JOB NO.: TCS01196/22

WSD CONTRACT NO.: 7/WSD/21 -

CONSTRUCTION OF SIU HO WAN WATER TREATMENT WORKS EXTENSION AND SIU HO WAN RAW WATER BOOSTER PUMPING STATION

6th QUARTERLY ENVIRONMENTAL MONITORING AND AUDIT REPORT – (August to October 2023)

PREPARED FOR

CHINA ROAD AND BRIDGE CORPORATION

Date	Reference No.	Prepared By Tam Kok Fung, Benjamin	Certified By Tam Tak Wing
9 November 2023	TCS01196/22/600/R0071v1	 Environmental Consultant	 Environmental Team Leader

Version	Date	Remarks
1	9 November 2023	First Submission

Our Ref. 1988/23-0027

27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong
T: +852 2815 7028
F: +852 2815 5399

www.asecg.com

Water Supplies Department
New Works Branch
Consultants Management Division
Sha Tin Office - 6/F Sha Tin Government Offices, 1 Sheung Wo Che Road, Sha Tin, New Territories.

Attn: Mr. SY Kin Lik (SE/CM 3)

9 November 2023

By E-mail

Dear Sir,

RE: CONTRACT NO. 7/WSD/21
INDEPENDENT ENVIRONMENTAL CHECKER FOR ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN WATER TREATMENT WORKS EXTENSION
6TH QUARTERLY ENVIRONMENTAL MONITORING AND AUDIT REPORT – (AUGUST 2023 TO OCTOBER 2023)

I refer to the 6th Quarterly Environmental monitoring and audit report – (August 2023 to October 2023)(Report No.: TCS01196/22/600/R0071v1) received on 9 November 2023 by the Environmental Team (ET), Action-United Environmental Services & Consulting (AUES) via email. In accordance with Condition 1.9 of Environmental Permit No.EP-207/2005/A, I hereby verify the captioned report.

Yours faithfully,

For and on behalf of
Allied Environmental Consultants Ltd.

Joanne NG
Independent Environmental Checker

JN/tw

c.c. Action-United Environmental Services & Consulting (AUES) Attn: Mr. Ben Tam (By E-mail)
Binnies Hong Kong Limited Attn: Mr. Alex TUNG (By E-mail)

EXECUTIVE SUMMARY

ES.01. This is the *6th* Quarterly EM&A Summary Report presenting monitoring results and inspection finding for the Project for the reporting period from *1 August to 31 October 2023.*

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02. Environmental monitoring activities under the EM&A programme for the Contract in the Reporting Period are summarized in the following table.

Issues	Environmental Monitoring Parameters / Inspection	Sessions
Air Quality	24-Hour TSP	16
Inspection / Audit	ET Regular Environmental Site Inspection	14
	Joint site audit with Project Consultant and IEC	3

ACTION AND LIMIT LEVELS EXCEEDANCE

ES.03. In the Reporting Period, no air quality monitoring exceedance was recorded.

ENVIRONMENTAL COMPLAINT

ES.04. In the Reporting Period, no environmental complaint was received.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.05. In the Reporting Period, no prosecution or notification of summons was received.

REPORTING CHANGE

ES.06. No reporting change was recorded in the Reporting Period.

FUTURE KEY ISSUES

ES.07. Special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to Siu Ho Wan Sewage Treatment Works. The *Contractor* should fully implement the construction dust mitigation measures as appropriately.

ES.08. Due to wet season has approached, the *Contractor* was reminded that all effluent discharge shall fulfill the requirement of Discharge Licence under the Water Pollution Control Ordinance.

ES.09. All other mitigation measures recommended in the Implementation Schedule for Environmental Mitigation Measures of the EM&A Manual should be properly implemented and maintained as far as practicable.

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Water Supplies Department (WSD) is the Proponent of the Works Contract ***7/WSD/21 – Construction of Siu Ho Wan Water Treatment Works Extension and Siu Ho Wan Raw Water Booster Pumping Station*** *(hereinafter named as the "Works Contract")*. The Project works predicted by WSD will be undertaken about 34 months. Layout plan of the Project is shown in ***Appendix A***.

1.1.2 According to the Environmental Impact Assessment Ordinance (EIAO), the proposed Siu Ho Wan Water Treatment Works Extension is a Designated Project under Schedule 2, which shall be implemented under the Environmental Permit EP-207/2005/A *(hereinafter called the "EP")*. Besides, the works for Siu Ho Wan Raw Water Booster Pumping Station is a non-designated project which mentioned in Section 1.10 of Environmental Monitoring and Audit (EM&A) Manual.

1.1.3 The Works Contract construction activities mainly include:-

a. Extension of the existing Siu Ho Wan WTW within the existing Siu Ho Wan WTW compound from a capacity of 150,000 m^3/day to 300,000 m^3/day
b. Uprating of the treated/fresh water pumping capacity in the existing Siu Ho Wan Raw Water and Fresh Water Pumping Station within the existing Siu Ho Wan WTW compound from a capacity of 150,000 m^3/day to 300,000 m^3/day
c. Construction of the proposed Siu Ho Wan Raw Water Booster Pumping Station and the laying of the associated water mains

1.1.4 On 20 March 2022, ***China Road and Bridge Corporation*** (hereinafter called the "Main *Contractor*") awarded the Works Contracts ***7/WSD/21***. According to EM&A Manual, only air quality monitoring is required to be conducted which related to the works area under Contracts ***7/WSD/21*** during construction phase of the SHW WTW Extension. Moreover, site inspection and audit is required under the EM&A program to ensure the recommended environmental mitigation measures are implemented properly and effective.

1.1.5 The Main-*Contractor* appointed Action-United Environmental Services & Consulting (AUES) as the Environmental Team of the Project (hereinafter referred as the "ET") to implement air quality (baseline and impact) monitoring as well as associated duties in accordance with the EM&A Manual stipulation.

1.1.6 Some design changes of the Project have been identified after the EIA stage for betterment in the design development. Some of these changes requires supplementary environmental review to address their likely environmental impacts and to identify any additional mitigation measures required for compliance with the EIAO. Supplementary environmental review has been performed for the changes and the review results are presented in the "Review Report on Environmental Impact Assessment (Review Report on EIA)" prepared under "Agreement No. CE 82/2017 (WS)". Having reviewed the Review Report on EIA, no changes to the environmental monitoring requirement in the EM&A Manual are proposed for the work of SHW WTW Extension.

1.1.7 According to the approved EM&A Manual, only air quality is required to be monitored during the construction phase of the Project. As part of the EM&A program, baseline monitoring is required to determine the ambient environmental conditions. Pursuant to the EM&A Manual, baseline environmental monitoring is required to be conducted prior to commencement of the construction works under the Project. Baseline air quality monitoring was conducted from ***8 to 21 April 2022***. During the baseline monitoring period, no major construction activities under the Project was observed.

1.1.8 This is the ***6th*** Quarterly EM&A Report presenting monitoring results and inspection finding for the Project for the reporting period from ***1 August to 31 October 2023.***

1.2 REPORT STRUCTURE

1.2.1 The Quarterly EM&A Report is structured into the following sections:-

Section 1 *Introduction*
Section 2 *Project Organization and Construction Progress*
Section 3 *Summary of Impact Monitoring Requirements*
Section 4 *Air Quality Monitoring*
Section 5 *Waste Management*
Section 6 *Site Inspections*
Section 7 *Environmental Complaints and Non-Compliances*
Section 8 *Implementation Status of Mitigation Measures*
Section 9 *Conclusions and Recommendations*

2 PROJECT ORGANISATION AND CONSTRUCTION PROGRESS

2.1 PROJECT ORGANISATION

2.1.1 The project organization is shown in ***Appendix B***. The roles and responsibilities of the various parties involved in the EM&A process and the organizational structure of the organizations responsible for implementing the EM&A programme are outlined below.

Water Supplies Department (WSD)

2.1.2 WSD is the Project Proponent and the Permit Holder of the EP of the development of the Project and will assume overall responsibility for the project. An Independent Environmental Checker (IEC) shall be employed by WSD to audit the results of the EM&A works carried out by the ET.

Environmental Protection Department (EPD)

2.1.3 EPD is the statutory enforcement body for environmental protection matters in Hong Kong.

Project Manager's Delegate *(PM*D)

2.1.4 The *PM*D is responsible for overseeing the construction works and for ensuring that the works are undertaken by the *Contractor* in accordance with the specification and contract requirements. The duties and responsibilities of the *PD*M with respect to EM&A are:

- Supervise the *Contractor*'s activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Inform the *Contractor* when action is required to reduce impacts in accordance with the Event and Action Plans;
- Comply with the agreed Event Contingency Plan in the event of any exceedance.

The Contractor

2.1.5 The Main *Contractor* is responsible perform construction works and for ensuring that the works are undertaken compliance with the specification and contract requirements. The duties and responsibilities of the Main *Contractor* with respect to EM&A are:

- Employ an ET to undertake monitoring, laboratory analysis and reporting of environmental monitoring and audit;
- Provide information / advice to the ET regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;
- Implement measures to reduce impact whenever Action and Limit levels are exceeded;
- Implement the corrective actions instructed by the *PM*D;
- Accompany joint site audit undertaken by the ET; and
- Adhere to the procedures for carrying out complaint investigation.

Environmental Team (ET)

2.1.6 The ET is responsible perform implementation EM&A programmes of the Contract Works as stipulated in the Updated EM&A Manual ensure the works are fully compliance with environmental regulations. The duties and responsibilities of the ET with respect to EM&A are:

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyze the EM&A data and review the success of EM&A programme to cost effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the *Contractor*s' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and take proactive actions to pre-empt problems;
- Audit and prepare audit reports on the environmental monitoring data and site environmental

conditions;

- Report on the EM&A results to the IEC, *Contractor*, the *PM*D and EPD or its delegated representative;
- Recommend suitable mitigation measures to the *Contractor* in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- Undertake regular and ad-hoc on-site audits / inspections and report to the *Contractor* and the *PM*D of any potential non-compliance; and
- Follow up and close out non-compliance actions.

Independent Environmental Checker (IEC)

2.1.7 The duties and responsibilities of IEC with respect to EM&A are:

- Review the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Report the audit results to the *PM*D and EPD in parallel;
- Review the EM&A reports (monthly summary reports) submitted by the ET;
- Review the proposal on mitigation measures submitted by the *Contractor* in accordance with the Event and Action Plans;
- Check the mitigation measures submitted by the *Contractor* in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary;
- Report the findings of site inspections and other environmental performance reviews to *PM*D and EPD;
- Coordinate the monitoring and auditing works for all the on-going contracts in the area in order to identify possible sources / causes of exceedances and recommend suitable remedial actions where appropriate; and
- Coordinate the assessment and response to complaints / enquires from locals, green groups, district councils or the public at large.

2.2 CONSTRUCTION PROGRESS

2.2.1 The major construction activities conducted under the Contract in the Reporting Period are listed below.

August 2023

- Concreting of slab at +7.20mPD was completed BPS-1
- DfMA installation works were in progress at portion BPS-1
- First layer of lateral support works was completed at portion WTW-1. Excavation works was in progress at portion WTW-1.
- Plant trial submitted concrete mix was in progress
- Construction of mass concrete wall works were in progress at portion WTW-2
- Capping off exiting DN800 washwater pipe was completed at portion WTW-1
- Trial pits excavation at portion WTW-7 was in progress
- Slap coring works was in progress at existing Chemical Building
- Decking of existing nullah to access portion BPS-2 was in progress
- Trial for earth rod installation at RWBPS
- E&M modification works at existing Chemical Building

September 2023

- Construction of CLP Transformer Room was in progress at portion BPS-1.
- DfMA installation works were in progress at portion BPS-1.
- Temporary run in at portion BPS-2 was completed.
- Excavation works was in progress at portion WTW-1.

- Plant trial for submitted concrete mix was in progress.
- Excavation works at portion WTW-2 were in progress.
- Construction of base slab of OLB were in progress
- Trench excavation, pipe laying and backfilling works at portion WTW-7 were in progress.
- Trial for earth rod installation at RWBPS.
- E&M modification works at existing Chemical Building.
- Reinstatement of trial pit at portion BPS-2 was in progress.
- Installation of drainage pipes and concealed conduits at RWBPS.

October 2023

- Construction of CLP Transformer Room was in progress at portion BPS-1.
- DfMA installation works were in progress at portion BPS-1.
- Excavation works was in progress at portion WTW-1.
- Plant trial for submitted concrete mix was in progress.
- Excavation works at portion WTW-2 were in progress.
- Construction of base slab of WTB were in progress
- Construction of base slab of OLB were in progress
- Trench excavation, pipe laying and backfilling works at portion WTW-7 were in progress.
- Trial for earth rod installation at RWBPS.
- E&M modification works at existing Chemical Building.
- Reinstatement of trial pit at portion BPS-2 was in progress.
- Installation of drainage pipes and concealed conduits at RWBPS.

2.3 SUMMARY OF ENVIRONMENTAL PERMITS AND LICENCES

2.3.1 Summary of the relevant permits, licences, and/or notifications on environmental protection for the Project are presented in ***Table 2-1***.

Table 2-1 Status of Environmental Licences and Permits of the Contract

Item	Description	Licence/Permit Status			
		Reference No./ License No./ Account No.	Approval Date	Expiry Date	Status
1	Air Pollution Control (Construction Dust) Regulation	Ref: 477913	23 Mar 2022	N/A	Valid
2	Waste Disposal Regulation – Billing Account for Disposal of Construction Waste	EPD Ref. No: RS02509 Acc. No.: 7043631	08 Apr 2022	N/A	Valid
3	Chemical Waste Producer Registration	5213-961-C4701-01	31 May 2023	N/A	Valid
4	Water Pollution Control Ordinance – Discharge Licence	WT00041885-2022	8 Sep 2022	30 Sep 2027	Valid
5	Construction Noise Permit	GW-RS0188-23	18 Mar 2023	17 Sep 2023	Valid until 17 Sep 2023
		GW-RS0714-23	18 Aug 2023	17 Feb 2024	Valid

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

3.1.1 Only air quality monitoring is required to carry out related to Works contracts ***7/WSD/21*** during the construction phase to ensure the dust mitigation measures and performance properly implementation.

3.1.2 The other environmental monitoring for Works Area of Pui O was related to other Works Contracts and will be implemented by other appointed ET.

3.1.3 According to the Review Report on EIA, no changes to the environmental monitoring requirement in the EM&A Manual are proposed for the work of SHW WTW Extension. Air quality monitoring work will be implemented according to the EM&A Manual.

3.2 MONITORING PARAMETERS

3.2.1 The EM&A program of construction phase monitoring shall cover the following environmental issues:

- Air quality;

3.2.2 A summary of impact monitoring parameters is presented in ***Table 3-1***:

Table 3-1 Summary of Monitoring Parameters

Environmental Issue	Parameters
Air Quality	• 1-hour TSP by Real-Time Portable Dust Meter(as required in case of complaints); and • 24-hour TSP by High Volume Air Sampler.

3.3 MONITORING LOCATIONS

3.3.1 According to the Review Report on EIA, air quality monitoring work should be implemented according to the EM&A Manual. As stated in Section 4 of EM&A Manual, there was only one air quality monitoring station designated under SHW WTW Extension. The air quality monitoring locations is listed in ***Table 3-2***.

Table 3-2 Designated Air Quality Monitoring Stations

Monitoring Station Identification No	Location
SHWAB	Siu Ho Wan WTW Administration Building

3.4 MONITORING FREQUENCY AND PERIOD

3.4.1 The requirements of impact monitoring are stipulated in *Sections 2.1.9* of the approved EM&A Manual and presented as follows.

Air Quality Monitoring

3.4.2 Frequency of impact air quality monitoring is as follows:

- 1-hour TSP 3 times every six days (as required in case of complaints)
- 24-hour TSP Once every 6 days during course of works.

3.5 MONITORING EQUIPMENT

Air Quality Monitoring

3.5.1 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it

shall submit sufficient information to the IEC to approve.

3.5.2 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

3.5.3 All equipment to be used for air quality monitoring are listed in below table.

Table 3-3 Air Quality Monitoring Equipment

Equipment	Model
24-Hr TSP	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5025A
1-Hour TSP	
Portable Dust Meter	Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter / SidePak™ Personal Aerosol Monitor AM510

3.6 MONITORING PROCEDURES

1-hour TSP

3.6.1 Operation of the 1-hour TSP meter will follow manufacturer's Operation and Service Manual.

3.6.2 The 1-hour TSP monitor, brand named "Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter" is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 900 light scattering. The 1-hour TSP monitor consists of the following:

a. A pump to draw sample aerosol through the optic chamber where TSP is measured;
b. A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
c. A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

3.6.3 The 1-hour TSP meter to be used will be within the valid period, calibrated by the manufacturer prior to purchasing. Span check and BG of the instrument will be performed before each monitoring event.

24-hour TSP

3.6.4 The equipment used for 24-hour TSP measurement is the High Volume Sampler (hereinafter the "HVS") brand named TISCH, Model TE-5170 TSP High Volume Air Sampler, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The HVS consists of the following:

a. An anodized aluminum shelter;
b. A 8"x10" stainless steel filter holder;
c. A blower motor assembly;
d. A continuous flow/pressure recorder;
e. A motor speed-voltage control/elapsed time indicator;
f. A 7-day mechanical timer, and
g. A power supply of 220v/50 Hz

3.6.5 For HVS for 24-hour TSP monitoring, the HVS is mounted in a metallic cage with a top for protection and also it is sat on the existing ground or the roof of building. The flow rate of the HVS between 0.6m^3/min and 1.7m^3/min will be properly set in accordance with the manufacturer's instruction to within the range recommended in *EPA Code of Federal Regulation, Appendix B to Part 50*. Glass Fiber Filter 8" x 10" of TE-653 will be used for 24-Hour TSP monitoring and would be supplied by laboratory. The general procedures of sampling are described as below:-

- A horizontal platform with appropriate support to secure the samples against gusty wind should

be provided;

- Installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
- Equipped with a timing/control device with ± 5 minutes accuracy for 24 hours operation;
- With flow control accuracy for ± 2.5% deviation over 24-hour sampling period;
- No two samplers should be placed less than 2 meters apart;
- The distance between the sampler and an obstacle, such as building, must be at least twice the height that the obstacle protrudes above the sample;
- A minimum of 2 meters of separation from any supporting structure, measured horizontally is required;
- Before placing any filter media at the HVS, the power supply will be checked to ensure the sampler work properly;
- The filter paper will be set to align on the screen of HVS to ensure that the gasket formed an air tight seal on the outer edges of the filter. Then filter holder frame will be tightened to the filter hold with swing bolts. The holding pressure should be sufficient to avoid air leakage at the edge.
- The mechanical timer will be set for a sampling period of 24 hours (00:00 mid-night to 00:00 mid-night next day). Information will be recorded on the field data sheet, which would be included the sampling data, starting time, the weather condition at current and the filter paper ID with the initial weight;
- After sampling, the filter paper will be collected and transfer from the filter holder of the HVS to a sealed envelope and sent to a local HOKLAS accredited laboratory for quantifying.

3.6.6 All the sampled 24-hour TSP filters will be kept in normal air conditioned room conditions, i.e. 70% HR (Relative Humidity) and 25°C, for six months prior to disposal.

3.6.7 The HVS used for 24-hour TSP monitoring will be calibrated before the commencement for sampling, and after in two months interval with the manufacturer's instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5025A) to establish a relationship between the follow recorder meter reading in cfm (cubic feet per minute) and the standard flow rate, Qstd, in m^3/min. Motor brushes of HVS will be regularly replaced of about five hundred hours per time.

3.6.8 The calibration certificates of all monitoring equipment used for the impact monitoring program in the Reporting Period and the HOKLAS accredited certificate of laboratory are presented in the relevant monthly EM&A reports.

3.7 DERIVATION OF ACTION/LIMIT (A/L) LEVELS

3.7.1 The baseline results form the basis for determining the environmental acceptance criteria for the impact monitoring. According to the approved Environmental Monitoring and Audit Manual, the air quality criteria were set up, namely Action and Limit levels are listed in ***Tables 3-4***.

Table 3-4 Action and Limit Levels of Air Quality

Monitoring Station	Action Level (μg /m^3)		Limit Level (μg/m^3)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
SHWAB	291	170	500	260

3.8 METEOROLOGICAL INFORMATION

3.8.1 The meteorological information including wind direction, wind speed, humidity, rainfall, air pressure and temperature is extracted from the Chek Lap Kok Station. Meteorological data are attached in ***Appendix F***.

3.9 DATA MANAGEMENT AND DATA QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

3.9.1 All monitoring data were handled by the ET's in-house data recording and management system.

3.9.2 The monitoring data recorded in the equipment were downloaded directly from the equipment at each monitoring day or after completion of baseline measurement. The downloaded monitoring data were input into a computerized database properly maintained by the ET. The laboratory results were input directly into the computerized database and checked by personnel other than those who input the data.

3.9.3 For monitoring parameters that require laboratory analysis, the local laboratory shall follow the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory tests.

4 AIR QUALITY MONITORING

4.1 GENERAL

4.1.1 In the reporting Period, no air quality complaint was received, thus no 1-hour TSP monitoring required to conduct according to ***Section 2.19*** of the approved EM&A Manual.

4.2 SUMMARY OF MONITORING RESULTS

4.2.1 Summary of air quality monitoring results during the Reporting Period are tabulated in ***Table 4-1.*** The relevant graphical plots throughout the Reporting Period are presented in ***Appendix E.***

Table 4-1 Summary of 24-hour TSP Monitoring Result – SHWAB

Monitoring Location	24-hour TSP (μg/m^3)		
	Max	Min	Mean
SHWAB	92	27	46
Record Date	16-Oct-2023	12-Aug-2023	16 events

4.2.2 Breaches of air quality A/L levels and statistical analysis of compliance for the air quality monitoring results are summarized in ***Table 4-2***.

Table 4-2 Summaries of Breaches of Air Quality A/L Levels

Location	Exceedance	24- hour TSP	Total
SHWAB	Action Level	0	0
	Limit Level	0	0

4.2.3 The meteorological data during the impact monitoring days are summarized in ***Appendix F***.

5 WASTE MANAGEMENT

5.1 GENERAL WASTE MANAGEMENT

5.1.1 Waste management was carried out in accordance with the Waste Management Section in Environmental Management Plan for the Contract.

5.2 RECORDS OF WASTE QUANTITIES

5.2.1 All types of waste arising from the construction works are broadly classified into the following:

- Insert construction and demolition (C&D) material; and
- C&D waste.

5.2.2 The quantities of waste for disposal in this Reporting Period under the Contract are summarised in ***Tables 5-1*** and ***5-2*** and the Waste Flow Table as shown in ***Appendix G***. Whenever possible, materials were reused on-site as far as practicable.

Table 5-1 Summary of Quantities of Inert C&D Materials for the Contract

Type of Waste	Quantity				Disposal Location
	Aug 23	Sep 23	Oct 23	Total	
Reused in this Contract (Inert) (in T)	0	0	0	0	NA
Reused in other Contracts/ Projects (Inert) (in T)	0	0	0	0	NA
Disposal as Public Fill (Inert) (in T)	320.650	4260.080	998.070	5258.150	TM 38

Table 5-2 Summary of Quantities of C&D Wastes for the Contract

Type of Waste	Quantity in Reporting Month				Disposal Location
	Aug 23	Sep 23	Oct 23	Total	
Recycled Metal (‘000kg)	0.010	0.0015	0.0045	0.016	NA
Recycled Paper / Cardboard Packing (‘000kg)	0.202	0.164	0.177	0.543	Licensed Collector
Recycled Plastic (‘000kg)	0.015	0.005	0.004	0.024	NA
Chemical Wastes (‘000kg)	0	0	0	0	NA
General Refuses (in T)	10.140	12.790	24.570	37.360	NENT

6 SITE INSPECTIONS

6.1 REQUIREMENTS

6.1.1 According to the EM&A Manual, the programme of environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections were carried out to confirm the environmental performance.

6.1.2 During the Reporting Period, ***14*** events of the joint site inspections were undertaken for The Contract to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in ***Table 6-1*** and the details of site inspection can be found in relevant EM&A monthly report.

Table 6-1 Summary of Reminders/Observations of Site Inspection

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
August 2023	1, 9, 15, 22 and 29 August 2023	4	Completed.
September 2023	5, 14, 19 and 26 September 2023	4	Completed.
October 2023	3, 10, 17, 24 and 31 October 2023	8	Completed.

6.1.3 In the Reporting Period, no non-compliance was recorded for The Contract; however, ***16*** observations/Reminders were recorded during the site inspections. Details of the findings of the inspection in the reporting period can be referred to the Monthly EM&A Report. The findings found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.

7 ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCES

7.1 ENVIRONMENTAL COMPLAINTS, SUMMONS AND PROSECUTIONS

7.1.1 In the Reporting Period, no environmental complaint was recorded.

7.1.2 No summons and prosecution under the EM&A Programme was lodged for all Contracts.

7.1.3 The statistical summary table of environmental complaint, summons and prosecution are presented in ***Tables 7-1, 7-2 and 7-3*** and the updated complaint log is shown in ***Appendix H***.

Table 7-1 Statistical Summary of Environmental Complaints

Reporting Month	Environmental Complaint Statistics			
	Frequency	Cumulative since commencement of project	Complaint Nature	Project related complaint
August 2023	0	0	NA.	NA.
September 2023	0	0	NA.	NA.
October 2023	0	0	NA.	NA.

Table 7-2 Statistical Summary of Environmental Summons

Reporting Month	Environmental Summons Statistics		
	Frequency	Cumulative	Project related summons
August 2023	0	0	NA.
September 2023	0	0	NA.
October 2023	0	0	NA.

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Month	Environmental Prosecution Statistics		
	Frequency	Cumulative	Project related prosecution
August 2023	0	0	NA.
September 2023	0	0	NA.
October 2023	0	0	NA.

8 IMPLEMENTATION STATUS OF MITIGATION MEASURES

8.1 GENERAL REQUIREMENTS

8.1.1 The environmental mitigation measures recommended in the ISEMM in the EM&A Manual covered the issues of dust, noise, water, waste, land contamination and ecology and they are summarised and presented in ***Appendix I.***

8.1.2 The Contract works under the Project shall be implementing the required environmental mitigation measures according to the EM&A Manual as subject to the site conditions. Environmental mitigation measures generally implemented by the Contract and the implementation status are shown in ***Appendix I***.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSIONS

9.1.1 As advised by the *Contractor*, the major construction works under Works Contract was commenced on 24 May 2022. This is the ***6th*** Quarterly EM&A Summary Report presenting the monitoring results and inspection findings for the Reporting Period from ***1 August to 31 October 2023.***

9.1.2 For air quality monitoring, no 24-hour TSP monitoring results triggered the Action /Limit Level.

9.1.3 No environmental compliant, summons or successful prosecutions were recorded in the Reporting Period.

9.1.4 During the Reporting Period, weekly joint site inspection by the *PM*D, IEC, ET and The *Contractor* were carried out in accordance with the EM&A Manual stipulation. No non-compliance observed during the site inspection.

9.2 RECOMMENDATIONS

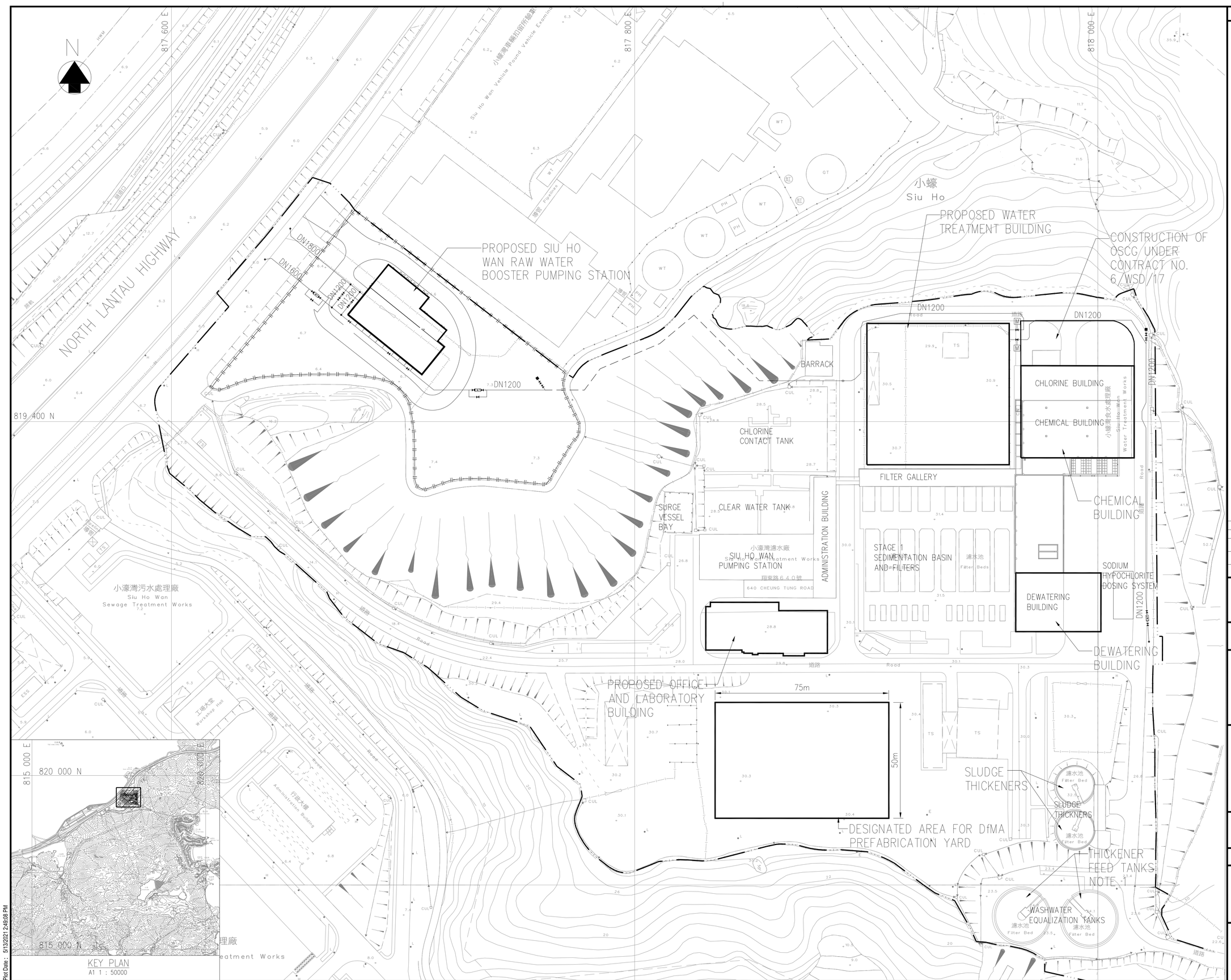
9.2.1 Special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to Siu Ho Wan Sewage Treatment Works. The *Contractor* should fully implement the construction dust mitigation measures as appropriately.

9.2.2 Due to wet season has approached, the *Contractor* was reminded that all effluent discharge shall fulfill the requirement of Discharge Licence under the Water Pollution Control Ordinance.

9.2.3 All other mitigation measures recommended in the Implementation Schedule for Environmental Mitigation Measures of the EM&A Manual should be properly implemented and maintained as far as practicable.

Appendix A

Layout Plan of the Project



KEY PLAN
A1 1 : 50000

LEGEND:

- SITE BOUNDARY
- PROPOSED RAW WATER MAINS (BURIED)
- PROPOSED RAW WATER MAINS (EXPOSED)
- PROPOSED FENCING
- PROPOSED BUILDING WORKS

NOTE1:
THE EXISTING WASHWATER EQUAULIZATION TANKS TO BE RENAMED AS "THICKENER FEED TANKS"

Revision	Date	Description			Initial
0	05/21	ISSUE FOR TENDER DRAWING			JC
	Designed	Checked	Drawn	Checked	
Initial	CT/CCK	YFC/AS	SZ	JC	
Date	05/21	05/21	05/21	05/21	

Approved
James Chan

Contract No.
7/WSD/21

Contract Title
CONSTRUCTION OF SIU HO WAN WATER TREATMENT WORKS EXTENSION AND SIU HO WAN RAW WATER BOOSTER PUMPING STATION

Drawing Title
SITE LOCATION

Drawing No.
199755A/B&V/GN/00001

Revision
0

Scale
A1 1 : 750
A3 1 : 1500

水務署
Water Supplies Department

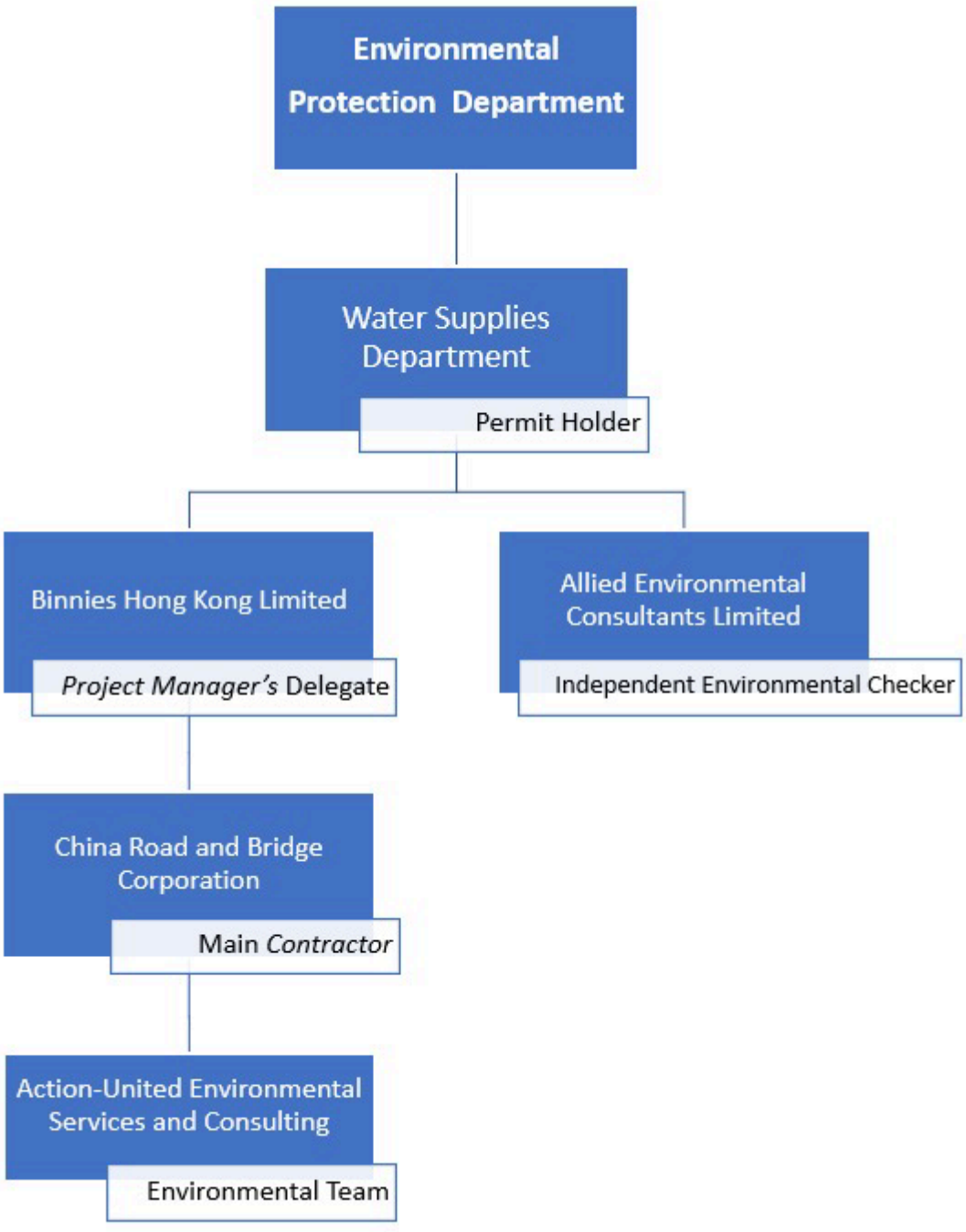
BINNIES HONG KONG LIMITED
賓尼斯工程顧問有限公司

Plot Date : 5/13/2021 2:49:08 PM

File Name : Y:\Daily Work\02 From other HK Projects\199755 -Tender Drawing\DWG\199755A-B&V-GN-00001

Appendix B

Project Organisation


Environmental Protection Department
Water Supplies Department
Permit Holder
Binnies Hong Kong Limited
Project Manager's Delegate
Allied Environmental Consultants Limited
Independent Environmental Checker
China Road and Bridge Corporation
Main Contractor
Action-United Environmental Services and Consulting
Environmental Team

Contact Details of Key Personnel

Organisation	Project Role	Position	Name	Tel No.
Binnies Hong Kong Limited	*Project Manager*'s Delegate	Chief Resident Engineer	Mr. Gilbert Ying	6343 1027
		Senior Resident Engineer	Mr. Alex Tung	9080 0079
		Resident Engineer	Mr. Patrick Wong	9267 8638
		Assistant Resident Engineer	Ms. Kelly Chan	9039 2863
China Road and Bridge Corporation	*Contractor*	Site Agent	Mr. Eros To	9224 0114
		Environmental Manager	Mr. Dennis Ho	5645 0563
		Environmental Officer	Ms. Wendy Leung	9877 4750
		Environmental Supervisor	Mr. Patrick Wan	9618 0010
Allied Environmental Consultants Limited	Independent Environmental Checker	Principle Consultant	Ms. Joanne Ng	2815 7028
Action-United Environmental Services and Consulting	Environmental Team	Environmental Team Leader	Mr. Tam Tak Wing	2959 6059
		Environmental Consultant	Ms. Nicola Hon	2959 6059
		Environmental Consultant	Mr. Ben Tam	2959 6059

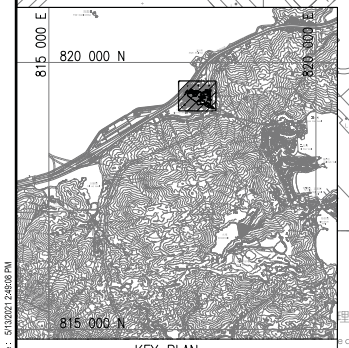
Appendix C

Monitoring Locations

LEGEND:

- SITE BOUNDARY
- PROPOSED RAW WATER MAINS (BURIED)
- PROPOSED RAW WATER MAINS (EXPOSED)
- PROPOSED FENCING
- PROPOSED BUILDING WORKS

NOTE1:
THE EXISTING WASHWATER EQUALIZATION TANKS TO BE RENAMED AS "THICKENER FEED TANKS"



KEY PLAN
A1 1 : 50000

Revision	Date	Description	Initial
0	05/21	ISSUE FOR TENDER DRAWING	JC

	Designed	Checked	Drawn	Checked
Initial	CT/CCK	YFC/AS	SZ	JC
Date	05/21	05/21	05/21	05/21

Approved
James Chan

Contract No.
7/WSD/21

Contract Title
CONSTRUCTION OF SIU HO WAN WATER TREATMENT WORKS EXTENSION AND SIU HO WAN RAW WATER BOOSTER PUMPING STATION

Drawing Title
SITE LOCATION

Drawing No.
199755A/B&V/GN/00001

Revision
0

Scale
A1 1 : 750
A3 1 : 1500

水務署
Water Supplies Department

BINNIES HONG KONG LIMITED
賓尼新工程顧問有限公司

Plot Date : 5/13/2021 12:45:05 PM

File Name : Y:\Daily Work\02 From other HK Projects\199755 -Tender Drawing\DWG\199755A-B&V-GN-00001

Appendix D

Event and Action Plan

Event Action Plan for Air Quality

Event	Action			
	ET	**IEC**	***PM*D**	***Contractor***
Action Level exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC, *PM*D and *Contractor*; 3. Repeat measurement to confirm finding; and 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check *Contractor*'s working method; and 3. Review and advise the ET and *PM*D on the effectiveness of the proposed remedial measures.	1. Notify *Contractor*.	1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Rectify any unacceptable practice and implement remedial measures; and 3. Amend working methods agreed with *PM*D if appropriate.
Action Level exceedance for two or more consecutive samples	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC, *PM*D and *Contractor*; 3. Advise the *PM*D and *Contractor* on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC, *PM*D and *Contractor* on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and *PM*D; and 8. 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 ET and *PM*D on the effectiveness of the proposed remedial measures; and 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify *Contractor*; and 3. Supervise and ensure remedial measures properly implemented.	1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Submit proposals for remedial actions to *PM*D with a copy to ET and IEC within 3 working days of notification; 3. Implement the agreed proposals; and 4. Amend proposal if appropriate.
Limit Level exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform *PM*D, *Contractor*, IEC and EPD;	1. Check monitoring data submitted by ET; 2. Check *Contractor*'s working method; 3. Discuss with ET, *PM*D and *Contractor* on possible remedial	1. Confirm receipt of notification of failure in writing; 2. Notify *Contractor*; and 3. Supervise and ensure remedial measures properly implemented.	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Take immediate action to avoid further exceedance;

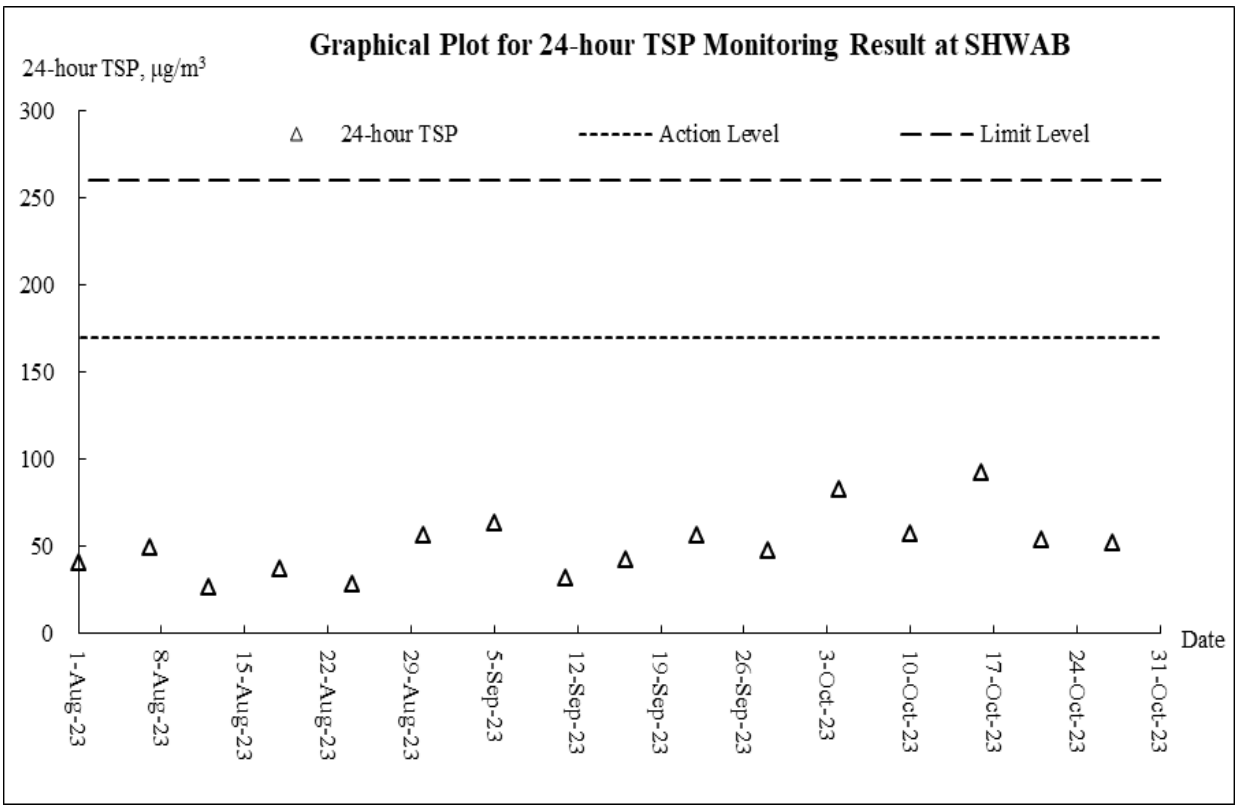
	3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of *Contractor*'s remedial actions and keep IEC, EPD and *PM*D informed of the results.	measures; 4. Advise the *PM*D and ET on the effectiveness of the proposed remedial measures; 5. Supervise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

Note:
ET – Environmental Team
IEC – Independent Environmental Checker
*PM*D – *Project Manager*'s Delegate

Appendix E

Graphical Plots for Monitoring Result

24-Hour TSP


Graphical Plot for 24-hour TSP Monitoring Result at SHWAB
24-hour TSP, µg/m3
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
Date
1-Aug-23
8-Aug-23
15-Aug-23
22-Aug-23
29-Aug-23
5-Sep-23
12-Sep-23
19-Sep-23
26-Sep-23
3-Oct-23
10-Oct-23
17-Oct-23
24-Oct-23
31-Oct-23

Appendix F

Meteorological Data

Weather Condition Extracted from HKO

The weather of August 2023

Mainly attributing to the warmer than normal sea surface temperature over the northern part of the South China Sea and a stronger than usual southwesterly flow in the lower atmosphere over the south China coast, August 2023 was much hotter than usual in Hong Kong. The monthly mean temperature of 29.7 degrees and monthly mean minimum temperature of 27.8 degrees were respectively 1.0 degree and 1.1 degrees above their normal and both were the highest on record for August. Moreover, the monthly mean maximum temperature of 32.4 degrees was 1.1 degrees above normal and one of the second highest on record for August. Together with the exceptionally hot weather in June and July, Hong Kong experienced the hottest summer on record from June to August 2023 with a record-breaking high mean temperature of 29.7 degrees. The mean maximum temperature of 32.4 degrees and mean minimum temperature of 27.6 degrees were both the second highest on record for the same period. There were 15 hot nights in August 2023, one of the highest on record for August. The month was also much drier than usual with a total rainfall of 140.7 millimetres, about 31 percent of the normal figure of 453.2 millimetres and the ninth lowest on record for August. The accumulated rainfall up to August this year was 1157.2 millimetres, a deficit of about 40 percent compared with the normal of 1921.5 millimetres for the same period.

The weather of September 2023

In terms of extreme weather, September 2023 was an eventful month in Hong Kong with the ferocious strike by Super Typhoon Saola on 1 – 2 September and the phenomenal rainstorm on 7 – 8 September. With a maximum sustained wind of 230 km/h near its centre, Saola was the second most intense tropical cyclone affecting the South China Sea since 1950 and Hurricane Signal No. 10 was issued in Hong Kong during the passage of Saola, the first time since Super Typhoon Mangkhut hit Hong Kong in September 2018. A trough of low pressure associated with the remnant of tropical cyclone Haikui brought prolonged torrential rain to Hong Kong on 7 – 8 September and necessitated the issuance of the Black Rainstorm Warning for 16 hours and 35 minutes, setting the longest record since the introduction of the rainstorm warning system in 1992. Mainly attributing to the heavy rain associated with Saola and troughs of low pressure in the first half of the month, the Observatory recorded an all-time high September rainfall of 1067.1 millimetres, more than three times of the September normal of 321.4 millimetres and easily breaking the previous record of 844.2 millimetres set way back in September 1952. Moreover, the rainfall deficit in the first eight months of this year was mostly compensated by the record-breaking rainfall in September. The accumulated rainfall this year up to September was 2224.3 millimetres, slightly less than the normal figure of 2242.8 millimetres for the same period. Despite the stormy weather in the first part of the month, there was a long spell of sunny and very hot weather with 10 consecutive very hot days from 21 to 30 September in the later part of the month. It also set the longest record of consecutive very hot days for September. Overall, the month remained hotter than usual with a mean temperature of 28.5 degrees, 0.6 degrees above the normal of 27.9 degrees.

The weather of October 2023

With more than usual moisture in the lower atmosphere over southern China, October 2023 was much cloudier than usual in Hong Kong. The mean amount of cloud in the month was 79 percent, 21 percent above the normal of 58 percent and the second highest on record for October. The duration of bright sunshine in the month was only 138.9 hours, about 30 percent lower than the normal figure of 197.8 hours and the fourth lowest on record for October. Mainly attributing to the record-breaking rainfall associated with tropical cyclone Koinu on 8 – 9 October, the month was also much wetter than usual. The monthly total rainfall was 546.0 millimetres, more than four times of the normal figure of 120.3 millimetres and the fifth highest on record for October. The accumulated rainfall this year up to October was 2770.3 millimetres, about 17 percent more than the normal figure of 2363.1 millimetres for the same period. Despite the below normal sunshine, the month was warmer than usual. The mean temperature of 26.4 degrees was 0.7 degrees above the normal and one of the fourth highest for October on record. There were 3 very hot days in the early part of the month, the highest on record for October.

Remark: The meteorological data during the Reporting Period is presented in the relevant monthly EM&A report.

Appendix G

Waste Flow Table

Monthly Summary Waste Flow Table for _2023__ (year)

Project : Construction of Siu Ho Wan Water Treatment Works Extension and Siu Ho Wan Raw Water Booster Pumping Station Contract No.: 7/WSD/21

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete (a) (see Note 3)	Reused in the Contract (b)	Reused in other Projects (c)	Disposed as Public Fill (d)	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse
	(in Tonne)	(in Tonne)	(in Tonne)	(in Tonne)	(in Tonne)	(in Tonne)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in Tonne)
Jan	2430.760	72.330	0.000	0.000	2358.430	457.960	0.0000	0.0000	0.0000	0.0000	6.180
Feb	2217.290	19.380	0.000	0.000	2197.910	0.000	0.0021	0.0000	0.0015	0.0000	7.680
Mar	837.370	290.470	0.000	0.000	546.900	434.980	11.410	0.177	0.0000	0.000	7.160
Apr	648.090	126.350	0.000	0.000	521.740	0.000	1.744	0.002	0.0035	0.000	5.480
May	613.250	49.950	0.000	0.000	563.300	3439.940	0.000	0.420	0.000	0.000	11.020
Jun	7263.910	50.150	0.000	0.000	7213.760	73.900	0.000	0.000	0.000	0.000	27.910
Sub-total	14010.670	608.630	0.000	0.000	13402.040	4406.780	13.1561	0.5990	0.0050	0.0000	65.430
Jul	7200.730	181.380	0.000	0.000	7019.350	657.820	0.000	0.377	0.000	0.000	56.110
Aug	408.090	87.440	0.000	0.000	320.650	166.670	0.010	0.202	0.015	0.000	10.140
Sep	4260.080	0.000	0.000	0.000	4260.080	100.000	0.0015	0.164	0.005	0.000	12.790
Oct	998.070	0.000	0.000	0.000	998.070	0.000	0.0045	0.177	0.004	0.000	24.570
Nov											
Dec											
Total	26877.640	877.450	0.000	0.000	26000.190	5331.270	13.1721	1.5190	0.0290	0.0000	169.040

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) Total Quantity Gernerated = a+b+c+d.

Appendix H

Environmental Complaints Log

Environmental Complaints Log

Log ref.	Date of complaint	Complaint route	Reference no.	Complaint nature	Investigation fining	Status
1						
2						
3						
4						

Appendix I

Implementation Schedule for Environmental Mitigation Measures

Environmental Mitigation Implementation Schedule for Air Quality Control

EIA Ref	Environmental Protection Measures	Location/Timing	Implementation Agent	Implementation Stages*			Relevant Legislation & Guidelines
				D	C	O	
Construction Phase (Air Quality Control)							
S3.8	Dust mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation shall be incorporated to control dust emission. Notice shall be given to authority prior to commencing of work. Relevant control measures include: • watering on the work sites at Siu Ho Wan WTW twice a day; • skip hoist for material transport shall be totally enclosed by impervious sheeting; • vehicle washing facilities shall be provided at every vehicle exit point; • the area where vehicle washing takes place and the section of the road between the washing facilities and the exit point shall be paved with concrete, bituminous materials or hardcores; • every main haul road shall be scaled with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet; • every stock of more than 20 bags of cement shall be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides; • all dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet; • every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the construction sites; • the dusty materials stockpiled on site shall be covered; and • the load of dusty materials carried by vehicle leaving a construction site shall be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle.	Work site / during construction period.	*Contractor*		√		Air Pollution Control (Construction Dust) Regulation
Operation Phase(Air Quality)							
NA	NA	NA	NA	NA	NA	NA	NA
Construction Phase (Noise Control)							
S4.8.1	Use of silenced PME	Work site close to all NSRs	*Contractor*		√		NCO, EIAO-TM
S4.8.6	Good Site Practices: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program. • Mobile plant, if any, should be sited as far away from NSRs as possible. • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs. • Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities. • Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction programme.	Work site close to all NSRs / throughout the construction period.	*Contractor*		√		NCO, EIAO-TM

EIA Ref	Environmental Protection Measures	Location/Timing	Implementation Agent	Implementation Stages*			Relevant Legislation & Guidelines
				D	C	O	
Operation Phase(Noise Control)							
NA	NA	NA	NA	NA	NA	NA	NA
Construction Phase (Water Quality Control)							
S5.7.2	*Construction Site Runoff and Drainage* • Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public sewers/drains. • Sand/silt removal facilities such as sand traps, silt traps and sediment basins shall be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of silt removal facilities shall be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures shall be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. • Water pumped out from foundation excavations shall be discharged into silt removal facilities. • Exposed soil surfaces shall be protected by paving or fill material as soon as possible to reduce the potential of soil erosion. • Open stockpiles of construction materials or construction wastes on-site of more than 50m3 shall be covered with tarpaulin or similar fabric during rainstorms.	Work site / During the construction period	*Contractor*		√		ProPECC PN 1/94; WPCO
S5.7.3	*General Construction Activities* • Debris and rubbish generated on-site shall be collected, handled and disposed of properly to avoid entering the nearby watercourses and storm water drains. Stockpiles of cement and other construction materials shall be kept covered when not being used.	Work site / During the construction period	*Contractor*		√		ProPECC PN 1/94; WPCO
S5.7.4	• Oils and fuels shall only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas shall be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund shall be drained of rainwater after a rain event.	Work site / During the construction period	*Contractor*		√		
S5.7.5	*Sewage from Construction Workforce* • Temporary sanitary facilities, such as portable chemical toilets, shall be employed on-site. A licensed contractor shall be responsible for appropriate disposal and maintenance of these facilities.	Work site / During the construction period	*Contractor*		√		WPCO
Operation Phase(Water Quality Control)							
NA	NA	NA	NA	NA	NA	NA	NA
Construction Phase (Ecology)							
S.6.9.3	*Mitigation to minimise impacts on vegetation in woodland* • All trees shall be preserved as far as possible, especially species of high conservation or amenity value. Recommendations to be provided in the Tree Survey Report to mitigate impacts on trees shall be followed. Where trees are to be preserved in-situ, but are likely to be disturbed from works activities, protective fencing/hoarding shall be carefully set up around the affected trees (refer to	Work site particularly woodland / During design phase and construction period	WSD/ *Contractor*	√	√		EIAO

EIA Ref	Environmental Protection Measures	Location/Timing	Implementation Agent	Implementation Stages*			Relevant Legislation & Guidelines
				D	C	O	
S.6.9.4/ S.6.11.2	Landscape and Visual). • Disturbance of individuals of the shrub/tree species Pavetta hongkongensis and tree Aquilaria sinensis of conservation interest should be avoided. A buffer to the dripline of each plant of at least 1m radius should be demarcated to prohibit disturbance. Where loss of this species would be unavoidable, it is recommended that these plants may be transplanted to safe locations within the same habitat. Following transplantation, regular monitoring of the trees and seedlings should be conducted by a suitably qualified botanist/horticulturist over a 12-month period.						
S.6.9.5	*Mitigation to minimise impacts on aquatic ecology* • Trench excavation works for the raw water mains near the stream courses should be carried out in the dry season as far as practicable.	Work site / During construction period	WSD/ *Contractor*	√	√		
S.6.9.6	*Mitigation to minimise general disturbance to wildlife* • Noise mitigation measures through the use of quiet construction plant shall be implemented to minimise disturbance to habitats adjacent to the works areas.	Work site / During construction period	*Contractor*		√		EIAO
S.6.9.7	*General good site practice* • Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimise disturbance to natural habitats. • Construction activities shall be restricted to works areas that shall be clearly demarcated. The works areas shall be reinstated after completion of the works. • Waste skips shall be provided to collect general refuse and construction wastes. The wastes shall be disposed of timely and properly off-site. • General drainage arrangements shall include sediment and oil traps to collect and control construction site run-off. • Open burning on works sites is illegal, and shall be strictly prohibited. Stove fires on works sites shall also not be allowed. Temporary fire fighting equipment shall be provided particularly in woodland areas.	Work site / During construction period	*Contractor*		√		EIAO
S.6.9.8.	*Re-vegetation to reinstate works areas* • As far as possible compensatory planting shall use native plants of the same species that occur in the adjacent woodland habitat and have flowers/fruits attractive to wildlife. On-site compensatory planting should be conducted on at least a one to one basis.	Work site in woodland / Immediately following works	*Contractor*		√		EIAO
Operation Phase(Ecology)							
NA	NA	NA	NA	NA	NA	NA	NA
Construction Phase (Landscape and Visual Impact)							
S7.9	• All existing top-soil shall be conserved and reused • Temporary hoarding barriers shall be of a recessive visual appearance in both colour and form. • Chromatic colour scheme with appropriate texture should be considered while designing the external surface of the proposed SHW Raw Water Booster Pumping Station in order to visually merge the proposed structures into the surrounding landscape.	During construction phase	*Contractor*		√		EIAO-TM
Operation Phase(Landscape and Visual Impact)							

EIA Ref	Environmental Protection Measures	Location/Timing	Implementation Agent	Implementation Stages*			Relevant Legislation & Guidelines
				D	C	O	
S7.9	• New compensatory planting works shall be carried out as early as possible in the construction period which allow maximum time for establishment and more mature trees when the works completed. • Landscape or compensatory planting shall be provided where appropriate for enhancing greening and achieving visual screening. In this aspect, compensatory tree planting shall be considered. Selection of plant species shall match with the surrounding vegetation type and form for consistency of landscape resources and visual comfort, for matching with the local habitat. Tree planting shall be firstly considered when the amenity area or slope is feasible for planting trees so as to provide visual screening.	During operation phase	*Contractor*			√	EIAO-TM
S7.9	• Planting area of approximately 2000 to 3000mm wide where fast growing tall trees with dense foliage shall be provided along the site boundary of Siu Ho Wan Raw Water Booster Pumping Station for visual screening. • For planting close to or surrounded by natural terrain, compensatory planting should be arranged in a semi natural manner where feasible in order to blend the new planting into natural environment. • The newly planted trees, shrubs and grassed areas are maintained throughout the first 12 months of the operation stage.	During operation phase	*Contractor*			√	EIAO-TM
Waste Management							
S10.5.1 - S10.5.3	*Good Site Practices* Good site practices during the construction activities include: • Nomination of approved personnel, such as a site manager, to be responsible for good site practices and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility. • Training of site personnel in proper waste management and chemical waste handling procedures. • Provision of sufficient waste disposal points and regular collection for disposal. • Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. • A Waste Management Plan shall be prepared and submitted to the Engineer for approval. One may make reference to ETWB TCW No. 15/2003 for details. • A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) shall be proposed. • In order to monitor the disposal of C&D material at public filling areas and to control fly tipping, a trip-ticket system shall be included as one of the contractual requirements to be implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. One may make reference to WBTC No. 21/2002 for details.	Work site / During the construction period	*Contractor*		√		Waste Disposal Ordinance (Cap.54) WBTC No.21/2002, ETWB TCW No. 15/2003
S10.5.4	*Waste Reduction Measures* Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction	Work site / During planning & design stage, and construction	WSD/*Contractor*	√	√		WBTC No.4/98, ETWB TCW No. 15/2003

EIA Ref	Environmental Protection Measures	Location/Timing	Implementation Agent	Implementation Stages*			Relevant Legislation & Guidelines
				D	C	O	
	include: • 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. • Separate labelled bins shall be provided to segregate aluminium cans from other general refuse generated by the work force, and to encourage collection of by individual collectors. • Any unused chemicals or those with remaining functional capacity shall be recycled. • Maximising the use of reusable steel formwork to reduce the amount of C&D material. • Proper storage and site practices to minimise the potential for damage or contamination of construction materials. • Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.	stage					
S10.5.9	*General Refuse* General refuse shall be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from C&D material.	Work site / During the construction period	*Contractor*		√		Public Health and Municipal Services Ordinance (Cap. 132)
S10.5.7	*Construction & Demolition (C&D) Material* When disposing C&D material at a public filling area, it shall be noted that the material shall only consist of soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt. The material shall be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be unsuitable by the Filling Supervisor.	Work site / During the construction period	*Contractor*		√		WBTC No. 4/98, 21/2002, 25/99, 12/2000 ETWB TCW No. 15/2003
S10.5.8	*Chemical Wastes* If chemical wastes are produced at the construction site, the *Contractor* would be required to register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes shall be used. Appropriate labels shall be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes generated at the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. All chemical wastes shall be removed from the waterworks installations at the first instance.	Work site / During the construction period	*Contractor*		√		

Note: N/A Not applicable
*D – Design; C – Construction; O – Operation