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ATAL-DEGREMONT-CHINA HARBOUR JOINT VENTURE

CONTRACT NO. DC/2013/10 - DESIGN, BUILD AND OPERATE SAN WAI SEWAGE TREATMENT WORKS – PHASE 1

MONTHLY EM&A REPORT NO. 1

(16 MAY – 31 MAY 2017)

Prepared by: _____
LO, Ting Yi

Certified by: _____
LAU, Chi Leung
Environmental Team Leader

Issued Date: 10 June 2017 *Report No.: ENA73278*

ANEWR

Drainage Services Department
Sewage Services Branch
Harbour Area Treatment Scheme
5/F, Western Magistracy
2A Po Fu Lam Road
Hong Kong

Your reference:

Our reference: HKDSD203/50/104406

Date: 3 July 2017

Attention: Ms Carol Ho

BY EMAIL & POST
(email: carolho@dsd.gov.hk)

Dear Sirs

Agreement No. HATS 02/2016
Services for Independent Environmental Checker (IEC) for
Contract No. DC/2013/10 – Design, Build and Operate San Wai Sewage Treatment Works – Phase 1
Revised Monthly Environmental Monitoring and Audit Report No.1 (May 2017)

We refer to email of 3 July 2017 from ETS-Testconsult Limited attaching the revised Monthly Environmental Monitoring and Audit Report No.1 (May 2017).

We have no comment and hereby verify the revised Monthly Environmental Monitoring and Audit Report No.1 (May 2017) in accordance with Clause 5.4 of the Environmental Permit no. EP-464/2013.

Should you have any queries, please do not hesitate to contact the undersigned or our Mr Nic Lam on 2618 2836.

Yours faithfully
ANEWR CONSULTING LIMITED

Adi Lee
Independent Environmental Checker

LYMA/LHHN/WCKJ/lhmh

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According to the Section 25 of the Particular Specification (PS) and the Environmental Permit No. EP-464/2013, 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-072/2003). The scope of monitoring works includes air quality, construction noise, water quality and environmental site audit.

Baseline monitoring was completed in April 2017. Action and Limit Levels were established for air quality, noise and water quality parameters based on the baseline monitoring results.

This is the first Monthly Environmental Monitoring and Audit (EM&A) Report for the Contract which summaries findings of the EM&A works conducted during the reporting period from 16 May 2017 to 31 May 2017.

Site Activities

As informed by the Contractor, site activities were carried out in this reporting month:

- *Piling Foundation (Prebored H-pile)*
- *Piling Foundation (Driven H-pile)*
- *Portion 5 (Access Road) Works*
- *Drainage Outlet connection (Effluent Connection to the Existing Junction Chamber)*

Environmental Monitoring and Audit Progress

The monthly EM&A programme was undertaken in accordance with the EM&A Manual for this Contract. The summary of the monitoring activities in this reporting month is listed below:

- *24-hour TSP Monitoring: 3 Occasions at 2 designated locations*
- *1-hour TSP Monitoring: 9 Occasions at 2 designated locations*
- *Noise Monitoring (Day-time): 3 Occasion at 2 designated locations*
- *Water Quality Monitoring: 7 Occasions at 1 designated location*
- *Weekly Site inspection: 2 Occasions*

Air Quality Monitoring

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

Noise Monitoring

No exceedance of Action and Limit levels for noise monitoring was recorded in the reporting month.

Water Quality Monitoring

According to the summary of water monitoring results, no exceedance of Action and Limit levels was recorded in this reporting month.

Weekly Site Inspections

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 5.0**.

Complaint Log
There was no complaint received in relation to the environmental impact during the reporting period.

Notifications of Summons and Successful Prosecutions

There were no notifications of summons or prosecutions received during the reporting period.

Reporting Change

There were no reporting changes during the reporting period.

Future Key Issues

The future key issues to be undertaken in the upcoming month are as follows:

- *Piling Foundation (Prebored H-pile)*
- *Piling Foundation (Driven H-pile)*
- *Portion 5 (Access Road) Works*
- *Drainage Outlet connection (Effluent Connection to the Existing Junction Chamber)*
- *Diversion of Existing Street Lighting and Traffic Sign;*
- *Civil Works by ADCJV for HyD's Diversion of Existing Street Lighting and Traffic Signs;*
- *Civil Works by ADCJV for WSD's Diversion of Existing Watermains;*
- *Civil Works by ADCJV between Site Boundary for WSD's Diversion of Existing Watermains*

1. INTRODUCTION

1.1. Basic Project Information

1.1.1. This Monthly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract No. DC/2013/10 - Design, Build and Operate San Wai Sewage Treatment Works – Stage 1 (the Project) (hereafter referred to as "the Contract"). The Contract was awarded to ATAL-DEGREMONT-CHINA HARBOUR JOINT VENTURE (ADCJV) by the Drainage Services Department (DSD) and ETS-Testconsult Limited was appointed as the Environmental Team (ET) by ADCJV to implement the EM&A program in compliance with the EP and the EM&A Manuals.

1.1.2. The project involves expansion of the preliminary treatment works at San Wai STW from 164,000 m^3/d to 200,000 m^3/d Average Dry Weather Flow, upgrading the preliminary treatment level to CEPT and adding centralized disinfection. The site layout plan is shown in **Appendix A**.

1.1.3. According to the Section 25 of the Particular Specification (PS) and the Environmental Permit No. EP-464/2013, an EM&A programme should be implemented by an independent Environmental Team (ET) in accordance with the procedures and requirements in the EM&A Manual of the approved EIA report (Registration No. AEIAR-072/2003).These documents are available through the EIA Ordinance Register. The construction works of the Contract commenced on 16 May 2017.

1.1.4. The scope of monitoring works includes air quality, construction noise, water quality and environmental site audit. 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.*

1.1.5. As part of the project EM&A program, baseline monitoring was conducted from 21 March 2017 to 15 April 2017 to determine the ambient environmental conditions before the project commence any major construction works and it had been verified by IEC and endorsed by EPD.

1.1.6. This is the first Monthly Environmental Monitoring and Audit (EM&A) Report for the Contract which summaries the audit findings of the EM&A programme during the reporting period from 16 May to 31 May 2017.

1.2. Project Organization

1.2.1. The project organization structure and lines of communication with respect to the on-site environmental management structure is shown in **Appendix B**. The key personnel contact names and numbers are summarized in **Table 1.1.**

Table 1.1 Contact Information of Key Personnel

Party	*Position*	*Name of Key Staff*	*Tel. No.*	*E-mail*
Supervising Officer (AECOM Asia Co. Ltd.)	*Resident Engineer*	*Mr. Patrick Leung*	*5222 6561*	*patrick.leung@swstw-aecom.com*
Independent Environmental Checker (ANewR Consulting Limited)	*Technical Director*	*Mr. Adi Lee*	*2618 2836*	*aymlee@anewr.com*
	Senior Environmental Consultant	*Mr. Nic Lam*	*2618 2836*	*nhhlam@anewr.com*
Contractor (ATAL-DEGREMONT-CHINA HARBOUR JOINT VENTURE)	*Environmental Officer*	*Mr. Johnny So*	*9513 8899*	*johnny.so@c302.chechk.com*
	Environmental Supervisor	*Ms Cherry Ye*	*6237 1125*	*cherry.ye@c302.chechk.com*
Environmental Team (ETS-Testconsult Ltd.)	*Environmental Team Leader*	*Mr. C. L. Lau*	*2946 7791*	*env@ets-testconsult.com*

1.3. Construction Programme

1.3.1. A copy of the Contractor's construction programme is provided in **Appendix C**.

1.4. Construction Works Undertaken During the Reporting Period

1.4.1. A summary of the construction activities undertaken during this reporting period is shown below:

- *Piling Foundation (Prebored H-pile)*
- *Piling Foundation (Driven H-pile)*
- *Portion 5 (Access Road) Works*
- *Drainage Outlet connection (Effluent Connection to the Existing Junction Chamber)*

2. AIR QUALITY MONITORING

2.1. Monitoring Requirements

2.1.1. 1-hr and 24-hr TSP levels were monitored in the reporting month in accordance with the EM&A Manual. Two air monitoring location were selected which was shown in **Figure 1**.

2.2. Monitoring Equipment

1-hour TSP Monitoring

1-hour TSP levels were measured by using dust meter which are capable of producing comparable results as the by high volume sampling method, to indicate short event impacts. The dust meter is compliant to the clause 1.2.5 of "General Technical Requirement of Environmental Monitoring" and clause 2.2 of "Generic Environmental Monitoring and Audit Manual".

Table 2.1 summarized the dust meter model used during the baseline monitoring. Copies of calibration certificates for dust meters were attached in **Appendix D1**.

Table 2.1 Air Quality Monitoring Equipment

Equipment	***Model***
Dust Meter	*SIBATA LD-3B*
High volume sampler (HVS)	*Greasby GMW (GS2310)*
Calibrator	*Tisch TE-5025A*

1-hr air quality monitoring (Dust Meter)

Measuring Procedures

The measuring procedures of the dust meter are in accordance with the Manufacturer's instruction Manual as follows:

- Press POWER to ON, check the battery indicator to ensure whether the power supply is enough to conduct the TSP monitoring;
- Press TIMER SET to Manual;
- Press START/STOP SWITCH to start the TSP monitoring;
- Press START/STOP SWITCH to stop the TSP monitoring after monitoring complete;
- Record measured COUNT directly from the dust meter and calculate the TSP level by using the equation of the certificate.

Maintenance & Calibration (QA/QC)

- Dust meter should be checked at 3-month intervals and calibrated at half-year intervals throughout all stages of air quality monitoring.

24-hr air quality monitoring (HVS)

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 0.6m^3/min and 1.7m^3/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 (Whatman G653) 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 month 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 recoded.
- Before weighting, all filters were equilibrated in desiccators for 24 hour with the temperature of 25^oC $\pm$ 3^oC and the relative humidity (RH) <50% $\pm$5%.

Maintenance & Calibration (QA/QC)

- 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

Wind data (wind speed and wind direction) were directly extracted from Wetland Park Station of Hong Kong Observatory. All wind data during this reporting month are shown in **Appendix G**.

2.3. Monitoring Parameters, Frequency and Duration

2.3.1. **Table 2.2** summarizes the monitoring parameters, monitoring duration and frequencies of impact air quality monitoring.

Table 2.2 Monitoring Parameters, Duration and Frequencies of Impact Air Quality Monitoring

Parameter	***Duration***	***Frequency***
1-hr TSP	*1 hr (0800-1900)*	*Three times per 6 days*
24-hr TSP	*24 hr*	*Once per 6 days*

2.3.2. In this reporting period, a total of 9 occasions of 1-hour TSP monitoring and 3 events of 24-hour TSP monitoring were undertaken and the schedule was shown in **Table 2.3**

Table 2.3 Time Schedule of Impact Air Quality Monitoring

May 2017						
Sunday	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
	1	2	*3*	*4*	5	*6*
7	8	9	*10*	*11*	*12*	*13*

14	15	*16*	*17*	*18*	*19* ▼	*20*
21	22	23	*24*	*25* ▼	*26*	*27*
28	29	30	*31* ▼			

Remark: (▼) = Air quality monitoring carried out by ET.

2.4. Action and Limit Levels

The criteria for Action and Limit levels have been set out in the contract document of the Project as follows:

Table 2.4 The criteria of Action and Limit Levels for Air Quality

Parameters	***Action***	***Limit***
1-hour TSP Level ($\mu g/m^3$)	*For baseline level $\leq$ 384$\mu g/m^3$, Action level = (baseline level plus*1.3 + Limit Level) / 2*	*500 $\mu g/m^3$*
	For baseline level >384$\mu g/m^3$, Action level = Limit Level	
24-hour TSP Level ($\mu g/m^3$)	*For baseline level < 200$\mu g/m^3$, Action level = (baseline level plus*1.3 + Limit Level) / 2*	*260 $\mu g/m^3$*
	For baseline level $\geq$ 200$\mu g/m^3$, Action level = Limit Level	

Following the criteria shown in **Table 2.4**, the Action and Limit levels for 1-hour TSP derived as illustrated in **Table 2.5**.

Table 2.5 Action and Limit Levels for 1-hour TSP and 24-hour TSP

Air Quality Monitoring Station	***1-hr TSP ($\mu g/m^3$)***		***24-hr TSP ($\mu g/m^3$)***	
	Action Level	***Limit Level***	***Action Level***	***Limit Level***
ASR1a	*309*	*500*	*260*	*260*
ASR2a	*292*	*500*	*228*	*260*

2.5. Results and Observations

2.5.1. 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 D2**. Graphical presentation of 1-hour and 24-hour TSP monitoring results for the reporting month is shown in **Appendix D3**. Wind data included wind speed and wind direction was extracted from Wetland Park Station of Hong Kong Observatory during this reporting month and is presented in **Appendix G**.

No exceedance of Action and Limit Level of 1-hr TSP and 24-hour TSP monitoring results was recorded during the reporting month.

2.5.2. Observation

Generally, 1-hour TSP and 24-hour TSP monitoring results fluctuated well below the Action Level in this reporting period. The major dust source observed near the monitoring stations was mainly from vehicles passing by the container yards and general earth works. It can be concluded that the contractor implemented sufficient dust mitigation measures during this reporting month.

2.6. Event and Action Plan

If the impact monitoring results exceed the Action and Limit Levels, the actions specified in **Table 2.6** shall be carried out.

Table 2.6 Event and Action Plan for Air Quality (Dust) during Construction Phase

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

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions; 6. Keep EPD and ER informed of the results.	on the possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly.	Contractor's working methods; 4. Discuss with IEC and Contractor on potential remedial actions; 5. Ensure remedial actions properly implemented.	working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Limit Level being exceeded for two or more consecutive samples	1. Identify source; 2. Inform IEC, ER and EPD the causes & actions taken for the exceedances; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Investigate the causes of exceedance; 6. Arrange meeting with EPD and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep EPD and ER informed of the results; 8. If exceedance stops, cease additional	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with Contractor on the possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Supervise the implementation of mitigation measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 4. Discuss with IEC and the Contractor on potential remedial actions; 5. Review Contractor's remedial actions whenever necessary to assure their effectiveness; 6. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not resolved; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	monitoring.		portion of work until the exceedance is abated.	

3. NOISE MONITORING

3.1. Monitoring Requirements

3.1.1. Noise levels (L_{eq}, L_{10} and L_{90}) were monitored in the reporting month in accordance with the EM&A Manual.

3.2. Monitoring Equipment

Sound level meters used for impact noise monitoring were Type 1 sound level meters capable of giving a continuous readout of the noise level reading including equivalent continuous sound pressure level (L_{eq}) and percentile sound pressure level (Lx). They complied with International Electro technical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). **Table 3.1** summarized the noise monitoring equipment model used during the baseline monitoring. Copies of calibration certificates for noise meters and calibrators were attached in **Appendix E1**.

Table 3.1 Noise Monitoring Equipment

Noise Monitoring Equipment	***Model***
Sound Level Meter	*Rion NL-31 / Rion NL-52*
Sound Level Calibrator	*Rion NC-73 / Castle GA607*

3.3. Monitoring Duration and Frequency

3.3.1. Impact noise monitoring for the A-weighted levels L_{eq}, L_{10} and L_{90} in 30-minute interval was recorded once per 6 days.

3.3.2. In this reporting period, a total of 3 occasions of noise monitoring were undertaken and the schedule was shown in **Table 3.2**

Table 3.2 Time Schedule of Impact Noise Monitoring

May 2017						
Sunday	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
	1	2	*3*	*4*	5	*6*
7	8	9	*10*	*11*	*12*	*13*
14	15	*16*	*17*	*18*	*19* ▼	*20*
21	22	23	*24*	*25* ▼	*26*	*27*
28	29	30	*31* ▼			

Remark: (▼) = Noise monitoring carried out by ET.

3.4. Monitoring Locations

Two noise monitoring stations, NSR1a (晉榮貨櫃服務有限公司) and NSR2a (永康貨櫃服務有限公司) which shown in **Figure 1**, were required to perform impact noise monitoring.

The impact noise monitoring programme was summarized in **Table 3.3**.

Table 3.3 Noise Monitoring Stations

Noise monitoring station	*Type of Measurement*
NSR1a	*Façade*
NSR2a	*Free Field*

3.5. Monitoring Methodology

Instrumentation

Integrating Sound Level Meters were employed for noise monitoring.

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 1 dB(A), the measurement would be considered invalid and repeat measurement would be required after re-calibration or repair of the equipment.
- 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.
- 3dB(A) correction had been added to the results if noise measurements were free-field.
- Noise monitoring would be cancelled in the presence of fog, rain, storm, wind with a steady speed exceeding 5m/s, or wind gusts exceeding 10m/s.

Maintenance and Calibration (QA/QC)

- The microphone head of the sound level meter and calibrator are cleaned with soft cloth at quarterly intervals.
- The meters are sent to the HOKLAS accredited laboratory or equivalent to check and calibrated at yearly intervals.

3.6. Actions and Limit Level

The Action and Limit Levels were established in **Table 3.4** for noise monitoring.

Table 3.4 Action and Limit Levels for Noise Monitoring

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

Remark: (*)70dB(A) for schools and 65dB(A) for schools during school examination period

3.7. Results and Observations

3.7.1. Results

Monitoring data of noise monitoring carried out in this reporting month are summarized in **Appendix E2**. Graphical presentation of 1-hour and 24-hour TSP monitoring results for the reporting month is shown in **Appendix E3**.

No exceedance of Action and Limit Level of noise monitoring results was recorded during the reporting month.

3.7.2. Observation

The noise monitoring data were found to be lower than the limit level. The major noise source during the monitoring event was the vehicles passing through the container yard entrance and the general earth works inside the construction site.

3.8 Event and Action Plan

If the impact monitoring results exceed the Action and Limit Levels, the actions specified in **Table 3.5** shall be carried out.

Table 3.5 Event/Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action level	1. Notify IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC and Contractor; 4. Discuss with the Contractor and formulate remedial measures ; 5. Increase monitoring frequency to check the effectiveness of mitigation measures.	1. Review the analyzed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure mitigation measures are properly implemented.	1. Submit noise mitigation proposal to IEC; 2. Implement noise mitigation proposals.
Limit level	1. Notify IEC, ER, EPD & Contractor; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency; 5. Carry out	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to	1. Confirm receipt of notification in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise	1. Undertake immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification;

	analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess the effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	problem; 4. Ensure mitigation 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.	3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by ER, until the exceedance is abated.

4. WATER QUALITY MONITORING

4.1. Monitoring Requirements

4.1.1. Water quality was monitored in the reporting month in accordance with the EM&A Manual at the one alternative water quality monitoring station, R1b (at Tin Shui Wai Nullah) which shown in **Figure 2.**

4.2 Monitoring Methodology and Equipment

For In-situ Water Quality Measurement

Dissolved Oxygen (DO) measuring equipment

A portable, weatherproof DO-measuring meter with built-in salinity compensation (e.g. YSI 85, YSI Pro 2030 or equivalent) was used in the baseline monitoring. It can be capable for measuring dissolved oxygen level in the range of 0-20 mg/L and 0-200 % saturation.

For Water Sampling and Sample Analysis

Water Sampler

A water sampler comprising a metal bucket was lowered into the water body.

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, labeled with a unique sample ID and sealed with a screw cap. The water samples were stored in a cool box maintained at 4^{o}C. The water samples will then be delivered to Environmental Laboratory of ETS-Testconsult Ltd (HOKLAS Registration No. 022) on the same day for analysis according to the Standard Method APHA 19ed.

The summary of testing methods of testing parameters required was shown in **Table 4.1**.

Table 4.1 Summary of Testing Procedures for water samples

Parameters	***Testing Procedure***	***Detection Limit***
Turbidity	*Dissolved Oxygen Meter Measurement*	*0.1 NTU*
Dissolved Oxygen	*In house method refer to APHA 19th ed 2130 B*	*0.01 mg/L*
Total suspended solids	*In house method refer to APHA 19th ed 2540D*	*0.1 mg/L*

4.3 Monitoring Frequency

4.3.1 Water samples were collected 3 times per week in 1 monitoring station. Three parameters including turbidity, dissolved oxygen and total suspended solids would be tested.

Table 4.2 Monitoring Frequency of Water Quality Monitoring

Parameters	***Frequency***	***No. of sampling stations***
Turbidity	*3 times per week*	*1 station*
Dissolved Oxygen		
Total suspended solids		

4.3.2 In this reporting period, a total of 7 occasions of water quality monitoring were undertaken and the schedule was shown in **Table 4.3**

Table 4.3 Time Schedule of Impact Water Quality Monitoring

May 2017						
Sunday	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
	1	2	*3*	*4*	5	*6*
7	8	9	*10*	*11*	*12*	*13*
14	15	*16* ▼	*17*	*18* ▼	*19*	*20* ▼
21	22	23 ▼	*24*	*25* ▼	*26*	*27* ▼
28	29 ▼	30	*31*			

Remark: (▼) = Water quality monitoring carried out by ET.

4.4 Quality Assurance (QA) / Quality Control (QC)

For in-situ measurements, at each measurement / sampling, two consecutive measurements of turbidity and dissolved oxygen (DO) were taken. The probes were retrieved out of the water after the first measurement and then re-deployed for the second measurement. If the difference between the first and second measurement is greater than 25% the reading will be discarded and the measurements will be repeated.

For laboratory analysis of water, test method of all test parameters and the QA/QC samples were carried out in accordance with the requirements of HOKLAS.

For our QA/QC procedure, one QC sample, one duplicate sample and one sample spike of every batch of 20 samples were analyzed.

4.5 Actions and Limit Levels

The criteria for Action and Limit Levels have been set out as follows:

Table 4.4 The criteria of Action and Limit Levels for Water Quality

Parameters	*Unit*	*Action Level*	*Limit Level*
Turbidity	*NTU*	95%ile of baseline data	99%ile of baseline data
Dissolved Oxygen	*mg/L*	5%ile of baseline data	1%ile of baseline data
Suspended solids	*mg/L*	95%ile of baseline data	99%ile of baseline data

Following the criteria shown in **Table 4.4**, the Action and Limit Levels for monitoring parameters derived as illustrated in **Table 4.5**.

Table 4.5 Action and Limit Levels for Water Quality

Parameters	*Unit*	*Action*	*Limit*
Turbidity	*NTU*	*19.8*	*20.5*
Dissolved Oxygen	*mg/L*	*1.84*	*1.81*
Suspended Solid	*mg/L*	*17.0*	*17.8*

4.6 Result and Observation

4.6.1 Result

Monitoring data of water quality monitoring carried out in this reporting month are summarized in **Appendix F2**. Graphical presentation of the monitoring results for the reporting month is shown in **Appendix F3**.

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

4.6.2 Observation

Generally, the turbidity and suspended solids were found to be lower than the action level. However, there was a trial of suspended solid collected on 20th May 2017 was found to be higher than the action and limit level. However, the result of suspended solid of the duplicate sample was found to be 16.0 mg/L which was lower than the action and limit level. Since the difference between two samples was less than 25% and thus it was concluded that the two results were valid. The variation between these two results may due to the water flow. The suspended solid may flow with the current and thus randomly sampling may resulted in different data. As the duplicate result was instantly sampled and no exceedance was recorded, the exceedance of suspended solid in Trial 1 may due to random error. Therefore, no exceedance of suspended solid was concluded on 20th May 2017. Besides, all results of dissolved oxygen measured in this reporting month were higher than the action level.

4.7 Event and Action Plan

If the impact monitoring results of the individual parameters exceed the Action and Limit Levels, the actions specified in **Table 4.6** shall be carried out.

Table 4.6 Event and Action Plan for Water Quality

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on	1. Discuss with IEC on the proposed mitigation measures; 2. make agreement on	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
	compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Repeat measurement on next day of exceedance.	mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	unacceptable practice; 3. Check all plant and equipment 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER; 6. Implement the agreed mitigation measures.
Action Level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
	frequency to daily; 8. Repeat measurement on next day of exceedance.			
Limit Level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit Level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods;	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment;

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
	and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days.	the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	3. Make agreement on the mitigation measures to be 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.	4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures; 7. As directed by the ER, to slow down or to stop all or part of the marine work or construction activities.

5. ENVIRONMENTAL SITE INSPECTION AND AUDIT

5.1. Site Inspection

5.1.1. Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control mitigation measures for the project. During the reporting period, site inspections were carried out on 19 & 26 May 2017.

5.1.2. Observations for the site inspections within this reporting period are summarized in **Table 5.1** and inspection checklists are attached in **Appendix H**.

Table 5.1 Summary of observation of site inspections

Date	Observations / Reminders	Follow-up Action	Closed Date
19 May 2017	1. Storage of dusty materials without impervious sheet was observed Reminder 1 – The contractor was reminded to provide sandbags for preventing washout of soil/sand.	1. Impervious sheet was provided for covering the dusty materials.	26 May 2017
26 May 2017	1. Stagnant pool in drip trays was observed. Follow-actions for outstanding observation will be inspected during the next	1. Follow-up actions for outstanding observation will be inspected during the next site inspection.	--

	site inspection. Reminder 1 – The contractor was reminded to provide temporary washing facilities with high pressure water jet before the completion of wheel washing bay. Reminder 2 – The contractor was reminded to provide seal between hoarding and the ground.		

5.2. Advice on the Solid and Liquid Waste Management Status

5.2.1. All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil

5.2.2. The quantities of waste for disposal in this Reporting Period are summarized in **Table 5.2** and **Table 5.3** and the Monthly Summary Waste Flow Table is shown in **Appendix I**. Whenever possible, materials were reused on-site as far as practicable.

Table 5.2 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity	Disposal Location
Reused in this Contract (Inert) (m^3)	0	--
Reused in other Projects (Inert) (m^3)	0	--
Disposed as Public Fill (Inert) (m^3)	1,762	Tuen Mun 38 Fill Bank

Table 5.3 Summary of Quantities of C&D Materials

Type of Waste	Quantity	Disposal Location
Recycled Metal (kg)	0	--
Recycled Paper / Cardboard Packing (kg)	0	--
Recycled Plastic (kg)	0	--
Chemical Wastes (kg)	0	--
General Refuses (m^3)	1,540	North East New Territories (NENT) Landfill

5.2.3. To control over the site performance on waste management, the Contractor shall ensure that all solid and liquid waste management works are in full compliance with the relevant license/permit requirements, such as the effluent discharge license and the chemical waste producer registration. The Contractor is also reminded to implement the recommended environmental mitigation measures according to the EM&A Manual based on actual site conditions.

5.3. Discharge License and Results of Effluent Monitoring

5.3.1. Effluent quality was monitored in the reporting month in accordance with the EM&A Manual at the discharge point. A discharge license under Water Pollution Control Ordinance was obtained by the Contractor upon commencement of the Project. Self-monitoring would be performed as per the requirement under the discharge license.

5.3.2. During the reporting period, no effluent monitoring was conducted by the Contractor since there was no discharging activities were undertaken on May 2017.

5.4. Environmental Licenses and Permits

5.4.1. The valid environmental licenses and permits during the reporting period are summarized in **Appendix J**.

5.5. Implementation Status of Environmental Mitigation Measures

5.5.1. The environmental mitigation measures that recommended in the Environmental Monitoring and Audit Manual covered the issues of dust, noise and waste and they are summarized as following:

Dust Mitigation Measures

a. The working area for the uprooting of trees, shrubs, or vegetation or for the removal of boulders, poles, pillars or temporary or permanent structures should be sprayed with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet;
b. All demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures, debris, rubbish and other items arising from site clearance) that may dislodge dust particles should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition;
c. Vehicle washing facilities including a high pressure water jet should be provided at every discernible or designated vehicle exit point;
d. The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;
e. Where a site boundary adjoins a road, street, service and or other area accessible to the public, hoarding of not less than 2.4m from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit;
f. Every main haul road (i.e. any course inside a construction site having a vehicle passing rate of higher than 4 in any 30 minutes) should be paved with concrete, bituminous materials, hardcores or metal plates, and kept clear of dusty materials; or sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet;
g. The portion of any road leading only to a construction site that is within 30m of a discernible or designated vehicle entrance or exit should be kept clear of dusty materials;
h. Immediately before leaving a construction site, every vehicle should be washed to remove any dusty materials from its body and wheels;
i. Where a vehicle leaving a construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle;
j. The working area of any excavation or earth moving operation should be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet;
k. Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabilizer within 6 months after the last construction activity on the construction site or part of the construction site where the exposed earth lies;
l. Any stockpile of dusty material should be either covered entirely by impervious sheeting; placed in an area sheltered on the top and the 3 sides; or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet.

Noise Mitigation Measures

a. Quiet plants should be used in order to reduce the noise impacts to protect the nearby NSRs.

b. Temporary and Movable Noise Barriers should be used in order to reduce the noise impact to the surrounding sensitive receivers
c. The contractor should site noisy equipment and activities as far from sensitive receivers as practical.
d. Idle equipment should be turned off or throttled down.
e. Construction activities should be planned so that parallel operation of several sets of equipment close to a given receiver is avoided
f. Construction plant should be properly maintained and operated.

Water Quality Mitigation Measures

a. Exposed stockpiles should be covered with tarpaulin or impervious sheets before a rainstorm occurs;
b. The exposed soil surfaces should also be properly protected to minimize dust emission;
c. The stockpiles of materials should be placed in the locations away from the drainage channel so as to avoid releasing materials into the channel;
d. Wheel washing facilities should be provided at site exits to ensure that earth, mud and debris would not be carried out of the works areas by vehicles;
e. Provision of site drainage systems and treatment facilities would be required to minimize the water pollution;
f. A discharge license needs to be applied from EPD for discharging effluent from the construction site;
g. The treated effluent quality is required to meet the requirements specified in the discharge license;
h. Provision of chemical toilets is required to collect sewage from workforce. The chemical toilets should be cleaned on a regular basis;
i. A licensed waste collector should be employed to clean the chemical toilets and temporary storage tank on a regular basis;
j. Illegal disposal of chemicals should be strictly prohibited;
k. Registration as a chemical waste producer is required if chemical wastes are generated and need to be disposed of. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes;
l. Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance should be used as a guideline for handing chemical wastes;
m. The impact from accidental spillage of chemicals can be effectively controlled through good management practices.

Waste Management Mitigation Measures

a. Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
b. To encourage collection of aluminium cans by individual collectors, separate bins should be provided to segregate this waste from other general refuse generated by the workforce;
c. Any unused chemicals or those with remaining functional capacity should be recycled;
d. Prior to disposal of C&D waste, it is recommended that wood, steel and other metals be separated for re-use and/or recycling and inert waste as fill material to minimize the quantity of waste to be disposed of to landfill;
e. Proper storage and site practices to minimize the potential for damage or contamination of construction materials; and
f. Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste.

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

5.6. Summary of Exceedance of the Environmental Quality Performance Limit

5.6.1. There was no Action and Limit level exceedance of 1-hour and 24-hr TSP monitoring was recorded at station ASR1a and ASR2a during this reporting month.

5.6.2. There was no Action and Limit Level exceedance for noise recorded at station NSR1a and NSR2a during the reporting period.

5.6.3. There was no Action and Limit Level exceedance for water quality monitoring recorded at station R1b during the reporting period.

5.7. Summary of Complaints, Notification of Summons and Successful Prosecution

5.7.1. There were no complaints received during the reporting period.

5.7.2. There were no notifications of summons or prosecutions received during the reporting period.

5.7.3. A summary of environmental complaints, notifications of summons and successful prosecutions was given in **Table 5.4**.

Table 5.4 Summary of Environmental Complaints Notification of Summons and Successful Prosecution

Reporting Period	Cumulative Statistic		
	Complaints	Notifications of summons	Successful prosecutions
The reporting period	0	0	0
From commencement date of construction to end of reporting month	0	0	0

6. FUTURE KEY ISSUES

6.1 Construction Programme for the Coming Months

6.1.1 As informed by the Contractor, the major construction activities for June 2017 are included:

- *Piling Foundation (Prebored H-pile)*
- *Piling Foundation (Driven H-pile)*
- *Portion 5 (Access Road) Works*
- *Drainage Outlet connection (Effluent Connection to the Existing Junction Chamber)*
- *Diversion of Existing Street Lighting and Traffic Sign;*
- *Civil Works by ADCJV for HyD's Diversion of Existing Street Lighting and Traffic Signs;*
- *Civil Works by ADCJV for WSD's Diversion of Existing Watermains;*
- *Civil Works by ADCJV between Site Boundary for WSD's Diversion of Existing Watermains*

6.2 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; and*
- *Dust and Noise generated from construction activities;*

Mitigation measures to be required in the coming month:

Air Quality Impact

- To provide adequate water spraying in the worksite;
- To operate and maintain automatic wheel washing facilities properly;
- To provide road sweeping site entrance and public roads outside site entrance;
- To ensure implementation of the dust mitigation measures for the site 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; and
- To follow up any exceedance caused by the construction work inside the worksite

Water Quality Impact
- To ensure the drainage system was maintained properly;
- To maintain the existing silt trap to ensure good efficiency of wheel wash facilities;
- To avoid stagnant water in the drip trays due to rainfall;
- To avoid any stagnant water or provide insecticide to avoid mosquito breeding

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 maintain proper housekeeping;
- To identify C&D material by packaging, labelling, storage, transportation and disposal in accordance with statutory regulations.

6.3 Environmental Monitoring and Site Inspection Schedule for the Coming Month

6.3.1 The tentative schedule for environmental monitoring and site inspection schedule for June 2017 is provided in **Appendix L**.

7. CONCLUSION

7.1 Conclusions

7.1.1 There was no Action and Limit level exceedance of 1-hour and 24-hr TSP monitoring was recorded at station ASR1a and ASR2a during this reporting month.

7.1.2 There was no Action and Limit Level exceedance for noise recorded at station NSR1a and NSR2a during the reporting period.

7.1.3 There was no Action and Limit Level exceedance for water quality monitoring recorded at station R1b during the reporting period.

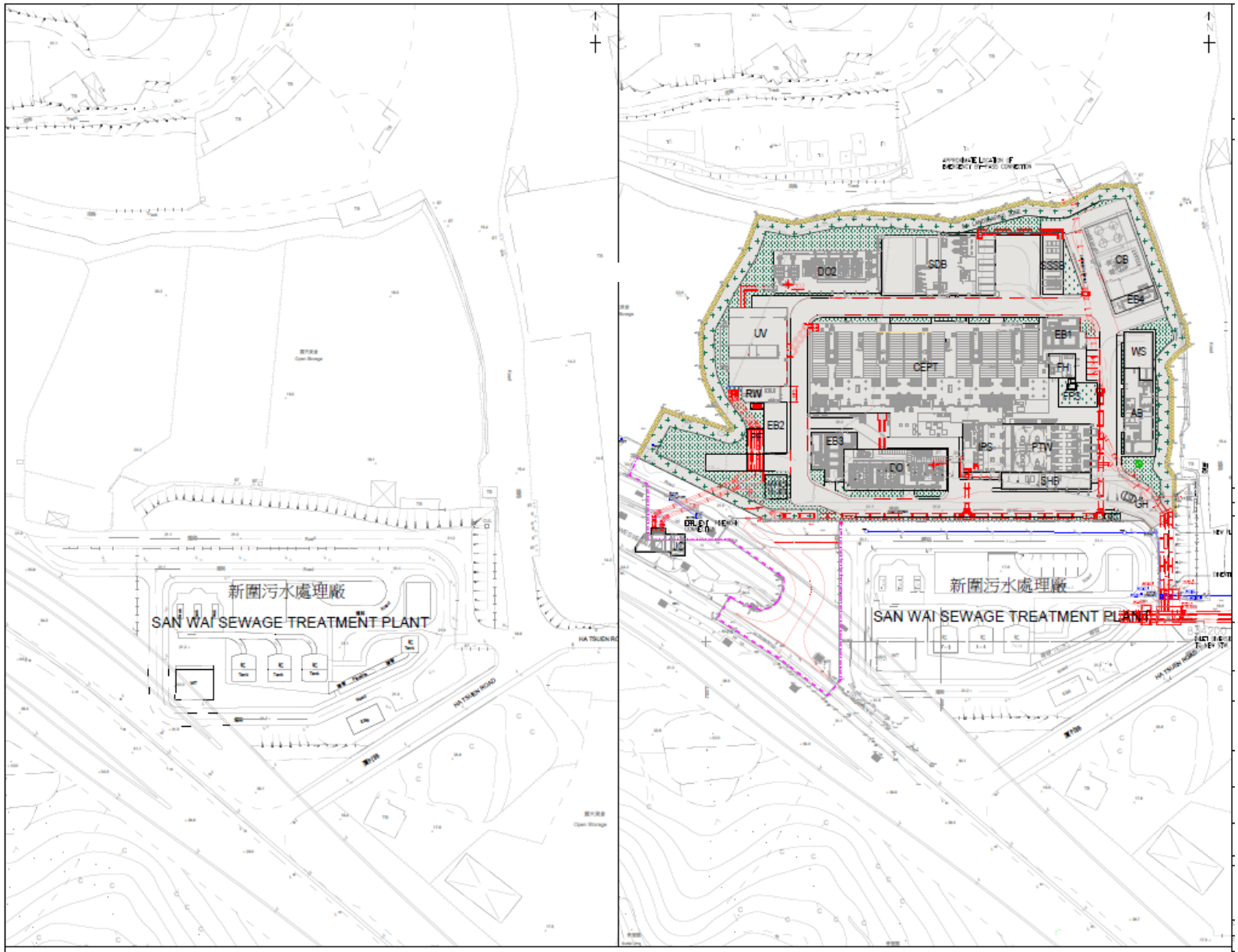
7.1.4 There were no complaints received during the reporting period.

7.1.5 There were no notifications of summons or prosecutions received during the reporting period.

- END OF REPORT -

Appendix A

Location of Works Areas

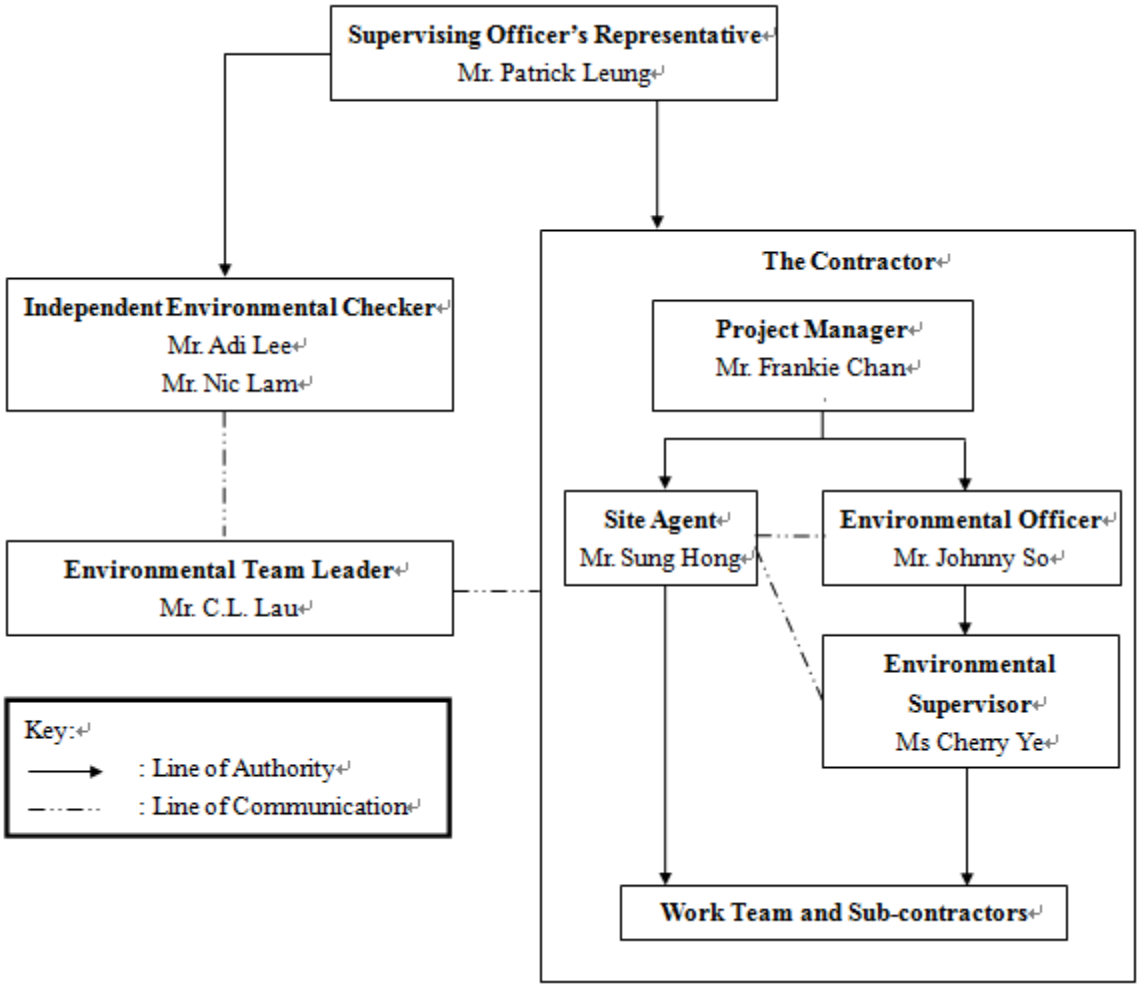


EXISTING SAN WAI SEWAGE TREATMENT WORKS

EXPANDED AND UPGRADED SAN WAI SEWAGE TREATMENT WORKS

Appendix B

Project Organization Chart

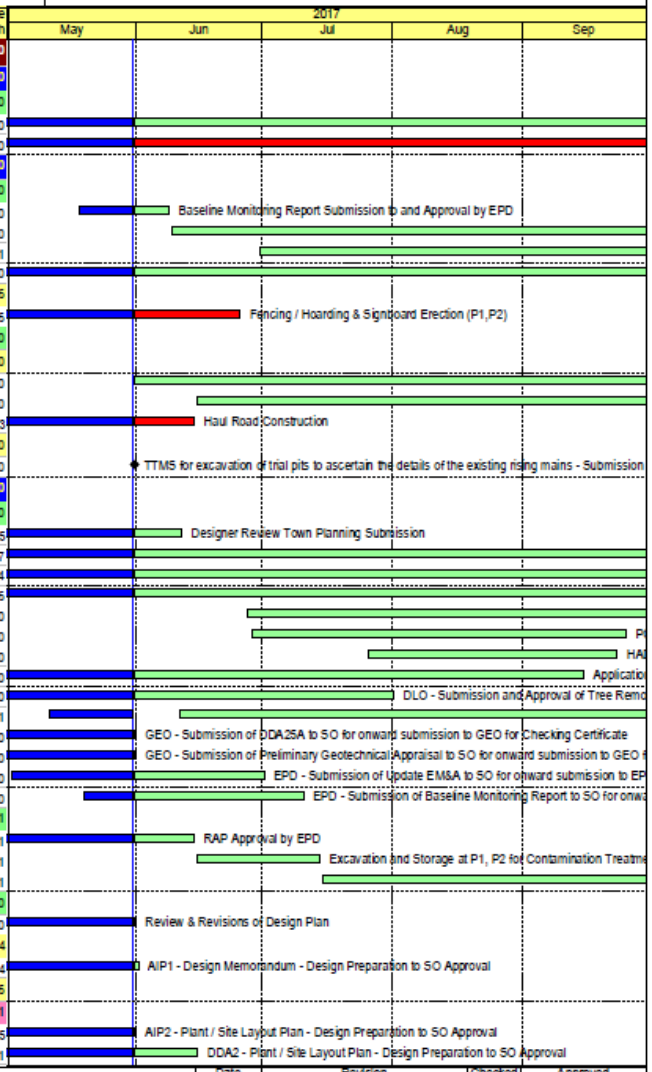

Supervising Officer's Representative
Mr. Patrick Leung
Independent Environmental Checker
Mr. Adi Lee
Mr. Nic Lam
Environmental Team Leader
Mr. C.L. Lau
The Contractor
Project Manager
Mr. Frankie Chan
Site Agent
Mr. Sung Hong
Environmental Officer
Mr. Johnny So
Environmental Supervisor
Ms Cherry Ye
Work Team and Sub-contractors
Key:
: Line of Authority
: Line of Communication

Appendix C

Construction Programme

DATA DATE: 31-May-17 | LAYOUT: SW Project PHase 1 Rev 6 (3M 31May17) | PAGE 1 OF 7

Activity ID	Activity Name	Original Duration	Start	Finish	Rev 6 BL Start	Rev 6 BL Finish	Slippage Start	Slippage Finish
San Wai Sewage Treatment Works Phase 1 - Rev 6 MP (Update as of 31 May		1585	27-May-16 A	28-Sep-20	27-May-16	27-Sep-20	0	0
Key Date		1585	27-May-16 A	28-Sep-20	27-May-16	27-Sep-20	0	0
Commencement & Completion of Works		1585	27-May-16 A	28-Sep-20	27-May-16	27-Sep-20	0	0
KD130	Section 1 - Period of Works (FOT P.3 cl 67,71) - Including 1.5 Days Granted EOT	552	27-May-16 A	29-Nov-17	27-May-16	29-Nov-17	0	0
KD160	Section 2 - Period of Works (FOT P.3 cl 67, 71) - Including 1.5 Days Granted EOT	1585	27-May-16 A	28-Sep-20	27-May-16	27-Sep-20	0	0
Preliminaries & General Requirement		1552	22-Nov-16 A	25-Sep-20	22-Nov-16	25-Sep-20	0	0
Contractor Requirement		1543	22-Nov-16 A	25-Sep-20	22-Nov-16	25-Sep-20	0	0
PS460	Baseline Monitoring Report Submission to and Approval by EPD	28	18-May-17 A	08-Jun-17	12-May-17	08-Jun-17	-6	0
PS465	Impact Monitoring	1204	09-Jun-17	24-Sep-20	09-Jun-17	24-Sep-20	0	0
PS475	Temporary Stockpile at DO2 Area	184	30-Jun-17	30-Dec-17	01-Jul-17	31-Dec-17	1	1
PS485	Site Drainage Plan Implementation	1274	01-Apr-17 A	25-Sep-20	01-Apr-17	25-Sep-20	0	0
Contractor Requirement for Working Area Portion (P1-P2)		130	22-Nov-16 A	25-Jun-17	22-Nov-16	31-Mar-17	0	-86
PS105	Fencing / Hoarding & Signboard Erection (P1,P2)	130	22-Nov-16 A	25-Jun-17	22-Nov-16	31-Mar-17	0	-86
Site Establishment		165	24-Dec-16 A	11-Nov-17	24-Dec-16	12-Sep-17	0	-60
Site Establishment for Working Area Portion (P1-P2)		165	24-Dec-16 A	11-Nov-17	24-Dec-16	12-Sep-17	0	-60
PS322	Submission of CSD and CBWD 3D Model in LD3	150	31-May-17	27-Oct-17	01-Apr-17	28-Aug-17	-60	-60
PS323	Submission of Clash Analysis Report	150	15-Jun-17	11-Nov-17	16-Apr-17	12-Sep-17	-60	-60
PS330	Haul Road Construction	50	24-Dec-16 A	14-Jun-17	24-Dec-16	11-Feb-17	0	-123
Site Establishment for Working Area Portion (P8)		0	31-May-17	31-May-17	31-May-17	31-May-17	0	0
PS390	TTMS for excavation of trial pits to ascertain the details of the existing rising mains - Submission to SO	0	31-May-17		31-May-17		0	0
Design & Design Checking of Permanent Works		887	27-May-16 A	18-Dec-18	27-May-16	18-Dec-18	0	0
Statutory Submission		854	10-Oct-16 A	18-Dec-18	10-Oct-16	18-Dec-18	0	0
DS120	Designer Review Town Planning Submission	120	10-Oct-16 A	11-Jun-17	10-Oct-16	06-Feb-17	0	-125
DS160	WSD - Water Supply & Plumbing	578	02-Feb-17 A	07-Aug-18	02-Feb-17	02-Sep-18	0	27
DS165	CLP - Power Supply	751	01-Nov-16 A	08-Oct-18	01-Nov-16	21-Nov-18	0	44
DS170	FSD - GBP with FS Notes and Dangerous Goods (DG)	283	02-Feb-17 A	17-Oct-17	02-Feb-17	11-Nov-17	0	26
DS173	PCCW - Telephone Lines and Megalink	540	27-Jun-17	18-Dec-18	27-Jun-17	18-Dec-18	0	0
DS174	PCCW - Telephone Lines for CLP Summation Metering	90	28-Jun-17	25-Sep-17	28-Jun-17	25-Sep-17	0	0
DS185	HAD - Home Affairs Department Application for Section 1 (ID KD150)	60	26-Jul-17	23-Sep-17	26-Jul-17	23-Sep-17	0	0
DS205	Application for XP and TTMS for diverting traffic onto the Access Road in Portion P5 - Submission and Appro	290	30-Nov-16 A	15-Sep-17	30-Nov-16	15-Sep-17	0	0
DS210	DLO - Submission and Approval of Tree Removal and Transplant Proposals	182	31-Jan-17 A	01-Aug-17	31-Jan-17	31-Jul-17	0	0
DS230	GEO - Submission of DDA28A to SO for onward submission to GEO for Checking Certificate	283	11-May-17 A	28-Feb-18	11-May-17	17-Feb-18	0	-11
DS232	GEO - Submission of DDA25A to SO for onward submission to GEO for Checking Certificate	175	08-Dec-16 A	31-May-17	08-Dec-16	31-May-17	0	0
DS234	GEO - Submission of Preliminary Geotechnical Appraisal to SO for onward submission to GEO for Checking	192	21-Nov-16 A	31-May-17	21-Nov-16	31-May-17	0	0
DS236	EPD - Submission of Update EM&A to SO for onward submission to EPD for Approval	60	02-May-17 A	01-Jul-17	02-May-17	30-Jun-17	0	0
DS238	EPD - Submission of Baseline Monitoring Report to SO for onward submission to EPD for Approval	60	19-May-17 A	10-Jul-17	12-May-17	10-Jul-17	-7	0
Site Investigation		296	15-Apr-17 A	10-Jan-18	15-Apr-17	10-Dec-17	0	-31
DS360	RAP Approval by EPD	30	15-Apr-17 A	14-Jun-17	15-Apr-17	14-May-17	0	-31
DS370	Excavation and Storage at P1, P2 for Contamination Treatment	30	15-Jun-17	14-Jul-17	15-May-17	13-Jun-17	-31	-31
DS380	Contamination Treatment (Biopile)	180	15-Jul-17	10-Jan-18	14-Jun-17	10-Dec-17	-31	-31
AIP / DDA Submission & Approval		562	27-May-16 A	10-Mar-18	27-May-16	10-Mar-18	0	0
DS410	Review & Revisions of Design Plan	340	26-Jun-16 A	31-May-17	26-Jun-16	31-May-17	0	0
Design Memorandum (AIP1 / DDA1)		186	26-Jun-16 A	01-Jun-17	26-Jun-16	28-Dec-16	0	-154
DS470	AIP1 - Design Memorandum - Design Preparation to SO Approval	186	26-Jun-16 A	01-Jun-17	26-Jun-16	28-Dec-16	0	-154
Global Design		550	27-May-16 A	10-Feb-18	27-May-16	04-Jan-18	0	-36
Plant / Site Layout & Formation Level w/. GBP (AIP2 / DDA2)		354	27-May-16 A	15-Jun-17	27-May-16	15-May-17	0	-31
DG352	AIP2 - Plant / Site Layout Plan - Design Preparation to SO Approval	225	27-May-16 A	31-May-17	27-May-16	06-Jan-17	0	-145
DG390	DDA2 - Plant / Site Layout Plan - Design Preparation to SO Approval	207	21-Oct-16 A	15-Jun-17	21-Oct-16	15-May-17	0	-31



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

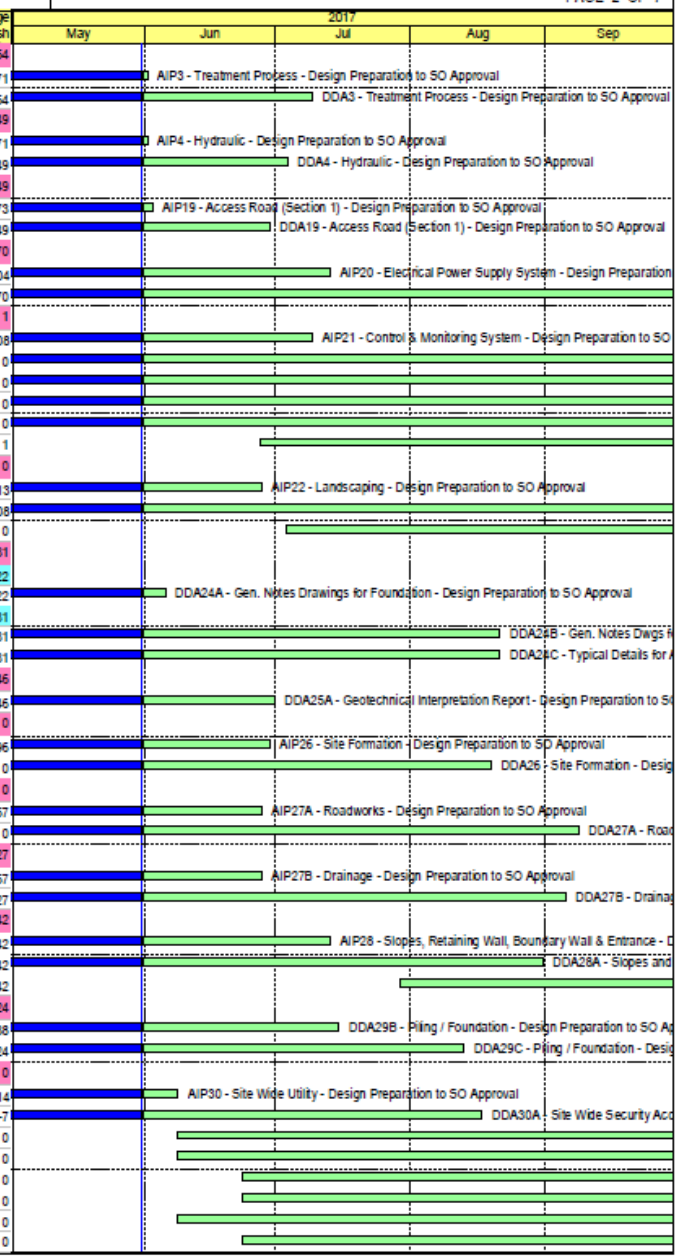
TASK filter: 3 Months Rolling Programme.

CONTRACT NO. DC/2013/10 DESIGN, BUILD & OPERATE
SAN WAI SEWAGE TREATMENT - PHASE 1
MASTER SCHEDULE Rev 6 (31 May 2017)
THREE (3) MONTHS ROLLING PROGRAMME

Date	Revision	Checked	Approved
31-May-17	Three (3) Months Rolling Program...		

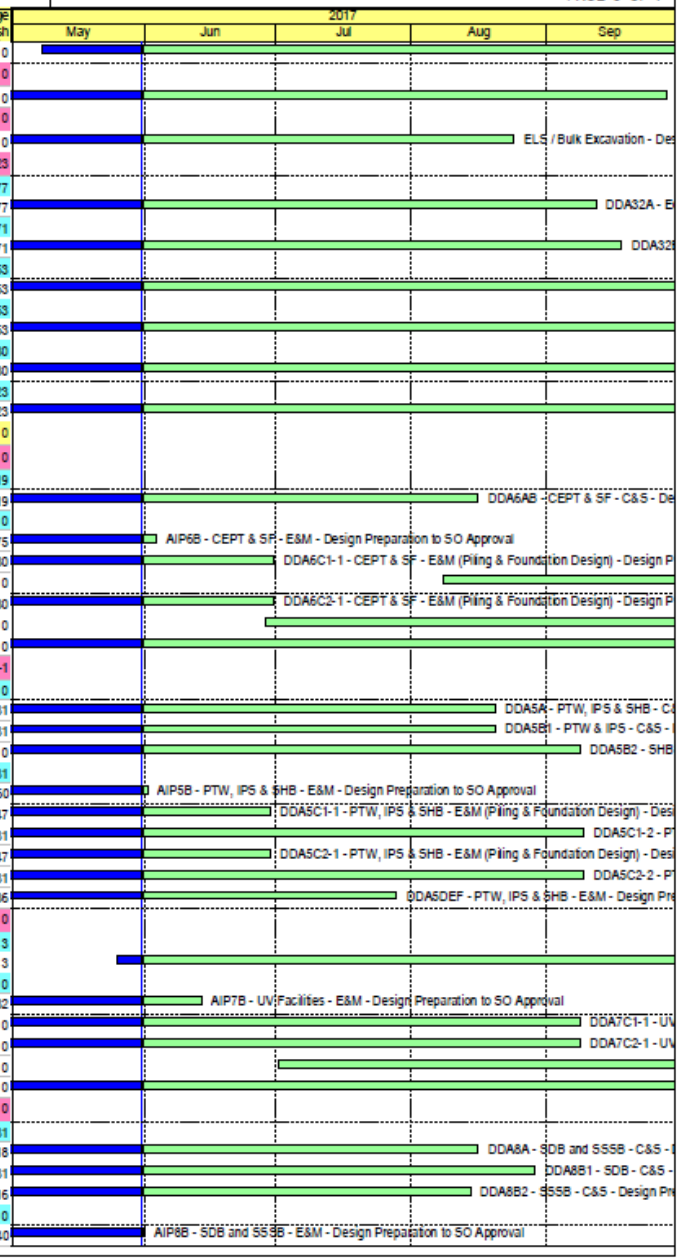
DATA DATE: 31-May-17 | LAYOUT: SW Project PHase 1 Rev 6 (3M 31May17) |

Activity ID	Activity Name	Original Duration	Start	Finish	Rev 6 BL Start	Rev 6 BL Finish	Slippage Start	Slippage Finish
Treatment Process (AIP3 / DDA3)		354	27-May-16 A	09-Jul-17	27-May-16	15-May-17	0	-54
DG114	AIP3 - Treatment Process - Design Preparation to SO Approval	299	27-May-16 A	01-Jun-17	27-May-16	21-Mar-17	0	-71
DG130	DDA3 - Treatment Process - Design Preparation to SO Approval	256	02-Sep-16 A	09-Jul-17	02-Sep-16	15-May-17	0	-54
Hydraulic (AIP4 / DDA4)		354	27-May-16 A	03-Jul-17	27-May-16	15-May-17	0	-49
DG146	AIP4 - Hydraulic - Design Preparation to SO Approval	299	27-May-16 A	01-Jun-17	27-May-16	21-Mar-17	0	-71
DG162	DDA4 - Hydraulic - Design Preparation to SO Approval	256	02-Sep-16 A	03-Jul-17	02-Sep-16	15-May-17	0	-49
Alternative Permanent Access Road [Section 1] (AIP19 / DDA19)		349	27-May-16 A	29-Jun-17	27-May-16	10-May-17	0	-49
DG227	AIP19 - Access Road (Section 1) - Design Preparation to SO Approval	3	27-May-16 A	02-Jun-17	27-May-16	21-Mar-17	0	-73
DG260	DDA19 - Access Road (Section 1) - Design Preparation to SO Approval	222	01-Oct-16 A	29-Jun-17	01-Oct-16	10-May-17	0	-49
Electrical Power Supply System (AIP20 / DDA20ABCD)		347	27-Sep-16 A	18-Nov-17	27-Sep-16	08-Sep-17	0	-70
DG1879	AIP20 - Electrical Power Supply System - Design Preparation to SO Approval	185	27-Sep-16 A	13-Jul-17	27-Sep-16	30-Mar-17	0	-104
DG1891	DDA20ABCD - Electrical Power Supply System - Design Preparation to SO Approval	246	24-Apr-17 A	18-Nov-17	06-Jan-17	08-Sep-17	-108	-70
Control and Monitoring System (AIP21 / DDA21ABCDE)		473	09-Oct-16 A	04-Jan-18	09-Oct-16	04-Jan-18	0	1
DG1905	AIP21 - Control & Monitoring System - Design Preparation to SO Approval	165	09-Oct-16 A	09-Jul-17	09-Oct-16	22-Mar-17	0	-108
DG1924	DDA21A - Process & Instrumentation Diagram (PID) - Design Preparation to SO Approval	286	12-Jan-17 A	25-Oct-17	12-Jan-17	24-Oct-17	0	0
DG1940	DDA21B - System Control Philosophy - Design Preparation to SO Approval	219	20-Mar-17 A	25-Oct-17	20-Mar-17	24-Oct-17	0	0
DG1956	DDA21C - Function Design Specification - Design Preparation to SO Approval	188	03-Apr-17 A	09-Nov-17	05-May-17	08-Nov-17	32	0
DG1972	DDA21D - PLC, SCADA & I/O Allocation Schedules - Design Preparation to SO Approval	188	23-Apr-17 A	01-Nov-17	27-Apr-17	31-Oct-17	4	0
DG1988	DDA21E - SCADA Graphic Interface - Design Preparation to SO Approval	191	27-Jun-17	04-Jan-18	01-Jul-17	04-Jan-18	4	1
Landscaping Works (AIP22 / DDA22AB)		370	08-Sep-16 A	29-Dec-17	08-Sep-16	29-Dec-17	0	0
DG1227	AIP22 - Landscaping - Design Preparation to SO Approval	180	08-Sep-16 A	27-Jun-17	08-Sep-16	06-Mar-17	0	-113
DG1260	DDA22A - Landscaping Works (Green Roof) - Design Preparation to SO Approval	210	06-Jan-17 A	20-Nov-17	06-Jan-17	03-Aug-17	0	-108
DG1274	DDA22B - Landscaping Works (Site Wide) - Design Preparation to SO Approval	180	03-Jul-17	29-Dec-17	03-Jul-17	29-Dec-17	0	0
General Notes Drawings for Foundation and Civil & Structure (AIP24AB / DDA24AB)		253	11-Nov-16 A	21-Aug-17	11-Nov-16	21-Jul-17	0	-31
General Notes Drawings for Foundation (AIP24A / DDA24A)		185	11-Nov-16 A	05-Jun-17	11-Nov-16	14-May-17	0	-22
DG3375	DDA24A - Gen. Notes Drawings for Foundation - Design Preparation to SO Approval	185	11-Nov-16 A	05-Jun-17	11-Nov-16	14-May-17	0	-22
General Notes Drawings for Civil & Structure (AIP24B / DDA24BC)		213	21-Dec-16 A	21-Aug-17	21-Dec-16	21-Jul-17	0	-31
DG3690	DDA24B - Gen. Notes Dwgs for Civil & Structure - Design Preparation to SO Approval	213	21-Dec-16 A	21-Aug-17	21-Dec-16	21-Jul-17	0	-31
DG3706	DDA24C - Typical Details for Architecture - Design Preparation to SO Approval	150	22-Feb-17 A	21-Aug-17	22-Feb-17	21-Jul-17	0	-31
Geotechnical Report (AIP25 / DDA25A)		219	09-Oct-16 A	30-Jun-17	09-Oct-16	15-May-17	0	-46
DG3445	DDA25A - Geotechnical Interpretation Report - Design Preparation to SO Approval	219	09-Oct-16 A	30-Jun-17	09-Oct-16	15-May-17	0	-46
Site Formation & Civil Works (AIP26 / DDA26)		360	25-Aug-16 A	19-Aug-17	25-Aug-16	19-Aug-17	0	0
DG627	AIP26 - Site Formation - Design Preparation to SO Approval	212	25-Aug-16 A	29-Jun-17	25-Aug-16	24-Mar-17	0	-96
DG660	DDA26 - Site Formation - Design Preparation to SO Approval	218	14-Jan-17 A	19-Aug-17	14-Jan-17	19-Aug-17	0	0
Roadworks (AIP27A / DDA27A)		260	23-Dec-16 A	08-Sep-17	23-Dec-16	08-Sep-17	0	0
DG1027	AIP27A - Roadworks - Design Preparation to SO Approval	130	23-Dec-16 A	27-Jun-17	23-Dec-16	01-May-17	0	-57
DG1060	DDA27A - Roadworks - Design Preparation to SO Approval	170	23-Mar-17 A	08-Sep-17	23-Mar-17	08-Sep-17	0	0
Drainage Works (AIP27B / DDA27B)		230	23-Dec-16 A	05-Sep-17	23-Dec-16	09-Aug-17	0	-27
DG927	AIP27B - Drainage - Design Preparation to SO Approval	130	23-Dec-16 A	27-Jun-17	23-Dec-16	01-May-17	0	-57
DG960	DDA27B - Drainage - Design Preparation to SO Approval	170	21-Feb-17 A	05-Sep-17	21-Feb-17	09-Aug-17	0	-27
Boundary Wall & Entrance (AIP28 / DDA28AB)		329	03-Feb-17 A	10-Feb-18	03-Feb-17	29-Dec-17	0	-42
DG1127	AIP28 - Slopes, Retaining Wall, Boundary Wall & Entrance - Design Preparation to SO Approval	118	03-Feb-17 A	13-Jul-17	03-Feb-17	31-May-17	0	-42
DG1160	DDA28A - Slopes and Retaining Wall - Design Preparation to SO Approval	167	03-Feb-17 A	31-Aug-17	03-Feb-17	19-Jul-17	0	-42
DG1195	DDA28B - Boundary Wall & Entrance - Design Preparation to SO Approval	196	29-Jul-17	10-Feb-18	17-Jun-17	29-Dec-17	-42	-42
Foundation & Piling Design (AIP29 / DDA29ABC)		154	16-Feb-17 A	13-Aug-17	16-Feb-17	19-Jul-17	0	-24
DG495	DDA29B - Piling / Foundation - Design Preparation to SO Approval (Area 2)	112	16-Feb-17 A	15-Jul-17	16-Feb-17	07-Jun-17	0	-38
DG510	DDA29C - Piling / Foundation - Design Preparation to SO Approval (Area 3)	112	30-Mar-17 A	13-Aug-17	30-Mar-17	19-Jul-17	0	-24
Site Wide Utility (AIP30 / DDA30)		409	02-Oct-16 A	09-Dec-17	02-Oct-16	09-Dec-17	0	0
DG3480	AIP30 - Site Wide Utility - Design Preparation to SO Approval	135	02-Oct-16 A	08-Jun-17	02-Oct-16	13-Feb-17	0	-114
DG3515	DDA30A - Site Wide Security Access Control - Design Preparation to SO Approval	189	30-Jan-17 A	17-Aug-17	02-Feb-17	09-Aug-17	3	-7
DG3774	DDA30B - Underground Process Pipework - Design Preparation to SO Approval	170	08-Jun-17	24-Nov-17	08-Jun-17	24-Nov-17	0	0
DG3788	DDA30C - Fire Services System and Street Fire Hydrant System - Design Preparation to SO Approval	170	08-Jun-17	24-Nov-17	08-Jun-17	24-Nov-17	0	0
DG3802	DDA30D - Cable Route and Cable Draw Pit - Design Preparation to SO Approval	170	23-Jun-17	09-Dec-17	23-Jun-17	09-Dec-17	0	0
DG3816	DDA30E - Misc. Small Electrical Power & Bldg. Services - Design Preparation to SO Approval	170	23-Jun-17	09-Dec-17	23-Jun-17	09-Dec-17	0	0
DG3830	DDA30F - Typical Electrical Installation Drawings - Design Preparation to SO Approval	185	08-Jun-17	09-Dec-17	08-Jun-17	09-Dec-17	0	0
DG3844	DDA30G - Typical Building Services Installation Drawings - Design Preparation to SO Approval	170	23-Jun-17	09-Dec-17	23-Jun-17	09-Dec-17	0	0



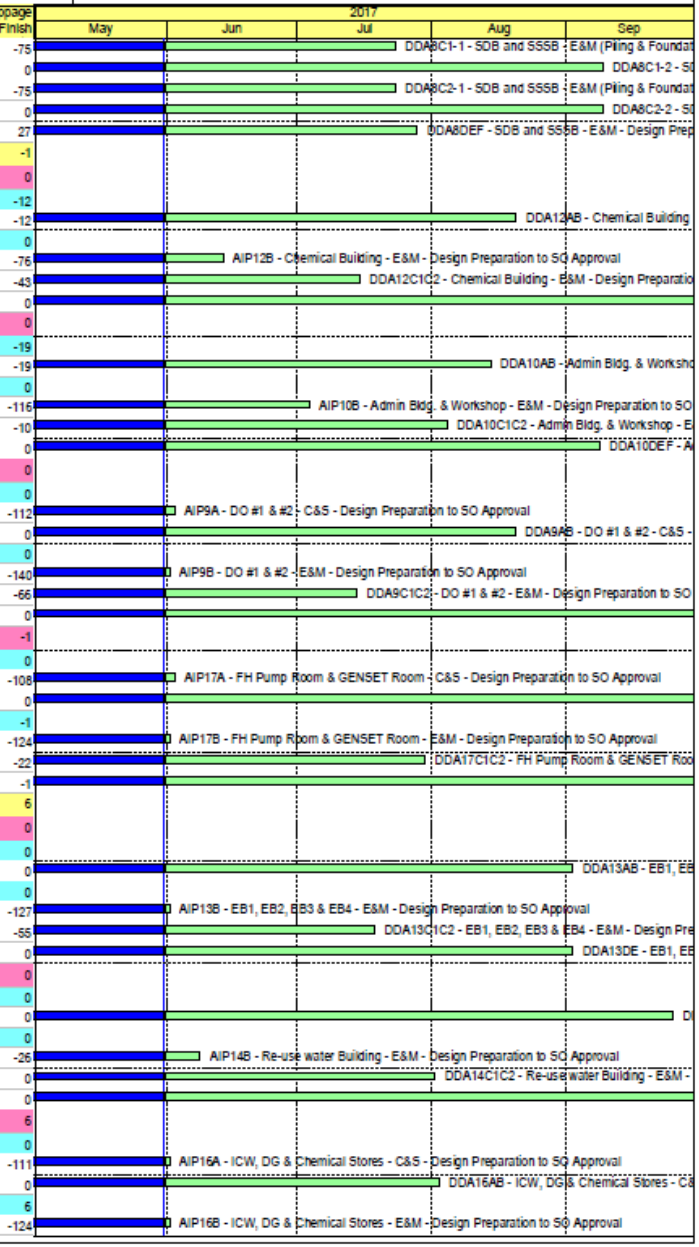
DATA DATE: 31-May-17 | LAYOUT: SW Project PHase 1 Rev 6 (3M 31May17) |

Activity ID	Activity Name	Original Duration	Start	Finish	Rev 6 BL Start	Rev 6 BL Finish	Slippage Start	Slippage Finish
DG3858	DDA30H - C&S Detailed Design Report for Pipe Trenches - Design Preparation to SO Approval	170	08-May-17 A	24-Oct-17	08-May-17	24-Oct-17	0	0
HAZOP Report (DDA31AB)		302	01-Dec-16 A	28-Sep-17	01-Dec-16	28-Sep-17	0	0
DG3530	DDA31A - HAZOP Study - Design Preparation to SO Approval	302	01-Dec-16 A	28-Sep-17	01-Dec-16	28-Sep-17	0	0
ELS / Bulk Excavation		215	22-Jan-17 A	24-Aug-17	22-Jan-17	24-Aug-17	0	0
DG3760	ELS / Bulk Excavation - Design Preparation to SO Approval	215	22-Jan-17 A	24-Aug-17	22-Jan-17	24-Aug-17	0	0
Miscellaneous Design		148	09-Jan-17 A	04-Nov-17	03-Jul-17	27-Nov-17	175	23
Equipment Schedule (DDA32A)		148	09-Jan-17 A	12-Sep-17	03-Jul-17	27-Nov-17	175	77
DG2012	DDA32A - Equipment Schedule - Design Preparation to SO Approval	148	09-Jan-17 A	12-Sep-17	03-Jul-17	27-Nov-17	175	77
Penstock & Stoplogs Schedule (DDA32B)		148	31-Jan-17 A	18-Sep-17	03-Jul-17	27-Nov-17	153	71
DG3216	DDA32B - Penstock & Stoplogs Schedule - Design Preparation to SO Approval	148	31-Jan-17 A	18-Sep-17	03-Jul-17	27-Nov-17	153	71
Valves Schedule (DDA32C)		148	01-Mar-17 A	06-Oct-17	03-Jul-17	27-Nov-17	124	53
DG3222	DDA32C - Valves Schedule - Design Preparation to SO Approval	148	01-Mar-17 A	06-Oct-17	03-Jul-17	27-Nov-17	124	53
Piping Schedule (DDA32D)		148	01-Mar-17 A	06-Oct-17	03-Jul-17	27-Nov-17	124	53
DG3864	DDA32D - Piping Schedule - Design Preparation to SO Approval	148	01-Mar-17 A	06-Oct-17	03-Jul-17	27-Nov-17	124	53
Painting Schedule (DDA32E)		148	30-Mar-17 A	28-Oct-17	03-Jul-17	27-Nov-17	95	30
DG3228	DDA32E - Painting Schedule - Design Preparation to SO Approval	148	30-Mar-17 A	28-Oct-17	03-Jul-17	27-Nov-17	95	30
Instrument and I/O Schedule (DDA32F)		148	08-Apr-17 A	04-Nov-17	03-Jul-17	27-Nov-17	86	23
DG3234	DDA32F - Instrument and I/O Schedule - Design Preparation to SO Approval	148	08-Apr-17 A	04-Nov-17	03-Jul-17	27-Nov-17	86	23
LOT #1 - Building / Facilities Design : CEPT+SF, PTW+IPS+SHB, UV, SDB+SSSB		543	27-May-16 A	10-Mar-18	09-Jul-16	10-Mar-18	43	0
CEPT and System Control Flowmeter Chamber		435	27-May-16 A	09-Feb-18	23-Jul-16	08-Feb-18	57	0
Civil and Structural Design (AIP6A / DDA6AB)		216	24-Dec-16 A	16-Aug-17	24-Dec-16	27-Jul-17	0	-19
DB1123	DDA6AB - CEPT & SF - C&S - Design Preparation to SO Approval	216	24-Dec-16 A	16-Aug-17	24-Dec-16	27-Jul-17	0	-19
Electrical and Mechanical Design (AIP6B / DDA6C1C2DEF)		435	27-May-16 A	09-Feb-18	23-Jul-16	08-Feb-18	57	0
DB1135	AIP6B - CEPT & SF - E&M - Design Preparation to SO Approval	241	23-Jul-16 A	03-Jun-17	23-Jul-16	20-Mar-17	0	-75
DB1147	DDA6C1-1 - CEPT & SF - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	273	31-Aug-16 A	30-Jun-17	31-Aug-16	30-May-17	0	-30
DB1160	DDA6C1-2 - CEPT & SF - E&M (Super Structural Design) - Design Preparation to SO Approval	185	08-Aug-17	09-Feb-18	08-Aug-17	08-Feb-18	0	0
DB1174	DDA6C2-1 - CEPT & SF - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	273	27-May-16 A	30-Jun-17	31-Aug-16	30-May-17	96	-30
DB1188	DDA6C2-2 - CEPT & SF - E&M (Super Structural Design) - Design Preparation to SO Approval	185	28-Jun-17	30-Dec-17	28-Jun-17	29-Dec-17	0	0
DB4508	DDA6DEF - CEPT & System Control - E&M - Design Preparation to SO Approval	289	25-Jan-17 A	10-Nov-17	25-Jan-17	09-Nov-17	0	0
Inlet Work, Preliminary Treatment Works, IPS and SHB		470	27-May-16 A	09-Sep-17	09-Jul-16	08-Sep-17	43	-1
Civil and Structural Design (AIP5A / DDA5AB1B2)		287	26-Nov-16 A	08-Sep-17	26-Nov-16	08-Sep-17	0	0
DB1223	DDA5A - PTW, IPS & SHB - C&S - Design Preparation to SO Approval	236	26-Nov-16 A	20-Aug-17	26-Nov-16	19-Jul-17	0	-31
DB4814	DDA5B1 - PTW & IPS - C&S - Design Preparation to SO Approval	215	17-Dec-16 A	20-Aug-17	17-Dec-16	19-Jul-17	0	-31
DB4830	DDA5B2 - SHB - C&S - Design Preparation to SO Approval	215	06-Feb-17 A	08-Sep-17	06-Feb-17	08-Sep-17	0	0
Electrical and Mechanical Design (AIP5B / DDA5C1C2DEF)		349	27-May-16 A	09-Sep-17	09-Jul-16	09-Aug-17	43	-31
DB1235	AIP5B - PTW, IPS & SHB - E&M - Design Preparation to SO Approval	167	18-Jul-16 A	01-Jun-17	09-Jul-16	22-Dec-16	-9	-160
DB1249	DDA5C1-1 - PTW, IPS & SHB - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	245	27-May-16 A	29-Jun-17	10-Sep-16	12-May-17	106	-47
DB1264	DDA5C1-2 - PTW, IPS & SHB - E&M (Super Structural Design) - Design Preparation to SO Approval	131	01-Apr-17 A	09-Sep-17	01-Apr-17	09-Aug-17	0	-31
DB1280	DDA5C2-1 - PTW, IPS & SHB - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	245	10-Sep-16 A	29-Jun-17	10-Sep-16	12-May-17	0	-47
DB1296	DDA5C2-2 - PTW, IPS & SHB - E&M (Super Structural Design) - Design Preparation to SO Approval	131	01-Mar-17 A	09-Sep-17	01-Apr-17	09-Aug-17	31	-31
DB4524	DDA5DEF - PTW, IPS & SHB - E&M - Design Preparation to SO Approval	208	27-Nov-16 A	28-Jul-17	27-Nov-16	22-Jun-17	0	-36
UV Disinfection Facilities		543	05-Aug-16 A	10-Mar-18	05-Aug-16	10-Mar-18	0	0
Civil and Structural Design (AIP7A / DDA7AB)		145	25-May-17 A	13-Oct-17	25-May-17	16-Oct-17	0	3
DB1325	DDA7AB - UV Facilities - C&S - Design Preparation to SO Approval	145	25-May-17 A	13-Oct-17	25-May-17	16-Oct-17	0	3
Electrical and Mechanical Design (AIP7B / DDA7C1C2DEF)		543	05-Aug-16 A	10-Mar-18	05-Aug-16	10-Mar-18	0	0
DB1337	AIP7B - UV Facilities - E&M - Design Preparation to SO Approval	281	05-Aug-16 A	13-Jun-17	05-Aug-16	12-May-17	0	-32
DB1352	DDA7C1-1 - UV Facilities - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	261	22-Dec-16 A	08-Sep-17	22-Dec-16	08-Sep-17	0	0
DB1384	DDA7C2-1 - UV Facilities - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	261	22-Dec-16 A	08-Sep-17	22-Dec-16	08-Sep-17	0	0
DB1399	DDA7C2-2 - UV Facilities - E&M (Super Structural Design) - Design Preparation to SO Approval	253	01-Jul-17	10-Mar-18	01-Jul-17	10-Mar-18	0	0
DB4540	DDA7DEF - UV Facilities - E&M - Design Preparation to SO Approval	306	30-Mar-17 A	30-Jan-18	30-Mar-17	29-Jan-18	0	0
Sludge Dewatering Building and Sludge Skip Storage Building		470	09-Jul-16 A	09-Sep-17	09-Jul-16	08-Sep-17	0	0
Civil and Structural Design (AIP8A / DDA8AB1B2)		217	24-Dec-16 A	29-Aug-17	24-Dec-16	28-Jul-17	0	-31
DB1433	DDA8A - SDB and SSSB - C&S - Design Preparation to SO Approval	217	24-Dec-16 A	16-Aug-17	24-Dec-16	28-Jul-17	0	-18
DB4844	DDA8B1 - SDB - C&S - Design Preparation to SO Approval	175	04-Feb-17 A	29-Aug-17	04-Feb-17	28-Jul-17	0	-31
DB4858	DDA8B2 - SSSB - C&S - Design Preparation to SO Approval	175	04-Feb-17 A	14-Aug-17	04-Feb-17	28-Jul-17	0	-16
Electrical and Mechanical Design (AIP8B / DDA8C1C2DEF)		470	09-Jul-16 A	09-Sep-17	09-Jul-16	08-Sep-17	0	0
DB1445	AIP8B - SDB and SSSB - E&M - Design Preparation to SO Approval	187	09-Jul-16 A	31-May-17	09-Jul-16	11-Jan-17	0	-140



DATA DATE: 31-May-17 | LAYOUT: SW Project PHase 1 Rev 6 (3M 31May17) |

Activity ID	Activity Name	Original Duration	Start	Finish	Rev 6 BL Start	Rev 6 BL Finish	Slippage Start	Slippage Finish
DB1460	DDA8C1-1 - SDB and SSSB - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	227	25-Sep-16 A	23-Jul-17	25-Sep-16	09-May-17	0	-75
DB1476	DDA8C1-2 - SDB and SSSB - E&M (Super Structural Design) - Design Preparation to SO Approval	133	29-Apr-17 A	09-Sep-17	29-Apr-17	08-Sep-17	0	0
DB1492	DDA8C2-1 - SDB and SSSB - E&M (Piling & Foundation Design) - Design Preparation to SO Approval	227	25-Sep-16 A	23-Jul-17	25-Sep-16	09-May-17	0	-75
DB1508	DDA8C2-2 - SDB and SSSB - E&M (Super Structural Design) - Design Preparation to SO Approval	133	29-Apr-17 A	09-Sep-17	29-Apr-17	08-Sep-17	0	0
DB4556	DDA8DEF - SDB and SSSB - E&M - Design Preparation to SO Approval	271	27-Nov-16 A	28-Jul-17	27-Nov-16	24-Aug-17	0	27
LOT #2 - Building / Facilities Design : AB+WS, DO, CB+EB4, FH		562	26-Jun-16 A	11-Dec-17	26-Jun-16	09-Dec-17	0	-1
Chemical Building and EB 4		470	26-Jun-16 A	09-Oct-17	26-Jun-16	08-Oct-17	0	0
Civil and Structural Design for CB & EB4 (AIP12A / DDA12AB)		185	31-Jan-17 A	20-Aug-17	17-Feb-17	07-Aug-17	17	-12
DB2123	DDA12AB - Chemical Building & EB4 - C&S - Design Preparation to SO Approval	185	31-Jan-17 A	20-Aug-17	17-Feb-17	07-Aug-17	17	-12
Electrical and Mechanical Design for CB only (AIP12B / DDA12C1C2DEF)		470	26-Jun-16 A	09-Oct-17	26-Jun-16	08-Oct-17	0	0
DB2135	AIP12B - Chemical Building - E&M - Design Preparation to SO Approval	277	26-Jun-16 A	13-Jun-17	26-Jun-16	29-Mar-17	0	-76
DB2148	DDA12C1C2 - Chemical Building - E&M - Design Preparation to SO Approval	247	28-Sep-16 A	15-Jul-17	28-Sep-16	01-Jun-17	0	-43
DB4602	DDA12DEF - Chemical Building - E&M - Design Preparation to SO Approval	246	05-Feb-17 A	09-Oct-17	05-Feb-17	08-Oct-17	0	0
Administration Building & Maintenance Workshop		426	01-Sep-16 A	08-Sep-17	01-Sep-16	08-Sep-17	0	0
Civil and Structural Design (AIP10A / DDA10AB)		186	22-Jan-17 A	14-Aug-17	22-Jan-17	26-Jul-17	0	-19
DB2234	DDA10AB - Admin Bldg. & Workshop - C&S - Design Preparation to SO Approval	186	22-Jan-17 A	14-Aug-17	22-Jan-17	26-Jul-17	0	-19
Electrical and Mechanical Design (AIP10B / DDA10C1C2DEF)		373	01-Sep-16 A	08-Sep-17	01-Sep-16	08-Sep-17	0	0
DB2273	AIP10B - Admin Bldg. & Workshop - E&M - Design Preparation to SO Approval	190	01-Sep-16 A	03-Jul-17	01-Sep-16	09-Mar-17	0	-116
DB2286	DDA10C1C2 - Admin Bldg. & Workshop - E&M - Design Preparation to SO Approval	295	03-Oct-16 A	04-Aug-17	03-Oct-16	24-Jul-17	0	-10
DB4618	DDA10DEF - Admin Bldg. & Workshop - E&M - Design Preparation to SO Approval	221	31-Jan-17 A	08-Sep-17	31-Jan-17	08-Sep-17	0	0
Deodorization Facilities No.1 and No.2		469	29-Jul-16 A	09-Oct-17	29-Jul-16	08-Oct-17	0	0
Civil and Structural Design (AIP9A / DDA9AB)		419	29-Jul-16 A	20-Aug-17	29-Jul-16	19-Aug-17	0	0
DB2311	AIP9A - DO #1 & #2 - C&S - Design Preparation to SO Approval	0	29-Jul-16 A	02-Jun-17	29-Jul-16	10-Feb-17	0	-112
DB2323	DDA9AB - DO #1 & #2 - C&S - Design Preparation to SO Approval	206	26-Jan-17 A	20-Aug-17	26-Jan-17	19-Aug-17	0	0
Electrical and Mechanical Design (AIP9B / DDA9C1C2DEF)		435	13-Aug-16 A	09-Oct-17	31-Jul-16	08-Oct-17	-13	0
DB2335	AIP9B - DO #1 & #2 - E&M - Design Preparation to SO Approval	165	13-Aug-16 A	01-Jun-17	31-Jul-16	11-Jan-17	-13	-140
DB2348	DDA9C1C2 - DO #1 & #2 - E&M - Design Preparation to SO Approval	146	15-Dec-16 A	14-Jul-17	15-Dec-16	09-May-17	0	-66
DB4634	DDA9DEF - DO #1 & #2 - E&M - Design Preparation to SO Approval	256	26-Jan-17 A	09-Oct-17	26-Jan-17	08-Oct-17	0	0
Street Fire Hydrant Pump Room & GENSET Room		465	01-Sep-16 A	11-Dec-17	01-Sep-16	09-Dec-17	0	-1
Civil and Structural Design (AIP17A / DDA17AB)		433	22-Oct-16 A	10-Nov-17	03-Sep-16	09-Nov-17	-49	0
DB2411	AIP17A - FH Pump Room & GENSET Room - C&S - Design Preparation to SO Approval	165	22-Oct-16 A	02-Jun-17	03-Sep-16	14-Feb-17	-49	-108
DB2423	DDA17AB - FH Pump Room & GENSET Room - C&S - Design Preparation to SO Approval	232	23-Mar-17 A	10-Nov-17	23-Mar-17	09-Nov-17	0	0
Electrical and Mechanical Design (AIP17B / DDA17C1C2DE)		465	01-Sep-16 A	11-Dec-17	01-Sep-16	09-Dec-17	0	-1
DB2435	AIP17B - FH Pump Room & GENSET Room - E&M - Design Preparation to SO Approval	149	01-Sep-16 A	01-Jun-17	01-Sep-16	27-Jan-17	0	-124
DB2448	DDA17C1C2 - FH Pump Room & GENSET Room - E&M - Design Preparation to SO Approval	213	07-Dec-16 A	30-Jul-17	07-Dec-16	07-Jul-17	0	-22
DB4648	DDA17DE - FH Pump Room & GENSET Room - E&M - Design Preparation to SO Approval	262	23-Mar-17 A	11-Dec-17	23-Mar-17	09-Dec-17	0	-1
LOT #3 - Building / Facilities Design : EB1, EB2, EB3, EB4, RW, DG+ICW, Inlet/Outlet		487	18-Jul-16 A	03-Dec-17	18-Jul-16	08-Dec-17	0	6
Electrical Building No.1, No.2, No.3, No.4		463	18-Jul-16 A	02-Sep-17	18-Jul-16	01-Sep-17	0	0
Civil and Structural Design for EB123 (AIP13A / DDA13AB)		147	08-Apr-17 A	02-Sep-17	08-Apr-17	01-Sep-17	0	0
DB3123	DDA13AB - EB1, EB2 and EB3 - C&S - Design Preparation to SO Approval	147	08-Apr-17 A	02-Sep-17	08-Apr-17	01-Sep-17	0	0
Electrical and Mechanical Design for EB1234 (AIP13B / DDA13C1C2DE)		411	18-Jul-16 A	02-Sep-17	18-Jul-16	01-Sep-17	0	0
DB3135	AIP13B - EB1, EB2, EB3 & EB4 - E&M - Design Preparation to SO Approval	191	18-Jul-16 A	01-Jun-17	18-Jul-16	24-Jan-17	0	-127
DB3148	DDA13C1C2 - EB1, EB2, EB3 & EB4 - E&M - Design Preparation to SO Approval	246	16-Sep-16 A	18-Jul-17	21-Sep-16	24-May-17	5	-55
DB4664	DDA13DE - EB1, EB2, EB3 & EB4 - E&M - Design Preparation to SO Approval	191	23-Feb-17 A	02-Sep-17	23-Feb-17	01-Sep-17	0	0
Re-use Water Building		487	08-Aug-16 A	18-Nov-17	08-Aug-16	18-Nov-17	0	0
Civil and Structural Design (AIP14A / DDA14AB)		166	13-Apr-17 A	25-Sep-17	13-Apr-17	25-Sep-17	0	0
DB3223	DDA14AB - Re-use water Building - C&S - Design Preparation to SO Approval	166	13-Apr-17 A	25-Sep-17	13-Apr-17	25-Sep-17	0	0
Electrical and Mechanical Design (AIP14B / DDA14C1C2DEF)		468	08-Aug-16 A	18-Nov-17	08-Aug-16	18-Nov-17	0	0
DB3235	AIP14B - Re-use water Building - E&M - Design Preparation to SO Approval	278	08-Aug-16 A	08-Jun-17	08-Aug-16	12-May-17	0	-26
DB3248	DDA14C1C2 - Re-use water Building - E&M - Design Preparation to SO Approval	242	03-Dec-16 A	01-Aug-17	03-Dec-16	01-Aug-17	0	0
DB4680	DDA14DEF - Re-use water Building - E&M - Design Preparation to SO Approval	220	13-Apr-17 A	18-Nov-17	13-Apr-17	18-Nov-17	0	0
ICW and DG Store & Chemical Waste Storage Building		389	29-Aug-16 A	03-Dec-17	07-Aug-16	08-Dec-17	-22	6
Civil and Structural Design (AIP16A / DDA16AB)		295	29-Aug-16 A	02-Aug-17	29-Aug-16	02-Aug-17	0	0
DB3311	AIP16A - ICW, DG & Chemical Stores - C&S - Design Preparation to SO Approval	165	29-Aug-16 A	01-Jun-17	29-Aug-16	09-Feb-17	0	-111
DB3323	DDA16AB - ICW, DG & Chemical Stores - C&S - Design Preparation to SO Approval	173	11-Mar-17 A	02-Aug-17	11-Mar-17	02-Aug-17	0	0
Electrical and Mechanical Design (AIP16B / DDA16C1C2DE)		360	01-Sep-16 A	03-Dec-17	07-Aug-16	08-Dec-17	-25	6
DB3335	AIP16B - ICW, DG & Chemical Stores - E&M - Design Preparation to SO Approval	174	01-Sep-16 A	01-Jun-17	07-Aug-16	27-Jan-17	-25	-124



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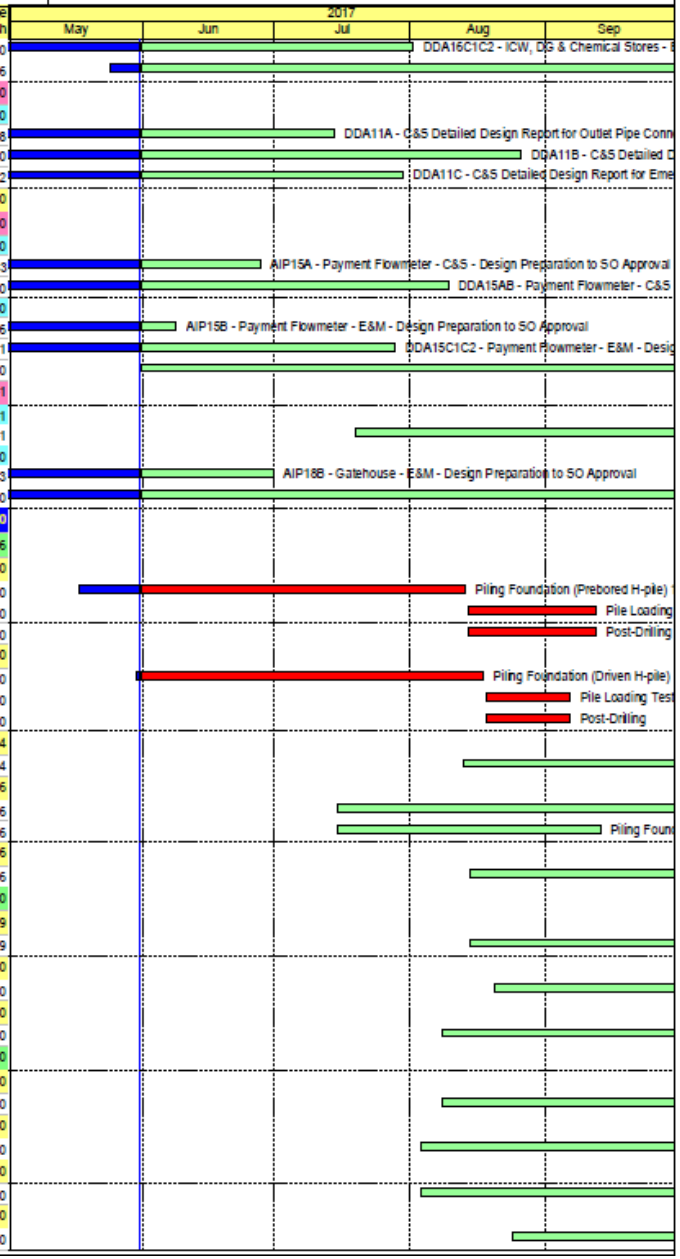
Activity ID	Activity Name	Original Duration	Start	Finish	Rev 6 BL Start	Rev 6 BL Finish	Slippage Start	Slippage Finish
DB3348	DDA16C1C2 - ICW, DG & Chemical Stores - E&M - Design Preparation to SO Approval	245	30-Nov-16 A	01-Aug-17	30-Nov-16	01-Aug-17	0	0
DB4694	DDA16DE - ICW, DG & Chemical Stores - E&M - Design Preparation to SO Approval	199	24-May-17 A	03-Dec-17	24-May-17	08-Dec-17	0	6
Inlet & Outlet Pipe Connections and Diversion Pipeworks		270	29-Nov-16 A	26-Aug-17	29-Nov-16	25-Aug-17	0	0
Civil and Structural Design (AIP11 / DDA11)		270	29-Nov-16 A	26-Aug-17	29-Nov-16	25-Aug-17	0	0
DB3424	DDA11A - C&S Detailed Design Report for Outlet Pipe Connection - Design Preparation to SO Approval	130	29-Nov-16 A	14-Jul-17	29-Nov-16	07-Apr-17	0	-98
DB3438	DDA11B - C&S Detailed Design Report for Inlet Pipe Connection - Design Preparation to SO Approval	140	08-Apr-17 A	26-Aug-17	08-Apr-17	25-Aug-17	0	0
DB3452	DDA11C - C&S Detailed Design Report for Emergency Bypass - Design Preparation to SO Approval	140	31-Dec-16 A	30-Jul-17	28-Feb-17	17-Jul-17	59	-12
LOT #4 - Building / Facilities Design : GH, PF		562	20-Aug-16 A	25-Dec-17	20-Aug-16	25-Dec-17	0	0
Payment Flowmeter Chamber		397	20-Aug-16 A	25-Dec-17	20-Aug-16	25-Dec-17	0	0
Civil and Structural Design (AIP15A / DDA15AB)		253	06-Nov-16 A	09-Aug-17	18-Oct-16	09-Aug-17	-19	0
DB4310	AIP15A - Payment Flowmeter - C&S - Design Preparation to SO Approval	120	06-Nov-16 A	27-Jun-17	18-Oct-16	14-Feb-17	-19	-133
DB4323	DDA15AB - Payment Flowmeter - C&S - Design Preparation to SO Approval	119	13-Apr-17 A	09-Aug-17	13-Apr-17	09-Aug-17	0	0
Electrical and Mechanical Design (AIP15B / DDA15C1C2DEF)		354	20-Aug-16 A	25-Dec-17	20-Aug-16	25-Dec-17	0	0
DB4335	AIP15B - Payment Flowmeter - E&M - Design Preparation to SO Approval	266	20-Aug-16 A	08-Jun-17	20-Aug-16	12-May-17	0	-26
DB4348	DDA15C1C2 - Payment Flowmeter - E&M - Design Preparation to SO Approval	249	25-Nov-16 A	28-Jul-17	03-Dec-16	08-Aug-17	8	11
DB4740	DDA15DEF - Payment Flowmeter - E&M - Design Preparation to SO Approval	209	31-May-17	25-Dec-17	31-May-17	25-Dec-17	0	0
Gatehouse		482	14-Jan-17 A	25-Dec-17	14-Jan-17	24-Dec-17	0	-1
Civil and Structural Design (AIP18A / DDA18AB)		160	19-Jul-17	25-Dec-17	18-Jul-17	24-Dec-17	-1	-1
DB4424	DDA18AB - Gatehouse - C&S - Design Preparation to SO Approval	160	19-Jul-17	25-Dec-17	18-Jul-17	24-Dec-17	-1	-1
Electrical and Mechanical Design (AIP18B / DDA18C)		330	14-Jan-17 A	09-Dec-17	14-Jan-17	09-Dec-17	0	0
DB4473	AIP18B - Gatehouse - E&M - Design Preparation to SO Approval	125	14-Jan-17 A	30-Jun-17	14-Jan-17	18-May-17	0	-43
DB4754	DDA18C - Gatehouse - E&M - Design Preparation to SO Approval	230	24-Apr-17 A	09-Dec-17	24-Apr-17	09-Dec-17	0	0
Civil & Structural Works		294	08-Apr-17 A	01-Mar-18	08-Apr-17	28-Feb-18	0	0
LOT #1 - Bldg / Facilities Const. (Arch'l & Struct'l) : CEPT+SF, PTW+IPS+SHB, UV, SD		216	17-May-17 A	04-Nov-17	17-May-17	18-Oct-17	0	-16
Chemically Enhanced Primary Treatment (CEPT)		182	17-May-17 A	12-Sep-17	17-May-17	12-Sep-17	0	0
C51500	Piling Foundation (Prebored H-pile) 177 {D1, D2, E1, E2} + Trial Pile	89	17-May-17 A	13-Aug-17	17-May-17	13-Aug-17	0	0
C51505	Pile Loading Test	30	14-Aug-17	12-Sep-17	14-Aug-17	12-Sep-17	0	0
C51507	Post-Driling	30	14-Aug-17	12-Sep-17	14-Aug-17	12-Sep-17	0	0
Inlet Work, Preliminary Treatment Works and Inlet Pumping Station (PTW & IPS)		182	30-May-17 A	06-Sep-17	30-May-17	06-Sep-17	0	0
C51200	Piling Foundation (Driven H-pile) 96 #2-1 {B1} +Trial Pile	80	30-May-17 A	17-Aug-17	30-May-17	17-Aug-17	0	0
C51205	Pile Loading Test	20	18-Aug-17	06-Sep-17	18-Aug-17	06-Sep-17	0	0
C51207	Post-Driling	20	18-Aug-17	06-Sep-17	18-Aug-17	06-Sep-17	0	0
UV Disinfection Facility (UV)		80	13-Aug-17	01-Nov-17	20-Jul-17	07-Oct-17	-24	-24
C51900	Piling Foundation (minipile) 75 #3-1 {C1}	80	13-Aug-17	01-Nov-17	20-Jul-17	07-Oct-17	-24	-24
Sludge Dewatering Building (SDB)		90	15-Jul-17	13-Oct-17	30-Jun-17	27-Sep-17	-16	-16
C51800	Piling Foundation (Prebored H-pile) 66 {E3}	90	15-Jul-17	13-Oct-17	30-Jun-17	27-Sep-17	-16	-16
C51810	Piling Foundation (minipile) 10 #1-1 {A1} + Trial Pile	60	15-Jul-17	13-Sep-17	30-Jun-17	28-Aug-17	-16	-16
Sludge Skip Storage Building (SSSB)		82	14-Aug-17	04-Nov-17	29-Jul-17	18-Oct-17	-16	-16
C52900	Substructure (rc structure)	82	14-Aug-17	04-Nov-17	29-Jul-17	18-Oct-17	-16	-16
LOT #2 - Bldg / Facilities Const. (Arch'l & Struct'l) : AB+WS, DO, CB, FH		96	08-Aug-17	12-Nov-17	27-Jul-17	11-Nov-17	-12	0
Administration Building & Maintenance Workshop (AB & WS)		50	14-Aug-17	03-Oct-17	27-Jul-17	14-Sep-17	-19	-19
C51110	Substructure (rc structure)	50	14-Aug-17	03-Oct-17	27-Jul-17	14-Sep-17	-19	-19
Deodorization Facilities No. 1 (DO 1)		84	20-Aug-17	12-Nov-17	20-Aug-17	11-Nov-17	0	0
C51610	Substructure (rc structure)	84	20-Aug-17	12-Nov-17	20-Aug-17	11-Nov-17	0	0
Chemical Building (CB)		91	08-Aug-17	07-Nov-17	08-Aug-17	06-Nov-17	0	0
C52310	Substructure (rc structure)	91	08-Aug-17	07-Nov-17	08-Aug-17	06-Nov-17	0	0
LOT #3 - Bldg / Facilities Const. (Arch'l & Struct'l) : EB, RW, DG, ICW, JC		90	03-Aug-17	01-Nov-17	03-Aug-17	31-Oct-17	0	0
Electrical Building No.4 (EB4) CB		85	08-Aug-17	01-Nov-17	08-Aug-17	31-Oct-17	0	0
C52710	Substructure (rc structure)	85	08-Aug-17	01-Nov-17	08-Aug-17	31-Oct-17	0	0
DG Store and Chemical Waste Storage Building (DG)		75	03-Aug-17	16-Oct-17	03-Aug-17	16-Oct-17	0	0
C52800	Substructure (rc structure)	75	03-Aug-17	16-Oct-17	03-Aug-17	16-Oct-17	0	0
Irrigation & Cleansing Water Pump Room (ICW)		75	03-Aug-17	16-Oct-17	03-Aug-17	16-Oct-17	0	0
C53370	Substructure (rc structure)	75	03-Aug-17	16-Oct-17	03-Aug-17	16-Oct-17	0	0
Existing Junction Chamber (JC)		50	24-Aug-17	13-Oct-17	25-Aug-17	13-Oct-17	0	0
C52190	Substructure (EL5 & Bulk excavation)	50	24-Aug-17	13-Oct-17	25-Aug-17	13-Oct-17	0	0



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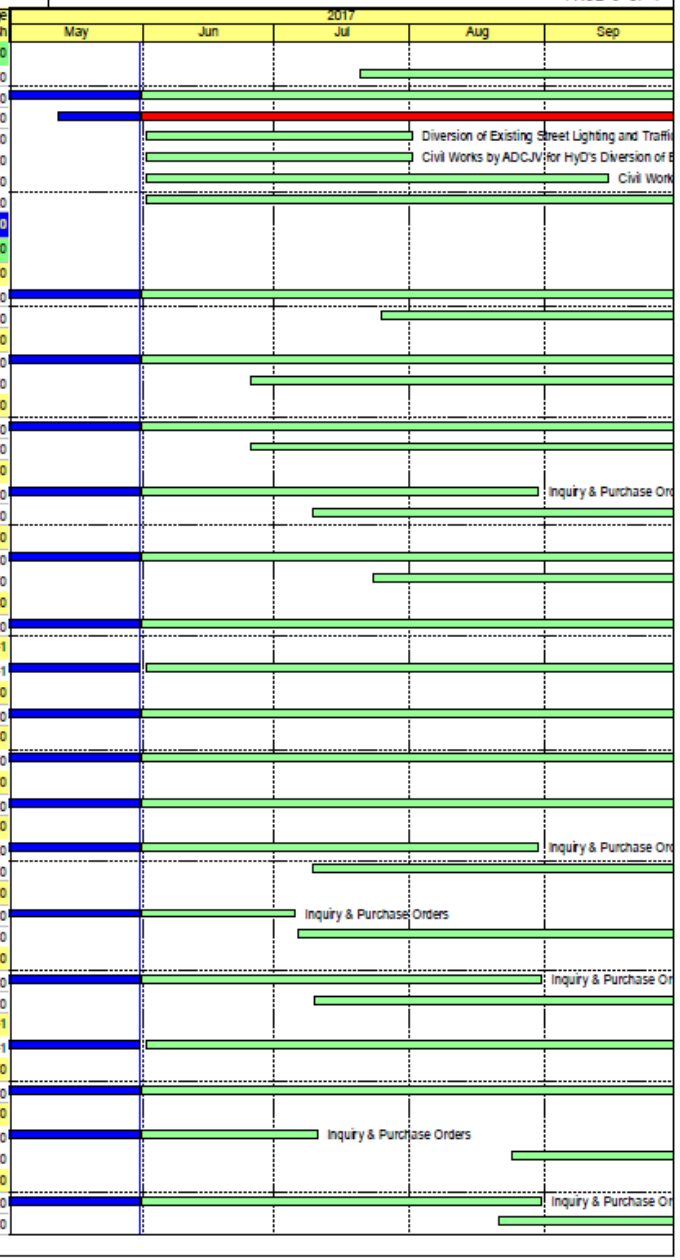
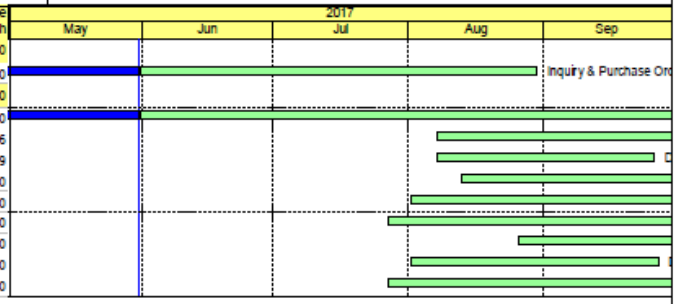
Activity ID	Activity Name	Original Duration	Start	Finish	Rev 6 BL Start	Rev 6 BL Finish	Slippage Start	Slippage Finish
External Works & Miscellaneous		294	08-Apr-17 A	01-Mar-18	08-Apr-17	28-Feb-18	0	0
C53203	Slope works (Northern Portion)	180	20-Jul-17	16-Jan-18	20-Jul-17	15-Jan-18	0	0
C53220	Drainage Outlet connection (Effluent Connection to the Existing Junction Chamber)	210	08-Apr-17 A	03-Nov-17	08-Apr-17	03-Nov-17	0	0
C53240	Portion 5 (Access Road) Works	201	12-May-17 A	29-Nov-17	12-May-17	28-Nov-17	0	0
C53282	Diversion of Existing Street Lighting and Traffic Signs (P5)	61	01-Jun-17	01-Aug-17	01-Jun-17	31-Jul-17	0	0
C53283	Civil Works by ADCJV for HyD's Diversion of Existing Street Lighting and Traffic Signs (P5)	61	01-Jun-17	01-Aug-17	01-Jun-17	31-Jul-17	0	0
C53286	Civil Works by ADCJV for WSD's Diversion of Existing Watermains	106	01-Jun-17	15-Sep-17	01-Jun-17	14-Sep-17	0	0
C53288	Civil Works by ADCJV between Site Boundary for WSD's Diversion of Existing Watermains	273	01-Jun-17	01-Mar-18	01-Jun-17	28-Feb-18	0	0
E&M Works		643	15-Jul-16 A	26-Jan-19	15-Jul-16	26-Jan-19	0	0
Procurement		643	15-Jul-16 A	26-Jan-19	15-Jul-16	26-Jan-19	0	0
Administration Building & Maintenance Workshop (AB & WS)		455	12-Dec-16 A	29-Jul-18	12-Dec-16	28-Jul-18	0	0
EM3125	Inquiry & Purchase Orders	360	12-Dec-16 A	07-Dec-17	12-Dec-16	06-Dec-17	0	0
EM3130	Manufacturing & Logistic	369	25-Jul-17	29-Jul-18	25-Jul-17	28-Jul-18	0	0
Inlet Work, Preliminary Treatment Units and Inlet Pumping Station (PTW & IPS)		580	04-Jan-17 A	26-Jan-19	04-Jan-17	26-Jan-19	0	0
EM3135	Inquiry & Purchase Orders	480	04-Jan-17 A	28-Apr-18	04-Jan-17	28-Apr-18	0	0
EM3140	Manufacturing & Logistic	580	25-Jun-17	26-Jan-19	26-Jun-17	26-Jan-19	0	0
Solid Handling Building (SHB)		477	12-Apr-17 A	19-Aug-18	12-Apr-17	19-Aug-18	0	0
EM3145	Inquiry & Purchase Orders	320	12-Apr-17 A	26-Feb-18	12-Apr-17	25-Feb-18	0	0
EM3150	Manufacturing & Logistic	420	25-Jun-17	19-Aug-18	26-Jun-17	19-Aug-18	0	0
System Control Flowmeter Chamber (SF)		404	17-Aug-16 A	07-Jun-18	17-Aug-16	07-Jun-18	0	0
EM3155	Inquiry & Purchase Orders	379	17-Aug-16 A	30-Aug-17	17-Aug-16	30-Aug-17	0	0
EM3160	Manufacturing & Logistic	333	09-Jul-17	07-Jun-18	10-Jul-17	07-Jun-18	0	0
Chemically Enhanced Primary Treatment (CEPT)		499	26-Aug-16 A	10-Sep-18	26-Aug-16	10-Sep-18	0	0
EM3115	Inquiry & Purchase Orders	401	26-Aug-16 A	30-Sep-17	26-Aug-16	30-Sep-17	0	0
EM3120	Manufacturing & Logistic	414	23-Jul-17	10-Sep-18	24-Jul-17	10-Sep-18	0	0
Deodorization Facilities No. 1 & 2 (DO 1 & DO 2)		480	10-Jan-17 A	04-May-18	10-Jan-17	04-May-18	0	0
EM3165	Inquiry & Purchase Orders	480	10-Jan-17 A	04-May-18	10-Jan-17	04-May-18	0	0
Street Fire Hydrant Pump Room & GENSET Room (FH)		230	18-Jan-17 A	11-Dec-17	24-Apr-17	09-Dec-17	96	-1
EM3275	Inquiry & Purchase Orders	230	18-Jan-17 A	11-Dec-17	24-Apr-17	09-Dec-17	96	-1
Gatehouse (GH)		247	07-Apr-17 A	10-Dec-17	07-Apr-17	09-Dec-17	0	0
EM3285	Inquiry & Purchase Orders	247	07-Apr-17 A	10-Dec-17	07-Apr-17	09-Dec-17	0	0
SCADA and CMMS Systems		295	06-Jan-17 A	28-Oct-17	06-Jan-17	27-Oct-17	0	0
EM3330	Inquiry & Purchase Orders	295	06-Jan-17 A	28-Oct-17	06-Jan-17	27-Oct-17	0	0
Sludge Dewatering Building (SDB)		560	04-Nov-16 A	18-May-18	04-Nov-16	17-May-18	0	0
EM3175	Inquiry & Purchase Orders	560	04-Nov-16 A	18-May-18	04-Nov-16	17-May-18	0	0
Payment Flowmeter Chamber (PF)		404	17-Aug-16 A	07-Jun-18	17-Aug-16	07-Jun-18	0	0
EM3205	Inquiry & Purchase Orders	379	17-Aug-16 A	30-Aug-17	17-Aug-16	30-Aug-17	0	0
EM3210	Manufacturing & Logistic	333	09-Jul-17	07-Jun-18	10-Jul-17	07-Jun-18	0	0
Existing Junction Chamber (JC)		236	07-Jan-17 A	01-Jan-18	07-Jan-17	01-Jan-18	0	0
EM3215	Inquiry & Purchase Orders	180	07-Jan-17 A	05-Jul-17	07-Jan-17	05-Jul-17	0	0
EM3220	Manufacturing & Logistic	180	06-Jul-17	01-Jan-18	06-Jul-17	01-Jan-18	0	0
Chemical Building (CB)		405	22-Jul-16 A	22-Apr-18	22-Jul-16	21-Apr-18	0	0
EM3225	Inquiry & Purchase Orders	405	22-Jul-16 A	31-Aug-17	22-Jul-16	30-Aug-17	0	0
EM3230	Manufacturing & Logistic	286	10-Jul-17	22-Apr-18	10-Jul-17	21-Apr-18	0	0
Electrical Buildings (EB1, EB2, EB3 & EB4)		475	10-Jan-17 A	01-May-18	10-Jan-17	29-Apr-18	0	-1
EM3235	Inquiry & Purchase Orders	475	10-Jan-17 A	01-May-18	10-Jan-17	29-Apr-18	0	-1
DG Store & Chemical Waste Storage Building (DG) and Irrigation & Cleansing Water I		328	15-Jan-17 A	09-Dec-17	15-Jan-17	08-Dec-17	0	0
EM3255	Inquiry & Purchase Orders	328	15-Jan-17 A	09-Dec-17	15-Jan-17	08-Dec-17	0	0
Sludge Skip Storage Building (SSSB)		215	08-Dec-16 A	20-Jan-18	08-Dec-16	20-Jan-18	0	0
EM3265	Inquiry & Purchase Orders	215	08-Dec-16 A	10-Jul-17	08-Dec-16	10-Jul-17	0	0
EM3270	Manufacturing & Logistic	149	24-Aug-17	20-Jan-18	25-Aug-17	20-Jan-18	0	0
Re-use Water Building (RW)		360	05-Sep-16 A	10-Mar-18	05-Sep-16	09-Mar-18	0	0
EM3195	Inquiry & Purchase Orders	360	05-Sep-16 A	31-Aug-17	05-Sep-16	30-Aug-17	0	0
EM3200	Manufacturing & Logistic	201	21-Aug-17	10-Mar-18	21-Aug-17	09-Mar-18	0	0



DATA DATE: 31-May-17 | LAYOUT: SW Project PHase 1 Rev 6 (3M 31May17) | PAGE 7 OF 7

Activity ID	Activity Name	Original Duration	Start	Finish	Rev 6 BL Start	Rev 6 BL Finish	Slippage Start	Slippage Finish
UV Disinfection Facility (UV)		412	15-Jul-16 A	30-Aug-17	15-Jul-16	30-Aug-17	0	0
EM3185	Inquiry & Purchase Orders	412	15-Jul-16 A	30-Aug-17	15-Jul-16	30-Aug-17	0	0
Cast - In Items		479	01-Feb-17 A	15-Mar-18	01-Feb-17	15-Mar-18	0	0
EM3520	Inquiry & Purchase Orders	408	01-Feb-17 A	15-Mar-18	01-Feb-17	15-Mar-18	0	0
EM3550	Delivery of Cast-in Items for SSSB	90	07-Aug-17	05-Nov-17	22-Jul-17	19-Oct-17	-16	-16
EM3555	Delivery of Cast-in Items for Admin. Building	50	07-Aug-17	26-Sep-17	20-Jul-17	07-Sep-17	-19	-19
EM3560	Delivery of Cast-in Items for DO No. 1	84	13-Aug-17	05-Nov-17	13-Aug-17	04-Nov-17	0	0
EM3570	Delivery of Cast-in Items for CB	91	01-Aug-17	31-Oct-17	01-Aug-17	30-Oct-17	0	0
EM3580	Delivery of Cast-in Items for ICW	75	27-Jul-17	09-Oct-17	27-Jul-17	09-Oct-17	0	0
EM3585	Delivery of Cast-in Items for EB1	136	26-Aug-17	09-Jan-18	26-Aug-17	08-Jan-18	0	0
EM3600	Delivery of Cast-in Items for EB4	57	01-Aug-17	27-Sep-17	01-Aug-17	26-Sep-17	0	0
EM3610	Delivery of Cast-in Items for DG	75	27-Jul-17	09-Oct-17	27-Jul-17	09-Oct-17	0	0



Appendix D1

Calibration Certificates for Impact Air Quality Monitoring Equipment

東業德勤測試顧問有限公司
ETS-TESTCONSULT LTD.™

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W: www.ets-testconsult.com

Calibration Report
of
High Volume Air Sampler

Manufacturer : Graseby GMW

Date of Calibration : 23 May 2017

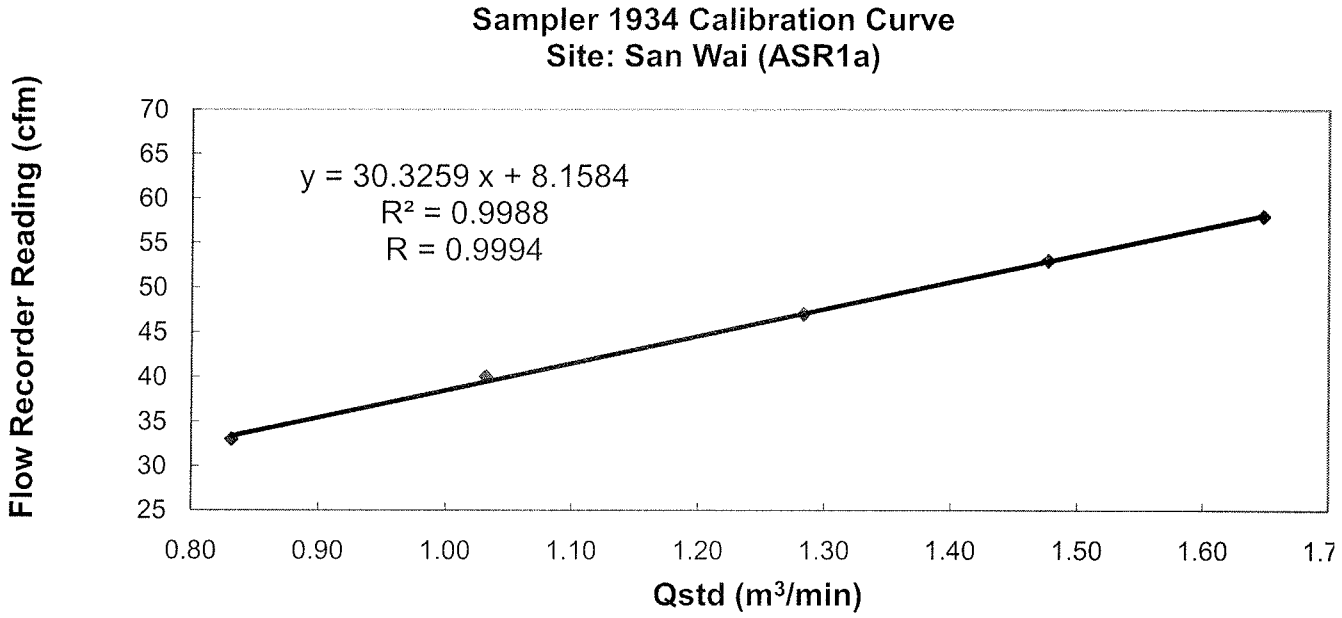
Serial No. : 1934 (ET / EA / 003 / 25)

Calibration Due Date : 22 July 2017

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	58	53	47	40	33
Qstd (Actual flow rate, m^3/min)	1.65	1.48	1.28	1.03	0.83
Pressure : 770.31 **mm Hg**		Temp. : 298 K			



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 : _____
CHAN, Wai Man
(Technician)

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

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W: www.ets-testconsult.com

Calibration Report
of
High Volume Air Sampler

Manufacturer : Graseby GMW

Date of Calibration : 27 March 2017

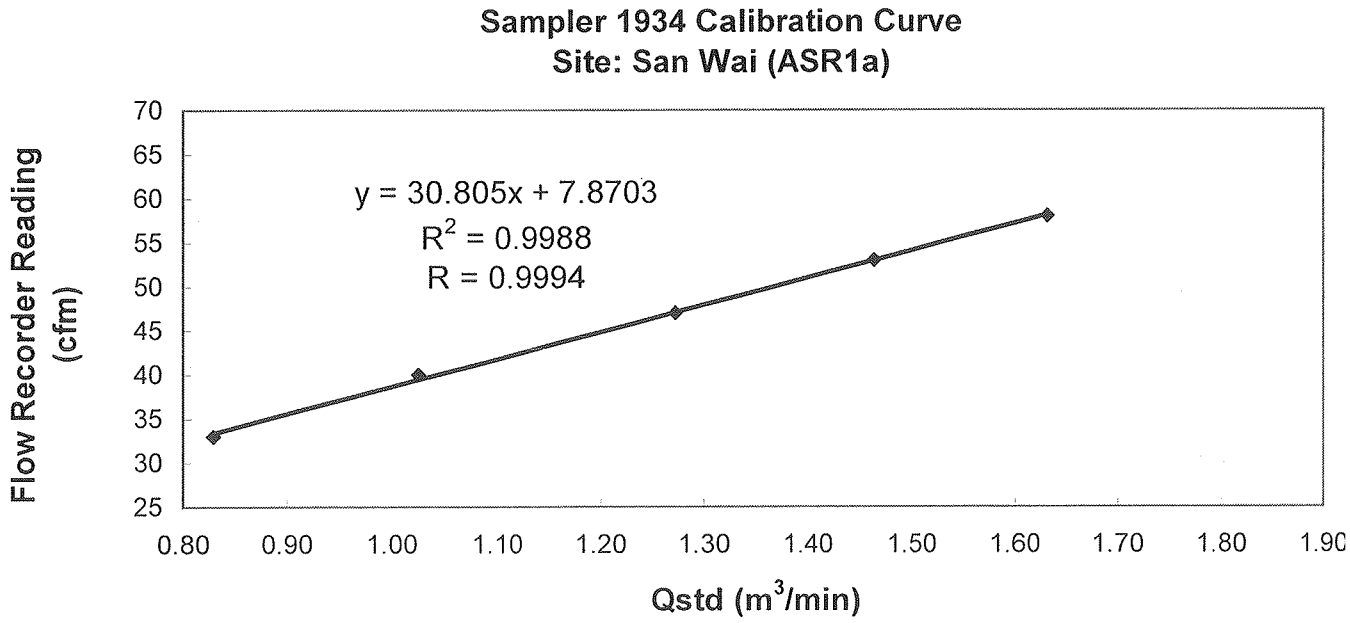
Serial No. : 1934 (ET / EA / 003 / 25)

Calibration Due Date : 26 May 2017

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)		58	53	47	40	33
Qstd (Actual flow rate, m^3/min)		1.63	1.46	1.27	1.03	0.83
Pressure :	770.31 **mm Hg**		Temp. :		305 K	



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 : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Approved by :
LAU, Chi Leung
(Environmental Consultant)

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Calibration Report
of
High Volume Air Sampler

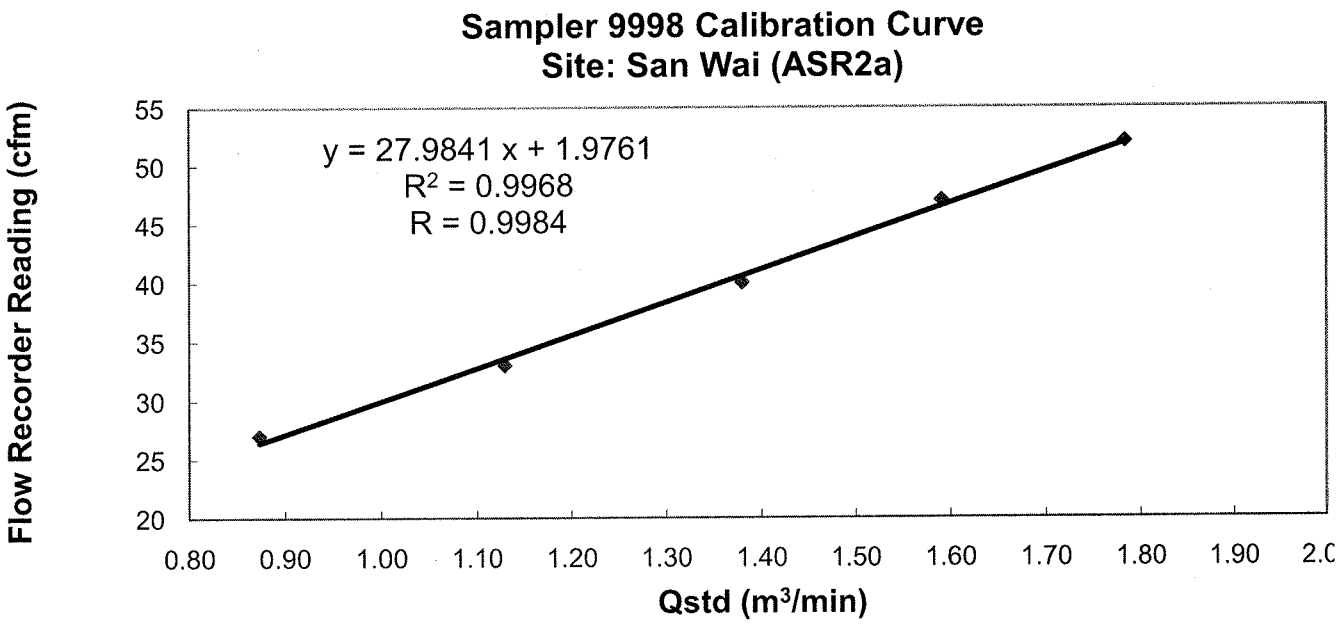
Manufacturer : Graseby (Model No. GS2310) Date of Calibration : 23 May 2017

Serial No. : 9998 (ET / EA / 003 / 12) Calibration Due Date : 22 July 2017

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	52	47	40	33	27
Qstd (Actual flow rate, m^3/min)	1.78	1.59	1.38	1.13	0.87
Pressure : 771.06 mm Hg		Temp. : 298 K			



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 : _____
CHAN, Wai Man
(Technician)

Checked by : _____
LAW, Sau Yee
(Senior Environmental Officer)

- END OF REPORT -

東業德勤測試顧問有限公司
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Calibration Report
of
High Volume Air Sampler

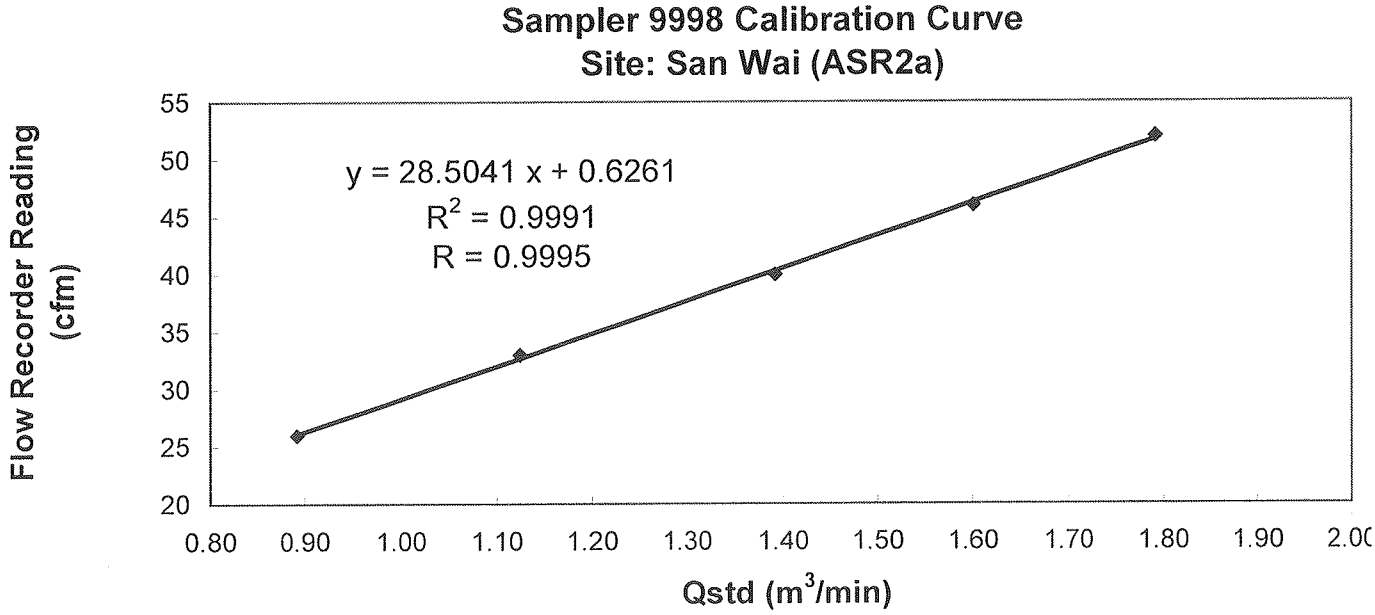
Manufacturer : Graseby (Model No. GS2310) Date of Calibration : 27 March 2017

Serial No. : 9998 (ET / EA / 003 / 12) Calibration Due Date : 26 May 2017

Method : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

Results :

Flow recorder reading (cfm)	52	46	40	33	26
Qstd (Actual flow rate, m^3/min)	1.79	1.60	1.39	1.12	0.89
Pressure : 771.06 mm Hg		Temp. : 298 K			



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 : Mak Kei Wai
MAK, Kei Wai
(Assistant Supervisor)

Checked by :
LAW, Sau Yee
(Senior Environmental Officer)

- END OF REPORT -

東業德勤測試顧問有限公司
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Internal Calibration Report of Dust Monitor

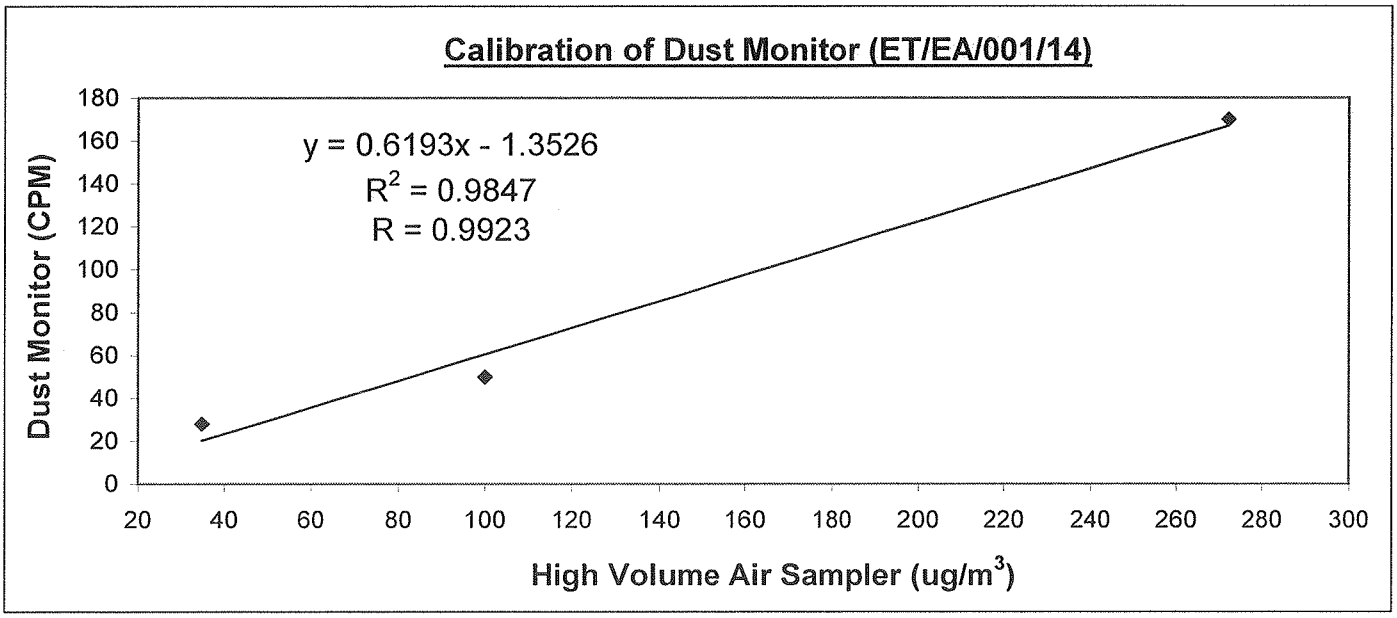
Manufacturer : SIBATA (LD-3B) Date of Calibration : 23 January 2017

Serial No. : 597340 (ET/EA/001/14) Calibration Due Date : 22 July 2017

Method : Parallel measurement (Three-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	28	50	170
High Volume Air Sampler (ug/m^3)	35	100	272
High Volume Air Sampler Serail No.: 1177	Calibration Due Date: 22 February 2017		



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

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : _____
CHUNG, Ka Ho
(Technician)

Checked by : _____
LAW, Sau Yee
(Senior Environmental Officer)

- END OF REPORT -

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Internal Calibration Report of Dust Monitor

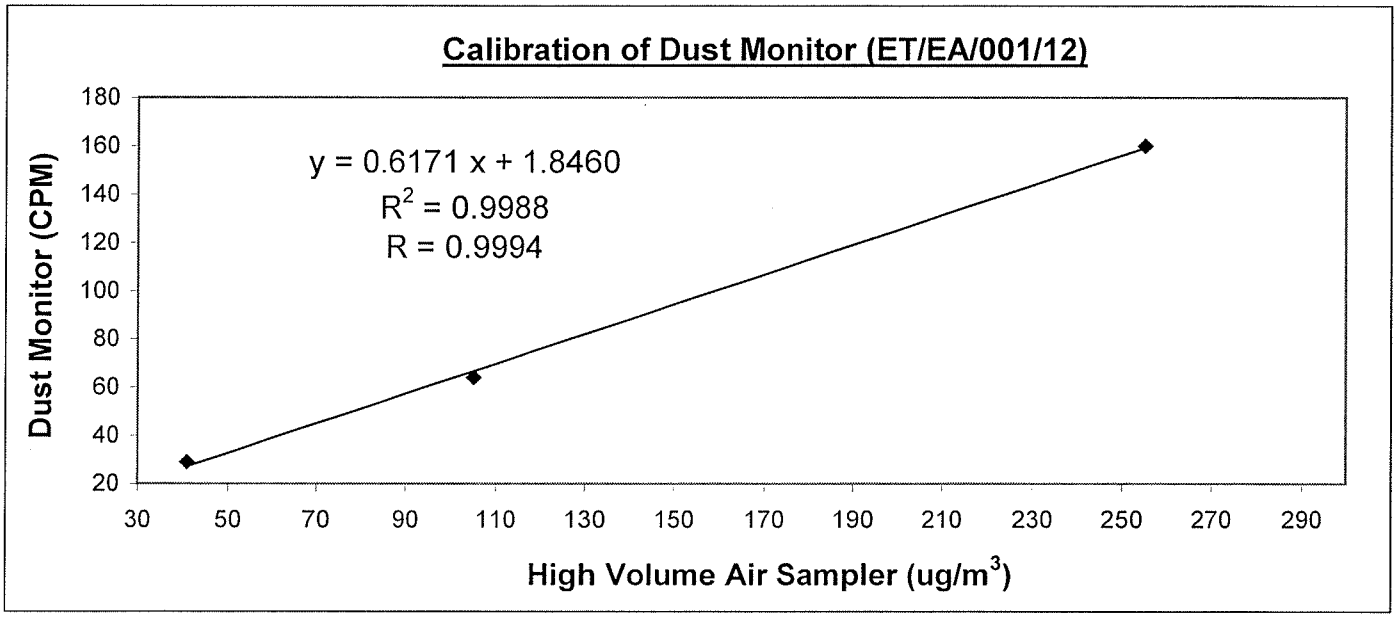
Manufacturer : SIBATA (LD-3B) Date of Calibration : 19 May 2017

Serial No. : 255864 (ET/EA/001/12) Calibration Due Date : 18 Novermber 2017

Method : Parallel measurement (Three-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	29	64	160
High Volume Air Sampler (ug/m^3)	41	105	255
High Volume Air Sampler Serail No.: 1177	Calibration Due Date: 18 June 2017		



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

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : _____
Chung, Ka Ho
(Technician)

Checked by : _____
LAW, Sau Yee
(Senior Environmental Officer)

- END OF REPORT -

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Internal Calibration Report of Dust Monitor

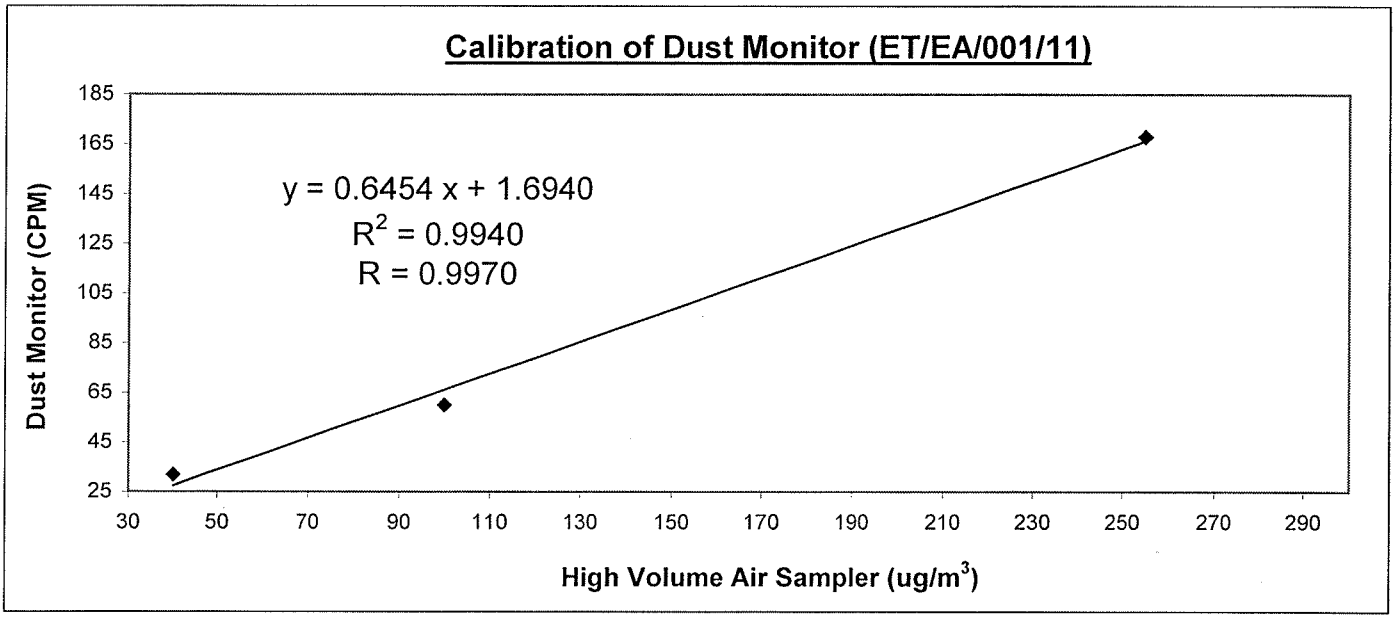
Manufacturer : SIBATA (LD-3B) Date of Calibration : 19 May 2017

Serial No. : 255863 (ET/EA/001/11) Calibration Due Date : 18 Novermber 2017

Method : Parallel measurement (Three-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	32	60	168
High Volume Air Sampler (ug/m^3)	40	100	255
High Volume Air Sampler Serail No.:1177	Calibration Due Date: 18 June 2017		



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

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : _____
CHUNG, Ka Ho
(Technician)

Checked by : _____
LAW, Sau Yee
(Senior Environmental Officer)

- END OF REPORT -

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W: www.ets-testconsult.com

Internal Calibration Report of Dust Monitor

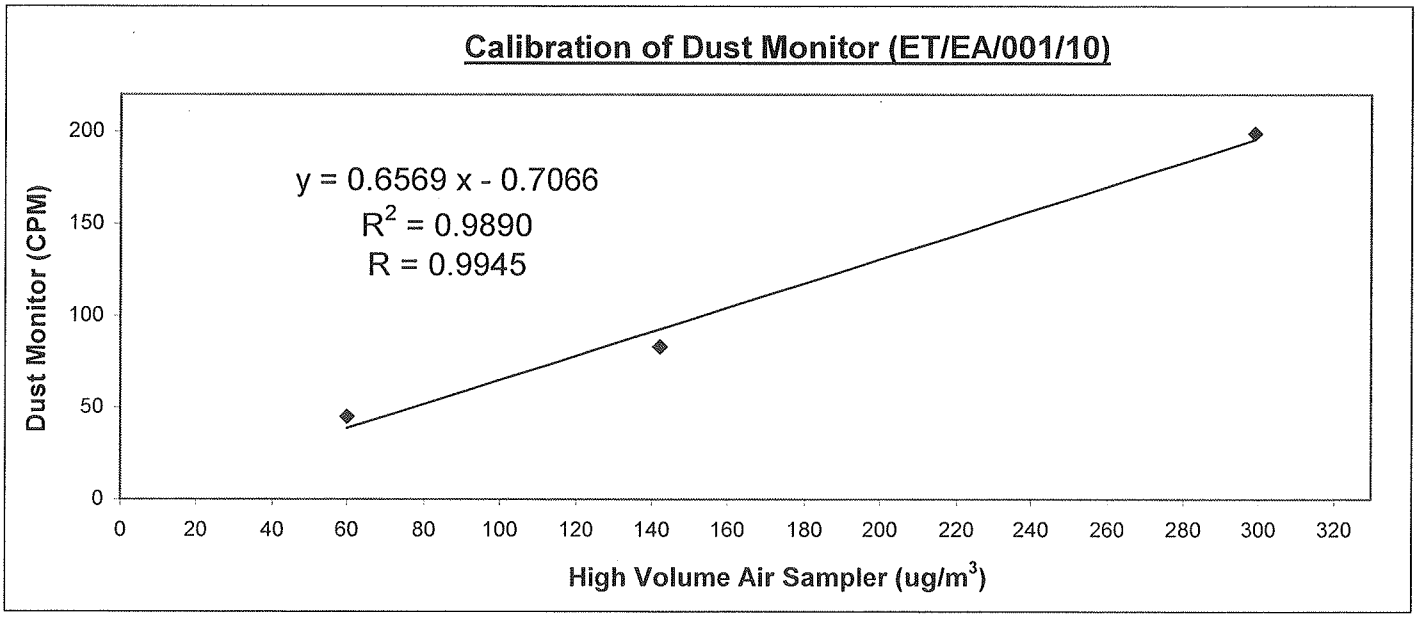
Manufacturer : SIBATA (LD-3B) Date of Calibration : 24 December 2016

Serial No. : 1Z5635 (ET/EA/001/10) Calibration Due Date : 23 June 2017

Method : Parallel measurement (Three-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	45	83	199
High Volume Air Sampler (ug/m^3)	60	142	299
High Volume Air Sampler Serail No.: 1177	Calibration Due Date: 23 February 2017		



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

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : _____
CHUNG, Kit Yu
(Technician)

Checked by : _____
LAW, Sau Yee
(Senior Environmental Officer)

- END OF REPORT -

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Internal Calibration Report of Dust Monitor

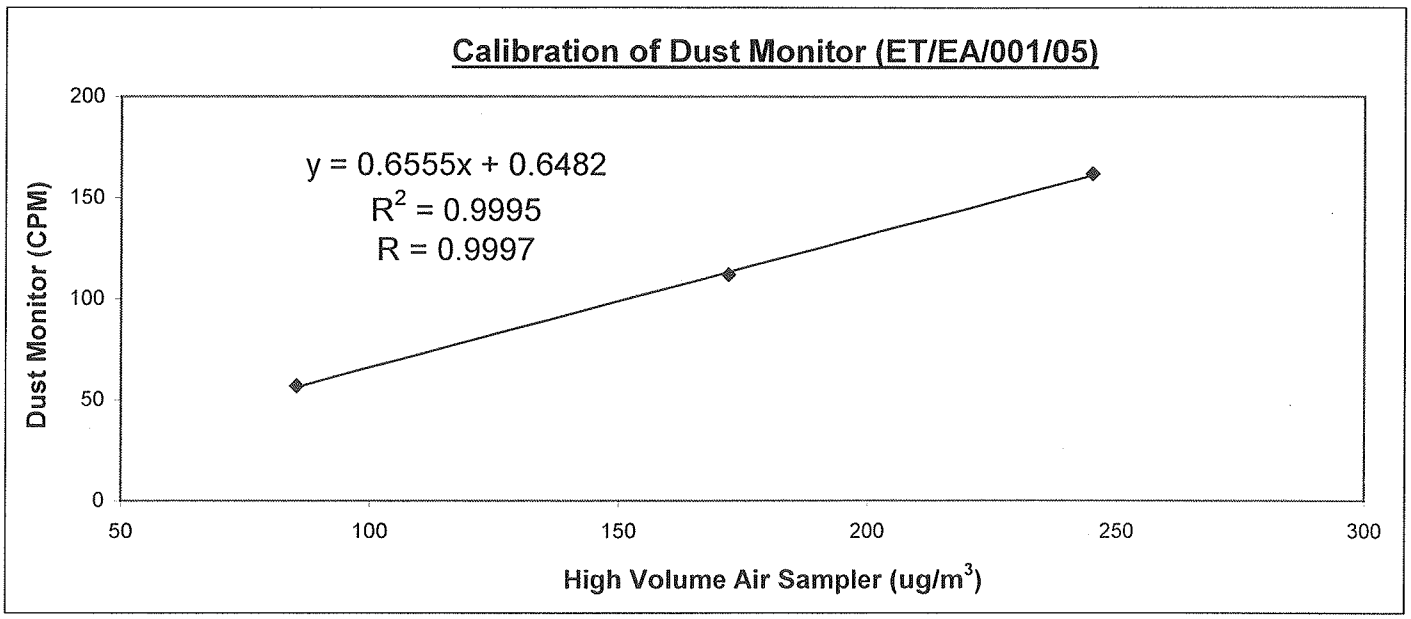
Manufacturer : SIBATA (LD-3B) Date of Calibration : 25 February 2017

Serial No. : 8X4282 (ET/EA/001/05) Calibration Due Date : 24 August 2017

Method : Parallel measurement (Three-point calibration) by placing the Dust Monitor and High Volume Air Samper together under the same environmental condition

Results :

Dust Monitor (CPM)	57	112	162
High Volume Air Sampler (ug/m^3)	85	172	245
High Volume Air Sampler Serail No.: 1177	Calibration Due Date: 21 April 2017		



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

The Dust Trak Monitor complies * / ~~does not comply~~ * with the internal calibration procedures and is deemed acceptable */ ~~unacceptable~~ * for use.

Calibrated by : _____
Chung Ka Ho
(Technician)

Checked by : _____
LAW, Sau Yee
(Senior Environmental Officer)

- END OF REPORT -

ET/EA/004/13

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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Apr 12, 2016 Rootsmeter S/N 0438320 Ta (K) - 294
Operator Tisch Orifice I.D. - 3163 Pa (mm) - 758.19

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	1.4390	3.2	2.00
2	NA	NA	1.00	1.0280	6.4	4.00
3	NA	NA	1.00	0.9160	7.9	5.00
4	NA	NA	1.00	0.8760	8.7	5.50
5	NA	NA	1.00	0.7240	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
1.0069	0.6997	1.4221		0.9958	0.6920	0.8806
1.0027	0.9754	2.0112		0.9916	0.9646	1.2454
1.0006	1.0923	2.2485		0.9895	1.0802	1.3924
0.9996	1.1411	2.3583		0.9885	1.1284	1.4604
0.9942	1.3732	2.8442		0.9832	1.3580	1.7613
Qstd slope (m) =		2.11024		Qa slope (m) =		1.32140
intercept (b) =		-0.05237		intercept (b) =		-0.03243
coefficient (r) =		0.99995		coefficient (r) =		0.99995
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}

Appendix D2

Impact Air Quality Monitoring Results

Summary of Impact 1-hour TSP Monitoring Results

Air Quality Monitoring Station : ASR1a

Date	Weather	Temperature (℃)	Monitoring Period		1-hr TSP ($\mu g/m^3$)
			Start	Finish	
19/5/2017	Cloudy	25	08:55	09:55	91
19/5/2017	Cloudy	25	09:55	10:55	74
19/5/2017	Cloudy	25	10:55	11:55	83
25/5/2017	Cloudy	25	09:36	10:36	45
25/5/2017	Cloudy	27	10:36	11:36	55
25/5/2017	Cloudy	28	13:00	14:00	52
31/5/2017	Fine	27	08:21	09:21	78
31/5/2017	Fine	28	09:21	10:21	50
31/5/2017	Fine	29	10:21	11:21	33
				Min	33
				Max	91
				Average	62

Air Quality Monitoring Station : ASR2a

Date	Weather	Temperature (℃)	Monitoring Period		1-hr TSP ($\mu g/m^3$)
			Start	Finish	
19/5/2017	Cloudy	25	09:00	10:00	81
19/5/2017	Cloudy	25	10:00	11:00	75
19/5/2017	Cloudy	25	11:00	12:00	85
25/5/2017	Cloudy	25	10:00	11:00	89
25/5/2017	Cloudy	27	11:00	12:00	97
25/5/2017	Cloudy	28	13:00	14:00	85
31/5/2017	Fine	27	08:30	09:30	63
31/5/2017	Fine	28	09:30	10:30	31
31/5/2017	Fine	29	10:30	11:30	26
				Min	26
				Max	97
				Average	70

Summary of Impact 24-hour TSP Monitoring Results

Air Quality Monitoring Station : ASR1a

Start		Finish		Elapse Time		Sampling Time (hrs)	Flow Rate (m^3/min.)		Average (m^3/min.)	Filter Paper Weight (g)		Conc. ($\mu g/m^3$)	Weather Condition
Date	Time	Date	Time	Initial	Final		Initial	Final		Initial	Final		
19/5/2017	08:55	20/5/2017	08:55	22853.64	22877.64	24	0.8482	0.8482	0.8482	2.6490	2.8478	163	Fine
25/5/2017	08:55	26/5/2017	08:55	22877.64	22901.64	24	0.8521	0.8521	0.8521	2.7855	3.0372	205	Fine
31/5/2017	08:55	1/6/2017	08:55	22901.64	22925.64	24	0.8521	0.8521	0.8521	2.8025	3.0673	216	Fine

Min	163
Max	216
Average	195

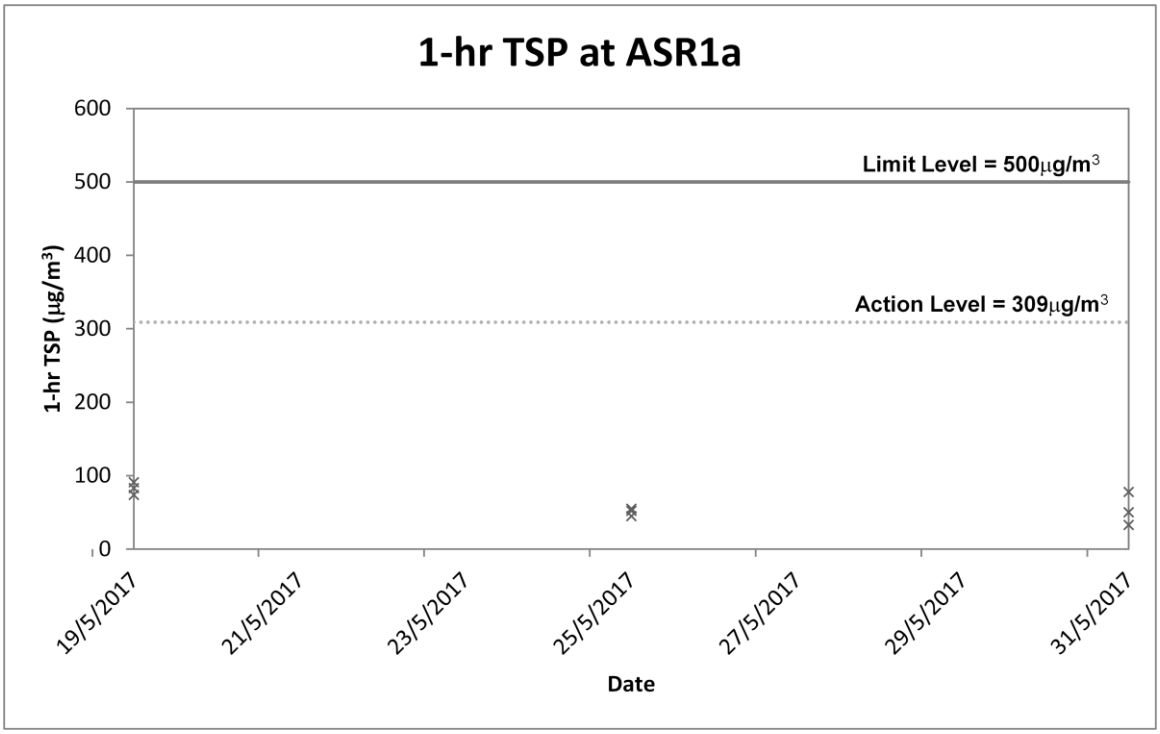
Air Quality Monitoring Station : ASR2a

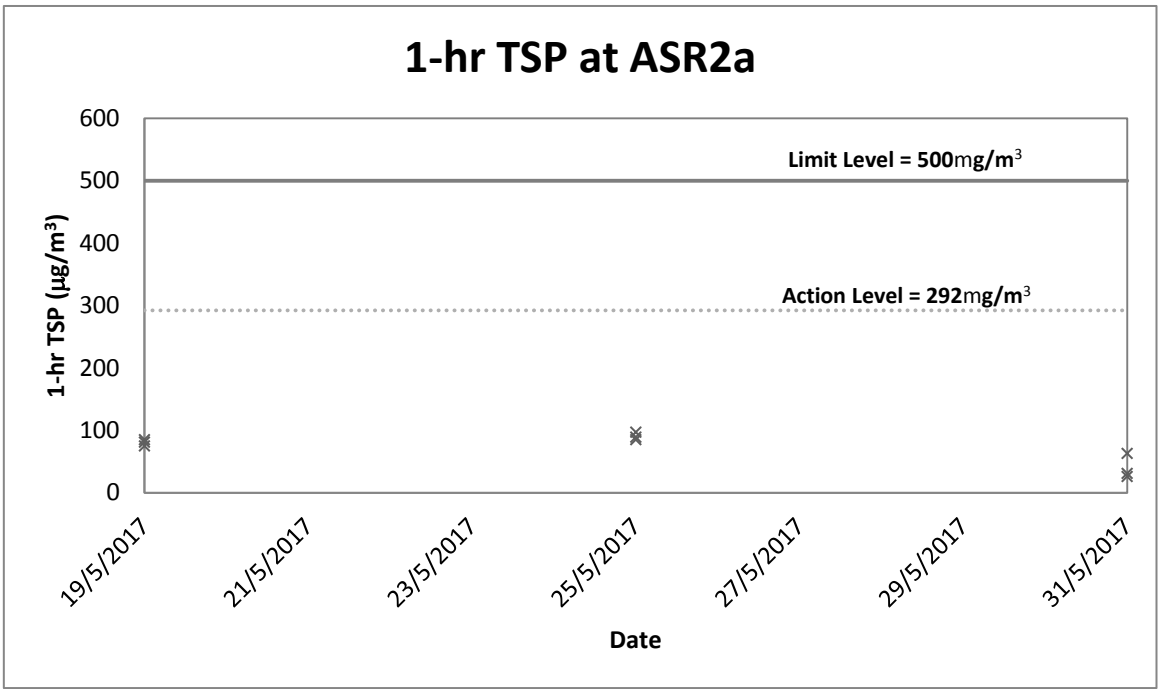
Start		Finish		Elapse Time		Sampling Time (hrs)	Flow Rate (m^3/min.)		Average (m^3/min.)	Filter Paper Weight (g)		Conc. ($\mu g/m^3$)	Weather Condition
Date	Time	Date	Time	Initial	Final		Initial	Final		Initial	Final		
19/5/2017	09:00	20/5/2017	09:00	19814.45	19838.45	24	1.1708	1.1708	1.1708	2.6248	2.8594	139	Fine
25/5/2017	09:00	26/5/2017	09:00	19838.45	19862.45	24	1.1444	1.1444	1.1444	2.8041	3.0709	162	Fine
31/5/2017	09:00	1/6/2017	09:00	19862.45	19886.45	24	1.1444	1.1444	1.1444	2.7936	3.0373	148	Fine

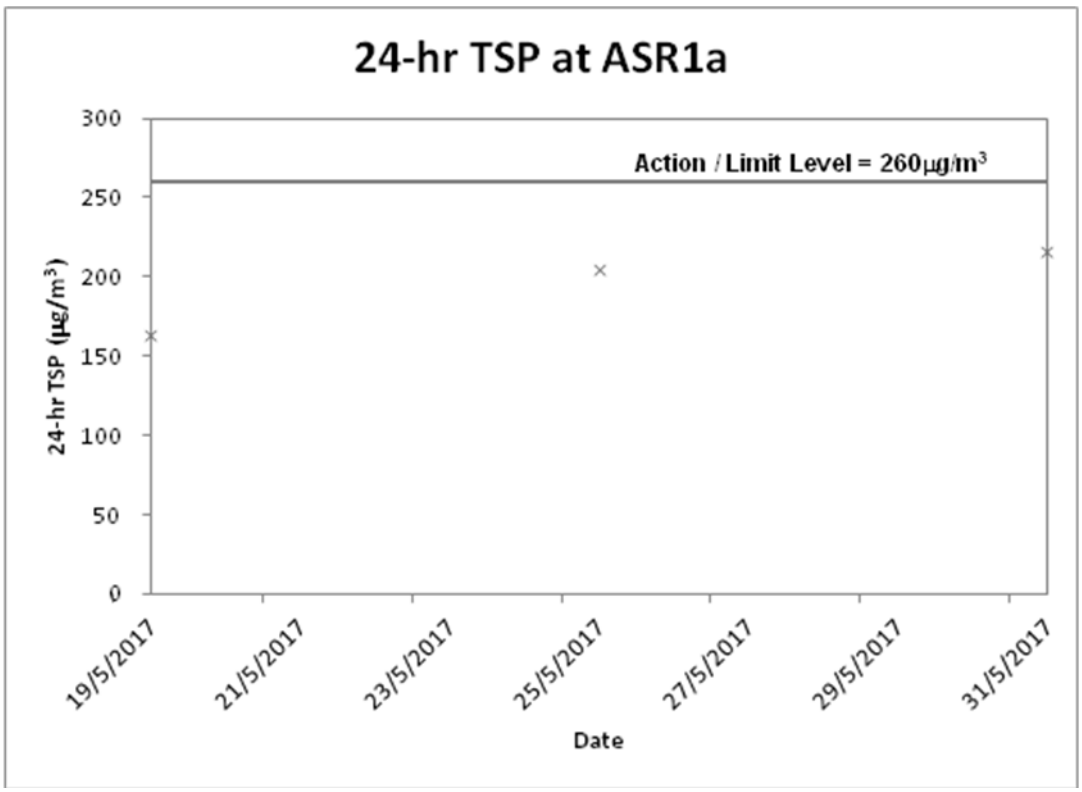
Min	139
Max	162
Average	150

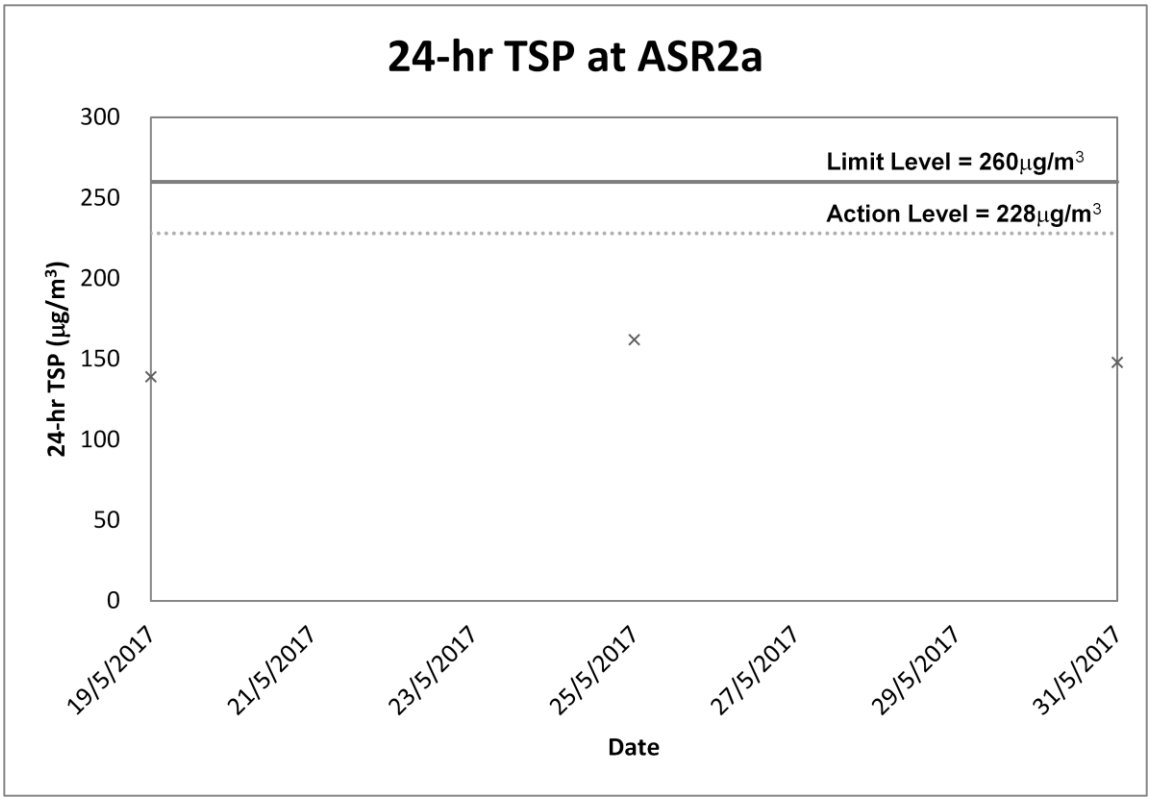
Appendix D3

Graphical Plots of Impact Air Quality Monitoring Results


1-hr TSP at ASR1a
600
500
400
300
200
100
0
1-hr TSP (μg/m³)
Limit Level = 500μg/m³
Action Level = 309μg/m³
19/5/2017
21/5/2017
23/5/2017
25/5/2017
27/5/2017
29/5/2017
31/5/2017
Date


1-hr TSP at ASR2a
600
500
400
300
200
100
0
1-hr TSP (μg/m³)
Limit Level = 500mg/m³
Action Level = 292mg/m³
19/5/2017
21/5/2017
23/5/2017
25/5/2017
27/5/2017
29/5/2017
31/5/2017
Date


24-hr TSP at ASR1a
Action / Limit Level = 260μg/m3
24-hr TSP (μg/m3)
300
250
200
150
100
50
0
19/5/2017
21/5/2017
23/5/2017
25/5/2017
27/5/2017
29/5/2017
31/5/2017
Date


24-hr TSP at ASR2a
Limit Level = 260μg/m3
Action Level = 228μg/m3
24-hr TSP (μg/m3)
300
250
200
150
100
50
0
19/5/2017
21/5/2017
23/5/2017
25/5/2017
27/5/2017
29/5/2017
31/5/2017
Date

Appendix E1

Calibration Certificates for Impact Noise Monitoring Equipment

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. 701812

Customer : ETS-Testconsult Limited

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

Order No. : Q70792 **Date of receipt :** 2-Mar-17

Item Tested

Description : Sound Level Meter
Manufacturer : Rion **I.D.** : ET/EN/003/18
Model : NL-52 **Serial No.** : 00264520

Test Conditions

Date of Test : 7-Mar-17 **Supply Voltage :** --
Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.
Ref. Document/Procedure: Z01, IEC 61672.

Test Results

All results were within the IEC 61672 Type 1 specification.
The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017	Multi-Function Generator	C170120	SCL-HKSAR
S240	Sound Level Calibrator	701036	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), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : Kin Wong **Approved by :** Alan Chu

Date: 7-Mar-17

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

Results :

1. **Self-generated noise:** 15.7 dBA (Mfr's Spec ≤ 17 dBA)

2. **Acoustical signal test**

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Octave Filter		
30-130	A	F	OFF	94.0	94.0
		S	OFF		94.0
	C	F	OFF		94.1
	Z	F	OFF		94.2
	A	F	OFF	114.0	114.0
		S	OFF		114.0
	C	F	OFF		114.0
	Z	F	OFF		114.1

IEC 61672 Type 1 Spec. : ± 1.1 dB
Uncertainty : ± 0.1 dB

3 **Electrical signal tests of frequency weightings** (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.7	- 39.4 dB, ± 2 dB
63 Hz	-26.2	- 26.2 dB, ± 1.5 dB
125 Hz	-16.2	- 16.1 dB, ± 1.5 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.2	- 3.2 dB, ± 1.4 dB
1 kHz	0.0 (Ref)	0 dB, ± 1.1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1.6 dB
4 kHz	+1.0	+ 1.0 dB, ± 1.6 dB
8 kHz	-1.1	- 1.1 dB, + 2.1 dB ~ -3.1 dB
16 kHz	-8.0	- 6.6 dB, + 3.5 dB ~ - 17.0 dB

Uncertainty : ± 0.1 dB

Calibration Certificate

4. Frequency & Time weightings at 1 kHz

4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	94.0 (Ref.)	- -	± 0.4 dB
C	94.	94.1	+0.1	
Z	94.0	94.2	+0.2	

4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	94.0 (Ref.)	- -	± 0.3 dB
Slow	94.0	94.0	0.0	
Time-averaging	94.0	94.0	0.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1012 hPa.
4. Preamplifier model : NH-25 , S/N : 64645
5. Firmware Version: 1.7
6. Power Supply Check: OK
7. The UUT was adjusted with the laboratory's sound calibrator at the reference sound pressure level before the calibration.

---------- END ----------

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. 701813 Page 1 of 3 Pages

Customer : ETS-Testconsult Limited

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

Order No. : Q70792 **Date of receipt :** 2-Mar-17

Item Tested

Description : Sound Level Meter

Manufacturer : Rion **I.D.** : ET/EN/003/17

Model : NL-52 **Serial No.** : 00264519

Test Conditions

Date of Test : 7-Mar-17 **Supply Voltage :** --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: Z01, IEC 61672.

Test Results

All results were within the IEC 61672 Type 1 specification.

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017	Multi-Function Generator	C170120	SCL-HKSAR
S240	Sound Level Calibrator	701036	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), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : Kin Wong **Approved by :** Alan Chu

Date: 7-Mar-17

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

Results :

1. **Self-generated noise:** 15.9 dBA (Mfr's Spec ≤ 17 dBA)

2. **Acoustical signal test**

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Octave Filter		
30-130	A	F	OFF	94.0	94.0
		S	OFF		94.0
	C	F	OFF		94.1
	Z	F	OFF		94.1
	A	F	OFF	114.0	114.1
		S	OFF		114.1
	C	F	OFF		114.1
	Z	F	OFF		114.1

IEC 61672 Type 1 Spec. : ± 1.1 dB
Uncertainty : ± 0.1 dB

3 **Electrical signal tests of frequency weightings** (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.7	- 39.4 dB, ± 2 dB
63 Hz	-26.2	- 26.2 dB, ± 1.5 dB
125 Hz	-16.2	- 16.1 dB, ± 1.5 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.2	- 3.2 dB, ± 1.4 dB
1 kHz	0.0 (Ref)	0 dB, ± 1.1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1.6 dB
4 kHz	+1.0	+ 1.0 dB, ± 1.6 dB
8 kHz	-1.1	- 1.1 dB, + 2.1 dB ~ -3.1 dB
16 kHz	-8.0	- 6.6 dB, + 3.5 dB ~ - 17.0 dB

Uncertainty : ± 0.1 dB

Calibration Certificate

4. Frequency & Time weightings at 1 kHz

4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	94.0 (Ref.)	- -	± 0.4 dB
C	94.0	94.1	+0.1	
Z	94.0	94.1	+0.1	

4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	94.0 (Ref.)	- -	± 0.3 dB
Slow	94.0	94.0	0.0	
Time-averaging	94.0	94.0	0.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1012 hPa.
4. Preamplifier model : NH-25 , S/N : 64644
5. Firmware Version: 1.7
6. Power Supply Check: OK
7. The UUT was adjusted with the laboratory's sound calibrator at the reference sound pressure level before the calibration.

---------- END ----------

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. 702279

Customer : ETS-Testconsult Limited

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

Order No. : Q70965 **Date of receipt :** 14-Mar-17

Item Tested

Description : Acoustic Calibrator

Manufacturer : Castle **I.D.** : ET/EN/002/07

Model : GA607 **Serial No.** : 038641

Test Conditions

Date of Test : 17-Mar-17 **Supply Voltage :** --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : IEC 60942, F06, F20, Z02.

Test Results

All results were within the IEC 60942 Class 1 specification.

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S014	Spectrum Analyzer	605758	NIM-PRC & SCL-HKSAR
S240	Sound Level Calibrator	701036	NIM-PRC & SCL-HKSAR
S041	Universal Counter	607883	SCL-HKSAR
S206	Sound Level Meter	605757	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), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : Kin Wong

Approved by : Alan Chu

Date: 17-Mar-17

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

Results :

1. Generated Sound Pressure Level

UUT Nominal Value (dB)	Measured Value (dB)	IEC 60942 Class 1 Spec.
94	94.0	± 0.4 dB

Uncertainty : ± 0.1 dB

2. Short-term Level Fluctuation : 0.0 dB

IEC 60942 Class 1 Spec. : ± 0.1 dB
Uncertainty : ± 0.01 dB

3. Frequency

UUT Nominal Value (kHz)	Measured Value (kHz)	IEC 60942 Class 1 Spec.
1	1.000	± 1 %

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

4. Total Distortion : < 2.8 %

IEC 60942 Class 1 Spec. : < 3 %
Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1026 hPa.

---------- END ----------

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **609158** 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. : Q63739 **Date of receipt :** 7-Oct-16

Item Tested

Description : Sound Level Calibrator

Manufacturer : Rion **I.D.** : ET/EN/002/01

Model : NC-73 **Serial No.** : 10196943

Test Conditions

Date of Test : 24-Oct-16 **Supply Voltage** : --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

Test Results

All results were within the manufacturer's specification.

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S014	Spectrum Analyzer	605758	NIM-PRC & SCL-HKSAR
S240	Sound Level Calibrator	601604	NIM-PRC & SCL-HKSAR
S041	Universal Counter	607883	SCL-HKSAR
S206	Sound Level Meter	605757	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), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : Kin Wong

Approved by : Alan Chu

Date: 24-Oct-16

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

Results :

1. Level Accuracy (at 1 kHz)

UUT Nominal Value	Measured Value	Mfr's Spec.
94 dB	94.0 dB	± 1 dB

Uncertainty : ± 0.2 dB

2. Frequency Accuracy

UUT Nominal Value	Measured Value	Mfr's Spec.
1 kHz	0.993 kHz	± 2 %

Uncertainty : ± 0.1 %

3. Level Stability : 0.0 dB
Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 0.4 %
Mfr's Spec. : < 3 %
Uncertainty : ± 2.3 % of reading

Remarks: 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1020 hPa

---------- END ----------

Hong Kong Calibration Ltd.
香 港 校 正 有限公司

Calibration Certificate

Certificate No. 700818 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. : Q70345 **Date of receipt :** 25-Jan-17

Item Tested

Description : Thermo-Anemometer

Manufacturer : AZ Instrument **I.D.** : ET/EN/001/05

Model : AZ 8908 **Serial No.** : 1064869

Test Conditions

Date of Test : 15-Feb-17 **Supply Voltage :** --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: T03, Z04.

Test Results

A correction factor of x 1.06 is required to bring the meter reading to within the manufacturer's specification.
The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S155	Std. Anemometer	611074	NIM-PRC
S223C	Std. Thermometer	604664	NIM-PRC

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), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : C H Chan

Approved by : Steve Kwan

Date: 15-Feb-17

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. 700818

Results :

1. Velocity

Applied Value (m/s)	UUT Reading (m/s)	Corrected Reading (UUT Reading x 1.06)	Mfr's Spec.
0.00	0.0	0.0	± 5 % of reading.
2.50	2.4	2.5	
5.00	4.8	5.1	
10.00	* 9.3	9.9	
15.00	* 13.6	14.4	
19.00	* 17.2	18.2	

2. Temperature

Applied Value (°C)	UUT Reading (°C)	Mfr's Spec.
22.85	22.5	± 1 °C

Remark : 1. UUT: Unit-Under-Test
2. Uncertainty : ± (0.9% + 0.16 m/s) for Velocity, ± 0.1 °C for Temperature, for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1 022 hPa
4. * Out of specification

---------- END ----------

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. 701814

Customer : ETS-Testconsult Limited

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

Order No. : Q70792 **Date of receipt :** 2-Mar-17

Item Tested

Description : Sound Level Meter
Manufacturer : Rion **I.D.** : ET/EN/003/19
Model : NL-52 **Serial No.** : 00264521

Test Conditions

Date of Test : 7-Mar-17 **Supply Voltage :** --
Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.
Ref. Document/Procedure: Z01, IEC 61672.

Test Results

All results were within the IEC 61672 Type 1 specification.
The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017	Multi-Function Generator	C170120	SCL-HKSAR
S240	Sound Level Calibrator	701036	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), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : Kin Wong **Approved by :** Alan Chu

Date: 7-Mar-17

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

Results :

1. **Self-generated noise:** 14.6 dBA (Mfr's Spec ≤ 17 dBA)

2. **Acoustical signal test**

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Octave Filter		
30-130	A	F	OFF	94.0	94.0
		S	OFF		94.0
	C	F	OFF		94.3
	Z	F	OFF		94.3
	A	F	OFF	114.0	114.1
		S	OFF		114.1
	C	F	OFF		114.1
	Z	F	OFF		114.1

IEC 61672 Type 1 Spec. : ± 1.1 dB
Uncertainty : ± 0.1 dB

3 **Electrical signal tests of frequency weightings** (A weighting)

Frequency	Attenuation (dB)	IEC 61672 Type 1 Spec.
31.5 Hz	-39.7	- 39.4 dB, ± 2 dB
63 Hz	-26.3	- 26.2 dB, ± 1.5 dB
125 Hz	-16.3	- 16.1 dB, ± 1.5 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 3.2 dB, ± 1.4 dB
1 kHz	0.0 (Ref)	0 dB, ± 1.1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1.6 dB
4 kHz	+0.9	+ 1.0 dB, ± 1.6 dB
8 kHz	-1.1	- 1.1 dB, + 2.1 dB ~ -3.1 dB
16 kHz	-8.1	- 6.6 dB, + 3.5 dB ~ - 17.0 dB

Uncertainty : ± 0.1 dB

Calibration Certificate

4. Frequency & Time weightings at 1 kHz

4.1 Frequency Weighting (Fast)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
A	94.0	94.0 (Ref.)	- -	± 0.4 dB
C	94.0	94.3	+0.3	
Z	94.0	94.3	+0.3	

4.2 Time Weighting (A-weighted)

UUT Setting	Applied Value (dB)	UUT Reading (dB)	Difference (dB)	IEC 61672 Type 1 Spec.
Fast	94.0	94.0 (Ref.)	- -	± 0.3 dB
Slow	94.0	94.0	0.0	
Time-averaging	94.0	94.0	0.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1012 hPa.
4. Preamplifier model : NH-25 , S/N : 64646
5. Firmware Version: 1.7
6. Power Supply Check: OK
7. The UUT was adjusted with the laboratory's sound calibrator at the reference sound pressure level before the calibration.

---------- END ----------

Appendix E2

Impact Noise Monitoring Results

Day-time Noise Monitoring

Monitoring Station: NSR1a

Date	Weather	Temperature (℃)	Start Time (hh:mm)	End Time (hh:mm)	Noise Level at NSR1a, dB (A)			Wind Speed (m/s)
					Leq (30min)	L10 (30min)	L90 (30min)	
19/05/17	Cloudy	25	09:00	09:30	65.0	68.7	63.2	0.2
25/05/17	Cloudy	25	09:58	10:28	58.3	60.8	53.7	0.2
31/05/17	Fine	28	09:09	09:39	67.5	70.5	53.9	0.2
			Min		67.5	70.5	63.2	
			Max		58.3	60.8	53.7	
			Logarithmic Average for normal weekdays		65.0	68.2	59.3	

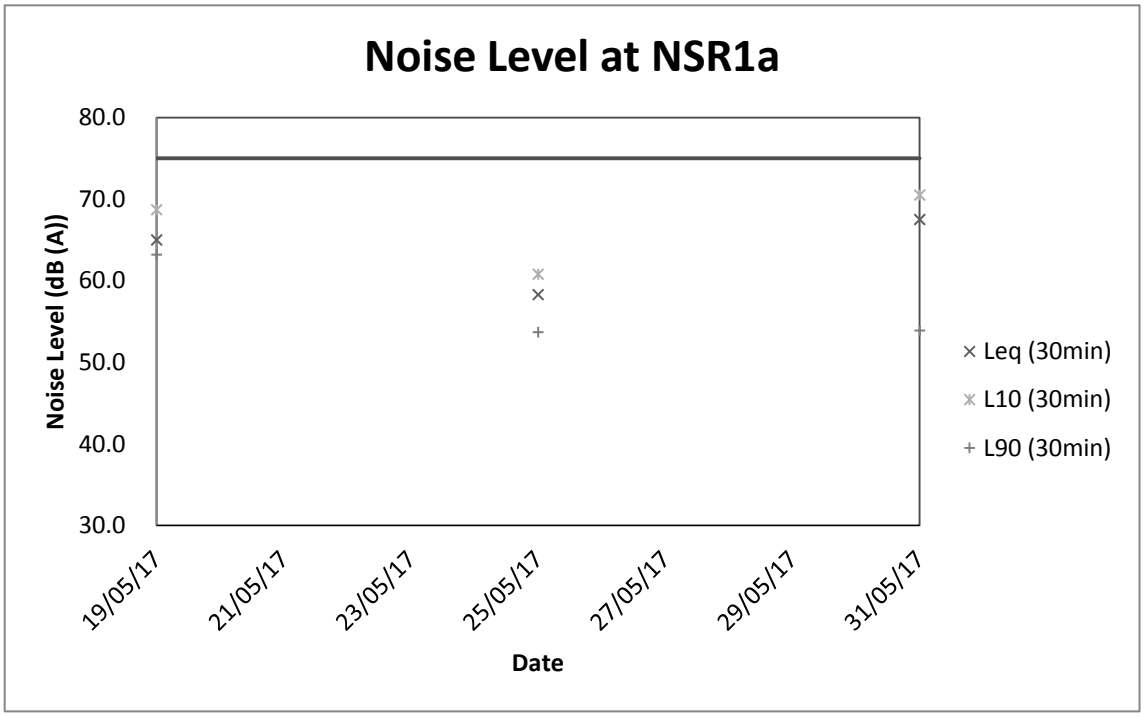
Monitoring Station: NSR2a(*)

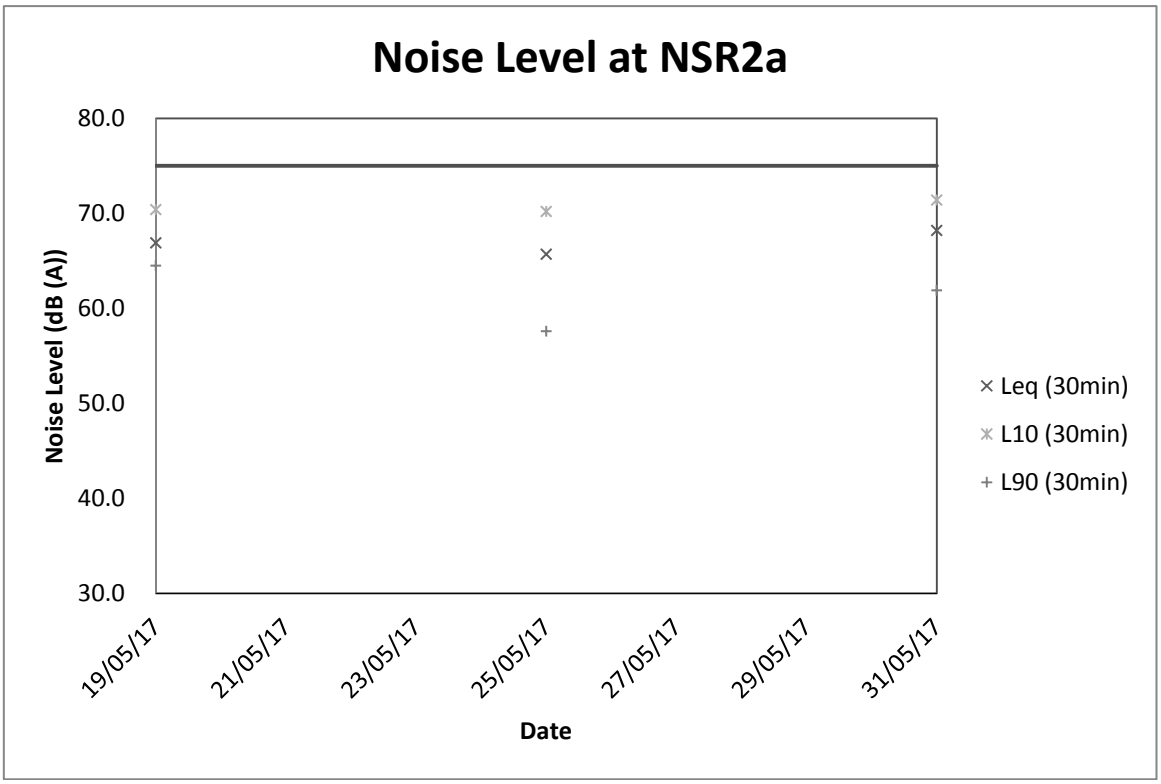
Date	Weather	Temperature (℃)	Start Time (hh:mm)	End Time (hh:mm)	Noise Level at NSR2a, dB (A)			Wind Speed (m/s)
					Leq (30min)	L10 (30min)	L90 (30min)	
19/05/17	Cloudy	25	09:35	10:05	66.9	70.4	64.5	0.2
25/05/17	Cloudy	27	11:30	12:00	65.7	70.2	57.6	0.4
31/05/17	Fine	27	08:30	09:00	68.2	71.4	61.9	0.2
			Min		65.7	70.2	57.6	
			Max		68.2	71.4	64.5	
			Logarithmic Average for normal weekdays		67.1	70.7	62.2	

(*) : 3dB(A) correction was added to the results during the free-field noise measurements

Appendix E3

Graphical Plots of Impact Noise Monitoring Data


Noise Level at NSR1a
80.0
70.0
60.0
50.0
40.0
30.0
Noise Level (dB (A))
19/05/17
21/05/17
23/05/17
25/05/17
27/05/17
29/05/17
31/05/17
Date
Leq (30min)
L10 (30min)
L90 (30min)


Noise Level at NSR2a
80.0
70.0
60.0
50.0
40.0
30.0
Noise Level (dB (A))
19/05/17
21/05/17
23/05/17
25/05/17
27/05/17
29/05/17
31/05/17
Date
Leq (30min)
L10 (30min)
L90 (30min)

Appendix F1

Calibration Certificates for Impact Water Quality Monitoring Equipments

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Performance Check of Turbidity Meter

Equipment Ref. No. : ET/0505/014 Manufacturer : HACH

Model No. : 2100Q Serial No. : 13110C029448

Date of Calibration : 22/05/2017 Due Date : 21/08/2017

Theoretical Value of Turbidity Standard (NTU)	Measured Value (NTU)	Difference % *
20	20.8	4.0
100	103	3.0
800	823	2.9

(*) Difference = (Measured Value – Theoretical Value) / Theoretical Value x 100

Acceptance Criteria

Difference : -5 % to 5 %

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

Prepared by : _____ Checked by : _____

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Performance Check of Turbidity Meter

Equipment Ref. No. : ET/0505/014 Manufacturer : HACH

Model No. : 2100Q Serial No. : 13110C029448

Date of Calibration : 25/02/2017 Due Date : 24/05/2017

Theoretical Value of Turbidity Standard (NTU)	Measured Value (NTU)	Difference % *
20	20.4	2.0
100	98.2	-1.8
800	775	-3.1

(*) Difference = (Measured Value – Theoretical Value) / Theoretical Value x 100

Acceptance Criteria

Difference : -5 % to 5 %

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

Prepared by : Brenno Checked by :

Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No.	:	ET/EW/008/008	Manufacturer	:	YSI
Model No.	:	Pro 2030	Serial No.	:	14M101489
Date of Calibration	:	22/04/2017	Calibration Due Date	:	21/07/2017

Temperature Verification

Ref. No. of Reference Thermometer : ET/0521/017

Ref. No. of Water Bath : ---

	Temperature (°C)			
Reference Thermometer reading	Measured	20.3	Corrected	19.8
DO Meter reading	Measured	19.7	Difference	0.1

Standardization of sodium thiosulphate ($Na_2S_2O_3$) solution

Reagent No. of $Na_2S_2O_3$ titrant	CPE/012/4.5/001/15	Reagent No. of 0.025N $K_2Cr_2O_7$	CPE/012/4.4/002/18

	Trial 1	Trial 2
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	10.15
Final Vol. of $Na_2S_2O_3$ (ml)	10.15	20.35
Vol. of $Na_2S_2O_3$ used (ml)	10.15	10.20
Normality of $Na_2S_2O_3$ solution (N)	0.02463	0.02451
Average Normality (N) of $Na_2S_2O_3$ solution (N)	0.02457	
Acceptance criteria, Deviation	Less than $\pm$ 0.001N	

Calculation: Normality of $Na_2S_2O_3$, N = 0.25 / ml $Na_2S_2O_3$ used

Lineality Checking

Determination of dissolved oxygen content by Winkler Titration *

Purging Time (min)	2		5		10	
Trial	1	2	1	2	1	2
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	10.90	21.80	0.00	6.80	10.60
Final Vol. of $Na_2S_2O_3$ (ml)	10.90	21.80	28.60	6.80	10.60	14.50
Vol. (V) of $Na_2S_2O_3$ used (ml)	10.90	10.90	6.80	6.80	3.80	3.90
Dissolved Oxygen (**DO**), mg/L	7.19	7.19	4.49	4.49	2.51	2.57
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: DO (mg/L) = V x N x 8000/298

Purging time, min	DO meter reading, mg/L			Winkler Titration result *, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	7.23	7.19	7.21	7.19	7.19	7.19	0.28
5	4.43	4.40	4.42	4.49	4.49	4.49	1.57
10	2.48	2.51	2.50	2.51	2.57	2.54	1.59
Linear regression coefficient				0.9998			

Internal Calibration Report of Dissolved Oxygen Meter

Zero Point Checking

DO meter reading, mg/L	0.00

Salinity Checking

Reagent No. of NaCl (10ppt)	CPE/012/4.7/004/1	Reagent No. of NaCl (30ppt)	CPE/012/4.8/004/1

Determination of dissolved oxygen content by Winkler Titration **

Salinity (ppt)	10		30	
Trial	1	2	1	2
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	10.70	21.30	30.70
Final Vol. of $Na_2S_2O_3$ (ml)	10.70	21.30	30.70	40.20
Vol. (V) of $Na_2S_2O_3$ used (ml)	10.70	10.60	9.40	9.50
Dissolved Oxygen (**DO**), mg/L	7.06	6.99	6.20	6.27
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: DO (mg/L) = V x N x 8000/298

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result**, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	7.00	6.97	6.99	7.06	6.99	7.03	0.57
30	6.07	6.11	6.09	6.20	6.27	6.24	2.43

Acceptance Criteria

(1) Differenc 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 : _____ Approved by : _____

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Performance Check of Salinity Meter

Equipment Ref. No. :	ET/EW/008/008	Manufacturer :	YSI
Model No. :	Pro 2030	Serial No. :	14M101489
Date of Calibration :	22/04/2017	Due Date :	21/07/2017

Ref. No. of Salinity Standard used (30ppt)	S/001/9

Salinity Standard Value (ppt)	Measured Salinity (ppt)	Difference * (%)
30.0	30.8	2.7

(*) Difference (%) = (Measured Salinity – Salinity Standard value) / Salinity Standard value x 100

Acceptance Criteria

Difference : -10 % to 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 : _____

Appendix F2

Impact Water Quality Monitoring Results

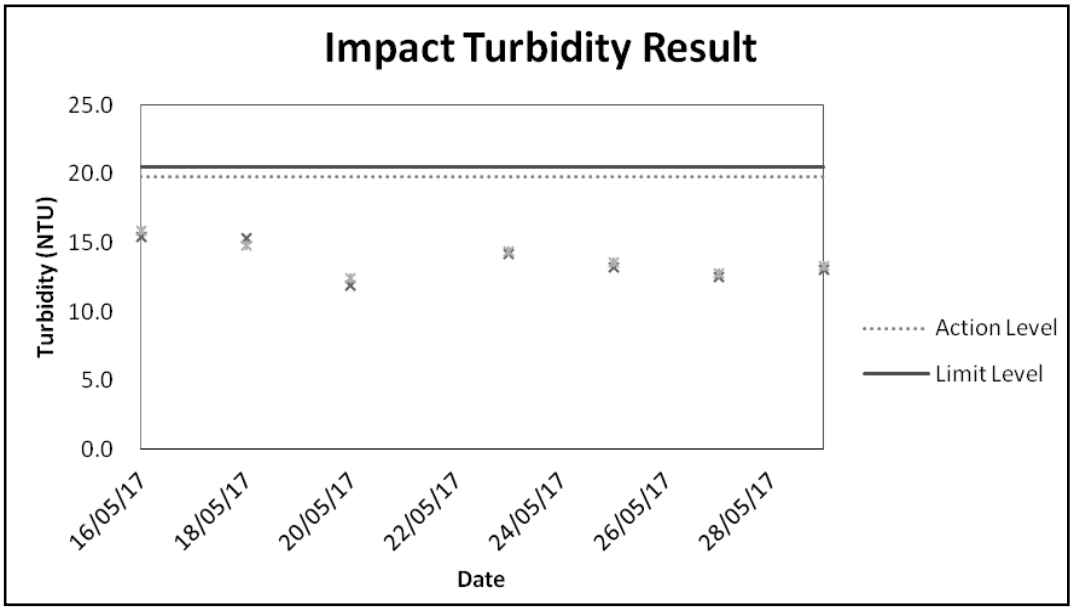
Impact Water Quality Monitoring

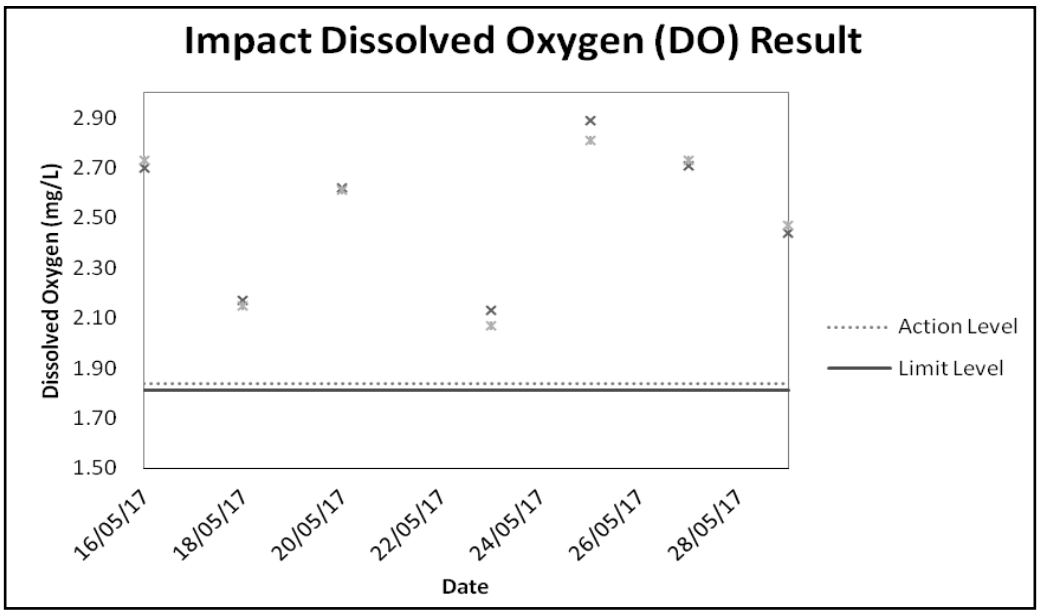
Monitoring Station: R1b

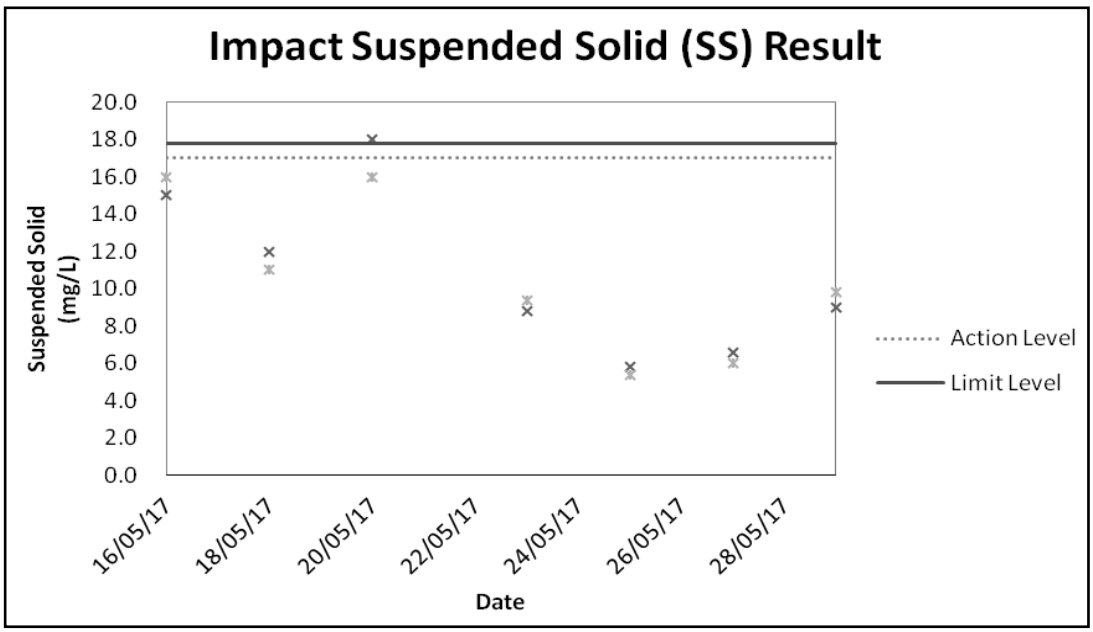
Date	Sampling Duration	Weather Condition	Sampling Level	Turbidity (NTU)			Dissolved Oxygen (DO) (mg/L)			Suspended Solid (SS) (mg/L)		
				1	2	Ave.	1	2	Ave.	1	2	Ave.
16/05/17	11:20-11:40	Cloudy	Mid-Depth	15.4	15.9	15.7	2.70	2.73	2.72	15.0	16.0	15.5
18/05/17	08:50-09:02	Cloudy	Mid-Depth	15.3	14.8	15.1	2.17	2.15	2.16	12.0	11.0	11.5
20/05/17	08:25-08:35	Cloudy	Mid-Depth	11.9	12.4	12.2	2.62	2.61	2.62	18.0	16.0	17.0
23/05/17	09:20-09:30	Cloudy	Mid-Depth	14.2	14.4	14.3	2.13	2.07	2.10	8.8	9.4	9.1
25/05/17	10:25-10:40	Cloudy	Mid-Depth	13.2	13.6	13.4	2.89	2.81	2.85	5.8	5.4	5.6
27/05/17	16:35-16:45	Cloudy	Mid-Depth	12.5	12.8	12.7	2.71	2.73	2.72	6.6	6.0	6.3
29/05/17	10:25-10:35	Fine	Mid-Depth	13.0	13.3	13.2	2.44	2.47	2.46	9.0	9.8	9.4
				Min		11.90	Min		2.07	Min		5.4
				Max		15.90	Max		2.89	Max		18.0
				Average		13.76	Average		2.52	Average		10.6

Appendix F3

Graphical Plots of Impact Water Quality Monitoring Data


Impact Turbidity Result
Turbidity (NTU)
25.0
20.0
15.0
10.0
5.0
0.0
16/05/17
18/05/17
20/05/17
22/05/17
24/05/17
26/05/17
28/05/17
Date
Action Level
Limit Level


Impact Dissolved Oxygen (DO) Result
Dissolved Oxygen (mg/L)
2.90
2.70
2.50
2.30
2.10
1.90
1.70
1.50
16/05/17
18/05/17
20/05/17
22/05/17
24/05/17
26/05/17
28/05/17
Date
Action Level
Limit Level


Impact Suspended Solid (SS) Result
Suspended Solid (mg/L)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
16/05/17
18/05/17
20/05/17
22/05/17
24/05/17
26/05/17
28/05/17
Date
Action Level
Limit Level

Appendix G

Weather Condition

Appendix G

Weather Condition

Daily Extract of Meteorological Observations, May 2017 – Wetland Park

Day	Mean Pressure (hPa)	Air Temperature			Mean Dew Point (deg. C)	Mean Relative Humidity (%)	Total Rainfall (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
		Absolute Daily Max (deg. C)	Mean (deg. C)	Absolute Daily Min (deg. C)					
01	1012.3	29.6	24.8	20.2	19.8	76	0.0	170	5.7
02	1011.5	30.3	26.2	22.9	22.6	81	0.0	150	5.4
03	1011.1	30.6	27.4	25.3	23.4	79	0.0	150	10.8
04	1011.7	27.5	24.4	22.4	22.9	91	32.0	170	4.8
05	1013.5	29.8	25.9	22.0	22.4	82	0.0	300	3.3
06	1014.5	33.5	27.5	23.9	23.1	78	0.0	170	3.5
07	1014.0	29.8	26.5	24.3	25.3	94	0.0	120	7.2
08	1011.5	29.9	26.4	22.1	23.8	87	22.5	170	8.1
09	1012.2	30.6	26.0	21.8	22.5	82	10.0	060	3.2
10	1013.6	31.5	26.2	23.9	23.9	88	9.5	050	2.2
11	1013.4	31.9	27.0	23.6	23.1	80	0.0	160	4.9
12	1010.7	30.8	27.5	25.1	22.7	76	0.0	320	4.0
13	1010.0	27.0	25.1	23.6	22.8	87	10.0	260	2.0
14	1010.0	31.1	26.5	22.7	23.4	84	0.0	160	4.8
15	1008.3	26.4#	25.2	24.2#	24.1	94	21.0	070	2.8
16	1007.5	27.9	24.9	22.3	21.1	80	4.0	050	6.2
17	1009.5	30.1	25.5	21.7	20.6	76	0.5	070	3.8
18	1011.7	28.2	25.3	23.4	20.0	73	0.5	070	6.5
19	1010.9	26.9#	24.3	22.7#	20.2	78	2.0	080	6.1
20	1008.5	25.3	24.0	22.3	21.4	86	0.0	060	5.6
21	1007.2	26.8	24.9	23.6	21.3	80	0.0	080	11.0
22	1007.7	27.8	25.6	24.9	22.3	82	0.0	080	8.6
23	1007.3	32.0	27.0	24.2	24.8	88	***	050	4.5
24	1006.7	26.5	25.2	23.9	24.3	95	***	330	4.4
25	1008.8	30.0	25.6	23.0	21.8	80	***	350	3.2
26	1010.0	27.3	24.6	22.3	20.2	77	0.0#	070	3.9
27	1009.8	31.4	25.9	22.1	18.5	67	0.0	070	3.8
28	1009.2	32.0	26.8	23.6	19.6	66	0.0	020	4.9
29	1009.5	32.6	27.0	24.2	20.4	69	0.0	070	6.9
30	1009.0	31.0	26.9	23.7	22.9	79	0.0	170	6.0
31	1006.1	33.0	28.1	23.7	24.4	81	0.0	150	6.3

*** *unavailable*

 # data incomplete

Rainfall measured in increment of 0.5 mm. Amount of < 0.5 mm cannot be detected

Appendix H

Environmental Site Inspection Checklist

Environmental Site Inspection Checklist – San Wai

Inspection Date: 19 May 2017 **Inspected By:** Ivy Lo

Time: 14:00 **Weather Condition:** Rainy

Participants: Patrick Leung, Teddy Yuen, T.Y. Lou, Johnny So, Cherry Ye.

1	**Permits/Licenses**	N/A	Yes	No	Remarks
1.1	Are Environmental Permit, license/ other permit displayed at major site exit and vehicle access?	☑	☐	☐	
1.2	Are Construction Noise Permits available for inspection?	☑	☐	☐	
1.3	Is wastewater discharge license available for inspection?	☑	☐	☐	
1.4	Are trip tickets for chemical waste and construction waste disposal available for inspection?	☑	☐	☐	
1.5	Are relevant license/permits for disposal of construction waste or excavated materials available for inspection?	☑	☐	☐	

2	**Air Quality**	N/A	Yes	No	Remarks
2.1	Is open burning avoided?	☑	☐	☐	
2.2	Are speed controlled at 10 km/h on unpaved site areas?	☑	☐	☐	
2.3	Are plant and equipment well maintained (i.e. without black smoke from powered plant)?	☐	☑	☐	
2.4	Observed dust source(s): ☐ Wind erosion ☐ Vehicle/ Equipment Movements ☐ Loading/ unloading of materials ☑ Others: Not observed				
2.5	Are the work sites wetted with water twice a day?	☑	☐	☐	
2.6	After removal of boulders, poles, pillars or temporary or permanent structures, are the entire surface sprayed with water or a dust suppression chemical immediately?	☑	☐	☐	
2.7	Is the area involved demolished items covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition?	☑	☐	☐	
2.8	Are wheel washing facilities with high pressure water jet provided at all site exits if practicable?	☑	☐	☐	
2.9	Are the areas of washing facilities and the road section between the washing facilities and the exit point paved with concrete, bituminous materials or hardcores?	☑	☐	☐	
2.10	Are hoarding ≧ 2.4m tall provided beside roads or area with public access?	☐	☑	☐	
2.11	Are main haul road paved with concrete, bituminous materials, hardcores or metal plates, and kept clear of dusty materials; or sprayed with water or a dust suppression chemical?	☑	☐	☐	
2.12	Are construction site that is within 30m of a discernible or designated vehicle entrance or exit kept clear of dusty materials?	☐	☑	☐	
2.13	Are all vehicles and plant cleaned before they leave the construction site?	☑	☐	☐	
2.14	Are loaded dump trucks covered by impervious sheeting appropriately	☑	☐	☐	

	before leaving the site?				
2.15	Are working areas of any excavation or earth moving operation sprayed with water or a dusty suppression chemical immediately?	☑	☐	☐	
2.16	Is exposed earth properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, concrete or other suitable surface stabilizer within 6 months after the last construction activity?	☑	☐	☐	
2.17	Are stockpile of dusty material covered entirely by impervious sheeting; placed in an area sheltered on the top and the 3 sides; or sprayed with water or dust suppression chemical?	☐	☐	☑	Item 1
2.18	Are unpaved areas / designated roads watered regularly to avoid dust generation?	☑	☐	☐	
2.19	Are dusty materials covered entirely by impervious sheeting or sprayed with water?	☐	☐	☑	Item 1
2.20	Is every stock of more than 20 bags of cement or dry pulverized fuel ash (PFA) covered entirely by impervious sheeting or placed in an area sheltered on the top and 3 sides?	☑	☐	☐	
2.21	Are the approval or exempted NRMM labels painted or securely fixed on site machines or vehicles and displayed at a conspicuous position according to the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation?	☐	☑	☐	

3	**Noise**	**N/A**	**Yes**	**No**	**Remarks**
3.1	Are idle plant/equipments turned off or throttled down?	☑	☐	☐	
3.2	Are silenced equipments or quiet plants utilized?				
3.3	Are the silencers or mufflers properly fitted on construction equipments and maintained regularly?	☑	☐	☐	
3.4	Is temporary hoarding installed located on the site boundaries between noisy construction activities and NSRs?	☐	☑	☐	
3.5	Are noise barriers (typically density @14kg/m^2) acoustic mat or full enclosure close to noise plants including air compressor, generators and saw etc. provided to protect NSRs?	☑	☐	☐	
3.6	Do air compressors have valid noise labels?	☑	☐	☐	
3.7	Are compressor operated with doors closed?	☑	☐	☐	
3.8	QPME used with valid noise labels?	☑	☐	☐	
3.9	Are construction activities planned so that parallel operation of several sets of equipment close to a given receiver is avoided?	☐	☑	☐	
3.10	Major noise source(s): ☑ Traffic ☐ Construction activities inside of site ☐ Construction activities outside of site ☐ Others:				

4	**Water Quality**	**N/A**	**Yes**	**No**	**Remarks**
	Construction Activities				
4.1	Before a rainstorm, are exposed stockpiles covered with tarpaulin or impervious sheets?	☑	☐	☐	
4.2	Are stockpiles of materials placed in the locations away from the drainage channel?	☑	☐	☐	

4.3	Are site drainage systems and treatment facilities provided to minimize the water pollution?	☑	☐	☐	
4.4	Is the treated effluent quality met the requirements specified in the discharge license?	☑	☐	☐	
4.5	Is the sewage generated from toilets collected using a temporary storage system?	☑	☐	☐	
4.6	Are sewage effluent and discharges from on-site kitchen facilities directed to public foul sewers or collected in a temporary storage tank if connection to public foul sewers is not feasible?	☑	☐	☐	
4.7	Is a licensed waste collector employed to clean the chemical toilets and temporary storage tank on a regular basis?	☑	☐	☐	
4.8	Is the storm drainage directed to storm drains via adequately designed sand/ silt removal facilities e.g. sand traps, silt traps and sediment basins?	☑	☐	☐	
4.9	Are measures taken to prevent the washout of construction materials, soil, silt or debris into any drainage system?	☑	☐	☐	Reminder 1
4.10	Are manholes adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and prevent storm run-off getting into foul sewers?	☑	☐	☐	
4.11	Is a wheel washing bay provided at every site exit?	☑	☐	☐	
4.12	Is the wheel wash overflow directed to silt removal facilities before being discharged to the storm drain?	☑	☐	☐	
4.13	Is the section of construction road between the wheel washing bay and the public road surfaced with crushed stone or coarse gravel?	☑	☐	☐	
4.14	Does the surface runoff from bunded areas pass through oil/grease traps prior to discharge to the storm water system?	☑	☐	☐	
4.15	Are sedimentation tanks or package treatment systems provided to treat the large amount of sediment-laden wastewater generated from wheel washing, site runoff and construction works?	☐	☑	☐	

5	**Waste / Chemical Management**	**N/A**	**Yes**	**No**	**Remarks**
	General Waste				
5.1	Are sufficient waste disposal points provided?	☑	☐	☐	
5.2	Is waste disposed regularly?	☑	☐	☐	
5.3	Is the general waste generated on-site stored in enclosed bins or compaction units separately from the construction and chemical wastes?	☑	☐	☐	
5.4	Are separated labeled containers/ areas provided for facilitating recycling and waste segregation?	☑	☐	☐	
	Construction Waste				
5.5	Are the temporary stockpiles maintained regularly?	☑	☐	☐	
5.6	Are the C&D materials sorted and recycled on-site?	☐	☑	☐	
5.7	Are the public fill and C&D waste segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal?	☑	☐	☐	
5.8	Is the segregation and storage of C&D wastes undertaken in designated area?	☑	☐	☐	

5.9	Are waste storage area properly cleaned and do not cause windblown litter and dust nuisance?	☑	☐	☐	
5.10	Are surplus insert C&D materials only consist of earth, building debris and broken rock and concrete and free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered unsuitable by the public filling supervisor?	☑	☐	☐	
	Chemical / Fuel Storage Area				
5.11	Are the fuel tanks and chemical storage areas provided with locks and sited on sealed areas?	☑	☐	☐	
5.12	Are the storage areas labeled and separated (if needed)?	☑	☐	☐	
5.13	Do the storage areas have adequate ventilation and be covered to prevent rainfall entering?	☑	☐	☐	
5.14	Are the containers used for the storage of chemical wastes suitable for the substance that are holding, resist to corrosion, maintained in a good condition, and securely closed?	☑	☐	☐	
5.15	Are proper measures to control oil spillage during maintenance or to control other chemicals spillage? (e.g. provide drip trays)	☑	☐	☐	
	Chemical Waste / Waste Oil				
5.16	Is chemical waste or waste oil stored and labeled in English and Chinese properly in designated area?	☑	☐	☐	
5.17	Are chemicals and waste oil collected and stored for recycling or proper disposal?	☑	☐	☐	
	Records				
5.18	Is a licensed waste hauler used for waste collection?	☑	☐	☐	
5.19	Are the records of quantities of wastes generated, recycled and disposed properly kept?	☐	☑	☐	
5.20	For the demolition material/ waste, is the number of loads for each day recorded as appropriate?	☐	☑	☐	

6	**Landscape and Visual Impacts**	**N/A**	**Yes**	**No**	**Remarks**
6.1	Is the work site confined within site boundaries?	☐	☑	☐	
6.2	Is damage to surrounding areas avoided?	☐	☑	☐	

7	**Environmental Complaint**	**N/A**	**Yes**	**No**	**Remarks**
7.1	Number of Environmental Complaint received from dd/mm/yyyy to dd/mm/yyyy?	☑	☐	☐	

8	**General Housekeeping**	**N/A**	**Yes**	**No**	**Remarks**
8.1	Are potential stagnant pools cleared and mosquito breeding prevented?	☑	☐	☐	
8.2	Are the defined boundaries of working areas identified to prevent loss of vegetation?	☐	☑	☐	

9	**Others**	**N/A**	**Yes**	**No**	**Remarks**
9.1	Are the portable toilets maintained in a state, which will not deter the workers from utilizing these portable toilets?	☑	☐	☐	

Follow up actions for pervious Site Audit: N/A

Observations Item 1. Storage of dusty materials without impervious sheet was observed.

Corrective Actions – Mitigation Measures Implemented or Proposed (if any):

1. The contractor shall provide impervious sheeting for covering the dusty materials

Reminder 1. The contractor was remind to provide sandbags for preventing washout of soil/sand.

Inspected by	**Checked and Approved by**	**Reviewed by**
Signature:	Signature:	Signature:
Name: Ivy Lo	Name: C.L. Lau	Name: C.C. Leung Patrick
Title: E.T.	Title: E.T. Leader	Title: RE
Date: 19/5/2017	Date: 20/5/2017	Date: 26/5/2017

Summary of the Weekly Environmental Site Inspection

Item	Details of observations	Proposed Follow Up Action	Photo Ref.	Further Action Required (Yes/No)	Proposed Follow up Date
1	 Storage of dusty materials without impervious sheet was observed.	To provide impervious sheeting for covering the dusty materials	170519_001	Yes	26/05/2017

Environmental Site Inspection Checklist – San Wai

Inspection Date: 26 May 2017 **Inspected By:** Ivy Lo

Time: ~~x 14:00~~ 10:00 **Weather Condition:** Cloudy

Participants: Patrick Leung, T.Y. Lau, Johnny So, Cherry Ye

1	**Permits/Licenses**	N/A	Yes	No	Remarks
1.1	Are Environmental Permit, license/ other permit displayed at major site exit and vehicle access?	☐	☑	☐	
1.2	Are Construction Noise Permits available for inspection?	☐	☑	☐	
1.3	Is wastewater discharge license available for inspection?	☐	☑	☐	
1.4	Are trip tickets for chemical waste and construction waste disposal available for inspection?	☐	☑	☐	
1.5	Are relevant license/permits for disposal of construction waste or excavated materials available for inspection?	☐	☑	☐	

2	**Air Quality**	N/A	Yes	No	Remarks
2.1	Is open burning avoided?	☐	☑	☐	
2.2	Are speed controlled at 10 km/h on unpaved site areas?	☑	☐	☐	
2.3	Are plant and equipment well maintained (i.e. without black smoke from powered plant)?	☐	☑	☐	
2.4	Observed dust source(s): ☐ Wind erosion ☐ Vehicle/ Equipment Movements ☐ Loading/ unloading of materials ☑ Others: Not observed				
2.5	Are the work sites wetted with water twice a day?	☑	☐	☐	
2.6	After removal of boulders, poles, pillars or temporary or permanent structures, are the entire surface sprayed with water or a dust suppression chemical immediately?	☑	☐	☐	
2.7	Is the area involved demolished items covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition?	☑	☐	☐	
2.8	Are wheel washing facilities with high pressure water jet provided at all site exits if practicable?	☐	☐	☑	Reminder 1
2.9	Are the areas of washing facilities and the road section between the washing facilities and the exit point paved with concrete, bituminous materials or hardcores?	☐	☑	☐	
2.10	Are hoarding ≧ 2.4m tall provided beside roads or area with public access?	☐	☑	☐	
2.11	Are main haul road paved with concrete, bituminous materials, hardcores or metal plates, and kept clear of dusty materials; or sprayed with water or a dust suppression chemical?	☑	☐	☐	
2.12	Are construction site that is within 30m of a discernible or designated vehicle entrance or exit kept clear of dusty materials?	☐	☑	☐	
2.13	Are all vehicles and plant cleaned before they leave the construction site?	☑	☐	☐	
2.14	Are loaded dump trucks covered by impervious sheeting appropriately	☑	☐	☐	

	before leaving the site?				
2.15	Are working areas of any excavation or earth moving operation sprayed with water or a dusty suppression chemical immediately?	☑	☐	☐	
2.16	Is exposed earth properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, concrete or other suitable surface stabilizer within 6 months after the last construction activity?	☑	☐	☐	
2.17	Are stockpile of dusty material covered entirely by impervious sheeting; placed in an area sheltered on the top and the 3 sides; or sprayed with water or dust suppression chemical?	☐	☑	☐	
2.18	Are unpaved areas / designated roads watered regularly to avoid dust generation?	☑	☐	☐	
2.19	Are dusty materials covered entirely by impervious sheeting or sprayed with water?	☐	☑	☐	
2.20	Is every stock of more than 20 bags of cement or dry pulverized fuel ash (PFA) covered entirely by impervious sheeting or placed in an area sheltered on the top and 3 sides?	☐	☑	☐	
2.21	Are the approval or exempted NRMM labels painted or securely fixed on site machines or vehicles and displayed at a conspicuous position according to the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation?	☐	☑	☐	

3	**Noise**	**N/A**	**Yes**	**No**	**Remarks**
3.1	Are idle plant/equipments turned off or throttled down?	☑	☐	☐	
3.2	Are silenced equipments or quiet plants utilized?				
3.3	Are the silencers or mufflers properly fitted on construction equipments and maintained regularly?	☐	☑	☐	
3.4	Is temporary hoarding installed located on the site boundaries between noisy construction activities and NSRs?	☐	☑	☐	
3.5	Are noise barriers (typically density @14kg/m^2) acoustic mat or full enclosure close to noise plants including air compressor, generators and saw etc. provided to protect NSRs?	☑	☐	☐	
3.6	Do air compressors have valid noise labels?	☐	☑	☐	
3.7	Are compressor operated with doors closed?	☐	☑	☐	
3.8	QPME used with valid noise labels?	☐	☑	☐	
3.9	Are construction activities planned so that parallel operation of several sets of equipment close to a given receiver is avoided?	☐	☑	☐	
3.10	Major noise source(s): ☐ Traffic ☑ Construction activities inside of site ☐ Construction activities outside of site ☐ Others:				

4	**Water Quality**	**N/A**	**Yes**	**No**	**Remarks**
	Construction Activities				
4.1	Before a rainstorm, are exposed stockpiles covered with tarpaulin or impervious sheets?	☑	☐	☐	
4.2	Are stockpiles of materials placed in the locations away from the drainage channel?	☑	☐	☐	

4.3	Are site drainage systems and treatment facilities provided to minimize the water pollution?	☐	☑	☐	
4.4	Is the treated effluent quality met the requirements specified in the discharge license?	☑	☐	☐	
4.5	Is the sewage generated from toilets collected using a temporary storage system?	☑	☐	☐	
4.6	Are sewage effluent and discharges from on-site kitchen facilities directed to public foul sewers or collected in a temporary storage tank if connection to public foul sewers is not feasible?	☑	☐	☐	
4.7	Is a licensed waste collector employed to clean the chemical toilets and temporary storage tank on a regular basis?	☑	☐	☐	
4.8	Is the storm drainage directed to storm drains via adequately designed sand/ silt removal facilities e.g. sand traps, silt traps and sediment basins?	☐	☑	☐	
4.9	Are measures taken to prevent the washout of construction materials, soil, silt or debris into any drainage system?	☐	☐	☑	Reminder 2
4.10	Are manholes adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and prevent storm run-off getting into foul sewers?	☑	☐	☐	
4.11	Is a wheel washing bay provided at every site exit?	☐	☑	☐	
4.12	Is the wheel wash overflow directed to silt removal facilities before being discharged to the storm drain?	☐	☑	☐	
4.13	Is the section of construction road between the wheel washing bay and the public road surfaced with crushed stone or coarse gravel?	☐	☑	☐	
4.14	Does the surface runoff from bunded areas pass through oil/grease traps prior to discharge to the storm water system?	☑	☐	☐	
4.15	Are sedimentation tanks or package treatment systems provided to treat the large amount of sediment-laden wastewater generated from wheel washing, site runoff and construction works?	☐	☑	☐	

5	**Waste / Chemical Management**	**N/A**	**Yes**	**No**	**Remarks**
	General Waste				
5.1	Are sufficient waste disposal points provided?	☐	☑	☐	
5.2	Is waste disposed regularly?	☐	☑	☐	
5.3	Is the general waste generated on-site stored in enclosed bins or compaction units separately from the construction and chemical wastes?	☑	☐	☐	
5.4	Are separated labeled containers/ areas provided for facilitating recycling and waste segregation?	☑	☐	☐	
	Construction Waste				
5.5	Are the temporary stockpiles maintained regularly?	☑	☐	☐	
5.6	Are the C&D materials sorted and recycled on-site?	☐	☑	☐	
5.7	Are the public fill and C&D waste segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal?	☐	☑	☐	
5.8	Is the segregation and storage of C&D wastes undertaken in designated area?	☐	☑	☐	

5.9	Are waste storage area properly cleaned and do not cause windblown litter and dust nuisance?	☑	☐	☐	
5.10	Are surplus insert C&D materials only consist of earth, building debris and broken rock and concrete and free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered unsuitable by the public filling supervisor?	☑	☐	☐	
	Chemical / Fuel Storage Area				
5.11	Are the fuel tanks and chemical storage areas provided with locks and sited on sealed areas?	☑	☐	☐	
5.12	Are the storage areas labeled and separated (if needed)?	☐	☑	☐	
5.13	Do the storage areas have adequate ventilation and be covered to prevent rainfall entering?	☑	☐	☐	
5.14	Are the containers used for the storage of chemical wastes suitable for the substance that are holding, resist to corrosion, maintained in a good condition, and securely closed?	☑	☐	☐	
5.15	Are proper measures to control oil spillage during maintenance or to control other chemicals spillage? (e.g. provide drip trays)	☐	☑	☐	
	Chemical Waste / Waste Oil				
5.16	Is chemical waste or waste oil stored and labeled in English and Chinese properly in designated area?	☑	☐	☐	
5.17	Are chemicals and waste oil collected and stored for recycling or proper disposal?	☑	☐	☐	
	Records				
5.18	Is a licensed waste hauler used for waste collection?	☑	☐	☐	
5.19	Are the records of quantities of wastes generated, recycled and disposed properly kept?	☐	☑	☐	
5.20	For the demolition material/ waste, is the number of loads for each day recorded as appropriate?	☐	☑	☐	

6	**Landscape and Visual Impacts**	**N/A**	**Yes**	**No**	**Remarks**
6.1	Is the work site confined within site boundaries?	☐	☑	☐	
6.2	Is damage to surrounding areas avoided?	☐	☑	☐	

7	**Environmental Complaint**	**N/A**	**Yes**	**No**	**Remarks**
7.1	Number of Environmental Complaint received from dd/mm/yyyy to dd/mm/yyyy?	☑	☐	☐	

8	**General Housekeeping**	**N/A**	**Yes**	**No**	**Remarks**
8.1	Are potential stagnant pools cleared and mosquito breeding prevented?	☐	☐	☑	Item 1
8.2	Are the defined boundaries of working areas identified to prevent loss of vegetation?	☐	☑	☐	

9	**Others**	**N/A**	**Yes**	**No**	**Remarks**
9.1	Are the portable toilets maintained in a state, which will not deter the workers from utilizing these portable toilets?	☐	☑	☐	

Follow up actions for pervious Site Audit: Follow up action to the item on 19/5/2017, all items were improved.

Observations

1. Stagnant Pool were observed in the drip trays

Corrective Actions – Mitigation Measures Implemented or Proposed (if any):

1. The contractor shall clear the stagnant pool inside the drip tray

Reminder 1. The contractor was remind to provide ~~other~~ temporary washing facilities with high pressure water jet before the completion of wheel washing bay.

Reminder 2. The contractor was remind to provide seal between hoarding and the ground.

Inspected by	**Checked and Approved by**	**Reviewed by**
Signature:	Signature:	Signature:
Name: Ivy Lo	Name: C.h. Lau	Name: T.Y. LOU LY Hung
Title: E.T.	Title: E.T. Leader	Title: ~~ARE~~ CRE
Date: 26/5/2017	Date: 27/5/2017	Date: 27/5/2017 27/5/2017

Summary of the Weekly Environmental Site Inspection

Item	Details of observations	Follow Up Action	Photo Ref.	Further Action Required (Yes/No)	Proposed Follow up Date
--	 Follow up action to Item 1 on 19/05/2017, impervious sheeting was provided for covering the dusty materials.	--	170526_001	No	--
1	 Stagnant pool in drip trays was observed.	To clear the stagnant pool inside the drip trays	170526_002	Yes	02/06/2017

Appendix I

Waste Flow Table

DSD Contract: DC/2013/10
Design, Build and Operate
San Wai Sewage Treatment Works Phase 1

ATAL-Degremont-China Harbour Joint Venture

Name of Department: DSD

Year: 2017

Project: Design, Build and Operate San Wai Sewage Treatment Works - Phase 1

Contract No.: DC/2013/10

Waste Flow Table

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Broken Concrete (see Note [3])	Reused in the Contract	Reused in other Projects	Disposed as Public Fill (see Note [4])	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note [2])	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 kg)
Jan	0	0	0	0	0	0	0	0	0	0	19.480
Feb	0	0	0	0	0.005	0	0	0	0	0	6.830
Mar	0	0	0	0	0	1.074	0	0	0	0	5.830
Apr	0	0	0	0	0.248	0	0	0	0	0	24.510
May	0	0	0	0	1.762	0	0	0	0	0	1.540
Jun											
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	0	0	0	0	2.016	1.074	0	0	0	0	57.030

Notes: (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(2) Plastics refer to plastic bottles/ containers, plastic sheets/ foam from packaging materials.

(3) Broken concrete for recycling into aggregates.

(4) Assumption: The densities of subbase, Rockfill, Soil, Mix Rock and Soil, Reclaimed Asphalt Pave, Slurry are 2.0 ton/m^3; the densities of Building debris is 2.1 ton/m^3; the densities of Broken Concrete is 2.4 ton/m^3.

Appendix J

Environmental Licenses and Permits

Item No.	Nature of Permit / License / Notification	Permit / License /Notification No.	Date of Issue / Effective of Permit / License	Date of Expiry of Permit / License	Remark (Validity for reporting period only)
1	Environmental Permit	EP-464/2013	18/10/2013	NA	Valid
2	Billing Account for Disposal of Construction Waste	7025330	07/07/2016	NA	Valid
3	Form NA notification (for APCO)	405489	26/07/2016	25/09/2020	Valid
4	Construction Noise Permit (for Site)	GW-RN0060-17	30/01/2017	12/06/2017	Valid
5	Chemical Waste Producer Registration (for Site)	5218-511-A2823-01	23/01/2017	NA	Valid
6	Wastewater Discharge Licence (for WPCO)	WT00026754-2017	28/04/2017	31/01/2022	Valid
7	Construction Noise Permit (for piling works)	PP-RN0010-17	01/04/2017	30/06/2017	Valid

Appendix K

Implementation Schedule for Environmental Mitigation Measures (EMIS)

Environmental Mitigation Measures	Location	Implementation Status			
		Implemented	Partially implemented	Not implemented	Not Applicable
Air Quality					
• The working area for the uprooting of trees, shrubs, or vegetation or for the removal of boulders, poles, pillars or temporary or permanent structures should be sprayed with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet;	Site Area	√			
• All demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures, debris, rubbish and other items arising from site clearance) that may dislodge dust particles should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition;	Site Area	√			
• Vehicle washing facilities including a high pressure water jet should be provided at every discernible or designated vehicle exit point;	Site Entrance	√			
• The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;	Site Exit	√			
• Where a site boundary adjoins a road, street, service and or other area accessible to the public, hoarding of not less than 2.4m from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit;	Site Area	√			
• Every main haul road (i.e. any course inside a construction site having a vehicle passing rate of higher than 4 in any 30 minutes) should be paved with concrete, bituminous materials, hardcores or metal plates, and kept clear of dusty materials; or sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet;	Main Haul Road				√
• The portion of any road leading only to a construction site that is within 30m of a discernible or designated vehicle entrance or exit should be kept clear of dusty materials;	Site Entrance and Exit	√			
• Immediately before leaving a construction site, every vehicle should be washed to remove any dusty materials from its body and wheels;	Site Exit	√			
• Where a vehicle leaving a construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle;	--	√			
• The working area of any excavation or earth moving operation should be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet;	Site Area	√			
• Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable	Site Area	√			

	surface stabilizer within 6 months after the last construction activity on the construction site or part of the construction site where the exposed earth lies;					
•	Any stockpile of dusty material should be either covered entirely by impervious sheeting; placed in an area sheltered on the top and the 3 sides; or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet.	Site Area	√			
Noise						
•	Quiet plants should be used in order to reduce the noise impacts to protect the nearby NSRs.	Site Area	√			
•	Temporary and Movable Noise Barriers should be used in order to reduce the noise impact to the surrounding sensitive receivers	Site Area	√			
•	Intermittent noisy activities should be scheduled to minimize exposure of nearby NSRs to high levels of construction noise.	Site Area	√			
•	Idle equipment should be turned off or throttled down.	Site Area	√			
•	Construction activities should be planned so that parallel operation of several sets of equipment close to a given receiver is avoided	Site Area	√			
•	Construction plant should be properly maintained and operated.	Site Area	√			
Water Quality						
•	Exposed stockpiles should be covered with tarpaulin or impervious sheets before a rainstorm occurs;	Site Area	√			
•	The exposed soil surfaces should also be properly protected to minimize dust emission;	Site Area	√			
•	The stockpiles of materials should be placed in the locations away from the drainage channel so as to avoid releasing materials into the channel;	Site Area	√			
•	Wheel washing facilities should be provided at site exits to ensure that earth, mud and debris would not be carried out of the works areas by vehicles;	Site Exit	√			
•	Provision of site drainage systems and treatment facilities would be required to minimize the water pollution;	Site Area	√			
•	A discharge license needs to be applied from EPD for discharging effluent from the construction site;	--	√			
•	The treated effluent quality is required to meet the requirements specified in the discharge license;	--	√			
•	Provision of chemical toilets is required to collect sewage from workforce. The chemical toilets should be cleaned on a regular basis;	Chemical Toilet	√			

• A licensed waste collector should be employed to clean the chemical toilets and temporary storage tank on a regular basis;	--	√			
• Illegal disposal of chemicals should be strictly prohibited;	Site Area	√			
• Registration as a chemical waste producer is required if chemical wastes are generated and need to be disposed of. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes;	Site Area	√			
• Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance should be used as a guideline for handing chemical wastes;	Site Area	√			
• The impact from accidental spillage of chemicals can be effectively controlled through good management practices.	Site Area	√			
Waste Management					
• Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;	Site Area	√			
• To encourage collection of aluminium cans by individual collectors, separate bins should be provided to segregate this waste from other general refuse generated by the workforce;	Site Area	√			
• Any unused chemicals or those with remaining functional capacity should be recycled;	Site Area	√			
• Prior to disposal of C&D waste, it is recommended that wood, steel and other metals be separated for re-use and/or recycling and inert waste as fill material to minimize the quantity of waste to be disposed of to landfill;	Site Area	√			
• Proper storage and site practices to minimize the potential for damage or contamination of construction materials; and	Site Area	√			
• Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste.	Site Area	√			

Appendix L

Environmental Site Inspection Schedule

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Contract No. DC/2013/10 -
Design, Build and Operate San Wai Sewage Treatment Works – Stage 1

Schedule for Environmental Monitoring and Site Inspection

May 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16 **WQM**	17	18 **WQM**	19 **24hr-TSP** **1hr-TSP x 3** **NM** **SI**	20 **WQM**
21	22	23 **WQM**	24	25 **24hr-TSP** **1hr-TSP x 3** **NM** **WQM**	26 **SI**	27 **WQM**
28	29 **WQM**	30	31 **24hr-TSP** **1hr-TSP x 3** **NM**			

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Contract No. DC/2013/10 -
Design, Build and Operate San Wai Sewage Treatment Works – Stage 1

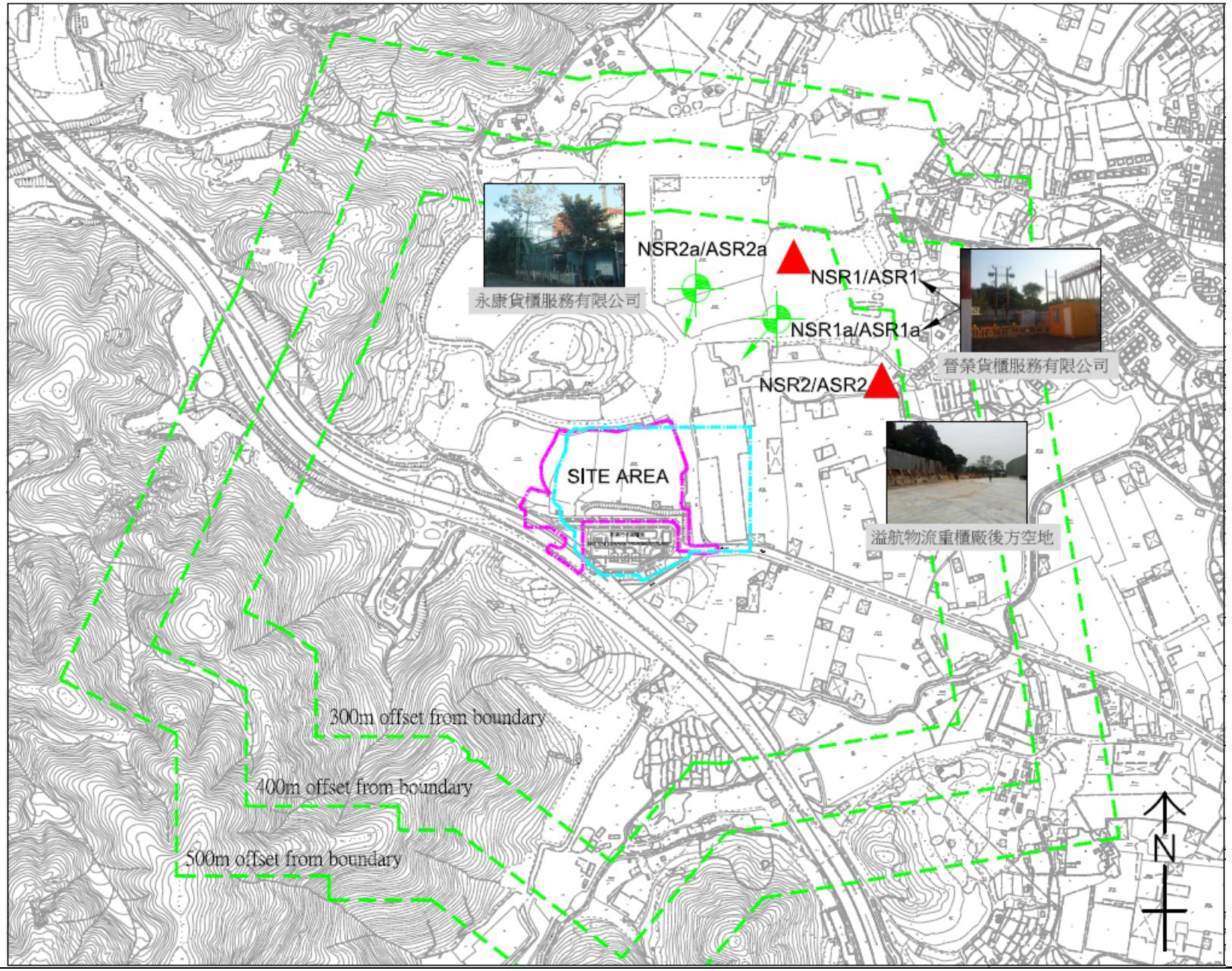
Schedule for Environmental Monitoring and Site Inspection

June 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 **WQM**	2 **SI**	3 **WQM**
4	5	6 **24hr-TSP** **1hr-TSP x 3** **NM** **WQM**	7	8 **WQM**	9 **SI**	10 **WQM**
11	12 **24hr-TSP** **1hr-TSP x 3** **NM**	13 **WQM**	14	15 **WQM**	16 **SI**	17 **24hr-TSP** **1hr-TSP x 3** **NM** **WQM**
18	19	20 **WQM**	21	22 **WQM**	23 **24hr-TSP** **1hr-TSP x 3** **NM** **SI**	24 **WQM**
25	26 **WQM**	27	28 **WQM**	29 **24hr-TSP** **1hr-TSP x 3** **NM**	30 **WQM** **SI**	

Figure 1

Locations of Air Quality and Noise Monitoring Stations

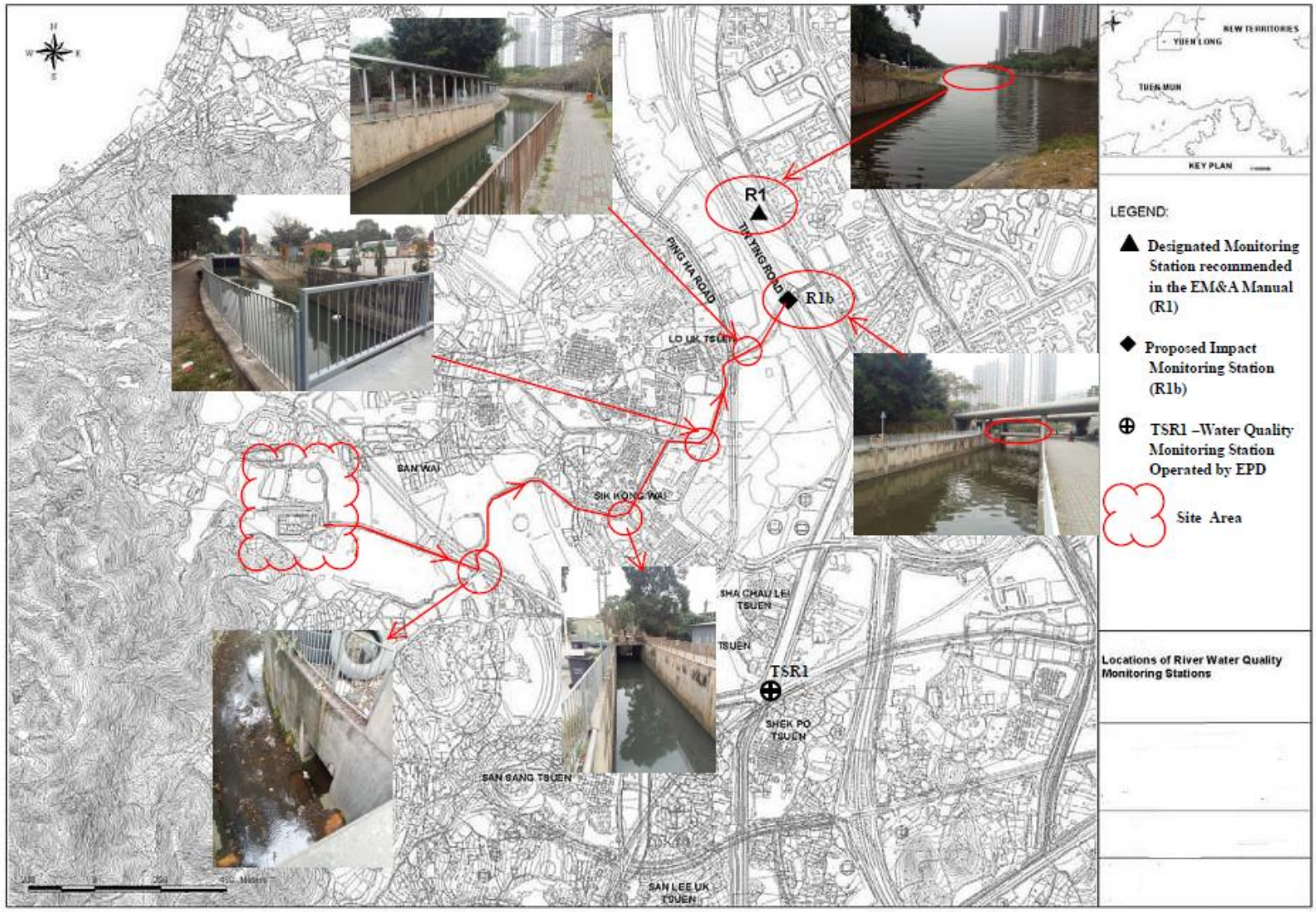


Project: Contract No. DC/2013/10 -Design, Build and Operate San Wai Sewage Treatment Works – Phase 1

Figure 1 Locations of Air Quality and Noise Monitoring Stations

Figure 2

Locations of Water Quality Monitoring Station



Project: Contract No. DC/2013/10 - Design, Build and Operate San Wai Sewage Treatment Works – Phase 1

Figure 2 Locations of Water Quality Monitoring Station