KINGSFORD ENVIRONMENTAL (H.K.) LTD.
Consultancy Engineering & Contracting

CONTRACT NO. DE/2005/03

SUPPLY AND INSTALLATION OF ELECTRICAL AND MECHANICAL EQUIPMENT FOR EXPANSION OF SHEK WU HUI SEWAGE TREATMENT WORKS

ENVIRONMENTAL MONITORING AND AUDIT

QUARTERLY EM&A SUMMARY REPORT NO. 8

FROM MARCH TO MAY 2008

for

Biwater Man Lee Limited

Submitted by

Kingsford Environmental (H.K.) Ltd.

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CUSTOMER: **Biwater Man Lee Limited**

PROJECT NAME: **Supply and Installation of Electrical and Mechanical Equipment for Expansion of Shek Wu Hui Sewage Treatment Works**

PROJECT NO.: 81869

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APPROVAL & DISTRIBUTION SHEET

DOCUMENT DATE: 31 May 2008

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Signature: _____ Date: 31 May 2008

Mr. Stanley Lau

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Independent Environmental Checker (CH2M HILL Hong Kong Limited)	Mr. Y. T. Tang	1

EXECUTIVE SUMMARY

This is the eighth Quarterly Environmental Monitoring and Audit (EM&A) Summary Report for the Drainage Services Department Contract No. DE/2005/03 entitled "Supply and Installation of Electrical and Mechanical Equipment for Expansion of Shek Wu Hui Sewage Treatment Works". The E&M Contractor has employed an independent Environmental Team (ET), Kingsford Environmental (H.K.) Ltd., to monitor the implementation of the environmental protection measures, as required in the contract.

The ET's duties are to review/comment on the contractor's method statements regarding actions, investigate complaints, provide monthly and quarterly reports on the environmental status, and certification of reports and all submissions under the EP in accordance to the requirement of the EM&A manual and the Environmental Permit. The Independent Environmental Checker (IEC) for the project is to review and verify the reports and all submissions under the EP.

For the environmental monitoring activities, Action and Limit (A/L) Levels are defined levels of impact recorded which represent levels at which a prescribed response is required. Action Limit is an indication of a deteriorating ambient environment for which appropriate remedial actions are likely to be necessary to prevent environmental quality from falling outside the Limit Levels. If these are exceeded, construction works should not be preceded without appropriate remedial action, including critical review of the methods. Baseline monitoring was conducted by the Civil Contractor in November 2005 (Report No. 01284R0012).

In the eighth quarter (March – May 2008), the major site activities mainly consisted of E&M equipment installation in Bioreactor No.5, Air Blower House No.2, Division Pump Pit No.1, Switch Room for RAS/SAS Pumping Station No. 2, RAS/SAS Pumping Station No.2. In addition, building service installation and lifting appliance installation in Air Blower House No.2 and the overhead crane installation and testing and commissioning in SAS Consolidation House. Beside, possession of E&M equipment installations for Flow Division Pump Pit No.1 has been taken on 6 March 2008 and Final Sedimentation Tank Nos. 9 and 10 and Switch Room for RAS/SAS Pumping Station No. 2 have been taken on 11 April 2008. Also, possession of E&M equipment installations for RAS/SAS Pumping Station No.2 has been taken on 28 April 2008.

Weekly site inspections, as recommended in the EM&A Manual, by an ET technician were commenced, as required. Joint site audits with the ER, the Contractors and environmental teams were also conducted in this quarter.

No deficiencies were found during the site inspections in this quarter. Thus, the work activities and mitigation measures were in compliance with the environmental protection regulations and contract requirements during this quarter.

Three monthly EM&A meetings were attended for the months of March to May 2008 with all of the parties (DSD, civil and E&M contractors, ETs, and the IEC) to review the environmental issues and communication between the parties.

There were no complaints received or notifications of summons or successful prosecutions during the quarter.

There was no reporting change during the reporting quarter.

The planned activities for June – August 2008 as regards E&M equipment are mainly the installation and T&C (if required) in 1) new Air Blower House No. 2, 2) Bioreactor No.5, 3) Flow Division Pump Pits, 4) Final Sedimentation Tank Nos.9 and 10 and 5) RAS/SAS Pumping Station No.2, 6) Switch Room for RAS/SAS Pumping Station No. 2, 7) Sludge Press House Extension, 8) Sludge Conditioning Tank Nos. 3 and 4, 9) Bunded Area for Ferric Chloride Storage Tank, and 10) defects rectification of SAS Thickening System in SAS Consolidation House.

Table 1: Master Construction Program for E&M Works

Section	Task Description	Date
I	- Submissions and approval of Process Design, Equipment, Schematics, GA and Civil Works Requirements.	14 Feb '06 – 13 Jun '06
II	- E&M equipment installation, T&C for Density Current Baffles for 3 Existing Final Sedimentation Tanks.	18 Jun '06 – 16 Oct '06
III	- E&M equipment installation, T&C for pH Control System for Bioreactors.	19 Jun '06 – 8 Jan '07
IV	- E&M equipment installation, T&C for Density Current Baffles for 4 Existing Final Sedimentation Tanks.	18 May '07 – 19 Sep '07
V	- E&M equipment installation, T&C for SAS Thickening Centrifuges.	18 May '07 – 31 Mar'08 (Tentative)
VI	- E&M equipment installation, T&C for New Air Blower House No. 2.	10 Oct '07 – 14 Sep'08
VII	- E&M equipment installation, T&C for New Flow Division Pump Pits. - E&M equipment installation, T&C for Bioreactor No. 5. - E&M equipment installation, T&C for Final Sedimentation Tank Distribution Chamber.	12 Sep '07 – 9 Jan '08 (Earliest) 18 Feb '08 – 25 Nov '08 (Latest)
VIII	- E&M equipment installation, T&C for New Final Sedimentation Tanks. - E&M equipment installation, T&C for RAS/SAS Pumping Station.	11 Nov '07 – 9 Mar '08 (Earliest) 9 Mar '08 – 16 Oct '08 (Latest)
IX	- E&M equipment installation, T&C for New Sludge Conditioning Tanks. - E&M equipment installation, T&C for Press House Extension. - E&M equipment installation, T&C for DG Store and Chemical Waste Store.	15 Mar '08 – 13 Jul '08 (Earliest) 23 Apr '08 – 26 Aug '08 (Latest)
X	- E&M equipment installation, Remaining Works.	14 Feb '06 – 25 Dec '08

The contact information for the key personnel is shown in Table 2.

Name	Title	Telephone	Fax
Mr. P. W. Lam (DSD)	Engineer's Representative	2594-7305	2827-8532
Mr. K. K. Cheung (DSD)	Engineer's Representative	2594-7338	2827-8532
Mr. W. S. Lui (BML)	Site Agent	2671-2350	2671-2351
Mr. K. H. Lau (BML)	Deputy Site Agent	2671-2350	2671-2351
Mr. S. M. Ho (BML)	Site Waste Manager/Co-ordinator	2671-2350	2671-2351
Mr. Stanley Lau (KEL)	ET Leader	2612-2817	2614-7012
Ms. Angela Lau (KEL)	ET Site Inspector	2612-2817	2614-7012
Mr. Y. T. Tang (CH2M)	The Independent Environmental Checker	3105-8686	2891-0305

3 Environmental Requirements

The works performed for this contract shall comply with the relevant Hong Kong government ordinances, regulations, guidelines, practice notes, etc. as regards environmental protection, as detailed in the Project Profile, the Environmental Monitoring and Audit Manual and Environmental Permit.

The EM&A Manual specifies environmental auditing to ensure that the mitigation measures recommended in the Project Profile are effectively implemented. A summary of the required environmental protection and mitigation measures for the construction phase extracted from Appendix B of the Manual ("Implementation Schedule of Mitigation Measures") is attached in Appendix 3.

The environmental aspects for the construction phase include plant noise, dust, water quality, and waste materials (including chemicals). Action and Limit (A/L) Levels are

Table 4: Site Inspections/Audits for March to May 2008

Month	Date of Site Inspections/Audits	
	by ER/ET/BML	by EPD
Mar 2008	5, 11, 19, 27 and 31	n/a
Apr 2008	8, 16, 22 and 29	n/a
May 2008	7, 14, 22 and 27	n/a

The work activities and dates of occurrence of each activity in this quarter are summarized in Table 5. Site layouts showing the areas of the work activities and the nearest sensitive receivers are attached in Appendix 5.

In the eighth quarter (March – May 2008), the major site activities mainly consisted of E&M equipment installation in Bioreactor No.5, Air Blower House No.2, Division Pump Pit No.1, Switch Room for RAS/SAS Pumping Station No. 2, RAS/SAS Pumping Station No.2. In addition, building service installation and lifting appliance installation in Air Blower House No.2 and the overhead crane installation and testing and commissioning in SAS Consolidation House. Beside, possession of E&M equipment installations for Flow Division Pump Pit No.1 has been taken on 6 March 2008 and Final Sedimentation Tank Nos. 9 and 10 and Switch Room for RAS/SAS Pumping Station No. 2 have been taken on 11 April 2008. Also, possession of E&M equipment installations for RAS/SAS Pumping Station No.2 has been taken on 28 April 2008.

Table 5: Work Activities from March to May 2008

SAS Consolidation House	
Testing and commissioning	5 Jan '08 – 31 Mar '08*
Defects rectification of SAS thickening system	31 Jan '08 – 30 Sep '08*
Air Blower House No.2	
Building Service Installation	13 Oct '07 – 15 Apr '08
Lifting Appliance Installation	15 Dec '07 – 31 Mar '08
Installation of E&M equipment	1 Apr '08 – 31 Aug '08*

Bioreactor No.5	
Installation of E&M equipment	18 Mar '08 – 31 Aug '08*
Flow Division Pump Pit No.1	
Installation of E&M equipment	18 Mar '08 – 31 July '08*
Switch Room for RAS/SAS Pumping Station No. 2	
Installation of E&M equipment	11 Apr '08 – 30 Sep '08*
RAS/SAS Pumping Station No.2	
Installation of E&M equipment	28 Apr '08 – 30 Sep '08*

* *Scheduled dates only for completion of the activities.*

Air Quality

Appropriate mitigation measures for the activities are in place in this quarter. Plastic covers with stakes/weights are readily available and used for covering of exposed material for control of dust. Water spray is available for dust suppression, if necessary.

No dusty material was found from the site areas or activities this month.

Water Quality

The plastic covers for exposed soil, etc. are available for minimization of silt in the run-off water during rainstorms, if necessary. Note that wastewater generated from the off-site project office was collected in a storage tank and tanker-away regularly by a licensed collector.

Anti-mosquito preventive measures, e.g. regular removal of stagnant water (if possible) and/or spraying larvicide (if necessary) at any site area, are taken for mosquito control and prevention, particularly for control of Dengue Fever and Japanese Encephalitis diseases.

No surface run-off or exposed soil was observed for the site activities during this quarter.

Due to the rains in this quarter, accumulations of rainwater were observed in the Bioreactor No.5 and Final Sedimentation Tank Nos. 9 and 10. The accumulated water should be drained away regularly, if possible, while mosquito larvicide is only applied when it is not feasible to drain away the water immediately.

Noise

Plants with low noise emittance are preferred and are operated/maintained to reduce noise. In this quarter, work was carried out during normal working hours (7am – 7pm Monday to Saturday) or otherwise specified in the contract. In the event of a schedule change such that construction work would be performed during the restricted hours (11pm – 7am and during general public holidays including Sundays), a Construction Noise Permit would be required.

During this quarter, the work activities and equipment used did not generate significant noise for noise sensitive receivers (NSRs).

Waste / Chemical Management

The construction waste materials are preferred to be removed promptly from the site. Recyclable hard inert C&D materials should be taken to a public filling area (the fill bank at WENT landfill at Nim Wan) whereas the non-inert C&D waste should be disposed of to NENT landfill at Ta Kwu Ling or other disposal site approved by the control authority. Note that the inert C&D materials should be reduced, reused and recycled if possible, before disposal. Any substance identified as chemical waste would be disposed of properly by a licensed collector. A trip ticket system for the disposal of C&D waste should be conducted as required by the Waste Management Plan. Rubbish bins are provided on-site for collecting general refuses as necessary. The general refuse would be removed regularly and disposed to landfills by a licensed collector. A proper record of each waste disposal, including the new bar-coded disposal delivery form, would be kept to verify proper handling and disposal.

A refuse bins and waste storage/sorting area were provided for the collection of general refuse and sorting the C&D materials. No accumulation of the collected wastes in the refuse bins was observed in the project office/work areas during the site inspections this quarter.

Some refuses, i.e. a fallen leaf and little plastic bag, etc. were observed at Bioreactor No.5 after heavy rain this quarter. The Contractor indicated that the wastes would be removed accordingly. No chemical waste was generated during this quarter.

Packaging wastes and construction wastes mainly from Air Blower House No.2, Bioreactor No.5, Flow Division Pump Pit No.1, Switch Room for RAS/SAS Pumping Station No. 2 and RAS/SAS Pumping Station No.2 were disposed to WENT landfill by the licensed waste collector this quarter.

The type and quantity of waste for final disposal during March – May 2008 is shown in Table 6. Note that the new bar-coded disposal delivery form for each disposal of C&D wastes continued to be kept.

Table 6: Type and Quantity of Waste Disposed of from March to May 2008

Types of Waste	Quantity
Inert C&D Material	Nil
Non-inert C&D Waste	2.32 tonnes (~ 15.06 m^3)
Chemical Waste	Nil
General Refuse*	3.96m^3

** Included the site office*

5 Summary of Deficiencies and Remedial Actions

A procedure for the EM&A site inspections, deficiency and remedial action reporting system was approved by the ER (Appendix 3), as required in the EM&A Manual (section 6.1.2). The site inspection checklists, reporting and interaction between the relevant parties was detailed.

There were no deficiencies noted from the site inspections in this quarter (March – May 2008).

6 Summary of Complaints and Remedial Actions

No complaints were received during this quarter (March – May 2008). In the event of complaints, the procedure for handling of the complaints is detailed in the EM&A Manual.

7 Summary of Summons and Prosecutions

No notification of summons and no prosecutions occurred in this quarter (March – May 2008).

8 Comments, Conclusions and Recommendations

The required weekly site inspections have been conducted. No deficiencies, i.e. non-compliances, were noted.

The planned activities for the coming three months (June – August 2008) as regards E&M equipment are to carry out installation, testing and commissioning for the following system/area:-

- new Blower House No.2
- Bioreactor No.5
- Flow Division Pump Pits
- Final Sedimentation Tank Nos. 9 and 10
- RAS/SAS Pumping Station No.2
- Switch Room for RAS/SAS Pumping Station No. 2
- Sludge Press House Extension
- Sludge Conditioning Tank Nos. 3 and 4
- Bunded Area for Ferric Chloride Storage Tank.
- Defects rectification of SAS Thickening System in SAS Consolidation House

The anticipated environmental issues for June – August 2008 will be as follows:-

- new Air Blower House No.2
  - The anticipated environmental issues will be related to:-
    - the waste disposal from the E&M equipment installation.

- Bioreactor No.5
  - The anticipated environmental issues will be related to:-
    - the waste disposal from the E&M equipment installation.
    - stagnant water since potential accumulation may occur in the tank during rainy days.

- Flow Division Pump Pits for Ferric Chloride Storage Tank.
- Defects rectification of SAS Thickening System in SAS Consolidation House

The anticipated environmental issues for June – August 2008 will be as follows:-

- new Air Blower House No.2
  - The anticipated environmental issues will be related to:-
    - the waste disposal from the E&M equipment installation.

- Bioreactor No.5
  - The anticipated environmental issues will be related to:-

- Defects rectification of SAS Thickening System in SAS Consolidation House

  - The anticipated environmental issues will be related to:-

    - Stagnant water, as defects rectification of equipment/system will be involved and the chemical handling (if any) during the T&C period.

Appendix 1

Reporting Structure

and Contractor Project Management Structure

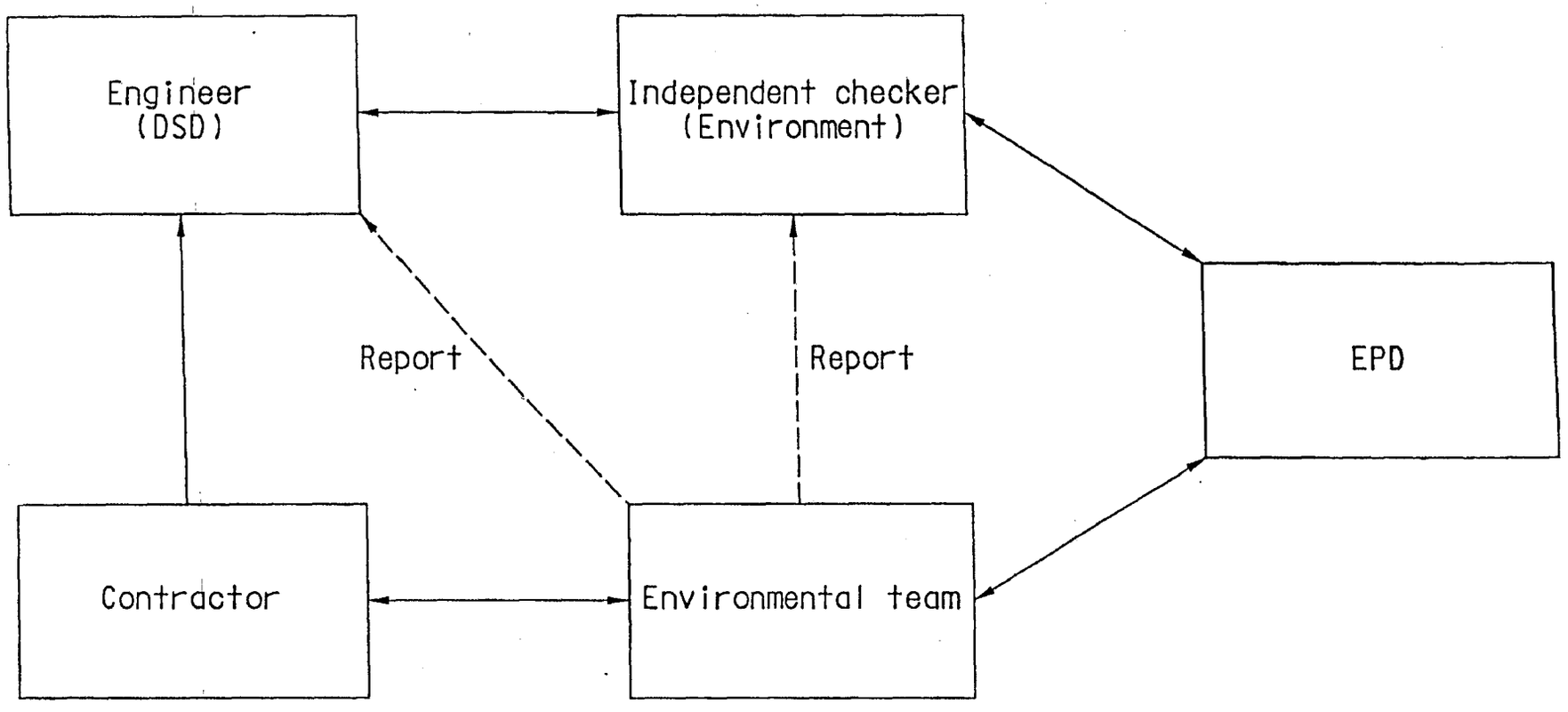

Figure Title

EXPANSION OF SHEK WU HUI SEWAGE TREATMENT WORKS
PROJECT ORGANISATION DURING CONSTRUCTION PHASE

Figure No.	Scale
3	DIAGRAMMATIC

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DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

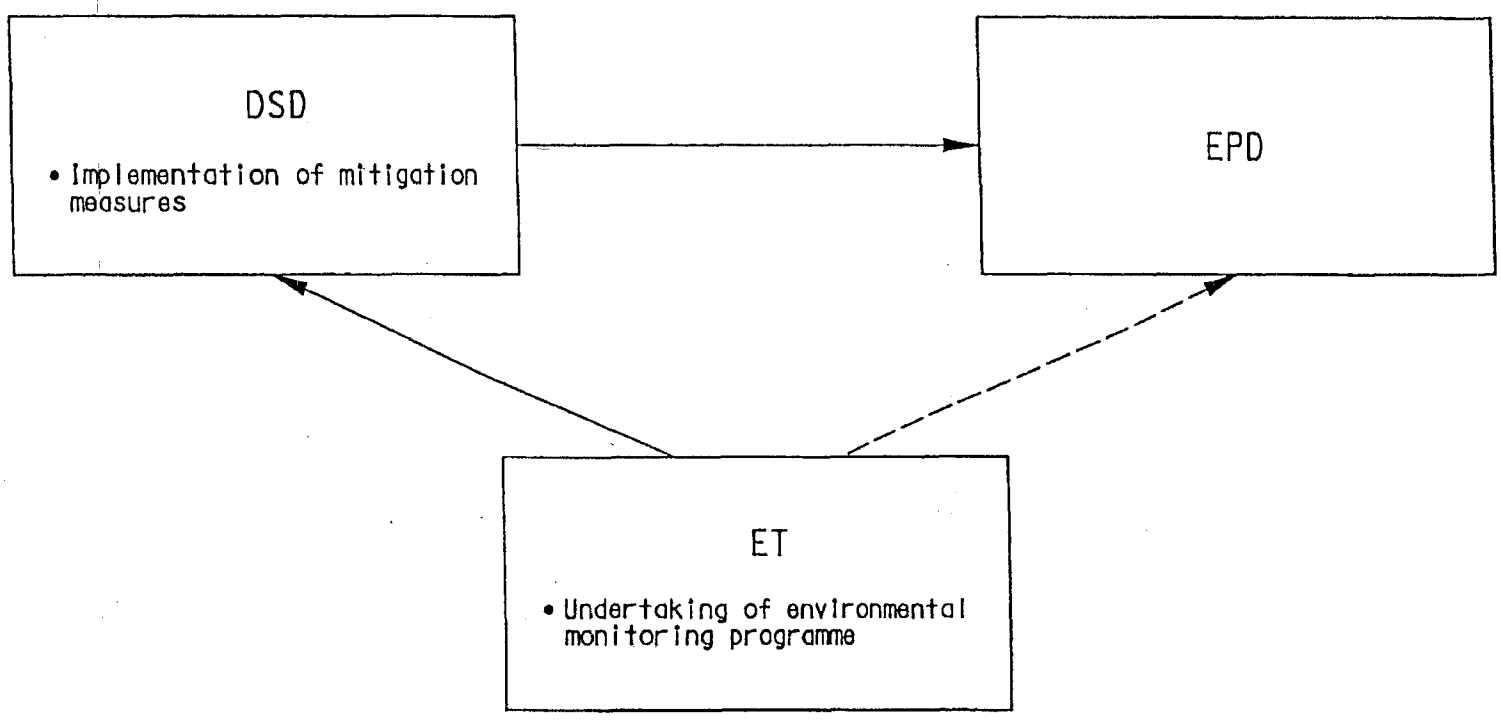

Figure Title

EXPANSION OF SHEK WU HUI SEWAGE TREATMENT WORKS
PROJECT ORGANISATION DURING OPERATION PHASE

Figure No.	Scale
4	DIAGRAMMATIC

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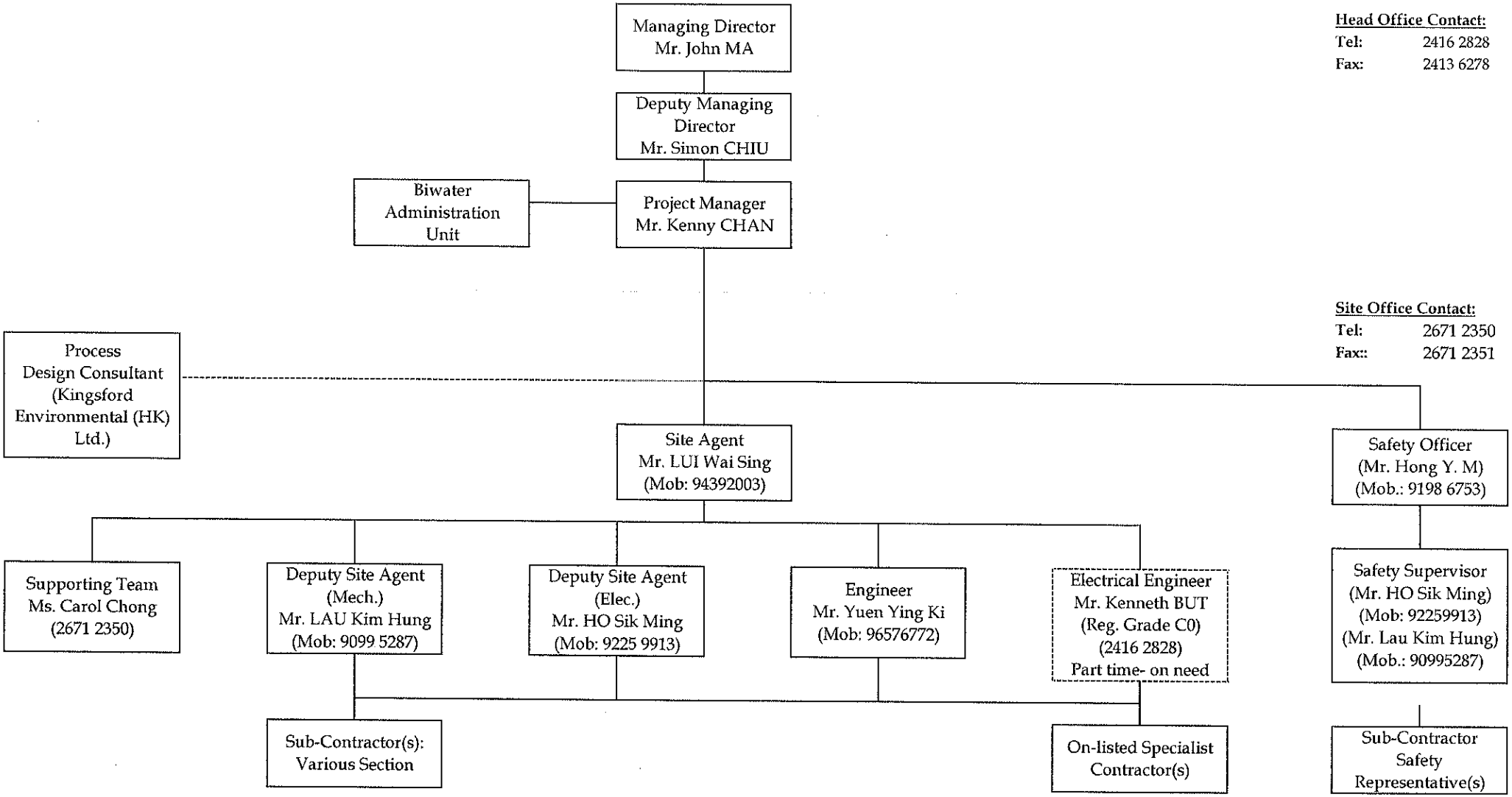
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

Contract No.: DE/2005/03
Supply & Installation of Electrical & Mechanical Equipment for
Expansion of Shek Wu Hui Sewage Treatment Works

Revision: 1
Date: 1/Jun/07

Biwater Man Lee Limited
Project Team Organisation Chart: Key Member



Head Office Contact:
Tel: 2416 2828
Fax: 2413 6278

Site Office Contact:
Tel: 2671 2350
Fax:: 2671 2351

Note: Waste management team/ organisation shall be refer to WMP.

Contact Information for Key Personnel

Name	Title	Telephone	Fax
Mr. P. W. Lam (DSD)	Engineer's Representative	2594-7305	2827-8532
Mr. K. K. Cheung (DSD)	Engineer's Representative	2594-7338	2827-8532
Mr. W. S. Lui (BML)	Site Agent	2671-2350	2671-2351
Mr. K. H. Lau (BML)	Deputy Site Agent	2671-2350	2671-2351
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Mr. Stanley Lau (KEL)	ET Leader	2612-2817	2614-7012
Ms. Angela Lau (KEL)	ET Site Inspector	2612-2817	2614-7012
Mr. Y. T. Tang (CH2M)	The Independent Environmental Checker	3105-8686	2891-0305

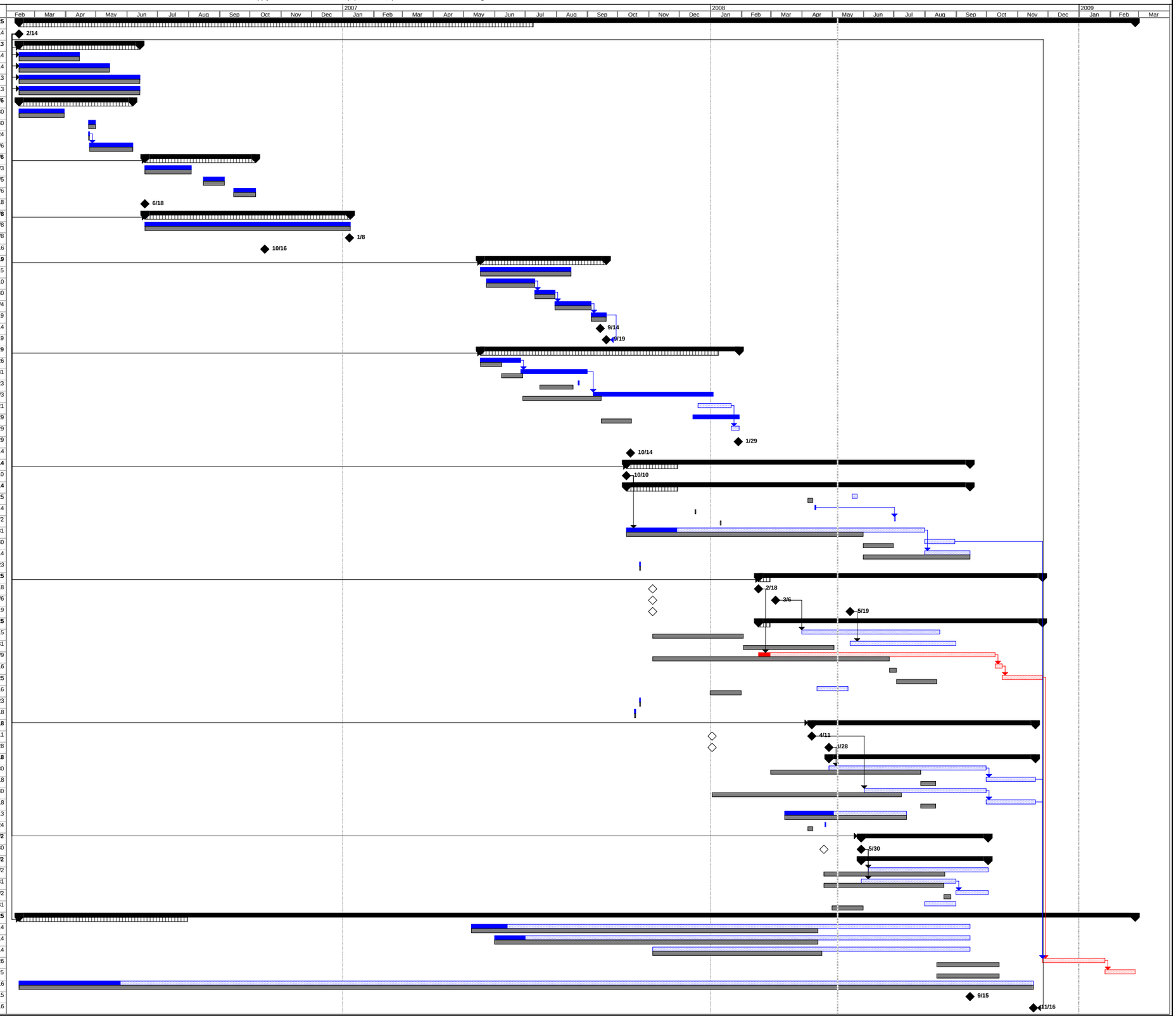
Appendix 2

Master Construction Work Program

and Contractor's Schedule

Work Programme for DE/2005/03
Supply and Installation of E&M Equipment for Expansion of Shek Wu Hui Sewage Treatment Works

ID	Task Name	Duration	Start	Finish
1	**Contract Construction Period**	**1108 days**	**Tue 06/2/14**	**Wed 09/2/25**
2	**Contract Commencement Date**	0 days	Tue 06/2/14	Tue 06/2/14
3	**Section I of Works - Design, Submission & Approval**	**120 days**	**Tue 06/2/14**	**Tue 06/6/13**
4	Civil Requirement for New Air Blower House No.2	60 days	Tue 06/2/14	Fri 06/4/14
5	Civil Requirement for Division Pump Pits, RAS/SAS Pumping Station	90 days	Tue 06/2/14	Sun 06/5/14
6	Civil Requirement for All other Section of Works	120 days	Tue 06/2/14	Tue 06/6/13
7	GA drawings & design for all Section of Works	120 days	Tue 06/2/14	Tue 06/6/13
8	**Process Design**	**113 days**	**Tue 06/2/14**	**Tue 06/6/6**
9	Preliminary Process Design	45 days	Tue 06/2/14	Thu 06/3/30
10	Initial Laboratory Analysis works for process design	7 days	Mon 06/4/24	Sun 06/4/30
11	Draft Process Design with Different Scenarios	1 day	Mon 06/4/24	Mon 06/4/24
12	Finalize the process design with the selected scenarios	43 days	Tue 06/4/25	Tue 06/6/6
13	**Section II of E&M Works**	**110 days**	**Sun 06/6/18**	**Fri 06/10/6**
14	I, T&C of Density Current Baffles for first existing FST	46 days	Mon 06/6/19	Thu 06/8/3
15	I, T&C of Density Current Baffles for second existing FST	21 days	Wed 06/8/16	Tue 06/9/5
16	I, T&C of Density Current Baffles for thrid existing FST	22 days	Fri 06/9/15	Fri 06/10/6
17	Original Completion date for Section II	0 days	Sun 06/6/18	Sun 06/6/18
18	**Section III of E&M Works**	**204 days**	**Mon 06/6/19**	**Mon 07/1/8**
19	S, I, T&C for pH Control System	204 days	Mon 06/6/19	Mon 07/1/8
20	Handover of pH Control System to DSD	0 days	Mon 07/1/8	Mon 07/1/8
21	Original Completion date for Section III	0 days	Mon 06/10/16	Mon 06/10/16
22	**Section IV of E&M Works**	**125 days**	**Fri 07/5/18**	**Wed 07/9/19**
23	Delivery of Density Current Baffles	90 days	Fri 07/5/18	Wed 07/8/15
24	I, T&C of Density Current Baffles for forth existing FST	48 days	Thu 07/5/24	Tue 07/7/10
25	I, T&C of Density Current Baffles for fifth existing FST	20 days	Wed 07/7/11	Mon 07/7/30
26	I, T&C of Density Current Baffles for sixth existing FST	36 days	Tue 07/7/31	Tue 07/9/4
27	I, T&C of Density Current Baffles for seventh existing FST	15 days	Wed 07/9/5	Wed 07/9/19
28	Original Completion date for Section IV	0 days	Fri 07/9/14	Fri 07/9/14
29	Actual Completion date for Section IV	0 days	Wed 07/9/19	Wed 07/9/19
30	**Section V of E&M Works**	**257 days**	**Fri 07/5/18**	**Tue 08/1/29**
31	Decommissioning of Existing DAF	40 days	Fri 07/5/18	Tue 07/6/26
32	Civil works for Thickening System	66 days	Wed 07/6/27	Fri 07/8/31
33	Local Delivery of Thickening Centrifuges to Site	1 day	Thu 07/8/23	Thu 07/8/23
34	Installation of new SAS thickening system	119 days	Fri 07/9/7	Thu 08/1/3
35	Installation of temporary automatic control system c/w site test	33 days	Thu 07/12/20	Mon 08/1/21
36	Site test for SAS thickening system	46 days	Sat 07/12/15	Tue 08/1/29
37	Commissioning of SAS thickening system	8 days	Tue 08/1/22	Tue 08/1/29
38	Substantial Completion of SAS thickening system	0 days	Tue 08/1/29	Tue 08/1/29
39	Original Completion date for Section V	0 days	Sun 07/10/14	Sun 07/10/14
40	**Section VI of E&M Works**	**341 days**	**Wed 07/10/10**	**Sun 08/9/14**
41	Possession of Site	0 days	Wed 07/10/10	Wed 07/10/10
42	**After Possession of Site**	**341 days**	**Wed 07/10/10**	**Sun 08/9/14**
43	Local Delivery of Air Blower	5 days	Wed 08/5/21	Sun 08/5/25
44	Delivery of Switchboard in ABH #2	1 day	Mon 08/4/14	Mon 08/4/14
45	Energize the main switchboard at ABH #2	1 day	Wed 08/7/2	Wed 08/7/2
46	Installation of new Air blower house equipment	296 days	Wed 07/10/10	Thu 08/7/31
47	T&C of new Air blower house equipment & interfacing with existing equip	30 days	Fri 08/8/1	Sat 08/8/30
48	I, T&C of interfacing works between new and existing equipment	45 days	Fri 08/8/1	Sun 08/9/14
49	**Delivery of Flow Division Pumps**	1 day	Tue 07/10/23	Tue 07/10/23
50	**Section VII of E&M Works**	**282 days**	**Mon 08/2/18**	**Tue 08/11/25**
51	Possession of Site (BR5 & FST Distribution Chamber)	0 days	Mon 08/2/18	Mon 08/2/18
52	Possession of Site (FDPP No.1)	0 days	Thu 08/3/6	Thu 08/3/6
53	Scheduled Date for Site Possession (FDPP No.2)	0 days	Mon 08/5/19	Mon 08/5/19
54	**After Possession of Site**	**282 days**	**Mon 08/2/18**	**Tue 08/11/25**
55	I, T&C of new Flow Division Pumps Pits No.1	137 days	Tue 08/4/1	Fri 08/8/15
56	I, T&C of new Flow Division Pumps Pits No.2	105 days	Mon 08/5/19	Sun 08/8/31
57	Installation of BR5	235 days	Mon 08/2/18	Thu 08/10/9
58	Prepare & implement of SOTR test for BR5	7 days	Fri 08/10/10	Thu 08/10/16
59	Testing & Commissioning of BR5	40 days	Fri 08/10/17	Tue 08/11/25
60	I, T&C of new FST distribution chamber	31 days	Wed 08/4/16	Fri 08/5/16
61	**Delivery of RAS Pumps**	1 day	Tue 07/10/23	Tue 07/10/23
62	**Delivery of SAS Pumps**	1 day	Thu 07/10/18	Thu 07/10/18
63	**Section VIII of E&M Works**	**222 days**	**Fri 08/4/11**	**Tue 08/11/18**
64	Possession of Site (FST No. 9 & 10 and LV Switchroom)	0 days	Fri 08/4/11	Fri 08/4/11
65	Possession of Site (RAS/SAS Pumping Station)	0 days	Mon 08/4/28	Mon 08/4/28
66	**After Possession of Site**	**205 days**	**Mon 08/4/28**	**Tue 08/11/18**
67	Installation of RAS/SAS Pumping Station	156 days	Mon 08/4/28	Tue 08/9/30
68	Commissioning of RAS/SAS Pumping Station	49 days	Wed 08/10/1	Tue 08/11/18
69	Installation of New FSTs	121 days	Mon 08/6/2	Tue 08/9/30
70	Commissioning of New FSTs	49 days	Wed 08/10/1	Tue 08/11/18
71	**Float Time for Section IX of Works**	121 days	Sat 08/3/15	Sun 08/7/13
72	**Delivery of New Press**	1 day	Thu 08/4/24	Thu 08/4/24
73	**Section IX of E&M Works**	**126 days**	**Fri 08/5/30**	**Thu 08/10/2**
74	Scheduled Date for Site Possession	0 days	Fri 08/5/30	Fri 08/5/30
75	**After Possession of Site**	**126 days**	**Fri 08/5/30**	**Thu 08/10/2**
76	I, T&C of new Sludge Conditioning Tanks	119 days	Fri 08/6/6	Thu 08/10/2
77	Installation of new Press House Equipment	94 days	Fri 08/5/30	Sun 08/8/31
78	Commissioning of new Press House Equipment	32 days	Mon 08/9/1	Thu 08/10/2
79	DG Store and Chemical Waste Store	31 days	Fri 08/8/1	Sun 08/8/31
80	**Section X of E&M Works - Remaining Works**	**1108 days**	**Tue 06/2/14**	**Wed 09/2/25**
81	Deodourizing system for Inlet Work	495 days	Wed 07/5/9	Sun 08/9/14
82	Deodourizing system for sludge holding tank	472 days	Fri 07/6/1	Sun 08/9/14
83	Waste gas burner	315 days	Mon 07/11/5	Sun 08/9/14
84	Process Commissioning	62 days	Wed 08/11/26	Mon 09/1/26
85	Stress Test for FST No. 9 & No. 10	30 days	Tue 09/1/27	Wed 09/2/25
86	All other Works not under other Sections	1007 days	Tue 06/2/14	Sun 08/11/16
87	Submission of FSD 501 for completion	0 days	Mon 08/9/15	Mon 08/9/15
88	**Contract Completion Date**	0 days	Sun 08/11/16	Sun 08/11/16



Date: 5 May 2008
Revision: 22
Prepared by: Biwater Man Lee Ltd.

Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Project Summary
External Tasks
External Milestone
Deadline

Appendix 3

EM&A Manual Key Requirements List,

Relevant Contract Requirements

& Remedial Action

APPENDIX B IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

Implementation Schedule for Air Quality Control

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 1 S1.7.1	Dust mitigation measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* shall be incorporated to control dust emission from the Site. Notice shall be given to the authority prior to commencement of works.	Work sites / during construction period	Contractor		√		Air Pollution Control (Construction Dust) Regulation
Annex 1 S1.7.6 – S1.7.9	Exposed area of inlet screw pumping station excluding its inlet chamber; and sludge holding tanks should be covered, with the foul air drawn through deodourizers and discharged after treatment. Exposed area of grit channels, flume channels and effluent launder channels of primary sedimentation tanks should be covered.	SWHSTW / during design and operation stage	DSD	√		√	

The section number in the Project Profile for Expansion of Shek Wu Hui Sewage Treatment Works (Application No. DIR-121/2005)
* D = Design, C = Construction and O = Operation

Implementation Schedule for Water Quality Control

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 2 S2.4.4	The practices outlined in Practice Note for Professional Persons on Construction Site Drainage, Professional Persons Environmental Protection Department, 1994 (ProPECC PN 1/94) including the use of sediment traps, wheel washing facilities for vehicles leaving the site, adequate maintenance of drainage systems to prevent flooding and overflow, sewage collection and treatment, and comprehensive waste management (collection, handling, transportation, disposal) procedures should be adopted to minimize the potential water quality impact from construction site runoff and various construction activities.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 2 S2.4.4	*Construction Runoff and Drainage* • At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed and internal drainage works and erosion and sedimentation control facilities implemented. Channels, earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the contractor prior to the commencement of construction. • The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/sand traps should be 5 minutes under maximum flow conditions. Sizes may vary depending upon the flow rate, but for a flow rate of $0.1m^3s^{-1}$ a sedimentation basin of $30m^3$ would be required and for a flow rate of $0.5m^3s^{-1}$ the basin would be $150m^3$. The detailed design of the sand/silt traps will be undertaken by the contractor prior to the commencement of construction. • Ideally, construction works should be programmed to minimize surface excavation works during the rainy season (April to September). All exposed earth areas should be compacted and vegetated as soon as possible after earthworks have been completed, or alternatively, within 14 days of cessation of earthworks where practicable. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means. • The overall slope of the site should be kept to a minimum to reduce the erosive potential of surface water flows, and all trafficked areas and access roads protected by coarse stone ballast. An additional advantage accruing from the use of crushed stone is the positive traction gained during prolonged periods of inclement weather and the reduction of surface sheet flows.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 2 S2.4.4	*Construction Runoff and Drainage (Cont'd)* • All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas. • Measures should be taken to minimize the ingress of site drainage into excavations. If the excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities. • Open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than $50m^3$ should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. • Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers. • Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface runoff during storms events, especially for areas located near steep slopes.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 2 S2.4.4	*Construction Runoff and Drainage (Cont'd)* • All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing bay should be provided at every site exits and wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfill toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains. • On-site drainage system should be equipped with oil interceptors to separate oil/fuel from contaminated storm water.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance
Annex 2 S2.4.4	*General Construction Activities* • Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts. • All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearly.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance
Annex 2 S2.4.4	*Sewage from Construction Workforce* • Sewage from construction workforce should be handled by portable chemical toilets or sewage holding tanks with the sewage regularly collected by a reputable sewage collector for disposal at, for example, SWHSTW. Sewage from on-site toilets should be diverted to and stored within sewage holding tanks for later disposal.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance
Annex 2 S2.5.3 – S2.5.11	The implementation programme of the village sewerage should be monitored to achieve the target sewerage connection to communal sewers.	SWHSTW/ During the operation period	DSD			√	ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 2 S2.5.12	Standby equipment will provide further safeguard on proper functioning of all key treatment facilities e.g. standby air blowers to ensure adequate air supply for the biological treatment process and standby pumps to prevent any overflow of sewage due to mechanical failure of pumps. In the remote case that untreated effluent is discharged, an emergency contingency plan has been formulated to minimize the impact of emergency discharges and facilitate subsequent management of emergency. If there is a power failure, the plant manager will start up the emergency generator to provide electricity supplies for the pumps and regularly monitor the quality of effluent discharge.	SWHSTW/ During the design and operation period	DSD	√		√	ProPECC PN 1/94; WPCO, Waste Disposal Ordinance
Annex 2 S2.7.2	Routine monitoring of the effluent quality from the SWHSTW should be conducted in order to satisfy the conditions of the *WPCO* discharge licence.	SWHSTW/ During the operation period	DSD			√	ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

The section number in the Project Profile for Expansion of Shek Wu Hui Sewage Treatment Works (Application No. DIR-121/2005)
* D = Design, C = Construction and O = Operation

Implementation Schedule for Waste Management

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 3 S3.5.1	*Waste Reduction Measures at Planning and Design Stage* • The levels of structures should be designed such that excavation could be minimized as far as practicable. • Excavated materials generated from construction works to be re-used on-site as far as practicable to reduce off-site disposal. • Control measures recommended under the prevailing ETWB circulars should be strictly followed to ensure proper management of the C&D materials with an aim to minimize the generation of C&D material and maximize the use of inert C&D material.	Work site / During the planning and design stage	DSD	√			ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 3 S3.5.1	*Waste Reduction Measures at Construction Stage* • Measures recommended in the ETWB TCW No. 15/2003 should be followed to require the contractor to prepare and implement an enhanced Waste Management Plan (WMP) to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction. • For the demolition works, the contractor shall submit a method statement for the works as part of the WMP. The Contractor shall include in the method statement the sequence of demolition and the work programme to facilitate effective recovery of reusable and/or recyclable portions of the C&D materials at the earliest stage, so as to minimise the need for subsequent sorting. • 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. • Prior to disposal of C&D waste, it is recommended that wood, steel and other metals shall be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill. • 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. • Minimize over ordering of concrete, mortars and cement grout by doing careful check before ordering.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 3 S3.5.2 – S3.5.5	*Good Site Practices* • 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 should be prepared and should be submitted to the Engineer for approval; and • a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed. • In order to monitor the disposal of C&D material at landfills and public filling facilities, as appropriate, and to control fly tipping, a trip-ticket system should be included as one of the contractual requirements to be implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. The measures recommended in ETWB TCW No. 31/2004 should be followed.	Work site / During the construction period	Contractor		√		ProPECC PN 1/94; WPCO, Waste Disposal Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 3 S 3.5.6	*General Refuse* • General refuse should be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material;	Work sites / During the construction period	Contractor		√		EIAO-TM and Noise Control Ordinance
Annex 3 S 3.5.7	*Construction and Demolition Material* • The C&D material generated from the site formation and demolition works should be sorted on-site into inert C&D material (that is, public fill) and C&D waste. In order to minimise the impact resulting from collection and transportation of C&D material for off-site disposal, the excavated material comprising fill material should be reused on-site as backfilling material as far as practicable. C&D waste, such as wood, plastic, steel and other metals should be reused or recycled and, as a last resort, disposed of to landfill. A suitable area should be designated within the site for temporary stockpiling of C&D material and to facilitate the sorting process.	Work sites / During the construction period	Contractor		√		EIAO-TM and Noise Control Ordinance

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 3 S 3.5.8	*Chemical Wastes* • When 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 requirements stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used. Appropriate labels should be securely attached on each chemical waste container indicating the chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed waste collector to transport and dispose of the chemical wastes in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Work sites / During the construction period	Contractor		√		EIAO-TM and Noise Control Ordinance

The section number in the Project Profile for Expansion of Shek Wu Hui Sewage Treatment Works (Application No. DIR-121/2005)
* D = Design, C = Construction and O = Operation

Implementation Schedule for Noise Control

PP Ref#	Environmental Protection Measures	Location / Timing	Implementation Agent	Implementation Stages *			Relevant Legislation & Guidelines
				D	C	O	
Annex 4 S4.7.1	Use of quiet PME	Work sites / During the construction period	Contractor		√		EIAO-TM and Noise Control Ordinance
Annex 4 S4.7.3	*Good Site Practice* • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction phase; • Silencers or mufflers on construction equipment should be utilised, if found necessary, to further reduce noise, and should be properly maintained during the construction phase; • Mobile plant 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, where possible, be orientated so that the noise is directed away from nearby NSRs; and • Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.	Work sites / During the construction period	Contractor		√		EIAO-TM and Noise Control Ordinance

The section number in the Project Profile for Expansion of Shek Wu Hui Sewage Treatment Works (Application No. DIR-121/2005)
* D = Design, C = Construction and O = Operation

(a) All contract preliminaries items to be provided to the Engineer's Representatives office for central acceptance and distribution. The Engineer's Representative would nominate designated officer(s) to accept these items. The Contractor shall not provide the items directly to individual site supervisory staff.

(b) Measuring and testing equipment shall be provided for the use of the Engineer as stated in Appendix 1. All equipment shall be new and shall be a type agreed by the Engineer.

(c) Equipment provided for the use of the Engineer shall be maintained in a clean and serviceable condition and all consumables shall be replenished when required. The Contractor shall replace or repair any defective equipment within one month. Measuring and testing equipment shall be calibrated before it is used and at regular intervals agreed by the Engineer. Equivalent replacements shall be provided for equipment which is out of service.

(d) The equipment will be returned to the Contractor at the end of the Defects Liability Period or at a time to be advised by the Engineer if earlier.

(e) Any equipment or facility to be provided for the use by the Engineer's staff is only required to meet the minimum requirement stipulated in the Contract. Where such is impracticable (e.g. When the model just satisfying the minimum requirement is outdated or out of stock), the Contractor may provide at his own cost equipment or facilities slightly exceeding the minimum requirement. However, extravagant or out of the norm overprovision is unnecessary and could result in embarrassment on the Engineer and hence should be avoided. In the event that a much higher quality than that stipulated shall be provided for legitimate reason, the Contractor shall give prior notification to the Employer of such over-provision.

1.39 Environmental Permit Conditions and Waste Management Plan

1.39.1 Reference to EIA Report, EM&A Manual

The Project Profile and Environmental Monitoring & Auditing Manual are available for inspection at Environmental Impact Assessment Ordinance Register Office. The concerned Environmental Permit is attached in Appendix 12 of this Particular Specification.

1.39.2 Environmental Permit

(a) Further to General Conditions of Contract Clause 30 the Contractor shall conform in all respects with the conditions of the Environmental Permit a copy of which is reproduced in Appendix 12.

(b) For the purpose of this Contract, the "Environmental Permit" means any environmental permit issued by the Director of Environmental Protection in respect of the Works or project which the Works form a part thereof under the Environmental Impact Assessment Ordinance (Cap. 499) including any variation of the environmental permit.

(c) The Contractor shall be responsible for displaying a copy of the most updated Environmental Permit at the locations as stipulated under the Environmental Permit or as directed by the Engineer.

(d) It is unnecessary for the Contractor to apply for and hold an environmental permit since he may rely on the Environmental Permit obtained by the Employer. Should for any reason the Contractor choose to apply for and hold an Environmental Permit he shall do so at his own risk and cost and it shall not form the basis of any claim for extension of time.

(e) The Contractor shall ensure full compliance with all conditions of the Environmental Permit before and during carrying out the construction works on the Site. Any non-compliance may constitute a contravention of the EIAO (Cap. 499) and shall be definite ground for enforcement action. The Contractor shall assume all the responsibilities under the Permit as if the Contractor is the Permit holder as far as it is applicable to this Contract. The Contractor is required to indemnify the Employer against any charge for any non-compliance with the Environmental Permit. The Contractor will not be compensated for any additional cost incurred due to the Contractor's non-compliance with any conditions of the Environmental Permit.

(f) The Environmental Permit shall not remove the responsibility of the Contractor to comply with any legislation currently in force such as the Noise Control Ordinance (Cap.400), Air Pollution Control Ordinance (Cap.311), Water Pollution Control Ordinance (Cap.358), Dumping at Sea Ordinance (Cap.466), the Waste Disposal Ordinance (Cap.354), and others.

(g) The Contractor shall make copies of the Environmental Permit available at all times for inspection by the Director of EPD at all Portions of the Site.

(h) The Contractor shall give a copy of this Environmental Permit to the person(s) in charge of the Site.

(i) The Contractor shall provide sufficient copies of finalized submissions as required by the Engineer to the Director of EPD for public inspections.

(j) The onus to obtain approvals from the Director of Environmental Protection as required by the Environmental Permit shall be rested on the Contractor. The Contractor is reminded to take early steps to obtain these approvals to reduce possible delay caused to the programme of works.

1.39.3 Environmental Team and Responsibilities of the Contractor

(a) With reference to the Environmental Permit, the Contractor shall engage and establish an Environmental Team (ET) which shall be independent to the Contractor to undertake environmental audit work during the construction phase of the Contract. The specified Environmental Team (ET) shall be established prior to the commencement of any Works.

(b) The Environmental Team shall be headed by an environmental engineer who has at least 7 years experience in environmental monitoring and auditing (EM&A) or

environmental management. The environmental engineer shall be supported by environmental technicians who shall have relevant experience in environmental monitoring and auditing accepted by the Engineer. The environmental technicians shall be considered as members of the Environmental Team.

(c) The Environmental Team shall be supervised by an Independent Environmental Checker (IEC) employed by the Employer to assist the Engineer to implement the EM&A requirements as contained in the EM&A Manual.

(d) The Contractor shall propose for the approval of the Engineer the employment of the Environmental Team and ET leader.

(e) The duties of the Environmental Team shall include regular environmental audits and shall be responsible for the implementation of the EM&A programme in accordance with the EM&A requirements as contained in the EM&A Manual and to ensure that environmental mitigation measures recommended in the Environmental Permit are enforced. The ET shall carry out site inspections to investigate and audit the Contractor's site practices, equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues for proactive action before problems arise.

(f) In the event of non-compliance, the Environmental Team shall immediately inform the Contractor, the Engineer and IEC in order that appropriate action can be implemented. The Environmental Team is also responsible for preparing monthly EM&A reports for submission to the Contractor, the Engineer, IEC and EPD. The Environmental Team shall assist the Contractor and the Engineer in formulating corrective actions and liaising with government departments as necessary.

(g) The environmental engineer may be engaged part time, but with sufficient presence on the Site to properly fulfil the duties as stipulated in sub-clause (e). The number of environmental technicians to be employed are not fixed but they shall perform the duties to the satisfaction of the Engineer. There shall be at least one environmental technician engaged full time on Site. If the Engineer considers the environmental technician(s) cannot perform the duties to his satisfaction, the Contractor shall engage additional full time environmental technician(s) as ordered by the Engineer at no extra cost.

(h) The EM&A reports shall be in an agreed format by the Engineer and shall include the following:

(i) summary of major points;
(ii) summary of the construction activities for the month;
(iii) monitoring data;
(iv) audit/review of the data;
(v) compliance check and report on exceedances;
(vi) remedial measures adopted to restore the adverse condition;
(vii) record of complaints and remedial measures;
(viii) forecast of work programme and schedule;
(ix) proposal for changes to mitigation measures, as appropriate; and
(x) comments and conclusions.

(i) The costs of provision of labour and testing instruments for assessment of environmental issues, pollution complaints, etc. if required, shall be included in this Contract.

(j) The Contractor shall submit within 14 days of the date of the Employer's letter of acceptance of the Tender three copies of a waste management plan (WMP) for the Engineer's approval. The WMP shall meet the requirements set out in Appendix 11 – Waste Management Plan (WMP). The Contractor shall review the WMP at monthly intervals and shall submit a revised and updated WMP if necessary. If and when the Engineer is of the opinion that the WMP does not meet the requirements of the Contract, the Engineer may by notice in writing require the Contractor to revise or update the WMP and the Contractor shall comply with that requirement within 7 days of the date of the notice.

necessary.

(g) The environmental engineer may be engaged part time, but with sufficient presence on the Site to properly fulfil the duties as stipulated in sub-clause (e). The number of environmental technicians to be employed are not fixed but they shall perform the duties to the satisfaction of the Engineer. There shall be at least one environmental technician engaged full time on Site. If the Engineer considers the environmental technician(s) cannot perform the duties to his satisfaction, the Contractor shall engage additional full time environmental technician(s) as ordered by the Engineer at no extra cost.

(h) The EM&A reports shall be in an agreed format by the Engineer and shall include the following:

(i) summary of major points;
(ii) summary of the construction activities for the month;
(iii) monitoring data;
(iv) audit/review of the data;
(v) compliance check and report on exceedances;
(vi) remedial measures adopted to restore the adverse condition;
(vii) record of complaints and remedial measures;
(viii) forecast of work programme and schedule;
(ix) proposal for changes to mitigation measures, as appropriate; and
(x) comments and conclusions.

2.2 Collect relevant E&M Contractor's method statements

2.2.1 DEFINITION

The method statements for the entire week should be provided by the Contractor's representative (Site Agent, or as authorized) at least a week before the work commences.

The method statements should contain the following information:
- list of involved site staff
- work activities*
- detailed work schedule
- list of equipment, materials (including chemicals)
- environmental protection/mitigation strategy

* The detailed work procedures could be reviewed by the technician at the E&M Contractor's site office, as needed.

PERFORMED BY ET Leader
The next figure is 2.3 Collect previous site inspections and related correspondence

2.3 Collect previous site inspections and related correspondence

2.3.1 DEFINITION

This previous information should be used when conducting the site inspection.

PERFORMED BY ET Leader
The next figure is 2.4 Review/comment on method statements

2.4 Review/comment on method statements

2.4.1 DEFINITION

Review/comments to be provided to E&M Contractor in writing within two (2) working days. E&M Contractor to supply method statement to IEC. IEC's comments on method statement to be incorporated.

PERFORMED BY ET Leader
The next figure is 2.5 Contact E&M Contractor site representative before each inspection

2.5 Contact E&M Contractor site representative before each inspection

PERFORMED BY ET Environmental Technician
The next figure is 2.6 Conduct regular site inspection with the approved checklist and site plan

2.6 Conduct regular site inspection with the approved checklist and site plan

2.6.1 DEFINITION

Regular inspection is carried out by an ET technician at least weekly, as required. In case of significant environmental problems are identified, *ad hoc*/subsequent inspections will also be carried out.

The technician is to complete the Daily Site inspection Checklist (attached) for the agreed scope (i.e. if item is not included in the scope, mark "N/A"). If a required item is not complied with, describe the deficiency in the "comments" column, and in any case, note the relevant environmental conditions observed. Technician to also observe conditions related to upcoming inspections.

The No. refers to each item of the Site Inspection Checklist Attachment (attached), which status of mitigation measures/key EM&A requirements summarised from the EM&A Manual. Technician to note the full details as repeated in the Site Inspection Checklist Attachment.

The technician should identify the relevant site locations on the site plan (attached) and on the Checklist by using a code, such as "A", "1", etc., for the scope of the inspection.

Technician to photograph site areas inspected.

PERFORMED BY ET Environmental Technician
The next figure is 2.7 Contact E&M Contractor's site representative after the inspection

2.7 Contact E&M Contractor's site representative after the inspection

2.7.1 DEFINITION

The results of the inspection should be discussed with the site representative on the day of the inspection. Note actions/plans regarding any non-compliance in the "comments" section. Also, the representative and technician shall both sign the checklist. A copy of the completed checklists and the site plan shall be provided to the representative.

PERFORMED BY ET Environmental Technician
The next figure is 2.8 Was an environmental deficiency found?

2.8 Was an environmental complaint received?

2.8.1 DEFINITION

When an environmental complaint was receives from the Engineer or ER, as originated from the general public, EPD or E/ER/other governmental departments, the ET leader shall follow a procedure for dealing with complaints as provided in the EM&A Manual.

PERFORMED BY ET Leader
The next figure for "No" is 2.11 Submit inspection results and, if applicable, deficiency and recommendations
The next figure for "Yes" is 2.9 Follow the EM&A procedure " Handling of Environmental Complaints"

2.9 Follow the EM&A Manual procedure "Handling of Environmental Complaints"

PERFORMED BY ET Leader

2.10 Was an environmental deficiency found?

2.10.1 DEFINITION

Deficiency is defined as a breach of the environmental requirements for the project, particularly if it may (or does) result in non-compliance with environmental laws/regulations.

PERFORMED BY ET Environmental Technician
The next figure for "No" is 2.11 Submit inspection results and, if applicable, deficiency and recommendations

The next figure for "Yes" is 2.12 Describe deficiency and formulate recommendations for immediate remedial action

2.11 Submit inspection results and, if applicable, deficiency and recommendations

2.11.1 DEFINITION

Submit the inspection results and, if applicable, description of the deficiency and recommendations for corrective action in writing to the E&M Contractor within 24 hours of the site inspection. Recommendations for the upcoming site activities may also be included. E&M Contractor to supply to the IEC and then to the ER.

PERFORMED BY ET Leader
The next figure is 2.15 Submit monthly EM&A report

2.12 Describe deficiency and formulate recommendations for immediate remedial action

2.12.1 DEFINITION

The deficiency shall be fully described and recommendations formulated with rationale for appropriate and effective corrective actions. Corrective actions shall be co-ordinated with the E&M Contractor.

PERFORMED BY ET Leader
The next figure is 2.11

2.13 Conduct investigation

2.13.1 DEFINITION

Investigate the deficiency and evaluate correction actions, in consultation with the EM&A Contractor. This may involve applicable measurements or monitoring.

PERFORMED BY ET Environmental Technicians
The next figure is 2.14 Submit investigation report

2.14 Submit investigation report

2.14.1 DEFINITION

Submit the results of the investigation to the E&M Contractor in a separate written report. E&M Contractor to supply to the IEC and then to the ER.

PERFORMED BY ET Leader
The next figure is 2.15 Submit monthly EM&A report

2.15 Submit monthly EM&A report

2.15.1 DEFINITION

The monthly Report will include the documents related to the site inspections including the completed checklists for the calendar month, the site locations inspected, photos, documents related to deficiencies, complaints, etc.

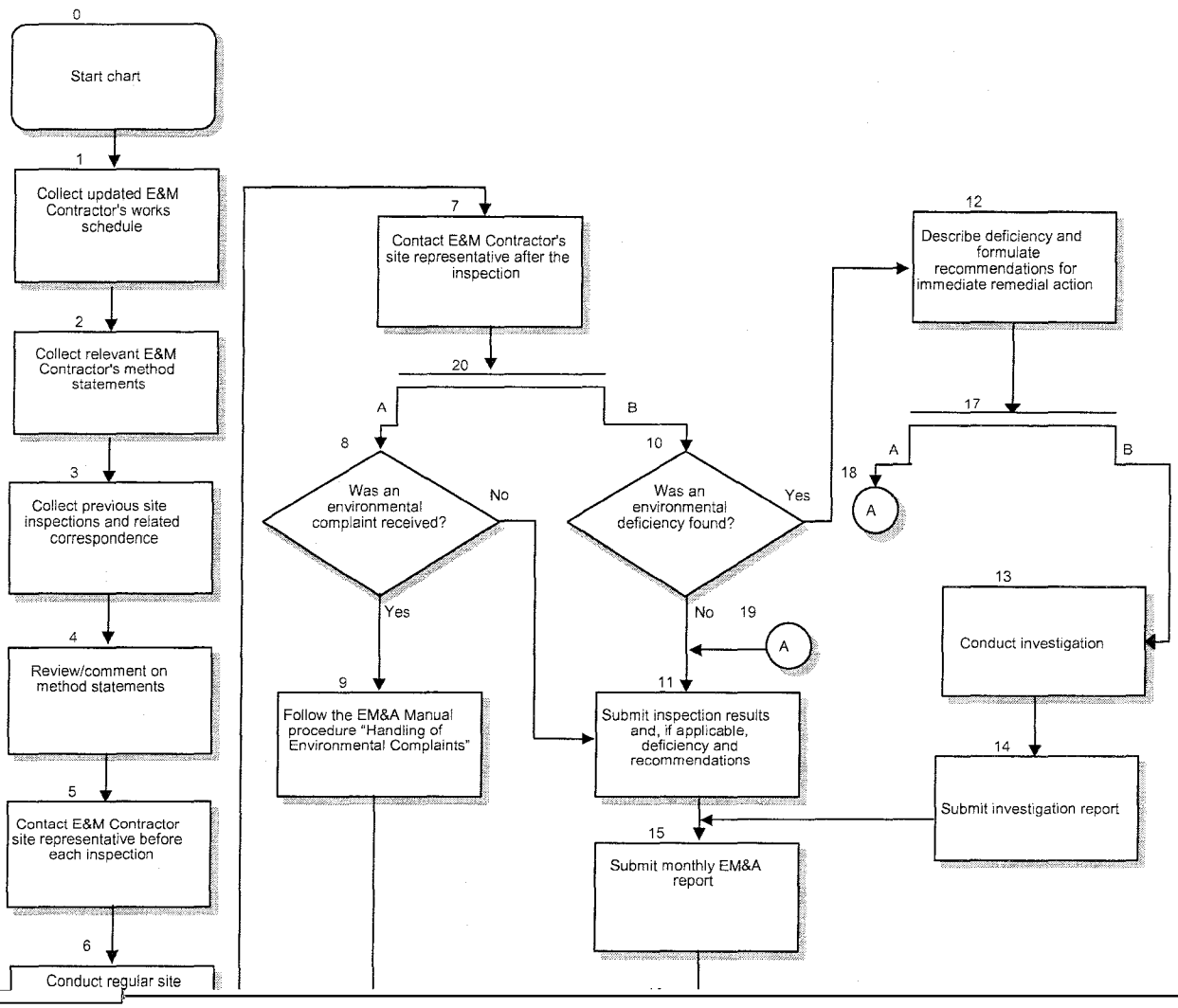
PERFORMED BY ET Leader
The next figure is 2.16 Finish

2.16 Finish

PERFORMED BY No Performer

3. Process Chart

EP006 SHEK WU HUI STW
Environmental Monitoring and Audit: Site Inspections and Remedial Action Reporting System
Version 1.0 Owner Environmental Team Leader
Created 2006/3/28 Modified 2006/5/9 Approved



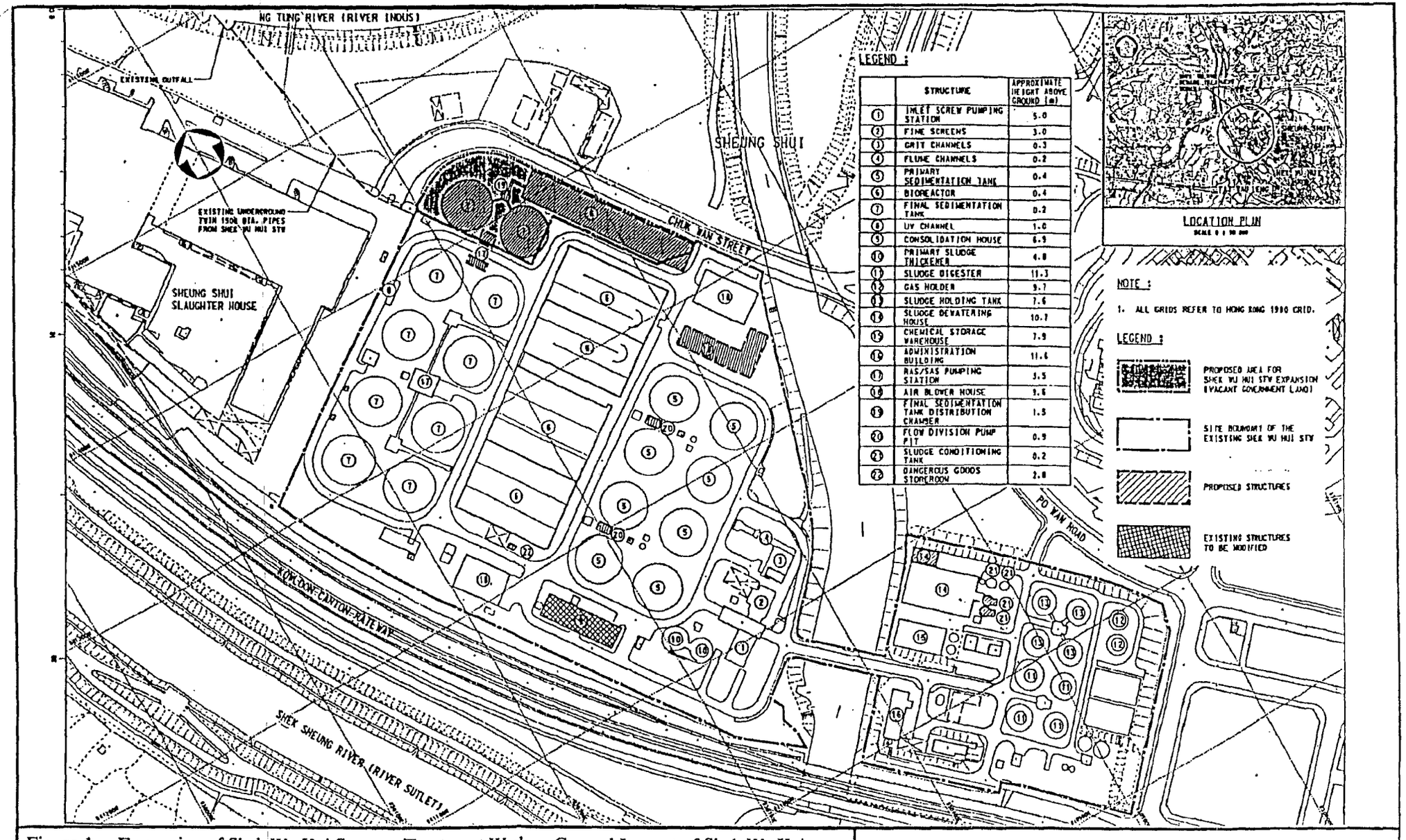


Figure 1- Expansion of Shek Wu Hui Sewage Treatment Works – General Layout of Shek Wu Hui Sewage Treatment Works Upon Project Completion

圖一 - 石湖墟污水處理廠擴建工程－石湖墟污水處理廠於工程完成後的平面圖

Environmental Permit No. : EP-218/2005

環境許可證編號： EP-218/2005

EIAO EPD

Appendix A Procedure for Handling of Environmental Complaints

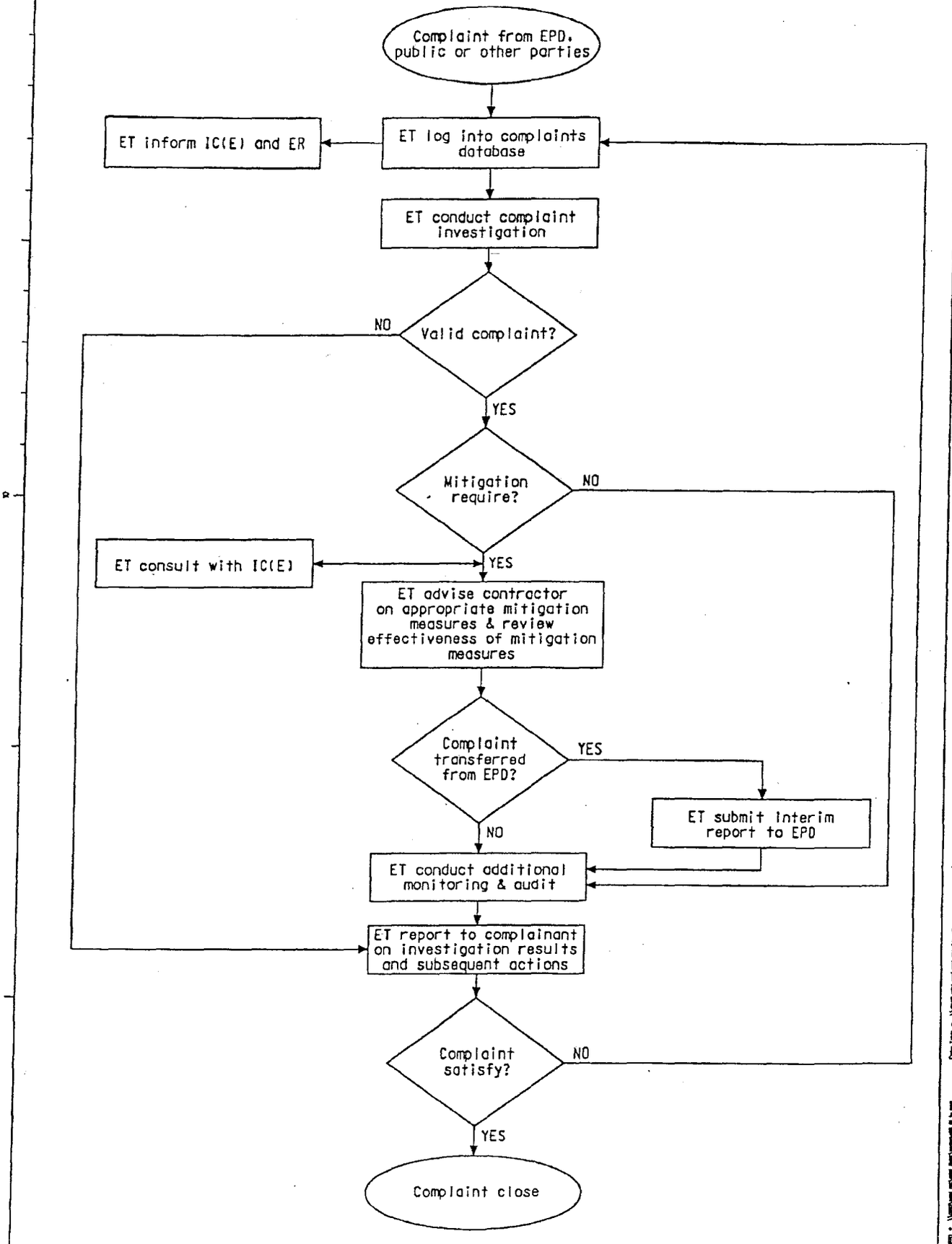


Figure Title	Figure No.	Scale
EXPANSION OF SHEK WU HUI SEWAGE TREATMENT WORKS COMPLAINT RESPONSE PROCEDURES	6.1	DIAGRAMMATIC

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6.3 Environmental Complaints

6.3.1 Complaints shall be referred to the ET Leader for action. The ET Leader shall undertake the following procedures upon receipt of any complaint:

(i) log complaint and date of receipt onto the complaint database and inform the IEC and the ER immediately;
(ii) investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;
(iii) identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;
(iv) advise the Contractor if mitigation measures are required;
(v) review the Contractor's response to identified mitigation measures, and the updated situation;
(vi) if the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;
(vii) undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;
(viii) report investigation results and subsequent actions to complainant (if the source of complaint is EPD, the results shall be reported within the timeframe assigned by the EPD); and
(ix) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

6.3.2 During the complaint investigation work undertaken by the EI Leader, the Contractor and the ER shall cooperate with the ET Leader by providing all necessary information and assistance fro completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation. The ER shall ensure that the measures have been carried out by the Contractor.

6.3.3 A flow chart of the complaint response procedures is shown in **Figure 6.1** and a sample template for the Interim Notification is annexed in **Appendix D**

Appendix 4

Permits

- Environmental Permit (Same as in June 2006 Report)

- Notification from EPD regarding The Completion of Registration as a Chemical Waste Producer (Same as in June 2007 Report)

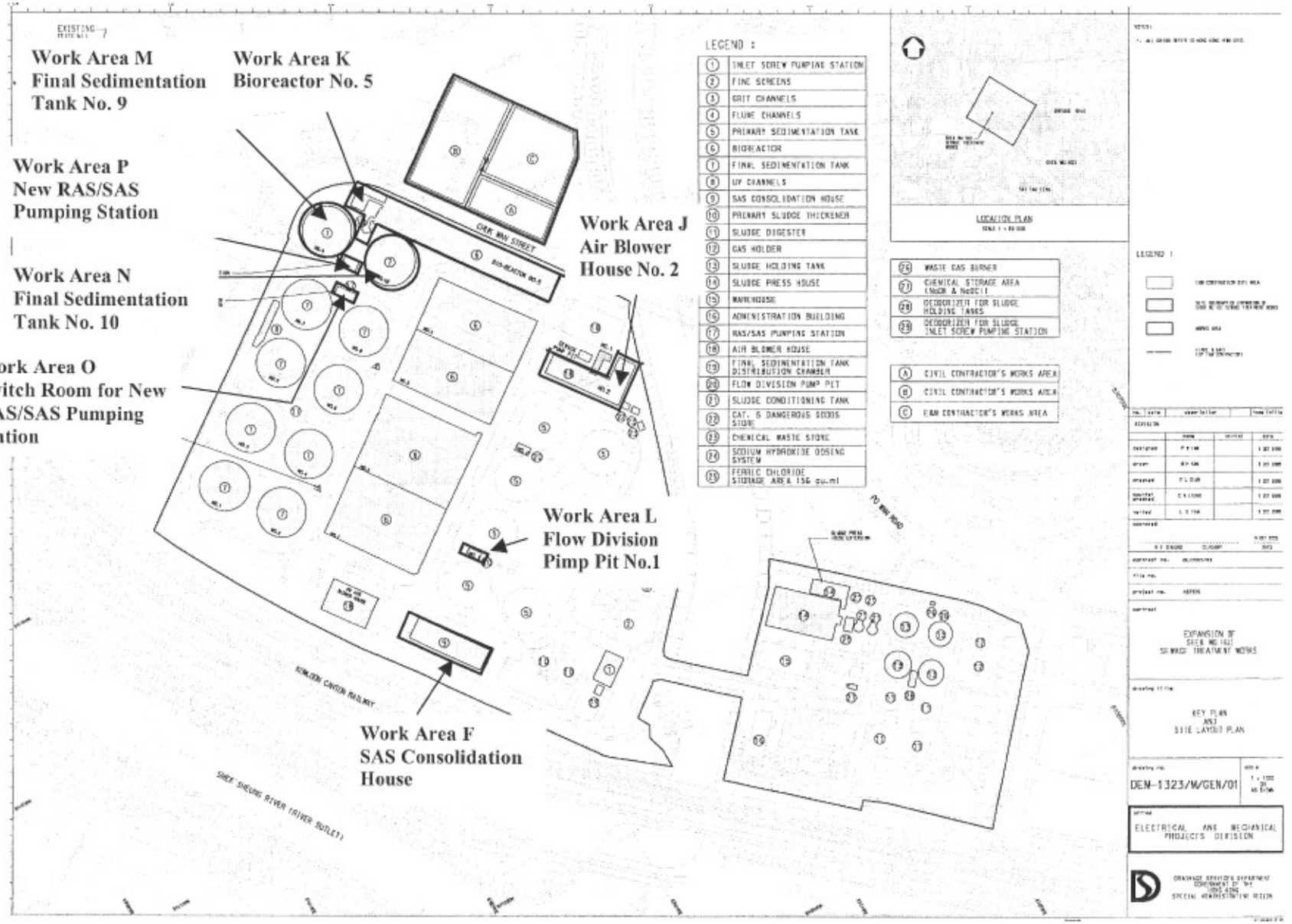
Appendix 5

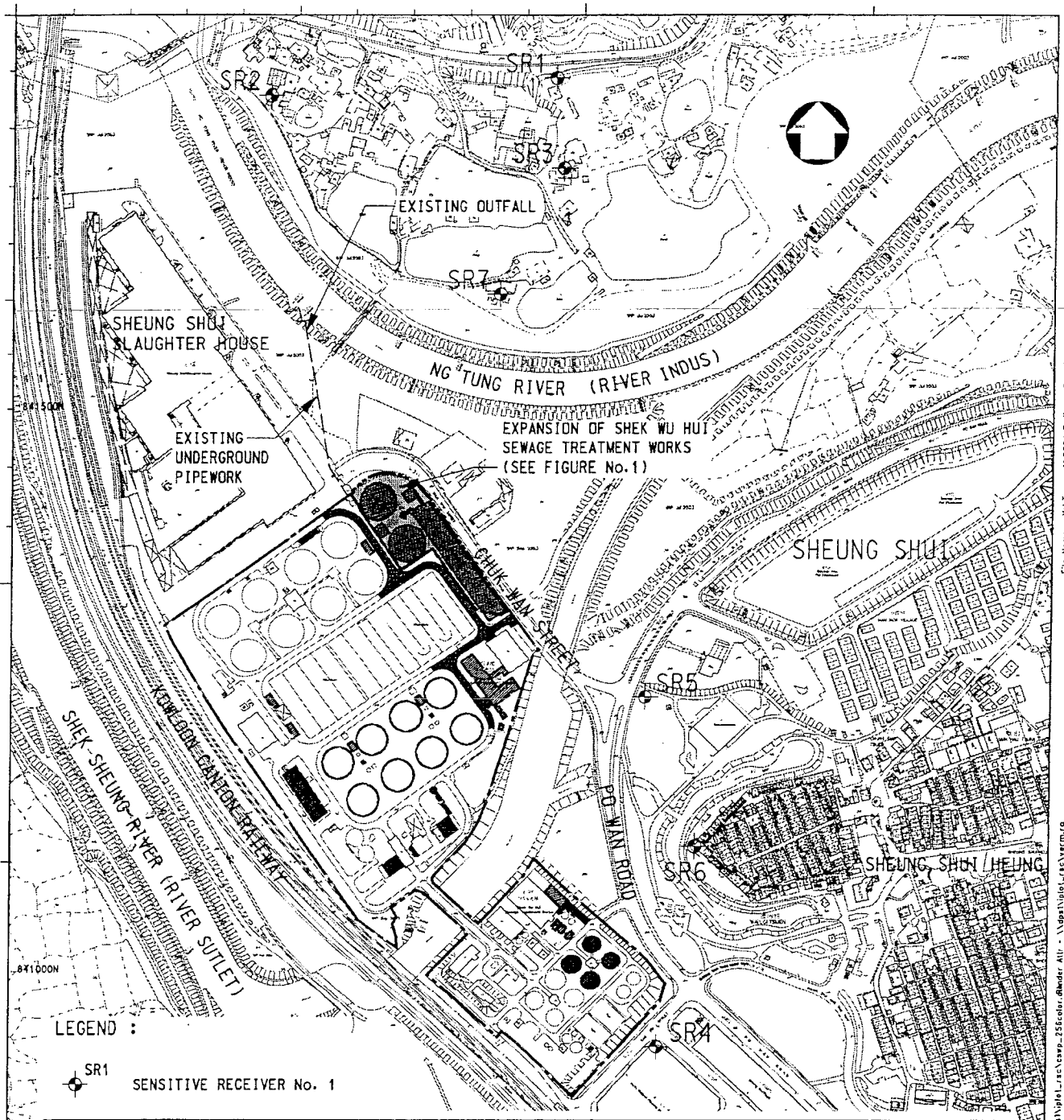
Site Layout of Work Areas, Sensitive Receivers,

Locations of Monitoring and Control Stations,

Action and Limited Levels and Event/ Action Plan

Shek Wu Hui STW – Expansion E&M Works
EM&A Site Inspection – March - May 2008
Site Layout





EXISTING SENSITIVE RECEIVERS		TYPE OF USE	TYPE OF SENSITIVE RECEIVERS (ASR / NSR)
SR1	ANCESTOR OF LIU TEMPLE (TAK YEUNG TONG)	WORSHIP	ASR & NSR
SR2	FU TEI AU TSUEN	RESIDENTIAL	ASR & NSR
SR3	FU TEI AU TSUEN	RESIDENTIAL	ASR & NSR
SR4	WAREHOUSE / TRADING AREA	INDUSTRIAL	ASR ONLY
SR5	SHEUNG SHUI HEUNG SITTING-OUT AREA AND BASKETBALL COURT	RECREATIONAL OPEN SPACE	ASR ONLY
SR6	WAI LOI TSUEN	RESIDENTIAL	ASR & NSR
SR7	TEMPORARY DOMESTIC STRUCTURE	RESIDENTIAL	ASR & NSR

NOTE : THERE ARE NO PLANNED SENSITIVE RECEIVERS IN THE VICINITY OF SHEK WU HUI SEWAGE TREATMENT WORKS.

Figure Title

EXPANSION OF SHEK WU HUI
SEWAGE TREATMENT WORKS

LOCATION PLAN OF
SENSITIVE RECEIVERS

Figure No. 2

Scale 1:5 000

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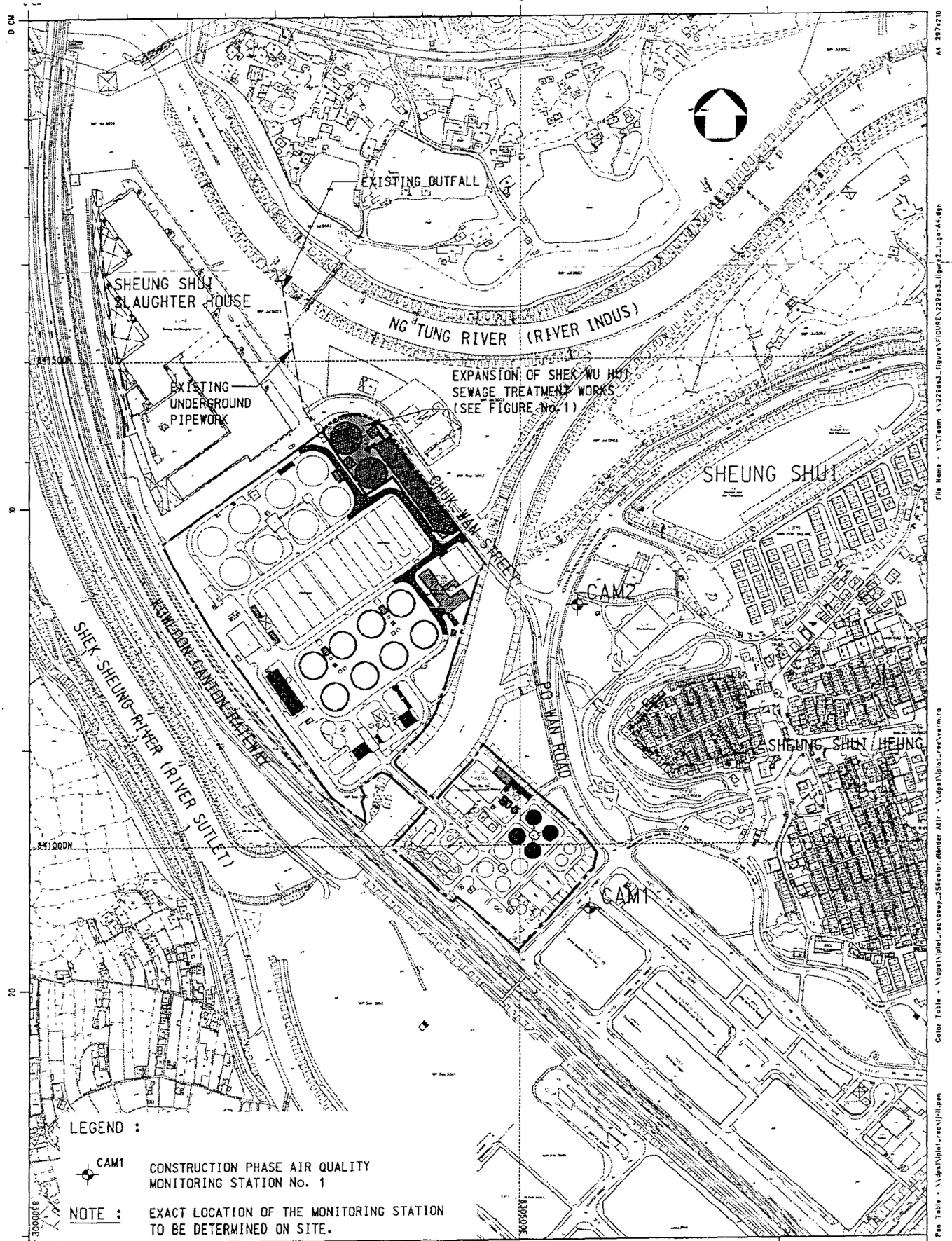

Figure Title

EXPANSION OF SHEK WU HUI
SEWAGE TREATMENT WORKS

LOCATION PLAN OF PROPOSED AIR QUALITY MONITORING STATION FOR CONSTRUCTION PHASE

Figure No. 2.1

Scale 1:5 000

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olfactory senses to detect any odour.

2.6.9 The observer should bring along a log book to record the findings. The log book should be kept in the plant office where it can be inspected when necessary. The findings should include the following:

- the prevailing weather condition;
- the wind direction;
- location where odour is spotted;
- possible source of odour;
- perceived intensity of the odour; and
- duration of odour.

2.6.10 The perceived intensity is to be divided into 5 levels which are ranked in the descending order as follows:

- Extreme
- Strong
- Moderate
- Slight
- Not detectable

2.7 Compliance Assessment

2.7.1 Action and Limit (A/L) levels that provide an appropriate framework for the interpretation of monitoring results have to be agreed between ET, IEC, EPD and the Engineer before commencement of the air quality monitoring. The air quality monitoring data shall be checked against the agreed A/L levels. Recommended A/L levels are listed in **Table 2.5**.

Table 2.5 Proposed Action and Limit Levels for Impact Monitoring

Parameter	Action Level (1)	Limit Level
TSP (24 hour average)	• BL ≤ 200 g m^{-3}, AL = (BL * 1.3 + LL)/2 • BL > 200 g m^{-3}, AL = LL	260 g m^{-3}
TSP (1 hour average)	• BL ≤ 384 g m^{-3}, AL = (BL * 1.3 + LL)/2 • BL > 384 g m^{-3}, AL = LL	500 g m^{-3}
H_2S (at ASRs only)	• BL ≤ 1.92 ppb, AL = (BL * 1.3 + LL)/2 • BL > 1.92 ppb, AL = LL	2.5 ppb
Incidence of odour complaints	Any incidence of odour complaint received through the Odour Complaint Register	Two or more complaints through the Odour Complaint Register within three months

(1) BL = Baseline level, AL = Action level, LL = Limit level.

Event and Action Plan (EAP) for Air Quality

2.7.2 The EAP is based on the prescription of procedures and actions associated with the measurement of certain defined levels of air pollution recorded by the environmental monitoring process and the agreed A/L levels. In case TSP A/L level exceedances occur, the ET, the IEC, the Engineer and the Contractor shall observe the relevant actions of the respective EAP listed in **Tables 2.6** whereas relevant sections in DSD shall be responsible for the implementation of the EAP as listed in **Table 2.7** in the event of odour exceedance/complaint for construction and operational phase respectively.

Table 2.6 Event/Action Plan for Air Quality Monitoring (Construction Phase)

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial actions to IEC within three working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform Contractor, IEC, ER, and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 6. 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 exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 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 and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 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. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

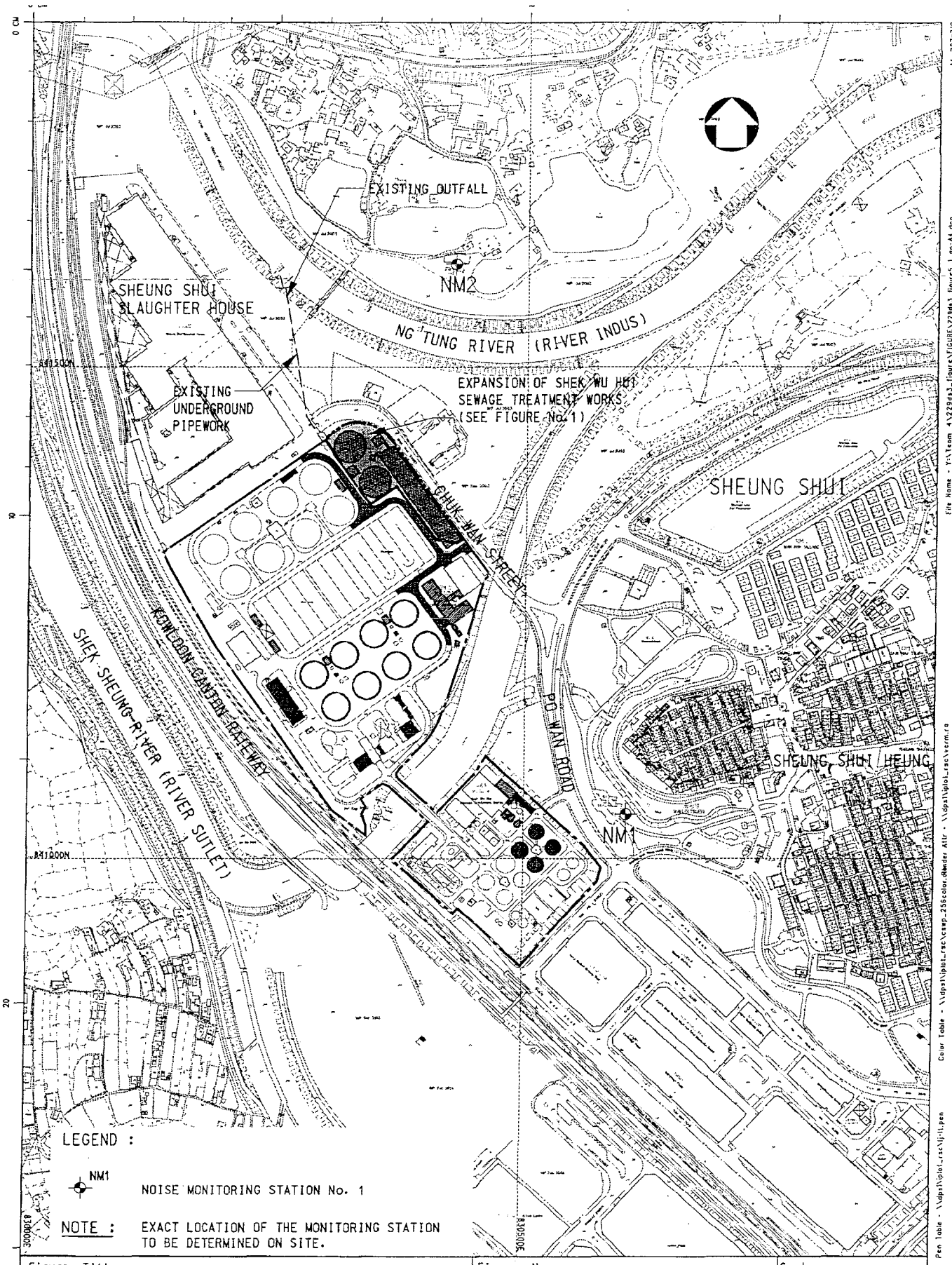

Figure Title

EXPANSION OF SHEK WU HUI
SEWAGE TREATMENT WORKS

LOCATION PLAN OF PROPOSED NOISE
MONITORING STATION (CONSTRUCTION PHASE ONLY)

Figure No. 5.1

Scale 1:5 000

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5.6 Impact Monitoring for Construction Noise

5.6.1 Noise monitoring shall be carried out at all designated monitoring stations. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station on a weekly basis when noise generating activities are underway:

- one set of measurements between 0700 and 1900 hours on normal weekdays.

5.6.2 If construction works are extended to include works during the hours of 1900 - 0700. Applicable permits under NCO shall be obtained by the Contractor.

5.6.3 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 5.3**, shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

5.6.4 Before commencement of impact monitoring, the ET Leader shall inform IEC of the impact monitoring programme such that the IEC can conduct an on-site audit to ensure the accuracy of the monitoring results.

5.7 Event and Action Plan (EAP) for Construction Noise

5.7.1 The Action and Limit levels for construction noise are defined in **Table 5.2**. Shall non-compliance of the criteria occur, action in accordance with the Action Plan in **Table 5.3** shall be implemented.

Table 5.2 Action and Limit Levels for Construction Noise

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

Table 5.3 Event/Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC and ER; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency to check mitigation effectiveness; 5. Carry out 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 effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 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. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Appendix 6

Deficiency Investigations Reports

(Not Applicable)

Appendix 7

Complaint Reports

(Not Applicable)

Appendix 8

Summons and Prosecutions Records

(Not Applicable)