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TEST REPORT

DRAINAGE SERVICES DEPARTMENT

**NGONG PING SEWAGE TREATMENT PLANT,
TRUNK SEWERS AND EFFLUENT EXPORT
PIPELINE
OPERATION PHASE
ANNUAL REPORT
FOR
GROUND WATER MONITORING
(FROM APRIL 2007 TO MARCH 2008)**

Prepared by:

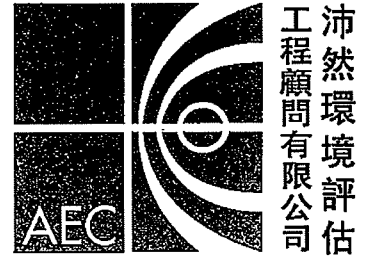
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Our Ref: 840/08-0015

13th May 2008

By POST and FAX (2827 8526)

Drainage Services Department
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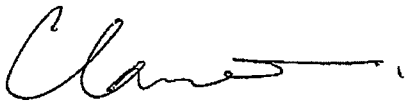
Attn: Mr. Ringo Mok

Dear Sir,

**Re: Ngong Ping Sewerage Project
Annual Report of Groundwater Monitoring at Ngong Ping STW and Effluent
Export Pipe (April 2007 – March 2008)**

I refer to the Environmental Permit (EP-157/2003) and the email from the environmental monitoring team, ETS-Testconsult Limited with the report, dated 28 April 2008 for the captioned. I do not have further comment and have verified the captioned report.

Yours sincerely,



Claudine Lee
Independent Environmental Checker

CL/ys

Cc. OAP – Mr. T N Chan (By Email)
ETS-Testconsult – Ms Linda Law (By Email and Fax: 2695 3944)



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EXECUTIVE SUMMARY

This annual report has been prepared by the Environmental Team (ET) of ETS-Testconsult Ltd for groundwater monitoring under the operation phase of "Ngong Ping Sewage Treatment Plant, Trunk Sewers and Effluent Export Pipeline" (the Project) during the reporting period from 01 April 2007 to 31 March 2008.

Under the requirements of Section 5 of "the Environmental Permit (No. EP-157/2003/A)" (the EP), EM&A programme as set out in the EM&A Manual and the EIA Report (Register No.: AEIAR-065/2002) is required to be implemented. In accordance with the EM&A manual and the EIA Report, groundwater monitoring is required for the Project.

Environmental Monitoring Progress

The summary of the monitoring activities during the monitoring period is listed below:

- *Groundwater Monitoring: 12 Occasions at 9 designated locations*

Groundwater Monitoring

The working principle of the ground water monitoring borehole is that if there is leakage, the effluent will find its way from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the nearest borehole. If underground water table is above the effluent export pipeline, ground water inside the borehole will be contaminated by the treated effluent. If underground water table is below the effluent export pipeline, the borehole will be partially filled with the treated effluent. Laboratory tests on the water samples taken from the boreholes will be able to reveal if there is any leakage of treated effluent.

The results of all testing parameters during the monitoring period show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground.

Environmental Complaints

No complaints were received in this monitoring period.

Notification of summons and successful prosecutions

There were no notification of summons and prosecutions with respect to environmental issues in the monitoring period.



1.0 INTRODUCTION

The construction works of Ngong Ping Sewage Treatment Works (NPSTW) was certificated completed on 09 March 2006 and the NPSTW was handed over to "Drainage Services Department" (DSD) for operation and maintenance from 10 March 2006. "ETS-Testconsult Limited" (ETL) has been commissioned as Environmental Team (ET) to carry out groundwater monitoring at Ngong Ping according to the EM&A Manual.

This annual report presents the results of groundwater monitoring during the reporting period from 01 April 2007 to 31 March 2008.

2.0 PROJECT INFORMATION

2.1 Background

Master Plan (OI SMP) Study in December 1994 and drew up a SMP for Lantau Island, Cheung Chau, Lamma Island, Peng Chau and other smaller and less populated islands. The SMP comprises provisions for upgrading and expanding the sewerage systems to cover unsewered areas.

This sewerage project is the Stage 1 works under the OI SMP and can be divided into 3 packages as follows:

Package 1 – Ngong Ping STW with tertiary treatment

Package 2 – Ngong Ping main trunk sewer and effluent export pipeline

Package 3 – Ngong Ping village sewerage system

This Project only covers the operation phase of Package 1 and Package 2. The general layout plan of the project is shown in Appendix D (Drawing No. 23400/EN/098).

The existing treatment facilities at Ngong Ping include grease traps and septic tanks, with discharge locally to soakaways. Following the opening of the Statue of Buddha in December 1993, the number of visitors to Ngong Ping increased significantly. Besides, the Cable Car system linking Tung Chung and Ngong Ping was being planned for commissioning in June 2006. It will certainly further increase the number of visitors in Ngong Ping. The existing treatment and disposal facilities were found to be inadequate, with significant quantities of sewage being directly discharged into the local stream. It was under this setting that the recommendation to provide a local sewerage system and a centralised treatment system for Ngong Ping was put forward in the OI SMP in 1994.

The Project was planned, designed, operated and maintained by the DSD. During the operation phase of NPSTW, DSD will follow the environmental monitoring recommendation stated at the M&A Manual that was prepared with reference to the EIA Report (Register No.: AEIAR-065/2002) to avoid the contamination of the water gathering ground.

2.2 Site Description

The general layout plan of the project is shown in Appendix D. The groundwater monitoring locations are also shown in the Drawing No. 23400/T/202, 23400/T/074, 23400/T/075 and 23400/T/076.

2.3 Project Organization and Management Structure

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

2.4 Contact Details of Key Personnel

The key personnel contact names and telephone numbers, and construction programme are shown in table 2.1.



Table 2.1 Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel. No.	Fax No.
DSD	Contractor	Mr. P C Wu	2594 7199	2827 6657
Allied Environmental Consultants Limited	Independent Environmental Checker	Ms. Claudine Lee	2815 7028	2815 5399
ETL	Contractor's Environmental Team	Mr. C L Lau (ET Leader)	2946 7791	2695 3944

3.0 GROUNDWATER QUALITY MONITORING

3.1 Monitoring Locations

Groundwater quality monitoring was undertaken at nine designated boreholes shown in Tables 3.1.

Table 3.1 Locations of Groundwater Quality Monitoring (April 07 to July 07)

Monitoring Period	April 07 to July 07
Sampling Point	Location
WM1	Keung Shan Road (L/P FA0463)
WM2	Keung Shan Road (L/P FA0458)
WM3	Keung Shan Road (L/P FA0445)
WM4	Keung Shan Road (L/P FA0437)
WM5	Keung Shan Road (L/P FA0428)
WM6	Ngong Ping STP
WM7	Ngong Ping STP
WM8	Ngong Ping STP
WM9	Ngong Ping STP
Monitoring Period	August 07 to Mar 08
Sampling Point	Location
WM3	Keung Shan Road (L/P FA0445)
WM3a	Keung Shan Road (L/P FA0445)
WM6	Ngong Ping STP
WM7	Ngong Ping STP
WM7a	Ngong Ping STP
WM9	Ngong Ping STP
WM10	Ngong Ping Village
WM11	Ngong Ping Village
WM12	Ngong Ping Village

3.2 Monitoring Parameters

Monitoring of the groundwater monitoring parameters are listed below:



- Biochemical Oxygen Demand (BOD₅), mg/L;
- Ammonia Nitrogen (NH₄⁺-N), mg/L;
- Nitrate + Nitrite Nitrogen (NO₂⁻+NO₃⁻), mg/L;
- pH value;
- Turbidity, NTU;
- Oil & Grease (O&G), mg/L;
- Total Phosphates (TP), mg/L;
- Synthetic detergents, mg/L;
- E-coli, cfu/100ml.

3.3 Monitoring Frequency

The monitoring frequency of the groundwater monitoring is summarized in Table 3.3.

Table 3.3 The frequency of the Groundwater Monitoring

Parameter	Frequency	No. of Boreholes
Biochemical Oxygen Demand	Once per month	9
Ammonia Nitrogen		
Nitrate + Nitrite		
pH value		
Turbidity		
Oil & Grease		
Total Phosphates		
Synthetic detergents		
E-coli		

3.4 Monitoring Methodology and Equipment Used

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

The sample container, made by high-density polythene / glass, was rinsed with a portion of the water sample. The groundwater sample was then transferred to the container, labeled with a unique sample ID and sealed with a screw cap. The water samples were stored in a cool box maintained at 4°C. The groundwater samples were then delivered to a local HOKLAS-accredited laboratory (Environmental Laboratory, ETS-Testconsult Ltd, HOKLAS Registration No. 022) on the same day for analysis.

The summary of testing methods of testing parameters as recommended by EIA or required by EPD were shown in Table 3.4.

Table 3.4 Summary of testing procedures

Laboratory Analysis	Testing Procedure	Detection Limit
Biochemical Oxygen Demand	In house method TPE/001/W or BS 6068 : Section 2.14 : 1990	2.0 mg/L
Ammoniacal Nitrogen	In house method TPE/016/W, refer to APHA 19ed 4500-NH ₃ F & G	0.13 mg/L
Nitrate + Nitrite	In house method TPE/023/W, refer to APHA 19ed 4500-NO ₃ B	0.004 mg/L
pH (at 25°C)	In house method TPE/003/W, refer to APHA 19ed APHA 4500-H ⁺ B	Detection range: 4.0-10.0
Turbidity	In house method TPE/005/W, refer to APHA 19ed 2130B	0.5 NTU
Oil & Grease	APHA 19ed 5520 B	5.0 m/L
Total Phosphate	In house method base on ASTM D 515-88	0.05 mg/L
Synthetic detergents	In house method based on APHA 19ed 5540 C & D	0.1 mg/L
E-coli	DoE Section 7.8 & 7.9 plus in-site urease test	<1 cfu/100ml



3.5 Groundwater Monitoring Results

During this reporting year, groundwater monitoring was carried out at the designated manholes once per month. The groundwater quality measurement results during the monitoring period are detailed in Appendix B. Graphical presentation of the monitoring parameters for this reporting month is shown in Appendix C.

The results of all testing parameters during the monitoring period show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground.

Apart from this, the testing results were found satisfactory and no contamination of groundwater due to the leakage from the NPSTP and Effluent Export Pipeline was detected.

4.0 ENVIRONMENTAL NON-CONFORMANCE

4.1 Summary of Groundwater Quality Monitoring

The results of all testing parameters during the monitoring period show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground.

4.2 Summary of Environmental Complaints

No complaints were received in the monitoring period.

4.3 Summary of Notification of Summons and Prosecution

There was no notification of summons respect to environmental issues registered in the monitoring period.

5.0 IMPLEMENTATION STATUS

5.1 Implementation Status of Environmental Mitigation Measures

DSD has been implementing the required environmental mitigation measures indicating in Clause 4.5.20 of the EM&A manual.

5.2 Implementation Status of Environmental Complaint Handling

No complaints were received in the monitoring period. The details of the complaint-log are presented in Table 5.1.



Table 5.1 Statistical Summary of Environmental Complaints

Reporting Month	Complaint Statistics			
	Frequency	Cumulative	Aspect	Investigation Results and Follow up Actions
April 07	0	0	---	---
May 07	0	0	---	---
June 07	0	0	---	---
July 07	0	0	---	---
Aug 07	0	0	---	---
Sept 07	0	0	---	---
Oct 07	0	0	---	---
Nov 07	0	0	---	---
Dec 07	0	0	---	---
Jan 08	0	0	---	---
Feb 08	0	0	---	---
Mar 08	0	0	---	---

5.3 Implementation Status of Notification of Summons and Prosecution

There were no notifications of summons respect to environmental issues registered in this monitoring period.

6.0 CONCLUSION

The results of all testing parameters during the monitoring period show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground

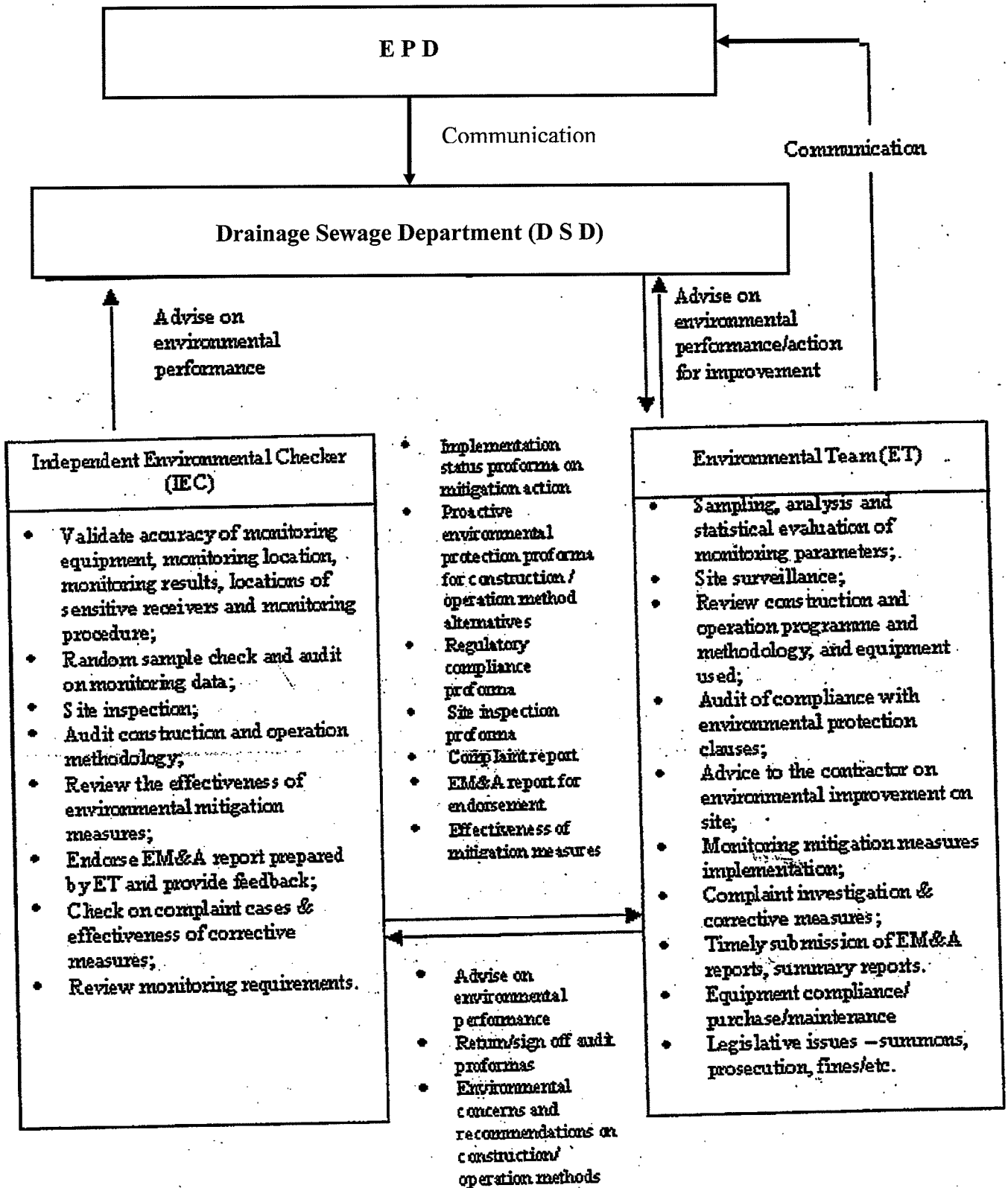
7.0 FUTURE KEY ISSUES

Based on the satisfactory ground water monitoring results, DSD will formulate and seek the Independent Environmental Checker (IEC)'s verification on the proposed way to taking forward the implementation of the EM&A requirements in future.



Appendix A

Lines of Communication





東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Appendix B

Groundwater Monitoring Results

Biochemical Oxygen Demand (mg/L)	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			8.2											
10/05/2007			8.7											
20/06/2007			7.8											
10/07/2007			5.1											
23/08/2007			6.4											
14/09/2007			4.9											
25/10/2007			<2.0											
23/11/2007			2.0											
30/11/2007			<2.0									5.0	3.1	<2.0
18/12/2007			2.4	2.2					2.3			3.4	3.2	2.1
23/01/2008			<2.0	2.4			2.1	3.9	2.9			4.2	2.9	15.0
21/02/2008			<2.0	<2.0			2.1	3.0				3.2	2.7	3.5
28/03/2008			<2.0	<2.0			3.2	13.0	10.0			3.6		12.0

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.

(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

pH value (at 25°C)	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			6.2											
10/05/2007			6.1											
20/06/2007			5.8											
10/07/2007			5.7											
23/08/2007			5.6											
14/09/2007			5.9											
25/10/2007			6											
23/11/2007			6											
30/11/2007				6.7										
18/12/2007			6.1	6.8					7.1					
23/01/2008			6.4	6.9			6.4	6.6	7.7					
21/02/2008			6.1	6.5			6.6	5.9						
28/03/2008			5.9	6.7			6.6	6.1	7.1					

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.

(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

Turbidity (NTU)	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			13											
10/05/2007			12											
20/06/2007			29											
10/07/2007			35											
23/08/2007			14											
14/09/2007			13											
25/10/2007			2.5											
23/11/2007			25											
30/11/2007				0.8										
18/12/2007			9.4	0.9					8.9					
23/01/2008			59	2.4			55	340	4.2					
21/02/2008			39	0.8			62	45						
28/03/2008			27	2.1			34	430	5.6					

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.

(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

Synthetic Detergents (mg/L) Date	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			<0.1											
10/05/2007			<0.1											
20/06/2007			<0.1											
10/07/2007			0.2											
23/08/2007			<0.1											
14/09/2007			<0.1											
25/10/2007			<0.1											
23/11/2007			<0.1	<0.1								<0.1	<0.1	<0.1
18/12/2007			<0.1	<0.1					<0.4			<0.1	<0.1	<0.1
23/01/2008			<0.1	<0.1			<0.1	0.2	0.3			<0.1	<0.1	<0.1
21/02/2008			<0.1	<0.1			<0.1	0.1	0.1			<0.1	<0.1	<0.1
28/03/2008			<0.1	<0.1			0.1	<0.1	<0.1			<0.1	<0.1	<0.1

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.
(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

Nitrate & Nitrite Nitrogen (mg/L) Date	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			0.41											
10/05/2007			0.46											
20/06/2007			<0.1											
10/07/2007			0.19											
23/08/2007			0.27											
14/09/2007			0.34											
25/10/2007			0.23											
23/11/2007			<0.04											
30/11/2007			0.06											
18/12/2007			0.15	0.056					<0.04			0.16	0.33	1.0
23/01/2008			0.14	0.04			1.6	0.6	0.14			<0.04	0.72	1.4
21/02/2008			0.23	<0.1			1.9	0.31				<0.04	<0.1	<0.004
28/03/2008			0.42	0.25			1.3	0.41	0.85			0.11	<0.1	<0.04

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.
(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

Ammonia Nitrogen (mg/L) Date	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			<0.025											
10/05/2007			0.087											
20/06/2007			<0.025											
10/07/2007			0.033											
23/08/2007			<0.025											
14/09/2007			0.033											
25/10/2007			0.2											
23/11/2007			<0.025											
30/11/2007			<0.025	<0.025										
18/12/2007			<0.025	<0.025					0.21			0.3	<0.025	<0.025
23/01/2008			<0.25	<0.25			<0.25	3.3	<0.25			<0.25	0.29	<0.25
21/02/2008			<0.025	<0.025			<0.025	<0.025	<0.25			<0.025	<0.25	<0.025
28/03/2008			<0.25	<0.25			<0.25	2.4	<0.25			<0.25	<0.25	<0.25

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.
(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

Total Phosphates (mg/L) Date	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			<0.1											
10/05/2007			0.03											
20/06/2007			<0.05											
10/07/2007			<0.05											
23/08/2007			<0.05											
14/09/2007			<0.1											
25/10/2007			<0.1											
23/11/2007			0.04											
30/11/2007			<0.1	1										
18/12/2007			<0.1	<0.1										
23/01/2008			<0.1	<0.1										
21/02/2008			0.27	0.33										
28/03/2008			0.21	0.17										

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.
(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

Oil & Grease (mg/L) Date	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			<5.0											
10/05/2007			<5.0											
20/06/2007			<5.0											
10/07/2007			<5.0											
23/08/2007			<5.0											
14/09/2007			<5.0											
25/10/2007			<5.0											
23/11/2007			<5.0											
30/11/2007			<5.0	<5.0										
18/12/2007			<5.0	<5.0										
23/01/2008			<5.0	<5.0										
21/02/2008			<5.0	<5.0										
28/03/2008			<5.0	<5.0										

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.
(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

E-coli (cfu/102ml) Date	Sampling Point													
	WM1	WM2	WM3	WM3a	WM4	WM5	WM6	WM7	WM7a	WM8	WM9	WM10	WM11	WM12
12/04/2007			7											
10/05/2007			<1											
20/06/2007			6											
10/07/2007			<1											
23/08/2007			4											
14/09/2007			10											
25/10/2007			1											
23/11/2007			<1											
30/11/2007			<1	1										
18/12/2007			<1	9										
23/01/2008			<1	4										
21/02/2008			<1	<1										
28/03/2008			21	34										

Remark: (a) From April 07 to July 07, groundwater monitoring was carried out at WM1, WM2, WM3, WM4, WM5, WM6, WM7, WM8 and WM9.
(b) From August 07 to Mar 08, groundwater monitoring was carried out at WM3, WM3a, WM6, WM7, WM7a, WM9, WM10, WM11 and WM12.

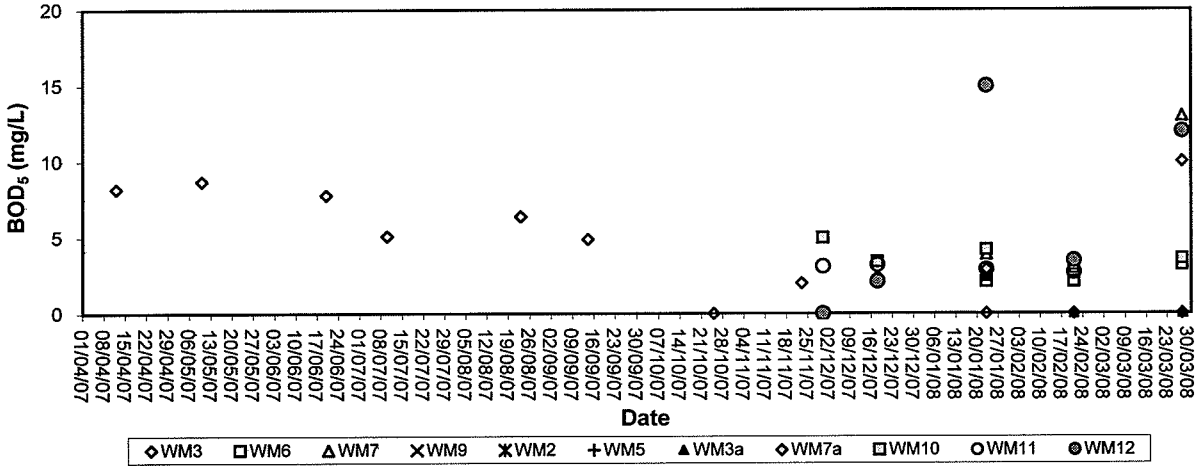


Appendix C

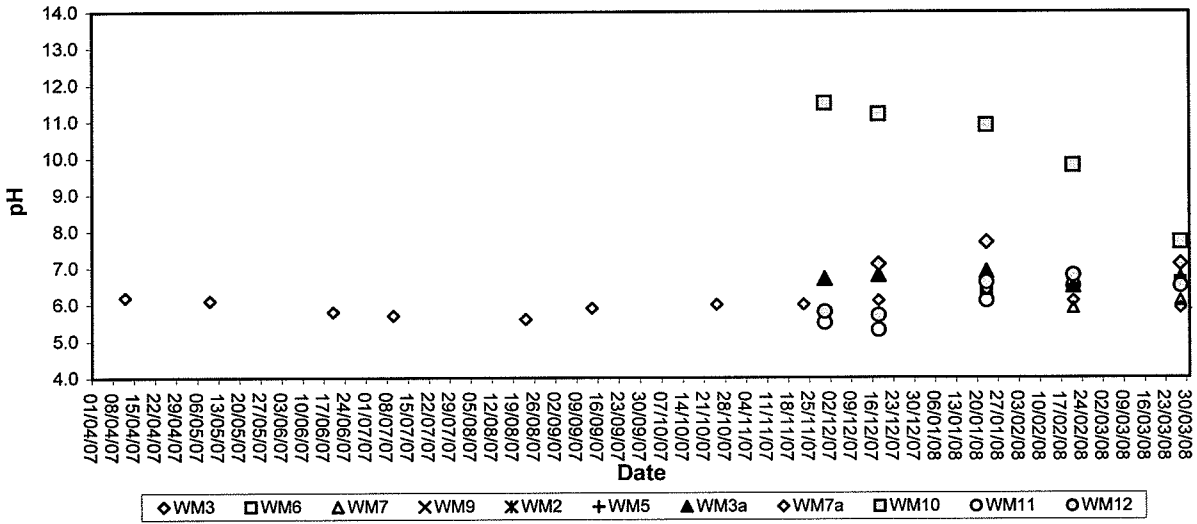
Graphical Plots of Groundwater Monitoring Data



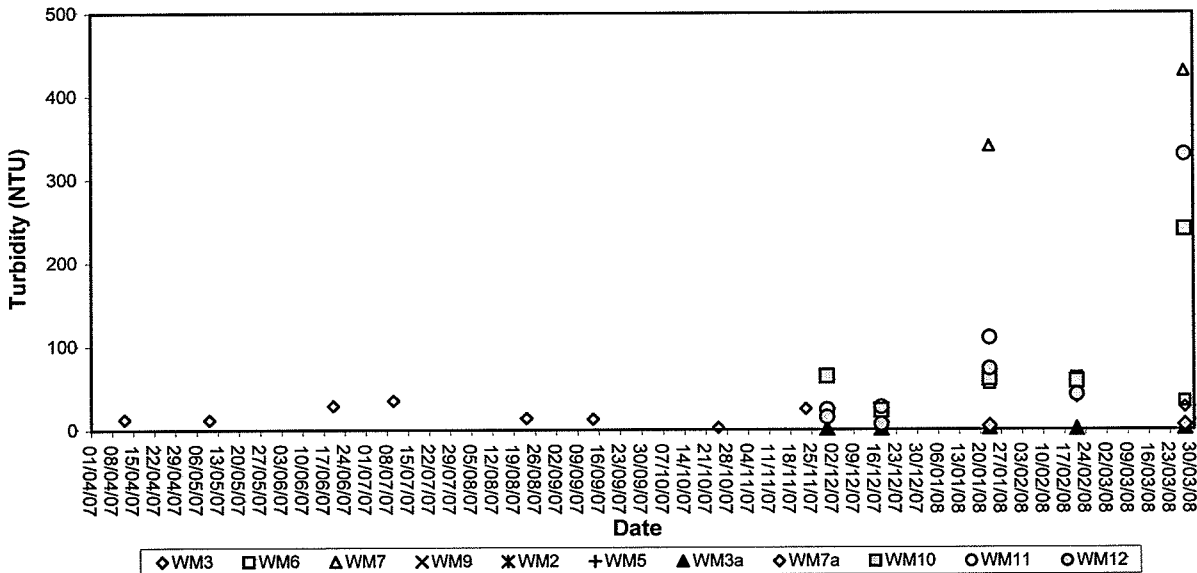
5-day Biochemical Oxygen Demand (BOD₅)



pH Value



Turbidity

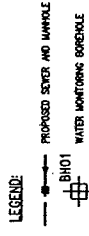




Appendix D

General Layout Plan

NOTE:
EXACT LOCATIONS OF GROUND WATER MONITORING BOREHOLES ARE
SUBJECT TO CONFIRMATION ON SITE.



Rev	Description	By	Date
A	TENDER ISSUE	TNC	07/05

Comments

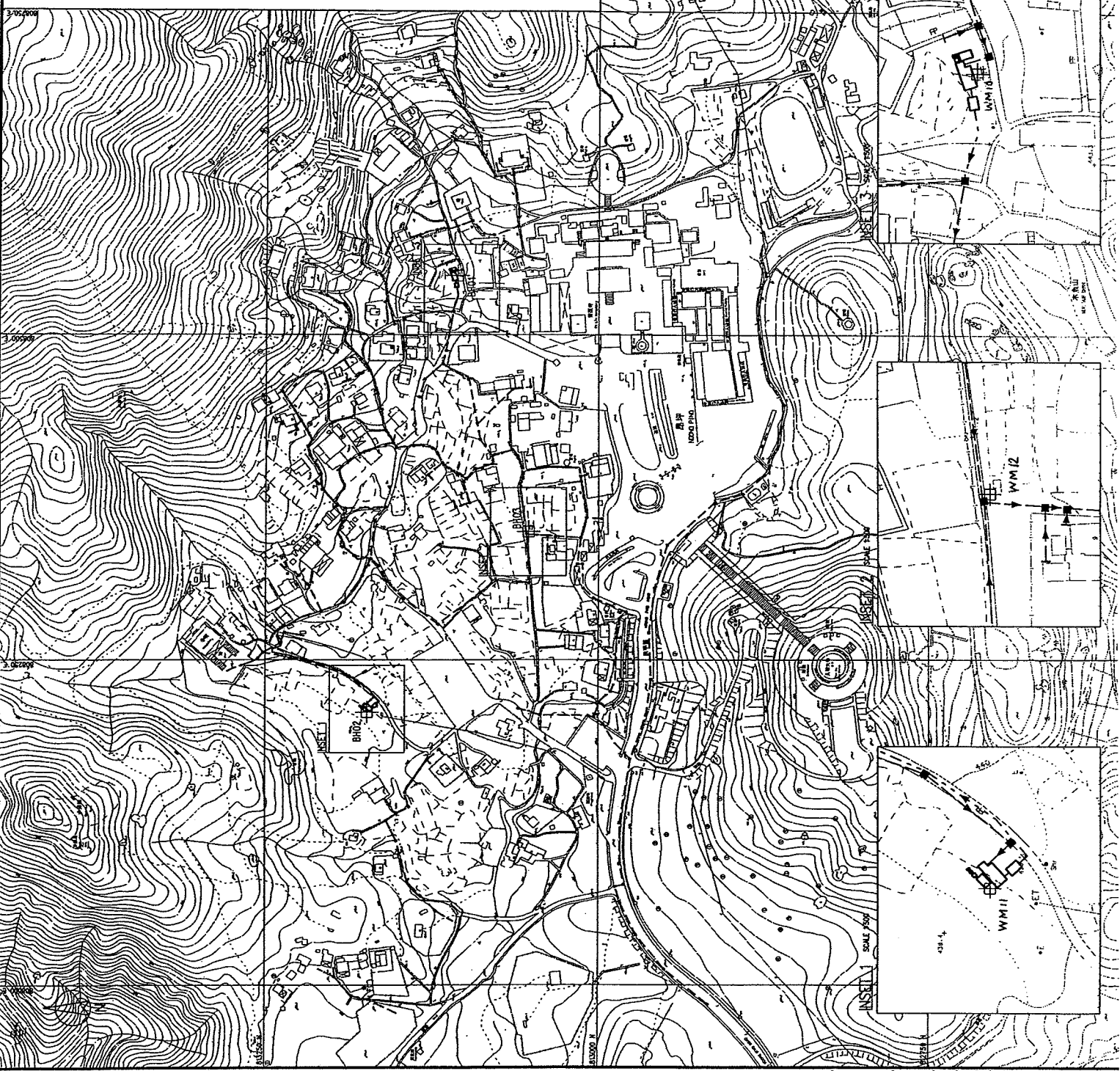
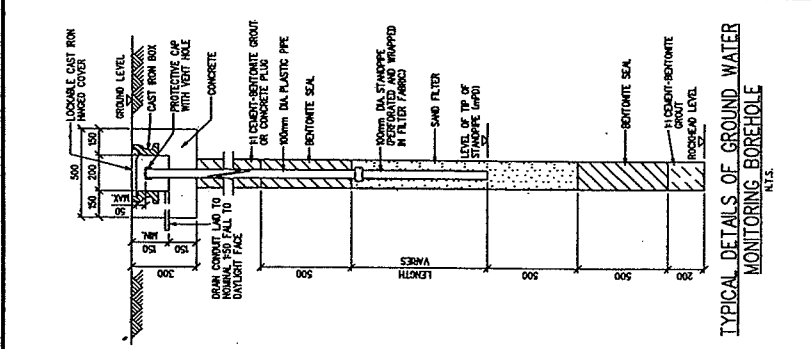
ARUP
One Arup & Parkside Hong Kong Limited

Project Site
CONTRACT NO. DC/2006/05
NGONG PING VILLAGE SEWERAGE

Drawing Title
LOCATION & TYPICAL DETAILS OF
GROUND WATER MONITORING BOREHOLE

Drawing No.	23400RVS/406	Rev.	A
Client	AMSS	Checked	TNC
Scale	AS SHOWN	Drawn	YJW
Author	YJW	Series	TENDER
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GOVERNMENT OF THE
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SPECIAL ADMINISTRATIVE REGION





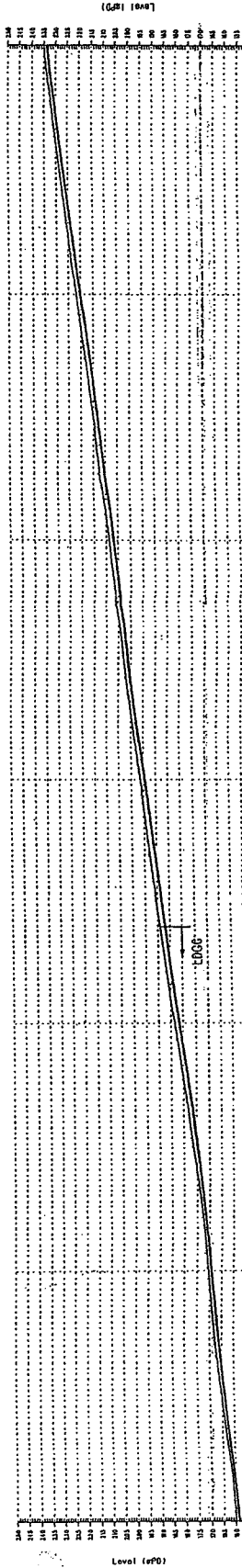
Figures

LEGENDS :

- EFFLUENT PIPELINE ALIGNMENT
- EXISTING GROUND LEVEL
- EFFLUENT PIPELINE PROFILE
- HATCHBOX CHAMBER
- GATE VALVES CHAMBER
- △ VENTILATION PIPE CHAMBER
- 0.25 BENDS

NOTE:

1. REFER TO DRAWING NO. 23400/0707 FOR CHECK NOTES.
2. USE 1:1000 SCALE FOR ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.
3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
4. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
6. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
7. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.



STATIONING (m)	PROPOSED INVERT LEVEL (m)	EXISTING GND. LEVEL (m)	CHAMBER (A)
0+00	248.50	248.50	
0+05	249.00	249.00	
0+10	249.50	249.50	
0+15	250.00	250.00	
0+20	250.50	250.50	
0+25	251.00	251.00	
0+30	251.50	251.50	
0+35	252.00	252.00	
0+40	252.50	252.50	
0+45	253.00	253.00	
0+50	253.50	253.50	
0+55	253.50	253.50	
0+60	253.50	253.50	
0+65	253.50	253.50	
0+70	253.50	253.50	
0+75	253.50	253.50	
0+80	253.50	253.50	
0+85	253.50	253.50	
0+90	253.50	253.50	
0+95	253.50	253.50	
0+100	253.50	253.50	

VERTICAL PROFILE

TWIN DN200

LCS TYPE 1

ARUP
On King & Palmer Hong Kong Limited

Project Unit
CONTRACT NO. DC/0003/01
NGONG PING SEWAGE TREATMENT PLANT, TRUNK SEWERS AND EFFLUENT EXPORT PIPELINE

Issue For Construction B/C 06/03
Rev Description By Date

Drawing No. 23400/07074
Drawing Title
EFFLUENT EXPORT PIPELINE ALIGNMENT AND PROFILE (SHEET 6 OF 10)

Scale
Drawing Unit
Sheet No. 6 of 10
Drawing Date
Drawing By
Drawing Check
Drawing Date

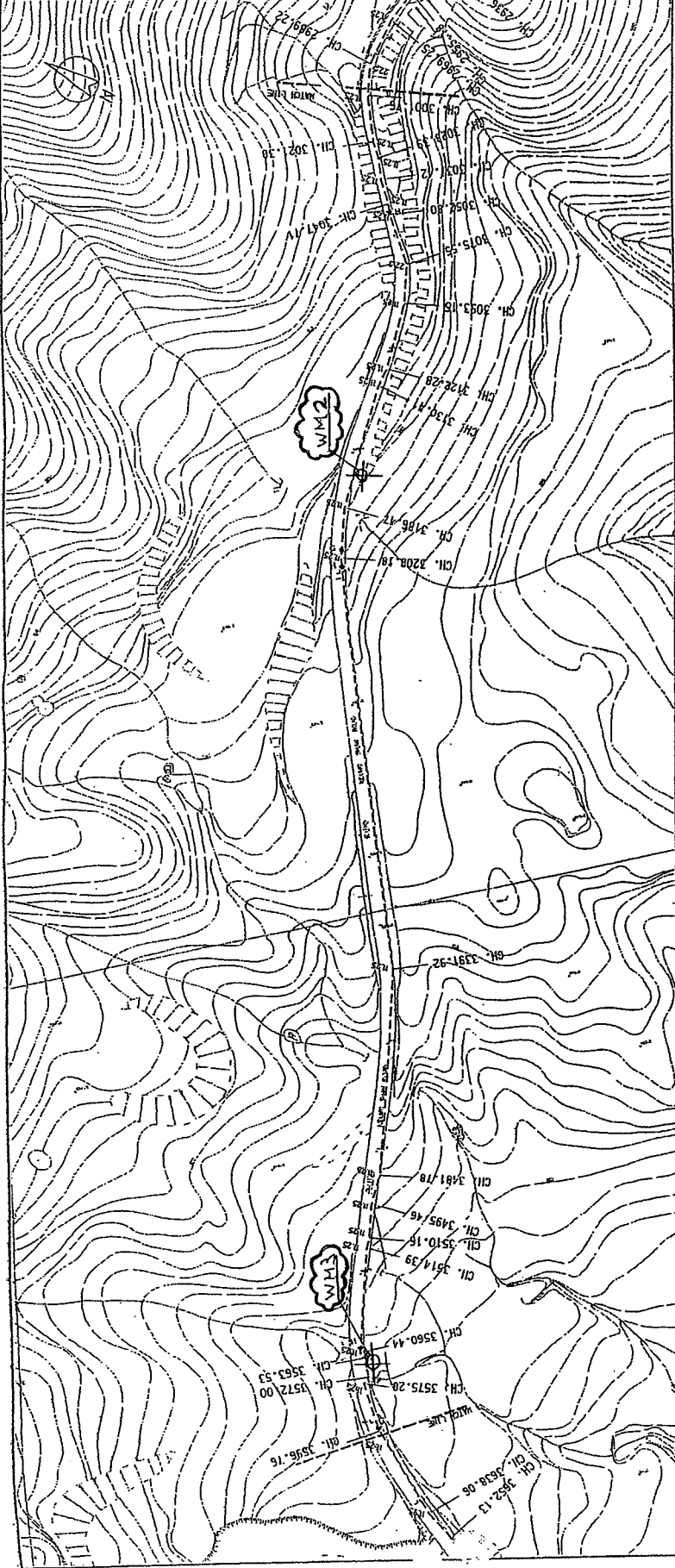
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DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

LEGENDS :

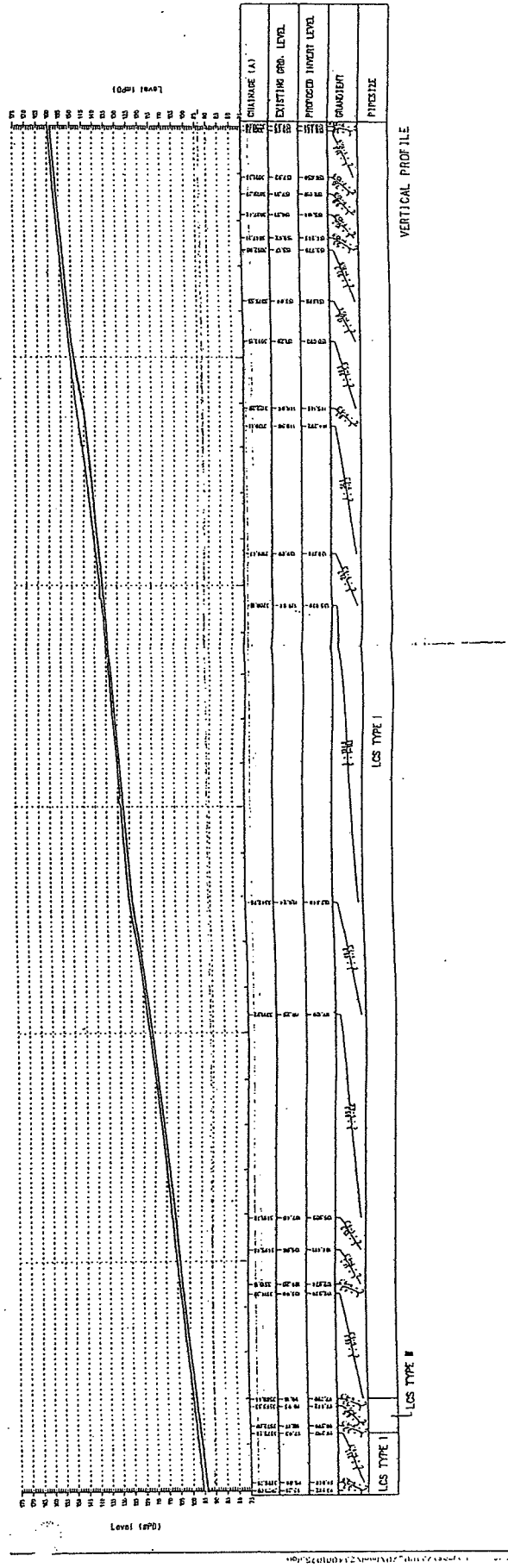
- EFFLUENT PIPELINE ALIGNMENT
- EXISTING GROUND LEVEL
- EFFLUENT PIPELINE PROFILE
- H HATCHBOX CHAMBER
- G GATE VALVES CHAMBER
- △ V VENTILATION PIPE CHAMBER
- 1:35 SLOPE

NOTE:

1. REFER TO DRAWING NO. DC/2003/01 FOR GENERAL NOTES
2. USE 1:25 SCALE FOR ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED
3. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED
4. REFER DRAWING NO. DC/2003/01 FOR THE DETAILS OF BENT VALVE CHAMBER
5. REFER DRAWING NO. DC/2003/01 FOR THE DETAILS OF GATE VALVE CHAMBER
6. REFER DRAWING NO. DC/2003/01 FOR THE DETAILS OF VENTILATION PIPE CHAMBER
7. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED
8. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED
9. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED
10. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED
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18. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED
19. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED
20. EXISTING GROUND LEVELS ARE TO BE OBTAINED FROM THE SURVEY DATA PROVIDED



ISSUE FOR CONSTRUCTION	DTC	06/03	
Rev / Description	By:	Date	
Comments			
ARUP <small>One Hong Kong Road, Hong Kong</small>			
Project Title			
CONTRACT NO. DC/2003/01 NGONG PING SEWAGE TREATMENT PLANT, TRUNK SEWERS AND EFFLUENT EXPORT PIPELINE			
Drawing Title			
EFFLUENT EXPORT PIPELINE: ALIGNMENT AND PROFILE (SHEET 6 OF 10)			
Drawing No. 23-00077075			
Scale			
Author			
Checked			
Approved			
Drawn			
Scale			
Sheet			
Volume			
Copyright Reserved			

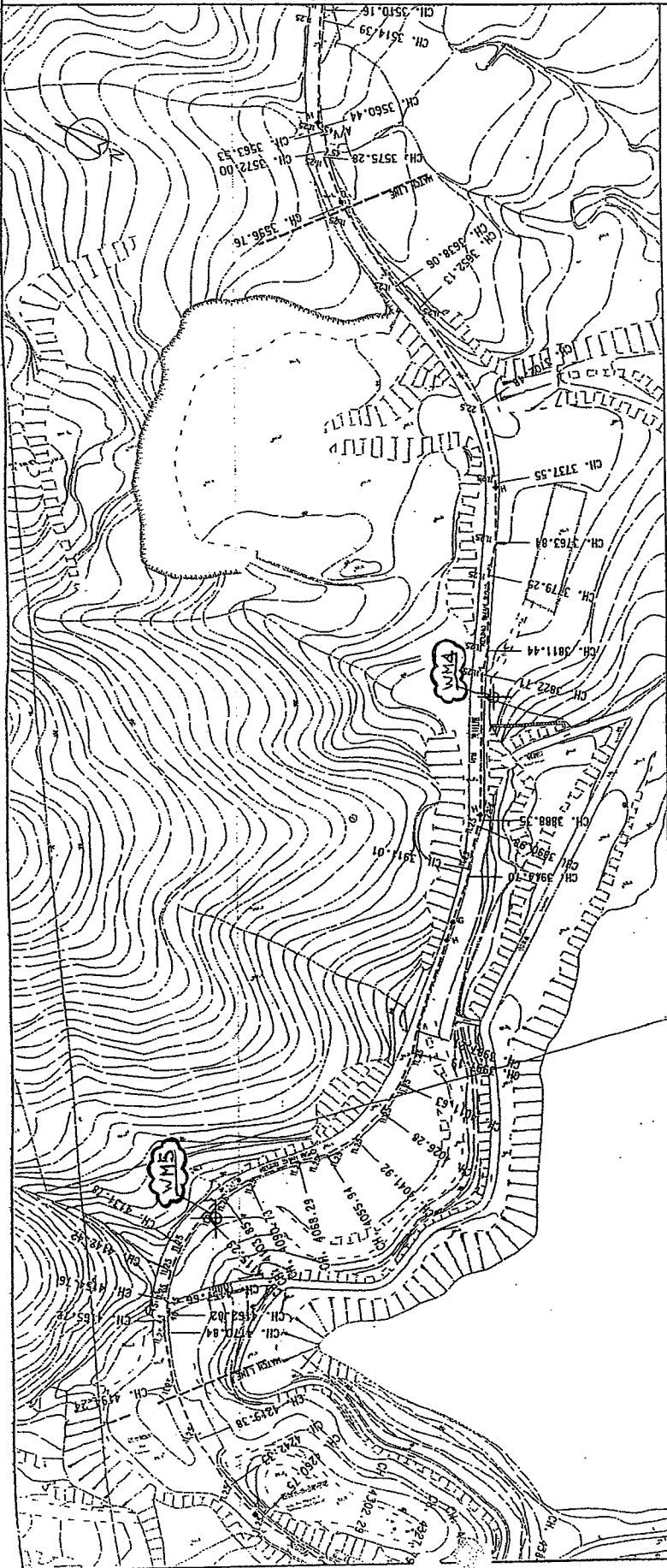


LEGENDS :

- EFFLUENT PIPELINE ALIGNMENT
- EXISTING GROUND LEVEL
- EFFLUENT PIPELINE PROFILE
- ⊕ HATCHBOX CHAMBER
- ⊙ GATE VALVE CHAMBER
- ⊕ VENTILATION PIPE CHAMBER
- 11.25 BENDS

NOTE:

1. REFER TO DRAWING NO. DRAINAGE/TRAFFIC/ROADS/10/21
2. REFER TO LOCAL COLLECTION STRUCTURES. LOCAL PIPES CROSSING ROAD.
3. REFER TO LOCAL COLLECTION STRUCTURES. LOCAL PIPES CROSSING ROAD.
4. REFER TO LOCAL COLLECTION STRUCTURES. LOCAL PIPES CROSSING ROAD.
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19. REFER TO LOCAL COLLECTION STRUCTURES. LOCAL PIPES CROSSING ROAD.
20. REFER TO LOCAL COLLECTION STRUCTURES. LOCAL PIPES CROSSING ROAD.



ISSUE FOR CONSTRUCTION	DATE	08/03
Rev	Description	By
Comments		

ARUP Overseas & Pacific Hong Kong Limited

Project Title
CONTRACT NO. DC200301
NGONG PING SEWAGE TREATMENT
PLANT, TRUNK SEWERS AND
EFFLUENT EXPORT PIPELINE

Drawing Title
EFFLUENT EXPORT PIPELINE:
ALIGNMENT AND PROFILE
(SHEET 7 OF 10)

Drawing No. **23-0007078**

Scale: 1" = 100'

DATE: 08/03

BY: [Signature]

CHECKED BY: [Signature]

APPROVED BY: [Signature]

PROJECT NO. [Blank]

DATE: [Blank]

BY: [Blank]

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PROJECT NO. [Blank]

DATE: [Blank]

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PROJECT NO. [Blank]

DATE: [Blank]

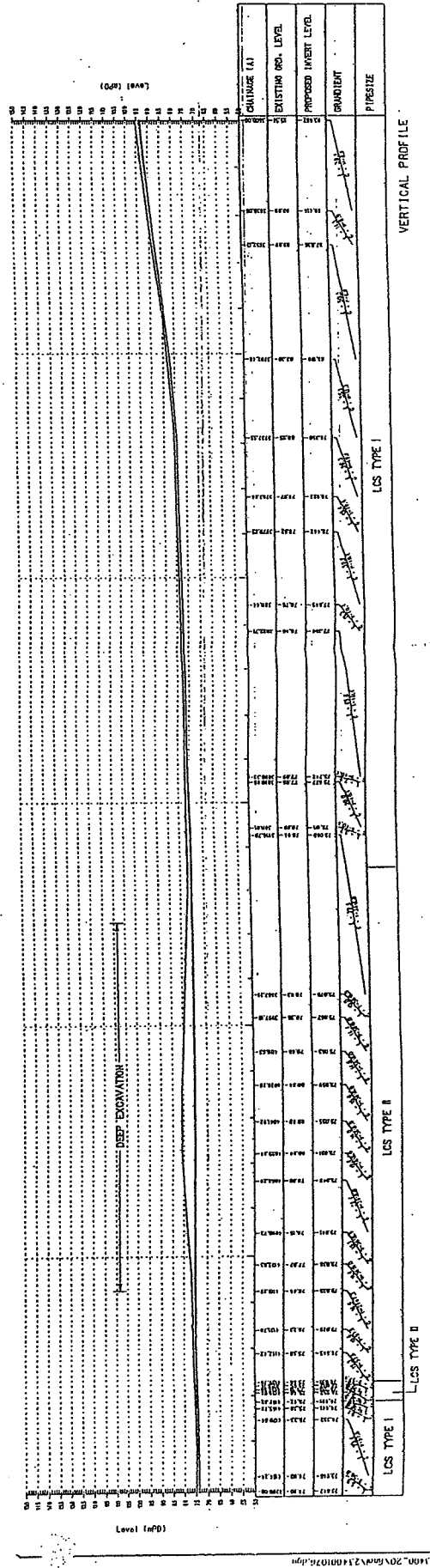
BY: [Blank]

CHECKED BY: [Blank]

APPROVED BY: [Blank]

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 GOVERNMENT OF THE
 HONG KONG
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Vertical Profile

LCS TYPE I

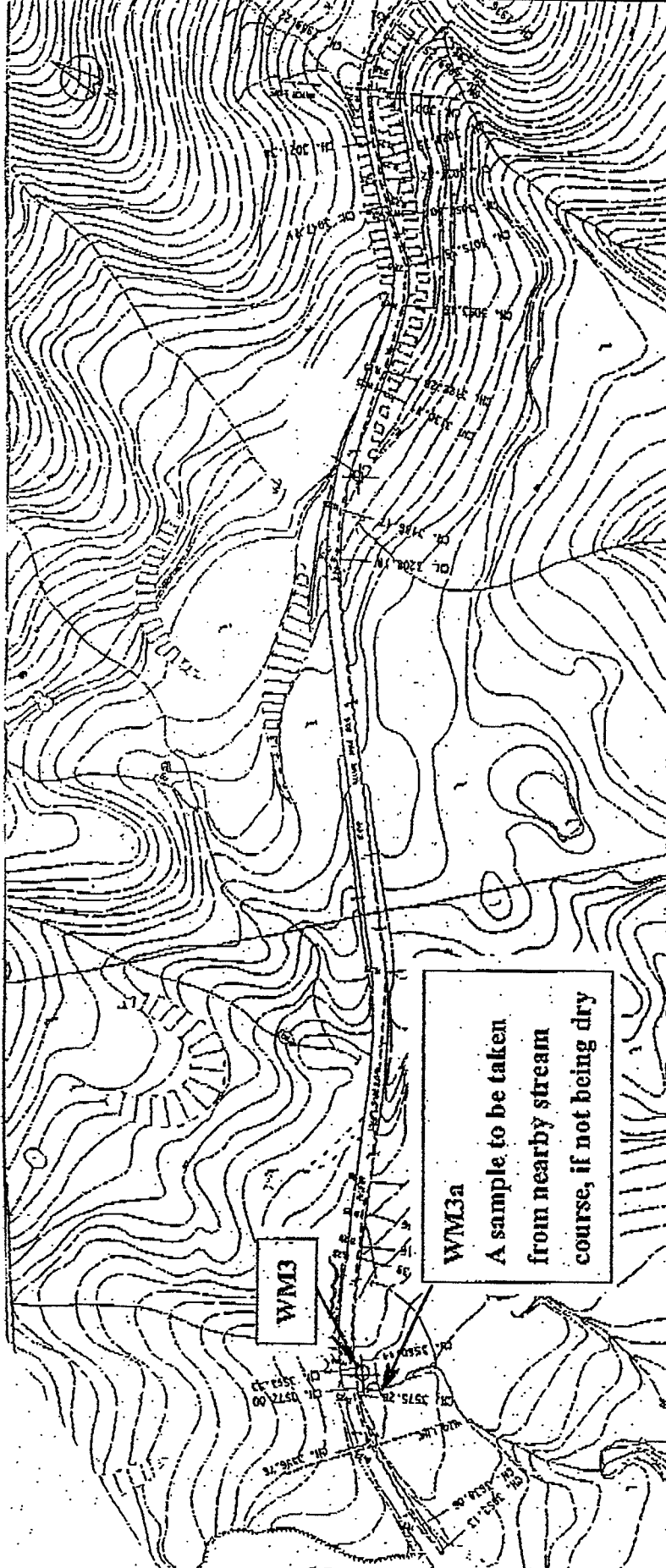
LCS TYPE II

LEGEND:

- EXISTING CHAN.
- EFFLUENT PIPELINE
- MANHOLE CHAMBER
- RAISE VALVES CHAMBER
- VENTILATION PIPE CHAMBER
- 1:12' SLOPES

NOTES:

1. ALL WORK TO BE ACCORDING TO THE SPECIFICATIONS AND CONTRACT DOCUMENTS.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
 3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AND UTILITIES AT ALL TIMES.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES AND STRUCTURES.
 5. THE CONTRACTOR SHALL MAINTAIN THE PROPOSED ALIGNMENT AND PROFILE AT ALL TIMES.
 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ADJACENT PROPERTIES AND UTILITIES.
 7. THE CONTRACTOR SHALL MAINTAIN THE PROPOSED ALIGNMENT AND PROFILE AT ALL TIMES.



ARUP Civil Engineering

CONTRACT NO. DC000301
 TROBING PING SEWAGE TREATMENT PLANT, TRUNK SEWERS AND EFFLUENT EXPORT PIPELINE

PROJECT NO. 22-00000005

EFFLUENT EXPORT PIPELINE: ALIGNMENT AND PROFILE (SHEET 6 OF 10)

DATE: 20/08/2015

BY: [Signature]

FOR: [Signature]

