microphone head of the sound level meter was cleaned with soft cloth at regular intervals.
- (b) The meter and calibrator were sent to the supplier or HOKLAS laboratory to check and calibrate at yearly intervals.
- (c) Calibration certificates of the sound level meters and acoustic calibrators are provided in **Appendix A**.

3.6 Results and Observations

- 3.6.1 There was no other major activity influencing the measured noise level during the baseline noise monitoring period. The dominant noise sources were from community noises and nearby cargos.
- 3.6.2 Baseline noise monitoring was conducted for consecutively 2 weeks, from 23 November 2009 to 6 December 2009.
- 3.6.3 The baseline noise monitoring results are summarized in **Tables 3.4 to 3.6**. Detailed noise monitoring results are presented in **Appendix C**.

Table 3.4 Summary of Baseline Noise Monitoring Results

Time period	30-min Mean of Noise Levels for time period (1) / 5-min Mean of Noise Levels for time period (2, (3) & (4), dB(A)			Range, dB(A)
	L _{eq}	L ₁₀	L ₉₀	L _{eq}
(1) 0700-1900 hrs on normal weekdays	76.5	77.5	75.0	70.8 – 78.9
(2) 1900-2300 hrs on normal weekdays	60.4	62.1	58.3	58.4 – 63.8
(3) 0700-2300 hrs on General Holidays and Sundays	61.5	64.1	58.7	58.6 – 64.4
(4) 2300-0700 hrs of next day on all days	59.6	60.5	58.2	58.0 – 61.0

- 3.6.4 Although no construction work was carried out in the vicinity during the course of measurement, the averaged baseline daytime noise levels recorded at the monitoring location exceeded the Limit Level of 75dB(A).
- 3.6.5 The averaged baseline night-time noise monitoring results exceeded the criteria of 55dB(A) at the monitoring location.

3.7 Action and Limit Levels

- 3.7.1 The Action and Limit Levels of noise monitoring have been set in accordance with the derivation criteria specified in the EM&A Manual as shown in **Table 3.7** below.

Table 3.7 Criteria for Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Levels
0700-1900 hrs of normal weekdays	When one documented complaint is received	75 dB(A)*

Notes: If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

* 70 dB(A) and 65 dB(A) for schools during normal teaching periods and school examination periods, respectively.

- 3.7.2 The Project area is within non-designated area under the Noise Control Ordinance (NCO) while Area Sensitivity Ratings of the noise sensitive receivers (NSRs) of the Projects are considered as “C” as they are directly affected industrial areas. With considering the monitoring location NM6 is not a NSR

and it serves as the only accessible alternative monitoring location for the planned monitoring location at Planned FSD Diving Rescue and Diving Training Centre (named as M11 in the EM&A Manual), the Limit Level as stipulated in the EM&A Manual is adopted. The Action and Limit Levels for impact noise monitoring are derived and presented in **Table 3.8** below.

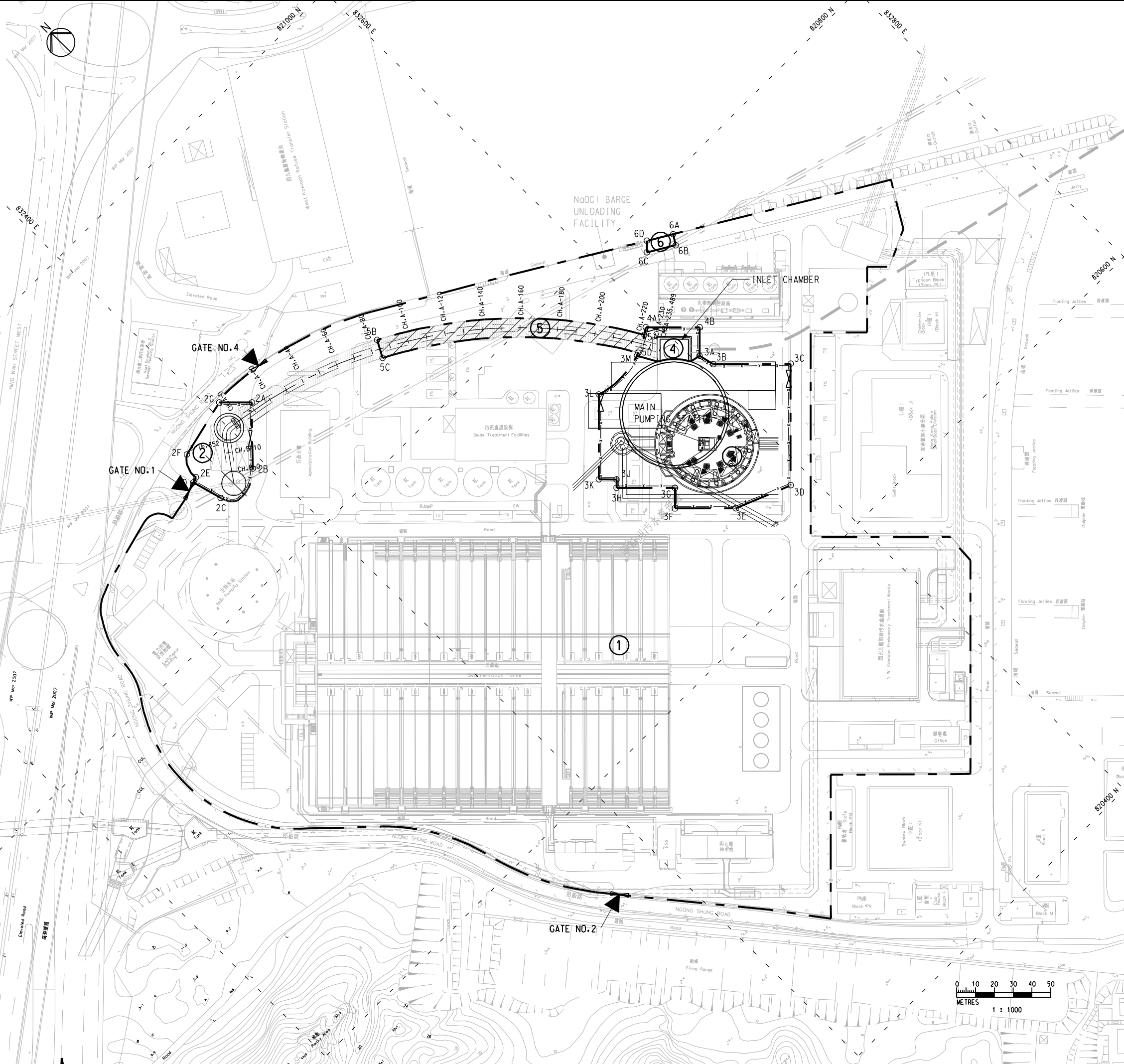
Table 3.8 Action and Limit Levels for Construction Noise of the Project

Time Period	Monitoring Station	Action Level	Limit Levels
0700-1900 hrs on normal weekdays	NM6	When one documented complaint is received	75 dB(A)
1900-2300 hrs on normal weekdays, 0700-2300 hrs on General Holidays and Sundays	NM6	When one documented complaint is received	70 dB(A)
2300-0700 hrs of next day on all days	NM6	When one documented complaint is received	55 dB(A)

4 CONCLUSION

- 4.1.1 Baseline air quality monitoring was carried out from 23 November 2009 to 6 December 2009 at 1 monitoring station AM7. Action Level for air quality at monitoring station AM7 was derived from the baseline monitoring results recorded. For monitoring station at Block A of Government Dockyard mentioned in the Monitoring Proposal, as monitoring station will be established by the Contract DE/2009/02 (Provision of Covers and Deodourisation Facilities to the Existing Sedimentation Tanks at SCISTW), so no baseline monitoring details at this station are mentioned in this report.
- 4.1.2 Baseline noise monitoring was carried out from 23 November 2009 to 6 December 2009 at 1 monitoring station NM6. The Action Level of construction noise is based on documented complaints received, while the Limit Level is the level at a specific limit according to EIAO-TM in daytime and NCO during restricted hours.
- 4.1.3 The averaged baseline daytime noise levels recorded at Customs' Marine Base (NM6) exceeded the Limit Level of 75dB(A).
- 4.1.4 The averaged baseline night-time noise monitoring results exceeded the criteria of 55dB(A) at monitoring location.

SETTING OUT POINT	COORDINATES	
	EASTING	NORTHING
2A	832418.157	820873.021
2B	832393.511	820847.759
2C	832370.541	820848.988
2D	832366.166	820865.050
2E	832369.066	820866.016
2F	832374.228	820877.952
2G	832405.890	820885.312
3A	832603.631	820722.290
3B	832605.535	820714.008
3C	832634.790	820685.078
3D	832589.136	820639.506
3E	832559.905	820651.517
3F	832536.997	820674.295
3G	832544.751	820682.033
3H	832522.852	820703.975
3J	832525.961	820707.078
3K	832519.384	820713.795
3L	832551.290	820745.638
3M	832580.181	820745.841
4A	832594.160	820753.206
4B	832614.344	820732.981
5A	832590.788	820750.854
5B	832488.595	820849.442
5C	832483.901	820840.613
5D	832581.809	820746.408
6A	832639.380	820777.871
6B	832636.292	820772.726
6C	832622.700	820780.883
6D	832627.088	820785.257



- NOTES :**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 2. ALL LEVELS REFER TO P.D.H.K. AND ARE IN METRES.
 3. ALL GRIDS REFER TO HONG KONG 1980 GRID.

- LEGEND :**
- [Symbol] PORTION / WORKS AREA
 - [Symbol] PORTION 1
 - [Symbol] GATE
 - [Symbol] INTERCONNECTION TUNNEL
 - [Symbol] THE CONTRACTOR SHALL NOT COMMENCE THE TUNNELLING WORKS WITHIN THIS PORTION OF SITE UNLESS OTHER CONTRACTOR COMPLETE THE FOUNDATION WORKS FOR THE SLUDGE TREATMENT FACILITIES ON THE DATE AS SHOWN IN PS CLAUSE 1.45(7).
 - [Symbol] CHAIN LINK FENCE TYPE 1 WITH GATE

0	ISSUE FOR CONSTRUCTION	KC	09/09
Rev	Description	By	Date

Consultant
ARUP 奧雅納工程顧問
 Ove Arup & Partners Hong Kong Limited

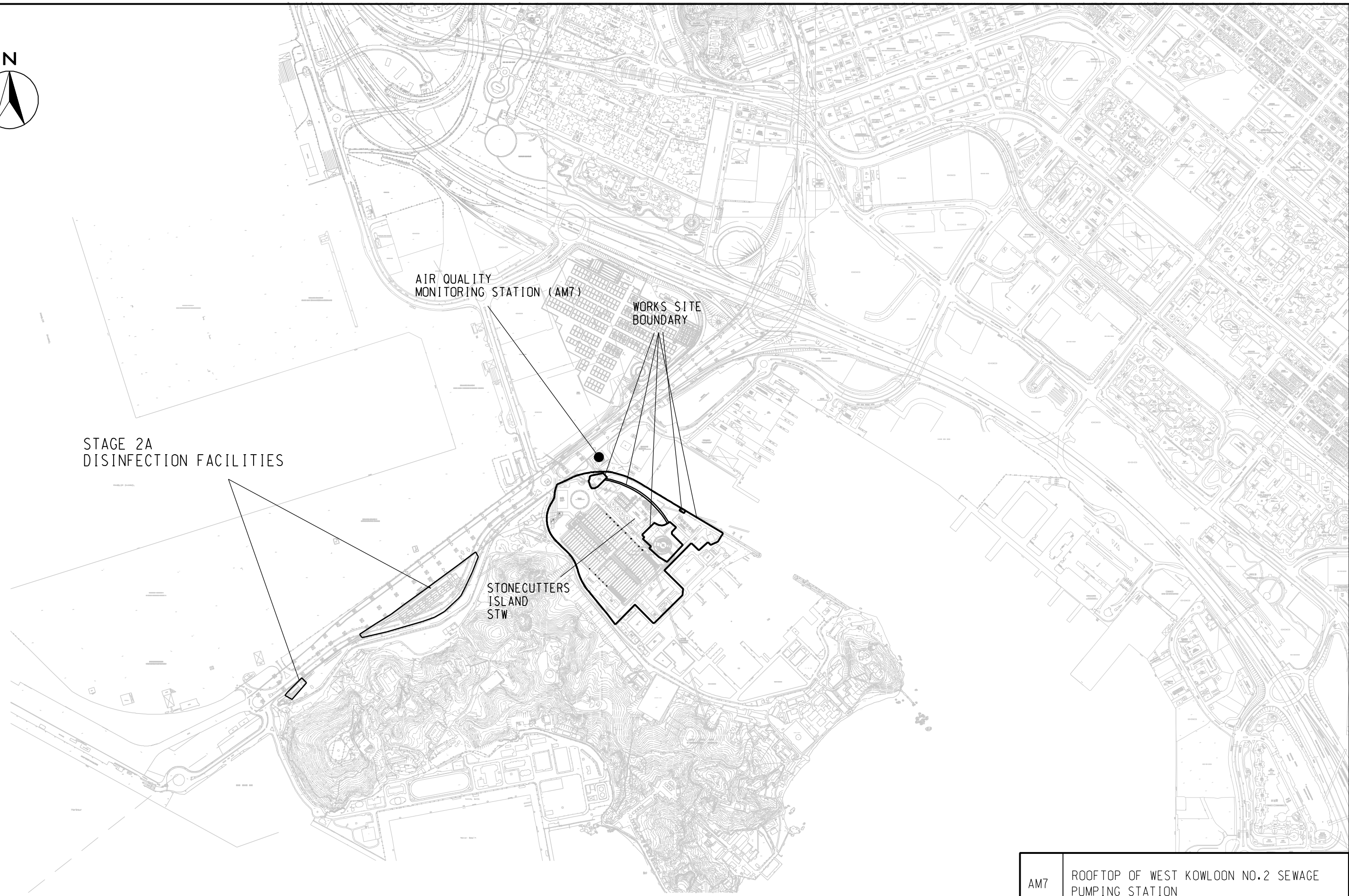
Project title
Contract No. DC/2009/05
Harbour Area Treatment Scheme Stage 2A-
Construction of Interconnection Tunnel
and Diaphragm Wall for Main Pumping
Station at Stonecutters Island Sewage
Treatment Works

Drawing title
PORTION OF SITE
 (SHEET 1)

Drawing no.	24888/DC0905/C/1003	Rev.	0
Drawn	Date	Checked	Approved
NK	11/08	PW	FW
Scale	1:1000 @A1	Status	WORKING

DRAINAGE SERVICES DEPARTMENT
 GOVERNMENT OF THE
 HONG KONG
 SPECIAL ADMINISTRATIVE REGION

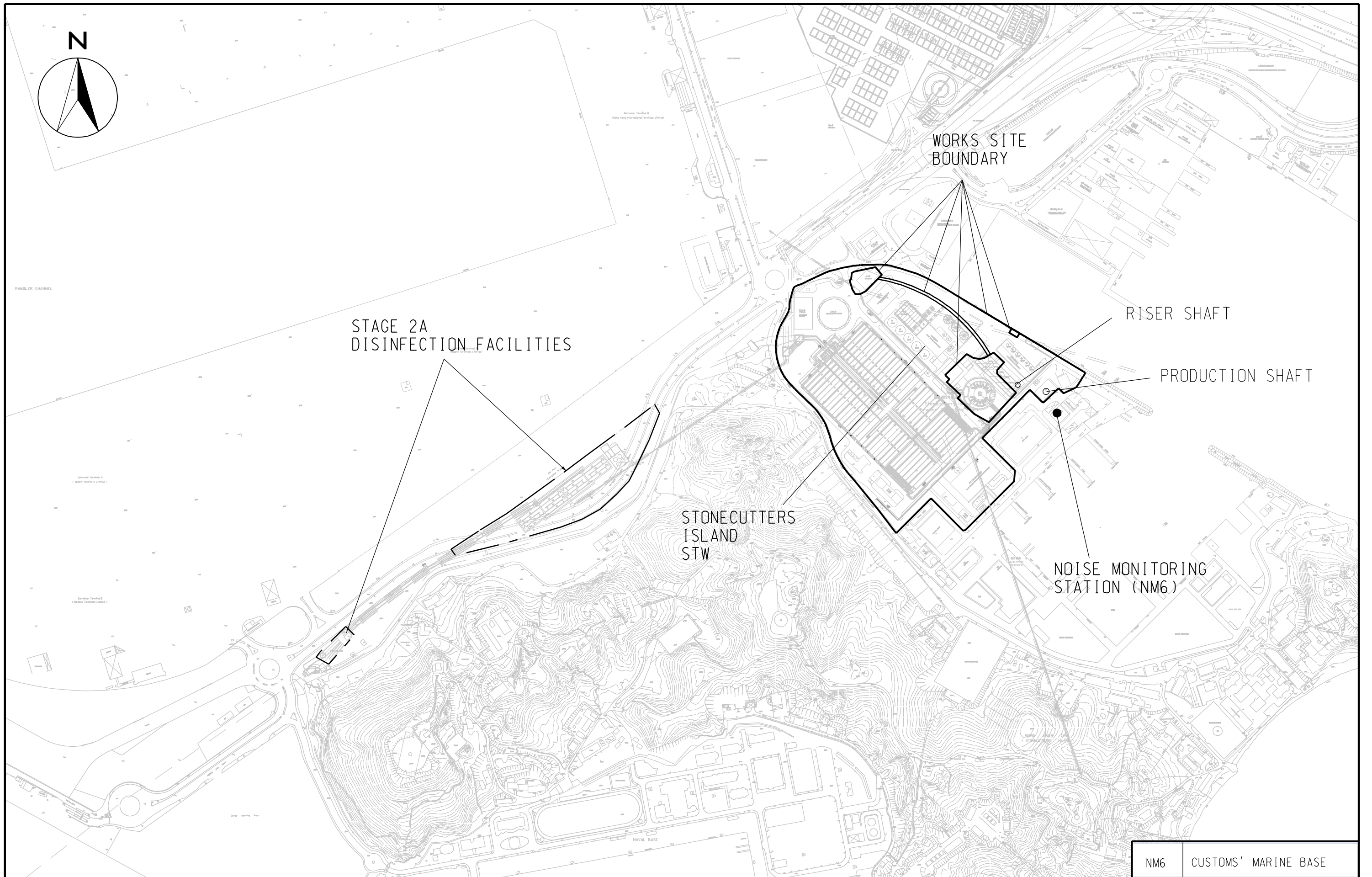
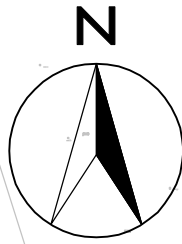
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AM7	ROOFTOP OF WEST KOWLOON NO.2 SEWAGE PUMPING STATION				
SCALE	N.T.S.	DATE	DEC 09		
CHECK	ENFL	DRAWN	LLMC		
JOB No.	60143571	FIGURE No.	2.1	REV	-

AECOM

CONTRACT NO. DC/2009/05
HARBOUR AREA TREATMENT SCHEME (HATS) STAGE 2A -
CONSTRUCTION OF INTERCONNECTION TUNNEL & DIAPHRAGM WALL FOR MAIN PUMPING STATION AT SCISTW
LOCATION OF AIR QUALITY MONITORING STATION DURING BASELINE MONITORING



NM6 CUSTOMS' MARINE BASE



CONTRACT NO. DC/2009/05
 HARBOUR AREA TREATMENT SCHEME (HATS) STAGE 2A -
 CONSTRUCTION OF INTERCONNECTION TUNNEL & DIAPHRAGM WALL FOR MAIN PUMPING STATION AT SCISTW
 LOCATION OF NOISE MONITORING STATION DURING BASELINE MONITORING

SCALE	N.T.S.	DATE	DEC 09
CHECK	ENFL	DRAWN	LLMC
JOB No.	60143571	FIGURE No.	3.1
		REV	-

AECOM Asia Company Limited
TSP High Volume Sampler
Field Calibration Report

Station: Rooftop of West Kowloon No. 2 Sewage Pumping Station (AM2) Operator: Fu Cho Yiu
 Cal. Date: 23-Nov-09 Next Due Date: 23-Jan-10
 Equipment No.: A.001.12T Serial No.: 10373

Station: Rooftop of West Kowloon No. 2 Sewage Pumping Station
 Cal. Date: 23-Nov-09
 Next Due Date: 23-Jan-10
 Set Point (IC): 44.54

Ambient Condition			
Temperature, Ta (K)	293.4	Pressure, Pa (mmHg)	762.8

Orifice Transfer Standard Information					
Serial No:	1559	Slope, mc	1.97702	Intercept, bc	-0.0007
Last Calibration Date:	18-May-09	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	18-May-10	$Qstd = \{ [DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc \} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.6	3.29	1.66	56.0	56.54
13	7.4	2.75	1.39	49.0	49.47
10	6.3	2.53	1.28	43.0	43.42
7	4.1	2.04	1.03	36.0	36.35
5	2.5	1.60	0.81	28.0	28.27

By Linear Regression of Y on X
 Slope, mw = 33.4288 Intercept, bw = 1.5106
 Correlation Coefficient* = 0.9925

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m³/min
 From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; IC = (mw x Qstd + bw) x [(760 / Pa) x (Ta / 298)]^{1/2} = 44.54

IC (CFM)	Qstd (m ³ /min)
24	0.673
25	0.703
26	0.733
27	0.762
28	0.792
29	0.822
30	0.852
31	0.882
32	0.912
33	0.942
34	0.972
35	1.002
36	1.032
37	1.062
38	1.092
39	1.121
40	1.151
41	1.181
42	1.211
43	1.241
44	1.271
45	1.301
46	1.331
47	1.361
48	1.391
49	1.421
50	1.451
51	1.480
52	1.510
53	1.540
54	1.570
55	1.600
56	1.630
57	1.660
58	1.690
59	1.720
60	1.750
61	1.780
62	1.809
63	1.839
64	1.869
65	1.899

Remarks: _____

QC Reviewer: Signature: Date: 24 Nov 09



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

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 18, 2009 Rootsometer S/N 9833620 Ta (K) - 293
 Operator Tisch Orifice I.D. - 1559 Pa (mm) - 765.81

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4130	3.2	2.00
2	NA	NA	1.00	0.9900	6.4	4.00
3	NA	NA	1.00	0.8850	7.9	5.00
4	NA	NA	1.00	0.8420	8.7	5.50
5	NA	NA	1.00	0.6970	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0205	0.7222	1.4317	0.9958	0.7047	0.8748
1.0163	1.0266	2.0247	0.9917	1.0017	1.2371
1.0142	1.1460	2.2637	0.9896	1.1182	1.3831
1.0132	1.2033	2.3742	0.9886	1.1741	1.4506
1.0078	1.4459	2.8633	0.9834	1.4109	1.7495
Qstd slope (m) = 1.97702			Qa slope (m) = 1.23797		
intercept (b) = -0.00070			intercept (b) = -0.00043		
coefficient (r) = 0.99992			coefficient (r) = 0.99992		

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

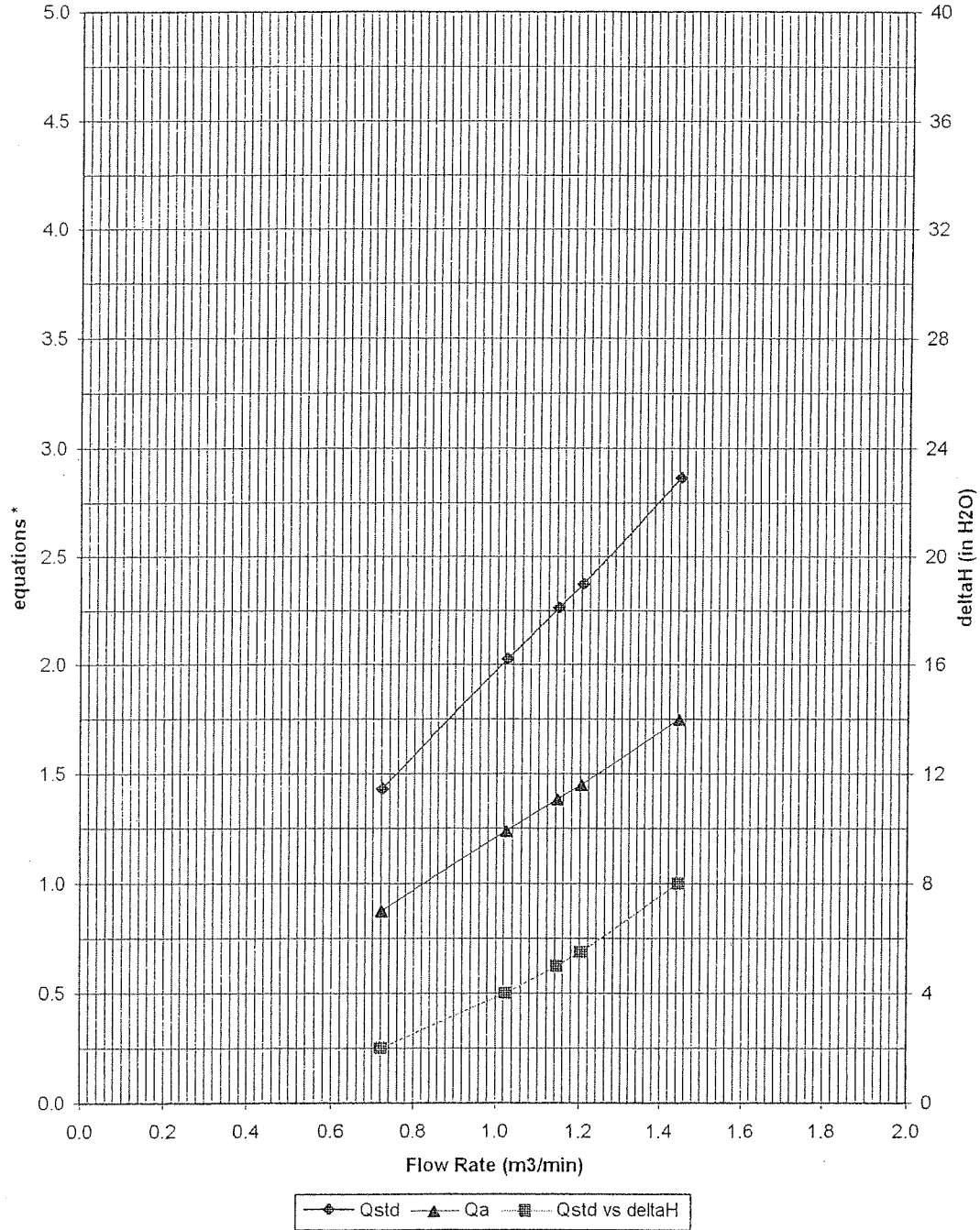
Va = Diff Vol [(Pa-Diff Hg)/Pa]
 Qa = Va/Time

For subsequent flow rate calculations:

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

AIR POLLUTION MONITORING EQUIPMENT

Qstd/Qa and Qstd vs deltaH



* y-axis equations:

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

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

1559

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3
 Equipment No.: A.005.11a
 Sensitivity Adjustment Scale Setting: 799 CPM
 Operator: Mike Shek (MSKM)

Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®
 Venue: Cyberport (Pui Ying Secondary School)
 Model No.: Series 1400AB
 Serial No.: Control: 140AB219899803
 Sensor: 1200C143659803 K_o: 12500
 Last Calibration Date*: 5 June 2008

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 799 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 799 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration ¹ (mg/m ³) Y-axis	Total Count ²	Count/ Minute ³ X-axis
			Temp (°C)	R.H. (%)			
1	04-07-09	11:00 - 12:00	29.7	78	0.03713	1498	24.97
2	04-07-09	12:00 - 13:00	29.7	78	0.03520	1404	23.41
3	04-07-09	14:00 - 15:00	30.1	81	0.03891	1553	25.91
4	04-07-09	15:00 - 16:00	30.1	81	0.04025	1618	26.97

- Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®
 2. Total Count was logged by Laser Dust Monitor
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0015
 Correlation coefficient: 0.9907

Validity of Calibration Record: 3 July 2010

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 6 July 2009

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3B
 Equipment No.: A.005.12a
 Sensitivity Adjustment Scale Setting: 805 CPM

Operator: Mike Shek (MSKM)

Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®
 Venue: Cyberport (Pui Ying Secondary School)
 Model No.: Series 1400AB
 Serial No.: Control: 140AB219899803
 Sensor: 1200C143659803 K₀: 12500
 Last Calibration Date*: 5 June 2009

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 805 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 805 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration ¹ (mg/m ³) Y-axis	Total Count ²	Count/ Minute ³ X-axis
			Temp (°C)	R.H. (%)			
1	24-10-09	08:00 - 09:00	29.9	74	0.03432	1302	21.70
2	24-10-09	09:00 - 10:00	29.9	74	0.02947	1092	18.20
3	24-10-09	10:00 - 11:00	30.0	74	0.03588	1352	22.53
4	24-10-09	11:00 - 12:00	30.0	76	0.02855	1078	17.97

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®
 2. Total Count was logged by Laser Dust Monitor
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0016
 Correlation coefficient: 0.9924

Validity of Calibration Record: 23 October 2010

Remarks:

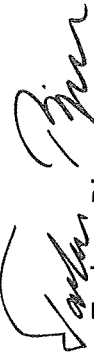
QC Reviewer: YW Fung Signature:  Date: 27 Oct 2009

MANUFACTURER'S CERTIFICATE OF CONFORMANCE

We certify that Brüel & Kjær -2250-L-- Serial No 2681366 has been tested and passed all production tests, confirming compliance with the manufacturer's published specification at the date of the test.

The final test has been performed using calibrated equipment, traceable to National or International Standards or by ratio measurements.

Brüel & Kjær is certified under ISO 9001:2000 assuring that all calibration data for test equipment are retained on file and are available for inspection upon request.
Nærum 05-maj-2009


Torben Bjørn
Vice President
Operations

Please note that this document is not a calibration certificate, for information on our calibration services please contact your nearest Brüel & Kjær Service Center.

BA0238-15

WORLD HEADQUARTERS: DK-2850 Nærum · Denmark
Telephone: +45-45 80 05 00 · Fax: +45-45 80 14 05 · <http://www.bksv.com> · e-mail: info@bksv.dk

Brüel & Kjær 

OBJ. NR.

LOC.

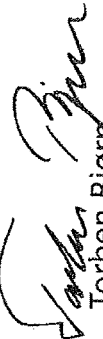
MANUFACTURER'S CERTIFICATE OF CONFORMANCE

We certify that Brüel & Kjær
-2270--- Serial No 2644597

has been tested and passed all production tests, confirming compliance with the manufacturer's published specification at the date of the test.

The final test has been performed using calibrated equipment, traceable to National or International Standards or by ratio measurements.

Brüel & Kjær is certified under ISO 9001:2000 assuring that all calibration data for test equipment are retained on file and are available for inspection upon request. 11-aug-2009
Nærum


Torben Bjørn
Vice President
Operations

Please note that this document is not a calibration certificate, for information on our calibration services please contact your nearest Brüel & Kjær Service Center.

BA-0238-15

WORLD HEADQUARTERS: DK-2850 Nærum - Denmark
Telephone: +45 4580 05 00 - Fax: +45 45 80 14 05 - <http://www.bksv.com> - e-mail: info@bksv.dk


Brüel & Kjær



CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0820 04 Page 1 of 2

Item tested

Description:	Sound Level Meter (Type 1)	Microphone
Manufacturer:	B & K	B & K
Type/Model No.:	2238	4188
Serial/Equipment No.:	2255687 / N.009.03	2250455
Adaptors used:	-	-

Item submitted by

Customer Name: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of request: 20-Aug-2009

Date of test: 24-Aug-2009

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	12-Jan-2010	CIGISMEC
Signal generator	DS 360	33873	22-Jun-2010	CEPREI
Signal generator	DS 360	61227	22-Jun-2010	CEPREI

Ambient conditions

Temperature: (21 ± 1) °C
Relative humidity: (60 ± 5) %
Air pressure: (1005 ± 5) hPa

Test specifications

- 1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- 2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsiveness of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:  Date: 26-Aug-2009 Company Chop: 

Huang Jian-Min/Feng Jun Qi

Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0710 04-05 Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: B&K
Type/Model No.: BK4231
Serial/Equipment No.: 1790985 / N.004.001
Adaptors used: -

Item submitted by

Customer: ENSR ASIA (HK) LTD.
Address of Customer: -
Request No.: -
Date of request: 10-Jul-2009

Date of test: 14-Jul-2009

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	23-Jun-2010	SCL
Preamplifier	B&K 2673	2239857	02-Dec-2009	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Dec-2009	CEPREI
Signal generator	DS 360	61227	22-Jun-2010	CEPREI
Digital multi-meter	34401A	US36087050	03-Dec-2009	CIGISMEC
Audio analyzer	8903B	GB41300350	27-Nov-2009	CEPREI
Universal counter	53132A	MY40003662	23-Jun-2010	CEPREI

Ambient conditions

Temperature: 23 ± 1 °C
Relative humidity: 55 ± 10 %
Air pressure: 995 ± 10 hPa

Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

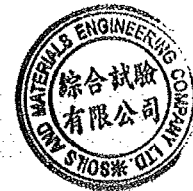
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:


Huang Jian Min / Feng Jun Qi

Date: 14-Jul-2009

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0311 02-02

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: B&K
Type/Model No.: BK4231
Serial/Equipment No.: 1850426 / N.004.02
Adaptors used: -

Item submitted by

Customer: ENSR ASIA (HK) LTD.
Address of Customer: -
Request No.: -
Date of request: 11-Mar-2009

Date of test: 13-Mar-2009

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	29-Jun-2009	SCL
Preamplifier	B&K 2673	2239857	02-Dec-2009	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Dec-2009	CEPREI
Signal generator	DS 360	61227	18-Jul-2009	CEPREI
Digital multi-meter	34401A	US36087050	03-Dec-2009	CIGISMEC
Audio analyzer	8903B	GB41300350	27-Nov-2009	CEPREI
Universal counter	53132A	MY40003662	11-Jul-2009	CEPREI

Ambient conditions

Temperature: 23 ± 1 °C
Relative humidity: 65 ± 10 %
Air pressure: 1000 ± 15 hPa

Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

Huang Jian-Min / Feng Jun Qi

Date: 17-Mar-2009

Company Chop:

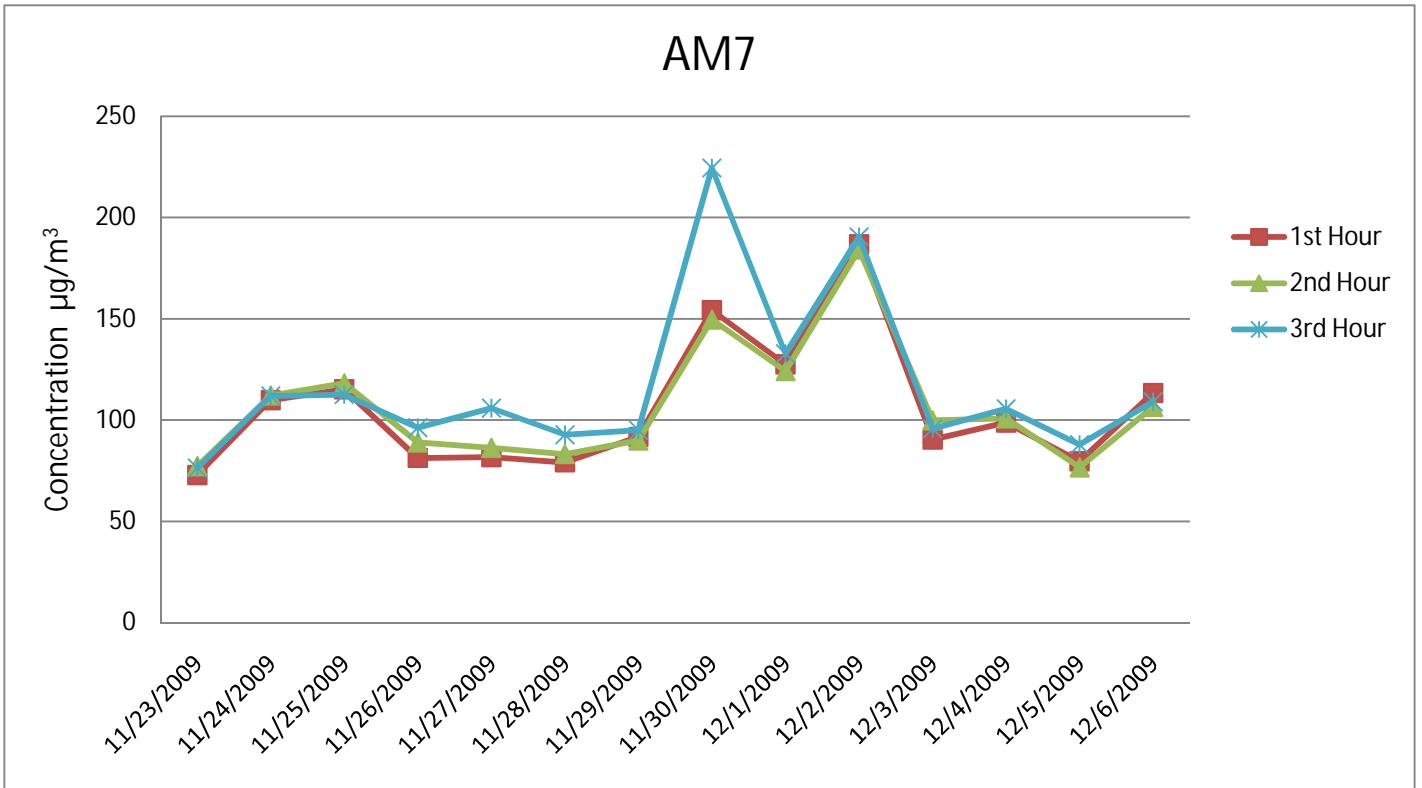


Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Appendix B
Baseline Air Quality Monitoring Results

1-hour TSP Monitoring Results at Station AM7
(Rooftop of West Kowloon No.2 Sewage Pumping Station)

Date	Start Time (hh:mm)	1st Hour	2nd Hour	3rd Hour
		Conc. ($\mu\text{g}/\text{m}^3$)	Conc. ($\mu\text{g}/\text{m}^3$)	Conc. ($\mu\text{g}/\text{m}^3$)
23-Nov-09	14:51	72.9	77.2	76.3
24-Nov-09	8:43	109.8	112.1	111.9
25-Nov-09	14:55	115.2	118.2	112.6
26-Nov-09	14:53	81.3	88.9	96.3
27-Nov-09	14:57	81.7	86.3	105.9
28-Nov-09	15:00	79.1	83.2	92.8
29-Nov-09	15:03	91.6	89.9	95.0
30-Nov-09	15:05	154.2	149.7	224.5
1-Dec-09	15:07	127.5	124.2	132.7
2-Dec-09	15:09	186.8	184.3	190.5
3-Dec-09	9:21	90.4	99.9	95.7
4-Dec-09	15:11	98.8	100.8	105.6
5-Dec-09	15:14	79.7	76.6	87.9
6-Dec-09	8:30	113.4	106.5	109.1
Average				109.9
Min				72.9
Max				224.5



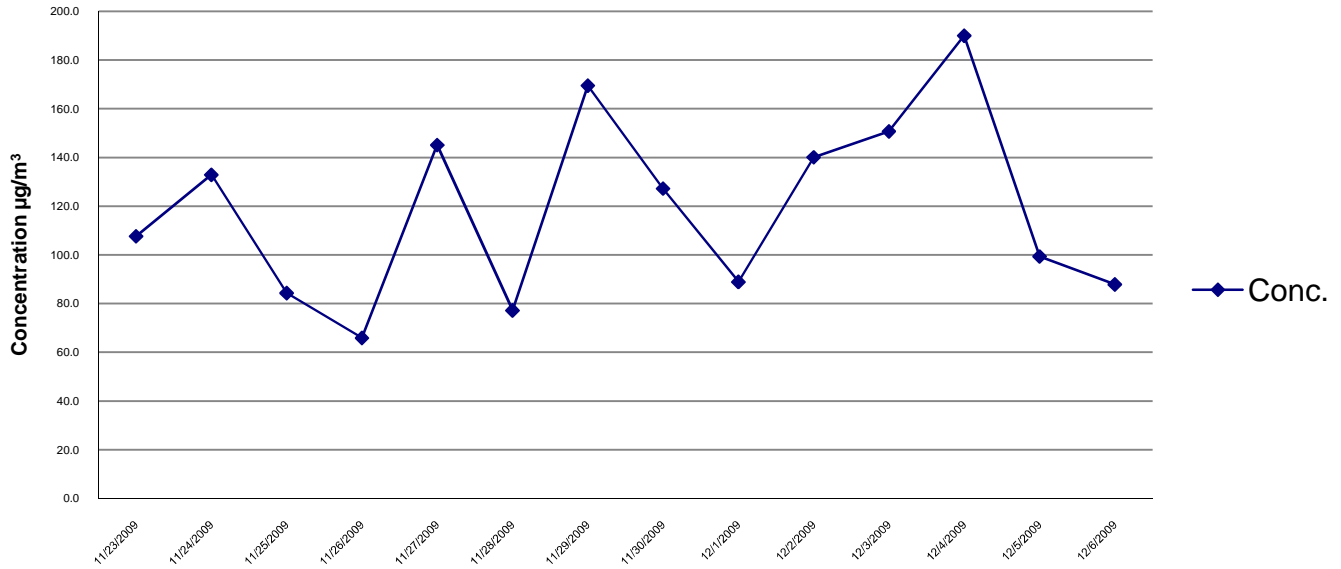
AECOM	HATS Stage 2A - Construction of Interconnection Tunnel and Diaphragm Wall for Main Pumping Station at SCISTW		SCALE	N.T.S.	DATE	Dec-09
	Graphical Presentation of baseline 1-hour TSP Monitoring Results		CHECK	ENFL	DRAWN	LCHC
			JOB NO.	60143571	APPENDIX No.	Rev.
				B		-

Appendix B
Baseline Air Quality Monitoring Results

24-hour TSP Monitoring Results at Station AM7 (Rooftop of West Kowloon No.2 Sewage Pumping Station)

Date	Weather Condition	Air Temp. (°C)	Atmospheric Pressure(hPa)	Flow Rate (m ³ /min.)		Av. flow (m ³ /min)	Total vol. (m ³)	Filter Weight (g)		Particulate weight(g)	Elapse Time		Sampling Time(hrs.)	Conc. (µg/m ³)
				Initial	Final			Initial	Final		Initial	Final		
23-Nov-09	Sunny	22.0	1018.7	1.30	1.30	1.30	1873.4	3.6381	3.8398	0.2017	5373.85	5397.85	24.00	107.7
24-Nov-09	Sunny	23.0	1016.4	1.30	1.30	1.30	1873.4	3.6038	3.8528	0.2490	5397.85	5421.85	24.00	132.9
25-Nov-09	Sunny	23.0	1016.5	1.30	1.30	1.30	1873.4	3.6014	3.7594	0.1580	5421.85	5445.85	24.00	84.3
26-Nov-09	Sunny	22.0	1016.4	1.30	1.30	1.30	1873.4	3.6417	3.7652	0.1235	5445.89	5469.89	24.00	65.9
27-Nov-09	Sunny	25.0	1017.2	1.30	1.30	1.30	1873.4	3.5838	3.8557	0.2719	5469.89	5493.89	24.00	145.1
28-Nov-09	Sunny	23.0	1018.8	1.30	1.30	1.30	1873.4	3.5886	3.7333	0.1447	5493.89	5517.89	24.00	77.2
29-Nov-09	Sunny	23.0	1020.2	1.30	1.30	1.30	1873.4	3.5947	3.9123	0.3176	5517.89	5541.89	24.00	169.5
30-Nov-09	Sunny	22.0	1021.4	1.30	1.30	1.30	1873.4	3.5998	3.8382	0.2384	5541.89	5565.89	24.00	127.3
1-Dec-09	Sunny	21.0	1021.5	1.30	1.30	1.30	1873.4	3.6001	3.7667	0.1666	5565.89	5589.89	24.00	88.9
2-Dec-09	Sunny	21.0	1020.9	1.30	1.30	1.30	1873.4	3.6001	3.8626	0.2625	5589.89	5613.89	24.00	140.1
3-Dec-09	Sunny	19.0	1021.3	1.30	1.30	1.30	1873.4	3.6121	3.8945	0.2824	5613.89	5637.89	24.00	150.7
4-Dec-09	Sunny	20.0	1019.8	1.30	1.30	1.30	1873.4	3.5877	3.9437	0.3560	5637.89	5661.89	24.00	190.0
5-Dec-09	Sunny	20.0	1019.7	1.30	1.30	1.30	1873.4	3.5838	3.7700	0.1862	5661.89	5685.89	24.00	99.4
6-Dec-09	Sunny	20.0	1018.2	1.30	1.30	1.30	1873.4	3.5772	3.7419	0.1647	5685.89	5709.89	24.00	87.9
													Average	119.1
													Min	65.9
													Max	190.0

AM7



**HATS Stage 2A - Construction of Interconnection Tunnel
and Diaphragm Wall for Main Pumping Station at
SCISTW**

**Graphical Presentation of baseline 24-hour TSP
Monitoring Results**

SCALE	N.T.S.	DATE	Dec-09
CHECK	ENFL	DRAWN	LCHC
JOB NO.	60143571	APPENDIX No.	B
		Rev.	-

Appendix C Baseline Noise Monitoring Results

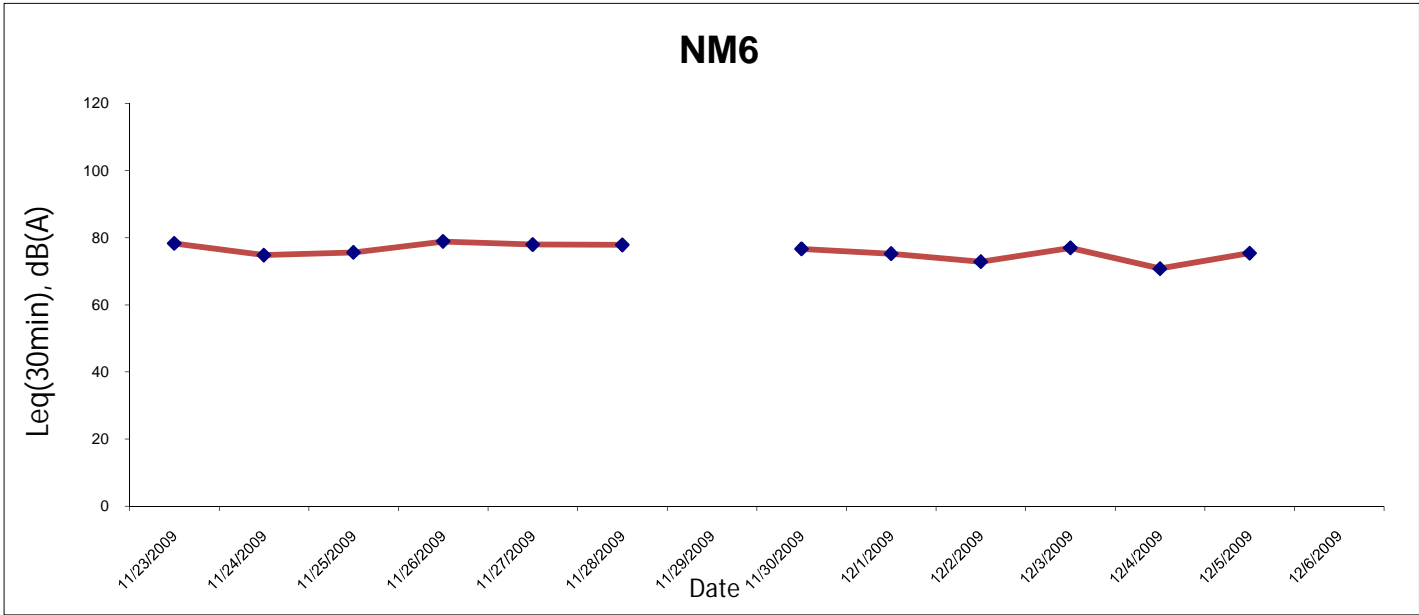
Location : NM6 Customs' Marine Base
(Block H of Government Dockyard) Rooftop

Daytime 07:00-19:00 hrs on Normal Weekdays

Date	Start Time hh:mm	End Time hh:mm	Noise Level for 30-min, dB(A)			
			Leg	L10	L90	
11/23/2009	13:28	13:58	78.3	79.3	76.5	
11/24/2009	10:23	10:53	74.8	76.2	72.6	
11/25/2009	8:33	9:03	75.6	76.5	74.2	
11/26/2009	12:45	13:15	78.9	79.7	77.8	
11/27/2009	12:10	12:40	78.0	79.1	76.1	
11/28/2009	16:45	17:15	77.9	78.5	76.8	
11/29/2009 #	N/A		N/A			
11/30/2009	13:55	14:25	76.7	77.3	75.5	
12/1/2009	12:18	12:48	75.2	76.6	73.5	
12/2/2009	12:28	12:58	72.9	74.1	71.4	
12/3/2009	12:18	12:48	77.0	78.4	75.2	
12/4/2009	12:10	12:40	70.8	74.5	66.5	
12/5/2009	12:20	12:50	75.4	76.1	74.7	
12/6/2009 #	N/A		N/A			
			Average	76.5	77.5	75.0
			Min	70.8	74.1	66.5
			Max	78.9	79.7	77.8

Remarks:

Public holiday



AECOM	HATS Stage 2A - Construction of Interconnection Tunnel	SCALE	N.T.S.	DATE	Dec-09
	and Diaphragm Wall for Main Pumping Station at	CHECK	ENFL	DRAWN	LCHC
	SCISTW	JOB NO.	60143571	APPENDIX No.	C
Graphical Presentation of Baseline Daytime Noise Monitoring Results on Normal Weekdays				Rev.	-

Appendix C Baseline Noise Monitoring Results

Location : NM6 Customs' Marine Base
(Block H of Government Dockyard) Rooftop

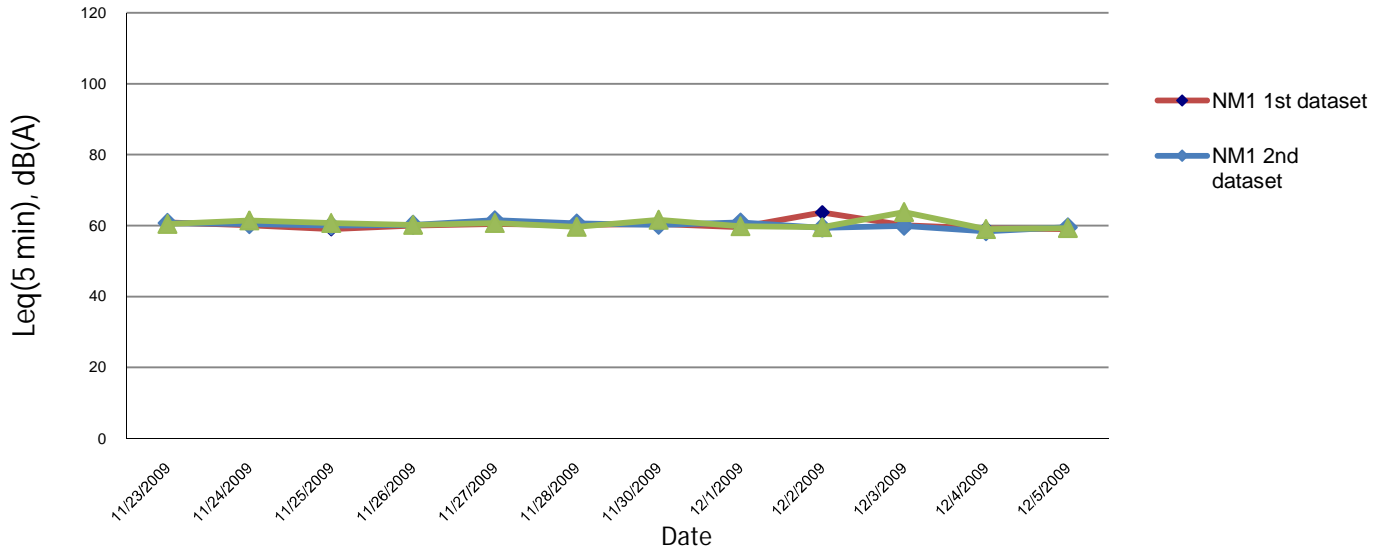
Evening time 19:00-23:00 hrs on Normal Weekdays

Date	Start Time	End Time	Noise Level for 5-min, dB(A)			
	hh:mm	hh:mm	Leq	L10	L90	
23-Nov-09	19:58	20:03	60.9	62.5	58.7	
	20:03	20:08	60.7	62.1	58.7	
	20:08	20:13	60.5	61.5	59.0	
24-Nov-09	19:03	19:08	60.1	61.0	59.0	
	19:08	19:13	60.4	61.0	59.0	
	19:13	19:18	61.4	63.0	59.0	
25-Nov-09	19:48	19:53	59.0	60.5	57.0	
	19:53	19:58	60.0	62.5	57.0	
	19:58	20:03	60.7	63.0	58.0	
26-Nov-09	20:45	20:50	60.0	62.0	57.5	
	20:50	20:55	60.2	62.5	57.0	
	20:55	21:00	60.2	62.0	58.0	
27-Nov-09	20:25	20:30	60.4	61.5	59.5	
	20:30	20:35	61.5	63.5	59.5	
	20:35	20:40	60.7	62.5	58.5	
28-Nov-09	21:45	21:50	60.2	62.0	58.0	
	21:50	21:55	60.6	62.5	58.5	
	21:55	22:00	59.6	61.0	57.5	
29-Nov-09 [#]	N/A		N/A			
30-Nov-09	21:58	22:03	60.4	62.0	58.0	
	22:03	22:08	60.2	62.0	58.0	
	22:08	22:13	61.6	63.5	59.0	
1-Dec-09	21:13	21:18	59.5	60.5	58.5	
	21:18	21:23	60.9	62.5	58.5	
	21:23	21:28	59.8	61.0	58.5	
2-Dec-09	20:08	20:13	63.7	66.5	58.5	
	20:13	20:18	59.4	60.5	58.0	
	20:18	20:23	59.5	61.0	58.0	
3-Dec-09	22:28	22:33	60.1	60.5	59.0	
	22:33	22:38	59.9	61.0	58.5	
	22:38	22:43	63.8	65.5	58.0	
4-Dec-09	22:25	22:30	59.2	60.2	57.7	
	22:30	22:35	58.4	59.9	56.7	
	22:35	22:40	59.0	60.1	57.0	
5-Dec-09	21:43	21:48	59.0	60.2	57.9	
	21:48	21:53	59.5	61.0	58.0	
	21:53	21:58	59.3	61.2	58.3	
6-Dec-09 [#]	N/A		N/A			
			Average	60.4	62.1	58.3
			Min	58.4	59.9	56.7
			Max	63.8	66.5	59.5

Remarks:

Public holiday

NM6



**HATS Stage 2A - Construction of Interconnection Tunnel
and Diaphragm Wall for Main Pumping Station at
SCISTW**

**Graphical Presentation of Baseline Evening Noise
Monitoring Results on Normal Weekdays**

SCALE	N.T.S.	DATE	Dec-09
CHECK	ENFL	DRAWN	LCHC
JOB NO.	60143571	APPENDIX No.	Rev.
		C	-

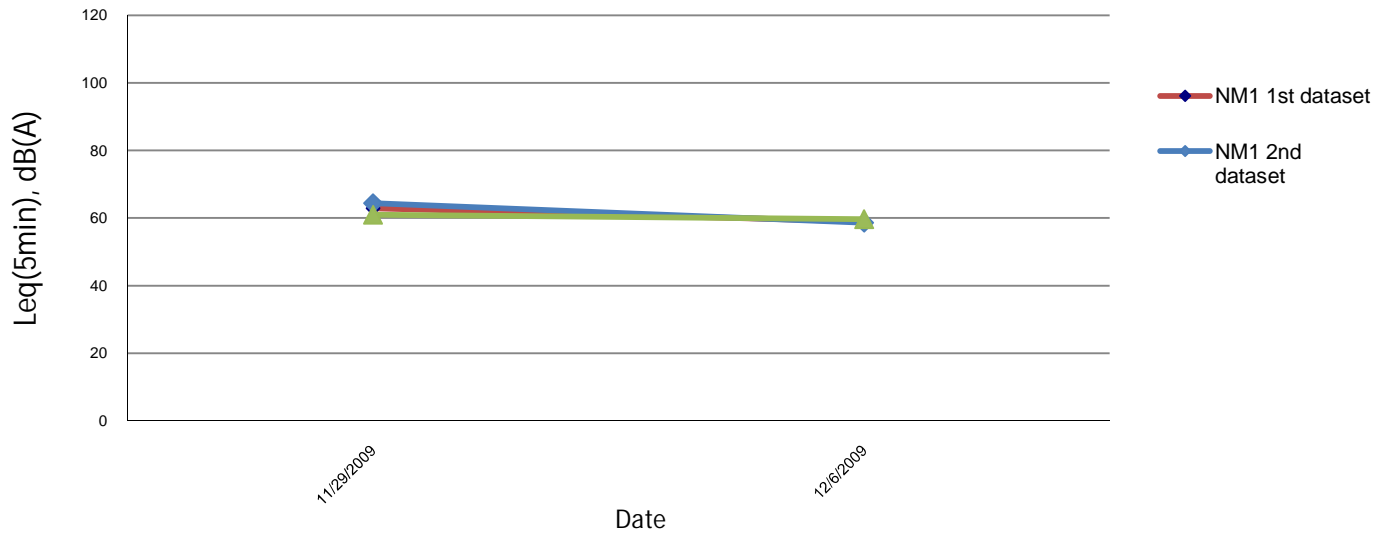
Appendix C Baseline Noise Monitoring Results

Location : NM6 Customs' Marine Base
(Block H of Government Dockyard) Rooftop

**Daytime and Evening time 07:00-23:00 hrs
on General Holidays and Sundays**

Date	Start Time hh:mm	End Time hh:mm	Noise Level for 5-min, dB(A)		
			Leq	L10	L90
29-Nov-09	9:55	10:00	62.9	67.0	59.5
	10:00	10:05	64.4	67.5	60.5
	10:05	10:10	61.0	62.5	59.0
6-Dec-09	22:30	22:35	59.0	60.3	57.5
	22:35	22:40	58.6	60.1	57.0
	22:40	22:45	59.7	60.2	57.8
Average			61.5	64.1	58.7
Min			58.6	60.1	57.0
Max			64.4	67.5	60.5

NM6



**HATS Stage 2A - Construction of Interconnection Tunnel
and Diaphragm Wall for Main Pumping Station at
SCISTW**

**Graphical Presentation of Baseline Daytime and
Evening Noise Monitoring Results on
General Holidays and Sundays**

SCALE	N.T.S.	DATE	Dec-09
CHECK	ENFL	DRAWN	LCHC
JOB NO.	60143571	APPENDIX No.	Rev.
		C	-

Appendix C Baseline Noise Monitoring Results

Location : NM6 Customs' Marine Base
(Block H of Government Dockyard) Rooftop

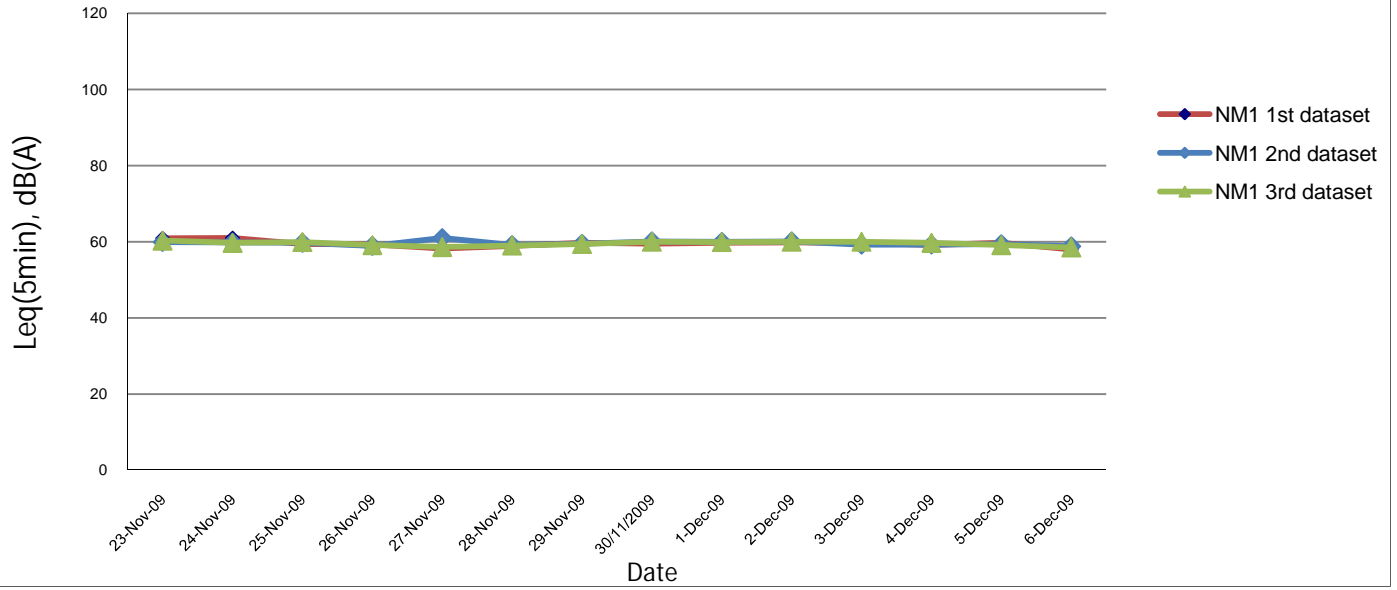
Night-time 23:00-07:00 hrs of the next day on All Days

Date	Start Time	End Time	Noise Level for 5-min, dB(A)		
	hh:mm	hh:mm	Leq	L10	L90
23-Nov-09	0:43	0:48	60.9	61.5	59.0
	0:48	0:53	59.9	60.0	59.0
	0:53	0:58	60.3	61.0	59.5
24-Nov-09	23:03	23:08	61.0	62.0	59.0
	23:08	23:13	59.8	61.0	58.0
	23:13	23:18	59.7	60.5	58.5
25-Nov-09	6:43	6:48	59.4	61.0	57.0
	6:48	6:53	59.7	61.0	58.0
	6:53	6:58	59.9	61.0	58.5
26-Nov-09	23:15	23:20	59.3	60.5	58.0
	23:20	23:25	58.9	60.0	57.0
	23:25	23:30	59.1	60.0	57.5
27-Nov-09	6:35	6:40	58.2	59.0	57.0
	6:40	6:45	61.0	59.0	56.5
	6:45	6:50	58.6	59.5	57.0
28-Nov-09	0:15	0:20	58.9	59.5	58.0
	0:20	0:25	59.1	60.0	58.0
	0:25	0:30	59.0	60.0	58.0
29-Nov-09	6:10	6:15	59.7	60.5	58.5
	6:15	6:20	59.5	60.0	58.5
	6:20	6:25	59.4	60.5	58.0
30-Nov-09	6:13	6:18	59.5	60.5	58.0
	6:18	6:23	60.1	60.5	58.5
	6:23	6:28	60.0	60.5	59.0
1-Dec-09	23:38	23:43	59.7	61.0	58.0
	23:43	23:48	60.0	61.0	58.5
	23:48	23:53	59.9	60.5	58.5
2-Dec-09	23:43	23:48	59.8	60.5	59.0
	23:48	23:53	60.1	60.5	59.0
	23:53	23:58	60.0	61.0	58.5
3-Dec-09	1:38	1:43	59.7	61.0	58.5
	1:43	1:48	59.2	60.0	58.5
	1:48	1:53	60.0	61.5	58.5
4-Dec-09	23:01	23:06	59.1	60.2	57.5
	23:06	23:11	59.2	60.4	58.1
	23:11	23:16	59.7	61.3	58.4
5-Dec-09	23:01	23:06	59.7	61.0	57.9
	23:06	23:11	59.4	60.8	58.4
	23:11	23:16	59.1	60.7	58.5
6-Dec-09	23:01	23:06	58.0	59.1	56.8
	23:06	23:11	58.8	60.0	57.2
	23:11	23:16	58.5	59.9	57.0
	Average		59.6	60.5	58.2
	Min		58.0	59.0	56.5
	Max		61.0	62.0	59.5

Remarks:

Public holiday

NM6



**HATS Stage 2A - Construction of Interconnection Tunnel
and Diaphragm Wall for Main Pumping Station at
SCISTW**

**Graphical Presentation of Baseline Night-time Noise
Monitoring Results on All Days**

SCALE	N.T.S.	DATE	Dec-09
CHECK	ENFL	DRAWN	LCHC
JOB NO.	60143571	APPENDIX No.	C
		Rev.	-